

# REHABILITATION STUDY REPORT

## State Bridge Program

State Project No. 137-164  
Bridge No. 03906 in Stonington  
Alpha Avenue over Amtrak and Local Roads

### *Prepared For:*

State of Connecticut  
Department of Transportation  
Newington, Connecticut



*Submitted:* April 2022



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## ALTERNATE COMPARISONS

Design Consideration	Alternate 1 Pier Cap Rehabilitation, Pier 4 Replacement and Girder Strengthening	Alternate 2 Pier Replacement and Girder Strengthening	Alternate 3 Pier Replacement, Girder Strengthening and Deck Patching	Alternate 4 Bridge Replacement with Removal of 6 Spans	Importance*
Bridge Structure Condition & Load Carrying Capacity	Acceptable Condition. Meets capacity & safety standards	Good Condition. Meets capacity & safety standards	Good Condition. Meets capacity & safety standards	Very Good Condition. Meets capacity & safety standards	High
Initial Cost	\$7.5M (Least Expensive)	\$8.6M	\$13.3	\$25.5M (Most Expensive)	High
Life Cycle Cost (Present Value/Value over 75 years)	\$53.5M/\$68.9M	\$84.9M/\$124.3M	\$88.0M/\$127.2M	\$27.1/\$27.8M	High
Service Life	15-20 years	15-20 years	50 years	75 years	High
Future Maintenance	Moderate	Minor	Minor	Minimal	High
Private Property Impacts	Minimal	Moderate	Moderate	Significant Impacts	High
Impacts to Traffic	Minimal	Minimal	Moderate	Significant	High
Railroad Impacts	Minor	Minor	Moderate	Significant	High
Construction Duration	8 Months	12 Months	12 Months	12 Months	Medium
Impacts to Roadway Network	None	None	None	Significant	Medium
Abides by CGS RR under clearance Requirements	Yes (Existing Maintained)	Yes (Existing Maintained)	Yes (Existing Maintained)	Yes (Standard Achieved)	Medium
Vertical Under Clearance/ Standards met?	18.5'/No	18.5'/No	18.5'/No	22.5'/Yes	Medium
Utility Impacts	None	None	None	Permanent Relocation	Low
Accommodation of Future Under Bridge Utilities	Feasible for small diameter	Feasible for small diameter	Feasible for small diameter	Challenging due to shallower beams & MSE Grids in Approaches	Low
*Design Consideration's level of importance for determining recommended alternate	Green = Best Alternate				
	Yellow = Less Desirable				
	Red = Least Desirable				

*Approved Repair Code*

Recommended Primary Repair Code

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## EXECUTIVE SUMMARY

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### Scope of Rehabilitation Work

Based upon the inspection and evaluation of Bridge No. 03906, CHA recommends **Alternate 3** - consisting of the following:

- Replacement of all piers with reinforced concrete piers using the existing foundations.
- Replacement of all bearings including those at the ship lap joint.
- Adding additional lateral bracing in Span 8 to increase the load rating.
- Repairs to the structural steel and painting of beam ends at deck joints.
- Installation of shield between the catenary wires and the beams.
- Removal of the existing bituminous overlay and membrane.
- Patching of the concrete deck, sidewalks and parapet.
- Placing of a new spray applied memberane and bituminous overlay.
- Replacement of the deck joints.
- Substructure concrete patching.
- Repairs to the existing protective fence.
- Replacement of parapet
- Replacement of the guiderail on the approach roadways to a system that meets MASH standards.

Reasons for the recommended rehabilitation work:

- The riveted built-up steel pier caps are in poor condition.
- Other portions of the steel bents have deterioration and will require continued maintenance.
- Reusing the pier foundations will minimize impacts to areas below the bridge and Amtrak and the foundations are in good condition.
- Insufficient lateral bracing of the beams in Span 8 at the depth transition cause a rating factor below 1.0.
- The beams and cross frames have minor deterioration.
- There is evidence of electrical arcing from the catenary wires to the steel beams above.
- Steel bearings require continued maintenance.
- Past photos show map cracking in the bituminous overlay, there is evidence of efflorescence at the longitudinal stage construction deck joint.
- The existing deck joint over Pier 4 has deterioration.
- The existing abutments and wingwalls have some concrete deterioration.
- The protective fence has damage.
- The approach guiderails are substandard.



## Maintenance and Protection of Traffic

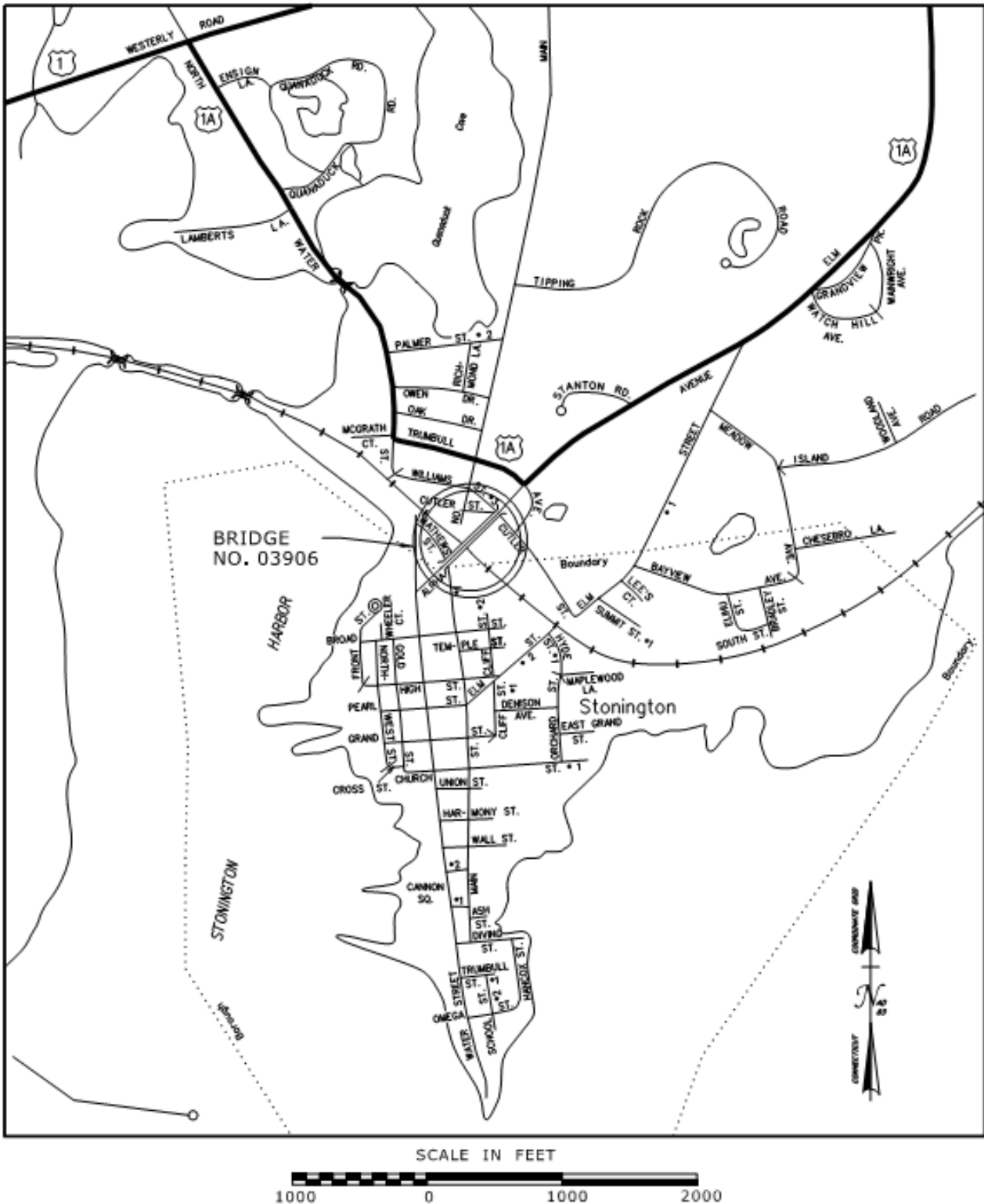
The proposed maintenance and protection of traffic primarily includes temporary off-peak lane and shoulder closures on Alpha Avenue. Alternating 1-way traffic will be required during these closures. Temporary closures to the sidewalks will also be required. Minimal impacts will be required to traffic on the local roads below the bridge. Off-peak track outages and catenary de-energization on the railroad will be required for work on Span 4 and are anticipated to only be available during overnight periods.

## Notable Facts

Estimated Construction Cost:	\$ 13,305,000
Estimated Construction Duration:	12 months
ROW Involvement:	Temporary Construction Easements, Possible Lease Termination
Utilities Impacted:	None anticipated
Permits Required:	CTDOT FMC- <del>MOU</del>
Design Exceptions:	Minimum vertical clearance for Railroad and Local Roads
Sufficiency Rating:	56.8%
Load Rating after Repairs:	HL-93
	CTDOT Legal & Permit Vehicles
2017 ADT:	4,810 (3% Truck Traffic)

Based on the current scope,  
the project is not required to  
complete the CTDOT MS4  
Designer's Worksheet

## LOCATION MAP



## INTRODUCTION

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CHA Consulting, Inc., (CHA) has been retained by the Connecticut Department of Transportation (CTDOT) to perform the rehabilitation evaluation for this bridge as part of the State Bridge Program.

This report describes the findings of a comprehensive evaluation of this bridge which includes a review of existing plans, Bridge Safety Routine Inspection Report dated January 19<sup>th</sup>, 2020 and site visits conducted by CHA and presents our recommendations for rehabilitation to ensure its structural and functional adequacy, as well as extend its service life.

## DESCRIPTION

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### General

Bridge No. 03906 is an eight span structure that carries Alpha Avenue over Amtrak Railroad and two local roadways in the town of Stonington, Connecticut. Alpha Avenue across the bridge provides the only vehicular access to the Borough of Stonington as there are no other crossings of Amtrak at the borough and the other sides of the borough are surrounded by water. The bridge was originally constructed in 1940 under State Project No. 137-025 and underwent a rehabilitation with deck replacement in 1990 under State Project No. 137-132. The bridge is located approximately 0.8 miles southeast of the intersection of US Route 1 and US Route 1A and carries one lane of traffic in the northbound and southbound directions along with shoulders within a curb-to-curb roadway width of 34'-0". 6-foot-wide sidewalks exist on both sides of the bridge with granite stone curbing used on the bridge and approaches of Alpha Avenue. Existing bridge Span 1 is 90 feet long, Spans 2 through 4 are 70 feet long, and Spans 5 through 8 are 80 feet long. The overall structure length is 625'-0" and the bridge has a 0-degree skew. Two electrified Amtrak Railroad tracks are located under Span 4 of the bridge. Mathews Street/Main Street and Cutler Street are under Spans 1 and 8, respectively. The remaining spans have relatively flat unpaved areas below them which are being used by the abutting property owners. Alpha Avenue crosses the bridge from the southwest to the northeast. To be consistent with the Bridge Inspection Report, the southernmost abutment will be referred to as Abutment 1 and the northernmost abutment will be referred to as Abutment 2.

The bridge superstructure consists of nine rolled steel I-beams with varying depths that carry an 8" thick reinforced concrete deck topped with a 2.5" thick bituminous concrete wearing surface on woven glass membrane waterproofing fabric. The beams are continuous over Spans 1 through 4 and Spans 5 through 8 with the only deck joint over Pier 4. Thermal expansion is accommodated by a ship lap joint over Pier 4 where the upper beam of the ship lap is supported by a rocker bearing resting on the lower beam. There is a modular joint between the deck ends over Pier 4. There are fixed pin bearings at both abutments so that horizontal movement is prevented at these locations. There are asphaltic plug joints at the deck ends at both abutments.

The bridge superstructure is supported by concrete abutments at either end of the approaches and seven riveted steel bent piers. The bents consist of three H-columns with cross bracing and steel pier caps. There are fixed pin bearings between each beam and the pier cap and between each H-column and the concrete footing. Thermal expansion of the superstructure is accommodated by tilting of the bents out of plumb.

Abutment 1 is supported by a pile foundation extending to bedrock, and Abutment 2 is supported by a spread footing on bedrock. The concrete foundations for Piers 1 and 2 are supported on pile foundations and Piers 3 through 7 are supported on directly bedrock. Straight wingwalls are used at 3 of the corners of the bridge, and there is one flared wingwall (wingwall 1B) located at the southeast corner, retaining the embankment fill behind

the abutments. There are stairways located behind wingwalls 1B and 2A which provide access to the bridge sidewalks from Mathews Street/Main Street and Cutler Street, respectively. 27" high reinforced concrete parapets and a vinyl coated chain link fence system is used on both side of the bridge adjacent to the 6-foot-wide sidewalks. Vertical plexiglass panels are used in front of the chain link fence, along with a curved top on span 4 over the railroad tracks. There are parapet buildouts for eight ornamental light standards on the bridge but two light standards are missing on the west parapet. An MBR railing system is used at both approaches of the bridge. There are no drainage features located on the bridge and catch basin systems are located at both sides of the approaches along Alpha Avenue. Photos of the bridge structure and approaches are contained in **Appendix A**, (refer to photos 1-4 and 31-32). The original 1940 construction plans, and 1990 rehabilitation plans for the bridge are attached as **Appendix B**. Sketches of the existing bridge plan, elevation and cross section are shown in **Appendix C**.

Is there any accident history for this project, specifically at Waters Street which may justify improving or eliminating existing sub-standard features (sight distance, sag curve values, design speed) that have been identified.

## Highway Geometrics

Alpha Avenue over Bridge No. 03906 has a functional classification of "Urban - Collector". The bridge is not on the National Highway System (NHS) and is not part of the Strategic Highway Network (STRAHNET). The proposed improvements featured in this project will adhere to the 3R Design Criteria specified in CTDOT Highway Design Manual (HDM) Section 2.3.0 (Figure 2-3H).

The roadway has a posted speed limit of 20 mph (southbound), with a sign located approximately 150 feet north of the bridge on Alpha Avenue. The northbound roadway approaching from the south and across the bridge is not posted. The Design Speed for the project site per Design Standards is determined using the 85<sup>th</sup> percentile speed in accordance with Figure 2-3H of CTDOT HDM. The 85<sup>th</sup> percentile speed data was obtained from CTDOT's Traffic Monitoring Data website which indicates an average 85<sup>th</sup> percentile speed of 30.8 mph. In accordance with Figure 2-4A of the HDM, a Proposed Design Speed of 30 mph was selected. The Design Speed of the existing roadway within the project site is less than 20 mph which is limited by the geometry of the sag vertical curve in the vicinity of Water Street.

The existing bridge accommodates a curb-to-curb roadway width of 34'-0", which matches the approach roadway width. The existing roadway width provides two travel lanes with approximately 12' lane widths with striped 5' shoulders. The 3R design criteria for a "Urban-Collector" contained in Figure 2-3H specifies a travel lane width ranging from 10' - 12' and shoulder width of 2' - 8' thereby requiring a minimum roadway width of 24'-0". However, Figure 2-7B specifies the minimum curb to curb width for Existing Bridges to Remain in Place to be a minimum of 28 feet or the approach traveled way width (24 feet) plus 4 feet (i.e., 28 feet) for an ADT greater than 4000 vehicles. Therefore, the minimum roadway width required to meet current State Standards is 28 feet. According to the Federal Highway Administration (FHWA) Coding Manual, a 34' wide roadway with an ADT of 2001 to 5000 has a Deck Geometry Rating Code of "5" which is somewhat better than minimum adequacy. Therefore, the existing 34' roadway width over the bridge meets the design width criteria set forth by CTDOT and is better than adequate according to FHWA.

The roadway horizontal alignment through the project site consists of a tangent beginning at the intersection with Water Street and continues north over the bridge. A large horizontal curve (R=4,583') begins just north of the bridge and continues through the intersection with Trumbull Avenue. This curve is much larger than the required radii of 295' for a normal cross slope and is well within the standards for Horizontal Stopping Sight Distance (200'). There is no superelevation with the project limits. The roadway crossing the bridge is located within the limits of a crest vertical curve (L=650') which is formed by tangent alignments on both approaches with grades of 5.6% for which is less than the standard maximum of 13%. This crest curve meets the standard requirements for K-Value

For rehab alternatives, can the shoulder slope be improved to meet minimum slope requirements?  
This feature may be a minor one but could result in less storm collection on the bridge.

(19) and Stopping Sight Distance (200') for the Design Speed. Sag vertical curves (L=147' & 66') begin approximately 100' and 200' from the bridge and end to the north and south of the bridge at the intersections with Trumbull Avenue and Water Street respectively. The sag curve to the north at Trumbull Street meets the standard requirements for K-value (37) and Stopping Sight Distance (200') for the Design Speed. The sag curve to the south at Water Street does not meet these standard values, having a K-Value of 9 and Stopping Sight Distance of 79'. In addition, this sag vertical curve length (66') does not meet the requirement of three times the design speed (3V) of 90'.

The standard cross slope for the travel lanes is 1.5% to 3%. The existing roadway through the project site consists of a normal crown with a cross slope of 2% for the lanes and the shoulders based on as-builts. Although cross slope for the lane is met, the shoulder cross slope does not meet the current standard of 4% - 6% for shoulder widths greater than or equal to 4' wide.

The clear zone requirement for this stretch of roadway is 14'. This clear zone requirement appears to be met as most of the edge of road is protected by guide rail or features which would constitute a hazard are beyond the clear zone distance.

Intersection Sight Distance (ISD) does not meet the standard criteria of 335' (passenger vehicle) at the intersections of Alpha Avenue with Water Street and Trumbull Avenue. Sight distance at the intersection of Alpha Avenue and Water Street is obstructed by trees along Alpha Avenue at the approach to Water Street. Additionally, Water Street NB traffic continuing north on Water Street may have obstructed by turning onto Alpha Avenue from Water Street. Sight distances for traffic approaching Alpha Avenue from the west is obstructed by trees on the NW corner. The roadway geometry of to the east creates challenges for vehicles traveling on Alpha Avenue to see vehicles approaching the intersection and as well as approaching vehicles will have difficulty seeing vehicles traveling on alpha Avenue. Has CTDOT coordinated with Amtrak? Are additional tracks below the bridge at some point in the future a consideration that should be included?

There are three local roads (Mathews Street/Main Street, Cutler Street & Cutler Place) and an Amtrak railroad beneath Bridge No. 03906. The minimum vertical clearance requirement for a local roadway beneath an existing bridge to remain in place is 14'-3". This requirement is not met as the measured vertical clearances for Mathews Street/Main Street (13'-5") and Cutler Street (14'-0") are below the minimum standard. Cutler Place meets Cutler Street at the north side of the bridge. The clearance at this location is shown as 15'5" in the latest inspection report. The minimum vertical clearance requirement for an "electrified" railroad beneath the bridge is 22'-6". This requirement is not met as the measured vertical clearance (18'-11") is below the minimum standard. The above measured minimum vertical clearances for the roadways and railroad were taken from the Fracture Critical and Routine Inspection report dated 1/19/2020.

Clear zones are also not met at Matthew Street or Cutler Place. The Highway Design Manual, Section 2-09.01.01.2 states "On urban and rural collectors and local roads where the 3R design speed is 45 mph and below, the minimum clear zone should be 10 ft." The northern most column for Pier 1 is located 2-feet from the edge of the existing pavement and a little less than 9-feet from the NB travel lane. Similarly, the northern most column of pier 7 is about 9'4" from the edge of pavement and travel lane for Cutler Place. The clear zone is also not met along the north side of Cutler place as the edge of the pavement and travel lane is slightly more than 4-feet from a hedge along long the property line.

As local streets in an urban area, accessibility requirements for disabled individuals should be met but are not part of the federal design requirements. No sidewalks are present at any of the streets making them substandard as they relate to accessibility requirements.

Is the current ADA routing acceptable, when considering park access, or are additional accommodations desirable.

The existing bridge rail system, comprising of 27 inch high reinforced concrete parapets with a 5-foot-high polyvinyl coated chain link fence meets current non-NHS bridge rail standards as the barrier is greater than 32" in height. The approach rail system, comprising of metal beam rail on steel posts at all approach corners does not meet current R-B MASH standards. The transitions also do not meet current safety standards as there is no rub-rail, and the approach guiderail ends also do not meet current standards as the end anchors are terminated within the clear zone.

## Traffic

According to the January 19<sup>th</sup>, 2020 Inspection Report, the estimated 2017 Average Daily Traffic (ADT) on the bridge was approximately 4,810 vehicles with 3% truck traffic. This traffic volume was used in the selection of design criteria since the most recent available data from 2020 was during the COVID epoch period (4,200 vpd) and likely lower than normal.

Commercial businesses, the Stonington Borough Fire Department, and residential neighborhoods are present on Mathews Street/Main Street which runs under span 1 near Abutment 1 of the bridge. Two Amtrak rail lines run under span 4 of the bridge. Residential properties and commercial businesses are also located on Cutler Street and Cutler Place which run under span 8 nearest to the Abutment 2 of the bridge.

## FIELD OBSERVATIONS

According to the Routine Inspection Report dated January 19<sup>th</sup>, 2020 and summarized below in Table 1, the bridge is considered to be in Poor condition based on the NBIS appraisal rating for the Substructure which is rated a "4". The Poor condition is a result of top flange and bottom flange deteriorations in critical locations of the existing steel pier caps. Based on the appraisal rating of "3" for bridge under clearances, the bridge vertical under clearance over the Amtrak Railway and local road (Cutler Street) does not meet current design standards and is intolerable. The Deck is rated a "7", Superstructure is rated a "5", and Approach Roadway Alignment is rated a "7". Site visits performed by CHA to observe the condition of the bridge elements confirm these condition ratings. A copy of the January 19<sup>th</sup>, 2020 inspection report is attached as **Appendix F**.

<b>TABLE 1</b>		
<b>BRIDGE INSPECTION REPORT RATING SUMMARY</b>		
<b>ITEM</b>	<b>CONDITION</b>	<b>RATING</b>
<b>Deck</b>	<b>Good</b>	<b>7</b>
Overlay (Bit. Concrete)	Good	7
Deck – Structure Condition (Reinforced Concrete Slab)	Good	7
Curbs	Good	7
Sidewalks	Satisfactory	6
Parapets	Satisfactory	6

Fence (Vinyl coated chain link)	Satisfactory	6
Drains	Satisfactory	6
Lighting Standard	Satisfactory	6
Construction Joints	Good	7
Expansion Joints	Satisfactory	6
<b>Superstructure</b>	<b>Fair</b>	<b>5</b>
Bearing Devices	Satisfactory	6
Girders (Rolled Steel)	Fair	5
Rivets & Bolts	Good	7
Welds - Cracks	Good	7
Collision Damage	Satisfactory	6
<b>Substructure</b>	<b>Poor</b>	<b>4</b>
Abutments (Stem & Backwall)	Good	7
Abutments (Wingwalls)	Good	7
Piers/Bents - Caps	Poor	4
Piers/Bents - Columns	Satisfactory	6
Footings (Abutments & Pier/Bents)	N	N
Piers/Bents - Settlement	Very Good	8
Collision Damage	Satisfactory	6
Erosion-Scour	Very Good	8
Under clearances	Intolerable	3
<b>Approach</b>	<b>Good</b>	<b>7</b>
*Guide Rail	Good	7
Pavement (Bit. Concrete)	Good	7
Embankment	Very Good	8
*Does not meet safety standards		

## Deck (Rating – Good)

The deck is rated to be in good condition based on deterioration observed on the underside of the concrete deck slab. The deck slab exhibits random transverse, longitudinal, and hairline map cracking with isolated rust areas. The bituminous concrete overlay is in good condition with random longitudinal, transverse, and diagonal cracks up to 3/16" wide. The report noted some of these cracks have been previously sealed. The sidewalks were noted to be in satisfactory condition, with random hairline cracks and random areas of sealant missing between the sidewalk and curbing noted. Span 6 exhibits random areas of scaling adjacent to the curbs up to 15' long, 8" wide, and 1" deep. The reinforced concrete parapets are in satisfactory condition, noting isolated areas of spalling, hairline map cracking, and an 18" long x 5" wide x 1.5" deep spall region of the span 4 east parapet showing



exposed rebar over track 1. The staircase parapets show areas of hairline map cracking and isolated areas of spalling. The staircase at the northwest approach is noted to have a 4.5' long x 1' high hollow areas along the south staircase parapet. The vinyl coated chain link fence is in satisfactory condition, noting 4 locations showing disconnected top and bottom horizontal rails. Additionally, a recent repair to the fence posts was noted since the last inspection. The bridge PVC weep drains which are intended to directly discharge below the bridge are in satisfactory condition. The report notes typical dampness on the underside of the deck around the weep drain outlets, and a few locations where previously short weeps have been extended to prevent drainage onto the diaphragms. There are six light standards mounted on top of the parapets of the bridge and two standards at the approaches. The span 3 west parapet light standard and light standard at the north east approach is missing per the latest inspection report and field observations performed by CHA. The deck construction joints are in good condition, with report noting the transverse and longitudinal joints in bay 5 have areas of minor overpour and light to moderate efflorescence. There are asphaltic plug joints at both abutments, and a modular joint with concrete headers over pier 4 that are noted to be in satisfactory condition. Work items are included in the report to repair the adhesion cracks, settlement, and failed/missing seals for the asphaltic plug joints. Refer to **Appendix A**, Photos 5-12 and 17 depicting the deck conditions.

### Superstructure (Rating – Fair)

The bearing devises are in satisfactory condition. The fixed pin bearings and expansion rocker bearings exhibit areas of painted over pitting losses and random areas on light rust and laminated rust on the masonry plates. The bearings have 1/8" -3/16" wide gaps between the masonry plate and tops of the steel pier caps due to pack rust. The fixed bearing at span 2 girder G6 has a 5/8" long crack in the masonry plate at the base. There is no paint on the expansion bearing pins and nuts. The continuous rolled steel girders are in fair condition. Girders in span 4 show typical areas of section losses 2" in diameter x 1/8' deep above the Amtrak rail lines due to electrical arcing and melted steel. Rolling defects in the bottom flange of span 4, girder G3 and web of span 7, girder G7 are also noted. The welds are in good condition, with a missing lower horizontal weld noted in span 3, bay 6 at diaphragm D1. The bridge has minor random girder bottom flange collision scrapes from impact located in spans 1 through 4 and 8. Work items are noted in the latest inspection report for grinding the gouges of these scrapes smooth. Refer to **Appendix A**, Photos 13-16 depicting superstructure conditions.

### Substructure (Rating – Poor)

The concrete abutment stems and backwalls are in satisfactory condition with numerous vertical hairline cracks, small pop outs, isolated hairline map cracking, and evidence of prior leakage noted at both abutments. The concrete bearing pedestals of Abutment 1, girders G3, G4, G7, and G9 have random hollow areas up to 22" x 5". Abutment 1 girder pedestals G6, G7, and G8 have random areas of spalling. **Abutment 2 girder G4 has (2) hollow areas up to 8" x 4", and girders G3 and G7 have random spalls. The wingwalls are in good condition exhibiting random horizontal and vertical hairline cracks, isolated map cracking, and random small popouts. Wingwall 1B is noted to have an isolated region of spall 1' long x 4" high x 1/2" deep.** The steel pier caps are in poor condition, with areas of peeling paint, painted over pitting loss/section loss and isolated locations of laminated rust. The report notes the worst top flange section loss location over the pier 6 cap at girder G8, resulting in an 8.0% loss to in a critical location. The report notes the worst bottom flange section loss location at pier 4 cap between girders G6 and G7 resulting in a painted over 26.9% section loss in a critical location. Random rivet heads in pier 4 were noted to have up to 90% section losses and batten plates have up to 3/16" deep section losses. The top coverplate of the pier 1 cap between girders G2 and G3 is noted to have a 2' long x 9" wide x 3/16" deep area of section loss in a semi-critical area. The steel columns of the bents are in satisfactory condition with random areas of peeling paint

and isolated regions of laminated rust. Pier 3 and pier 4 columns exhibits laminated rust and painted over section losses at the bases interior column legs up to full width x 8" high x 3/16" deep. The pier column fixed pin bearings show up to 3/16" deep painted over pitting losses in the masonry and vertical plates. Random anchor bolt nuts have up to 90% section loss and a few nuts are missing due to pack rust. Several fixed bearings have up to 7/16" pack rust between the vertical plates. Refer to **Appendix A**, Photos 18-27 depicting substructure conditions.

## Approaches (Rating – Good)

The approach pavement is in good condition, with random longitudinal, transverse, and map cracks up to 1/8" wide. The south approach has a full length 3/8" wide transverse crack that has been sealed, and has since re-cracked. A previously noted pothole in the south approach has been recently patched. The metal beam rail with steel post approach guiderail system at all approach corners is in satisfactory condition. The southwest approach corner has minor impact dents, and southeast rail near the buried termination end has 2 deep dents. The approach guide rails, guiderail ends, and transitions to the bridge do not meet current R-B 350 standards. Refer to **Appendix A**, Photos 31-34 depicting approach conditions.

## Drainage

There are a total of 34 1 1/2" diameter PVC pipe drains, 18 along each curb line. As mentioned previously, the inspection report notes wetness around the outlets of the pipe drains from the underside of the bridge deck. There are no closed drainage systems located on the bridge. Closed drainage systems exist along the curb line of the approaches of bridge along Alpha Avenue. There is a storm drainage system south of the railroad with catch basins along Mathews Street/Main Street.

## Utilities

There are overhead telecommunication utilities carried by the bridge structure that are in good condition. Railroad catenary wires are below the bottom flanges of the girders in span 4. A pole line runs parallel to Cutler Street along the south side. The communication wires along this pole line are attached to the bottom flanges of Girders G1 and G9 in span 8, and the electric wires along this pole line cross over the bridge at span 8. A pole line runs parallel to the railroad on the south side of the railroad and carries a set of electric wires over the bridge across span 3.

## Property

Based on the 1940 as-built and 1990 rehabilitation plans, the structure was reverted from the Railroad company to the Town, and the roadway corridor of Alpha Avenue was reverted to the Town of Stonington. The bridge is located over property used by local businesses, utility companies, and Amtrak Rail. Pier 4 is within the Amtrak ROW, within a permanent easement for Alpha Avenue. Based on the referenced plan sets, Piers 2 and 3 may also be on Amtrak property but are outside of the Amtrak security fence. The region of property under spans 1 through 3 is used by the Dodson Boat Yard. The region of property under Spans 6 and 7 adjacent to Cutler Street is used by the Stonington Community Center Thrift Shop for parking. Part of the building is located underneath span 7 of the existing bridge. Refer to **Appendix A**, Photo 35 depicting the building located under the bridge. It is not clear if the property located under the bridge on either side of Amtrak is owned by the Town or owned by private entities.

## Cultural Resources

According to the Town of Stonington Zoning Map (2017), the bridge is located just north of the Stonington Borough. The National Register of Historic Places 2020 mapper includes the area of the bridge on Alpha Avenue as part of the Stonington Borough Historic District; however, the bridge itself is not identified as an individual historic listing or is considered to be a contributing element of the historic district. It is not anticipated that the bridge rehabilitation and roadway improvements will have an adverse visual or physical effect on the historic district.

The area has a high population of citizens over the age of 64 according to the EPA's Environmental Justice (EJ) Screening and Mapping Tool (Version 2020). There are no other environmental indicators of concern in the project vicinity according to the EJ Screening and Mapping tool.

This section discusses being in floodplain (BFE 11') and wave action zone (14'). Will the final design of the project need to address issues related to floodplains and resiliency for preferred alternative. The majority of Alpha Ave approaches within the project limits are below the flood elevation. It is suggested to add the Datum of referenced flood elevations.

## Environmental Resources

Bridge No. 03906 is not located in an Aquifer Protection Area but is within half a mile of a CTDEEP Natural Diversity Database (NDDDB) area for State listed species per December 2021 Mapping. As a result, NDDDB coordination will only occur if a full replacement is required, otherwise, rehabilitation will not require this coordination. Since the State of Connecticut is considered a location for federally listed Northern Long Eared Bat population of interest, coordination will likely be required with the U.S. Fish and Wildlife Service.

According to the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map number 09011C0534J (effective date 09/26/2008), the bridge is located in Special Flood Hazard Area, Zone AE at elevation 11 feet to the east and Zone VE at elevation 14 feet to the west. These areas associated with Stonington Harbor indicate that fill within the floodplain may have significant regulatory impacts. A small area of wetlands is identified on 1990 rehabilitation plans for the bridge; however, wetlands impacts are not anticipated for this project.

The project is located within the coastal area and the coastal boundary; therefore, a Coastal Area Management permit is anticipated through DOT, ~~as well as the Town of Stonington Planning and Zoning Commission or Zoning Board of Appeals for a Coastal Area Management (CAM) site plan review.~~

The ground water supply surrounding the structure is classified as GB, whose designated uses include industrial process water and cooling waters and baseflow for hydraulically-connected water bodies and is presumed not suitable for human consumption without treatment. The surface water in the structure's vicinity is designated as Class B which is suitable habitat for fish and other aquatic life and wildlife; recreation; navigation; industrial and agricultural water supply.

## SOILS & GEOTECHNICAL CONSIDERATIONS

According to the original 1940 construction plans, the existing North bridge abutments and wingwalls are supported by spread footings founded on bedrock. The existing South bridge abutments and wingwalls are supported on steel piles which bear on bedrock. Soil boring information is shown in the original construction plans on bridge sheet 1 of 7 and confirms that rock was found near the bottom of footing elevations. Piers 1 and 2 are founded on piles while the remaining are founded on bedrock. Considering that three alternates proposed are rehabilitations of the existing bridge, the existing abutments, footings, and pier bents are anticipated to be able to support loads from the proposed rehabilitation. Geotechnical investigations will be performed as part of the design phase, as necessary.

Consider including a financial contingency. The assumption that the foundations are in good condition and adequate for the proposed rehabilitation alternates 2 & 3 could result in additional construction costs if the foundations need rehabilitation.

## HYDRAULICS

No watercourses are located under the bridge. However, due to its proximity to Long Island Sound, the bridge is located within a FEMA Special Flood Hazard Area, Zone VE and AE which are a coastal flood zone with velocity (wave action) and a determined base flood (VE) and a determined base flood (AE 500-year); therefore any fill within the coastal flood zone will require a DEEP FMC-MOU filed with DOT Hydraulics and Drainage unit. A DEEP Coastal Permit will be investigated during the design phase to determine if it is required.

## SCOUR

According to the inspection report dated January 19, 2020, the erosion scour for the site is very good "8". This rating indicates the bridge foundations have been determined to be stable. The inspection report has assigned the Item 113 Scour Critical Rating an "N", indicating that channel scour is not a concern at this bridge site, as the bridge is not located over a watercourse.

Are "Less than 1.0" tables available from the load rating to assess the need for additional girder strengthening beyond what has been identified on these repair location plans?

## LOAD RATING

The existing bridge is not posted for live load restriction. A load rating performed by Stantec dated May 23, 2019 and updated by CTDOT in May, 2021 determined the following governing live load ratings for an AASHTO HL-93 vehicle:

Inventory HL-93 Pair Rating 0.50  
Operating HL-93 Pair Rating 0.66  
Legal (CT-P380) 0.68

permit

EMERGENCY VEHICULAR RATING SUMMARY									
LIVE LOAD	RF	GVW (Tons)	AXLE (Tons)	SPAN CELL	CONTROLLING MEMBER	MEMBER LENGTH (ft)	CONTROL LOC (x,xL)	LIMIT STATE	CONTROLLING MECHANISM
Type EV2	0.96	27.59	16.07	3	G9	80	1L	Strength I	Flexure
Type EV3	0.65	27.94	20.15	7	G9	80	1L	Strength I	Flexure

Governing ratings for the structure are the result of lateral torsional buckling of the beam sections in span 8 of the structure. The capacity of the structure is reduced over pier 7 in span 8 because the beam sections are non-prismatic. Based on a review of the 1990 rehabilitation plans, the girder sections in span 7 consists of rolled W36x160 and have been reduced to W24x162 rolled sections in Span 8 over Cutler Street to increase the vertical under clearance of the bridge. The existing bridge is not posted for live load restrictions. It is recommended that the bridge be added to the agenda for the next Load Rating Committee meeting, if it has not yet been discussed by the committee.

## SEISMIC CONSIDERATIONS

The CTDOT Bridge Design Manual Section 3.8 requires bridge rehabilitation projects to be designed in accordance with the latest AASHTO LRFD Specifications. Per AASHTO LRFD Section 4.7.4.1, bridges in Seismic Zone 1 need not be analyzed for seismic loads, regardless of their operational classification and geometry, but the minimum requirements specified in Sections 3.10.9 and 4.7.4.4 shall apply. These requirements are generally limited to correcting deficiencies in support length and providing adequate restraint for seismic forces at the bearings to prevent superstructure collapse.

## REHABILITATION ALTERNATES

As discussed previously, the existing substructure is in a poor condition as a result of deteriorations to the existing steel pier caps. Based on a review of existing site and bridge conditions, a substructure repair or replacement is warranted to address all the deficiencies, in lieu of a full bridge replacement, for the following reasons:

- The existing substructure is in poor condition due to the steel pier caps. The rehabilitation alternates will need to address the deterioration conditions found at critical and semi-critical locations of the existing steel pier caps.
- The existing deck is in good condition and can be reused.
- The existing superstructure is in fair condition and can be repaired and reused.
- The existing abutments and pier bent footings are founded on piles or directly on bedrock and have no scour/settlement concerns at the site.
- Substructure repairs or replacement will have significantly less impacts on local traffic, railroad operations, property under the existing bridge, and utilities compared to a full replacement involving full demolition and reconstruction of the superstructure and substructure.
- The approach rail systems at all four corners of the existing bridge does not meet current design standards.

Three bridge rehabilitations and one full bridge replacement alternates described below were evaluated based on the aforementioned project goals.

H&H recommends avoiding concrete encasement or structural steel filled with concrete since it is challenging to inspect and durability is sometimes a concern.

### Alternate 1 – Pier Cap Rehabilitation, Pier 4 Replacement and Girder Strengthening

This alternate includes installing reinforcing steel and placing concrete in the space between the transverse steel pier cap girders, at Piers 1 through 3 and Piers 5 through 7. Holes will need to be cut through the existing vertical plate members, between the webs of the girders, to allow for the reinforcing steel to run the full length of the pier cap. The addition of this reinforced concrete to the pier cap will address the loss of capacity due to steel section losses. The capacity of the existing steel pier columns and bracing will need to be checked due to the additional weight. This work can be performed while traffic remains on the bridge and without requiring the superstructure to be jacked at these locations. Pier 4 will be replaced in its entirety with a reinforced concrete pier due to the deterioration that exists on the steel element below the pier cap including the pin bearings at the footings. The concrete footings will remain. The superstructure will need to be jacked at this location to replace the pier but traffic can remain on the bridge during this work.

All existing steel pin bearings will be cleaned and painted. The existing rocker bearings at the ship lap joint over Pier 4 will be replaced with elastomeric bearings. Additional transverse restraint is not proposed at the piers and abutments due to the existing bearings being able to resist transverse seismic loads. New transverse restraint is required at the shiplap joints. The existing asphaltic plug joints at both abutments will be replaced with a sawed and sealed pavement joint. The existing modular joint over Pier 4 will be replaced with a new prefabricated expansion joint.

Strengthening of the Span 8 girders over Cutler Street in order to bring the load rating factors above 1.2 will occur by providing additional lateral restraint at the depth transition. This alternate also includes minor steel repairs and painting of the beam ends, as well as installation of shields between the girders and the catenary wires to prevent arcing. Concrete patching and crack repairs of the abutments, wingwalls and stairs, along with application of penetrating sealer to sidewalks, parapets and substructure faces within the spray zone is also included. The parapet mounted fence will be repaired, as necessary.

The existing metal beam rail along the approaches to the bridge and will be maintained. No modifications will be made to the intersections nor the existing geometry of the bridge.

Sketches depicting the proposed Roadway Plan, Profile, Bridge Plan, Elevation and Cross Section for this alternate are attached as **Appendix D**.

Depending on the ownership of the property below the bridge, temporary construction easements may be required or lease agreements may need to be temporarily suspended. An easement to work within and over the Amtrak ROW will be required. Utilities will not be impacted with this alternate. The rehabilitation is estimated to cost approximately \$7,492,000. The service life of the rehabilitated structure is estimated to be approximately 15 to 20 years, at which time deck patching will be required and repairs to the remaining steel bent piers will likely be required.

Temporary alternating one-way traffic patterns will be required for the joint work. The anticipated duration of construction is 8 months.

In comparison with Alternates 2, 3 and 4, this alternate offers the following major advantages and disadvantages:

#### Advantages:

- Least expensive alternate.
- Shortest construction duration.
- Eliminates the need to repair deterioration on the riveted steel pier caps.
- Eliminates the need to repair the portions of the bent below the pier cap, including the pin bearings at the base of Pier 4.
- Eliminates the need to temporarily support the superstructure for repairs at all piers except Pier 4.
- Has very little impact to traffic on Alpha Avenue. Only joint work impacts traffic.
- Only work at Pier 4 has significant impacts to Amtrak.
- No impacts to utilities.

#### Disadvantages:

- Shortest extended service life.
- Portions of Piers 1 through 3 and 5 through 7 below the pier caps will need to be repaired by traditional methods which can be difficult due to the riveted members.
- The superstructure will need to be temporarily supported at Pier 4, which is within the Amtrak ROW.
- No work to the deck, though it does show some signs of deterioration.
- The bridge remains its current length, therefore requiring higher future maintenance costs.
- The substandard vertical clearance over Amtrak remains.

## Alternate 2 – Pier Replacement and Girder Strengthening

This alternate includes replacing all 7 of the existing piers with concrete piers, while reusing the existing footings. All other work included in Alternate 1 will be included under this alternate. Sketches depicting the proposed Roadway Plan, Profile, Bridge Plan, Elevation and Cross Section for this alternate are attached as **Appendix D**.

The ROW needs and utility impacts are the same as Alternate 1.

The rehabilitation is estimated to cost approximately \$8,640,000. The service life of the rehabilitated structure is estimated to be approximately 15 to 20 years, at which time deck patching will be required.

Temporary alternating one-way traffic patterns will be required for the joint work. The anticipated duration of construction is 8 months.

The anticipated duration of construction is 12 months.

In comparison with Alternates 1, 3 and 4, this alternate offers the following major advantages and disadvantages:

#### Advantages:

- Eliminates the need to repair deterioration on the riveted steel pier caps.
- Eliminates the need to repair the portions of the bents below the pier cap, including the pin bearings at the base of all Piers and extends the substructure service life.
- Has very little impact to traffic on Alpha Avenue. Only joint work impacts traffic.
- Only work at Pier 4 has significant impacts to Amtrak.
- No impacts to utilities.

#### Disadvantages:

- More expensive than Alternate 1.
- Has a longer construction duration than Alternate 1.
- The superstructure will need to be temporarily supported at all piers for their replacement.
- No work to the deck, though it does show some signs of deterioration.
- The bridge remains its current length, therefore requiring higher future maintenance costs.
- The substandard vertical clearance over Amtrak remains.

### Alternate 3 – Pier Replacement, Girder Strengthening and Deck Patching

This alternate includes removal of the existing bituminous overlay and membrane and patching of the deck. A new spray applied waterproof membrane and a new bituminous overlay will be placed on the deck. Concrete deterioration in the sidewalk and parapets will be replaced. The approach guiderails will be replaced with MASH compliant MBR. All other work included in Alternate 2 will be included under this alternate. Sketches depicting the proposed Roadway Plan, Profile, Bridge Plan, Elevation and Cross Section for this alternate are attached as **Appendix D**.

Temporary alternating one-way traffic patterns will be required for the deck work and joint work. The anticipated duration of construction is 12 months.

The ROW needs and utility impacts are the same as alternate 1.

The rehabilitation is estimated to cost approximately \$13,305,000. The service life of the rehabilitated structure is estimated to be approximately 50 years at which point replacement of the existing beams, that are currently 107 years old, may be warranted.

In comparison with Alternates 1, 2, and 4, this alternate offers the following major advantages and disadvantages:

#### Advantages:

- Eliminates the need to repair deterioration on the riveted steel pier caps.
- Eliminates the need to repair the portions of the bents below the pier cap, including the pin bearings at the base of all Piers and extends the substructure service life.
- Strengthens girders over Cutler Street bringing it up to standard.



Alternative 4 cost and life cycle is significantly better than recommended Alternative 3. It appears mainly structural elements were utilized in the prioritization ranking. Preferred Alternative 3 does not fix any sub-standard features except approach railing MASH.

- Deck deterioration will be repaired and a new spray applied membrane will and overlay will increase the service life.
- Deteriorated concrete in the sidewalks and parapets will be repaired.
- Replacement of the substandard parapet height.
- The substandard approach guiderails will be replaced.
- No impacts to utilities.

Does the department have concerns with having all piers on temporary supports (simultaneously) during construction?

#### Disadvantages:

- More expensive than Alternates 1 and 2.
- Impact to traffic on Alpha Avenue will be significantly more than Alternates 1 and 2.
- Deck patching in Span 4 has the potential to impact Amtrak.
- The superstructure will need to be temporarily supported at all piers for their replacement.
- The bridge remains its current length, therefore requiring higher future maintenance costs.
- The substandard vertical clearance over Amtrak remains.

This will cut off the access to the Community Center and other public amenities from those living on the north side

### Alternate 4– Bridge Replacement with Removal of 6 spans

This alternate fully replaces the existing bridge essentially along the same alignment. This alternate maintains the existing bridge width while raising the profile to meet minimum vertical clearance over the Amtrak Railroad of 22'-6". The new bridge will have two spans with one over Amtrak and one over the boat yard lot immediately south of Amtrak. A new concrete pier will be located south of the Amtrak ROW. The other six spans of the existing bridge will be filled using GRS embankments and facing walls below the spans prior to removing a portion of the bridge. MSE walls can be swapped out instead of the GRS walls based on input from a Geotechnical investigation. The superstructure will use relatively shallow steel beams, continuous over the pier, to accommodate the minimum vertical clearance and minimum K-value for the roadway design speed. A typical reinforced concrete deck with sidewalks and parapets on both sides will be used. The deck will be protected with a spray applied membrane and 3" of bituminous pavement. A protective fence will be mounted to the parapet and solid panels will be used over electrified Amtrak.

Further staging details are located later in this section write-up. Sketches depicting the proposed Bridge Plan, Elevation and Cross Section for this alternate are attached as **Appendix D**.

This alternate requires permanent ROW takes for property located beneath the bridge. These include local roads, parking lots, a part of a building and a portion of a boat yard. Both Mathews Street/Main Street and Cutler Street will no longer pass under Alpha Avenue and will be dead ended at the new embankment. The communication wires along Cutler Street, below the bridge, will need to be placed in conduits below the new embankment, raised up on higher poles to cross over Alpha Avenue or permanently relocated.

The proposed structure and filling of the spans is anticipated to require 12 months. The rehabilitation is estimated to cost approximately \$25,483,000 and the new bridge will have a service life of 75 years.

In comparison with Alternates 1, 2 and 3, this alternate offers the following major advantages and disadvantages:

#### Advantages:

- New bridge has a 75-year service life.
- Achieves minimum vertical clearance standard for Amtrak Railroad.
- No deck joint over the pier.
- The substandard approach guiderails will be replaced.

**Alternate 4:**  
-The boring logs included on the plans indicate that the subsurface condition was comprised of topsoil over sand and clay over bedrock. The Designer shall verify that proposing fill type retaining wall (GRS-IBS or MSE Wall) to eliminate six piers would not result in excessive settlement that would adversely impact the rail line and their facilities as well as neighboring properties.  
-The report states "These areas associated with Stonington Harbor indicate that fill within the floodplain may have significant regulatory impacts." Verify that eliminating six piers by constructing a fill type retaining wall (MSE Wall or GRS-IBS Structure) would be acceptable to regulatory agencies.

- The shorter bridge has less future maintenance costs.
- Lowest life cycle cost over a 75-year period.

#### Disadvantages:

- Most expensive alternate.
- Has significant impacts to traffic on Alpha Avenue.
- Has significant impacts to Amtrak.
- Most significant impacts to properties below the bridge including a portion of a building and parking areas.
- Two local roads will need to dead end at the new embankment.
- Utilities below the bridge will need to be permanently relocated. Utilities passing over the bridge may need to be temporarily relocated.

## Cost Considerations

**Appendix E** contains an itemized cost estimate for each alternate. The table below provides a summary of the total costs.

Rehabilitation Alternates	Structure Cost	Highway Cost	Rounded Total Cost (Including other & incidentals)
1- Pier Cap Rehabilitation, Pier 4 Replacement and Girder Strengthening	\$2,683,300	\$185,500	\$7,492,000
2 - Pier Replacement and Girder Strengthening	\$3,142,300	\$185,500	\$8,640,000
3- Pier Replacement, Girder Strengthening and Deck Patching	\$4,737,400	\$589,200	\$13,305,000
4 - Bridges Replacement with Removal of 6 Spans	\$9,034,700	\$1,389,000	\$25,483,000

## CONSTRUCTION SEQUENCE & MAINTENANCE AND PROTECTION OF TRAFFIC

The proposed maintenance and protection of traffic (MPT) for **Alternates 1 and 2** is relatively straightforward. Only the replacement of the deck joints will impact traffic on Alpha Avenue. This work will be performed using temporary off peak lane and shoulder closures with alternating 1-way traffic control. Strengthening of the girders within Span 8 can be performed in the unpaved area adjacent to Cutler Street and will have little to no impact on traffic. The rehabilitation of the pier caps, coating of deck underside exposed rebar, steel repairs to the girders and pier bents will impact the vacant property below the bridge. Any activities currently happening below those spans will need to be temporarily suspended while the Contractor performs their work. The replacement of all piers in Alternate 2 will have longer and more significant impact to those areas. The substructure concrete

patching will minimally impact the adjacent roads as there is some usable width between the substructure and the travelways.

The replacement of Pier 4 and the replacement of the bearings above Pier 4, the installation of shields over the catenary wires, and steel repairs in Span 4 will impact rail traffic. Pier 4 is within the Amtrak ROW but is approximately 24' from the center of the adjacent track. By reusing the existing foundation, deep excavation adjacent to the track can be prevented. It may be possible to install a temporary safety fence between the pier and the track to allow work to occur without requiring Amtrak flagmen and track outages. The temporary support of the superstructure will need to be located on the north side of the pier, away from the tracks. All other work within Span 4 will likely need to be done at night during times when Amtrak can provide track outages and de-energize the catenaries.

The proposed MPT for **Alternate 3** will be the same as for Alternates 1 and 2, but will have additional impacts to traffic on Alpha Avenue and to pedestrians. The removal of the existing bituminous overlay; the patching of the deck, sidewalks, stairs and parapets; the application of the membrane and the placement of the new bituminous overlay will require multiple off peak closures of shoulders and lanes to perform the work. During these closure traffic will be maintained in a single lane of alternating 1-way traffic controlled by flaggers. Traffic will need to ride on the bare concrete deck to utilize off peak closures. Pedestrians can be routed to the sidewalk on the other side of the bridge when sidewalk and parapet work is performed on one side.

The proposed construction sequence and MPT for **Alternate 4** has significantly more impacts to vehicular traffic, pedestrians, rail traffic and the properties below the bridge. The areas below the existing bridge will be impacted from the beginning of construction and many of them permanently after construction is complete. During construction the areas (vacant property and roadways) under all existing spans, except Span 4, will not be available for public use. Track outages and de-energization of the catenaries will be necessary for demolition work and installation of new components over the tracks and are anticipated to only be available overnight and for relatively short durations.

The suggested general sequence is as follows:

- Build a new pier south of Pier 3 under the existing bridge.
- Build new abutments south of Pier 2 and north of Pier 4 under the existing bridge.
- Place embankment fill with MSE walls within the remaining spans under the existing bridge, for the approach roadways to the new bridge. The existing piers will be abandoned in place within the fill.
- Using 1 lane of alternating 1-way traffic on the existing bridge.
  - Remove half of the existing superstructure above the areas of new embankment fill.
  - Cut the top of the existing piers down to the top of the placed fill.
  - Place additional fill in the approach areas up to the roadway level.
  - Place temporary pavement.
  - The 4 bullets above may need to happen in multiple substages depending on how long the alternating 1-way traffic can be maintained as a continuous operation.
    - If multiple substages are required, then the superstructure will need to be cut at existing pier locations and TERS will be needed to retain embankment fill at the back of the piers to allow a transition from the new approach roadway to the remaining portion of the existing superstructure. Temporary barrier curb will also be required along the edges of the new approach roadways.
  - Remove half of the superstructure in existing Spans 3 & 4.
  - Construct the tops of the new abutments and pier.

There is little discussion about the impacts and acceptance of long duration one-way temporary lanes

- Erect the new 2 span superstructure.
  - PBUs can likely be used to speed construction of these 2 spans.
- Shift traffic to the newly constructed half of the bridge and approach roadways.
- Repeat the sequence for the other half of the bridge.
- Construct the final barrier walls and guiderail on the approaches.
- Place the final paving and pavement markings.

## OTHER REHABILITATION ALTERNATES

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The following alternates were qualitatively evaluated. However, a preliminary review indicated several drawbacks with the alternates, and they were therefore not investigated further for a quantitative evaluation.

1. Traditional steel repairs for the built up pier caps consisting of adding repair plates over areas of deterioration or replacing deteriorated members. This method requires lots of custom fabrication and is time consuming due to the existing rivet patterns. This method will likely require temporary support of the superstructure if existing members need to be removed and replaced.
2. Fully removing the existing pier caps and replacing with new steel pier caps. This will require temporary support of the superstructure.
3. Girder modifications over Amtrak – replace the girders over Amtrak with a shallower depth and increase the number of girders to provide the required live load capacity. This rehab would improve the MVC over Amtrak by 6”.
4. Fully encase the existing piers in concrete this would allow for a significantly longer lifespan and achieve similar results to Alternative 3.
5. Overbuild a new structure or create a new geometry in order to minimize impact to traveling public.
6. Bridge at a new location or temporary at grade crossing were considered for temporary traffic handling.

## RECOMMENDATIONS FOR REHABILITATION

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Based on the engineering analysis for this structure and deliberation of the previously described alternates, CHA recommends **Alternate 3** – Pier Replacement with Concrete Piers, Girder Strengthening and Deck Patching as the preferred alternate for the rehabilitation of Bridge No. 03906. This alternate will address the bridge substructure deficiencies and extend their service life by eliminating the steel bents which typically require more maintenance than concrete piers. This alternate will address possible hidden deterioration in the concrete deck. This alternate has relatively minimal impacts to traffic on Alpha Avenue, which is the only way in and out of the Borough of Stonington, and minimal impacts to rail traffic.

*Important Note: The life cycle cost analysis shows that a full replacement (Alternate 4) would be the least expensive option over a 75-year period.*

## UTILITY / DRAINAGE / ENVIRONMENTAL / PROPERTY IMPACTS (RECOMMENDED ALTERNATE)

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The recommended alternate is anticipated to have no impacts to existing aerial utilities. CTDOT policy is to remove overhead wires that are attached to the underside of bridges, whenever possible. The Utility Companies could be required to relocate their wires as part of this project if desired. There would be no cost to the State as

the bridge is carrying a local road and Utility Companies get zero reimbursement in this situation. There are no anticipated impacts to the storm drainage system, however its location to with respect to temporary shoring tower locations will need to be investigated during design.

There are no wetlands and watercourses within the project limits. However the project site is within the 100 year flood zone. The project does not propose any earthen fill within the project limits however the volume of the new concrete piers will be grater than the existing steel bent piers. The total acreage of tree clearing and number of trees greater than three inches in diameter requiring removal will also need to be quantified by the Designer of Record to determine the impact on the Northern Long Eared Bat species but this is anticipated to be very few trees.

Depending on the ownership of the property under the bridge, impacts to private property will vary. The project may require Temporary Construction Easements, Rights of Access, or Termination of Lease Agreements. If the property below the bridge is not part of the Town's ROW, CTDOT may want to permanently acquire this as a ROW for Alpha Avenue. An Encroachment Permit will be required for the work within the Amtrak ROW.

Additional research is necessary to assess ROW /  
Property ownership, which may impact total cost.

## **SUBSTANDARD FEATURES & POTENTIAL DESIGN EXCEPTIONS (RECOMMENDED ALTERNATE)**

Based on a review of the controlling design criteria identified in the CTDOT Highway Design Manual for a Non-Freeway Urban Collector 3R project, six elements, namely the vertical Stopping Sight Distance (SSD), sag curve K-value, cross slope (shoulder), Intersection Sight Distance (ISD) from Water Street, Structural Capacity and Minimum Vertical Clearance (roadway & railroad), have been identified as not meeting current design standards. The recommended alternate will not improve any of these to current standards, other than the Structural Capacity, however none of these elements will be made worse by the project. Under the Bridge to Remain in Place criteria, the only elements requiring formal Design Exception approval are: Horizontal and Vertical Clearance under the bridge and Horizontal Clearance in the bridge. The Vertical Clearance is under the bridge is substandard and will require a formal Design Exception. The vertical clearance over the railroad does not meet CTDOT standards nor Amtrak standards. A Design Exception approval will be required from both CTDOT and Amtrak. The recommended alternate does meet the criteria of the applicable State Statute for vertical clearance by maintaining the existing, so a legislative exception will not be required.

The bridge is identified as being within the 100-year floodplain. The discussion makes mention of Alternative 3, but does not include assessment of Alternative 4.

- a. Are there any coastal resiliency concerns?
- b. Is there any concern over improving Emergency Vehicle Access during flooding events?
- c. Are costs reflective of a GRS abutment constructed using free draining backfill in a coastal flood zone?

## APPENDICES

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- Appendix A – Photographs
- Appendix B – Original Bridge Construction Plans
- Appendix C – Existing Bridge Sketches
- Appendix D – Rehabilitation Alternate Sketches
- Appendix E – Rehabilitation Alternate Cost Comparisons
- Appendix F – 2020 CTDOT Inspection Report
- Appendix G – Life Cycle Cost Analysis

## Appendix A: Photographs





*Photo 1: West elevation of bridge over Matthews/Main Street*



*Photo 2: East elevation of bridge over Matthews/Main Street*



*Photo 3: East elevation of bridge over Cutler Street.*



*Photo 4: West elevation of bridge over Culter Street.*





*Photo 5: Condition of deck overlay showing transverse and longitudinal cracks (typical).*



*Photo 6: Condition of modular expansion joint with concrete headers over pier bend 4.*



*Photo 7: Condition of asphaltic plug joints over abutments. Note adhesion crack and settlement of joints (typical).*



*Photo 8: Condition of southeast stairwell showing spalled concrete and missing hand rail post.*





*Photo 9: Bridge deck weephole drains extended to prevent drainage onto structure below (location in photo over pier bent 4).*



*Photo 10: Close up of missing lighting standard at Span 3 west parapet.*



*Photo 11: Condition of bridge parapets and vinyl coated chain link fencing.*



*Photo 12: Sidewalk located on south side of bridge (looking North). Isolated areas on sealant and concrete missing behind the granite curbing (typical).*





*Photo 13: Typical condition of fixed rocker bearings.*

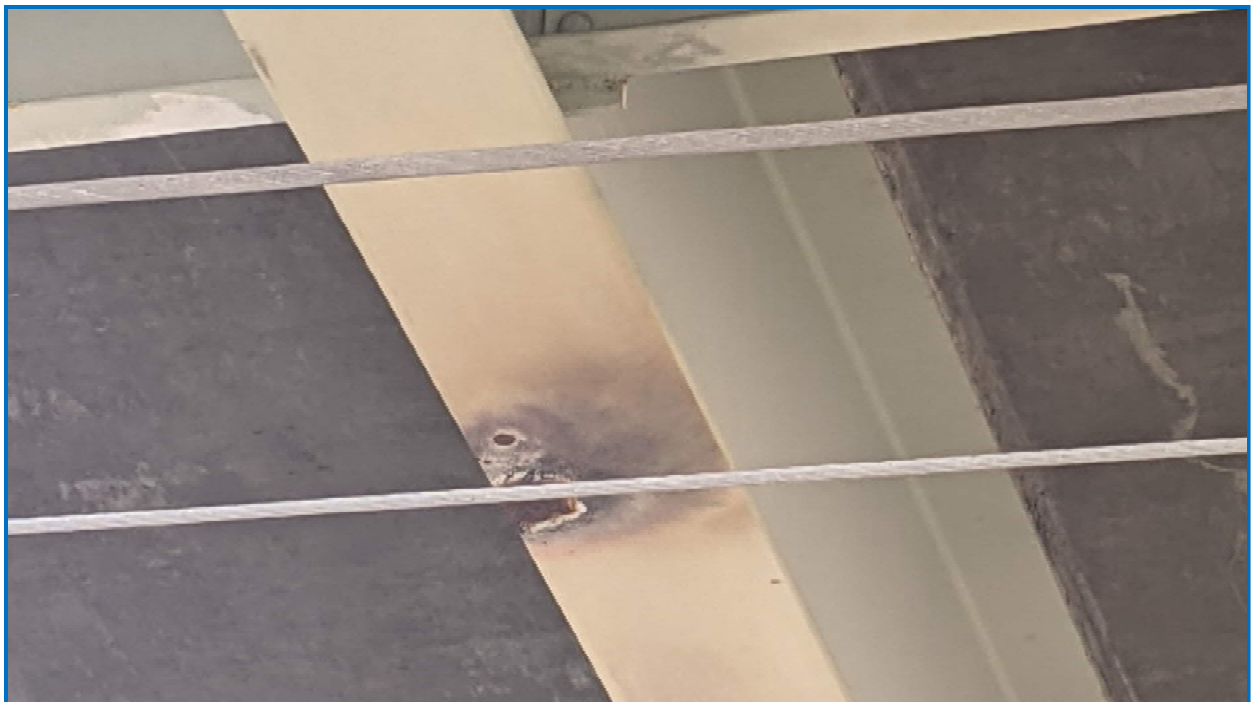


*Photo 14: Expansion bearings over pier bent 4. No paint over the nuts or bearing pins (typical).*





*Photo 15: Minor Collision scrape at Pier Cap 3.*



*Photo 16: Typical Span 4 girder 2" diameter x 1/8" deep section loss due to electrical arcing over Amtrak rail lines.*



*Photo 17: Underside of concrete deck. Random transverse cracks, active efflorescence, and isolated spalling. (Span 6 Girders 8 and 9 in photo).*



*Photo 18: Abutment 1 and Wingwall 1A adjacent to Matthews/Main Street.*



*Photo 19: Wingwall 1B adjacent to stairway.*



*Photo 20: Abutment 2 adjacent to Cutler Street. Note scrape marks on bottom flange of Girder G2 painted over in top right of photo.*





*Photo 21: View under Span 8 showing flange transition and field splices adjacent to Pier 7.*



*Photo 22: Facia of Girder G9 in Span 8 showing areas of peeling paint and surface rust near field splice.*



*Photo 23: Wingwall 2B showing bridge number and vertical under clearance sign.*



*Photo 24: View of Pier Cap 6 from south side.*



*Photo 25: Pier Cap 6 from North side showing top and bottom section losses and random missing rivets..*



*Photo 26: Pier Cap 4 North side located within Amtrak fence line.*





*Photo 27: Pier Cap 6 top and bottom flange deterioration over center column. Photo taken from South side of pier.*



*Photo 28: Pier bent bearing under pier 4 showing heavy laminar rust and pack rusting between plates.*





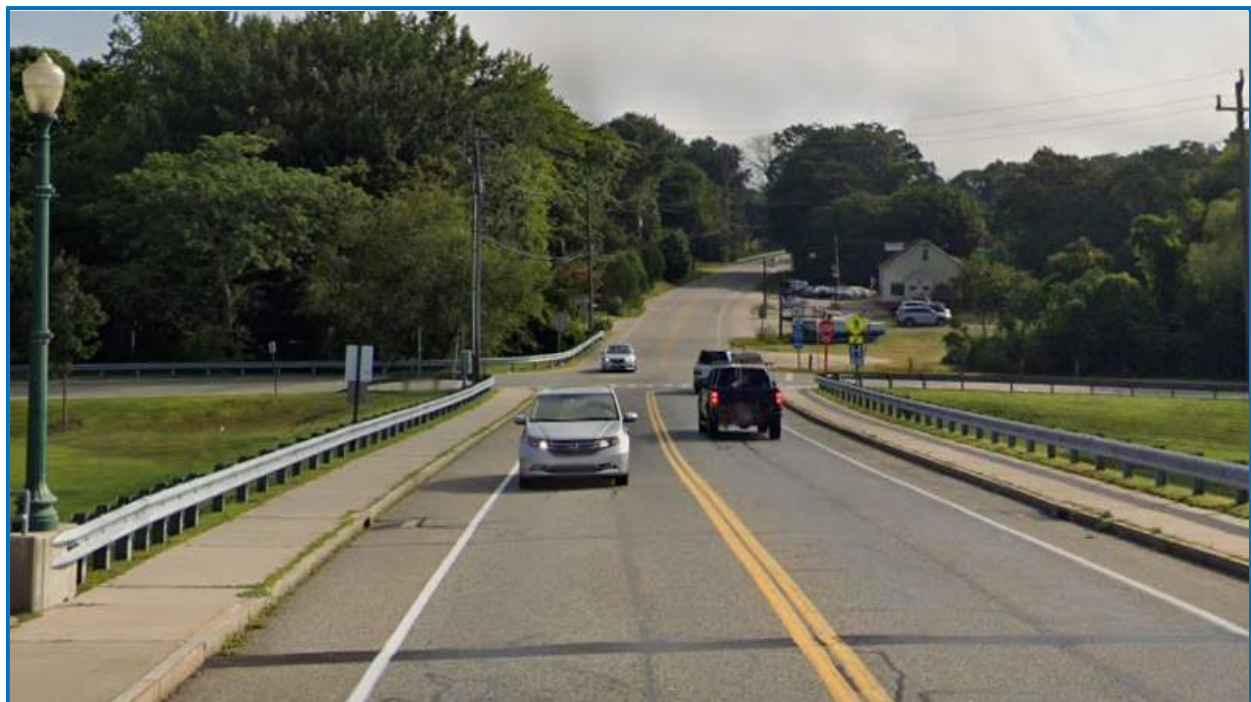
*Photo 29: Tree growing beside bearing pedestal under Pier 5.*



*Photo 30: Elevation of Pier 3 column and bearing. Note laminated rust and section losses on interior column legs near bases.*



*Photo 31: South bridge approach at intersection with Water Street (looking South).*



*Photo 32: North bridge approach looking north towards US Route 1A.*





*Photo 33: Metal Beam rail with steel posts and block outs. Typical for all approach corners.*



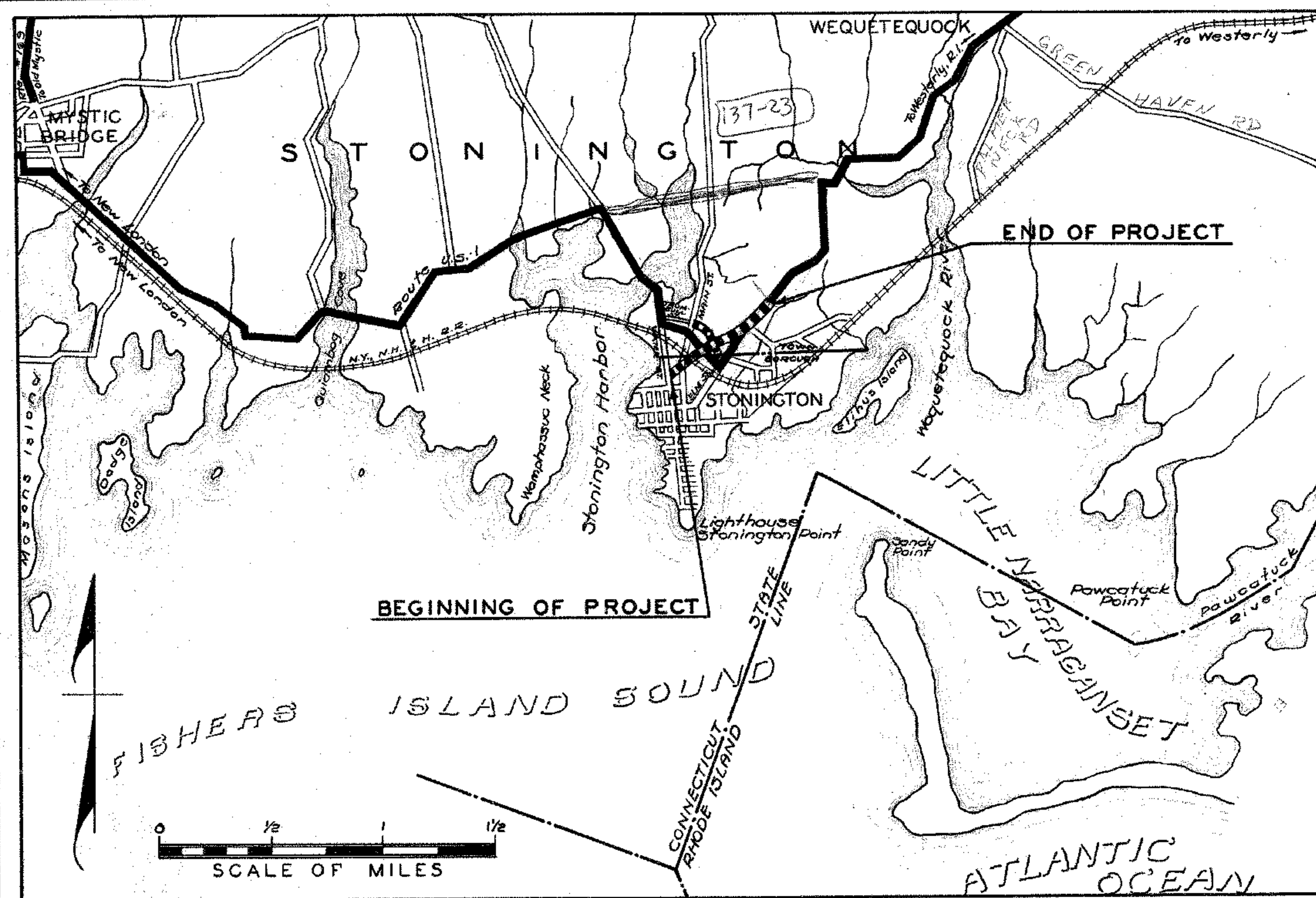
*Photo 34: Guidrail end treatment and southwest approach embankment.*



*Photo 35: Portion of existing building located under span 7 and pier 7 (looking North).*

## Appendix B: Original Bridge Construction Plans





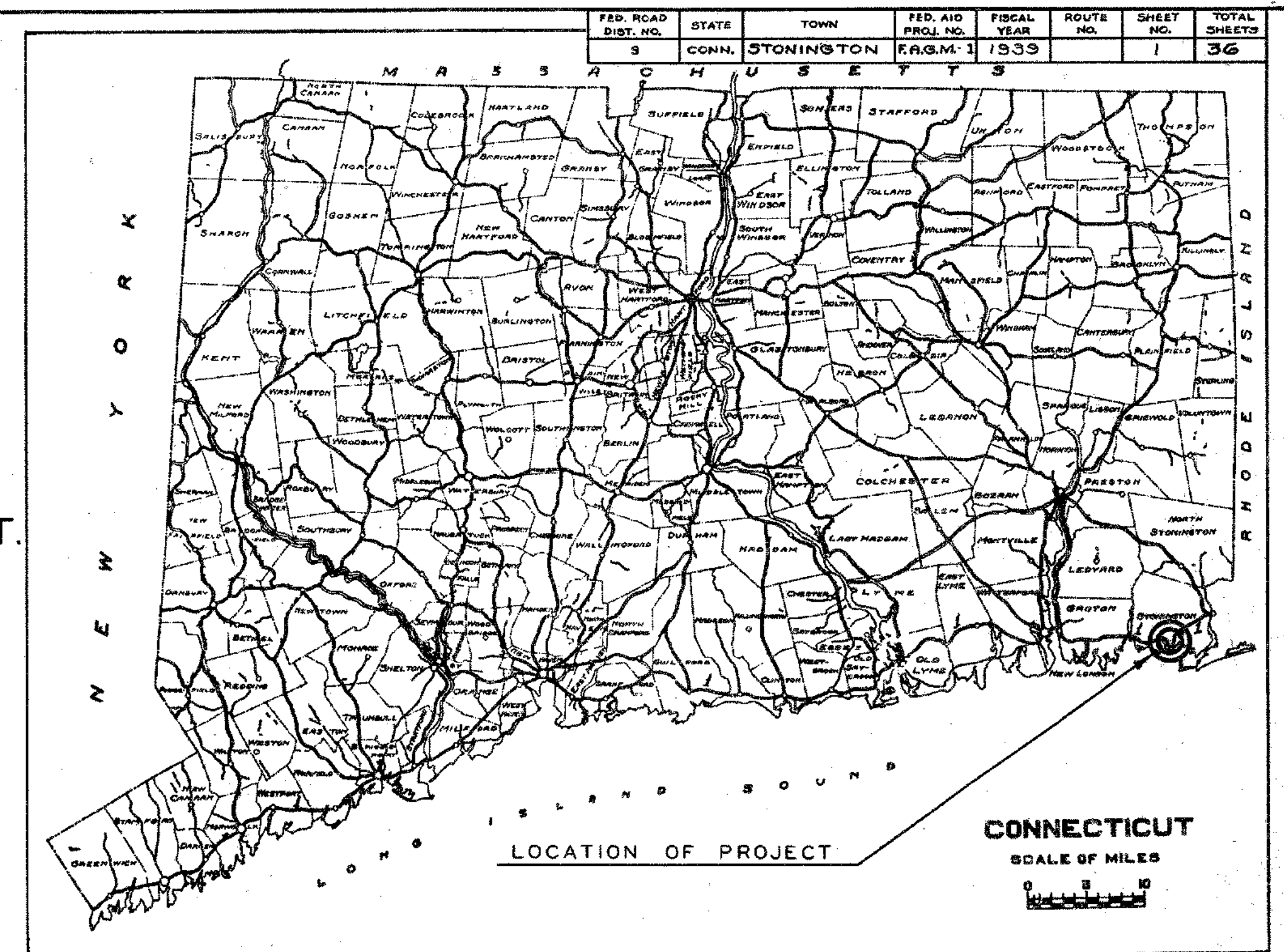
LOCATION PLAN  
Construction Started  
Construction Completed Nov. 23, 1940.  
Plans revised to show road as constructed in 1940  
May 1942. By T.R.

