



Road & Bridge Design Publications

Monthly Update – June 2014

Revisions for the month of **June** are listed and displayed below. New special details will be included in projects submitted for the **September** letting as is stated on the special detail index sheets. Contact Vladimir Zokvic (zokvicv@michigan.gov) for questions related to these changes.

Special Details

EJ3AA & EJ4N: Added a note regarding tying deck reinforcing steel and expansion joint anchors.

Bridge Design Manual

7.01.15 (LFD & LRFD): A note was updated to reflect post 2013 requirements for 2 lane freeway and interstate shoulder widths of 14'-10".

7.02.23 B. (LFD & LRFD), 10.01.04 H: Excluded the welding of stay in place forms on steel beam tension zones without approval.

12.07.03: Added mention of detailing the trimming of deck fascias and soffits when open expansion joints are closed.

Updates to MDOT Cell Library, Bridge Auto Draw Program, etc., may be required in tandem with some of this month's updates. Until such updates to automated tools can be made, it is the designer's/detailer's responsibility to manually incorporate any necessary revisions to notes and plan details to reflect these revisions.

Index to Special Details

6-16-2014

⑥

SPECIAL DETAIL NUMBER	NUMBER OF SHEETS	TITLE	CURRENT DATE
21	2	GUARDRAIL AT INTERSECTIONS	5-24-01
24	5	GUARDRAIL ANCHORED IN BACK SLOPE TYPES 4B & 4T	7-22-02
99	2	CHAIN LINK FENCE WITH WIRE ROPE	11-1-00
R-30-G	2	CONCRETE CURB AND CONCRETE CURB & GUTTER	2-6-14
R-110-A	3	PAVEMENT SAFETY EDGE	3-17-14
R-126-I	5	PLACEMENT OF TEMPORARY BARRIER	3-26-12
<p>* Denotes New or Revised Special Detail to be included in projects for (beginning with) the September letting.</p> <p>Note: Former Standard Plans IV-87, IV-89, IV-90, and IV-91 Series, used for building cast-in-place concrete head walls for elliptical and circular pipe culverts, are now being replaced with plans that detail each specific size. The Municipal Utilities Unit will provide these full sized special details for inclusion in construction plans for MDOT jobs. To assure prompt delivery, requests must be made in advance.</p> <p>Former Standard Plans IV-93 and IV-94 series have been replaced with precast concrete box & three-sided culverts as per the 2012 Standard Specifications for Construction.</p>			

Index to Bridge Detail Sheets

6-16-2014

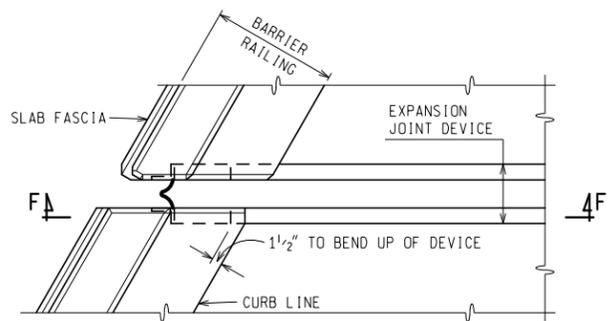
7

DETAIL NUMBER	NUMBER OF SHEETS	TITLE	CURRENT DATE
*EJ3AA	1 or 2	EXPANSION JOINT DETAILS	6-16-14
*EJ4N	1 or 2	EXPANSION JOINT DETAILS	6-16-14
B-25-H	6	BRIDGE RAILING, AESTHETIC PARAPET TUBE	11-27-13
PC-2G	1	70" PRESTRESSED CONCRETE I-BEAM DETAILS	3-31-06
PC-4E	1	PRESTRESSED CONCRETE 1800 BEAM DETAILS	3-31-06
PC-1L	1	PRESTRESSED CONCRETE I-BEAM DETAILS	7-12-06

*** Denotes New or Revised Special Detail to be included in projects for (beginning with) the September letting.**

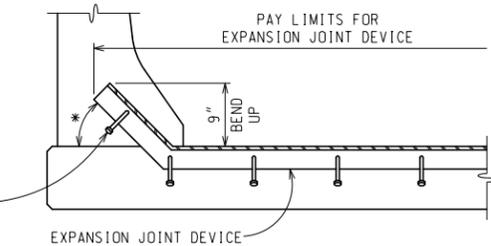
Note: Details EJ3AA & EJ4N are interactive, i.e. designers and detailers choose details based upon railing type and angle of crossing. Place all details appropriate for the project, structure specific information, and the Expansion Joint Device quantity on the sheet. The sheet shall then be added to the plans as a normal plan sheet.

Detail PC-1L, PC-2G and PC-4E shall have structure specific information and quantities added to the sheet. The sheet shall then be added to the plans as a normal plan sheet.



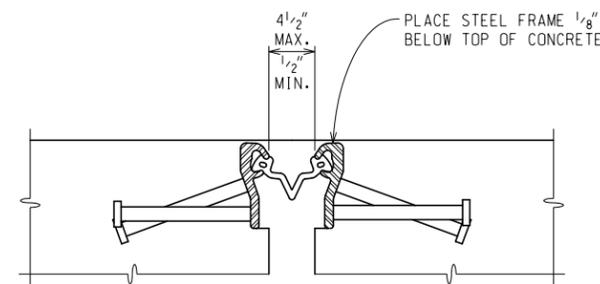
PLAN AT BARRIER RAILING

ORIENT STUDS TO CLEAR BARRIER FASCIA

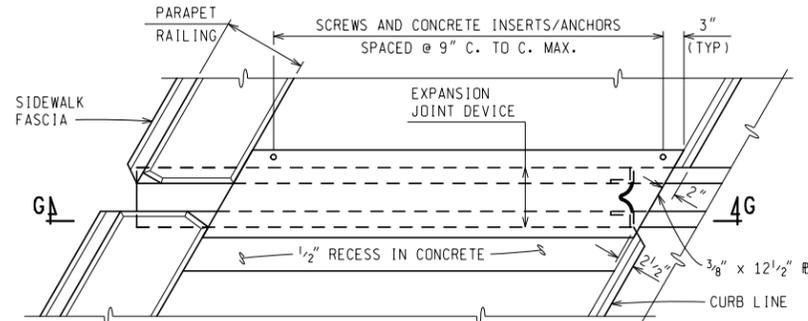


SECTION F - F

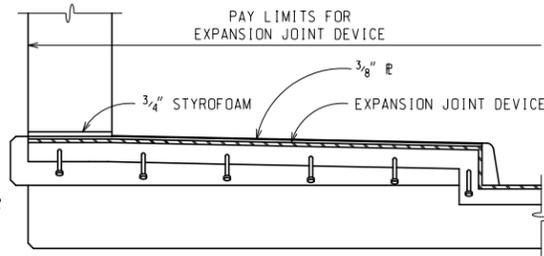
* FOR ANGLES OF CROSSING FROM 69° TO 45° INCLUSIVE, BEND ANCHORAGE UP 45° ALONG C OF EXPANSION JOINT. FOR ANGLES OF CROSSING LESS THAN 45°, A SPECIAL ENDING MAY BE REQUIRED.



