# SUMMARY OF ESTIMATED QUANTITIES

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**REHABILITATION OVERVIEW**

Rehabilitation consists of:
1. Replace truss diagonal members.
2. Repair truss roller bearings.
3. Replace Span 1 girder bearings.
4. Miscellaneous repairs to Span 1, Span 2 and Span 3 floor systems.
5. Replace existing bridge siding.
6. Replace existing traffic railings.
7. Repair existing longitudinal gusset plate.
8. Clean and paint all metal elements.
9. Replace existing bridge lighting.

See detail sheets for specific requirements.

**KEY TO SCHEMATIC OF REPAIRS**

1. Replace sub-tie diagonals (12 locations, truss span).
2. Replace plate girder bearings (14 locations, Span 1).
3. Replace end floor beam (Span 1).
4. Replace web plate in sidewalk cantilever beam (1 location, Span 1).
5. Repair truss roller bearings (12 locations).
6. Repair vertigons (2 locations in truss span as determined by the Engineer).
7. Repair sidewalk cantilever beam connection to truss (1 location as determined by the Engineer).
8. Repair flanges in sidewalk cantilever beams (115 locations, truss span).
9. Replace stringers (11 location as determined by the Engineer, truss span).
10. Replace gusset plate pin nuts (12 locations, cantilever girder face as shown, and as determined by the Engineer).
11. Repair plate gusset ends (2 locations, Span 3).
12. Heat-straighten lower lateral bracing (4 locations per detail sheets, Spans 1 & 3).

*Locations of repairs to be determined by the Engineer.*

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**EXISTING UTILITIES**

All existing utilities will be removed from the bridge or be disconnected by the utility owner. See "Existing Utility Location Details" sheets, and Special Provision "Important Notice to Contractors" for the locations of utilities. The status of utility lines will be verified by the Contractor. The Contractor is responsible for determining the status and labelling of utilities left in place during construction.

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**WASHINGTON AVENUE BRIDGE**

<table>
<thead>
<tr>
<th>BRIDGE LOCATION</th>
<th>TOLL/STREET (%)</th>
<th>OWNER (agency)</th>
<th>PROJECT #</th>
<th>YEAR LAID</th>
<th>CONTRACTOR</th>
<th>CONSTRUCTION</th>
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**PLAN - SPAN 1**

(North Approach Span)

**PLAN - SPAN 2**

(Truss Span)

**PLAN - SPAN 3**

(South Approach Span)

**ELEVATION - LEFT TRUSS (LOOKING SOUTH EAST)**

**ELEVATION - LEFT TRUSS (LOOKING NORTH EAST)**

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[Diagrams and details of bridge components showing specific repair locations and details.]

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[Signature and approval stamp: C.S. Mair, C.E.]

[Stamp and date: Texas Department of Transportation, Bridge Division. WASHINGTON AVENUE BRIDGE. C.S. Mair, C.E. G-24-08]
REMOVING RAILING AND DECK PANELS:
EXISTING DECK PANELS TO BE REMOVED CONSISTS OF THE CONCRETE ROADWAY AND SIDEWALK SLAB BETWEEN FLOORDIAGS, RAILING TO BE REMOVED CONSISTS OF THE EXISTING TRAFFIC RAIL, TO BE REMOVED AND REPLACED; AND THE EXISTING PEDESTRIAN RAIL, TO BE REMOVED, RESTORED AND RE-INSTALLED. REMOVE EXISTING RAILING AND DECK PANELS IN THE SEQUENCE SHOWN PRIOR TO REPLACE TRUSS MEMBERS.

AFTER REMOVING THE RAILINGS AND UTILITIES TO THE LIMIT OF THE CONSTRUCTION PHASE, REMOVE THE CONCRETE PANELS BEGINNING WITH THE PANELS NEAREST THE CENTER OF THE TRUSS SPAN.

REMOVE PANELS IN PAIRS SYMMETRIC ABOUT THE CENTER OF THE SPAN BEFORE PROCEEDING TO ADJACENT PANELS.

DECK PANELS LEFT IN PLACE OUTSIDE THE LIMITS OF A CONSTRUCTION PHASE MAY BE USED TO PROVIDE TEMPORARY CONSTRUCTION ACCESS.

AFTER REMOVING THE BRIDGE RAIL AND DECK PANELS FOR A PHASE OF CONSTRUCTION, REPLACE THE TRUSS MEMBERS AS SHOWN IN THE PLANS.

DO NOT REMOVE PANELS IN A SUBSEQUENT PHASE OF CONSTRUCTION UNTIL AFTER WORK IN THE PREVIOUS PHASE IS COMPLETE.

DECK REMOVAL SEQUENCE:

PHASE 1
REMOVE BRIDGE RAIL AND CONCRETE DECK FROM L5 TO L3, REPLACING SUB-TIE DIAGONALS UR-MT AND UR-MF, LEFT AND RIGHT TRUSS.
PRIOR TO REMOVING SUB-TIE DIAGONAL UR-MF, LEFT TRUSS ONLY, REMOVE EXISTING RETROFIT HARDWARE FROM THE ADJACENT COUNTER DIAGONAL (UR - MR, LEFT TRUSS), SET HARDWARE ASIDE FOR RE-USE, RE-INSTALL RETROFIT HARDWARE AFTER SUB-TIE REPLACEMENT AT UR IS COMPLETE;

PHASE 2
REMOVE BRIDGE RAIL AND CONCRETE DECK FROM L5 TO L3 AND FROM L7 TO L11, REPLACE SUB-TIE DIAGONALS UR-MS AND UR-MS', LEFT AND RIGHT TRUSS.

PHASE 3
REMOVE BRIDGE RAIL AND CONCRETE DECK FROM L5 TO L3 AND FROM L7 TO L11, REPLACE SUB-TIE DIAGONALS UR-M3 AND UR-M3', LEFT AND RIGHT TRUSS.

PHASED REMOVAL OF DECK AND RAILING
UNSTRESS THE SUB-TIE DIAGONALS

REMOVE TENSION IN THE SUB-TIE BY APPLYING AN UPWARD FORCE TO THE INTERMEDIATE FLOORBEAM BELOW THE SUB-TIE. SEE SCHEMATIC, SHEET 2 OF 9.

