This mailing contains revisions to both

English and Metric versions of the

Standard Road Plans

effective for the **10-18-11** letting.

The pink memos, describing the revisions made,

should be retained in the "Revision Letters" section

in the back of the manuals for future reference.

Federal and state laws prohibit employment and/or public accommodation discrimination on the basis of age, color, creed, disability, gender identity, national origin, pregnancy, race, religion, sex, sexual orientation or veteran's status. If you believe you have been discriminated against, please contact the Iowa Civil Rights Commission at 800-457-4416 or Iowa Department of Transportation's affirmative action officer. If you need accommodations because of a disability to access the Iowa Department of Transportation's services, contact the agency's affirmative action officer at 800-262-0003.

Iowa Department of Transportation
Highway Division

TO: **Holders of Standard Road Plans** **TRANSMITTAL DATE:**

FROM: **Office of Design** **REVISION DATE:** **10-18-11**

SUBJECT: **Revision of Manual (English)**

INSTRUCTIONS: The attached Standard Road Plans have received approval and may be referred to in the plans by number. Questions concerning the distribution of revisions to the manual should be directed to the Office of Document Services, telephone (515) 239-1940. Questions concerning information contained on the Standard Road Plans should be directed to the Methods Section, Office of Design, telephone (515) 239-1133 or email amy.tinken@dot.iowa.gov.

Item Description	Description of Revision
Note	The following revisions are effective with the October 18, 2011 letting. Projects let prior to this date may reference earlier versions of these Standard Road Plans.
BA INDEX	
BA-106	Changed 5g2 bar to 5g3 bar in the Reinforcing Bar List.
BA-107	Labeled 5d2 bars. Modified 'x' bar dimensions, and respective bar lengths and bar weights. Updated language in notes.
BA-200	Added Installation in Paved Surface detail and circle note 2. Clarified height at curb face.
BA-202	Added note to clarify lapping procedure for terminal section. Added bolt pattern details to sheet 2 and 3. Removed circle note 2.
BA-203	Changed to three post design and added materials included in the Contract Item.
BA-204	Changed block out size from 19" to 22". Clarified notes. Modified materials included in Contract Items.
BA-205	Modified Materials included in the Contract Item. Clarified drawings and notes.
BA-206	Reworded note 1. Clarified drawings. Modified materials included in Contract Items.
BA-250	Updated reference to renamed standards.
BA-251	Updated reference to renamed standards.
BA-252	Changed circle note under ET from 1 to 2. Updated standard reference. Modified End Anchor. Modified new Possible Tab.
BA-253	Updated references to renamed standards. Modified dimensioning on plan view.
EC INDEX	
EC-202	Updated to conform to new specification.
EW INDEX	
EW-201	Removed 'A' and 'B' points from centerline. Added 'W' points. Removed 'A' and 'B' numbers.
EW-202	Removed 'A' and 'B' points from centerline. Added 'W' points. Removed 'A' and 'B' numbers.
EW-203	Removed 'A' and 'B' points from centerline. Added 'W' points. Removed 'A' and 'B' numbers.
EW-204	Removed 'A' and 'B' points from centerline. Added 'W' points. Removed 'A' and 'B' numbers.

MI INDEX	
MI-102	Modified notes to conform with modified specifications. Added circle notes 4 through 8.
MI-104	Removed general notes covered by specs.
MI-210	Modified sidewalk general note and moved it to circle note 7. Shaded possible sidewalk.
MI-220	Modified layouts and designs.
MI-221	Combine with SUDAS. New design.
PM INDEX	
PM-111	Added EXIT to word markings.
PM-210	Added additional 'W' information and moved to circle note 2. Flush Medians: changed NPZ length table, changed DCY4 to NPY4 and removed 'W'.
PM-211	Removed offset information from general note.
PV INDEX	
PV-03	Modified HMA drawings. Added circle notes 1 and 2.
PV-12	Shaded all pavement for clarification.
PV-305	Modified 'W' dimension and moved shoulder labels on sheet 1 top detail.
PV-410	Added 'C' Joint and circle notes 7 and 8.
PV-411	Added 'C' Joint and circle notes 8, 9, and 10. Renumbered circle notes.
PV-412	Added 'C' Joint and circle notes 8 and 9.
PV-414	Added 'C' Joint and circle notes 9, 10, and 11.
RD INDEX	
RD-5	Void. Design controlled by appropriate railroad authority.
RD-6	Void. Design controlled by appropriate railroad authority.
RD-7	Void. Design controlled by appropriate railroad authority.
RF INDEX	
RF-01	Void. DOT will go to the AASHTO (and ASTM) Class (and equivalent) design.
RF-02	Modified circle note 5 to allow lift holes to be used for tie rods. Changed RF-1 reference to AASHTO M 170.
RF-03	Corrected 'A' dimension. Removed references to RF-1. Removed language added to Specifications.
RF-13	Removed reference to RF-1. Modified language.
RF-14	Added details to allow for alternate tie rods per revised Materials I.M. 451, table for connector bar sizes and circle note 3. Changed RF-1 references.
RF-21	Changed RF-1 reference to AASHTO M 170.
RF-26	New design. Added arch pipe sizes.
RF-41	Void. Use AASHTO M 206.
RF-42	Removed circle note 2 and replaced with 2 foot dimension. Modified 102 x 62 'A' dimension.

RK INDEX	
RK-20	Changed "U" Bar size on sheet 1 from #5 to #4 to match sheet 3. Added note 9. Changed curb.
RK-25	Changed "U" Bar size on sheet 1 from #5 to #4 to match sheet 3. Added note 9. Changed curb.
RK-26	Changed "U" Bar size on sheets 1 and 2 from #5 to #4 to match sheet 4. Added note 9. Changed curb.
RK-27	New.
RM INDEX	
RM-39	Modified and clarified general notes. Removed information covered by Specifications.
RM-42	Added allowance for slots with Type '1' handhole. Removed reference to RF-1.
RM-47	Corrected title spelling.
SI INDEX	
SI-113	Added alternate base plates.
SI-114	Modified Breakaway Brace weld size. Added size of welds on Section C-C, added alternate 2 and clarified dimensioning on Section B-B.
SI-131	Added Perforated Square Tube Post to Wood Post Installation detail.
SI-172	Changed face of curb reference.
SI-181	Added 'W' to match tab. Added general note and modified circle note 1 to clarify 'W'.
SI-182	Added to general notes that the three object marker types are equivalent. Added 'W' to match tab. Modified circle note 1.
SI-241	New. Replaces Details 9105 and 9106.
SW INDEX	
SW-509	Added circle note 5 and note for transitioning curbs. Clarified spacer dimensions and configuration.
SW-510	Added circle note 5 and note for transitioning curbs. Clarified spacer dimensions and configuration.
SW-545	Added "Type G" (casting) on sheets 1 and 2.
TC INDEX	
TC-01	Changed size of W21-6 sign. Updated language of general notes. Made into a color standard.
TC-030	Updated to color standard. Updated values in table.
TC-233	Adjusted amber light wording in general notes.
TC-283	Made into color standard. Changed size of signs to 48" X 48".
TC-416	Added circle note and sign names to prior "special" signs. Modified work area and signs (sht 1). Modified device spacing and shoulders on all sheets.
TC-417	Added Type III Barricade to page 1, location of yield sign, device spacing, and circle note 1. Changed offset of vertical panels on page 3.
TC-418	Updated traffic signs. Reworded general notes. Added circle note 4. Made into color standard.
TC-421	Removed LANE CLOSED 2000 FT sign. Made into color standard.
TC-422	Updated traffic signs. Reworded general notes. Made into color standard.
TC-433	Adjusted amber light wording in general notes.
TC-454	Added circle note 2. Updated to color. Removed W20-5 sign.
TC-601	New
TC-602	New

SECTION

Barriers

BA

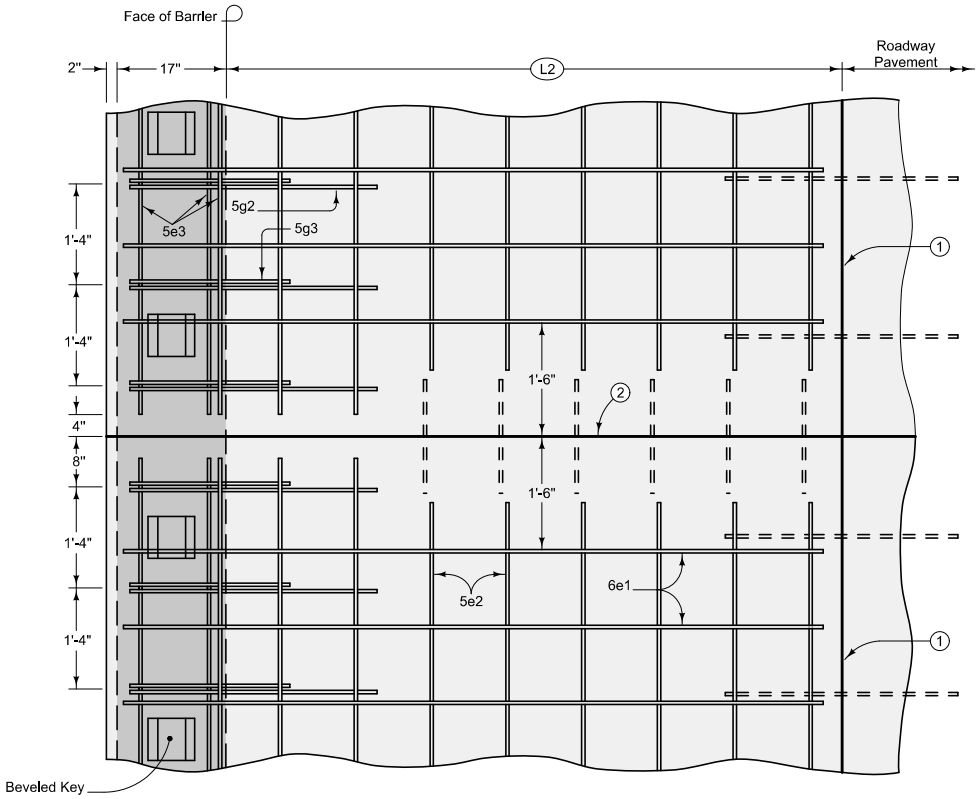
NO.	DATE	TITLE
		Concrete Barriers
BA-100	04-20-10	44" Concrete Median Barrier (Full Section)
BA-101	04-20-10	44" Concrete Median Barrier Width Transition
BA-102	04-19-11	44" Concrete Barrier (Half Section)
BA-103	04-20-10	34" Concrete Barrier (Half Section)
BA-104	04-20-10	34" Concrete Barrier for use with Reinforced Paved Shoulder
BA-105	04-20-10	34" to 44" Concrete Barrier Transition Section
BA-106	10-18-11	Reinforced Paved Shoulder for Concrete Barrier
BA-107	10-18-11	Concrete Barrier End Section
BA-108	04-19-11	Concrete Barrier Tapered End Section
BA-150	04-19-11	Side Obstacle Protection with Concrete Barrier and Guardrail
		Steel Beam Guardrail
BA-200	10-18-11	Steel Beam Guardrail Components
BA-201	10-19-10	Steel Beam Guardrail Barrier Transition Section
BA-202	10-18-11	Steel Beam Guardrail Bolted End Anchor
BA-203	10-18-11	Steel Beam Guardrail W-Beam End Anchor
BA-204	10-18-11	Steel Beam Guardrail Thrie-Beam End Anchor
BA-205	10-18-11	Steel Beam Guardrail End Terminal
BA-206	10-18-11	Steel Beam Guardrail Flared End Terminal For Cable Connection
BA-210	04-20-10	Guardrail Post Adaptor Unit
BA-250	10-18-11	Steel Beam Guardrail Installation at Concrete Barrier or Bridge End Post
BA-251	10-18-11	Steel Beam Guardrail Installation at Side Obstacle (Two-Way Protection)
BA-252	10-18-11	Steel Beam Guardrail Installation at Side Obstacle (One-Way Protection)
BA-253	10-18-11	Steel Beam Guardrail Installation at Railroad Signal
		Cable Guardrail
BA-351	04-20-10	High Tension Cable Guardrail

SECTION

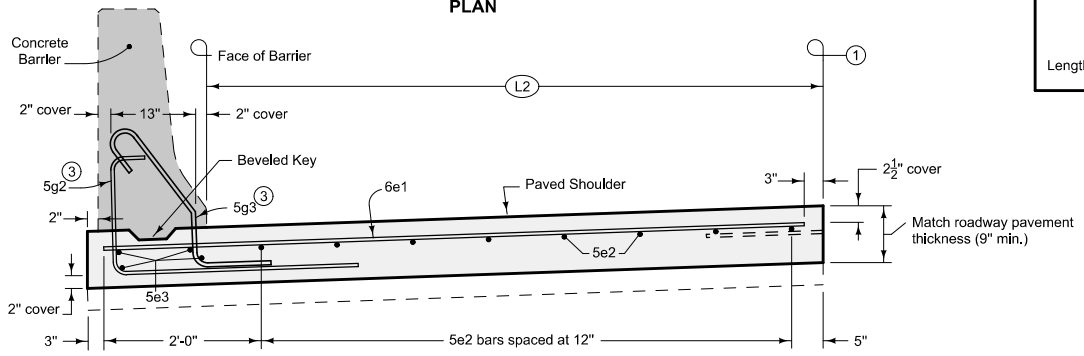
Barriers

BA

NO.	DATE	TITLE
		Temporary Barrier Rails
BA-400	04-20-10	Temporary Barrier Rail (Steel)
BA-401	04-20-10	Temporary Barrier Rail (Precast Concrete)
		Crash Cushions
BA-500	04-20-10	Temporary Crash Cushions Sand Barrel



PLAN



TYPICAL SECTION

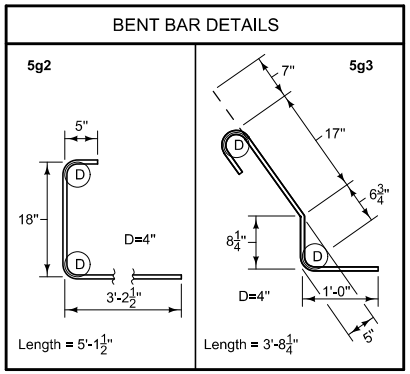
REINFORCING BAR LIST
Per Shoulder Panel (Approximately 20 Linear Feet)

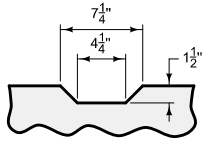
L2	Bar	Number of Bars	Length	Spacing
4'	6e1	18	5'-1"	12"
	5e2	4	18'-0"	12"
6'	6e1	18	7'-1"	12"
	5e2	6	18'-0"	12"
8'	6e1	18	9'-1"	12"
	5e2	8	18'-0"	12"
10'	6e1	18	11'-1"	12"
	5e2	10	18'-0"	12"
12'	6e1	18	13'-1"	12"
	5e2	12	18'-0"	12"
Applies to all Shoulder Widths	5e3	4	18'-8"	See Drawing
	5g2 (3)	15	5'-1½"	1'-4"
	5g3 (3)	15	3'-8¼"	1'-4"

ESTIMATED SHOULDER QUANTITIES
Per Linear Foot

	L2				
	4'	6'	8'	10'	12'
Concrete Sq. Yds.	0.62	0.84	1.06	1.29	1.51

BENT BAR DETAILS





BEVELED KEY

Use 2 x 8 lumber 8" long to make keys.
Place keys at 2'-8" centers.

1. 'L-2' or 'KT-2' joint. When roadway pavement is existing, use 'BT-3' joint. See PV-101.
2. 'CD' joint. Match roadway joint locations. See PV-101. No 'CD' joint baskets required within 4' of outside edge of shoulder.
3. When shoulder will be located under a concrete barrier end section, replace 5g2 and 5g3 bars with reinforcement as shown on BA-107.

Possible Contract Item:
Reinforced Paved Shoulder

Possible Tabulation:
108-18B

Iowa Department of Transportation

REVISION	
2	10-18-11

STANDARD ROAD PLAN

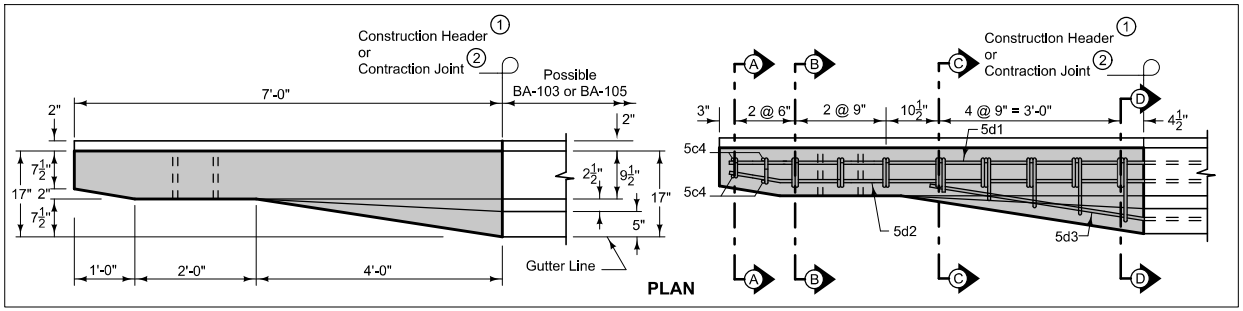
BA-106

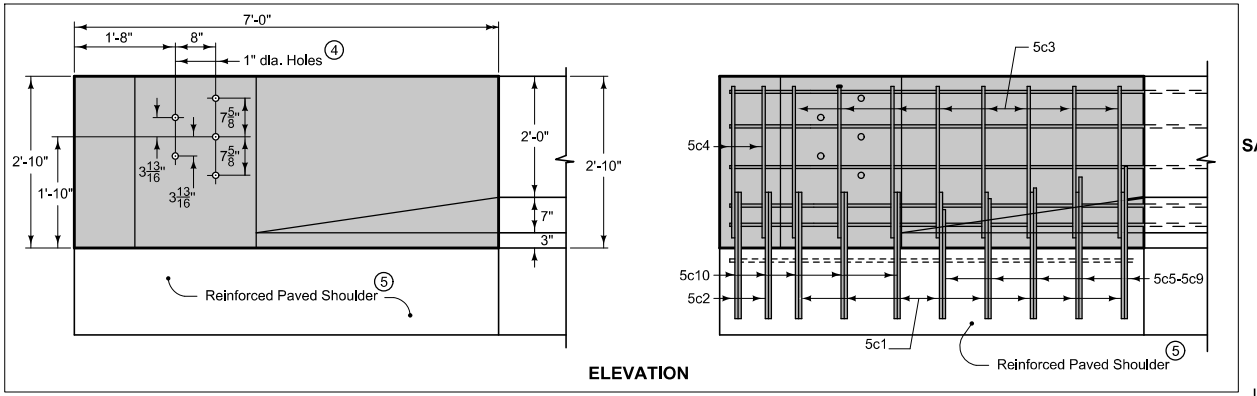
SHEET 1 of 1

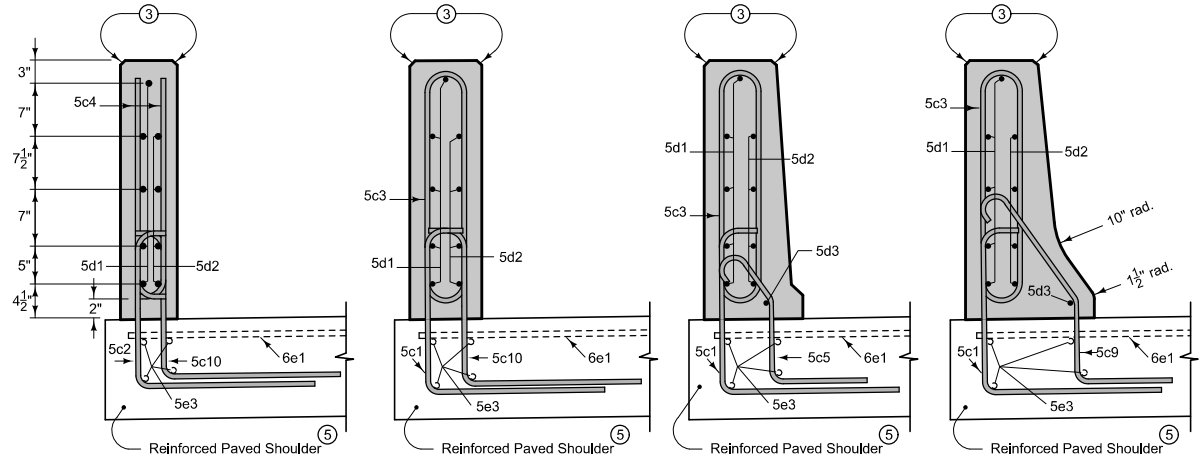
REVISIONS: Changed 5g2 bar to 5g3 bar in reinforcing bar list.

Deanna Maifield
APPROVED BY DESIGN METHODS ENGINEER

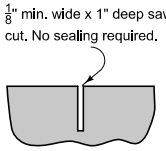
REINFORCED PAVED SHOULDER FOR CONCRETE BARRIER







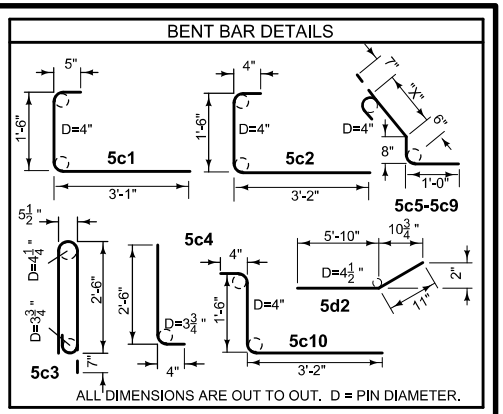
BAR	"X"
5c5	$6\frac{3}{16}$"
5c6	$8\frac{11}{16}$"
5c7	$10\frac{3}{8}$"
5c8	1'-$1\frac{5}{8}$"
5c9	1'-$4\frac{1}{16}$"



SAWED CONTRACTION JOINT

Saw cut top and front face.
Saw cut back if exposed.

CONCRETE QUANTITIES
Per End Section
0.62 cy



REINFORCING BAR LIST

BAR	LOCATION	SHAPE	NO.	LENGTH	WEIGHT
5c1	VERTICAL	⌐	8	5'-0"	42
5c2	VERTICAL	⌐	2	5'-0"	10
5c3	VERTICAL	∩	8	6'-1"	51
5c4	VERTICAL	⌐	4	2'-10"	12
5c5-5c9	VERTICAL	⌐	5	VARIES	17
5c10	VERTICAL	⌐	5	5'-0"	26
5d1	HORIZONTAL	—	5	6'-8"	35
5d2	HORIZONTAL	—	4	6'-9"	28
5d3	HORIZONTAL	—	1	3'-5"	4
				TOTAL WEIGHT (LBS.)	225

Use Grade 60 epoxy - coated reinforcing bars. Provide 2 inches minimum cover. Anchor all reinforcement to prevent movement. Secure each section at the front, back, and at 3'-6" intervals using a method approved by the Engineer.

① Expansion joints are necessary only where specifically required by project plans. Conform expansion material to the shape of the barrier. No sealer is required.

② Where abutting sections are placed as separate pours, a butt joint may be used. Extend longitudinal reinforcement into the abutting section a minimum of 1'-6".

③ Fillet all exposed corners with a ¾ inch dressed and beveled strip.

④ Form holes using 1 inch diameter plastic conduit.

⑤ See BA-106 for details of 5e3 bars, 6e1 bars, and reinforced paved shoulder.

Possible Contract Item:
Concrete Barrier Rail, BA-107

Possible Tabulation:
108-18B

Iowa Department of Transportation

STANDARD ROAD PLAN

REVISION	
2	10-18-11

BA-107

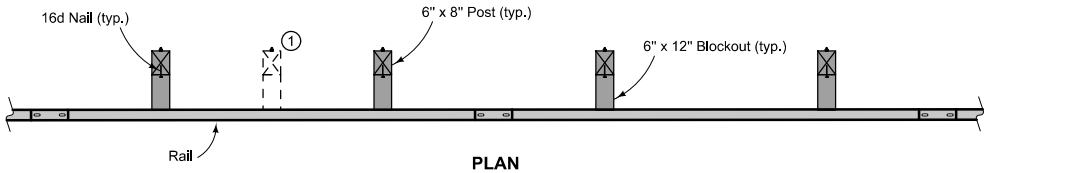
SHEET 1 of 1

REVISIONS: Labeled 5d2 bars. Modified 'X' bar dimensions and respective bar lengths and bar weights. Updated language in notes.

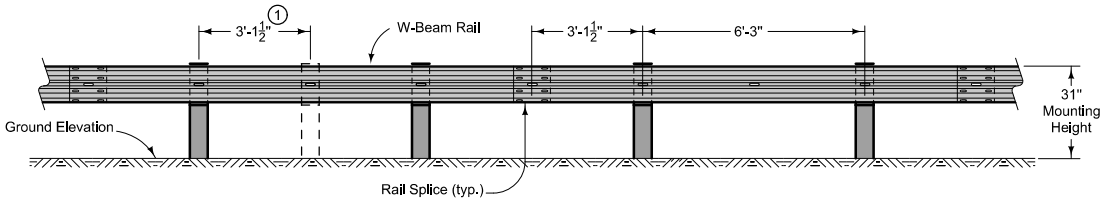
Deanna Maifield
APPROVED BY DESIGN METHODS ENGINEER

CONCRETE BARRIER END SECTION

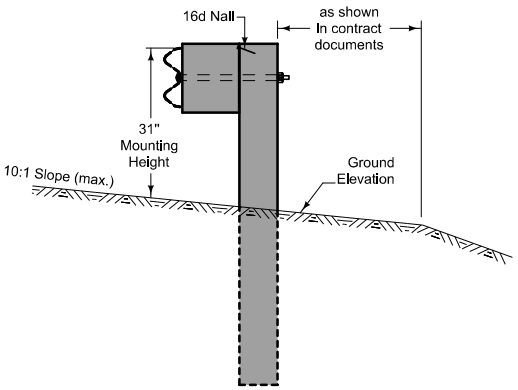
DESIGNER INFO



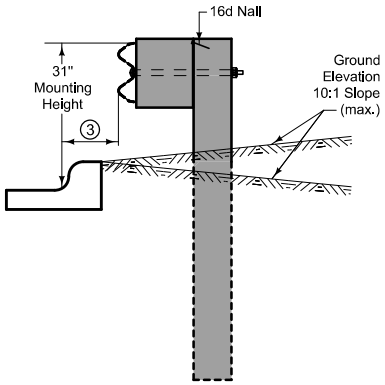
PLAN



ELEVATION



SECTION

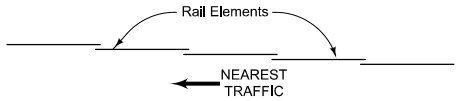


SECTION WITH CURB

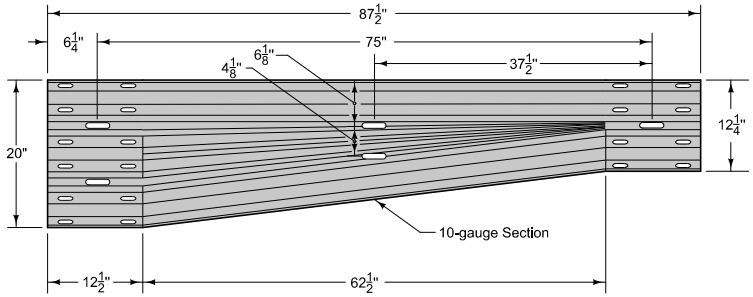
W-BEAM INSTALLATION

At Bridge End Drains, cut Scour Protection (Scourstop and TRM) or remove rock as required to place post(s) such that Bridge End Drains abut post(s).

1. When specified by the contract documents, install posts at 3'-1½" spacing.
2. When posts are placed in solid material such as paved shoulder or rock, drill minimum 15 inch diameter holes for the depth of the material. Backfill holes with special backfill.
3. 6" maximum for 6" Standard or 6" Sloped curbs and for non-standard curbs.

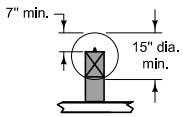


LAPPING PROCEDURE



ASYMMETRICAL TRANSITION SECTION

Possible Contract Item:
Steel Beam Guardrail



INSTALLATION IN PAVED SURFACE OR ROCK (2)

Iowa Department of Transportation

REVISION
2 | 10-18-11

STANDARD ROAD PLAN

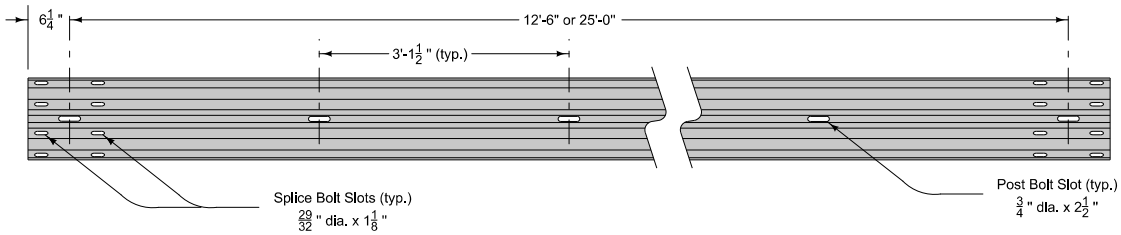
BA-200

SHEET 1 of 2

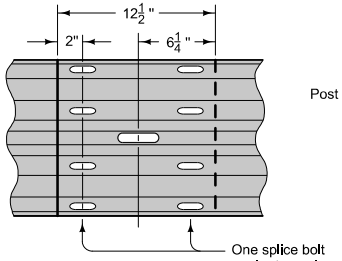
REVISIONS: Added Installation In Paved Surface detail and circle note 2. Clarified height at curb face.

Deanna Maifield
APPROVED BY DESIGN METHODS ENGINEER

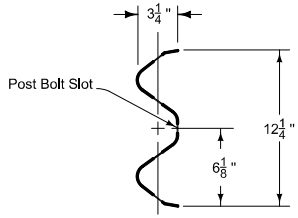
STEEL BEAM GUARDRAIL COMPONENTS



ELEVATION

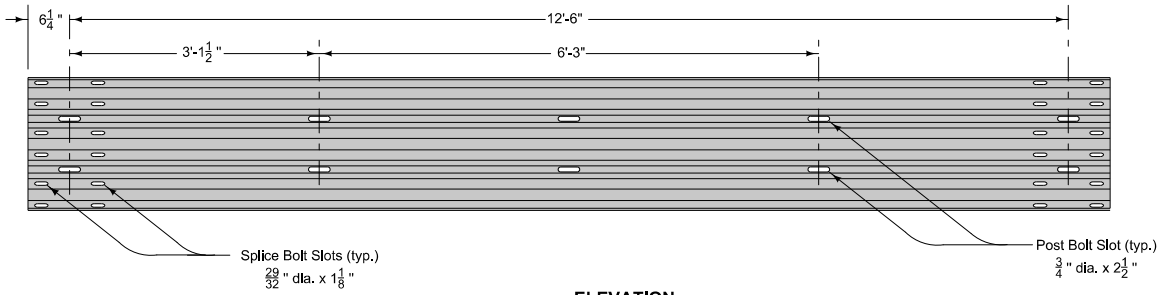


RAIL SPLICE

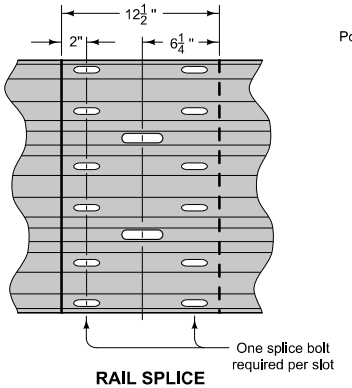


SECTION

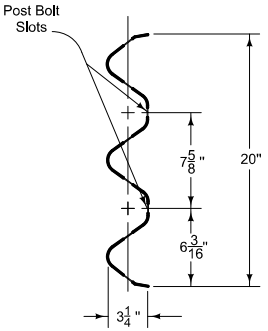
W-BEAM RAIL



ELEVATION

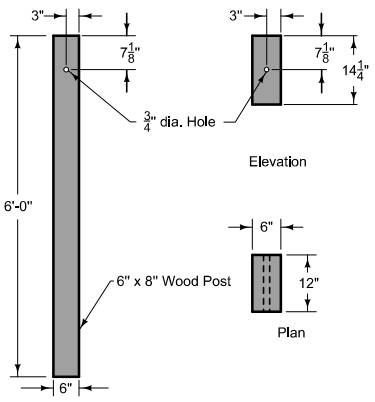


RAIL SPLICE



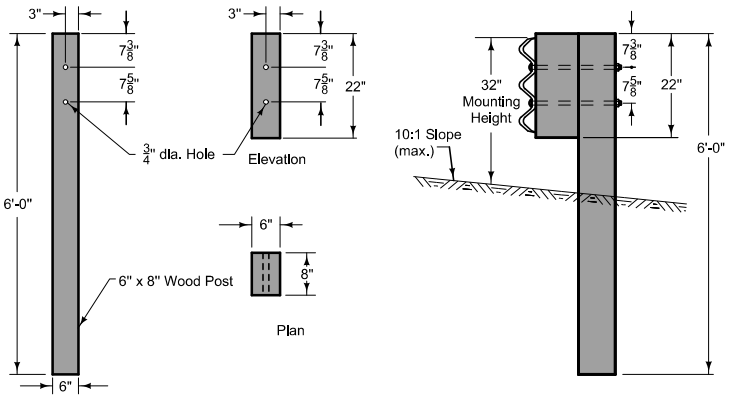
SECTION

THRIE-BEAM RAIL



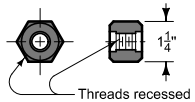
POST BLOCKOUT

W-BEAM

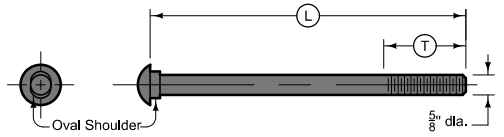


POST BLOCKOUT SECTION

THRIE-BEAM



NUT



BOLT

APPLICATION	T	L
Post Bolt for 8" Blockout	2½"	18"
Post Bolt for 12" Blockout	2½"	22"
Splice Bolt	1 1/16"	1¼"

T = Min. Thread Length L = Bolt Length

HARDWARE

Iowa Department of Transportation

STANDARD ROAD PLAN

REVISION	
2	10-18-11

BA-200

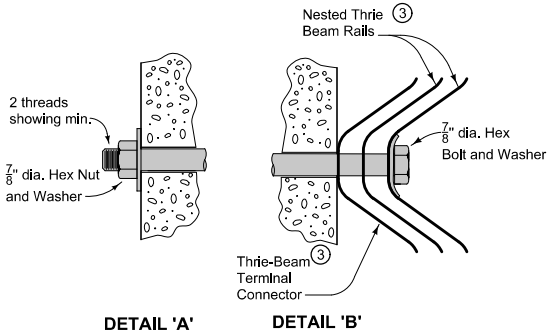
SHEET 2 of 2

REVISIONS: Added Installation In Paved Surface detail and circle note 2. Clarified height at curb face.

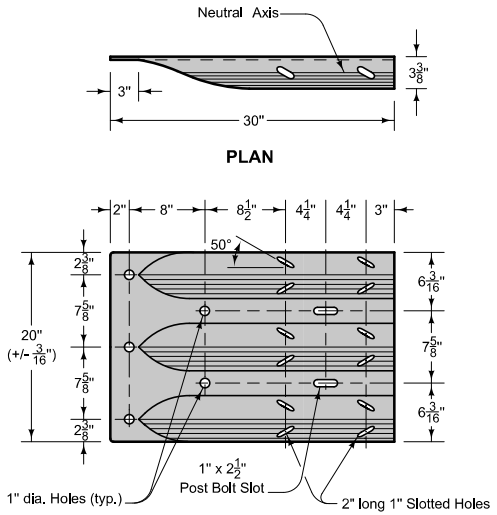
Deanna Maifield
APPROVED BY DESIGN METHODS ENGINEER

STEEL BEAM GUARDRAIL COMPONENTS

DESIGNER INFO



DETAIL 'A' DETAIL 'B'

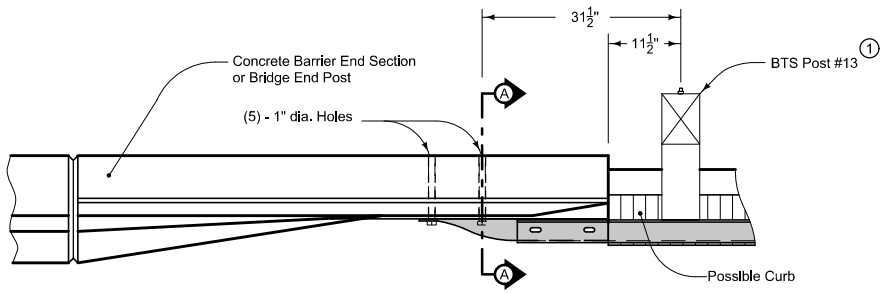


PLAN

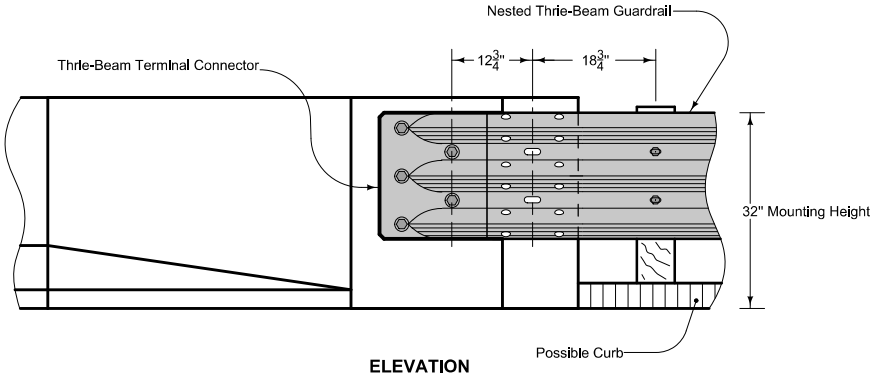
ELEVATION

THRIE - BEAM TERMINAL CONNECTOR

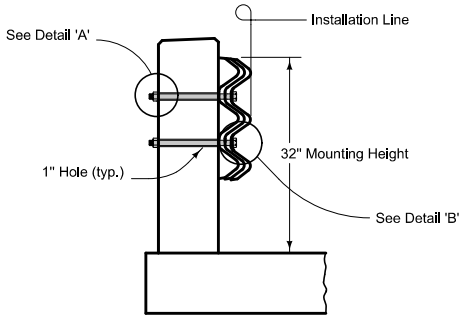
TYPE A



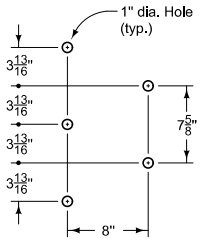
PLAN



ELEVATION



SECTION A-A



5 - BOLT PATTERN
Thrie-Beam Terminal Connector

① See **BA-201**.

③ Lap the Terminal Connector on the outside of the nested thrie beam rails for attachments on the trailing end of a bridge.

Possible Contract Item:
Steel Beam Guardrail End Anchor, Bolted

Materials included in the Contract Item:
Thrie-Beam Terminal Connector
Approved 7/8" x sufficient length Hex Bolts
Approved 7/8" Hex Nuts
Approved 15/16" Washers

Iowa Department of Transportation

STANDARD ROAD PLAN

REVISION	
1	10-18-11

BA-202

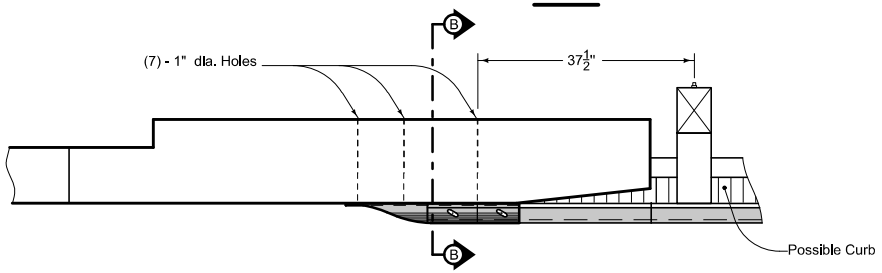
SHEET 1 of 3

REVISIONS: Added note to clarify lapping procedure for terminal section. Added bolt pattern details to sheet 2 and 3. Removed circle note 2.

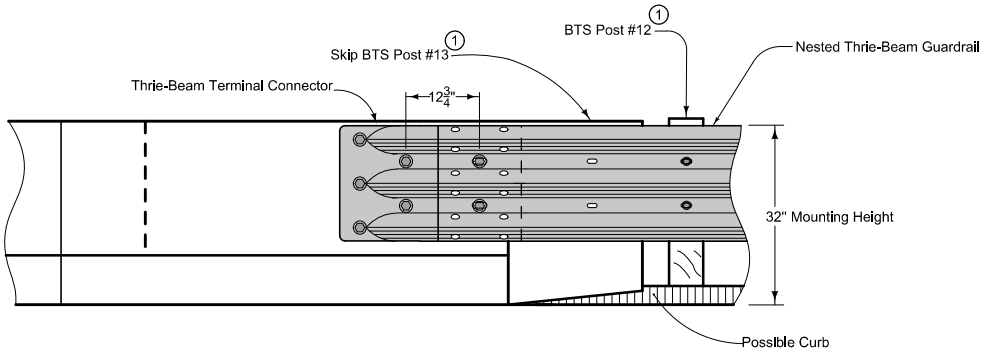
Deanna Maifield
APPROVED BY DESIGN METHODS ENGINEER

STEEL BEAM GUARDRAIL
BOLTED END ANCHOR

TYPE B

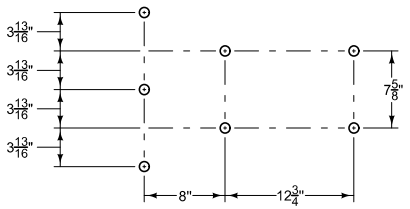


PLAN



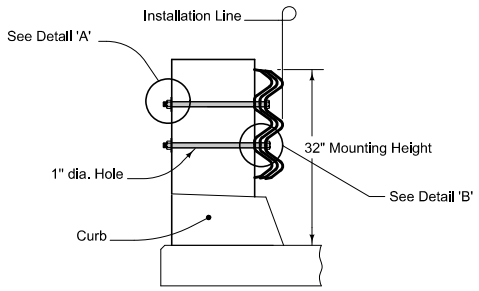
ELEVATION

① See **BA-201**.



7 - BOLT PATTERN

Thrie - Beam Terminal Connector



SECTION B-B

Iowa Department of Transportation

STANDARD ROAD PLAN

REVISION	
1	10-18-11

BA-202

SHEET 2 of 3

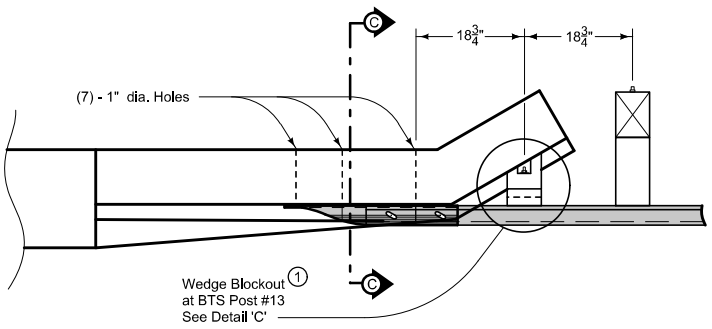
REVISIONS: Added note to clarify lapping procedure for terminal section. Added bolt pattern details to sheet 2 and 3. Removed circle note 2.

Deanna Maifield

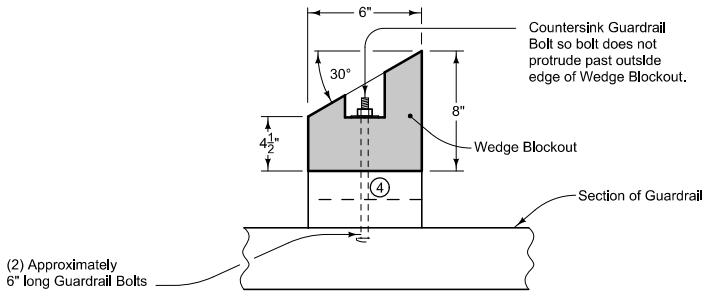
APPROVED BY DESIGN METHODS ENGINEER

STEEL BEAM GUARDRAIL
BOLTED END ANCHOR

TYPE C



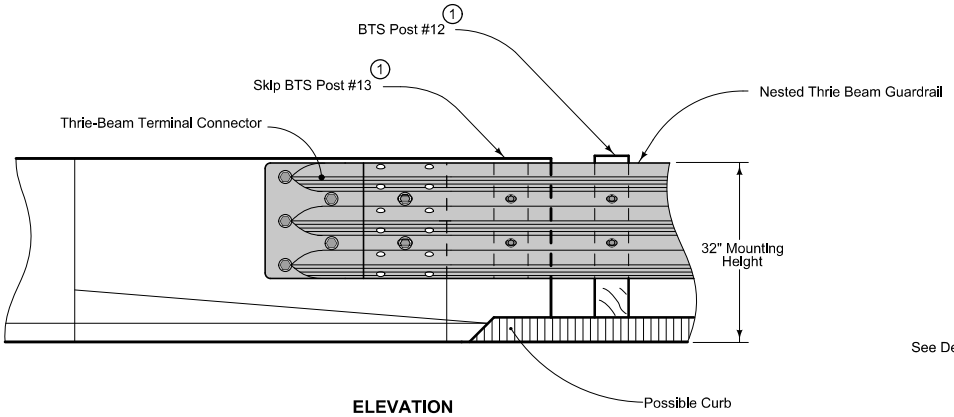
PLAN



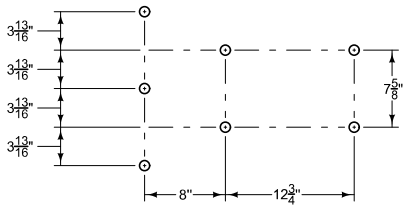
DETAIL 'C'

(1) See **BA-201**.

(4) Use treated spacer boards (1 in. x 6 in. or 2 in. x 6 in.) to produce a tight fit between the wedge blockout and endpost. A nominal 1 inch gap is acceptable. Spacer boards are incidental to bolted end anchor.

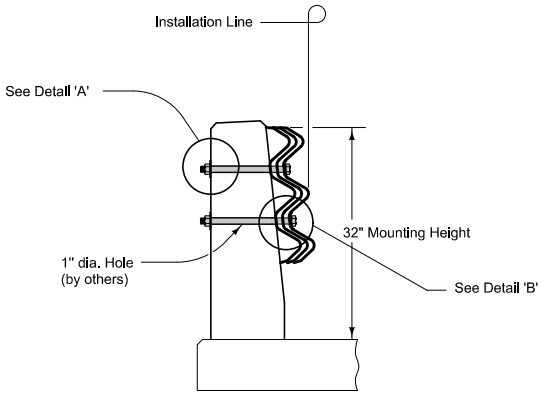


ELEVATION



7 - BOLT PATTERN

Thrie - Beam Terminal Connector



SECTION C-C

Iowa Department of Transportation

STANDARD ROAD PLAN

REVISION	
1	10-18-11

BA-202

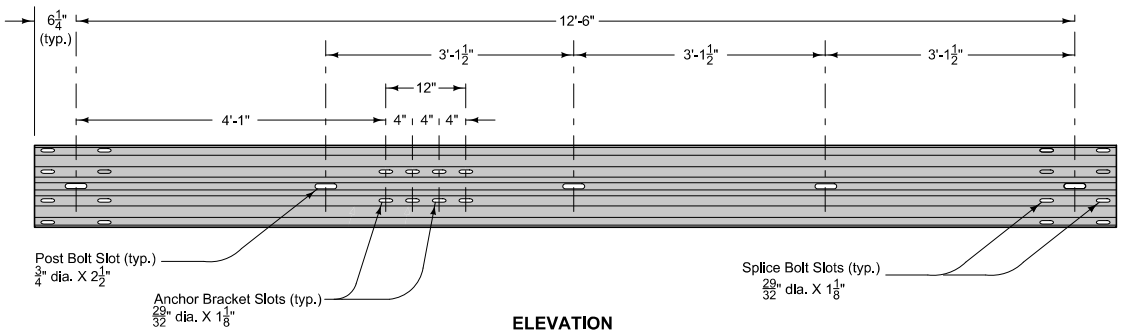
SHEET 3 of 3

REVISIONS: Added note to clarify lapping procedure for terminal section. Added bolt pattern details to sheet 2 and 3. Removed circle note 2.

Deanna Maifield
APPROVED BY DESIGN METHODS ENGINEER

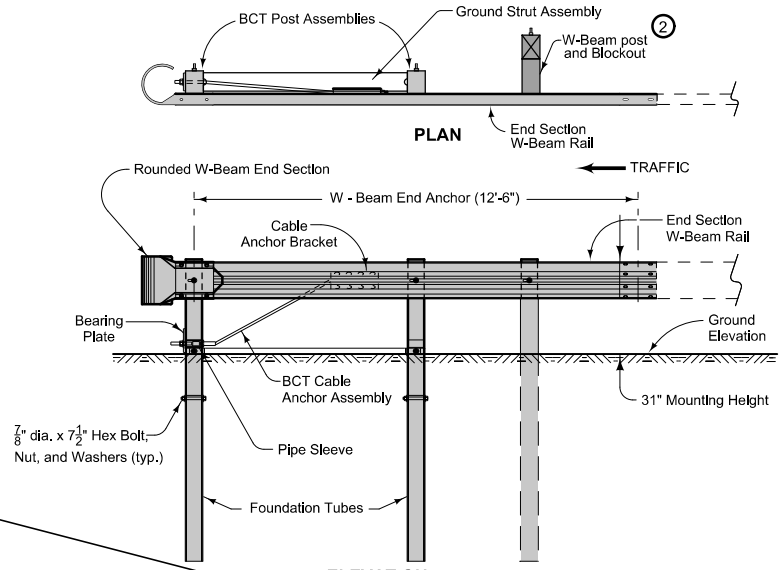
STEEL BEAM GUARDRAIL BOLTED END ANCHOR

DESIGNER INFO



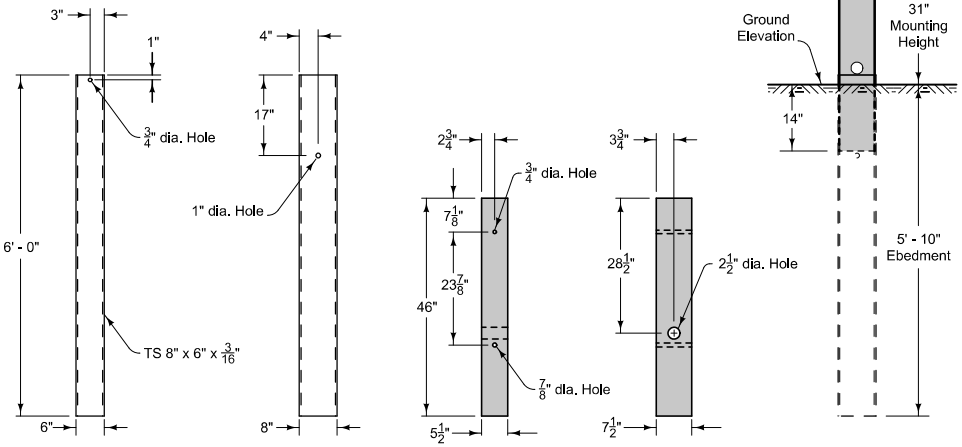
ELEVATION

END SECTION W-BEAM RAIL

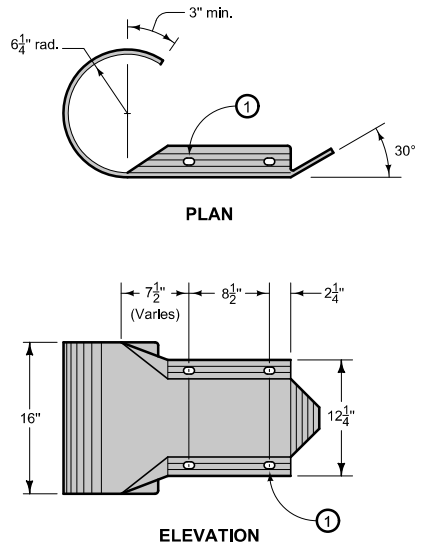


ELEVATION

INSTALLATION



BCT POST ASSEMBLY



ROUNDED W-BEAM END SECTION

1. 29/32" x 1⅛" slots (29/32" x 3" slots acceptable).
2. Refer to BA-200.

Possible Contract Item:
Steel Beam Guardrail End Anchor, W-Beam

Materials included in the Contract Item:
- (1) 12'-6" End Section W-Beam Rail
- (2) Foundation Tube Assemblies
- (2) BCT Wood Posts
- (1) Rounded W-Beam End Section
- (1) Cable Anchor Bracket
- (1) BCT Cable Anchor Assembly
- (1) Ground Strut Assembly
- (1) Pipe Sleeve
- (1) Bearing Plate
- (1) W-Beam Post (wood or steel - match remainder of installation)
- (1) W-Beam Blockout

Approved bolts, nuts, and washers

Iowa Department of Transportation

REVISION: 1 | 10-18-11

STANDARD ROAD PLAN

BA-203

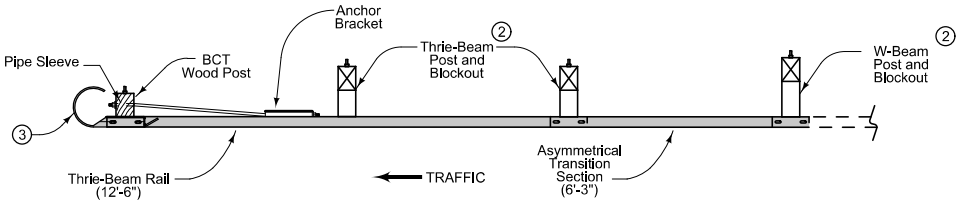
SHEET 1 of 1

REVISIONS: Changed to three post design and added materials included in the Contract Item.

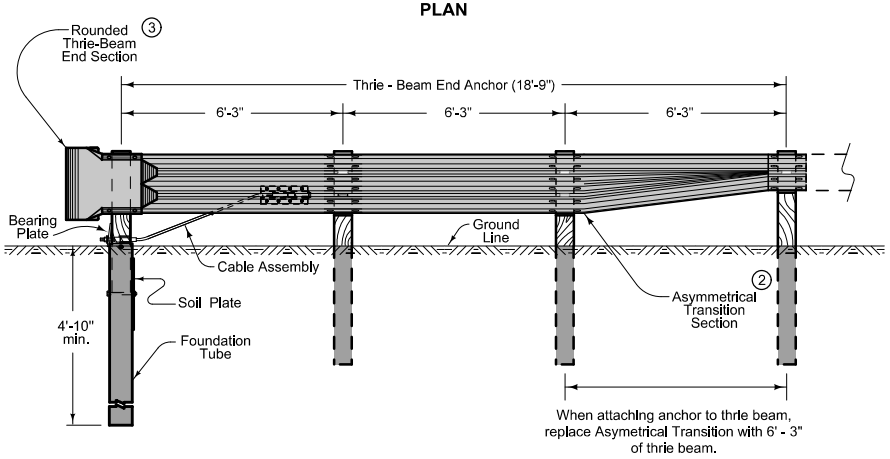
Deanna Maifield
APPROVED BY DESIGN METHODS ENGINEER

STEEL BEAM GUARDRAIL W-BEAM END ANCHOR

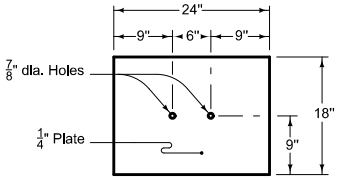
DESIGNER INFO



PLAN

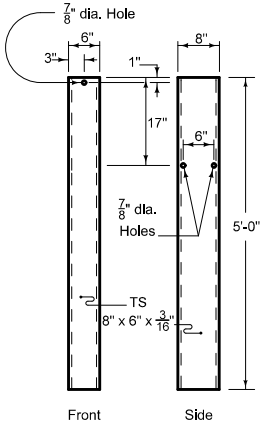


ELEVATION

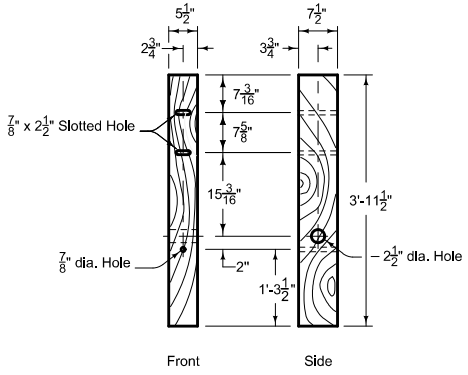


SOIL PLATE

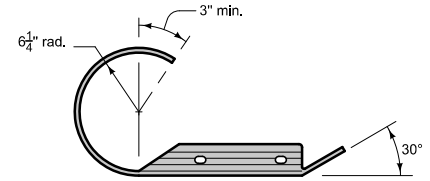
1. Slotted holes $\frac{29}{32}$" x $1\frac{1}{8}$" long.
2. Refer to **BA-200**.
3. Cover entire face of end section with alternating black and yellow striped adhesive sheeting. Stripes shall be approximately 3 inches in width and shall be sloped down at an angle of 45 degrees toward the side on which traffic is to pass the end anchor. Yellow stripes shall meet the retroreflectivity requirements for Type III or Type IV reflective sheeting.



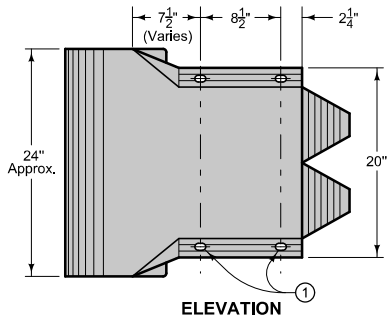
FOUNDATION TUBE



BCT WOOD POST



PLAN



ELEVATION

ROUNDED THRIE-BEAM END SECTION

Possible Contract Item:
Steel Beam Guardrail End Anchor, Thrie-Beam

Materials included in the Contract Item:
- (1) 12'-6" Thrie-Beam rail section
- (1) Asymmetrical Transition Section
- (2) Thrie-Beam posts (wood or steel - match remainder of installation)
- (1) W-Beam post (wood or steel - match remainder of installation)
- (1) W-Beam blockout
- (2) Thrie-Beam blockouts
- (1) BCT Wood Post
- (1) Rounded Thrie-Beam End Section
- (1) Anchor Bracket Assembly
- (1) Cable Assembly
- (1) Foundation Tube Assembly with Soil Plate
- (1) Pipe Sleeve

Approved bolts, nuts, and washers

Iowa Department of Transportation

REVISION
1 | 10-18-11

STANDARD ROAD PLAN

BA-204

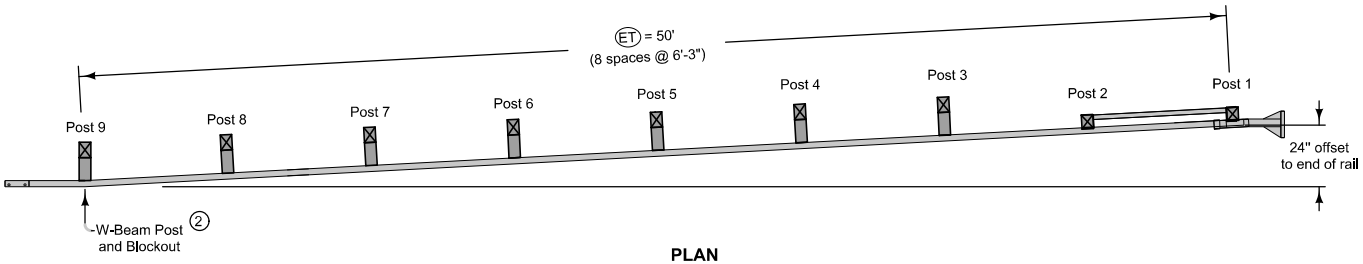
SHEET 1 of 1

REVISIONS: Changed block out size from 19" to 22". Clarified notes. Modified materials included in Contract Items.

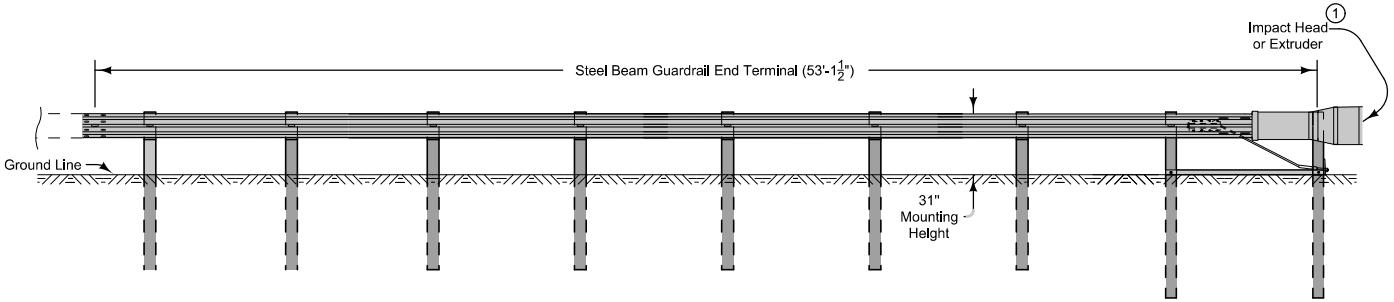
Deanna Maifield
APPROVED BY DESIGN METHODS ENGINEER

STEEL BEAM GUARDRAIL THRIE-BEAM END ANCHOR

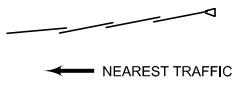
DESIGNER INFO



PLAN



ELEVATION



LAPPING PROCEDURE

Provide the following:

SKT-MGS by Road Systems, Inc.
OR
ET-Plus by Trinity Highway Products, LLC.

Use materials meeting the respective manufacturer's specifications. Install end terminals in accordance with the manufacturer's recommendations.

Note: at the Contractor's option, and at no additional cost to the Contracting Authority, alternate post designs developed by the manufacturer and accepted by the FHWA for use within the end terminal may be substituted for the wood post design shown. When such a substitution is made, provide the Engineer with three copies of the most current installation and maintenance manual for the alternate design.

(1) Cover entire face of impact head or extruder with alternating black and yellow striped adhesive sheeting.

- Stripes are approximately 3 inches wide and slope down at a 45 degree angle toward the side on which traffic is to pass the end terminal.

- Yellow stripes meet the retroreflectivity requirements for Type III or Type IV reflective sheeting.

(2) Refer to BA-200.