# CONNECTICUT STATE HIGHWAY DEPARTMENT PLAN FOR CONSTRUCTION OF GRADE CROSSING ELIMINATION OF ELM ST., MAIN ST. & WATER ST. IN THE TOWN OF STONINGTON

FROM STA. 0+00 TO STA. 37+00  
LENGTH 3700 FT.

PLAN 1 IN. = 40 FT.  
PROFILES 1 IN. = 40 FT. VERT. 1 IN. = 4 FT.  
CROSS SECTIONS 1 IN. = 5 FT.

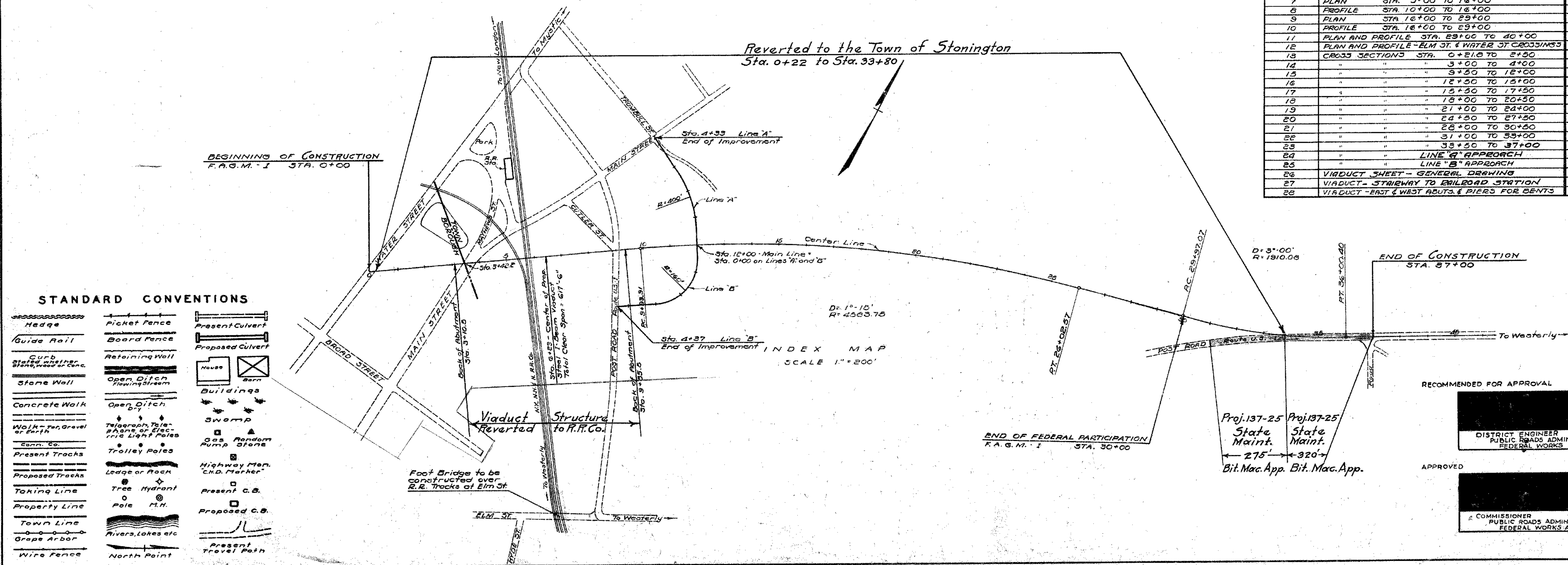
FEDERAL AID GRADE CROSSING PROJECT  
NO. F. A. G. M. 1-(1)  
STA. 0+00 TO STA. 30+00 - LENGTH 3000 FT.



1935 SPECIFICATIONS FORM 804 GOVERN

TOWN NO. 137  
PROJECT NO. 25

LIST OF DRAWINGS			
SHEET NO.	TITLE	SHEET NO.	TITLE
1	TITLE SHEET	29	VIADUCT SHEET - WINGS FOR WEST ABUTMENT
2	DETAILED ESTIMATE SHEET	30	" " WINGS FOR EAST ABUTMENT
3	TYPICAL CROSS SECTIONS	31	" " STRUCTURAL STEEL DETAILS
4	BARRICADE, CONC. RAMP & CURB DETAILS	32	" " SLAB AND RAILING DETAILS
5	PLAN STA. 0+00 TO 11+00	33	" " CONCRETE STAIRWAY DETAILS
6	PROFILE STA. 0+00 TO 11+00	34	BRIDGE SHEET - FOOT BRIDGE AT ELM STREET
7	PLAN STA. 11+00 TO 14+00	35	PAVING DETAILS
8	PROFILE STA. 11+00 TO 14+00	36	PLAN SHOWING RAILROAD WORK
9	PLAN STA. 14+00 TO 29+00	11A	Added for Maint. Drainage (1954)
10	PROFILE STA. 14+00 TO 29+00		
11	PLAN AND PROFILE STA. 29+00 TO 40+00		
12	PLAN AND PROFILE - ELM ST. & WATER ST. CROSSINGS	217	WIRE ROPE RAILING, ANCHORS AND SINGLE POSTS
13	CROSS SECTIONS STA. 0+21.0 TO 2+50	221B	CONC. PIPE, ENDWALLS, UNDERDRAIN AND WOOD CURB
14	" " " " 3+00 TO 4+00	222	CURBS, GUTTERS AND FENCES
15	" " " " 5+50 TO 12+00	223	MANHOLES
16	" " " " 12+50 TO 15+00	224A	STD. CATCH BASINS
17	" " " " 15+50 TO 17+50	225	CURB TRAP CATCH BASINS
18	" " " " 18+00 TO 20+50	234A	EXPANDED METAL MESH REINFORCEMENT
19	" " " " 21+00 TO 24+00	236B	FABRIC AND BAR MAT REINFORCEMENT
20	" " " " 24+50 TO 27+50	711	FIGURES FOR DATES ON BRIDGES
21	" " " " 28+00 TO 30+50	712	BARWAYS, CONC. WALK, CONC. STEPS & SERVICE BRIDGES
22	" " " " 31+00 TO 33+00	714	REINF. CONC. MARKED POSTS
23	" " " " 33+50 TO 37+00		
24	" " " " LINE "A" APPROACH		
25	" " " " LINE "B" APPROACH		
26	VIADUCT SHEET - GENERAL DRAWING		
27	VIADUCT - STAIRWAY TO RAILROAD STATION		
28	VIADUCT - EAST & WEST ABUTS. & PIERS FOR CENTS		



## STANDARD CONVENTIONS

Hedge	Picket Fence	Present Culvert
Guide Rail	Board Fence	Proposed Culvert
Curb	Retaining Wall	House
Stone Wall	Open Ditch	Barn
Concrete Walk	Open Ditch	Buildings
Walkway, Gravel or Earth	Telephone Poles	Swamp
Conn. Co.	Trolley Poles	Gas Random Pump Stone
Present Tracks	ledge or Rock	Highway Man. C&D Marker
Proposed Tracks	Tree Hydrant	Present C.S.
Taking Line	Pole R.H.	Proposed C.S.
Property Line		
Town Line		
Grape Arbor		
Wire Fence		
	North Point	

APPROVED: [Signature]  
APPROVED: [Signature]  
APPROVED: [Signature]  
APPROVED: July 7, 1939  
ENGINEER OF HIGHWAY DESIGN  
APPROVED: Aug 18, 1937  
ENGINEER OF LOCATION & DESIGN  
APPROVED: Aug 18, 1939  
DEPUTY HIGHWAY COMMISSIONER



**MISCELLANEOUS NEW CONSTRUCTION**

Grade all intersecting roads, drives and barway approaches disturbed by construction as shown on plans or as directed. Where directed, place 6" Loose Gravel Surface on drives and barway approaches.

Sta. 0+15 to 3+10.5 on right and 0+66 to 3+10.5 on left - Construct Concrete Sidewalk and Plain Concrete Curb.

Sta. 0+75 to 3+10 on right and 0+75 to 3+10 on left - Construct Wire Rope Railing.

Sta. 3+10.5 to 3+70 Construct Plain Concrete Curb along under proposed Viaduct as shown on plans or as directed.

Sta. 3+70 to 4+15 - Construct Bituminous Concrete Sidewalk under proposed Viaduct as shown on plans or as directed.

Sta. 3+10.5 to 3+35.5 - Construct Steel I-Beam Viaduct as shown in detail on Sheets Nos. 26, 27, 28, 29, 30, 31, 32, 33.

Sta. 3+15 to 4+42 - Construct Plain Concrete Curb along under proposed Viaduct as shown on plans or as directed.

Sta. 5+56 Left and 6+10 Left - Construct Barriercades across Main Street. For detail of Barriercades see Sheet No. 4.

Sta. 9+38 Left - Construct Bit. Concrete Sidewalk 9' 4" Foot Of Proposed Lane. Steps As Shown On Plans Or As Directed.

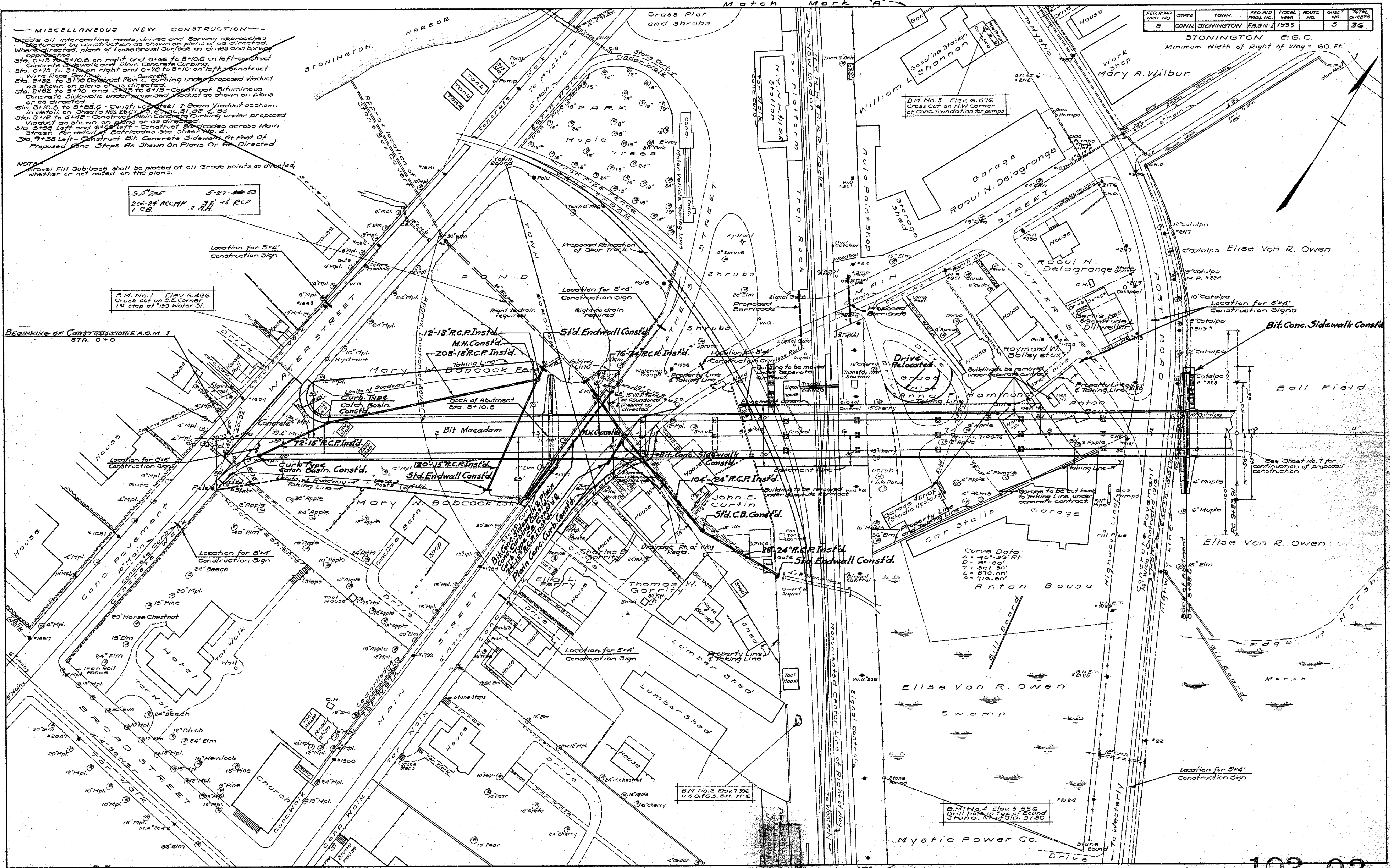
**NOTE**

Gravel Fill Sub-base shall be placed at all Grade points, as directed, whether or not noted on the plans.

3.0" 235 5-27-53  
200' 24" ACCMP 3 1/2" 15" R.C.P.  
1 C.B.

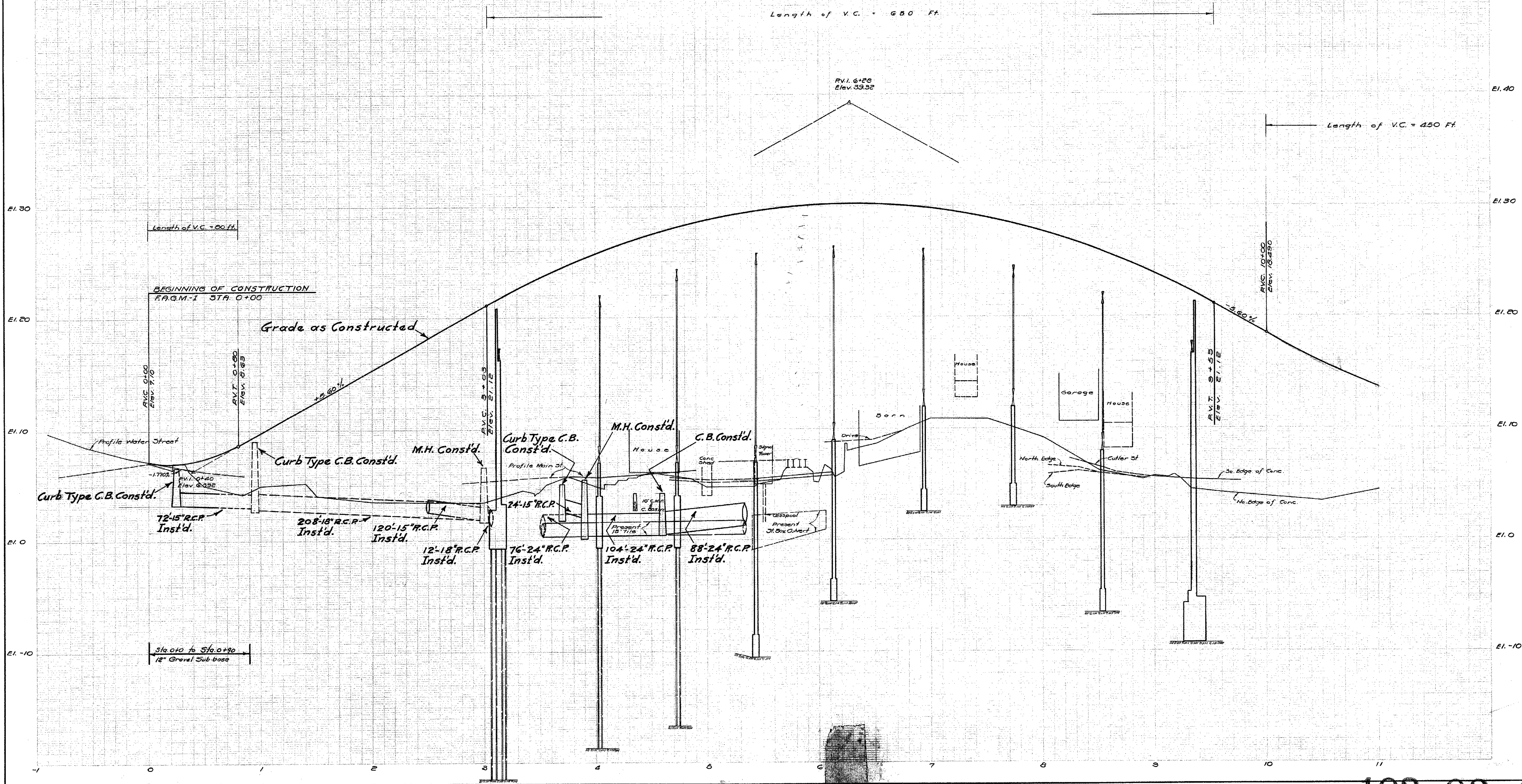
B.M. No. 1 Elev. 6.466  
Cross cut on S.E. Corner  
1/4" step of 130 Water St.

**BEGINNING OF CONSTRUCTION E.A.M. 1**  
STA. 0+0





STONINGTON E.G.C.

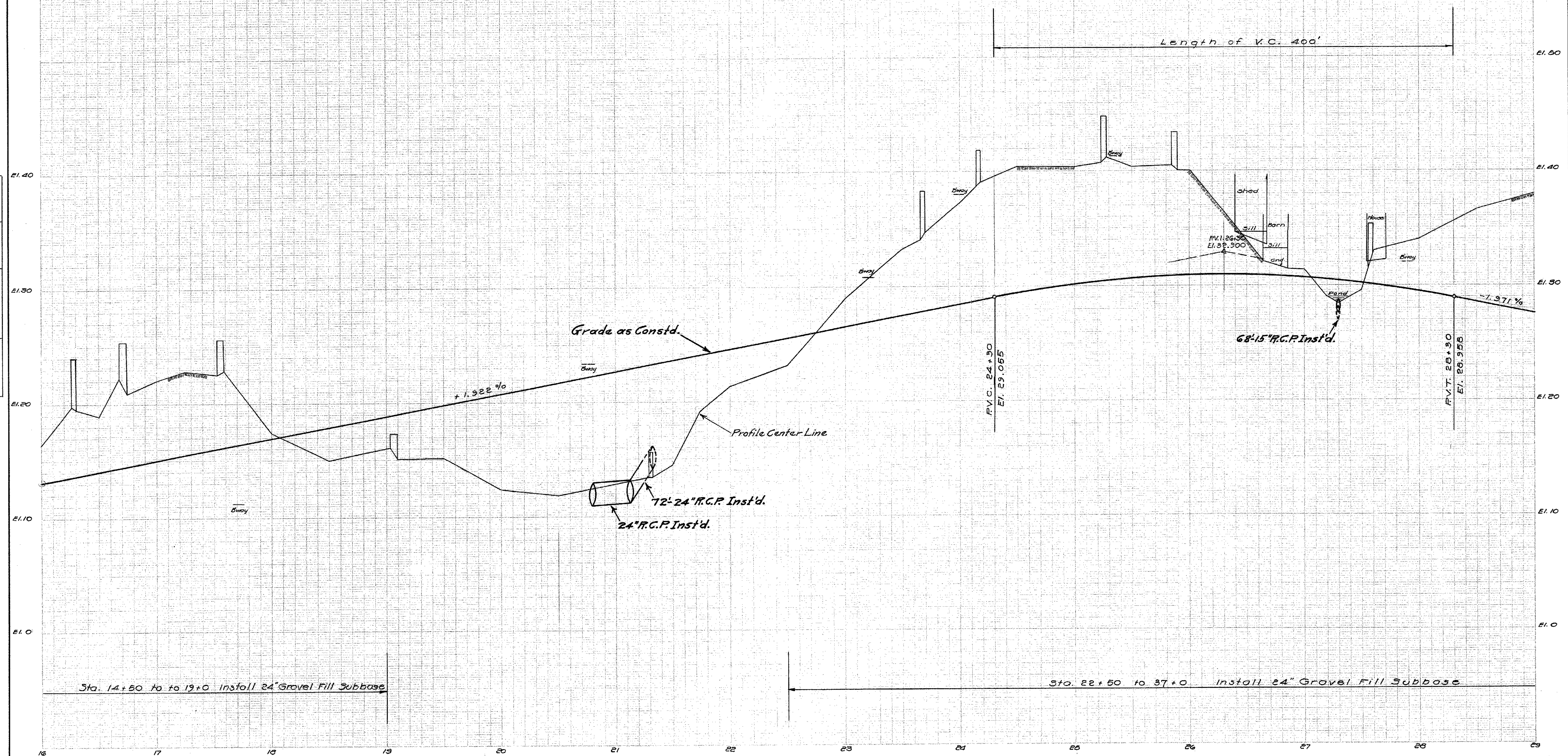


NO.	Plotted	Grades plotted	Grades checked	B. Ms. noted
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				
23				
24				
25				
26				
27				
28				
29				
30				
31				
32				
33				
34				
35				
36				



FED. ROAD DIST. NO.	STATE	TOWN	FED. AID PROJ. NO.	FISCAL YEAR	ROUTE NO.	SHEET NO.	TOTAL SHEETS
9	CONN.	STONINGTON	F.A.G.M. 2	1939		10	36

STONINGTON E.G.C.

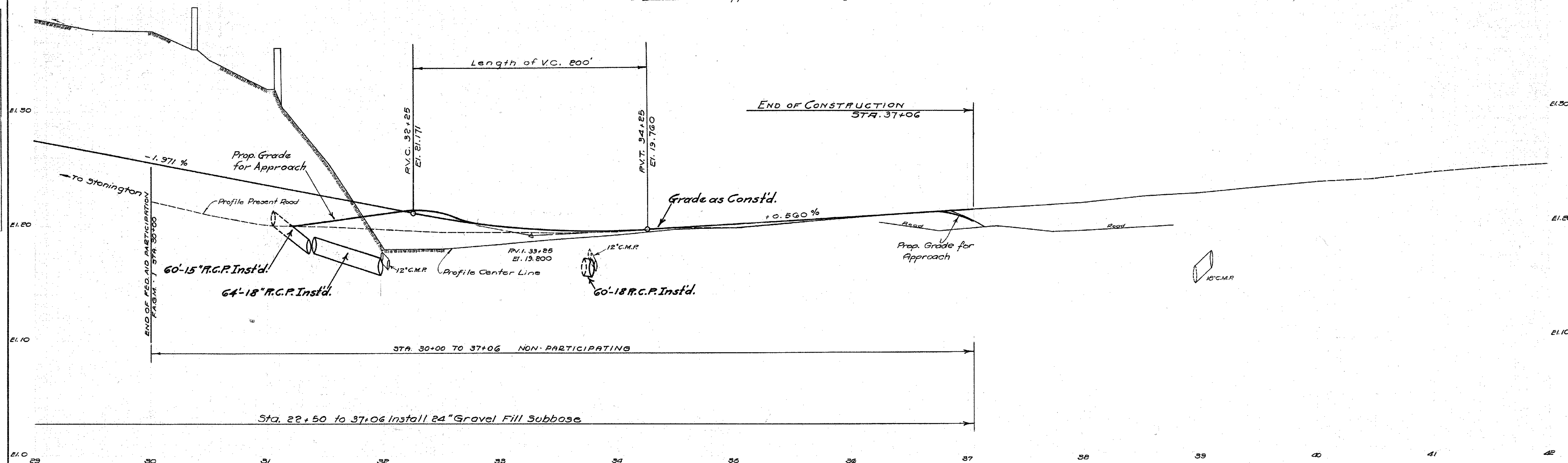
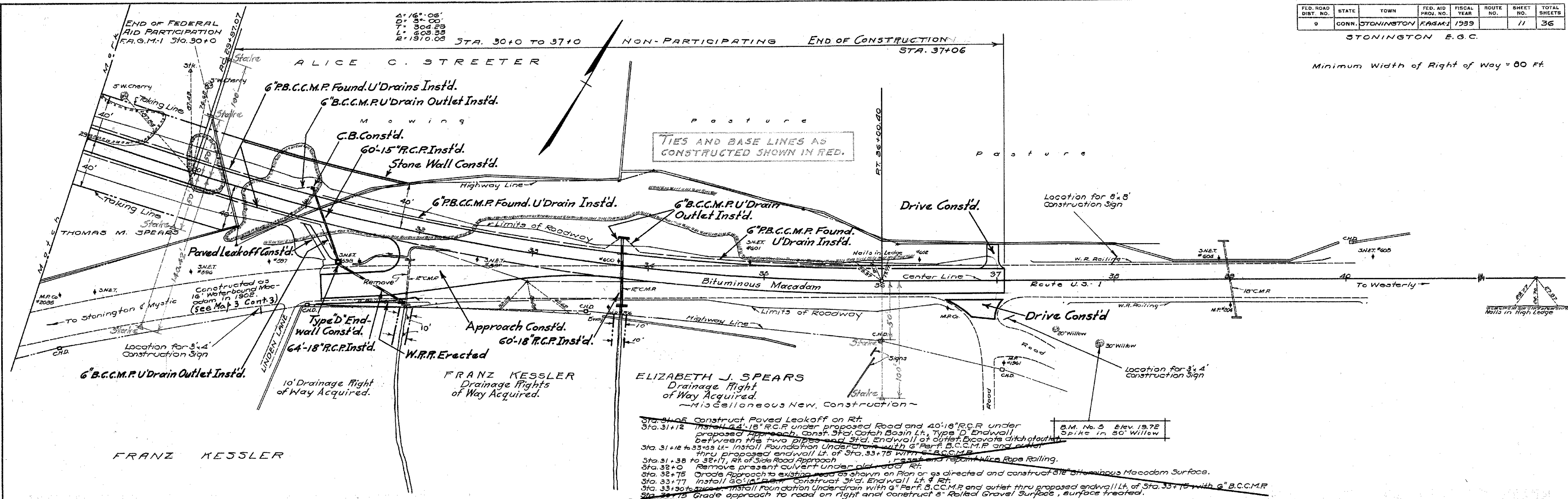




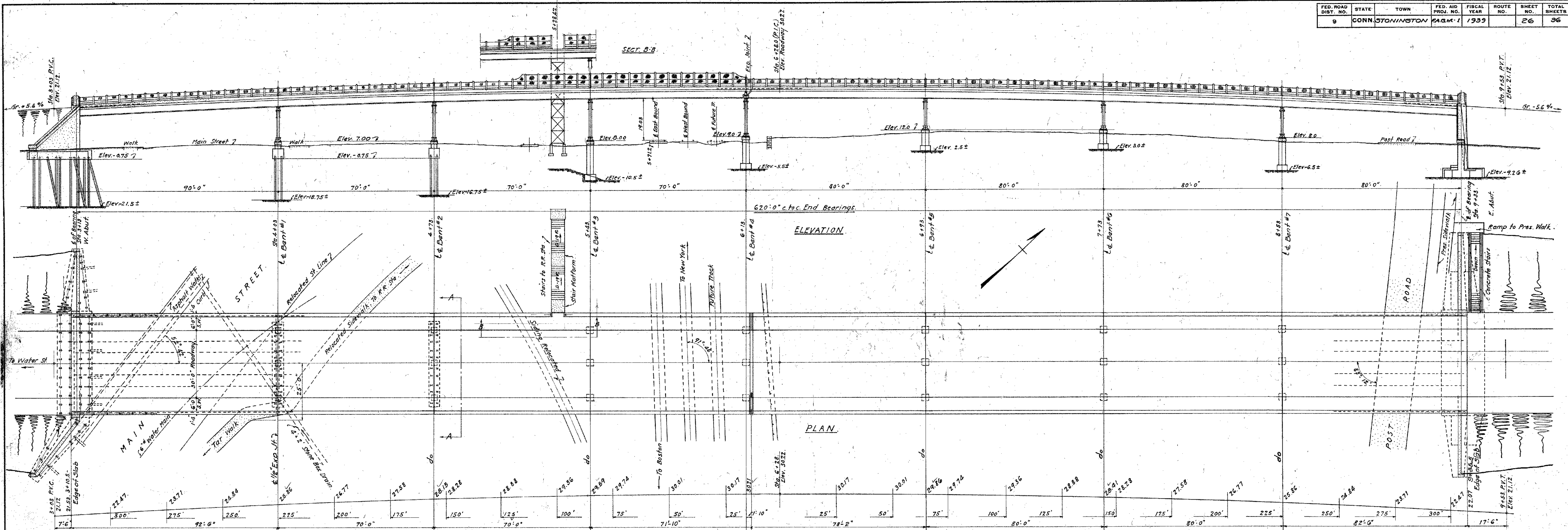
FED. ROAD DIST. NO.	STATE	TOWN	FED. AID PROJ. NO.	FISCAL YEAR	ROUTE NO.	SHEET NO.	TOTAL SHEETS
9	CONN.	STONINGTON	F.A.S.M. 1	1939		11	36

STONINGTON E. G. C.

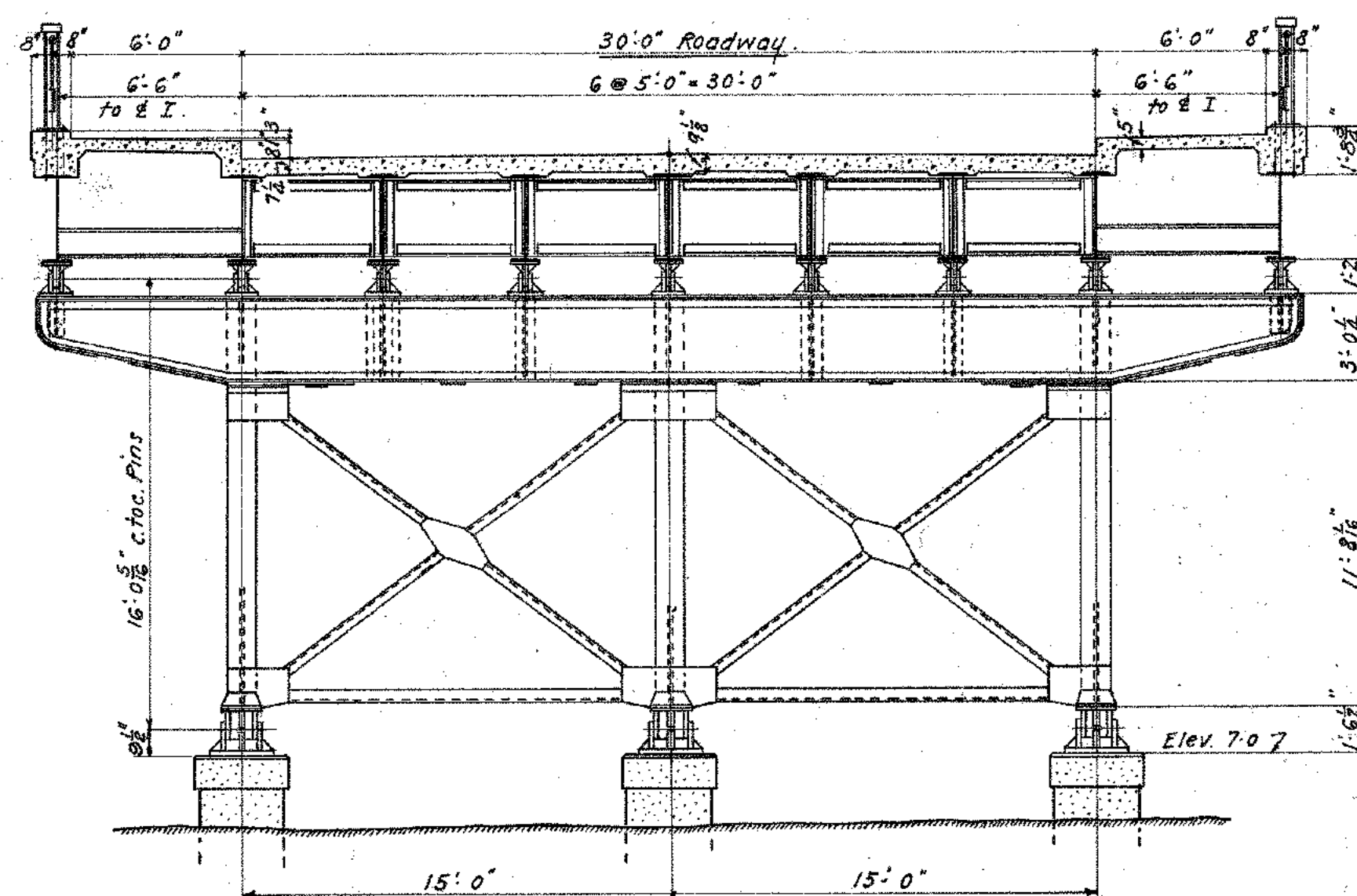
Minimum Width of Right of Way = 80 Ft.



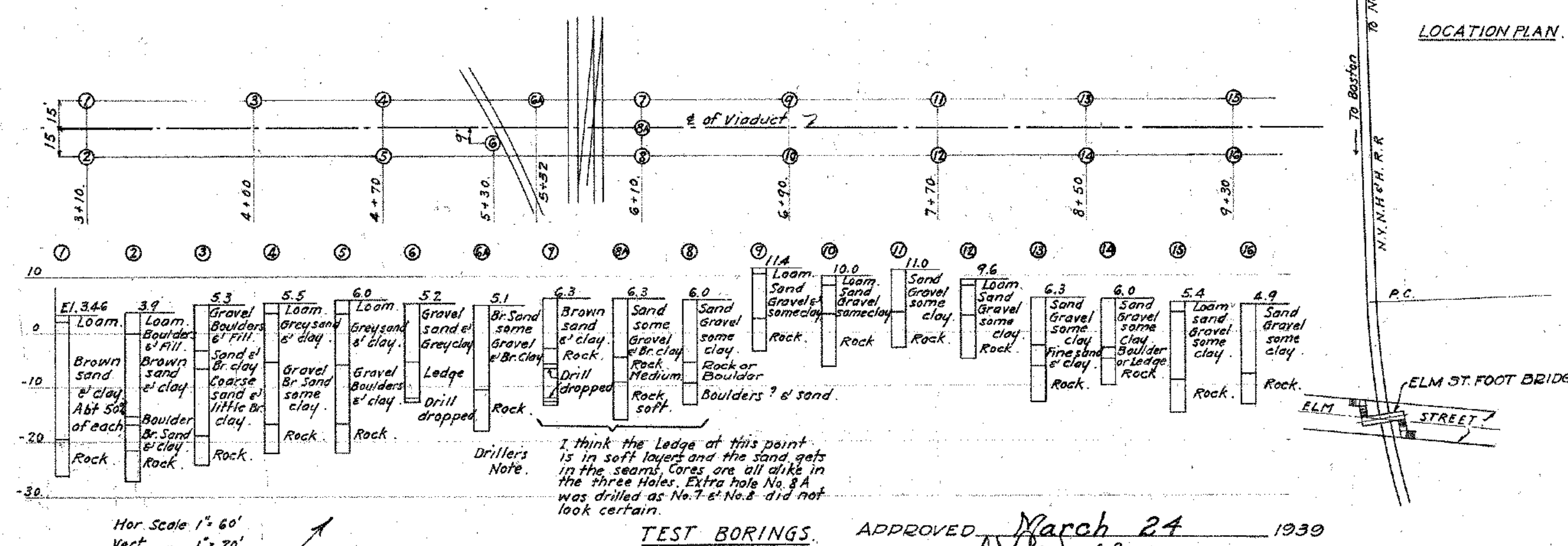




ORDINATES OF VERTICAL CURVE  
(E's on & Rdwy)



SECTION A-A  
(Showing Bent No. 2)



TEST BORINGS

Note: Lengths of piling estimated from Test boring data shown on above schedule.

General Notes: Bridge Notes listed here pertain to Sheets 1 to 3 Specifications: Conn. State Highway Dept. 1935 Live Load: H-20 Loading, Impact 50/L+125 (Viaduct) 100/L+10 (Foot Bridge) Class "A" Concrete to be used thruout except for Concrete End Posts on Viaduct. Reinforcing Steel to consist of Deformed Steel Bars of an approved type. Jt. Filler is to be either cork or rubber. Bevels in Concrete shall be 1" x 1" on Super-structure & Foot Bridge, 1 1/2" x 1 1/2" on Piers and 2" x 2" on Abuts. The Quantities are approximate only and do not relieve the Contractor of the responsibility of checking them in preparing his bid. Paint. One shop coat of Red Lead and two field coats, color to be determined later. All back filling in front of abutments shall be completed before any fill in back of abutments is placed.

Notes for Sheet 2, 3, & 4 Broken Stone for Drains to be Grade "C" Size "A" Cost of 4" C.I. Pipe for Drains to be included in General Cost of Contract Waterproof Paint (2 coats Asphalt) is to be applied to back of Abut. from Top of Footing to Top of Backwall and on back of Wings from Top of Footing to within one foot of Top of Wing. All Reinf. Bars in East Abut. & Wings to be prefixed "E" and all Bars for West Abut. & Wings to be prefixed with "W".

SUMMARY OF BRIDGE QUANTITIES

ITEM	UNIT	AMOUNT
Bridge Excavation	C.Y.	2432
Class "A" Concrete	C.Y.	1888
1/2" Jt. Filler (cork or rubber)	S.F.	717
Deformed Steel Bars	LBS.	212575
Structural Steel	LBS.	1267175
Steel Sheet Piling (Left in place)	LBS.	75000
Steel Castings	LBS.	41500
Steel Bearing Piles	LBS.	113890
Driving Steel Bearing Piles	L.F.	2330
Loading Test Piles	No.	2
Running Test Piles	No.	2
Running Test Piles	No.	2
Iron Bridge Railing for Viaduct	L.F.	1039' 6"
Woven Wire Fencing	L.F.	210' 6"
Iron Pipe Railing for Foot Bridge	L.F.	260' 6"
Woven Wire Fencing for Foot Bridge	L.F.	149' 6"
Copper Flashing	LBS.	269
Drains (for Viaduct)	Ea.	12
Drains (for Foot Bridge)	Ea.	14
Wrought Iron (for Blast Plates)	Lbs.	7350
Broken Stone (for Drains)	Tons.	260
Portland Cement	Bbls.	2907
Stair Treads 10" x 12" x 6" O.	Ea.	100
Stair Treads 5" x 8" x 6" O.	Ea.	100
Iron Railing for Core	L.F.	63' 6"

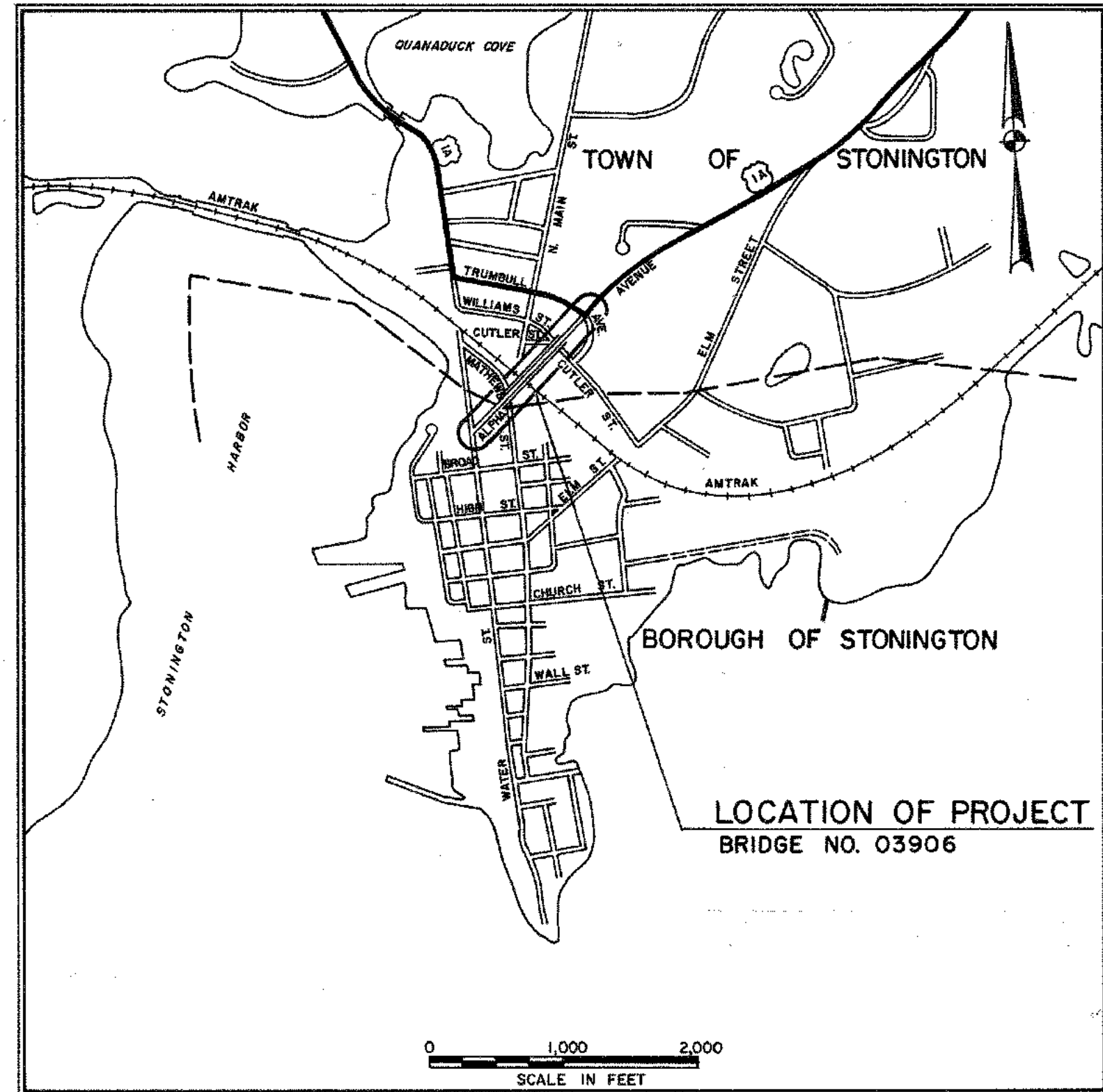
CONNECTICUT  
STATE HIGHWAY DEPARTMENT  
TOWN OF STONINGTON  
PROPOSED  
GRADE CROSSING ELIMINATION  
OVER  
N.Y. N.H. & H. R. R.  
GENERAL DRAWING

REVISIONS	
NO.	DATE
1.	2/10/39
2.	1/6/40
3.	6/24/40

MADE BY R.B.D.	DATE 3-4-39
CHECKED BY G.S.J.	DATE 3-23-39
APPROVED	DATE

APPROVED March 24 1939  
ENGINEER OF BRIDGE DESIGN  
APPROVED March 24 1939  
ENGINEER OF BRIDGES & STRUCTURES  
APPROVED 1939  
DEPUTY HIGHWAY COMMISSIONER





LOCATION MAP

# CONNECTICUT DEPARTMENT OF TRANSPORTATION PLAN FOR REHABILITATION OF ALPHA AVENUE VIADUCT IN THE TOWN OF STONINGTON

FROM STA. 0+00.00 TO STA. 12+00.00  
LENGTH 1,200.00 FT.

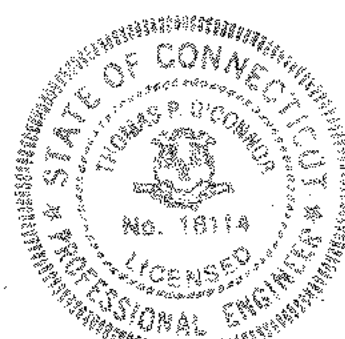
DESIGN SCALES  
PLAN 1 IN. = 40 FT.  
PROFILE HOR. 1 IN. = 40 FT. VERT. 1 IN. = 4 FT.  
CROSS SECTIONS 1 IN. = 5 FT.

OTHER SCALES AS NOTED  
FEDERAL AID PROJECT NO. BHM-3583(3)  
TO BE MAINTAINED BY THE STATE

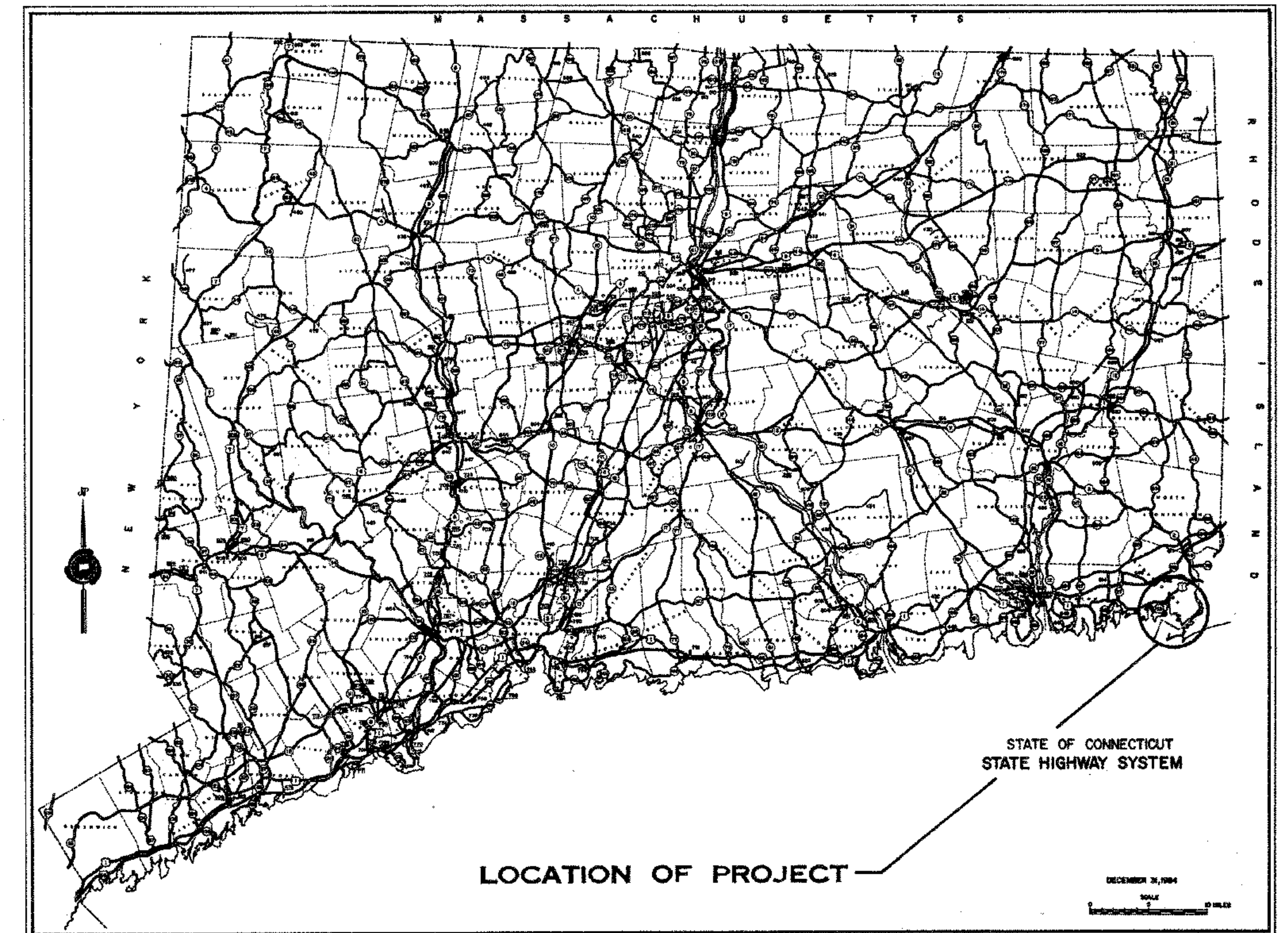
CONSTRUCTION STARTED MARCH 25, 1991  
CONSTRUCTION COMPLETED JULY 8, 1993

LIST OF DRAWINGS		LIST OF STANDARD DRAWINGS		
SHEET NO.	TITLE	DRAWING NO.	STANDARD DRAWINGS	FHWA APPROVAL DATE
1	TITLE SHEET	222-D	SIDEWALKS AND DRIVES	3-22-72
2	DETAILED ESTIMATE SHEET	228-D	STEEL FRAME AND GRATE-TYPE A FOR TYPE "C", "C-6" & "C-L" CATCH BASIN	2-25-76
3-4	TYPICAL CROSS SECTION & MISC. DETAILS	228-C	TYPE "C-L" CATCH BASIN/TYPE "C-L" DROP INLET	2-18-76
5-8	PLANS & PROFILES	228-E	TYPE "C" CATCH BASIN/TYPE "C" DROP INLET	2-18-76
9-42	BRIDGE PLANS	507-D	TYPE "C" CATCH BASIN DOUBLE GRATE-TYPE I, II	7-30-79
43-44	ILLUMINATION PLANS	601-A	FIGURES FOR DATES ON BRIDGE PARAPETS	10-15-86
45-53	CROSS SECTIONS	652-A	METAL & REINFORCED CONCRETE CULVERT END	12-29-78
54-61	TRAFFIC CONTROL PLANS & STAGE CROSS SECTIONS	811-A	CURBING	10-15-86
62-66	EMERGENCY CROSSING PLANS	910-A	METAL BEAM RAIL (TYPE R-B) & (TYPE MD-B)	3-16-79
67-74	TRAFFIC SIGNING PLANS	910-E	METAL BEAM RAIL (TYPE R-I) TREATMENT AT LEADING END OF BRIDGE AND AT FIXED OBJECT	—
		911-B	METAL BEAM RAIL (TYPE R-B) ATTACHMENT TO BRIDGE PARAPET	—
		651-A	TYPICAL C.C.M. PIPE INSTALLATIONS IN EARTH AND ROCK SLOPES AND BEDDING FOR CULVERTS	10-15-86
		925-A	PAVEMENT FOR RAILING	9-1-88
		822-A	PRECAST CONCRETE MEDIAN BARRIER CURB FOR TEMPORARY TRAFFIC CONTROL	4-24-87
		911-F	END ANCHORAGES TYPE II, METAL BEAM RAIL TYPES R-I, MD-I AND R-B	11-87

I ASSUME FULL RESPONSIBILITY FOR THE ACCURACY OF THE REVISIONS TO THE "AS BUILT" TRACINGS



*THP.O.C.* 10/15/93



1988 SPECIFICATIONS, FORM NO. 814 INCLUDING SUPPLEMENT THERE TO DATED JULY 1, 1990 GOVERN ELEVATIONS ON THIS PROJECT ARE BASED ON NATIONAL GEODETIC VERTICAL DATUM OF 1929 (MEAN SEA LEVEL).

TOWN NO. 137  
PROJECT NO. 132

STANDARD CONVENTIONS

Bit. Conc. Lip Curb	Picket Fence	Existing Culvert
Curb stated whether Stone or Conc.	Board Fence	Proposed Culvert
Stone Wall	Wire Fence	House
Concrete Walk	Crane Arbor	Barn
Walk - Top, Gravel or Earth	Retaining Wall	Swamp
Name of Co.	Open Ditch	Gas Pump
Existing RR. Tracks	Telegraph Telephone or Electric Light Poles	Random Stone
Proposed R.R. Tracks	Guide Rail Note Type	D.O.T. Mon.
Taking Line	Ledge or Rock	Existing C.B.
Taking Line NA or EA Line	Decid. Ever. out Trees green	Proposed C.B.
Easement Line	Pole M.M.	Existing Travel Path
Property Line	Rivers, Lakes, Flowing Stream, etc.	
Town Line	North Point	

BRIDGE NO. 03906

DESIGNED BY:

MAGUIRE GROUP INC.

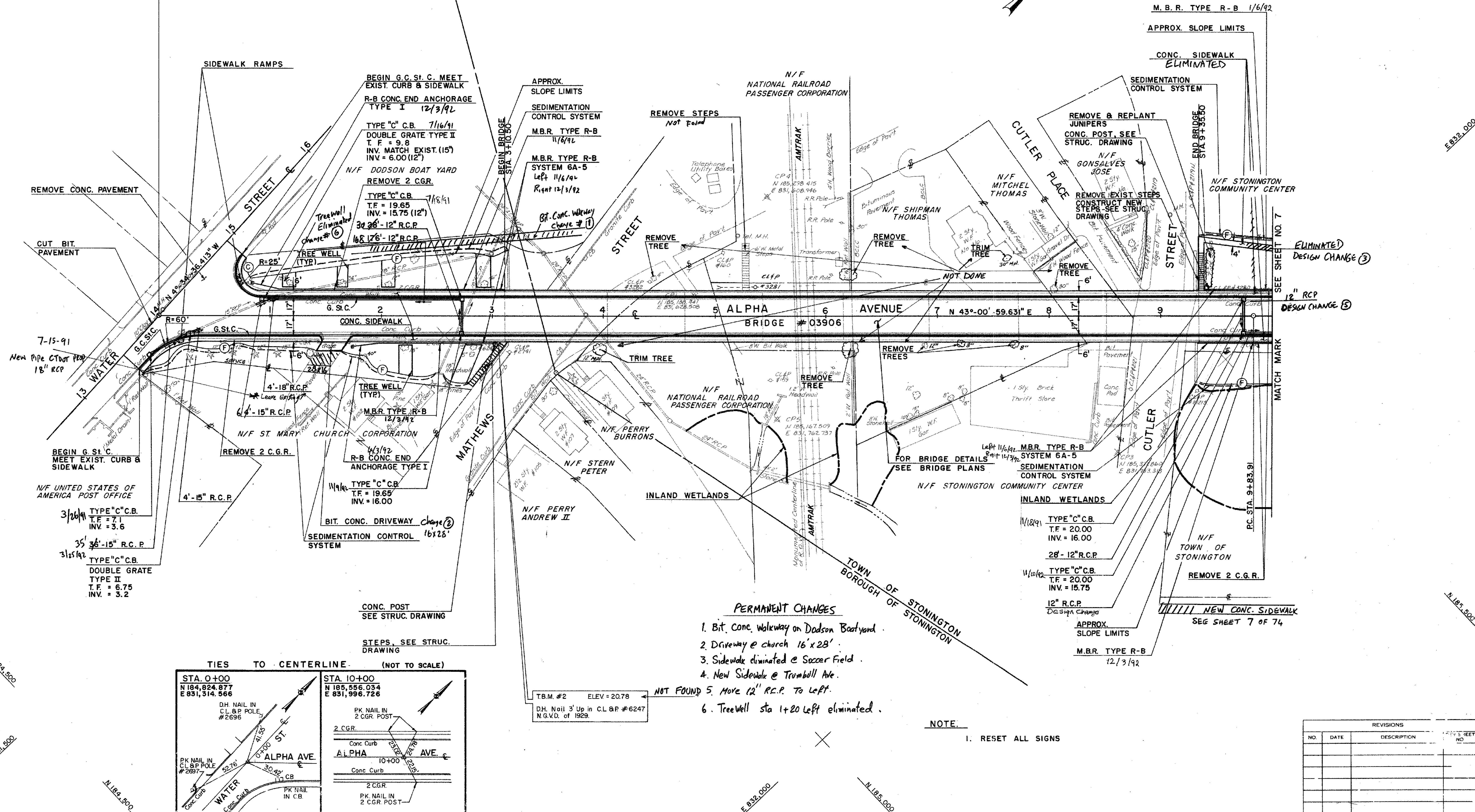
PER: *Yusuf A. Gonen*  
Yusuf A. Gonen, Vice President  
Conn. Prof. Eng. Reg. No. 6130

DATE: 7/3/90



BRIDGE LOG NO. 03906

# REHABILITATION OF ALPHA AVENUE VIADUCT



NOTE:

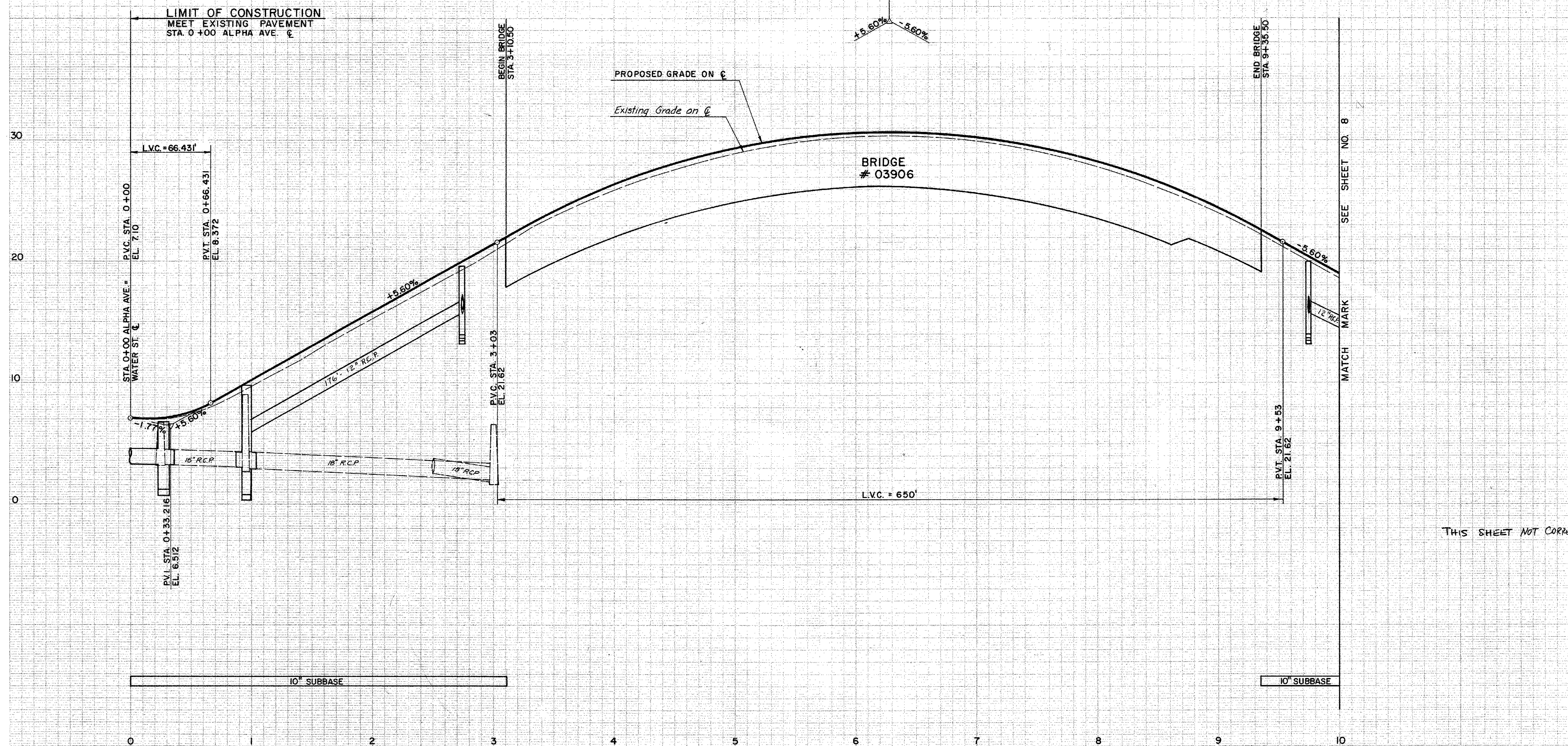
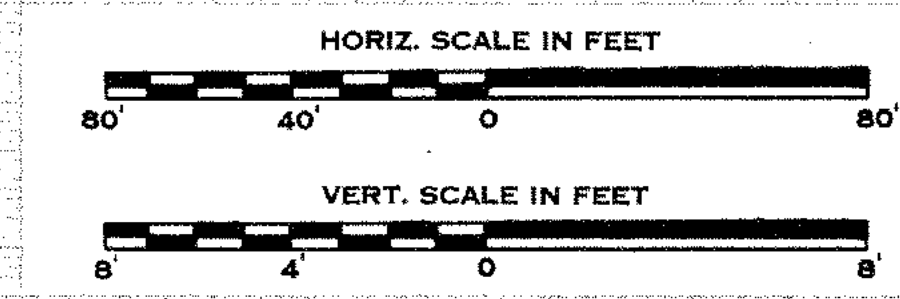
1. RESET ALL SIGNS

[illegible]



F.W.D. A. REGION NO.	STATE	TOWN	FED. AID PROJ. NO.	PROJ. NO.	YEAR	ROUTE NO.	SHEET NO.	TOTAL SHEETS
1	CONN.	STONINGTON	BHM-3583(3)	137-132	1990	—	6	74

# REHABILITATION OF ALPHA AVENUE VIADUCT

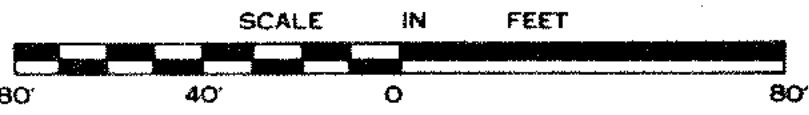


THIS SHEET NOT CORRECTED

PROFILE	NO.	DATE	CHECKED BY	DATE
Surveyed				
Plotted				
Checked				
Reviewed				
New Const. Noted				
Top. Field Chk. Noted				



REHABILITATION OF  
ALPHA AVENUE VIADUCT



LIST OF ABBREVIATIONS

- APPROX. - APPROXIMATE  
BIT. CONC. - BITUMINOUS CONCRETE  
C - CENTERLINE  
G.S.C. - GRANITE STONE CURBING  
G.C.S.C. - GRANITE CURVED STONE CURBING  
C.B. - CATCH BASIN  
M.B.R. - METAL BEAM RAIL  
C.G.R. - CABLE GUIDE RAIL  
C.P. - CONTROL POINT  
EXIST. - EXISTING  
M.H. - MANHOLE  
PAV'T. - PAVEMENT  
R.C.P. - REINFORCED CONCRETE PIPE  
R.C.C.E. - REINFORCED CONCRETE CULVERT END  
G.S.T.C. - GRANITE STONE TRANSITION CURBING  
N.I.C. - NOT IN CONTRACT

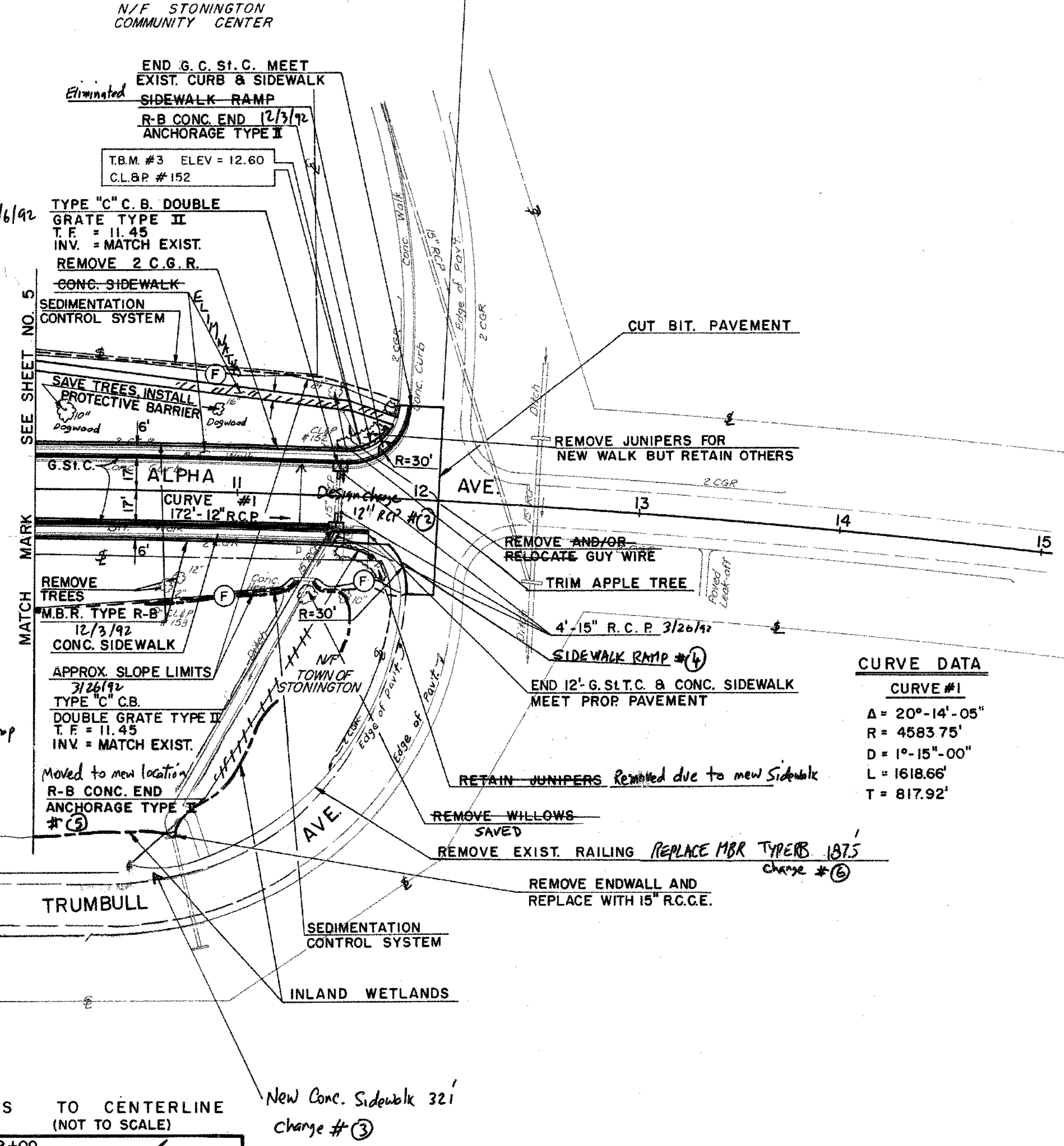
\* Note: Design change for 12" RCP Drainage  
Sta 9+75 Right thru 11+50 Right  
Sta 9+75 Left thru 11+50 Left.  
See Sheet 49-50 of 74

PERMANENT CHANGES

- 1 Eliminate Sidewalk @ Soccer Field.
- 2 Design Change 12" R.C.P. (\*See Note above).
- 3 New Sidewalk @ Trumbull.
- 4 New Sidewalk Ramp.
- 5 Relocated RB cur. Type II Anchor.
- 6 New M.B.R. Type R.B.
- 7 Bit. Conc. Class 1 Ramp.

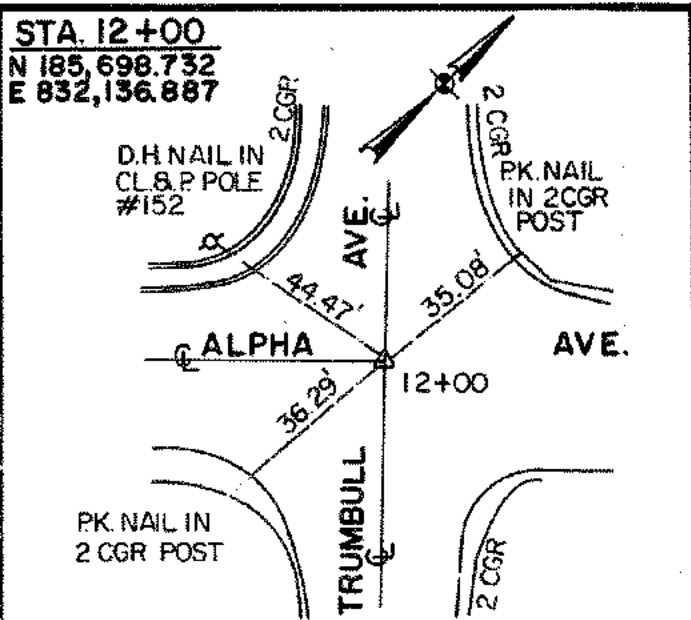
REVISIONS			
NO.	DATE	DESCRIPTION	REV. SHEET NO.