PROVIDE A DESIGN FOR THE TEMPOARY BEAM, THE TEMPORARY HANGER AND FOR ANY TEMPORARY BRACING, BEARINGS, SADDLES OR BLOCKING REQUIRED TO PREVENT BUCKLING OF THE EXISTING FLOORBEAM. PROVIDE GAUGES FOR MEASURING THE FORCES APPLIED TO THE FLOORBEAMS CONTINUOUSLY DURING THE APPLICATION OF FORCE.

PROVIDE LIFTING EQUIPMENT WITH GAUGE CELLS, LOAD CELLS OR SIMILAR MEANS OF MEASURING A CONTINUOUS READ-OUT OF THE LOAD APPLIED TO THE INTERMEDIATE FLOORBEAM.

SUBMIT THE DESIGN AND A LOADING PLAN INCLUDING THE CONSTRUCTION LOADS AND POINTS OF APPLICATION TO THE ENGINEER OF RECORD FOR APPROVAL.

INSTALL TEMPORARY BEAMS ON BOTH SIDES OF THE ROADDWAY AND APPLY THE FORCES SYMMETRICALLY AND SIMULTANEOUSLY TO THE LEFT TRUSS AND THE RIGHT TRUSS.

UNSTRESS THE SUB-TIE DIAGONALS BY APPLYING THE LIFTING FORCE SHOWN TO THE INTERMEDIATE FLOORBEAM.

<table>
<thead>
<tr>
<th>TABLE OF TEMPORARY FORCES</th>
<th>APPLIED TO FLOORBEAMS (KIPS)</th>
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<tr>
<td>3</td>
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F - THEORETICAL UPLIFT APPLIED TO EACH TRUCK AT INTERMEDIATE FLOORBEAM TO UNSTRESS THE SUB-TIE DIAGONALS

R - THEORETICAL REACTION ON ADJACENT FLOORBEAM

FORCES ARE BASED ON CALCULATED UNFACTORED DEAD WEIGHT OF EXISTING DECK PLUS THE CONCRETE DECK IN PLACE DURING THE CONSTRUCTION PHASE INDICATED.

ADJUST FORCES AS NEEDED FOR SELF WEIGHT OF BEAMS, JACKS AND OTHER CONSTRUCTION LOADS.

SUBMIT ESTIMATED CONSTRUCTION LOADS TO THE ENGINEER OF RECORD FOR A REVISED ESTIMATE OF THEORETICAL FORCES IN MEMBERS DUE TO CONSTRUCTION LOADS.

REPLACE TRUSS MEMBERS

WASHINGTON AVENUE BRIDGE

PART SECTION AT ADJACENT FLOORBEAM

UNSTRESS THE SUB-TIE DIAGONALS
UNSTRESS THE PRIMARY DIAGONALS:

FABRICATE THE TEMPORARY PIN STRAPS.

PREPARE THE ACCESS OPENING IN THE TOP CHORD AT THE
UPPER NODE OF THE PRIMARY DIAGONAL. SEE SHEET 7 OF 9
FOR ACCESS DETAILS.

CUT END PLATE ON UPPER POST AND LOWER POST AS SHOWN
TO PERMIT INSTALLATION OF PIN STRAPS.

INSTALL TEMPORARY PIN STRAPS ON THE MIDDLE AND
LOWER POSTS AT THE END OF THE PRIMARY DIAGONAL.

RE-INSTALL SPICE PLATES AT THE ACCESS OPENING.

TENSION THE RODS WITHIN THE LIMITS SHOWN IN TABLE 5.
AS TO REMOVE TENSION FROM THE PRIMARY DIAGONAL EYEBARS.

RE-CHECK THE SUB-TIE TO ENSURE NO TENSION. WHEN
THE PRIMARY DIAGONAL AND SUB-TIE ARE IN A CONDITION
OF NO TENSION, THE PIN NUT, PRIMARY DIAGONALS AND SUB-TIE
EYEBAR MAY BE REMOVED FROM THE PIN.

INSTALL NEW SUB-TIE ON THE PIN. RE-INSTALL THE EXISTING
PRIMARY DIAGONAL EYEBARS AND PIN NUT ON THE PIN.

PROVIDE A SEQUENCE AND SCHEDULE FOR INSTALLING THE
NEW SUB-TIE EYEBAR TO THE ENGINEER OF RECORD FOR APPROVAL.

MINIMUM, AS MUCH AS POSSIBLE, THE TIME THE PRIMARY
DIAGONAL IS DISCONNECTED FROM THE PIN.

### TABLE OF TEMPORARY FORCES

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<tr>
<td>3</td>
<td>129</td>
<td>U2-L6</td>
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**T1 - THEORETICAL TENSION IN THE UPPER DIAGONAL**

**T2 - THEORETICAL TENSION IN THE LOWER DIAGONAL**

**FORCES ARE BASED ON CALCULATED UNFACTORED DEAD WEIGHT OF EXISTING STEEL PLUS THE CONCRETE DECK IN PLACE FOR THE INTERPOLATED PHASE INDICATED.**

ADJUST AS NEEDED FOR SELF-WEIGHT OF BEAMS, JACKS AND OTHER CONSTRUCTION LOADS.

SUBMIT ESTIMATED CONSTRUCTION LOADS TO THE ENGINEER OF RECORD FOR A REVISED ESTIMATE OF THEORETICAL FORCES IN MEMBERS DUE TO CONSTRUCTION LOADS.

### TEMPORARY PIN STRAP INSTALLATION SCHEMATIC

**EXISTING PRIMARY DIAGONALS**

To be temporarily disconnected as noted.

Weights are given for individual eyebars.

**EXISTING PRIMARY DIAGONAL FORCES**

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<td>3</td>
<td>129</td>
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</table>

**FOR INFORMATION ONLY.**

**UPPER TABLE FORCES ARE BASED ON CALCULATED UNFACTORED DEAD WEIGHT OF EXISTING STEEL.**

**LOWER TABLE FORCES ARE BASED ON CALCULATED UNFACTORED DEAD WEIGHT OF EXISTING STEEL AND CONCRETE DECK IN PLACE DURING THE INDICATED PHASE OF CONSTRUCTION,**

**BUT PRIOR TO APPLICATION OF ANY TEMPORARY FORCES.**

**UNSTRESS THE SUB-TIE DIAGONALS**

**WASHINGTON AVENUE BRIDGE**

**Cevilla**

**6-13-08**
EXISTING SPlice PLATE
Remove rivets. Clean and prime contact surfaces prior to re-installation.

TEMPORARY ACCESS OPENING DETAIL

REMOVE EXISTING SUB-TIE:
Prepare the access opening in the top chord at the upper node of the sub-tie diagonal to be removed. Remove the existing splice plate and retain for re-installation.