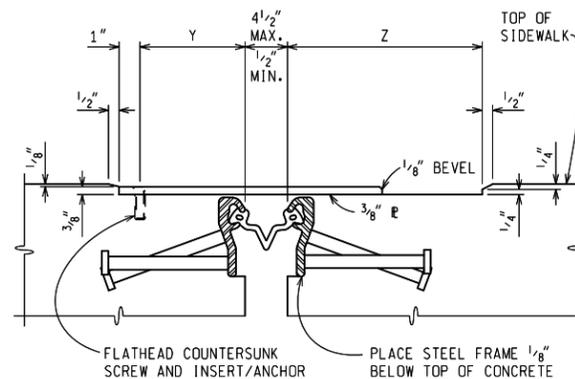
SECTION THROUGH EXPANSION JOINT



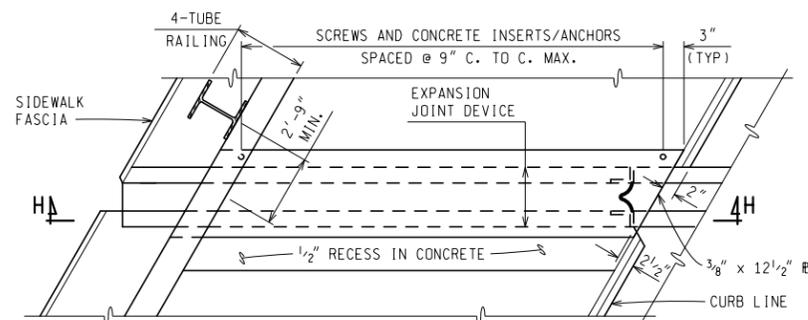
PLAN AT PARAPET RAILING WITH SIDEWALK



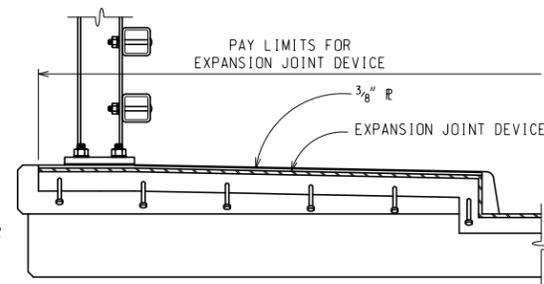
SECTION G - G



SECTION THROUGH EXPANSION JOINT AND COVER PLATE



PLAN AT 4 TUBE (PEDESTRIAN) STEEL RAILING

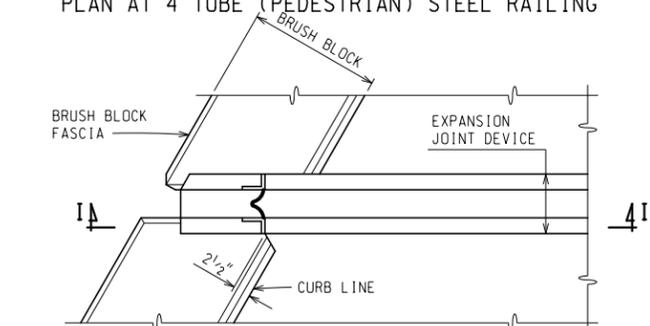


SECTION H - H

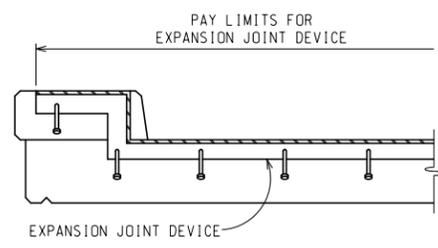
WABO STRIP SEAL TYPE M			
TOTAL TRAVEL *	PLATE WIDTH	Y	Z
< 1"	10"	3 3/4"	5 3/4"
1" - 2"	11"	3 3/4"	6 3/4"
2" - 3"	12"	3 3/4"	7 3/4"
> 3"	13"	3 3/4"	8 3/4"

ALL OTHER DEVICES			
TOTAL TRAVEL *	PLATE WIDTH	Y	Z
< 1 1/2"	8"	2 1/2"	5"
1 1/2" - 3 1/2"	10"	2 1/2"	7"
> 3 1/2"	12"	2 1/2"	9"

* SEE TABLE FOR MINIMUM TOTAL TRAVEL ALONG CENTERLINE OF BRIDGE



PLAN AT 2 TUBE & 4 TUBE (BICYCLE) STEEL RAILING



SECTION I - I

SIDEWALK SECTIONS

ALL STEEL FOR COVER PLATE SHALL BE AASHTO M270, GRADE 36, MEET THE REQUIREMENTS OF ASTM A786 AND GALVANIZED (ASTM A123).

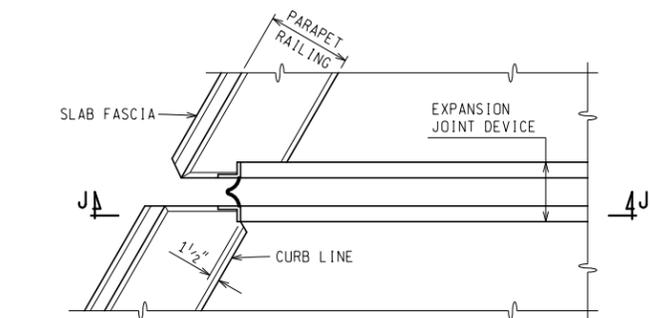
USE ASTM F 593 (TYPE 304) STAINLESS STEEL 3/4" OR 1/2" DIAMETER FLATHEAD COUNTERSUNK SCREWS WITH 3/4" OR 1/2" DIAMETER INSERTS OR FLUSH TYPE EXPANSION ANCHORS WITH A MINIMUM ALLOWABLE OR SAFE WORKING TENSION LOAD CAPACITY OF 1200 POUNDS.

CAST CURBS AND SIDEWALKS WITH 3/8" SLIDING PLATES IN PLACE TO INSURE THAT INSERTS AND SCREWS ARE ALIGNED PROPERLY. APPLY BOND BREAKER TO SLIDING PLATES PRIOR TO INSTALLATION.

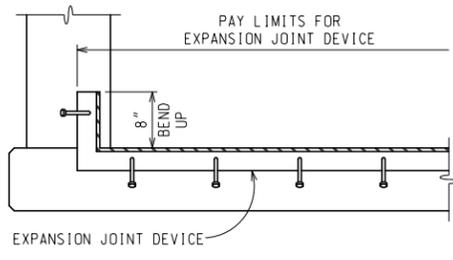
FORM CONCRETE RECESS AREA IN SIDEWALK AND GRIND TO PROVIDE SMOOTH SURFACE. TOOL OR GRIND CONCRETE EDGES TO 1/4" RADIUS. APPLY ONE COAT OF EPOXY RESIN ADHESIVE TO ALLOW BENT SLIDING PLATE TO MOVE FREELY WITHOUT FRICTION. CARE SHALL BE TAKEN SO THAT NO ADHESIVE COMES IN CONTACT WITH ANY PART OF THE EXPANSION JOINT DEVICE OR GLAND. REMOVE ANY FOREIGN PARTICLES FROM THE SURFACE PRIOR TO INSTALLING PLATES.

INSTALL PLATES SO THAT THE SCREWS AND INSERTS ARE SET ON THE HIGH SIDE OF LONGITUDINAL SIDEWALK GRADE.

THE COST OF ALL MATERIALS AND LABOR REQUIRED FOR PROPER INSTALLATION OF THE COVER PLATE IS INCLUDED IN THE PAYMENT FOR THE EXPANSION JOINT DEVICE COVER PLATE.