LIMIT OF CONSTRUCTION  
MEET EXISTING PAVEMENT  
STA. 12+00.00 ALPHA AVE. C



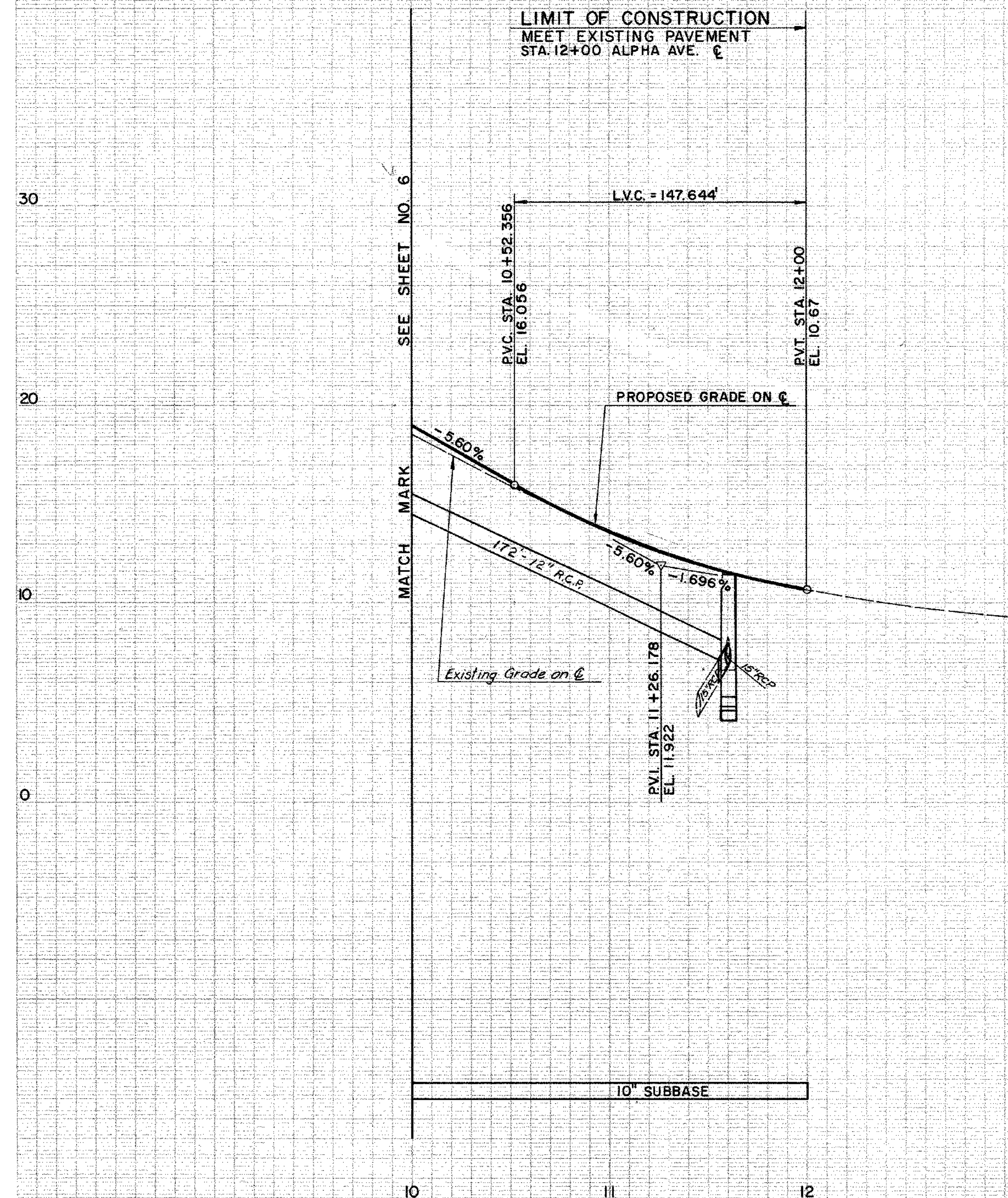
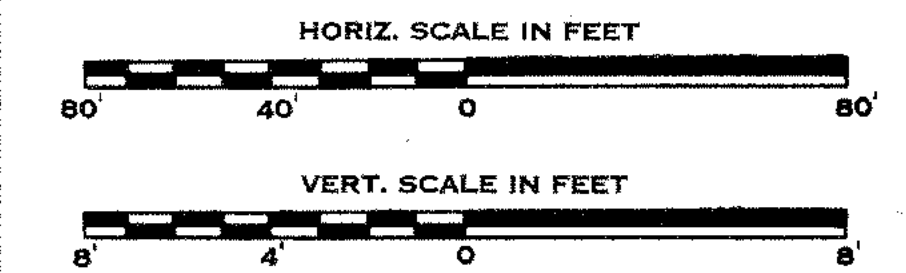
CURVE DATA	
CURVE #1	
Δ = 20°-14'-05"	
R = 4583.75'	
D = 1°-15'-00"	
L = 1618.66'	
T = 817.92'	

TIES TO CENTERLINE  
(NOT TO SCALE)



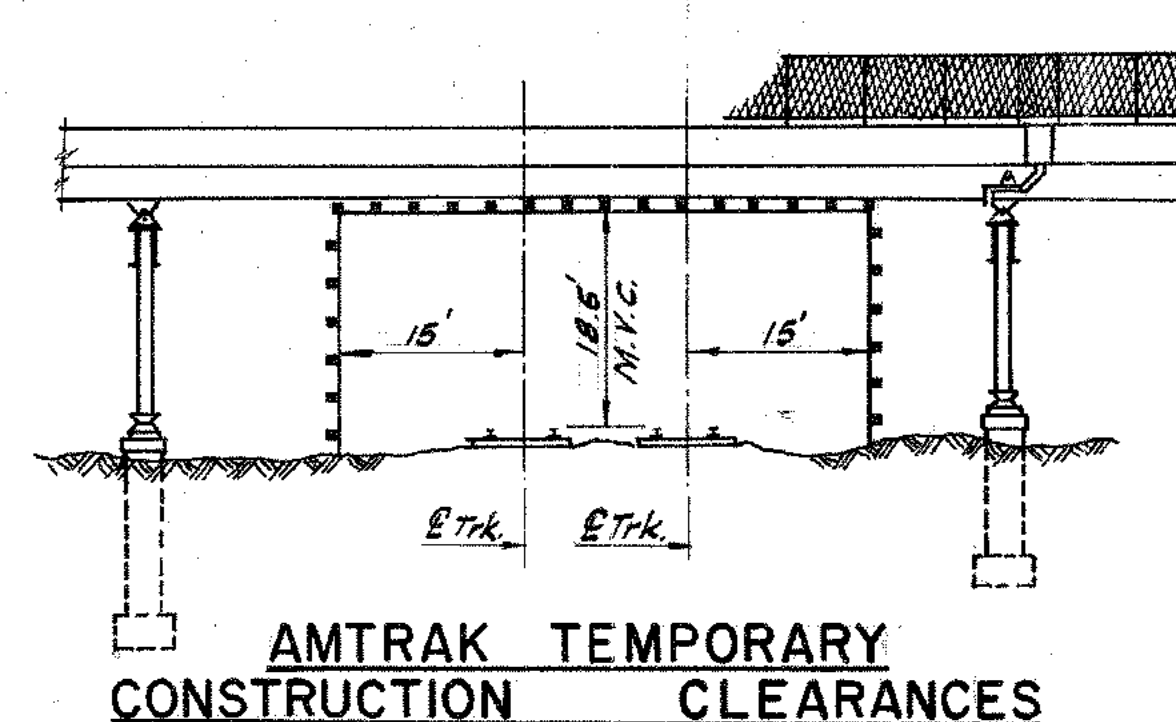
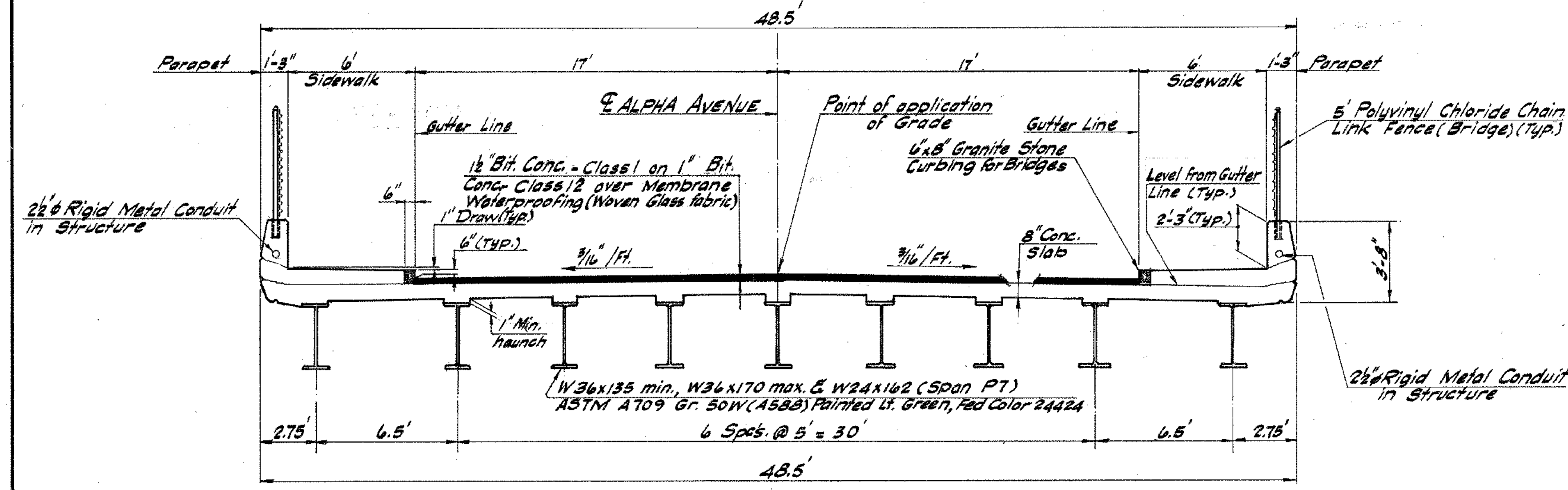
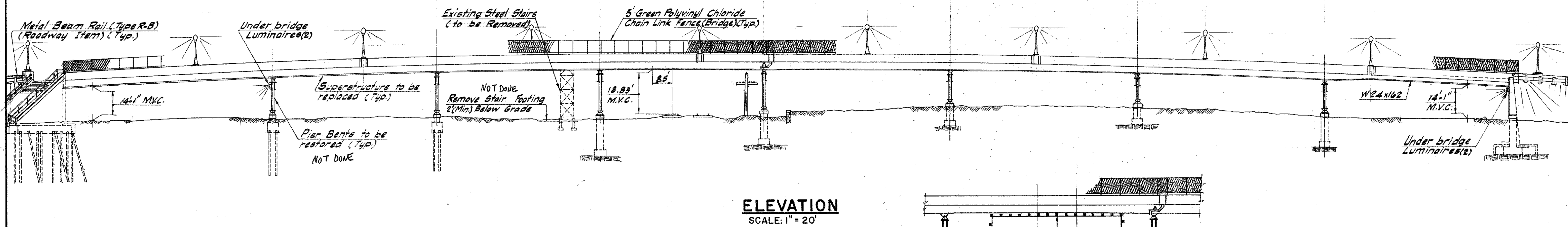
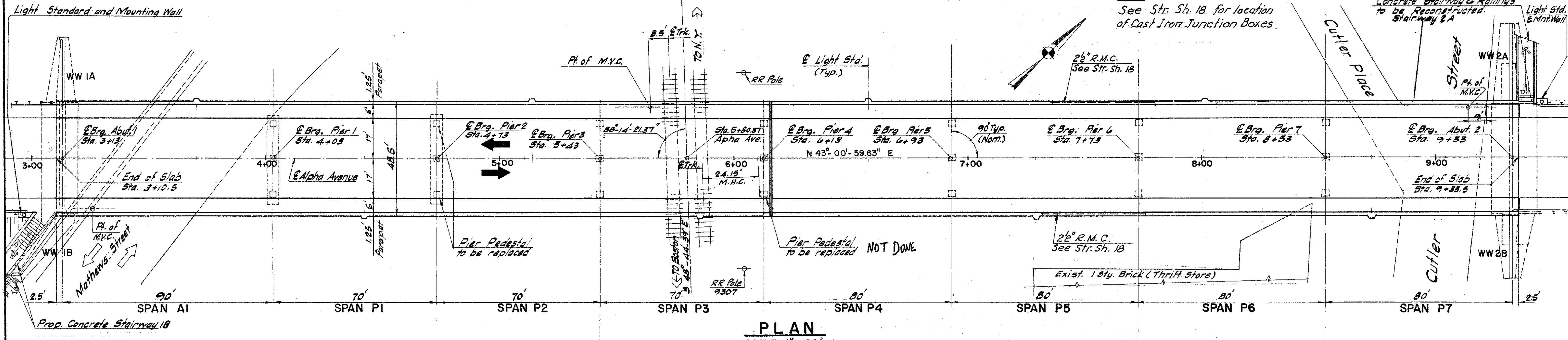
F. HW. A. REGION NO.	STATE	TOWN	FED. AID PROJ. NO.	PROJ. NO.	YEAR	ROUTE NO.	SHEET NO.	TOTAL SHEETS
1	CONN.	STONINGTON	BHM-3583(3)	137-132	1990	—	8	74

# REHABILITATION OF ALPHA AVENUE VIADUCT



THIS SHEET NOT CORRECTED) 0 0





CONCRETE DISTRIBUTION			INSPECTION OF FIELD WELDS		
ITEM	UNIT	QUAN.	METHOD	UNIT	QUANTITY
SUPERSTRUCTURE	C.Y.	1410	ULTRASONIC	IN.	60
SUBSTRUCTURE	C.Y.	4	MAGNETIC PARTICLE	LF.	319
FOOTINGS	C.Y.	215			
TOTAL	C.Y.	1629			

NOTICE TO BRIDGE INSPECTORS

THE DEPARTMENT'S BRIDGE SAFETY PROCEDURES REQUIRE THIS BRIDGE TO BE INSPECTED FOR, BUT NOT LIMITED TO, ALL APPROPRIATE COMPONENTS INDICATED IN THE GOVERNING MANUALS FOR BRIDGE INSPECTION. ATTENTION MUST BE GIVEN TO INSPECTING THE FOLLOWING SPECIAL COMPONENTS AND DETAILS. (THE LISTING OF COMPONENTS FOR SPECIFIC ATTENTION SHALL NOT BE CONSTRUED TO REDUCE THE IMPORTANCE OF INSPECTION OF ANY OTHER COMPONENT OF THE STRUCTURE.) THE FREQUENCY OF INSPECTION OF THIS STRUCTURE SHALL BE IN ACCORDANCE WITH THE GOVERNING MANUALS FOR BRIDGE INSPECTION, UNLESS OTHERWISE DIRECTED BY THE ENGINEER OF BRIDGES AND STRUCTURES.

COMPONENT OR DETAIL	BRIDGE SHEET REFERENCE
Expansion Joint, Beams and Bearings at Pier 4	13, 14 and 15

STATE OF CONNECTICUT  
DEPARTMENT OF TRANSPORTATION

STONINGTON

REHABILITATION OF  
ALPHA AVENUE  
OVER  
MATHEWS STREET, AMTRAK &  
CUTLER STREET

GENERAL PLAN

ENGINEER MAGUIRE GROUP INC.

DESIGNER R.F.V. DRAFTER O.I.T. CHECKER JAD

APPROVED [Signature] DATE 12/28/89

STRUCTURE NO. 137-132-1 BRIDGE LOG NO. 3906 STRUCTURE SHEET NO. 1 of 34

THE INFORMATION, INCLUDING ESTIMATED QUANTITIES OF WORK SHOWN ON THESE SHEETS IS BASED ON LIMITED INVESTIGATIONS BY THE STATE AND IS IN NO WAY WARRANTED TO INDICATE THE TRUE CONDITIONS OR ACTUAL QUANTITIES OR DISTRIBUTION OF QUANTITIES OF WORK WHICH WILL BE REQUIRED.

F.H.A. REGION NO.	STATE	TOWN	FED. AID PROJ. NO.	PROJ. NO.	YEAR	ROUTE NO.	SHEET NO.	TOTAL SHEETS
1	CONN.	STONINGTON	BHM-3583(3)	137-132	1990	—	10	74

GENERAL NOTES

SPECIFICATIONS: CONNECTICUT DEPARTMENT OF TRANSPORTATION FORM 814 (1988), AND SPECIAL PROVISIONS.

DESIGN SPECIFICATIONS: STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES (AASHTO - 1989), AS SUPPLEMENTED BY THE CONNECTICUT DEPARTMENT OF TRANSPORTATION BRIDGE MANUAL (1985), WITH REVISIONS UP TO AND INCLUDING MARCH, 1988.

ALLOWABLE DESIGN STRESSES:

CLASS "F" CONCRETE BASED ON  $f'_c = 4000$  psi  
REINFORCEMENT (ASTM A615 GRADE 60)  $f_s = 24,000$  psi  
STRUCTURAL STEEL (ASTM A709 GRADE 50W (A588)(PAINTED))  $F_t = 27,000$  psi

LIVE LOAD: HS 20-44

COMPOSITE CONSTRUCTION: NO TEMPORARY INTERMEDIATE SUPPORTS SHALL BE USED DURING THE PLACING AND SETTING OF THE CONCRETE DECK SLAB. TEMPORARY SUPPORTS MAY BE USED FOR STRUCTURAL STEEL ERECTION ONLY. LIVE AND SUPERIMPOSED DEAD LOADS WILL BE PERMITTED WHEN DIRECTED BY THE ENGINEER BUT NOT LESS THAN 10 DAYS AFTER THE FINAL PORTION OF DECK SLAB HAS BEEN PLACED.

CLASS "F" CONCRETE: CLASS "F" CONCRETE SHALL BE USED THROUGHOUT.

JOINT SEAL: SEE SPECIAL PROVISIONS

PARAFFIN: THE COST OF FURNISHING AND APPLYING PARAFFIN IS INCLUDED IN THE ITEM FOR CLASS "F" CONCRETE.

EXPOSED EDGES: EXPOSED EDGES OF CONCRETE SHALL BE BEVELED 1" x 1" UNLESS DIMENSIONED OTHERWISE.

STRUCTURAL STEEL: SEE STRUCTURE SHEET NOS. 5&12 FOR ASTM DESIGNATIONS.

REINFORCEMENT: ALL REINFORCEMENT SHALL BE ASTM A615 GRADE 60.

EPOXY COATED REINFORCING BARS: ALL REINFORCEMENT INCLUDING DOWEL BAR SPLICER SYSTEMS SHALL BE EPOXY COATED. THESE BARS SHALL BE INCLUDED IN THE PAY ITEM FOR "DEFORMED STEEL BARS-EPOXY COATED", FOR PERMANENT CONSTRUCTION.

PIER BENT PAINT: PAINT SHALL CONFORM TO THE REQUIREMENTS OF THE SPECIAL PROVISIONS, "ABRASIVE BLAST CLEANING AND FIELD PAINTING OF STRUCTURE" (SITE NO. II). THE COLOR OF TOPCOAT MATERIAL ON THE STRUCTURAL STEEL SHALL CONFORM TO FEDERAL STANDARD COLOR NO. 24424. (APPROXIMATELY THE DEPARTMENT'S STANDARD COLOR NO. 503 (LT. GREEN)).

SUPERSTRUCTURE PAINT: PAINT SHALL CONFORM TO THE REQUIREMENTS OF THE SPECIAL PROVISION, "STRUCTURAL STEEL". THE COLOR OF THE TOPCOAT MATERIAL ON THE STRUCTURAL STEEL SHALL CONFORM TO FEDERAL STANDARD COLOR NO. 24424. (APPROXIMATELY THE DEPARTMENT'S STANDARD COLOR NO. 503 (LT. GREEN)).

BITUMINOUS CONCRETE OVERLAY: THIS SHALL CONSIST OF TWO LIFTS. THE FIRST SHALL BE BITUMINOUS CONCRETE - CLASS 12 (1" THICK) AND THE SECOND SHALL BE BITUMINOUS CONCRETE - CLASS 1 (1 1/2" THICK).

CONSTRUCTION JOINTS: CONSTRUCTION JOINTS, OTHER THAN THOSE SHOWN ON THE PLANS, WILL NOT BE PERMITTED WITHOUT PRIOR APPROVAL OF THE ENGINEER.

DECIMAL DIMENSIONS: WHEN DIMENSIONS ARE GIVEN TO LESS THAN THREE DECIMAL PLACES, THE OMITTED DIGITS SHALL BE ASSUMED TO BE ZEROS.

EXISTING DIMENSIONS: DIMENSIONS OF THE EXISTING STRUCTURE SHOWN ON THESE PLANS ARE FOR GENERAL REFERENCE ONLY. THEY HAVE BEEN TAKEN FROM THE ORIGINAL DESIGN DRAWINGS AND ARE NOT GUARANTEED. THE CONTRACTOR SHALL TAKE ALL FIELD MEASUREMENTS NECESSARY TO ASSURE PROPER FIT OF THE FINISHED WORK AND SHALL ASSUME FULL RESPONSIBILITY FOR THEIR ACCURACY. WHEN SHOP DRAWINGS BASED ON FIELD MEASUREMENTS ARE SUBMITTED FOR APPROVAL, THE FIELD MEASUREMENTS SHALL ALSO BE SUBMITTED FOR REFERENCE BY THE REVIEWER.

GEOMETRY: GEOMETRIC INFORMATION HAS BEEN OBTAINED FROM THE ORIGINAL DESIGN DRAWINGS (STATE PROJECT NO. 137-25 AND FEDERAL AID PROJECT NO. F.A.G.M.111) DATED 1939), THE ORIGINAL SHOP DRAWINGS (DATED 1940) AND SURVEY BY L.C. ASSOCIATES DATED 1989.

TRAFFIC: ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE SPECIAL PROVISIONS "MAINTENANCE AND PROTECTION OF TRAFFIC" AND "PROSECUTION AND PROGRESS".

TRAFFIC LOADS WILL BE PERMITTED WHEN DIRECTED BY THE ENGINEER. FOR ADDITIONAL DETAILS SEE CONSTRUCTION STAGING AND TRAFFIC SHEETS.

CONCRETE COATING/SEALER: PROTECTIVE COMPOUND FOR BRIDGES SHALL CONSIST OF FURNISHING AND APPLYING A PENETRATING SEALER TO EXPOSED CONCRETE SURFACES OF STEPS AND SIDEWALKS AND INSIDE AND TOP FACES OF PARAPETS (SEE SPECIAL PROVISION "PROTECTIVE COMPOUND FOR BRIDGES"). A PROTECTIVE COATING FOR CONCRETE (COLOR: PEARL GREY) SHALL BE FURNISHED AND APPLIED TO EXPOSED CONCRETE SURFACES OF ABUTMENTS, WINGWALLS AND PIER PEDESTALS (SEE SPECIAL PROVISION "PROTECTIVE COATING FOR CONCRETE").

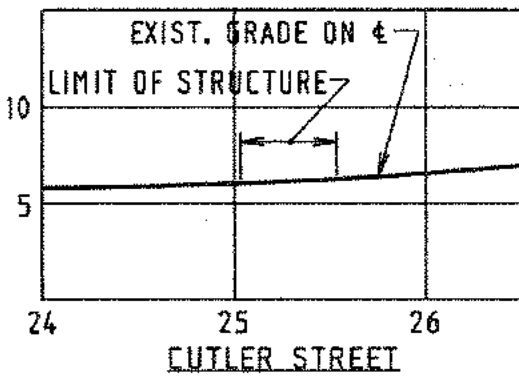
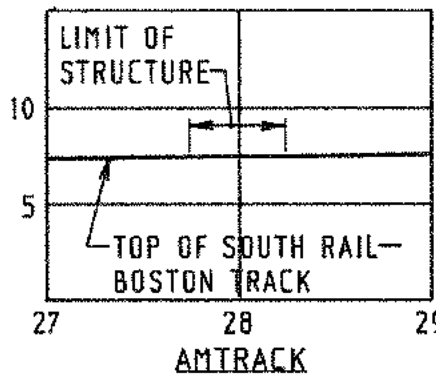
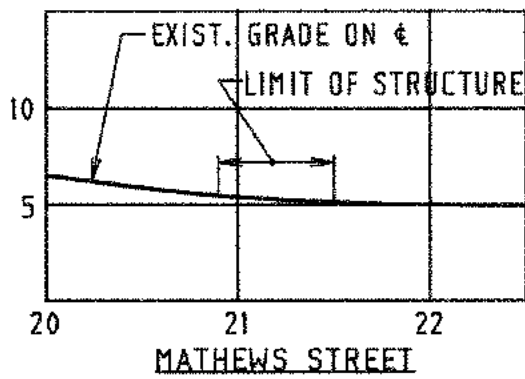
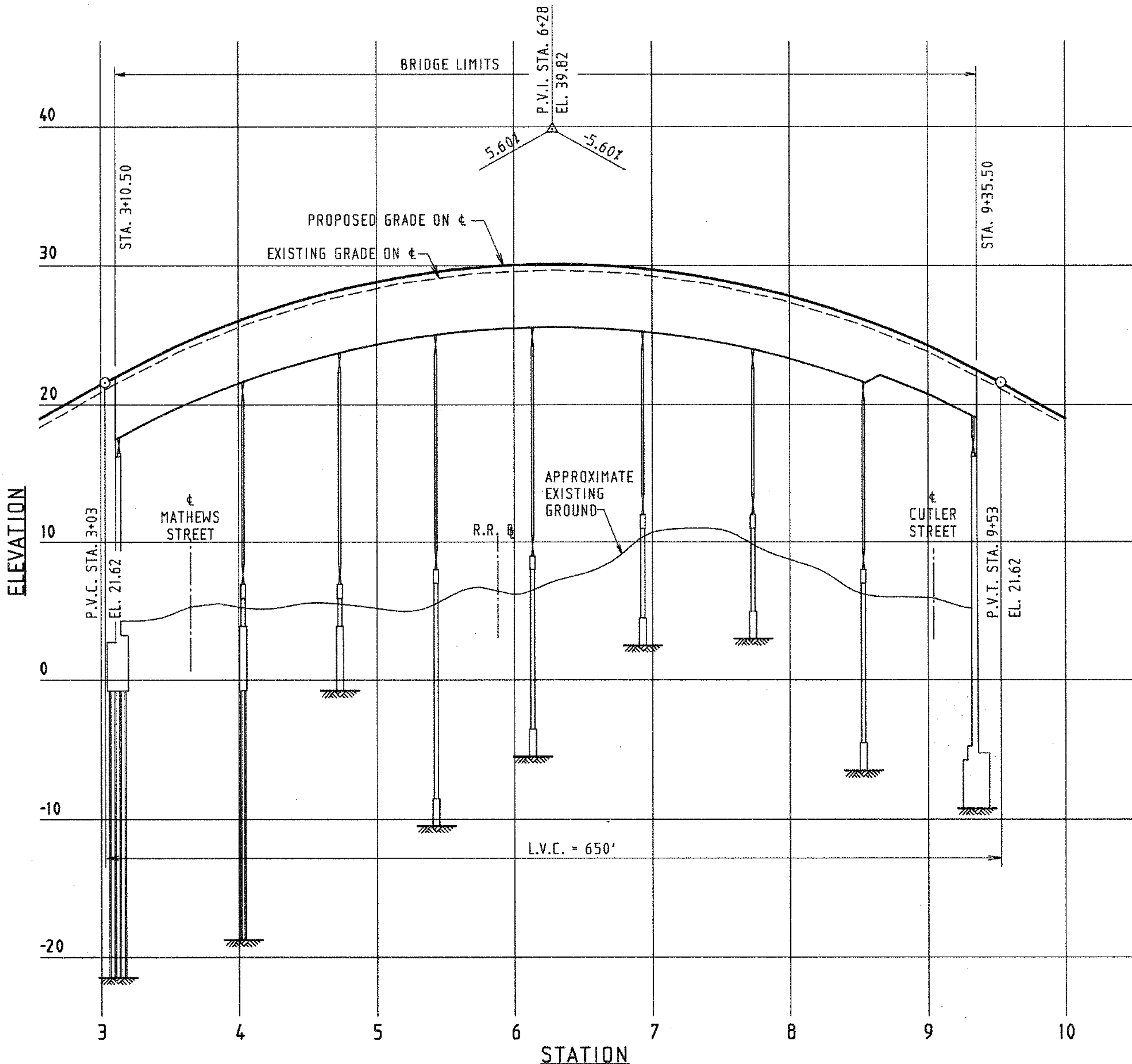
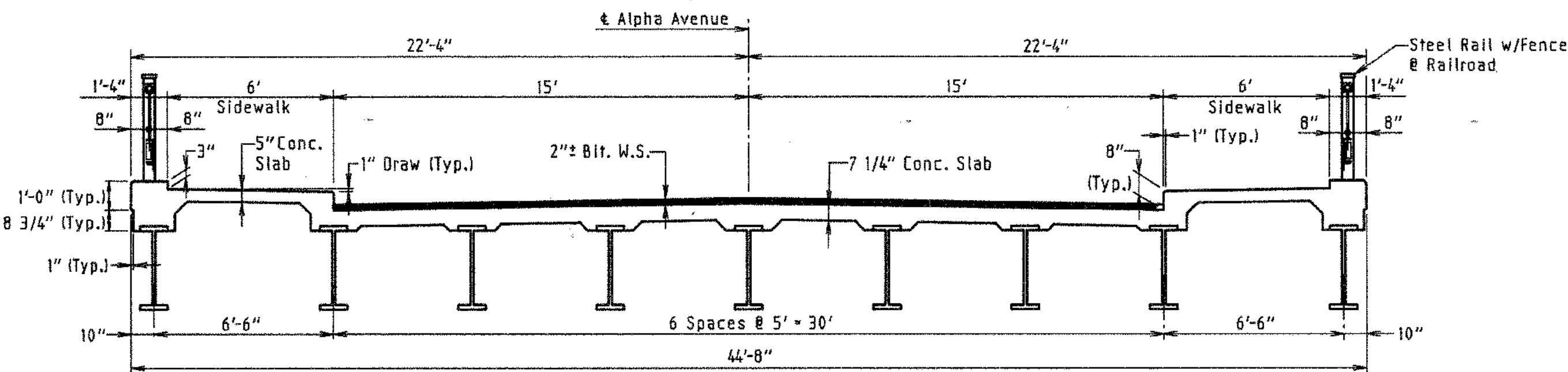
REMOVALS: REMOVAL OF STEEL SUPERSTRUCTURE SHALL START WITH SPAN P3 AND PROGRESS TOWARDS THE ABUTMENTS.

REMOVAL OF THE EXISTING SUPERSTRUCTURE INCLUDING BEAMS, CONCRETE DECK BITUMINOUS WEARING SURFACE, RAILINGS AND FENCES, BRIDGE DRAINAGE AT THE PIERS AND STEEL STAIRS NEAR PIER 3 SHALL BE INCLUDED UNDER THE ITEM "REMOVAL OF SUPERSTRUCTURE".

REMOVAL OF THE EXISTING CONCRETE STAIRS AND FOUNDATIONS, THE STEEL STAIR, FOOTINGS, & PEDESTALS TO THE LIMITS AS SHOWN ON THE PLANS AND THE CONCRETE HEADWALL SHALL BE INCLUDED UNDER THE ITEM "REMOVAL OF EXISTING MASONRY".

ILLUMINATION: CONTRACTOR SHALL MAINTAIN EXISTING LIGHTING DURING STAGES I & II. ILLUMINATION FOR STAGES III & IV SHALL BE PROVIDED BY PERMANENT LIGHTING FIXTURES.

MISCELLANEOUS: THE CONTRACTOR SHALL PROTECT THE EXISTING ONE-STORY BRICK BUILDING (THRIFT STORE) NEAR PIER 7 DURING THE ENTIRE CONSTRUCTION. THE COST OF PROTECTING THE BUILDING WILL NOT BE MEASURED FOR PAYMENT BUT SHALL BE INCLUDED IN THE GENERAL COST OF THE WORK.



PROFILES

SCALE: HORIZ. 1" = 100' VERT. 1" = 10'

QUANTITIES		
ITEM	UNIT	QUANTITY
REMOVAL OF BITUMINOUS OVERLAY	S.Y.	625
STRUCTURE EXCAVATION - EARTH (COMPLETE)	C.Y.	60
PERVIOUS STRUCTURE BACKFILL	C.Y.	55
BITUMINOUS CONCRETE - CLASS 1	TON	200
BITUMINOUS CONCRETE - CLASS 12	TON	135
SAWING AND SEALING JOINTS	L.F.	68
TEMPORARY STAIRWAY	EA.	4
TEMPORARY WALKWAY	L.S.	L.S.
REMOVAL OF SUPERSTRUCTURE	L.S.	L.S.
REMOVAL OF CONCRETE SUPERSTRUCTURE	L.S.	L.S.
TEMPORARY PIER BENT	EA.	8
JACKING EXISTING GIRDERS	EA.	35
SHEAR CONNECTORS	L.S.	L.S.
WELDED STUDS	EA.	168
1 1/2" POLYVINYL CHLORIDE PLASTIC PIPE	L.F.	190
PREFABRICATED EXPANSION JOINT (MOVEMENT CAPACITY 8")	L.F.	49
CLASS "F" CONCRETE	C.Y.	1,415
1" PREFORMED EXPANSION JOINT FILLER FOR BRIDGES	S.F.	32
1" CLOSED CELL ELASTOMER	C.I.	16,000
PROTECTIVE COATING FOR CONCRETE	S.F.	3,250
DEFORMED STEEL BARS	LB.	50,500
DEFORMED STEEL BARS - EPOXY COATED	LB.	240,000
DOWEL BAR SPLICER SYSTEM-EPOXY COATED	EA.	1,252
CONTAINMENT AND COLLECTION OF SURFACE PREPARATION DEBRIS (SITE NO. I)	L.S.	L.S.
DISPOSAL OF DEBRIS (CONTAMINATED)	C.Y.	23
STRUCTURAL STEEL	L.S.	L.S.
DISPOSAL OF DEBRIS (HAZARDOUS)	C.Y.	23
BRIDGE BEARING RESTORATION	EA.	111
REHABILITATION OF EXISTING STRUCTURAL STEEL	CWT.	155
TEMPORARY STEEL PLATES	EA.	4
ABRASIVE BLAST CLEANING AND FIELD PAINTING OF STRUCTURE (SITE NO. I)	L.S.	L.S.
CONCRETE CYLINDER CURING BOX	EA.	1
MEMBRANE WATERPROOFING (WOVEN GLASS FABRIC)	S.Y.	2,460
6"x8" GRANITE STONE CURBING FOR BRIDGES	L.F.	1,250
PROTECTIVE COMPOUND FOR BRIDGES	S.Y.	2300
TEMPORARY PRECAST CONCRETE BARRIER CURB (STRUCTURE)	L.F.	625
TEMPORARY PRECAST CONCRETE BARRIER (15"x34 1/2" (STRUCTURE)	L.F.	1075
5' POLYVINYL CHLORIDE CHAIN LINK FENCE (BRIDGE)	L.F.	1,250
TEMPORARY 5' CHAIN LINK FENCE (BRIDGE)	L.F.	1,800
REMOVAL OF EXISTING MASONRY	C.Y.	50
LIGHT STANDARD (ORNAMENTAL - BRIDGE)	EA.	10
UNDERBRIDGE LUMINAIRE HIGH PRESSURE SODIUM (100 WATT)	EA.	4
1" RIGID METAL CONDUIT IN STRUCTURE	L.F.	70
2 1/2" RIGID METAL CONDUIT IN STRUCTURE	L.F.	1,275
18"x12"x8" CAST IRON JUNCTION BOX	EA.	13

DEFORMED STEEL BARS: PLAIN REINFORCEMENT SHALL BE USED FOR TEMPORARY CONSTRUCTION.  
REMOVAL OF CONCRETE SUPERSTRUCTURE: INCLUDES REMOVAL OF CONCRETE DECK, WEARING SURFACE AND RAILING REQUIRED FOR STAGE I CONSTRUCTION.  
REMOVAL OF BITUMINOUS OVERLAY: INCLUDES REMOVAL OF BITUMINOUS MATERIAL BETWEEN THE PROPOSED TEMPORARY DECK AND THE CENTERLINE OF ALPHA AVENUE.

THIS SHEET NOT CORRECTED

CONNECTICUT DEPARTMENT OF TRANSPORTATION		
STONINGTON		
REHABILITATION OF ALPHA AVENUE OVER MATHEWS STREET, AMTRAK & CUTLER STREET		
GENERAL NOTES, QUANTITIES, PROFILES AND EXISTING CROSS SECTION		
ENGINEER MAGUIRE GROUP INC.		
DESIGNER <i>RFV</i>	DRAFTER T.L.B./A.D.	CHECKER <i>JAD</i>
APPROVED <i>James A. Gorman</i>	DATE 7/3/90	
NO.	DATE	DESCRIPTION
REVISIONS		
STRUCTURE NO. 137-132-1		BRIDGE LOG NO. 03906
		STRUCTURE SHEET NO. 2 OF 34

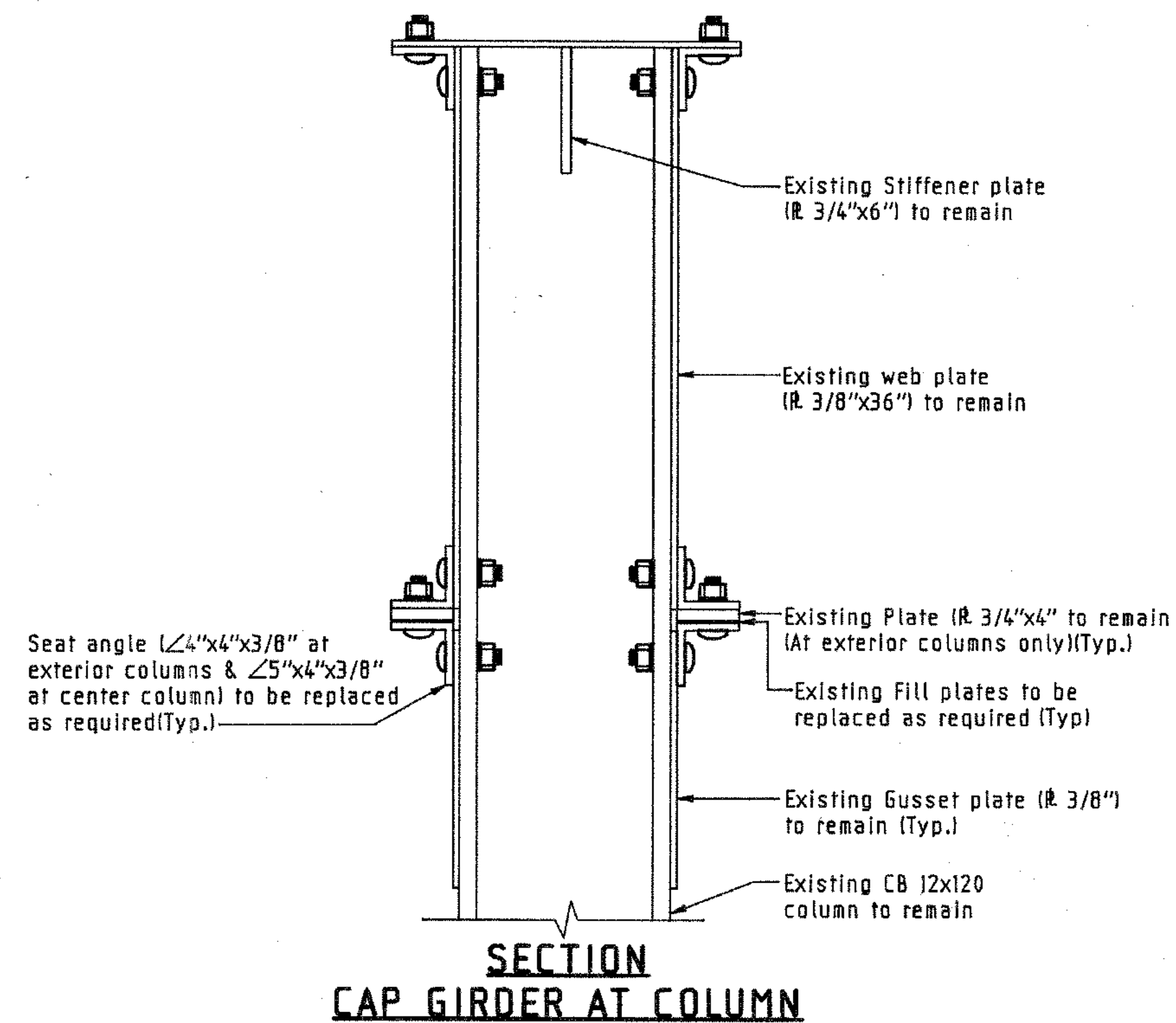
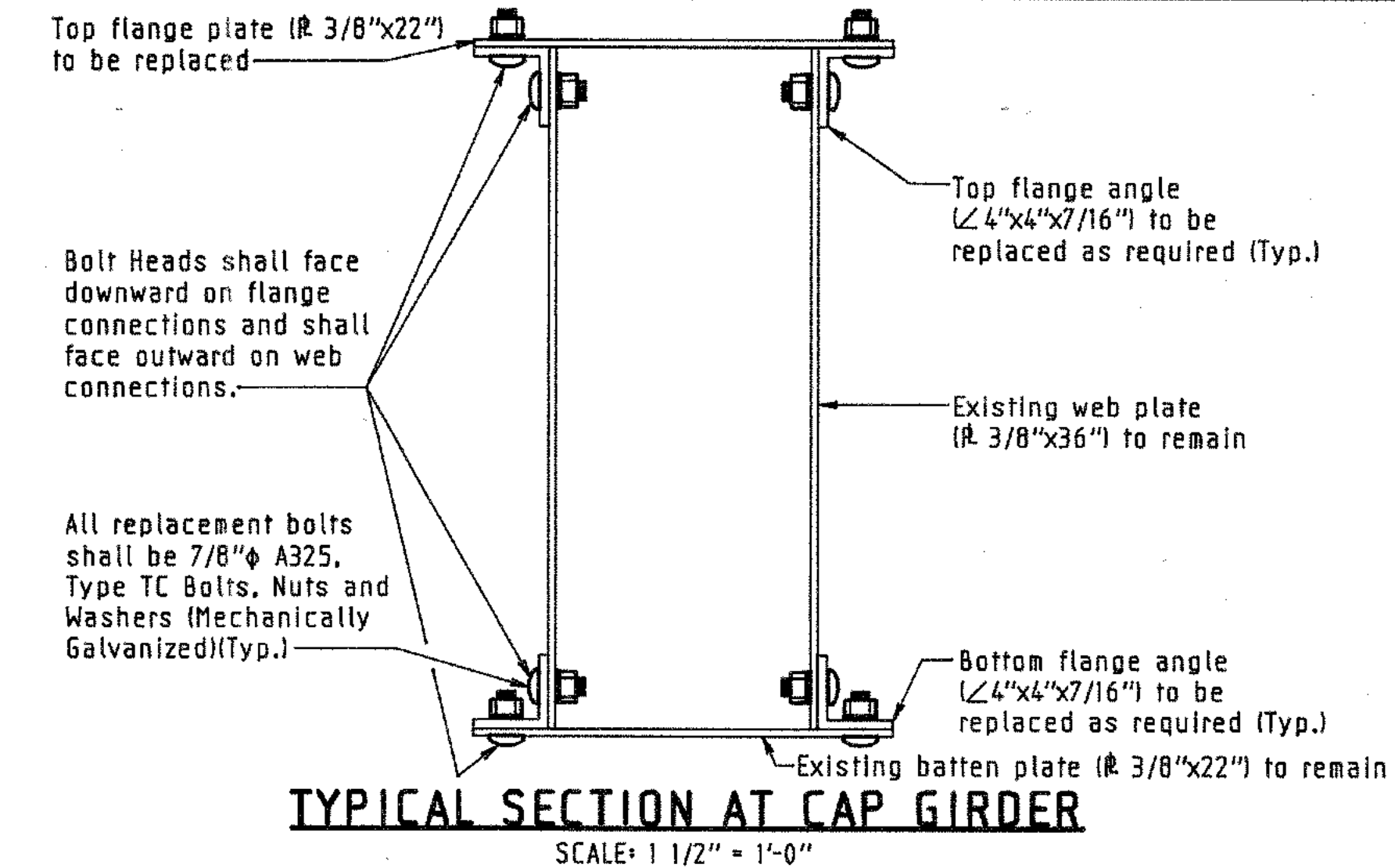
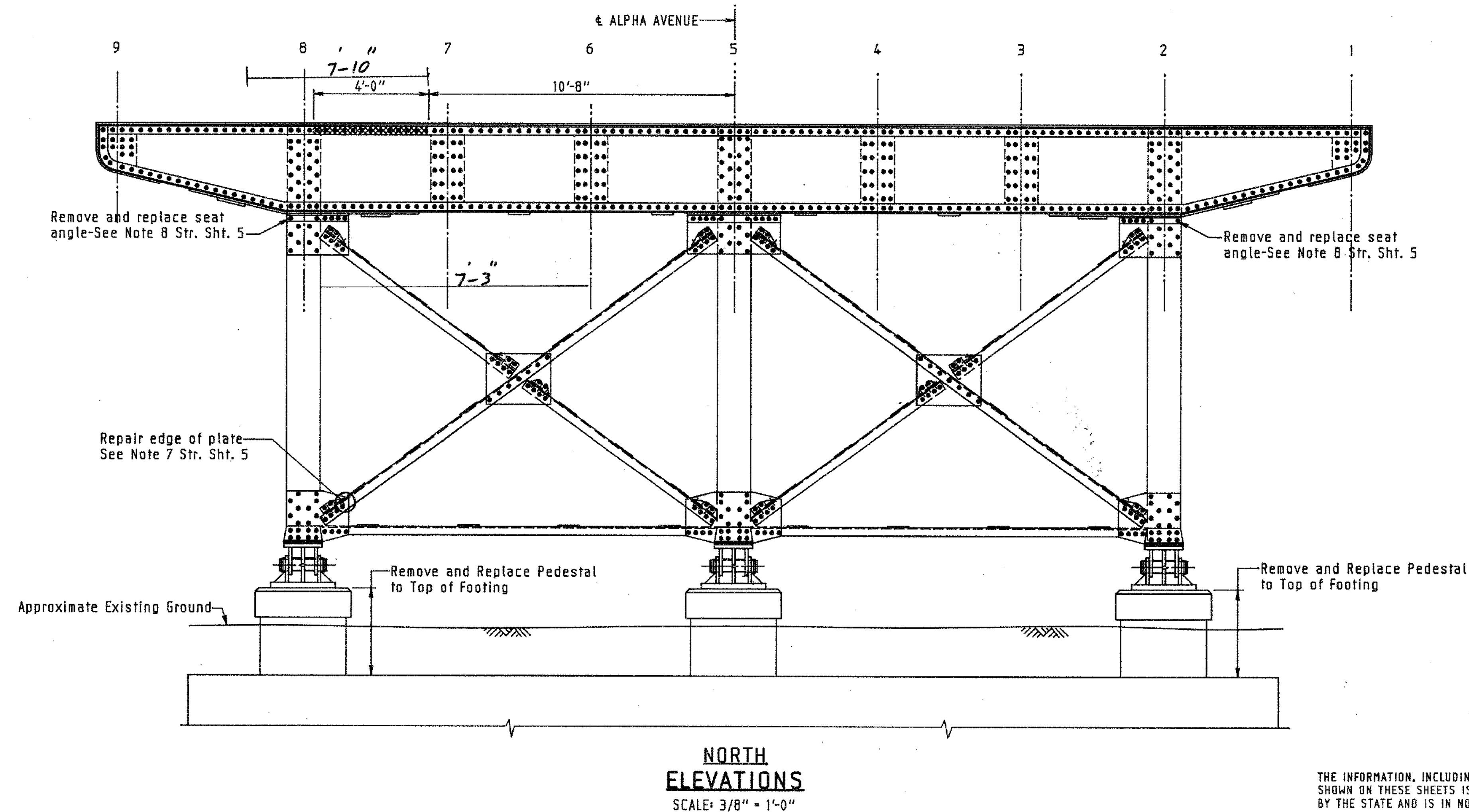
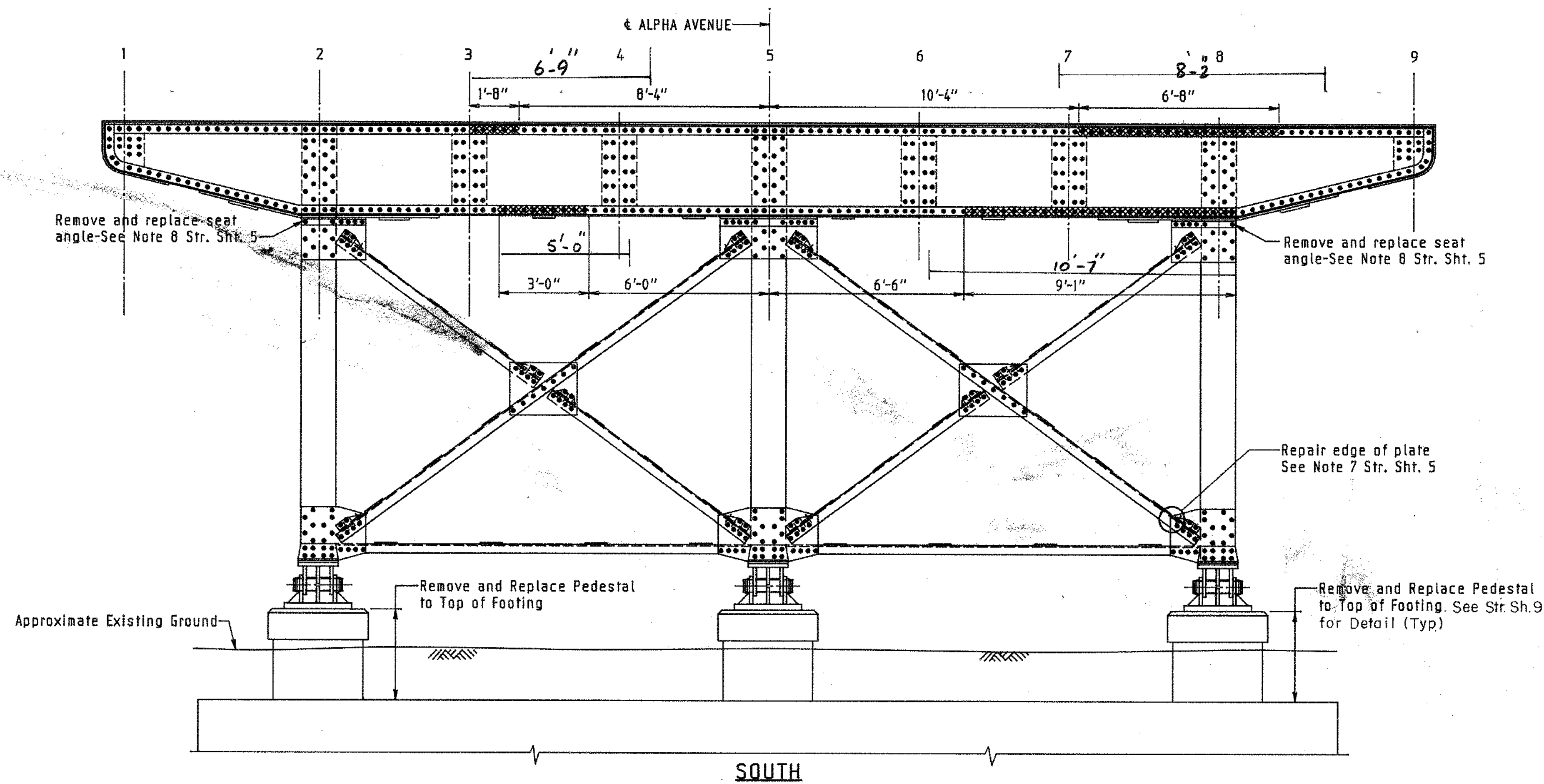








F.H.W.A. REGION NO.	STATE	TOWN	FED. AID PROJ. NO.	PROJ. NO.	YEAR	ROUTE NO.	SHEET NO.	TOTAL SHEETS
1	CONN.	STONINGTON	BHM-3583(3)	137-132	1990	—	14	74



- NOTES: 1. For seat angle repair details see Repair Note 8 Str. Sht. 5.  
2. For additional notes and details see "Typical Section at Cap Girder".

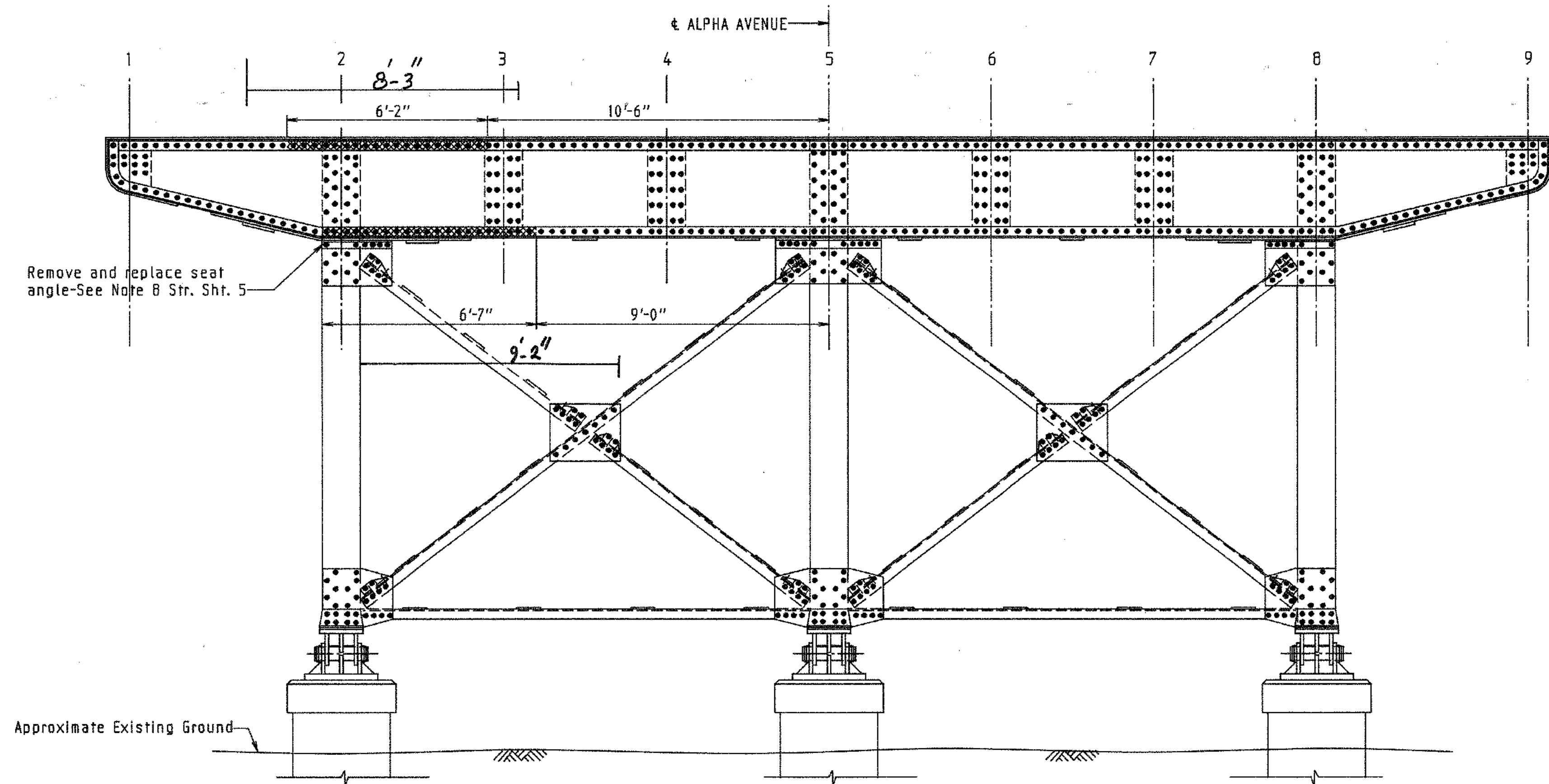
NOTE: FOR ADDITIONAL REPAIRS SEE STR. SHT. 5.

CONNECTICUT DEPARTMENT OF TRANSPORTATION			
STONINGTON			
REHABILITATION OF ALPHA AVENUE OVER MATHEWS STREET, AMTRAK & CUTLER STREET PIER 2			
ENGINEER MAGUIRE GROUP INC.			
DESIGNER	RAV	DRAFTER	AD
CHECKER	JAO		
APPROVED	Jerry D. Gorman	DATE	12/28/89
STRUCTURE NO. 137-132-1		BRIDGE LOG NO. 03906	STRUCTURE SHEET NO. 6 OF 34

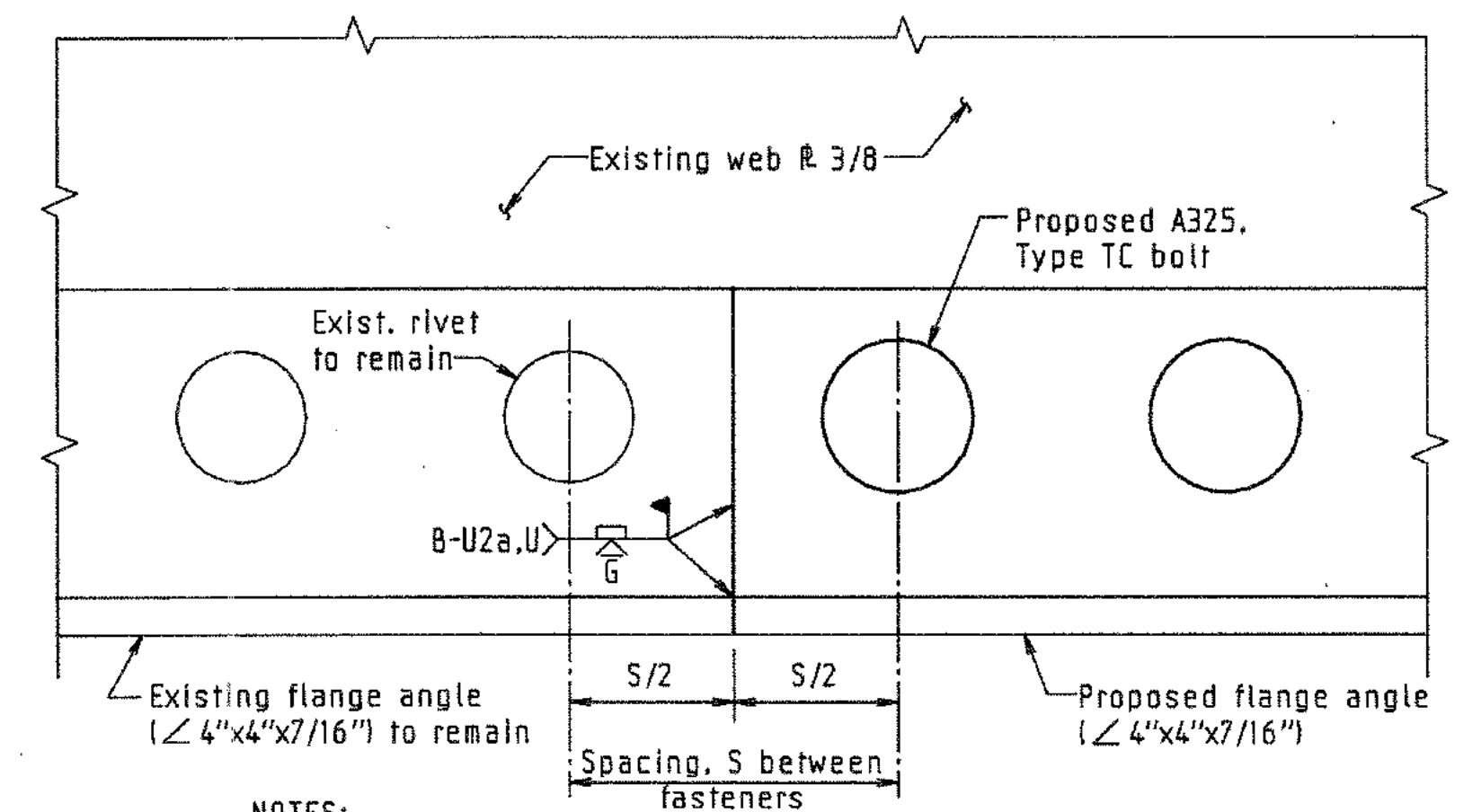
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F.H.W.A. REGION NO.	STATE	TOWN	FED. AID PROJ. NO.	PROJ. NO.	YEAR	ROUTE NO.	SHEET NO.	TOTAL SHEETS
1	CONN.	STONINGTON	BHM-3583(3)	137-132	1990	—	15	74



SOUTH

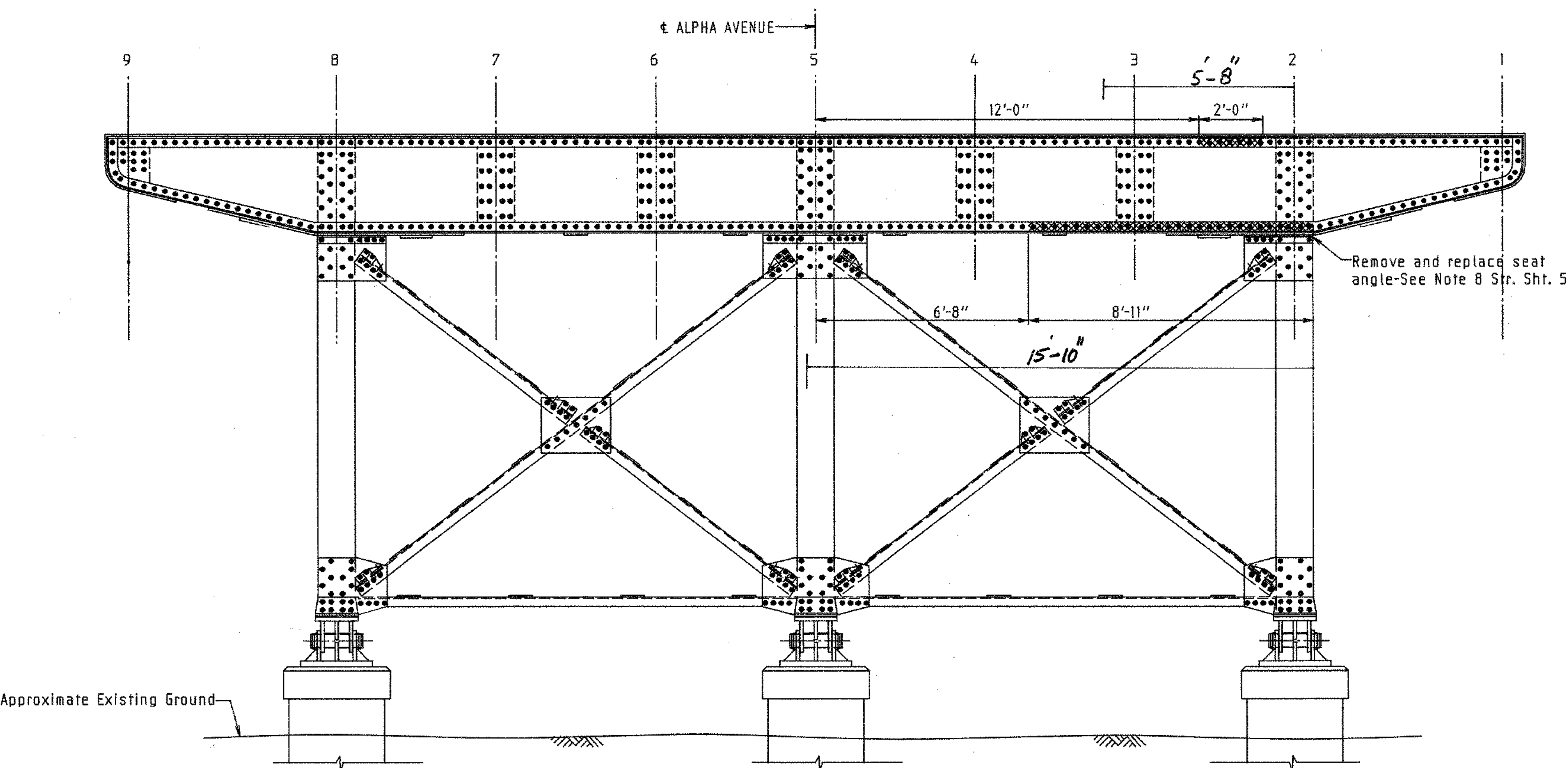


#### NOTES:

1. Repair at bottom flange shown - Repair at top flange similar.
2. Remove backing strip after completing weld.
3. Back gouge and repair weld as required.
4. Grind weld area smooth with adjacent base metal.
5. The weld shall be qualified in accordance with AASHTO/AWS D1.5-88, Section 5.

#### ELEVATION FLANGE ANGLE SPICE DETAIL

HALF SIZE



NORTH  
ELEVATIONS

SCALE: 3/8" = 1'-0"

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NOTES: FOR ADDITIONAL REPAIRS SEE STR. SHT. 5.

CONNECTICUT  
DEPARTMENT OF TRANSPORTATION  
STONINGTON  
REHABILITATION OF  
ALPHA AVENUE  
OVER  
MATHEWS STREET, AMTRAK &  
CUTLER STREET  
PIER 3

ENGINEER MAGUIRE GROUP INC.

DESIGNER *RFV* DRAFTER AD

CHECKER *JAD*

APPROVED *James D. Gorman*

DATE 12/28/89

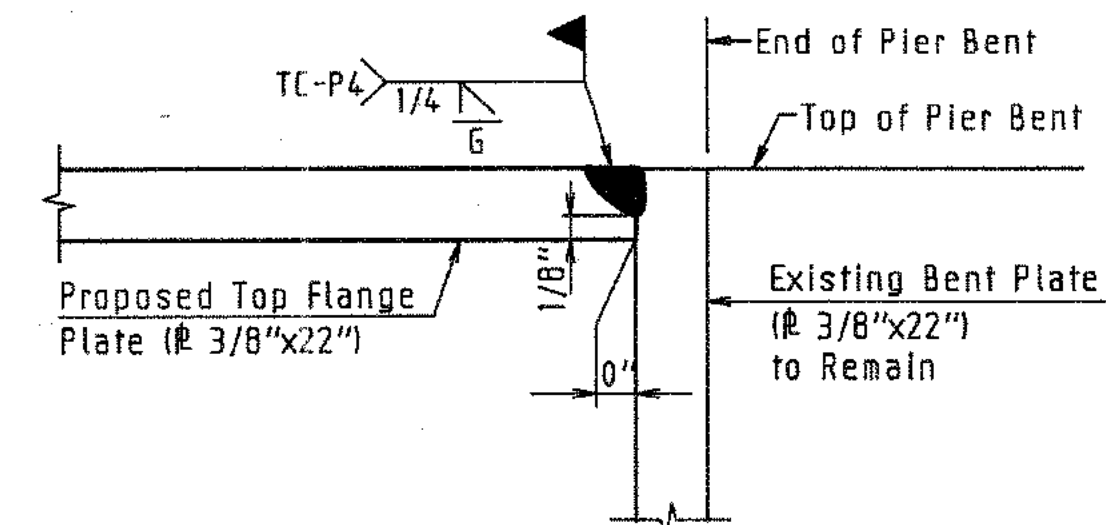
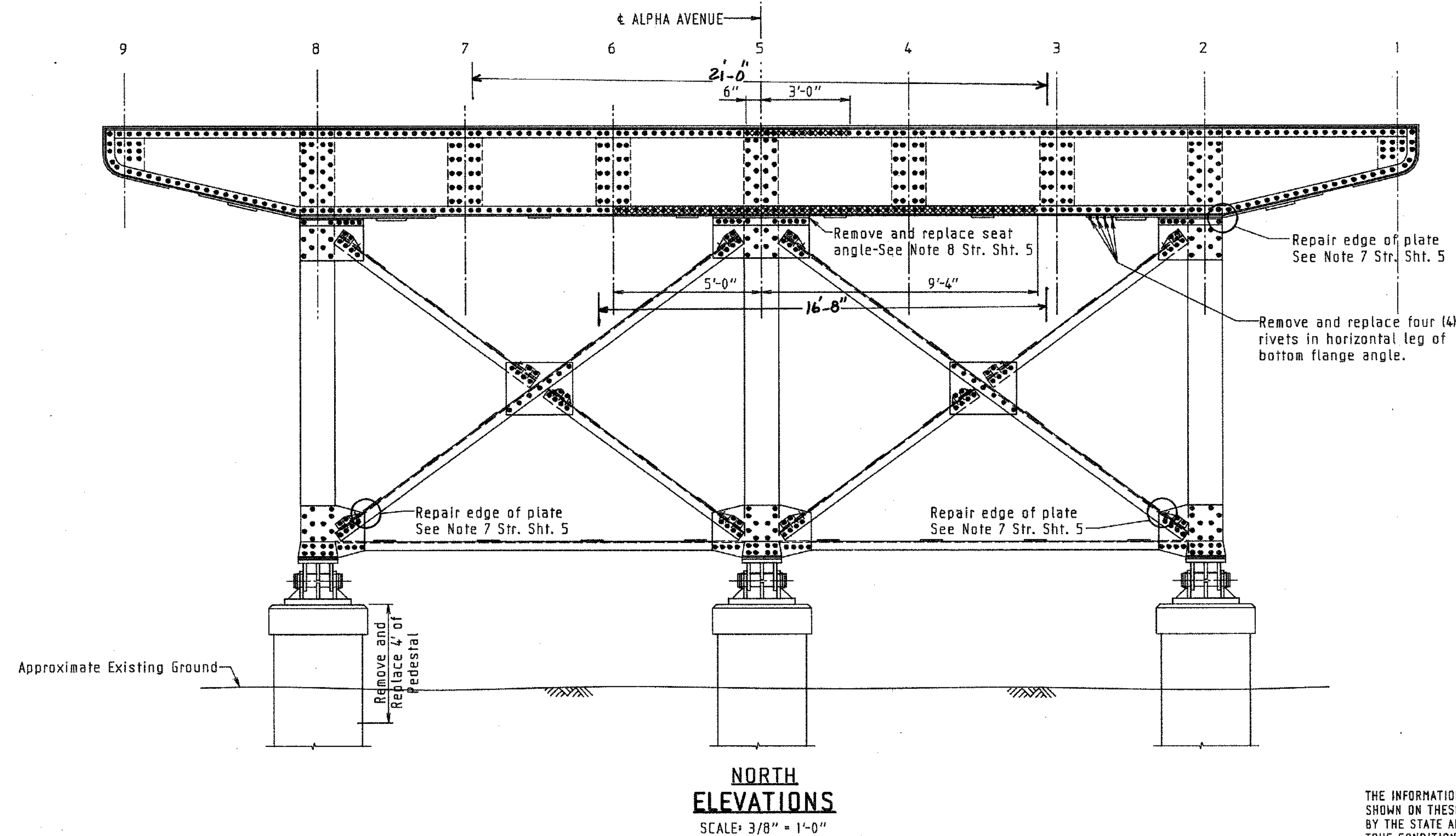
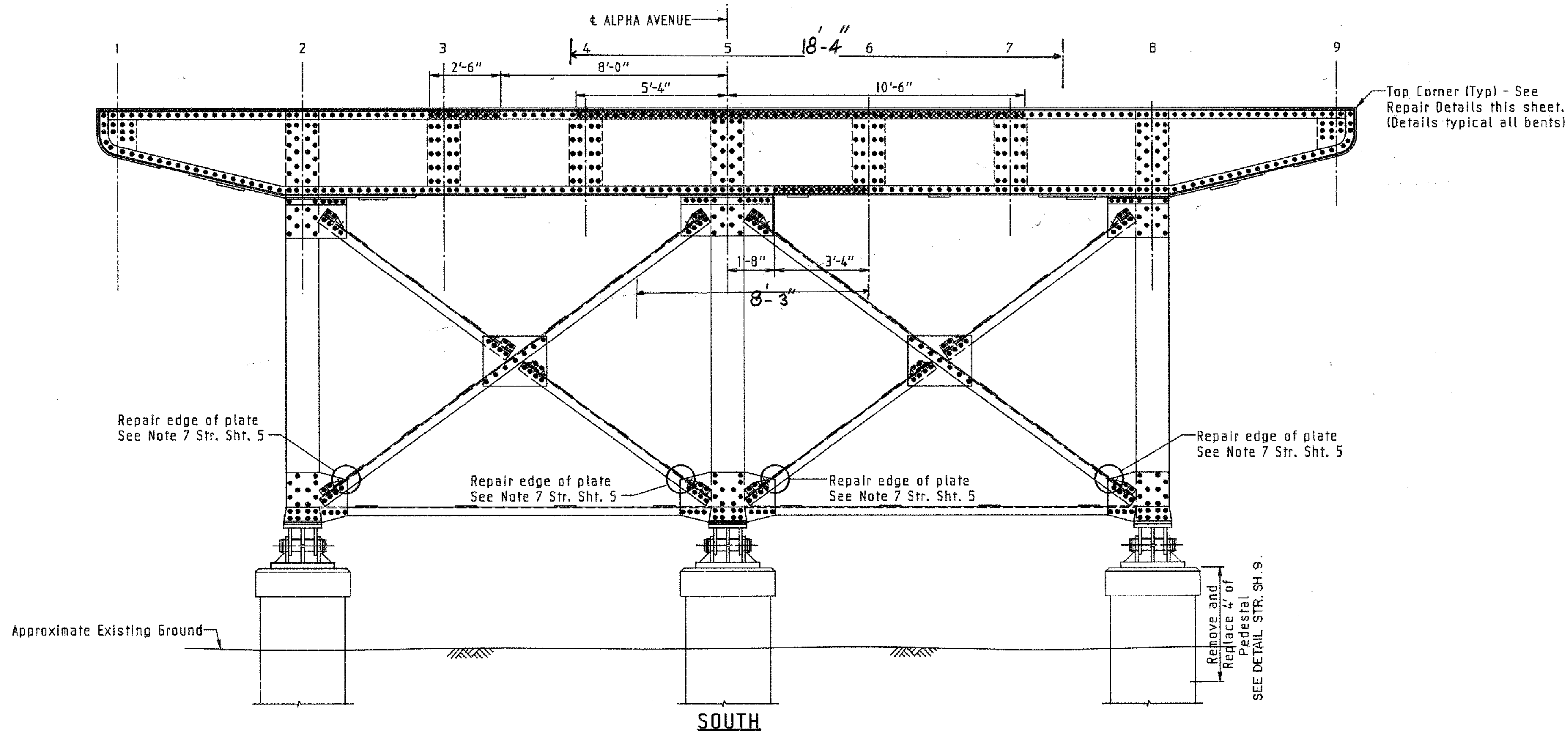
REVISIONS

STRUCTURE NO. 137-132-1

BRIDGE LOG NO. 03906  
STRUCTURE SHEET NO. 7 OF 34



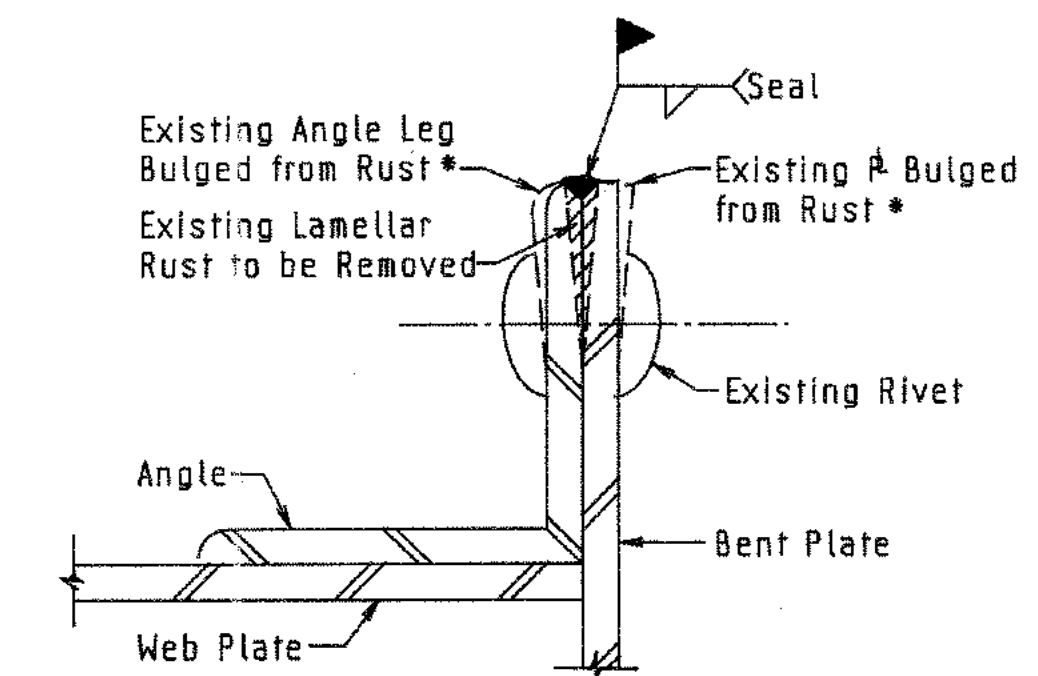
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1	CONN.	STONINGTON	BHM-3583(3)	137-132	1990	—	16	74



- NOTES: 1. Welding shall be completed after all bolting has been completed.  
2. Angles and rivets/bolts not shown.