To be removed. See Sheet 9 of 9 for new eye bar details.

24 EXISTING SUB-TIE DIAGONALS

FIRST CUT
SECOND CUT
THIRD CUT

REPLACE TRUSS MEMBERS
WASHINGTON AVENUE BRIDGE

REPLACE UPPER SUB-TIE CONNECTION

3'-0' Max
1'-3' Max
Cut, Spay and Remove
INSTALL NEW EYEBAR UPPER CONNECTION

INSTALL NEW EYEBAR UPPPER CONNECTION

FABRICATE NEW ADJUSTABLE SUB-TIE EYEBARS. UPPER LOOPS IS TO BE FIELD MOLDED TO THE BAR TO PERMIT INSTALLATION. PROVIDE PUNCH MARKS AS SHOWN TO VERIFY FITUP IN THE FIELD. SEE SHEET 6 OF 9 FOR DETAILS.

INSTALL THE LOOP FOR UPPER CONNECTION THROUGH THE ACCESS OPENING. SEAT THE LOOP ON THE PIN. SECURE THE BAR FOR THE UPPER CONNECTION IN PLACE AND IN ALIGNMENT WITH PUNCH MARKS. FIELD WELD THE UPPER CONNECTION.

THE CONTRACTOR MAY DETERMINE THE ORDER OF INSTALLATION OF THE UPPER CONNECTION, LOWER CONNECTION, AND SLEEVE NUTS. AFTER INSTALLATION OF ALL PARTS OF THE NEW SUB-TIE, ADJUST THE SLEEVE NUT TO REMOVE SLEEK.


AFTER THE INSTALLATION OF THE SECOND EYEBAR IS COMPLETE, RE-INSTALL THE SPLIT PLATE. REPLACE RIVETS WITH ASTM 4325 BOLTS OF THE SAME DIAMETER AS THE ORIGINAL RIVETS.

AFTER RE-INSTALLATION OF THE SPLIT PLATE, MOVE TO SUB-TIE IN THE OPPOSITE TRUSS. DO NOT RELAX THE TIMBERS FORCES ON THE FIRST SUB-TIE BEFORE THE SUB-TIE ON THE OPPOSITE TRUSS HAS BEEN REPLACED AND THE SPLIT PLATE HAS BEEN RE-INSTALLED.

AFTER INSTALLATION OF BOTH SUB-TIES (14 EYEBARS) IS COMPLETE RELEASE TEMPORARY FORCES ON BOTH TRUSSES SYMMETRICALLY AND SIMULTANEOUSLY.

RE-INSTALL EXISTING SPLICE PLATE

FIELD WELD DETAIL
SEQUENCE OF WORK:

1. REMOVE THE BRIDGE DECK.
2. INSTALL SHORING AT ABUTMENT NO. 1.
3. REMOVE LATERAL BRACING AT ABUTMENT NO. 1.
4. REMOVE THE END FLOORBEAM AT ABUTMENT NO. 1. SEE SHEET 2 OF 9 FOR DETAILS.
5. INSTALL NEW END FLOORBEAM.
6. INSTALL NEW SLIDING ELASTOMERIC BEARINGS AT PIER NO. 2. SEE SHEET 6 OF 9 FOR DETAILS.
7. CLEAN AND LUBRICATE EXISTING SIDEWALK STRINGER BEARINGS. SEE SHEET 5 OF 9 FOR DETAILS.
8. RE-INSTALL LATERAL BRACING AT ABUTMENT NO.1.
9. INSTALL SHORING AT PIER NO. 2.
10. INSTALL NEW SLIDING ELASTOMERIC BEARINGS AT PIER NO. 2. SEE SHEET 6 OF 9 FOR DETAILS.
11. CLEAN, REPAIR, AND LUBRICATE TRUSS ROLLER BEARINGS AT PIER NO. 2. SEE SHEET 6 OF 9 FOR DETAILS.
12. REPAIR CANTILEVER BEAM WEB & STRAIGHTEN LATERAL BRACING. SEE SHEET 9 OF 9 FOR DETAILS.
13. PROCEED TO SPAN 3 REPAIRS.

TABLE OF ESTIMATED QUANTITIES

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<th>REPAIR STEEL BRIDGE MEMBERS</th>
<th>SLIDING ELASTOMERIC BEARINGS</th>
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GENERAL NOTES:

Submit a survey plan to the Engineer of Record for supporting the warranty of preliminarily designed lateral bracing at the conclusion of construction. Include a check of actual building of existing members or provide data supporting the abandoning of preliminary bracing. A working drawing for confirming the accuracy of the lateral bracing. 

Where existing lateral bracing is indicated in the plans, use Prebure 1999 lubricant suitable for use with the manufacturer's recommendations. Contact the manufacturer, Grijalva, Inc., at (913) 420-8900 for information on local lubricants.

Field verify all dimensions before ordering materials.

FLOORBEAM REPLACEMENT

Payment for temporary bracing and handling of existing grinders and grinders is not included in this repair. Payment for this work is provided in Item 443 for "Repair Steel Bridge Members, Lateral Bracing - New." 

NEW ELASTOMERIC BEARINGS

Use sliding bearings meeting the requirements of Item 443.2 (a) "Sliding Elastomeric Bearings". 

Price bid for "Sliding Elastomeric Bearings" includes payment for temporary bracing and handling of existing grinders, and for cleaning and lubricating existing grinders, as well as the new bearings, and for lubricating existing grinders.

CLEAN, REPAIR, AND LUBRICATE TRUSS BEARINGS

Price bid for "Repair Steel Bridge Members (Bearings)" includes payment for cleaning and lubricating existing grinders.

CANTILEVER WEB REPLACEMENT

Payment for temporary bracing and handling of existing grinders is included in Item 443.2 (b) "Repair Steel Bridge Members, Cantilever Web".