Possible Contract Item:
Steel Beam Guardrail End Terminal

Materials included in the Contract Item:
W-Beam Guardrail Sections totaling 53'-1½"
(1) Impact Head or Extruder
(1) Cable Anchor Bracket/Box
(1) BCT Cable Anchor Assembly
(1) BCT Bearing Plate
(1) Ground Strut or Angle Strut
(8) End Terminal Post Assemblies (wood or steel option)
(6) End Terminal Blockouts (as required by manufacturer)
(2) Foundation Tubes (wood post option)
(1) BCT Post Sleeve (wood post option)
(1) W-Beam Post (wood or steel - match remainder of installation.
(1) W-Beam Blockout
Approved Bolts, Nuts, Washers, and Screws

Iowa Department of Transportation

REVISION	
1	10-18-11

STANDARD ROAD PLAN

BA-205

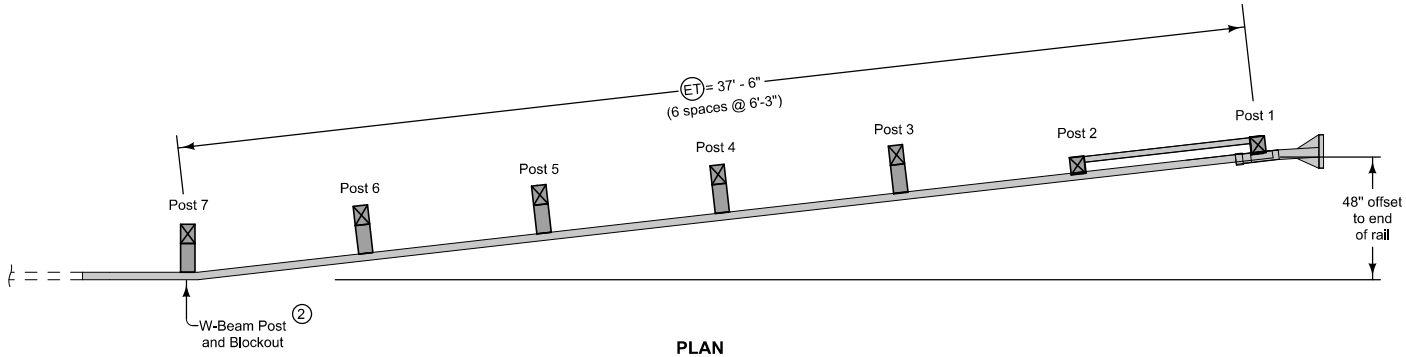
SHEET 1 of 1

REVISIONS: Modified Materials included in the Contract Item. Clarified drawings and notes.

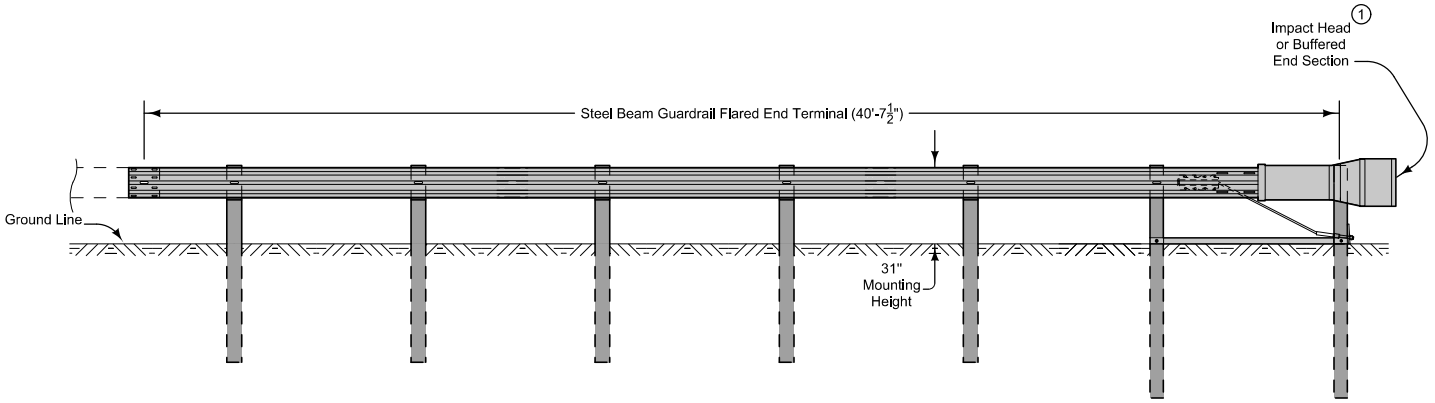
Deanna Maifield
APPROVED BY DESIGN METHODS ENGINEER

STEEL BEAM GUARDRAIL END TERMINAL

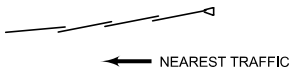
DESIGNER INFO



PLAN



ELEVATION



LAPPING PROCEDURE

Provide the following:

FLEAT-MGS by Road Systems, Inc.
OR
SRT-31 by Trinity Highway Products, LLC.

Use materials meeting the respective manufacturer's specifications. Install end terminals in accordance with the manufacturer's recommendations.

Note: at the Contractor's option, and at no additional cost to the Contracting Authority, alternate post designs developed by the manufacturer and accepted by the FHWA for use within the end terminal may be substituted for the wood post design shown. When such a substitution is made, provide the Engineer with three copies of the most current installation and maintenance manual for the alternate design.

① Cover entire face of impact head or buffered end section with alternating black and yellow striped adhesive sheeting.

-Stripes are approximately 3 inches wide and slope down at a 45 degree angle toward the side on which traffic is to pass the end terminal.

-Yellow stripes meet the retroreflectivity requirements for Type III or Type IV reflective sheeting.

② Refer to BA-200.

Possible Contract Item:
Steel Beam Guardrail Flared End Terminal

Materials included in the Contract Item:

W-Beam Guardrail Sections totaling 40'-7½"
(1) Impact Head or Buffered End Section
(1) Cable Anchor Bracket/Box
(1) BCT Cable Anchor Assembly
(1) BCT Bearing Plate
(1) Ground Strut or Angle Strut
(6) End Terminal Post Assemblies (wood or steel option)
(4) End Terminal Blockouts (as required by manufacturer)
(2) Foundation Tubes (wood post option)
(1) BCT Post Sleeve (wood post option)
(1) W-Beam Post (wood or steel - match remainder of installation.
(1) W-Beam Blockout
Approved Bolts, Nuts, Washers, and Screws

Iowa Department of Transportation

REVISION	
1	10-18-11

STANDARD ROAD PLAN

BA-206

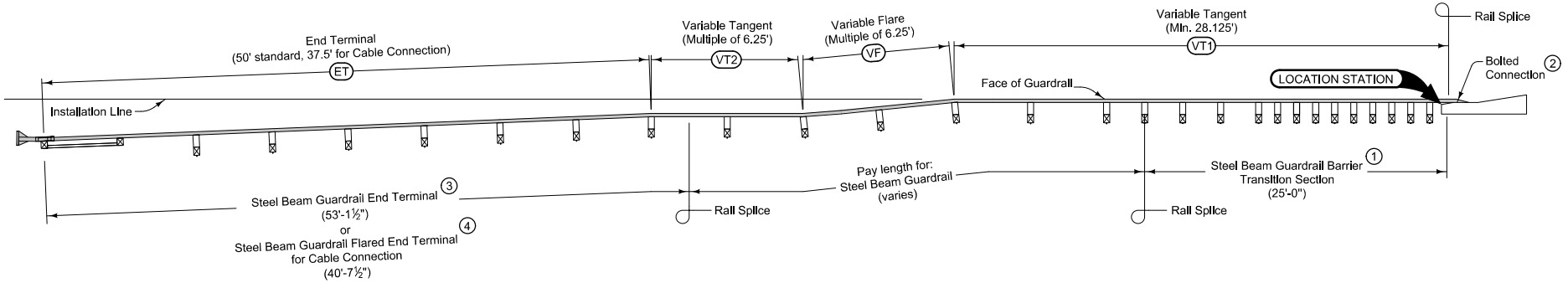
SHEET 1 of 1

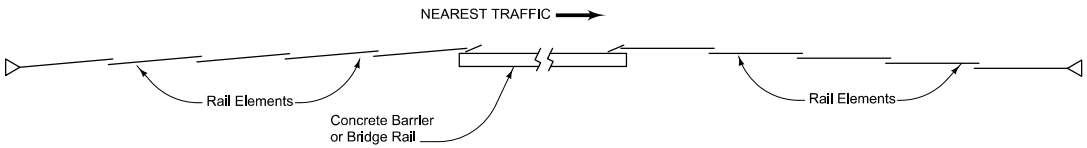
REVISIONS: Reworded Note 1. Clarified drawings. Modified materials in contract items.

Deanna Maifield
APPROVED BY DESIGN METHODS ENGINEER

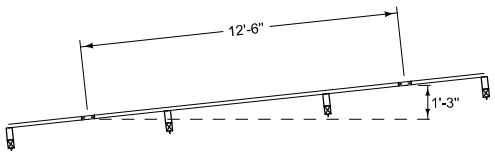
STEEL BEAM GUARDRAIL FLARED END TERMINAL FOR CABLE CONNECTION

DESIGNER INFO





LAPPING PROCEDURE



VARIABLE FLARE

Install delineators and object markers according to **SI-211**.

For grading requirements, see **EW-301**.

For general guardrail details, see **BA-200**.

1. See **BA-201**.
2. See **BA-202** for connections to concrete barriers and bridge end posts.
3. See **BA-205**.
4. See **BA-206**.

Possible Contract Items:
- Steel Beam Guardrail
- Steel Beam Guardrail Barrier Transition Section
- Steel Beam Guardrail End Anchor, Bolted
- Steel Beam Guardrail End Terminal

Possible Tabulation:
108-8A

Iowa Department of Transportation

REVISION 2 10-18-11

STANDARD ROAD PLAN

BA-250

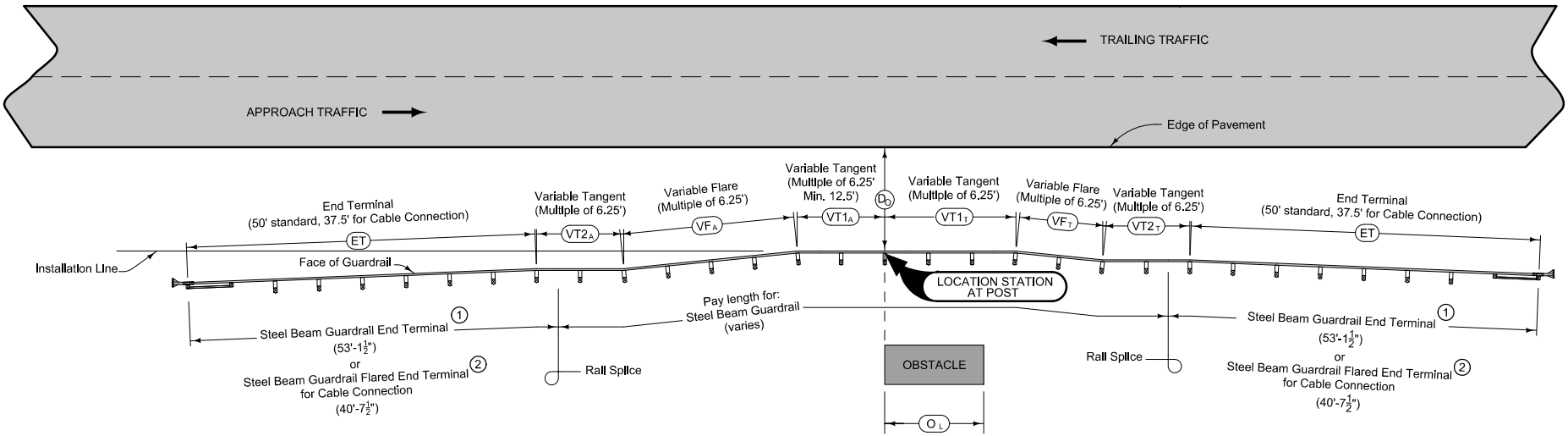
SHEET 1 of 1

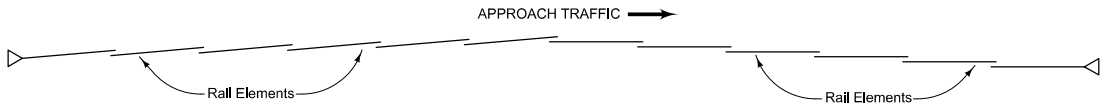
REVISIONS: Updated reference to renamed standards.

Deanna Maifield
APPROVED BY DESIGN METHODS ENGINEER

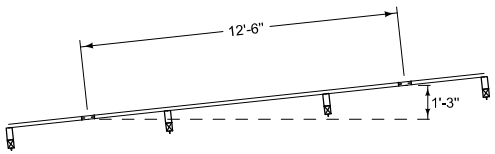
STEEL BEAM GUARDRAIL INSTALLATION AT CONCRETE BARRIER OR BRIDGE END POST

DESIGNER INFO





LAPPING PROCEDURE



VARIABLE FLARE

Install delineators and object markers according to **SI-211**.

For grading requirements, see **EW-301**.

For general guardrail details, see **BA-200**.

1 See **BA-205**.

2 See **BA-206**.

Possible Contract Items:
Steel Beam Guardrail
Steel Beam Guardrail End Terminal

Possible Tabulation:
108-8B

Iowa Department of Transportation

REVISION
2 | 10-18-11

STANDARD ROAD PLAN

BA-251

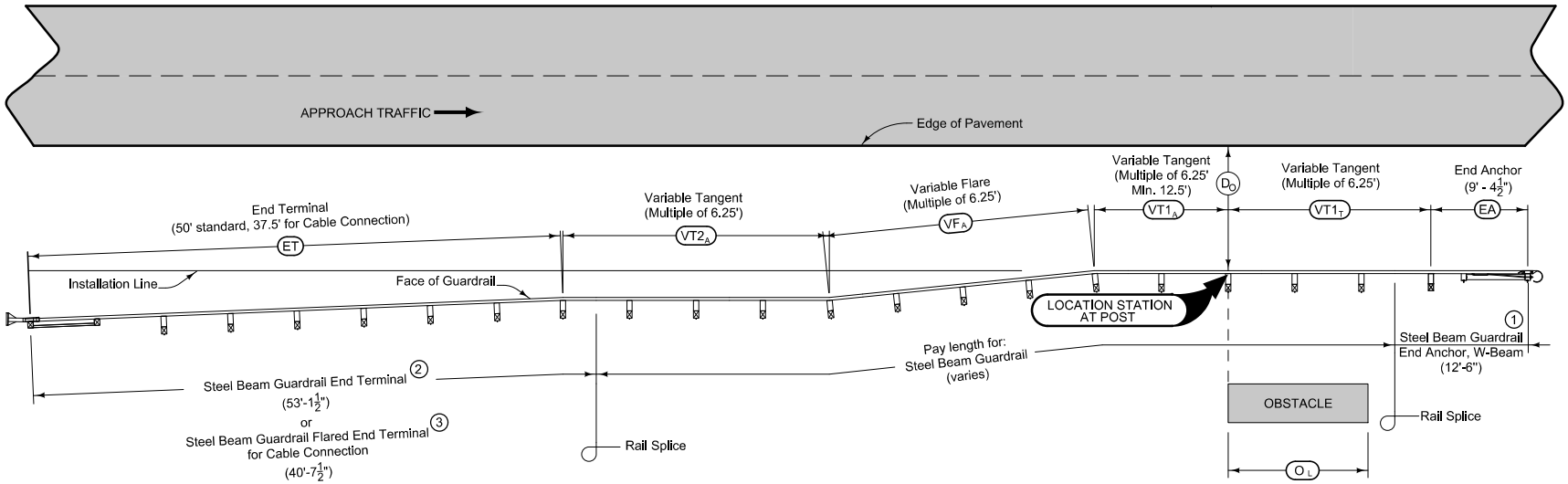
SHEET 1 of 1

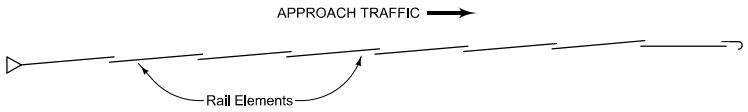
REVISIONS: Update reference to renamed standards.

Deanna Maifield
APPROVED BY DESIGN METHODS ENGINEER

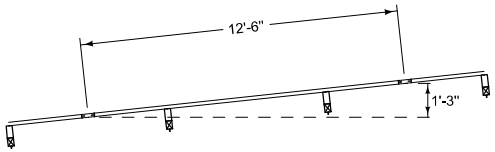
STEEL BEAM GUARDRAIL INSTALLATION AT SIDE OBSTACLE (TWO-WAY PROTECTION)

DESIGNER INFO





LAPPING PROCEDURE



VARIABLE FLARE

Install delineators and object markers according to **SI-211**.

For grading requirements, see **EW-301**.

For general guardrail details, see **BA-200**.

1 See **BA-203**.

2 See **BA-205**.

3 See **BA-206**.

Possible Contract Items:
Steel Beam Guardrail
Steel Beam Guardrail End Anchor, W-Beam
Steel Beam Guardrail End Terminal

Possible Tabulation:
108-8C

Iowa Department of Transportation

REVISION
3 | 10-18-11

STANDARD ROAD PLAN

BA-252

SHEET 1 of 1

REVISIONS: Changed circle note under ET from 1 to 2. Updated standard reference. Modified End Anchor. Modified new Possible Tab.

Deanna Maifield
APPROVED BY DESIGN METHODS ENGINEER

STEEL BEAM GUARDRAIL INSTALLATION AT SIDE OBSTACLE (ONE-WAY PROTECTION)

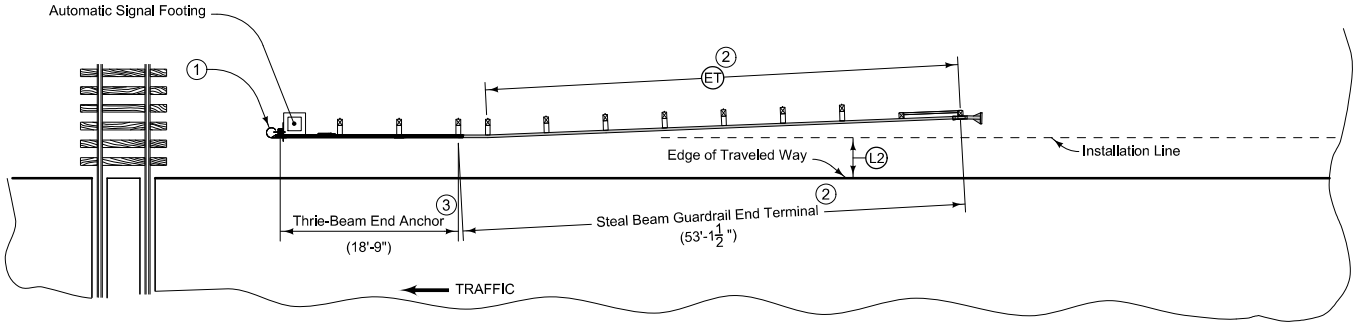
For grading requirements, refer to **EW-301**.

For additional guardrail requirements, refer to **BA-200**.

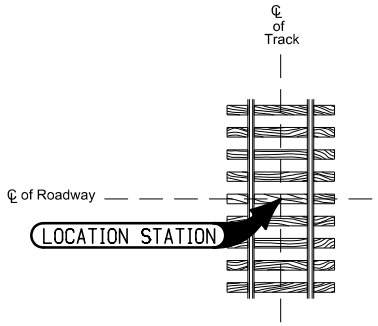
(1) Cover entire face of terminal section with alternating black and yellow striped adhesive sheeting. Stripes shall be approximately 3 inches in width and shall be sloped down at an angle of 45 degrees toward the side on which traffic is to pass the end anchorage. Yellow stripes shall meet the retroreflectivity requirements for Type III or Type IV reflective sheeting.

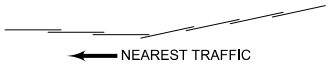
(2) Refer to **BA-205**.

(3) Refer to **BA-204**.



PLAN





LAPPING PROCEDURE

Possible Contract Items:
Steel Beam Guardrail End Anchor, Thrie-Beam
Steel Beam Guardrail End Terminal

Possible Tabulation:
108-8D

Iowa Department of Transportation

REVISION
1 | 10-18-11

STANDARD ROAD PLAN

BA-253

SHEET 1 of 1

REVISIONS: Updated references to renamed standards. Modified dimensioning on plan view.

Deanna Maifield
APPROVED BY DESIGN METHODS ENGINEER

STEEL BEAM GUARDRAIL INSTALLATION AT RAILROAD SIGNAL

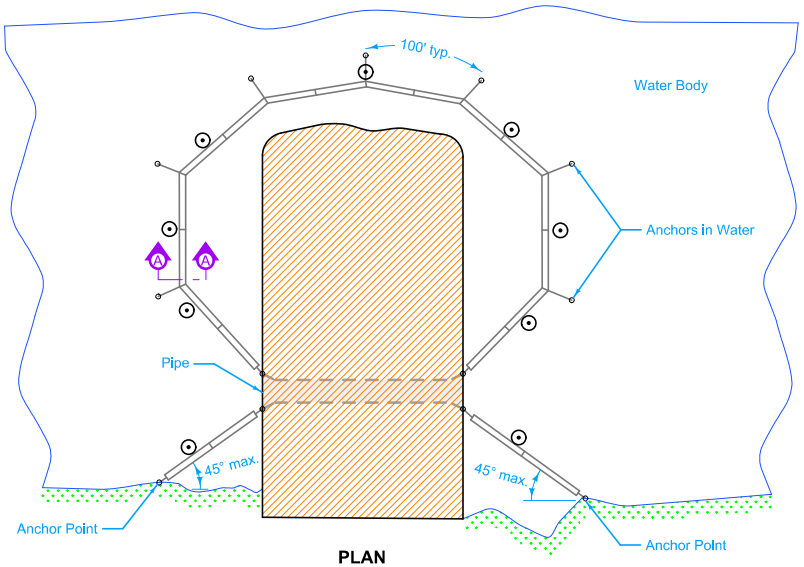
SECTION

Erosion Control

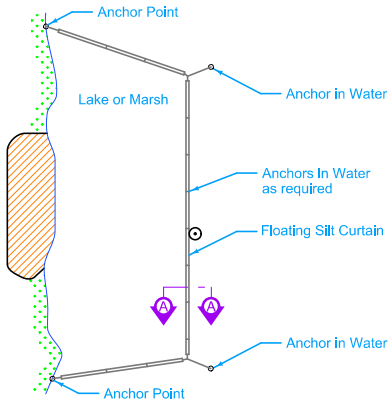
EC

NO.	DATE	TITLE
EC-101	04-20-10	Wood Excelsior Mat for Ditch Protection
EC-102	04-20-10	Sod for Ditch Protection
EC-103	04-20-10	Wood Excelsior Mat for Slope Protection
EC-201	04-20-10	Silt Fence
EC-202	10-18-11	Floating Silt Curtain
EC-501	04-20-10	Trees and Shrubs

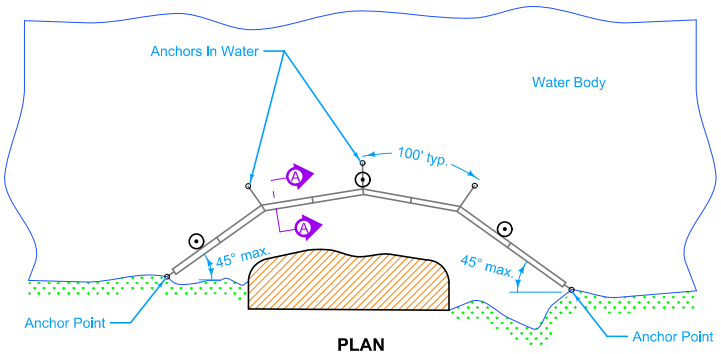
DESIGNER INFO



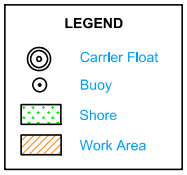
PLAN
Locations with pipe
Under stream crossing or causeway



PLAN
Still Water Only



PLAN
Locations without pipe
Under causeway or pad



Keep silt curtain as close to work area as possible.

Anchors and weights are to be as recommended by manufacturer. Construct floating silt curtain of fabric fastened to a flotation carrier and weighted along the bottom edge. Depth of curtain is the dimension of the curtain fabric extending below the flotation, i.e. hanging in the water. Upon completion of the work, remove the curtain in a manner that will prevent re-suspension of sediment into the water.

Install according to Hanging Installation unless otherwise specified.

Possible Tabulation:
100-10

Possible Contract Items:
Clean-out of Floating Silt Curtian (Containment)
Floating Silt Curtain (Containment)
Floating Silt Curtain (Hanging)

Iowa Department of Transportation

REVISION
2 | 10-18-11

STANDARD ROAD PLAN

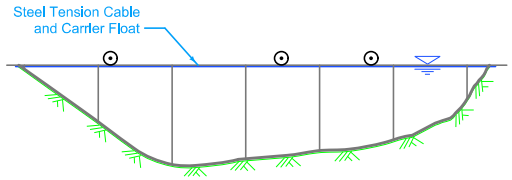
EC-202

SHEET 1 of 2

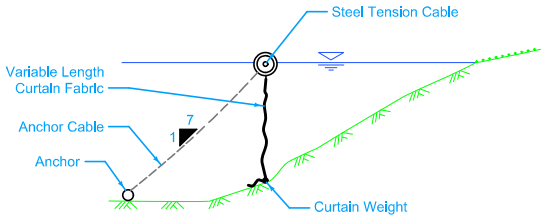
REVISIONS: Updated to conform to new specification.

Deanna Maifield
APPROVED BY DESIGN METHODS ENGINEER

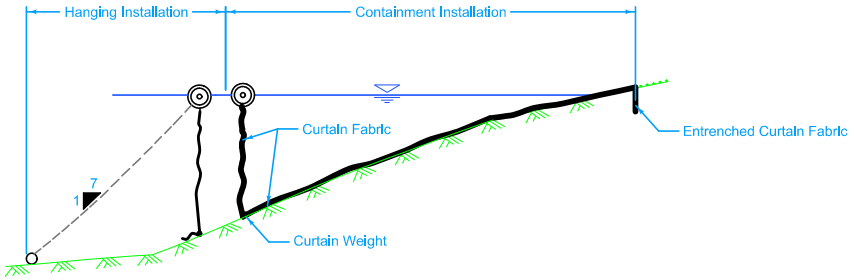
FLOATING SILT CURTAIN



PROFILE



SECTION A-A
Hanging Installation



SECTION A-A (1)
Containment Installation

LEGEND

- Carrier Float
- Buoy
- Water Surface

(1) When Containment Installation is specified, it will be in combination with a Hanging Installation that is paid for separately.

Remove containment by pulling buoy towards land until it reaches trench line. Remove entrenched fabric and pull both ends up and out of the water. Move silt and fabric offsite to ensure total containment.

Iowa Department of Transportation

REVISION
2 | 10-18-11

STANDARD ROAD PLAN

EC-202

SHEET 2 of 2

REVISIONS: Updated to conform to new specification.

Deanna Maifield
APPROVED BY DESIGN METHODS ENGINEER

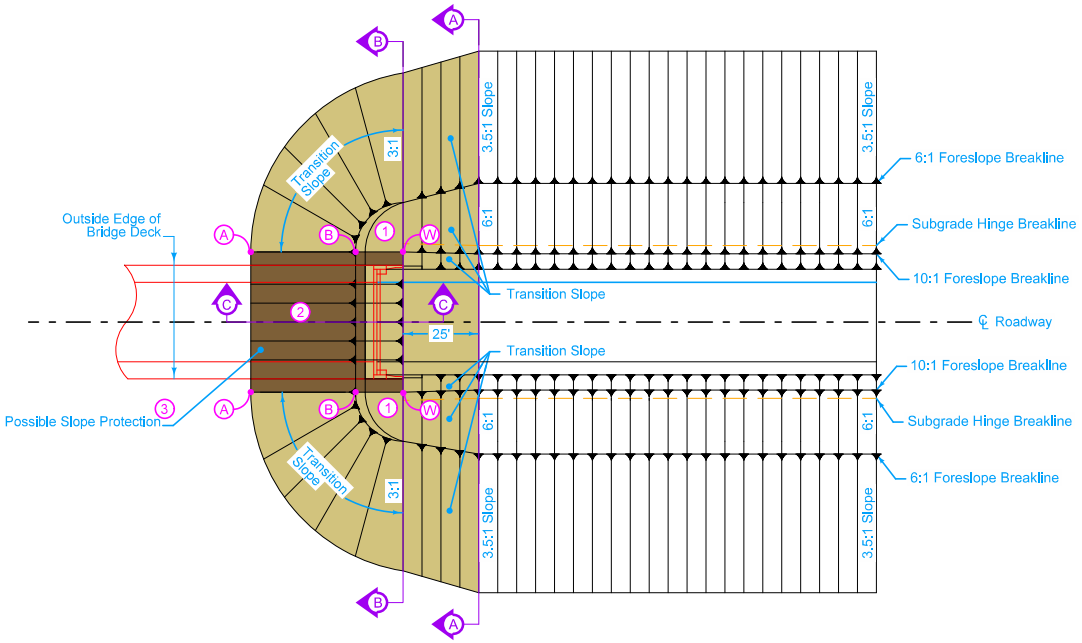
FLOATING SILT CURTAIN

SECTION

Earthwork

EW

NO.	DATE	TITLE
EW-101	04-19-11	Embankment and Rebuilding Embankments
EW-201	10-18-11	Bridge Berm Grading without Recoverable Slope (Barnroof Section)
EW-202	10-18-11	Bridge Berm Grading without Recoverable Slope (Non-Barnroof Section)
EW-203	10-18-11	Bridge Berm Grading with Recoverable Slope (Non-Barnroof Section)
EW-204	10-18-11	Bridge Berm Grading with Recoverable Slope (Barnroof Section)
EW-301	04-19-11	Guardrail Grading



PLAN VIEW OF BRIDGE BERM
(BARNROOF FORESLOPE)

Grading surface:
Refer to berm slope location table in project plans for locations of A, B, W and possible other points.

1. Variable slope.
2. Bridge Berm slope may vary and is determined by the A and B points. Slope is normally 2.5:1 or flatter.
3. Refer to contract documents for limits of the slope protection.

Iowa Department of Transportation

REVISION
1 | 10-18-11

STANDARD ROAD PLAN

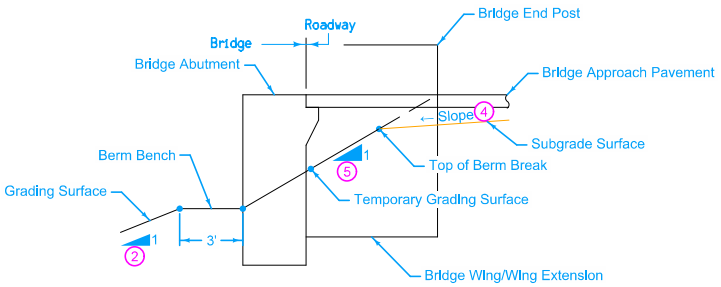
EW-201

SHEET 1 of 3

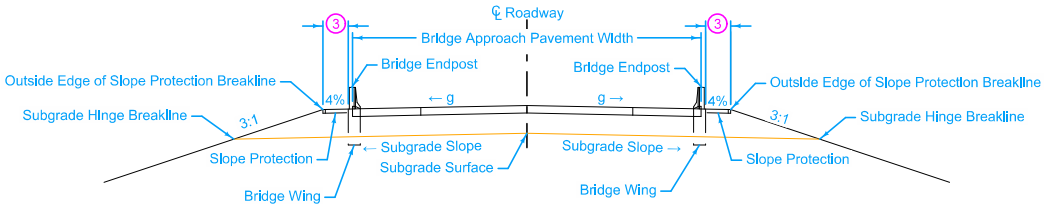
REVISIONS: Removed 'A' and 'B' points from centerline. Added 'W' points. Removed 'A' and 'B' numbers.

Deanna Maifield
APPROVED BY DESIGN METHODS ENGINEER

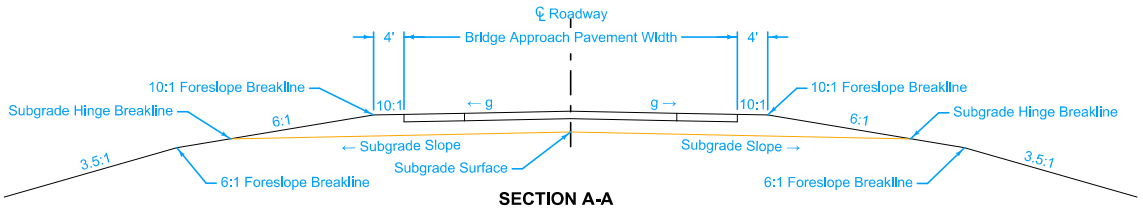
BRIDGE BERM GRADING WITHOUT RECOVERABLE SLOPE (BARNROOF SECTION)



PART SECTION C-C



SECTION B-B



SECTION A-A

(2) Bridge Berm slope may vary and is determined by the A and B points.

(3) Refer to contract documents for limits of the slope protection.

(4) Refer to RK series for longitudinal subgrade slope.

(5) Temporary grading slope.

g = Pavement cross slope.

Iowa Department of Transportation

REVISION

1	10-18-11

STANDARD ROAD PLAN

EW-201

SHEET 2 of 3

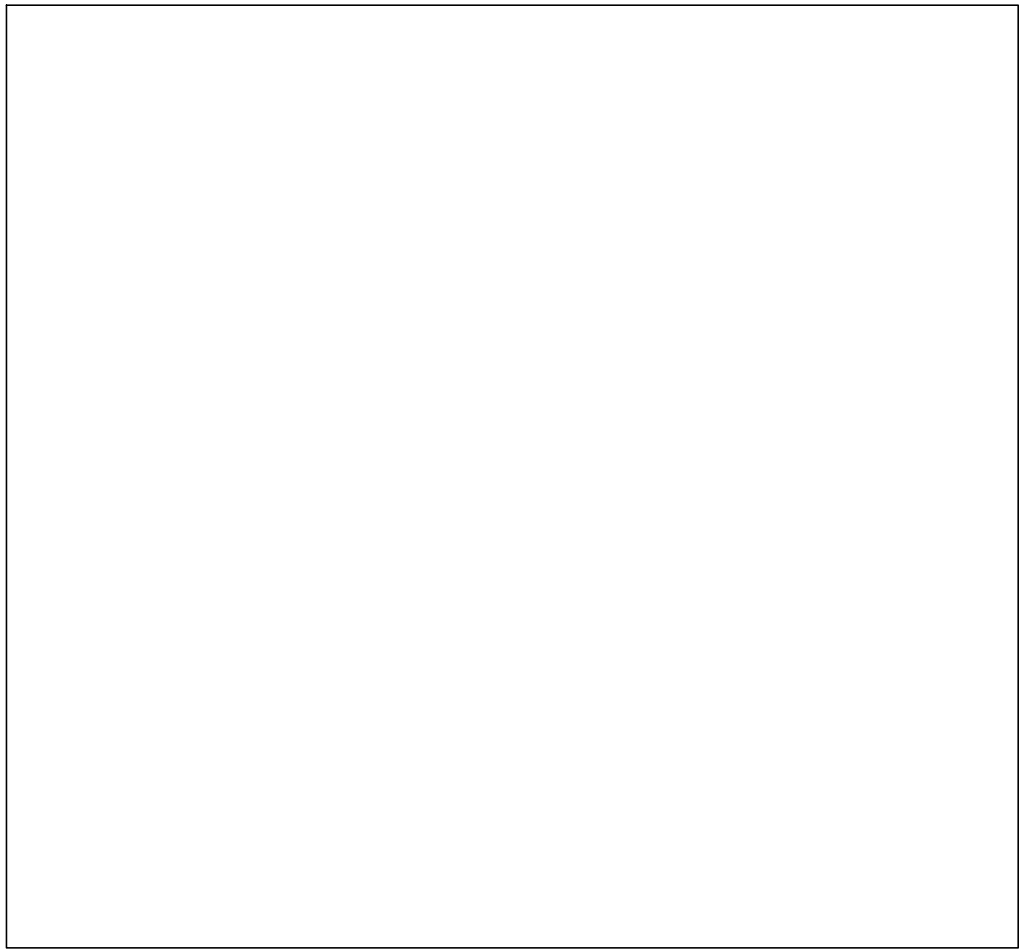
REVISIONS: Removed 'A' and 'B' points from centerline. Added 'W' points. Removed 'A' and 'B' numbers.

Deanna Maifield

APPROVED BY DESIGN METHODS ENGINEER

BRIDGE BERM GRADING WITHOUT RECOVERABLE SLOPE (BARNROOF SECTION)

This image can be viewed in 3D on the the ERL or at our website http://www.iowadot.gov/design/stdrdpln.htm



This image can be viewed in 3D on the the ERL or at our website http://www.iowadot.gov/design/stdrdpln.htm

Iowa Department of Transportation

STANDARD ROAD PLAN

REVISION	
1	10-18-11

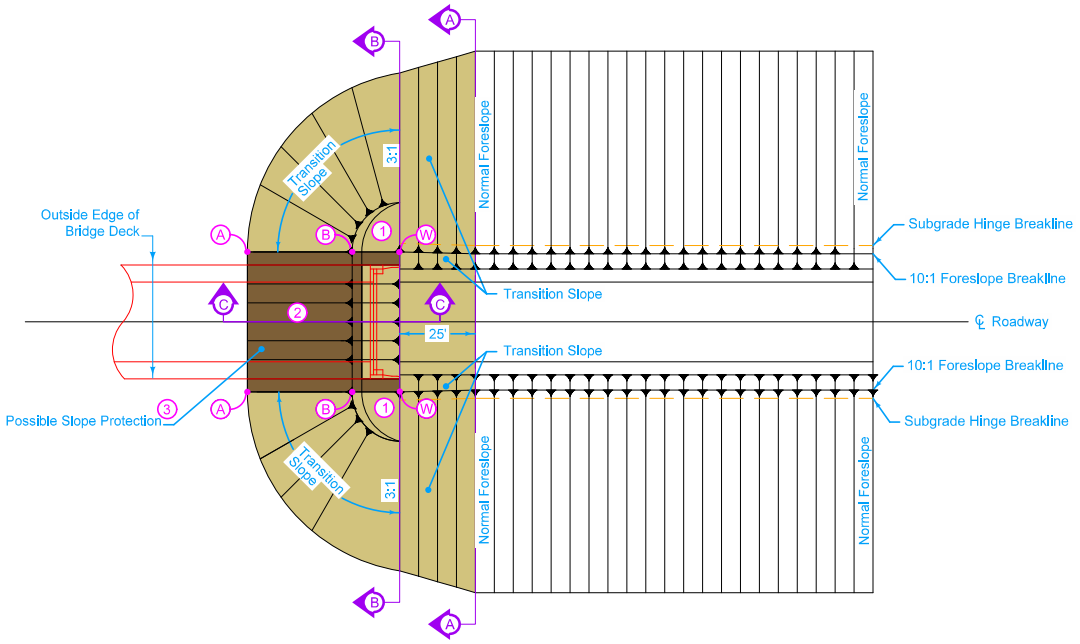
EW-201

SHEET 3 of 3

REVISIONS: Removed 'A' and 'B' points from centerline. Added 'W' points. Removed 'A' and 'B' numbers.

Deanna Maifield
APPROVED BY DESIGN METHODS ENGINEER

BRIDGE BERM GRADING WITHOUT RECOVERABLE SLOPE (BARNROOF SECTION)



PLAN VIEW OF BRIDGE BERM
(NON-BARNROOF FORESLOPE)

Grading Surface:
Refer to berm slope location table in project plans for locations of A, B, W and possible other points.

1. Variable slope.
2. Bridge Berm slope may vary and is determined by the A and B points. Slope is normally 2.5:1 or flatter.
3. Refer to contract documents for limits of the slope protection.

Iowa Department of Transportation

REVISION
1 | 10-18-11

STANDARD ROAD PLAN

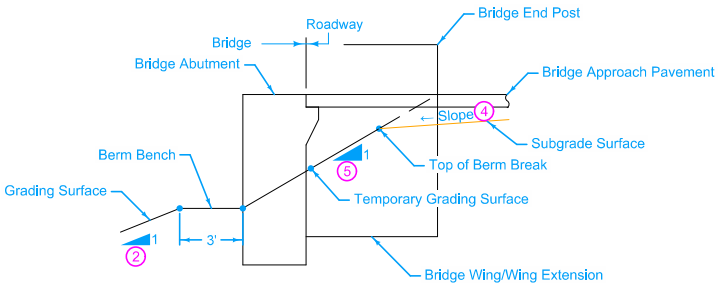
EW-202

SHEET 1 of 3

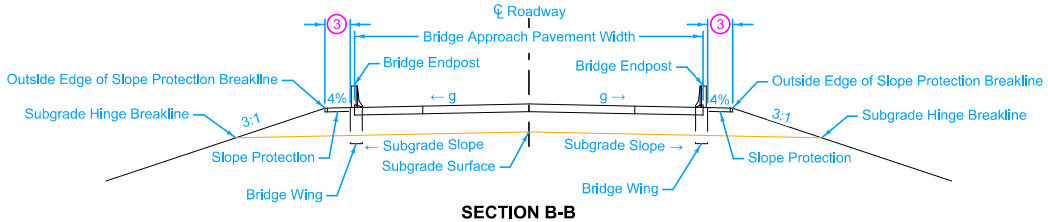
REVISIONS: Removed 'A' and 'B' points from centerline. Added 'W' points. Removed 'A' and 'B' numbers.

Deanna Maifield
APPROVED BY DESIGN METHODS ENGINEER

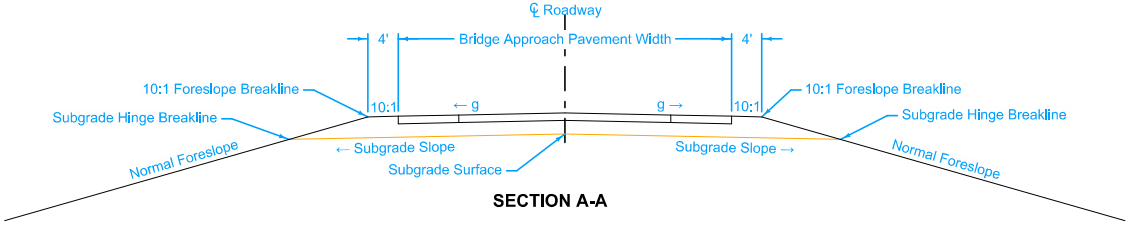
BRIDGE BERM GRADING WITHOUT RECOVERABLE SLOPE (NON-BARNROOF SECTION)



PART SECTION C-C



SECTION B-B



SECTION A-A

(2) Bridge Berm slope may vary and is determined by the A and B points.

(3) Refer to contract documents for limits of the slope protection.

(4) Refer to RK series for longitudinal subgrade slope.

(5) Temporary grading slope.

g = Pavement cross slope.

Iowa Department of Transportation

REVISION
1 | 10-18-11

STANDARD ROAD PLAN

EW-202

SHEET 2 of 3

REVISIONS: Removed 'A' and 'B' points from centerline. Added 'W' points. Removed 'A' and 'B' numbers.

Deanna Maifield
APPROVED BY DESIGN METHODS ENGINEER

BRIDGE BERM GRADING WITHOUT RECOVERABLE SLOPE (NON-BARNROOF SECTION)

This image can be viewed in 3D on the the ERL or at our website http://www.iowadot.gov/design/stdrdpln.htm

This image can be viewed in 3D on the the ERL or at our website http://www.iowadot.gov/design/stdrdpln.htm

Iowa Department of Transportation

STANDARD ROAD PLAN

REVISION	
1	10-18-11

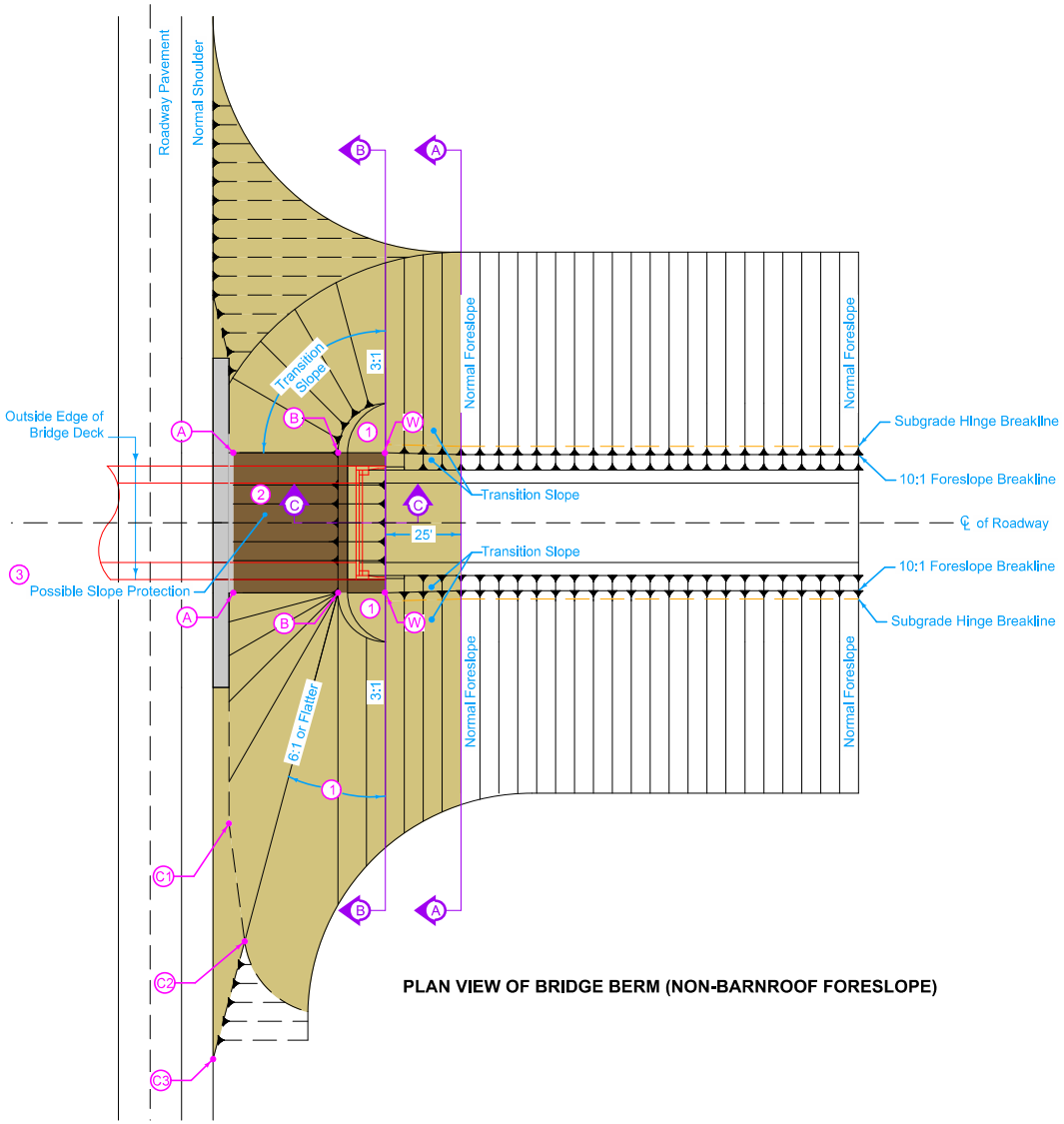
EW-202

SHEET 3 of 3

REVISIONS: Removed 'A' and 'B' points from centerline. Added 'W' points. Removed 'A' and 'B' numbers.

Deanna Maifield
APPROVED BY DESIGN METHODS ENGINEER

BRIDGE BERM GRADING
WITHOUT RECOVERABLE SLOPE
(NON-BARNROOF SECTION)



PLAN VIEW OF BRIDGE BERM (NON-BARNROOF FORESLOPE)

Grading Surface:
Refer to berm slope location table in project plans for locations of A, B, C, W and possible other points.

The cost of removel, stockpiling and placement of macadam stone shall be considered incidental to "Paved Shoulder, P.C. Concrete".

(1) Special shaping.

(2) Bridge Berm slope may vary and is determined by the A and B points. Slope is normally 2.5:1 or flatter.

(3) Refer to contract documents for limits of the slope protection.

Possible Tabulation: 104-9

Iowa Department of Transportation

REVISION
1 | 10-18-11

STANDARD ROAD PLAN

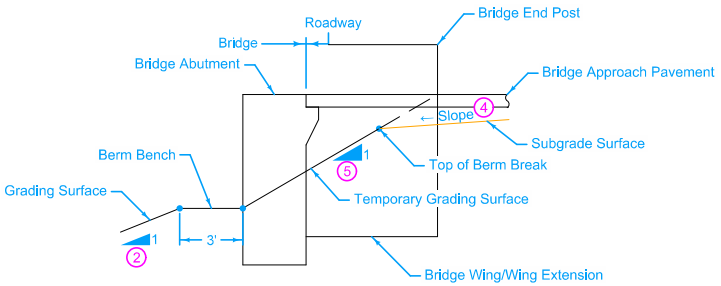
EW-203

SHEET 1 of 5

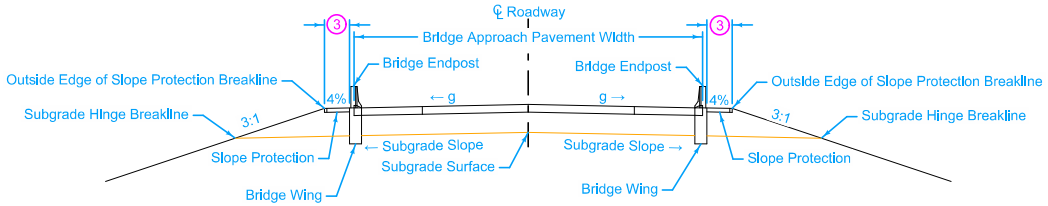
REVISIONS: Removed 'A' and 'B' points from centerline. Added 'W' points. Removed 'A' and 'B' numbers.

Deanna Maifield
APPROVED BY DESIGN METHODS ENGINEER

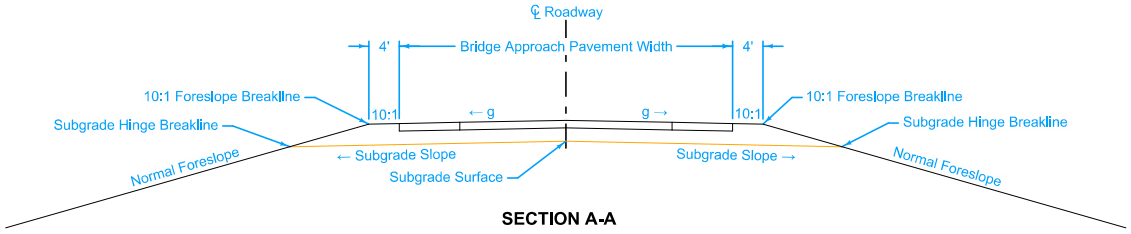
BRIDGE BERM GRADING WITH RECOVERABLE SLOPE (NON-BARNROOF SECTION)



SECTION C-C



SECTION B-B



SECTION A-A

(2) Bridge Berm slope may vary and is determined by the A and B points. Slope is normally 2.5:1 or flatter.

(3) Refer to contract documents for limits of the slope protection.

(4) Refer to RK series for longitudinal subgrade slope.

(5) Temporary grading slope.

g = pavement cross slope.

Iowa Department of Transportation

REVISION
1 | 10-18-11

STANDARD ROAD PLAN

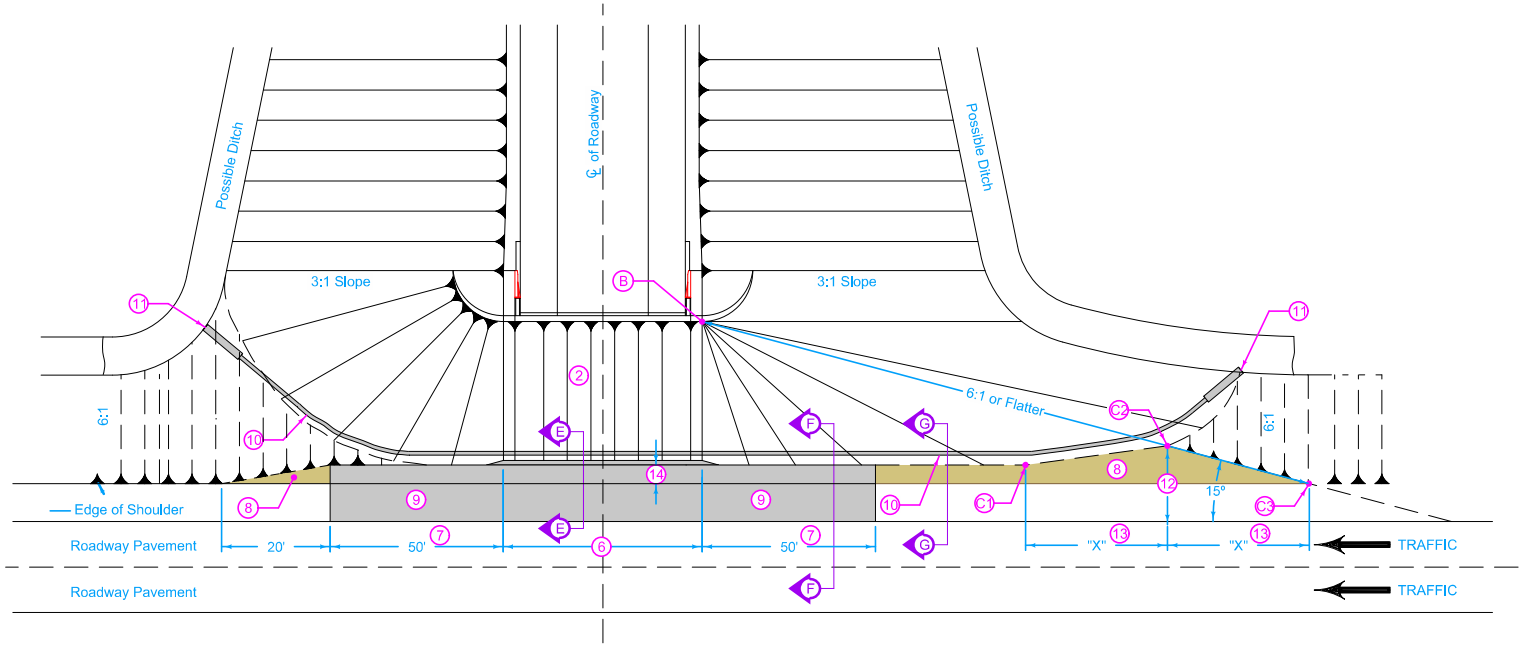
EW-203

SHEET 2 of 5

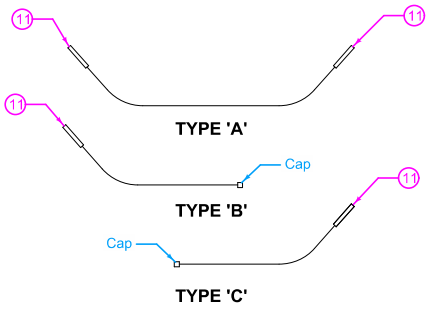
REVISIONS: Removed 'A' and 'B' points from centerline. Added 'W' points. Removed 'A' and 'B' numbers.

Deanna Maifield
APPROVED BY DESIGN METHODS ENGINEER

BRIDGE BERM GRADING WITH RECOVERABLE SLOPE (NON-BARNROOF SECTION)



PLAN VIEW OF BRIDGE BERM AREA



TYPE 'A'

TYPE 'B'

TYPE 'C'

SUBDRAIN LAYOUT TYPES

(2) Bridge Berm slope may vary and is determined by the A and B points. Slope is normally 2.5:1 or flatter.

(6) Width of bridge slab + 3' on each side. Build 6" sloped curb to this width. Refer to PV-102 for curb details.

(7) Includes curb runout length. Refer to PV-102 for curb runout details.

(8) Match typical shoulder slope.

(9) See typical cross-sections for details of paved shoulder.

(10) Approximate location of bridge subdrain.

(11) Refer to RF-19E subdrain outlet. When flow of subdrain does not require an outlet at both ends, cap the end without an outlet in a method approved by the Engineer.

(12) 2 times typical shoulder width.

(13) "X" distance based on station difference between points C2 and C3.

(14) 5' offset unless otherwise noted on the Bridge Situation Plan. 4' offset minimum.

Iowa Department of Transportation

REVISION
1 | 10-18-11

STANDARD ROAD PLAN

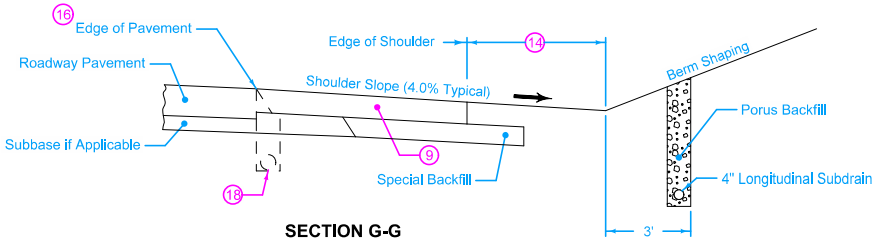
EW-203

SHEET 3 of 5

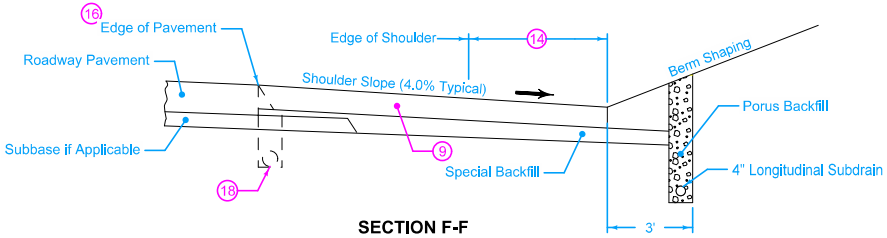
REVISIONS: Removed 'A' and 'B' points from centerline. Added 'W' points. Removed 'A' and 'B' numbers.

Deanna Maifield
APPROVED BY DESIGN METHODS ENGINEER

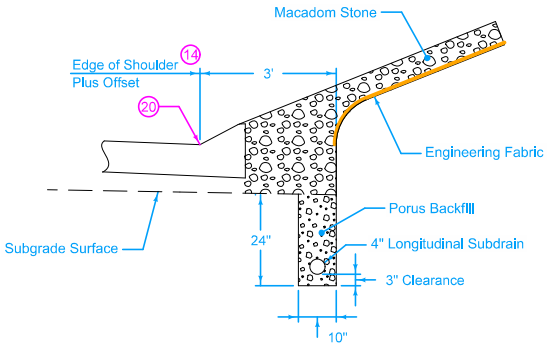
BRIDGE BERM GRADING WITH RECOVERABLE SLOPE (NON-BARNROOF SECTION)



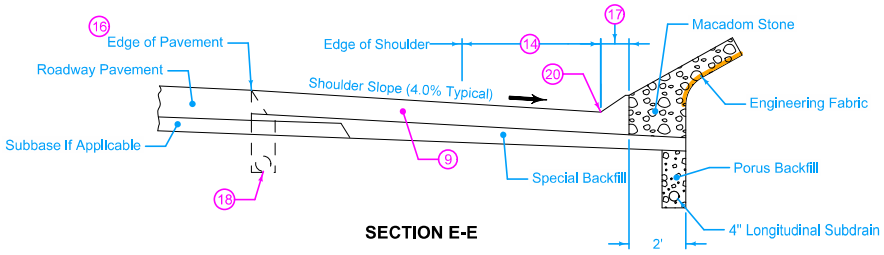
SECTION G-G



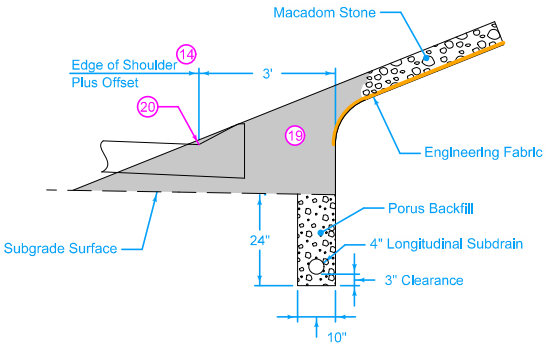
SECTION F-F



PARTIAL SECTION E-E
As constructed by others



SECTION E-E



PARTIAL SECTION E-E
Proposed construction

(9) See typical cross-sections for details of paved shoulder.

(14) 5' offset unless otherwise noted on the Bridge Situation Plan. 4' offset minimum.

(16) If roadway pavement is newly-constructed PCC, use BT-1 or BT-2 joint. If roadway pavement is existing PCC, use BT-3, BT-4, or BT-5 joint. Refer to PV-101 joint details.

(17) 6" sloped curb. Refer to PV-102 curb details.

(18) Roadway subdrain location. Use caution when excavating. Maintain porus material in trench to bottom of roadway pavement.

(19) Remove and stockpile macadam stone. Carefully seperate the macadam stone from the surrounding soil. Preserve the integrity of the engineering fabric.

(20) Toe of the berm. Refer to A points on the berm slope location table.

Iowa Department of Transportation

REVISION
1 | 10-18-11

STANDARD ROAD PLAN

EW-203

SHEET 4 of 5

REVISIONS: Removed 'A' and 'B' points from centerline. Added 'W' points. Removed 'A' and 'B' numbers.

Deanna Maifield
APPROVED BY DESIGN METHODS ENGINEER

BRIDGE BERM GRADING WITH RECOVERABLE SLOPE (NON-BARNROOF SECTION)

This image can be viewed in 3D on the the ERL or at our website http://www.iowadot.gov/design/stdrdpln.htm

This image can be viewed in 3D on the the ERL or at our website http://www.iowadot.gov/design/stdrdpln.htm

Iowa Department of Transportation

STANDARD ROAD PLAN

REVISION

1	10-18-11

EW-203

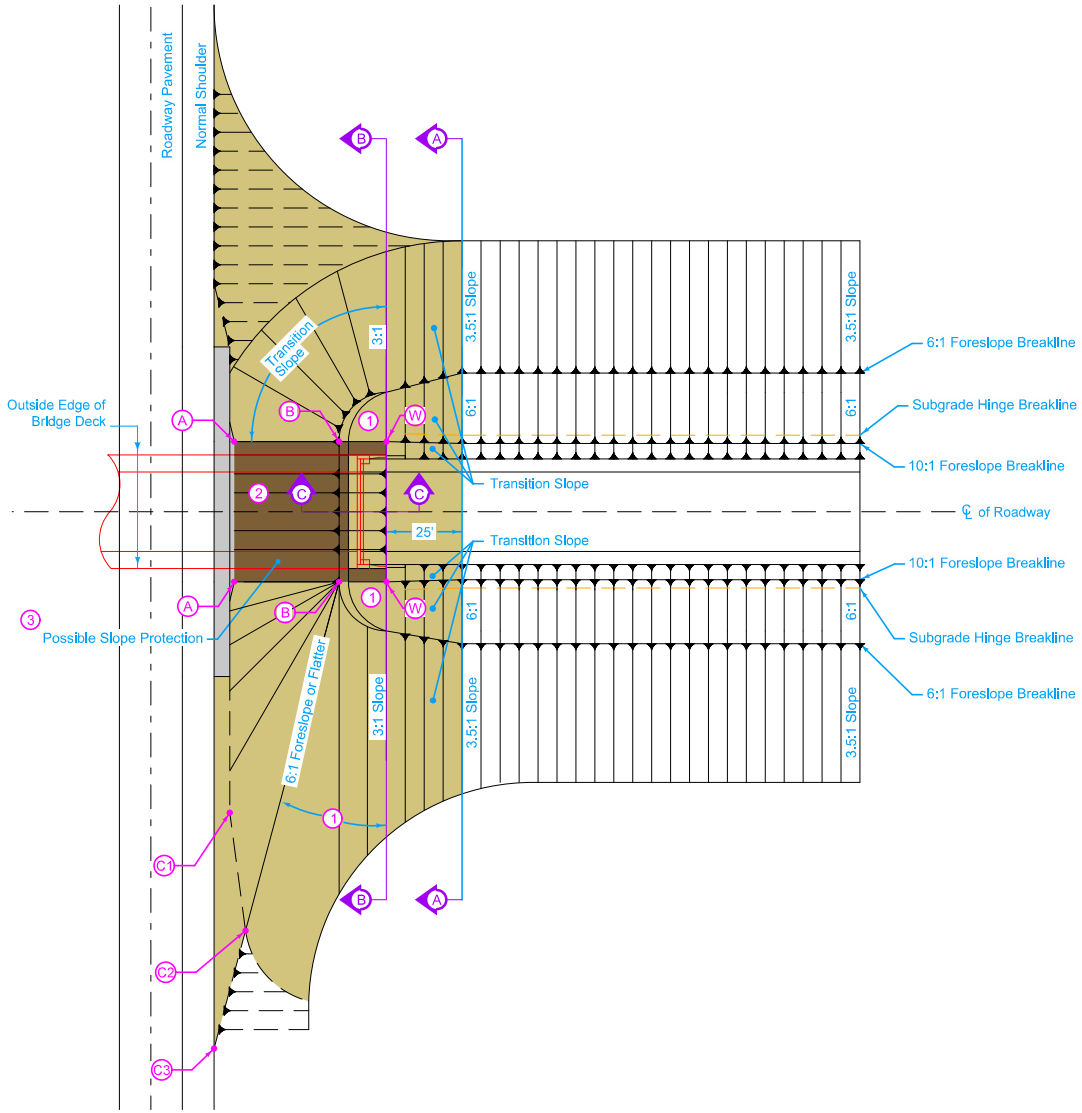
SHEET 5 of 5

REVISIONS: Removed 'A' and 'B' points from centerline. Added 'W' points. Removed 'A' and 'B' numbers.