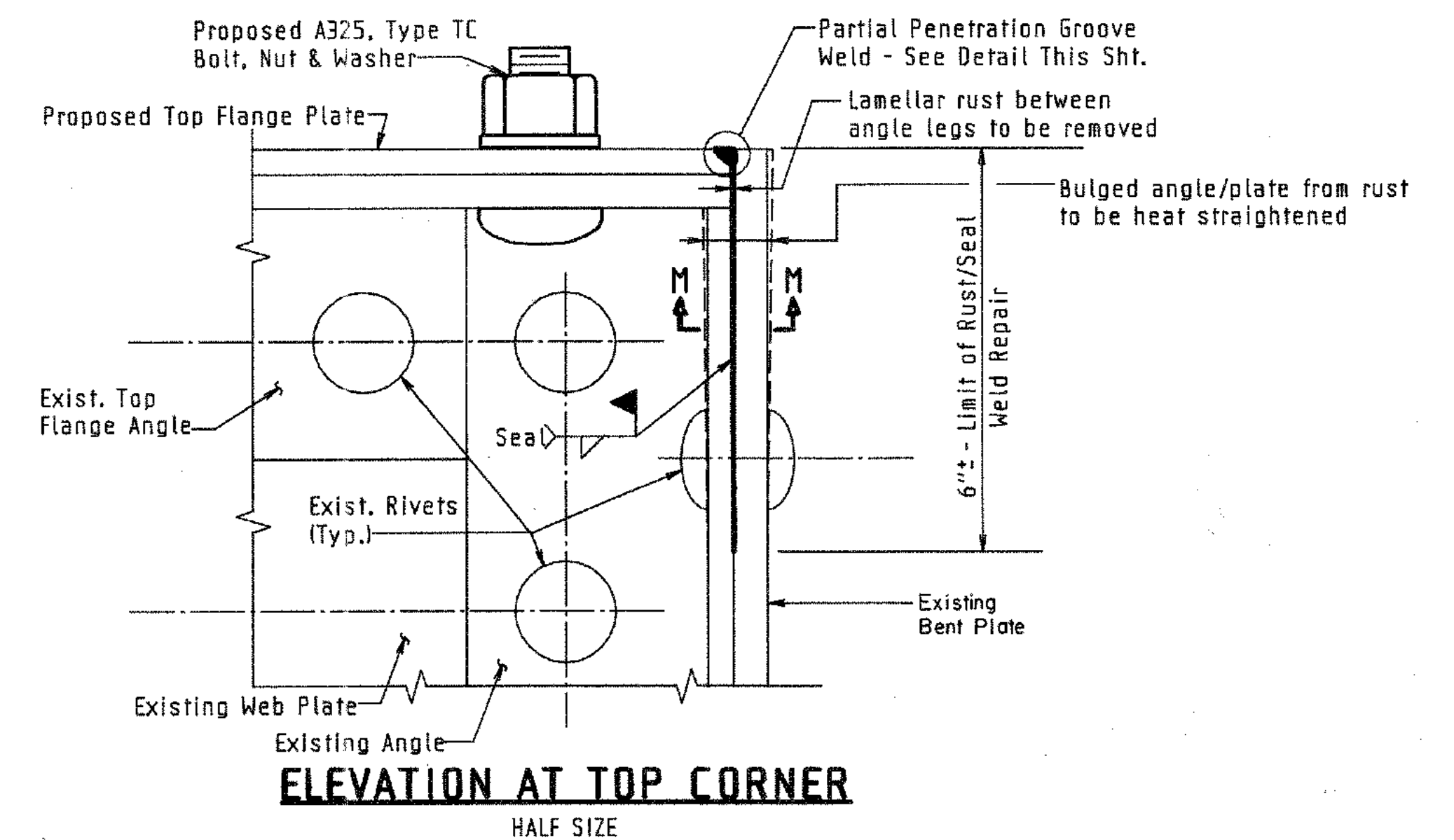
### WELDING DETAIL AT TOP CORNER OF PIER BENT

FULL SIZE



For additional details See Note 7 Str. Sht. 5  
\* To be heat straightened.

### SECTION M-M



NOTE: FOR ADDITIONAL REPAIRS SEE STR. SHT. 5.

**CONNECTICUT**  
**DEPARTMENT OF TRANSPORTATION**  
**STONINGTON**  
**REHABILITATION OF**  
**ALPHA AVENUE**  
**OVER**  
**MATHEWS STREET, AMTRAK &**  
**CUTLER STREET**  
**PIER 4**

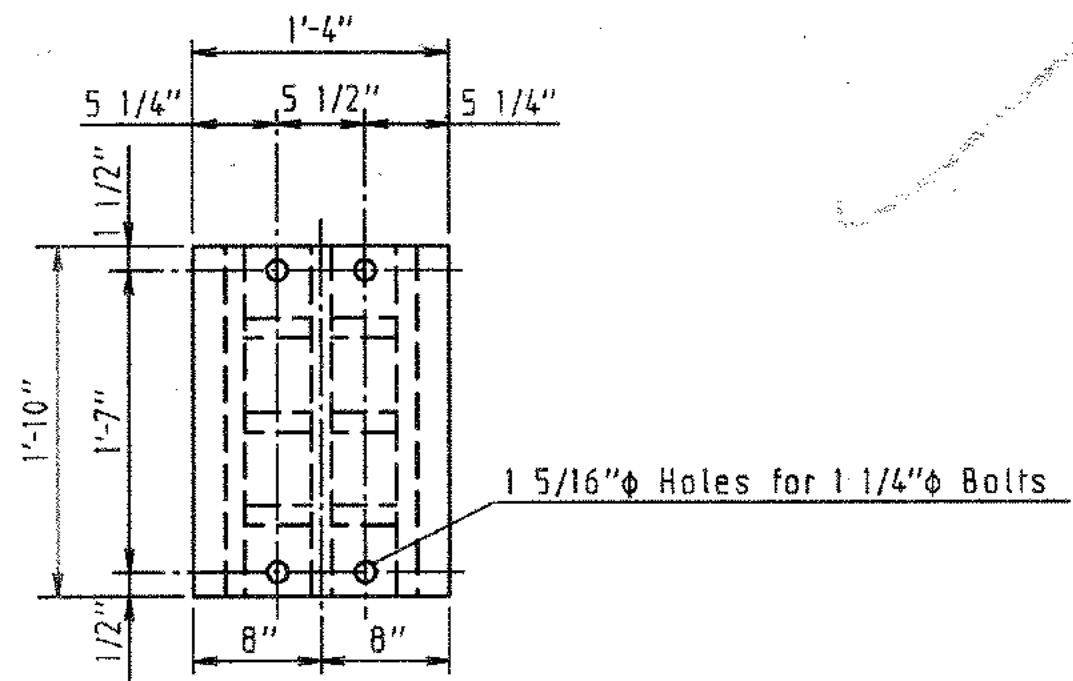
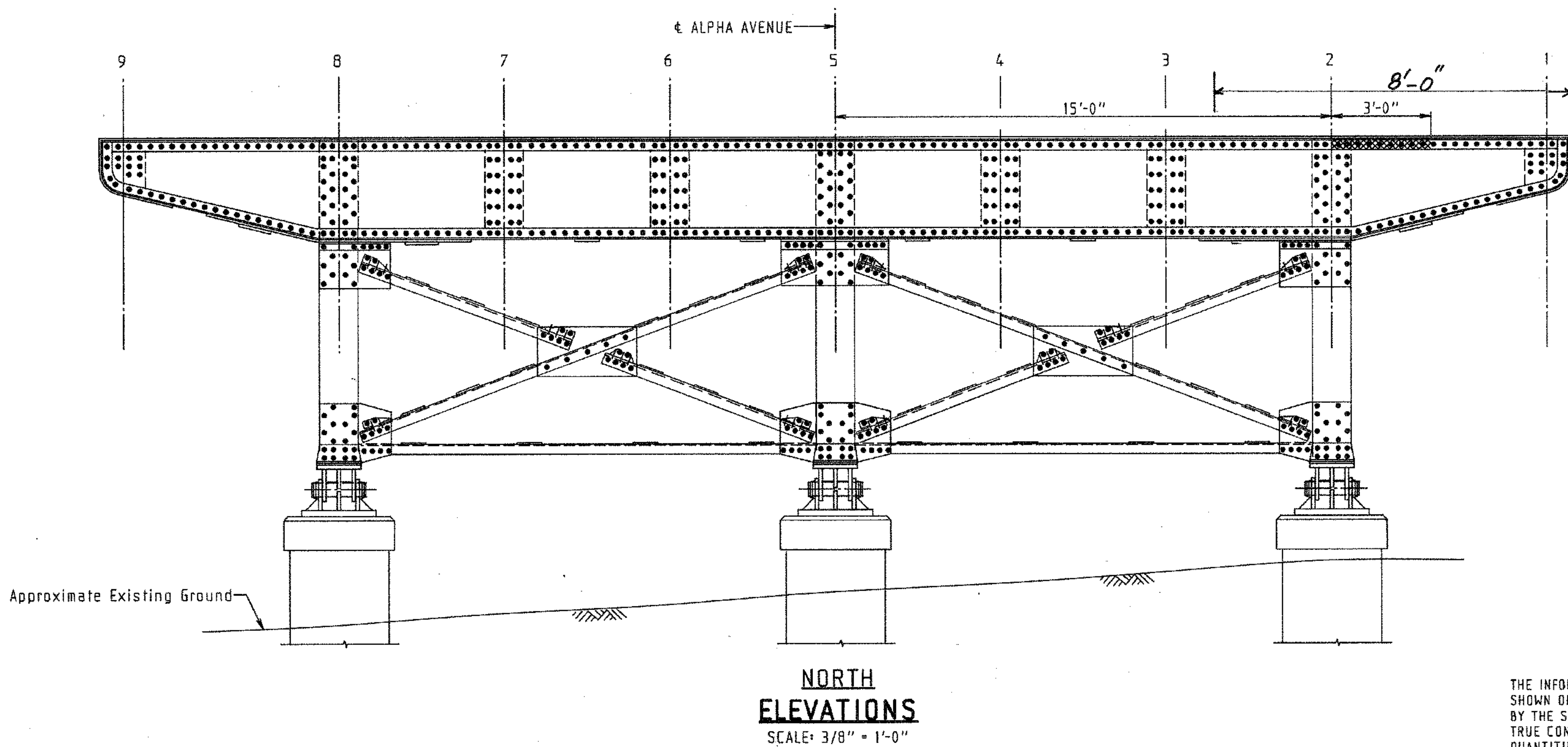
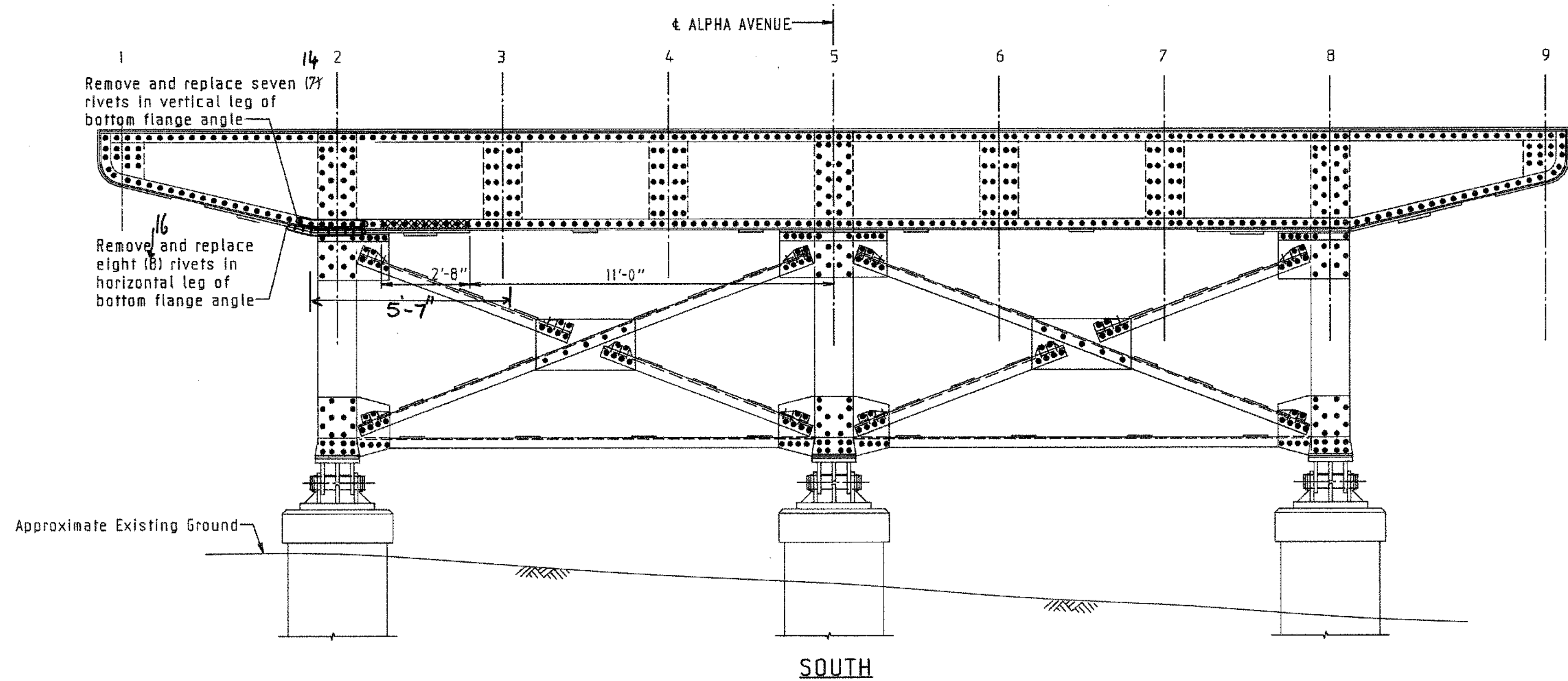
ENGINEER MAGUIRE GROUP INC.		
DESIGNER <i>RFV</i>	DRAFTER <i>AD</i>	CHECKER <i>JAD</i>
APPROVED <i>James D. Gorman</i>	DATE <i>12/28/89</i>	
BRIDGE LOG NO. 03906	STRUCTURE SHEET NO. 8	OF 34

NO.	DATE	DESCRIPTION

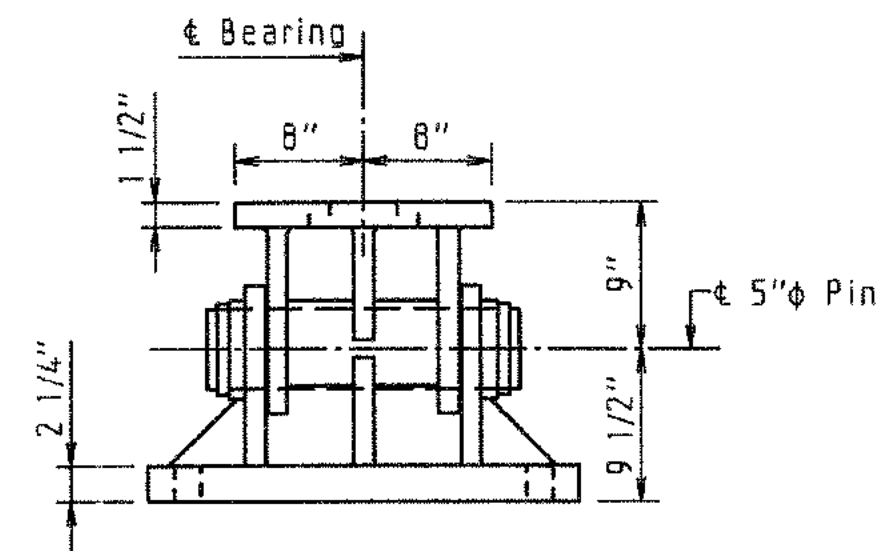
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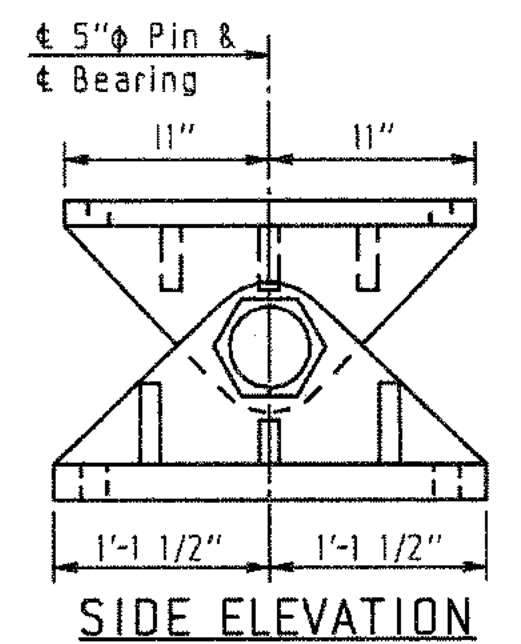
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1	CONN.	STONINGTON	BHM-3583(3)	137-132	1990	—	18	74



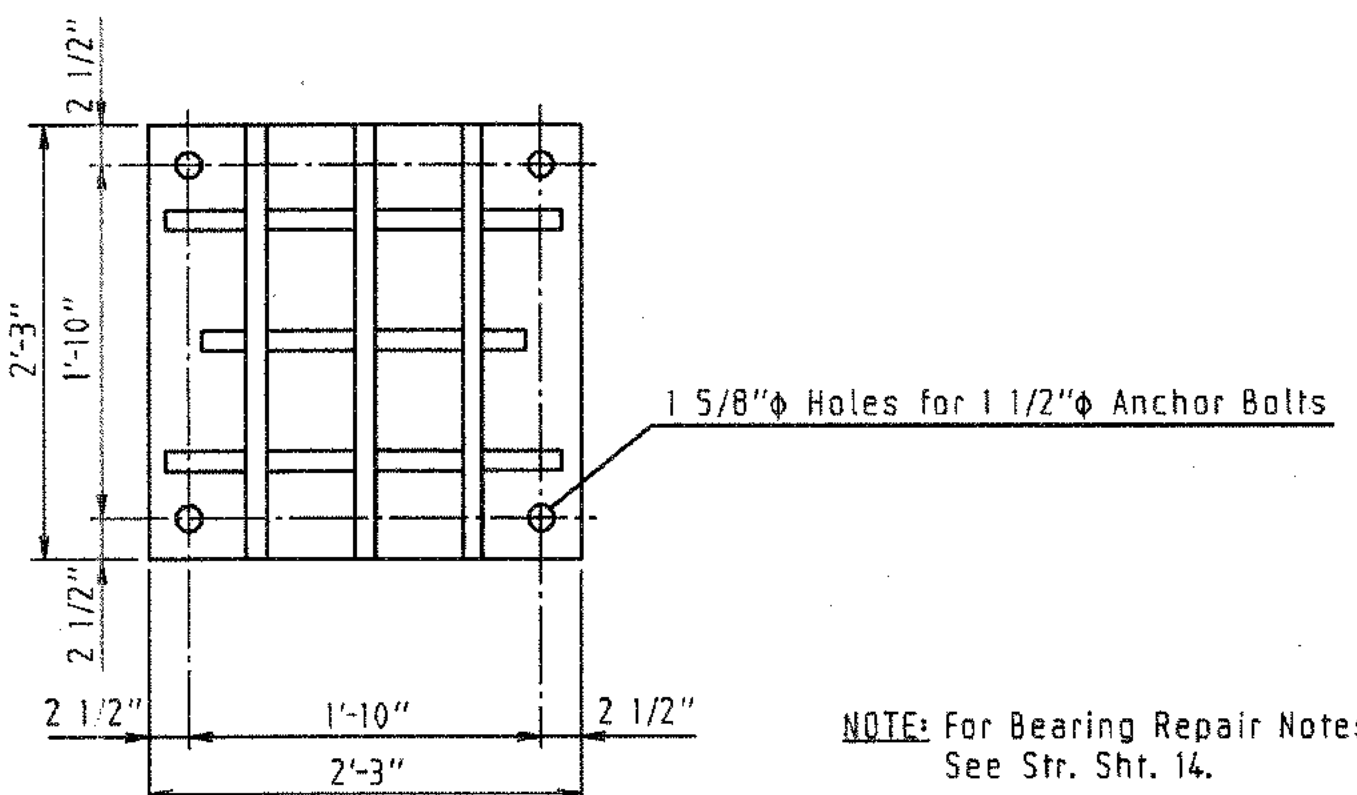
PLAN - TOP SHOE



FRONT ELEVATION



SIDE ELEVATION



PLAN - BOTTOM SHOE

EXISTING PIER COLUMN BEARING DETAIL

SCALE: 1" = 1'-0"

NOTE: FOR ADDITIONAL REPAIRS SEE STR. SHT. 5.

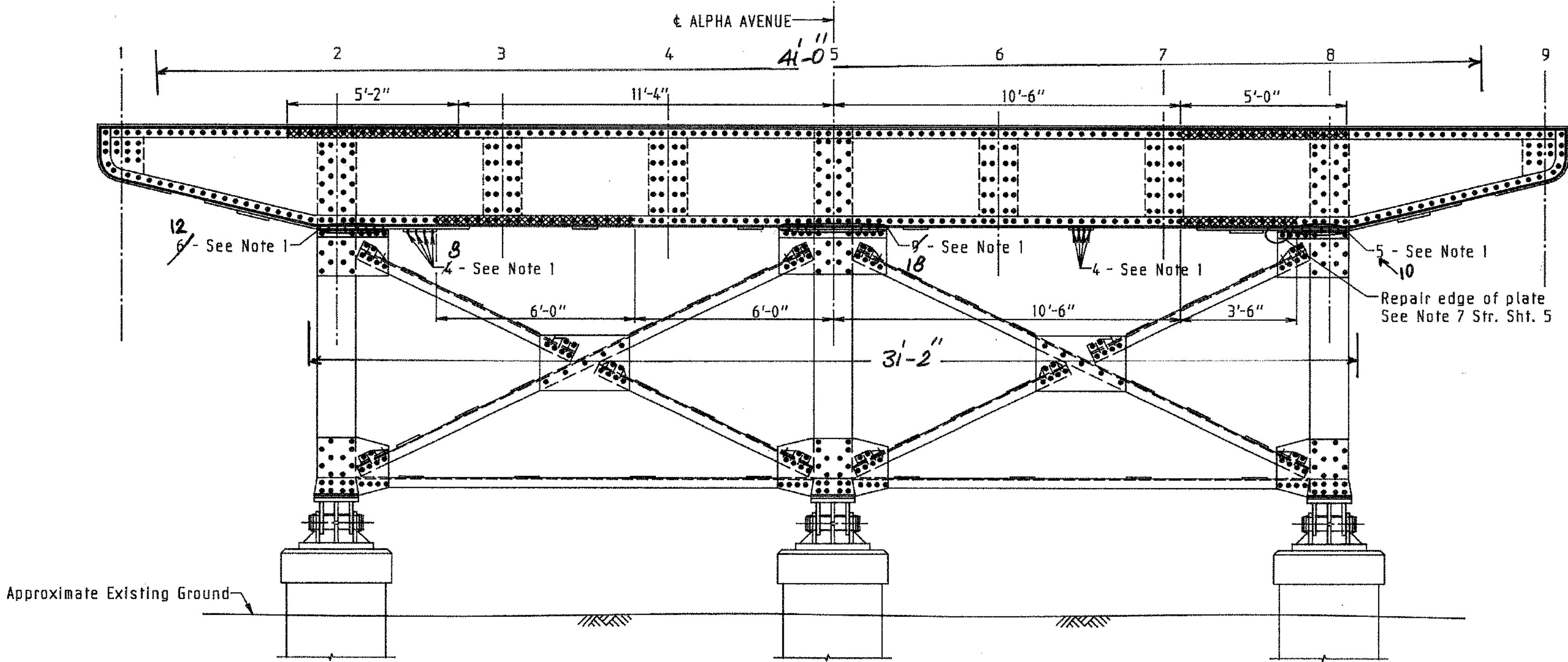
CONNECTICUT DEPARTMENT OF TRANSPORTATION			
STONINGTON			
REHABILITATION OF ALPHA AVENUE OVER MATHEWS STREET, AMTRAK & CUTLER STREET			
PIER 6			
ENGINEER MAGUIRE GROUP INC.			
DESIGNER	RFV	DRAFTER	AD
CHECKER	JAD	DATE	12/28/89
NO.	DATE	DESCRIPTION	APPROVED
REVISIONS		STRUCTURE NO.	137-132-1
		BRIDGE LOG NO.	03906
		STRUCTURE SHEET NO.	10 OF 34

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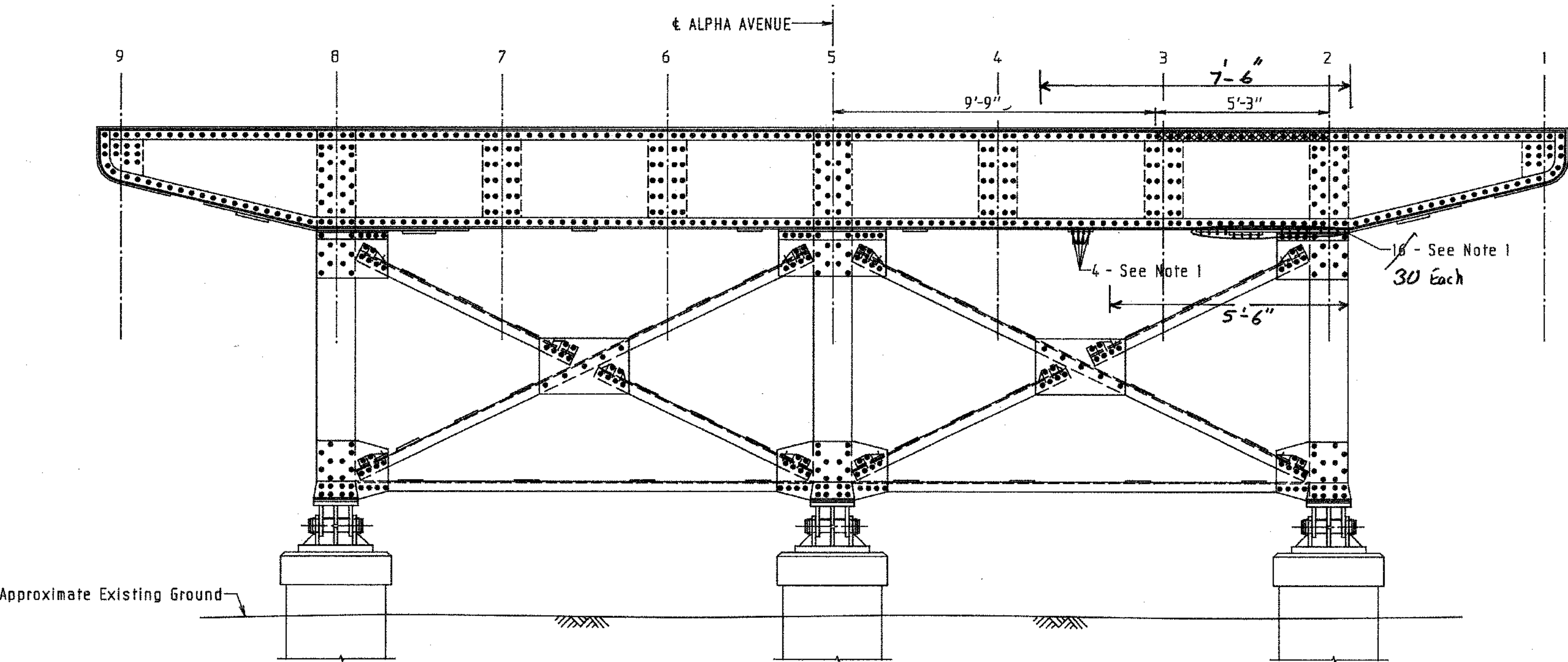
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1	CONN.	STONINGTON	BHM-3583(3)	137-132	1990	—	19	74

NOTE:

1. Indicates number of rivets to be removed and replaced in horizontal leg of bottom flange angle.



SOUTH



NORTH

ELEVATIONS

SCALE: 3/8" = 1'-0"

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NOTE: FOR ADDITIONAL REPAIRS SEE STR. SHT. 5.

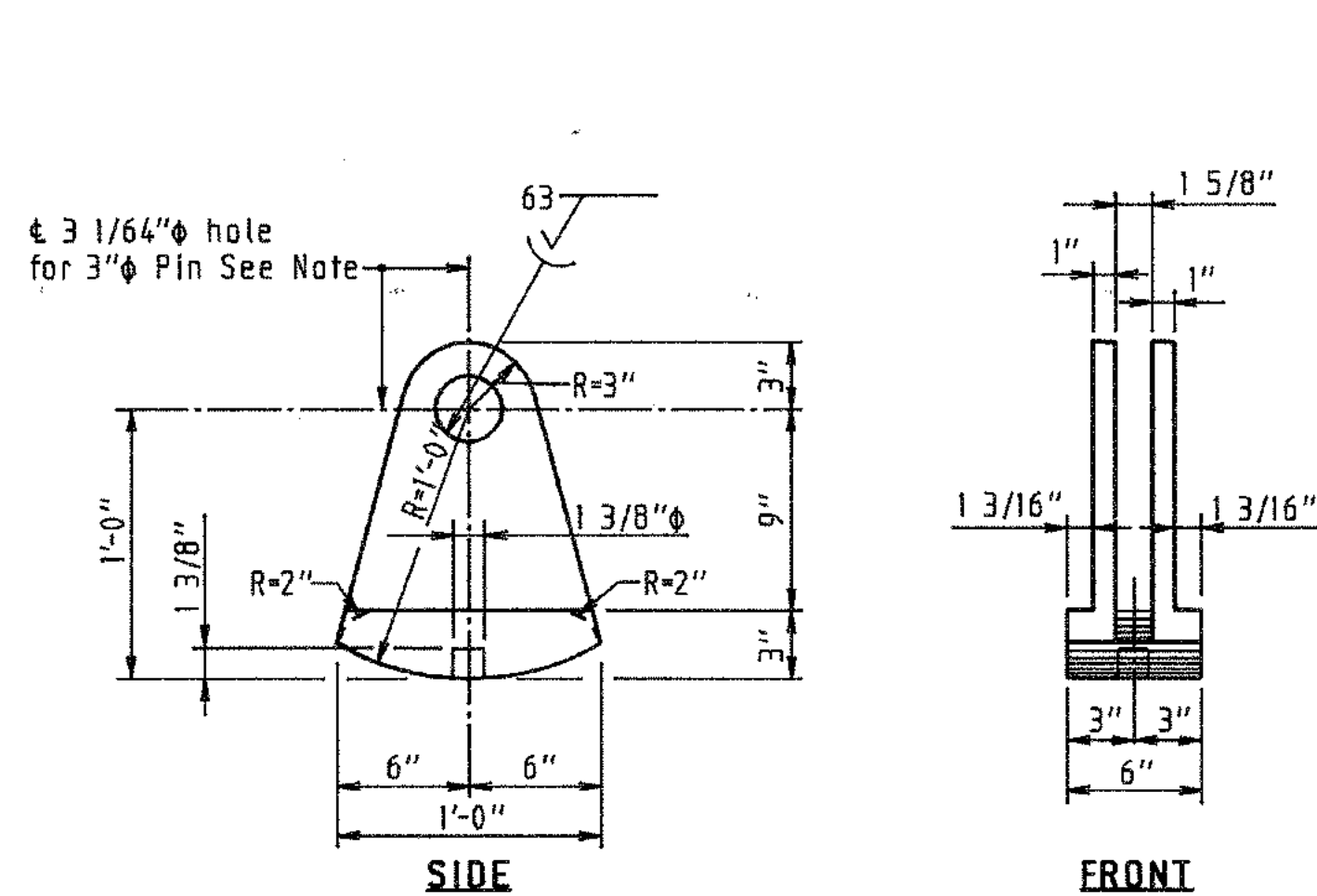
			CONNECTICUT DEPARTMENT OF TRANSPORTATION		
			STONINGTON		
			REHABILITATION OF ALPHA AVENUE OVER MATHEWS STREET, AMTRAK & CUTLER STREET		
			PIER 7		
			ENGINEER MAGUIRE GROUP INC.		
			DESIGNER <i>RFV</i>	DRAFTER AD	CHECKER JAD
			APPROVED <i>James A. Fournier</i>	DATE 12/28/89	
			STRUCTURE NO. 137-132-1		BRIDGE LOG NO. 03906
			REVISIONS		11 OF 34





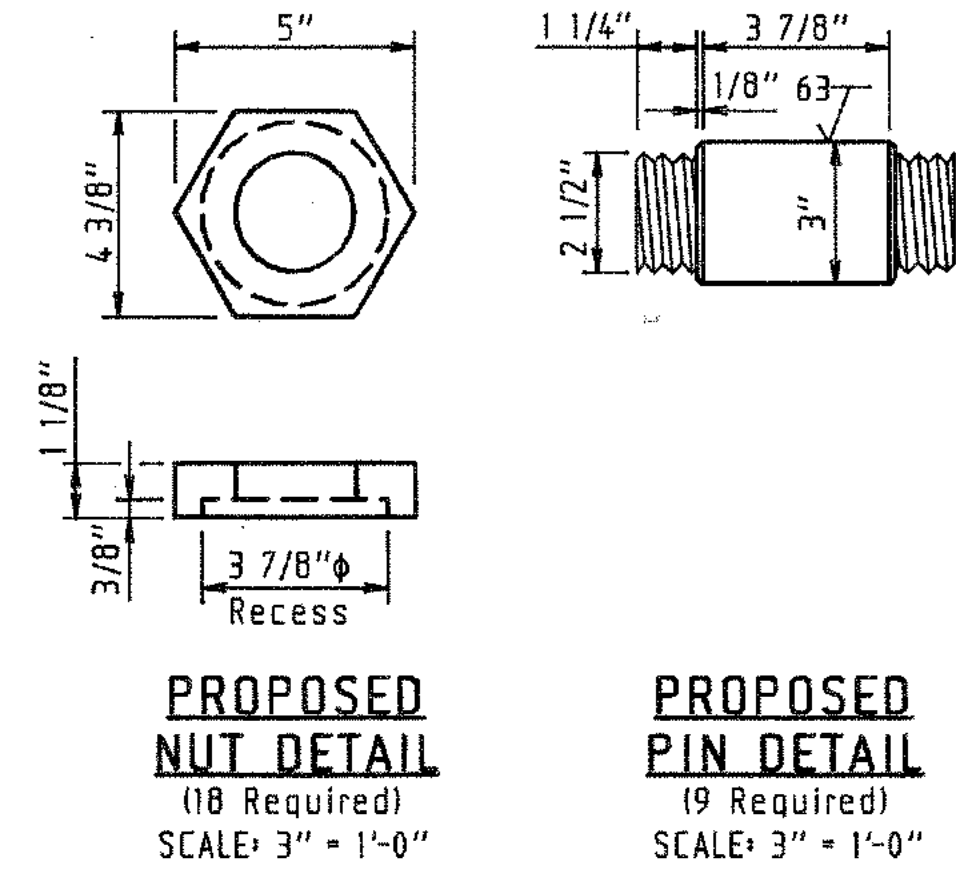


F.R.D. A. REGION NO.	STATE	TOWN	FED. AID PROJ. NO.	PROJ. NO.	YEAR	ROUTE NO.	SHEET NO.	TOTAL SHEETS
1	CONN.	STONINGTON	BHM-3583(3)	137-132	1990	—	22	74



**ELEVATIONS**  
 Note: Existing hole to be enlarged.  
 Cost to be included under the item "Structural Steel."

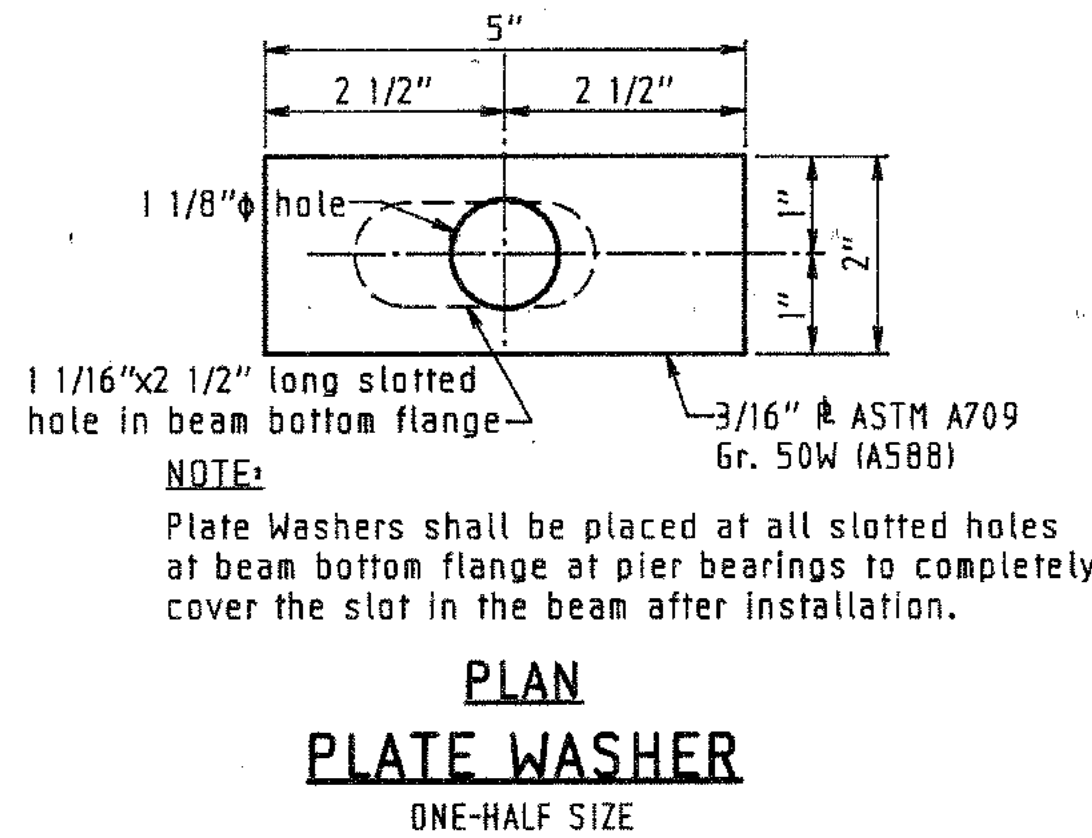
**EXISTING ROCKER BEARING**  
 SCALE: 1 1/2" = 1'-0"



**MATERIAL:** ASTM A276, Types 410 or 414, Condition T, with minimum Brinell Hardness of 163

**NOTES:**

- Upon assembly and final positioning of the entire structure, the nuts shall be finger tightened and the threads burred at the face of the nut with a pointed tool.
- Cost of Pins and Nuts shall be included under the item "Structural Steel."



**BEARING NOTES:**

From information on the original shop plans dated 1940, the existing beam bearings, rocker bearings and pier column bearings are cast steel annealed conforming to ASTM A27-24 Class 8 medium grade.

The beam bearings and pins and nuts from all piers and rocker bearings from Pier 4 shall be carefully removed from the structure so as not to cause excessive and/or undue damage/distress to the material to be reused in the proposed structure.

These bearing assemblies are to be cleaned to a surface quality equivalent to SSPC-SP-10 "Near White Blast Cleaning" and shall be completely inspected for surface discontinuities by the Liquid Penetrant Inspection Method in accordance with ASTM E165.

Surface discontinuities shall be repaired by welding in accordance with AASHTO/AWS D1.5-88 Bridge Welding Code Section 3, ASTM A27 "Mild to Medium Strength Carbon-Steel Castings for General Application" and ASTM A488 "Steel Castings, Welding Qualifications of Procedures and Personnel".

The top & bottom shoes of the beam bearings, pins and nuts shall not be separated to complete this work. The bearings shall be capable of free movement prior to painting. Penetrating oil may be used if required to free the pieces.

The rocker bearings, pins and nuts shall be removed from the existing beams and all parts separated. The rocker bearings shall be tested and repaired as required above, prior to enlarging the pin hole to accept the proposed 3" pin. The rocker bearings and pins and nuts shall have their final assembly to the beams made in the shop with the bearings capable of free movement.

The beam bearings and pins and nuts from the piers and pins and nuts and rocker bearings, shall receive the same paint system as the proposed structural steel beams in accordance with the special provision "Structural Steel". A minimum of one coat of inorganic zinc primer shall be applied to all surfaces of the bearings, pins and nuts in the shop.

Beam bearings at the abutments and the pier column bearings shall not be removed from the structure but shall be inspected and repaired as required in place as indicated above and shall be cleaned to SSPC-SP-10 "Near White Blast Cleaning" and field painted in accordance with the Special Provision "Abrasive Blast Cleaning and Field Painting of Structure (Site No.1)"

See special provision "Bridge Bearing Restoration".

**BOLT NOTES**

All bolts shall be mechanically galvanized, except where sandblasted after installation.

Payment for all bolts, nuts and washers in beam splices and bearings shall be included under the item "Structural Steel."

(Contractor to verify hole sizes in existing bearings prior to ordering and fabricating rolled beams, plates and nuts, bolts and washers)

**Beam to Bearing Connection**

Piers (63 locations): 4 - 1 1/16"x2 1/2" long slotted holes in bottom flange of each beam (See detail Str. Sht. 13) for 4-1" A325, Type 3 Bolts with nuts and washers per bearing. In addition, use plate washer to cover slotted hole. See detail this Sht.

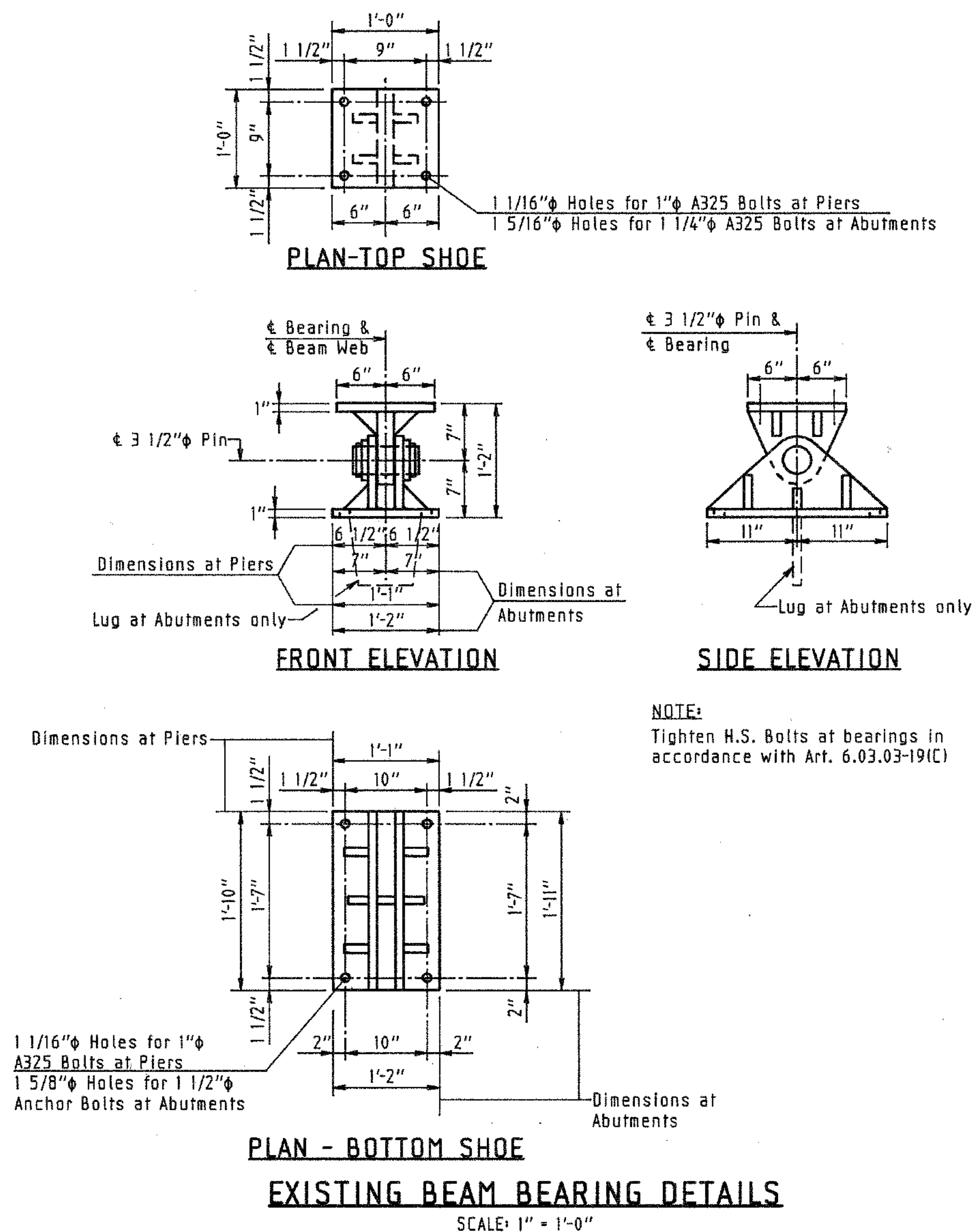
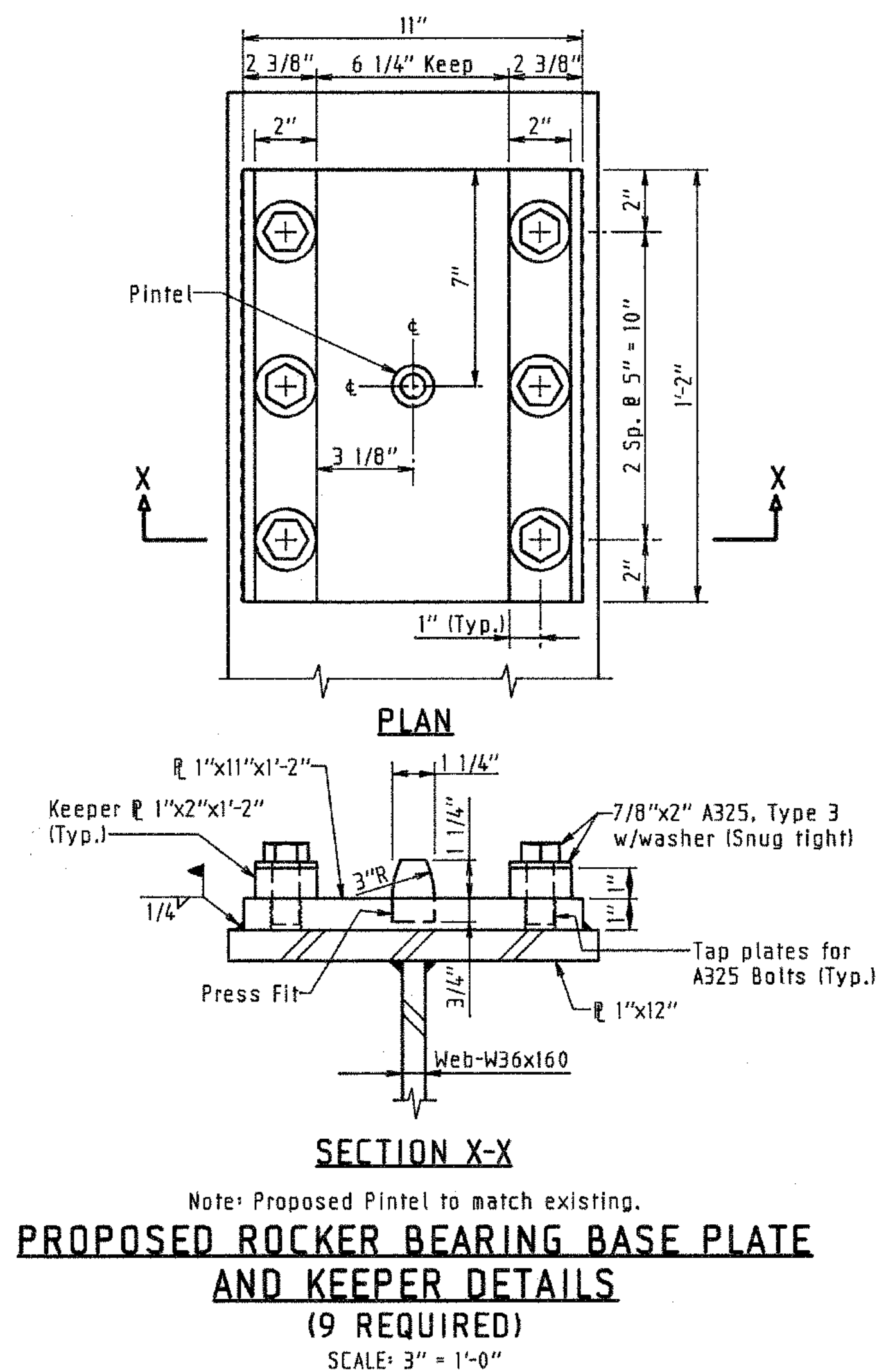
Abutments (18 locations): 4 - 1 5/16" holes in bottom flange of each beam for 4 - 1 1/4" A325, Type 3 Bolts with nuts and washers ea. bearing.

**Bearing to Pier Cap Connection**

Piers (63 locations): 4 - 1 1/16" holes at top flange plate of pier for 4-1" A325, Type 3 Bolts with nuts and washers ea. bearing.

**Field Splices**

6 Field Splices per beam: For Details See Str. Sht. 16



CONNECTICUT DEPARTMENT OF TRANSPORTATION			
STONINGTON			
REHABILITATION OF ALPHA AVENUE OVER MATHEWS STREET, AMTRAK & CUTLER STREET			
STRUCTURAL STEEL DETAILS - 2			
ENGINEER MAGUIRE GROUP INC.			
DESIGNER	RFV	DRAFTER T.L.B./A.D.	CHECKER JAO
NO.	DATE	DESCRIPTION	APPROVED
REVISIONS		STRUCTURE NO. 137-132-1	DATE 12/28/89
		BRIDGE LOG NO. 03906	14 OF 34







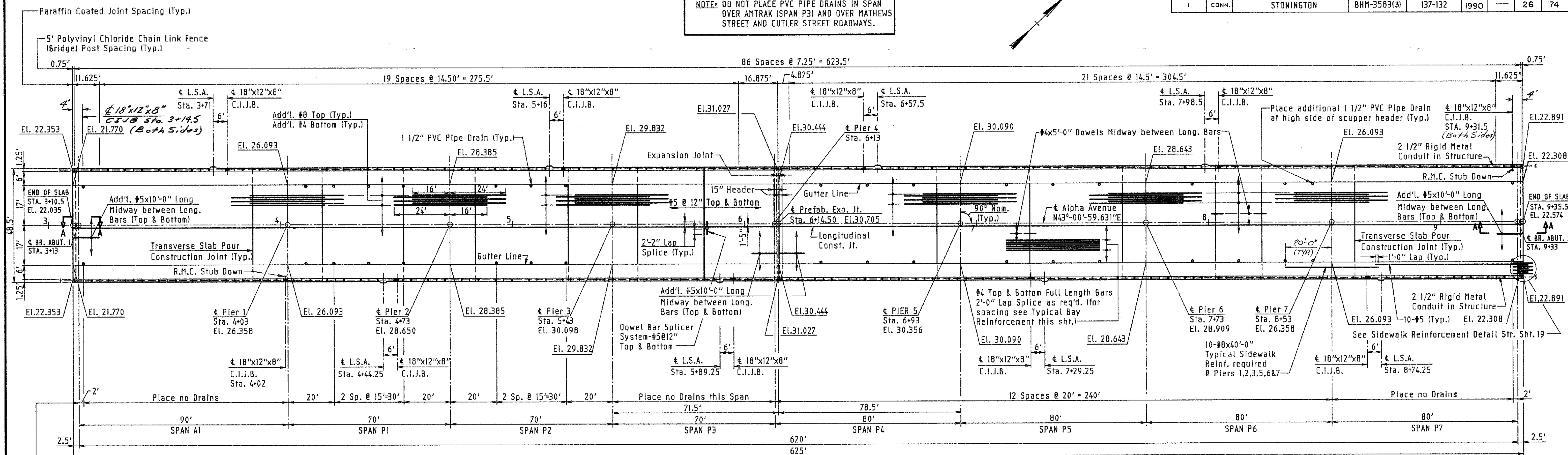






F.H.W.A. REGION NO.	STATE	TOWN	FED. AID PROJ. NO.	PROJ. NO.	YEAR	ROUTE NO.	SHEET NO.	TOTAL SHEETS
1	CONN.	STONINGTON	BHM-3583(3)	137-132	1990	—	26	74

NOTE: DO NOT PLACE PVC PIPE DRAINS IN SPAN OVER AMTRAK (SPAN P3) AND OVER MATHEWS STREET AND CUTLER STREET ROADWAYS.



- NOTES:
- Elevations shown apply at top of Wearing Surface.
  - Unless noted otherwise, all bars shall be spliced as follows: #4 - 2'-0", #5 - 2'-0", #8 - 4'-0"
  - L.S.A. indicates Light Standard Anchorage; C.I.J.B. indicates Cast Iron Junction Box
  - For Slab Placing Sequence see Str. Sht. 20.
  - For Section A-A see Str. Sht. 19.
  - For details of headers at Expansion Joint see Str. Sht. 22.

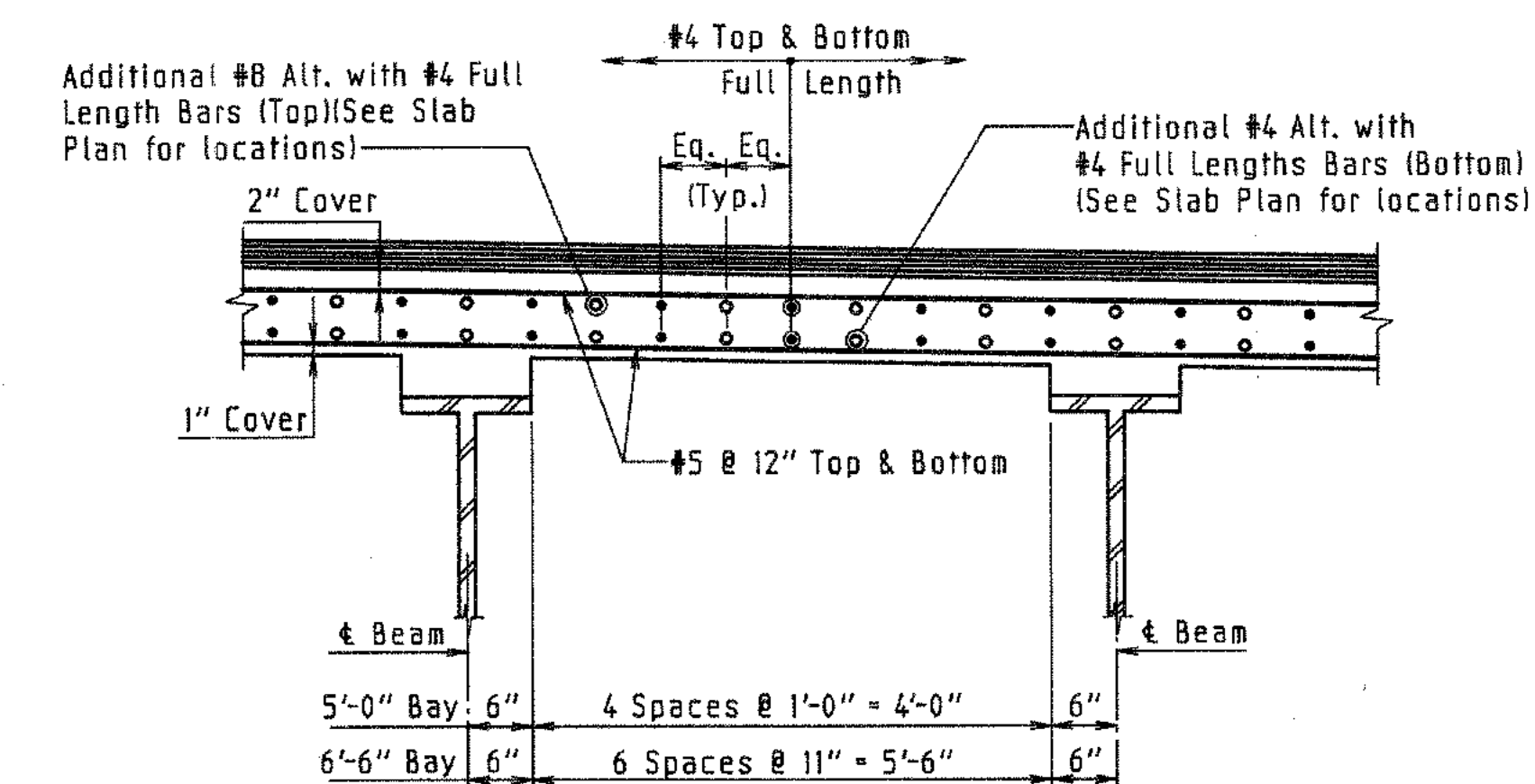
### SLAB PLAN

SCALE: 1" = 20'

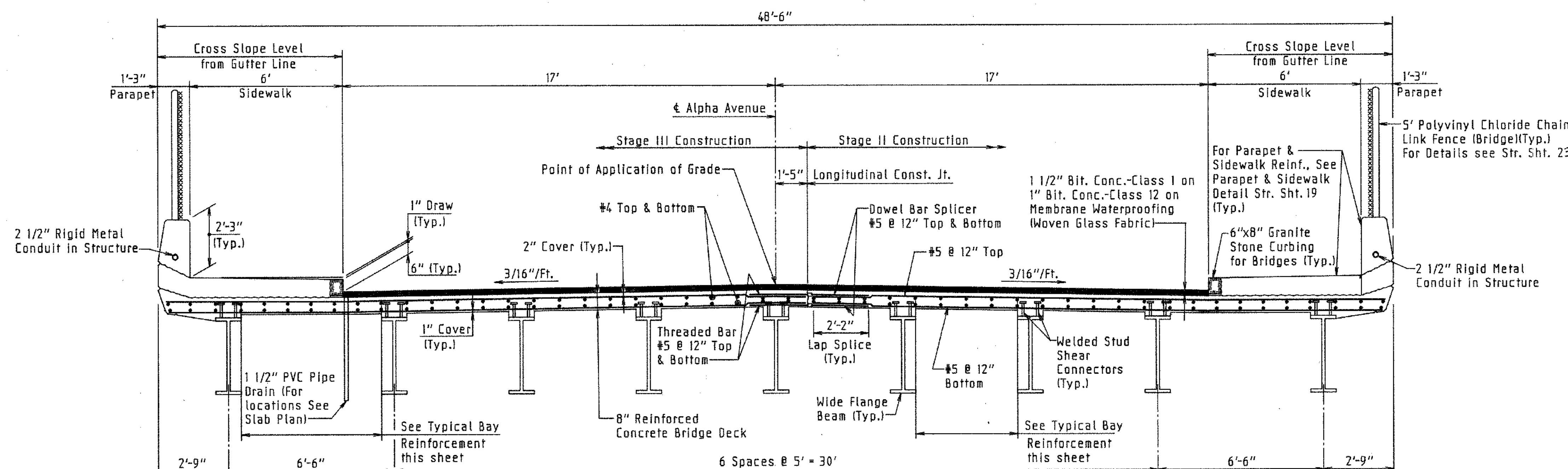
### DOWEL BAR SPlicer SYSTEM NOTES:

- The Dowel Bar Splicer System shall be capable of developing at least 125 percent of the specified yield strength of the bar.
- Dowel Bar Splicer System shall be epoxy coated and shall be paid for under the item "Dowel Bar Splicer System - Epoxy Coated".