LOWER LATERAL BRACING

Payment for cleaning and lubricating existing grinders is included in Item 443.2 (c) "Repair Steel Bridge Members, Lower Lateral Bracing".

Sheet 1 of 9

Texas Department of Transportation
Bridge Division
WASHINGTON AVENUE BRIDGE

SPAN 1 REPAIR DETAILS

* * *

CEWAL 08-25-08
**EXISTING WEB STIFFENER AND FILL PLATE**

For information only.

**EXISTING CONNECTION ANGLE**

For information only.

**EXISTING END FLOORBEAM DETAILS**

**FLOORBEAM REPLACEMENT**

Replace the floorbeam of equipment No. 1 with new web material of the same size as the original. Match the existing end floorbeam with new external stiffeners and fill plates, and web stiffeners. Replace flutes with bolts of the same size. Snore the longitudinal girders prior to beginning replacement.

With the approval of the Engineer, the Contractor may elect to replace original flanges with new external stiffeners, if the existing flanges cannot be straightened properly.

Field verify all dimensions before ordering materials.

**FLOORBEAM REPLACEMENT SEQUENCE**

1. Remove floorbeam.
2. Remove Connection Angles, Web Stiffeners, and Fill Plates from the floorbeam.
3. Fabricate new web.
5. Install new floorbeam and reconnect lateral bracing.

**FLOORBEAM ELEVATION**

**NEW END FLOORBEAM DETAILS**
BEARING REPLACEMENT (TYPE TR1)
Replace existing girder roller bearings at Abutment No. 1 with new Type TR1 sliding bearings as shown.
Shore girders during bearing replacement.
Provide an upward locking force at each girder bearing sufficient to unload the bearings without lifting the girders. The dead load reaction at each girder bearing is 65 kips.

BEARING REPLACEMENT SEQUENCE
1. Remove existing girder roller bearing.
2. Clean and dry existing base plate and upper bearing plate.
3. Install new lower plate assembly and TR1 elastomeric pad on existing base plate as shown.
4. Install new upper plate assembly on existing bearing plate as shown.

Shore girders to maintain existing girder erection. Check verified depth of bearing from bearing surface of base plate to bearing surface of upper bearing plate. Verify that the total depth of the new TR1 bearing is equal to the required bearing depth.

NEW GIRDER BEARING AT ABUTMENT NO. 1
Type TR1 Bearings consist of a new Upper Plate Assembly, a new Elastomeric Bearing Pad, and a new Lower Plate Assembly.

EXISTING ROLLER BEARING DETAILS

Sheet 3 of 9

SPAN 1 REPAIR DETAILS
WASHINGTON AVE. BRIDGE

Texas Department of Transportation
Bridge Division

6-25-08
UPPER PLATE ASSEMBLY DETAIL

TRI Elastomeric Pad not shown. Place pad within retaining bars prior to bearing installation.

TRI BEARING DETAILS

DETAIL A

TRI INSTALLATION DETAILS

Sheet 4 of 9

WASHINGTON AVENUE BRIDGE

TEXAS DEPARTMENT OF TRANSPORTATION

SPAN 1 REPAIR DETAILS

DURIO 70

ELASTOMERIC PAD DETAIL

Pod is 11" x 11"

(2) Bond PTFE to 1/8" plate with an approved adhesive.

(3) Steel for 1/8" plate must conform to ASTM A36. Vulcanize plate to elastomer. Paint plate in the shop with System E1 in accordance with Item 446. No paint is permitted in recess or on PTFE.
CLEANING AND LUBRICATING SIDEWALK STRINGER BEARINGS

Remove the existing utilities from between the abutment (both) and sidewalk stringer ends. See "Existing Utility Location Detail" sheets and Special Provision "Important Notice to Contractors" for information on the Contractor's responsibilities regarding utilities left in place during construction.

Ensure the existing bearing surfaces between the existing sidewalk stringers and the bearing plate are free to slide.

Clean the stringer ends, bearing surfaces, and surrounding areas with a Class 5 water blast. Dry thoroughly and lubricate the bearing surfaces of the sidewalk stringers, Stringer Bearing Plate (PL 7/16). Do not apply lubricant to the inside of the Stringer Bearing Plate or within 1 ft of the stringers. Apply the lubricant to the uncoated areas of bearing plate. Protect the lubricated surfaces from blast and paint during cleaning and painting. Do not cause the stringer flange to the bearing plate. Reapply lubricant as needed after painting.

ELEVATION

(SHOWING OUTSIDE STRINGER AT SIDEWALK/ABUTMENT)

SIDEWALK STRINGER BEARINGS
CLEAN, REPAIR, AND LUBRICATE TRUSS ROLLER BEARINGS

Prior to making repairs or ordering materials, waterblast clean the truss rollers, bearing bars, masonry plate and pier cap plate, and field verify all dimensions.

Remove the existing lateral restraint from the roller bearings as shown. Existing lateral restraint will consist of the upper retainer angle, and the lower retainer angle and plate. Remove lateral restraint from each side of each truss roller bearing.

Cut the existing upper bearing plate as shown. Do not damage the rollers during cutting. Use thermal cutting in accordance with Texas DOT "Steel Structures" Section 441.31.1.1.

Re-clean the rollers, bearing bars and masonry plate with a Class 2 waterblast. Thoroughly dry the area. Apply a preservative lubricant to the rollers, bearing bars and masonry plate. See General Notes for preservative lubricant requirement. After the lubricant has air dried, protect the lubricated surfaces from dust and debris during construction.

Fabricate and shop paint the new lateral restraint.

Drill through the pier cap plate and install adhesive anchors for the new lateral restraint. Size adhesive anchor holes per the manufacturer's guidelines to the depth shown. Drill holes with proper sized anchor drill. Use proper anchor equipment. Use Type III C-16 neat epoxy meeting the requirements of ASTM D4947, "Epoxy Resins and Adhesives," using a two-component, epoxy based system supplied in the manufacturer's standard dual cartridge and dispensed through a static-mixing nozzle supplied by the manufacturer. Install per the anchor adhesive manufacturer's instructions.

BEARING REPAIR SEQUENCE

1. Clean roller bearings and verify dimensions.
2. Remove existing lateral restraint.
3. Cut upper bearing plate.
4. Clean, lubricate and cover roller bearing.
5. Install new lateral restraint.