Deanna Maifield

APPROVED BY DESIGN METHODS ENGINEER

BRIDGE BERM GRADING WITH RECOVERABLE SLOPE (NON-BARNROOF SECTION)



PLAN VIEW OF BRIDGE BERM (BARNROOF FORESLOPE)

Grading Surface:
Refer to berm slope location table in project plans for locations of A, B, C, W and possible other points.

The cost of removel, stockpiling and placement of macadam stone shall be considered incidental to "Paved Shoulder, P.C. Concrete".

(1) Special shaping.

(2) Face of Bridge Berm slope may vary and is determined by the A and B points. Slope is normally 2.5:1 or flatter.

(3) Refer to contract documents for limits of the slope protection.

Possible Tabulation: 104-9

Iowa Department of Transportation

REVISION	
1	10-18-11

STANDARD ROAD PLAN

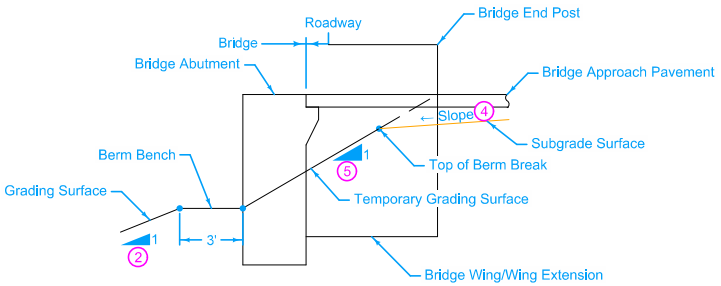
EW-204

SHEET 1 of 5

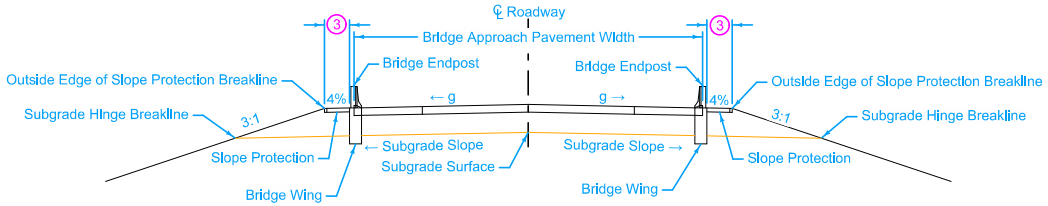
REVISIONS: Removed 'A' and 'B' points from centerline. Added 'W' points. Removed 'A' and 'B' numbers.

Deanna Maifield
APPROVED BY DESIGN METHODS ENGINEER

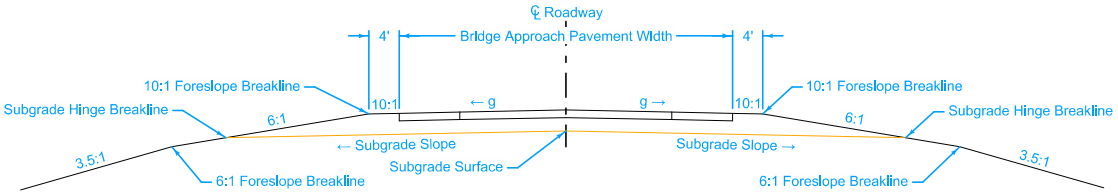
BRIDGE BERM GRADING WITH RECOVERABLE SLOPE (BARNROOF SECTION)



SECTION C-C



SECTION B-B



SECTION A-A

(2) Bridge Berm slope may vary and is determined by the A and B points. Slope is normally 2.5:1 or flatter.

(3) Refer to contract documents for limits of the slope protection.

(4) Refer to RK series for longitudinal subgrade slope.

(5) Temporary grading slope.

g = pavement cross slope.

Iowa Department of Transportation

REVISION
1 | 10-18-11

STANDARD ROAD PLAN

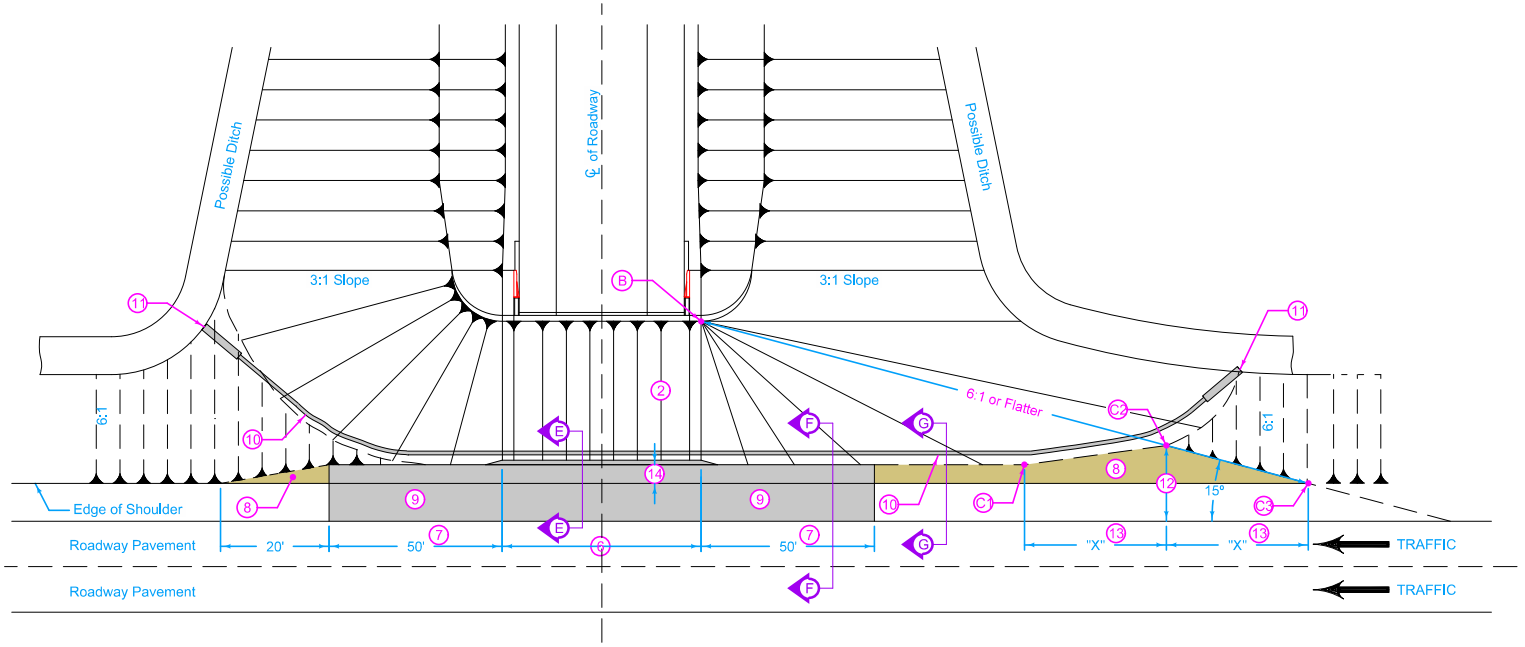
EW-204

SHEET 2 of 5

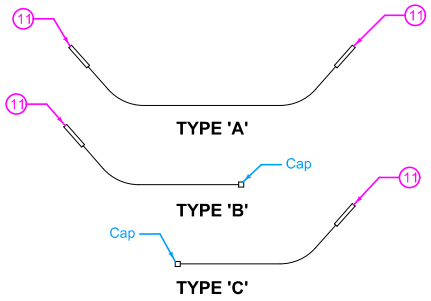
REVISIONS: Removed 'A' and 'B' points from centerline. Added 'W' points. Removed 'A' and 'B' numbers.

Deanna Maifield
APPROVED BY DESIGN METHODS ENGINEER

BRIDGE BERM GRADING WITH RECOVERABLE SLOPE (BARNROOF SECTION)



PLAN VIEW OF BRIDGE BERM AREA



SUBDRAIN LAYOUT TYPES

(2) Bridge Beam slope may vary and is determined by the A and B points. Slope is normally 2.5:1 or flatter.

(6) Width of bridge slab + 3' on each side. Build 6" sloped curb to this width. Refer to PV-102 for curb details.

(7) Includes curb runout length. Refer to PV-102 for curb runout details.

(8) Match typical shoulder slope.

(9) See typical cross-sections for details of paved shoulder.

(10) Approximate location of bridge subdrain.

(11) Refer to RF-19E subdrain outlet. When flow of subdrain does not require an outlet at both ends, cap the end without an outlet in a method approved by the Engineer.

(12) 2 times typical shoulder width.

(13) "X" distance based on station difference between points C2 and C3.

(14) 5' offset unless otherwise noted on the Bridge Situation Plan. 4' offset minimum.

Iowa Department of Transportation

REVISION
1 | 10-18-11

STANDARD ROAD PLAN

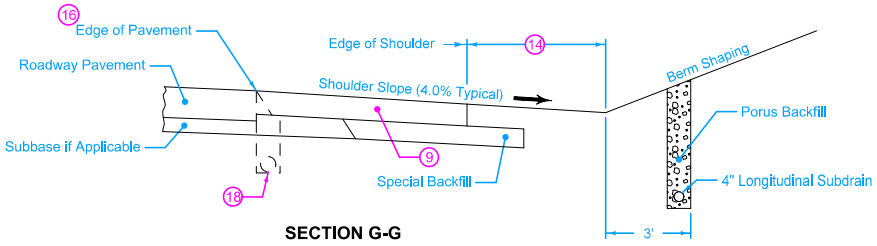
EW-204

SHEET 3 of 5

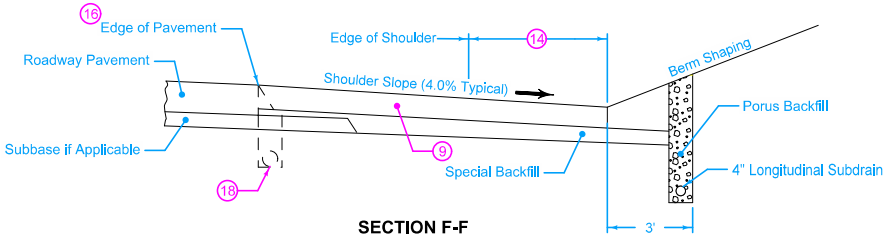
REVISIONS: Removed 'A' and 'B' points from centerline. Added 'W' points. Removed 'A' and 'B' numbers.

Deanna Maifield
APPROVED BY DESIGN METHODS ENGINEER

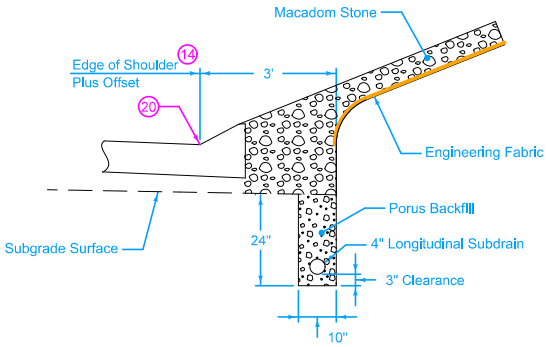
BRIDGE BERM GRADING WITH RECOVERABLE SLOPE (BARNROOF SECTION)



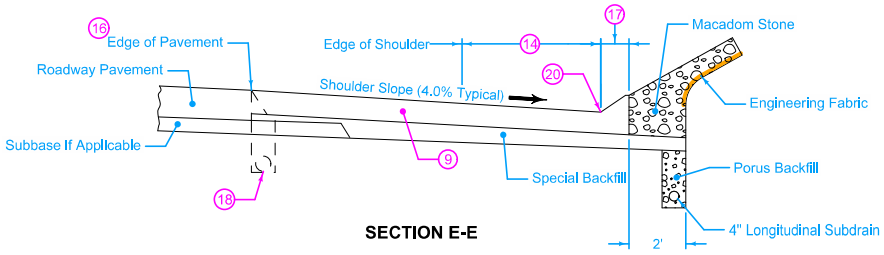
SECTION G-G



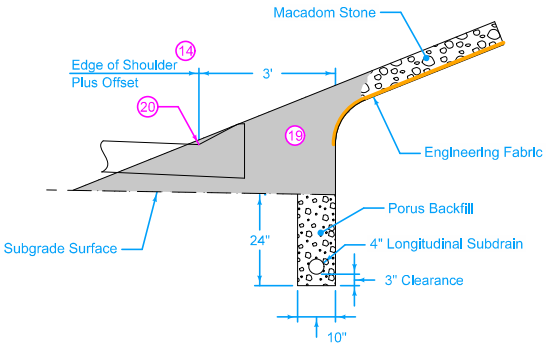
SECTION F-F



PARTIAL SECTION E-E
As constructed by others



SECTION E-E



PARTIAL SECTION E-E
Proposed construction

(9) See typical cross-sections for details of paved shoulder.

(14) 5' offset unless otherwise noted on the Bridge Situation Plan. 4' offset minimum.

(16) If roadway pavement is newly-constructed PCC, use BT-1 or BT-2 joint. If roadway pavement is existing PCC, use BT-3, BT-4, or BT-5 joint. Refer to PV-101 joint details.

(17) 6" sloped curb. Refer to PV-102 curb details.

(18) Roadway subdrain location. Use caution when excavating. Maintain porus material in trench to bottom of roadway pavement.

(19) Remove and stockpile macadam stone. Carefully seperate the macadam stone from the surrounding soil. Preserve the integrity of the engineering fabric.

(20) Toe of the berm. Refer to A Points on the berm slope location table.

Iowa Department of Transportation

REVISION
1 | 10-18-11

STANDARD ROAD PLAN

EW-204

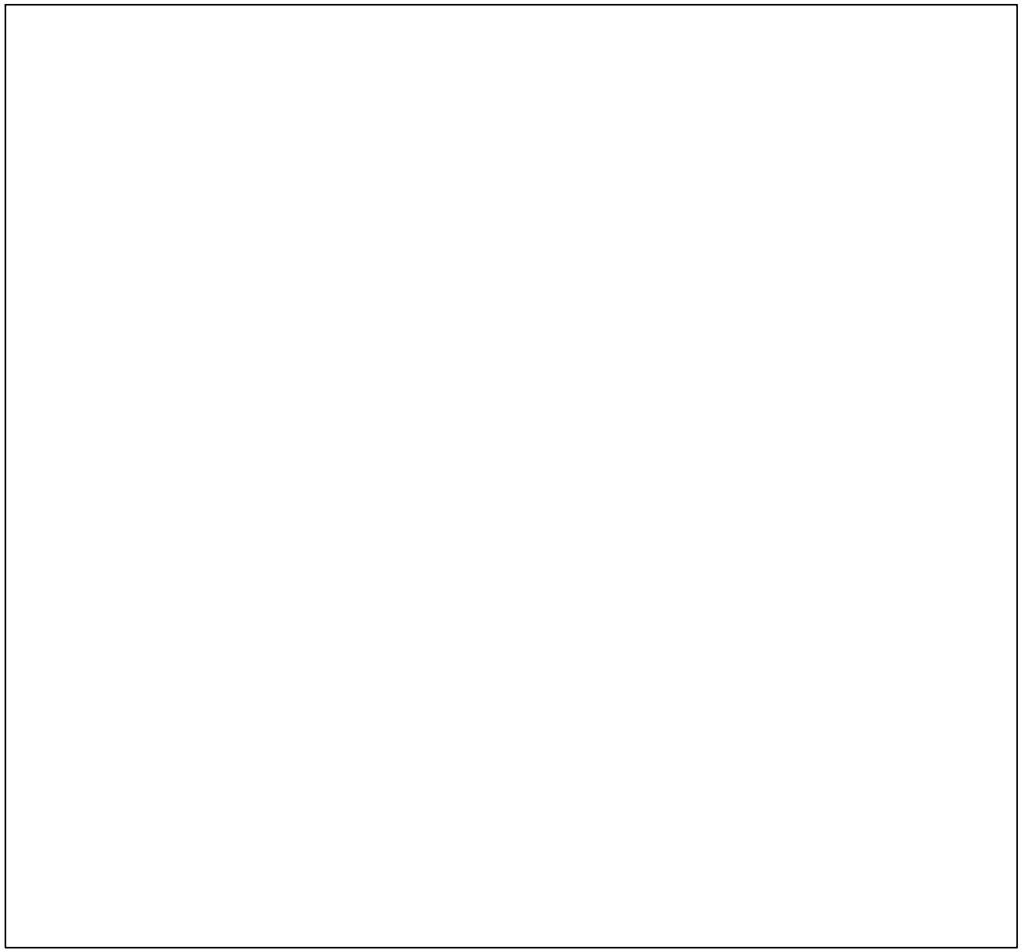
SHEET 4 of 5

REVISIONS: Removed 'A' and 'B' points from centerline. Added 'W' points. Removed 'A' and 'B' numbers.

Deanna Maifield
APPROVED BY DESIGN METHODS ENGINEER

BRIDGE BERM GRADING WITH RECOVERABLE SLOPE (BARNROOF SECTION)

This image can be viewed in 3D on the the ERL or at our website http://www.iowadot.gov/design/stdrdpln.htm



This image can be viewed in 3D on the the ERL or at our website http://www.iowadot.gov/design/stdrdpln.htm

Iowa Department of Transportation

REVISION

1	10-18-11

STANDARD ROAD PLAN

EW-204

REVISIONS: Removed 'A' and 'B' points from centerline. Added 'W' points. Removed 'A' and 'B' numbers.

Deanna Maifield

APPROVED BY DESIGN METHODS ENGINEER

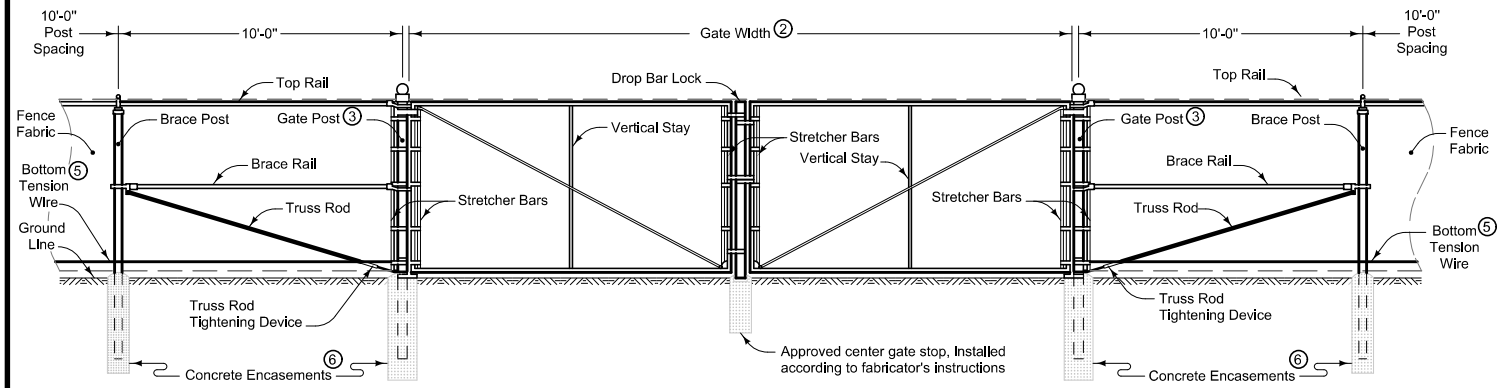
BRIDGE BERM GRADING WITH RECOVERABLE SLOPE (BARNROOF SECTION)

SECTION

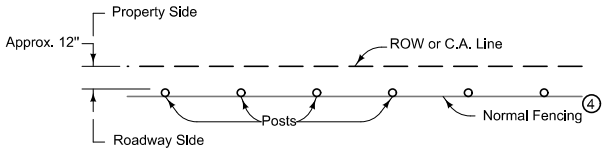
Miscellaneous

MI

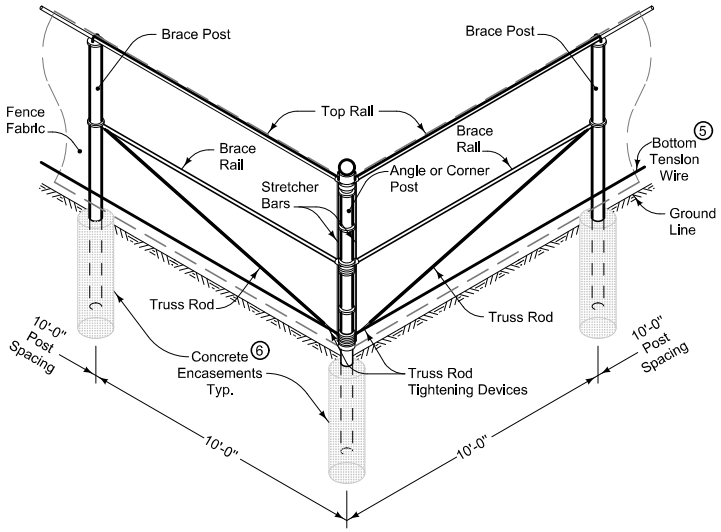
NO.	DATE	TITLE
		Fencing
MI-101	04-20-10	Fencing Layout
MI-102	10-18-11	Chain Link Fence Construction
MI-103	04-20-10	Field Fence Construction
MI-104	10-18-11	Deer Fence Construction
		Sidewalks and Driveways
MI-210	10-18-11	PCC Driveways and Alleys
MI-220	10-18-11	Sidewalks with Detectable Warnings
MI-221	10-18-11	Combined Retaining Wall - Sidewalk



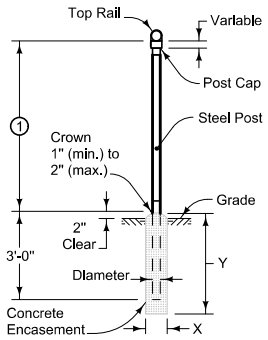
GATE INSTALLATION



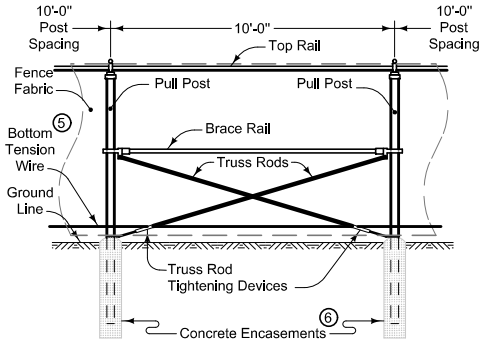
PLAN OF FENCE



ANGLE OR CORNER POST INSTALLATION



POST INSTALLATION



PULL POST INSTALLATION

Attach chain link fabric to braces, top rail, tension wire, and intermediate posts at intervals of 12 inches maximum.

(1) Fabric width will be 6 feet unless otherwise specified.

(2) Unless specified otherwise, install gates 16 feet in width. Double gate (shown) is required only for widths more than 16 feet. Exact details of gate design are subject to approval of the Engineer. Furnish gate with approved stop, latch and means for locking. Install as recommended by the manufacturer.

(3) End Post used to terminate run of fence if no gate is proposed.

(4) Place fence fabric on roadway side of post. For stream crossings place fabric on the upstream side of the post.

(5) Connect bottom tension wire to end posts, angle posts, and pull posts. Install a turnbuckle or other approved tightening device on each continuous span of tension wire.

(6) Refer to Post Installation detail.

Possible Contract Items:
Chain Link Fence
Chain Link Gate Assembly

ITEM	POST SIZE			CONCRETE ENCASEMENT SIZE	
	Nominal Pipe Size, in.	Outside Diameter, in.	Weight, lb./ft.	X	Y
Rail	1¼	1.660	2.27	----	----
Brace Post	1¼	1.660	2.27	0'-9"	3'-6"
Line Post	2	2.375	3.65	0'-9"	3'-6"
Angle, Corner, End, or Pull Post	2½	2.875	5.79	1'-0"	3'-9"
Gate Post for various gate widths:					
6 ft. or less	2½	2.875	5.79	1'-0"	3'-9"
over 6 ft. to 12 ft.	3½	4.000	9.11	1'-0"	4'-0"
over 12 ft. to 18 ft.	6	6.625	18.97	1'-4"	4'-0"
over 18 ft. to 24 ft.	8	8.625	28.55	1'-6"	4'-0"

Iowa Department of Transportation

REVISION
1 | 10-18-11

STANDARD ROAD PLAN

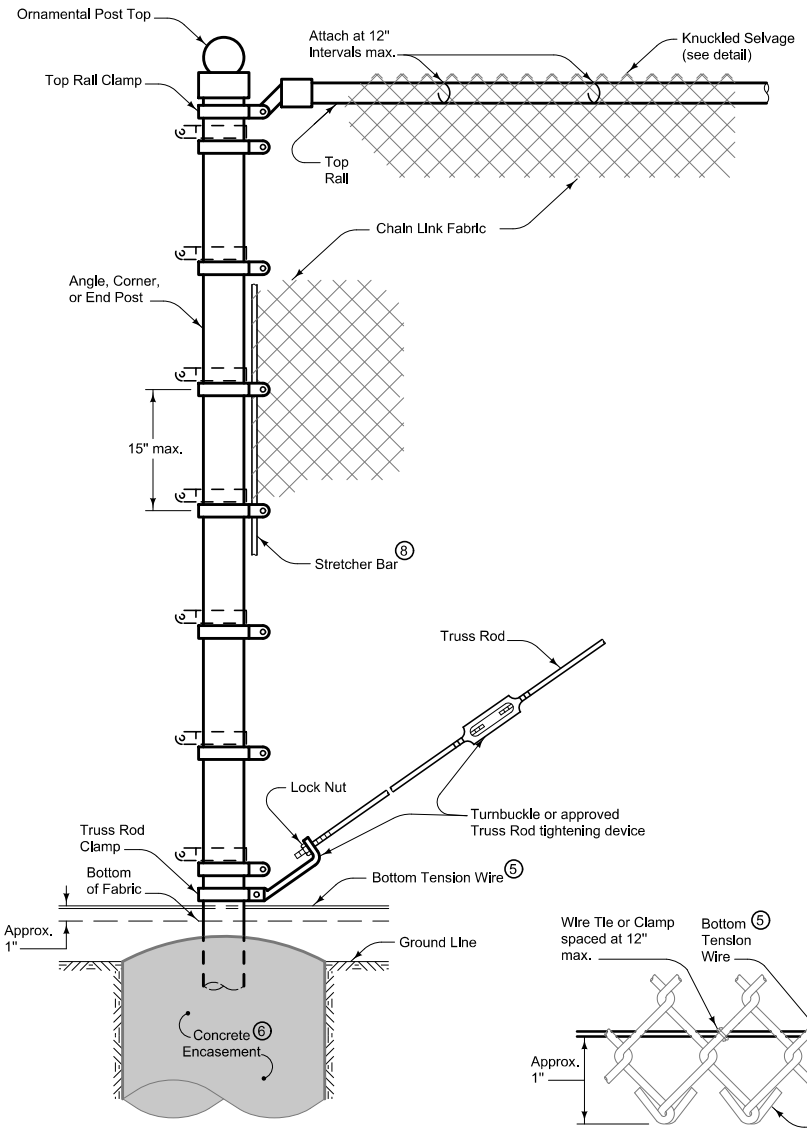
MI-102

SHEET 1 of 2

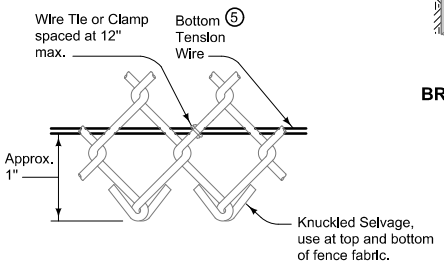
REVISIONS: Modified notes to conform with modified specifications. Added circle notes 4 through 8.

Deanna Maifield
APPROVED BY DESIGN METHODS ENGINEER

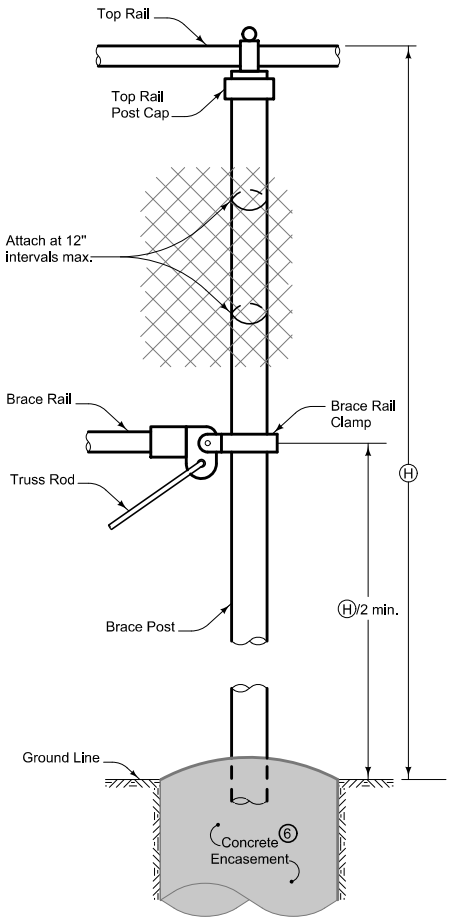
CHAIN LINK FENCE CONSTRUCTION



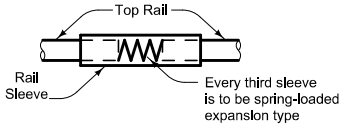
ANGLE, CORNER, OR END POST ASSEMBLY



BOTTOM TENSION WIRE AND KNUCKLED SELVAGE



BRACE POST ASSEMBLY



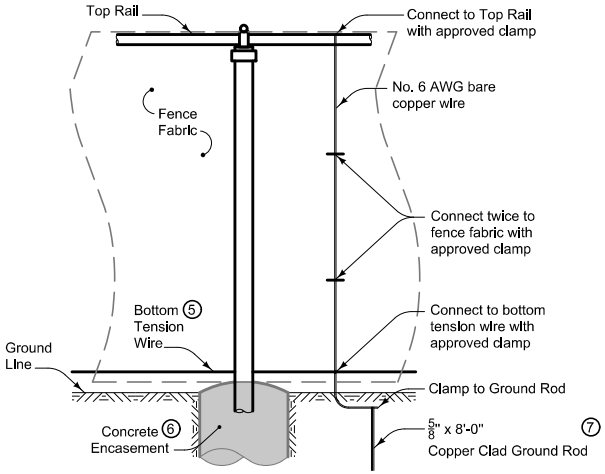
RAIL SLEEVE

(5) Connect bottom tension wire to end posts, angle posts, corner posts, and pull posts. Install a turnbuckle or other approved tightening device on each continuous span of tension wire.

(6) Refer to Post Installation detail.

(7) Drive ground rod vertically until the top is 6 inches below the ground surface.

(8) Secure each end of each run of fabric using a stretcher bar inserted in the final links of the fabric. Use a bar that is as long as the fabric is wide.



GROUND ROD INSTALLATION

Iowa Department of Transportation

STANDARD ROAD PLAN

REVISION	
1	10-18-11

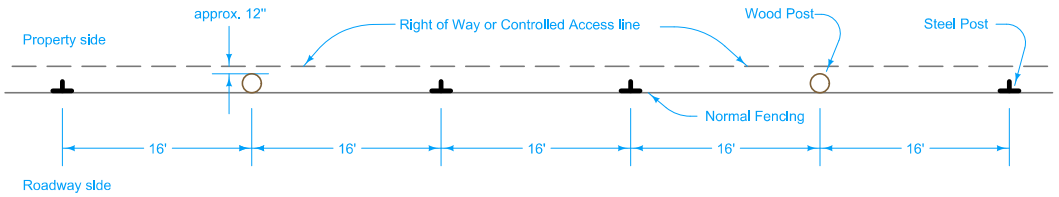
MI-102

SHEET 2 of 2

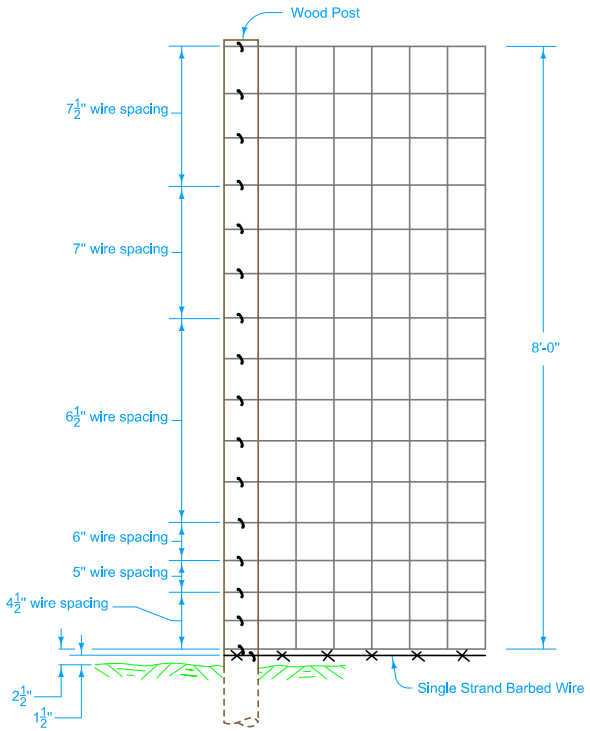
REVISIONS: Modified notes to conform with modified specifications. Added circle notes 4 through 8.

Deanna Maifield
APPROVED BY DESIGN METHODS ENGINEER

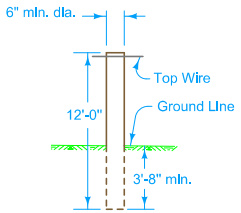
CHAIN LINK FENCE CONSTRUCTION



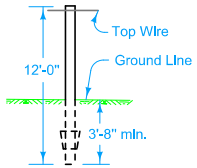
FENCE PLAN



ELEVATION



WOOD POST



STEEL POST

Follow Standard Specification 2519.03A for general fence construction requirements.

Space line brace posts according to MI-103 where fencing is continuous and where end, corner, and line brace posts are not specified.

Double wrap barbed wire and tie off at end posts, corner posts, and line brace posts. Single wrap woven wire and tie off. Restart fence to be continued, in like manner.

Fence wire may be placed on either the road side or the field side of posts, depending on local conditions; I.E., on curves, the wire should be placed on the side which would result in the least amount of tension on the staples. This will also apply where wind, drift, or other conditions would exert unusual pressure against the wire.

Refer to MI-103 for layouts of brace posts.

Refer to MI-103 for details of channel crossing installation and termination of fencing at structures.

Possible Contract Items:
- Deer Fence, 96 in.
- Deer Fence Brace Panels
- Gate, Deer, As Per Plan

Possible Tabulation:
- 100-7

Iowa Department of Transportation

REVISION 2 10-18-11

STANDARD ROAD PLAN

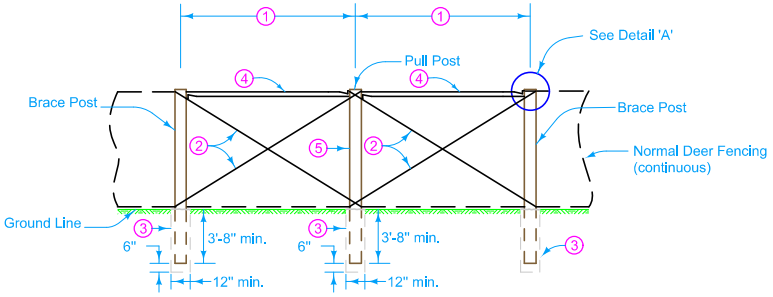
MI-104

SHEET 1 of 3

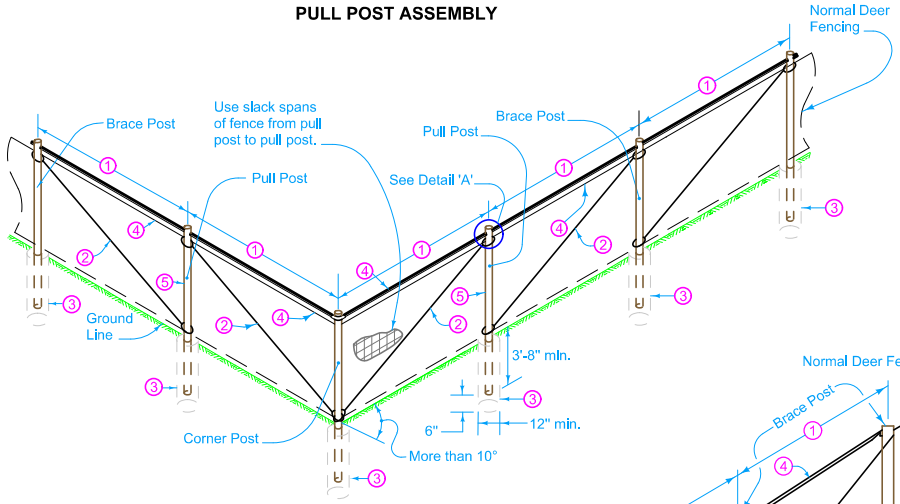
REVISIONS: Removed general notes covered by specs.

Deanna Maifield
APPROVED BY DESIGN METHODS ENGINEER

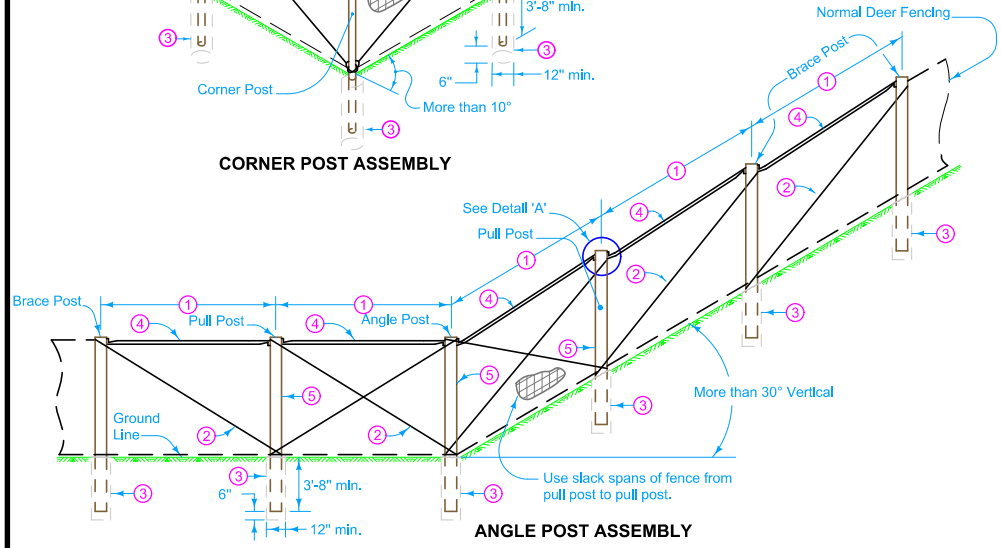
DEER FENCE CONSTRUCTION



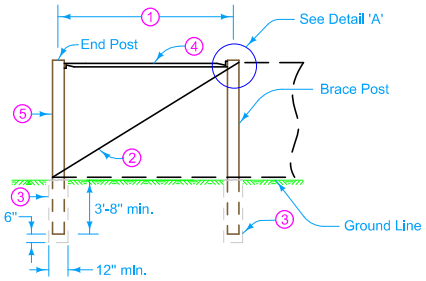
PULL POST ASSEMBLY



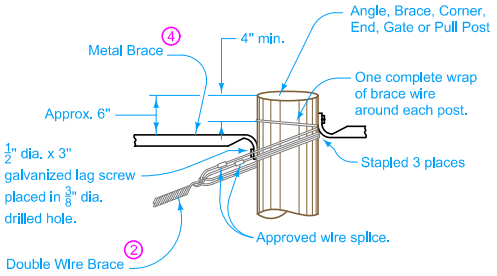
CORNER POST ASSEMBLY



ANGLE POST ASSEMBLY



END POST INSTALLATION



DETAIL 'A'
BRACE WIRE INSTALLATION (6)

(Brace wire wrapped the same at the bottom of post.)

1. Brace Panel.
2. Brace wire: 4 strands of No. 9 wire.
3. Details indicate placement of granular material for certain posts. Posts may be driven if satisfactory method is demonstrated to the Engineer. Granular material will not be required for driven posts.
4. Metal Brace 8 feet long.
5. Wrap wire fabric around post.
6. Twist the two brace wires together to produce proper tension in the brace assembly.

Iowa Department of Transportation

STANDARD ROAD PLAN

REVISION	
2	10-18-11

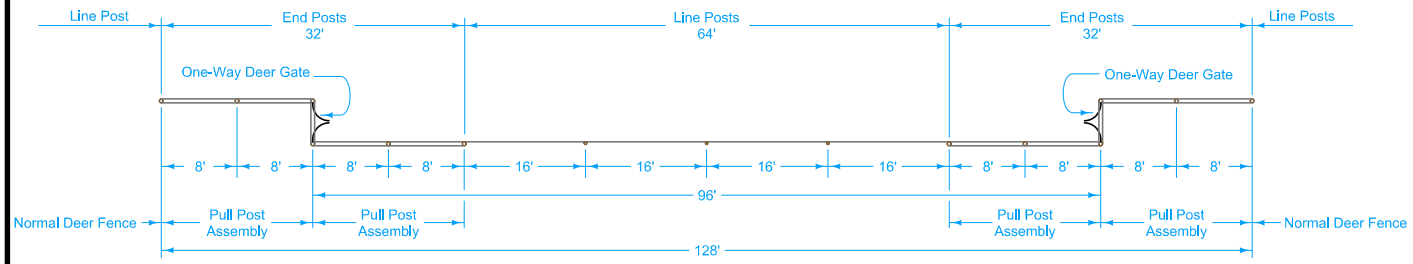
MI-104

SHEET 2 of 3

REVISIONS: Removed general notes covered by specs.

Deanna Maifield
APPROVED BY DESIGN METHODS ENGINEER

DEER FENCE CONSTRUCTION



GATE PLAN

(7) Spring loaded hinge allows tines to spread apart and return to original position.

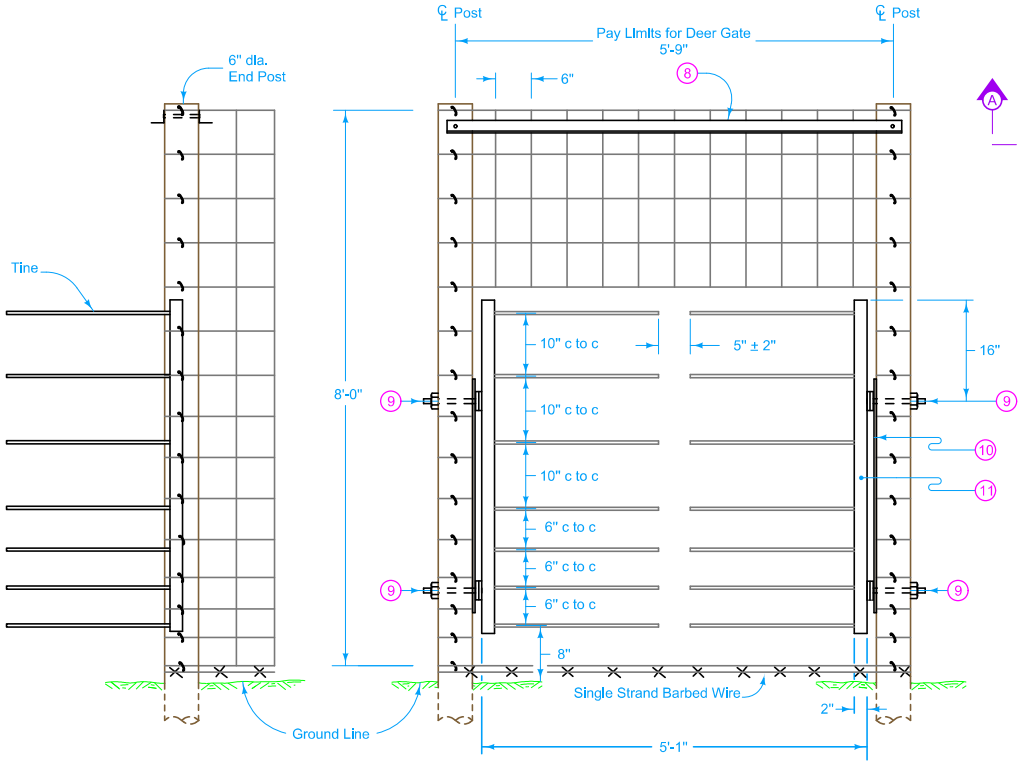
(8) Two 2 in. x 2 in. x $\frac{1}{8}$ in. L top braces held by $\frac{1}{2}$ inch diameter bolts.

(9) Attach nut and washer to each bolt.

(10) Support Plate 3 in. x $\frac{5}{16}$ in. x 37 in.

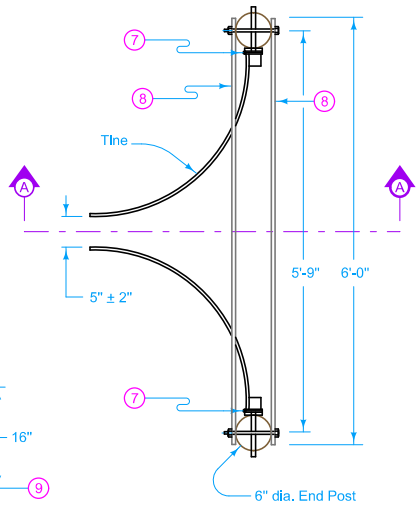
(11) 2 in. x 2 in. x 54 in. structural steel tubing welded to Hinge Plate.

(12) $\frac{3}{4}$ in. diameter x 8 in. bolt welded to Support Plate

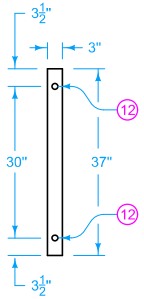


SECTION A-A

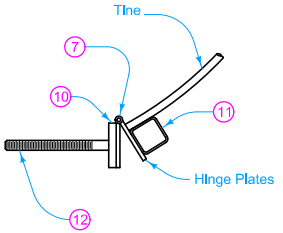
GATE FRONT



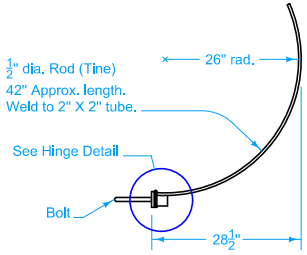
GATE TOP



SUPPORT PLATE



HINGE



TINE

Iowa Department of Transportation

STANDARD ROAD PLAN

REVISION	
2	10-18-11

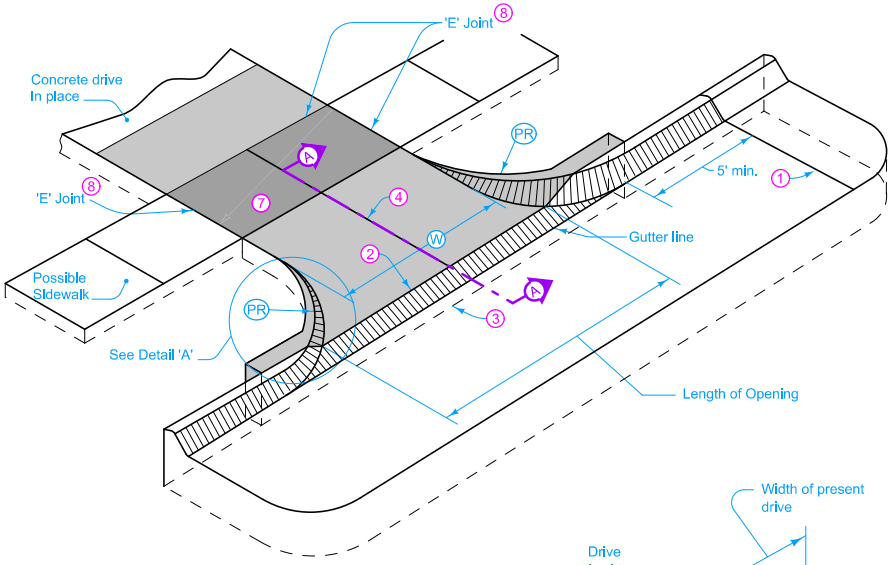
MI-104

SHEET 3 of 3

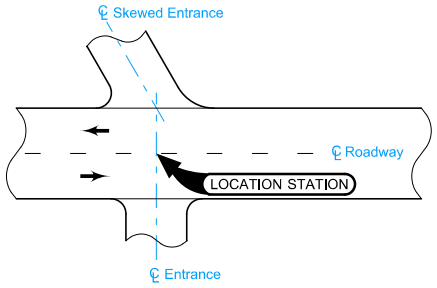
REVISIONS: Removed general notes covered by specs.

Deanna Maifield
APPROVED BY DESIGN METHODS ENGINEER

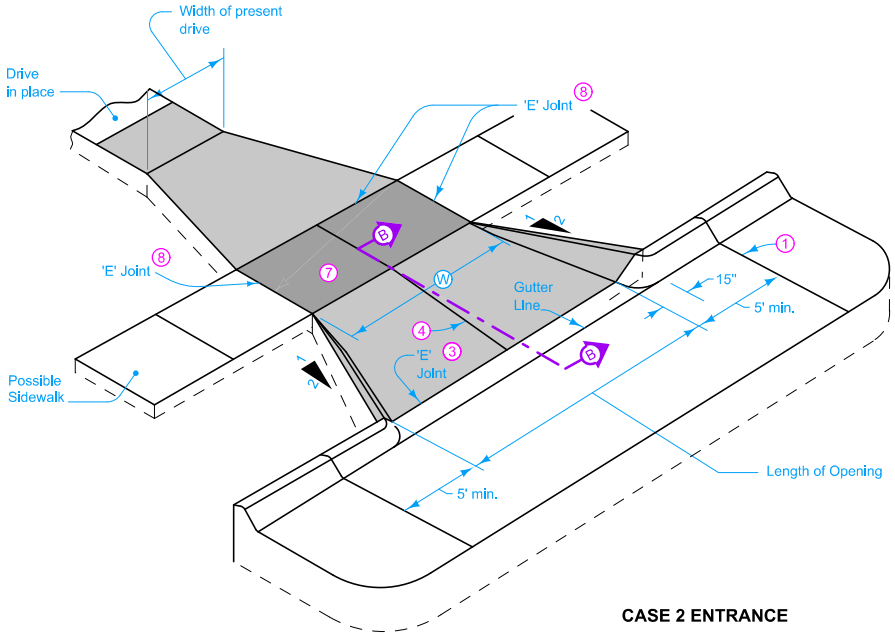
DEER FENCE CONSTRUCTION



CASE 1 ENTRANCE



ENTRANCE LOCATION



CASE 2 ENTRANCE

Special details for entrances other than Cases 1 and 2 are included in the detail plans. The shape and surface of driveways and alleys will vary to fit individual conditions.

Use unreinforced concrete pavement mix with a minimum thickness of 6 inches, unless specified otherwise for driveways and alleys. If an alley drains toward the roadway, use a 2 inch inverted crown; otherwise, use flat surface for driveway pavement.

W is measured at the street side of sidewalk. If sidewalk is not present, W is to be measured at the end of the returns for Case 1 and 10 feet back of curb for Case 2.

(1) Transverse Pavement Joints as per detail Project Plans.

(2) 'K' Pavement Joint (Refer to **PV-101**) from end of radius to end of radius.

(3) Line at the Back of Curb.

(4) 'C' Joint on Centerline.

(7) If driveway is designed to accomodate a sidewalk, construct the sidewalk within the limits of the driveway using the same thickness as the driveway. Refer to project plans for layout.

(8) If the sidewalk is in place at the time of construction, place 'E' Joint along the front edge of the sidewalk. If the sidewalk is reconstructed with the driveway entrance, place 'E' Joint along the back edge of the sidewalk and a 'C' Joint sawed or formed along the front edge of the sidewalk. Refer to **PV-101** for joint details.

Possible Contract Items:
Driveway, P.C. Concrete
Driveway, Reinforced P.C. Concrete
Removal of Paved Driveway
Sidewalk, P.C. Concrete, 6 in.

Possible Tabulation:
102-3

Iowa Department of Transportation

REVISION
3 | 10-18-11

STANDARD ROAD PLAN

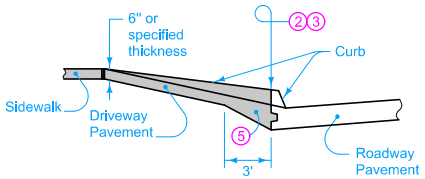
MI-210

SHEET 1 of 2

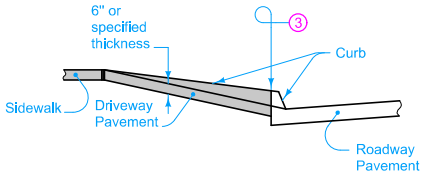
REVISIONS: Modified sidewalk general note and moved it to circle note 7. Shaded possible sidewalk.

Deanna Maifield
APPROVED BY DESIGN METHODS ENGINEER

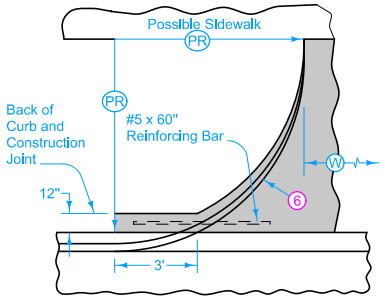
PCC DRIVEWAYS AND ALLEYS



SECTION A-A
(Case 1 Entrance)



SECTION B-B
(Cases 2 Entrance)



DETAIL 'A'
CASE 1 ENTRANCE

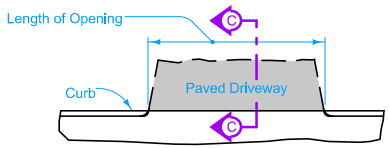
(2) 'K' Pavement Joint (Refer to PV-101) from end of radius to end of radius.

(3) Line at the Back of Curb.

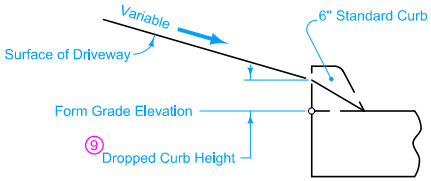
(5) Taper to Pavement Thickness.

(6) Lip curb varies from either $4\frac{1}{2}$ inch or 3 inch at back of curb to 0 inch at front of sidewalk.

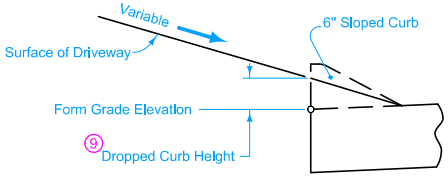
(9) Refer to Tabulation 102-3.



PLAN



SECTION C-C
(Standard Curb)



SECTION C-C
(Sloped Curb)

DROPPED CURB

Iowa Department of Transportation

REVISION
3 | 10-18-11

STANDARD ROAD PLAN

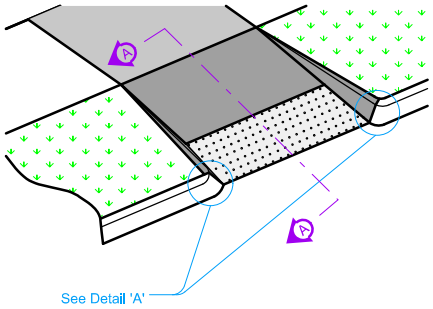
MI-210

SHEET 2 of 2

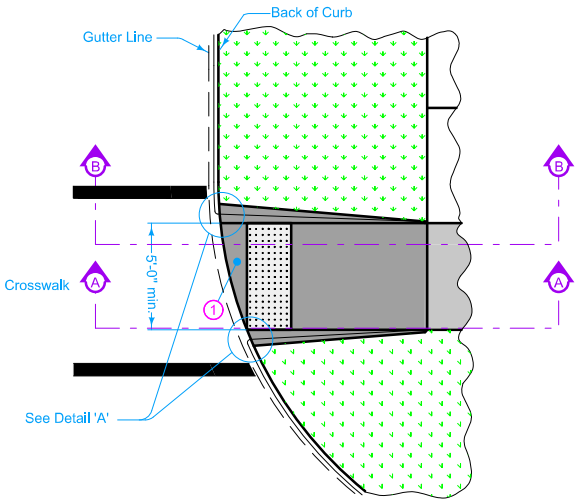
REVISIONS: Modified sidewalk general note and moved it to circle note 7. Shaded possible sidewalk.

Deanna Maifield
APPROVED BY DESIGN METHODS ENGINEER

PCC DRIVEWAYS AND ALLEYS

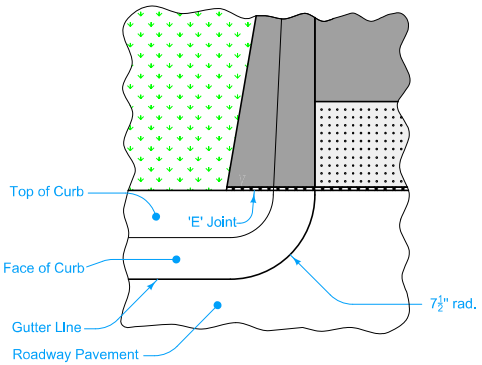


CURB RAMP PERPENDICULAR TO CURB



CURB RAMP NOT PERPENDICULAR TO CURB

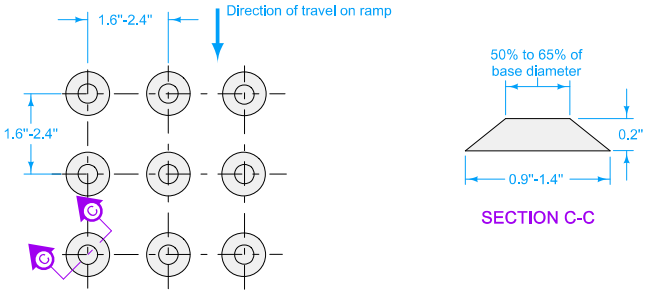
① Unless curb ramp is aligned perpendicular to the street radius, provide an area of special shaping at the bottom of the ramp. This area allows the grade break at the bottom of the ramp to be perpendicular to the ramp and provides a smooth transition to gutterline for wheelchair access.



DETAIL 'A'

LEGEND

- Ramp
- Landing
- Detectable Warnings
- Vegetation



SQUARE PATTERN
(Parallel alignment)

DOME DETAILS ON DETECTABLE WARNINGS

Possible Contract Items:
- Detectable Warnings
- Sidewalk, P.C. Concrete, 6 in.
- Sidewalk, P.C. Concrete, 4 in.
- Removal of Sidewalk

Possible Tabulation:
- 113-1

Iowa Department of Transportation

REVISION: 3 | 10-18-11

STANDARD ROAD PLAN

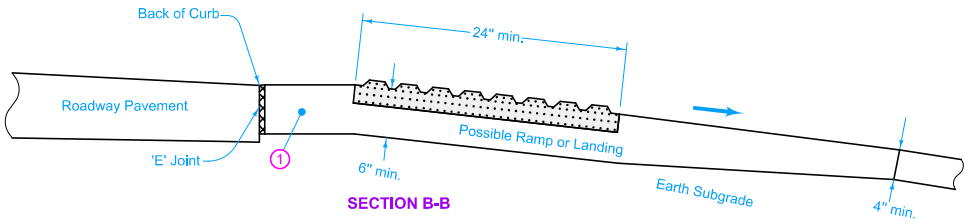
MI-220

SHEET 1 of 3

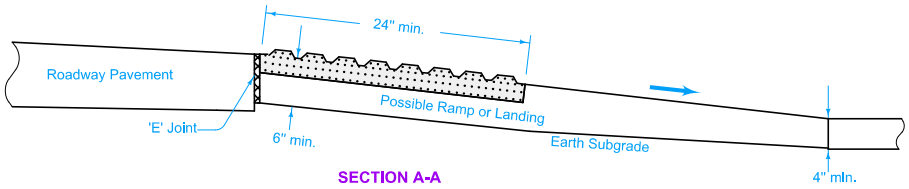
REVISIONS: Modified layouts and designs.

Deanna Maifield
APPROVED BY DESIGN METHODS ENGINEER

SIDEWALK WITH DETECTABLE WARNINGS



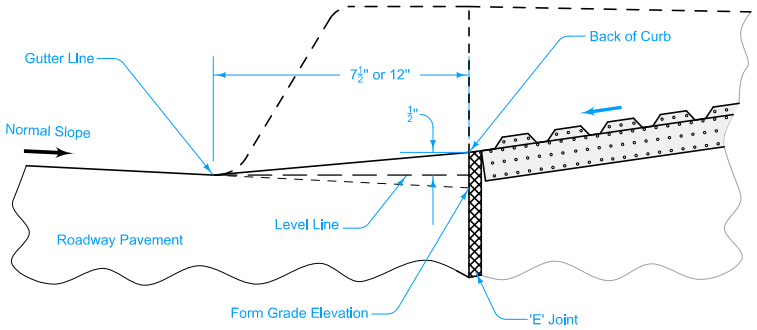
SECTION B-B



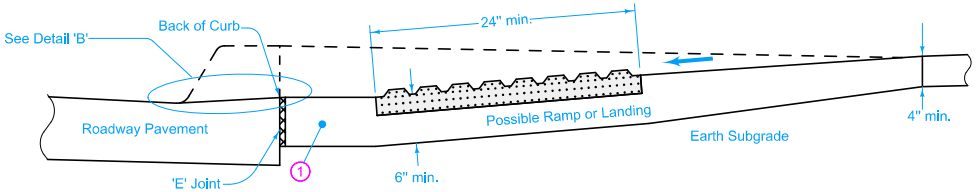
SECTION A-A

TYPICAL INSTALLATION DETECTABLE WARNING
WITH NON CURBED ROADWAY

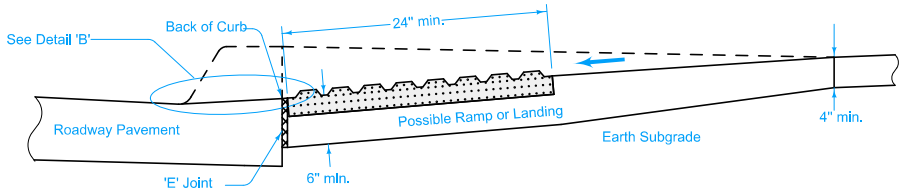
1 Unless curb ramp is aligned perpendicular to the street radius, provide an area of special shaping at the bottom of the ramp. This area allows the grade break at the bottom of the ramp to be perpendicular to the ramp and provides a smooth transition to gutterline for wheelchair access.