PLAN AT FLUSH MOUNT PARAPET RAILING



SECTION J - J

NOTES:

JOINT TYPES

THE EXPANSION JOINT DEVICE SHALL BE OF A TYPE THAT INCLUDES A CONTINUOUS NEOPRENE (OR EQUIVALENT) SEAL ACROSS THE DECK. UNLESS OTHERWISE NOTED ON THE PLANS, THE CONTRACTOR HAS THE OPTION OF USING ANY OF THE DEVICES LISTED BELOW:

DEVICE	MANUFACTURER
WABO STRIP SEAL - TYPE M	WATSON-BOWMAN & ACME, INC.
WABO STRIP SEAL - TYPE A	WATSON-BOWMAN & ACME, INC.
STEELEX-SSA2	D.S. BROWN
STEELEX-SSCM	D.S. BROWN
ONFLEX 40 SS	STRUCTURAL RUBBER PRODUCTS CO.

THE MODEL OF THE JOINT TYPE SELECTED SHALL BE SUITABLE TO ACCOMMODATE THE TOTAL MOVEMENT NOTED ON THE PLANS.

COMPLETE WORKING DRAWINGS OF ALL DETAILS OF FABRICATION OF THE EXPANSION JOINT DEVICE SHALL BE SUBMITTED FOR REVIEW IN ACCORDANCE WITH STANDARD SPECIFICATION 104.02. THIS REQUIREMENT IS WAIVED FOR EXPANSION JOINT DEVICES FOR WHICH A SET OF STANDARD INSTALLATION DETAILS HAS BEEN APPROVED. STANDARD INSTALLATION DETAILS CAN BE OBTAINED FROM THE DESIGN DIVISION.

FABRICATION AND INSTALLATION

THE EXPANSION JOINT SHALL BE SHOP FABRICATED TO CONFORM TO THE CONTOUR OF THE BRIDGE DECK, BARRIERS, ETC. IT SHALL BE INSTALLED IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS SUBJECT TO NOTES HEREIN AND THE APPROVAL OF THE ENGINEER.

THE DECK REINFORCING STEEL TO STEEL FRAME ANCHORS TO MAXIMUM EXTENT PRACTICABLE WITHOUT DAMAGING GALVANIZED OR EPOXY COATINGS.

THE TOP OF THE EXPANSION JOINT DEVICE SHALL BE SET 1/8" - 1/4" BELOW THE CONCRETE SLAB (PAVEMENT) WITH A TOLERANCE OF ± 1/8".

THE STEEL ANCHORAGE FOR STRIP SEAL GLANDS SHALL BE HOT DIP GALVANIZED IN ACCORDANCE WITH SUBSECTION 707.03C.17 OF THE STANDARD SPECIFICATIONS.

THE AREA OF THE STEEL ANCHORAGE AND SEALING GLAND WHICH WILL BE IN CONTACT WITH A SEALANT, OR LUBRICANT-ADHESIVE SHALL BE CLEANED WITH TOLUENE OR OTHER APPROVED SOLVENT.

IN THE EVENT THAT SPLICING IS REQUIRED OF THE SEALING GLAND, IT SHALL BE SPLICED BY AN APPROVED METHOD (SUCH AS COLD VULCANIZATION) BY A TRAINED REPRESENTATIVE OF THE MANUFACTURER.

DETAILS AT CURBS OR BARRIERS

THE DETAILS ON THIS SHEET SHOW AN APPROVED MEANS OF TERMINATING THE EXPANSION JOINT DEVICE AT CURBS OR BARRIERS. VARIATIONS OR ALTERNATIVE SCHEMES WILL BE CONSIDERED AND MAY BE USED IF APPROVED BY THE ENGINEER.

MATERIALS

THE COST OF ALL MATERIALS AND LABOR REQUIRED FOR PROPER INSTALLATION OF THE EXPANSION JOINT AND THE TERMINAL ASSEMBLIES AT THE CURBS, SIDEWALKS, OR BARRIERS IS INCLUDED IN THE PAYMENT FOR THE EXPANSION JOINT DEVICE.

STRUCTURE NUMBER	ANGLE OF CROSSING TO NEAREST 10°	LOCATION OF JOINT	MIN. TOT. TRAVEL ALONG CENTERLINE OF BRIDGE *	REQUIRED LENGTH OF EXPANSION JOINT DEVICE

QUANTITY		
ITEM	UNIT	AMOUNT
Expansion Joint Device	F+	
Expansion Joint Device, Cover Plate	F+	

PLAN REVISIONS							
NO.	DATE	AUTH	DESCRIPTION	NO.	DATE	AUTH	DESCRIPTION



NO SCALE

DRAWN BY:

CHK'D BY:

FILE:

CORR BY:

DATE:

DESIGN UNIT:

TSC:

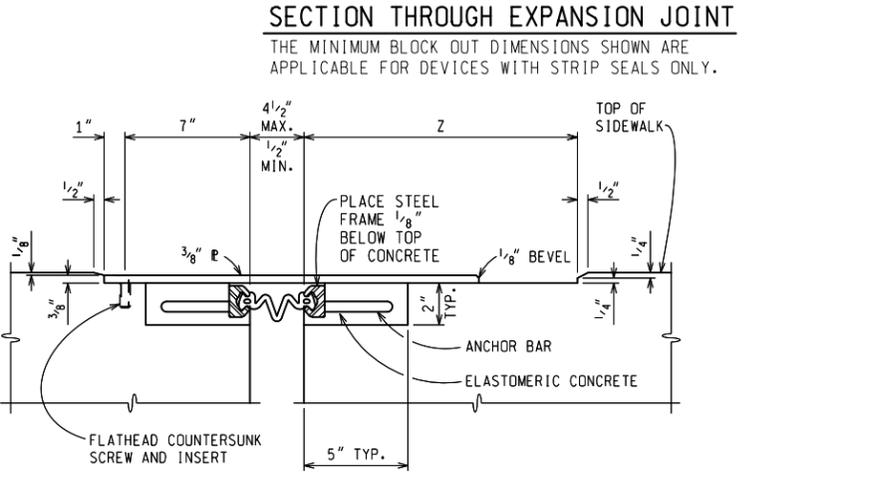
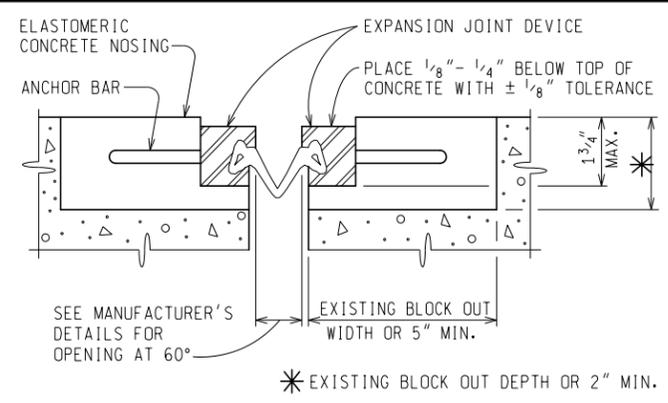
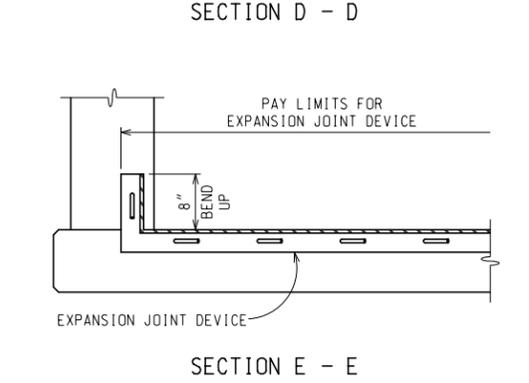
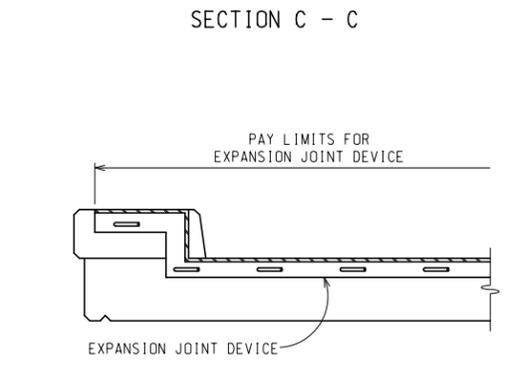
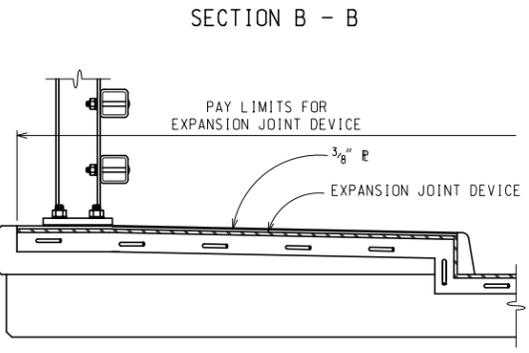
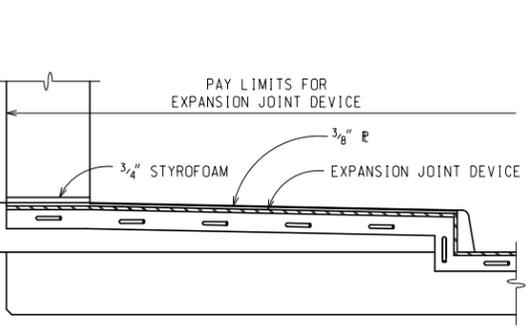
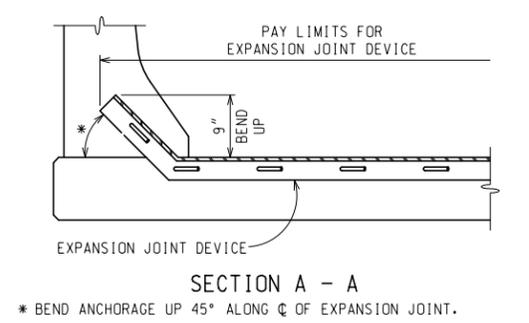
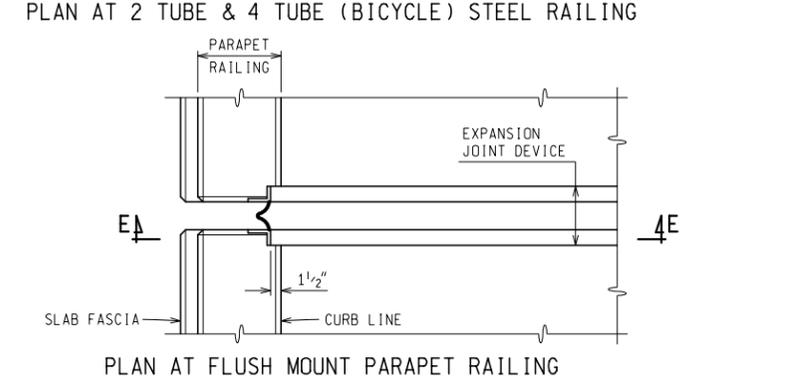
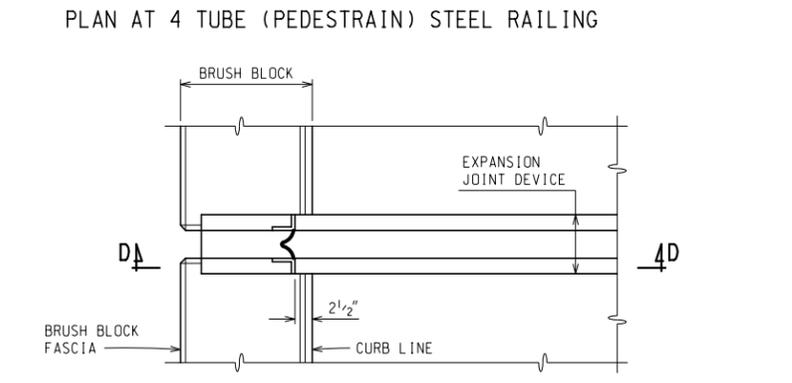
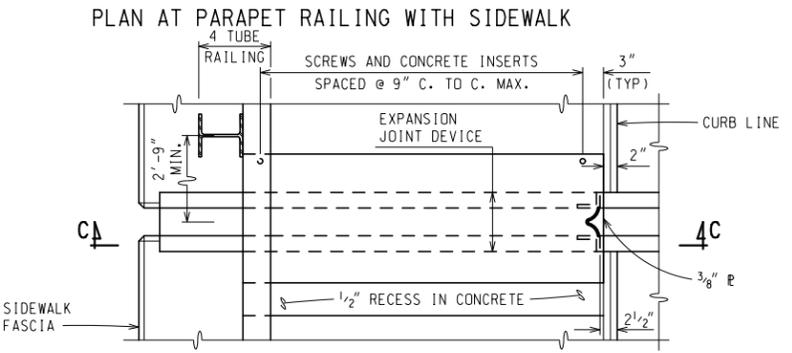
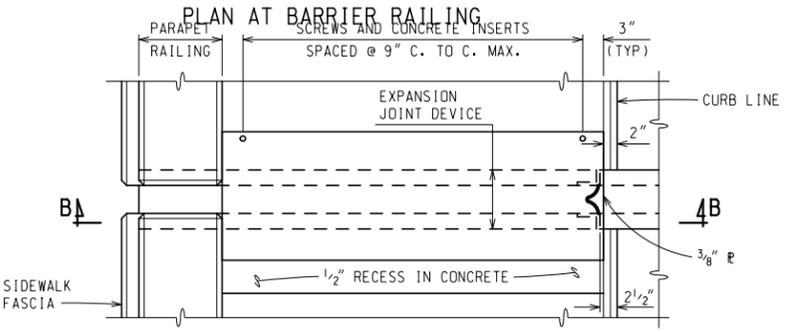
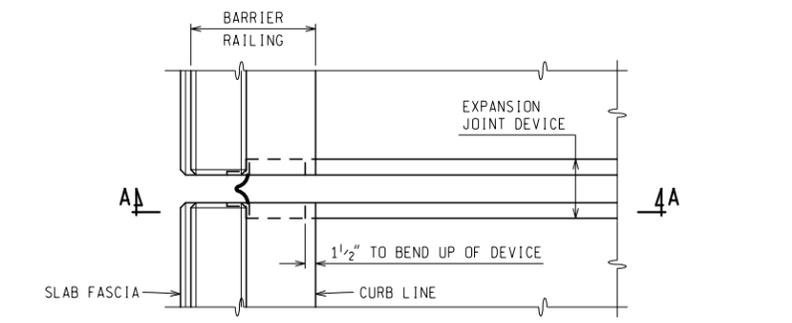
CS:

JN:

EXPANSION JOINT DETAILS

EJ3AA (06-16-2014)

DRAWING SHEET



TOTAL TRAVEL *	PLATE WIDTH	Z
≤ 1"	15"	7"
1" - 2"	16"	8"
2" - 3"	17"	9"
≥ 3"	18"	10"

* SEE TABLE FOR MINIMUM TOTAL TRAVEL ALONG CENTERLINE OF BRIDGE

SIDEWALK SECTIONS

ALL STEEL FOR EXPANSION JOINT AND COVER PLATE SHALL BE AASHTO M270, GRADE 36, AND GALVANIZED (ASTM A123) WITH A STATIC COEFFICIENT OF FRICTION OF 0.6 OR GREATER.