NEW LATERAL RESTRAINT DETAIL

Install two lateral restraints at each bearing.
EXISTING GIRDER BEARING AT PIER NO. 2

BEARING REPLACEMENT (TYPE TR2)
Replace existing girder roller bearings of Pier No. 2 with new Type TR2 sliding bearings as shown.
Shore girders during bearing replacement.
Provide an upward loading force on each girder bearing surface to unload the bearings.
Provide appropriate support to prevent girder movement. The total load reaction at each girder bearing is 65 kips.

BEARING REPLACEMENT SEQUENCE:
1. Remove existing girder roller bearing and upper bearing plates.
2. Clean and dry existing girder bearing castings.
3. Install new lower retaining plate and TR2 elastomeric pad on existing casting as shown.
4. Install new upper bearing plate assembly.

NEW GIRDER BEARING AT PIER NO. 2
Type TR2 Bearings consist of a new Upper Plate Assembly, a New Elastomeric Bearing, and a New Lower Retaining Plate.
CANTILEVER WEB REPAIRS

Replace the cantilever web with a new plate of the same size as the original. Match existing dimensions and rivet hole spacing. Reinstall beam using the original flanges and cill angles. Replace rivets with bolts of the same size.

The Engineer may elect to replace flanges with new material if excessive corrosion is present. When directed by the Engineer to replace flanges, match existing dimensions and rivet hole spacing. Bend bottom flange by heat-curving in accordance with Item 441, "Steel Structures".

Field verify all dimensions before ordering materials.

CANTILEVER WEB REPAIR SEQUENCE

1. Remove stringers in adjacent bays.
2. Remove the web connection angle rivets and separate the cantilever beam from the longitudinal girder.
3. Remove the flange angles and cill angles from the web.
4. Fabricate new web.
5. Bolt up flanges and cill angles.
6. Reinstall cantilever beam and stringers in adjacent bays.

SECTION A-A

NEW WEB DETAIL

PL 7½" 1'-2" s 5'-8" s 1'-0" s
5'-10" t 7'-10" t

TOP FLANGE

(12L 3 ½" x 2 7/8" x ¾"
Matching angles are opposite hand)

BOTTOM FLANGE

(12L 3 ½" x 2 7/8" x ¾"
Matching angles are opposite hand)

EXISTING CANTILEVER BEAM

EXISTING FLANGE DETAILS

(Span 1 Repair Details)

For Information Only

CANTILEVER WEB REPAIRS

WASHINGTON AVENUE BRIDGE

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Texas Department of Transportation
Bridge Division

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C2E00982

C2E00982-01
SEQUENCE OF WORK:

1. REMOVE THE BRIDGE DECK.
2. INSTALL SHORING AT PIER NO. 3.
3. REPAIR THE LONGITUDINAL GIDER ENDS.
4. STRAIGHTEN LATERAL BRACING.
5. PROCEED TO SPAN 2 REPAIRS.

GENERAL NOTES:

Submit a shoring plan to the Engineer of Record for support of the longitudinal girders prior to beginning Span 3 repairs.

Prior to beginning work, submit a procedure for removing rivets and provide a demonstration of the method to the Engineer of Record to determine its suitability. A new fastener can damage the connected metal and will not be approved.

When removal of existing rivets or bolts is indicated in the plans, replace with ASTM A325 bolts of the same diameter as the original fastener.

When metal contact surfaces are exposed by the removal of rivets, clean the surfaces and subject the repaired or replaced areas to painting, as specified in the contract documents.

Payment for this work is subject to Item 464, "Cleaning and Painting Steel."

Field verify all dimensions before ordering materials.

REPAIR GIRDER ENDS

Payment for temporary shoring of longitudinal girders and stringers is subsidiary to Item 784, "Repair Steel Bridge Members (Gider Ends)."

LOWER LATERAL BRACING

Heat-straighten indicated lower lateral bracing members in accordance with Item 784, "Repairing Steel Bridge Members."

Payment for heat-straightening lower lateral bracing is at the lump sum price bid for Item 784, "Repairing Steel Bridge Members (Lateral Bracings)."
GIRDER END REPAIR

The dead load reaction on each bearing is 38 kips due to self-weight of existing steel only.

Replace bottom flange angles at Pier No. 3 bearing connection with new angles. E Replace existing dimensions and rivet bolt hole pads. Reconstruct the girder end bearing connection angles, web stiffeners, bearing plates, and anchor bolts.

The Engineer may elect to replace the original connection angles, web stiffeners, bearing plates, or anchor bolts if excessive corrosion is present. When directed by the Engineer to replace additional sections, match existing dimensions and rivet bolt spacing.

GIRDER END REPAIR SEQUENCE

1. Remove anchor bolt nut and counter-sunk rivets connecting existing bottom flange to bearing plate.
2. Remove existing bottom flange from girder web plate.
3. Install new bottom flange angles and splice plates.
4. Connect new bottom flange sections to bearing plate.

SECTION A-A

Remove bottom flange section
Remove bottom flange section

SECTION B-B

New Bottom Flange Angle

Existing Flange Angle
New Bottom Flange Angle

Top Splice Plate
Top Splice Plate

Bottom Splice Plate
Bottom Splice Plate

New Bottom Flange Angle (L6 x 3 1/4 x 3/8"
Existing Bottom Flange Angle (L6 x 3 1/4 x 3/8"

WASHINGTON AVE. BRIDGE

SPAN 3 REPAIR DETAILS

Sheet 2 of 3
Crimp Top Splice Plates ¾" prior to drilling holes.

Field drill ¾" holes for new ¾" dia. bolts in existing bottom flange.

CRIMP DETAIL

ELEVATION

1. Match existing rivet/bolt hole size and spacing.

PLAN

NEW BOTTOM FLANGE ANGLE DETAILS

2 - PL 6 x 3½ x ½ (Matching angles are opposite hand)
REPAIRS TO SPAN 2

SPAN 2 IS THE TRUSS MAIN SPAN. REPAIRS DESCRIBED IN "SPAN 2 REPAIR DETAILS" DO NOT INCLUDE REPAIRS TO THE TRUSS MEMBERS, OR REPAIRS TO THE TRUSS ROLLER BEARINGS. SEE REPAIRS TO TRUSS MEMBERS, CANTILEVER CONNECTORS, AND ROLLER BEARINGS. SPAN 1 REPAIR DETAILS FOR REPAIRS TO THE ROLLER BEARINGS. COMPLETE THE REPLACEMENT OF TRUSS MEMBERS AND THE REPAIRS TO SPAN 1 PRIOR TO BEGINNING REPAIRS DESCRIBED IN "SPAN 2 REPAIR DETAILS".