CHANGED



TYPICAL BAY REINFORCEMENT  
SCALE: 3/4" = 1'-0"



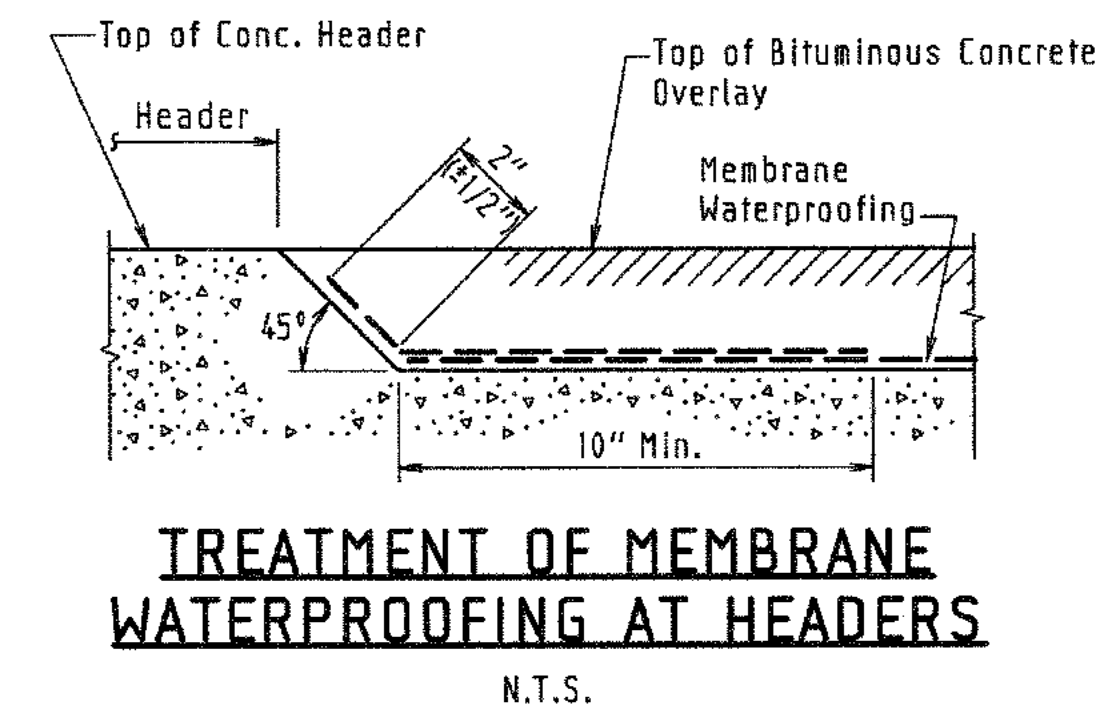
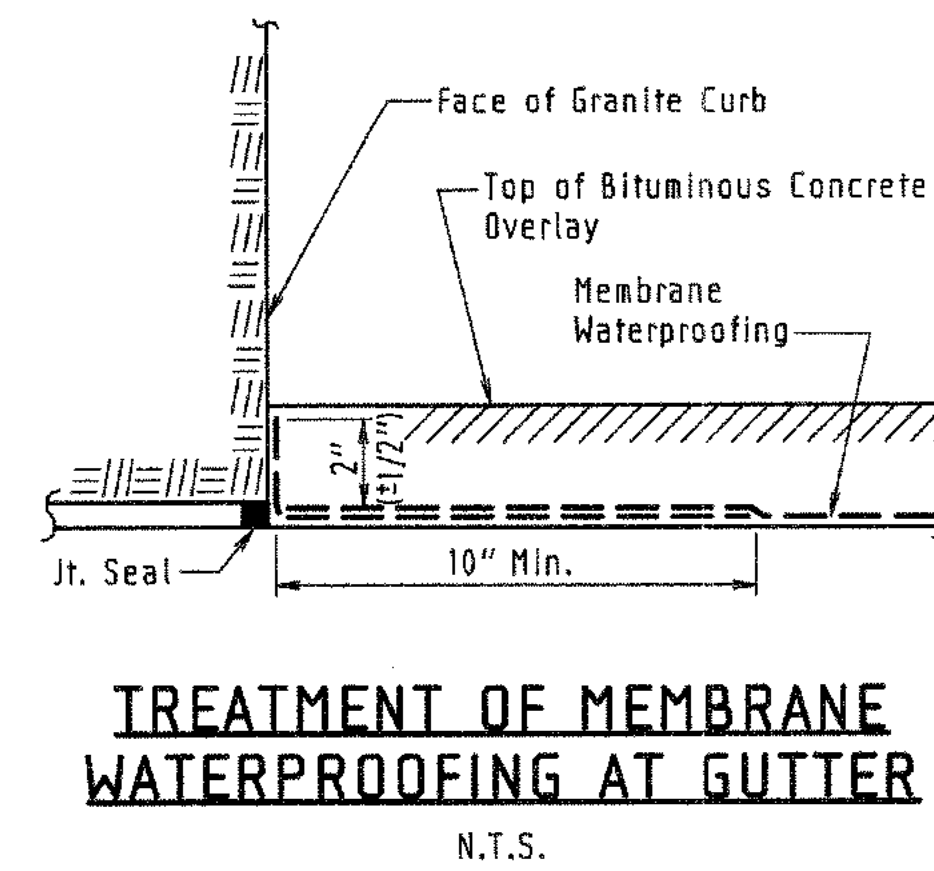
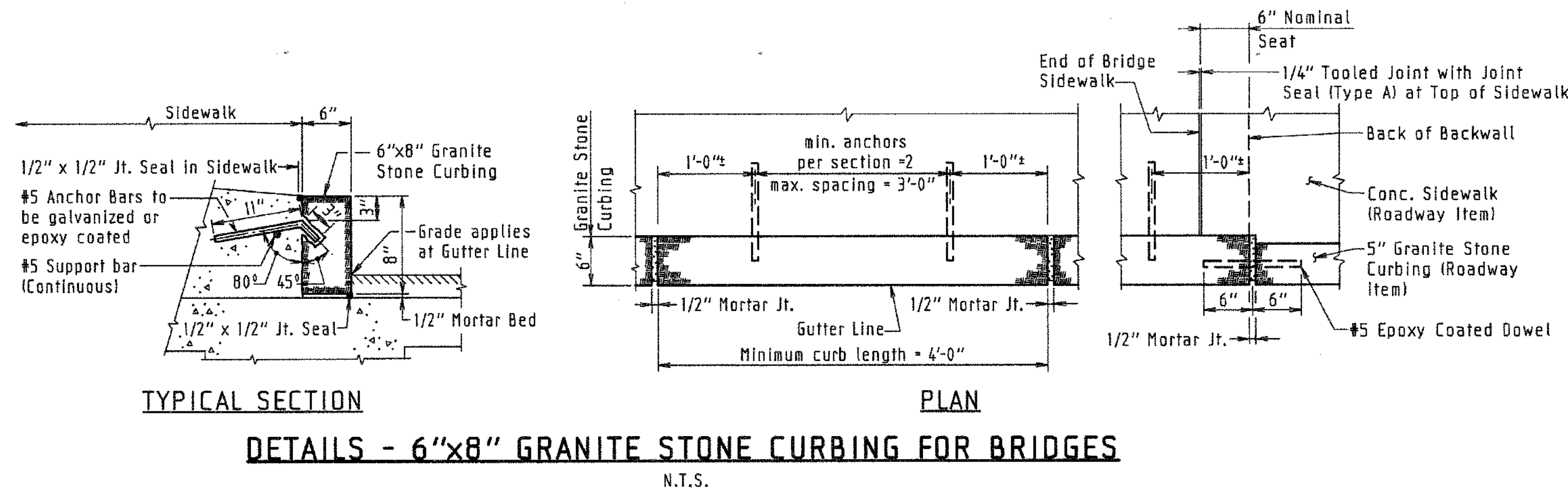
TYPICAL CROSS SECTION  
SCALE: 3/8" = 1'-0"

CONNECTICUT DEPARTMENT OF TRANSPORTATION			
STONINGTON			
REHABILITATION OF ALPHA AVENUE OVER MATHEWS STREET, AMTRAK & CUTLER STREET			
SLAB PLAN			
ENGINEER MAGUIRE GROUP INC.			
DESIGNER RFL		DRAFTER TLB	CHECKER JAD
APPROVED <i>[Signature]</i>		DATE 7/3/90	
NO.	DATE	DESCRIPTION	
REVISIONS		STRUCTURE NO. 137-132-1	BRIDGE LOG NO. 03906
		STRUCTURE SHEET NO. 18 OF 34	



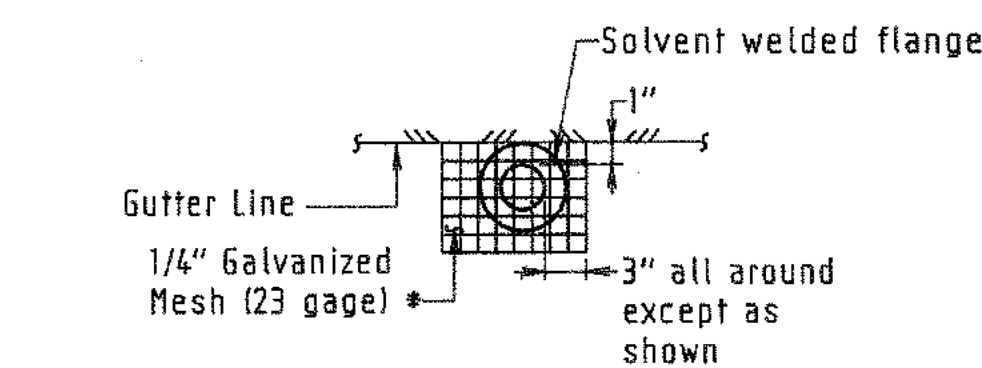
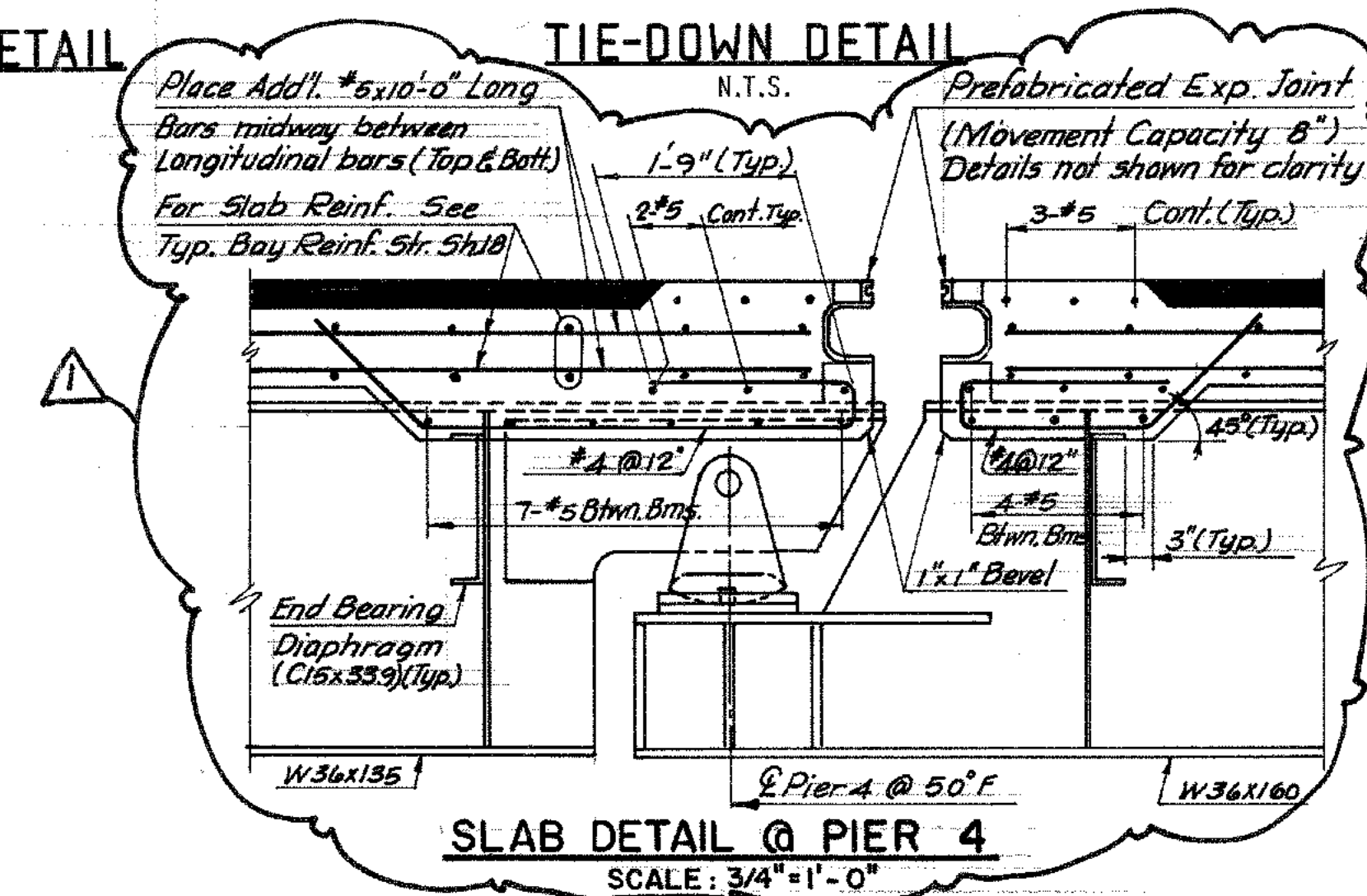
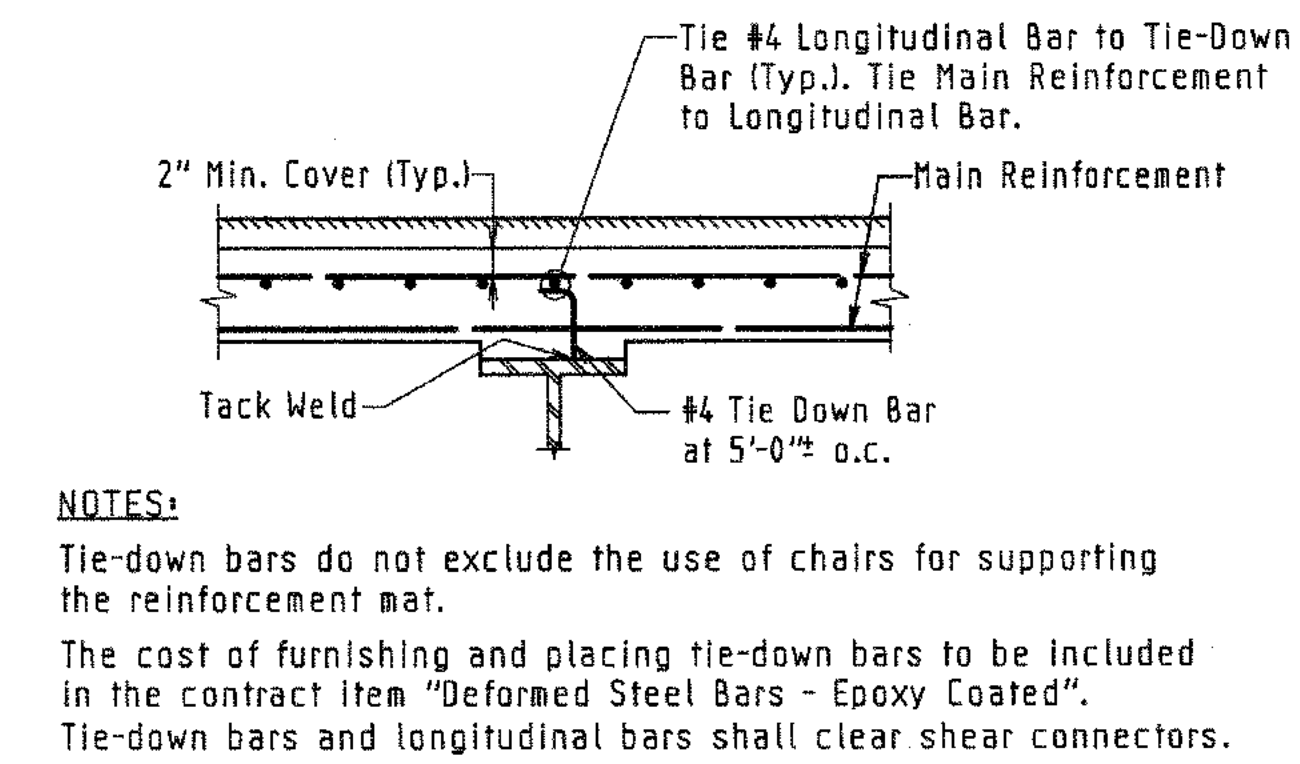
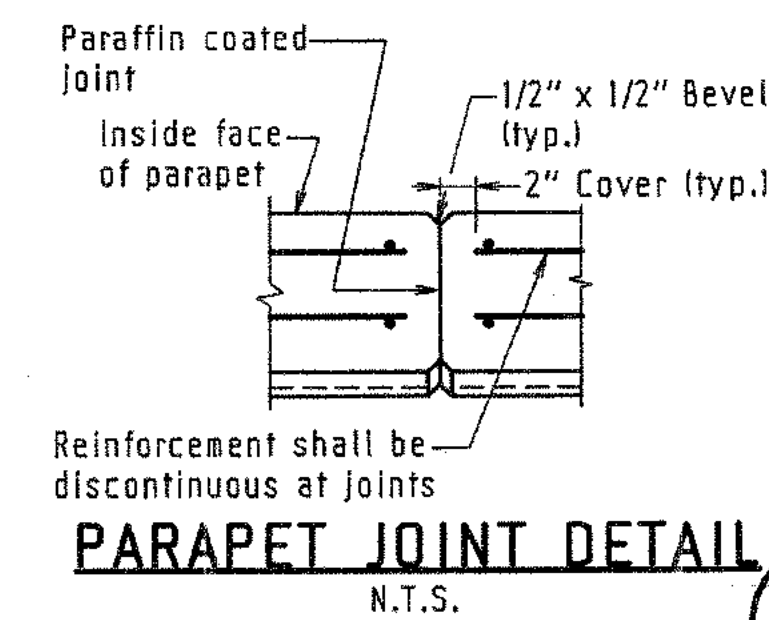
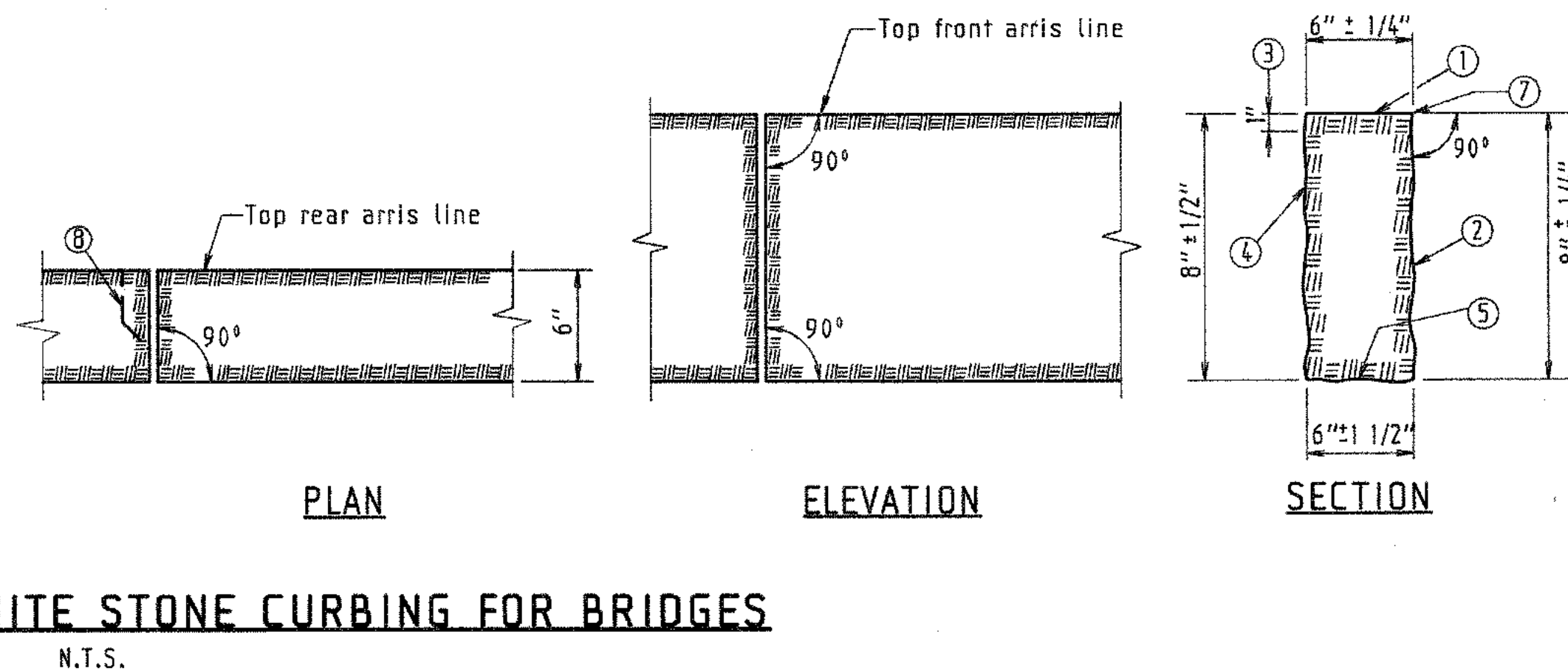


F.H.W.A. REGION NO.	STATE	TOWN	FED. AID PROJ. NO.	PROJ. NO.	YEAR	ROUTE NO.	SHEET NO.	TOTAL SHEETS
1	CONN.	STONINGTON	BHM-3583(3)	137-132	1990	—	28	74

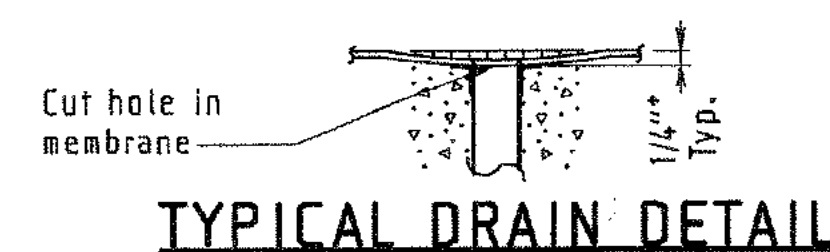


# TOLERANCE NOTES

- Sawed surface approximating a true plane with no projections or depressions greater than 1/4".
- Smooth, quarry split surface, free of drill holes, with projections or depressions not over 1/2".
- No projections or depressions within this area greater than 1/4".
- Split surface shall be free of any projections over 1".
- Sawed or split surface approximating a true plane to the specified dimensions with projection no greater than 1/4".
- Sawed surface free of all quarry sawing and cutting marks with allowable depressions or projections not over 1/4".
- These arris lines shall be straight and true within a ± tolerance of 1/4".
- Ends of stones at intermediate joints shall be held full for 2" from all exposed surfaces with a permitted variation of 1/4". Beyond this area the joint may fall away a maximum of 3".



\* The cost of furnishing and installing 1/4" square Galvanized Mesh shall be included in the contract bid price per ton for "Bituminous Concrete - Class 1".



THIS SHEET NOT CORRECTED

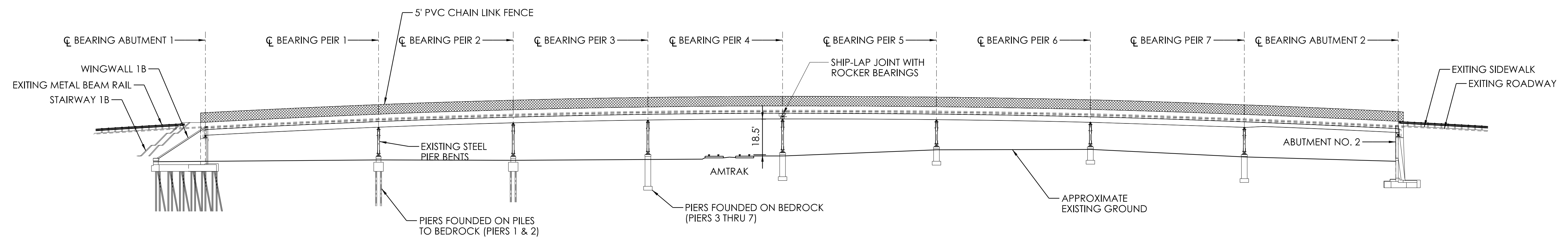
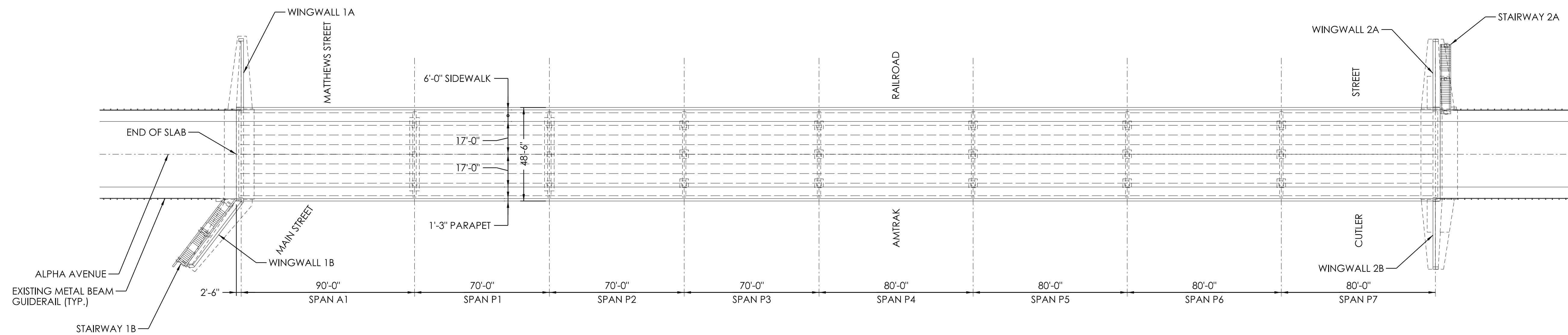
CONNETICUT DEPARTMENT OF TRANSPORTATION STONINGTON REHABILITATION OF ALPHA AVENUE OVER MATHEWS STREET, AMTRAK & CUTLER STREET SLAB DETAILS - 2			
ENGINEER MAGUIRE GROUP INC.			
DESIGNER R.F.V.	DRAFTER TLB	CHECKER JAD	
NO. DATE DESCRIPTION	APPROVED <i>John B. Gennaro</i>		DATE 7/3/90
REVISIONS		STRUCTURE NO. 137-132-1	BRIDGE LOG NO. 03906 STRUCTURE SHEET NO. 20 OF 34

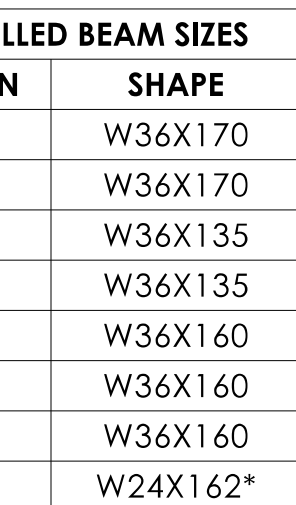
## Appendix C: Existing Bridge Sketches



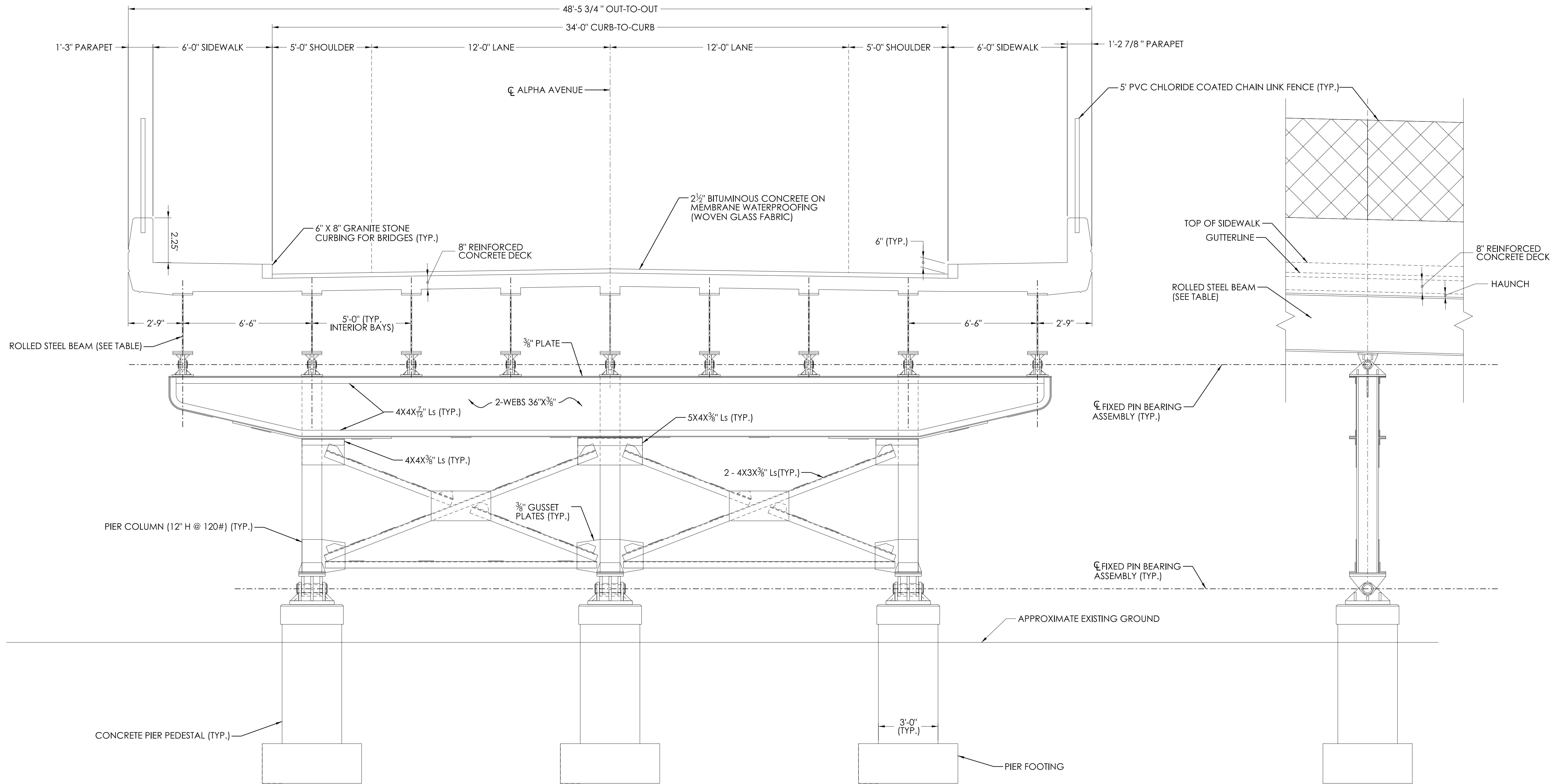




[illegible]







EXISTING BRIDGE CROSS SECTION  
SCALE: 3/8" = 1'-0"

EXISTING PIER SOUTH ELEVATION  
SCALE: 3/8" = 1'-0"

\* IN SPAN P7, GIRDER SIZE  
DECREASES FROM W36X160  
TO W24X162 AT FIELD SPLICE  
LOCATED 10'-0" FROM PIER 7

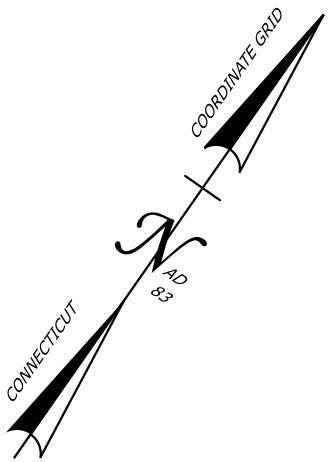
NOTES:  
- PIER 6 SHOWN - PIER 3 THRU 7 FRAME AND FOUNDATION SIMILAR  
- PIERS 1 THRU 2 - FRAME SIMILAR - DIFFERENT FOUNDATION

REV.	DATE	REVISION DESCRIPTION

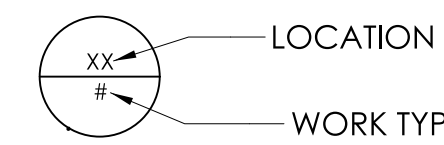
DESIGNER/DRAFTER: RRB	CHECKED BY: AJF	SCALE AS NOTED	SIGNATURE/ BLOCK:	STATE OF CONNECTICUT DEPARTMENT OF TRANSPORTATION	PROJECT NUMBER: 137-164 PROJECT DESCRIPTION: REHABILITATION OF BRIDGE NO. 03906 TOWN(S): STONINGTON DRAWING TITLE: EXISTING BRIDGE CROSS SECTION	DRAWING NO. STR-2 SHEET NO.
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## Appendix D: Rehabilitation Alternate Sketches





Consider adding blast clean and paint quantities to all piers being filled with concrete. This is most likely necessary to allow for good adhesion and prevent the already rusted steel from causing the new concrete from spalling. This would be significant in cost.



NOTES:


\* SEE STR-1 FOR TYPICAL PIER REPAIR LOCATIONS  
AND REPAIR DETAILS

[illegible]

DESIGNER/DRAFTER: TAS CHECKED BY: AJF

**LASTED SAVED BY:** 7336 **FILE NAME:** V:\Projects\ANY\K5\067838.STA\137-164\08\_Reports\RSR Appendices\Appendix\_D\_Proposed\_RSR\_Bridge\_Plans\STR\_03906\_Prop\_Bridge\_PLN\_ELEV\_SEC.dgn

**PLOTTED DATE:** 4/5/2022



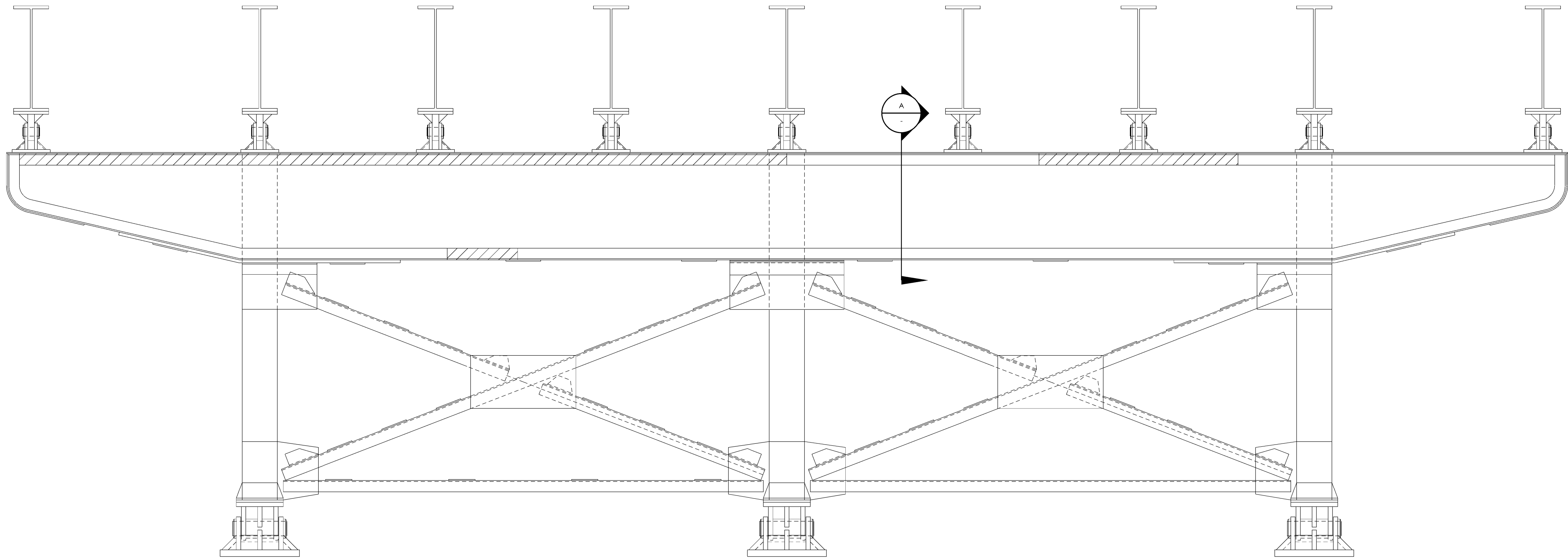
STATE OF CONNECTICUT  
DEPARTMENT  
OF  
TRANSPORTATION



PROJECT NUMBER: 137-164
PROJECT DESCRIPTION: REHABILITATION OF BRIDGE NO. 03906
TOWN(S): STONINGTON
DRAWING TITLE: ALTERNATE 1 BRIDGE PLAN & ELEVATION

AWING NO.  
HWY-1

EET NO.  
1 OF 6

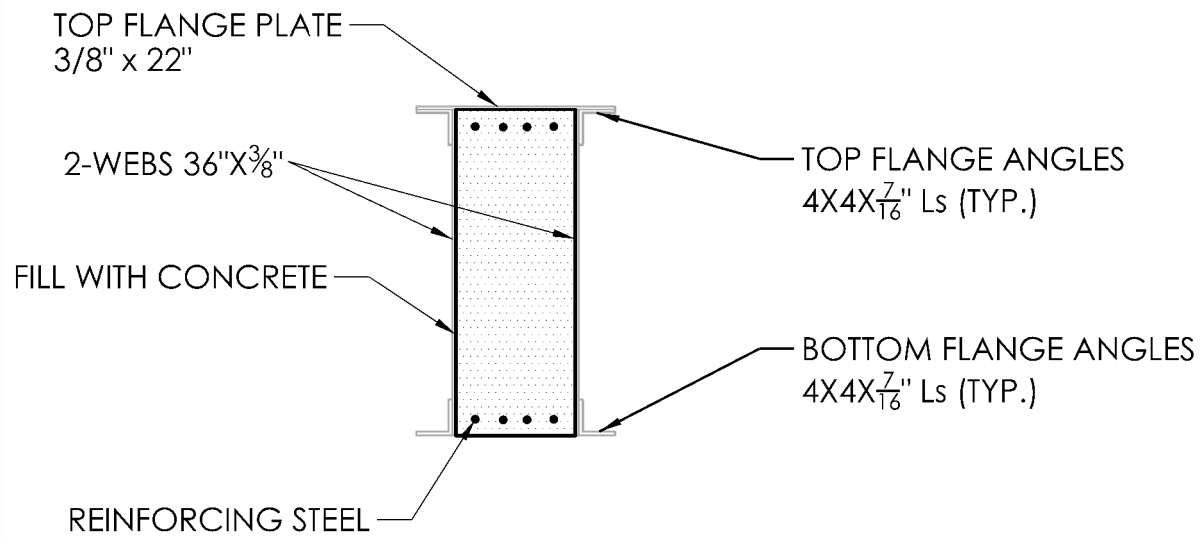


**BRIDGE CROSS SECTION**  
SCALE: 9/16" = 1'-0"  
PIER 6 SOUTH ELEVATION SHOWN FOR REFERENCE. OTHER PIERS SIMILAR

NOTES:  
- SECTION LOSS TO BE VERIFIED IN FIELD. APPROXIMATE SIZES SHOWN IN TABLE EXTEND A MINIMUM OF 6' PAST LIMITS OF SIGNIFICANT DETERIORATION

\* IN SPAN P7, GIRDER SIZE DECREASES FROM W36X160 TO W24X162 AT FIELD SPLICE LOCATED 10'-0" FROM PIER 7

INSPECTED DETERIORATION			
PIER	FACE	COMPONENT	APPROXIMATE SIZE/ COMPONENT
P1	SOUTH	TOP FLANGE PLATE	36"x12"x $\frac{3}{8}$ "
P1	SOUTH	WEB	16"x6"x $\frac{3}{8}$ "
P1	SOUTH	WEB	42"x3"x $\frac{3}{8}$ "
P1	NORTH	TOP ANGLE	180" OF ANGLE
P2	SOUTH	TOP ANGLE	60" OF ANGLE
P2	SOUTH	BOT. ANGLE	60" OF ANGLE
P2	SOUTH	BOT. ANGLE	84" OF ANGLE
P2	NORTH	TOP ANGLE	102" OF ANGLE
P2	NORTH	BOT. ANGLE	92" OF ANGLE
P3	SOUTH	BOT. ANGLE	120" OF ANGLE
P3	NORTH	BOT. ANGLE	108" OF ANGLE
P5	NORTH	BOT. ANGLE	12" OF ANGLE
P6	SOUTH	TOP ANGLE	266" OF ANGLE
P6	SOUTH	TOP ANGLE	102" OF ANGLE
P6	SOUTH	BOT. ANGLE	48" OF ANGLE
P7	SOUTH	WEB	24"x8"x $\frac{3}{8}$ "
P7	NORTH	TOP FLANGE PLATE	300"x24"x $\frac{3}{8}$ "



**SECTION**  
SCALE: 9/16" = 1'

PIER CAP REHABILITATION (CONCEPTUAL SEQUENCE)

1. CUT HOLES THROUGH INTERIOR VERTICAL STIFFENER PLATES FOR REBAR AND CONCRETE
2. REPLACE DETERIORATED RIVETS AND BOLTS
3. BLAST CLEAN INTERIOR AND EXTERIOR OF PIER CAPS
4. INSTALL NEW REINFORCING STEEL WITHIN INTERIOR OF PIER CAP
5. FORM BOTTOM AND ENDS OF PIER CAP
6. PLACE AND CURE CONCRETE

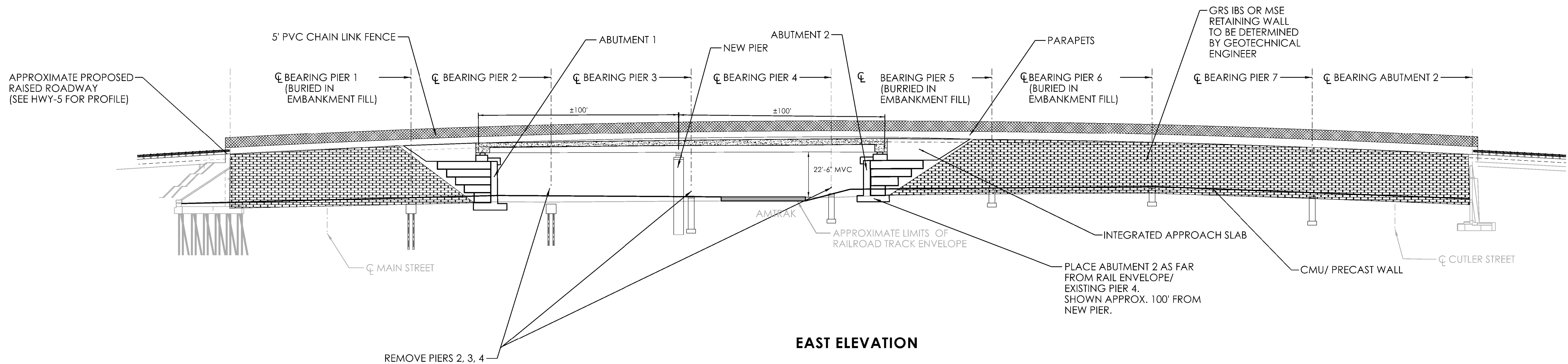
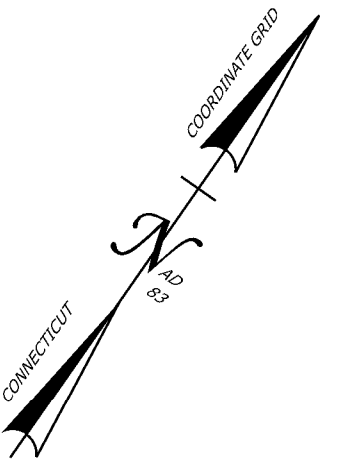
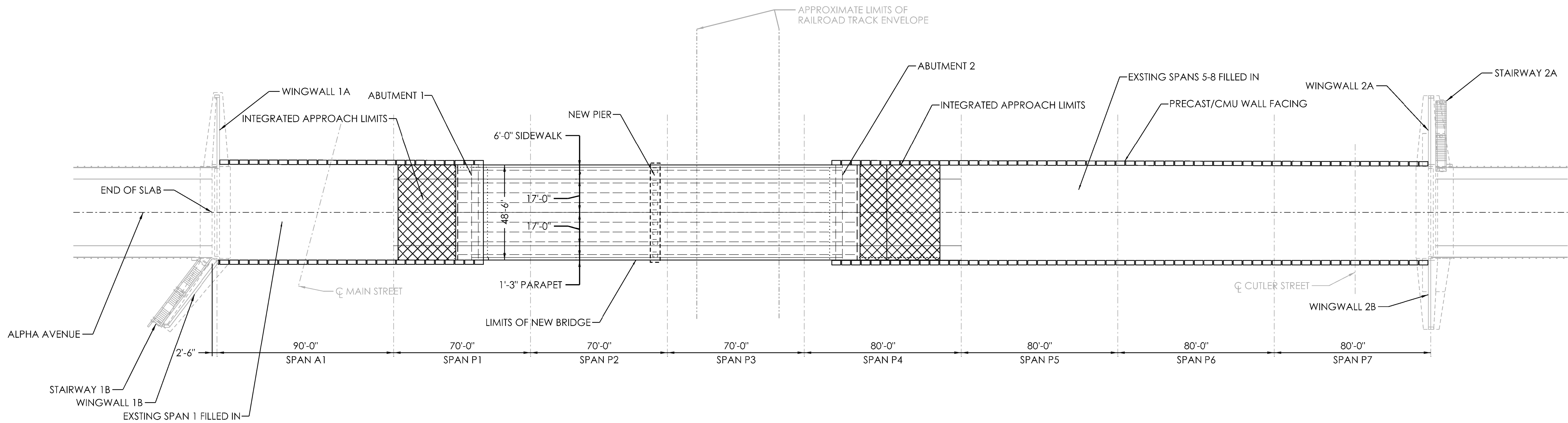
REV.	DATE	REVISION DESCRIPTION



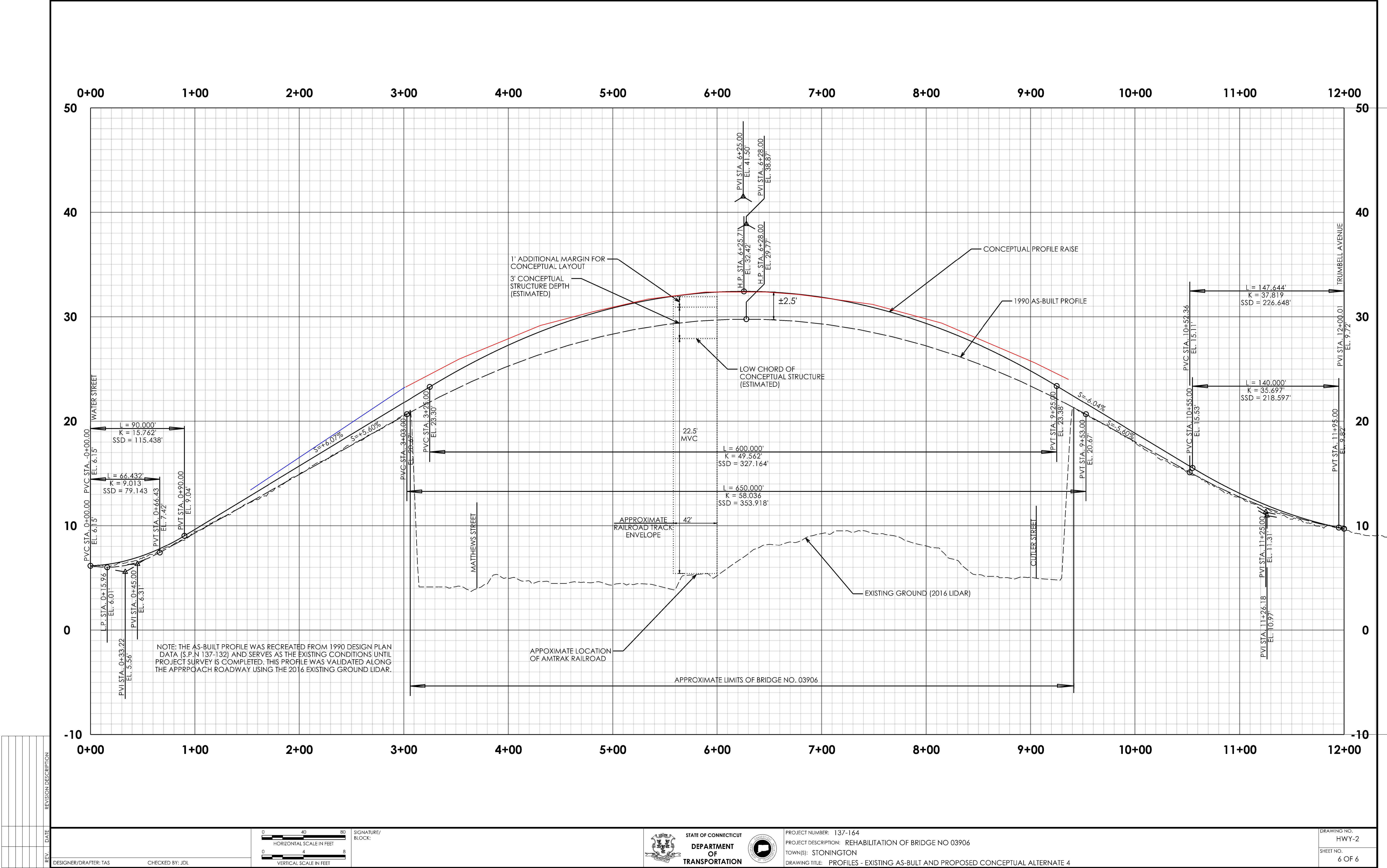









REV.	DATE	REVISION DESCRIPTION





Appendix E: Rehabilitation Alternate Cost Comparisons

	COMPUTATION BY		TAS	DATE	2/15/22	SHEET	1	OF	1
	CHECKED BY		AJF	DATE	2/21/22	CHA PROJECT NO. 067838.STA			
	CLIENT		ConnDOT State Liaison Bridge Project			CLIENT PROJECT NO. 137-164			
	ITEM Bridge #03906 Alternate 1 Cost Estimate Summary								

#### Alternate 1: Pier 4 Replacement and Structural Repairs/Strengthening

##### Superstructure Work:

1. Removal and replacement of existing modular joint located over pier 4.
2. Replace existing asphaltic plug joints.
3. Steel repairs and spot painting.
4. Strengthening of girders in span 8.
5. Install arc shields over catenary wires.
6. Paint beam ends at ship lap joint and abutments.
7. Replace rocker bearings.
8. Repairs to existing weep drains.

##### Substructure Work:

1. Epoxy injection crack repairs to abutments and wingwalls
2. Repairs to existing pier bents.
3. Full replacement of pier 4.
4. Fill existing pier caps with concrete.
5. Replacement of bearings in ship lap over pier 4.
6. Clean and lubricate existing bearings.
7. Repair or replace missing or deteriorated rivets.

##### STRUCTURE ITEMS

ITEM NO.	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	TOTAL
0503041	JACKING FOR PIER MODIFICATION	LS	1	\$500,000.00	\$500,000.00
0503889	JACKING EXISTING SUPERSTRUCTURE	EA	6	\$125,000.00	\$750,000.00
0511116	REPAIR WEEP DRAINS	EA	4	\$1,100.00	\$4,400.00
0520036	ASPHALTIC PLUG EXPANSION JOINT SYSTEM	CF	73	\$353.25	\$25,800.00
0520456	PREFABRICATED EXPANSION JOINT SYSTEM	LF	52	\$1,500.00	\$78,000.00
0521001	ELASTOMERIC BEARING PADS	CI	15000	\$1.38	\$20,700.00
0521003	BEARING REPLACEMENT WITH ELASTOMERIC BEARING PADS	EA	18	\$2,926.80	\$52,700.00
0522129	CLEAN AND LUBRICATE EXISTING BEARINGS	EA	90	\$1,600.00	\$144,000.00
0601066	COLUMN AND CAP CONCRETE	CY	120	\$2,000.00	\$240,000.00
0601954	EPOXY INJECTION CRACK REPAIR	LF	184	\$98.10	\$18,100.00
0602030	DEFORMED STEEL BARS - GALVANIZED	LB	15000	\$1.94	\$29,100.00
0603061	STRUCTURAL STEEL (SITE NO. 1)	LS	1	\$415,000.00	\$415,000.00
0603081	STRUCTURAL STEEL REPAIRS (SITE NO. 1)	CWT	20	\$5,000.00	\$100,000.00
0603147	ABRASIVE BLAST CLEANING AND FIELD PAINTING OF STRUCTURE	LS	1	\$161,600.00	\$161,600.00
0603563	CLASS 1 CONTAINMENT AND COLLECTION OF SURFACE PREPARATION DEBRIS (SITE NO. 1)	LS	1	\$122,000.00	\$122,000.00
0603659	REPLACE REMOVED OR MISSING RIVETS AND BOLTS WITH HIGH STRENGTH BOLTS	EA	190	\$115.00	\$21,900.00
				SUBTOTAL 1	\$2,683,300.00

##### ROADWAY ITEMS

ITEM NO.	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	TOTAL
0000804A	GROUNDING, BONDING AND RAIL RETURN SYSTEM	LS	1	\$125,000.00	\$125,000.00
0822100.01	TEMPORARY TRAFFIC BARRIER	LF	800	\$55.00	\$44,000.00
0822101.01	RELOCATED TEMPORARY TRAFFIC BARRIER	LF	500	\$35.00	\$17,500.00
				SUBTOTAL 2	\$186,500.00

##### MINOR ITEMS

	% of Sub 1 +2	UNIT	QUANTITY	UNIT PRICE	TOTAL
Minor Items (20% of Subtotal 1+2)	20%	LS	1	\$573,960.00	\$574,000.00
				SUBTOTAL 3	\$574,000.00

##### LUMP SUM ITEMS

	% of Sub 1 & 2 & 3	UNIT	QUANTITY	UNIT PRICE	TOTAL
Clearing & Grubbing	2.0%	LS	1	\$68,876.00	\$69,000.00
M & P of Traffic	5.5%	LS	1	\$189,409.00	\$190,000.00
Mobilization and Project Closeout	7.0%	LS	1	\$223,847.00	\$224,000.00
Construction Staking	2.0%	LS	1	\$103,314.00	\$104,000.00
				SUBTOTAL 4	\$587,000.00

##### ENGINEERING PERCENTAGES

	% of Sub 1, 2 & 3	ITEM	TOTAL
Incidentals	25%	INCIDENTALS	\$1,007,700.00
Contingency	20%	CONTINGENCY	\$806,200.00
		SUBTOTAL 5	\$1,813,900.00

##### AMTRAK RAIL ITEMS

AMTRAK FORCE ACCOUNT	\$250,000.00	\$250,000.00
	SUBTOTAL 6	\$250,000.00

##### ESCALATION TO YEAR OF CONSTRUCTION

	% per Year	ITEM	TOTAL
3.5% per Year to 2026 Construction	3.50%	SUBTOTAL 7	\$1,397,300.00

TOTAL \$7,492,000.00

GRAND TOTAL	\$7,492,000.00
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COMPUTATION BY TAS	DATE 2/15/22	SHEET 1 OF 1
CHECKED BY AJF	DATE 2/21/22	CHA PROJECT NO. 067838 STA
CLIENT ConnDOT State Liaison Bridge Project		CLIENT PROJECT NO. 137-164

ITEM  
Bridge # 03906 Alternate 2 Cost Estimate Summary

#### **Alternate 2: Replacement of Piers and Structural Repairs/Strengthening**

##### **Superstructure Work:**

1. Removal and replacement of existing modular joint located over pier 4.
2. Replace existing asphaltic plug joints.
3. Steel repairs and spot painting.
4. Strengthening of girders in span 8.
5. Install arc shields over catenary wires.
6. Paint beam ends at ship lap joint and abutments.
7. Repairs to existing weep drains.

##### **Substructure Work:**

1. Epoxy injection crack repairs to abutments and wingwalls
2. Replacement of all pier bents and caps with concrete piers.
3. Replace all existing bearings with elastomeric bearings.

##### **STRUCTURE ITEMS**

<u>ITEM NO.</u>	<u>ITEM DESCRIPTION</u>	<u>UNIT</u>	<u>QUANTITY</u>	<u>UNIT PRICE</u>	<u>TOTAL</u>
0503889	JACKING EXISTING SUPERSTRUCTURE	EA	7	\$125,000.00	\$875,000.00
0511116	REPAIR WEEP DRAINS	EA	4	\$1,100.00	\$4,400.00
0520036	ASPHALTIC PLUG EXPANSION JOINT SYSTEM	CF	73	\$353.25	\$25,800.00
0520456	PREFABRICATED EXPANSION JOINT SYSTEM	LF	52	\$1,800.00	\$93,600.00
0521001	ELASTOMERIC BEARING PADS	CI	59000	\$1.38	\$81,500.00
0521003	BEARING REPLACEMENT WITH ELASTOMERIC BEARING PADS	EA	18	\$2,926.80	\$52,700.00
0601064	ABUTMENT AND WALL CONCRETE	CY	930	\$1,100.00	\$1,023,000.00
0601954	EPOXY INJECTION CRACK REPAIR	LF	184	\$98.10	\$18,100.00
0602030	DEFORMED STEEL BARS - GALVANIZED	LB	112000	\$1.94	\$217,300.00
0603061	STRUCTURAL STEEL (SITE NO. 1)	LS	1	\$415,000.00	\$415,000.00
0603147	ABRASIVE BLAST CLEANING AND FIELD PAINTING OF STRUCTURE	LS	1	\$161,600.00	\$161,600.00
0603479	ABRASIVE BLAST CLEANING AND PAINTING OF BEAM ENDS	LS	1	\$43,100.00	\$43,100.00
0603563	CLASS 1 CONTAINMENT AND COLLECTION OF SURFACE PREPARATION DEBRIS (SITE NO. 1)	LS	1	\$122,000.00	\$122,000.00
0603659	REPLACE REMOVED OR MISSING RIVETS AND BOLTS WITH HIGH STRENGTH BOLTS	EA	80	\$115.00	\$9,200.00
SUBTOTAL 1					\$3,142,300.00

##### **ROADWAY ITEMS**

<u>ITEM NO.</u>	<u>ITEM DESCRIPTION</u>	<u>UNIT</u>	<u>QUANTITY</u>	<u>UNIT PRICE</u>	<u>TOTAL</u>
0000804A	GROUNDING, BONDING AND RAIL RETURN SYSTEM	LS	1	\$75,000.00	\$75,000.00
0822100.01	TEMPORARY TRAFFIC BARRIER	LF	800	\$55.00	\$44,000.00
0822101.01	RELOCATED TEMPORARY TRAFFIC BARRIER	LF	500	\$35.00	\$17,500.00
SUBTOTAL 2					\$136,500.00

##### **MINOR ITEMS**

	<u>% of Sub 1 +2</u>	<u>UNIT</u>	<u>QUANTITY</u>	<u>UNIT PRICE</u>	<u>TOTAL</u>
Minor Items (20% of Subtotal 1+2)	20%	LS	1	\$655,760.00	\$656,000.00
SUBTOTAL 3					\$656,000.00

##### **LUMP SUM ITEMS**

	<u>% of Sub 1 &amp; 2 &amp; 3</u>	<u>UNIT</u>	<u>QUANTITY</u>	<u>UNIT PRICE</u>	<u>TOTAL</u>
Clearing & Grubbing	2.0%	LS	1	\$78,696.00	\$79,000.00
M & P of Traffic	5.5%	LS	1	\$216,414.00	\$217,000.00
Mobilization and Project Closeout	7.0%	LS	1	\$255,762.00	\$256,000.00
Construction Staking	2.0%	LS	1	\$118,044.00	\$119,000.00
SUBTOTAL 4					\$671,000.00

##### **ENGINEERING PERCENTAGES**

	<u>% of Sub 1, 2 &amp; 3</u>	<u>ITEM</u>	<u>TOTAL</u>
Incidentals	25%	INCIDENTALS	\$1,151,500.00
Contingency	20%	CONTINGENCY	\$921,200.00
SUBTOTAL 5			\$2,072,700.00

##### **AMTRAK RAIL ITEMS**


	<u>UNIT PRICE</u>	<u>TOTAL</u>
AMTRAK FORCE ACCOUNT	\$ 250,000.00	\$250,000.00
SUBTOTAL 6		\$250,000.00

##### **ESCALATION TO YEAR OF CONSTRUCTION**

	<u>% per Year</u>	<u>ITEM</u>	<u>TOTAL</u>
3.5% per Year to 2026 Construction	3.50%	SUBTOTAL 7	\$1,588,400.00

TOTAL \$8,516,900.00

GRAND TOTAL \$8,517,000.00

	COMPUTATION BY		TAS	DATE	2/15/22	SHEET	1	OF	1
	CHECKED BY		AJF	DATE	2/21/22	CHA PROJECT NO. 067838.STA			
	CLIENT					CLIENT PROJECT NO. 137-164			
	ConnDOT State Liaison Bridge Project								
ITEM Bridge # 03906 Alternate 3 Cost Estimate Summary									

### Alternate 3: Replacement of Piers and Structural Repairs/Strengthening

#### Superstructure Work:

1. Removal and replacement of existing modular joint located over pier 4.
2. Replace existing asphaltic plug joints.
3. Strip existing overlay and install new membrane and bituminous overlay.
4. Mill and overlay approaches.
5. Minor patching work to existing bridge sidewalks.
6. Strengthening of girders in span 8.
7. Install arc shields over catenary wires.
8. Repairs to existing light standards.
9. Minor patching and repair to existing wingwall stairwells.
10. Painting and repairs to existing bridge fence.
11. Add new mbr-mash and end blocks to bridge.
12. Repairs to existing weep drains.
13. Full and partial depth deck Patching
14. Modifications to Parapets

How has the quantity for pier concrete been included with this alternative?

#### Substructure Work:

1. Epoxy injection crack repairs to abutments and wingwalls
2. Replacement of all pier bents and caps with concrete piers.
3. Replace all existing bearings with elastomeric bearings.

#### STRUCTURE ITEMS

ITEM NO.	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	TOTAL
0202529	CUT BITUMINOUS CONCRETE PAVEMENT	LF	68	\$2.83	\$200.00
0406236	MATERIAL FOR TACK COAT	GAL	290	\$6.00	\$1,740.00
0406277	REMOVAL OF EXISING WEARING SURFACE	SF	24800	\$15.20	\$377,000.00
0406171	HMA S0.5	TON	300	\$121.40	\$36,500.00
0406173	HMA S0.25	TON	140	\$118.20	\$16,548.00
0503041	JACKING FOR PIER MODIFICATION	LS	1	\$200,000.00	\$200,000.00
0503889	JACKING EXISTING SUPERSTRUCTURE	EA	8	\$125,000.00	\$1,000,000.00
0511116	REPAIR WEEP DRAINS	EA	4	\$1,100.00	\$4,400.00
0520036	ASPHALTIC PLUG EXPANSION JOINT SYSTEM	CF	73	\$353.25	\$25,800.00
0520456	PREFABRICATED EXPANSION JOINT SYSTEM	LF	52	\$1,500.00	\$78,000.00
0521001	ELASTOMERIC BEARING PADS	CI	66000	\$1.38	\$91,100.00
0521002	BEARING REPLACEMENT WITH ELASTOMERIC BEARING PADS	EA	90	\$2,926.80	\$263,500.00
0601121	PARAPET CONCRETE	LF	1380	\$350.00	\$483,000.00
0601122	BRIDGE SIDEWALK CONCRETE	CY	1	\$1,600.00	\$1,600.00
0601270	FULL DEPTH PATCH (HIGH EARLY STRENGTH)	CY	10	\$4,900.00	\$49,000.00
0601318	PARTIAL DEPTH PATCH	CF	380	\$450.00	\$171,000.00
0601954	EPOXY INJECTION CRACK REPAIR	LF	184	\$98.10	\$18,100.00
0603061	STRUCTURAL STEEL (SITE NO. 1)	LS	1	\$1,000,000.00	\$1,000,000.00
0603081	STRUCTURAL STEEL REPAIRS (SITE NO. 1)	CWT	10	\$5,000.00	\$50,000.00
0603147	ABRASIVE BLAST CLEANING AND FIELD PAINTING OF STRUCTURE	LS	1	\$161,600.00	\$161,600.00
0603479	ABRASIVE BLAST CLEANING AND PAINTING OF BEAM ENDS	LS	1	\$43,100.00	\$43,100.00
0603563	CLASS 1 CONTAINMENT AND COLLECTION OF SURFACE PREPARATION DEBRIS (SITE NO. 1)	LS	1	\$122,000.00	\$122,000.00
0603659	REPLACE REMOVED OR MISSING RIVETS AND BOLTS WITH HIGH STRENGTH BOLTS	EA	80	\$115.00	\$9,200.00
0904900	METAL BRIDGE RAIL PROTECTIVE FENCE	LF	1252	\$426.48	\$534,000.00
				SUBTOTAL 1	\$4,737,388.00

#### ROADWAY ITEMS

ITEM NO.	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	TOTAL
0000804A	GROUNDING, BONDING AND RAIL RETURN SYSTEM	LS	1	\$125,000.00	\$125,000.00
0406171	HMA S0.5	TON	370	\$121.40	\$45,000.00
0202529	CUT BITUMINOUS CONCRETE PAVEMENT	LF	68	\$2.83	\$200.00
0822100.01	TEMPORARY TRAFFIC BARRIER	LF	800	\$55.00	\$44,000.00
0822101.01	RELOCATED TEMPORARY TRAFFIC BARRIER	LF	500	\$35.00	\$17,500.00
1002300	LIGHT STANDARD	EA	3	\$2,500.00	\$7,500.00
1118101	TEMPORARY SIGNALIZATION	EST	1	\$350,000.00	\$350,000.00
				SUBTOTAL 2	\$589,200.00

#### MINOR ITEMS

	% of Sub 1 +2	UNIT	QUANTITY	UNIT PRICE	TOTAL
Minor Items (20% of Subtotal 1+2)	20%	LS	1	\$1,065,317.60	\$1,066,000.00
				SUBTOTAL 3	\$1,066,000.00

#### LUMP SUM ITEMS


	% of Sub 1 & 2 & 3	UNIT	QUANTITY	UNIT PRICE	TOTAL
Clearing & Grubbing	2.0%	LS	1	\$127,851.76	\$128,000.00
M & P of Traffic	5.5%	LS	1	\$351,592.34	\$352,000.00
Mobilization and Project Closeout	7.0%	LS	1	\$415,518.22	\$416,000.00
Construction Staking	2.0%	LS	1	\$191,777.64	\$192,000.00
				SUBTOTAL 4	\$1,088,000.00

#### ENGINEERING PERCENTAGES

<u>ENGINEERING PERCENTAGES</u>		<u>% of Sub 1, 2 &amp; 3</u>	<u>ITEM</u>	<u>TOTAL</u>
Incidentals	20%		INCIDENTALS	\$1,496,200.00
Contingency	20%		CONTINGENCY	\$1,496,200.00
			SUBTOTAL 5	\$2,992,400.00



<u>AMTRAK RAIL ITEMS</u>		<u>UNIT PRICE</u>	<u>TOTAL</u>
AMTRAK FORCE ACCOUNT		\$ 350,000.00	\$350,000.00
		SUBTOTAL 6	\$350,000.00
<u>ESCALATION TO YEAR OF CONSTRUCTION</u>		<u>ITEM</u>	<u>TOTAL</u>
3.5% per Year to 2026 Construction	<u>% per Year</u> 3.50%	SUBTOTAL 7	\$2,481,300.00
		TOTAL	\$13,304,288.00
		GRAND TOTAL	\$13,305,000.00

	COMPUTATION BY		TAS	DATE	1/10/22	SHEET	1	OF	1
	CHECKED BY		AJF	DATE	3/10/22	CHA PROJECT NO. 067838.STA			
	CLIENT		ConnDOT State Liaison Bridge Project				CLIENT PROJECT NO. 137-164		
ITEM Bridge # 03906 Alternate 4 Cost Estimate Summary									

#### Alternate 4: Remove Superstructure, Raise Superstructure, New Bridge in Spans 2 through 4, Fill Spans 1, 5 through 8 with GRS-IBS

##### Superstructure/ Roadway Work:

1. Remove existing superstructure.
2. Replace spans 2,3,4 with a new superstructure.
3. Install integrated approaches.
4. Raise profile of roadway and full depth reconstruction for approx. 900'.
5. Replace existing sidewalks and curbing along approaches.
6. Replace existing light standards.

##### Substructure Work:

1. Epoxy injection crack repairs to existing stairwells.
2. Install reinforced soil foundation.
3. Install GRS-IBS abutments and structural fill under existing spans 1,5,6, 7, and 8.
4. Install new pier next to existing pier 3.
5. Installation of CMU facing walls in front of GRS-IBS.
6. Installation of shields over Amtrak wires under Span 4.

##### STRUCTURE ITEMS

ITEM NO.	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	TOTAL
0216000	PERVIOUS STRUCTURE BACKFILL	CY	5060	\$48.50	\$245,500.00
0406171	HMA S0.5	TON	97	\$121.40	\$11,800.00
0406173	HMA S0.25	TON	60	\$118.20	\$7,092.00
0503001	REMOVAL OF SUPERSTRUCTURE	LS	1	\$1,600,000.00	\$1,600,000.00
0520036	ASPHALTIC PLUG EXPANSION JOINT SYSTEM	CF	110	\$353.25	\$38,900.00
0521001	ELASTOMERIC BEARING PADS	CI	17000	\$1.38	\$23,500.00
0601064	ABUTMENT AND WALL CONCRETE	CY	280	\$895.00	\$250,600.00
0601118	BRIDGE DECK CONCRETE	CY	310	\$1,100.00	\$341,000.00
0601121	PARAPET CONCRETE	LF	1380	\$350.00	\$483,000.00
0601122	BRIDGE SIDEWALK CONCRETE	CY	56	\$1,100.00	\$61,600.00
0602030	DEFORMED STEEL BARS - GALVANIZED	LB	40000	\$1.94	\$77,600.00
0603061	STRUCTURAL STEEL (SITE NO. 1)	LS	1	\$1,900,000.00	\$1,900,000.00
0712021A	GRS ABUTMENT AND WINGWALL	CY	21900	\$90.00	\$1,971,000.00
0712022	ABUTMENT AND WINGWALL CMU FACING	SF	27540	\$40.00	\$1,101,600.00
0712023	REINFORCED SOIL FOUNDATION	CY	3100	\$125.00	\$387,500.00
0904900	METAL BRIDGE RAIL PROTECTIVE FENCE	LF	1252	\$426.48	\$534,000.00
				SUBTOTAL 1	\$9,034,692.00

##### ROADWAY ITEMS

ITEM NO.	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	TOTAL
0000804A	GROUNDING, BONDING AND RAIL RETURN SYSTEM	LS	1	\$125,000.00	\$125,000.00
0202000	SUBBASE	CY	960.00	\$45.00	\$43,200.00
0202491	REMOVAL OF GRANITE STONE CURBING	LF	2710	\$18.00	\$48,800.00
0202513	REMOVAL OF CONCRETE SIDEWALK	SY	1810	\$47.50	\$86,000.00
0202529	CUT BITUMINOUS CONCRETE PAVEMENT	LF	68	\$2.83	\$200.00
0406171	HMA S0.5	TON	1743	\$121.40	\$211,700.00
0507001	TYPE "C" CATCH BASIN	EA	5	\$2,500.00	\$12,500.00
0507022	TYPE "C" CATCH BASIN DOUBLE GRATE - TYPE II	EA	4	\$6,500.00	\$26,000.00
0651011	12" R.C. PIPE	LF	428	\$100.00	\$42,800.00
0651012	15" R.C. PIPE	LF	45	\$100.00	\$4,500.00
0651013	18" R.C. PIPE	LF	4	\$100.00	\$400.00
0813012	5" X 18" GRANITE STONE CURBING	LF	2710	\$40.00	\$108,400.00
0822100.01	TEMPORARY TRAFFIC BARRIER	LF	1880	\$55.00	\$103,400.00
0822101.01	RELOCATED TEMPORARY TRAFFIC BARRIER	LF	680	\$35.00	\$23,800.00
092001	CONCRETE SIDEWALK	SF	14,020	\$13.00	\$182,300.00
1002300	LIGHT STANDARD	EA	8	\$2,500.00	\$20,000.00
1118101	TEMPORARY SIGNALIZATION	EST	1	\$350,000.00	\$350,000.00
				SUBTOTAL 2	\$1,389,000.00

##### MINOR ITEMS

	% of Sub 1 +2	UNIT	QUANTITY	UNIT PRICE	TOTAL
Minor Items (20% of Subtotal 1+2)	20%	LS	1	\$2,084,738.40	\$2,085,000.00
				SUBTOTAL 3	\$2,085,000.00

##### LUMP SUM ITEMS

	% of Sub 1 & 2 & 3	UNIT	QUANTITY	UNIT PRICE	TOTAL
Clearing & Grubbing	0.5%	LS	1	\$62,543.46	\$63,000.00
M & P of Traffic	5.5%	LS	1	\$687,978.06	\$688,000.00
Mobilization and Project Closeout	5.0%	LS	1	\$813,064.98	\$814,000.00
Construction Staking	1.0%	LS	1	\$375,260.76	\$376,000.00
				SUBTOTAL 4	\$1,941,000.00

##### ENGINEERING PERCENTAGES

	% of Sub 1, 2 & 3	ITEM	TOTAL
Incidentals	20%	INCIDENTALS	\$2,890,000.00
Contingency	20%	CONTINGENCY	\$2,890,000.00
		SUBTOTAL 5	\$5,780,000.00

##### AMTRAK RAIL ITEMS

AMTRAK FORCE ACCOUNT	\$	500,000.00	\$500,000.00
		SUBTOTAL 6	\$500,000.00

##### UTILITY ITEMS

1014910	UTILITY RELOCATION	LS	1	\$300,000.00	\$300,000.00
				SUBTOTAL 7	\$300,000.00



**ESCALATION TO YEAR OF CONSTRUCTION**

3.5% per Year to 2026 Construction

**% per Year**

3.50%

**ITEM**

SUBTOTAL 8

**TOTAL**

\$4,752,400.00

TOTAL

\$25,482,092.00

**GRAND TOTAL**

**\$25,483,000.00**

## Appendix F: 2020 CTDOT Inspection Report





## **BRIDGE NO.03906**

73770 - STONINGTON  
ALPHA AVENUE  
over  
AMTRAK RR & LOCAL ROADS

Fracture Critical and Routine Inspection

1/19/2020

Inspected by: PRIME AE



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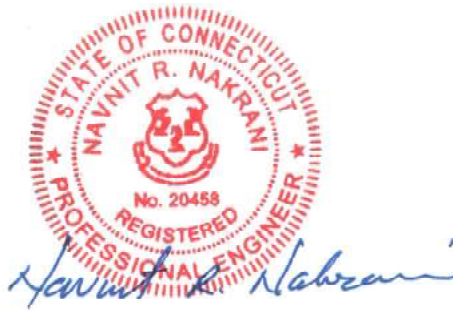
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## Report Title Page

Bridge No. 03906, Alpha Avenue over Amtrak Railroad & Local Roads, Stonington, CT

Date of Inspection: 01/19/2020



Professional Certification: I hereby certify that this report, including all its contents, has been approved by me, and that I am a duly licensed professional engineer under the laws of the State of Connecticut.

Signature:



Navnit R Nakrani

Digitally signed by Navnit R Nakrani  
Date: 2020.04.10 10:25:12 -04'00'

License No.: 20458

Date: 04/10/2020

**Form: Location**

**Inspection type:** Fracture Critical,Routine

**Inspection Date:** 1/19/2020

**Inspected by:** PRIME AE

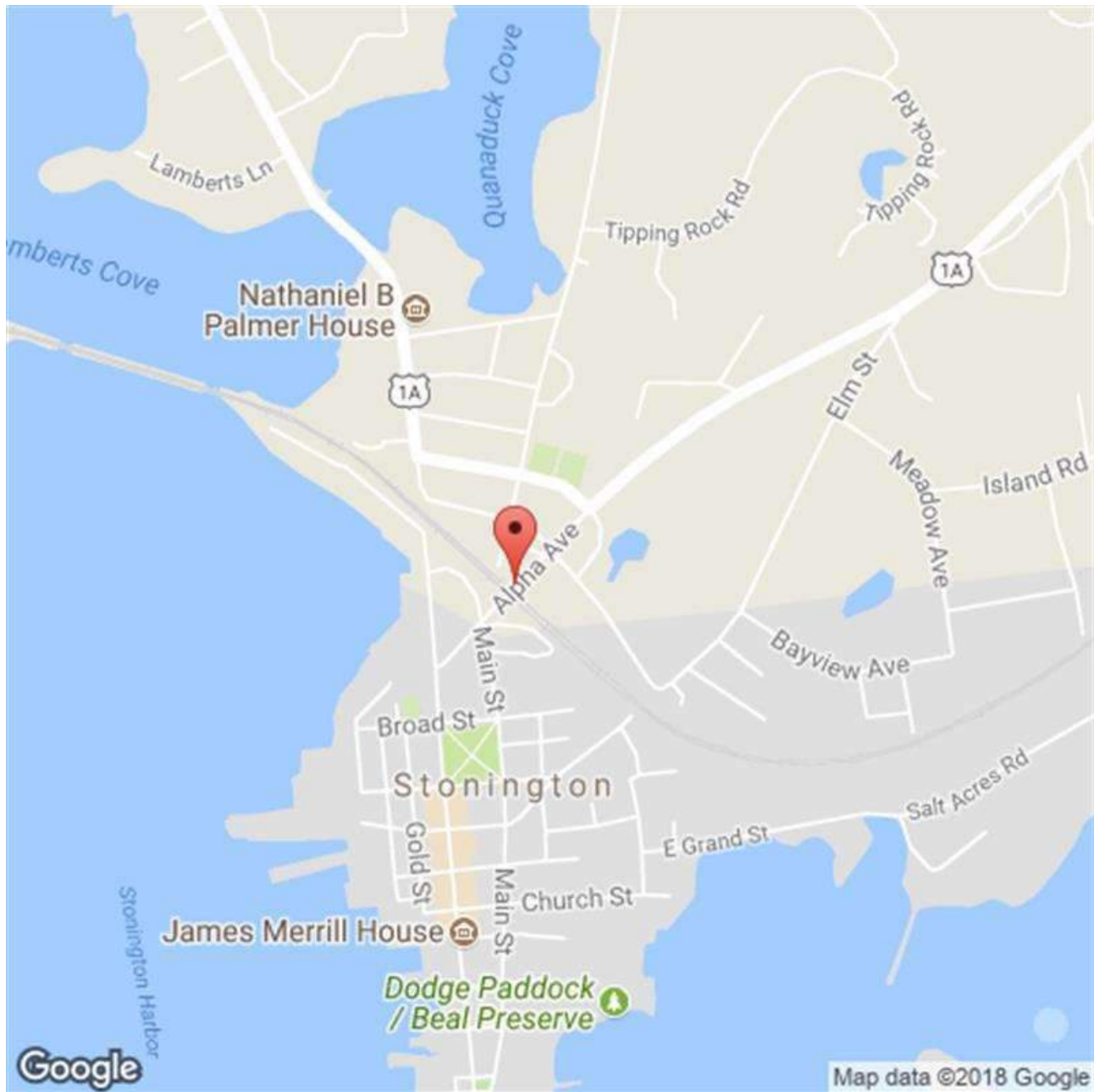
**:Bridge No 03906**

**Town:** STONINGTON

**Carried:** ALPHA AVENUE

**Crossed:** AMTRAK RR & LOCAL ROADS

**Inventory Route:** Non-NHS



Location Map # 1

Bridge No. 03906

Alpha Ave. over Amtrak Railroad & Local Rds.

Stonington, CT

Lat: 41°20'19.86" Long: -71°54'20.28"

## In-Depth Components

Bridge: 03906

Town: 73770 - STONINGTON



Carried: ALPHA AVENUE

Crossed: AMTRAK RR & LOCAL  
ROADS



Form: BRI-19, Rev. 2/15

Inspection type: Fracture Critical,Routine

Inspection Date: 1/19/2020

Inspected by: PRIME AE

:Bridge No 03906

Town: STONINGTON

Carried: ALPHA AVENUE

Crossed: AMTRAK RR & LOCAL ROADS

Inventory Route: Non-NHS

## STRUCTURE INVENTORY & APPRAISAL

### INSPECTION

Structurally Deficient  Functionally Obsolete

Sufficiency Rating

(90) Inspection Date  (91) Frequency

Indepth Insp  Proposed next Indepth Year

Deck Survey Date  Class

Access  Flagman

	Frequency	Date	Type
Fracture	<input type="text" value="24"/>	<input type="text" value="01/19/2020"/>	<input type="text" value="K Steel Pier Caps, riveted box or plate girders"/>
Underwater	<input type="text"/>	<input type="text"/>	<input type="text"/>
Special	<input type="text"/>	<input type="text"/>	<input type="text" value="F Crack Growth"/>

### IDENTIFICATION

Bridge Name

Town Code - Name

(5) Inventory Route

(A) Record Type

(B) Signing Prefix

(C) Level of Service

(D) Route Number.

(E) Dir Suffix

(6A) Featured Intersected

(6B) Critical Facility Indicator

(7) Facility Carried

(9) Location

(11) Mile Post  Miles

(16) Latitude  Deg.  Min.  Sec.

(17) Longitude  Deg.  Min.  Sec.

(98) Border Bridge

(A) State Code  (B) Percent Responsibility  %

(C) Border Town Name

(99) Border Bridge Structure No.

### STRUCTURE TYPE & MATERIALS

(43) Structure Type, Main

A) Material

B) Design Type

(44) Structure Type, Approach

A) Material

B) Design Type

(45) Number of Spans, Main Unit

(46) Number of Approach Spans

(107) Deck Structure Type

(108) Wearing Surface/Protection Systems

A) Type of Wearing Surface

B) Type of Membrane

C) Type of Deck Protection

Substructure

A) Material

B) Design Type

Paint

Type

Year

Comment

### GEOMETRIC DATA

(48) Length of Maximum Span  ft.

(49) Structure Length  ft.

(50) Curb or Sidewalk Widths

A) Left  ft.  in. B) Right  ft.  in.

(51) Bridge Roadway Width Curb to Curb  ft.  in.

(52) Deck Width, Out to Out  ft.  in.

(32) Approach Roadway Width  ft.

Form: BRI-19, Rev. 2/15

Inspection type: Fracture Critical,Routine

Inspection Date: 1/19/2020

Inspected by: PRIME AE

:Bridge No 03906

Town: STONINGTON

Carried: ALPHA AVENUE

Crossed: AMTRAK RR & LOCAL ROADS

Inventory Route: Non-NHS

(33) Bridge Median

0 - No median

Deck Area

30313 sq. ft.