DETAIL 'B'



SECTION B-B



SECTION A-A

TYPICAL INSTALLATION DETECTABLE WARNING
WITH CURBED ROADWAY

LEGEND

- Ramp
- Landing
- Detectable Warnings
- Vegetation

Iowa Department of Transportation

STANDARD ROAD PLAN

REVISION
3 | 10-18-11

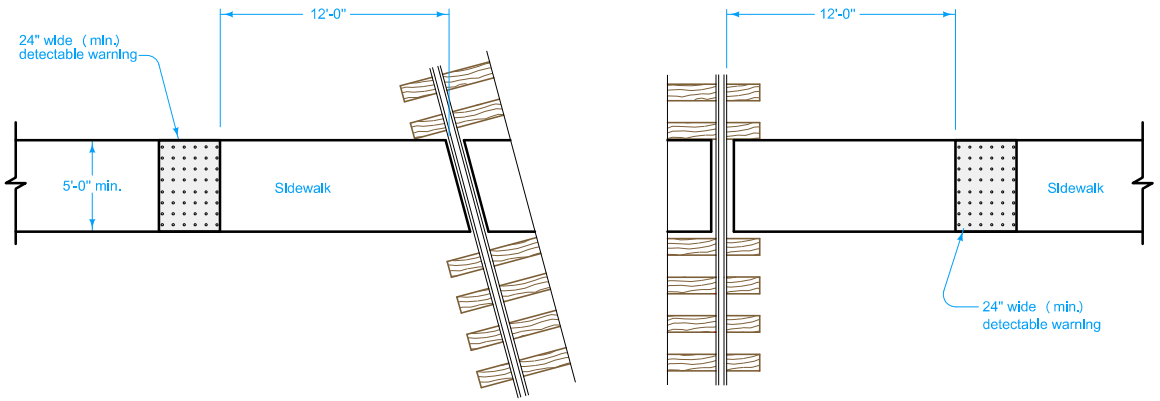
MI-220

SHEET 2 of 3

REVISIONS: Modified layouts and designs.

Deanna Maifield
APPROVED BY DESIGN METHODS ENGINEER

SIDEWALK WITH
DETECTABLE WARNINGS



RAILROAD CROSSING

LEGEND

- Ramp
- Landing
- Detectable Warnings
- Vegetation

Iowa Department of Transportation

REVISION
3 | 10-18-11

STANDARD ROAD PLAN

MI-220

SHEET 3 of 3

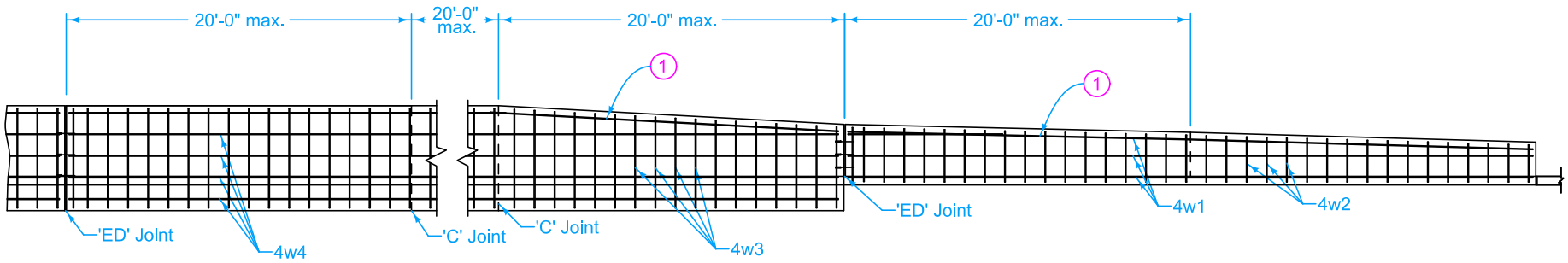
REVISIONS: Modified layouts and designs.

Deanna Maifield
APPROVED BY DESIGN METHODS ENGINEER

SIDEWALK WITH DETECTABLE WARNINGS

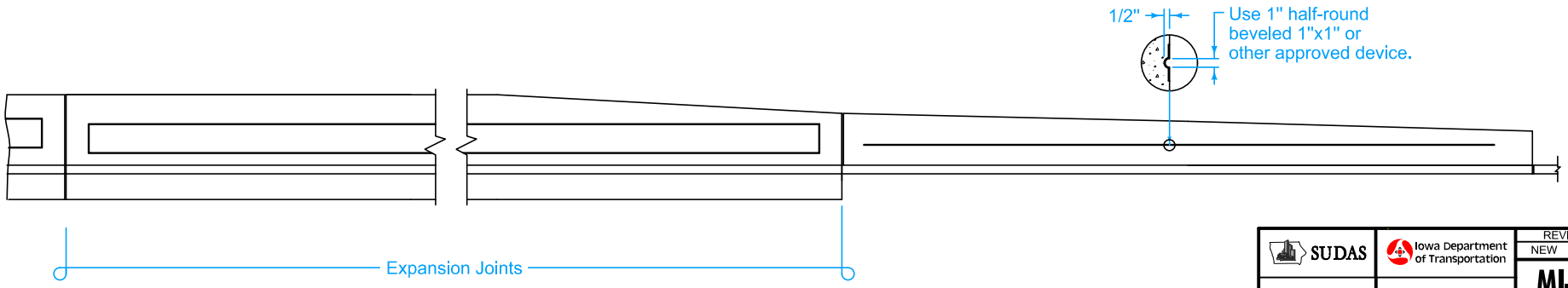
Provide a minimum concrete cover to near reinforcement of 1 1/2 inches. Provide 3 inches minimum cover at the ends of bars.

(1) Top bar parallel to top of wall. Lap 6 inch minimum as necessary. Tie securely.



TYPE B WALL **TYPE A WALL**

TYPICAL LONGITUDINAL SECTION OF RETAINING WALL



TYPICAL RUSTICATION DETAIL

FIGURE 9072.101 SHEET 1 OF 2

SUDAS | Iowa Department of Transportation

REVISION: NEW 10-18-11

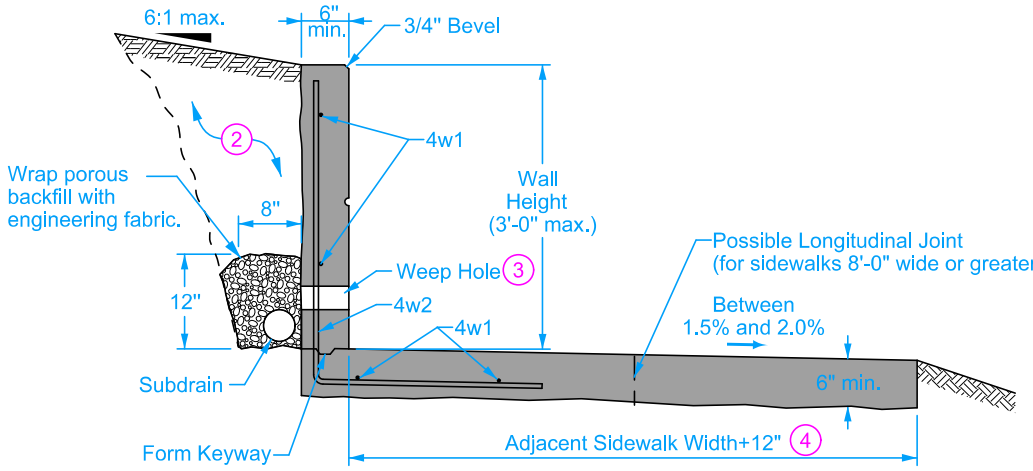
FIGURE 9072.101 | STANDARD ROAD PLAN | MI-221

SHEET 1 OF 2

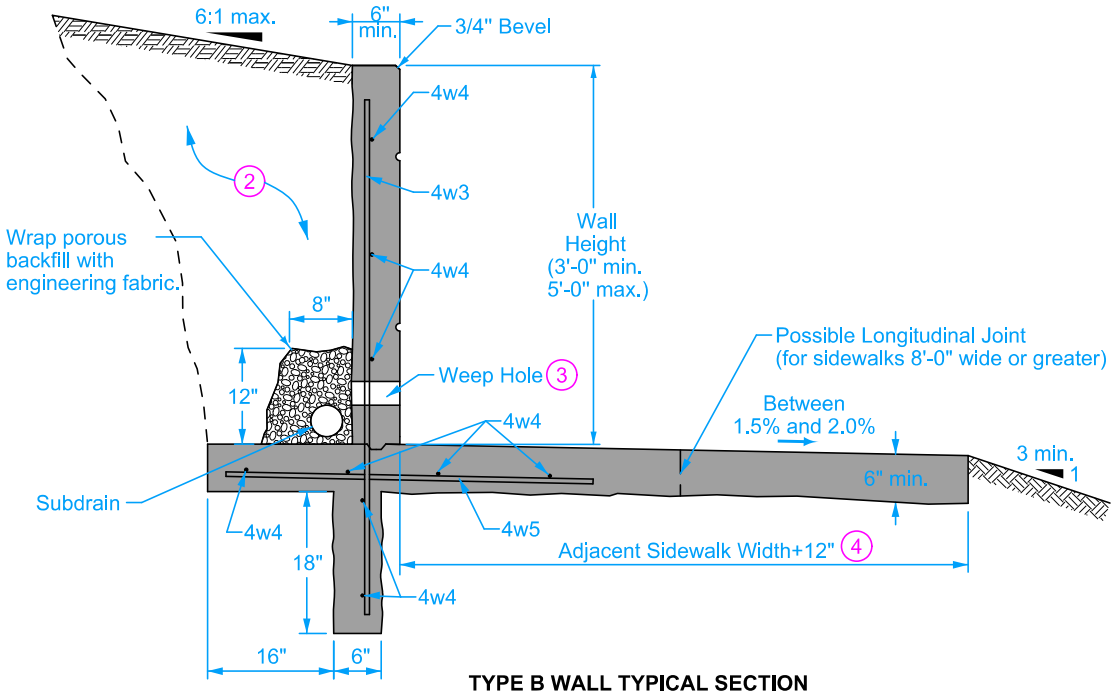
REVISIONS: Combined with SUDAS, New design.

Paul D. Wiegand, SUDAS DIRECTOR | Deanna Maifield, DESIGN METHODS ENGINEER

COMBINED RETAINING WALL - SIDEWALK



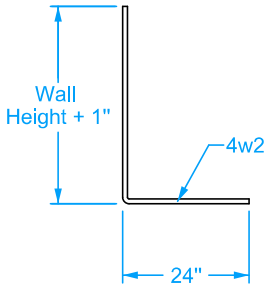
TYPE A WALL TYPICAL SECTION



TYPE B WALL TYPICAL SECTION

Provide a minimum concrete cover to near reinforcement of 1 1/2 inches. Provide 3 inches minimum cover at the ends of bars.

2. Excavate and place backfill material as necessary.
3. Provide 3 inch diameter weep holes at 8 foot intervals. Install rodent guards in weep holes. Align bottom of weep hole with top of subdrain.
4. Additional 12 inch width is adjacent to wall.



BENT BARS

REINFORCING BAR LIST

Wall Type	Mark	Size	Shape	Length	Spacing
Type A	4w1	4	———	Variable	15"
	4w2	4	L	Variable	14"
Type B	4w3	4	—	Wall Height + 18"	14"
	4w4	4	—	Variable	15"
	4w5	4	—	3'-10"	14"

SUDAS | Iowa Department of Transportation

REVISION: NEW 10-18-11

FIGURE 9072.101 | STANDARD ROAD PLAN | MI-221

SHEET 2 OF 2

REVISIONS: Combined with SUDAS, New design.

Paul D. Wiegand, SUDAS DIRECTOR | Deanna Maifield, DESIGN METHODS ENGINEER

COMBINED RETAINING WALL - SIDEWALK

FIGURE 9072.101 SHEET 2 OF 2

SECTION

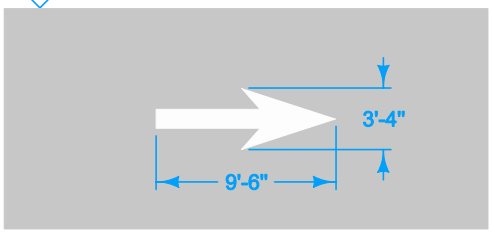
Pavement Markings

PM

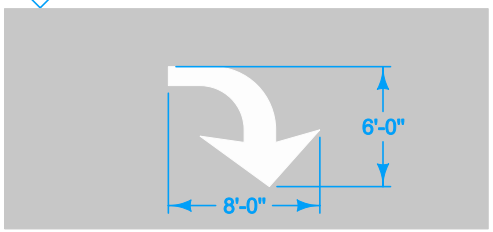
NO.	DATE	TITLE
PM-110	04-19-11	Line Types
PM-111	10-18-11	Symbols and Legends
PM-120	04-19-11	Stop Lines and Islands
PM-210	10-18-11	Separation in Two-Lane Roadway
PM-211	10-18-11	Separation in Four-Lane Roadway
PM-240	04-19-11	Railroad Crossing on Two-Lane Roadway
PM-242	04-19-11	Railroad Crossing on Four-Lane Roadway
PM-310	04-19-11	Entrance and Exit Ramps
PM-420	04-19-11	Two-Lane Roadway with no Turn Lanes (One-Way Stop Condition)
PM-520	04-19-11	Two-Lane Roadway with no Turn Lanes (Two-Way Stop Condition)
PM-521	04-19-11	Two-Lane Roadway with Right Turn Lanes
PM-522	04-19-11	Two-Lane Roadway with Left Turn Lanes
PM-550	04-19-11	Two-Lane Roadway with Two-Way Left Turn Lane
PM-560	04-19-11	Divided Multi-Lane Roadway with no Turn Lanes
PM-561	04-19-11	Divided Multi-Lane Roadway with Right Turn Lanes
PM-562	04-19-11	Divided Multi-Lane Roadway with Left Turn Lanes
PM-620	04-19-11	Two-Lane Roadway with no Turn Lanes (Four-Way Stop Condition)
PM-650	04-19-11	Multi-Lane Roadway with Two-Way Left Turn Lane
PM-760	04-19-11	Divided Multi-Lane Roadway Median

DESIGNER INFO

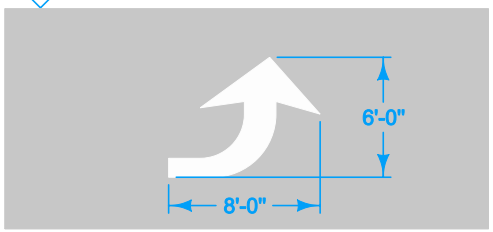
STAW STRAIGHT ARROW (White)



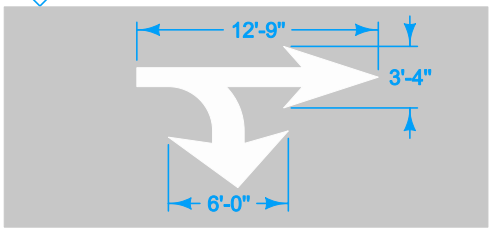
RTAW RIGHT TURN ARROW (White)



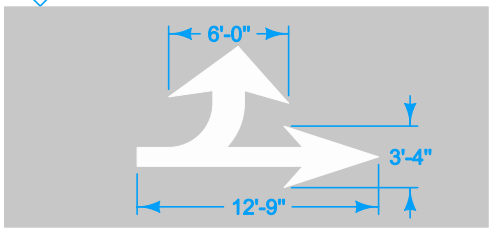
LTAW LEFT TURN ARROW (White)



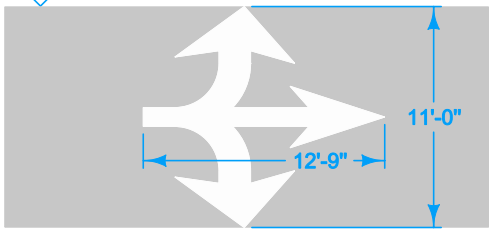
CSRW COMBINED STRAIGHT AND RIGHT TURN ARROW (White)



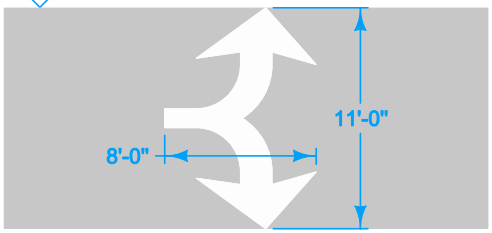
CSLW COMBINED STRAIGHT AND LEFT TURN ARROW (White)



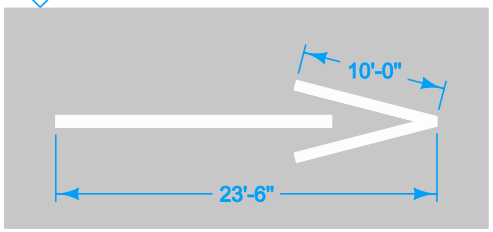
CSTW COMBINED STRAIGHT, RIGHT AND LEFT TURN ARROW (White) (1)



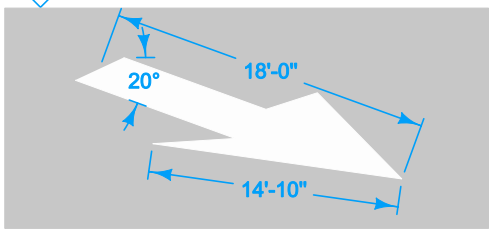
CRLW COMBINED RIGHT AND LEFT TURN ARROW (White) (1)



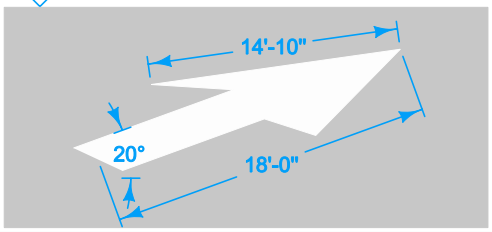
FERW FREEWAY, EXPRESSWAY AND RAMP ARROW (White)



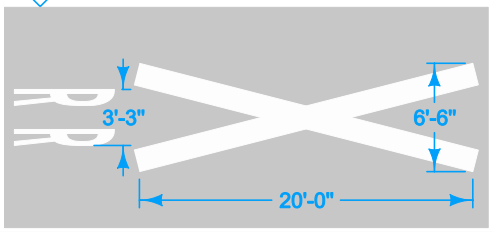
LLRW LEFT LANE REDUCTION ARROW (White)



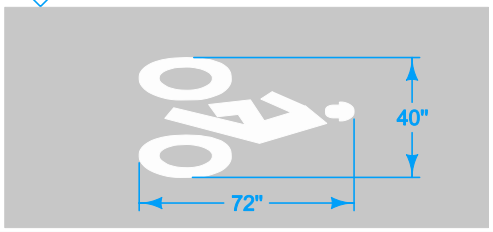
RLRW RIGHT LANE REDUCTION ARROW (White)



RRCW RAILROAD CROSSING SYMBOL (White)



BLSW BIKE LANE SYMBOL (White)



Layouts shown are for typical installations. Drawings are oriented to represent direction of traffic moving from left to right.

Center markings within the lane.

All dimensions shown are nominal. For proper proportion details, see current MUTCD Standard Highway Signs and Markings booklet.

Pavement word, symbol, and arrow markings are to be proportionally scaled to fit within the width of the facility upon which they are applied.

Except for the SCHOOL word marking, all markings are to be no more than one lane in width.

(1) Add template for Right Turn Arrow (RTAW) to Left Turn Arrow (LTAW) or Combined Straight and Left Turn Arrow (CSLW) to create new templates.

Possible Contract Item:
Pavement Marking Symbol and Legend Items

Possible Tabulation:
108-29

Iowa Department of Transportation

REVISION
1 10-18-11

STANDARD ROAD PLAN

PM-111

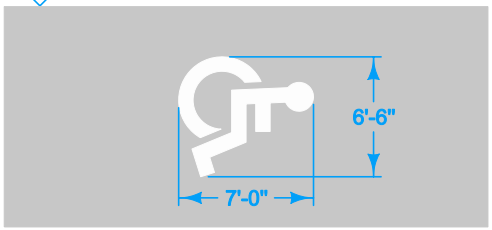
SHEET 1 of 2

REVISIONS: Added EXIT to word markings.

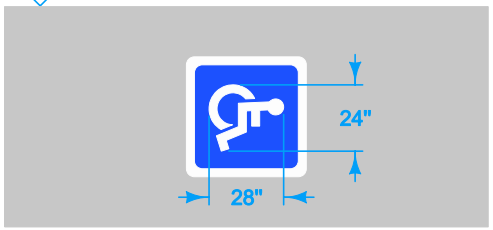
Deanna Maifield
APPROVED BY DESIGN METHODS ENGINEER

SYMBOLS AND LEGENDS

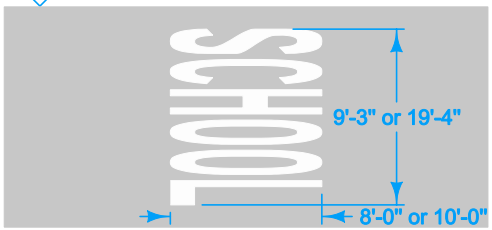
WCSW WHEELCHAIR SYMBOL (White)



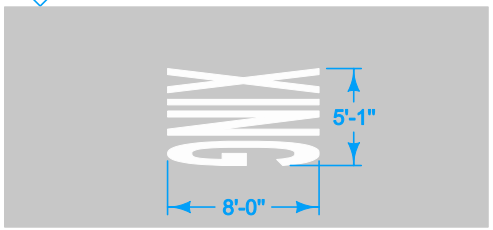
WPSB WHEELCHAIR PARKING SYMBOL (Blue)



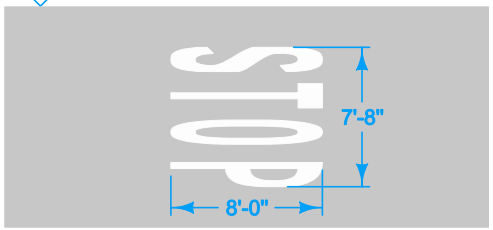
SCLW SCHOOL WORD MARKING (White) ②



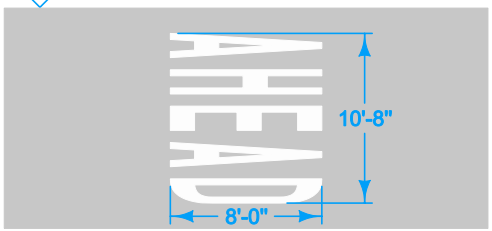
XNGW XING WORD MARKING (White)



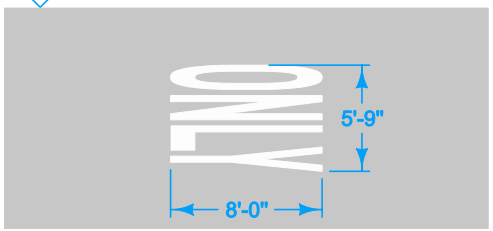
STPW STOP WORD MARKING (White)



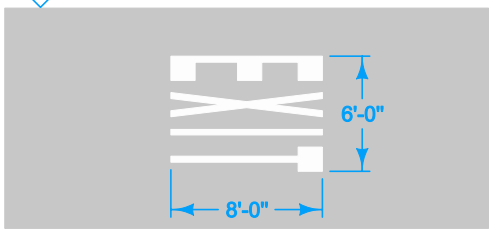
AHDW AHEAD WORD MARKING (White)



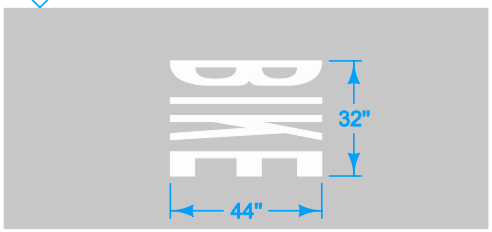
ONLW ONLY WORD MARKING (White)



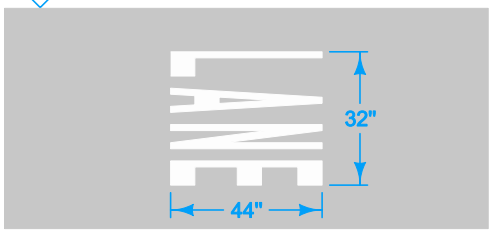
XITW EXIT WORD MARKING (White)



BIKW BIKE WORD MARKING (White)



LANW LANE WORD MARKING (White)



② When placed across one lane, use the smaller dimensions shown. When placed across two lanes, use the larger dimensions shown.

Iowa Department of Transportation

REVISION
1 10-18-11

STANDARD ROAD PLAN

PM-111

SHEET 2 of 2

REVISIONS: Added EXIT to word markings.

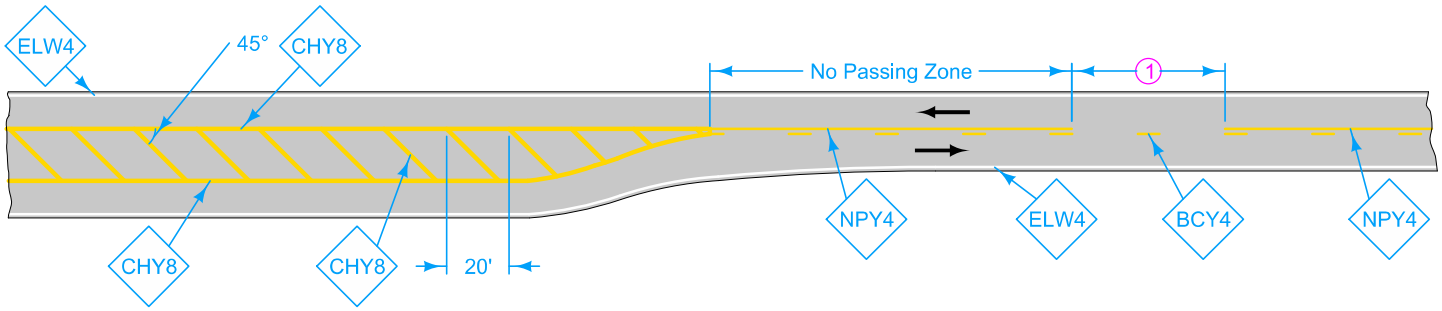
Deanna Maifield
APPROVED BY DESIGN METHODS ENGINEER

SYMBOLS AND LEGENDS

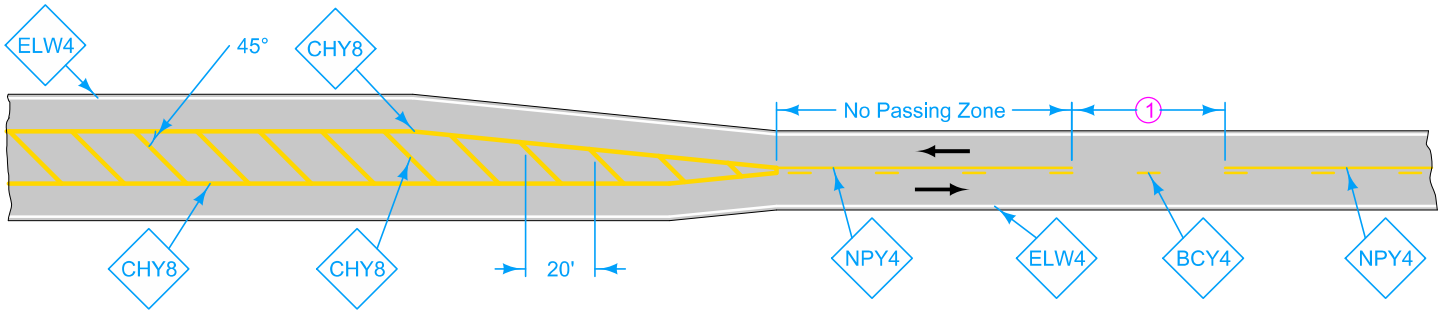
DESIGNER INFO

For line information, see PM-110.

(1) If less than 400 feet, join solid yellow lines.



OFFSET ALL TO ONE SIDE



OFFSET SPLIT BETWEEN SIDES

FLUSH MEDIANS

Speed (mph)	Length of No Passing Zone
20	300'
25	300'
30	360'
35	360'
40	480'
45	480'
50	600'
55	600'

LEGEND

— - -	Centerline Extension	CHY8	Channelizing Line (Yellow)
←	Direction of Traffic	ELW4	Edge Line Right (White)
BCY4	Broken Centerline (Yellow)	NPY4	No Passing Zone Line (Yellow)

Possible Contract Item:
Pavement Marking Line Items

Possible Tabulation:
108-22

Iowa Department of Transportation

REVISION

1	10-18-11

STANDARD ROAD PLAN

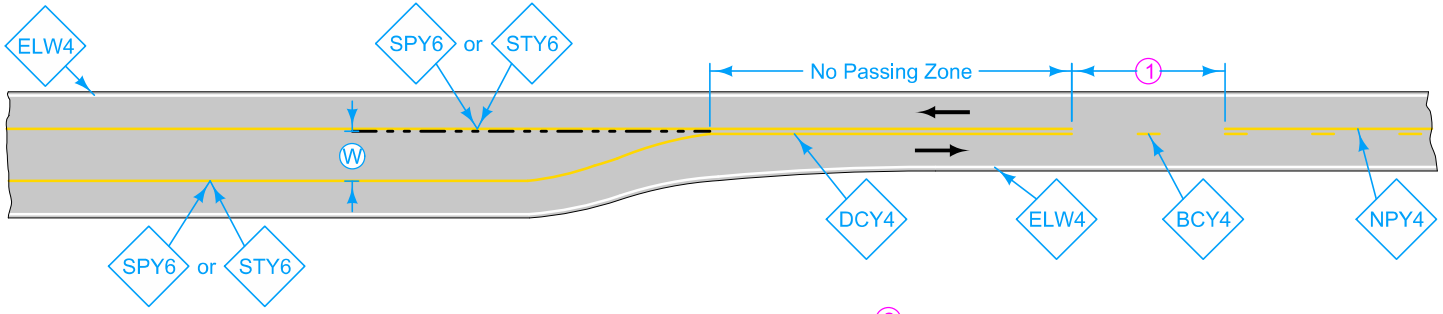
PM-210

SHEET 1 of 2

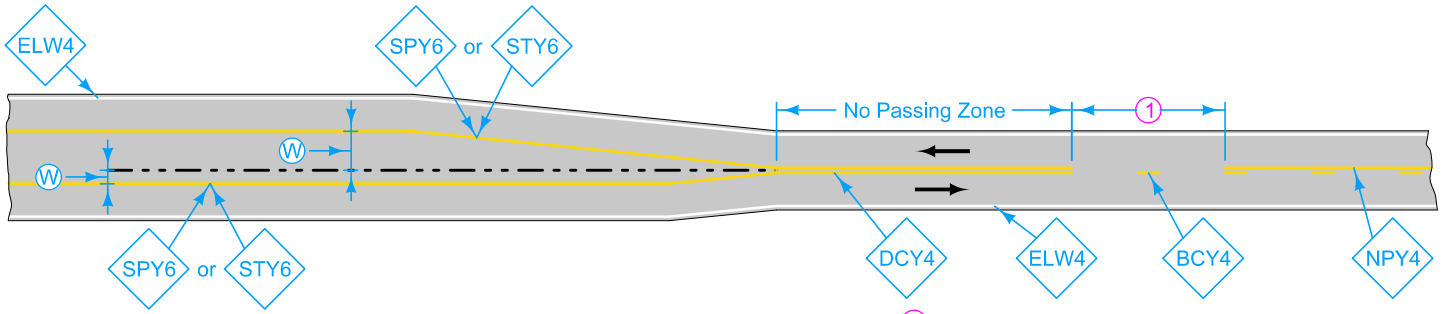
REVISIONS: Added additional 'W' Information and moved to circle note 2. Flush medians: Changed NPZ length table, changed DCY4 to NPY4, and removed 'W'.

Deanna Maifield
APPROVED BY DESIGN METHODS ENGINEER

SEPARATION IN TWO-LANE ROADWAY



OFFSET (W) ALL TO ONE SIDE (2)



OFFSET (W) SPLIT BETWEEN SIDES (2)

(1) If less than 400 feet, join solid yellow lines.

(2) The offset distance from centerline, W, can be either the entire width of the offset if the offset is all to one side, or it is the larger of the two partial offsets if the entire width of the offset is split between the two directions of traffic. Measure W from the midpoint of the centerline to the outside edge of the painted curb.

RAISED MEDIANS

LEGEND

— - -	Centerline Extension	ELW4	Edge Line Right (White)
←	Direction of Traffic	NPY4	No Passing Zone Line (Yellow)
BCY4	Broken Centerline (Yellow)	SPY6	Sloped Curb 6" (Yellow)
DCY4	Double Centerline (Yellow)	STY6	Standard Curb 6" (Yellow)

Length of No Passing Zone						
Speed (mph)	(W) = offset distance from centerline					
	6'	8'	10'	12'	14'	16'
25	200	200	210	250	300	340
35	250	330	410	490	580	660
45	540	720	900	1080	1260	1440
55	660	880	1100	1320	1540	1760
65	780	1040	1300	1560	1820	2080

Iowa Department of Transportation

REVISION
1 | 10-18-11

STANDARD ROAD PLAN

PM-210

SHEET 2 of 2

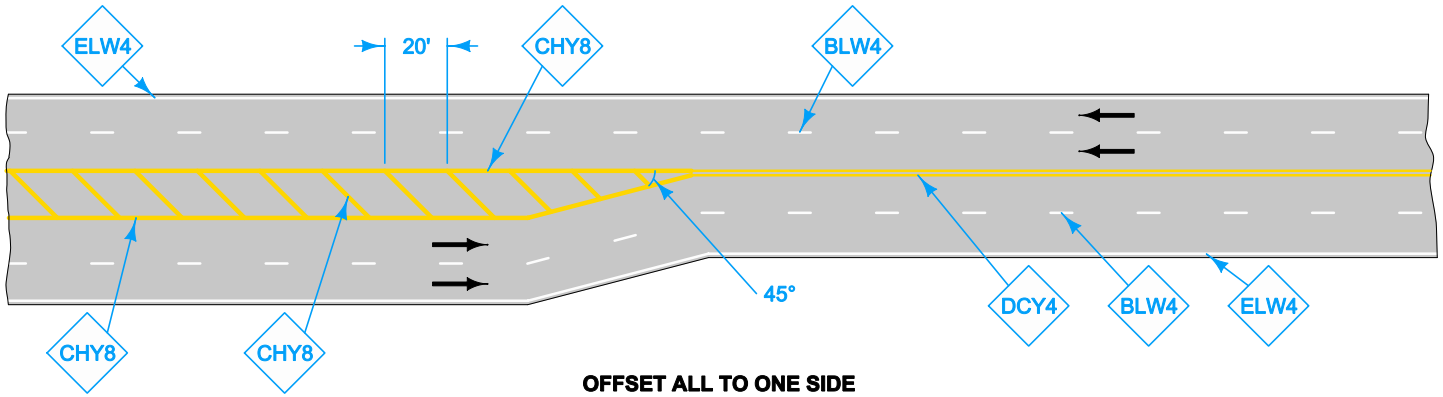
REVISIONS: Added additional 'W' information and moved to circle note 2. Flush medians: Changed NPZ length table, changed DCY4 to NPY4, and removed 'W'.

Deanna Maifield
APPROVED BY DESIGN METHODS ENGINEER

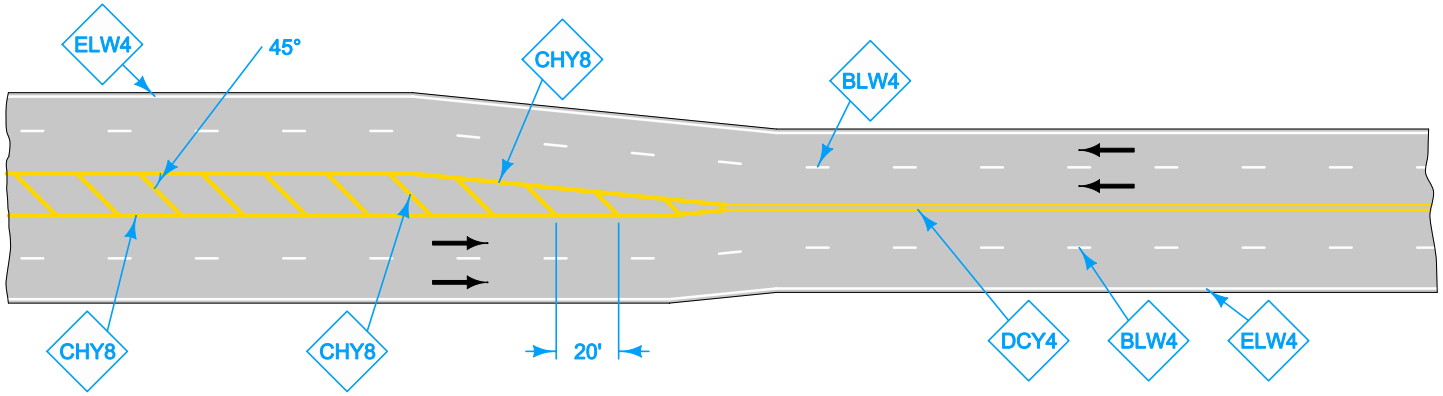
SEPARATION IN TWO-LANE ROADWAY

DESIGNER INFO

For line information, see PM-110.



OFFSET ALL TO ONE SIDE



OFFSET SPLIT BETWEEN SIDES

FLUSH MEDIANS

LEGEND

←	Direction of Traffic	DCY4	Double Centerline (Yellow)
BLW4	Broken Lane Line (White)	ELW4	Edge Line Right (White)
CHY8	Channelizing Line (Yellow)		

Possible Contract Item:
Pavement Marking Line Items

Possible Tabulation:
108-22

Iowa Department of Transportation

STANDARD ROAD PLAN

REVISION	
1	10-18-11

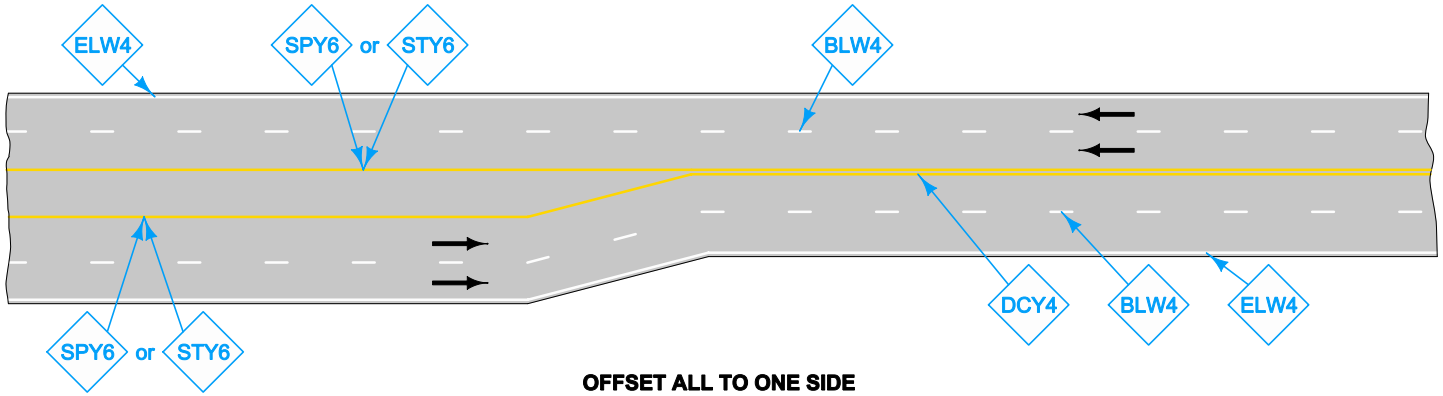
PM-211

SHEET 1 of 2

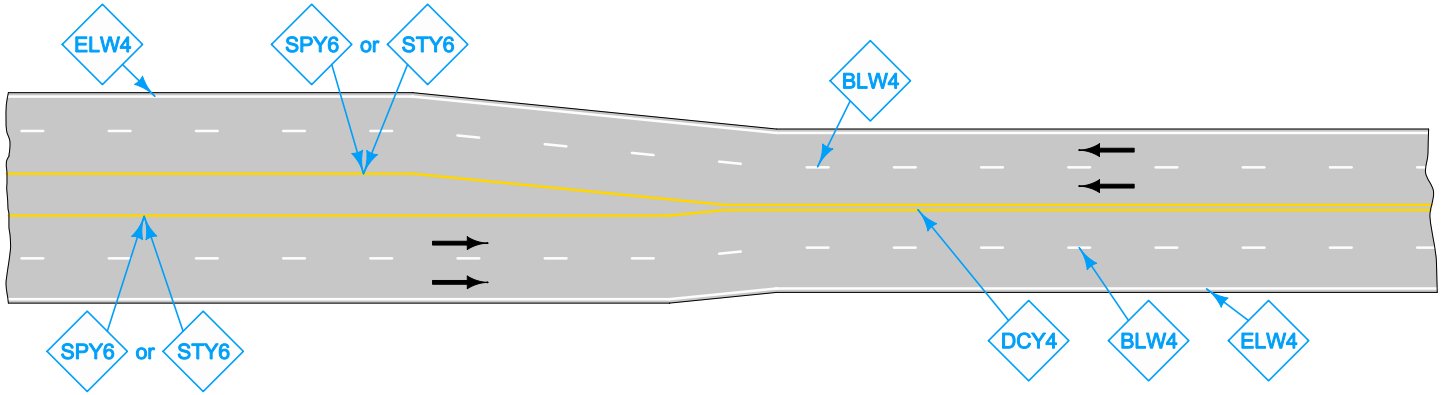
REVISIONS: Removed offset information from general note.

Deanna Maifield
APPROVED BY DESIGN METHODS ENGINEER

SEPARATION IN FOUR-LANE ROADWAY



OFFSET ALL TO ONE SIDE



OFFSET SPLIT BETWEEN SIDES

RAISED MEDIANS

LEGEND

←	Direction of Traffic	ELW4	Edge Line Right (White)
BLW4	Broken Lane Line (White)	SPY6	Sloped Curb 6" (Yellow)
DCY4	Double Centerline (Yellow)	STY6	Standard Curb 6" (Yellow)

Iowa Department of Transportation

STANDARD ROAD PLAN

REVISION 1 10-18-11

PM-211

SHEET 2 of 2

REVISIONS: Removed offset information from general note.

Deanna Maifield
APPROVED BY DESIGN METHODS ENGINEER

SEPARATION IN FOUR-LANE ROADWAY

SECTION

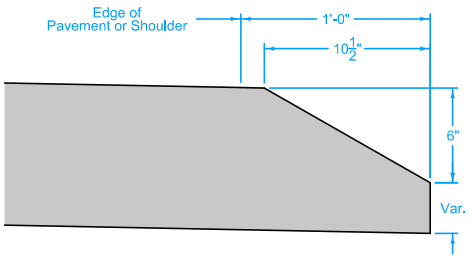
Pavement

PV

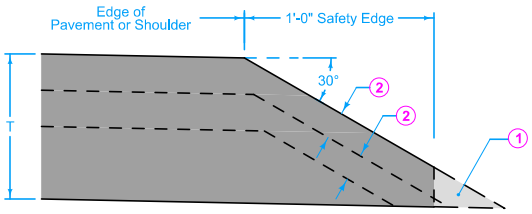
NO.	DATE	TITLE
		General
PV-1	Void	Replaced by PV-101
PV-2	Void	Replaced by PV-102 and PV-104
PV-3	10-18-11	Safety Edge
PV-10	04-19-11	Rumble Strip Panel for Intersection Approach
PV-11	04-20-10	Structural Rumble Strips
PV-12	10-18-11	Milled Shoulder Rumble Strips
PV-13	04-19-11	Milled Centerline Rumble Strips
		PCC
PV-101	04-19-11	Joints
PV-102	04-19-11	PCC Curb Details
PV-103	04-19-11	Manhole Boxouts in PCC Pavement
PV-104	04-19-11	Ramped Median Nose
		HMA
PV-201	04-19-11	Manhole Boxouts in HMA Pavement and HMA Overlays
		Superelevation
PV-301	04-19-11	Superelevation Details Two Lane Roadway
PV-302	04-19-11	Superelevation Details Four Lane Roadway Depressed Median
PV-303	04-19-11	Superelevation Details Ramps
PV-304	04-19-11	Superelevation Details Six Lane Roadway Depressed Median
PV-305	10-18-11	Superelevation Details Six Lane Roadway Closed Median
PV-306	04-19-11	Superelevation Details Eight Lane Roadway Closed Median
		Ramp Tapers
PV-410	10-18-11	Deceleration Taper for 16' Exit Ramp
PV-411	10-18-11	Acceleration Taper for 16' Entrance Ramp
PV-412	10-18-11	Deceleration Taper for 18' Exit Loop
PV-414	10-18-11	Acceleration Taper for 18' Entrance Loop

Pavement

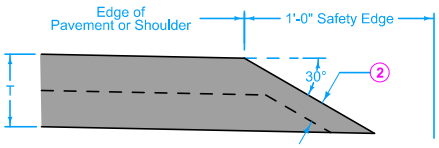
NO.	DATE	TITLE
		Median Crossovers
PV-500	04-19-11	Median Crossover (50' Median)
PV-501	04-19-11	Median Crossover (50' Median) 16' Wide 1 Lane
PV-502	04-19-11	Median Crossover (50' Median) 28' Wide 2 Lane
PV-503	04-19-11	Median Crossover (64' Median)
PV-504	04-19-11	Median Crossover (64' Median) 16' Wide 1 Lane
PV-505	04-19-11	Median Crossover (64' Median) 28' Wide 2 Lane
PV-506	04-19-11	Median Crossover (68.24' Median)
PV-507	04-19-11	Median Crossover (68.24' Median) 16' Wide 1 Lane
PV-508	04-19-11	Median Crossover (68.24' Median) 28' Wide 2 Lane



PCC



T > 8"



T < 8"

HMA

Quantities for Safety Edge are included in the estimated quantity of the pavement or shoulder. For HMA quantities calculated by area, the Safety Edge is measured as one foot of width regardless of thickness.

See paving typicals for placement within roadway.

The number of HMA lifts shown are for illustration purposes only.

(1) Material in excess of 1' width is contractor's option.

(2) Coverage thickness to exceed nominal maximum aggregate size.

Iowa Department of Transportation

REVISION
1 | 10-18-11

STANDARD ROAD PLAN

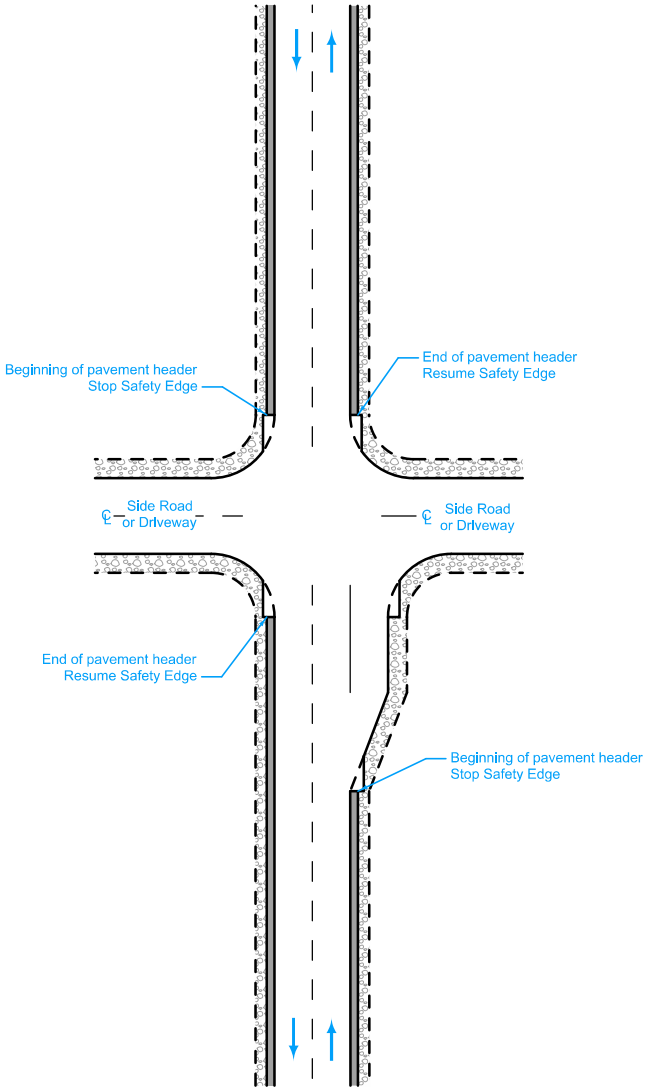
PV-3

SHEET 1 of 2

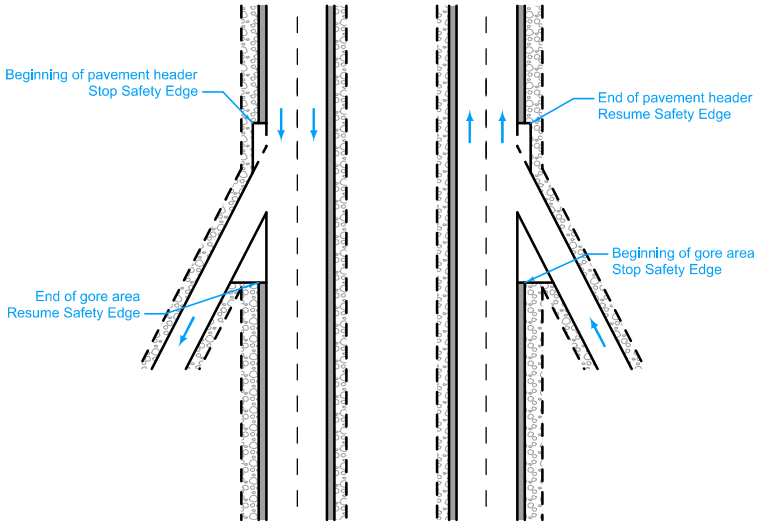
REVISIONS: Modified HMA drawings. Added circle notes 1 and 2.

Deanna Maifield
APPROVED BY DESIGN METHODS ENGINEER

SAFETY EDGE



AUXILIARY LANES AND INTERSECTIONS



RAMPS AND LOOPS

Iowa Department of Transportation

STANDARD ROAD PLAN

REVISION	
1	10-18-11

PV-3

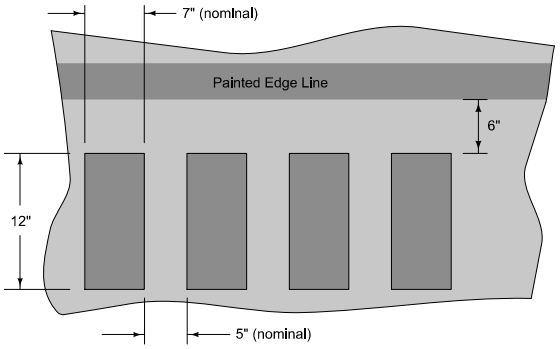
SHEET 2 of 2

REVISIONS: Modified HMA drawings. Added circle notes 1 and 2.

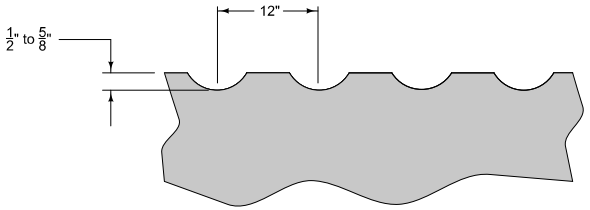
Deanna Maifield
APPROVED BY DESIGN METHODS ENGINEER

SAFETY EDGE

DESIGNER INFO



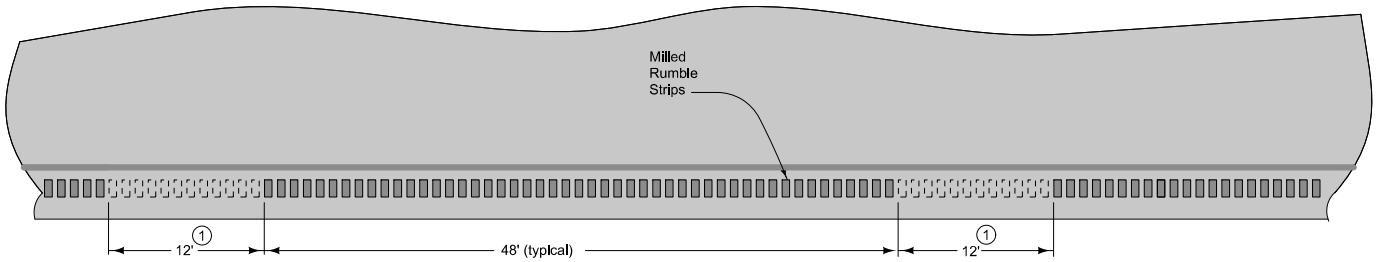
PLAN



SECTION

MILLED RUMBLE STRIP

① Place continuous Milled Rumble Strips (no 12-foot gaps) on all median-side shoulders and on all interstate shoulders.



GAP DETAILS ①

Possible Contract Items:
- Asphalt Emulsion for Fog Seal (Shoulder Rumble Strips)
- Milled Shoulder Rumble Strips, HMA Surface
- Milled Shoulder Rumble Strips, PCC Surface

Possible Tabulation:
- 112-10

Iowa Department of Transportation

REVISION 3 10-18-11

STANDARD ROAD PLAN

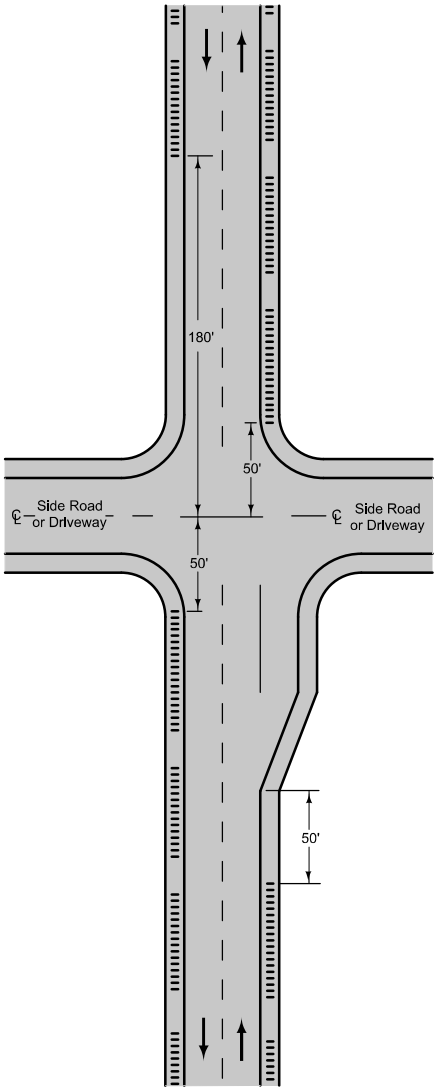
PV-12

SHEET 1 of 2

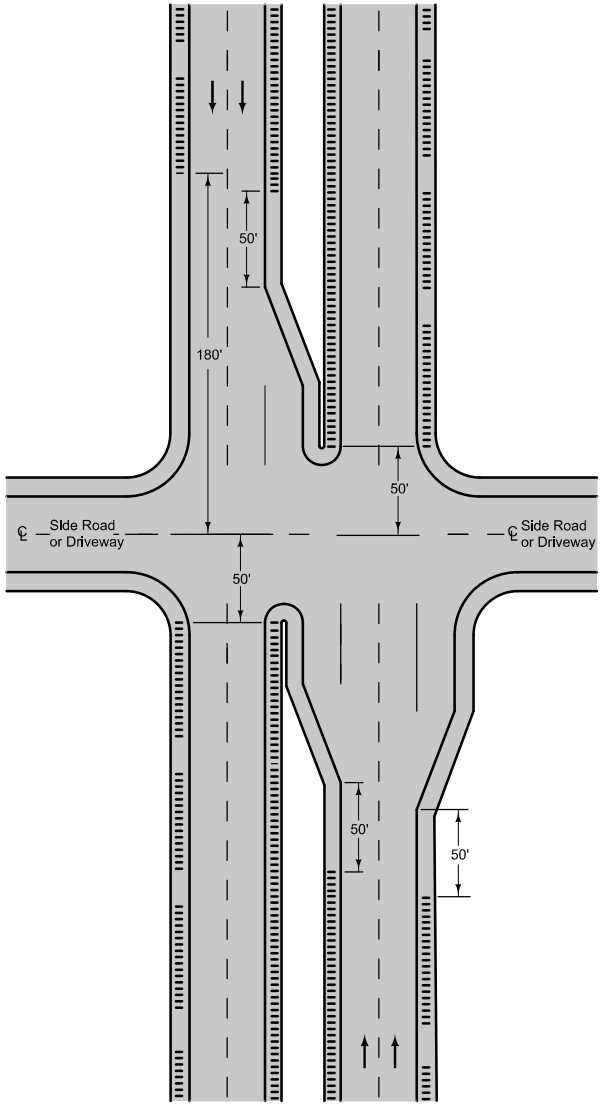
REVISIONS: Shaded all pavement for clarification.

Deanna Maifield
APPROVED BY DESIGN METHODS ENGINEER

MILLED SHOULDER RUMBLE STRIPS

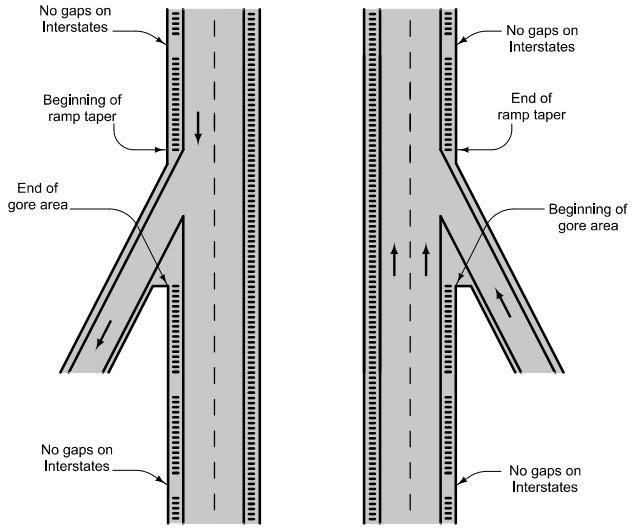


UNDIVIDED HIGHWAYS

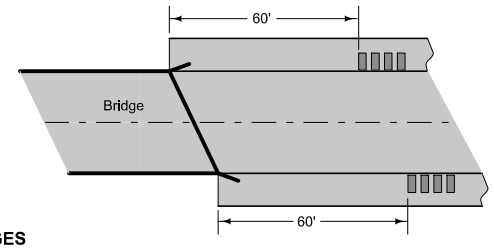


DIVIDED HIGHWAYS

INTERSECTION SITUATIONS



RAMP AND LOOP TERMINALS (1)



BRIDGES

(1) Place continuous Milled Rumble Strips (no 12-foot gaps) on all median-side shoulders and on all interstate shoulders.

Iowa Department of Transportation

REVISION	
3	10-18-11

STANDARD ROAD PLAN

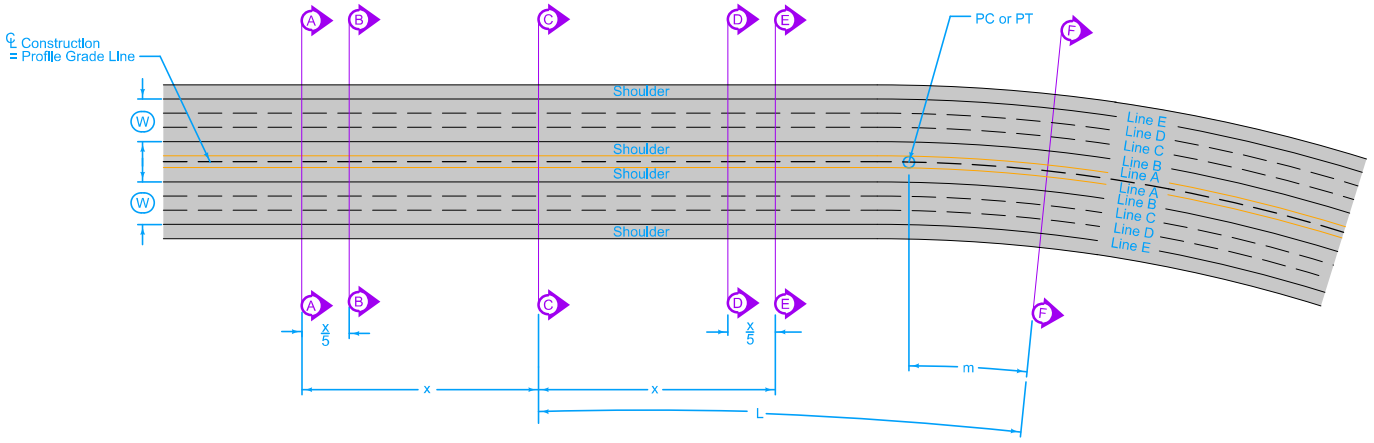
PV-12

SHEET 2 of 2

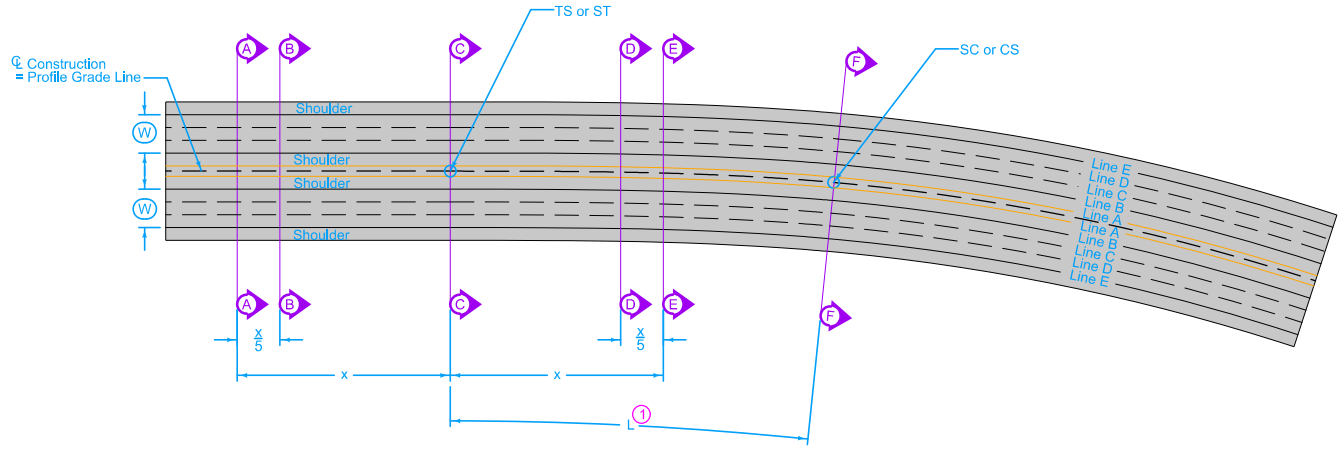
REVISIONS: Shaded all pavement for clarification.

Deanna Maifield
APPROVED BY DESIGN METHODS ENGINEER

MILLED SHOULDER RUMBLE STRIPS



TRANSITION DETAILS - TANGENT TO CURVE



TRANSITION DETAILS - SPIRAL CURVE

Refer to specific curve data contained in project plans for tangent runout length (x), runoff length (L) and full superelevation (e).

When spiral curve transitions are not required:
Place 70% of full superelevation at the P.C. and P.T.
Place 30% of the runoff length within the curve.

Unless otherwise specified, all lengths are measured along the centerline of construction.

Superelevations on this standard are shown for curves to the right. Curves to the left are a mirror image of what is shown.

Smooth curves should be established at the time of construction at sections A-F along the profile edge of lines A-E.