USE ASTM F 593 (TYPE 304) STAINLESS STEEL 3/4" DIAMETER FLATHEAD COUNTERSUNK SCREWS WITH 3/4" DIAMETER INSERTS.

CAST CURBS AND SIDEWALKS WITH 3/8" SLIDING PLATES IN PLACE TO INSURE THAT INSERTS AND SCREWS ARE ALIGNED PROPERLY. APPLY BOND BREAKER TO SLIDING PLATES PRIOR TO INSTALLATION.

FORM CONCRETE RECESS AREA IN SIDEWALK AND GRIND TO PROVIDE SMOOTH SURFACE. TOOL OR GRIND CONCRETE EDGES TO 1/4" RADIUS. APPLY ONE COAT OF EPOXY RESIN ADHESIVE TO ALLOW BENT SLIDING PLATE TO MOVE FREELY WITHOUT FRICTION. CARE SHALL BE TAKEN SO THAT NO ADHESIVE COMES IN CONTACT WITH ANY PART OF THE EXPANSION JOINT DEVICE OR GLAND. REMOVE ANY FOREIGN PARTICLES FROM THE SURFACE PRIOR TO INSTALLING PLATES.

INSTALL PLATES SO THAT THE SCREWS AND INSERTS ARE SET ON THE HIGH SIDE OF LONGITUDINAL SIDEWALK GRADE.

THE COST OF ALL MATERIALS AND LABOR REQUIRED FOR PROPER INSTALLATION OF THE COVER PLATE IS INCLUDED IN THE PAYMENT FOR THE EXPANSION JOINT DEVICE COVER PLATE.

NOTES:

JOINT TYPES

THE EXPANSION JOINT DEVICE SHALL BE OF A TYPE THAT INCLUDES A CONTINUOUS NEOPRENE (OR EQUIVALENT) SEAL ACROSS THE DECK. UNLESS OTHERWISE NOTED ON THE PLANS, THE CONTRACTOR HAS THE OPTION OF USING ANY OF THE DEVICES LISTED BELOW:

DEVICE	MANUFACTURER
STEEFLEX-SSE2	D.S. BROWN CO.
WABO STRIP SEAL - TYPE E	WATSON BOWMAN ACME, CORP.

THE MODEL OF THE JOINT TYPE SELECTED SHALL BE SUITABLE TO ACCOMMODATE THE TOTAL MOVEMENT NOTED ON THE PLANS.

COMPLETE WORKING DRAWINGS OF ALL DETAILS OF FABRICATION OF THE EXPANSION JOINT DEVICE SHALL BE SUBMITTED FOR REVIEW IN ACCORDANCE WITH STANDARD SPECIFICATION 104.02. THIS REQUIREMENT IS WAIVED FOR EXPANSION JOINT DEVICES FOR WHICH A SET OF STANDARD INSTALLATION DETAILS HAS BEEN APPROVED. STANDARD INSTALLATION DETAILS CAN BE OBTAINED FROM THE DESIGN DIVISION.

FABRICATION AND INSTALLATION

THE EXPANSION JOINT SHALL BE SHOP FABRICATED TO CONFORM TO THE CONTOUR OF THE BRIDGE DECK, BARRIERS, ETC. IT SHALL BE INSTALLED IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS SUBJECT TO NOTES HEREIN AND THE APPROVAL OF THE ENGINEER.

THE DECK REINFORCING STEEL TO STEEL FRAME ANCHORS TO MAXIMUM EXTENT PRACTICABLE WITHOUT DAMAGING GALVANIZED OR EPOXY COATINGS.

THE TOP OF THE EXPANSION JOINT DEVICE SHALL BE SET 1/8" - 1/4" BELOW THE CONCRETE SLAB (PAVEMENT) WITH A TOLERANCE OF ± 1/8".

THE STEEL ANCHORAGE FOR STRIP SEAL GLANDS SHALL NOT BE HOT DIP GALVANIZED.

THE ELASTOMERIC CONCRETE NOSING SHALL BE DELCRETE ELASTOMERIC CONCRETE.

THE AREA OF THE STEEL ANCHORAGE AND SEALING GLAND WHICH WILL BE IN CONTACT WITH A SEALANT, OR LUBRICANT-ADHESIVE SHALL BE CLEANED WITH TOLUENE OR OTHER APPROVED SOLVENT.

IN THE EVENT THAT SPLICING IS REQUIRED OF THE SEALING GLAND, IT SHALL BE SPLICED BY AN APPROVED METHOD (SUCH AS COLD VULCANIZATION) BY A TRAINED REPRESENTATIVE OF THE MANUFACTURER.

DETAILS AT CURBS OR BARRIERS

THE DETAILS ON THIS SHEET SHOW AN APPROVED MEANS OF TERMINATING THE EXPANSION JOINT DEVICE AT CURBS OR BARRIERS. VARIATIONS OR ALTERNATIVE SCHEMES WILL BE CONSIDERED AND MAY BE USED IF APPROVED BY THE ENGINEER.

MATERIALS

THE COST OF ALL MATERIALS AND LABOR REQUIRED FOR PROPER INSTALLATION OF THE EXPANSION JOINT (INCLUDING ELASTOMERIC CONCRETE NOSING) AND THE TERMINAL ASSEMBLIES AT THE CURBS, SIDEWALKS OR BARRIER NOSING AND THE THE PAYMENT FOR THE EXPANSION JOINT DEVICE.

STRUCTURE NUMBER	ANGLE OF CROSSING TO NEAREST 10°	LOCATION OF JOINT	MIN. TOT. TRAVEL ALONG CENTERLINE OF BRIDGE *	REQUIRED LENGTH OF EXPANSION JOINT DEVICE

QUANTITY		
ITEM	UNIT	AMOUNT
Expansion Joint Device	Ft	
Expansion Joint Device, Cover Plate	Ft	