(34) Skew Angle

00 deg.

(35) Structure Flared

0 - No flare

(10) Inv. Rte. Min. Vert. Clearance

99 ft. 99 in.

(47) Inv. Rte. Total Horiz. Clr.

34 ft. 0 in.

Log Inv. Rte. Total Horiz. Clr.

34 ft. 0 in.

RLog Inv. Rte. Total Horiz. Clr.

0 ft. 0 in.

(53) Min. Vert. Clearance Over Bridge

99 ft. 99 in.

(54) Log-Min. Vert. Underclearance

H ref. 13 ft. 5 in.

(55) Min. Lat Underclearance on Right

H ref. 2 ft. 0 in.

(56) Min. Lat Underclearance on Left

0 ft. 0 in.

#### CONDITION

(58) Deck

7

(59) Superstructure

5

(60) Substructure

4

(61) Channel & Channel Protections

N

(62) Culverts

N

(36) Traffic Safety Features

A) Bridge Railings

1

B) Transitions

0

C) Approach Guardrail

0

D) Approach Guardrail Ends

0

#### WATERWAY

Drainage Basin Waterway

(38) Navigation Control

N - Not applicable, no waterway

(39) Navigation Vertical Clearance

0 ft.

(40) Navigation Horiz. Clr.

0 ft.

(111) Pier/Abutment Navigation

(116) Vert-Lift Brg Nav Min

0 ft. 0 in.

#### AGE AND SERVICE

Year Built

1940

(106) Year Reconstructed

1992

(42) Type of Service

A) On

5 - Highway-pedestrian

B) Under

4 - Highway - railroad

(28) Number of Lanes

A) On

02

B) Under

04

(29) Average Daily Traffic

4810

Is Above Half ADT?

No

(109) Percent Truck

3 %

(30) Years of ADT

2017

(19) Bypass, Detour Length

1 Miles

#### APPRAISALS

(67) Structural Evaluation

4

(68) Deck Geometry

5

(69) Underclearances, Vert. & Horiz.

3

(71) Waterway Adequacy

N

(72) Approach Roadway Alignment

6

(113) Scour Critical

N

#### COMMENTS

- Access: Code 99 (Other) - 45' Bucket Truck and 40' High rail used for inspection.  
- Load Rating and Posting based on "Operating Rating" per BIM Section 8.1.5 - RAP 4/22/14  
- ADT: Based on 1% increase per year for local roads.

#### CLASSIFICATION

(112) NBIS Bridge Length

Yes

(104) Highway System

0 - Structure/Route is NOT on NHS

(26) Functional Class

17 - Urban - Collector

(100) Defense Highway

0 - Not a STRAHNET route

(101) Parallel Structure

N - No parallel structure

(102) Direction of Traffic

2 - 2-way traffic

Form: BRI-19, Rev. 2/15

Inspection type: Fracture Critical,Routine

Inspection Date: 1/19/2020

Inspected by: PRIME AE

:Bridge No 03906

Town: STONINGTON

Carried: ALPHA AVENUE

Crossed: AMTRAK RR & LOCAL ROADS

Inventory Route: Non-NHS

(103) Temporary Structure	
(110) Designated National Network	0 - Inventory route not on network
(20) Toll	3 - On Free Road
(21) Maintain	25 - Other Local Agencies
(22) Owner	80 - Other or Unknown
Report Class	O - ORPHAN
(37) Historical Significance	5 - Not eligible for National Register

#### POSTED SIGNS

Other Posted Sign 1			
Other Posted Sign 2			
	Actual	Recomended	
Posted Load Single Unit Truck			tons
Posted Load Semi-Trailer Truck			tons
Posted Load 4 Axle Truck			tons
Posted Load 3S2 Truck			tons
All Vehicles			tons
Posted Vert. Clearance on Bridge		ft.	in.
Posted Vert. Underclearance	13	ft.	2 in.
Posted Speed Limit on Bridge	25	m.p.h.	

#### OTHER FEATURES

Fence Required	Yes
Fence Present	Yes
Fence Type	2 - Chain Link
Fence Height	7.3
Fence Material	2 - Steel
Fence Top Type	2 - Return
Barrel Ladders	No
Stand Pipes	No
Catwalks	No
Moveable Inspection System	No
Haunches Present over Roadway	YES
Utilities	3   Electric
	4   Telephone

#### PROPOSED IMPROVEMENTS

(75A) Type of Work Proposed	
(75B) Work Done By	
(76) Length of Structure Improvement	ft.
(94) Bridge Improvement Cost	\$
(95) Roadway Improvement Cost	\$
(96) Total Project Cost	\$
(97) Year of Improvement Estimate	
(114) Future ADT	7147
(115) Year of Future ADT	2037
DOT Bridge Program List No	
Project No	
Advertised Date	

#### LOAD RATING & POSTING

(31) Design Load	5 - HS 20
(63) Operating Rating Type	1 - Load Factor (LF)
(64) Operating Rating	43.5
(65) Inventory Rating Type	1 - Load Factor (LF)
(66) Inventory Rating	26.1
Evaluation Code	L - Load Factor
Year of Evaluation	2000
(70) Bridge Posting	5 - Equal to or above legal loads
(41) Structure Status	A - Open



Form: BRI-19, Rev. 2/15

Inspection type: Fracture Critical,Routine

Inspection Date: 1/19/2020

Inspected by: PRIME AE

:Bridge No 03906

Town: STONINGTON

Carried: ALPHA AVENUE

Crossed: AMTRAK RR & LOCAL ROADS

Inventory Route: Non-NHS

**INSPECTOR'S SIGNATURES:**

1) \_\_\_\_\_ Date: 04/07/2020

*Eriol Begelli*

2) \_\_\_\_\_ Date: 04/07/2020

*Bob K*

3) \_\_\_\_\_ Date:

4) \_\_\_\_\_ Date:

P.E. SIGNATURE:

*N. E. Nahrani*

Date: 04/10/2020

P.E. #

PEN.0020458

Reviewed By:

*William Freeman Jr.*  
William Freeman, Jr.

Date: 05/08/2020

**Form: BRI-18, Rev. 1/14****Inspection type:** Fracture Critical,Routine**Inspection Date:** 1/19/2020**Inspected by:** PRIME AE**:Bridge No 03906****Town:** STONINGTON**Carried:** ALPHA AVENUE**Crossed:** AMTRAK RR & LOCAL ROADS**Inventory Route:** Non-NHS

## FIELD INSPECTION REPORT

Location: 1000 FT SOUTH OF ROUTE  
 Main Material: 4 - Steel continuous  
 Main Design: 02 - Stringer/Multi-beam or

Year Built: 1940  
 Year Rebuilt: 1992

Snooper Required: ☐Snooper Used: ☐**Inspectors:**

Lead Inspector: Jack Klucznik

Inspector: Task:

Agolli,Elvis BSE - Inspector

Area,14 BSE - Inspector

Begolli,Eriol BSE - Inspector

Klucznik,Jack BSE - Inspector

Mohammed,Muqtadar BSE - Inspector

Nyei,Anwar BSE - Inspector

Spahiu,Igli BSE - Inspector

**Visits:**

Visit Date: Temp: Start Time: End Time:

01/19/2020 20 09:30 PM 02:45 AM

01/28/2000 40 08:30 AM 04:00 PM

01/29/2020 40 09:00 AM 12:45 PM

02/26/2020 47 02:15 PM 02:45 PM

**58. DECK:**

Reinforced concrete deck with bituminous overlay.

Overall Rating: 7

**Rating**

Overlay: 7

Bituminous concrete overlay:

- Overlay has random longitudinal, transverse & diagonal cracks open up to 3/16" wide and longitudinal paving seams are opened up to 3/16" wide. Some cracks have been previously sealed in the past.

See Top of Deck Sketches and Photo 9.

Deck - Str. Condition: 7

Underside of concrete deck:

- Random transverse, longitudinal and hairline map cracking with and without efflorescence, dampness and isolated rust.
- Span 2, Bay 8, north of Diaphragm D2 at the transverse construction joint, there is an area of light scaling with moderate efflorescence for full width x 1' long.
- Span 4, Bay 8, north of Diaphragm D2, there is a 10" wide x 7" long x 1.5" deep spall with exposed rebar.
- Span 6, Bay 3 & Bay 5 have hollow areas up to 6' long x 3" wide which could not be removed due to parked vehicles below (Work Item 03906-2020-0008).
- There are a few spalls around the weeps in Span 5 & Span 7 up to 7" long x 6" wide x 3/4" deep.
- The transverse construction joints and the longitudinal construction joints in Bay 5 have area of minor overpour and light to moderate efflorescence.

See Underside of Deck &amp; Framing Plan Sketches and Photos 8, 10 - 12 &amp; 22.

Curbs: 7

Granite block curbs:

- The curbs have vertical hairline cracks, minor edge chipping and scrape marks.
- Average curb reveals is 6" high along the west side and 5-3/4" high along the east side.

See Top of Deck Sketches and Photos 13 &amp; 14.

Median: N

Sidewalks: 6

Concrete sidewalks:

- The sidewalks have random hairline cracks.
- The sealant between the sidewalk & curb is deteriorated/missing or separated at random locations.
- There are random areas of scaling adjacent to the curbs up to 15' long x 8" wide x 1" deep (Span 6), which are fill with sand debris (CTDOT notified via email dated 1/30/2020).

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	<p>Approach Sidewalks:</p> <ul style="list-style-type: none"><li>- The southeast approach sidewalk adjacent to Abutment 1 deck joint has a 28" wide x 11" long x 3.5" deep scale area, which is filled with sand debris.</li><li>- The stair slab in the southeast approach near Abutment 1 is settled 3/4" and the joint sealant has failed (1.5" noted previously).</li><li>- The northwest approach sidewalk has a full length x 3/4" wide transverse crack with 1/2" settlement.</li></ul> <p>See Top of Deck Sketches and Photos 13 - 15.</p>
Parapet: 6	<p>Reinforced concrete parapets:</p> <ul style="list-style-type: none"><li>- The parapets have random vertical hairline map cracks with and without efflorescence. Some cracks extend across the top of the parapet.</li><li>- Span 4, east parapet at mid-span has a 6" diameter x 1" deep spall on the interior face.</li><li>- Span 4, east parapet exterior fascia has an 18" long x 5" wide x 1.5" deep spall with exposed rebar over Track 1.</li><li>- Span 8, east parapet at mid-span had a 14" long x 7" wide x 1.5" deep spall with an embedded wood block on top of the parapet.</li><li>- Span 8, east parapet at the 1st post from Abutment 2 has an 8" diameter x 1" deep spall around the post base.</li></ul> <p>Staircase parapets:</p> <ul style="list-style-type: none"><li>- The stair parapets have random vertical hairline map cracks with and without efflorescence. Some cracks extend across the top of the parapet.</li><li>- The staircase parapets at the southeast approach have two (2) spalls up to 29" long x 9" wide x 4" deep on the top adjacent to the hand railing posts.</li><li>- The staircase at the northwest approach has a 4.5' long x 1' high hollow area on the south parapet.</li></ul> <p>See Top of Deck Sketches, Underside of Deck &amp; Framing Plan - Span 4 Sketch and Photos 13, 16 &amp; 17.</p>
Railing: N	
Paint: N	
Fence: 6	<p>Vinyl coated chainlink fence with curved return &amp; plexiglass panels over the railroad tracks in Span 4:</p> <ul style="list-style-type: none"><li>- Random disconnected top and bottom horizontal rails, four (4) locations total, typically adjacent to Pier 4 deck joint and one (1) isolated location in Span 3.</li><li>- The previously noted locations where the fence posts are pulled out of the parapet with gaps between the mesh and the parapet were repaired since the last inspection.</li></ul> <p>See Top of Deck Sketch and Photos 13 &amp; 17.</p>
Drains: 6	<p>P.V.C. weeps in Bays 1 &amp; 8:</p> <ul style="list-style-type: none"><li>- There are broken/short deck weeps in Bay 1 of Span 1, Bay 1 of Span 2, Bays 1 &amp; 8 of Span 5; four (4) total.</li><li>- There is typically dampness at the underside of deck around the short and extended deck weeps, but do not drain onto the steel.</li><li>- The previously noted short weep in Span 2 &amp; Span 3, Bay 8 between Diaphragms D1 &amp; D2 have been extended since the last inspection.</li><li>-The previously noted weep leaking on top Diaphragm D1 in Bay 8 of Span 5 has been extended since the last inspection.</li><li>- Span 5, Bay 8 at Diaphragm D2 has a short weep, which has been plugged.</li></ul> <p>See Underside of Deck &amp; Framing Plan Sketches and Photos 18 &amp; 19.</p>
Lighting Standard: 6	<p>Eight (8) light standards with plastic architectural domes mounted on top of the parapets:</p> <ul style="list-style-type: none"><li>- Not on at time of inspection.</li><li>- Random junction box covers are missing up to (5/14) screws but are secure (Span 1).</li><li>- Span 1, west parapet light standard has a 10" long crack in the plastic dome base along the circumference.</li><li>- Span 3, west parapet light standard has been removed since the last inspection. The wires are exposed and have capped ends (CTDOT notified via email dated 1/30/2020).</li><li>- Span 4, east parapet light standard has a 4" long crack in the plastic dome base.</li></ul>



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- Span 5, west parapet light standard has a 3" long crack in the plastic dome base.
- Span 6, east parapet light standard has a 4" long crack in the plastic dome base.
- Span 8, east parapet light standard has a 4" long crack in the plastic dome base.

Two (2) under bridge luminaires mounted to the south face of Pier 1 and Abutment 2:  
- Not on at time of inspection.

See Top of Deck Sketches, Abutment 2 Sketch, Pier 1 - South Elevation Sketch and Photos 20 & 21.

Overall Utility Condition Rating 7 - Good

Utility Type/Size

3 | Electric

There are railroad catenary wires attached to the bottom flanges of the girders in Span 4.

There are electric wires attached to the bottom flanges of Girders G1 and G9 in Span 8.

See Underside of Deck & Framing Plan Sketches and Photo 8.

4 | Telephone

There are telephone wires attached to the bottom flanges of Girders G1 and G9 in Span 8.

See Underside of Deck & Framing Plan Sketches.

Construction Joints: 7 - The transverse construction joints and the longitudinal construction joints in Bay 5 have area of minor overpour and light to moderate efflorescence.

Also, see item "Deck-Str. Condition" above.

See Underside of Deck & Framing Plan Sketches and Photos 8, 12 & 22

Expansion Joint: 6 Asphaltic plug joints at both abutments:  
- The plug joints have random areas of exposed aggregate and evidence of past leakage noted below at the abutment backwalls.  
- Abutment 1 plug joint has adhesion cracks up to 7' long x 1/4" wide and the approach side is settled/depressed for full length x 1/2" deep (Work Item 03906-2020-0009).  
- Abutment 2 plug joint has adhesion cracks up to 15' long x 1/2" wide and the approach side is settled/depressed for full length x 1" deep (Work Item 03906-2020-0009).  
- The east sidewalk at Abutment 1 deck joint is open for 2" wide with a failed/missing seal (Work Item 03906-2020-0009).

Strip seal joint with concrete headers at Pier 4:

- The strip seal joint has heavy accumulations of sand debris inside the joint and light rust on the steel extrusions.
- The steel sidewalk sliding plate joints have light rust.
- The concrete headers have have random transverse hairline cracks.

See Top of Deck Sketches and Photos 15 & 23 - 25.

Haunches Present over travelway? YES

#### APPROACH CONDITION:

Bituminous concrete approach pavement and metal beam guide rail at all approaches.

Overall Rating: 7

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Inventory Route: Non-NHS

**Rating**

Approach Slab: N

Relief Joints: N

Approach Guide Rail: 7 Metal beam rail on steel posts at all approach corners:  
- The southwest approach corner has minor impact dents.  
- The southeast approach metal beam rail near the buried end has a two (2) segments of 12.5' long x 8" deep dents.

See Top of Deck Sketches and Photo 26.

Approach Pavement: 7 Bituminous concrete approach pavement:  
- The approach pavement has random longitudinal, transverse and mapcracks open up to 1/8" wide. Some cracks have been previously sealed in the past.  
- The south approach pavement has a full length x 3/8" wide transverse crack, which was sealed in the past and has re-cracked.  
- The previously noted pothole in the south approach pavement has been patched since the last inspection.

See Top of Deck Sketches and Photo 27.

Approach Embankment: 8

**Traffic Safety Features**

Bridge Railings: 1 Meets current non-NHS bridge standards:  
- Greater than 32" high barrier.

Transitions: 0 Does not meet current R-B 350 standards:  
- No rub-rail.

Approach Guardrails: 0 Does not meet current R-B 350 standards:  
- Metal blockouts.

Approach Guardrail Ends: 0 Does not meet current standards:  
- Buried ends terminated within clearzone.

**59. SUPERSTRUCTURE:**

Continuous rolled steel multi-girder system.

Overall Rating: 5

**Rating**

Bearing Devices: 6 Fixed rocker bearings at both Abutments and all piers except Span 4 at Pier 4:  
- Fixed bearings have random areas of painted over pitting losses up to 1/4" deep with random areas of recurring light rust and laminated rust on the masonry plates.  
- Few anchor bolts are short up to 3/8" (Abutment 1) and anchor bolt nuts have up to 25% section loss.  
- Random bearings have up to a 1/16" wide gap between the pin nut and masonry plate, isolated locations have up to a 1/8" gap.  
- Bearings typically have up to a 1/8" - 3/16" gap between the masonry plate and top of steel pier caps due to pack rust.  
- Span 2, Girder G6 bearing at Pier 2 has a 5/8" long x 1/16" wide vertical crack in the base of the masonry plate on the south face.  
- Span 8, Girders G4 - G6 bearings at Abutment 2 have gaps up to 1/4" between pedestal and masonry plate.  
- Span 8, Girder G8 bearing at Abutment 2 has 2" x 1" loss of contact between the masonry plate and pedestal on the west side due to a minor spall.

Expansion rocker bearings in Span 4 at Pier 4:

- The rockers have painted over pitting/section loss 1/8" - 3/16" deep with isolated locations up to 1/4" deep.  
- Girder G1 - G5 bearings do not have painted over pins. The pins and nut have light to moderate surface rust.  
- Girder G4 & G6 rockers were in contact with the west keepers and had minor abrasion rust.

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		<ul style="list-style-type: none"><li>- Girder G8 bearing has a 3/16" gap between the pin nut and rocker.</li><li>- All bearings were in expansion mode at 40° Fahrenheit.</li></ul> <p>See Rocker Bearing Measurement Sheet (BRI-15), Underside of Deck &amp; Framing Plan Sketches and Photos 28 - 33.</p>
Stringers:	N	
Girders:	5	<p>Continuous rolled steel girders:</p> <ul style="list-style-type: none"><li>- The girders have isolated areas of peeling paint with light to moderate surface rust and areas of light to moderate pigeon debris on top of the bottom flange.</li><li>- In Span 4, the girder bottom flanges have areas of section loss above the Amtrak electrical lines due to electrical arcing and melted steel. The areas of section loss are typically 2" diameter x 1/8" deep average with areas up to 6" long x 1" high on the edges. There are a few locations of section loss up to 2" diameter x 1/4" deep, which results in up to a 4.4% loss to bottom flange capacity at a critical location. Two (2) new locations have been noted since the last inspection and conditions are advancing at previously noted locations.</li><li>- Span 4, Girder G3 bottom of bottom flange at mid-span has rolling defects up to 16" long x 2" wide x 1/16" deep.</li><li>- Span 7, Girder G7 east web between Diaphragm D3 &amp; Pier 7 has a 4' long x 2" high x 1/16" deep rolling defect.</li><li>- Span 8, Girder G8 at Abutment 2 is out of plumb by 7/16" - 1/2" west over full height.</li></ul> <p>Diaphragms:</p> <ul style="list-style-type: none"><li>- The diaphragms have isolated areas of peeling paint with light to moderate surface rust.</li><li>- Span 4, Bay 5 end diaphragm at Pier 4 top at Girder G5 connection has 5" long x 3/4" wide flame cuts in the top and bottom flanges along the web.</li><li>- Span 4, Bay 8, Diaphragm D2 has 2" diameter x 1/8" deep arcing section loss on the bottom flange.</li></ul> <p>Also, see item 'Collision Damage' below.</p> <p>Per CTDOT BIM Section 10.5 item "Girders" rating lowered to '5' from '6' due to less than 5% bottom flange section loss from arcing at numerous critical locations on all girders in Span 4.</p> <p>See Underside of Deck &amp; Framing Plan Sketches and Photos 8 &amp; 34 - 38.</p>
Floor Beams:	N	
Trusses - General:	N	
Trusses - Portals:	N	
Trusses - Bracing:	N	
Paint:	6	See items "Bearing Devices" and "Girders" above.
Rust:	7	See the items above.
Machinery Movable Span:	N	
Rivets & Bolts:	7	<p>Bolted field splices:</p> <ul style="list-style-type: none"><li>- Random bolts at field splices have peeling paint and isolated light rust.</li><li>- Span 6, Girder G7 east top flange at the bolted field splice has one(1) splice bolt nut not fully engaged.</li></ul> <p>Erection bolts:</p> <ul style="list-style-type: none"><li>- Span 6, Bay 5 end diaphragm at Pier 5 connection to Girder G5 is missing one (1) erection bolt (weld in place).</li></ul> <p>See Underside of Deck &amp; Framing Plan Sketches and Photo 39.</p>
Welds - Cracks:	7	<p>Diaphragm welds:</p> <ul style="list-style-type: none"><li>- Welds at the diaphragms exhibit isolated areas of light rust on diaphragm vertical welds.</li><li>- Span 3, Bay 6 at Diaphragm D1 connection to Girder G5 has a missing lower horizontal weld.</li></ul> <p>See Underside of Deck &amp; Framing Plan Sketches and Photo 40.</p>



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Timber Decay:	N	
Concrete Cracking:	N	
Collision Damage:	6	<p>Collision damage:</p> <ul style="list-style-type: none"> <li>- Random girder bottom flanges in Spans 1, 2, 3, 4 &amp; 8 have minor collision scrapes from impact.</li> <li>- Span 1, Girder G7 west bottom flange between Diaphragms D2 &amp; D3 has a 3/4" long x 1/8" high x 1/16" deep gouge, which has not been ground smooth (Work Item 03906-2020-0006).</li> <li>- Span 1, Girder G9 west bottom flange at 8" north of Diaphragm D1 has a 1/4" long x 1/8" high x 1/16" deep gouge, which has not been ground smooth (Work Item 03906-2020-0006).</li> <li>- Span 6, Girder G1 west bottom flange between Diaphragms D1 &amp; D2 has a 30" long scrape with a 3.5" long x 1/2" wide x 1/16" - 1/8" deep notch, which has not been ground smooth (Work Item 03906-2020-0006).</li> <li>- Span 8, Girder G6 bottom of bottom flange near Pier 7 has two (2) full width x 3/8" wide x 1/8" deep gouges, which has not been ground smooth (Work Item 03906-2020-0006).</li> </ul> <p>See Underside of Deck &amp; Framing Plan Sketches and Photos 42 &amp; 43.</p>
Member Alignment:	7	See item "Girders" and "Collision Damage" above.
Deflection Under Load:	N	Normal: (N) Excessive: (E)
Vibration Under Load:	N	Normal: (N) Excessive: (E)
Stand Pipes:	N	
Catwalks:	N	
Movable Inspection System:	N	
Barrel Ladders:	N	
Are Barrel Ladders OSHA Compliant?		NA

**60. SUBSTRUCTURE:**

Reinforced concrete abutments &amp; wingwalls and steel piers.

Overall Rating: 4

**Rating**

Abutments - Stem:	7	<p>Reinforced concrete abutment stems:</p> <ul style="list-style-type: none"> <li>- Random vertical hairline cracks up to full height with &amp; without efflorescence and isolated hairline mapcracking and random small popouts.</li> <li>- Abutment 1 stem has two (2) isolated popouts/minor spalls up to 1' wide x 6" high x 1" deep.</li> <li>- Evidence of past leakage at both abutments.</li> </ul> <p>Concrete pedestals:</p> <ul style="list-style-type: none"> <li>- Random hairline cracks on vertical and horizontal faces.</li> <li>- Abutment 1, Girder G3, G4, G7 &amp; G9 pedestals have random hollow areas up to 22" x 5" and Girder G6 - G8 pedestals have random spalls up to 14" x 4" x 1" deep with no undermining noted.</li> <li>- Abutment 2, Girder G4 pedestal has two (2) hollow areas up to 8" x 4" and Girder G3, G7 pedestals have random spalls up to 4" x 4" x 2" deep with no undermining noted.</li> <li>- Abutment 2, Girder G8 pedestal has a 6" x 4" x 1/2" deep spall with 2" x 1" minor loss of contact with the bearing.</li> </ul> <p>See Abutment Sketches and Photos 44 &amp; 45.</p>
Abutments - Backwall:	7	<p>Reinforced concrete abutment backwalls:</p> <ul style="list-style-type: none"> <li>- Random vertical and horizontal hairline cracks.</li> <li>- Evidence of past leakage at both abutments.</li> </ul> <p>See Abutment Sketches and Photos 44 &amp; 45.</p>
Abutments - Footings:	N	Not visible.
Abutments - Settlement:	8	

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Abutments - Wingwalls:	7	<p>Reinforced concrete wingwalls:</p> <ul style="list-style-type: none"><li>- Random vertical &amp; horizontal hairline cracks with and without efflorescence, isolated hairline mapcracking, random small popouts and random light scale.</li><li>- Wingwall 1B has an isolated 1' long x 4" high x 1/2" deep spall.</li></ul> <p>See Wingwall Sketches and Photo 46.</p>
Piers/Bents - Caps:	4	<p>Steel pier caps:</p> <ul style="list-style-type: none"><li>- The pier caps have random areas of peeling paint with light to moderate rust. Isolated locations with laminated rust.</li><li>- Random pier caps have up to 3/16" pack rust between the top flange angles and the cover plate and up to 7/8" pack rust between bottom flange angles and column plates.</li><li>- Random pier cap webs and vertical face of flange angles have random areas of painted over pitting loss/section loss up to 3" high x 3/16" deep.</li><li>- The pier cap top flanges over the columns have painted over section loss/pitting loss up to 3" wide x 3/16" deep. The worst location is Pier 6 cap at Girder G8, which results in an 8.0% loss to top flange in a critical location. The top flanges have painted over pitting loss/section loss up to 1/2" deep in non-critical locations.</li><li>- The pier cap bottom flanges at mid-span between the columns have painted over section loss/pitting loss up to 3" wide x 3/16" deep. The worst location is Pier 4 cap between Girders G6 &amp; G7, which results in a 26.9% loss to bottom flange in a critical location. The bottom flanges have painted over pitting loss/section loss up to 3/8" deep in non-critical locations.</li><li>- Random rivet heads have up to 90% section loss (Pier 4) and random batten plates have up to 3/16" deep section loss (Pier 4).</li><li>- Pier 1 cap, top flange cover plate between Girders G2 &amp; G3 (semi-critical) has a 2' long x 9" wide x 3/16" deep area of section loss. Previously noted ponding water not present at time of inspection.</li><li>- Pier 5 cap, north elevation has one (1) missing bolt at the top flange angle to cover plate connection.</li><li>- Pier 7 cap, south elevation over Column C3 has a 14" long x 1/2" wide x 1/4" deep gouge/fabrication defect in the web.</li></ul> <p>Also, see item 'Collision Damage' below.</p> <p>Per CTDOT BIM Section 10.5 item "Piers/Bents - Caps" rating could be lowered to '3' due to flange section loss greater than 25% in a fracture critical member at a critical location, however only there is only one (1) isolated location greater than 25% and it is painted over. Most section loss is in the range of 5% - 25% loss. The rating shall be lowered to '4' from '6'. A load rating is recommended and the rating may be revised per CTDOT decision after load rating results.</p> <p>See Pier Sketches, Section Loss Detail Sketches and Photos 47 - 54.</p>
Piers/Bents - Pile Bent:	N	
Piers/Bents - Columns:	6	<p>Steel columns:</p> <ul style="list-style-type: none"><li>- The columns have random areas of peeling paint with light to moderate rust. Isolated locations with laminated rust.</li><li>- There is up to 3/8" thick pack rust between the columns and vertical gusset plates at random locations (Pier 2).</li><li>- Pier 2, Column C2 south elevation has a 3" long x 3/4" wide x 1/8" deep fabrication imperfection in the flange.</li><li>- Random column bases above the bearings have areas of laminated rust with up to full width x 8" high x 3/16" deep section loss at the inside faces of the flanges and vertical stiffeners.</li></ul> <p>Diagonal &amp; horizontal bracing:</p> <ul style="list-style-type: none"><li>- Random diagonal bracing and vertical gusset plates have random painted over pitting up to 1/8" deep, isolated 1/4" deep (Pier 4).</li><li>- There is up to 3/8" thick pack rust between the diagonal/horizontal braces and vertical gusset plates at random locations (Pier 3).</li></ul> <p>Pier column fixed bearings:</p> <ul style="list-style-type: none"><li>- Bearings with up to 3/16" deep painted over pitting losses on masonry plate and vertical plates.</li></ul>

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- Few anchor bolts are tipped, random anchor bolt nuts have up to 90% section loss and few nuts are backed off due to pack rust.
- Random bearings have up to 7/16" pack rust between the vertical plates.

Column Pedestals:

- Have hairline cracks and random spalls up to 8" x 4" x 1" deep (Pier 6, north elevation).

See Pier Sketches and Photos 47 & 55 - 60.

Piers/Bents - Footings:	N	Not visible
Piers/Bents - Settlement:	8	
Erosion - Scour:	8	Erosion rated: 8
		Scour rated: N/A
Concrete Crack - Spall:	6	See above items.
Steel Corrosion:	6	See above items.
Paint:	7	See above items.
Timber Decay:	N	
Collision Damage:	6	Collision damage: <ul style="list-style-type: none"><li>- Pier 3 lower horizontal bracing between Columns C2 &amp; C3 is bent down 1/4".</li><li>- Pier 5 cap, north elevation at the west end has collision damage to the bottom flange plate with a 2" long x 1/4" deep dent and several gouges/notches up to 1.5" long x 1/2" wide x 1/4" deep, which have not been ground smooth.</li><li>- Pier 6 cap at the west end has isolated minor scrape marks on the bottom flange plate.</li></ul> See Pier Sketches and Photos 61 & 62.
Debris:	7	Light to moderate accumulation of bird debris and nests on abutment seats. See Abutment Sketches.

61. CHANNEL AND CHANNEL PROTECTION:

Overall Rating: N

Rating

Channel - Scour:	N
Embankment - Erosion:	N
Debris:	N
Vegetation:	N
Channel Change:	N
Fender - System:	N
Spur Dikes and Jetties:	N
Rip Rap:	N

62. CULVERTS AND RETAINING WALLS:

Overall Rating: N

Rating

Barrel:	N
Concrete:	N
Steel:	N
Timber:	N
Headwall:	N



Form: BRI-18, Rev. 1/14

Inspection type: Fracture Critical,Routine

Inspection Date: 1/19/2020

Inspected by: PRIME AE

:Bridge No 03906

Town: STONINGTON

Carried: ALPHA AVENUE

Crossed: AMTRAK RR & LOCAL ROADS

Inventory Route: Non-NHS

Cutoff Wall: N

Debris: N

Retaining Wall System: N

Footing: N

**LOAD POSTING:**

**Rating**

Single Unit (Tons):

Semi Trailer (Tons):

4 Axle (Tons):

3S2 (Tons):

All Vehicles:

Advanced Warning: None

Warning At Bridge: None

Legibility:

Visibility:

**VERTICAL CLEARANCE POSTING**

Min. Vert Under Clearance: 13 Ft 5 In

Located at the west end of Pier 1 cap above Mathews Street edge of pavement.

Minimum Amtrak railroad clearance is 18'-11".

Note collision damage is occurring at the west end of Pier 5 over the paved parking area adjacent to the restaurant. Food delivery trucks seen driving through area.

See Clearance Diagram Sketches.

Posted Clearance Under Bridge: 13 Ft 2 In

13'-10" (westbound) 13'-11" (eastbound) posted at Cutler Street and 13'-2" on Mathews street.

Posted Clearance On Bridge: Ft In

Advanced Warning: None

Warning At Bridge: None

Legibility:

Visibility:

**NOTES / COMMENTS:**

Character of Traffic: Moderate volume, mixed weights.

Additional Notes:

- Bridge ID was clear and legible at time of inspection.
- The bridge is logged from south to north with Girder G1 located at the west fascia which is consistent with previous inspection report and bridge plans.
- Local lane closure and town police used for the inspection of Spans 1 & 8. A flagman, foreman and ET linemen utilized for inspection of Span 4 over Amtrak.
- A 18' ladder, 40' high rail and 45' lift truck were used for inspection.
- There are three (3) new work items associated with this inspection report.
- There are two (2) outstanding work items which have not been completed or addressed.
- There is one (1) previous work item which has been completed.
- CTDOT was notified of the light standard with exposed wires and the scale areas in the sidewalk via email dated 1/30/2020.

**Form: BRI-18, Rev. 1/14**

**Inspection type:** Fracture Critical,Routine

**Inspection Date:** 1/19/2020

**Inspected by:** PRIME AE

**:Bridge No 03906**

**Town:** STONINGTON

**Carried:** ALPHA AVENUE

**Crossed:** AMTRAK RR & LOCAL ROADS

**Inventory Route:** Non-NHS

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Additional Comments:

Open Work Items

-Old/Town 000 sidewalk, 0005 fence

-New/State 0006 collision damage, 0008 hollow conc. deck, 0009 joints

-Old/Amtrak 0004 electrical arcing

No Pending Project

Steel pier caps have been dropped to a "4" causing item 60 substructure to also drop to a "4" from a "6" by consultant

Load Rating Requested 2020, results can/will justify pier cap and item 60 rating

**National Bridge Elements****Inspection type:** Fracture Critical,Routine**Inspection Date:** 1/19/2020**Inspected by:** PRIME AE**:Bridge No 03906****Town:** STONINGTON**Carried:** ALPHA AVENUE**Crossed:** AMTRAK RR & LOCAL ROADS**Inventory Route:** Non-NHS

	Environment	Total Quantity	Units	Condition State 1	Condition State 2	Condition State 3	Condition State 4
<b>12 - Reinforced Concrete Deck</b>	Mod.	30313	sq. ft.	27662	2638	13	0
1080 - Delamination/Spall/Patched Area		13		0	10	3	0
1120 - Efflorescence/Rust Staining		1763		0	1753	10	0
1130 - Cracking (RC and Other)		875		0	875	0	0
510 - Wearing Surfaces		21250	sq. ft.	21037	213	0	0
3220 - Crack (Wearing Surface)		213		0	213	0	0
<b>107 - Steel Open Girder/Beam</b>	Mod.	5580	ft.	5476	77	24	3
1000 - Corrosion		56		0	56	0	0
7000 - Damage		48		0	21	24	3
515 - Steel Protective Coating		53948	sq. ft.	53408	540	0	0
3440 - Effectiveness (Steel Protective Coatings)		540		0	540	0	0
<b>202 - Steel Column</b>	Mod.	21	each	7	8	6	0
1000 - Corrosion		5		0	0	5	0
1020 - Connection		8		0	8	0	0
7000 - Damage		1		0	0	1	0
515 - Steel Protective Coating		2289	sq. ft.	2220	46	23	0
<b>215 - Reinforced Concrete Abutment</b>	Mod.	94	ft.	76	17	1	0
1080 - Delamination/Spall/Patched Area		2		0	1	1	0
1120 - Efflorescence/Rust Staining		4		0	4	0	0
1130 - Cracking (RC and Other)		12		0	12	0	0
<b>231 - Steel Pier Cap</b>	Mod.	315	ft.	126	32	127	30
1000 - Corrosion		184		0	30	124	30
7000 - Damage		5		0	2	3	0
515 - Steel Protective Coating		5451	sq. ft.	5232	164	55	0
<b>303 - Assembly Joint with Seal</b>	Mod.	34	ft.	0	34	0	0
2350 - Debris Impaction		34		0	34	0	0
<b>306 - Other Joint</b>	Mod.	68	ft.	33	35	0	0
2310 - Leakage		35		0	35	0	0
<b>311 - Movable Bearing</b>	Mod.	9	each	0	3	6	0
1000 - Corrosion		9		0	3	6	0
515 - Steel Protective Coating		9	sq. ft.	4	5	0	0
<b>313 - Fixed Bearing</b>	Mod.	81	each	14	26	41	0
1000 - Corrosion		65		0	25	40	0
2240 - Loss Bearing Area		1		0	1	0	0
7000 - Damage		1		0	0	1	0
515 - Steel Protective Coating		81	sq. ft.	26	45	10	0
<b>331 - Reinforced Concrete Bridge Railing</b>	Mod.	1250	ft.	933	311	6	0
1080 - Delamination/Spall/Patched Area		6		0	0	6	0
1120 - Efflorescence/Rust Staining		249		0	249	0	0
1130 - Cracking (RC and Other)		62		0	62	0	0



### ROCKER BEARING MEASUREMENTS

Form BRI - 15, Rev 9/97

Span No. = 4

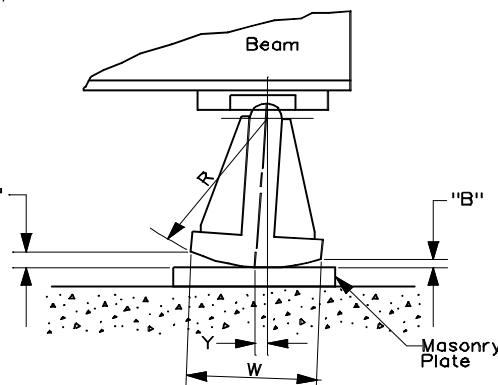
Substructure Unit = Pier 4

Temperature = 40 °F

$$\theta = \sin^{-1} (F-B)/W$$

$$Y = R \tan \theta$$

The "Front" of the bearing is the side facing the fixed bearing.



R = 12 inch  
W = 12 inch

#### NOTE:

"F" & "B" should be measured at the left side corners of the rocker or on the side closest to the front face of the substructure on skewed bridges.

Beam	" F "	" B "	Y	Cont or Exp.	Comments
G1	1 3/4	1 7/16	5/16	E	Up to 1/4" deep pitting loss on rocker base.
G2	1 15/16	1 1/4	11/16	E	1/4" deep section loss on rocker base.
G3	1 11/16	1 1/2	3/16	E	Up to 1/4" deep pitting on rocker base. Moderate rust between rocker plates.
G4	1 3/4	1 5/16	7/16	E	Rocker in contact with the west keeper and has minor abrasion rust.
G5	1 7/8	1 3/8	8/16	E	1/8" deep pitting on rocker basen, peeling paint and active rust inside rocker plates.
G6	1 3/4	1 7/16	5/16	E	Rocker in contact with the west keeper and has minor abrasion rust.
G7	1 7/8	1 5/16	9/16	E	Up to 1/8"-3/16" deep painted over section loss on rocker base.
G8	2	1 1/16	15/16	E	Up to 3/16" gap between pin nut and rocker.
G9	1 15/16	1 3/16	12/16	E	Up to 1/8" deep section loss on rocker base.

#### Notes:

- Not accessible from Amtrak due to overhead wires. Measurements were taken from Span 5, left (west), front (south), and back (north).
- All of the bearings have minor areas of peeling paint and light rust.
- Rockers with 1/8"-3/16" deep painted over section loss/pitting loss at base (1/4" at isolated locations).
- Girders G1-G5 pins & nuts have no paint and light to moderate rust. Girders G6-G9 pins & nuts are painted.

Form: BRI-12, Rev. 1/14

Inspection type: Fracture Critical,Routine

Inspection Date: 1/19/2020

Inspected by: PRIME AE

:Bridge No 03906

Town: STONINGTON

Carried: ALPHA AVENUE

Crossed: AMTRAK RR & LOCAL ROADS

Inventory Route: Non-NHS

## **FRACTURE CRITICAL MEMBERS / FRACTURE PRONE DETAILS**

### **Inspectors:**

Lead Inspector: Jack Klucznik

Inspector: Task:

Agolli,Elvis BSE - Inspector

Area,14 BSE - Inspector

Begolli,Eriol BSE - Inspector

Klucznik,Jack BSE - Inspector

Mohammed,Muqtadar BSE - Inspector

Nyei,Anwar BSE - Inspector

Spahiu,Igli BSE - Inspector

### **Visits:**

Visit Date: Temp: Start Time: End Time:

01/19/2020 20 09:30 PM 02:45 AM

01/28/2000 40 08:30 AM 04:00 PM

01/29/2020 40 09:00 AM 12:45 PM

02/26/2020 47 02:15 PM 02:45 PM

**Fracture Critical Inspection Frequency:** 24 Months

**Fracture Critical Type Code:** K Steel Pier Caps, riveted box or plate girders

**Structure Type:** Highway Bridges **Year Built:** 1940 **ADT:** 4810 **Year of ADT:** 2017 **% Truck:** 3

**Access Equipment Needed:** 45' lift truck, ladder & Hi-Rail

**Traffic Control Required:** Local lane closure with local police for spans 1 & 8. Amtrak railroad flagmen, foremen and groundmen for span 4.

**Reference to Plans:** Project No. 137-132 (Year 1990)

### **MEMBER/DETAIL TYPE # 1**

**Member/Details Type:** C Steel bent caps sustaining tensile stresses

**Fracture Critical:** Yes

**Fatigue Category:**

**Steel Type:** A-7

**Fatigue Prone:** No

**Description:** Bolted and riveted steel caps (fracture critical).

**Inspection Procedure:** Inspected 100% hands-on.

**Condition Comments:** See BRI-18.

**Procedure Followed This Inspection?** Yes

**If No please explain:**

# Sketches

Inspection type: Fracture Critical,Routine

Inspection Date: 1/19/2020

Inspected by: PRIME AE

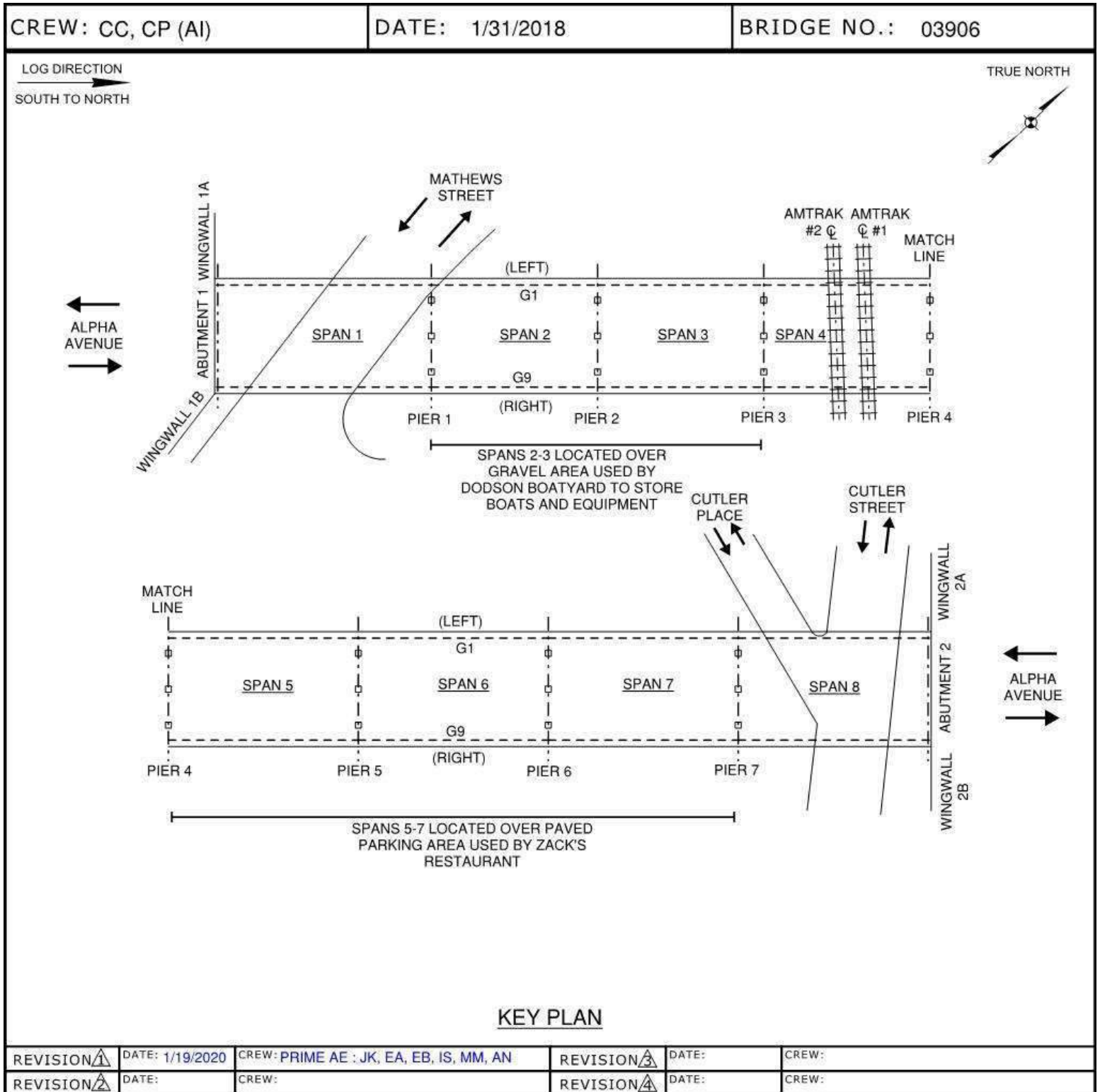
:Bridge No 03906

Town: STONINGTON

Carried: ALPHA AVENUE

Crossed: AMTRAK RR & LOCAL ROADS

Inventory Route: Non-NHS





# Sketches

Inspection type: Fracture Critical, Routine

Inspection Date: 1/19/2020

Inspected by: PRIME AE

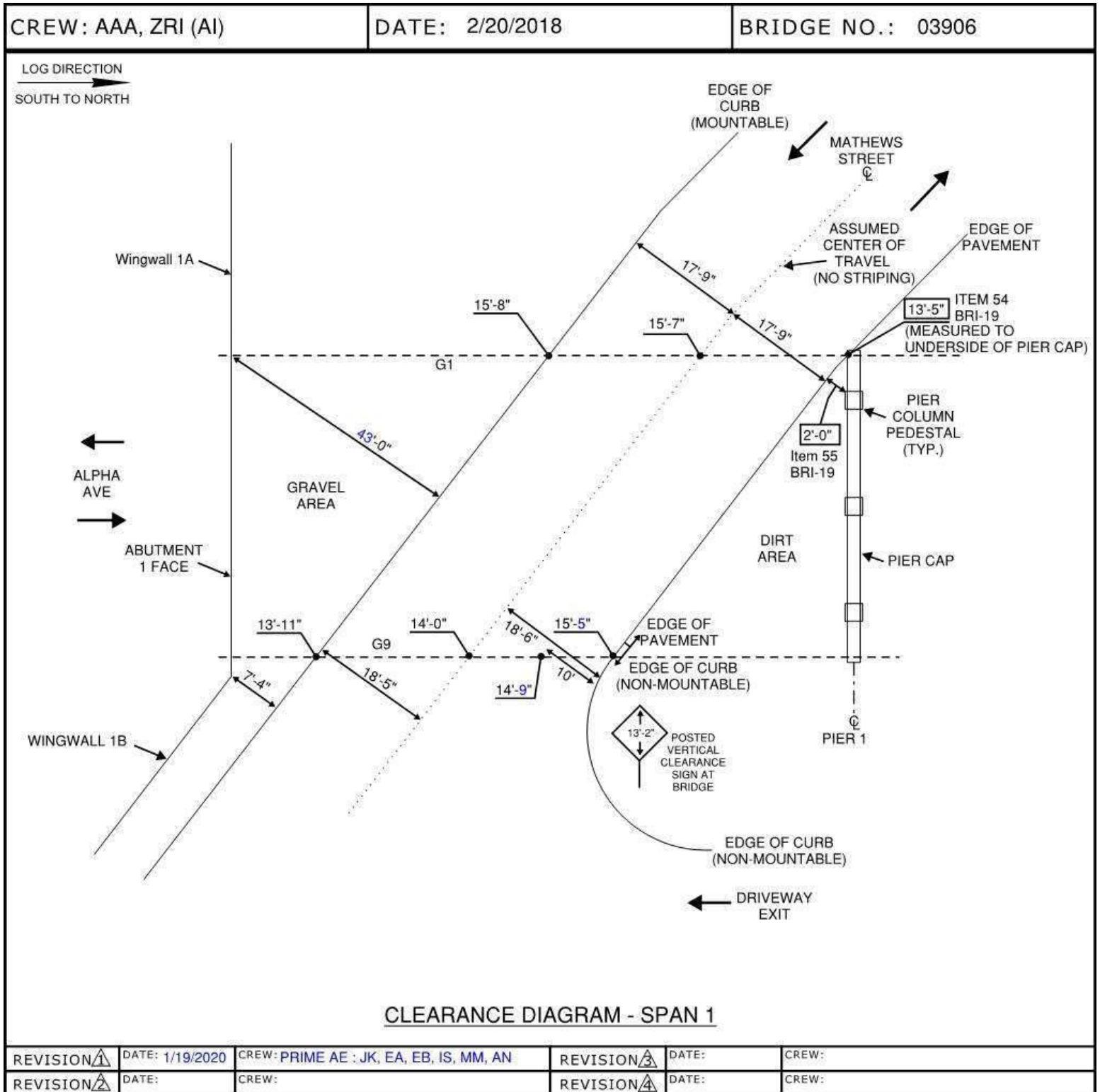
:Bridge No 03906

Town: STONINGTON

Carried: ALPHA AVENUE

Crossed: AMTRAK RR & LOCAL ROADS

Inventory Route: Non-NHS





## Sketches

**Inspection type:** Fracture Critical,Routine

**Inspection Date:** 1/19/2020

**Inspected by:** PRIME AE

**Town:** STONINGTON

**Carried:** ALPHA AVENUE

**Crossed:** AMTRAK RR & LOCAL ROADS

**Inventory Route:** Non-NHS

CREW: AAA, ZRI (AI)		DATE: 2/20/2018		BRIDGE NO.: 03906	
CLEARANCE DIAGRAM - SPAN 8					
REVISION 1	DATE: 1/19/2020	CREW: PRIME AE : JK, EA, EB, IS, MM, AN	REVISION 3	DATE:	CREW:
REVISION 2	DATE:	CREW:	REVISION 4	DATE:	CREW:



# Sketches

Inspection type: Fracture Critical,Routine

Inspection Date: 1/19/2020

Inspected by: PRIME AE

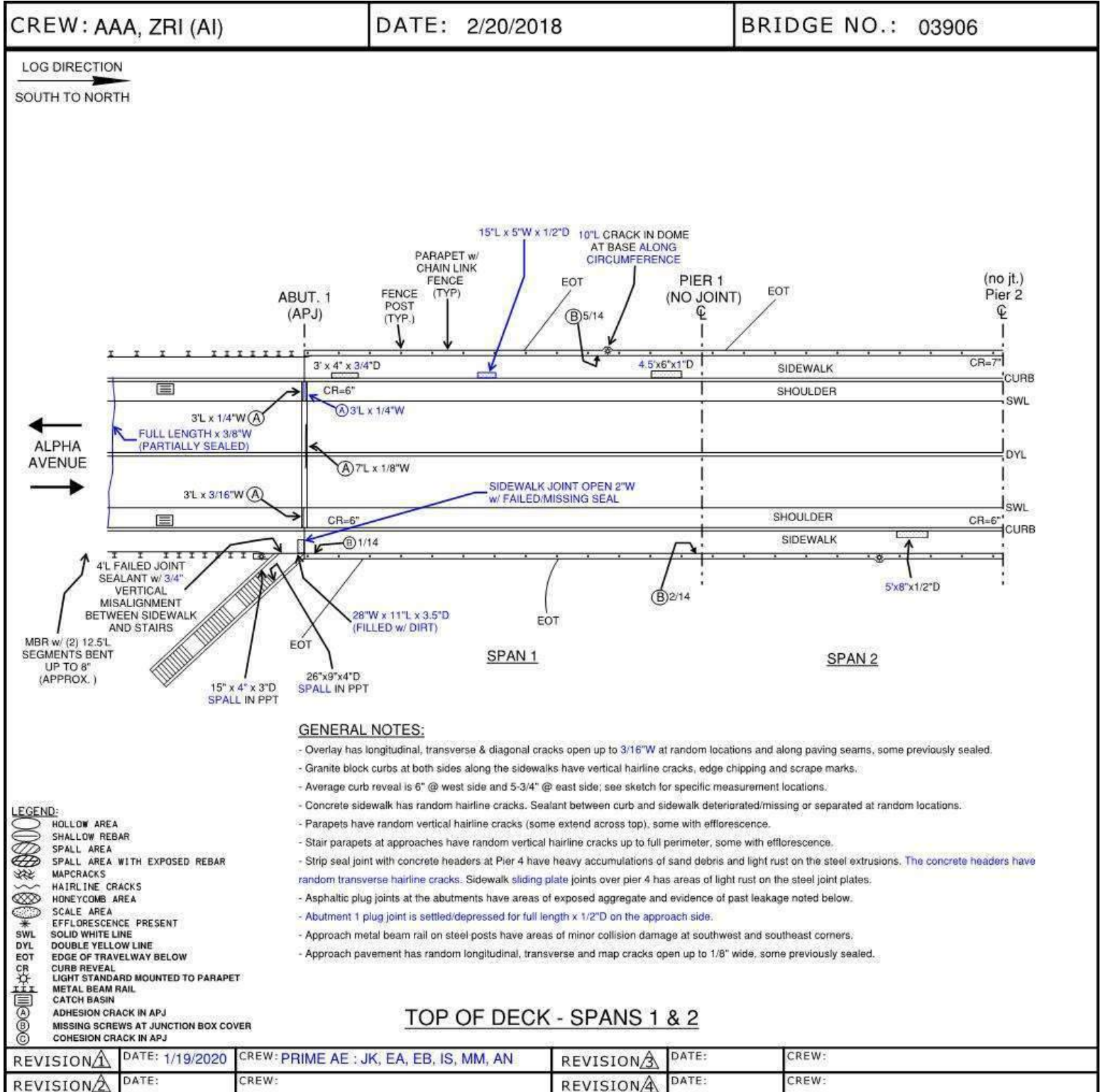
:Bridge No 03906

Town: STONINGTON

Carried: ALPHA AVENUE

Crossed: AMTRAK RR & LOCAL ROADS

Inventory Route: Non-NHS



## Sketches

Inspection type: Fracture Critical, Routine

Inspection Date: 1/19/2020

Inspected by: PRIME AE

Bridge No 03906

Town: STONINGTON

Carried: ALPHA AVENUE

Crossed: AMTRAK RR & LOCAL ROADS

Inventory Route: Non-NHS

CREW: AAA, ZRI (AI)	DATE: 2/20/2018	BRIDGE NO.: 03906
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LOG DIRECTION  
 SOUTH TO NORTH

The sketch shows the top of the bridge deck for Spans 3 and 4. It includes labels for various components: (no jt.) Pier 2, Pier 3, Amtrak #2, Amtrak #1, Pier 4, Sidewalk, Shoulder, SWL, DYL, Alpha Avenue, Bottom horiz. rail disconnected @ fence, 10' x 3.5" x 1/2" D, 26" x 8" x 1/2" D, 8' x 10" x 3/4" D, 6" Ø x 1" D spall in ppt, Lt. std. w/ 4" L crk in dome @ base, CR=5.5", Strip seal jt. w/ conc. headers, Top horiz. rail disconnected, and BOTTOM RAIL SHORT & DISCONNECTED. A note indicates 'LIGHT STANDARD REMOVED w/ EXPOSED WIRES & CAPPED ENDS' with an arrow pointing to a specific location on the deck.

**LEGEND:**

- HOLLOW AREA
- SHALLOW REBAR
- SPALL AREA
- SPALL AREA WITH EXPOSED REBAR
- MAP CRACKS
- HAIRLINE CRACKS
- HONEYCOMB AREA
- SCALE AREA
- EFFLORESCE PRESENT
- SOLID WHITE LINE
- DOUBLE YELLOW LINE
- EDGE OF TRAVELWAY BELOW
- CURB REVEAL
- LIGHT STANDARD MOUNTED TO PARAPET
- METAL BEAM RAIL
- CATCH BASIN
- ADHESION CRACK IN APJ
- MISSING SCREWS AT JUNCTION BOX COVER
- COHESION CRACK IN APJ

**GENERAL NOTES:**

- SEE "TOP OF DECK - SPANS 1 & 2" GENERAL NOTES.
- SPAN 4 FENCE w/ CURVED RETURN AND PLEXIGLASS PANELS

**TOP OF DECK - SPANS 3 & 4**

REVISION <u>1</u>	DATE: 1/19/2020	CREW: PRIME AE : JK, EA, EB, IS, MM, AN	REVISION <u>3</u>	DATE:	CREW:
REVISION <u>2</u>	DATE:	CREW:	REVISION <u>4</u>	DATE:	CREW:

# Sketches

Inspection type: Fracture Critical, Routine

Inspection Date: 1/19/2020

Inspected by: PRIME AE

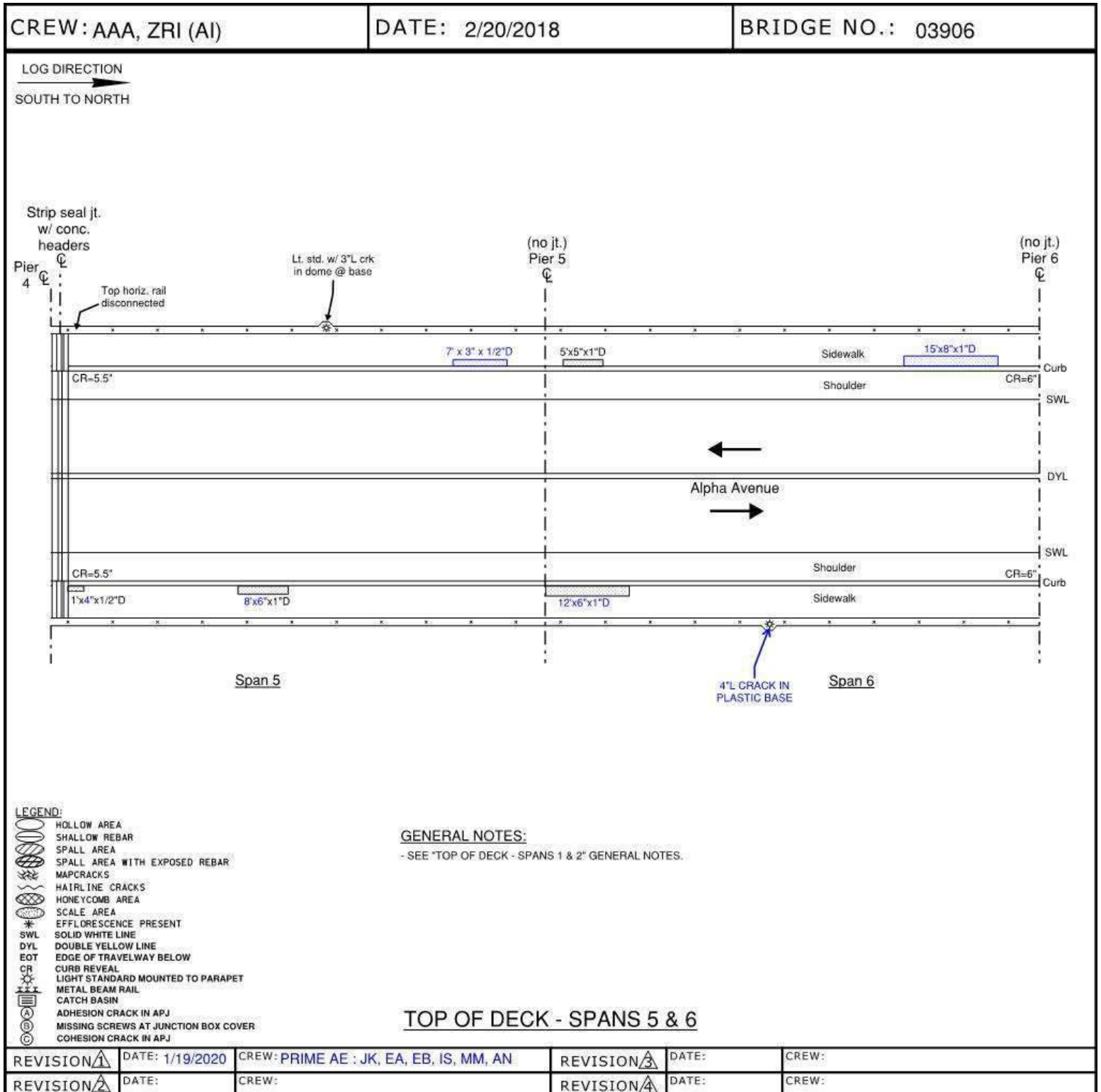
Bridge No 03906

Town: STONINGTON

Carried: ALPHA AVENUE

Crossed: AMTRAK RR & LOCAL ROADS

Inventory Route: Non-NHS





## Sketches

Inspection type: Fracture Critical, Routine

Inspection Date: 1/19/2020

Inspected by: PRIME AE

:Bridge No 03906

Town: STONINGTON

Carried: ALPHA AVENUE

Crossed: AMTRAK RR & LOCAL ROADS

Inventory Route: Non-NHS

CREW: AAA, ZRI (AI)	DATE: 2/20/2018	BRIDGE NO.: 03906
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LOG DIRECTION  
 SOUTH TO NORTH

The sketch shows a plan view of the bridge deck for spans 7 and 8. It includes labels for Pier 6, Pier 7, and Abutment 2 (APJ). Various defects are marked with codes: (B) 1/14, (A) 15'x1/2" W, (A) 3'x1/8" W, (A) 2'x1/4" W, (A) 3'x1/2" W, and (A) 8'x1" D. Other labels include 'CR-6"', 'EOT', 'Lt. std. w/ 4"L crk in dome @ base', '14"x7"x1.5"D spall on top of ppt w/ wood block in conc.', and '8'x1"D spall in ppt around fence post base'. A note on the right indicates 'Alpha Avenue' with arrows pointing left and right.

**LEGEND:**

- HOLLOW AREA
- SHALLOW REBAR
- SPALL AREA
- SPALL AREA WITH EXPOSED REBAR
- MAP CRACKS
- HAIRLINE CRACKS
- HONEYCOMB AREA
- SCALE AREA
- EFFLORESCENCE PRESENT
- SOLID WHITE LINE
- DOUBLE YELLOW LINE
- EDGE OF TRAVELWAY BELOW
- CURB REVEAL
- LIGHT STANDARD MOUNTED TO PARAPET
- METAL BEAM RAIL
- CATCH BASIN
- ADHESION CRACK IN APJ
- MISSING SCREWS AT JUNCTION BOX COVER
- COHESION CRACK IN APJ

**GENERAL NOTES:**

- SEE "TOP OF DECK - SPANS 1 & 2" GENERAL NOTES.
- ABUTMENT 2 PLUG JOINT IS SETTLED/DEPRESSED FOR FULL LENGTH x 1" D ON THE APPROACH SIDE.

**TOP OF DECK - SPANS 7 & 8**

REVISION <u>1</u>	DATE: 1/19/2020	CREW: PRIME AE : JK, EA, EB, IS, MM, AN	REVISION <u>3</u>	DATE:	CREW:
REVISION <u>2</u>	DATE:	CREW:	REVISION <u>4</u>	DATE:	CREW:

## Sketches

Inspection type: Fracture Critical, Routine

Inspection Date: 1/19/2020

Inspected by: PRIME AE

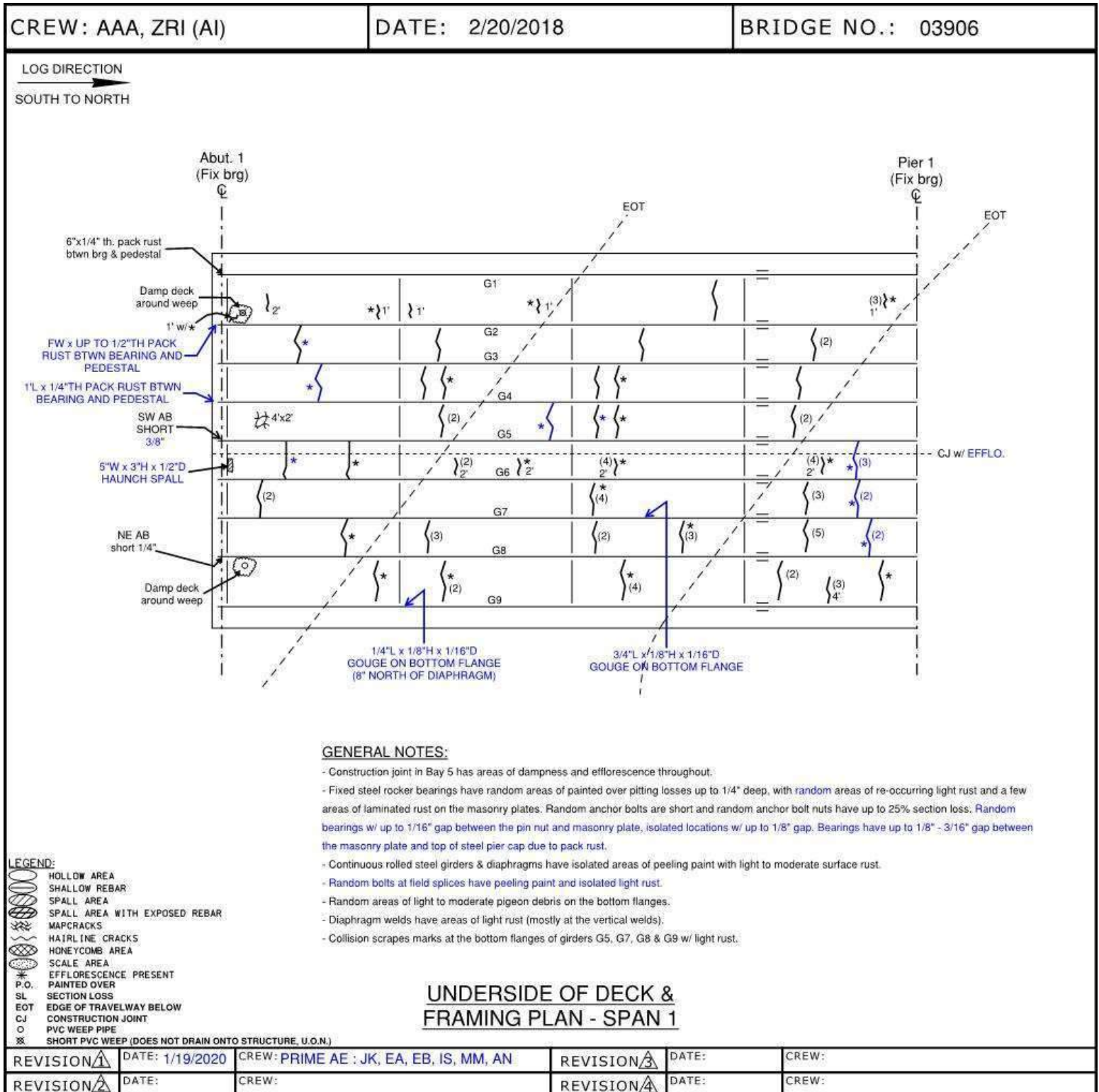
Bridge No 03906

Town: STONINGTON

Carried: ALPHA AVENUE

Crossed: AMTRAK RR & LOCAL ROADS

Inventory Route: Non-NHS



## Sketches

Inspection type: Fracture Critical,Routine

Inspection Date: 1/19/2020

Inspected by: PRIME AE

Bridge No 03906

Town: STONINGTON

Carried: ALPHA AVENUE

Crossed: AMTRAK RR & LOCAL ROADS

Inventory Route: Non-NHS

CREW: CC, MRS (AI)	DATE: 2/20/2018	BRIDGE NO.: 03906
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LOG DIRECTION  
 SOUTH TO NORTH

**GENERAL NOTES:**

- SEE "UNDERSIDE OF DECK & FRAMING PLAN - SPAN 1" GENERAL NOTES.
- Collision scrapes marks at the bottom flanges of girders G5, G7, G8 & G9 w/ light rust.

**LEGEND:**

- HOLLOW AREA
- SHALLOW REBAR
- SPALL AREA
- SPALL AREA WITH EXPOSED REBAR
- MAPCRACKS
- HAIRLINE CRACKS
- HONEYCOMB AREA
- SCALE AREA
- EFFLORESCENCE PRESENT
- P.O. PAINTED OVER
- SL SECTION LOSS
- EOT EDGE OF TRAVELWAY BELOW
- CJ CONSTRUCTION JOINT
- PVC WEEP PIPE
- SHORT PVC WEEP (DOES NOT DRAIN ONTO STRUCTURE, U.O.N.)

**UNDERSIDE OF DECK & FRAMING PLAN - SPAN 2**

**DETERIORATION NOTES:**

- ① BF w/ 18"L scrape mark w/ lam. rust (neg. SL).