THE PRECEDING REPAIRS DESCRIBED IN "SPAN 2 REPAIR DETAILS" INCLUDE REMOVING ONE CANTILEVER BEAM AND REPLACING THE CONNECTOR PLATE. REPLACING THE HORIZONTAL FLANGES OF 10 CANTILEVER BEAMS, REMOVING 2 TRUSS VERTICALS AT THE LOWER LATERAL BRACE CONNECTOR, REPLACING ONE STRINGER, AND REPLACING 12 PIN NUTS. ADDITIONAL REPAIRS INCLUDE STRAIGHTENING BENT LOWER LATERAL BRACING AT 2 LOCATIONS.

THE CONTRACTOR MAY DETERMINE THE SEQUENCE OF REPAIRS IN SPAN 2.

LIST OF REPAIRS:

1. REPAIR CANTILEVER CONNECTOR. SEE SHEET 2 OF 6.
2. REPAIR CANTILEVER FLANGES. SEE SHEET 3 OF 6.
3. REPAIR VERTICAL AT LOWER LATERAL BRACE CONNECTOR. SEE SHEET 4 OF 6.
4. REPLACE STRINGER. SEE SHEET 5 OF 6.
5. REPLACE PIN NUTS. SEE SHEET 6 OF 6.
6. STRAIGHTEN LATERAL BRACING.

TABLE OF ESTIMATED QUANTITIES

<table>
<thead>
<tr>
<th>REPAIR STEEL BRIDGE MEMBERS</th>
<th>CANTILEVER CONNECTOR</th>
<th>CANTILEVER FLANGE</th>
<th>VERTICAL</th>
<th>STRINGER</th>
<th>PIN NUT</th>
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</table>

GENERAL NOTES:

Prior to beginning work, submit a procedure for removing rivets and provide a demonstration of the method to the Engineer, for approval. Methods which can damage the connected metal will not be approved.

When removal of existing rivets or bolts is indicated in the plans, replace with ASTM A325 bolts of the same diameter as the original fastener.

When metal contact surfaces are exposed by the removal of rivets, clean the surfaces and apply the required prime coat in accordance with Item 446 PRIOR to installing new bolts. Paint for this work is supplied to Item 446, "Cleaning and Priming Steel".

Field verify all dimensions before ordering materials.

REPAIR CANTILEVER CONNECTOR

Payment for temporary spacers of standard and custom truss beam is supplied to Item 184, "Repair Steel Bridge Members (Cantilever Connectors)"

REPAIR CANTILEVER FLANGE

Payment for temporary spacers of standard and custom truss beam is supplied to Item 184, "Repair Steel Bridge Members (Cantilever Flanges)"

REPAIR TRUSS VERTICAL

Payment under Item 174, "Repair Steel Bridge Members (Verticals)" includes payment for furnishing and placing all required work. This item also includes compensation for temporary support for bottom lateral brace providing access for inspection, cleaning and proper alignment of all details, and for all labor, tools, equipment and incidental required to complete the work.

REPLACE STRINGER

Reuse existing clip angles unless otherwise directed by the Engineer. When replacement is required, payment is supplied to Item 174, "Repair Steel Bridge Members (Stringers)"

REPLACE PIN NUTS

Replace pin nuts with new pin nuts of ASTM A325 steel.

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SPAN 2 REPAIR DETAILS

WASHINGTON AVENUE BRIDGE

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Sheet 1 of 6

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C.E. Wall

Sheet 1 of 6
CANTILEVER CONNECTOR REPAIRS

Replace the cantilever connector plates with new plates of the same size as the originals. Match existing dimensions and rivet hole spacing. Reuse existing connection angles, cantilever beam, sidewalk stringers, and stringer clip angles. Replace rivets with bolts of the same size.

The Engineer may elect to replace additional sections with new material if excessive corrosion is present. When directed by the Engineer to replace additional sections, match existing dimensions and rivet spacing. See "Span 1 Repair Details" for details not shown.

Field verify all dimensions before ordering materials.

CANTILEVER CONNECTOR REPAIR SEQUENCE

1. Remove stringers in adjacent bays.
2. Remove connection angle rivets from cantilever connector.
3. Slide cantilever beam and cantilever connector assembly through truss vertical.
4. Remove and replace cantilever connectors (both sides).
5. Slide cantilever beam and new cantilever connector assembly through truss vertical.
6. Reconnect connection angles and sidewalk stringers.

ISOMETRIC

Floorbeam and other truss members not shown.

EXPLODED VIEW

Floorbeam, truss members, cantilever top flange, and stringers not shown.

WASHINGTON AVE. BRIDGE

SPAN 2 REPAIR DETAILS
CANTILEVER FLANGE REPAIRS

Replace cantilever beam top flanges at the following locations:

Left Truss: L2, L4, L5, L6, L7, L9, L11, and L16


Replace the cantilever beam top flange angles with new angles of the same size as the originals. Match existing dimensions and rivet hole spacing. Reconstruct the beam using the original web, bottom flange angles, and clip angles. Replace rivets with bolts of the same size.

The engineer may elect to replace original web or bottom flange angles with new material. If excessive corrosion is present, when directed by the engineer to replace web or bottom flange angles, match existing dimensions and rivet hole spacing. See "Span 1 Repair Details" for details not shown.

Field verify all dimensions before ordering materials.

CANTILEVER FLANGE REPAIR SEQUENCE

1. Remove strings in adjacent bays.
2. Remove web connection angle rivets and web cantilever connector rivets. Remove cantilever beam.
3. Remove clip angles and top flange angles.
4. Fabricate new top flange angles.
5. Bolt up flange and clip angles.
6. Reinstall cantilever beam and strings in adjacent bays.