PLAN REVISIONS							
NO.	DATE	AUTH	DESCRIPTION	NO.	DATE	AUTH	DESCRIPTION



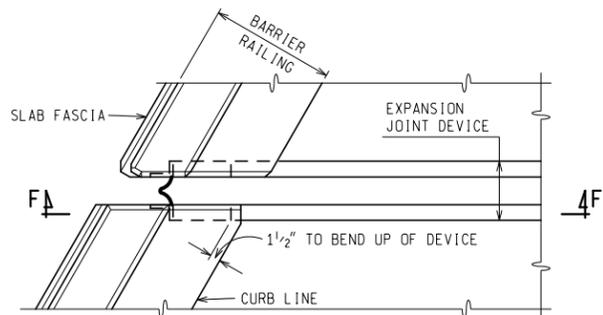
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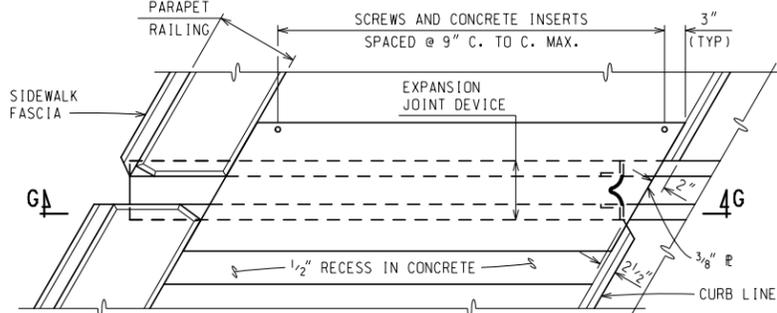
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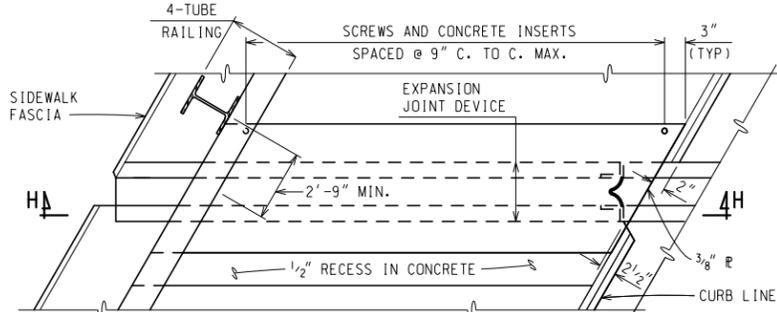
EXPANSION JOINT DETAILS
EJ4N (06-16-2014)
DRAWING SHEET



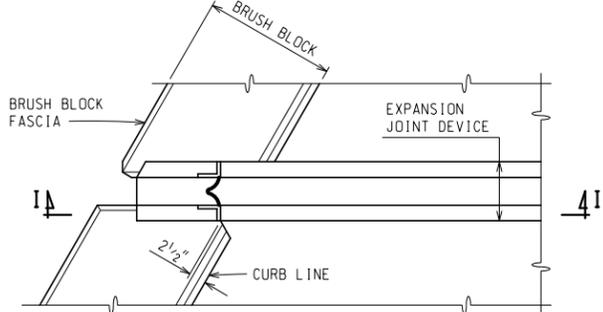
PLAN AT BARRIER RAILING



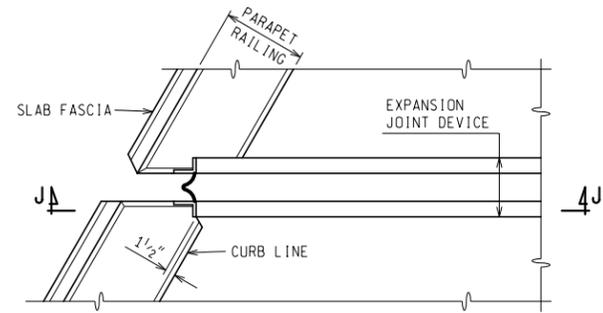
PLAN AT PARAPET RAILING WITH SIDEWALK



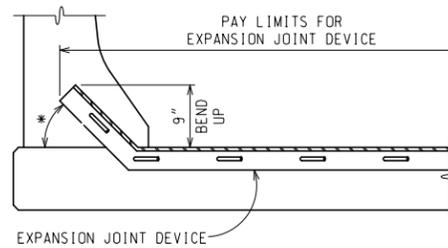
PLAN AT 4 TUBE (PEDESTRIAN) STEEL RAILING



PLAN AT 2 TUBE & 4 TUBE (BICYCLE) STEEL RAILING

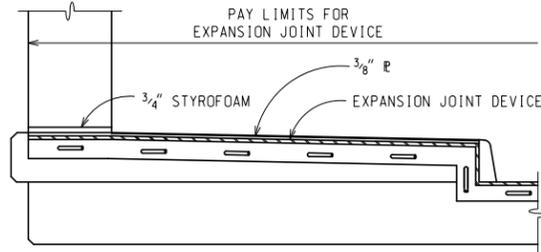


PLAN AT FLUSH MOUNT PARAPET RAILING

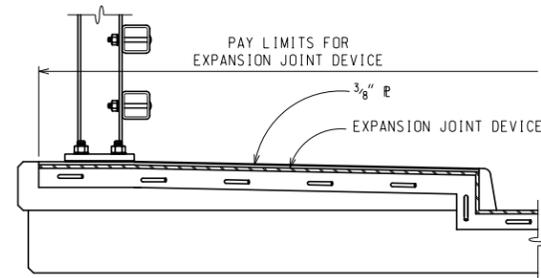


SECTION F - F

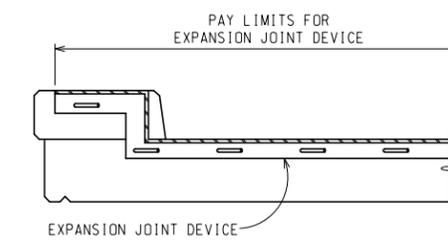
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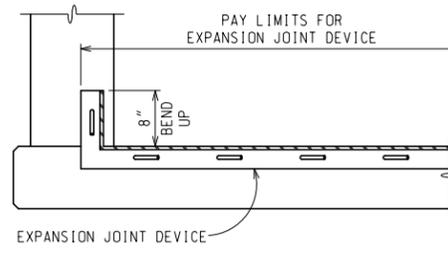
SECTION G - G



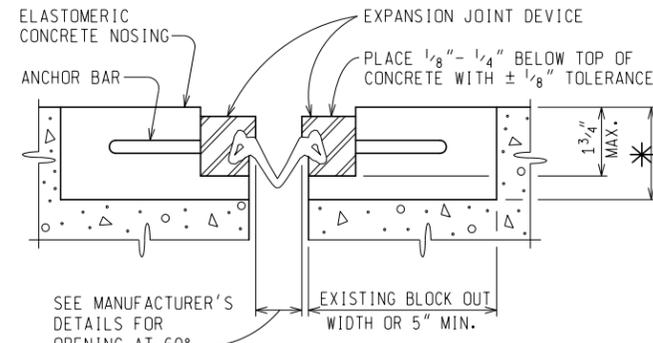
SECTION H - H



SECTION I - I

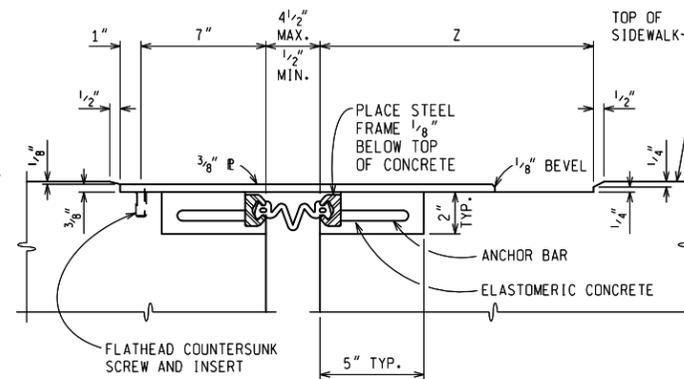


SECTION J - J



SECTION THROUGH EXPANSION JOINT

THE MINIMUM BLOCK OUT DIMENSIONS SHOWN ARE APPLICABLE FOR DEVICES WITH STRIP SEALS ONLY.



SECTION THROUGH EXPANSION JOINT AND COVER PLATE

TOTAL TRAVEL *	PLATE WIDTH	Z
≤ 1"	15"	7"
1" - 2"	16"	8"
2" - 3"	17"	9"
≥ 3"	18"	10"

* SEE TABLE FOR MINIMUM TOTAL TRAVEL ALONG CENTERLINE OF BRIDGE

SIDEWALK SECTIONS

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USE ASTM F 593 (TYPE 304) STAINLESS STEEL 3/4" DIAMETER FLATHEAD COUNTERSUNK SCREWS WITH 3/4" DIAMETER INSERTS.