See Detail A for profile grade location.

m = 30% of Runoff Length (L)

Ⓦ = 36'

L = Distance to Change Cross Slope from 0% to e

e = Superelevation Rate

x = Distance to Change Cross Slope from 0% to 2.5%

s = Normal Shoulder Slope

① Spiral curve length coincides with runoff length (L)

Iowa Department of Transportation

REVISION
1 | 10-18-11

STANDARD ROAD PLAN

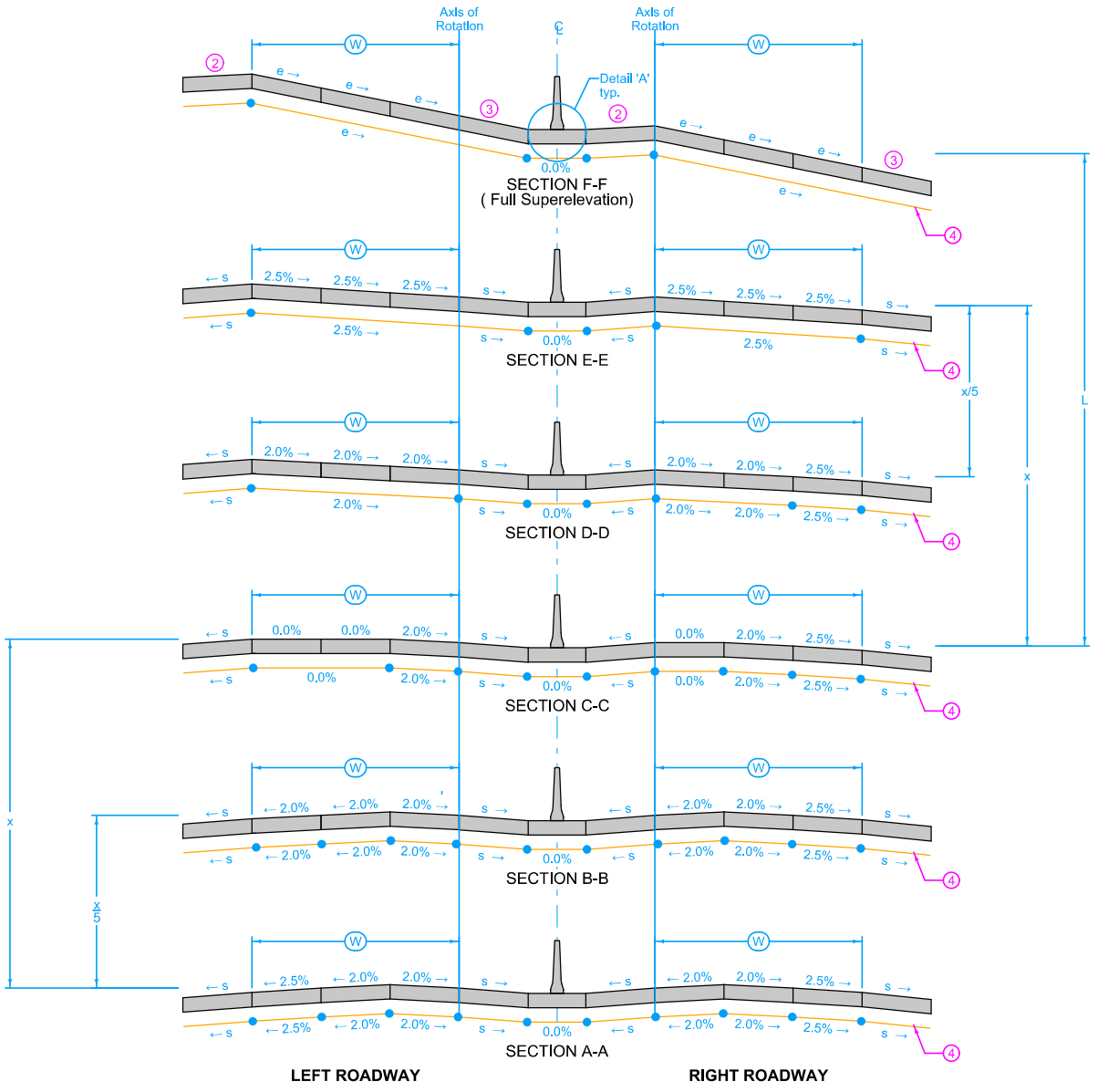
PV-305

SHEET 1 of 4

REVISIONS: Modified 'W' dimension and moved shoulder labels on sheet 1 top detail.

Deanna Maifield
APPROVED BY DESIGN METHODS ENGINEER

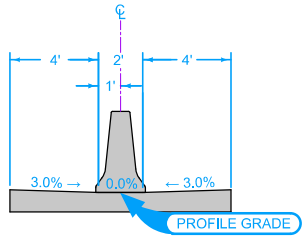
SUPERELEVATION DETAILS
SIX LANE ROADWAY
CLOSED MEDIAN



(2) High Side Shoulder: Maintain normal shoulder cross slope (s) until the cross slope break with the adjacent pavement reaches 8.0%, then slope the shoulder at the same rate as the adjacent pavement maintaining an 8% cross slope breakover.

(3) Low Side Shoulder: Maintain normal shoulder cross slope (s) until the adjacent pavement slope equals s, then slope the shoulder at the same cross slope as the adjacent pavement.

(4) Subgrade Surface: Subgrade surface cross slope parallel to pavement surface cross slope.



DETAIL A

Iowa Department of Transportation

STANDARD ROAD PLAN

REVISION
1 | 10-18-11

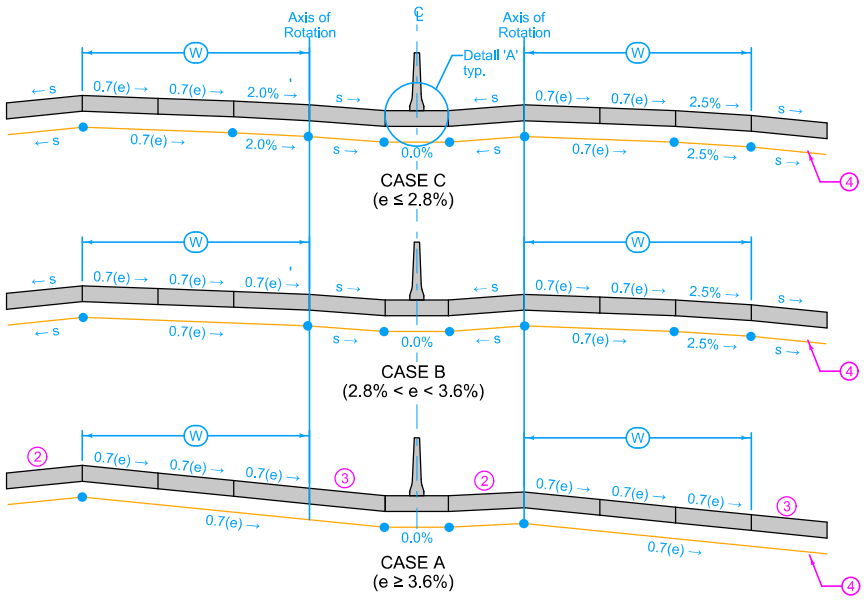
PV-305

SHEET 2 of 4

REVISIONS: Modified 'W' dimension and moved shoulder labels on sheet 1 top detail.

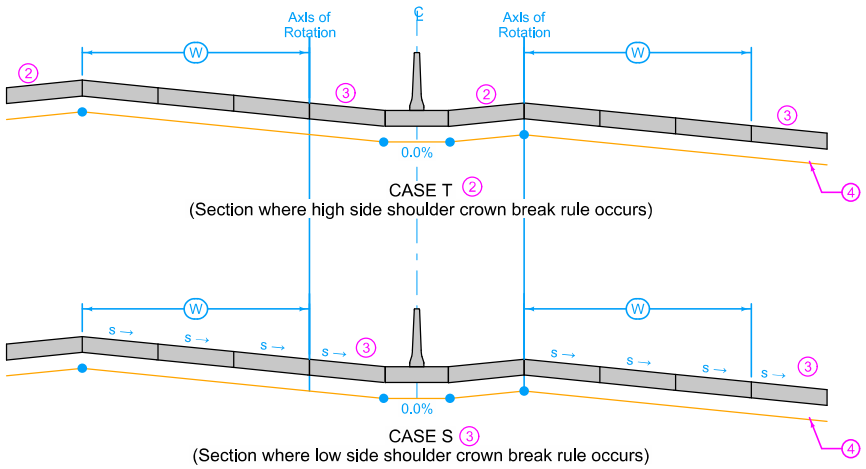
Deanna Maifield
APPROVED BY DESIGN METHODS ENGINEER

SUPERELEVATION DETAILS
SIX LANE ROADWAY
CLOSED MEDIAN



LEFT ROADWAY **RIGHT ROADWAY**

SECTION AT THE PC OR PT



LEFT ROADWAY **SECTION WHERE SHOULDER SLOPE TRANSITION BEGINS** **RIGHT ROADWAY**

(2) High Side Shoulder: Maintain normal shoulder cross slope (s) until the cross slope break with the adjacent pavement reaches 8.0%, then slope the shoulder at the same rate as the adjacent pavement maintaining an 8% cross slope breakover.

(3) Low Side Shoulder: Maintain normal shoulder cross slope (s) until the adjacent pavement slope equals s, then slope the shoulder at the same cross slope as the adjacent pavement.

(4) Subgrade Surface: Subgrade surface cross slope parallel to pavement surface cross slope.

Iowa Department of Transportation

REVISION 1 10-18-11

STANDARD ROAD PLAN

PV-305

SHEET 3 of 4

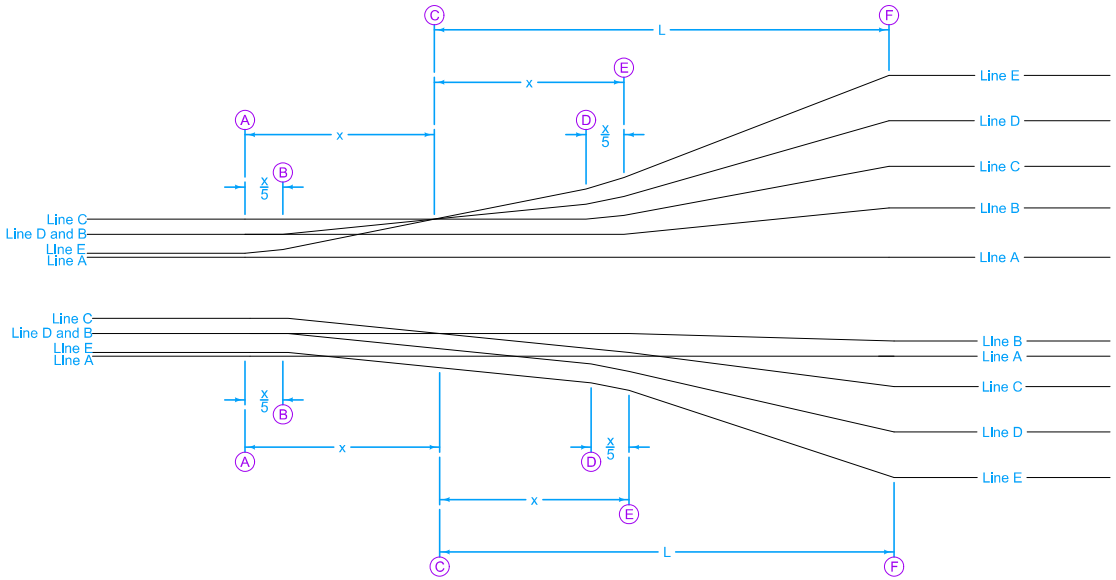
REVISIONS: Modified 'W' dimension and moved shoulder labels on sheet 1 top detail.

Deanna Maifield
APPROVED BY DESIGN METHODS ENGINEER

SUPERELEVATION DETAILS
SIX LANE ROADWAY
CLOSED MEDIAN

TABLE OF OFFSETS AND DROPS FOR LEFT ROADWAY								
Location of Cross Sections		(A)	(B)	(C)	(D)	(E)	(F)	
From Line A To Line B	Offset (Ft.)	*	*	*	*	*	*	
	Slope (%)	s	s	s	s	s	(3)	
	Drop (Ft.)							
From Line B To Line C	Offset (Ft.)	12	12	12	12	12	12	
	Slope (%)	2.0	2.0	2.0	2.0	2.5	e	
	Drop (Ft.)	0.24	0.24	0.24	0.24	0.30	12(e)	
From Line C To Line D	Offset (Ft.)	12	12	12	12	12	12	
	Slope (%)	-2.0	-2.0	0.0	2.0	2.5	e	
	Drop (Ft.)	-0.24	-0.24	0.0	0.24	0.30	12(e)	
From Line D To Line E	Offset (Ft.)	12	12	12	12	12	12	
	Slope (%)	-2.5	-2.0	0.0	2.0	2.5	e	
	Drop (Ft.)	-0.30	-0.24	0.0	0.24	0.30	12(e)	

* Refer to plan details for shoulder width



DIAGRAMMATIC PROFILES OF THE PAVEMENT EDGE LINES

TABLE OF OFFSETS AND DROPS FOR RIGHT ROADWAY								
Location of Cross Sections		(A)	(B)	(C)	(D)	(E)	(F)	
From Line A To Line B	Offset (Ft.)	*	*	*	*	*	*	
	Slope (%)	s	s	s	s	3.0	(2)	
	Drop (Ft.)							
From Line B To Line C	Offset (Ft.)	12	12	12	12	12	12	
	Slope (%)	2.0	2.0	0.0	-2.0	-2.5	-e	
	Drop (Ft.)	0.24	0.24	0.0	-0.24	-0.30	-12(e)	
From Line C To Line D	Offset (Ft.)	12	12	12	12	12	12	
	Slope (%)	-2.0	-2.0	-2.0	-2.0	-2.5	-e	
	Drop (Ft.)	-0.24	-0.24	-0.24	-0.24	-0.30	-12(e)	
From Line D To Line E	Offset (Ft.)	12	12	12	12	12	12	
	Slope (%)	-2.5	-2.5	-2.5	-2.5	-2.5	-e	
	Drop (Ft.)	-0.30	-0.30	-0.30	-0.30	-0.30	-12(e)	

* Refer to plan details for shoulder width

Iowa Department of Transportation

STANDARD ROAD PLAN

REVISION	
1	10-18-11

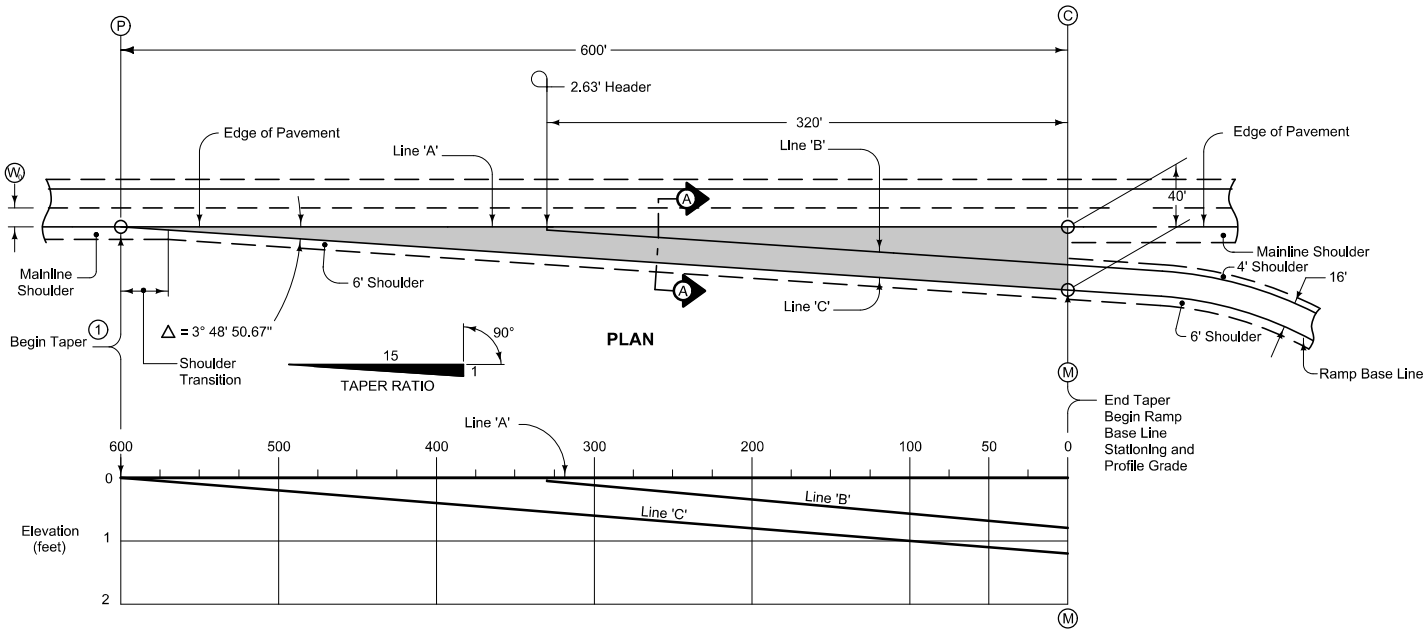
PV-305

SHEET 4 of 4

REVISIONS: Modified 'W' dimension and moved shoulder labels on sheet 1 top detail.

Deanna Maifield
APPROVED BY DESIGN METHODS ENGINEER

SUPERELEVATION DETAILS
SIX LANE ROADWAY
CLOSED MEDIAN



NOTE: The algebraic difference between profile grade for Ramp Base Line at Ⓜ and relative profile grade of Mainline at Ⓒ is 0.2%.

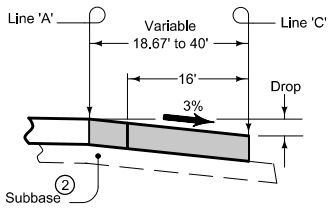
PROFILE

Ⓒ

TABLE OF OFFSETS AND DROPS FOR 16' RAMP TAPER																									
DISTANCE (Ft.)	600	575	550	525	500	475	450	425	400	375	350	320	300	275	250	225	200	175	150	125	100	75	50	25	0
OFFSET (Ft.)	0	1.67	3.33	5.00	6.67	8.33	10.00	11.67	13.33	15.00	16.67	18.67	20.00	21.67	23.33	25.00	26.67	28.33	30.00	31.67	33.33	35.00	36.67	38.33	40.00
DROP (Ft.)	0	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.56	0.60	0.65	0.70	0.75	0.80	0.85	0.90	0.95	1.00	1.05	1.10	1.15	1.20

Ⓜ

NOTE: The elevations at edge of taper from BEGIN TAPER to POINT 'M' are established by a constant 3% slope across the appropriate taper widths based on the Taper Ratio of 15:1. Drop = (0.03) x (Offset).



SECTION A-A

TABLE OF SHOULDER TRANSITION LENGTHS			
Ⓦ	Shoulder Width beyond Edge of Mainline Pavement		
	8'	10'	12'
12'	NA	60'	90'
14'	30'	60'	NA

NOTE: W_0 is the width of the outside lane to the Edge of Pavement.

Construct ramp exit pavement the same thickness as mainline pavement.

Ramp exit pavement shown by shaded area is 1334 square yards.

For joint details, see PV-101.

① For header construction details at the beginning of taper, see Typical 7101 or Typical 7102.

② Construct subbase for ramp exit pavement the same thickness as mainline subbase.

Iowa Department of Transportation

STANDARD ROAD PLAN

REVISION	
2	10-18-11

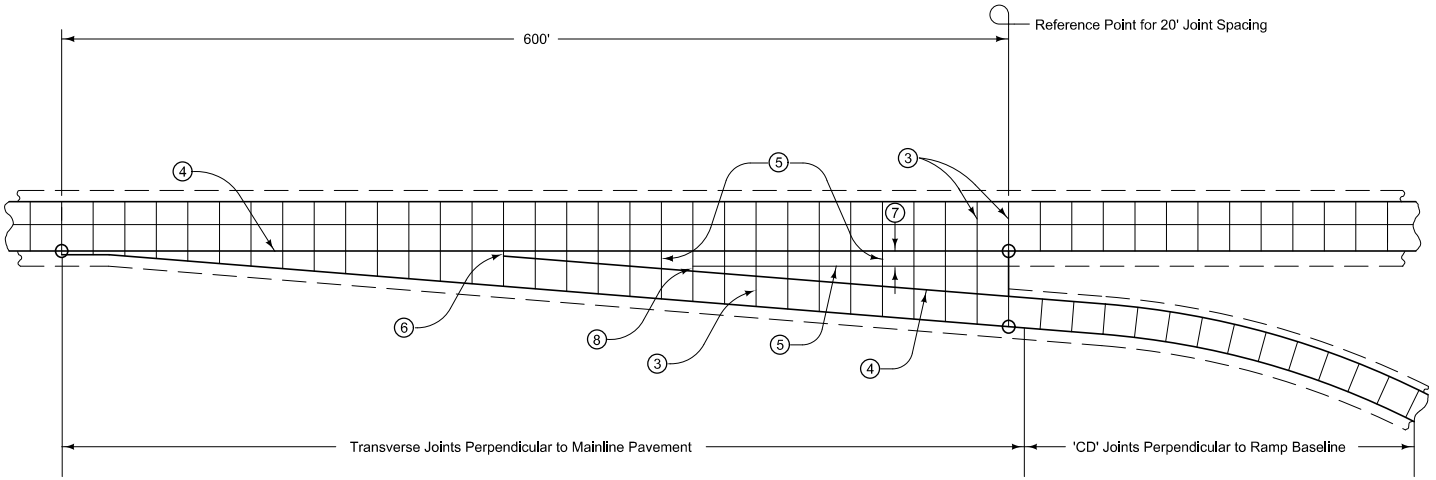
PV-410

SHEET 1 of 2

REVISIONS: Added 'C' Joint and circle notes 7 and 8.

Deanna Maifield
APPROVED BY DESIGN METHODS ENGINEER

DECELERATION TAPER FOR 16' EXIT RAMP



16' EXIT RAMP

③ 'CD' Joints at 20' spacing.

④ 'BT-2' joint for existing pavement or 'KT-2' for new pavement .

⑤ 'C' Joint.

⑥ 'B' Joint. 2' minimum. 4' maximum.

⑦ 10' minimum or equal to mainline shoulder width.

⑧ 'B' or 'C' Joint. 2' minimum. 4' maximum.

Iowa Department of Transportation

REVISION 2 10-18-11

STANDARD ROAD PLAN

PV-410

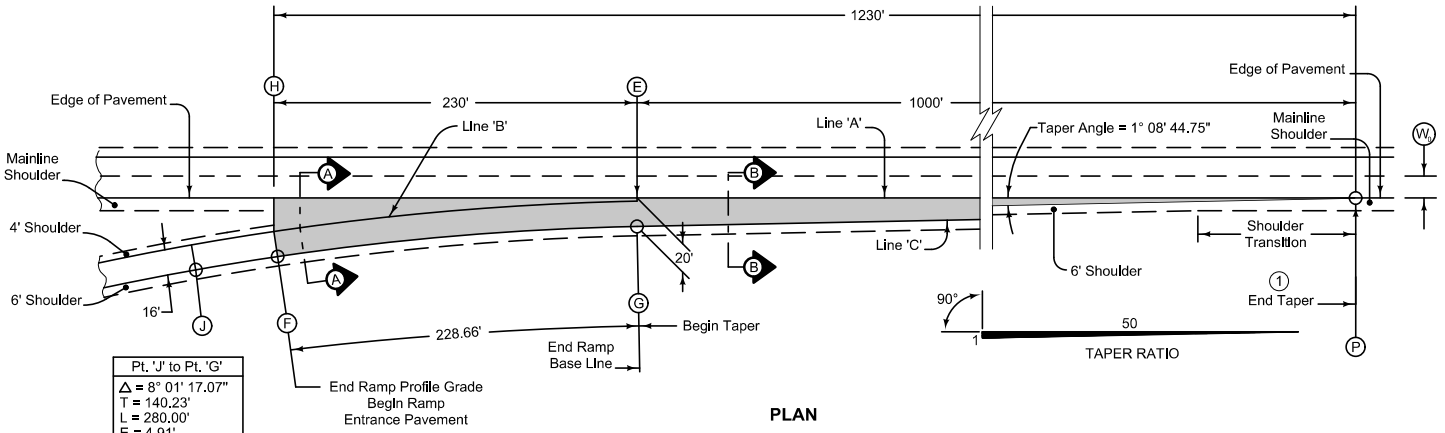
SHEET 2 of 2

REVISIONS: Added 'C' Joint and circle notes 7 and 8.

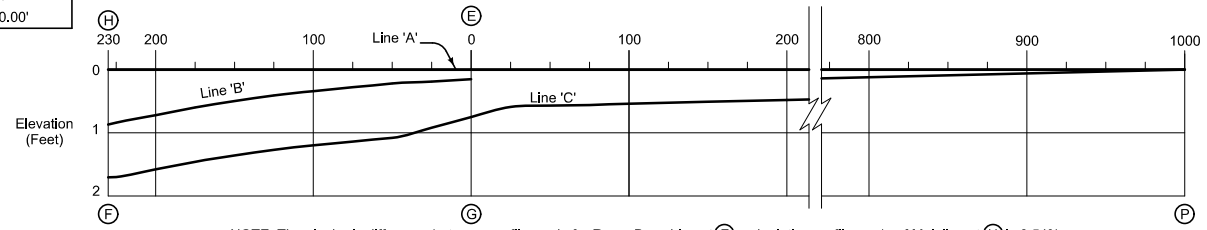
Deanna Maifield

APPROVED BY DESIGN METHODS ENGINEER

DECELERATION TAPER FOR 16' EXIT RAMP



PLAN

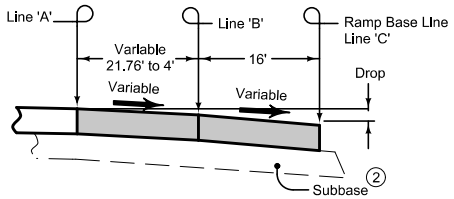


NOTE: The algebraic difference between profile grade for Ramp Base Line at (F) and relative profile grade of Mainline at (H) is 0.54%.

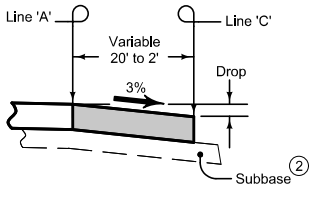
PROFILE

TABLE OF OFFSETS AND DROPS FOR 16' RAMP TAPER

Distance From Point (E) Along Line 'A' (Ft.)		230	225	200	175	150	125	100	75	50	25	0	25	50	75	100	200	300	400	500	600	700	800	900	1000
From Line 'A' To Line 'B'	Offset (Ft.)	21.76	21.10	17.95	15.11	12.59	10.38	8.48	6.90	5.62	4.66	4.0													
	Slope (%)	← Constant 4.0% Slope →										3.78													
	Drop (Ft.)	0.87	0.84	0.72	0.60	0.50	0.42	0.34	0.28	0.22	0.19	0.15													
From Line 'B' To Line 'C'	Offset (Ft.)	← Constant 16.0' Offset →																							
	Slope (%)	5.40	5.40	5.40	5.40	5.40	5.40	5.40	5.40	5.40	4.58	3.78													
	Drop (Ft.)	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.73	0.60													
From Line 'A' To Line 'C'	Offset (Ft.)												19.5	19.0	18.5	18.0	16.0	14.0	12.0	10.0	8.0	6.0	4.0	2.0	0.0
	Slope (%)												← Constant 3.0% Slope →												
	Drop (Ft.)	1.73	1.70	1.58	1.46	1.36	1.28	1.20	1.14	1.08	0.92	0.75	0.59	0.57	0.56	0.54	0.48	0.42	0.36	0.30	0.24	0.18	0.12	0.06	0.0
Distance From Point (G) Along Line 'C' (Ft.)		228.66	223.66	198.66	173.70	148.77	123.87	99.00	74.15	49.31	24.49	0.00													



SECTION A-A



SECTION B-B

TABLE OF SHOULDER TRANSITION LENGTHS			
W_o	Shoulder Width beyond Edge of Mainline Pavement		
	8'	10'	12'
12'	NA	200'	300'
14'	100'	200'	NA

NOTE: W_o is the width of the outside lane to the Edge of Pavement.

Construct ramp entrance pavement the same thickness as mainline pavement.

Ramp entrance pavement shown by shaded area is 1793 square yards.

For joint details, see PV-101

(1) For header construction details at the end of taper, see Typical 7101 or Typical 7102.

(2) Construct subbase for ramp entrance pavement the same thickness as mainline subbase.

Iowa Department of Transportation

REVISION 2 10-18-11

STANDARD ROAD PLAN

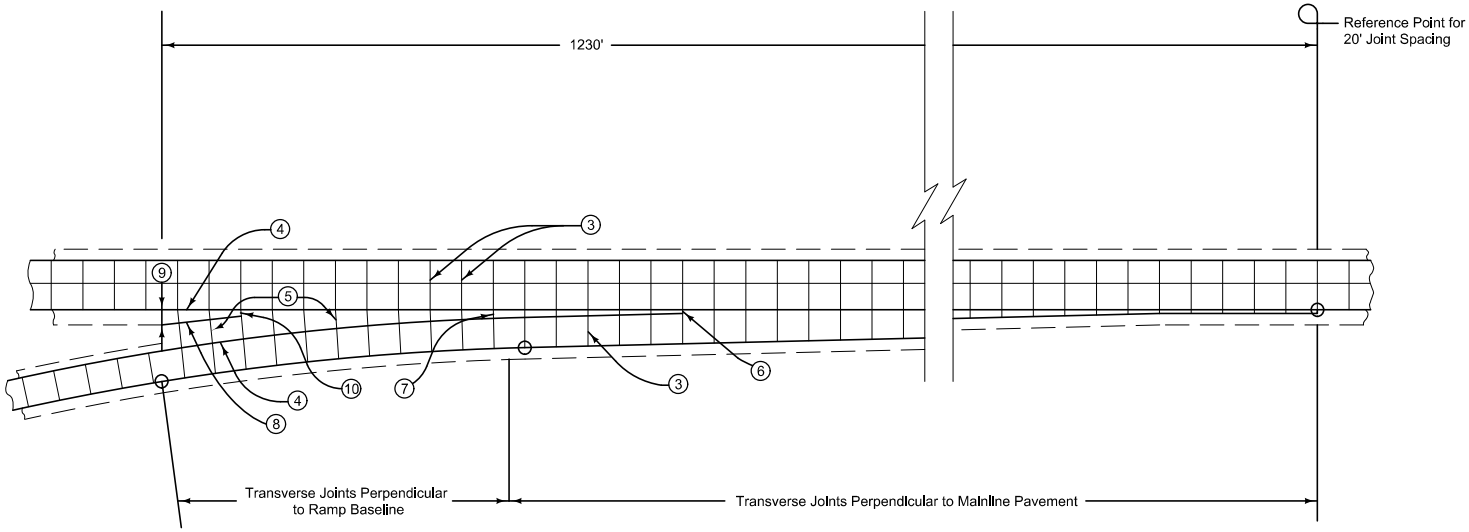
PV-411

SHEET 1 of 2

REVISIONS: Added 'C' Joint and circle notes 8, 9, and 10. Renumbered circle notes.

Deanna Maifield
APPROVED BY DESIGN METHODS ENGINEER

ACCELERATION TAPER FOR 16' ENTRANCE RAMP



16' ENTRANCE RAMP

③ 'CD' Joints at 20' spacing.

④ 'BT-2' or 'KT-2' Joint.

⑤ 'C' Joint.

⑥ 'B' Joint. 2' minimum, 4' maximum.

⑦ Construct transverse joints on the exit ramp taper perpendicular to the tapered edge where the gore area is greater than 4 feet.

⑧ 'C' Joint parallel to ramp baseline.

⑨ 10' minimum, or equal to mainline shoulder width.

⑩ 'B' or 'C' Joint. 2' minimum. 4' maximum.

Iowa Department of Transportation

REVISION 2 10-18-11

STANDARD ROAD PLAN

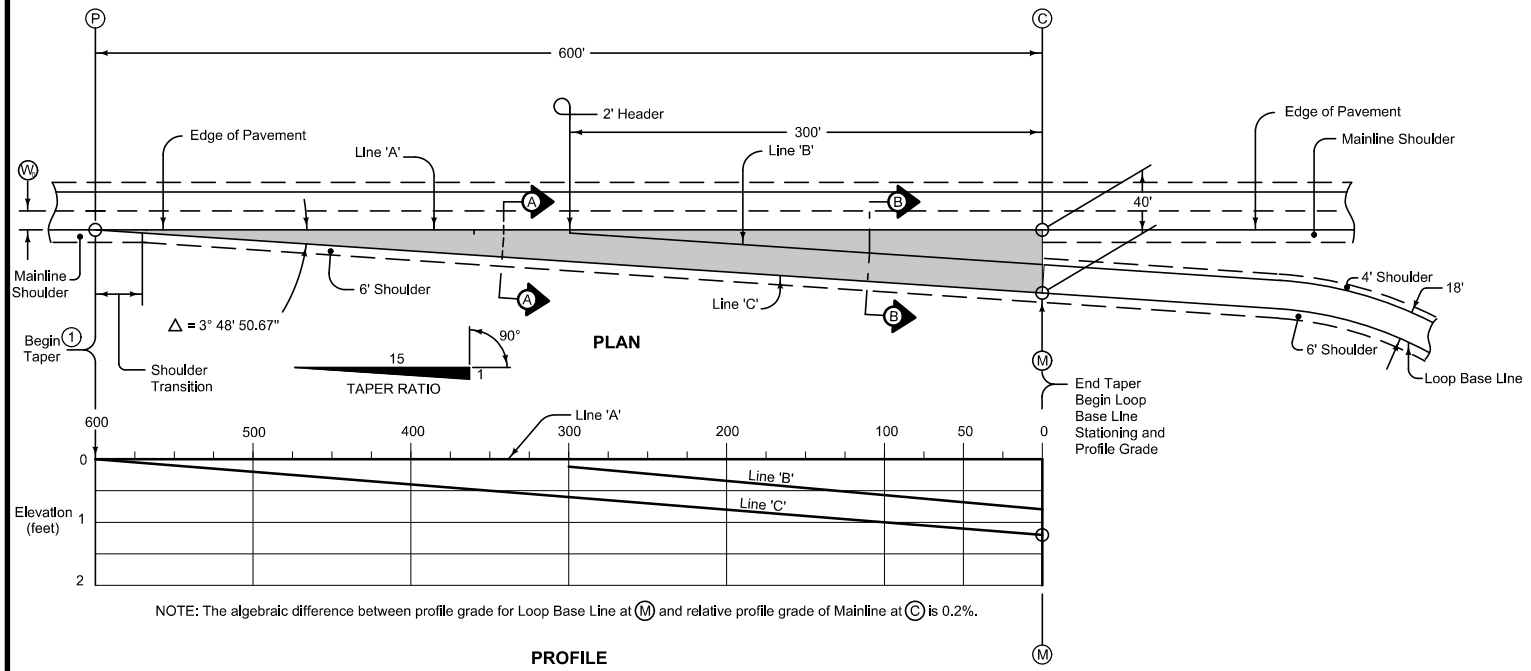
PV-411

SHEET 2 of 2

REVISIONS: Added 'C' Joint and circle notes 8, 9, and 10. Renumbered circle notes.

Deanna Maifield
APPROVED BY DESIGN METHODS ENGINEER

ACCELERATION TAPER FOR 16' ENTRANCE RAMP



NOTE: The algebraic difference between profile grade for Loop Base Line at Ⓜ and relative profile grade of Mainline at Ⓒ is 0.2%.

PROFILE

Construct Loop exit pavement the same thickness as mainline pavement.

Loop exit pavement shown by shaded area is 1334 square yards.

For joint details, see PV-101

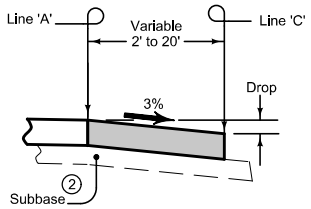
1. For header construction details at the beginning of taper, see Typical 7101 or Typical 7102.
2. Construct subbase for ramp exit pavement the same thickness as mainline subbase.

Ⓒ

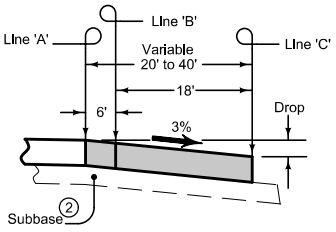
TABLE OF OFFSETS AND DROPS FOR 18' LOOP TAPER																									
DISTANCE (Ft.)	600	575	550	525	500	475	450	425	400	375	350	325	300	275	250	225	200	175	150	125	100	75	50	25	0
OFFSET (Ft.)	0	1.67	3.33	5.00	6.67	8.33	10.00	11.67	13.33	15.00	16.67	18.33	20.00	21.67	23.33	25.00	26.67	28.33	30.00	31.67	33.33	35.00	36.67	38.33	40.00
DROP (Ft.)	0	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.55	0.60	0.65	0.70	0.75	0.80	0.85	0.90	0.95	1.00	1.05	1.10	1.15	1.20

NOTE: The elevations at edge of taper from BEGIN TAPER to POINT 'M' are established by a constant 3% slope across the appropriate taper widths based on the Taper Ratio of 15:1, Drop = (0.03) x (Offset).

Ⓜ



SECTION A-A



SECTION B-B

TABLE OF SHOULDER TRANSITION LENGTHS			
W	Shoulder Width beyond Edge of Mainline Pavement		
	8'	10'	12'
12'	NA	60'	90'
14'	30'	60'	NA

NOTE: W_0 is the width of the outside lane to the Edge of Pavement.

Iowa Department of Transportation

REVISION 2 10-18-11

STANDARD ROAD PLAN

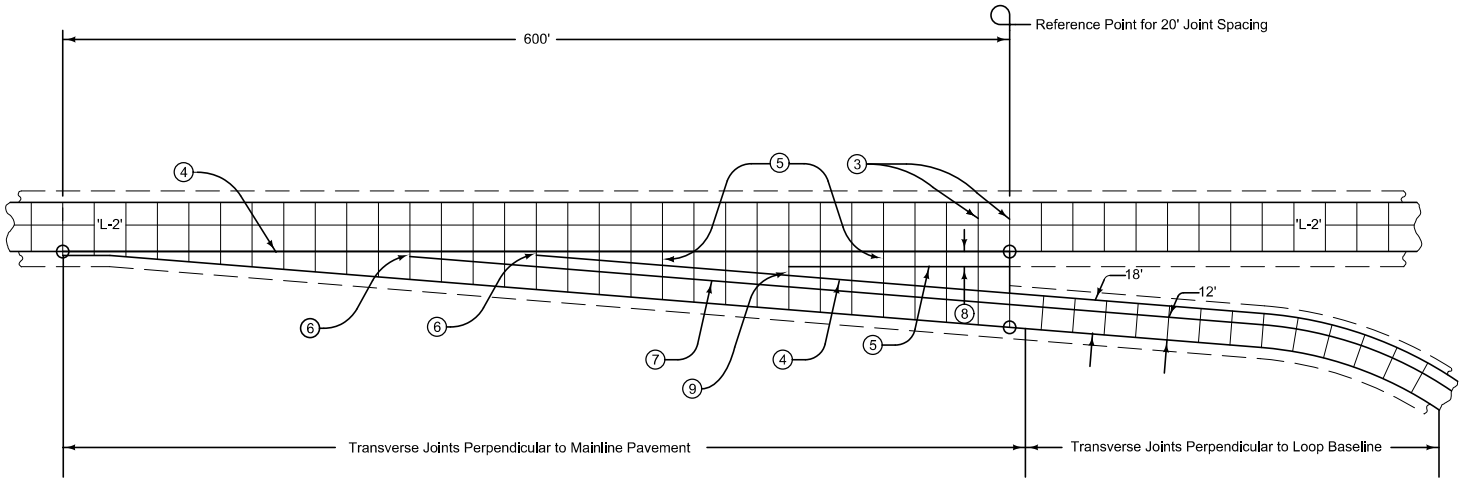
PV-412

SHEET 1 of 2

REVISIONS: Added 'C' Joint and circle note 8 and 9.

Deanna Maifield
APPROVED BY DESIGN METHODS ENGINEER

DECELERATION TAPER FOR 18' EXIT LOOP



18' EXIT LOOP

③ 'CD' Joints at 20' spacing.

④ 'BT-2' or 'KT-2' Joint.

⑤ 'C' Joint.

⑥ 'B' Joint. 2' minimum, 4' maximum.

⑦ 'L-2' Joint.

⑧ 10' minimum or equal to mainline shoulder width.

⑨ 'B' or 'C' Joint. 2' minimum. 4' maximum.

Iowa Department of Transportation

REVISION 2 10-18-11

STANDARD ROAD PLAN

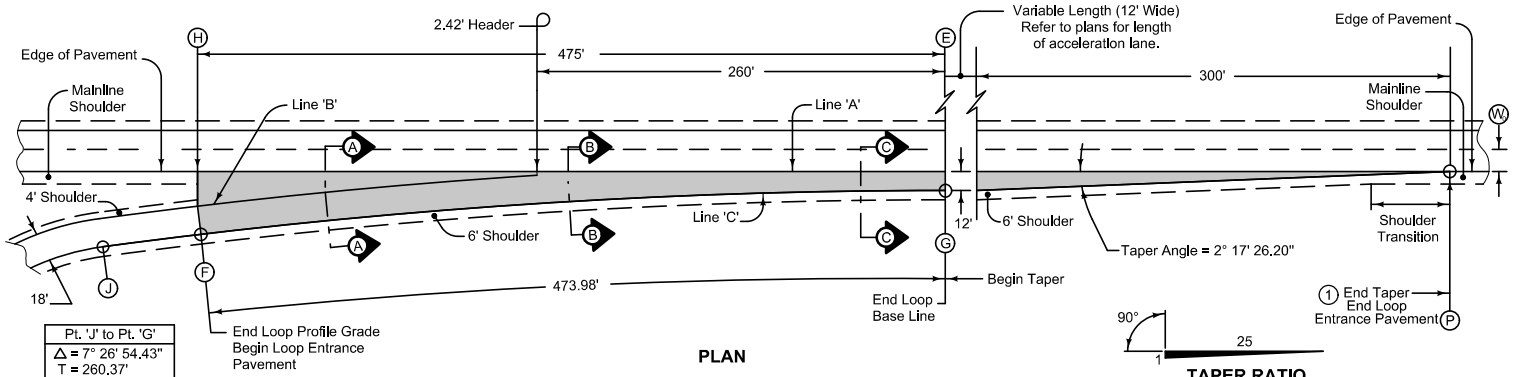
PV-412

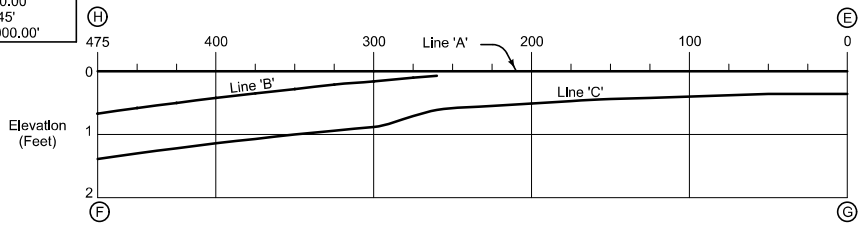
SHEET 2 of 2

REVISIONS: Added 'C' Joint and circle note 8 and 9.

Deanna Maifield
APPROVED BY DESIGN METHODS ENGINEER

DECELERATION TAPER FOR 18' EXIT LOOP





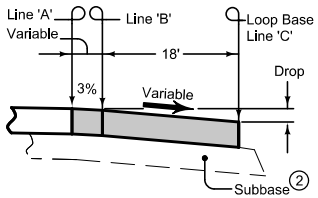
NOTE: The algebraic difference between profile grade for Loop Base Line at (F) and relative profile grade of Mainline at (H) is 0.36%.

PROFILE

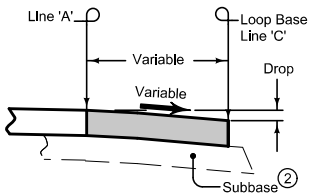
TABLE OF OFFSETS AND DROPS FOR 18' LOOP TAPER

Distance From Point (E) Along Line 'A' (Ft.)		475	450	425	400	375	350	325	300	275	260	225	200	175	150	125	100	75	50	25	0
From Line 'A' To Line 'B'	Offset (Ft.)	22.18	19.28	16.54	13.96	11.54	9.27	7.17	5.22	3.42	2.42										
	Slope (%)	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00										
	Drop (Ft.)	0.67	0.58	0.50	0.42	0.35	0.28	0.22	0.16	0.10	0.07										
From Line 'B' To Line 'C'	Offset (Ft.)	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0										
	Slope (%)	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	3.38	3.00										
	Drop (Ft.)	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.61	0.54										
From Line 'A' To Line 'C'	Offset (Ft.)											18.33	17.00	15.83	14.81	13.95	13.25	12.70	12.31	12.08	12.00
	Slope (%)											3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00
	Drop (Ft.)	1.39	1.30	1.22	1.14	1.07	1.00	0.94	0.88	0.71	0.61	0.55	0.51	0.47	0.44	0.42	0.40	0.38	0.37	0.36	0.36
Distance From Point (G) Along Line 'C' (Ft.)		473.98	448.93	423.89	398.87	373.86	348.87	323.90	298.93	273.98	260.18	225.12	200.08	175.06	150.03	125.02	100.01	75.00	50.00	25.00	0.00

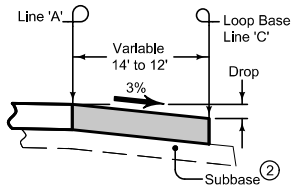
NOTE: From (G) to (P) cross-slope between Line 'A' and Line 'C' is a constant 3%.



SECTION A-A



SECTION B-B



SECTION C-C

TABLE OF SHOULDER TRANSITION LENGTHS			
(W)	Shoulder Width beyond Edge of Mainline Pavement		
	8'	10'	12'
12'	NA	100'	150'
14'	50'	100'	NA

NOTE: W_o is the width of the outside lane to the Edge of Pavement.

Construct loop entrance pavement the same thickness as mainline pavement.

Loop entrance pavement shown by shaded area is 1329 square yards.

For joint details, see PV-101.

(1) For header construction details at the end of taper, see Typical 7101 or Typical 7102.

(2) Construct subbase for loop entrance pavement the same thickness as mainline subbase.

Iowa Department of Transportation

STANDARD ROAD PLAN

REVISION	
2	10-18-11

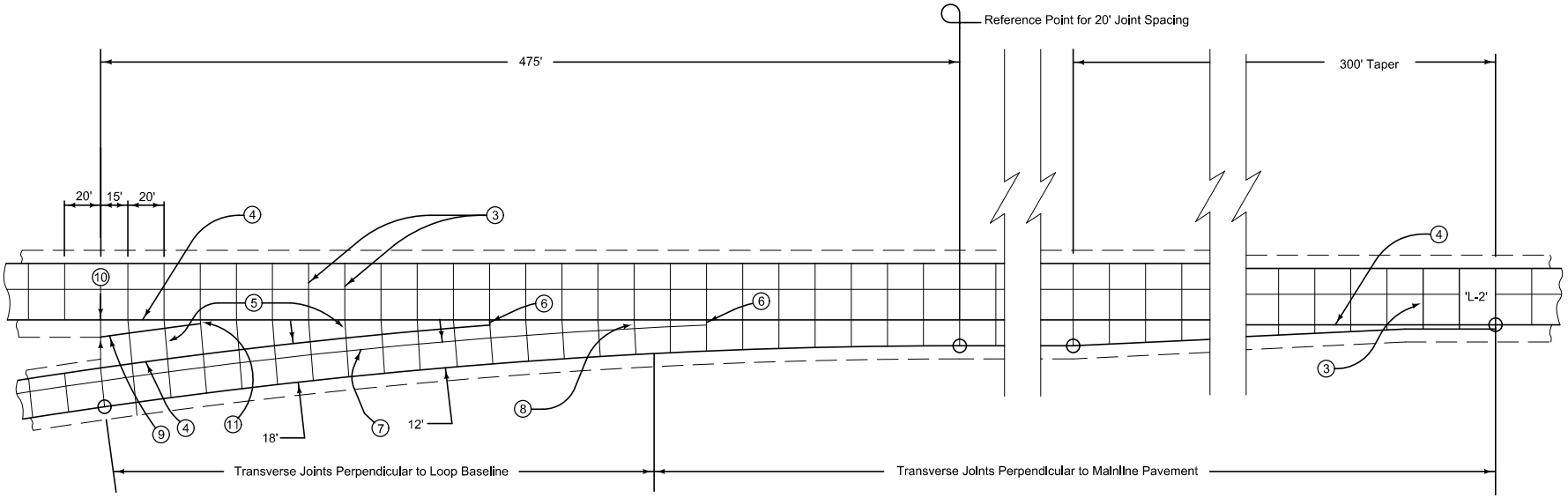
PV-414

SHEET 1 of 2

REVISIONS: Added 'C' Joint and circle notes 9, 10, and 11.

Deanna Maifield
APPROVED BY DESIGN METHODS ENGINEER

ACCELERATION TAPER FOR 18' ENTRANCE LOOP



18' ENTRANCE LOOP

③ 'CD' Joints at 20' spacing.

④ 'BT-2' or 'KT-2' Joint.

⑤ 'C' Joint.

⑥ 'B' Joint. 2' minimum, 4' maximum.

⑦ 'L-2' Joint.

⑧ Construct transverse joints on the exit ramp taper perpendicular to the ramp baseline where the gore area is 4 feet or greater.

⑨ 'C' Joint parallel to loop baseline.

⑩ 10' minimum or equal to mainline shoulder width.

⑪ 'B' or 'C' Joint. 2' minimum. 4' maximum.

Iowa Department of Transportation

STANDARD ROAD PLAN

REVISION 2 10-18-11

PV-414

SHEET 2 of 2

REVISIONS: Added 'C' Joint and circle notes 9, 10, and 11.

Deanna Maifield
APPROVED BY DESIGN METHODS ENGINEER

ACCELERATION TAPER FOR 18' ENTRANCE LOOP

Signs

NO.	DATE	TITLE
RD-5	---	Void
RD-6	---	Void
RD-7	---	Void

SECTION

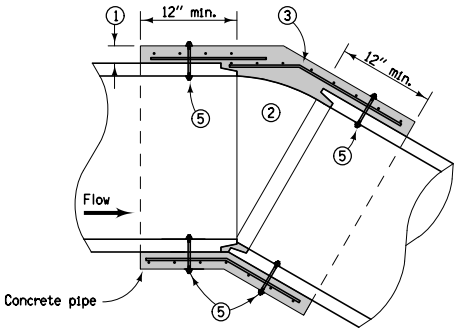
RF

Drainage

NO.	DATE	TITLE
RF-1	---	Void
RF-2	10-18-11	Construction of Type "C" Concrete Adaptors for Pipe Culvert Connections
RF-3	10-18-11	Concrete Aprons
RF-5	10-03-00	Metal Pipe Aprons and Beveled Ends
RF-7	10-16-07	Corrugated Metal Type "A" Diaphragm
RF-8	10-28-97	Precast Stock Pass
RF-13	10-18-11	Pipe Bends and Half Pipe
RF-14	10-18-11	Connected Pipe Joints
RF-19A	07-15-97	Subdrains for Fill or Foundation Drainage (Standard)
RF-19B	03-29-94	Subdrains Standard (Farm Tile Replacement)
RF-19C	10-19-10	Subdrains (Longitudinal)
RF-19E	10-20-09	Outlets for Longitudinal, Transverse and Backslope Subdrains
RF-19F	04-25-00	Subdrain Outlets (Standard Subdrain, Pressure Release and Special)
RF-21	10-18-11	Culvert Pipe Tee Sections
RF-26	10-18-11	Pipe Apron Guard
RF-27	10-19-10	Beveled Pipe and Guard
RF-29	04-20-10	Safety Grates for Box Culverts
RF-30A	10-19-10	Culvert (Bedding and Backfill)
RF-30B	10-19-10	Pipe Culvert (Cover and Camber)
RF-30C	04-30-02	Pipe Culvert (Installation Details)
RF-31	03-28-95	Depth of Cover Tables for Concrete Pipe
RF-32	10-19-10	Depth of Cover Tables for Corrugated Pipe
RF-38	04-20-10	Intake for Bridge End Drain
RF-39	04-19-11	Scour Protection for Bridge End Drain
RF-40	10-19-10	Rock Flume for Bridge End Drain
RF-41	---	Void
RF-42	10-18-11	Concrete Arch Aprons
RF-43	10-03-00	Metal Arch Aprons (for Corrugated Metal Pipe)

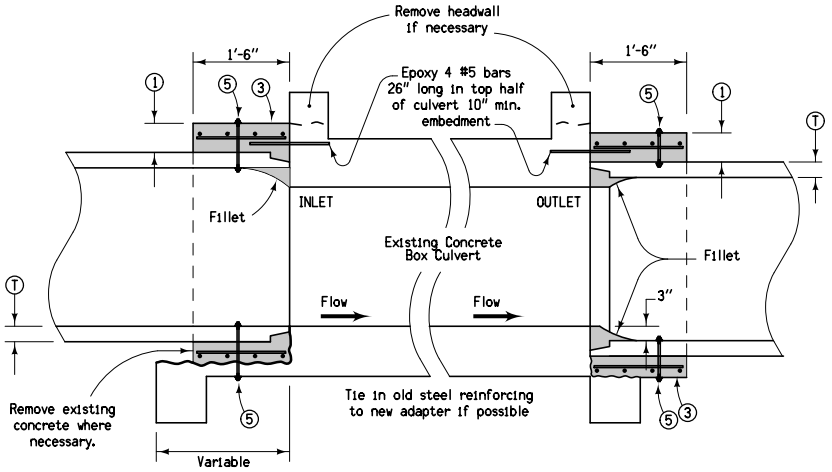
Drainage

NO.	DATE	TITLE
RF-44	10-03-00	Metal Safety Slope Apron 6:1 Slope
RF-45	10-19-10	Slotted Drain for Median Crossovers



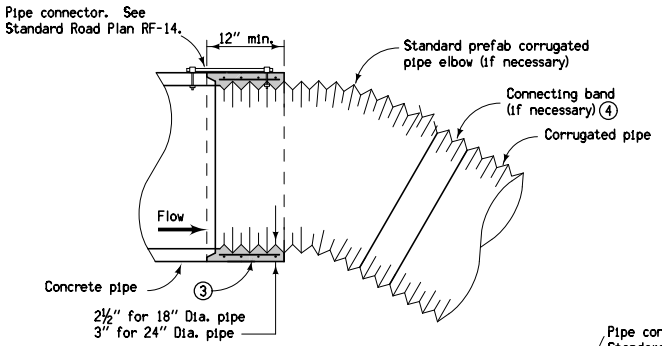
CONCRETE PIPE TO CONCRETE PIPE

TYPE "C-1"



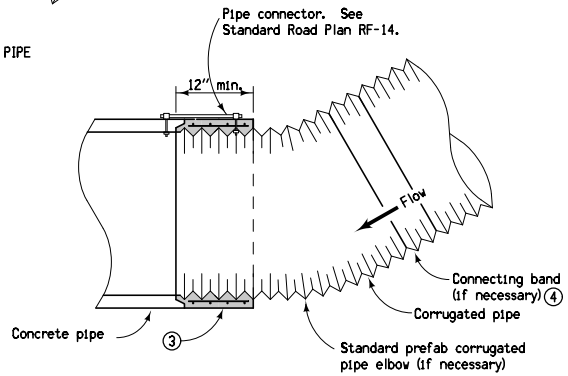
CONCRETE PIPE TO CONCRETE BOX CULVERT

TYPE "C-2"



CONCRETE PIPE TO CORRUGATED PIPE

TYPE "C-3"



CORRUGATED PIPE TO CONCRETE PIPE

TYPE "C-4"

ESTIMATED ENCASEMENT QUANTITIES PER LINEAR FOOT FOR "C-2" ADAPTORS			
Diameter, D inches	Concrete cu. yds.	Wire Mesh lbs.	Concrete for Fillet ("C-2") cu. yds.
15	0.1	2.0	N.A.
18	0.1	2.3	N.A.
21	0.1	2.6	N.A.
24	0.1	2.8	N.A.
30	0.2	3.4	0.1
36	0.2	4.0	0.1
42	0.2	4.5	0.1
48	0.3	5.1	0.1
54	0.3	5.7	0.1
60	0.4	6.2	0.1
66	0.5	6.9	0.1
72	0.6	7.5	0.1
78	0.6	8.1	0.1
84	0.7	8.7	0.1

(2000 D and 3000 D Pipe)

No payment will be made for individual adaptors.

The cost of furnishing all materials and constructing adaptor as indicated will be considered incidental to the pipe culvert.

The cost of removing and disposing, as directed, of any necessary headwall, wingwall or other concrete, shall be bid as "Removal of Existing Structures".

Type "C-1" and "C-2" adaptors shall be formed and constructed on the job site by methods approved by the Engineer.

Type "C-3" and "C-4" adaptors may be shop fabricated by a method approved by the Engineer for attaching a concrete collar (either tongue or groove end) to a standard section of corrugated pipe. Holes may be field drilled in corrugated pipe to match alignment with concrete pipe.

1. Thickness same as pipe thickness (T) but not less than 4 inches.
2. Opening between pipes shall be carefully grouted.
3. Minimum reinforcing shall be steel wire mesh 6" x 6" - W2 No. 8 wire - 30 lbs/100 sq. ft. Lap ends 6 inches.
4. Positive type joint coupling required.
5. 5/8" (min.) bolts in 7/8" (min.) holes. Four bolts around each connection at equal intervals. Existing pipe connector holes may be used if available; place remaining two bolts at approximate equal intervals.
T. Thickness of wall of concrete pipe. See AASHTO M 170.

Iowa Department of Transportation

STANDARD ROAD PLAN

REVISION 10 10-18-11

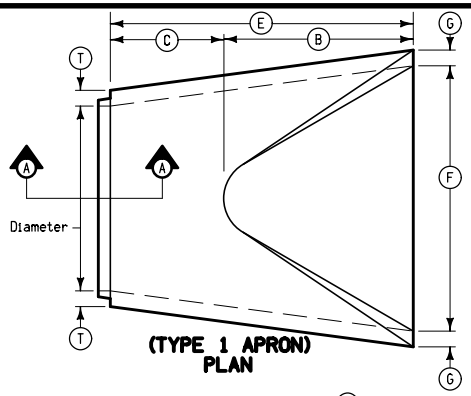
RF-2

SHEET 1 of 1

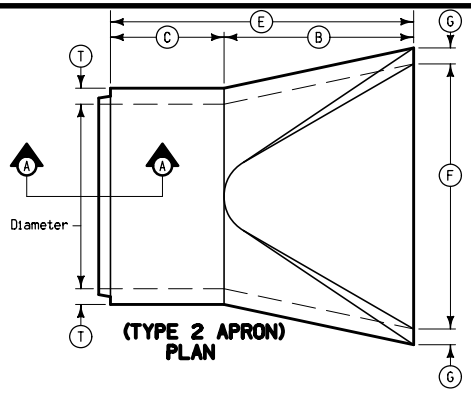
REVISIONS: Modified circle note 5 to allow lift holes to be used for tie rods. Changed RF-1 reference to AASHTO M 170.

Deanna Maifield
APPROVED BY DESIGN METHODS ENGINEER

CONSTRUCTION OF TYPE 'C' CONCRETE ADAPTERS FOR PIPE CULVERT CONNECTIONS



(TYPE 1 APRON)
PLAN

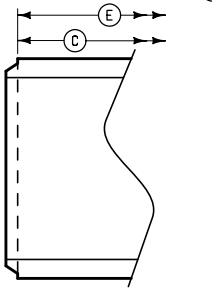


(TYPE 2 APRON)
PLAN

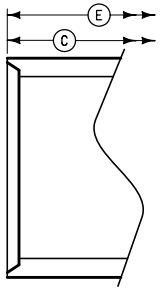
Dimension 'E' shown is minimum and shall be considered the design length. Any difference between the actual length of concrete apron installed and the length indicated hereon shall be appropriately adjusted for in the length of concrete culvert pipe furnished.

When specified in the contract documents, pipe apron guards shall be installed as shown on RF-26. Pipe apron guards will not be measured separately for payment, but shall be included in the contract unit price for "Concrete Aprons."

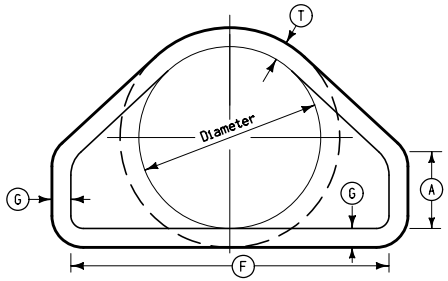
(1) Tongue end used on inlet end section. Groove end used on outlet end section. Comply with AASHTO M 170 for tongue and groove dimensions.



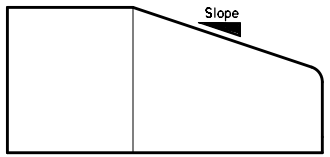
SECTION A-A
TONGUE END DETAIL (1)



SECTION A-A
GROOVE END DETAIL (1)



(TYPE 1 AND TYPE 2 APRONS)
END VIEW



SIDE VIEW

TYPE 1 APRONS								
DIAM.	SLOPE	A	B	MINIMUM C	MINIMUM E	F	G	T
12″	2.4:1	4″	2′-0″	4′-⅞″	6′-⅞″	2′-0″	2″	2″
15″	2.4:1	6″	2′-3″	3′-10″	6′-1″	2′-6″	2¼″	2¼″
18″	2.3:1	9″	2′-3″	3′-10″	6′-1″	3′-0″	2½″	2½″
21″	2.4:1	9″	3′-0 ″	3′-1½″	6′-1½″	3′-5″	3″	3″
24″	2.5:1	9½″	3′-7½″	2′-6″	6′-1½″	4′-0″	3″	3″
27″	2.5:1	10½″	4′-1 ″	2′-0″	6′-1½″	4′-4″	3½″	3½″
30″	2.5:1	12″	4′-6″	1′-7¾″	6′-1¾″	5′-0″	3½″	3½″
36″	2.5:1	15″	5′-3″	2′-9″	8′-0″	6′-0″	4″	4″
42″	2.5:1	21″	5′-3″	2′-9″	8′-0″	6′-6″	4½″	4½″
48″	2.5:1	24″	6′-0″	2′-0″	8′-0″	7′-0″	5″	5″
54″	1.8:1	27″	5′-0″	3′-0″	8′-0″	7′-6″	5½″	5½″
60″	1.6:1	29½″	5′-0″	3′-0″	8′-0″	8′-0″	5½″	6″
66″	1.7:1	30″	6′-0″	2′-3″	8′-3″	8′-0″	5½″	6″
72″	1.6:1	30″	6′-6″	1′-9″	8′-3″	9′-0″	6″	7″
78″	1.8:1	36″	7′-6″	1′-9″	9′-3″	9′-6″	6½″	7½″
84″	1.3:1	29½″	6′-9″	2′-6½″	9′-3½″	10′-0″	6½″	8″

TYPE 2 APRONS								
DIAM.	SLOPE	A	B	MINIMUM C	MINIMUM E	F	G	T
12″	2.4:1	4″	2′-0″	4′-⅞″	6′-⅞″	2′-0″	2″	2″
15″	2.4:1	6″	2′-3″	3′-10″	6′-1″	2′-6″	2¼″	2¼″
18″	2.3:1	9″	2′-3″	3′-10″	6′-1″	3′-0″	2½″	2½″
21″	2.4:1	9″	3′-0″	3′-1½″	6′-1½″	3′-5″	3″	3″
24″	2.5:1	9½″	3′-7½″	2′-6″	6′-1½″	4′-0″	3″	3″
27″	2.5:1	10½″	4′-1 ″	2′-0″	6′-1½″	4′-4″	3½″	3½″
30″	2.5:1	12″	4′-6″	1′-7¾″	6′-1¾″	5′-0″	3½″	3½″
36″	2.5:1	15″	5′-3″	2′-9″	8′-0″	6′-0″	4″	4″
42″	2.5:1	21″	5′-3″	2′-9″	8′-0″	6′-6″	4½″	4½″
48″	2.5:1	24″	6′-0″	2′-0″	8′-0″	7′-0″	5″	5″
54″	1.9:1	24½″	5′-5″	2′-7″	8′-0″	7′-6″	5½″	5½″
60″	1.4:1	24½″	5′-0″	3′-0″	8′-0″	8′-0″	5½″	6″
66″	1.7:1	30″	6′-0″	2′-3″	8′-3″	8′-0″	5½″	6″
72″	1.4:1	24″	6′-6″	1′-9″	8′-3″	9′-0″	6″	7″
78″	1.8:1	36″	7′-6″	1′-9″	9′-3″	9′-6″	6½″	7½″
84″	1.5:1	23½″	7′-6½″	1′-9″	9′-3½″	10′-0″	6½″	8″

Contract Item:

Apron, Concrete

Tabulations:

104-3
104-5C

Iowa Department of Transportation

REVISION
9 10-18-11

STANDARD ROAD PLAN

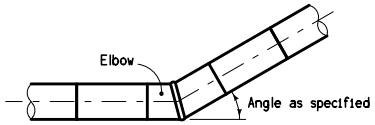
RF-3

SHEET 1 of 1

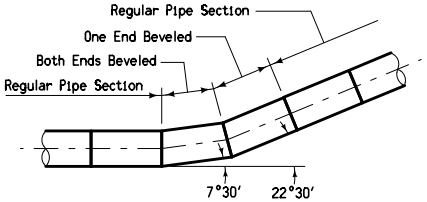
REVISIONS: Corrected 'A' dimension. Removed references to RF-1. Removed language added to Specifications.