EXISTING WEB AND BOTTOM FLANGE DETAILS

(For information only)

ELEVATION

NEW TOP FLANGE DETAIL

(22 3/4" x 2 3/4" x 3/8"

WATCHING ANGLES ARE OPPOSITE HAND

SECTION A-A

BOTTOM FLANGE

(22 3/4" x 2 3/4" x 3/8"

WATCHING ANGLES ARE OPPOSITE HAND

PLAN

EXISTING SIDEWALK CANTILEVER BEAM

WASHINGTON AVENUE BRIDGE

SPAN 2 REPAIR DETAILS
VERTICAL REPAIR

Repair verticals at locations indicated by the Engineer. Crack repairs consist of repairing multiple cracks to one or both sides of the vertical channel web. Cracks may be separate or may extend through the channel web. Repairs made to cracks at each truss node are considered one repair.

Abrasive-blast clean the area where cracks are identified. Contain and collect all debris and removed paint chips using a method approved by the Engineer. Locate crack tips using dye penetrant.

Gouge out crack and weld as shown. Grind weld cap flush with the clean surface. All welds must be made by a certified welder in accordance with AWS, "Structural Field Welding," and will be inspected by a Bridge Division Structural Steel Inspector before acceptance.

Clean and spot paint the area around the crack repair. Contain and collect all debris removed and generated. Cleaning and spot paint the repaired area with AWS D4.4, "Cleaning and Painting Steel" System II.

Damage shown in the drawing is for information only and is not representative of size or area. Prior to beginning work, carefully examine cracks to determine the extent and severity. Make field adjustments to the extent of repair work as directed by the Engineer.

VERTICAL REPAIR SEQUENCE

1. Disconnect gusset plate and gusset-vertical connection angle from vertical web.
2. Blast clean the cracked region.
3. Identify and mark all crack tips using dye penetrant.
4. Repair cracks as shown in the repair details. Take care to prevent slag entrapment in weld groove. Heat-straightening of the cracked vertical web may be required prior to welding.
5. Inspect repaired cracks. Repair all cracks at each location on both sides of the vertical web as directed by the Engineer.
6. Reconnect gusset plate and gusset-vertical connection angle using ASTM A325 bolts of the same size as the original fasteners.

BOTTOM VIEW - TRUSS VERTICAL - LOWER LATERAL BRACING CONNECTION

(looking up from below truss)
**STRINGER REPAIR**

Replace the exterior sidewalk stringer with a new stringer of the same size as the original at the location indicated by the Engineer. Match existing dimensions and rivet hole spacing. Install new stringer using original clip angles. Replace rivets in the same size. The Engineer may elect to replace additional stringers if excessive corrosion is present. When directed by the Engineer to replace interior or exterior stringers, match existing dimensions and rivet hole spacing.

Field verify all dimensions before ordering materials.

**STRINGER REPLACEMENT SEQUENCE**

1. Remove clip angles from cantilever beams and from stringer.
2. Remove stringer.
3. Install new stringer.

---

**EXISTING INTERIOR STRINGER DETAIL**

S12x31.8

(for information only)

---

**NEW EXTERIOR STRINGER DETAIL**

C12x20.7

---

**EXISTING SIDEWALK STRINGERS**
TRUSS PIN NUT REPLACEMENT

Remove and replace existing truss pin nuts at the following locations and at other locations as directed by the Engineer:

Interior of Left Truss: L3, L4, L6, L7, L7', L5, and L4'.

Interior of Right Truss: L3, L5, L7, L6', and L2'.

Provide new recessed pin nuts with the same size thread pitch, and appearance as the original pin nuts.

PIN AND PIN NUT FRONT ELEVATION

PIN NUT SIDE ELEVATION

<table>
<thead>
<tr>
<th>Diameter of Pin</th>
<th>Pin Thread</th>
<th>Nut Thickness</th>
<th>Nut Diameter</th>
<th>Nut Depth</th>
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<td>8&quot;</td>
<td>2 1/4&quot;</td>
<td>2 1/4&quot;</td>
<td>9 1/8&quot;</td>
<td>10 1/8&quot;</td>
</tr>
</tbody>
</table>

Pin nuts threaded at 6 threads per inch

All pin nut sizing and information obtained from CARNEGIE POCKET COMPANION, 1923. Data is for contractor's information only. Determine pin nut size and thread pitch from existing.

PIN NUT REreplacement
ABUTMENT DETAILS

Details Include:
- Reinforcing and forming details for recasting the upper portion of the Abutment No. 1 & No. 4 backwalls to match the new bridge deck.
- Details for new steel armor plates for the sidewalk expansion joint between Abutment No. 1 and the new bridge deck.
- Details for the new concrete parapet and traffic rail foundation which comprises the terminus for the new bridge rail at Abutment No. 1 and No. 4.

SCHEMATIC OF ABUTMENT NO. 1 DETAILS

- End of Parapet and Foundation
- New Bridge Rail Foundation (TRF)
- New Concrete Parapet See Sheet 4
- New Bridge Rail
- Face of Parapet
- Top of Bridge Curb & Sidewalk
- Top of Bridge Deck
- New Bridge Rail
- New Concrete Parapet See Sheet 4
- Face of Parapet
- Top of Bridge Curb & Sidewalk
- Top of Bridge Deck
- New Bridge Rail
- Face of Parapet
- Top of Bridge Curb & Sidewalk
- Top of Bridge Deck
- New Bridge Rail

SCHEMATIC OF ABUTMENT NO. 4 DETAILS

- End of Parapet and Foundation
- New Bridge Rail Foundation (TRF)
- New Concrete Parapet See Sheet 4
- New Bridge Rail
- Face of Parapet
- Top of Bridge Curb & Sidewalk
- Top of Bridge Deck
- New Bridge Rail
- Face of Parapet
- Top of Bridge Curb & Sidewalk
- Top of Bridge Deck
- New Bridge Rail
- Face of Parapet
- Top of Bridge Curb & Sidewalk
- Top of Bridge Deck
- New Bridge Rail

GENERAL NOTES:

ABUTMENT BACKWALL:
- Break back existing backwall concrete in Abutment No. 1 and Abutment No. 4 as shown.
- Payment for removal of existing backwall concrete is subsidiary to the price bid for Item 496, Remove Bridge Rail. This work may be done when the bridge slab is removed.
- Payment for recasting the backwall of Abutment No. 1 is made at the unit price for Class "C" Concrete Backwall. Contractor has the option to use Class "C" Concrete or Class "B" Concrete (Lightweight) for recasting the backwall. This work may be done when the Span 1 deck is cast.
- Insist reinforcing in Abutment No. 4 as shown prior to casting the new bridge deck. Payment for installing reinforcing at Abutment No. 4 is subsidiary to the price bid for Item 442, Reinforced Concrete Slab.