CAST CURBS AND SIDEWALKS WITH 3/8" SLIDING PLATES IN PLACE TO INSURE THAT INSERTS AND SCREWS ARE ALIGNED PROPERLY. APPLY BOND BREAKER TO SLIDING PLATES PRIOR TO INSTALLATION.

FORM CONCRETE RECESS AREA IN SIDEWALK AND GRIND TO PROVIDE SMOOTH SURFACE. TOOL OR GRIND CONCRETE EDGES TO 1/4" RADIUS. APPLY ONE COAT OF EPOXY RESIN ADHESIVE TO ALLOW BENT SLIDING PLATE TO MOVE FREELY WITHOUT FRICTION. CARE SHALL BE TAKEN SO THAT NO ADHESIVE COMES IN CONTACT WITH ANY PART OF THE EXPANSION JOINT DEVICE OR GLAND. REMOVE ANY FOREIGN PARTICLES FROM THE SURFACE PRIOR TO INSTALLING PLATES.

INSTALL PLATES SO THAT THE SCREWS AND INSERTS ARE SET ON THE HIGH SIDE OF LONGITUDINAL SIDEWALK GRADE.

THE COST OF ALL MATERIALS AND LABOR REQUIRED FOR PROPER INSTALLATION OF THE COVER PLATE IS INCLUDED IN THE PAYMENT FOR THE EXPANSION JOINT DEVICE COVER PLATE.

NOTES:

JOINT TYPES

THE EXPANSION JOINT DEVICE SHALL BE OF A TYPE THAT INCLUDES A CONTINUOUS NEOPRENE (OR EQUIVALENT) SEAL ACROSS THE DECK. UNLESS OTHERWISE NOTED ON THE PLANS, THE CONTRACTOR HAS THE OPTION OF USING ANY OF THE DEVICES LISTED BELOW:

DEVICE	MANUFACTURER
STEELEX-SSE2	D.S. BROWN CO.
WABO STRIP SEAL - TYPE E	WATSON BOWMAN ACME, CORP.

THE MODEL OF THE JOINT TYPE SELECTED SHALL BE SUITABLE TO ACCOMMODATE THE TOTAL MOVEMENT NOTED ON THE PLANS.

COMPLETE WORKING DRAWINGS OF ALL DETAILS OF FABRICATION OF THE EXPANSION JOINT DEVICE SHALL BE SUBMITTED FOR REVIEW IN ACCORDANCE WITH STANDARD SPECIFICATION 104.02. THIS REQUIREMENT IS WAIVED FOR EXPANSION JOINT DEVICES FOR WHICH A SET OF STANDARD INSTALLATION DETAILS HAS BEEN APPROVED. STANDARD INSTALLATION DETAILS CAN BE OBTAINED FROM THE DESIGN DIVISION.

FABRICATION AND INSTALLATION

THE EXPANSION JOINT SHALL BE SHOP FABRICATED TO CONFORM TO THE CONTOUR OF THE BRIDGE DECK, BARRIERS, ETC. IT SHALL BE INSTALLED IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS SUBJECT TO NOTES HEREIN AND THE APPROVAL OF THE ENGINEER.

TIE DECK REINFORCING STEEL TO STEEL FRAME ANCHORS TO MAXIMUM EXTENT PRACTICABLE WITHOUT DAMAGING GALVANIZED OR EPOXY COATINGS.

THE TOP OF THE EXPANSION JOINT DEVICE SHALL BE SET 1/8" - 1/4" BELOW THE CONCRETE SLAB (PAVEMENT) WITH A TOLERANCE OF ± 1/8".

THE STEEL ANCHORAGE FOR STRIP SEAL GLANDS SHALL NOT BE HOT DIP GALVANIZED.

THE ELASTOMERIC CONCRETE NOSING SHALL BE DELCRETE ELASTOMERIC CONCRETE.

THE AREA OF THE STEEL ANCHORAGE AND SEALING GLAND WHICH WILL BE IN CONTACT WITH A SEALANT, OR LUBRICANT-ADHESIVE SHALL BE CLEANED WITH TOLUENE OR OTHER APPROVED SOLVENT.

IN THE EVENT THAT SPLICING IS REQUIRED OF THE SEALING GLAND, IT SHALL BE SPLICED BY AN APPROVED METHOD (SUCH AS COLD VULCANIZATION) BY A TRAINED REPRESENTATIVE OF THE MANUFACTURER.

DETAILS AT CURBS OR BARRIERS

THE DETAILS ON THIS SHEET SHOW AN APPROVED MEANS OF TERMINATING THE EXPANSION JOINT DEVICE AT CURBS OR BARRIERS. VARIATIONS OR ALTERNATIVE SCHEMES WILL BE CONSIDERED AND MAY BE USED IF APPROVED BY THE ENGINEER.

MATERIALS

THE COST OF ALL MATERIALS AND LABOR REQUIRED FOR PROPER INSTALLATION OF THE EXPANSION JOINT (INCLUDING ELASTOMERIC CONCRETE NOSING) AND THE TERMINAL ASSEMBLIES AT THE CURBS, SIDEWALKS OR BARRIER NOSING AND THE THE PAYMENT FOR THE EXPANSION JOINT DEVICE.

STRUCTURE NUMBER	ANGLE OF CROSSING TO NEAREST 10°	LOCATION OF JOINT	MIN. TOT. TRAVEL ALONG CENTERLINE OF BRIDGE *	REQUIRED LENGTH OF EXPANSION JOINT DEVICE

QUANTITY		
ITEM	UNIT	AMOUNT
Expansion Joint Device	Ft	
Expansion Joint Device, Cover Plate	Ft	

PLAN REVISIONS							
NO.	DATE	AUTH	DESCRIPTION	NO.	DATE	AUTH	DESCRIPTION



NO SCALE

DRAWN BY: _____ DATE: _____
 CHK'D BY: _____ CORR BY: _____ DESIGN UNIT: _____
 FILE: _____ TSC: _____

CS: _____
 JN: _____

EXPANSION JOINT DETAILS
 EJ4N (06-16-2014)
 DRAWING SHEET

MICHIGAN DESIGN MANUAL BRIDGE DESIGN - CHAPTER 7: LRFD

7.01.15

Shoulder Widths for Work Zone Safety and Mobility (8-20-2009) (6-16-2014)

For 2 lane freeway and interstate new bridge construction and reconstruction (superstructure replacement and deck replacement) the standard bridge shoulder widths shall be 14'-10". This will provide increased safety and mobility for future maintenance of traffic. The cross section will provide part width bridge construction with traffic being maintained on two 11 ft. lanes with 1 ft. shy distance on each side. For cross section see Bridge Design Guide 6.05.01A. An MDOT internal design exception will be required for 4R projects when the shoulder width is not met. The Region Systems Manager shall determine the required shoulder width at the scoping of the projects.

Designers should layout beam spacing to accommodate future part width reconstruction. In most cases beams at centerline of structure should be avoided. Side by side box beam structures should have beams on either side of structure centerline. (11-28-2011)

Bridge approach guardrail and bridge approach curb and gutter will be affected as a result of the widened shoulders and must be addressed in the design of the approaches. If the increased shoulder width is deemed necessary on reconstruction projects substructure widening may become necessary.