REVISION <u>1</u>	DATE: 1/19/2020	CREW: PRIME AE : JK, EA, EB, IS, MM, AN	REVISION <u>3</u>	DATE:	CREW:
REVISION <u>2</u>	DATE:	CREW:	REVISION <u>4</u>	DATE:	CREW:



## Sketches

Inspection type: Fracture Critical, Routine

Inspection Date: 1/19/2020

Inspected by: PRIME AE

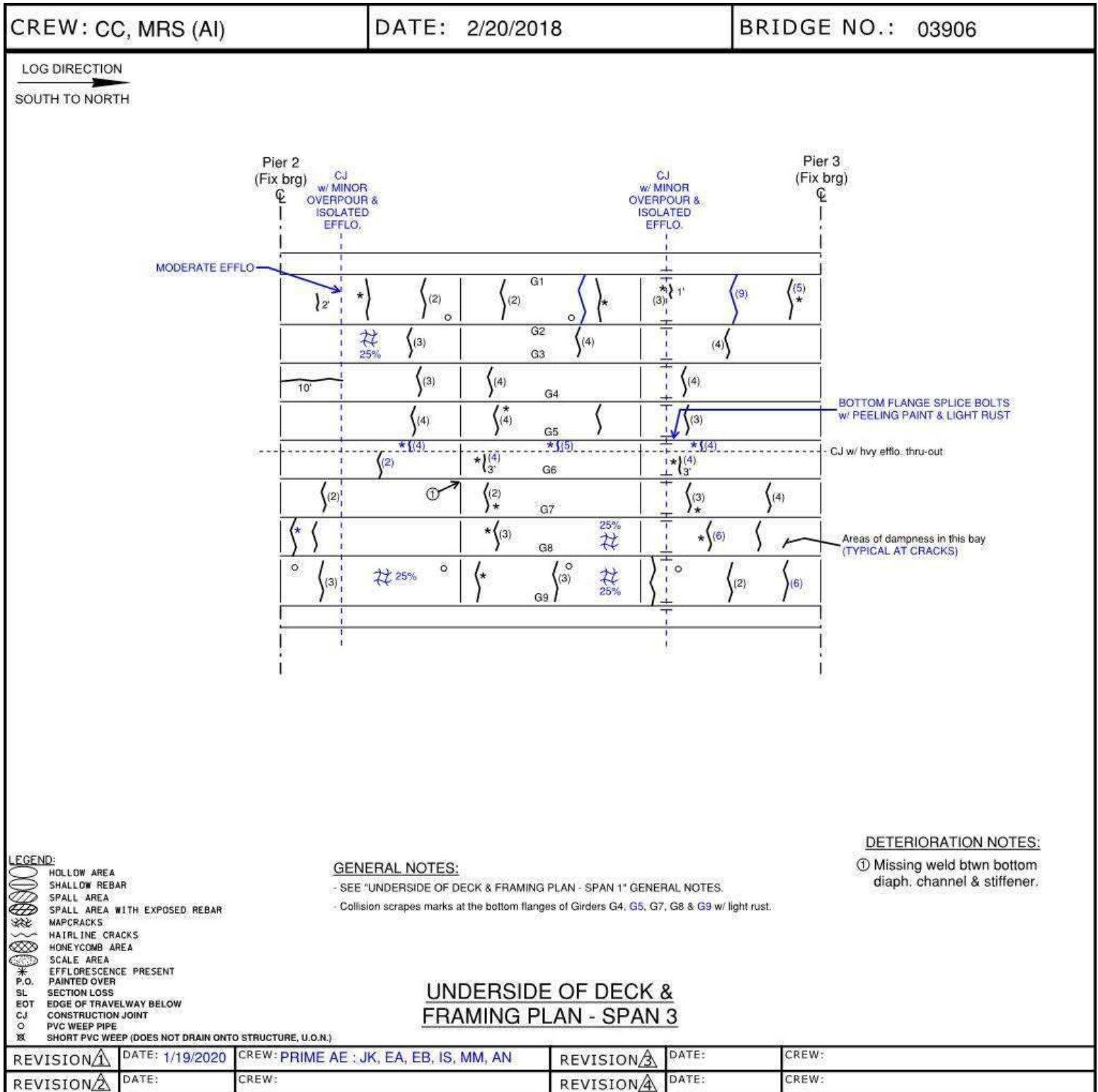
Bridge No 03906

Town: STONINGTON

Carried: ALPHA AVENUE

Crossed: AMTRAK RR & LOCAL ROADS

Inventory Route: Non-NHS



**Inspection type:** Fracture Critical,Routine  
**Inspection Date:** 1/19/2020  
**Inspected by:** PRIME AE

**Town:** STONINGTON  
**Carried:** ALPHA AVENUE  
**Crossed:** AMTRAK RR & LOCAL ROADS  
**Inventory Route:** Non-NHS

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# Sketches

Inspection type: Fracture Critical,Routine

Inspection Date: 1/19/2020

Inspected by: PRIME AE

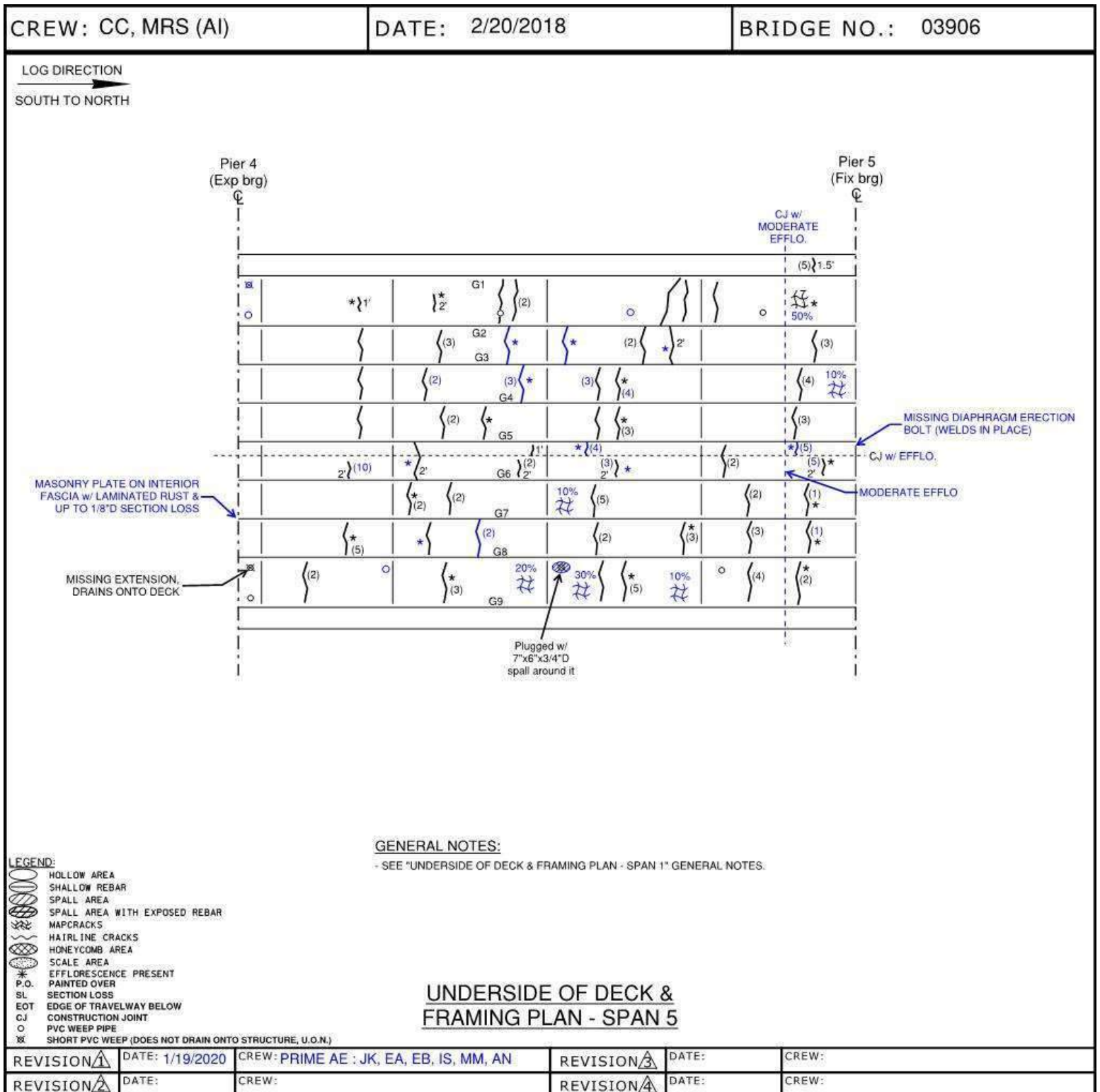
:Bridge No 03906

Town: STONINGTON

Carried: ALPHA AVENUE

Crossed: AMTRAK RR & LOCAL ROADS

Inventory Route: Non-NHS



**LEGEND:**

- HOLLOW AREA
- SHALLOW REBAR
- SPALL AREA
- SPALL AREA WITH EXPOSED REBAR
- MAPCRACKS
- HAIRLINE CRACKS
- HONEYCOMB AREA
- SCALE AREA
- EFFLORESCENCE PRESENT
- PAINTED OVER
- SECTION LOSS
- EDGE OF TRAVELWAY BELOW
- CONSTRUCTION JOINT
- PVC WEEP PIPE
- SHORT PVC WEEP (DOES NOT DRAIN ONTO STRUCTURE, U.O.N.)

**GENERAL NOTES:**

- SEE "UNDERSIDE OF DECK & FRAMING PLAN - SPAN 1" GENERAL NOTES.



# Sketches

Inspection type: Fracture Critical, Routine

Inspection Date: 1/19/2020

Inspected by: PRIME AE

Bridge No 03906

Town: STONINGTON

Carried: ALPHA AVENUE

Crossed: AMTRAK RR & LOCAL ROADS

Inventory Route: Non-NHS

CREW: CC, MRS (AI)	DATE: 2/20/2018	BRIDGE NO.: 03906
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LOG DIRECTION  
 SOUTH TO NORTH

**LEGEND:**

- HOLLOW AREA
- SHALLOW REBAR
- SPALL AREA
- SPALL AREA WITH EXPOSED REBAR
- MAP CRACKS
- HAIRLINE CRACKS
- HONEYCOMB AREA
- SCALE AREA
- EFFLORESCENCE PRESENT
- PAINTED OVER
- SECTION LOSS
- EDGE OF TRAVELWAY BELOW
- CONSTRUCTION JOINT
- PVC WEEP PIPE
- SHORT PVC WEEP (DOES NOT DRAIN ONTO STRUCTURE, U.O.N.)

**GENERAL NOTES:**

- SEE "UNDERSIDE OF DECK & FRAMING PLAN - SPAN 1" GENERAL NOTES.

**UNDERSIDE OF DECK & FRAMING PLAN - SPAN 6**

REVISION <u>1</u>	DATE: 1/19/2020	CREW: PRIME AE : JK, EA, EB, IS, MM, AN	REVISION <u>3</u>	DATE:	CREW:
REVISION <u>2</u>	DATE:	CREW:	REVISION <u>4</u>	DATE:	CREW:

# Sketches

Inspection type: Fracture Critical,Routine

Inspection Date: 1/19/2020

Inspected by: PRIME AE

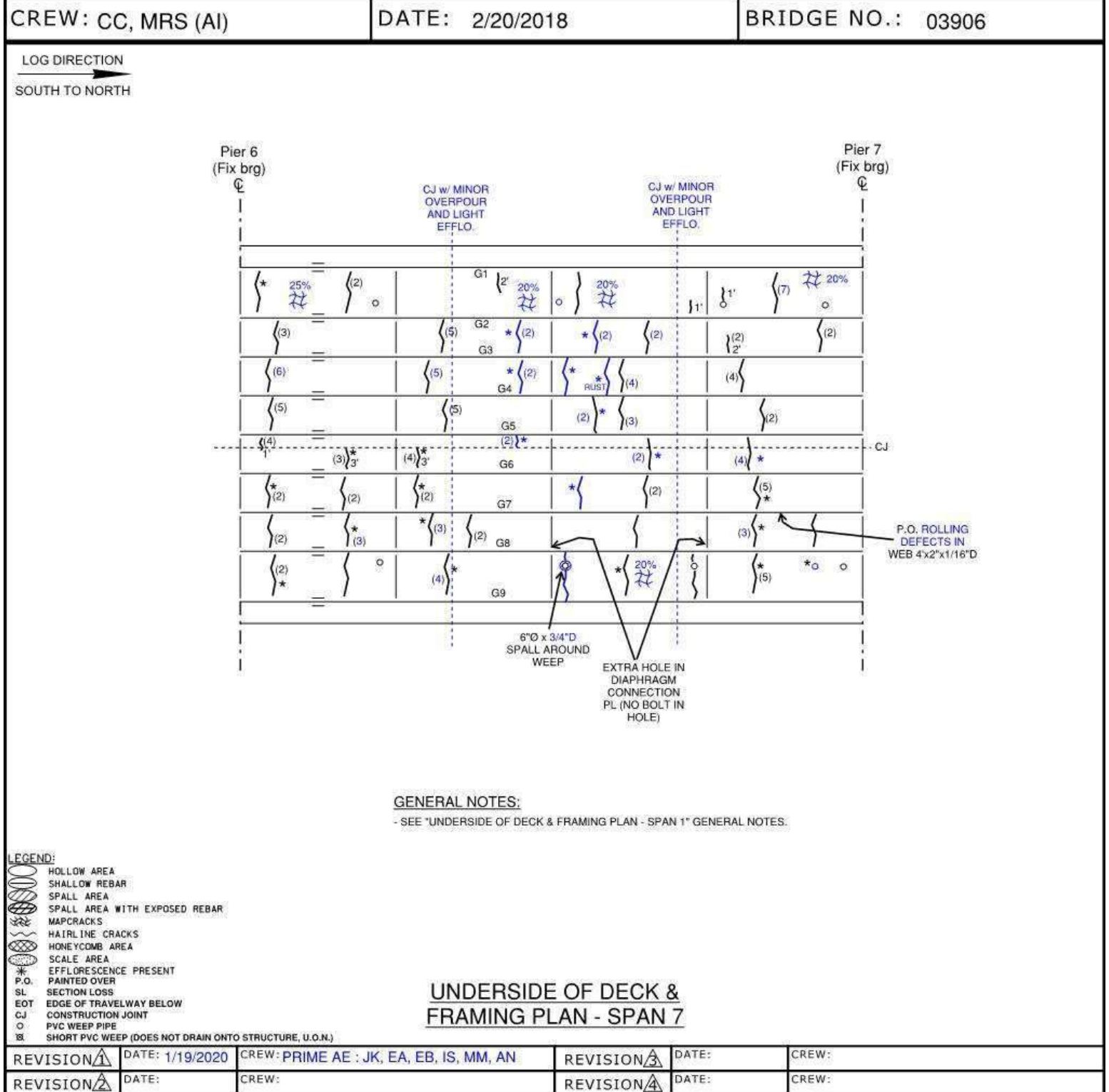
:Bridge No 03906

Town: STONINGTON

Carried: ALPHA AVENUE

Crossed: AMTRAK RR & LOCAL ROADS

Inventory Route: Non-NHS



**Inspected by:** PRIME AE

**Inventory Route:** Non-NHS

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## Sketches

Inspection type: Fracture Critical, Routine

Inspection Date: 1/19/2020

Inspected by: PRIME AE

Bridge No 03906

Town: STONINGTON

Carried: ALPHA AVENUE

Crossed: AMTRAK RR & LOCAL ROADS

Inventory Route: Non-NHS

CREW: AAA, ZRI (AI)	DATE: 2/20/2018	BRIDGE NO.: 03906
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GENERAL NOTES:

- There is mod. accumulation of pigeon debris on bridge seat.
- Abutment stem has protective coating.
- Random shallow spalls and popouts up to 1'x6"x1/4" deep.
- Evidence of past leakage at backwall.

**LEGEND:**

- HOLLOW AREA
- SHALLOW REBAR
- SPALL AREA
- SPALL AREA WITH EXPOSED REBAR
- MAPCRACKS
- HAIRLINE CRACKS
- HONEYCOMB AREA
- SCALE AREA
- EFFLORESCENCE PRESENT
- WEEP PIPE

**ABUTMENT 1**

REVISION <u>1</u>	DATE: 1/19/2020	CREW: PRIME AE : JK, EA, EB, IS, MM, AN	REVISION <u>3</u>	DATE:	CREW:
REVISION <u>2</u>	DATE:	CREW:	REVISION <u>4</u>	DATE:	CREW:

# Sketches

Inspection type: Fracture Critical, Routine

Inspection Date: 1/19/2020

Inspected by: PRIME AE

Bridge No 03906

Town: STONINGTON

Carried: ALPHA AVENUE

Crossed: AMTRAK RR & LOCAL ROADS

Inventory Route: Non-NHS

CREW: AAA, ZRI (AI)	DATE: 2/20/2018	BRIDGE NO.: 03906
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**LEGEND:**

- HOLLOW AREA
- SHALLOW REBAR
- SPALL AREA
- SPALL AREA WITH EXPOSED REBAR
- MAP CRACKS
- HAIRLINE CRACKS
- HONEYCOMB AREA
- SCALE AREA
- EFFLORESCECE PRESENT
- WEEP PIPE
- LIGHT FIXTURE

**GENERAL NOTES:**

- Abutment stem has protective coating.
- Evidence of past leakage at backwall and stem.

## ABUTMENT 2

REVISION <u>1</u>	DATE: 1/19/2020	CREW: PRIME AE : JK, EA, EB, IS, MM, AN	REVISION <u>3</u>	DATE:	CREW:
REVISION <u>2</u>	DATE:	CREW:	REVISION <u>4</u>	DATE:	CREW:

# Sketches

Inspection type: Fracture Critical,Routine

Inspection Date: 1/19/2020

Inspected by: PRIME AE

:Bridge No 03906

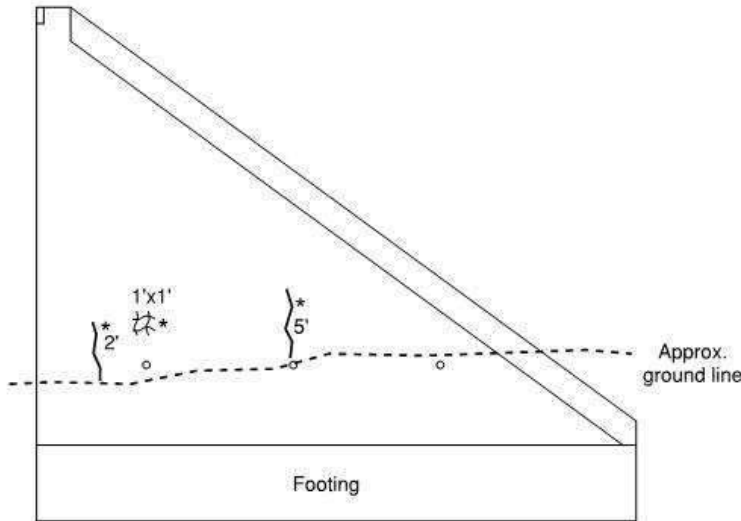
Town: STONINGTON

Carried: ALPHA AVENUE

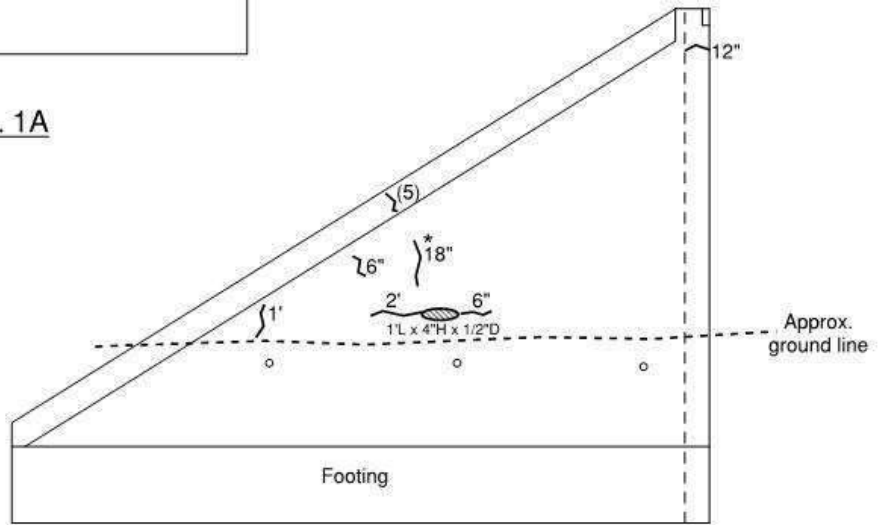
Crossed: AMTRAK RR & LOCAL ROADS

Inventory Route: Non-NHS

CREW: AAA, ZRI (AI)	DATE: 2/20/2018	BRIDGE NO.: 03906
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WINGWALL 1A



WINGWALL 1B

LEGEND:	
	HOLLOW AREA
	SHALLOW REBAR
	SPALL AREA
	SPALL AREA WITH EXPOSED REBAR
	MAPCRACKS
	HAIRLINE CRACKS
	HONEYCOMB AREA
	SCALE AREA
	EFFLORESCENCE PRESENT
	WEEP PIPE

## GENERAL NOTES:

- Have a protective coating.
- Random small popouts.

WINGWALLS 1A & 1B

REVISION <u>1</u>	DATE: 1/19/2020	CREW: PRIME AE : JK, EA, EB, IS, MM, AN	REVISION <u>3</u>	DATE:	CREW:
REVISION <u>2</u>	DATE:	CREW:	REVISION <u>4</u>	DATE:	CREW:



# Sketches

Inspection type: Fracture Critical,Routine

Inspection Date: 1/19/2020

Inspected by: PRIME AE

:Bridge No 03906

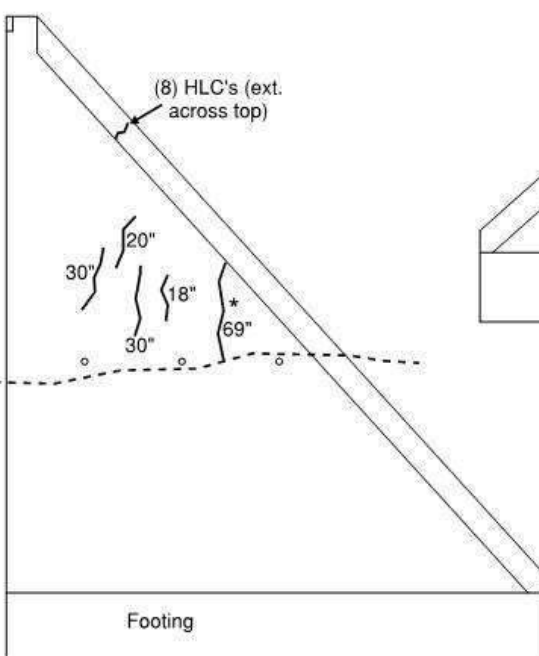
Town: STONINGTON

Carried: ALPHA AVENUE

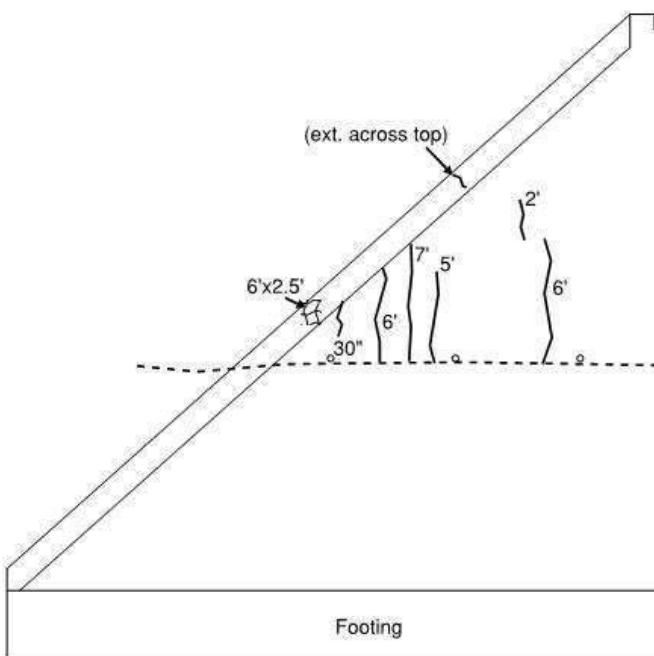
Crossed: AMTRAK RR & LOCAL ROADS

Inventory Route: Non-NHS

CREW: AAA, ZRI (AI)	DATE: 2/20/2018	BRIDGE NO.: 03906
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WINGWALL 2B



WINGWALL 2A

**LEGEND:**

- HOLLOW AREA
- SHALLOW REBAR
- SPALL AREA
- SPALL AREA WITH EXPOSED REBAR
- MAPCRACKS
- HAIRLINE CRACKS
- HONEYCOMB AREA
- SCALE AREA
- EFFLORESCE PRESENT
- WEEP PIPE

**GENERAL NOTES:**

- Have a protective coating.
- Random small popouts.
- Areas of light scale.

WINGWALLS 2A & 2B

REVISION <u>1</u>	DATE: 1/19/2020	CREW: PRIME AE : JK, EA, EB, IS, MM, AN	REVISION <u>3</u>	DATE:	CREW:
REVISION <u>2</u>	DATE:	CREW:	REVISION <u>4</u>	DATE:	CREW:

# Sketches

Inspection type: Fracture Critical,Routine

Inspection Date: 1/19/2020

Inspected by: PRIME AE

:Bridge No 03906

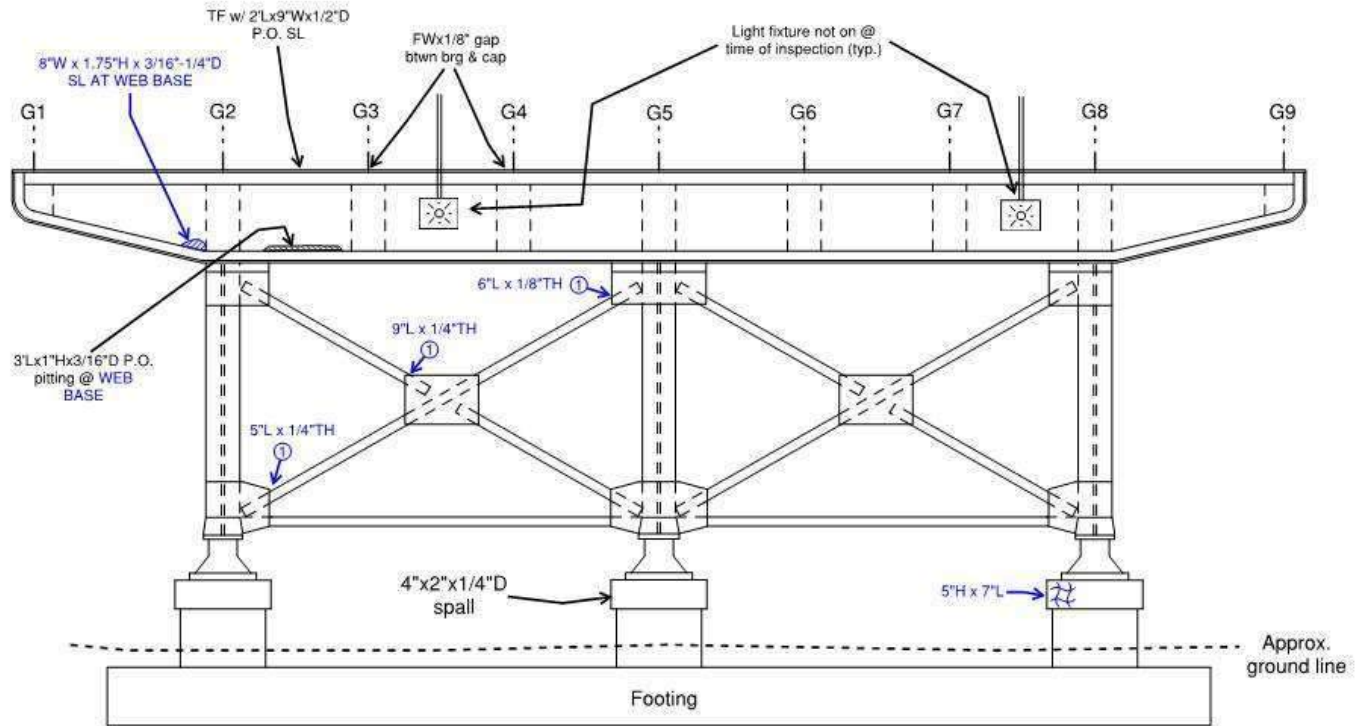
Town: STONINGTON

Carried: ALPHA AVENUE

Crossed: AMTRAK RR & LOCAL ROADS

Inventory Route: Non-NHS

CREW: AAA, ZRI (AI)	DATE: 2/20/2018	BRIDGE NO.: 03906
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## DETERIORATION NOTES:

- ① Pack rust btwn gusset plate and member.

## GENERAL NOTES:

- Pier column bearings have areas of peeling paint w/ spotty light-moderate rust; random brg's have drain hole with isolated areas of laminated rust around the holes.
- Random areas of pack rust up to 3/16" thick between vertical bearing plates.
- Steel random areas of peeling paint w/ light to moderate rust. (ISOLATED LOCATIONS w/ LAMINATED RUST)
- Steel has random areas of painted over pitting up to 1/8"D (not full sections; worst areas noted on sketch).

## LEGEND:

- HOLLOW AREA
- SHALLOW REBAR
- SPALL AREA
- SPALL AREA WITH EXPOSED REBAR
- MAPCRACKS
- HAIRLINE CRACKS
- HONEYCOMB AREA
- SCALE AREA
- EFFLORESCENCE PRESENT
- PAINTED OVER
- P.O. SECTION LOSS

## PIER 1 - SOUTH ELEVATION

REVISION <u>1</u>	DATE: 1/19/2020	CREW: PRIME AE : JK, EA, EB, IS, MM, AN	REVISION <u>3</u>	DATE:	CREW:
REVISION <u>2</u>	DATE:	CREW:	REVISION <u>4</u>	DATE:	CREW:

## Sketches

Inspection type: Fracture Critical,Routine

Inspection Date: 1/19/2020

Inspected by: PRIME AE

:Bridge No 03906

Town: STONINGTON

Carried: ALPHA AVENUE

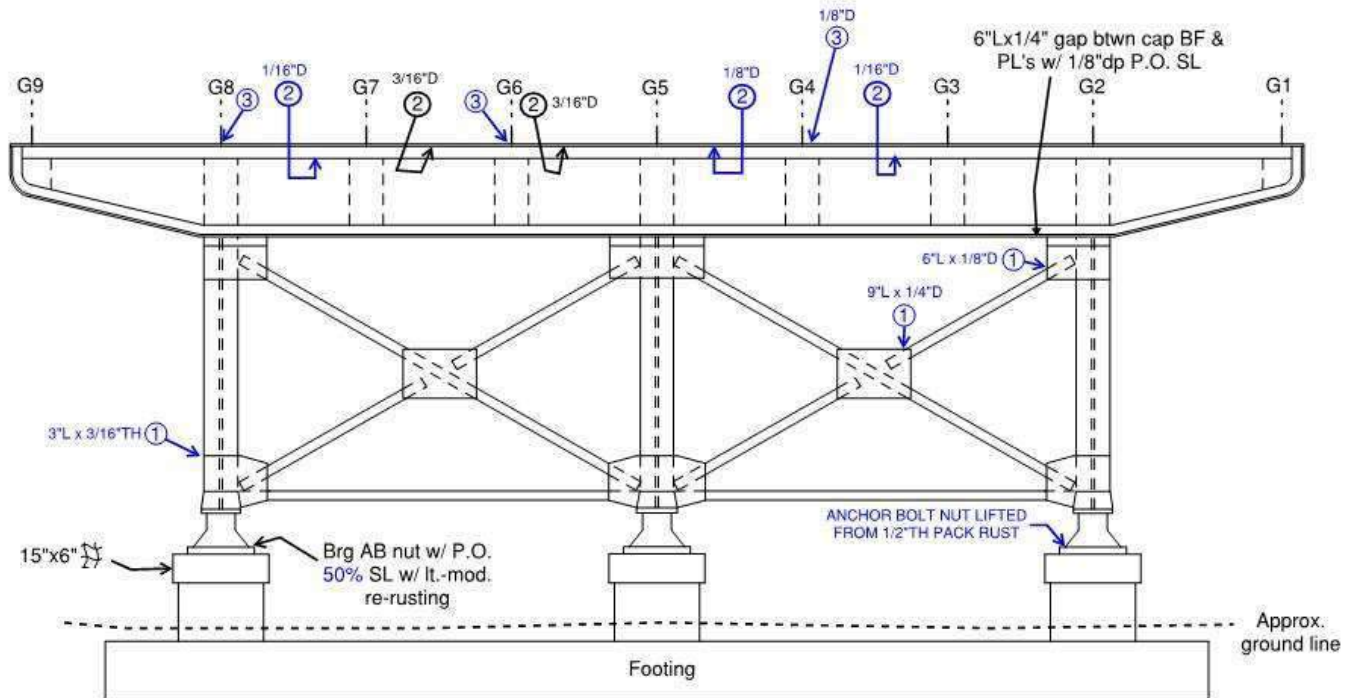
Crossed: AMTRAK RR & LOCAL ROADS

Inventory Route: Non-NHS

CREW: AAA, ZRI (AI)

DATE: 2/20/2018

BRIDGE NO.: 03906



### DETERIORATION NOTES:

- ① Pack rust btwn gusset plate and member.
- ② HORIZONTAL LEG TOP FLANGE ANGLE w/ FW x 1/8" D (PO) PITTING (UP TO 3/16" D AT ISOLATED LOCATIONS)
- ③ 9" L x 3/16" TH PACK RUST BETWEEN HORIZONTAL ANGLE AND TOP PLATE

### GENERAL NOTES:

- See Pier 1 South Elevation general notes.
- Random gaps/pack rust up to 1/8" thick between TF plate and TF angle.
- HEAVY RUSTING AT RANDOM ANCHOR BOLT NUTS AT BOTTOM OF PIER.

### PIER 1 - NORTH ELEVATION

LEGEND:

	HOLLOW AREA
	SHALLOW REBAR
	SPALL AREA
	SPALL AREA WITH EXPOSED REBAR
	MAPCRACKS
	HAIRLINE CRACKS
	HONEYCOMB AREA
	SCALE AREA
	EFFLORESCENCE PRESENT
	PAINTED OVER
	SECTION LOSS

REVISION <u>1</u>	DATE: 1/19/2020	CREW: PRIME AE : JK, EA, EB, IS, MM, AN	REVISION <u>3</u>	DATE:	CREW:
REVISION <u>2</u>	DATE:	CREW:	REVISION <u>4</u>	DATE:	CREW:



## Sketches

Inspection type: Fracture Critical, Routine

Inspection Date: 1/19/2020

Inspected by: PRIME AE

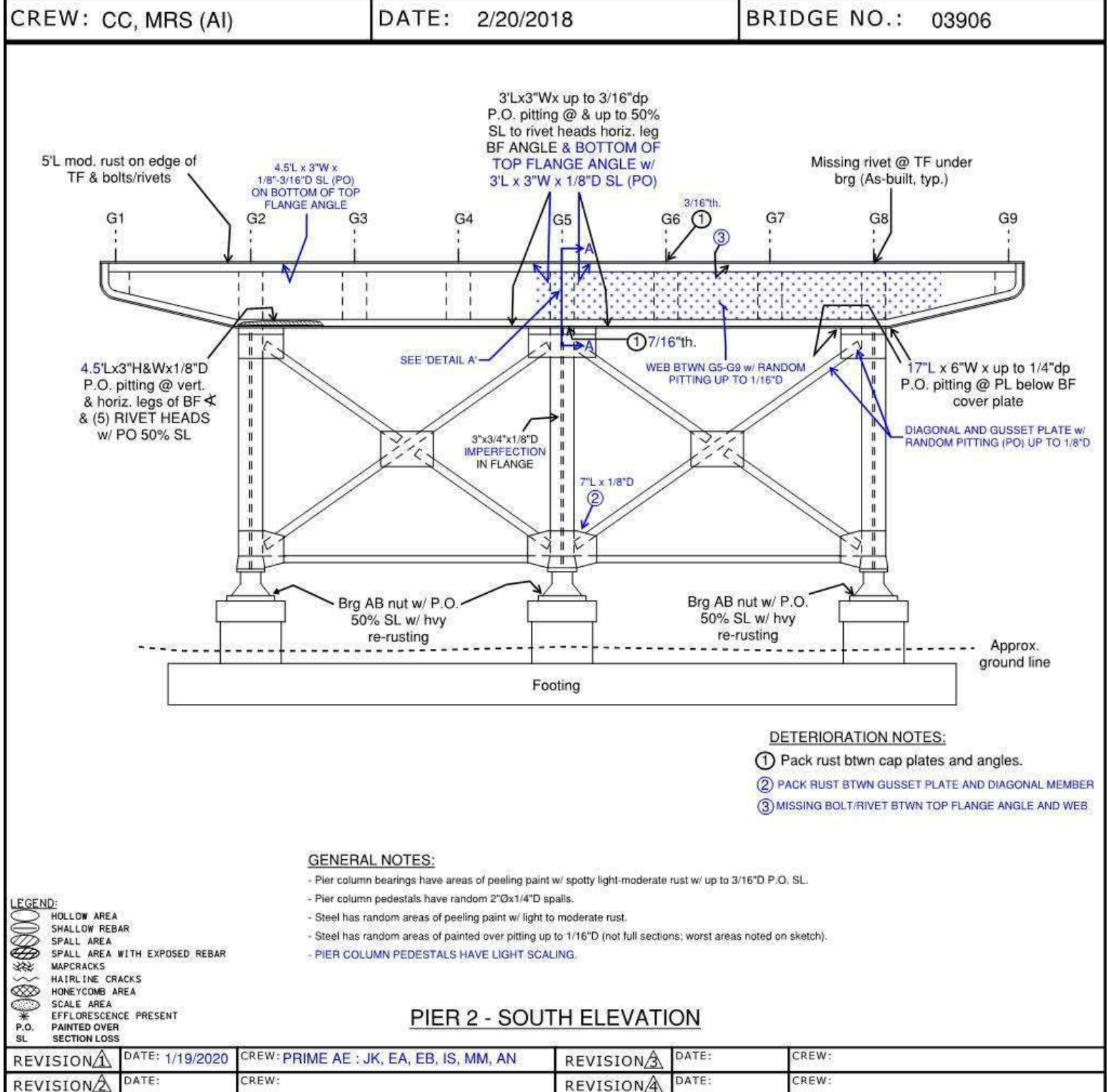
Bridge No 03906

Town: STONINGTON

Carried: ALPHA AVENUE

Crossed: AMTRAK RR & LOCAL ROADS

Inventory Route: Non-NHS



## Sketches

Inspection type: Fracture Critical, Routine

Inspection Date: 1/19/2020

Inspected by: PRIME AE

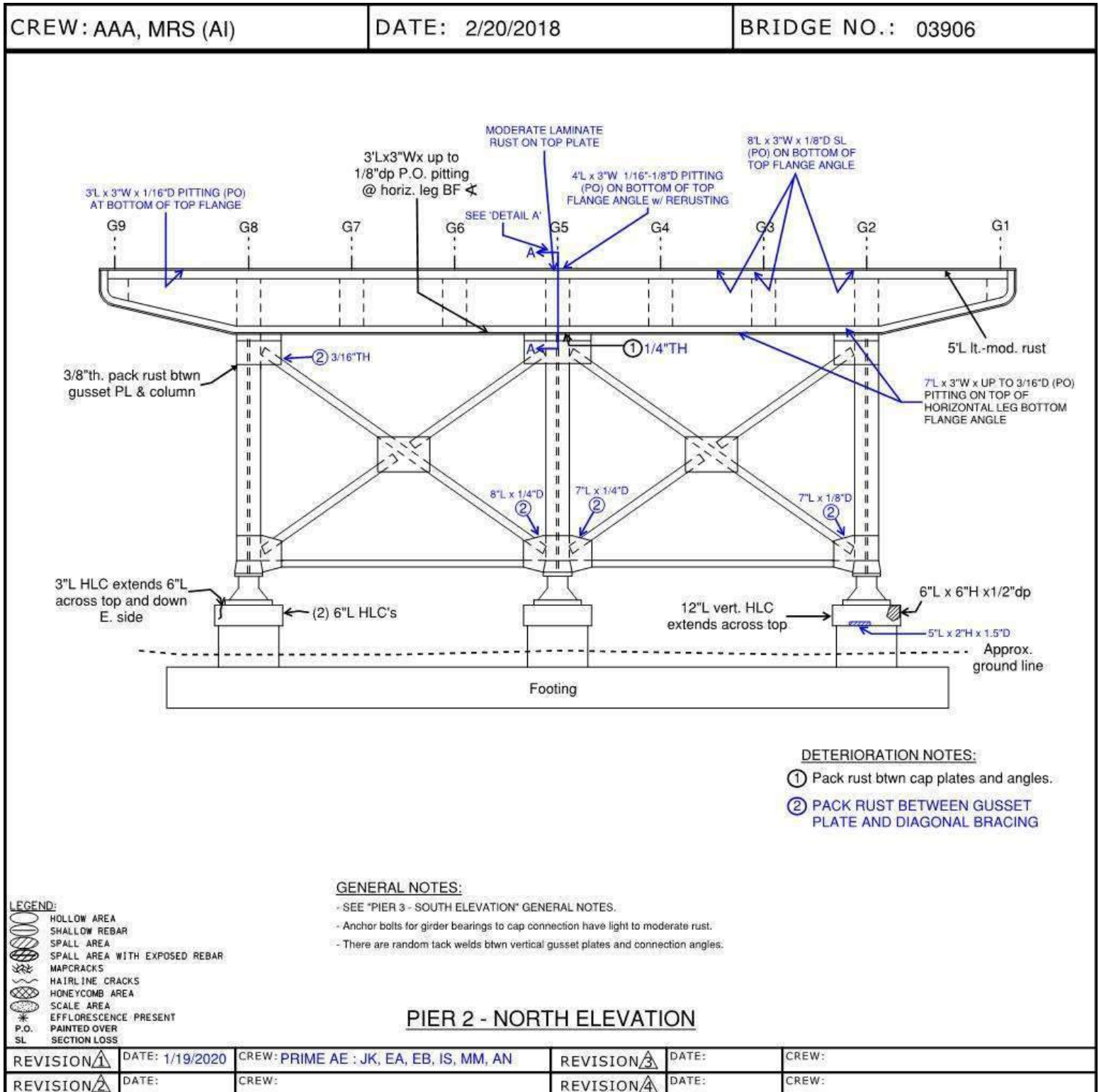
Bridge No 03906

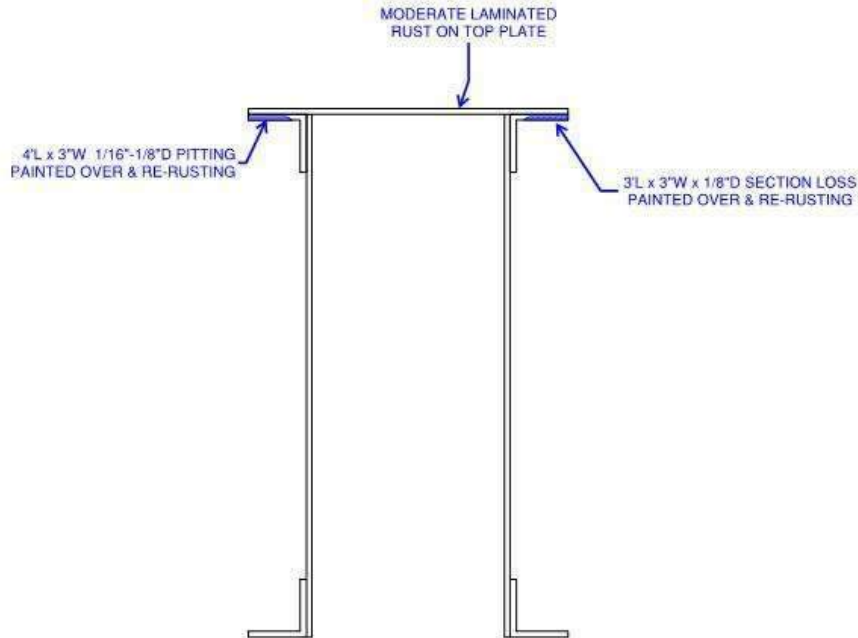
Town: STONINGTON

Carried: ALPHA AVENUE

Crossed: AMTRAK RR & LOCAL ROADS

Inventory Route: Non-NHS



**Sketches****Inspection type:** Fracture Critical,Routine**Inspection Date:** 1/19/2020**Inspected by:** PRIME AE**:Bridge No 03906****Town:** STONINGTON**Carried:** ALPHA AVENUE**Crossed:** AMTRAK RR & LOCAL ROADS**Inventory Route:** Non-NHS**CREW:** JK, EA, EB, IS, MM, AN**DATE:** 1/19/2020**BRIDGE NO.:** 03906

SECTION A-A (LOOKING EAST)

TOP FLANGE SECTION LOSS (CRITICAL):

ORIGINAL TOP FLANGE AREA =  $2(4" \times 7/16") + (22" \times 3/8") = 11.75 \text{ in}^2$

TOP FLANGE LOSS AREA =  $(3" \times 3/32") + (3" \times 1/8") = 0.66 \text{ in}^2$

PERCENT SECTION LOSS =  $(0.66 \text{ in}^2 / 11.75 \text{ in}^2) \times 100 = 5.6\% \text{ LOSS}$

SECTION PROPERTIES:

WEB = (2)  $36" \times 3/8"$

ANGLES = (4)  $4" \times 4" \times 7/16"$

COVER PLATE =  $22" \times 3/8"$

DETAIL A  
PIER 2 CAP  
AT GIRDER G5

REVISION <u>1</u>	DATE: 1/19/2020	CREW: PRIME AE : JK, EA, EB, IS, MM, AN	REVISION <u>3</u>	DATE:	CREW:
REVISION <u>2</u>	DATE:	CREW:	REVISION <u>4</u>	DATE:	CREW:



## Sketches

Inspection type: Fracture Critical, Routine

Inspection Date: 1/19/2020

Inspected by: PRIME AE

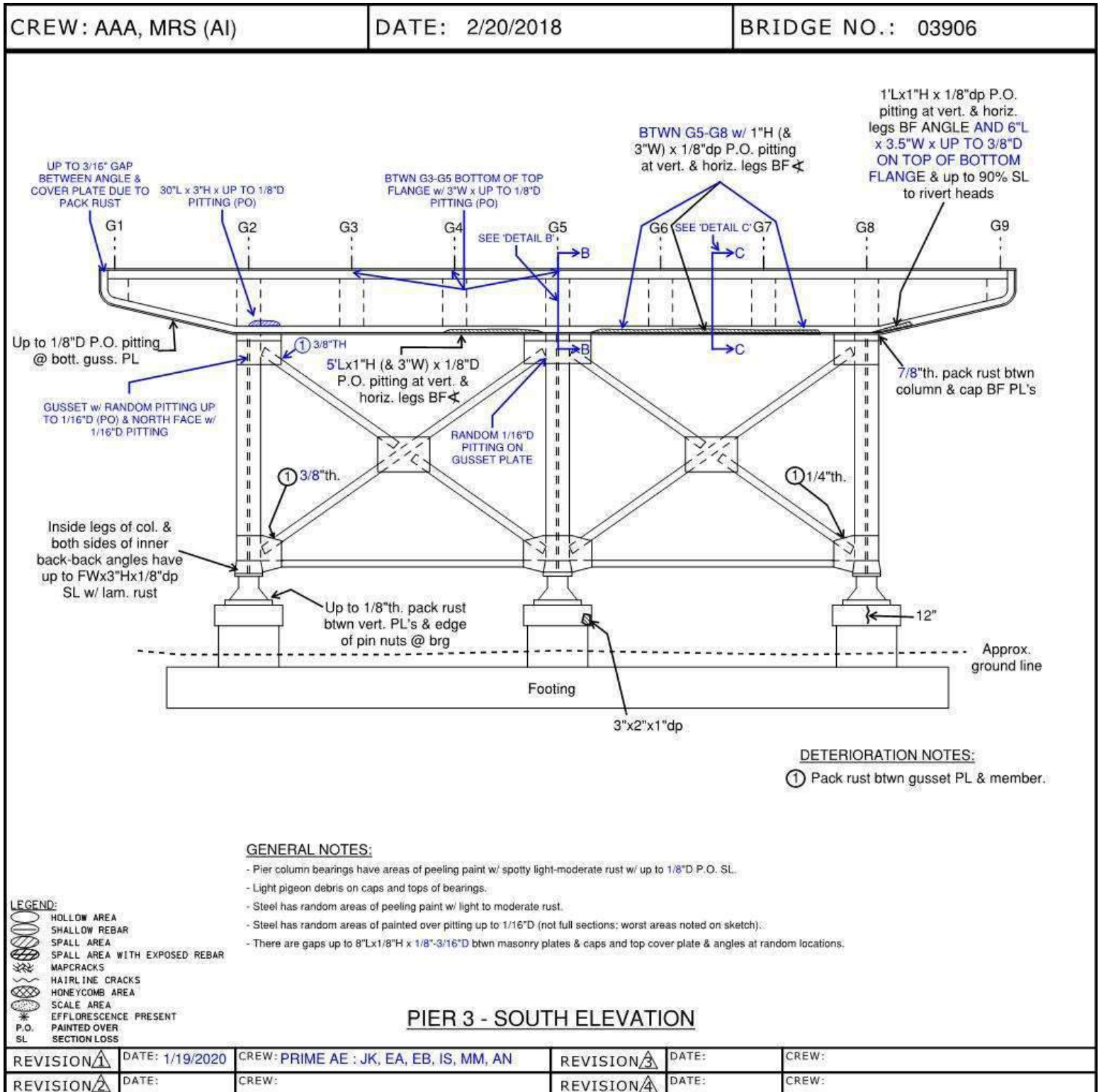
Bridge No 03906

Town: STONINGTON

Carried: ALPHA AVENUE

Crossed: AMTRAK RR & LOCAL ROADS

Inventory Route: Non-NHS



## Sketches

Inspection type: Fracture Critical, Routine

Inspection Date: 1/19/2020

Inspected by: PRIME AE

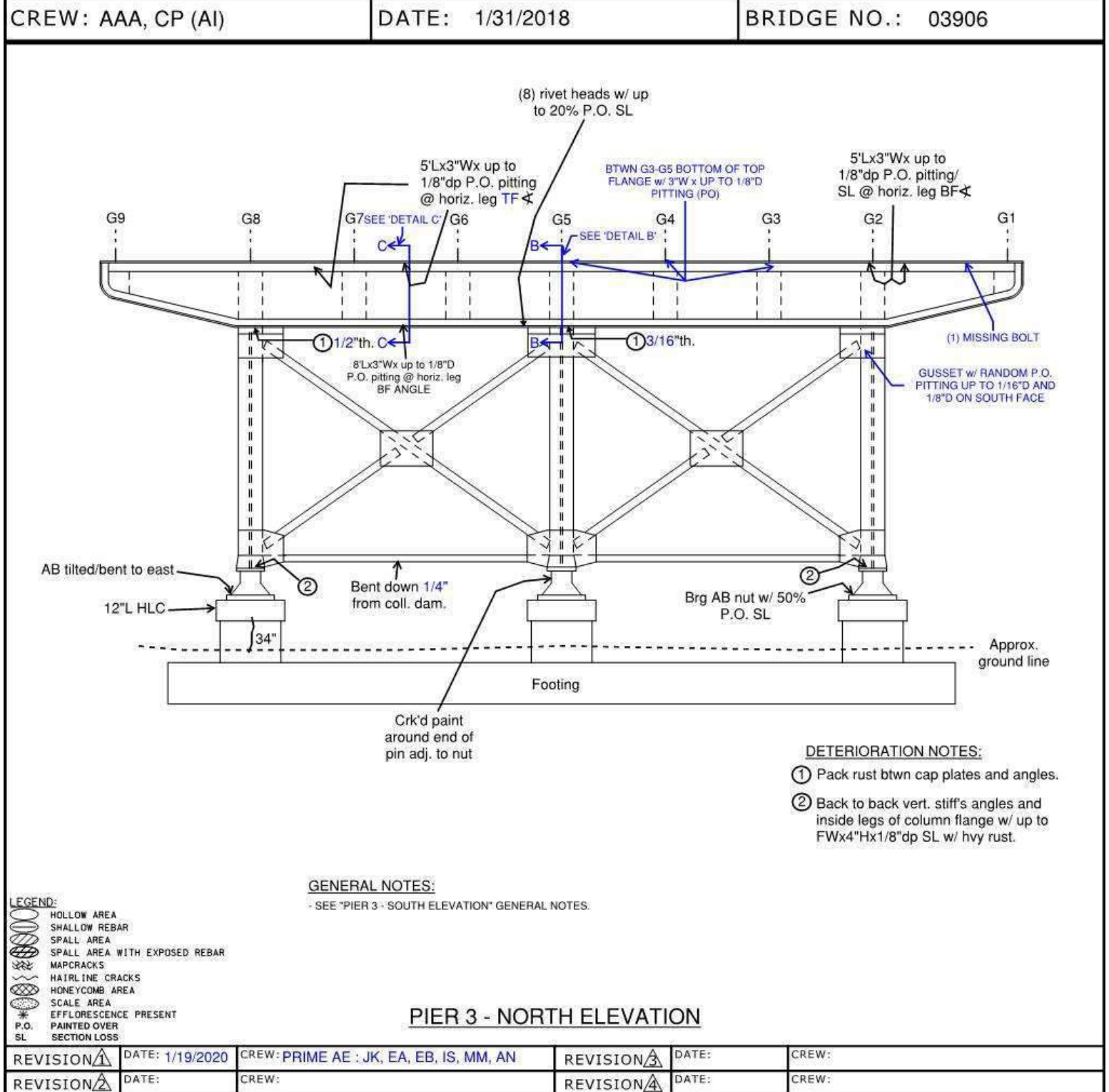
Bridge No 03906

Town: STONINGTON

Carried: ALPHA AVENUE

Crossed: AMTRAK RR & LOCAL ROADS

Inventory Route: Non-NHS

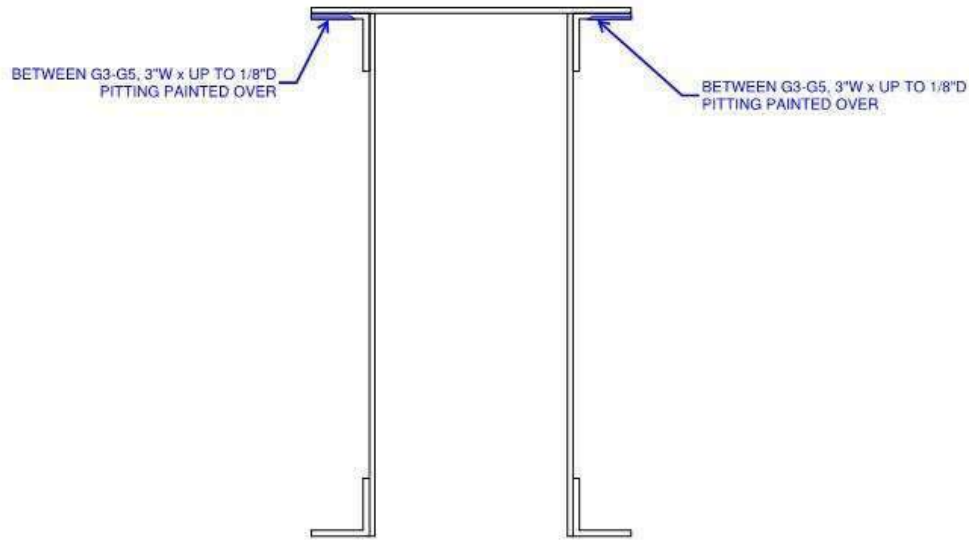


**Sketches****Inspection type:** Fracture Critical,Routine**Inspection Date:** 1/19/2020**Inspected by:** PRIME AE**:Bridge No 03906****Town:** STONINGTON**Carried:** ALPHA AVENUE**Crossed:** AMTRAK RR & LOCAL ROADS**Inventory Route:** Non-NHS

CREW: JK, EA, EB, IS, MM, AN

DATE: 1/19/2020

BRIDGE NO.: 03906

SECTION B-B (LOOKING EAST)TOP FLANGE SECTION LOSS (CRITICAL):ORIGINAL TOP FLANGE AREA =  $2(4" \times 7/16") + (22" \times 3/8") = 11.75 \text{ in}^2$ TOP FLANGE LOSS AREA =  $2(3" \times 1/8") = 0.75 \text{ in}^2$ PERCENT SECTION LOSS =  $(0.75 \text{ in}^2 / 11.75 \text{ in}^2) \times 100 = 6.4\% \text{ LOSS}$ SECTION PROPERTIES:WEB = (2)  $36" \times 3/8"$ ANGLES = (4)  $4" \times 4" \times 7/16"$ COVER PLATE =  $22" \times 3/8"$ DETAIL B  
PIER 3 CAP  
AT GIRDER G5

REVISION <u>1</u>	DATE: 1/19/2020	CREW: PRIME AE : JK, EA, EB, IS, MM, AN	REVISION <u>3</u>	DATE:	CREW:
REVISION <u>2</u>	DATE:	CREW:	REVISION <u>4</u>	DATE:	CREW:

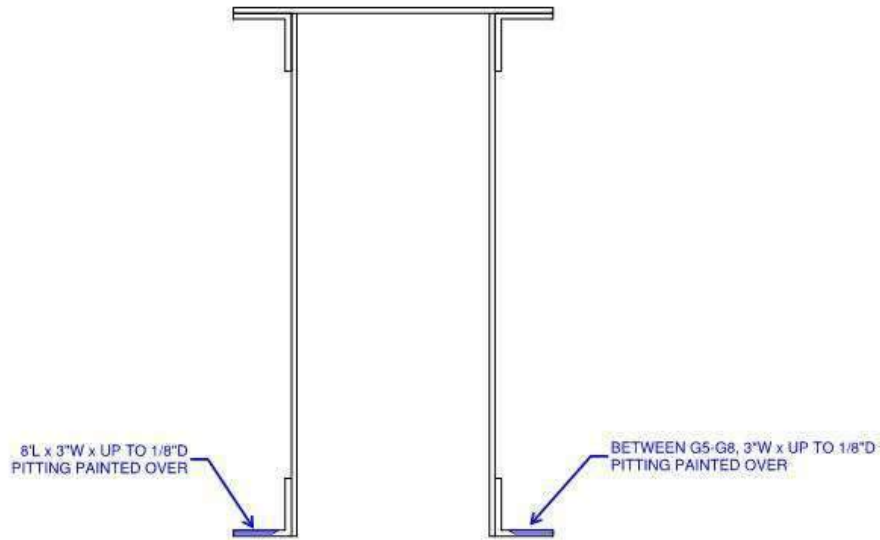


**Sketches****Inspection type:** Fracture Critical,Routine**Inspection Date:** 1/19/2020**Inspected by:** PRIME AE**:Bridge No** 03906**Town:** STONINGTON**Carried:** ALPHA AVENUE**Crossed:** AMTRAK RR & LOCAL ROADS**Inventory Route:** Non-NHS

CREW: JK, EA, EB, IS, MM, AN

DATE: 1/19/2020

BRIDGE NO.: 03906

SECTION C-C (LOOKING EAST)BOTTOM FLANGE SECTION LOSS (CRITICAL):ORIGINAL BOTTOM FLANGE AREA =  $2(4" \times 7/16") = 3.50 \text{ in}^2$ BOTTOM FLANGE LOSS AREA =  $2(3" \times 1/8") = 0.75 \text{ in}^2$ PERCENT SECTION LOSS =  $(0.75 \text{ in}^2 / 3.50 \text{ in}^2) \times 100 = 21.4\% \text{ LOSS}$ SECTION PROPERTIES:WEB = (2)  $36" \times 3/8"$ ANGLES = (4)  $4" \times 4" \times 7/16"$ COVER PLATE =  $22" \times 3/8"$ 

DETAIL C  
PIER 3 CAP  
BETWEEN GIRDERS G6 & G7

REVISION 1 DATE: 1/19/2020 CREW: PRIME AE : JK, EA, EB, IS, MM, ANREVISION 3 DATE: CREW:REVISION 2 DATE: CREW:REVISION 4 DATE: CREW:

## Sketches

Inspection type: Fracture Critical, Routine

Inspection Date: 1/19/2020

Inspected by: PRIME AE

Bridge No 03906

Town: STONINGTON

Carried: ALPHA AVENUE

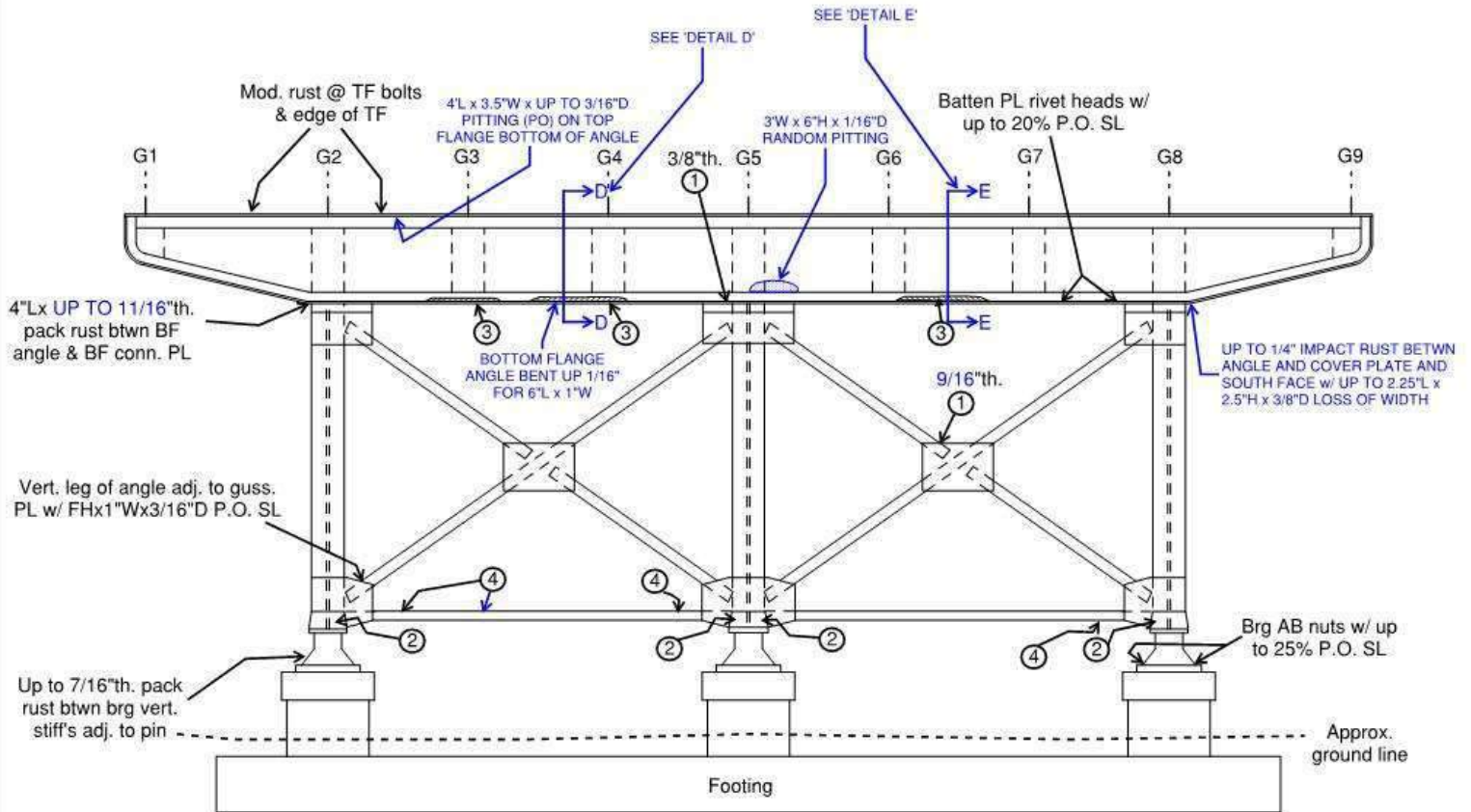
Crossed: AMTRAK RR & LOCAL ROADS

Inventory Route: Non-NHS

CREW: AAA, CP (AI)

DATE: 1/31/2018

BRIDGE NO.: 03906



### GENERAL NOTES:

- Pier column bearings have areas of peeling paint w/ spotty light-moderate rust w/ up to 3/16"D P.O. SL.
- Steel has random areas of peeling paint w/ light to moderate rust.
- Steel has random areas of painted over pitting up to 1/16"D (not full sections; worst areas noted on sketch).

### DETERIORATION NOTES:

- ① Pack rust btwn gusset PL & member.
- ② Inside legs of column flange w/ up to FWx8"Hx3/16"D SL w/ hvy rust. Rivet heads w/ up to 80% SL.
- ③ 4Lx3"H (& 3"W) x 1/8"D P.O. pitting at vert. & horiz. legs BF.
- ④ Up to 12"L x 9"W x 1/4"D P.O. SL ON TOP OF BOTTOM PLATES w/ up to 60% SL to rivet heads.

### PIER 4 - SOUTH ELEVATION

LEGEND:

	HOLLOW AREA
	SHALLOW REBAR
	SPALL AREA
	SPALL AREA WITH EXPOSED REBAR
	MAP CRACKS
	HAIRLINE CRACKS
	HONEYCOMB AREA
	SCALE AREA
	EFFLORESCE PRESENT
	PAINTED OVER
	SECTION LOSS

REVISION <u>1</u>	DATE: 1/19/2020	CREW: PRIME AE : JK, EA, EB, IS, MM, AN	REVISION <u>3</u>	DATE:	CREW:
REVISION <u>2</u>	DATE:	CREW:	REVISION <u>4</u>	DATE:	CREW:

## Sketches

Inspection type: Fracture Critical, Routine

Inspection Date: 1/19/2020

Inspected by: PRIME AE

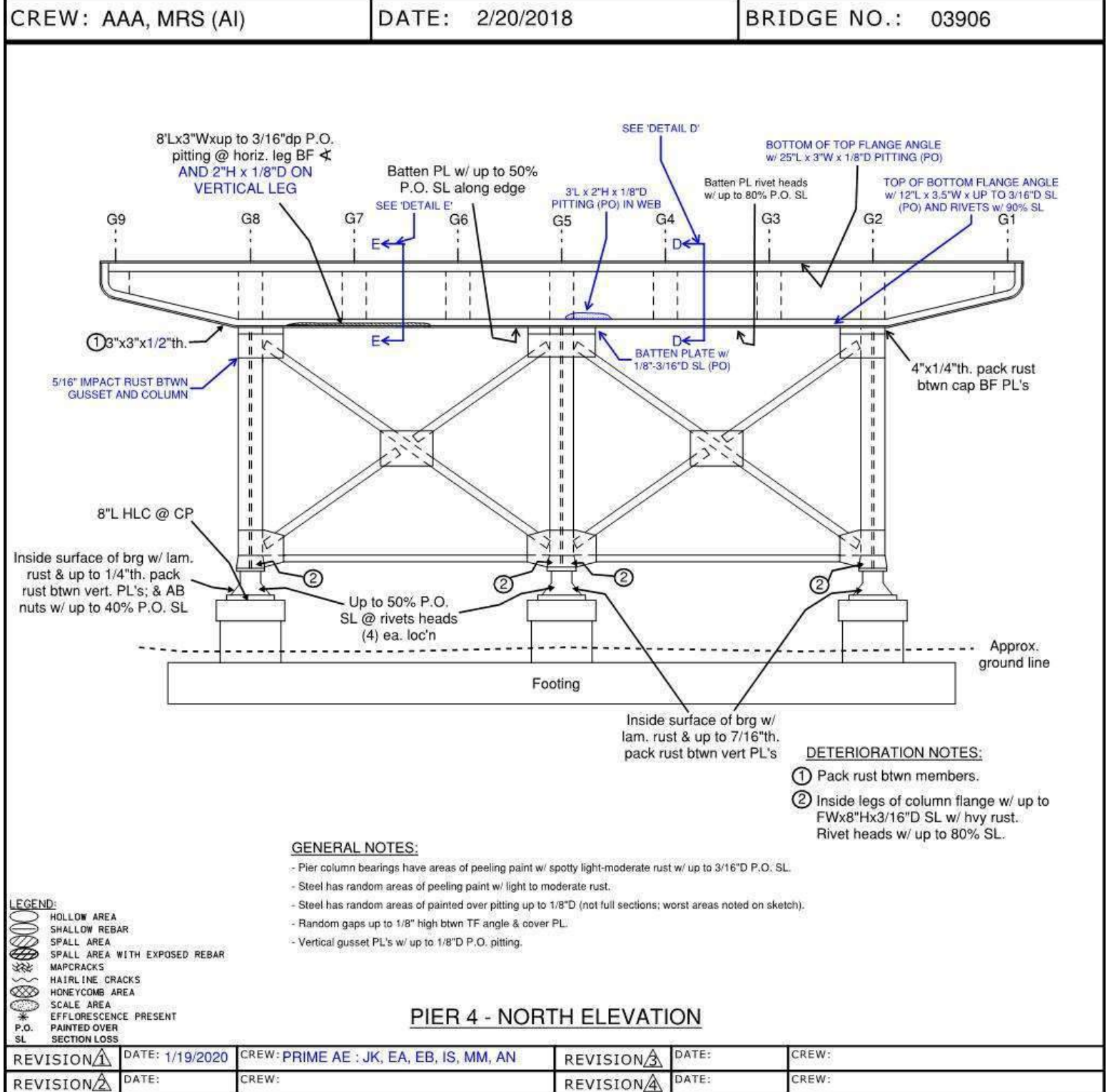
Bridge No 03906

Town: STONINGTON

Carried: ALPHA AVENUE

Crossed: AMTRAK RR & LOCAL ROADS

Inventory Route: Non-NHS



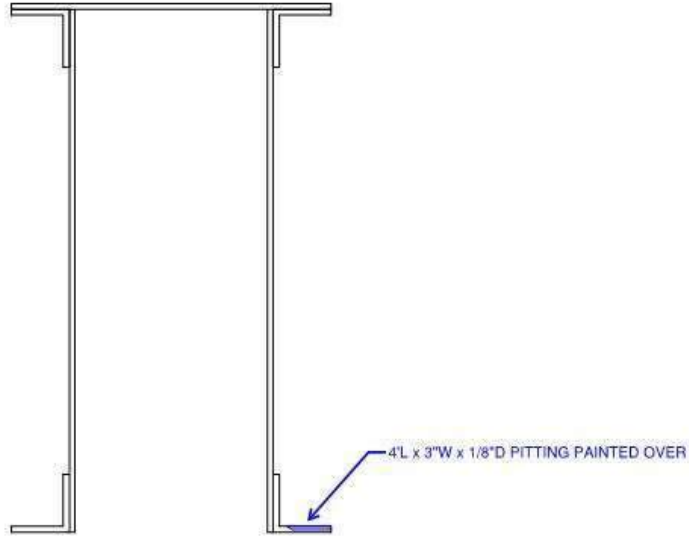


**Sketches****Inspection type:** Fracture Critical,Routine**Inspection Date:** 1/19/2020**Inspected by:** PRIME AE**:Bridge No 03906****Town:** STONINGTON**Carried:** ALPHA AVENUE**Crossed:** AMTRAK RR & LOCAL ROADS**Inventory Route:** Non-NHS

CREW: JK, EA, EB, IS, MM, AN

DATE: 1/19/2020

BRIDGE NO.: 03906

SECTION D-D (LOOKING EAST)BOTTOM FLANGE SECTION LOSS (CRITICAL):ORIGINAL BOTTOM FLANGE AREA =  $2(4" \times 7/16") = 3.50 \text{ in}^2$ BOTTOM FLANGE LOSS AREA =  $(3" \times 1/8") = 0.94 \text{ in}^2$ PERCENT SECTION LOSS =  $(0.94 \text{ in}^2 / 3.50 \text{ in}^2) \times 100 = 10.7\% \text{ LOSS}$ SECTION PROPERTIES:WEB = (2)  $36" \times 3/8"$ ANGLES = (4)  $4" \times 4" \times 7/16"$ COVER PLATE =  $22" \times 3/8"$ 

DETAIL D  
PIER 4 CAP  
BETWEEN GIRDERS G3 & G4

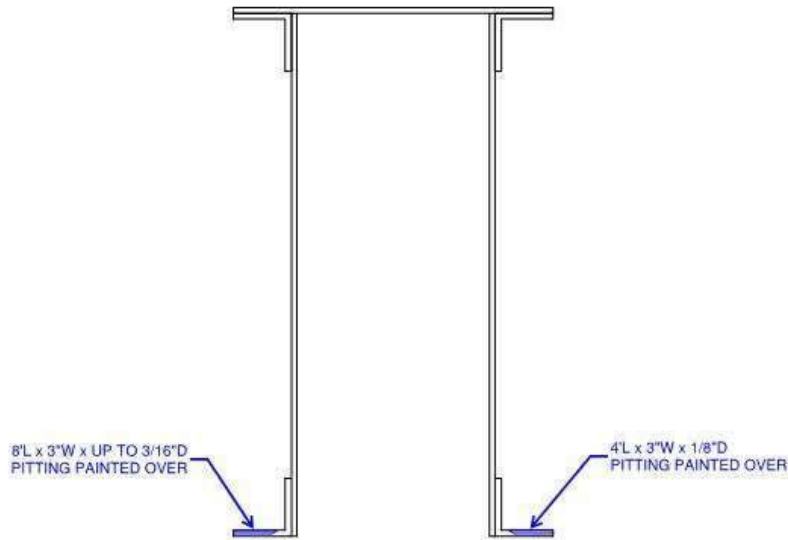
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REVISION <u>2</u>	DATE:	CREW:	REVISION <u>4</u>	DATE:	CREW:

**Sketches****Inspection type:** Fracture Critical,Routine**Inspection Date:** 1/19/2020**Inspected by:** PRIME AE**:Bridge No 03906****Town:** STONINGTON**Carried:** ALPHA AVENUE**Crossed:** AMTRAK RR & LOCAL ROADS**Inventory Route:** Non-NHS

CREW: JK, EA, EB, IS, MM, AN

DATE: 1/19/2020

BRIDGE NO.: 03906

SECTION E-E (LOOKING EAST)BOTTOM FLANGE SECTION LOSS (CRITICAL):ORIGINAL BOTTOM FLANGE AREA =  $2(4" \times 7/16") = 3.50 \text{ in}^2$ BOTTOM FLANGE LOSS AREA =  $(3" \times 3/16") + (3" \times 1/8") = 0.94 \text{ in}^2$ PERCENT SECTION LOSS =  $(0.94 \text{ in}^2 / 3.50 \text{ in}^2) \times 100 = 26.9\% \text{ LOSS}$ SECTION PROPERTIES:WEB = (2)  $36" \times 3/8"$ ANGLES = (4)  $4" \times 4" \times 7/16"$ COVER PLATE =  $22" \times 3/8"$ 

DETAIL E  
PIER 4 CAP  
BETWEEN GIRDERS G6 & G7

REVISION <u>1</u>	DATE: 1/19/2020	CREW: PRIME AE : JK, EA, EB, IS, MM, AN	REVISION <u>3</u>	DATE:	CREW:
REVISION <u>2</u>	DATE:	CREW:	REVISION <u>4</u>	DATE:	CREW:

## Sketches

Inspection type: Fracture Critical, Routine

Inspection Date: 1/19/2020

Inspected by: PRIME AE

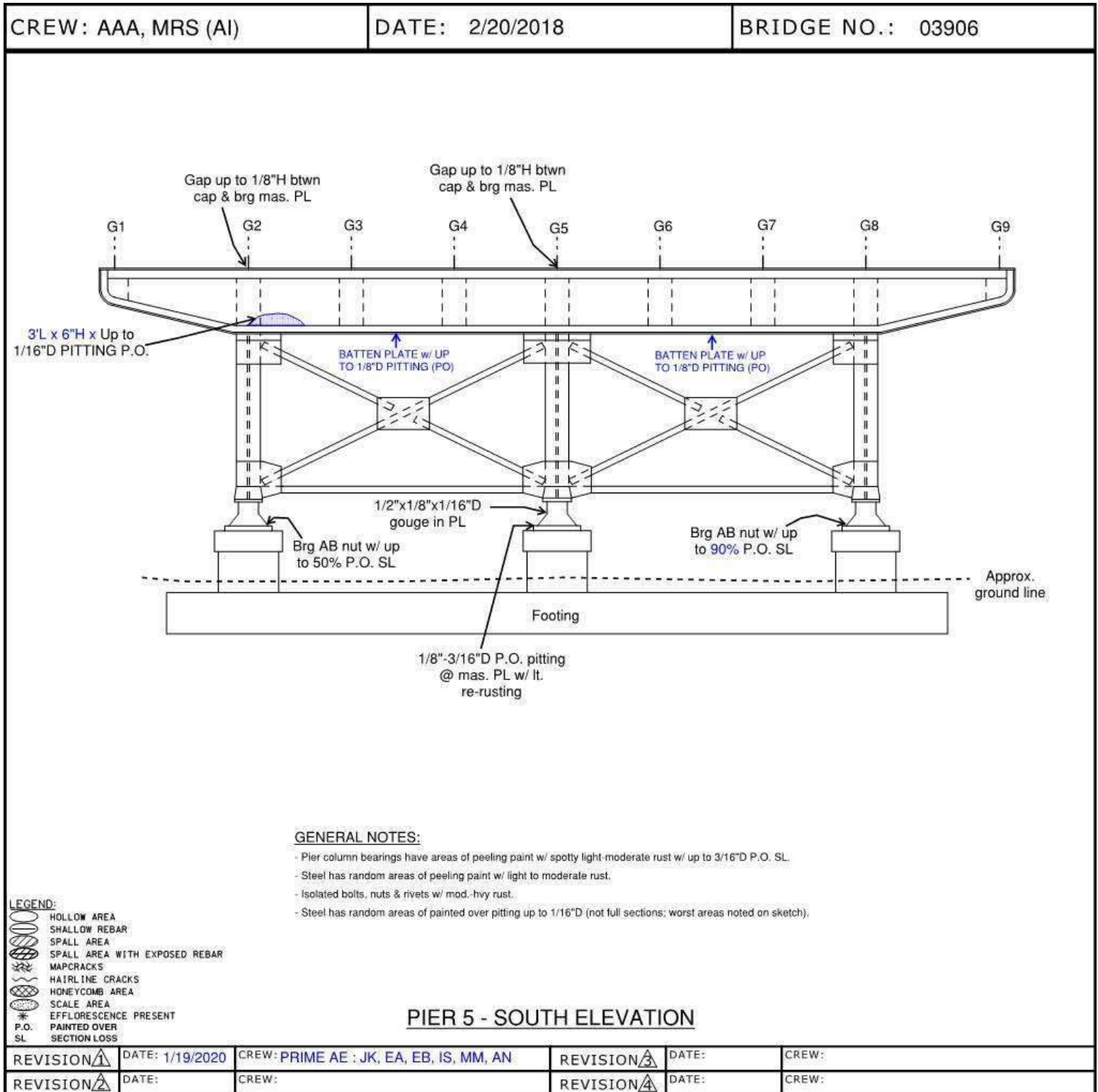
:Bridge No 03906

Town: STONINGTON

Carried: ALPHA AVENUE

Crossed: AMTRAK RR & LOCAL ROADS

Inventory Route: Non-NHS





## Sketches

Inspection type: Fracture Critical, Routine

Inspection Date: 1/19/2020

Inspected by: PRIME AE

Bridge No 03906

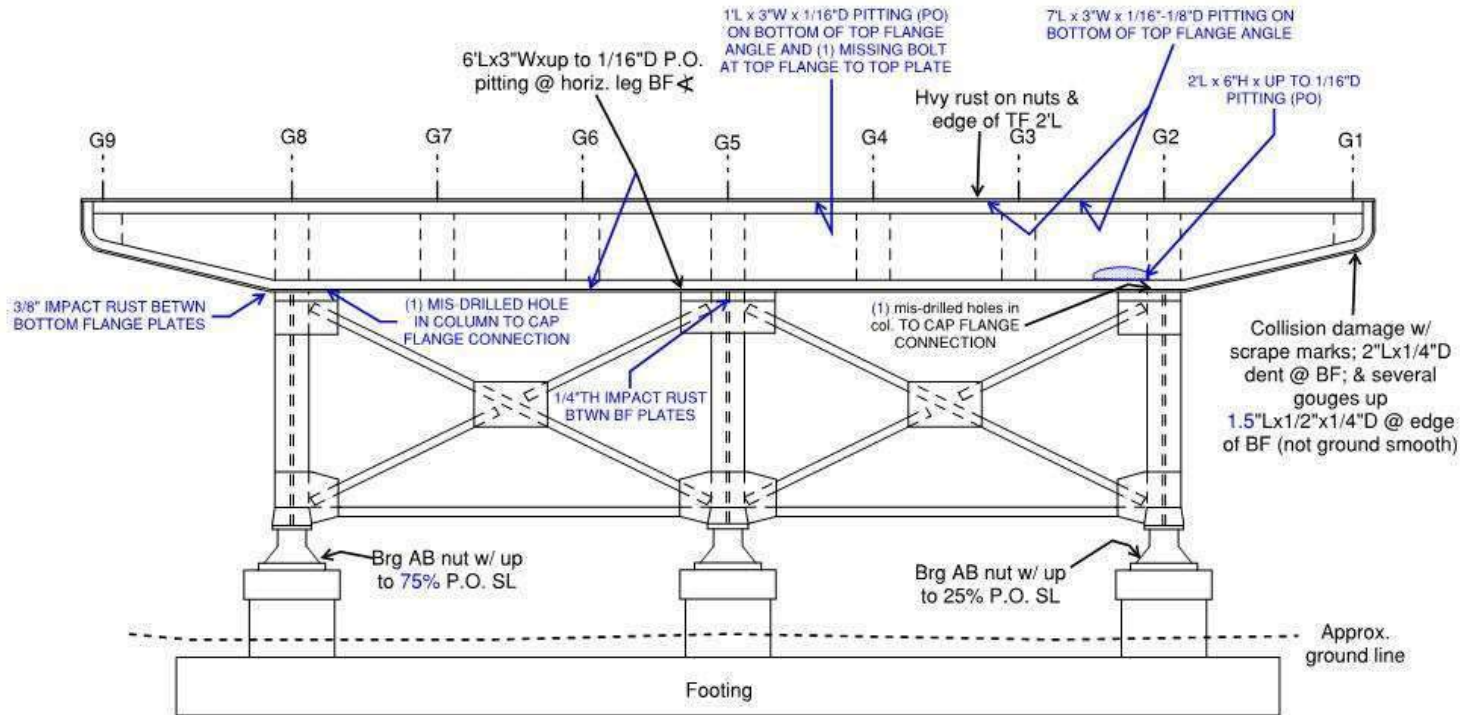
Town: STONINGTON

Carried: ALPHA AVENUE

Crossed: AMTRAK RR & LOCAL ROADS

Inventory Route: Non-NHS

CREW: AAA, MRS (AI)	DATE: 2/20/2018	BRIDGE NO.: 03906
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### GENERAL NOTES:

- SEE "PIER 5 - SOUTH ELEVATION" GENERAL NOTES.
- Up to 1/8"th, pack rust between the TF PL's & angles at random locations.