Deanna Maifield
APPROVED BY DESIGN METHODS ENGINEER

CONCRETE APRONS

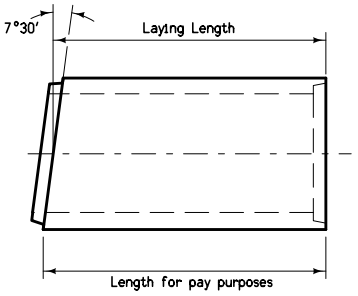


TYPICAL PLAN WITH ELBOW

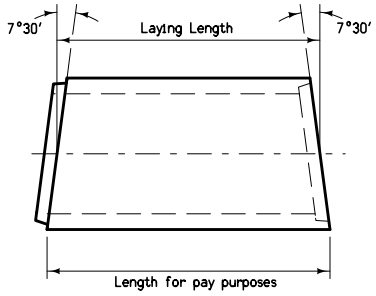


TYPICAL PLAN WITH "D" SECTIONS

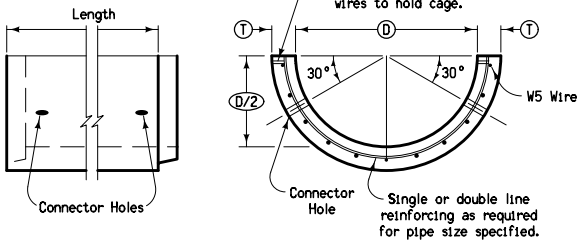
REINFORCING BARS		
Size "D"	Bar Size	Number Required
12" - 21"	3/8"	4
24" - 42"	3/8"	8
48" - 60"	1/2"	8
66" - 84"	5/8"	8



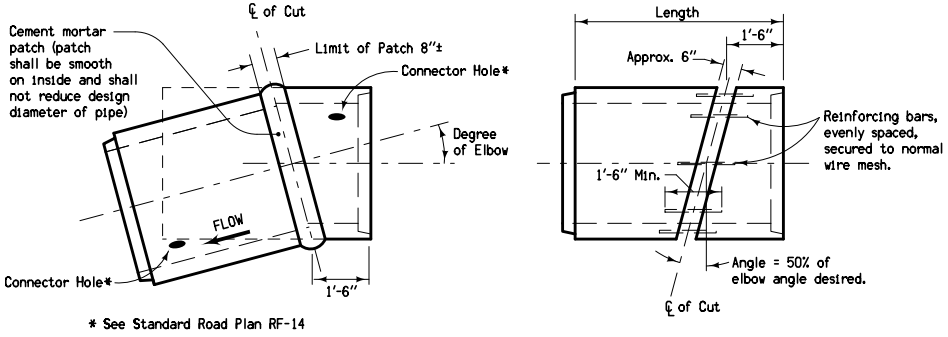
TYPE "D" SECTION (SINGLE BEVEL)



TYPE "D" SECTION (DOUBLE BEVEL)



DETAILS OF HALF PIPE SECTION



* See Standard Road Plan RF-14

TYPICAL CONCRETE PIPE ELBOW

Fabricate concrete pipe elbows and Type "D" pipe sections in conformance with AASHTO M 170 for the size and class of pipe specified.

Meet the requirements of AASHTO M 32 for wire reinforcing.

Refer to plans for degree of elbow required for each individual installation.

Minimum length of elbow to be 5'-6" measured along centerline of pipe. Design length of pipe to be considered 6'-0".

Fabricate elbows by a method approved by the Engineer and resulting in a finished product essentially as indicated hereon. The typical method for fabricating elbows is as follows: Steel rods, as specified, to be attached to the normal wire reinforcing cage as indicated hereon. After pipe is cast, make a cut 50% of the degree of elbow desired as indicated, and cut the reinforcing rods and mesh on centerline of the cut. Rotate the severed section of pipe 180 degrees and reweld the reinforcing to the opposite rods. Patch the remaining opening with cement mortar to effect a satisfactorily completed elbow as shown.

Unless specified otherwise, bevel the Type "D" section on a 7.5 degree miter. The bevel may be provided on either the tongue end or groove end of the pipe. In certain cases, both ends of the pipe section may require the beveled end.

Include Type "D" pipe sections in measurement for pipe culvert. No payment to be made specifically for the Type "D" section bevel. This is considered incidental to the price bid.

Half pipe to conform to the requirements for 2000D for the size specified, unless otherwise noted. Maximum "D" size for Half Pipe is 48 inches. Unless specified otherwise, Half Pipe is to be fabricated with connector holes as indicated.

Minimum length of Half Pipe section is 4'-0". The minimum number of 4'-0" sections are to be used to make up the necessary length of Half Pipe Flume as indicated on detail plans. Normal length is 6'-0".

Price bid for Half Pipe, per foot, is considered full compensation for furnishing and installing Half Pipe in accordance with plan requirements.

For pipe sizes up through 48" in diameter, bends may be accomplished in increments of 7.5 degrees by using standard "D" sections in appropriate combinations.

For pipe sizes from 54" to 72" in diameter, limit the "D" section to a maximum of 5 degree miter on any one end of pipe section.

For pipe sizes through 48" in diameter, bends from 15 to 45 degrees may be accomplished using a single elbow. Bends more than 45 degrees require two elbows unless approved otherwise by the Engineer.

The Contractor may substitute an approved elbow for "D" section bends of 15 degrees or less. Such elbows will not be measured for payment but will be considered incidental to price bid for culvert pipe.

Iowa Department of Transportation

REVISION
6 | 10-18-11

STANDARD ROAD PLAN

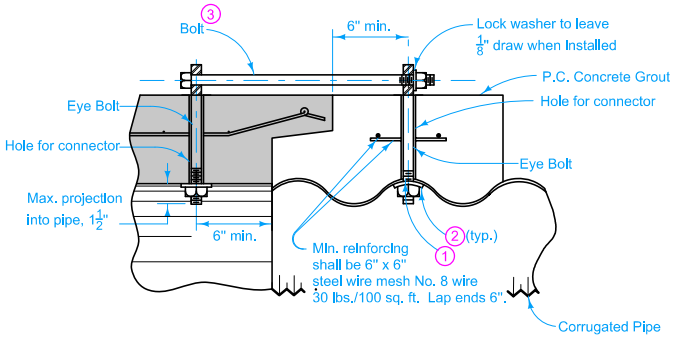
RF-13

SHEET 1 of 1

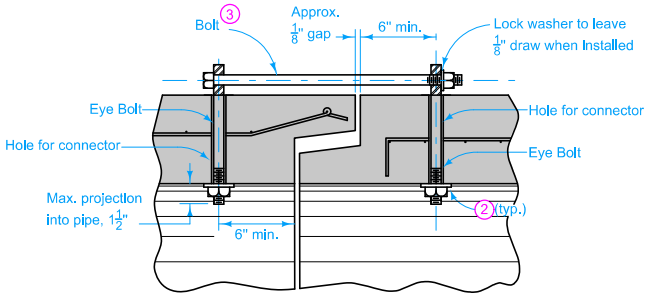
REVISIONS: Removed references to RF-1. Modified language.

Deanna Maifield
APPROVED BY DESIGN METHODS ENGINEER

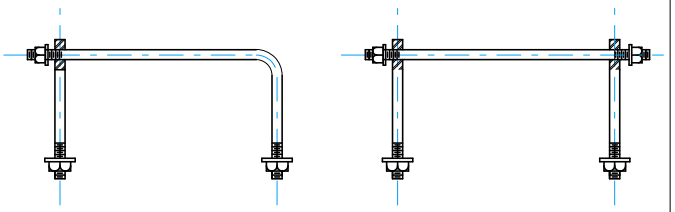
PIPE BENDS AND HALF PIPE



SECTION OF PIPE CONNECTOR
(Concrete Pipe to Corrugated Pipe)

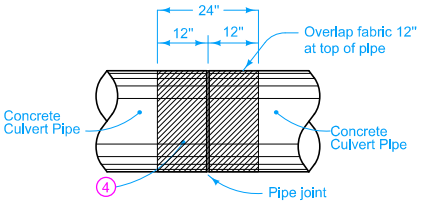


SECTION OF PIPE CONNECTOR
(Concrete Pipe to Concrete Pipe)



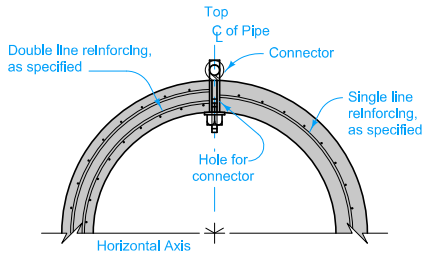
ONE BEND END **THREADED AT BOTH ENDS**

OPTIONAL BOLTS/CONNECTORS

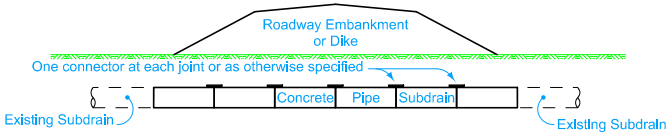


PIPE JOINT WRAPPING

PIPE SIZE (In)	CONNECTOR AND BOLT SIZE (in.)	HOLE FOR CONNECTOR (In.)
12 to 27	5/8	7/8
30 to 60	3/4	1.0
66 to 132	1.0	1 1/4



TYPICAL SECTION
(Non-Sealed Joint)



TYPICAL INSTALLATION

TYPE 1 CONNECTION

Wrap all joints on concrete roadway pipe culverts.

Use Type 3 Connections on all culvert pipes, unless otherwise specified. Refer to Materials I.M. **445.01** for Connector requirements.

Minimum 2 threads showing at all threaded ends.

TYPE 1

One connector at the top of the pipe section.

TYPE 2 (Sealed Joint)

Two connectors near the top of the pipe section. For details of reinforcement, refer to AASHTO M 170 for the class of pipe required. Refer to Materials I.M. 491.09 for seal requirements.

TYPE 3 (Non - Sealed Joint)

Two connectors near the top of the pipe section. For details of reinforcement, refer to AASHTO M 170 for the class of pipe required.

1. If holes are field drilled, place a ribbon of butyl sealant around bolts before placing 3 in. x 3 in. x 1/4 in. plate on bolts through corrugated metal pipe and tightening nuts.
2. 1 3/4 inch round x 9/64 inch thick washer or 3 in. x 3 in. x 1/4 in. square plate (shaped to pipe radius).
3. Connectors with One Bend End and Bell End spacers allowed per Materials I.M. 451. Refer to Optional Bolts detail.
4. Engineering fabric for embankment erosion control.

Possible Tabulation:
104-3

Iowa Department of Transportation

REVISION
15 | 10-18-11

STANDARD ROAD PLAN

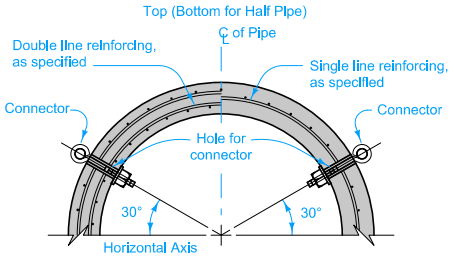
RF-14

SHEET 1 of 2

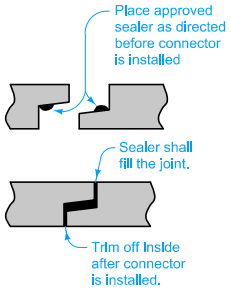
REVISIONS: Added details to allow for alternate tie rods per revised Materials I.M.451, table for connector bar sizes and circle note 3. Changed RF-1 references.

Deanna Maifield
APPROVED BY DESIGN METHODS ENGINEER

CONNECTED PIPE JOINTS

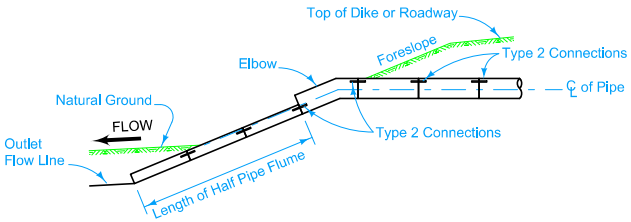


TYPICAL SECTION
TYPE 2 CONNECTION
TYPE 3 CONNECTION

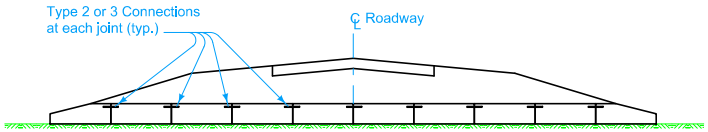


SEALED JOINT
TYPE 2 CONNECTION

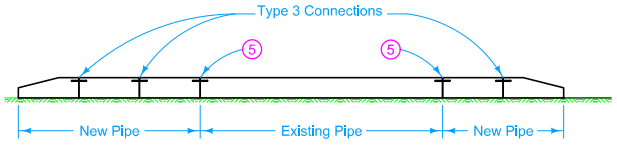
(5) On culvert extensions, connect all new joints including the joint between the old and new culvert pipe. Holes may need to be drilled into existing pipes.



TYPICAL INSTALLATION
TYPE 2 CONNECTION



TYPICAL INSTALLATION
NEW CONSTRUCTION - TYPE 2 or 3 CONNECTION



TYPICAL INSTALLATION
PIPE EXTENSION - TYPE 3 CONNECTION

TYPE 2 AND TYPE 3 CONNECTIONS

Iowa Department of Transportation

REVISION	
15	10-18-11

STANDARD ROAD PLAN

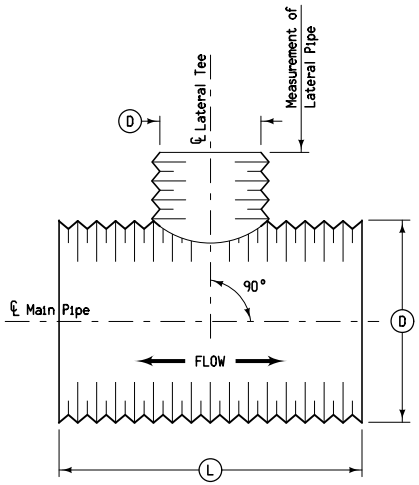
RF-14

SHEET 2 of 2

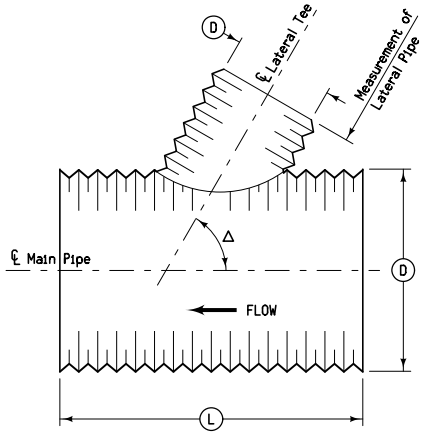
REVISIONS: Added details to allow for alternate tie rods per revised Materials I.M.451, table for connector bar sizes and circle note 3. Changed RF-1 references.

Deanna Maifield
APPROVED BY DESIGN METHODS ENGINEER

CONNECTED PIPE JOINTS

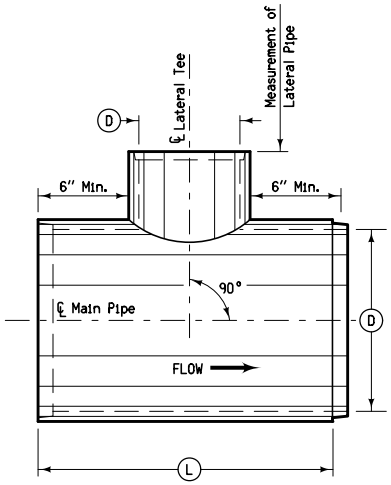


PLAN OF STRAIGHT TEE

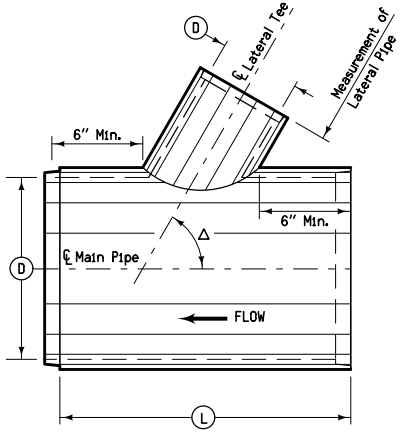


PLAN OF ANGLE TEE

CORRUGATED METAL PIPE

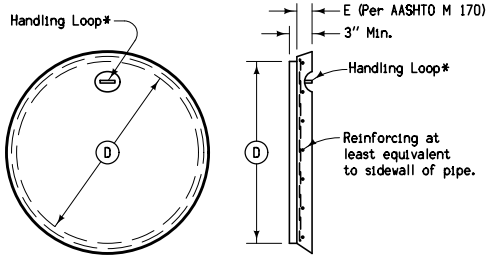


PLAN OF STRAIGHT TEE



PLAN OF ANGLE TEE

CONCRETE PIPE



PLAN SECTION

*The handling loop may be omitted when the cap is placed in a buried installation.

DETAILS OF CONCRETE PIPE CAP

GENERAL NOTES:

Tees may be required in any size from 12 inch diameter to 48 inch diameter (in 6 inch increments) on main pipe culverts equal to or greater in diameter than that of the tee. Angle tees may be required in any delta angle (of 5 degree increment) between 45 and 90 degrees. Unless a delta angle of other than 90 degrees is so specified in the detail project plans, tee sections shall be considered to be 90 degrees (straight tees).

Example: "18–36 inch Tee" means a 18 inch diameter 90 degree lateral tee attached to a 36 inch main pipe culvert.

Example: "24–48 inch 75 degree Tee" means a 24 inch diameter lateral tee attached to a 48 inch main pipe culvert at an angle of 75 degrees.

The fabrication of the tee shall be accomplished in such a manner as to be as free from obstruction on the inside of the pipe as is reasonable and otherwise to be constructed by methods approved by the Engineer.

CORRUGATED METAL PIPE TEE:

Any damage to protective coating resulting from installation of culvert shall be repaired as directed by the Engineer.

CONCRETE PIPE TEE:

Length of main pipe section (L) shall be a minimum of 4 feet and a maximum of 6 feet. Length of main pipe section shall be included in measured length of structure.

CONCRETE PIPE CAP:

The use of an approved pipe cap is required when so indicated on the detail project plans. The dimensions of the pipe cap shall be such as to neatly fit the groove end of the appropriate size of culvert pipe.

The cap may be precast or it may be cast directly into the pipe end with a tight mortar joint between the cap and the pipe. If the cap is positioned at the construction site, an approved bituminous joint material shall be placed between the cap and the pipe.

The Pipe Cap shall not be paid for directly, but when specified, shall be considered to be incidental to other pipe culvert work on the project.

Iowa Department of Transportation

STANDARD ROAD PLAN

REVISION	
5	10-18-11

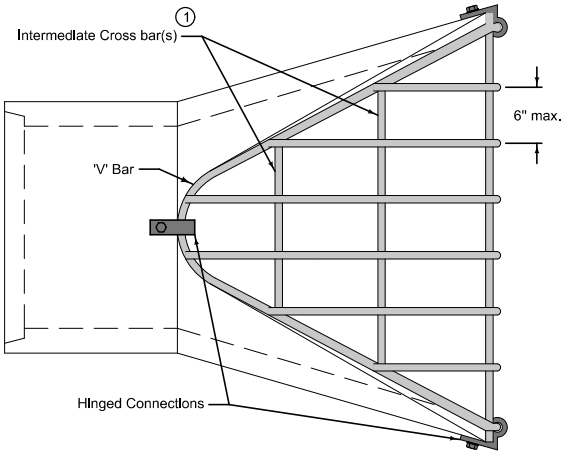
RF-21

SHEET 1 of 1

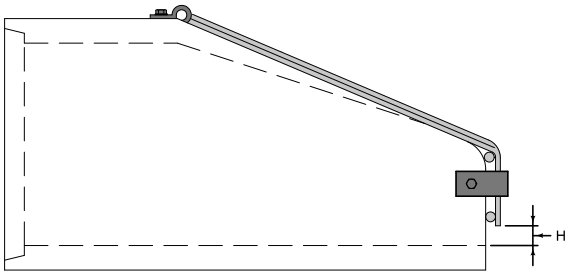
REVISIONS: Changed RF-1 reference to AASHTO M 170.

Deanna Maifield
APPROVED BY DESIGN METHODS ENGINEER

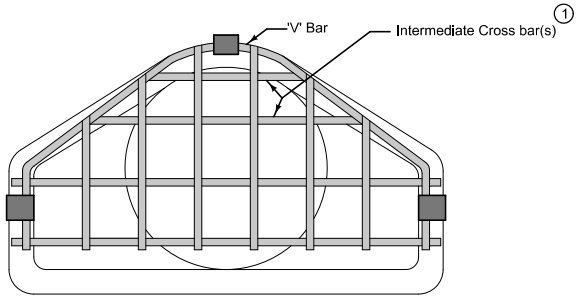
CULVERT PIPE TEE SECTIONS



PLAN



PROFILE



FRONT

Provide guard dimensions to fit with Type of apron provided (RF-3, Type 1 or Type 2 or RF-42). 'V' Bar to completely rest on apron.

Use ASTM A615, Grade 40, or merchant quality, smoothed or deformed steel bars in construction of the guard. Conform to fabrication requirements of Standard Specifications Section **2404**.

Hot-dip galvanize the completed apron guard in accordance with ASTM A123.

(1) All guards to have at least one intermediate cross bar. If pipe size is 60 inches or greater, use two intermediate cross bars equally spaced.

Possible Tabulation:
104-3

ROUND		ARCH	
PIPE SIZE	H	PIPE SIZE	H
12"	$2\frac{1}{2}$"	22" x 14" to 29" x 18"	4"
15"	3"	37" x 23" to 44" x 27"	5"
18" - 24"	4"	52" x 32" to 65" x 40"	6"
27" - 36"	5"	73" x 45" to 88" x 54"	7"
42" - 54"	6"		
60" - 72"	7"		
78" - 90"	8"		

BAR SIZES

	PIPE SIZE	HOLE DIA. REQ'D.	BOLT DIA.	BAR SIZE
ROUND	12" - 18"	$\frac{3}{4}$"	$\frac{5}{8}$"	$\frac{3}{4}$"
	21" - 42"	$\frac{7}{8}$"	$\frac{3}{4}$"	1"
	48" - 90"	$1\frac{1}{8}$"	1"	$1\frac{1}{4}$"
ARCH	up to 22" x 14"	$\frac{3}{4}$"	$\frac{5}{8}$"	$\frac{3}{4}$"
	29" x 18" to 52" x 32"	$\frac{7}{8}$"	$\frac{3}{4}$"	1"
	59" x 36" to 88" x 54"	$1\frac{1}{8}$"	1"	$1\frac{1}{4}$"

BOLT LENGTH = PIPE WALL THICKNESS + $2\frac{1}{2}$"

Iowa Department of Transportation

STANDARD ROAD PLAN

REVISION
8 | 10-18-11

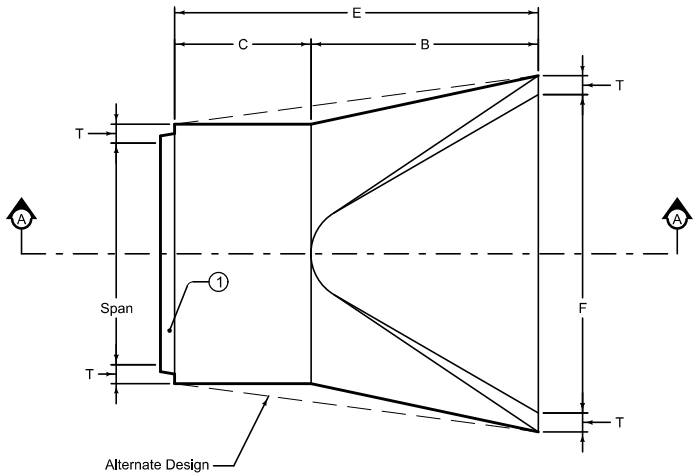
RF-26

SHEET 1 of 1

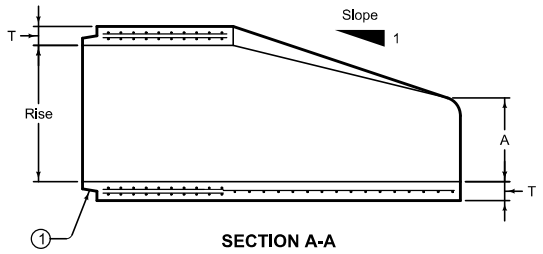
REVISIONS: New design. Added arch pipe sizes.

Deanna Maifield
APPROVED BY DESIGN METHODS ENGINEER

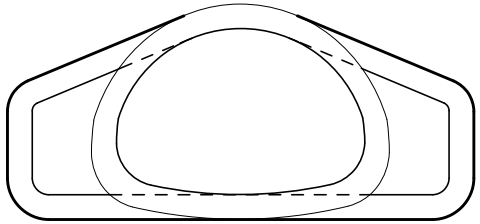
PIPE APRON GUARD



PLAN



SECTION A-A



END

Comply Apron Reinforcement with AASHTO M 206.

Dimension "E" shown is minimum and is considered the design length. Appropriately adjust for any difference between the actual length of concrete apron installed and the length indicated hereon for the length of concrete culvert pipe furnished.

(1) Tongue end on inlet end section. Groove end on outlet end section. (Inlet end section shown.)

NOMINAL DIMENSIONS SPAN X RISE Inches	EQUIVALENT DIAMETER Inches	WEIGHT PER SECTION Lbs.	SPAN Inches	RISE Inches	SLOPE	APPROXIMATE DIMENSIONS Inches					
						Ⓣ	Ⓐ	Ⓑ	Ⓒ	Ⓔ	Ⓕ
22 X 14	18	1090	22	13 1/2	3:1	2 1/2	7	27	45	72	36
29 X 18	24	1760	28 1/2	18	3:1	3	8 1/2	39	33	72	48
37 X 23	30	3280	36 1/4	22 1/2	3:1	3 1/2	9 1/2	50	46	96	60
44 X 27	36	4330	43 3/4	26 5/8	3:1	4	11 1/8	60	36	96	72
52 X 32	42	5260	51 1/8	31 5/16	3:1	4 1/2	15 13/16	60	36	96	78
59 X 36	48	6380	58 1/2	36	3:1	5	21	60	36	96	84
65 X 40	54	7860	65	40	3:1	5 1/2	25 1/2	60	36	96	90
73 X 45	60	9520	73	45	3:1	6	31	60	36	96	96
88 X 54	72	13550	88	54	2:1	7	31	60	39	99	120
102 X 62	84	17800	102	62	2:1	8	21 1/2	83	19	102	144

Possible Contract Item:
Concrete Arch Apron

Possible Tabulations:
104-3
104-4

Iowa Department of Transportation

REVISION
5 | 10-18-11

STANDARD ROAD PLAN

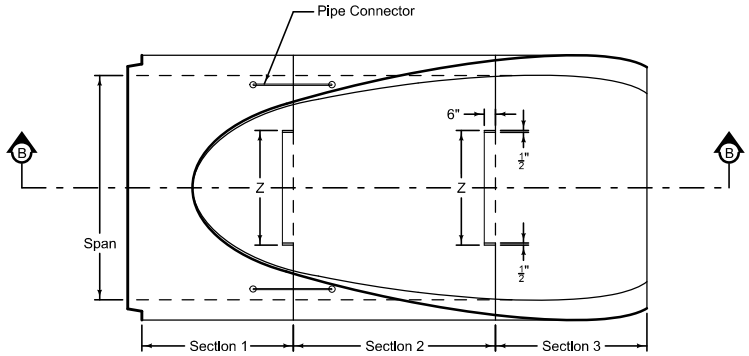
RF-42

SHEET 1 of 2

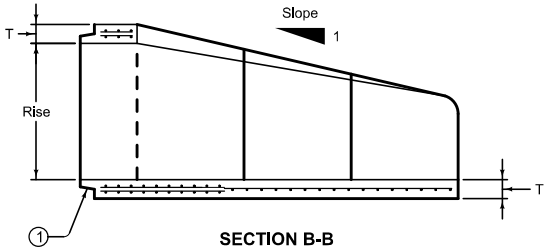
REVISIONS: Removed circle note 2 and replaced with 2 foot dimension. Modified 102x62 'A' dimension. Changed RF-41 ref. to AASHTO M 206 and 'T' values.

Deanna Maifield
APPROVED BY DESIGN METHODS ENGINEER

CONCRETE ARCH APRONS

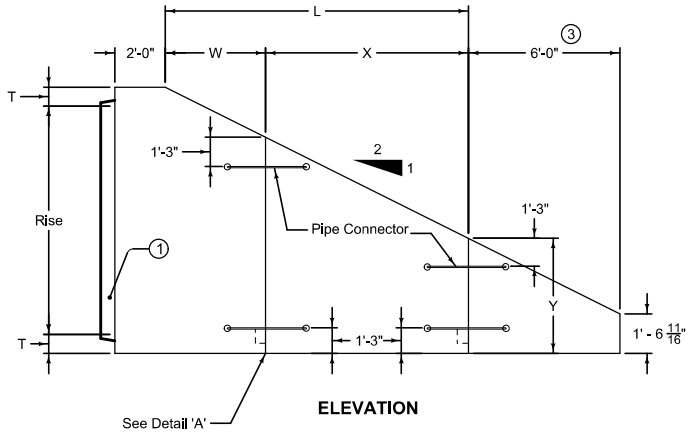


PLAN

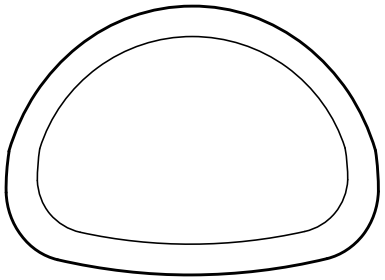


SECTION B-B

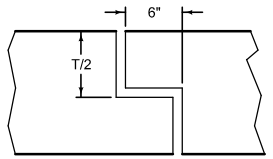
1. Tongue end on inlet end section. Groove end on outlet end section. (Inlet end section shown.)
3. 132" size is a three-piece end section.



ELEVATION



END



DETAIL 'A'

NOMINAL DIMENSIONS SPAN X RISE Inches	EQUIVALENT DIAMETER Inches	WEIGHT PER SECTION Lbs. (Approx.)			SPAN Inches	RISE Inches	APPROXIMATE DIMENSIONS Inches					
		Section 1	Section 2	Section 3			Ⓣ	Ⓛ	Ⓦ	Ⓧ	Ⓨ	Ⓩ
115 X 72	90	19100	3950		115 1/2	72	8 1/2	102 1/4	72	30 1/4	37 7/8	48
122 X 78	96	22000	6050		122 3/8	78	9	112 1/2	72	40 1/2	39	54
138 X 88	108	23000	15800		138 1/2	88	10	129 1/2	48	81 1/2	42 3/8	66
154 X 97	120	27000	24600		154	96 7/8	11	144	48	96	46 7/8	78
169 X 107	132 ③	27950	25260	13640	168 3/4	106 1/2	10	144	48	96	54 5/8	90

Iowa Department of Transportation

STANDARD ROAD PLAN

REVISION	
5	10-18-11

RF-42

SHEET 2 of 2

REVISIONS: Removed circle note 2 and replaced with 2 foot dimension. Modified 102x62 'A' dimension. Changed RF-41 ref. to AASHTO M 206 and 'T' values.

Deanna Maifield
APPROVED BY DESIGN METHODS ENGINEER

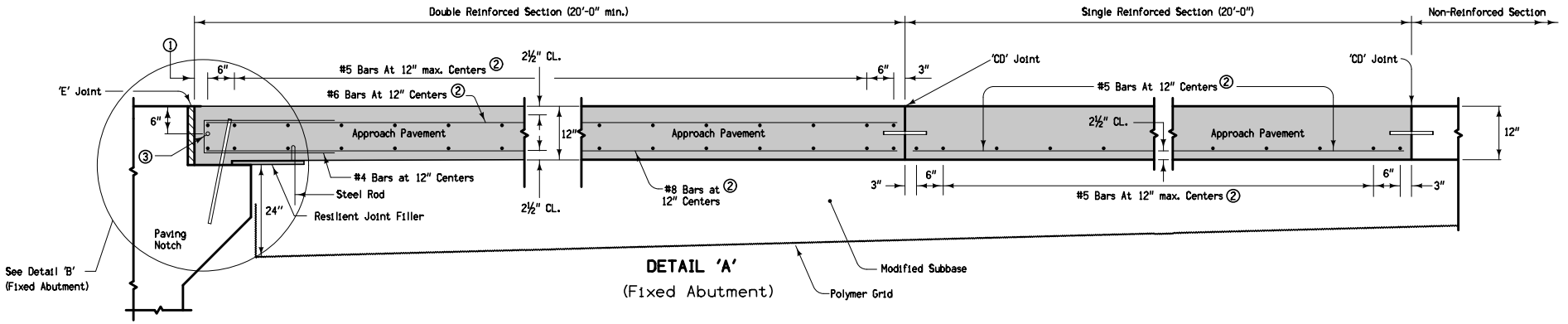
CONCRETE ARCH APRONS

SECTION

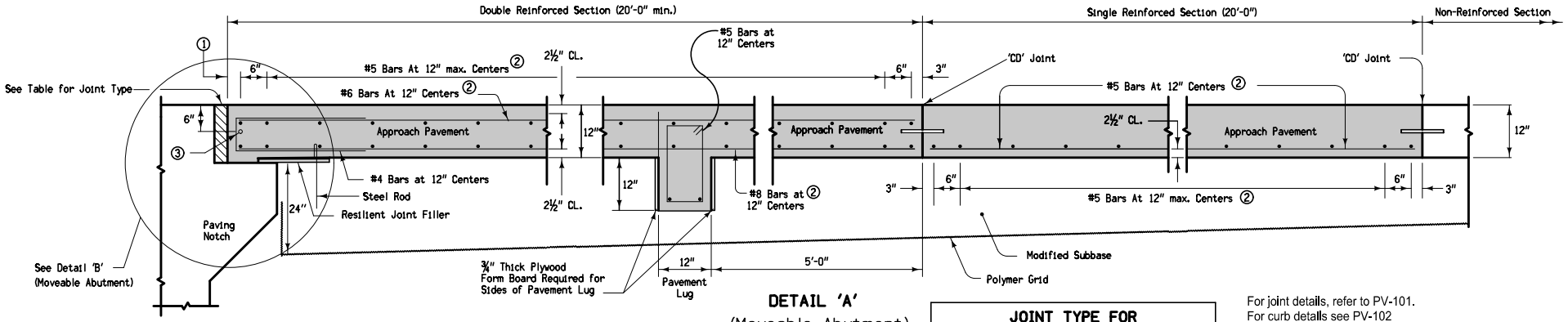
Bridge Approach Pavement

RK

NO.	DATE	TITLE
RK-16	04-19-11	Bridge Approach Details (in Conjunction with Bridge Deck Overlay)
RK-17	04-19-11	PCC Overlay of Reinforced Bridge Approach Section
RK-18	04-19-11	Bridge Approach Details (Secondary Roads)
RK-19A	04-19-11	Bridge Approach Section (General Details)
RK-19B	04-19-11	Bridge Approach Section (Two-Lane) (Abutting PCC Pavement)
RK-19C	04-19-11	Bridge Approach Section (Two Lane for Bridge Reconstruction, P.C.C. Pavement)
RK-19F	04-19-11	Bridge Approach Section (at Existing Bridges, PCC Pavement)
RK-19G	04-19-11	Bridge Approach Section (Two Lane, HMA Pavement)
RK-19H	04-19-11	Bridge Approach Section (Two Lane for Bridge Reconstruction, HMA Pavement)
RK-19J	04-19-11	Bridge Approach Section (at Existing Bridges, HMA Pavement)
RK-20	10-18-11	Double Reinforced 12" Approach
RK-21	04-19-11	Bridge Approach (abutting PCC or Composite Pavement)
RK-22	04-19-11	Bridge Approach (abutting HMA Pavement)
RK-23	04-19-11	Bridge Approach (Multi-Lane, Curbed Roadway)
RK-25	10-18-11	Double Reinforced 10" Approach
RK-26	10-18-11	Double Reinforced 10" Approach with Variable Depth Paving Notch
RK-27	10-18-11	Double Reinforced 12" Approach with Variable Depth Paving Notch
RK-30	04-19-11	Bridge Approach (Abutting Pavement)



DETAIL 'A'
(Fixed Abutment)



DETAIL 'A'
(Moveable Abutment)

JOINT TYPE FOR MOVEABLE ABUTMENT BRIDGES		
Joint	Maximum Bridge Length	
	Concrete Beam or Slab	Steel Girder
CF-1	370'	250'
CF-2	465'	320'
CF-3	575'	400'

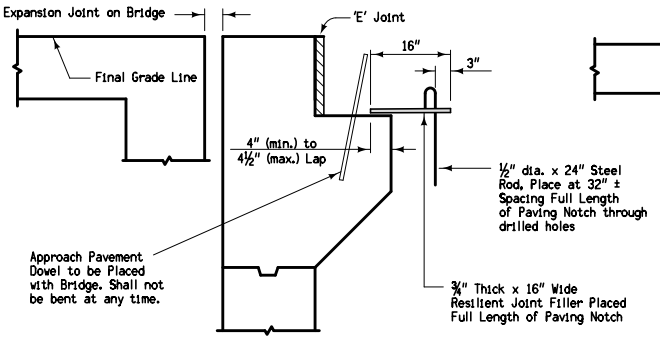
For joint details, refer to PV-101.
For curb details see PV-102

All transverse bars are #5.

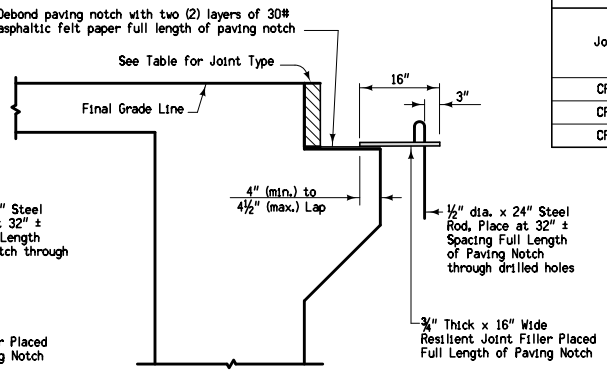
Possible Contract Item:

Bridge Approach, RK-20

Possible Tabulation: 112-6



DETAIL 'B' (Fixed Abutment)



DETAIL 'B' (Moveable Abutment)

① 2" min. to 2 1/2" max. clear to bent bar.

② Minimum lap length: #5 Bars - 18"
#6 Bars - 27"
#8 Bars - 48"

③ If bridge is skewed, place additional #5 bar parallel to skewed face.

Iowa Department of Transportation

STANDARD ROAD PLAN

REVISION	
8	10-18-11

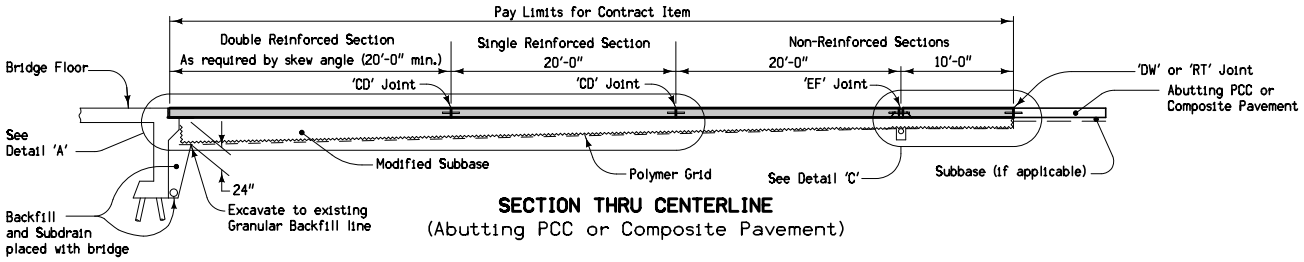
RK-20

SHEET 1 of 3

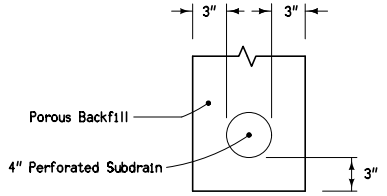
REVISIONS: Changed "U" bar size on sheet 1 from #5 to #4 to match sheet 3. Added note 9. Changed curb.

Deanna Maifield
APPROVED BY DESIGN METHODS ENGINEER

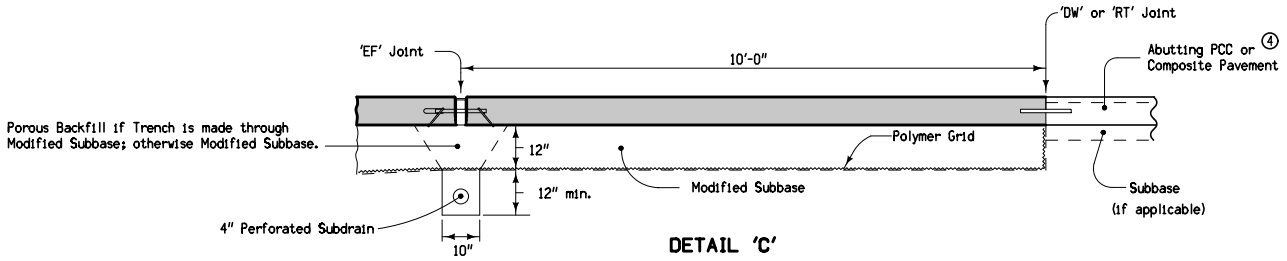
DOUBLE REINFORCED 12" APPROACH



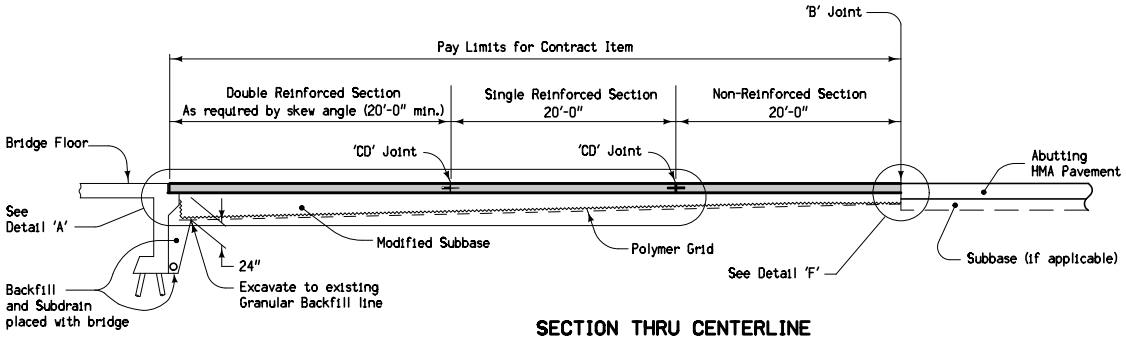
SECTION THRU CENTERLINE
(Abutting PCC or Composite Pavement)



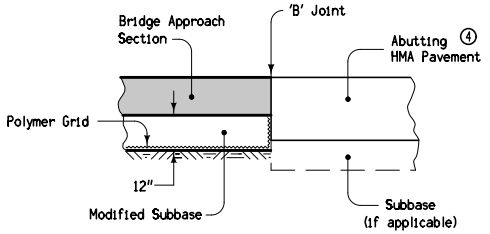
4" SUBDRAIN LOCATION



DETAIL 'C'
(Doweled PCC Pavement)



SECTION THRU CENTERLINE
(Abutting HMA Pavement)



DETAIL 'F'

④ If abutting pavement (PCC or HMA) is not in place, refer to RK-30.

Iowa Department of Transportation

STANDARD ROAD PLAN

REVISION	
8	10-18-11

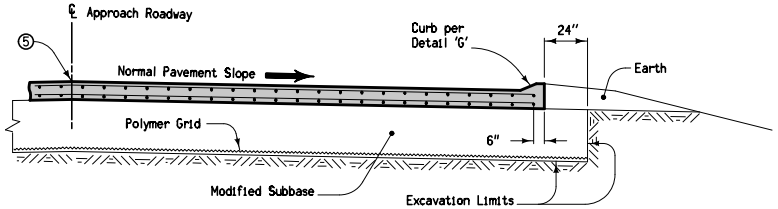
RK-20

SHEET 2 of 3

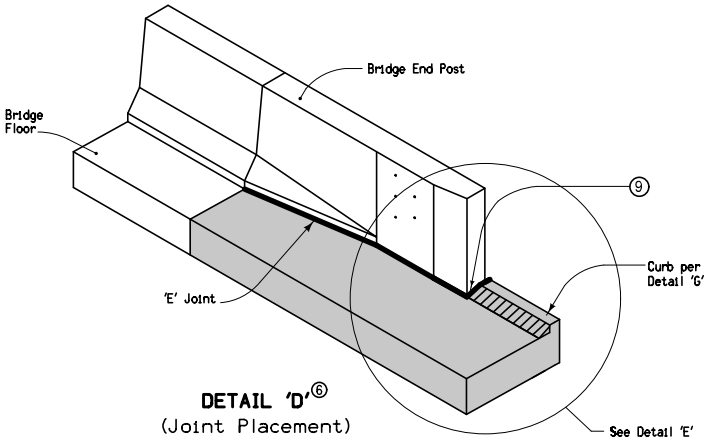
REVISIONS: Changed "U" bar size on sheet 1 from #5 to #4 to match sheet 3. Added note 9. Changed curb.

Deanna Maifield
APPROVED BY DESIGN METHODS ENGINEER

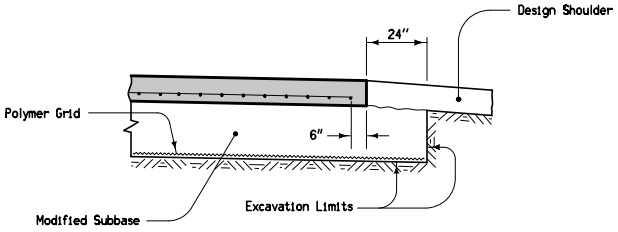
DOUBLE REINFORCED 12" APPROACH



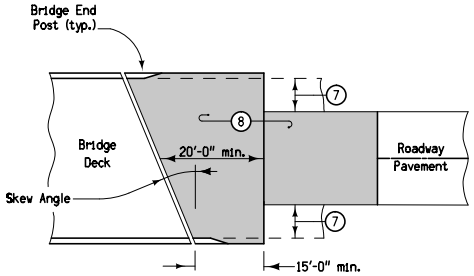
SECTION A-A ⑥



DETAIL 'D' ⑥
(Joint Placement)



SECTION B-B ⑥



APPROACH PAVEMENT LAYOUT AT A SKEW

⑤ Longitudinal Joint: (PV-101)
Single pour — Saw cut joint per Detail B.
Two pours — Use 'KS-2' Joint

⑥ Refer to RK-21, RK-22, or RK-23.

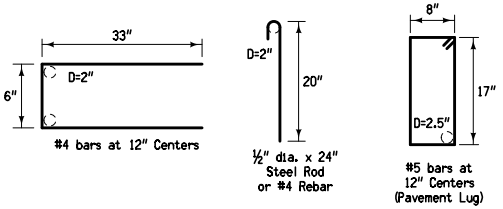
⑦ Design shoulder width.

⑧ Reinforced bridge approach section.

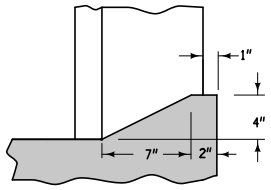
⑨ Expansion joint at end of bridge end post: Place joint filler the full depth of the bridge approach pavement. In areas with curb, place full depth of pavement plus curb and shape material to fit the shape of the curb per Section B-B of PV-101. Seal joint per Detail F of PV-101.

- Fixed Abutment Bridges:Type 'E' Joint

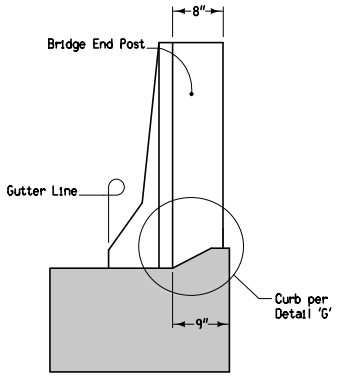
- Moveable Abutment Bridges: Flexible Foam Expansion Joint Filler in accordance with Specification Section 4136. Minimum filler width is the abutment 'CF' joint width. Joint length as required to completely fill from back side of curb to front face of bridge wing.



BENT BAR SHAPES



DETAIL 'G'



DETAIL 'E'
(Back of Curb Placement)

Iowa Department of Transportation

REVISION
8 | 10-18-11

STANDARD ROAD PLAN

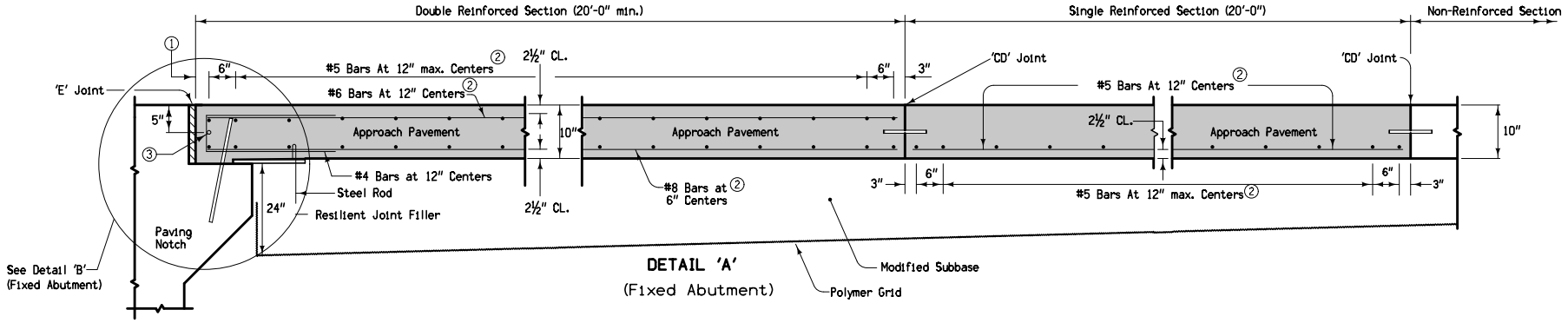
RK-20

SHEET 3 of 3

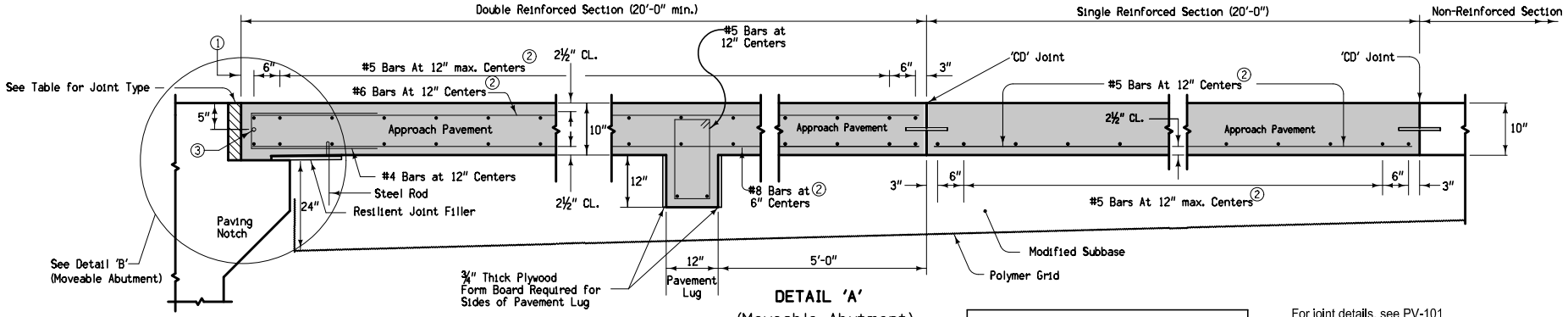
REVISIONS: Changed "U" bar size on sheet 1 from #5 to #4 to match sheet 3. Added note 9. Changed curb.

Deanna Maifield
APPROVED BY DESIGN METHODS ENGINEER

DOUBLE REINFORCED 12" APPROACH



DETAIL 'A'
(Fixed Abutment)



DETAIL 'A'
(Moveable Abutment)

JOINT TYPE FOR MOVEABLE ABUTMENT BRIDGES		
Joint	Maximum Bridge Length	
	Concrete Beam or Slab	Steel Girder
CF-1	370'	250'
CF-2	465'	320'
CF-3	575'	400'

For joint details, see PV-101.
For curb details, see PV-102.

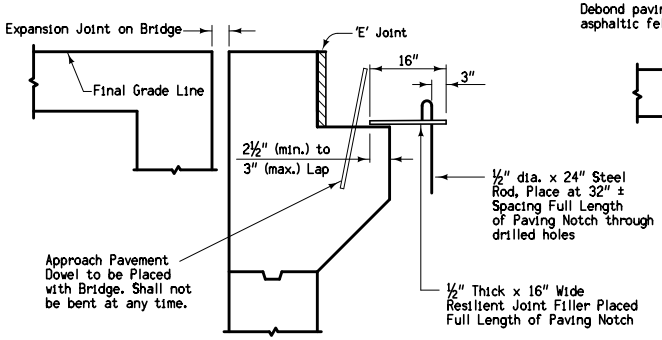
All transverse bars are #5.

Possible Contract Item:

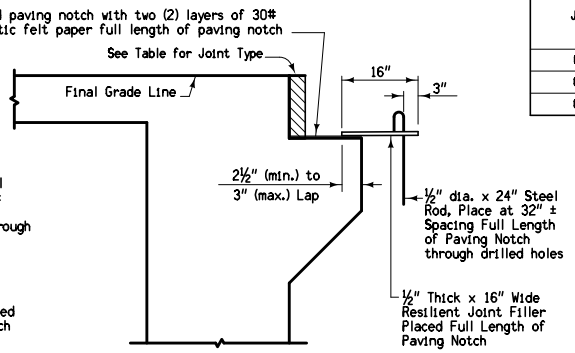
Bridge Approach, RK-25

Possible Tabulation:

112-6



DETAIL 'B' (Fixed Abutment)



DETAIL 'B' (Moveable Abutment)

① 2" min. to 2 1/2" max. clear to bent bar.

② Minimum lap length: #5 Bars - 18"
#6 Bars - 27"
#8 Bars - 48"

③ If bridge is skewed, place additional #5 bar parallel to skewed face.

Iowa Department of Transportation

STANDARD ROAD PLAN

REVISION	
8	10-18-11

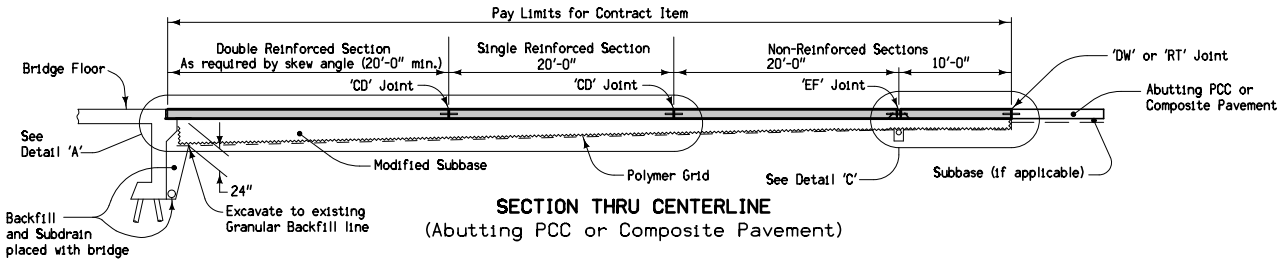
RK-25

SHEET 1 of 3

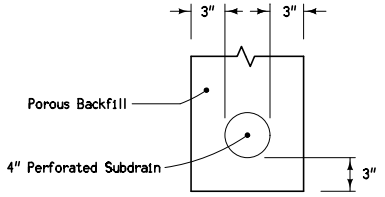
REVISIONS: Changed "U" bar size on sheet 1 from #5 to #4 to match sheet 3. Added note 9. Changed curb.

Deanna Maifield
APPROVED BY DESIGN METHODS ENGINEER

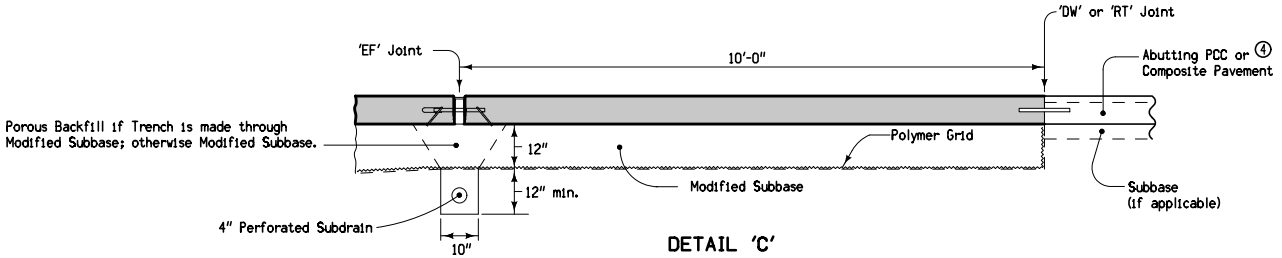
DOUBLE REINFORCED 10" APPROACH



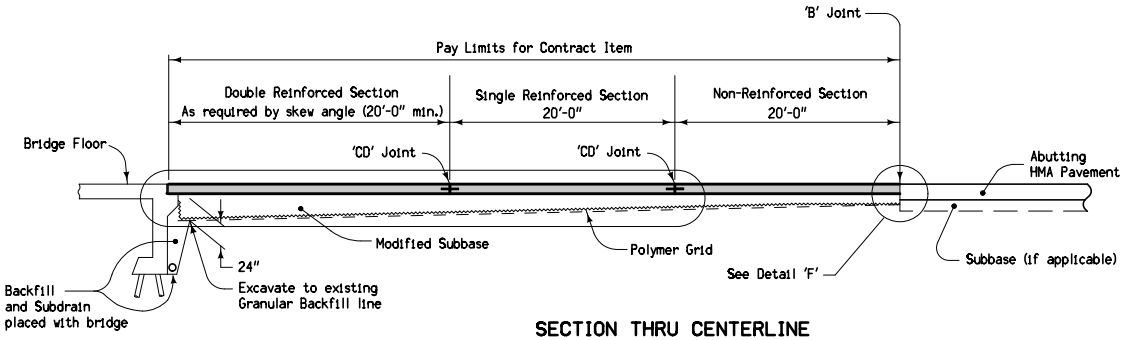
SECTION THRU CENTERLINE
(Abutting PCC or Composite Pavement)



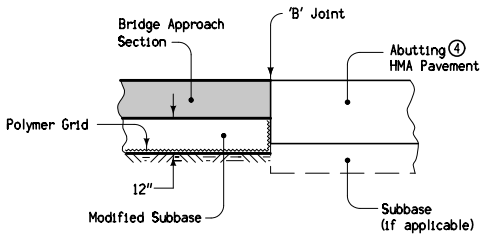
4" SUBDRAIN LOCATION DETAIL



DETAIL 'C'
(Doweled PCC Pavement)



SECTION THRU CENTERLINE
(Abutting HMA Pavement)



DETAIL 'F'

④ If abutting pavement (PCC or HMA) is not in place, see RK-30.

Iowa Department of Transportation

REVISION	
8	10-18-11

STANDARD ROAD PLAN

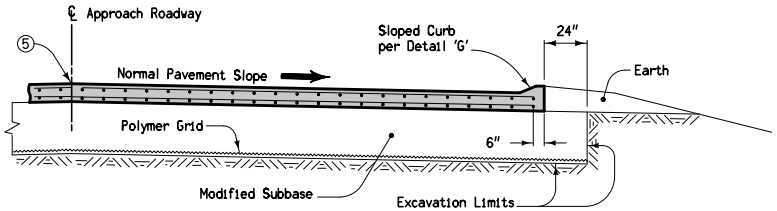
RK-25

SHEET 2 of 3

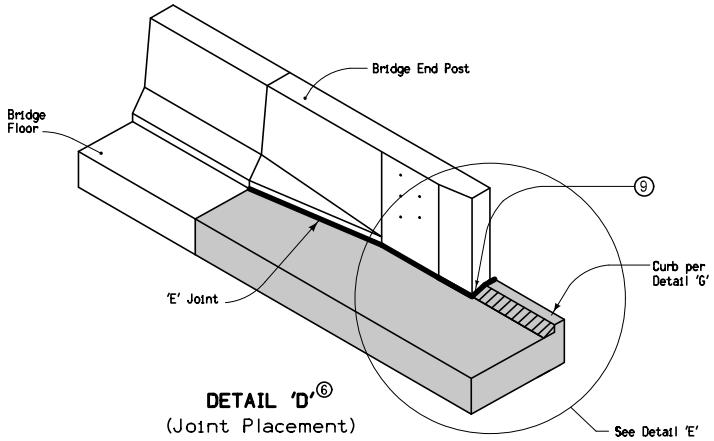
REVISIONS: Changed "U" bar size on sheet 1 from #5 to #4 to match sheet 3. Added note 9. Changed curb.

Deanna Maifield
APPROVED BY DESIGN METHODS ENGINEER

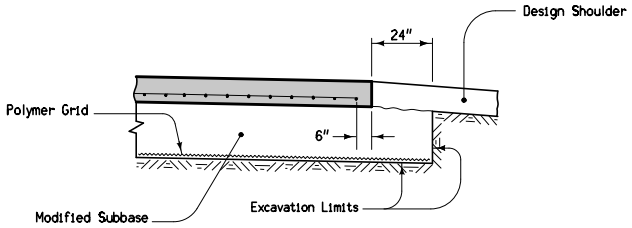
DOUBLE REINFORCED 10" APPROACH



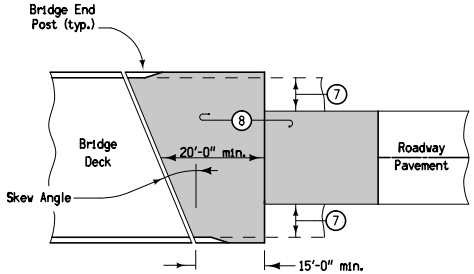
SECTION A-A ⑥



DETAIL 'D' ⑥
(Joint Placement)



SECTION B-B ⑥



APPROACH PAVEMENT LAYOUT AT A SKEW

⑤ Longitudinal Joint: (PV-101)
Single pour — Saw cut joint per Detail B.
Two pours — Use 'KS-2' Joint

⑥ See RK-21, RK-22, or RK-23.

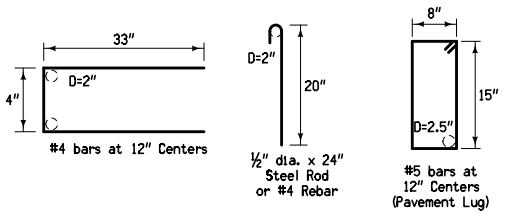
⑦ Design shoulder width.