7.01.16

Redundancy (8-20-2009) (9-17-2012)

Consideration should be given to providing redundancy in bridge designs. Avoid nonredundant schemes if possible. All non-redundant or fracture critical designs shall be approved by the Engineer of Bridge Design.

7.01.17

Part Width Construction (11-28-2011)

For existing bridges used to maintain traffic, the structural performance of the in-service portion of the structure shall be evaluated with respect to stage demolition and adjacent construction.

To the extent possible, plans shall show location of existing spread footings with respect to proposed construction.

Unbraced excavations for new substructures shall not extend below the bearing elevation of adjacent spread footing foundations.

Drilled excavations adjacent to in-service spread footing foundations shall be cased to prevent undermining.

MICHIGAN DESIGN MANUAL BRIDGE DESIGN

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MICHIGAN DESIGN MANUAL BRIDGE DESIGN - CHAPTER 7: LRFD

7.02.22

Screeding

A. Transverse Screeding

Transverse screeding shall be used for finishing all bridge decks.

When the skew angle is greater than or equal to 45°, the strike equipment is placed parallel to the reference lines.

B. Screed Elevations

In computing screed elevations, the specified camber should be used.

The following dead loads should be used in computing beam deflection for screed elevations:

- 10 LBS/SFT for formwork
- 10 LBS/SFT for reinforcing steel
- 145 LBS/SFT for plain concrete
- 150 LBS/SFT for reinforced concrete

Screed elevations for suspended spans are to be figured for the case of no deck concrete having been poured in any span.

7.02.23

Stay-In-Place Forms

A. Use (9-2-2003)

Because of the design accommodations, any need for stay-in-place forms should be anticipated in the Contract Plans and Specifications.

The criteria for the use of metal stay-in-place forms are safety and economy in construction. Where practical, they should be included as a contractor option.

The use of concrete stay-in-place forms is not allowed.

B. Design (5-6-99)

The design of metal stay-in-place forms is the responsibility of the contractor. If the beams on a deck replacement project can't accommodate an increased dead load of 15 LBS/SFT (7.01.04 I) then note 8.07.01 S shall be used on the plans. Because of the load and deflection limits of the forms, it may be necessary to reduce the beam spacing resulting in the use of one or more additional rows of beams. This additional cost should be justified by the improved safety and/or in the cost reduction of maintaining traffic on the roadway below.

When the use of stay-in-place forms cannot be economically justified the designer shall prohibit their use by including note 8.07.01 T. on the plans. (9-2-2003)

Detail steel beam tension zones on plans. Welding of stay in place forms is not allowed to beam top flanges in tension zones (due to stress concentrations) without approval by the Engineer. (6-16-2014)

MICHIGAN DESIGN MANUAL BRIDGE DESIGN

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MICHIGAN DESIGN MANUAL BRIDGE DESIGN

10.01.04

Metal Stay-In-Place Forms (11-26-99)

Shop drawings for fabricator designed metal stay-in-place forms shall be reviewed for the following items:

- A. That all criteria listed in section 706.03 D of the Standard Specifications for Construction have been adhered to. (12-5-2005)
- B. Voids are filled or not filled with concrete based upon original design.
- C. Deck depth has not been compromised (increased or decreased) as result of using forms.
- D. All materials are galvanized.
- E. Support angles do not protrude above proposed top of haunch (or top of the beam where there is no proposed haunch) Note 8.07.01 Y. shall be added to Superstructure plan sheets. (8-20-2009)
- F. Caulk or grout is applied along longitudinal seam between support angles and beam.
- G. Gauge (thickness) of metal deck form. Generally 0.0456"(19 gauge) or 0.0336" (22 gauge) is acceptable.
- H. Welding criteria or procedures for metal forms and steel beams. **No welds in tension zones (negative moment regions) without approval by the Design and Construction Engineer. (6-16-2014)**

10.01.05

Expansion Joints

Shop drawings are not required for proprietary expansion joints installed in bridge decks where the maximum opening is 4", and where standard shop drawings have been pre-approved by MDOT. The Contractor may select any joint that satisfies the design requirements from a number of joints listed on the plans and in the supplemental specifications. Copies of the standard shop drawings of the devices selected are available at the MDOT website or will be provided to the Resident/Delivery Engineer by the Design Division. When the maximum opening in the bridge deck is larger than 4", a modular expansion joint is required and shop drawings for these joints shall be handled as the shop drawings for structural steel in Section 10.01.01.

10.01.06

Mechanical Equipment

Shop drawings for mechanical equipment must be reviewed for general conformance with the design specifications and plan details. The Contractor may submit copies of catalogue cuts, parts lists, operating procedures, etc., for review.

10.01.07

Electrical Equipment and Circuitry

Shop drawings for electrical equipment and circuitry must be reviewed for general conformance with the design specifications and plan details. The Contractor may submit copies of catalogue cuts, parts lists, operating procedures, etc., for review.

10.01.08

Water Mains

Shop drawings for water mains must be reviewed for general conformance with the design specifications and plan details. The drawings shall, as a minimum, show the plan and profile of the water mains, the type and quantity of material, all details for special connectors and fittings, and a listing of all specialty items.

MICHIGAN DESIGN MANUAL

BRIDGE DESIGN

12.07

PAINTING

Projects for painting structural steel are requested by the Region/TSC. These projects may either be for the repainting of previously coated steel or the initial painting of A588 steel. For additional information, see Subsection 7.02.17.

12.07.01

Blast Cleaning

- A. In addition to the normal precautions required during blast cleaning of existing steel, provisions must be made to properly confine and dispose of abrasive material and residue. These provisions are required whether the entire structure is to be cleaned or only isolated portions. (8-6-92)
- B. (8-6-92) Some telephone ducts installed under bridges in the past have been Johns Manville Transite ducts, made in part of asbestos. These will have to be encased to prevent release of the asbestos into the atmosphere during blast cleaning for painting.

The bridge inspectors will identify ducts marked "Johns Manville" or "Transite" and record this information on their reports. If the telephone ducts are inaccessible and the material cannot be identified, this will be noted. We will then make the determination during a site visit. (5-1-2000)

These ducts and others not requiring painting should be encased in a protective shielding to prevent damage due to blast cleaning (see Note 8.09.04C).

12.07.02

Substructure Protection

The top surface of all substructure units under superstructure transverse joints shall be coated with "Concrete Pier Cap Sealer" as described in the Special Provision for Pier Cap Sealers. (5-1-2000)

12.07.03

Pins and Hangers

The pin and hanger assemblies of cantilever bridges are particularly susceptible to corrosion, and their replacement may have to be included in painting contracts. Region scoping engineers will designate which assemblies will have to be replaced. See Chapter 7 for details.

Where steel beams of adjacent spans are in contact at a closed expansion joint, plans should note whether or not the beam ends are to be "trimmed" to restore an expansion gap. The decision should be based on the maintenance report and/or observations made during field reviews. If the webs are buckling, they should be trimmed. If there is no apparent distress, they can be left in contact since the pin replacement is made during the summer when expansion is maximum and no further forces should develop. **If necessary detail the trimming of fascias and soffits of the bridge deck making sure not to expose deck steel.** (5-1-2000) (6-16-2014)

New pins shall be stainless steel and used in conjunction with nylon washers and non-metallic bushings. New pin plates/link plates shall use an allowable bearing stress of 0.8 F_y. Non-redundant structures shall use a reduced allowable bearing stress of 0.4 F_y. (12-5-2005)