LEGEND:	
	HOLLOW AREA
	SHALLOW REBAR
	SPALL AREA
	SPALL AREA WITH EXPOSED REBAR
	MAP CRACKS
	HAIRLINE CRACKS
	HONEYCOMB AREA
	SCALE AREA
	EFFLORESCENCE PRESENT
	PAINTED OVER
	SECTION LOSS

### PIER 5 - NORTH ELEVATION

REVISION <u>1</u>	DATE: 1/19/2020	CREW: PRIME AE : JK, EA, EB, IS, MM, AN	REVISION <u>3</u>	DATE:	CREW:
REVISION <u>2</u>	DATE:	CREW:	REVISION <u>4</u>	DATE:	CREW:

## Sketches

Inspection type: Fracture Critical, Routine

Inspection Date: 1/19/2020

Inspected by: PRIME AE

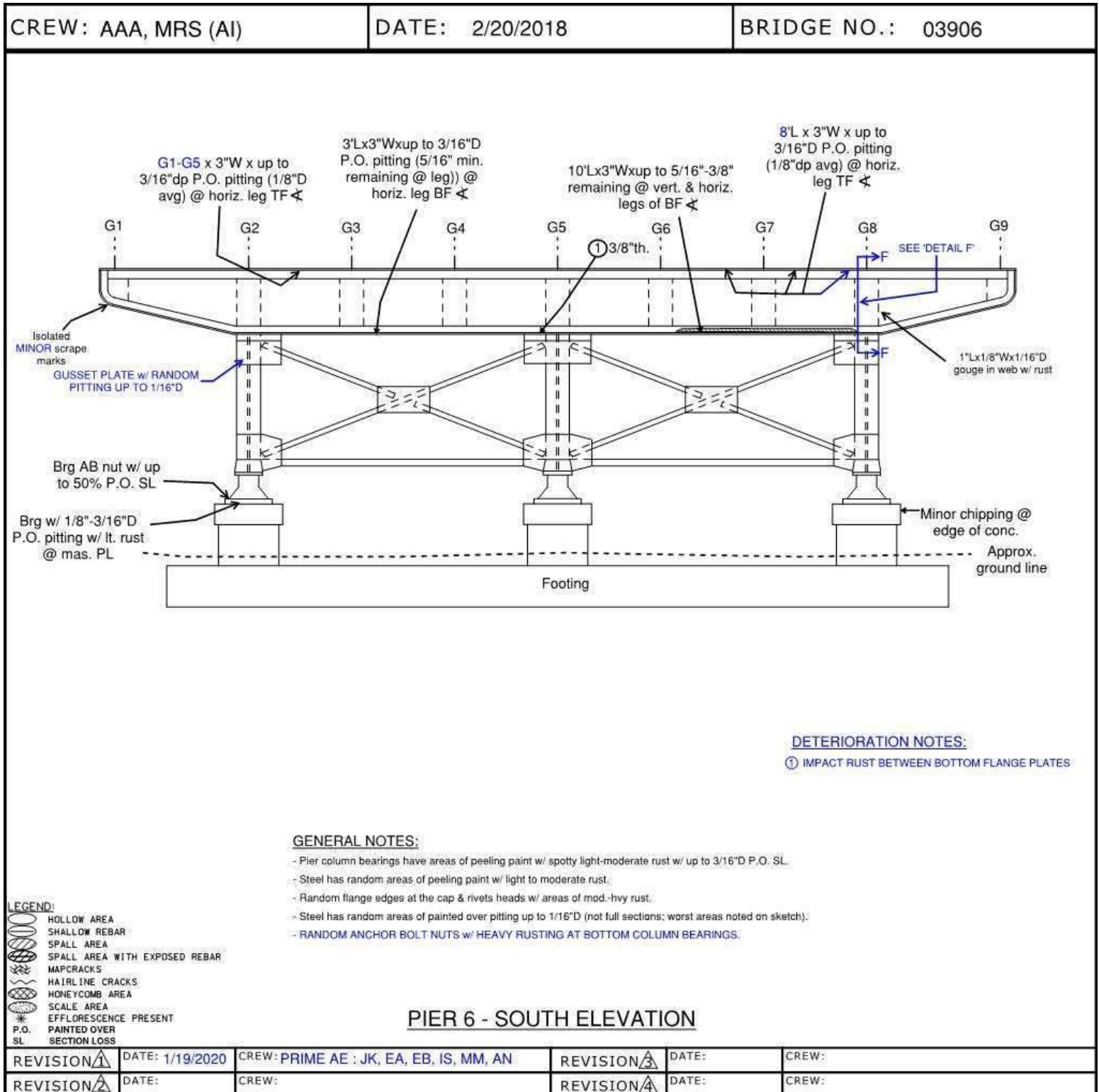
Bridge No 03906

Town: STONINGTON

Carried: ALPHA AVENUE

Crossed: AMTRAK RR & LOCAL ROADS

Inventory Route: Non-NHS



# Sketches

Inspection type: Fracture Critical, Routine

Inspection Date: 1/19/2020

Inspected by: PRIME AE

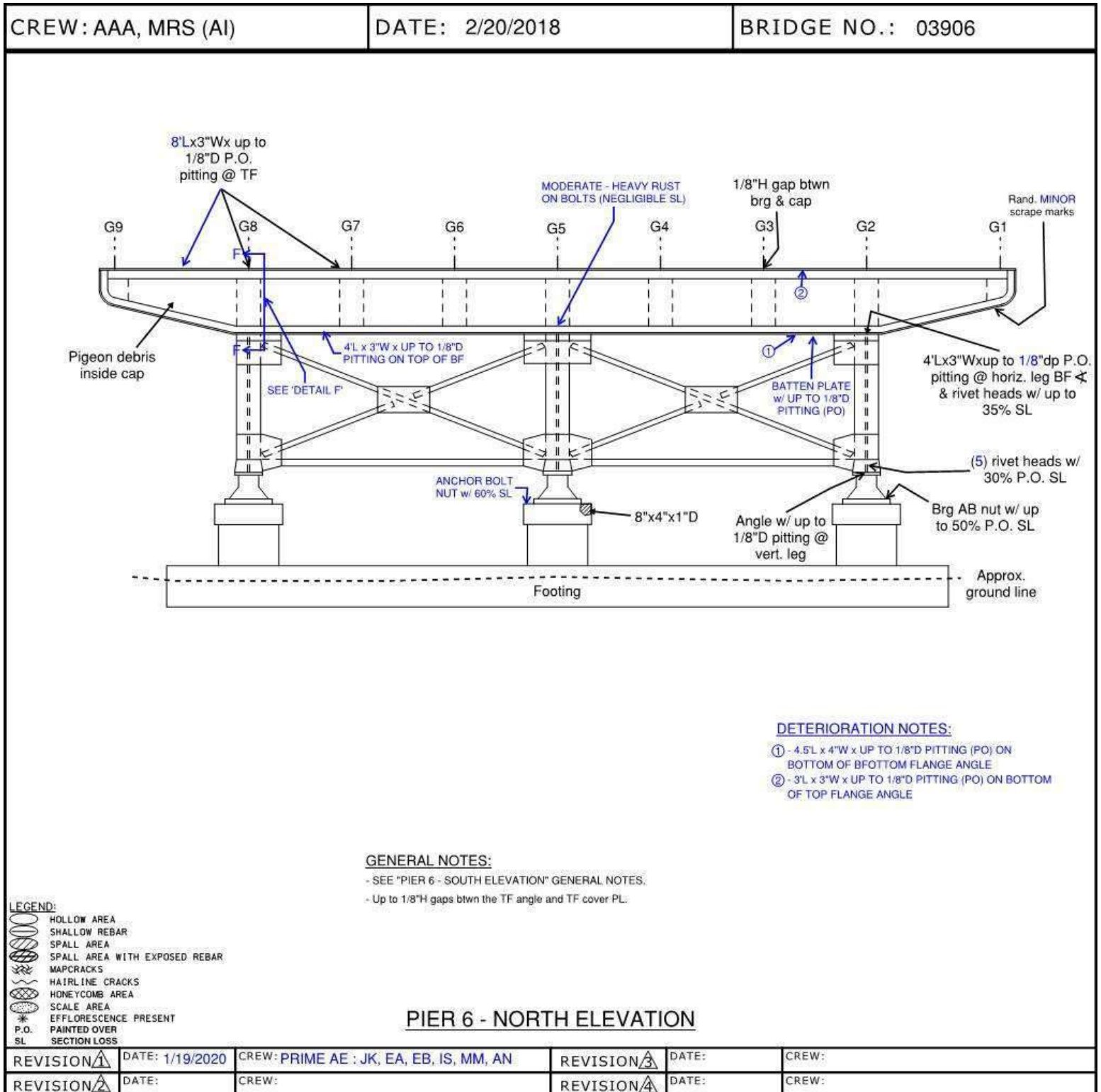
:Bridge No 03906

Town: STONINGTON

Carried: ALPHA AVENUE

Crossed: AMTRAK RR & LOCAL ROADS

Inventory Route: Non-NHS



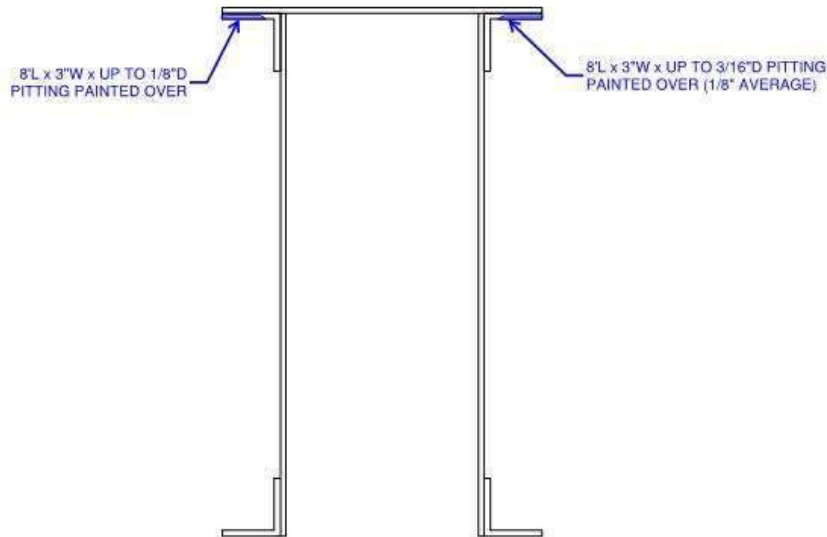


**Sketches****Inspection type:** Fracture Critical,Routine**Inspection Date:** 1/19/2020**Inspected by:** PRIME AE**:Bridge No 03906****Town:** STONINGTON**Carried:** ALPHA AVENUE**Crossed:** AMTRAK RR & LOCAL ROADS**Inventory Route:** Non-NHS

CREW: JK, EA, EB, IS, MM, AN

DATE: 1/19/2020

BRIDGE NO.: 03906

SECTION F-F (LOOKING EAST)TOP FLANGE SECTION LOSS (CRITICAL):ORIGINAL TOP FLANGE AREA =  $2(4" \times 7/16") + (22" \times 3/8") = 11.75 \text{ in}^2$ TOP FLANGE LOSS AREA =  $(3" \times 1/8") + (3" \times 3/16") = 0.94 \text{ in}^2$ PERCENT SECTION LOSS =  $(0.94 \text{ in}^2 / 11.75 \text{ in}^2) \times 100 = 8.0\% \text{ LOSS}$ SECTION PROPERTIES:WEB = (2)  $36" \times 3/8"$ ANGLES = (4)  $4" \times 4" \times 7/16"$ COVER PLATE =  $22" \times 3/8"$ 

DETAIL F  
PIER 6 CAP  
AT GIRDER G8

REVISION <u>A</u>	DATE: 1/19/2020	CREW: PRIME AE : JK, EA, EB, IS, MM, AN	REVISION <u>3</u>	DATE:	CREW:
REVISION <u>A</u>	DATE:	CREW:	REVISION <u>4</u>	DATE:	CREW:

## Sketches

Inspection type: Fracture Critical, Routine

Inspection Date: 1/19/2020

Inspected by: PRIME AE

:Bridge No 03906

Town: STONINGTON

Carried: ALPHA AVENUE

Crossed: AMTRAK RR & LOCAL ROADS

Inventory Route: Non-NHS

CREW: AAA, ZRI (AI)	DATE: 2/20/2018	BRIDGE NO.: 03906
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The sketch shows the south elevation of Pier 7. It features a horizontal bridge deck supported by a central pier column and two side columns. The deck is divided into sections labeled G1 through G9. Key inspection findings are noted: a 9"Wx1/8"H gap between the bridge and cap with pack rust; a mis-drilled bolt hole; isolated minor (PO) scrape marks; a 14"Lx1/2"Wx1/4"D defect in the web; 1"Lx1"x1/8"D P.O. pitting along the edge of the BF; a 10"L x 3/16" TH section; a 7"L x 1/2" TH section; a 4"L crk ext. to mas. PL; a 7"L crk ext. to mas. PL; and a 4"L crk ext. to mas. PL. The footing is shown at the base, and an approximate ground line is indicated.

**DETERIORATION NOTES:**

① IMPACT RUST BETWEEN GUSSET PLATE AND DIAGONAL BRACING

**GENERAL NOTES:**

- Pier column bearings have areas of peeling paint w/ spotty light-moderate rust w/ up to 1/8"D P.O. SL.
- Steel has random areas of peeling paint w/ light to moderate rust.
- Random flange edges at the cap & rivets heads w/ areas of lt.-mod. rust. Random rivet heads have up to 20% P.O. SL @ diagonals & up to 40% P.O. SL @ the cap.
- Steel has isolated areas of painted over pitting up to 1/8"D (not full sections; worst areas noted on sketch).

**LEGEND:**

- HOLLOW AREA
- SHALLOW REBAR
- SPALL AREA
- SPALL AREA WITH EXPOSED REBAR
- MAPCRACKS
- HAIRLINE CRACKS
- HONEYCOMB AREA
- SCALE AREA
- EFFLORESCENCE PRESENT
- P.O. PAINTED OVER
- SL SECTION LOSS

**PIER 7 - SOUTH ELEVATION**

REVISION <u>1</u>	DATE: 1/19/2020	CREW: PRIME AE : JK, EA, EB, IS, MM, AN	REVISION <u>3</u>	DATE:	CREW:
REVISION <u>2</u>	DATE:	CREW:	REVISION <u>4</u>	DATE:	CREW:

# Sketches

Inspection type: Fracture Critical,Routine

Inspection Date: 1/19/2020

Inspected by: PRIME AE

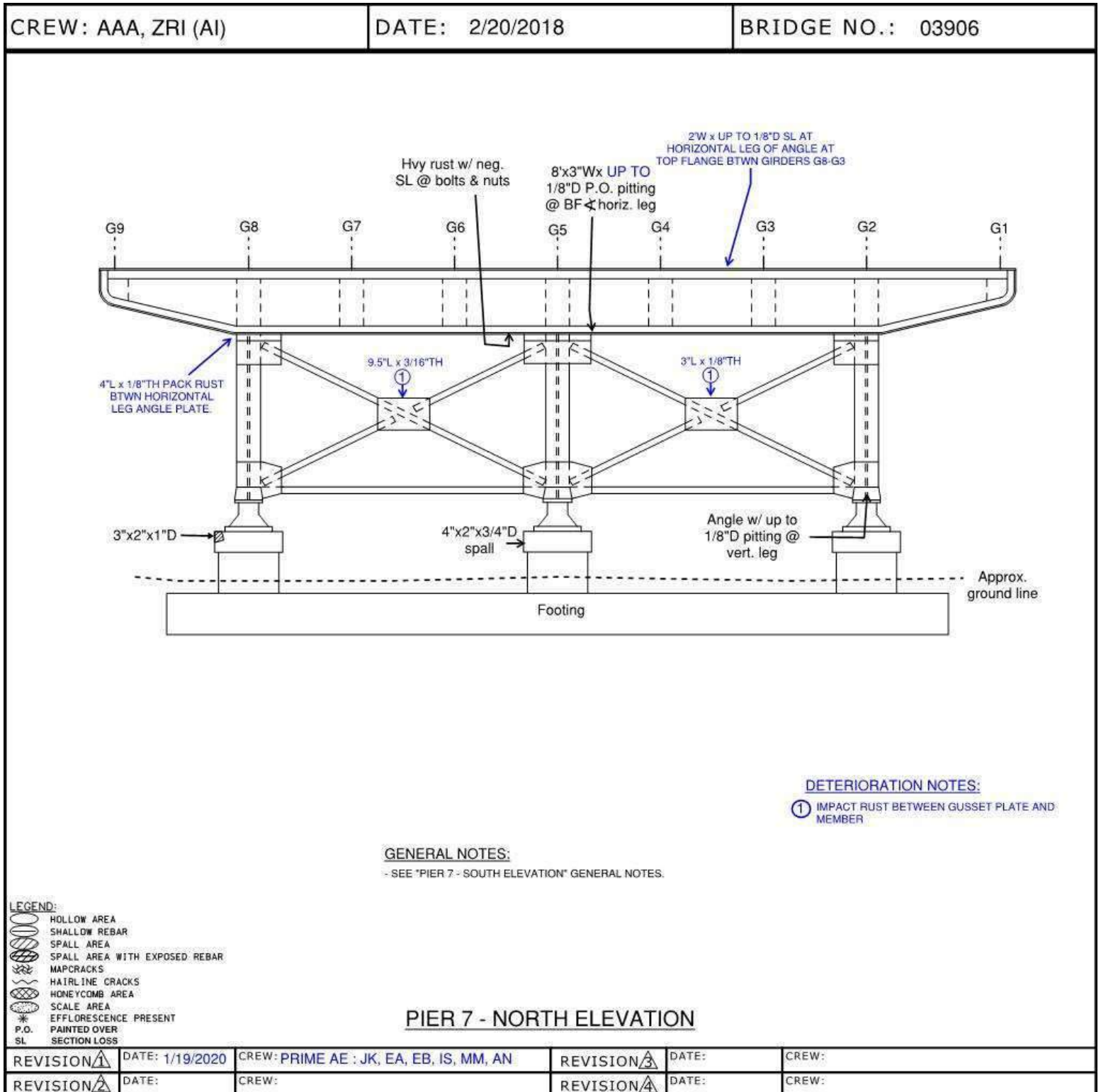
:Bridge No 03906

Town: STONINGTON

Carried: ALPHA AVENUE

Crossed: AMTRAK RR & LOCAL ROADS

Inventory Route: Non-NHS





**Form: Asset Photos**

**Inspection type:** Fracture Critical,Routine

**Inspection Date:** 1/19/2020

**Inspected by:** PRIME AE

**:Bridge No 03906**

**Town:** STONINGTON

**Carried:** ALPHA AVENUE

**Crossed:** AMTRAK RR & LOCAL ROADS

**Inventory Route:** Non-NHS



Photo Number: 1

Photo Taken: 01/28/2020

Bridge identification number.



Photo Number: 2

Photo Taken: 02/26/2020

West elevation of the bridge.

**Form: Asset Photos**

**Inspection type:** Fracture Critical,Routine

**Inspection Date:** 1/19/2020

**Inspected by:** PRIME AE

**:Bridge No 03906**

**Town:** STONINGTON

**Carried:** ALPHA AVENUE

**Crossed:** AMTRAK RR & LOCAL ROADS

**Inventory Route:** Non-NHS



Photo Number: 3

Photo Taken: 01/28/2020

East elevation of the bridge.



Photo Number: 4

Photo Taken: 01/29/2020

Bridge from the south approach.

**Form: Asset Photos**

**Inspection type:** Fracture Critical,Routine

**Inspection Date:** 1/19/2020

**Inspected by:** PRIME AE

**:Bridge No 03906**

**Town:** STONINGTON

**Carried:** ALPHA AVENUE

**Crossed:** AMTRAK RR & LOCAL ROADS

**Inventory Route:** Non-NHS



Photo Number: 5

Photo Taken: 01/29/2020

South approach from the bridge.



Photo Number: 6

Photo Taken: 01/29/2020

Bridge from the north approach.



**Form: Asset Photos**

**Inspection type:** Fracture Critical,Routine

**Inspection Date:** 1/19/2020

**Inspected by:** PRIME AE

**:Bridge No 03906**

**Town:** STONINGTON

**Carried:** ALPHA AVENUE

**Crossed:** AMTRAK RR & LOCAL ROADS

**Inventory Route:** Non-NHS



Photo Number: 7

Photo Taken: 01/29/2020

North approach from the bridge.



Photo Number: 8

Photo Taken: 01/28/2020

Typical configuration and condition of the underside of deck and superstructure framing, Span 4 shown looking north.

**Form: Asset Photos**

**Inspection type:** Fracture Critical,Routine

**Inspection Date:** 1/19/2020

**Inspected by:** PRIME AE

**:Bridge No 03906**

**Town:** STONINGTON

**Carried:** ALPHA AVENUE

**Crossed:** AMTRAK RR & LOCAL ROADS

**Inventory Route:** Non-NHS



Photo Number: 9

Photo Taken: 01/29/2020

Typical condition of the bridge overlay, looking northwest showing Span 3 & Span 4.



Photo Number: 10

Photo Taken: 01/19/2020

Span 4, Bay 8 underside of deck between Diaphragm D2 & Pier 4 has a spall with exposed rebar.

**Form: Asset Photos**

**Inspection type:** Fracture Critical,Routine

**Inspection Date:** 1/19/2020

**Inspected by:** PRIME AE

**:Bridge No 03906**

**Town:** STONINGTON

**Carried:** ALPHA AVENUE

**Crossed:** AMTRAK RR & LOCAL ROADS

**Inventory Route:** Non-NHS



Photo Number: 11

Photo Taken: 01/29/2020

Span 6, Bay 3 underside of deck between Diaphragms D2 & D3 near Diaphragm D3 has a spall with an adjacent hollow area over the parking lot below.



Photo Number: 12

Photo Taken: 01/29/2020

Span 6, Bay 5 underside of deck between Diaphragm D3 & Pier 6 has a hollow area along the construction joint overpour over the parking lot below.



**Form: Asset Photos**

**Inspection type:** Fracture Critical,Routine

**Inspection Date:** 1/19/2020

**Inspected by:** PRIME AE

**:Bridge No** 03906

**Town:** STONINGTON

**Carried:** ALPHA AVENUE

**Crossed:** AMTRAK RR & LOCAL ROADS

**Inventory Route:** Non-NHS



Photo Number: 13

Photo Taken: 01/29/2020

Typical configuration and condition of the west curb, sidewalk parapet and fence, looking north from Span 4. Note: Section over Amtrak has a curved return.



Photo Number: 14

Photo Taken: 01/29/2020

Span 5, east sidewalk walk adjacent to the curb has a large scale area, looking south. Note: Seal between sidewalk and curb missing/deteriorated.

**Form: Asset Photos**

**Inspection type:** Fracture Critical,Routine

**Inspection Date:** 1/19/2020

**Inspected by:** PRIME AE

**:Bridge No 03906**

**Town:** STONINGTON

**Carried:** ALPHA AVENUE

**Crossed:** AMTRAK RR & LOCAL ROADS

**Inventory Route:** Non-NHS



Photo Number: 15

Photo Taken: 01/29/2020

Southeast approach sidewalk at Abutment 1 deck joint has a scale area. Note: Abutment 1 sidewalk joint open with failed seal and staircase slab is settled.



Photo Number: 16

Photo Taken: 01/19/2020

Span 4, east parapet just south of Track 1 has a spall with exposed rebar.



**Form: Asset Photos**

**Inspection type:** Fracture Critical,Routine

**Inspection Date:** 1/19/2020

**Inspected by:** PRIME AE

**:Bridge No 03906**

**Town:** STONINGTON

**Carried:** ALPHA AVENUE

**Crossed:** AMTRAK RR & LOCAL ROADS

**Inventory Route:** Non-NHS



Photo Number: 17

Photo Taken: 01/29/2020

Span 8, east parapet has a spall on top of the parapet over the travelway. Note: Previously noted gap at fence not found.



Photo Number: 18

Photo Taken: 01/28/2020

Span 3, Bay 8 underside of deck between Diaphragms D1 & D2, the previously noted short weep has been extended since the last inspection.



**Form: Asset Photos**

**Inspection type:** Fracture Critical,Routine

**Inspection Date:** 1/19/2020

**Inspected by:** PRIME AE

**:Bridge No 03906**

**Town:** STONINGTON

**Carried:** ALPHA AVENUE

**Crossed:** AMTRAK RR & LOCAL ROADS

**Inventory Route:** Non-NHS



Photo Number: 19

Photo Taken: 01/28/2020

Span 2, Bay 1 underside of deck between Pier 1 and Diaphragm D1 has a short/broken weep, which drains onto the deck.



Photo Number: 20

Photo Taken: 01/29/2020

Span 3, west parapet lighting standard has been removed with exposed wires which have capped ends.

**Form: Asset Photos**

**Inspection type:** Fracture Critical,Routine

**Inspection Date:** 1/19/2020

**Inspected by:** PRIME AE

**:Bridge No 03906**

**Town:** STONINGTON

**Carried:** ALPHA AVENUE

**Crossed:** AMTRAK RR & LOCAL ROADS

**Inventory Route:** Non-NHS



Photo Number: 21

Photo Taken: 01/29/2020

Span 5, west parapet lighting standard has a vertical crack in the architectural dome at the base.



Photo Number: 22

Photo Taken: 01/19/2020

Span 4, Bay 5 underside of deck has a longitudinal construction joint which has damp concrete, efflorescence and numerous adjacent transverse cracks.



**Form: Asset Photos**

**Inspection type:** Fracture Critical,Routine

**Inspection Date:** 1/19/2020

**Inspected by:** PRIME AE

**:Bridge No 03906**

**Town:** STONINGTON

**Carried:** ALPHA AVENUE

**Crossed:** AMTRAK RR & LOCAL ROADS

**Inventory Route:** Non-NHS



Photo Number: 23

Photo Taken: 01/29/2020

Abutment 1 plug joint has multiple adhesion cracks with full length settlement/depressions, looking east.



Photo Number: 24

Photo Taken: 01/29/2020

Abutment 2 plug joint has multiple adhesion cracks with full length settlement/depressions, looking east.



**Form: Asset Photos**

**Inspection type:** Fracture Critical,Routine

**Inspection Date:** 1/19/2020

**Inspected by:** PRIME AE

**:Bridge No** 03906

**Town:** STONINGTON

**Carried:** ALPHA AVENUE

**Crossed:** AMTRAK RR & LOCAL ROADS

**Inventory Route:** Non-NHS



Photo Number: 25

Photo Taken: 01/29/2020

Pier 4 strip seal joint has accumulation of sand debris and random transverse hairline cracks in the concrete headers, looking east.



Photo Number: 26

Photo Taken: 01/29/2020

Southeast approach metal beam guide rail, looking south. Note: Impact damage near the buried end.

**Form: Asset Photos**

**Inspection type:** Fracture Critical,Routine

**Inspection Date:** 1/19/2020

**Inspected by:** PRIME AE

**:Bridge No 03906**

**Town:** STONINGTON

**Carried:** ALPHA AVENUE

**Crossed:** AMTRAK RR & LOCAL ROADS

**Inventory Route:** Non-NHS



Photo Number: 27

Photo Taken: 01/29/2020

South approach pavement has a full length transverse crack, which has been sealed and re-cracked, looking west.



Photo Number: 28

Photo Taken: 01/28/2020

East elevation of Girder G8 fixed bearing at Pier 2 has painted over section loss on the masonry plate, looking south.

**Form: Asset Photos**

**Inspection type:** Fracture Critical,Routine

**Inspection Date:** 1/19/2020

**Inspected by:** PRIME AE

**:Bridge No 03906**

**Town:** STONINGTON

**Carried:** ALPHA AVENUE

**Crossed:** AMTRAK RR & LOCAL ROADS

**Inventory Route:** Non-NHS



Photo Number: 29

Photo Taken: 01/28/2020

West elevation of Girder G6 fixed bearing at Pier 2, the west pin has a 1/8" wide gap between the nut and masonry plate.



Photo Number: 30

Photo Taken: 01/28/2020

South elevation of Girder G6 fixed bearing at Pier 2 has a 5/8" long crack in the masonry plate at the base.



**Form: Asset Photos**

**Inspection type:** Fracture Critical,Routine

**Inspection Date:** 1/19/2020

**Inspected by:** PRIME AE

**:Bridge No 03906**

**Town:** STONINGTON

**Carried:** ALPHA AVENUE

**Crossed:** AMTRAK RR & LOCAL ROADS

**Inventory Route:** Non-NHS



Photo Number: 31

Photo Taken: 01/28/2020

Span 5, north elevation Girder G8 fixed bearing at Pier 4 has laminated rust and section loss on the interior face of the masonry plate.



Photo Number: 32

Photo Taken: 01/29/2020

North elevation of Girder G3 fixed bearing at Pier 6 has a gap between the masonry plate and pier cap due to pack rust.

**Form: Asset Photos**

**Inspection type:** Fracture Critical,Routine

**Inspection Date:** 1/19/2020

**Inspected by:** PRIME AE

**:Bridge No 03906**

**Town:** STONINGTON

**Carried:** ALPHA AVENUE

**Crossed:** AMTRAK RR & LOCAL ROADS

**Inventory Route:** Non-NHS



Photo Number: 33

Photo Taken: 01/28/2020

Span 4, east elevation Girder G2 expansion bearing at Pier 4 has painted over section loss on the rocker plate. Note: Nut & pin have no paint with surface rust.



Photo Number: 34

Photo Taken: 01/19/2020

Span 4, Girder G6 underside of bottom flange over Track 1 has arcing section loss, looking west.

**Form: Asset Photos**

**Inspection type:** Fracture Critical,Routine

**Inspection Date:** 1/19/2020

**Inspected by:** PRIME AE

**:Bridge No 03906**

**Town:** STONINGTON

**Carried:** ALPHA AVENUE

**Crossed:** AMTRAK RR & LOCAL ROADS

**Inventory Route:** Non-NHS



Photo Number: 35

Photo Taken: 01/19/2020

Span 4, Girder G8 west bottom flange over Track 2 has arcing section loss.



Photo Number: 36

Photo Taken: 01/19/2020

Span 4, Girder G3 bottom of bottom flange between Diaphragms D1 & D2 has minor rolling defects, looking south.



**Form: Asset Photos**

**Inspection type:** Fracture Critical,Routine

**Inspection Date:** 1/19/2020

**Inspected by:** PRIME AE

**:Bridge No 03906**

**Town:** STONINGTON

**Carried:** ALPHA AVENUE

**Crossed:** AMTRAK RR & LOCAL ROADS

**Inventory Route:** Non-NHS



Photo Number: 37

Photo Taken: 01/28/2020

Span 8, Girder G8 at Abutment 2 is out of plumb 1/2" to the west, east elevation shown.



Photo Number: 38

Photo Taken: 01/19/2020

Span 4, Bay 5 end diaphragm at Pier 4 has a torch cut in the top flange & bottom flange web connections at the connection to Girder G5.

**Form: Asset Photos**

**Inspection type:** Fracture Critical,Routine

**Inspection Date:** 1/19/2020

**Inspected by:** PRIME AE

**:Bridge No 03906**

**Town:** STONINGTON

**Carried:** ALPHA AVENUE

**Crossed:** AMTRAK RR & LOCAL ROADS

**Inventory Route:** Non-NHS



Photo Number: 39

Photo Taken: 01/29/2020

Span 6, Girder G7 east elevation at the bolted field splice. Top flange has one (1) bolt with a nut not fully engaged.



Photo Number: 40

Photo Taken: 01/28/2020

Span 3, Bay 6 at Diaphragm D1 connection to Girder G6 has a missing lower horizontal weld.

**Form: Asset Photos**

**Inspection type:** Fracture Critical,Routine

**Inspection Date:** 1/19/2020

**Inspected by:** PRIME AE

**:Bridge No 03906**

**Town:** STONINGTON

**Carried:** ALPHA AVENUE

**Crossed:** AMTRAK RR & LOCAL ROADS

**Inventory Route:** Non-NHS



Photo Number: 41

Photo Taken: 01/28/2020

Span 1, Girder G7 west bottom flange between Diaphragms D2 & D3 has an impact gouge.



Photo Number: 42

Photo Taken: 01/29/2020

Span 6, Girder G1 west bottom flange between Diaphragms D1 & D2 has impact gouge/notch.



**Form: Asset Photos**

**Inspection type:** Fracture Critical,Routine

**Inspection Date:** 1/19/2020

**Inspected by:** PRIME AE

**:Bridge No 03906**

**Town:** STONINGTON

**Carried:** ALPHA AVENUE

**Crossed:** AMTRAK RR & LOCAL ROADS

**Inventory Route:** Non-NHS



Photo Number: 43

Photo Taken: 01/28/2020

Span 8, Girder G6 bottom of bottom flange near Pier 7 has two (2) impact gouges.



Photo Number: 44

Photo Taken: 01/28/2020

Abutment 1 elevation.

**Form: Asset Photos**

**Inspection type:** Fracture Critical,Routine

**Inspection Date:** 1/19/2020

**Inspected by:** PRIME AE

**:Bridge No 03906**

**Town:** STONINGTON

**Carried:** ALPHA AVENUE

**Crossed:** AMTRAK RR & LOCAL ROADS

**Inventory Route:** Non-NHS



Photo Number: 45

Photo Taken: 01/28/2020

Abutment 2 elevation.



Photo Number: 46

Photo Taken: 01/28/2020

Wingwall 1B elevation.

**Form: Asset Photos**

**Inspection type:** Fracture Critical,Routine

**Inspection Date:** 1/19/2020

**Inspected by:** PRIME AE

**:Bridge No 03906**

**Town:** STONINGTON

**Carried:** ALPHA AVENUE

**Crossed:** AMTRAK RR & LOCAL ROADS

**Inventory Route:** Non-NHS



Photo Number: 47

Photo Taken: 01/28/2020

Pier 5, south elevation.



Photo Number: 48

Photo Taken: 01/28/2020

Pier 2 cap, south elevation below Bay 4, the top of the bottom flange angle has painted over section loss and the rivets have up to 50% section loss.



**Form: Asset Photos**

**Inspection type:** Fracture Critical,Routine

**Inspection Date:** 1/19/2020

**Inspected by:** PRIME AE

**:Bridge No 03906**

**Town:** STONINGTON

**Carried:** ALPHA AVENUE

**Crossed:** AMTRAK RR & LOCAL ROADS

**Inventory Route:** Non-NHS



Photo Number: 49

Photo Taken: 01/28/2020

Pier 2 cap, south elevation at Girder G7 has pack rust between the top flange angle and cover plate. Note: One (1) missing rivet in web.



Photo Number: 50

Photo Taken: 01/28/2020

Pier 3 cap, north elevation between Girders G3 - G5, the bottom of the top flange angle has painted over pitting/section loss.

**Form: Asset Photos**

**Inspection type:** Fracture Critical,Routine

**Inspection Date:** 1/19/2020

**Inspected by:** PRIME AE

**:Bridge No 03906**

**Town:** STONINGTON

**Carried:** ALPHA AVENUE

**Crossed:** AMTRAK RR & LOCAL ROADS

**Inventory Route:** Non-NHS



Photo Number: 51

Photo Taken: 01/28/2020

Pier 3 cap, south elevation below Girder G4, the top of the bottom flange has painted over section loss.



Photo Number: 52

Photo Taken: 01/19/2020

Pier 4 cap, south elevation below Girder G4, the bottom of the bottom flange angle has painted over section loss.

**Form: Asset Photos**

**Inspection type:** Fracture Critical,Routine

**Inspection Date:** 1/19/2020

**Inspected by:** PRIME AE

**:Bridge No 03906**

**Town:** STONINGTON

**Carried:** ALPHA AVENUE

**Crossed:** AMTRAK RR & LOCAL ROADS

**Inventory Route:** Non-NHS



Photo Number: 53

Photo Taken: 01/19/2020

Pier 4 cap, south elevation between Girders G6 - G7, the top of the bottom flange angle has painted over pitting.



Photo Number: 54

Photo Taken: 04/02/2020

Pier 7 cap, south elevation over Column C3, the web has a gouge/fabrication defect.



**Form: Asset Photos**

**Inspection type:** Fracture Critical,Routine

**Inspection Date:** 1/19/2020

**Inspected by:** PRIME AE

**:Bridge No 03906**

**Town:** STONINGTON

**Carried:** ALPHA AVENUE

**Crossed:** AMTRAK RR & LOCAL ROADS

**Inventory Route:** Non-NHS



Photo Number: 55

Photo Taken: 01/28/2020

Pier 2, Column C2 south elevation at the top has gouges/fabrication defects.



Photo Number: 56

Photo Taken: 01/28/2020

Pier 3, Column 3 west elevation at the base has laminated rust and section loss on the interior column legs.

**Form: Asset Photos**

**Inspection type:** Fracture Critical,Routine

**Inspection Date:** 1/19/2020

**Inspected by:** PRIME AE

**:Bridge No 03906**

**Town:** STONINGTON

**Carried:** ALPHA AVENUE

**Crossed:** AMTRAK RR & LOCAL ROADS

**Inventory Route:** Non-NHS



Photo Number: 57

Photo Taken: 01/19/2020

Pier 4, Column C3 west elevation at the base has laminated rust with section loss and areas of painted over section loss on the interior column legs.



Photo Number: 58

Photo Taken: 01/19/2020

Pier 4, south elevation at the center gusset plate of the diagonal bracing between Columns C2 & C3 with 9/16" thick pack rust between the gusset plate and the diagonal bracing.

**Form: Asset Photos**

**Inspection type:** Fracture Critical,Routine

**Inspection Date:** 1/19/2020

**Inspected by:** PRIME AE

**:Bridge No 03906**

**Town:** STONINGTON

**Carried:** ALPHA AVENUE

**Crossed:** AMTRAK RR & LOCAL ROADS

**Inventory Route:** Non-NHS



Photo Number: 59

Photo Taken: 01/19/2020

Pier 4, north elevation of Column C1 bearing has laminated rust with section loss on the bearing plates and pack rust between the vertical plates.



Photo Number: 60

Photo Taken: 01/28/2020

Pier 2, south elevation of Column C1 bearing, the southeast anchor bolt nut has 50% section loss.



**Form: Asset Photos**

**Inspection type:** Fracture Critical,Routine

**Inspection Date:** 1/19/2020

**Inspected by:** PRIME AE

**:Bridge No 03906**

**Town:** STONINGTON

**Carried:** ALPHA AVENUE

**Crossed:** AMTRAK RR & LOCAL ROADS

**Inventory Route:** Non-NHS



Photo Number: 61

Photo Taken: 01/29/2020

Pier 5 cap, north elevation below Girder G1 has impact damage and gouges/notches on the bottom flange cover plate, which has been painted over.



Photo Number: 62

Photo Taken: 01/29/2020

Same location as the previous photo, close up of the gouges/notches on the bottom flange cover plate.

**Form: Maintenance****Carried:** ALPHA AVENUE**Crossed:** AMTRAK RR & LOCAL ROADS**:Bridge No 03906****Town:** STONINGTON**Inventory Route:** Non-NHS**Status:** Maintenance Review**Assigned To:** David Hiscox**Work Item ID:** 03906-2020-0009**Date Issued:** 04/07/2020**Priority:** Routine Repair**Deficiency:** Deck Joint**Structural Component:** Deck

**Comments:** - The plug joints have random areas of exposed aggregate and evidence of past leakage noted below at the abutment backwalls.  
- Abutment 1 plug joint has adhesion cracks up to 7' long x 1/4" wide and the approach side is settled/depressed for full length x 1/2" deep.  
- Abutment 2 plug joint has adhesion cracks up to 15' long x 1/2" wide and the approach side is settled/depressed for full length x 1" deep.  
- The east sidewalk at Abutment 1 deck joint is open for 2" wide with a failed/missing seal.

**Date Completed:****Actual Quantity:**

Abutment 1 plug joint has multiple adhesion cracks with full length settlement/depressions, looking east.

**Form: Maintenance****Carried:** ALPHA AVENUE**Crossed:** AMTRAK RR & LOCAL ROADS**:Bridge No 03906****Town:** STONINGTON**Inventory Route:** Non-NHS**Status:** Bridge Maintenance  
Garage**Assigned To:** District\_2 Bridge**Work Item ID:** 03906-2020-0008**Date Issued:** 04/15/2020**Priority:** Priority Repair**Deficiency:** Hollow Concrete**Structural Component:** Deck**Comments:** - Span 6, Bay 3 & Bay 5 have hollow areas up to 6' long x 3" wide which could not be removed due to parked vehicles below.**Date Completed:****Actual Quantity:**

Span 6, Bay 3 underside of deck between Diaphragms D2 & D3 near Diaphragm D3 has a spall with an adjacent hollow area over the parking lot below.



**Form: Maintenance****Carried:** ALPHA AVENUE**Crossed:** AMTRAK RR & LOCAL ROADS**:Bridge No 03906****Town:** STONINGTON**Inventory Route:** Non-NHS**Status:** Bridge Maintenance  
Garage**Assigned To:** District\_2 Bridge**Work Item ID:** 03906-2020-0006**Date Issued:** 04/15/2020**Priority:** Priority Repair**Deficiency:** Collision Damage**Structural Component:** Superstructure

**Comments:** - Span 1, Girder G7 west bottom flange between Diaphragms D2 & D3 has a 3/4" long x 1/8" high x 1/16" deep gouge, which has not been ground smooth.  
- Span 1, Girder G9 west bottom flange at 8" north of Diaphragm D1 has a 1/4" long x 1/8" high x 1/16" deep gouge, which has not been ground smooth.  
- Span 6, Girder G1 west bottom flange between Diaphragms D1 & D2 has a 30" long scrape with a 3.5" long x 1/2" wide x 1/16" - 1/8" deep notch, which has not been ground smooth.  
- Span 8, Girder G6 bottom of bottom flange near Pier 7 has two (2) full width x 3/8" wide x 1/8" deep gouges, which has not been ground smooth.

**Date Completed:****Actual Quantity:**

Span 8, Girder G6 bottom of bottom flange near Pier 7 has two (2) impact gouges.

**Form: Maintenance****Carried:** ALPHA AVENUE**Crossed:** AMTRAK RR & LOCAL ROADS**:Bridge No 03906****Town:** STONINGTON**Inventory Route:** Non-NHS**Status:** Open**Assigned To:** ATB ATB**Work Item ID:** 03906-2018-0005**Date Issued:** 03/13/2018**Priority:** Priority Repair**Deficiency:** Fence**Structural Component:** Deck**Comments:** Vinyl coated chainlink fence with return over the railroad tracks in span 4:

- Random disconnected top and bottom horizontal rails, total 6 locations. See photo 15.
- There are three locations where the fence posts are partially pulled out of the parapet causing gaps between the fence and the top of the parapet located over Mathews Street (4" high) in span 1, over paved parking area (7" high) in span 7, and over Cutler Street (7" high) in span 8. See photos 9 & 13.

**Date Completed:****Actual Quantity:**

General view of the east sidewalk, parapet and fence. Note the fence post partially lifted out of parapet causing a gap between the fence and top of the parapet in span 7. Also see photo 13.

**Form: Maintenance****Carried:** ALPHA AVENUE**Crossed:** AMTRAK RR & LOCAL ROADS**:Bridge No 03906****Town:** STONINGTON**Inventory Route:** Non-NHS**Status:** Open**Assigned To:** ATB ATB**Work Item ID:** 03906-2018-0004**Date Issued:** 03/12/2018**Priority:** Priority Repair**Deficiency:** Other**Structural Component:** Superstructure

**Comments:** - In Span 4, the girder bottom flanges have areas of section loss above the Amtrak electrical lines due to electrical arcing and melted steel. The areas of section loss are typically 2" diameter x 1/8" deep average with areas up to 6" long x 1" high on the edges. There are a few locations of section loss up to 2" diameter x 1/4" deep, which results in up to a 4.4% loss to bottom flange capacity at a critical location. Two (2) new locations have been noted since the last inspection and conditions are advancing at previously noted locations.

**Date Completed:****Actual Quantity:**

Typical melting section loss at girder G1 over track 1, typical.



**Form: Maintenance****Carried:** ALPHA AVENUE**Crossed:** AMTRAK RR & LOCAL ROADS**:Bridge No 03906****Town:** STONINGTON**Inventory Route:** Non-NHS**Status:** Open**Assigned To:** ATB ATB**Work Item ID:** 03906-2018-0002**Date Issued:** 03/12/2018**Priority:** Routine Repair**Deficiency:** Sidewalk/ Safety Walk**Structural Component:** Deck**Comments:** The sealant between the sidewalk and the southeast stairway joint has failed for 4' long and there is a 1.5" high vertical misalignment between the sidewalk and stairwell at the southeast approach. See photo 12.**Date Completed:****Actual Quantity:**

Deteriorated sealant and vertical misalignment at the southeast staircase and southeast approach sidewalk.

## Appendix G: Life Cycle Cost Analysis

Bridge Rehab Alternatives - Life cycle Cost analysis and Summary of Estimated Future Project Costs

Full Replacement Option

Project No. 137-164

Alpha Ave over local roads and Amtrak

Bridge Life Cycle Cost Analysis

$PV = FV / (1 + DR)^N$

PV= Present Value

FV= Future Value at time N

DR= Real Discount Rate =

N= Period (Years)

INPUT

0.78

%

Bridge Costs- 75 Year Life - future projections

$F = P * (1 + i)^N$

P= Present Cost

FV= Future Cost

i = inflation rate

N= Period (Years)

3.00

%

Alternate 1 - Pier Rehabilitation

Item	Present Value	Discount Rate	Period (Years)	Future Value	Notes
Minor Rehabilitation (20-25 Year Service Life)	\$7,500,000.00	0.0000	0	\$0	
Milling & Paving (Year 15)	\$901,273.12	0.0078	15	\$1,012,679	
Deck Patching (Year 15)	\$582,361.09	0.0078	15	\$654,346	
Full Replacement (Year 25)	\$41,679,287.38	0.0078	25	\$50,614,988	
Milling & Paving (Year 35)	\$1,393,522.00	0.0078	35	\$1,829,011	
Milling & Paving (Year 50)	\$1,932,221.41	0.0078	50	\$2,849,539	
Milling & Paving (Year 65)	\$2,679,168.02	0.0078	65	\$4,439,489	
Residual Value	-\$3,103,004.96	0.0078	75	-\$5,557,238	Residual on Full Replacement at Year 45
Total Cost	\$53,564,828.07				

Alternate 2 - Pier Replacement with girder strenthening

Item	Present Value	Discount Rate	Period (Years)	Future Value	Notes
Minor Rehabilitation (50 Year Service Life)	\$8,600,000.00	0.0000	0	\$0	
Milling & Paving (Year 15)	\$901,273.12	0.0078	15	\$1,012,679	
Minor Rehabilitation - Structures & Deck and Mill/Overlay (Year 20)	\$2,195,562.27	0.0078	20	\$2,564,678	
Milling & Paving (Year 35)	\$1,393,522.00	0.0078	35	\$1,829,011	
Full Replacement (Year 50)	\$71,860,800.71	0.0078	50	\$105,976,544	
Milling & Paving (Year 65)	\$2,679,168.02	0.0078	65	\$4,439,489	
Residual Value	-\$2,675,002.80	0.0078	75	-\$4,790,720	Residual on Full Replacement at Year 50
Total Cost	\$84,955,323.32				

Alternate 3 - Piers Replacement with girder strengthening and minor rehabilitations

Item	Present Value	Discount Rate	Period (Years)	Future Value	Notes
Minor Rehabilitation (50 Year Service Life)	\$13,300,000.00	0.0000	0	\$0	
Milling & Paving (Year 15)	\$901,273.12	0.0078	15	\$1,012,679	
Minor Rehabilitation - Structures (Year 20)	\$541,159.71	0.0078	20	\$632,139	
Milling & Paving (Year 35)	\$1,393,522.00	0.0078	35	\$1,829,011	
Full Replacement (Year 50)	\$71,860,800.71	0.0078	50	\$105,976,544	
Milling & Paving (Year 65)	\$2,679,168.02	0.0078	65	\$4,439,489	
Residual Value	-\$2,675,002.80	0.0078	75	-\$4,790,720	Residual on Full Replacement at Year 50
Total Cost	\$88,000,920.77				

Alternate 4 - Full Replacement

Item	Present Value	Discount Rate	Period (Years)	Future Value	Notes
Full Replacement (75 Year Service Life)	\$25,500,000.00	0.0000	0	\$0	
Milling & Paving (Year 15)	\$235,717.58	0.0078	15	\$264,854	
Milling & Paving (Year 30)	\$326,839.88	0.0078	30	\$412,635	
Milling & Paving (Year 45)	\$453,187.69	0.0078	45	\$642,871	
Milling & Paving (Year 60)	\$628,378.28	0.0078	60	\$1,001,573	
Residual Value	\$0.00	0.0078	75	\$0	* Replace in kind
Total Cost	\$27,144,123.43				

Alternate 1 - Pier Rehabilitation

Item	Present Cost	Inflation Rate	Period (Years)	Future Cost
Minor Rehabilitation (20-25 Year Service Life)	\$7,500,000	0.03	0	\$7,500,000
Milling & Paving (Year 15)	\$650,000	0.03	15	\$1,012,679
Deck Patching (Year 15)	\$420,000	0.03	15	\$654,346
Full Replacement (Year 25)	\$24,174,000	0.03	25	\$50,614,988
Milling & Paving (Year 35)	\$650,000	0.03	35	\$1,829,011
Milling & Paving (Year 50)	\$650,000	0.03	50	\$2,849,539
Milling & Paving (Year 65)	\$650,000	0.03	65	\$4,439,489
Total Cost:	\$34,694,000			\$68,900,051

Alternate 2 - Pier Replacement with girder strenthening

Item	Present Cost	Inflation Rate	Period (Years)	Future Cost
Minor Rehabilitation (50 Year Service Life)	\$8,600,000	0.03	0	\$8,600,000
Milling & Paving (Year 15)	\$650,000	0.03	15	\$1,012,679
Minor Rehabilitation - Structures & Deck and Mill/Overlay (Ye	\$1,420,000	0.03	20	\$2,564,678
Milling & Paving (Year 35)	\$650,000	0.03	35	\$1,829,011
Full Replacement (Year 50)	\$24,174,000	0.03	50	\$105,976,544
Milling & Paving (Year 65)	\$650,000	0.03	65	\$4,439,489
Residual Value	\$0	0.03	75	\$0
Total Cost:	\$36,144,000			\$124,422,400

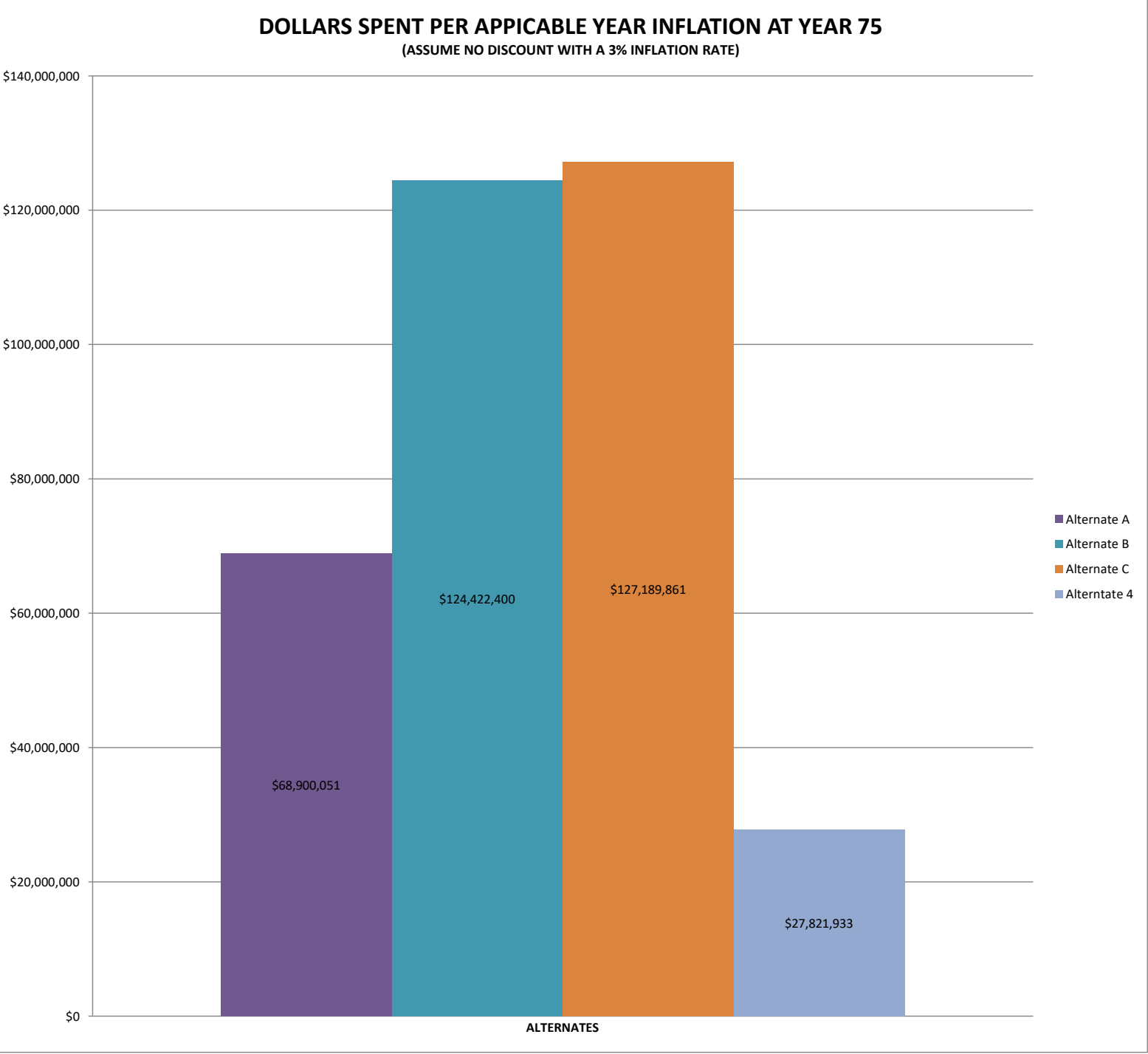
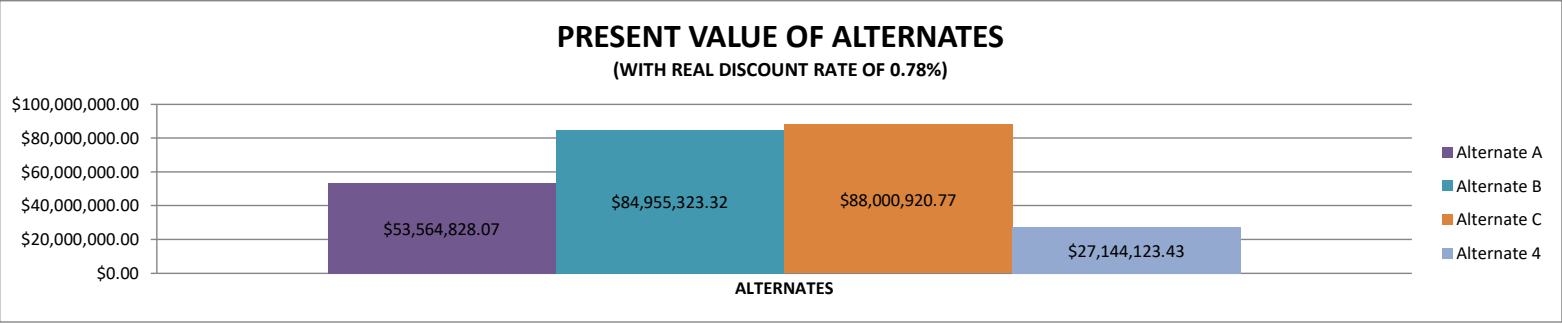
Alternate 3 - Piers Replacement with girder strengthening and minor rehabilitations

Item	Present Cost	Inflation Rate	Period (Years)	Future Cost
Minor Rehabilitation (50 Year Service Life)	\$13,300,000	0.03	0	\$13,300,000
Milling & Paving (Year 15)	\$650,000	0.03	15	\$1,012,679
Minor Rehabilitation - Structures (Year 20)	\$350,000	0.03	20	\$632,139
Milling & Paving (Year 35)	\$650,000	0.03	35	\$1,829,011
Full Replacement (Year 50)	\$24,174,000	0.03	50	\$105,976,544
Milling & Paving (Year 65)	\$650,000	0.03	65	\$4,439,489
Residual Value	\$0	0.03	75	\$0
Total Cost:	\$39,774,000			\$127,189,861

Alternate 4 - Full Replacement

Item	Present Cost	Inflation Rate	Period (Years)	Future Cost
Full Replacement (75 Year Service Life)	\$25,500,000	0.03	0	\$25,500,000
Milling & Paving (Year 15)	\$170,000	0.03	15	\$264,854
Milling & Paving (Year 30)	\$170,000	0.03	30	\$412,635
Milling & Paving (Year 45)	\$170,000	0.03	45	\$642,871
Milling & Paving (Year 60)	\$170,000	0.03	60	\$1,001,573
Residual Value	\$0	0.03	75	\$0
Total Cost:	\$26,180,000			\$27,821,933





Bridge Rehab Alternatives - Life cycle Cost analysis and Summary of Estimated Future Project Costs

Super Replacement Option

Project No. 137-164    Alpha Ave over local roads and Amtrak

Bridge Life Cycle Cost Analysis

$$PV = FV / (1 + DR)^N$$

INPUT

PV= Present Value  
FV= Future Value at time N  
DR= Real Discount Rate    =    0.78 %  
N= Period (Years)

Bridge Costs- 75 Year Life - future projections

$$F = P * (1 + i)^N$$

P= Present Cost  
FV= Future Cost  
i = inflation rate    3.00 %  
N= Period (Years)

Alternate 1 - Pier Rehabilitation

Item	Present Value	Discount Rate	Period (Years)	Future Value	Notes
Minor Rehabilitation (20-25 Year Service Life)	\$7,500,000.00	0.0000	0	\$0	
Milling & Paving (Year 15)	\$901,273.12	0.0078	15	\$1,012,679	
Deck Patching (Year 15)	\$582,361.09	0.0078	15	\$654,346	
Full Replacement (Year 25)	\$41,679,287.38	0.0078	25	\$50,614,988	
Milling & Paving (Year 35)	\$1,393,522.00	0.0078	35	\$1,829,011	
Milling & Paving (Year 50)	\$1,932,221.41	0.0078	50	\$2,849,539	
Milling & Paving (Year 75)	\$3,331,414.40	0.0078	75	\$5,966,302	
Residual Value	-\$3,103,004.96	0.0078	75	-\$5,557,238	Residual on Full Replacement at Year 45
Total Cost	\$54,217,074.44				

Alternate 1 - Pier Rehabilitation

Item	Present Cost	Inflation Rate	Period (Years)	Future Cost
Minor Rehabilitation (20-25 Year Service Life)	\$7,500,000	0.03	0	\$7,500,000
Milling & Paving (Year 15)	\$650,000	0.03	15	\$1,012,679
Deck Patching (Year 15)	\$420,000	0.03	15	\$654,346
Full Replacement (Year 25)	\$24,174,000	0.03	25	\$50,614,988
Milling & Paving (Year 35)	\$650,000	0.03	35	\$1,829,011
Milling & Paving (Year 50)	\$650,000	0.03	50	\$2,849,539
Milling & Paving (Year 75)	\$650,000	0.03	75	\$5,966,302
Total Cost:	\$34,694,000			\$70,426,864

Alternate 2 - Pier Replacement with girder strenthening

Item	Present Value	Discount Rate	Period (Years)	Future Value	Notes
Minor Rehabilitation (50 Year Service Life)	\$8,600,000.00	0.0000	0	\$0	
Milling & Paving (Year 15)	\$901,273.12	0.0078	15	\$1,012,679	
Minor Rehabilitation - Structures & Deck and Mill/Overlay (Year 20)	\$2,195,562.27	0.0078	20	\$2,564,678	
Milling & Paving (Year 35)	\$1,393,522.00	0.0078	35	\$1,829,011	
Super/Deck Replacement (Year 50)	\$38,882,240.15	0.0078	50	\$57,341,491	
Milling & Paving (Year 65)	\$2,679,168.02	0.0078	65	\$4,439,489	
Residual Value	-\$1,447,383.00	0.0078	75	-\$2,592,149	Residual on Full Replacement at Year 50
Total Cost	\$53,204,382.56				

Alternate 2 - Pier Replacement with girder strenthening

Item	Present Cost	Inflation Rate	Period (Years)	Future Cost
Minor Rehabilitation (50 Year Service Life)	\$8,600,000	0.03	0	\$8,600,000
Milling & Paving (Year 15)	\$650,000	0.03	15	\$1,012,679
Minor Rehabilitation - Structures & Deck and Mill/Overlay (Yea	\$1,420,000	0.03	20	\$2,564,678
Milling & Paving (Year 35)	\$650,000	0.03	35	\$1,829,011
Super/Deck Replacement (Year 50)	\$13,080,000	0.03	50	\$57,341,491
Milling & Paving (Year 65)	\$650,000	0.03	65	\$4,439,489
Residual Value	\$0	0.03	75	\$0
Total Cost:	\$25,050,000			\$75,787,347

Alternate 3 - Piers Replacement with girder strengthening and minor rehabilitations

Item	Present Value	Discount Rate	Period (Years)	Future Value	Notes
Minor Rehabilitation (50 Year Service Life)	\$13,300,000.00	0.0000	0	\$0	
Milling & Paving (Year 15)	\$901,273.12	0.0078	15	\$1,012,679	
Minor Rehabilitation - Structures (Year 20)	\$541,159.71	0.0078	20	\$632,139	
Milling & Paving (Year 35)	\$1,393,522.00	0.0078	35	\$1,829,011	
Super/Deck Replacement (Year 50)	\$38,882,240.15	0.0078	50	\$57,341,491	
Milling & Paving (Year 65)	\$2,679,168.02	0.0078	65	\$4,439,489	
Residual Value	-\$1,447,383.00	0.0078	75	-\$2,592,149	Residual on Full Replacement at Year 50
Total Cost	\$56,249,980.00				

Alternate 3 - Piers Replacement with girder strengthening and minor rehabilitations

Item	Present Cost	Inflation Rate	Period (Years)	Future Cost
Minor Rehabilitation (50 Year Service Life)	\$13,300,000	0.03	0	\$13,300,000
Milling & Paving (Year 15)	\$650,000	0.03	15	\$1,012,679
Minor Rehabilitation - Structures (Year 20)	\$350,000	0.03	20	\$632,139
Milling & Paving (Year 35)	\$650,000	0.03	35	\$1,829,011
Super/Deck Replacement (Year 50)	\$13,080,000	0.03	50	\$57,341,491
Milling & Paving (Year 65)	\$650,000	0.03	65	\$4,439,489
Residual Value	\$0	0.03	75	\$0
Total Cost:	\$28,680,000			\$78,554,808

Alternate 4 - Full Replacement

Item	Present Value	Discount Rate	Period (Years)	Future Value	Notes
Full Replacement (75 Year Service Life)	\$25,000,000.00	0.0000	0	\$0	
Milling & Paving (Year 15)	\$235,717.58	0.0078	15	\$264,854	
Milling & Paving (Year 30)	\$326,839.88	0.0078	30	\$412,635	
Milling & Paving (Year 45)	\$453,187.69	0.0078	45	\$642,871	
Milling & Paving (Year 60)	\$628,378.28	0.0078	60	\$1,001,573	
Residual Value	\$0.00	0.0078	75	\$0	* Replace in kind
Total Cost	\$26,644,123.43				

Alternate 4 - Full Replacement

Item	Present Cost	Inflation Rate	Period (Years)	Future Cost
Full Replacement (75 Year Service Life)	\$25,500,000	0.03	0	\$25,500,000
Milling & Paving (Year 15)	\$170,000	0.03	15	\$264,854
Milling & Paving (Year 30)	\$170,000	0.03	30	\$412,635
Milling & Paving (Year 45)	\$170,000	0.03	45	\$642,871
Milling & Paving (Year 60)	\$170,000	0.03	60	\$1,001,573
Residual Value	\$0	0.03	75	\$0
Total Cost:	\$26,180,000			\$27,821,933