⑧ Reinforced bridge approach section.

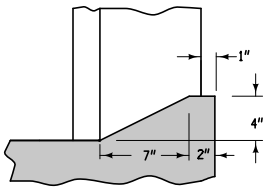
⑨ Expansion joint at end of bridge end post: Place joint filler the full depth of the bridge approach pavement. In areas with curb, place full depth of pavement plus curb and shape material to fit the shape of the curb per Section B-B of PV-101. Seal joint per Detail F of PV-101.

- Fixed Abutment Bridges:Type 'E' Joint

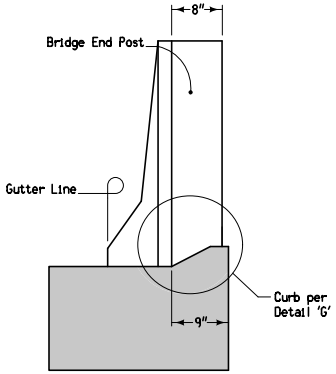
- Moveable Abutment Bridges: Flexible Foam Expansion Joint Filler in accordance with Specification Section 4136. Minimum filler width is the abutment 'CF' joint width. Joint length as required to completely fill from back side of curb to front face of bridge wing.



BENT BAR SHAPES



DETAIL 'G'



DETAIL 'E'
(Back of Curb Placement)

Iowa Department of Transportation

REVISION
8 | 10-18-11

STANDARD ROAD PLAN

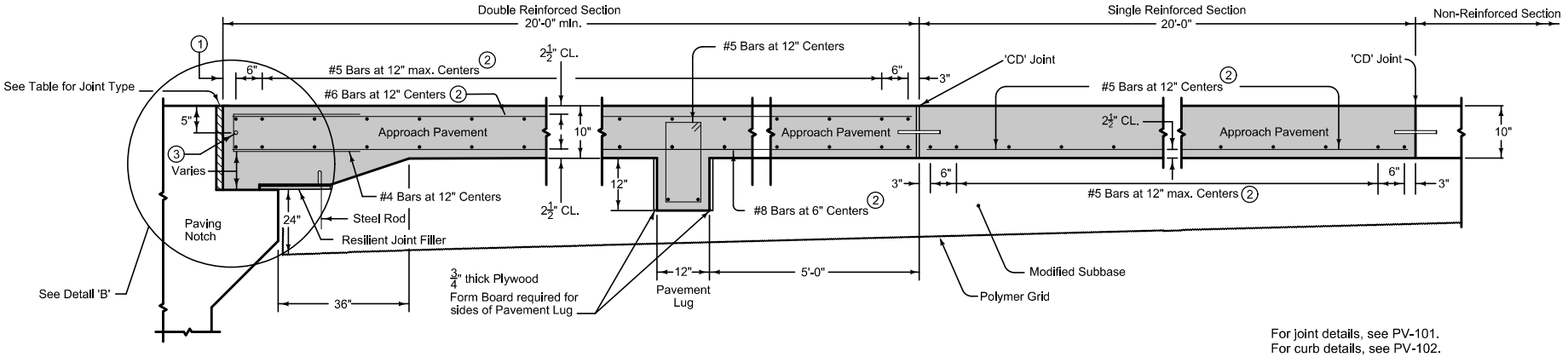
RK-25

SHEET 3 of 3

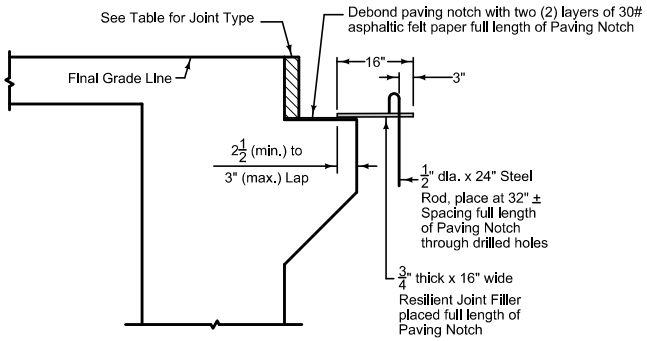
REVISIONS: Changed "U" bar size on sheet 1 from #5 to #4 to match sheet 3. Added note 9. Changed curb.

Deanna Maifield
APPROVED BY DESIGN METHODS ENGINEER

DOUBLE REINFORCED 10" APPROACH



DETAIL 'A'



DETAIL 'B'

JOINT TYPE FOR MOVEABLE ABUTMENT BRIDGES		
Joint	Maximum Bridge Length	
	Concrete Beam or Slab	Steel Girder
CF-1	370'	250'
CF-2	465'	320'
CF-3	575'	400'

MOVEABLE ABUTMENT

For joint details, see PV-101.
For curb details, see PV-102.

All Transverse Bars are #5.

See RK-21 or RK-22 for shoulders.

① 2" to 2½" clear to bent bar.

② Minimum lap length: #5 bars - 18 inches
#6 bars - 27 inches
#8 bars - 48 inches

③ If bridge is skewed, place additional #5 bar parallel to skewed face.

Possible Contract Item:
Bridge Approach, RK-26

Possible Tabulation:
112-6

Iowa Department of Transportation

REVISION
7 | 10-18-11

STANDARD ROAD PLAN

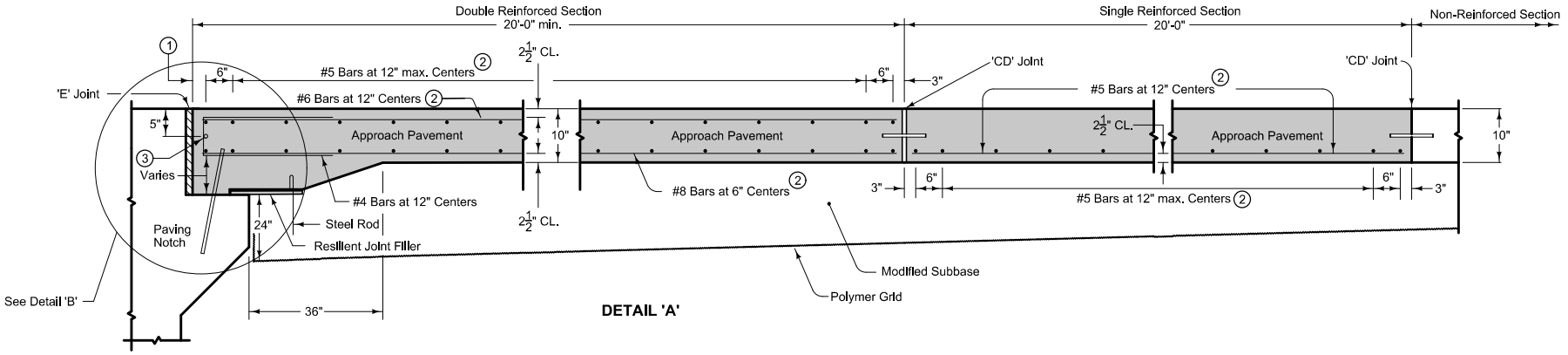
RK-26

SHEET 1 of 4

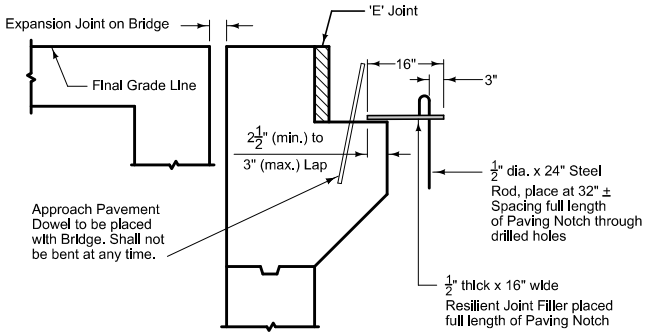
REVISIONS: Changed "U" bar size on sheets 1 and 2 from #5 to #4 to match sheet 4. Added circle note 9 and Detail 'G'. Changed curb.

Deanna Maifield
APPROVED BY DESIGN METHODS ENGINEER

DOUBLE REINFORCED 10" APPROACH WITH VARIABLE DEPTH PAVING NOTCH



DETAIL 'A'



DETAIL 'B'

① 2" to 2½" clear to bent bar.

② Minimum lap length: #5 bars - 18 inches
#6 bars - 27 inches
#8 bars - 48 inches

③ If bridge is skewed, place additional #5 bar parallel to skewed face.

FIXED ABUTMENT

Iowa Department of Transportation

STANDARD ROAD PLAN

REVISION
7 | 10-18-11

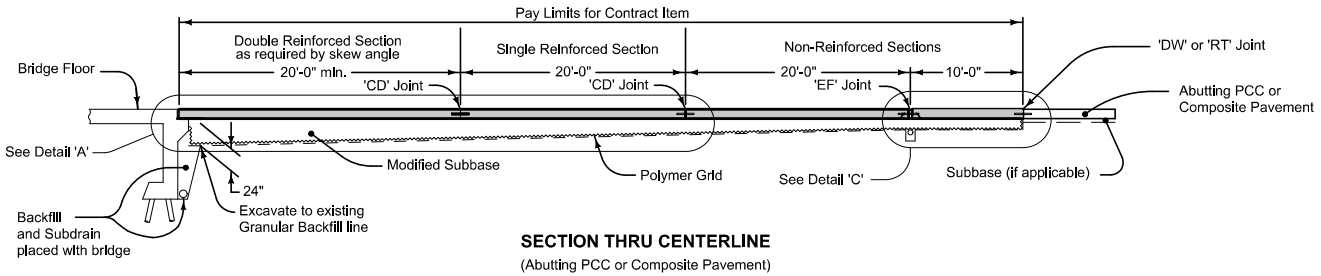
RK-26

SHEET 2 of 4

REVISIONS: Changed "U" bar size on sheets 1 and 2 from #5 to #4 to match sheet 4. Added circle note 9 and Detail 'G'. Changed curb.

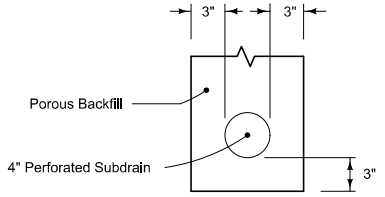
Deanna Maifield
APPROVED BY DESIGN METHODS ENGINEER

DOUBLE REINFORCED 10" APPROACH WITH VARIABLE DEPTH PAVING NOTCH

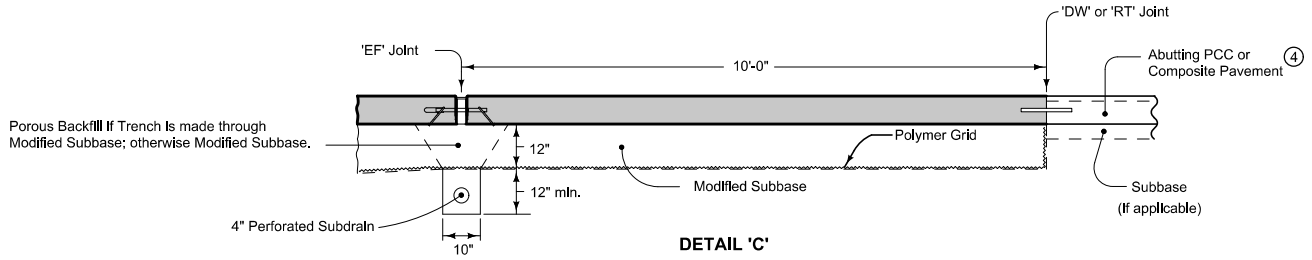


SECTION THRU CENTERLINE

(Abutting PCC or Composite Pavement)

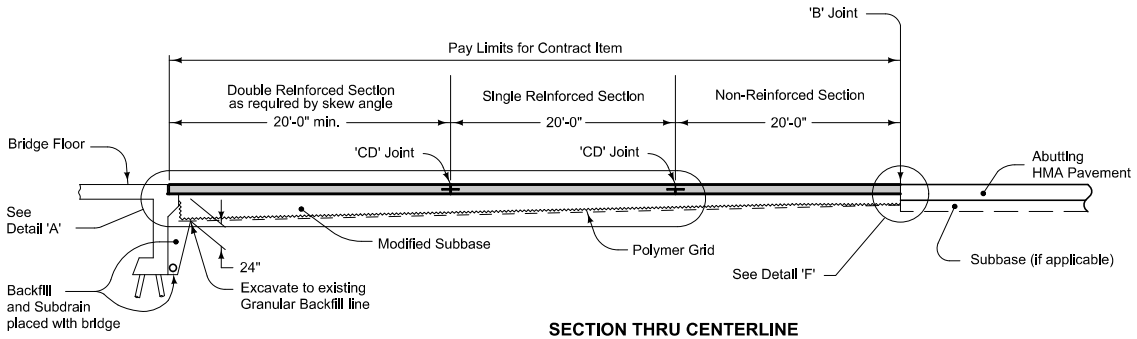


4" SUBDRAIN LOCATION DETAIL



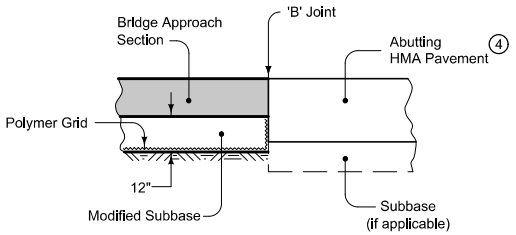
DETAIL 'C'

(Doweled PCC Pavement)



SECTION THRU CENTERLINE

(Abutting HMA Pavement)



DETAIL 'F'

④ If abutting pavement (PCC or HMA) is not in place, see RK-30.

Iowa Department of Transportation

STANDARD ROAD PLAN

REVISION	
7	10-18-11

RK-26

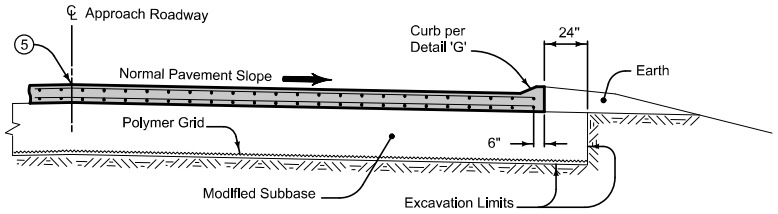
SHEET 3 of 4

REVISIONS: Changed "U" bar size on sheets 1 and 2 from #5 to #4 to match sheet 4. Added circle note 9 and Detail 'G'. Changed curb.

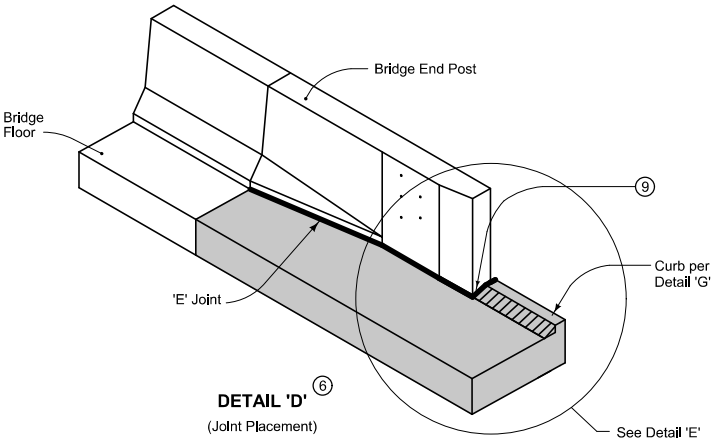
Deanna Maifield

APPROVED BY DESIGN METHODS ENGINEER

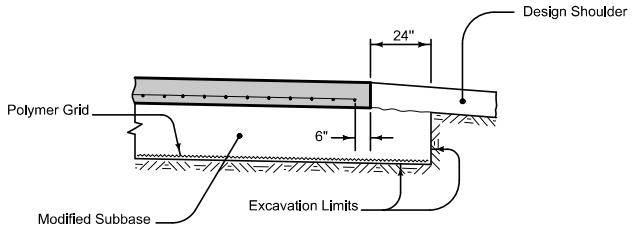
DOUBLE REINFORCED 10" APPROACH WITH VARIABLE DEPTH PAVING NOTCH



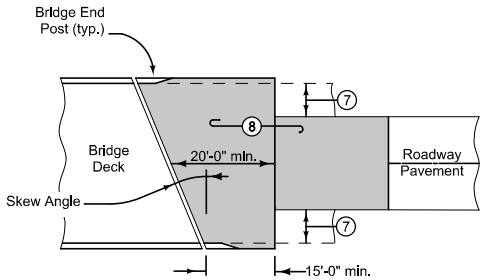
SECTION A-A (6)



DETAIL 'D' (6)
(Joint Placement)



SECTION B-B (6)



APPROACH PAVEMENT LAYOUT AT A SKEW

(5) Longitudinal Joint: (PV-101)
Single pour - Saw cut joint per Detail B
Two pours - use 'KS-2' Joint

(6) See RK-21, RK-22, or RK-23.

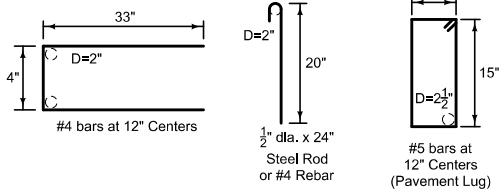
(7) Design shoulder width.

(8) Reinforced bridge approach section.

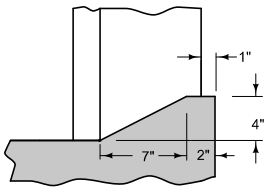
(9) Expansion joint at end of bridge end post: Place joint filler the full depth of the bridge approach pavement. In areas with curb, place full depth of pavement plus curb and shape material to fit the shape of the curb per Section B-B of PV-101. Seal joint per Detail F of PV-101.

- Fixed Abutment Bridges:Type 'E' Joint

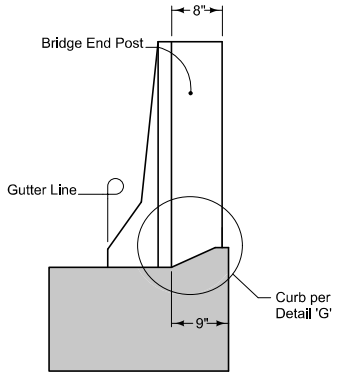
- Moveable Abutment Bridges: Flexible Foam Expansion Joint Filler in accordance with Specification Section 4136. Minimum filler width is the abutment 'CF' joint width. Joint length as required to completely fill from back side of curb to front face of bridge wing.



BENT BAR SHAPES



DETAIL 'G'



DETAIL 'E'
(Back of Curb Placement)

Iowa Department of Transportation

REVISION
7 | 10-18-11

STANDARD ROAD PLAN

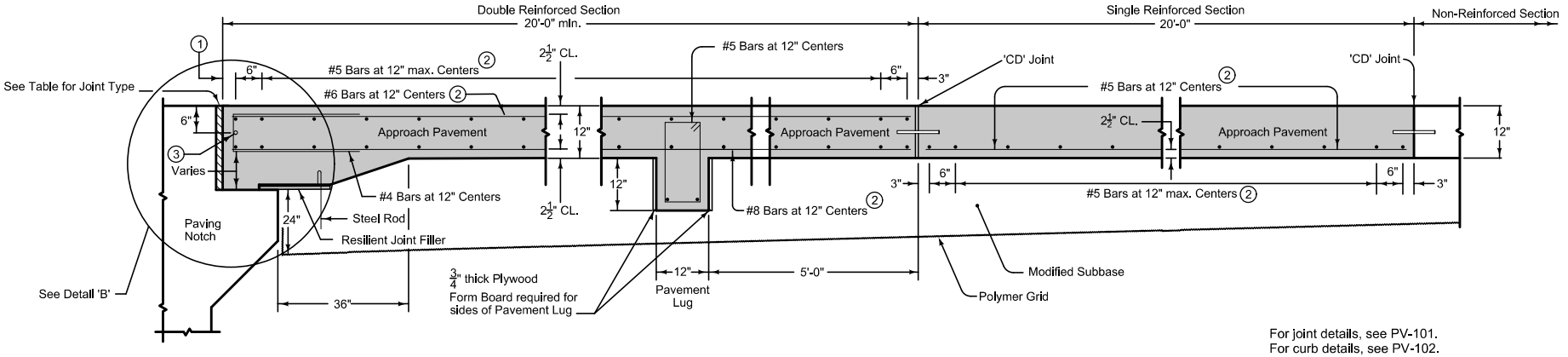
RK-26

SHEET 4 of 4

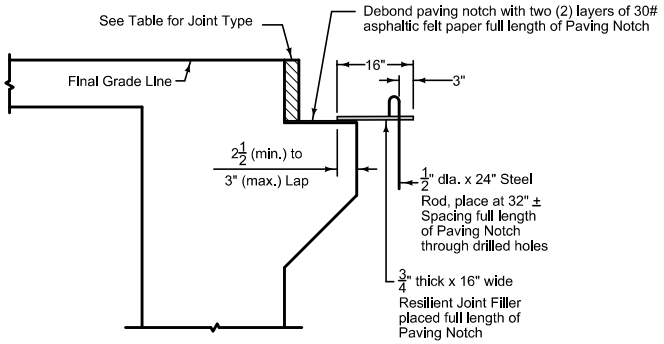
REVISIONS: Changed "U" bar size on sheets 1 and 2 from #5 to #4 to match sheet 4. Added circle note 9 and Detail 'G'. Changed curb.

Deanna Maifield
APPROVED BY DESIGN METHODS ENGINEER

DOUBLE REINFORCED 10" APPROACH WITH VARIABLE DEPTH PAVING NOTCH



DETAIL 'A'



DETAIL 'B'

JOINT TYPE FOR MOVEABLE ABUTMENT BRIDGES		
Joint	Maximum Bridge Length	
	Concrete Beam or Slab	Steel Girder
CF-1	370'	250'
CF-2	465'	320'
CF-3	575'	400'

MOVEABLE ABUTMENT

For joint details, see PV-101.
For curb details, see PV-102.

All Transverse Bars are #5.

See RK-21 or RK-22 for shoulders.

① 2" to 2½" clear to bent bar.

② Minimum lap length: #5 bars - 18 inches
#6 bars - 27 inches
#8 bars - 48 inches

③ If bridge is skewed, place additional #5 bar parallel to skewed face.

Possible Contract Item:
Bridge Approach, RK-27

Possible Tabulation:
112-6

Iowa Department of Transportation

REVISION
NEW 10-18-11

STANDARD ROAD PLAN

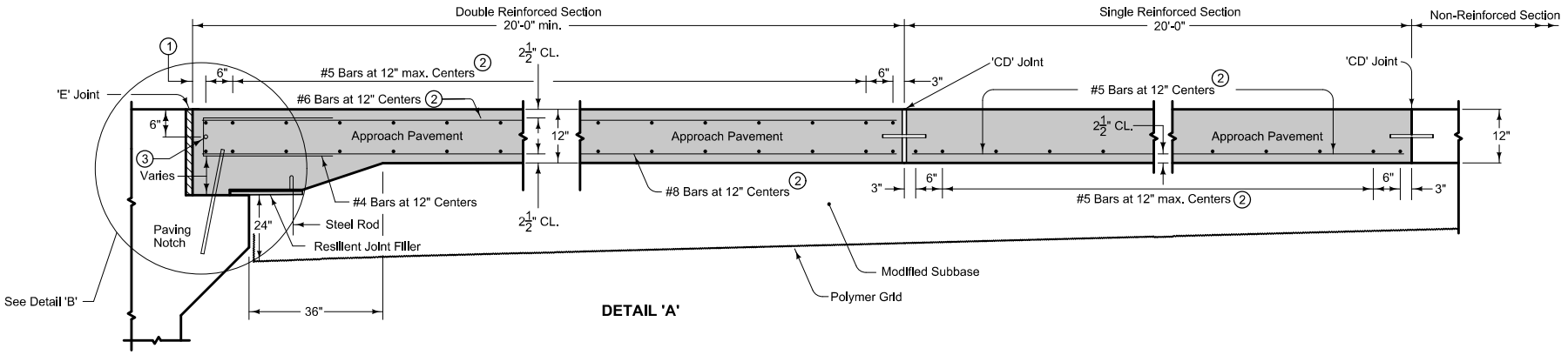
RK-27

SHEET 1 of 4

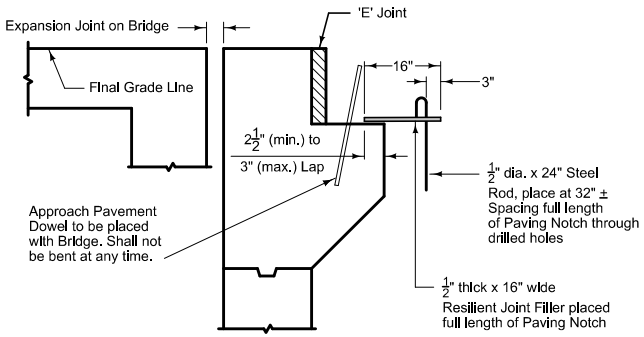
REVISIONS: New.

Deanna Maifield
APPROVED BY DESIGN METHODS ENGINEER

DOUBLE REINFORCED 12" APPROACH WITH VARIABLE DEPTH PAVING NOTCH



DETAIL 'A'



DETAIL 'B'

① 2" to 2½" clear to bent bar.

② Minimum lap length: #5 bars - 18 inches
#6 bars - 27 inches
#8 bars - 48 inches

③ If bridge is skewed, place additional #5 bar parallel to skewed face.

FIXED ABUTMENT

Iowa Department of Transportation

STANDARD ROAD PLAN

REVISION: NEW 10-18-11

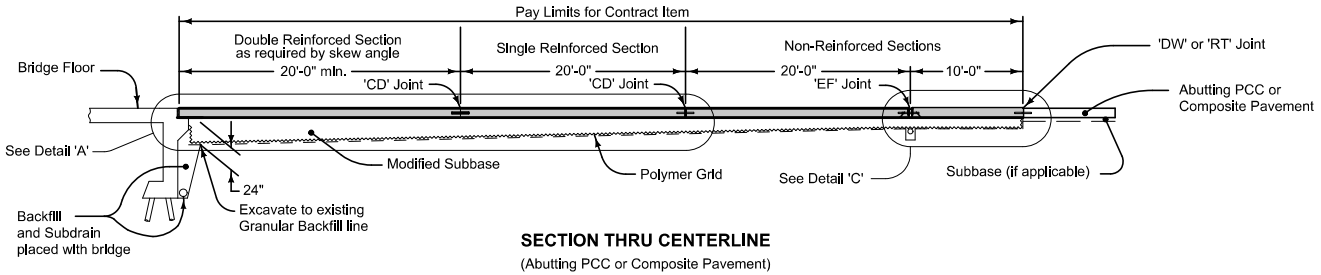
RK-27

SHEET 2 of 4

REVISIONS: New.

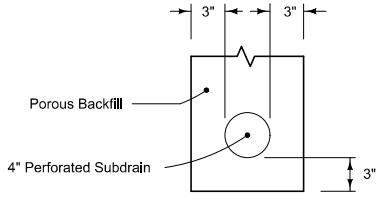
Deanna Maifield
APPROVED BY DESIGN METHODS ENGINEER

DOUBLE REINFORCED 12" APPROACH WITH VARIABLE DEPTH PAVING NOTCH

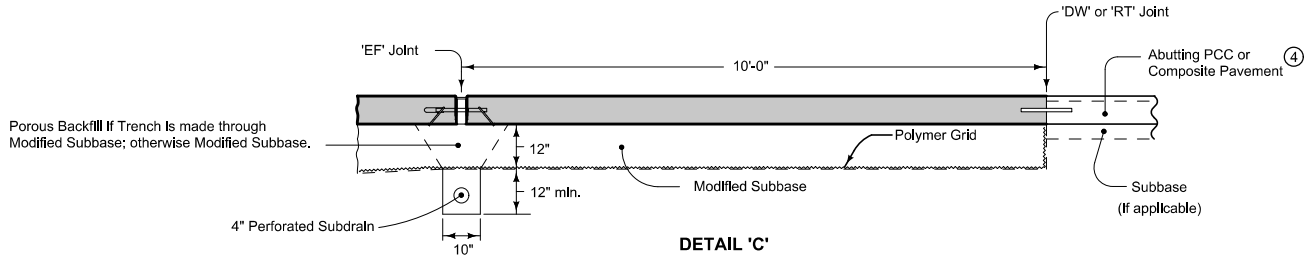


SECTION THRU CENTERLINE

(Abutting PCC or Composite Pavement)

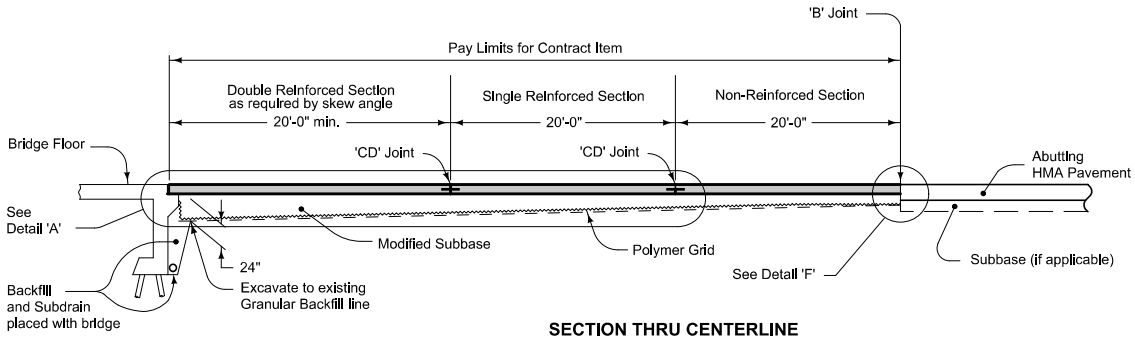


4" SUBDRAIN LOCATION DETAIL



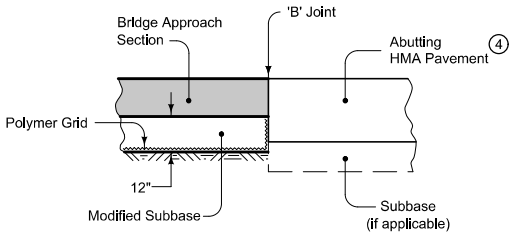
DETAIL 'C'

(Doweled PCC Pavement)



SECTION THRU CENTERLINE

(Abutting HMA Pavement)



DETAIL 'F'

④ If abutting pavement (PCC or HMA) is not in place, see RK-30.

Iowa Department of Transportation

STANDARD ROAD PLAN

REVISION	
NEW	10-18-11

RK-27

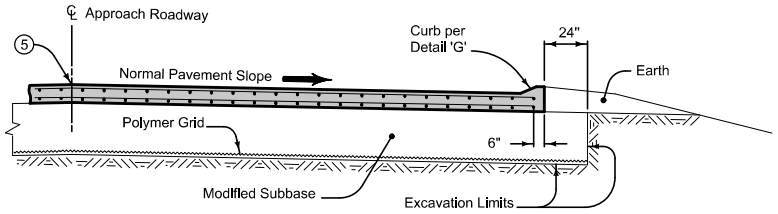
SHEET 3 of 4

REVISIONS: New.

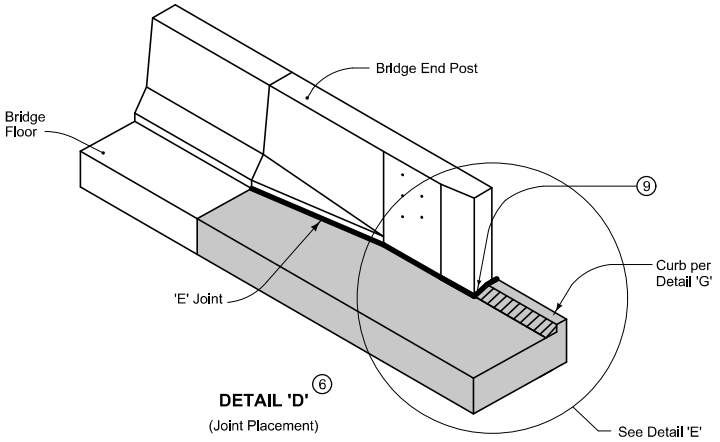
Deanna Maifield

APPROVED BY DESIGN METHODS ENGINEER

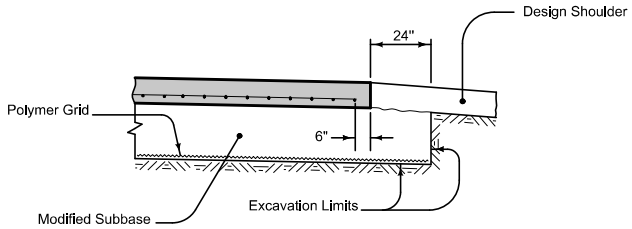
DOUBLE REINFORCED 12" APPROACH WITH VARIABLE DEPTH PAVING NOTCH



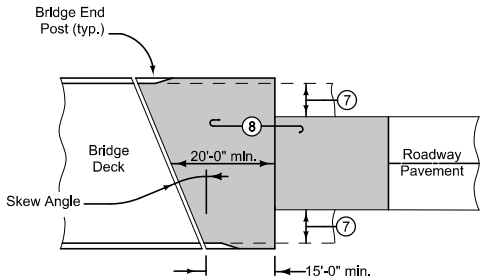
SECTION A-A (6)



DETAIL 'D' (6)
(Joint Placement)



SECTION B-B (6)



APPROACH PAVEMENT LAYOUT AT A SKEW

(5) Longitudinal Joint: (PV-101)
Single pour - Saw cut joint per Detail B
Two pours - use 'KS-2' Joint

(6) See RK-21, RK-22, or RK-23.

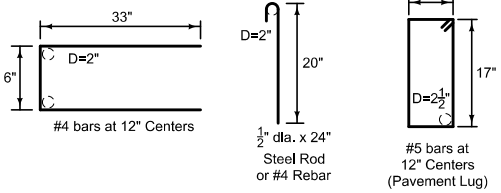
(7) Design shoulder width.

(8) Reinforced bridge approach section.

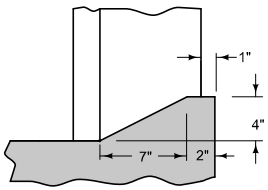
(9) Expansion joint at end of bridge end post: Place joint filler the full depth of the bridge approach pavement. In areas with curb, place full depth of pavement plus curb and shape material to fit the shape of the curb per Section B-B of PV-101. Seal joint per Detail F of PV-101.

- Fixed Abutment Bridges:Type 'E' Joint

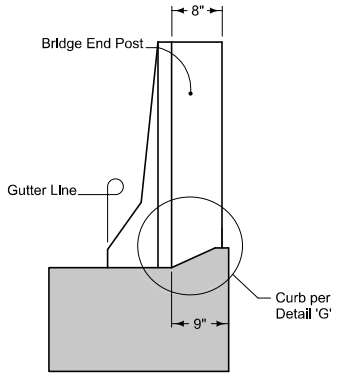
- Moveable Abutment Bridges: Flexible Foam Expansion Joint Filler in accordance with Specification Section 4136. Minimum filler width is the abutment 'CF' joint width. Joint length as required to completely fill from back side of curb to front face of bridge wing.



BENT BAR SHAPES



DETAIL 'G'



DETAIL 'E'
(Back of Curb Placement)

Iowa Department of Transportation

REVISION
NEW 10-18-11

STANDARD ROAD PLAN

RK-27

SHEET 4 of 4

REVISIONS: New.

Deanna Maifield
APPROVED BY DESIGN METHODS ENGINEER

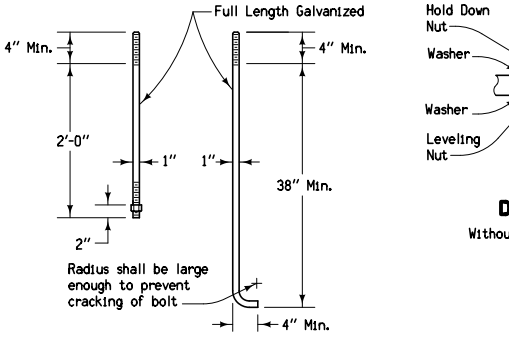
DOUBLE REINFORCED 12" APPROACH WITH VARIABLE DEPTH PAVING NOTCH

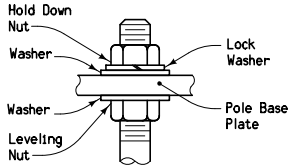
SECTION

Signals and Lighting

RM

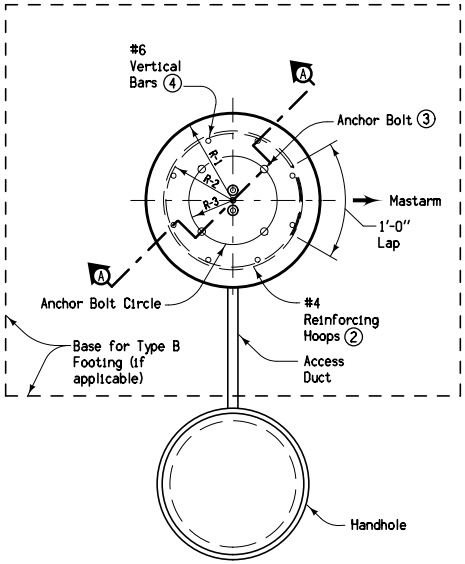
NO.	DATE	TITLE
RM-31	09-21-99	Location Details for Poles on Transformer Bases (Roadway Lighting)
RM-32	04-27-99	Location Details for Poles on Slip Bases (Roadway Lighting)
RM-33	10-03-00	Electrical Installation Details (Roadway Ducts)
RM-34A	10-19-04	Electrical Installation Details via Handhole (Slip-Base)
RM-34B	09-21-99	Electrical Installation Details (Transformer Base)
RM-35	04-19-11	Control Station Details (Pole-Mounted)
RM-36	04-19-11	Control Station Details (Pad-Mounted)
RM-37	10-21-08	Junction Box (Cast Iron)
RM-38	04-27-99	Junction Box (Fiber Reinforced Concrete)
RM-39	10-18-11	Light Pole Footings
RM-40	09-21-99	Cable Splices and Connectors
RM-41	04-25-00	Underdeck Lighting (High Pressure Sodium Luminaire)
RM-42	10-18-11	Precast Handhole
RM-43	10-18-05	Transformer Base (Cast Aluminum)
RM-44	10-20-09	Lighting Tower
RM-46	10-16-07	Slip Base for Light Poles
RM-47	10-18-11	Footing for Slip-Base Light Poles
RM-48	10-17-06	Temporary Floodlighting



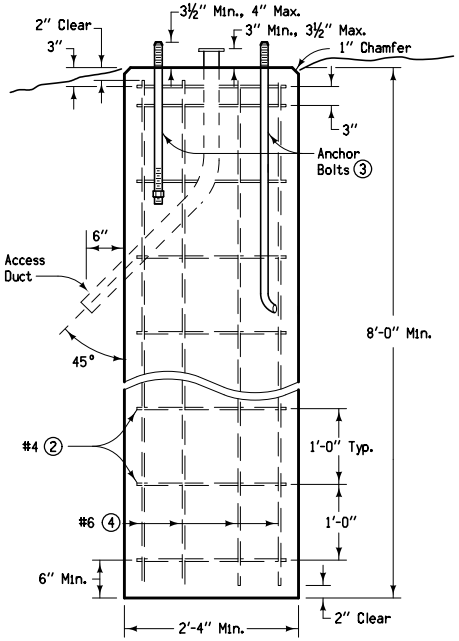


DETAIL 'A'
Without Transformer Base (5)

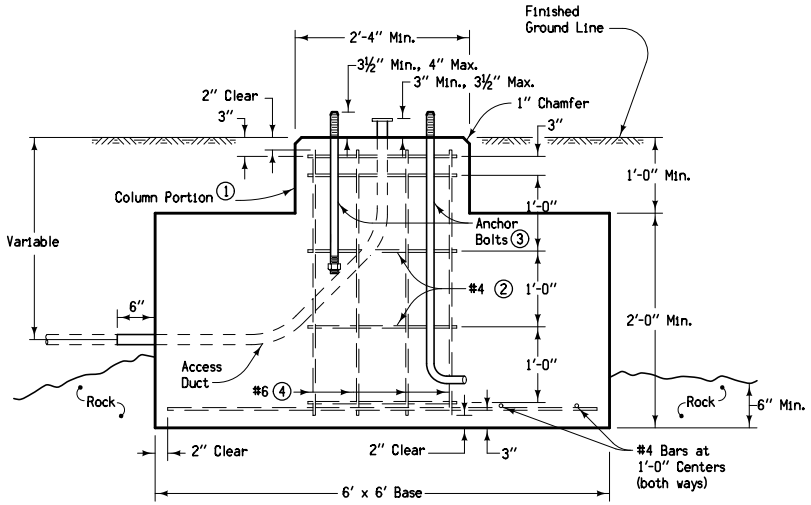
ANCHOR BOLT DETAILS



FOOTING PLAN



SECTION A-A
TYPE A FOOTING



SECTION A-A
TYPE B FOOTING

The details indicated hereon are for the construction of a concrete footing for light poles with a mounting height of 49 feet or less. Where poles with greater mounting heights are specified, footings of different designs may be required.

The Type A Footing is the normally required footing construction. Where rock, shale, sandstone, broken or shattered rock, or other similar material is encountered, the Engineer may approve the use of the Type B Footing. Dispose of all excavations in the area adjacent to the footing and shape to the natural contour unless otherwise directed by the Engineer.

Diameter of footing is determined by the Anchor Bolt Circle required for the diameter of the pole being installed. Where dimensional requirements indicated cannot be met with normal footings, enlarge the footing as necessary to accomodate the required diameter at Contractor's expense.

R-1 Radius of the outside of the footing is 1' -1½" minimum unless anchor bolt circle requires a larger radius.

R-2 Radius of the reinforcing hoop is a maximum of 2" less than R-1 and a minimum of 1" greater than R-3.

R-3 Radius of the anchor bolt circle.

Cap open ends of conduit during construction to prevent infiltration of foreign material. After the cable is installed, seal the upper end of the ducts against entry of moisture by a method approved by the Engineer. For access ducts use a 2" nominal outside diameter, with a minimum of two access ducts per footing, unless otherwise specified. Use a 1" nominal outside diameter for the ground wire duct.

No welding of the anchor bolts is permitted. Obtain a template from the light pole manufacturer for placement of anchor bolts.

(1) Footing base may be thickened and column portion omitted at the Contractor's option.

(2) Horizontal reinforcing hoops are #4 bars lapped a minimum of 1'-0" as indicated. Hoops may be welded to vertical bars.

(3) Either type of bolt shown may be used at the option of the Contractor.

(4) This bar is to be a #7 when the mounting height is greater than 44 feet.

(5) When transformer base is required, refer to Standard Road Plan RM-43.

Iowa Department of Transportation

STANDARD ROAD PLAN

REVISION	
4	10-18-11

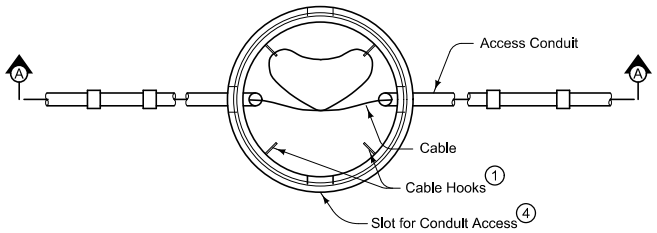
RM-39

SHEET 1 of 1

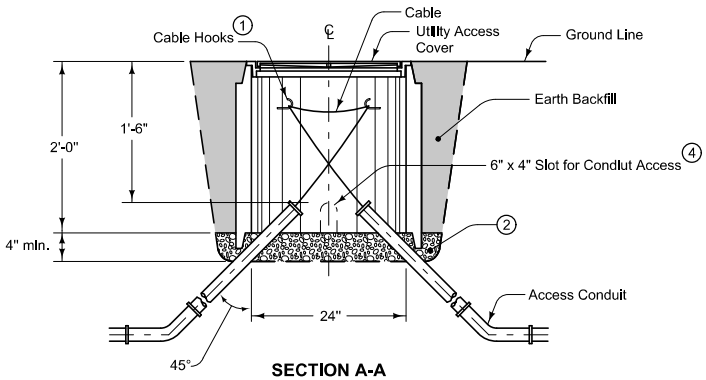
REVISIONS: Modified and clarified general notes. Removed information covered by Specifications.

Deanna Maifield
APPROVED BY DESIGN METHODS ENGINEER

LIGHT POLE FOOTINGS

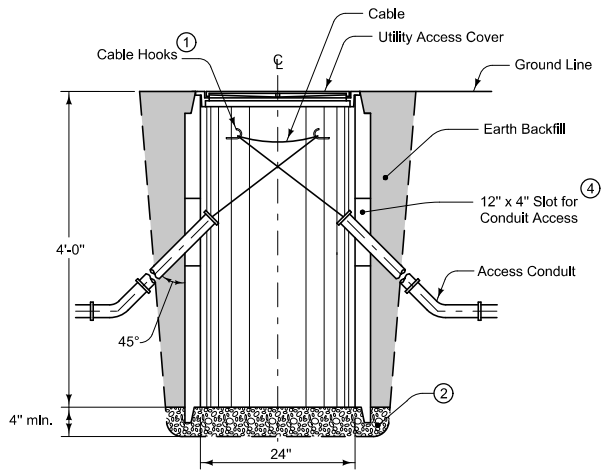


PLAN



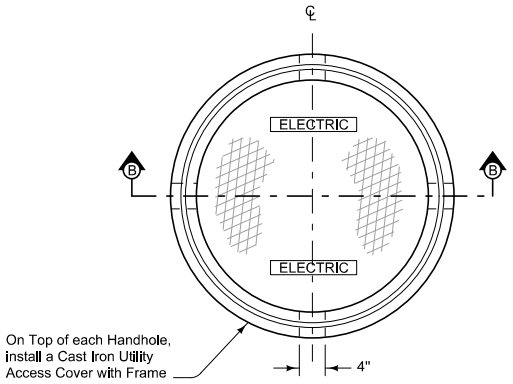
SECTION A-A

Type 1

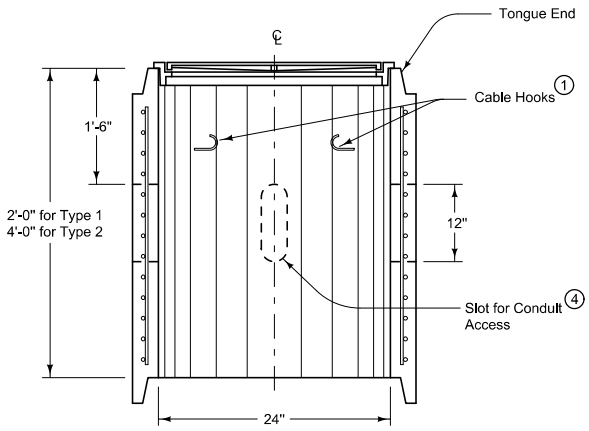


SECTION A-A

Type 2



PLAN



SECTION B-B

Install pipe complying with the requirements of Class 1500 D concrete pipe. Place with Tongue End at top of handhole.

Use cable hooks and handling loops galvanized according to ASTM A153 or ASTM B695.

Use the same material for access conduit as required for the circuit ducts unless otherwise specified.

Minimum Weight (Frame + Cover) = 145 lbs.

(1) $\frac{3}{8}$" diameter Steel Rod or approved equivalent. Cable hooks may be precast with handhole or Installed as approved by the Engineer.

(2) Granular Material meeting requirements of Gradation Number 3 or 5 as shown in the Aggregate Gradation Table from the current General Supplemental Specifications.

(4) Slots for conduit access may be cast at 90 degree spacing, as shown, or cast only as necessary for conduit installation as project plans require. Grout slots with mortar after necessary conduits are installed. See Sections A-A for slot dimensions.

Possible Contract Item:
Handholes and Junction Boxes

Iowa Department of Transportation

REVISION
7 | 10-18-11

STANDARD ROAD PLAN

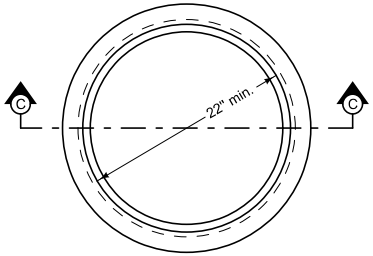
RM-42

SHEET 1 of 2

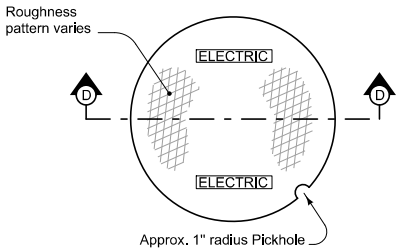
REVISIONS: Added allowance for slots with Type '1' handhole. Removed reference to RF-1. Added circle note 4.

Deanna Maifield
APPROVED BY DESIGN METHODS ENGINEER

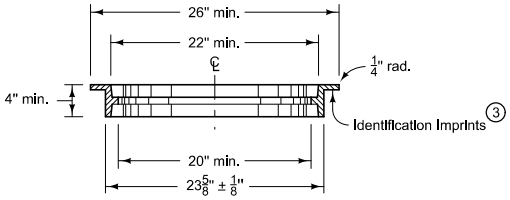
PRECAST HANDHOLE



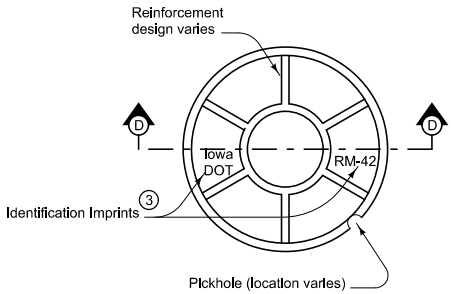
FRAME PLAN



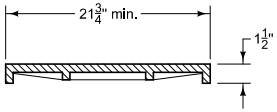
COVER TOP PLAN



SECTION C-C



COVER BOTTOM PLAN



SECTION D-D

③ Place an identification imprint "Iowa DOT RM-42" on each frame and cover according to Materials I.M. 453.04. Covers previously imprinted with "Iowa DOT RA-69" and meeting the dimension and I.M. requirements of this standard are also acceptable.

Iowa Department of Transportation

STANDARD ROAD PLAN

REVISION	
7	10-18-11

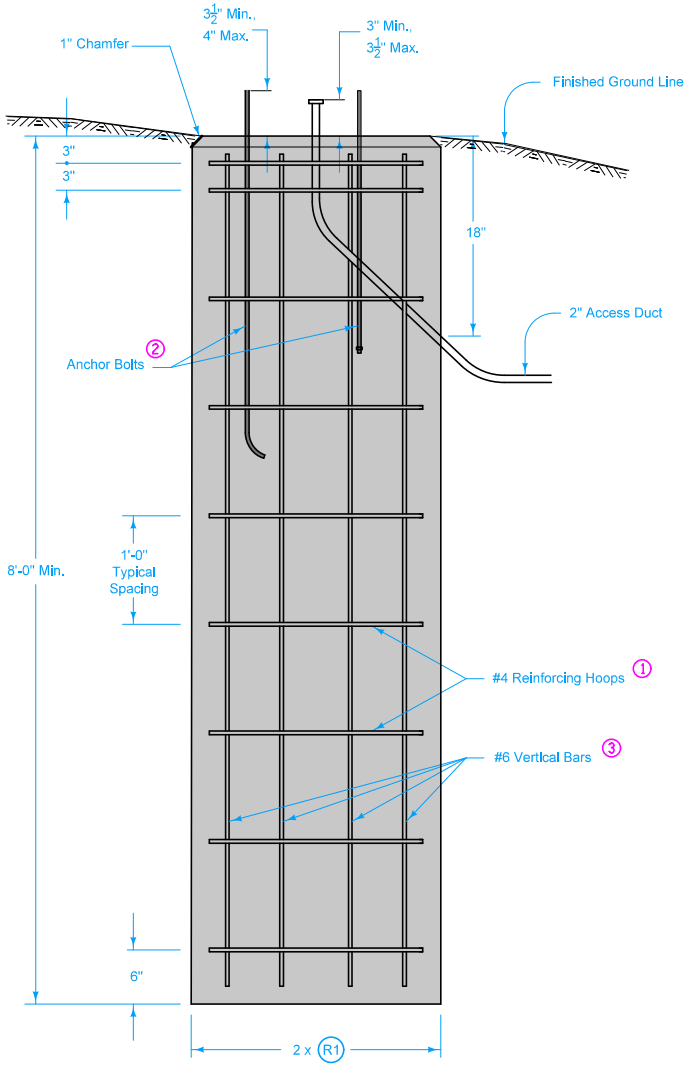
RM-42

SHEET 2 of 2

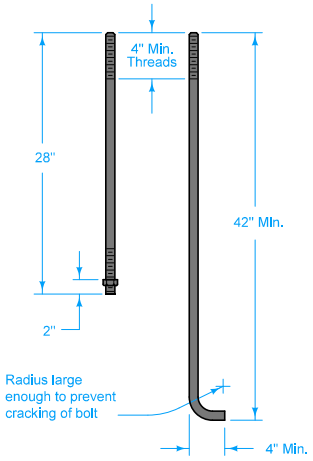
REVISIONS: Added allowance for slots with Type '1' handhole. Removed reference to RF-1. Added circle note 4.

Deanna Maifield
APPROVED BY DESIGN METHODS ENGINEER

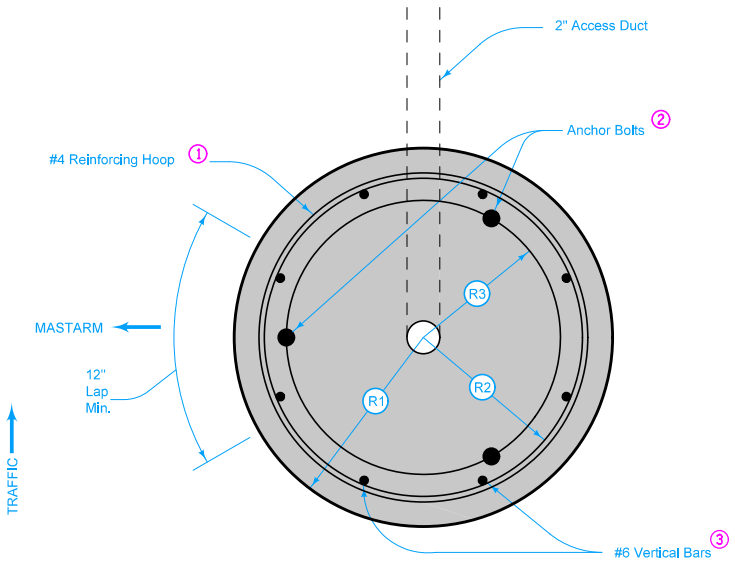
PRECAST HANDHOLE



TYPICAL SECTION



1" ANCHOR BOLTS ②



PLAN

Diameter of footing is determined by the Anchor Bolt Circle required for the pole being installed.

Provide minimum 2" clear for all reinforcement.

(R1) = Radius of footing, minimum of 2" greater than R2, 13.5" minimum.

(R2) = Radius of the reinforcing hoop, minimum of 1" greater than R3.

(R3) = Radius of the anchor bolt circle.

When precast footings are used, backfill with Class B concrete. When caving soil or ground water are present, remove to provide an acceptable condition prior to placing Class B concrete.

① #4 bars lapped a minimum of 12". Hoops may be welded to vertical bars.

② Three anchor bolts required per footing. Either anchor bolt type may be used.

③ Use #7 bars when mounting height is greater than 44 feet.

Iowa Department of Transportation

REVISION 7 10-18-11

STANDARD ROAD PLAN

RM-47

SHEET 1 of 1

REVISIONS: Corrected title spelling.

Deanna Maifield
APPROVED BY DESIGN METHODS ENGINEER

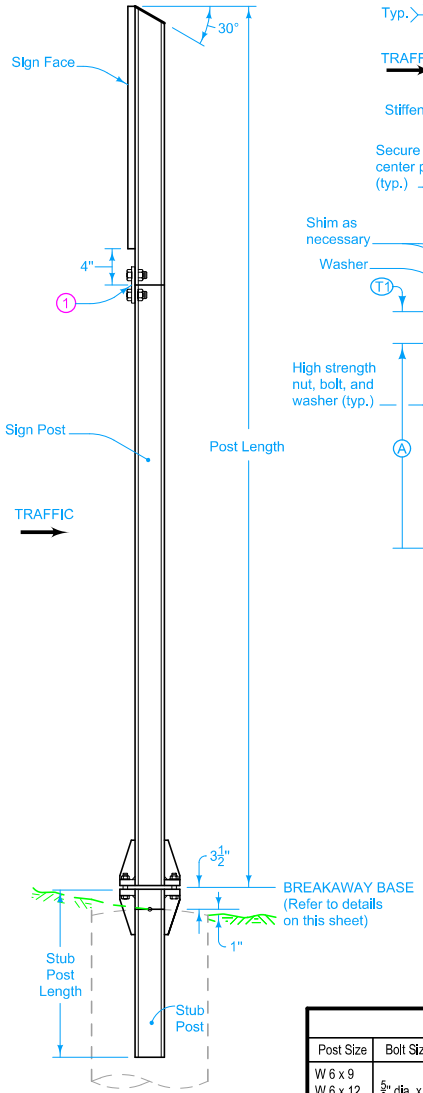
FOOTING FOR SLIP-BASE LIGHT POLES

SECTION

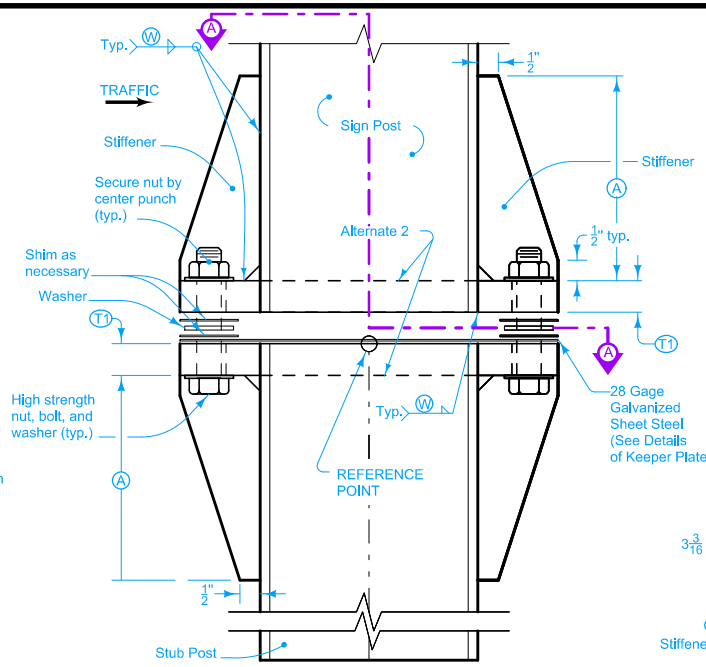
Signs

SI

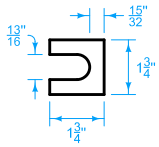
NO.	DATE	TITLE
SI-101	04-21-09	Locations - Type 'A' Signs
SI-102	10-20-09	Locations - Type 'B' Signs
SI-111	10-20-09	Support Structures - Wood Posts
SI-113	10-18-11	Support Structures - Steel Breakaway Posts
SI-114	10-18-11	Support Structures - Steel Breakaway Posts Rectangular Tube
SI-119	10-20-09	Support Structures - Mounting Brackets
SI-121	04-20-10	Fabrication - Sign Legend Components
SI-123	10-20-09	Fabrication - Type 'B' Signs
SI-131	10-18-11	Installation - Type 'A' Signs
SI-132	04-20-10	Installation - Type 'B' Signs
SI-171	10-20-09	Reference Posts
SI-172	10-18-11	Delineators
SI-173	04-20-10	Object Markers
SI-175	10-19-10	Chevrons
SI-181	10-18-11	Permanent Road Closure - Rural
SI-182	10-18-11	Permanent Road Closure - Urban
SI-211	10-19-10	Object Marker and Delineator Placement with Guardrail
SI-241	10-18-11	Sign Placement Approaching a Railroad Crossing
SI-881	04-19-11	Special Signs for Workzones
SI-882	04-20-10	Special Signs for Restricted Width Traffic Control Zones



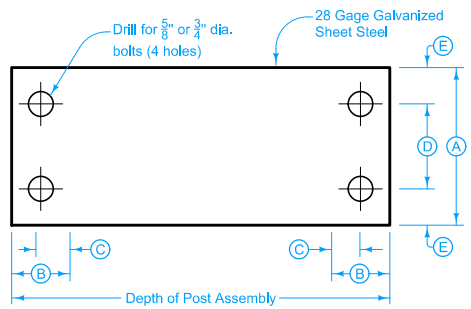
SIGN INSTALLATION
Side View



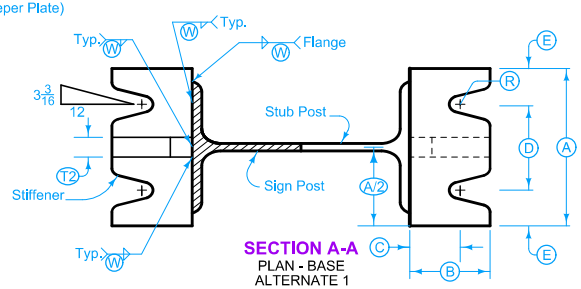
BREAKAWAY BASE
Side View



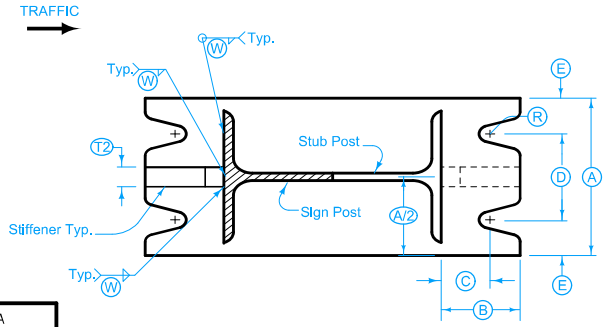
SHIM



KEEPER PLATE



SECTION A-A
PLAN - BASE
ALTERNATE 1



SECTION A-A
PLAN - BASE
ALTERNATE 2

BREAKAWAY BASE DATA										
Post Size	Bolt Size & Torque	A	B	C	D	E	T1	T2	W	R
W 6 x 9 W 6 x 12 W 6 x 15 W 8 x 18	⅝" dia. x 2¾" Torque = 37.50 ft. lbs.	5"	2"	1¼"	2¾"	1⅛"	¾"	½"	¼"	11/32"
W 8 x 21 W 10 x 22 W 10 x 26 W 12 x 26	¾" dia. x 3½" Torque = 62.50 ft. lbs.	6"	2¼"	1⅜"	3½"	1¼"	1"	¾"	5/16"	13/32"

POST DATA	
Post Size	Stub Length
W 6 x 9 W 6 x 12 W 6 x 15 W 8 x 18	2'-6"
W 8 x 21 W 10 x 22 W 10 x 26 W 12 x 26	3'-0"

Place signpost by installing shims. Furnish two shims each of 0.012" and 0.032" thickness (total of 4 per post). Shims to be brass stock or strip conforming to ASTM B 36.

Grind smooth all welds and galvanizing between Base Plates.

(W) Welds to be continuous fillet welds and of a depth equal to the thickness of the flange for the post unless otherwise specified.

Construct the footing as shown for normal footing in earth. Where solid rock is encountered, the alternate design for footing in solid rock may be used with the approval of the Engineer.

Dispose of all excavation for the footing in the area adjacent to the footing and shape to normal ground contour, unless directed otherwise by the Engineer.

Hold the stub post in proper position by an approved device to ensure that it remains in proper position upon completion of concrete placement.

Base Plate(s):
The following alternates are considered equivalent:

Alternate 1 - Weld base plates (2 each), to sides of signpost and stub post flanges.