SIDEWALK ARMOR PLATE:
- Payment for fabrication and installation of the Sidewalk Armor Plate is made at the unit price bid for Structural Steel (SHB).
- Use 3/8 steel.
- U-bolts in accordance with Item 500, Secure the anchor joint in position and place to proper grade and alignment by welding braces to adjacent reinforcing steel.
- After braising and welding, remove excess bolts and spacers.
- Seat expansion joints before placing concrete.

PARAPET & TRAFFIC RAIL FOUNDATION:
- Payment for the Traffic Rail Foundation (TRF) is made at the unit price bid for Class "C" Concrete (TRF). Excavation for the TRF is subsidiary to payment for Class "C" Concrete (TRF).
- Payment for the Parapet is made at the unit price bid for Rolling Parapet.
- Use Class "C" Concrete for the TRF and the Parapet.
- Provide a Sub Finish on the Parapet concrete in accordance with Item 427.4(2b) "Surface Finishes for Concrete."
BRIDGE DECK PLATE

L 4 x 3 x 3/8"
9 E.S.
8'-0 1/2"

ABUTMENT PLATE

SIDEWALK ARMOR PLATE DETAIL

(might side shown. Left side is opposite hand.)

Symmetrical about E of roadway

19'-10 1/2" 1 1/2"
7'-1 3/8"

Limits of S J O Limits of Sidewalk Armor Plate

ARMOR PLATE PLACEMENT DETAIL

TRANSVERSE SECTION

EXPANSION JOINT AT ABUTMENT NO. 1

See "SE-A" Sheet for details not shown.
AT END POST
(Left Truss shown, Right Truss is opposite hand)
Provide access portals at all End Posts.

SECTION A-A

SECTION A-A

SECTION A-A

SECTION A-A

PLAN

PLAN

PLAN

PLAN

AT DIAGONAL
(Lt. Blk & Lt. Blk Only)

AT TYPICAL VERTICAL

AT TYPICAL DIAGONAL

DECK OPENING REINFORCING
Provide extra reinforcing Bors #4 at sidewalk openings. Cut Bors #2 and Bors #5 as needed to provide 1/2" clear than opening.

TABLE OF DECK OPENING OFFSETS

<table>
<thead>
<tr>
<th>Location</th>
<th>Offset</th>
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<td>3'-9&quot;</td>
</tr>
<tr>
<td>Lt Blk</td>
<td>3'-9&quot;</td>
</tr>
</tbody>
</table>

Access Portal Plate
Each plate weighs 50 lbs.

See Sheet 1

DECK OPENING DETAILS

WASHINGON AVENUE BRIDGE

CONCRETE DECK DETAILS

SHEET 8 OF 8

Texas Department of Transportation
Bridge Division

C. E. Walker
6-13-08

45590

C.E. Walker

CE Walker

6-13-08
TRANVERSE SECTION SHOWING BRIDGE RAIL

POST FRONT VIEW

POST SIDE VIEW

RAIL POST DETAILS

RAIL BOLTING DETAIL

USE BOLTS WITH ROUND HEADS ON OUTER SURFACES OF THE C12x20.7 BRIDGE RAIL.

GENERAL NOTES:

- New rolling has been shown equivalent to similar rolling, conformed to meet NDRP report 350. E. S. 2/16-18.
- This rail is comprised of the following parts: New steel gussets, new steel rolling, steel for expansion joints and splices shown, adhesive anchor, lip angle, and bolts. Provision and installation of the above listed rail components are included in the unit price bid for Duct Railing (SP1).
- Contractor has the option to install adhesive anchors after casting the deck in lieu of the post-installed anchor bolts shown. Use threaded rods of the same diameter. Size holes per the manufacturer's guidelines to the depth shown. Drill holes with rotary type boring or masonry drill drilling equipment. Use Type III (Class C) neat epoxy meeting the requirements of ASTM D6180. Grout and adhesive. Use Type III Class C neat epoxy in the manufacturer's standard dual cartridge and dispensed through a static-mixing nozzle supplied by the manufacturer. Install per the anchor adhesive manufacturer's instructions. Use A325 bolts, except where "bolts with round head" is indicated in the plan. Use galvanized bolts with Grade 5 bolts with round heads. Use round headed bolts meeting the dimensional requirements of ANSI/ASME B18.2.5 "Round Heeded Bolts Inch Series." Do not use ASTM F1852 Tension Control Bolts in lieu of "bolts with round head."

WASHINGTON AVENUE BRIDGE

Texas Department of Transportation
Bridge Division

C.E. 
6-24-08

WASHINGTO AVENUE BRIDGE

C.E. 
6-24-08

 SHEET 1 OF 5
ELEVATION - BRIDGE RAIL LAYOUT

DETAILED AT ABUTMENT NO. 1

DETAILED AT ENDS OF TRUSS

DETAILED AT ABUTMENT NO. 4
**FINGER CUTTING DETAIL**

- 1" Wide Fingers
- 1 3/4" Wide Slots

**COVER PLATE**

- Top & Bottom
- 1 1/4" x 1 1/4" Slotted Holes
- Pipe sleeves for 3/8" bolts (See detail)

**EXPANSION JOINT**

- 2 1/4" Slotted Holes
- 1 1/4" x 1 1/4" Slotted Holes

**PIPE SLEEVE DETAIL**

- Cut from 5/8" dia Std Pipe (G.P. x 1 1/4"
- 4 Required per expansion joint

**COVER PLATE BOLTING DETAIL**

- 5/8" Dia Bolt, 1 1/2" Long

**NOTE**

- Use bolts with round heads on outer surfaces of the C12X20.7 Bridge Rail. Use one standard washer with one beveled washer under the nut. Place round heads towards traffic side of rail. Use one beveled washer under the standard washer when shown in the plan.