Alternate 2 - Weld base plate (1 each) to end of sign post and stub post by continuous fillet weld. Properly match and align the bolt holes and notches in the stub post plate and the sign post plate as indicated herein.

The contract price for size of footing required to be full compensation of footing as detailed hereon, including all necessary excavation regardless of character.

(1) Not for single post installations.

Possible Contract Item:
Steel Breakaway Sign Post

Iowa Department of Transportation

REVISION
4 | 10-18-11

STANDARD ROAD PLAN

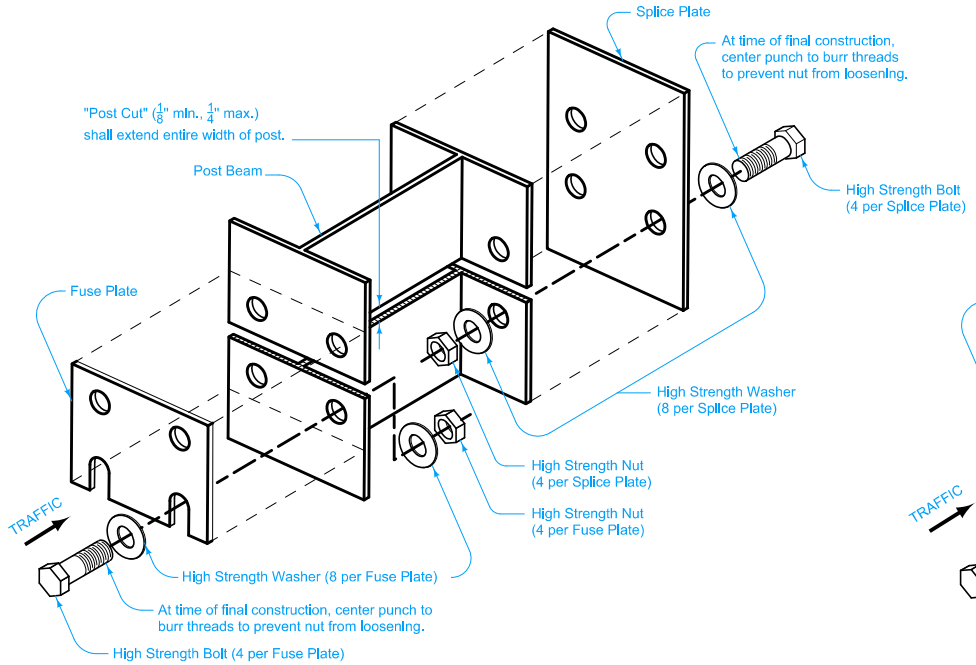
SI-113

SHEET 1 of 3

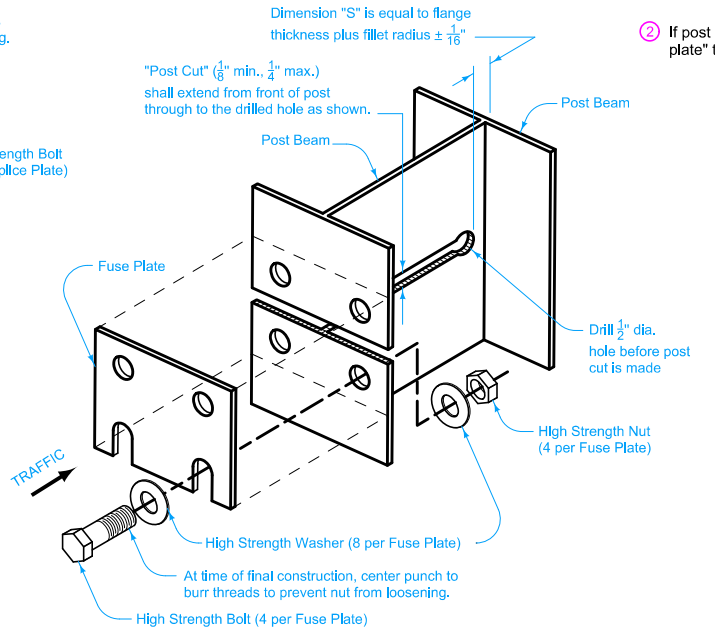
REVISIONS: Added alternate base plates.

Deanna Maifield
APPROVED BY DESIGN METHODS ENGINEER

SUPPORT STRUCTURES - STEEL BREAKAWAY POSTS



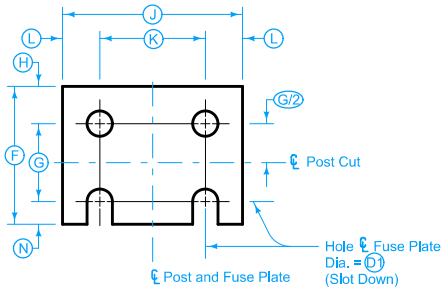
Hinge Alternate 1
(With Splice Plate)



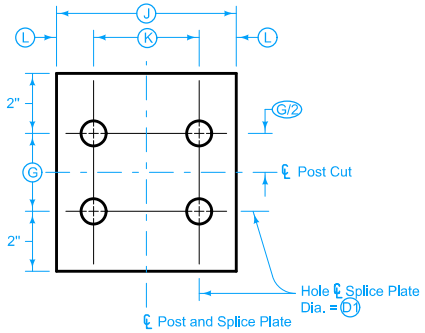
Hinge Alternate 2 (2)
(One-Piece Post)

(2) If post is to be transported after cut is made, bolt a "splice plate" to front of post to prevent damage to the post.

FUSE PLATE ASSEMBLY



FUSE PLATE
(Thickness T3)



SPLICE PLATE
(Thickness T4)

Bolt Size	Torque
1/2"	100 Ft. Lbs.
5/8"	180 Ft. Lbs.
3/4"	320 Ft. Lbs.
7/8"	470 Ft. Lbs.

FUSE AND SPLICE PLATE DATA

Post Size	Bolt Dia.	F	G	H	J	K	L	N	D1	T3	T4
W6x9	1/2"	3 5/8"	2"	1 1/8"	4"	2 1/4"	7/8"	1/2"	9/16"	1/4"	1/4"
W6x12	5/8"	3 3/4"	2"	1 1/8"	4"	2 1/4"	7/8"	5/8"	11/16"	3/8"	1/4"
W6x15	3/4"	4 1/2"	2 1/2"	1 1/4"	6"	3 1/2"	1 1/4"	3/4"	13/16"	1/2"	1/4"
W8x18	3/4"	4 1/2"	2 1/2"	1 1/4"	5 1/4"	2 3/4"	1 1/4"	3/4"	13/16"	1/2"	3/8"
W8x21	7/8"	4 7/8"	2 1/2"	1 1/2"	5 1/4"	2 3/4"	1 1/4"	7/8"	15/16"	5/8"	3/8"
W10x22	7/8"	5 3/8"	3"	1 1/2"	5 3/4"	2 3/4"	1 1/2"	7/8"	15/16"	5/8"	3/8"
W10x26	7/8"	5 3/8"	3"	1 1/2"	5 3/4"	2 3/4"	1 1/2"	7/8"	15/16"	5/8"	3/8"
W12x26	7/8"	5 3/8"	3"	1 1/2"	6 1/2"	3 1/2"	1 1/2"	7/8"	15/16"	5/8"	3/8"

Iowa Department of Transportation

STANDARD ROAD PLAN

REVISION	
4	10-18-11

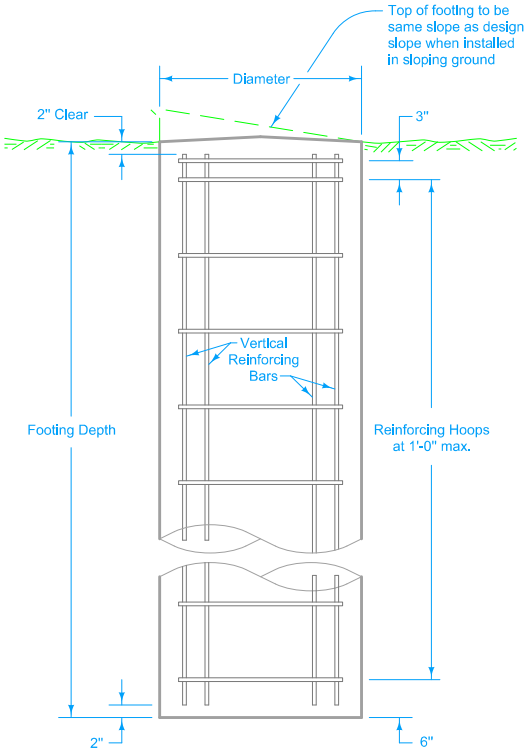
SI-113

SHEET 2 of 3

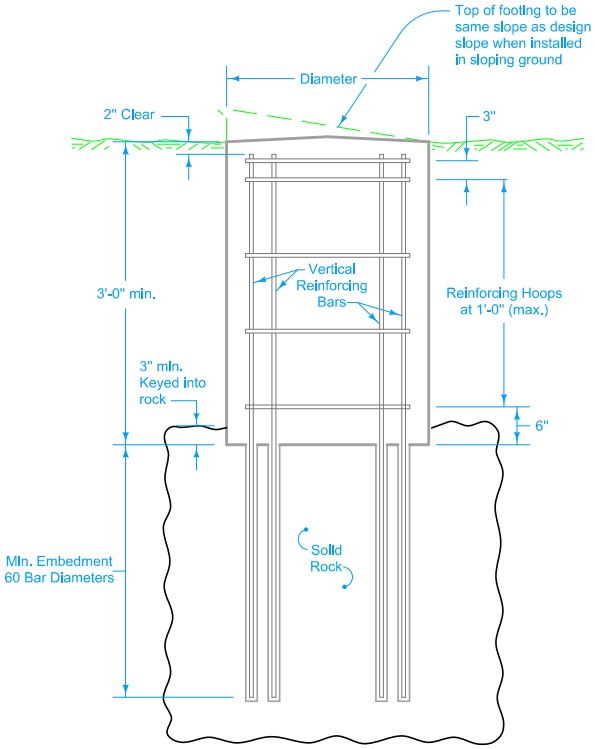
REVISIONS: Added alternate base plates.

Deanna Maifield
APPROVED BY DESIGN METHODS ENGINEER

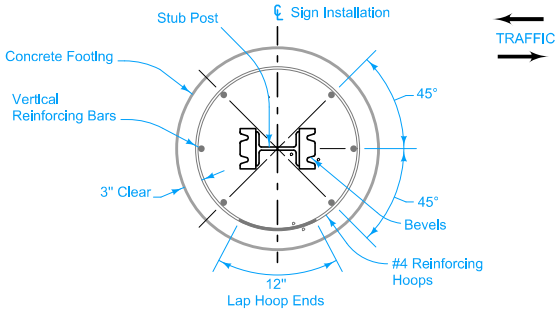
SUPPORT STRUCTURES - STEEL BREAKAWAY POSTS



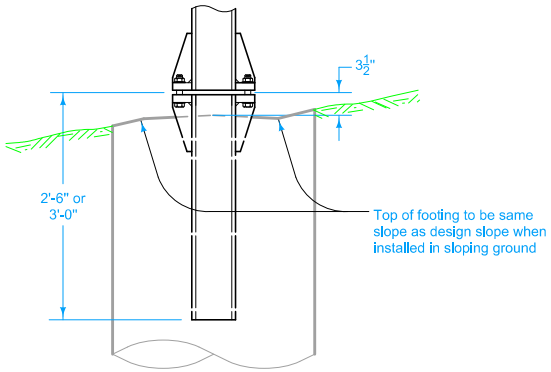
INSTALLATION
NORMAL FOOTING IN EARTH



ALTERNATE DESIGN (4)
FOOTING IN SOLID ROCK



PLAN
(Reinforcing Placement and Sign Orientation)



BREAKAWAY POST INSTALLATION

(3) Lengths are for normal footings. Required length may vary where alternate rock design is used.

(4) Set vertical bars in solid rock as follows:
1. Drill holes twice bar diameter and fill with water.
2. When hole is fully saturated; blow water out and fill two-thirds depth with sand cement mortar.
3. Insert bar and consolidate mortar.
4. Fill hole to top with mortar.

FOOTING REINFORCING DATA

Post Size	Stub Length	Footing		Vertical Rein. Bar	
		Diameter	Depth	Size	Length (3)
W6x9	2'-6"	2'-0"	6'-0"	No. 6	5'-8"
W6x12	2'-6"	2'-0"	6'-0"	No. 6	5'-8"
W6x15	2'-6"	2'-0"	6'-6"	No. 6	6'-2"
W8x18	2'-6"	2'-0"	7'-0"	No. 6	6'-8"
W8x21	3'-0"	2'-8"	7'-6"	No. 8	7'-2"
W10x22	3'-0"	2'-8"	8'-0"	No. 8	7'-8"
W10x26	3'-0"	2'-8"	8'-6"	No. 8	8'-2"
W12x26	3'-0"	2'-8"	9'-0"	No. 8	8'-8"

Iowa Department of Transportation

REVISION
4 | 10-18-11

STANDARD ROAD PLAN

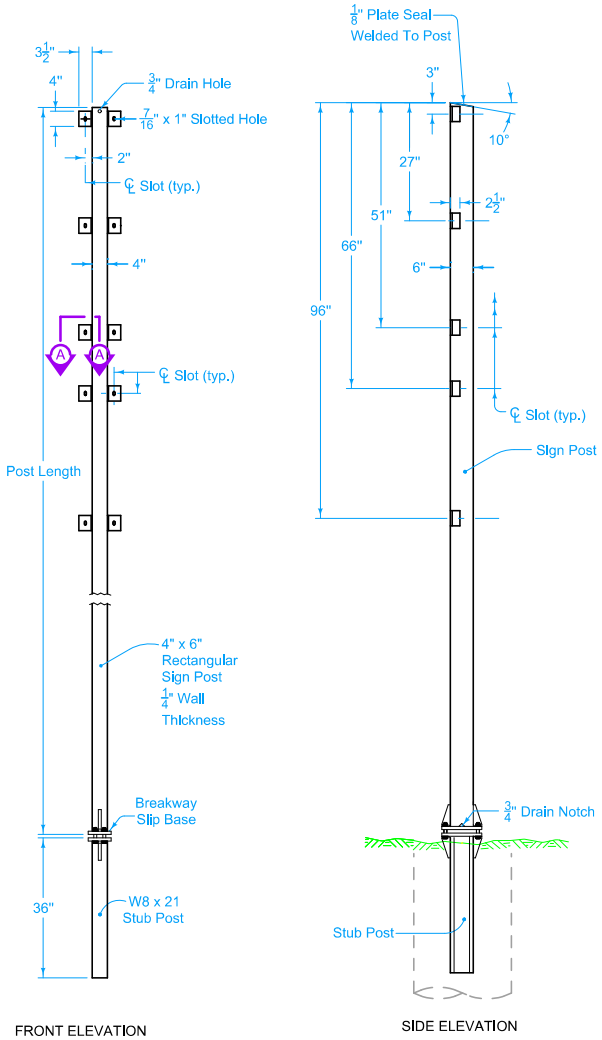
SI-113

SHEET 3 of 3

REVISIONS: Added alternate base plates.

Deanna Maifield
APPROVED BY DESIGN METHODS ENGINEER

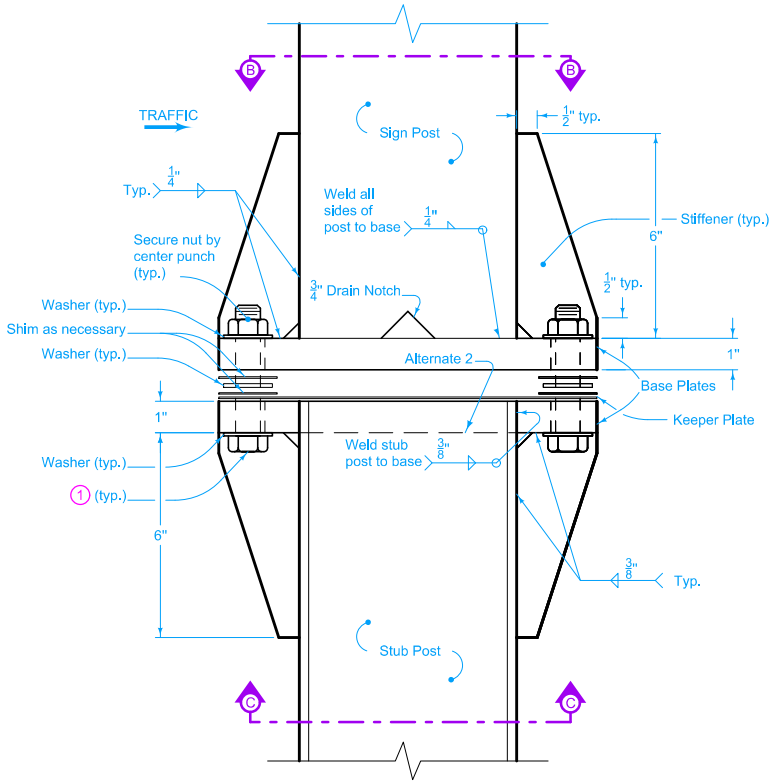
SUPPORT STRUCTURES - STEEL BREAKAWAY POSTS



FRONT ELEVATION

SIDE ELEVATION

4" x 6" RECTANGULAR TUBE POST FOR INTERSTATE SPEED SIGNS



BREAKAWAY BASE
Side View

Furnish post, stub, and fasteners as per Specification 4186.10.B.

Plumb signpost by installing shims. Furnish two shims each of 0.012" and 0.032" thickness (total of 4 per post). Shims to be brass stock or strip conforming to ASTM B 36.

Construct the footing as shown for normal footing in earth. Where solid rock is encountered, the alternate design for footing in solid rock may be used with the approval of the Engineer.

Dispose of all excavation for the footing in the area adjacent to the footing and shape to normal ground contour, unless directed otherwise by the Engineer.

Hold the stub post in proper position by an approved device to ensure that it remains in proper position upon completion of concrete placement.

Stub Post Base Plate(s);
The following alternates are considered equivalent:

ALTERNATE 1 - Weld base plates (2 each) to sides of stub post flanges.

ALTERNATE 2 - Weld base plate (1 each) to end of stub post by continuous fillet weld. During assembly, properly match and align the bolt holes and notches in the stub post plate and the sign post plate as indicated hereon.

The contract price for size of footing required is full compensation of footing as detailed hereon, including all necessary excavation regardless of character.

Grind smooth all welds and galvanizing between Base Plates.

(1) ¾" dia. x 3½"
Torque = 62.50 ft. lbs.

Possible Contract Items:
Concrete Footing for Steel Breakaway Post
Steel Breakaway Sign Post, Rectanguler Tube

Iowa Department of Transportation

REVISION
1 | 10-18-11

STANDARD ROAD PLAN

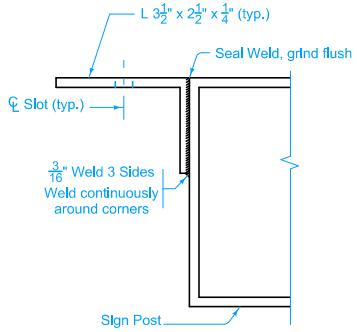
SI-114

SHEET 1 of 3

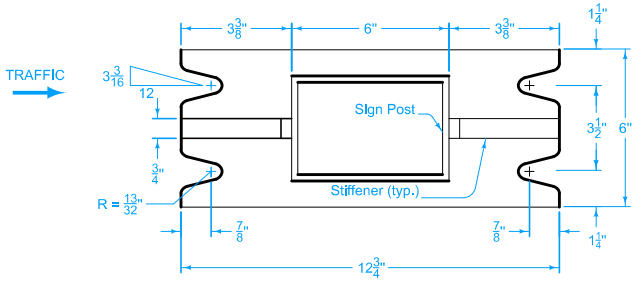
REVISIONS: Modified Breakaway Brace weld size. Added size of welds on Section C-C, added Alternate 2 and clarified dimensioning on Section B-B.

Deanna Maifield
APPROVED BY DESIGN METHODS ENGINEER

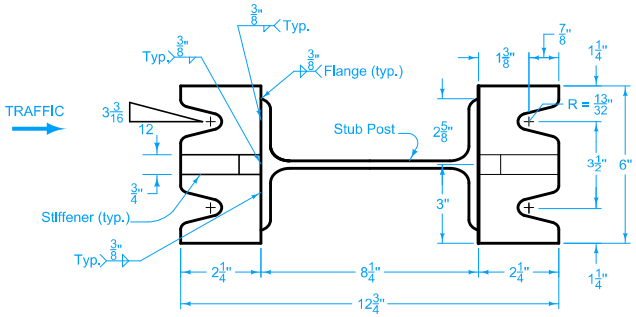
SUPPORT STRUCTURES - STEEL BREAKAWAY POSTS RECTANGULAR TUBE



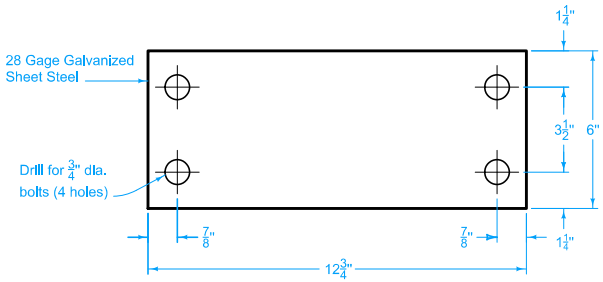
SECTION A-A



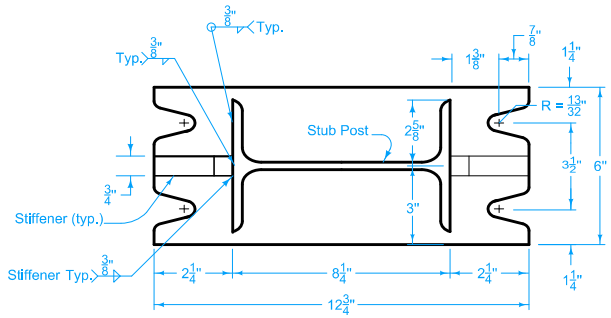
SECTION B-B
PLAN - BASE



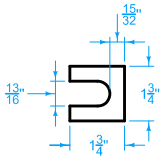
SECTION C-C
PLAN - BASE
ALTERNATE 1



KEEPER PLATE



SECTION C-C
PLAN - BASE
ALTERNATE 2



SHIM

Iowa Department of Transportation

STANDARD ROAD PLAN

REVISION	
1	10-18-11

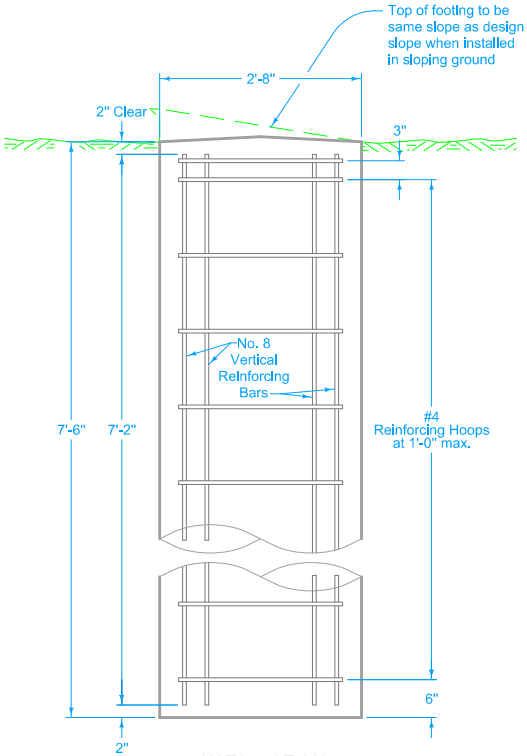
SI-114

SHEET 2 of 3

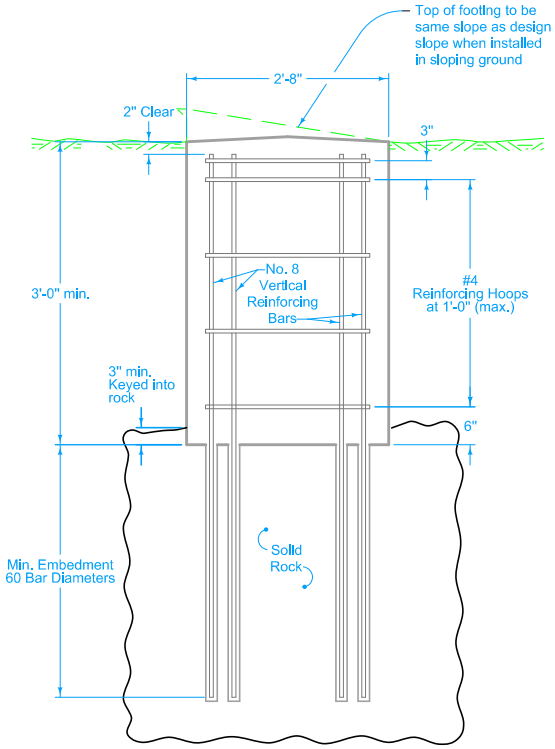
REVISIONS: Modified Breakaway Brace weld size. Added size of welds on Section C-C, added Alternate 2 and clarified dimensioning on Section B-B.

Deanna Maifield
APPROVED BY DESIGN METHODS ENGINEER

SUPPORT STRUCTURES - STEEL BREAKAWAY POSTS RECTANGULAR TUBE

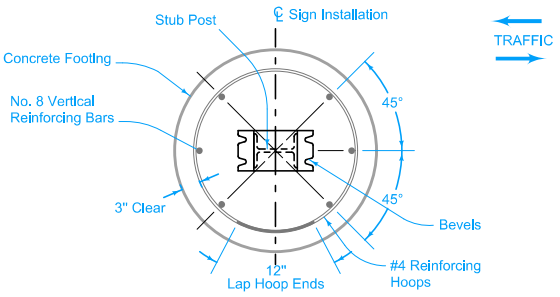


INSTALLATION
NORMAL FOOTING IN EARTH

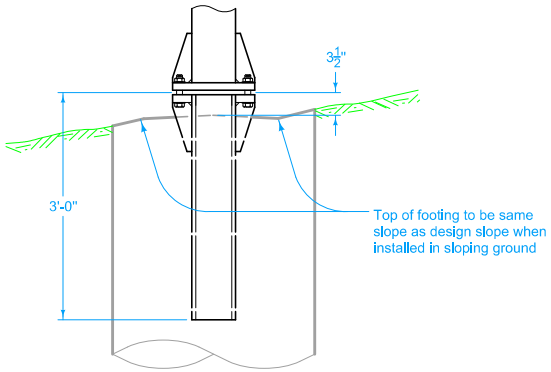


ALTERNATE DESIGN (2)
FOOTING IN SOLID ROCK

(2) Set vertical bars in solid rock as follows:
1. Drill holes twice bar diameter and fill with water.
2. When hole is fully saturated; blow water out and fill two-thirds depth with sand cement mortar.
3. Insert bar and consolidate mortar.
4. Fill hole to top with mortar.



PLAN
(Reinforcing Placement and Sign Orientation)



BREAKAWAY POST INSTALLATION

Iowa Department of Transportation

REVISION
1 | 10-18-11

STANDARD ROAD PLAN

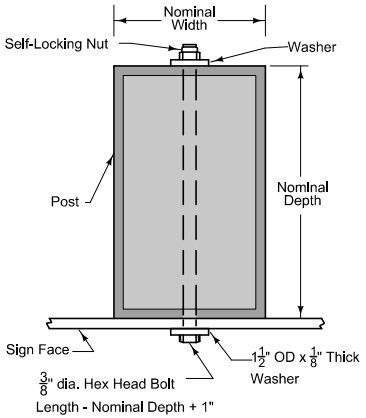
SI-114

SHEET 3 of 3

REVISIONS: Modified Breakaway Brace weld size. Added size of welds on Section C-C, added Alternate 2 and clarified dimensioning on Section B-B.

Deanna Maifield
APPROVED BY DESIGN METHODS ENGINEER

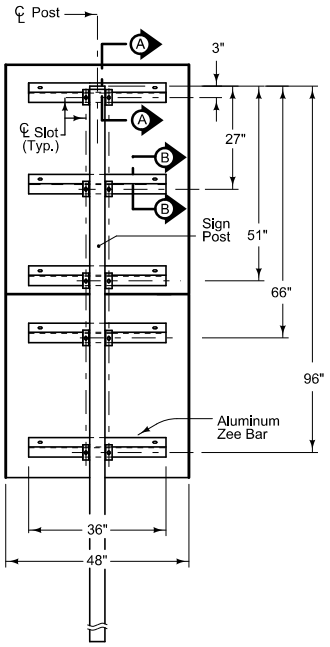
SUPPORT STRUCTURES - STEEL BREAKAWAY POSTS RECTANGULAR TUBE



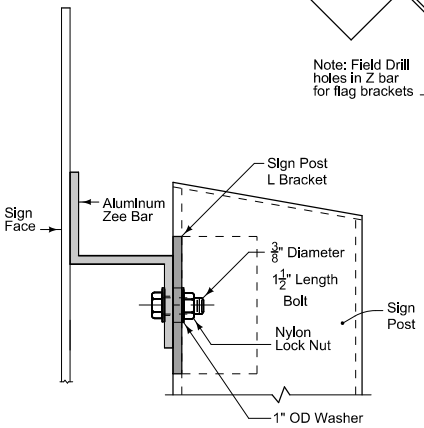
PLAN

NOTE: Treated Wood or Perforated Square Tube Post

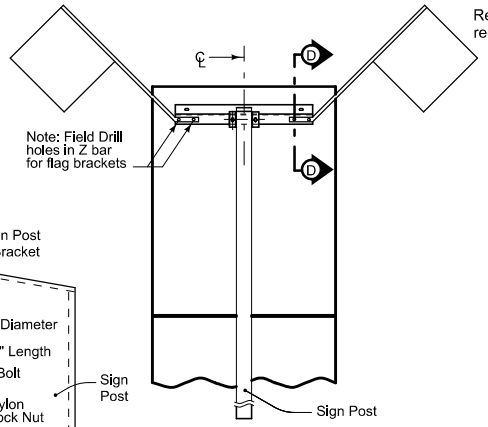
WOOD OR PERFORATED SQUARE TUBE POST INSTALLATION



BACK ELEVATION
4" x 6" RECTANGULAR TUBE POST ATTACHMENT DETAILS

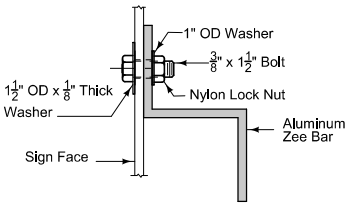


SECTION A-A

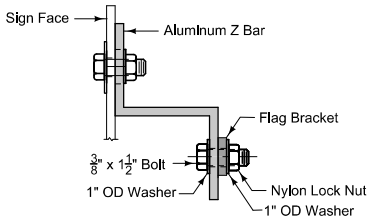


BACK ELEVATION ATTACHMENT DETAILS FOR FLAGS

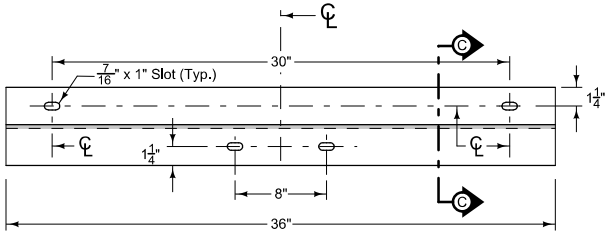
Refer to SI-114 for details of steel breakaway sign post rectangular tube.



SECTION B-B

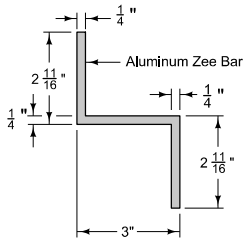


SECTION D-D



ALUMINUM ZEE BAR

RECTANGULAR TUBE POST INSTALLATION



SECTION C-C

Possible Contract Items:
Steel Breakaway Sign Post
Wood Sign Post

Iowa Department of Transportation

STANDARD ROAD PLAN

REVISION	
3	10-18-11

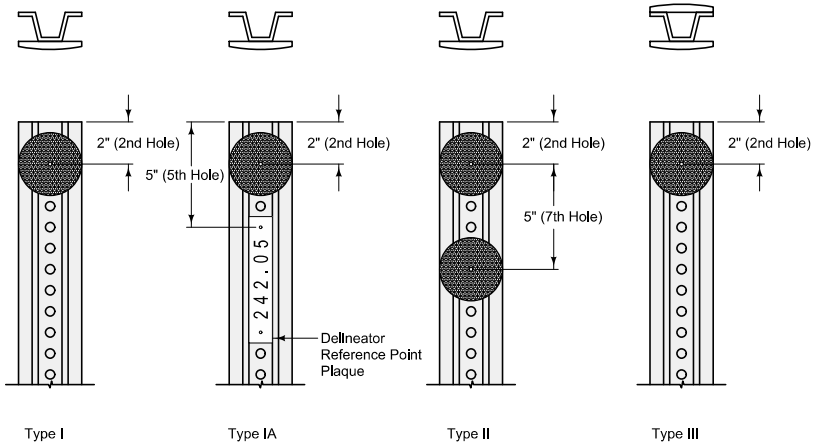
SI-131

SHEET 1 of 1

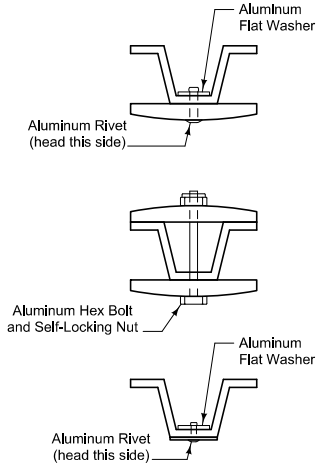
REVISIONS: Added Perforated Square Tube Post to Wood Post Installation detail.

Deanna Maifield
APPROVED BY DESIGN METHODS ENGINEER

INSTALLATION - TYPE 'A' SIGNS



RIGID DELINEATOR MOUNTINGS



ATTACHMENTS

Place delineators at a constant distance from the edge of pavement and/or the edge of shoulder.

The delineator height is measured from the edge of pavement or the face of curb.

When placed behind curb, the delineator offset is measured from the face of curb. Allowable offsets are 2 feet minimum and 8 feet maximum. If the curb is part of a shoulder, maintain at least a minimum 8 foot offset from the edge of pavement.

When placed on the foreslope, the delineator offset is measured from the edge of shoulder. Allowable offsets are 2 feet minimum and 8 feet maximum. However, for shoulders less than 6 feet in width, maintain a minimum 8 feet to the edge of pavement.

Refer to the project plans for specific offset dimensions.

Furnish white, yellow, and/or red reflectors as specified in the project plans.

Furnish Type I delineator posts. Post lengths are to be sufficient to ensure the proper installation height and provide a minimum of 2'-6" embedment. See Table I for post lengths for various slope and offset conditions.

Install delineators truly vertical.

Delineators placed along freeways and expressways are to be spaced every 0.05 mile along the thru roadway. Placements are based on the reference post marker. A Delineator Reference Point Plaque is required on each delineator for both directions of travel.

Fabricate plaques from 0.063 inch thick sheet aluminum of the appropriate dimensions. Use non-reflectorized sheeting. White for the background, and black for the numerals.

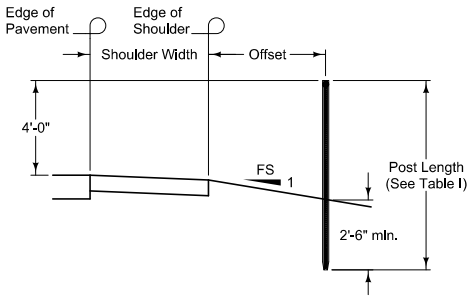
Attach single reflectors to the post with an aluminum, brazier head, blind rivet of $\frac{3}{16}$ inch diameter and a grip range of 0.376 to 0.625 inches, and an aluminum flat washer of 0.193 in. ID x 0.750 in. OD x 0.091 in. thickness.

Attach back to back reflectors to the post with an aluminum $\frac{3}{16}$ in. dia x $2\frac{1}{2}$ in. length hex head bolt with a matching self-locking nut.

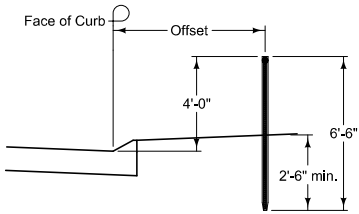
Attach plaques to the post with an aluminum, brazier head, blind rivet of $\frac{1}{8}$ inch diameter and a grip range of 0.126 to 0.250 inches, and an aluminum flat washer of 0.129" ID x 0.750" OD x 0.091" thickness.

All materials shall comply with Standard Specification 4186.

Post Lengths for Shoulder Installation					
Offset	Foreslope Rate (FS:1)				
ft	10:1	6:1	4:1	3:1	2:1
2	8	8	8	8	8
4	8	8	8	10	10
6	8	8	10	10	10
8	8	10	10	10	12

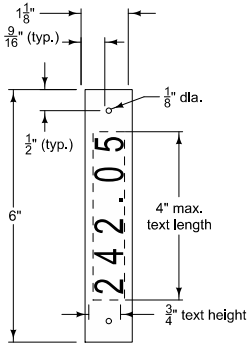


Shoulder Installation



Curb Installation

DELINEATOR POST LOCATIONS



DELINEATOR REFERENCE POINT PLAQUE

Iowa Department of Transportation

REVISION
1 | 10-18-11

STANDARD ROAD PLAN

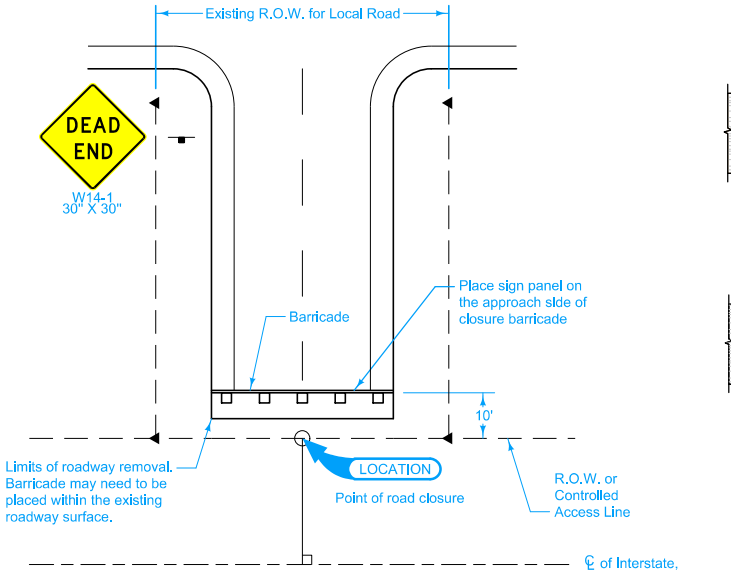
SI-172

SHEET 1 of 1

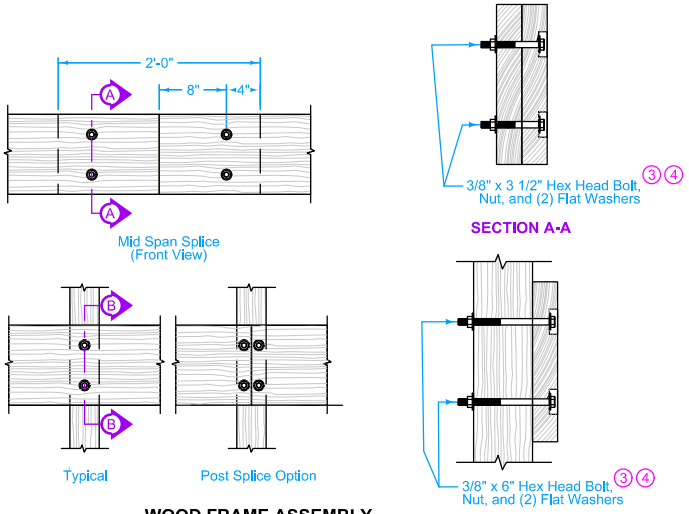
REVISIONS: Changed Face of Curb reference.

Deanna Maifield
APPROVED BY DESIGN METHODS ENGINEER

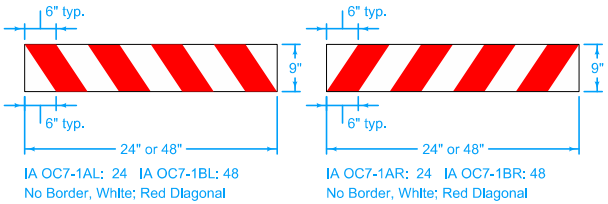
DELINEATORS



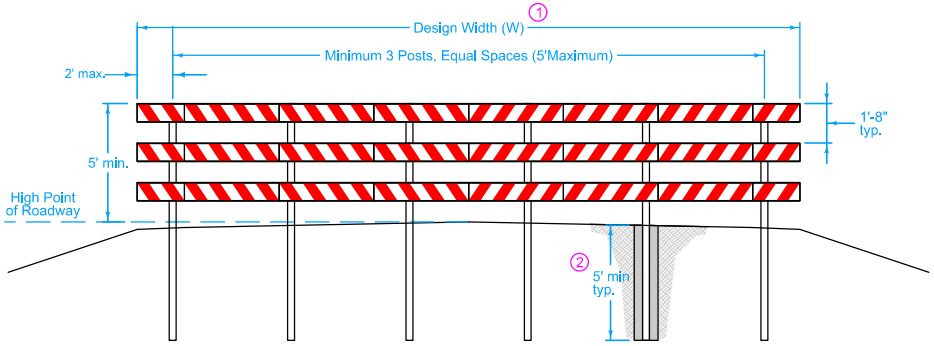
PLAN - INSTALLATION



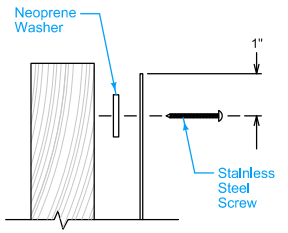
WOOD FRAME ASSEMBLY



SIGN PANEL FABRICATION (5)



APPROACH VIEW (6)



SIGN PANEL INSTALLATION (5)

Price bid for "Permanent Road Closure, Rural, SI-181" includes furnishing and installing the barricade, signs, posts, and hardware.

The length will be measured in linear feet based upon the width of standard sign panels installed.

The Contractor will be paid the contract unit price per linear foot.

Minimum Barricade length = design width (W).

(1) Design width (W) equals width of existing roadway and shoulders.

(2) Install posts as per Standard Specification **2524.03.B.1**.

(3) Assemble the wood frame with standard strength, hot dip galvanized bolts, nuts and washers as per the following specifications:

Bolts - ASTM A307
Nuts - ASTM A563
Washers - ASTM F884
Galvanization - ASTM F2329.

(4) Recess all bolt heads in a $1\frac{1}{4}$ inch diameter x $\frac{1}{2}$ inch deep hole to allow sign panels to lay flush on the planks.

(5) Use 0.063 inch aluminum blank for sign panel. Sign panel to meet the requirements of Standard Specification **2524**. Attach sign panels to the planks along the top and bottom at 2 foot centers using #10 x 1 $\frac{1}{4}$ inch self-drilling, phillips, pan head, 18-8 stainless steel screws. Use a 1 in. OD x $\frac{1}{8}$ in. thick neoprene washer between the sign panel and the treated wood plank to prevent corrosion.

(6) Use pressure treated 4 in. x 4 in. x 12 ft. nominal boards for posts, and pressure treated 2 in. x 10 in. x variable length nominal boards for planks. Use planks of sufficient length to span at least 2 posts.

Possible Contract Item:
Permanent Road Closure, Rural, SI-181

Possible Tabulation:
102-4

Iowa Department of Transportation

REVISION
1 | 10-18-11

STANDARD ROAD PLAN

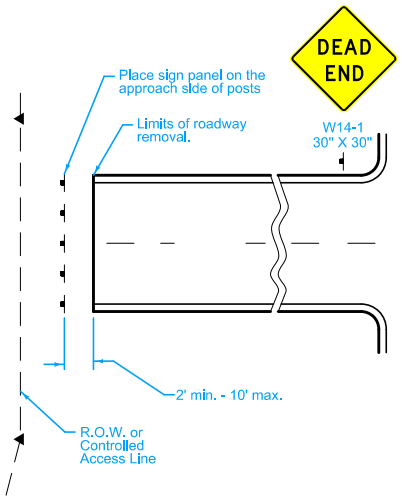
SI-181

SHEET 1 of 1

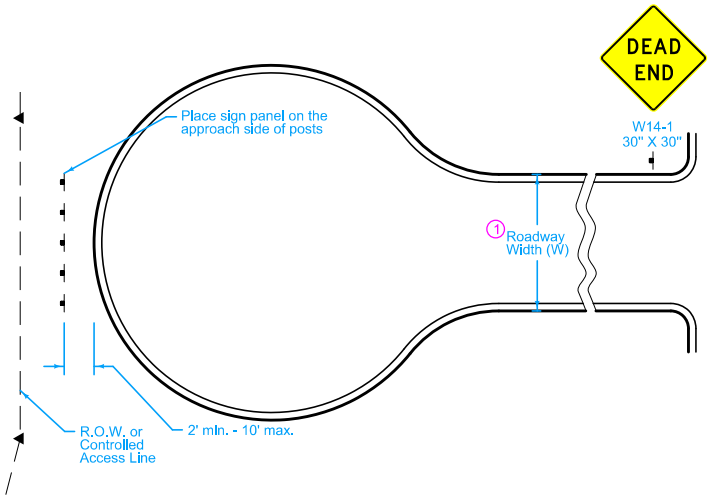
REVISIONS: Added 'W' to match tab. Added general note and modified circle note 1 to clarify 'W'.

Deanna Maifield
APPROVED BY DESIGN METHODS ENGINEER

PERMANENT ROAD CLOSURE - RURAL



DEAD END WITHOUT CUL-DE-SAC

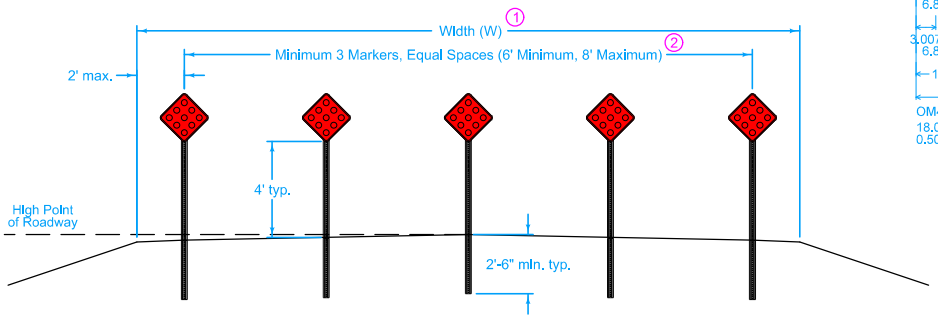


DEAD END WITH CUL-DE-SAC

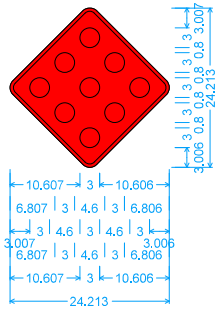
Price bid for "Permanent Road Closure, Urban, SI-182" includes furnishing and installing the closure, signs, posts, and hardware.

Closures will be counted and the contractor will be paid the contract unit price for each closure.

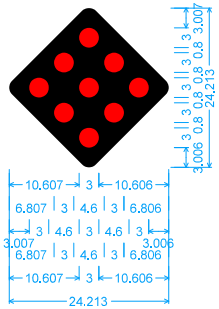
1. Width includes the width of the existing roadway and shoulders.
2. Type I delineator posts.
3. The three types of markers are equivalent. The same type should be used for each closure. Use 0.063 inch aluminum blank with Type III or IV retro reflective sheeting for sign panel. Use reflectors for buttons.



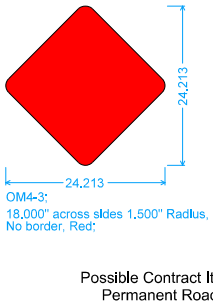
APPROACH VIEW



OM4-1:
18.000" across sides 1.500" Radius,
0.500" Border, Red on Red;



OM4-2:
18.000" across sides 1.500" Radius,
No border, Black;



OM4-3:
18,000" across sides 1.500" Radius,
No border, Red;

END OF ROADWAY MARKER FABRICATION 3

Possible Contract Item:
Permanent Road Closure, Urban, SI-182

Possible Tabulation:
102-4

Iowa Department of Transportation

REVISION
1 | 10-18-11

STANDARD ROAD PLAN

SI-182

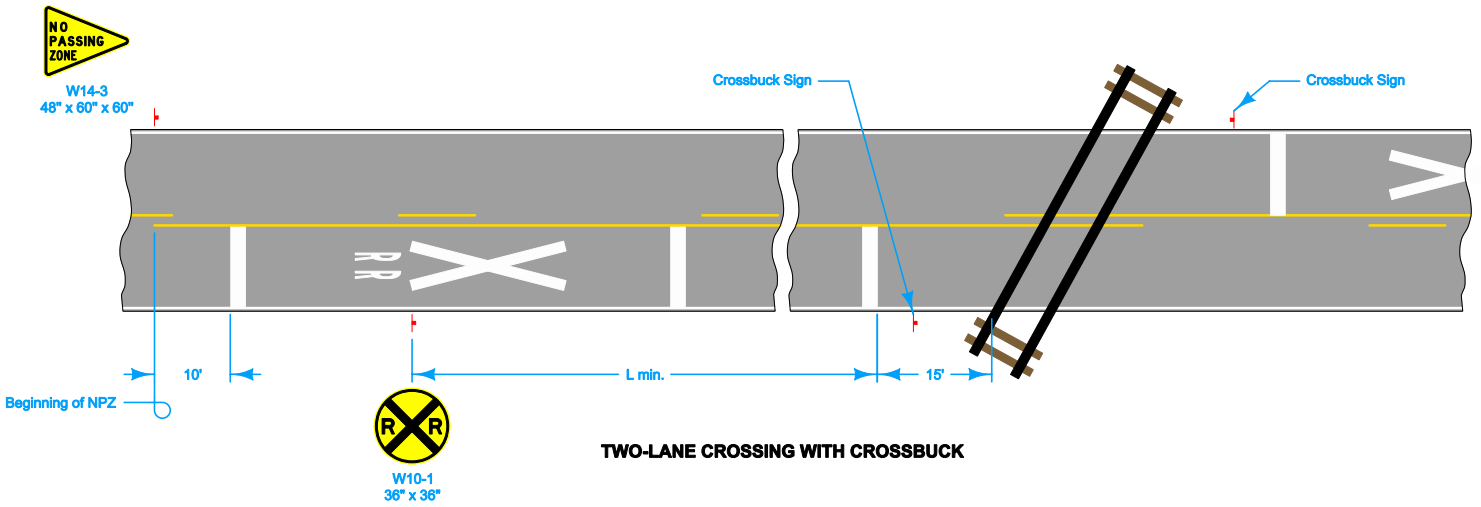
SHEET 1 of 1

REVISIONS: Added to general notes that the three object marker types are equivalent. Added 'W' to match tab. Modified circle note 1.

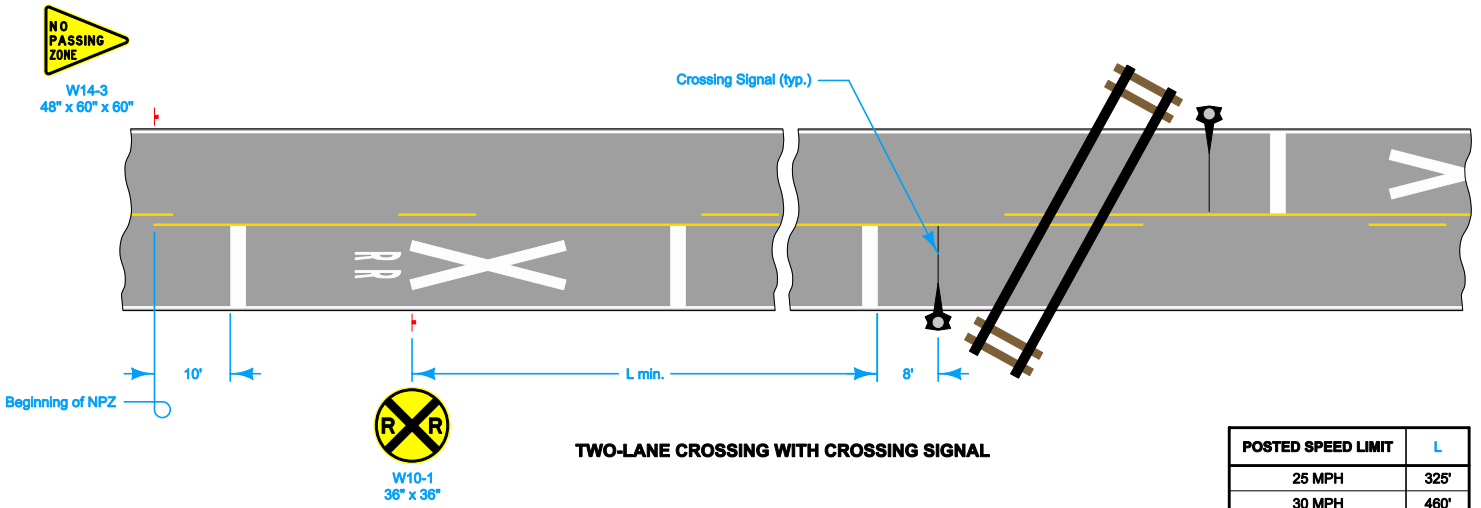
Deanna Maifield
APPROVED BY DESIGN METHODS ENGINEER

PERMANENT ROAD CLOSURE - URBAN

For pavement marking information, see PM-240 and PM-242.



TWO-LANE CROSSING WITH CROSSBUCK



TWO-LANE CROSSING WITH CROSSING SIGNAL

POSTED SPEED LIMIT	L
25 MPH	325'
30 MPH	460'
35 MPH	565'
40 MPH	670'
45 MPH	775'
50 MPH	885'
55 MPH	990'
60 MPH	1100'
65 MPH	1200'

LEGEND

Traffic Sign

Iowa Department of Transportation

STANDARD ROAD PLAN

REVISION	
New	10-18-11

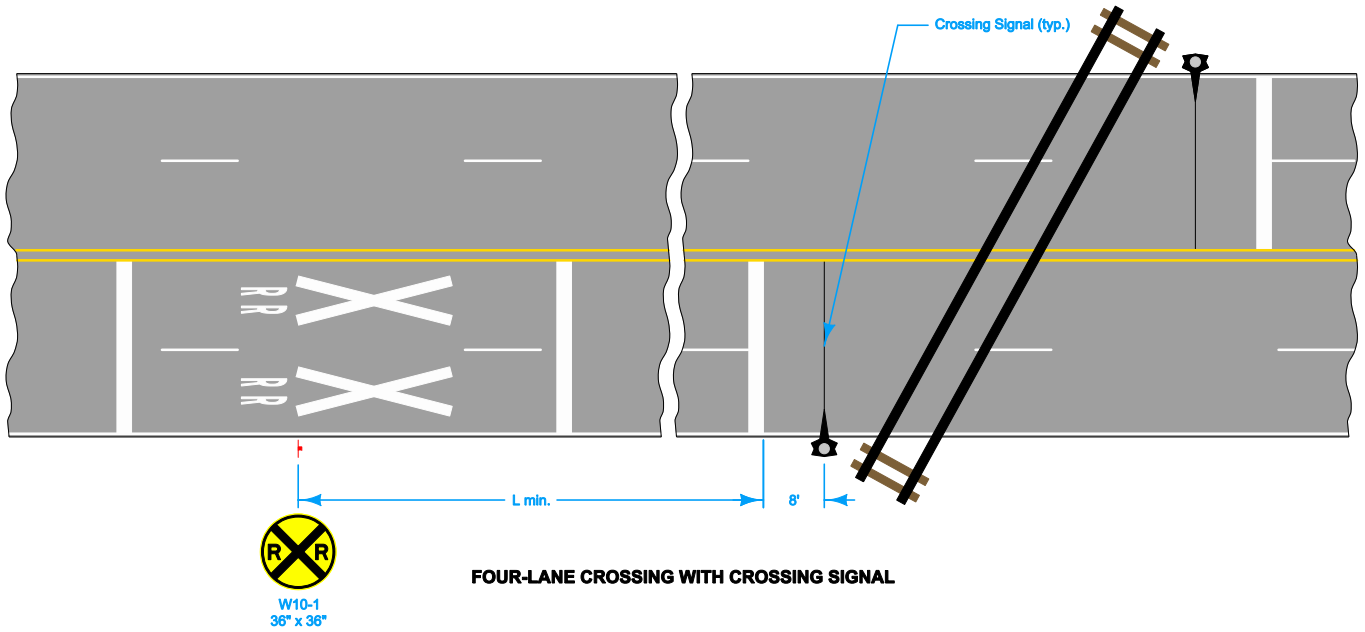
SI-241

SHEET 1 of 2

REVISIONS: New. Replaces Details 9105 and 9106.

Deanna Maifield
APPROVED BY DESIGN METHODS ENGINEER

SIGN PLACEMENT APPROACHING A RAILROAD CROSSING



FOUR-LANE CROSSING WITH CROSSING SIGNAL

LEGEND

Traffic Sign

POSTED SPEED LIMIT	L
25 MPH	325'
30 MPH	460'
35 MPH	565'
40 MPH	670'
45 MPH	775'
50 MPH	885'
55 MPH	990'
60 MPH	1100'
65 MPH	1200'

Iowa Department of Transportation

STANDARD ROAD PLAN

REVISION	
New	10-18-11

SI-241

SHEET 2 of 2

REVISIONS: New. Replaces Details 9105 and 9106.

Deanna Maifield
APPROVED BY DESIGN METHODS ENGINEER

SIGN PLACEMENT APPROACHING A RAILROAD CROSSING

SECTION

Storm and Sanitary Sewers

SW

NO.	DATE	TITLE
		Trench and Backfill
SW-101	04-21-09	Trench Bedding and Backfill Zones
SW-102	04-21-09	Rigid Gravity Pipe Trench Bedding
SW-103	04-21-09	Flexible Gravity Pipe Trench Bedding
SW-104	04-21-09	Pressure Pipe Trench Bedding
SW-105	10-20-09	Miscellaneous Pipe Bedding
		General Sewer
SW-201	04-21-09	Sanitary Sewer Service Stub
SW-202	04-21-09	Sewage Air Release Valve Pit
SW-203	10-20-09	Sanitary Sewer Cleanout
SW-211	04-21-09	Special Pipe Connections for Storm Sewer
		Sanitary Sewer Manholes
SW-301	04-21-09	Circular Sanitary Sewer Manhole
SW-302	04-21-09	Rectangular Sanitary Sewer Manhole
SW-303	04-21-09	Sanitary Sewer Manhole over Existing Sewer
SW-304	04-21-09	Rectangular Base/Circular Top Sanitary Sewer Manhole
SW-305	04-21-09	Tee-Section Sanitary Sewer Manhole
SW-306	04-21-09	Chimney Seals for Sanitary Sewer Manholes
SW-307	04-21-09	Drop Connection for Sanitary Sewer
SW-350	10-20-09	Travel Trailer Dump Station
		Storm Sewer Manholes
SW-401	04-21-09	Circular Storm Sewer Manhole
SW-402	04-21-09	Rectangular Storm Sewer Manhole
SW-403	04-21-09	Deep Well Rectangular Storm Sewer Manhole
SW-404	04-21-09	Rectangular Base/Circular Top Storm Sewer Manhole
SW-405	04-21-09	Tee-Section Storm Sewer Manhole

SECTION

Storm and Sanitary Sewers

SW

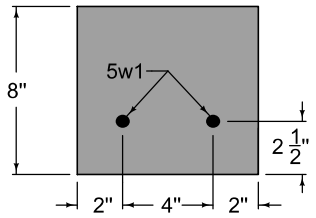
NO.	DATE	TITLE
		Storm Sewer Intakes
SW-501	04-21-09	Single Grate Intake
SW-502	04-21-09	Circular Single Grate Intake
SW-503	04-21-09	Single Grate Intake with Manhole
SW-504	04-21-09	Single Grate Intake with Flush-Top Manhole
SW-505	04-21-09	Double Grate Intake
SW-506	04-21-09	Double Grate Intake with Manhole
SW-507	10-20-09	Single Open-Throat Intake, Small Box
SW-508	10-20-09	Single Open-Throat Intake, Large Box
SW-509	10-18-11	Double Open-Throat Curb Intake, Small Box
SW-510	10-18-11	Double Open-Throat Curb Intake, Large Box
SW-511	04-21-09	Rectangular Area Intake
SW-512	10-20-09	Circular Area Intake
SW-513	04-21-09	Open-Sided Area Intake
SW-514	04-21-09	Boxouts for Grate Intakes
SW-541	04-19-11	Open-Throat Curb Intake under Pavement
SW-542	10-20-09	Extension Unit for Open-Throat Curb Intake under Pavement
SW-545	10-18-11	Single Open-Throat Curb Intake with Extended Opening
SW-546	04-19-11	Single Open-Throat Barrier Intake
SW-547	04-19-11	Triple-Grate Barrier Intake
SW-548	04-19-11	Single-Grate Barrier Intake, Circular
SW-549	04-19-11	Single-Grate Barrier Intake, Rectangular
SW-550	04-20-10	Alternate Construction Method (SW-508 and SW-510 Intake)
SW-562	10-20-09	Vertical Throat Area Intake

SECTION

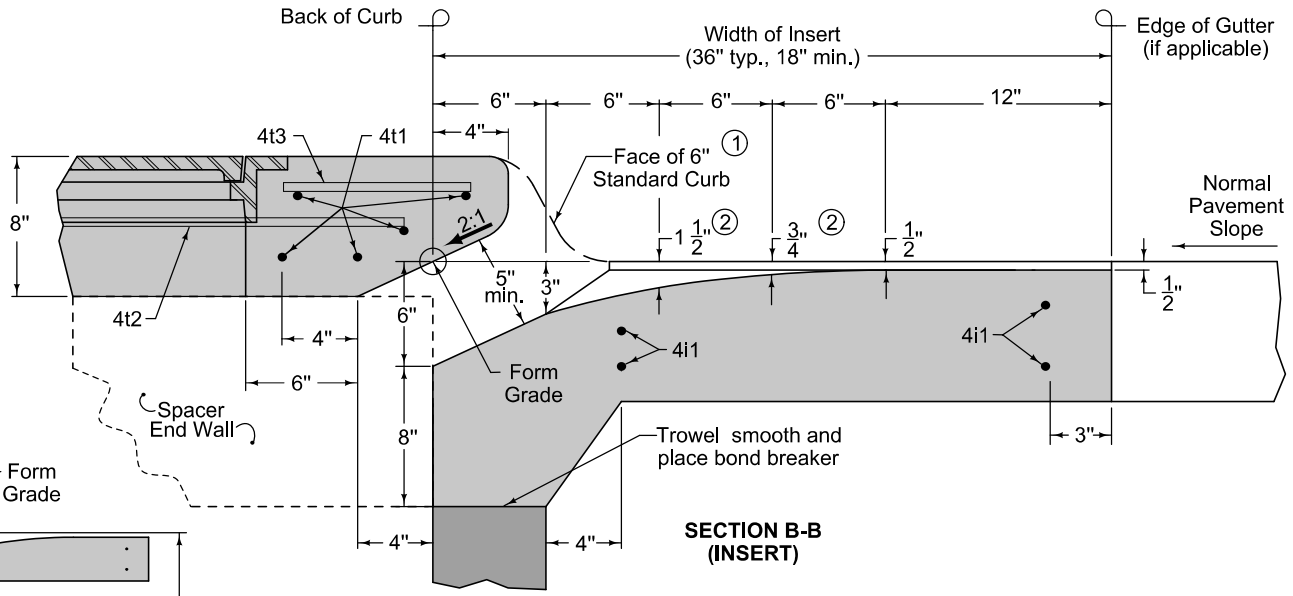
Storm and Sanitary Sewers

SW

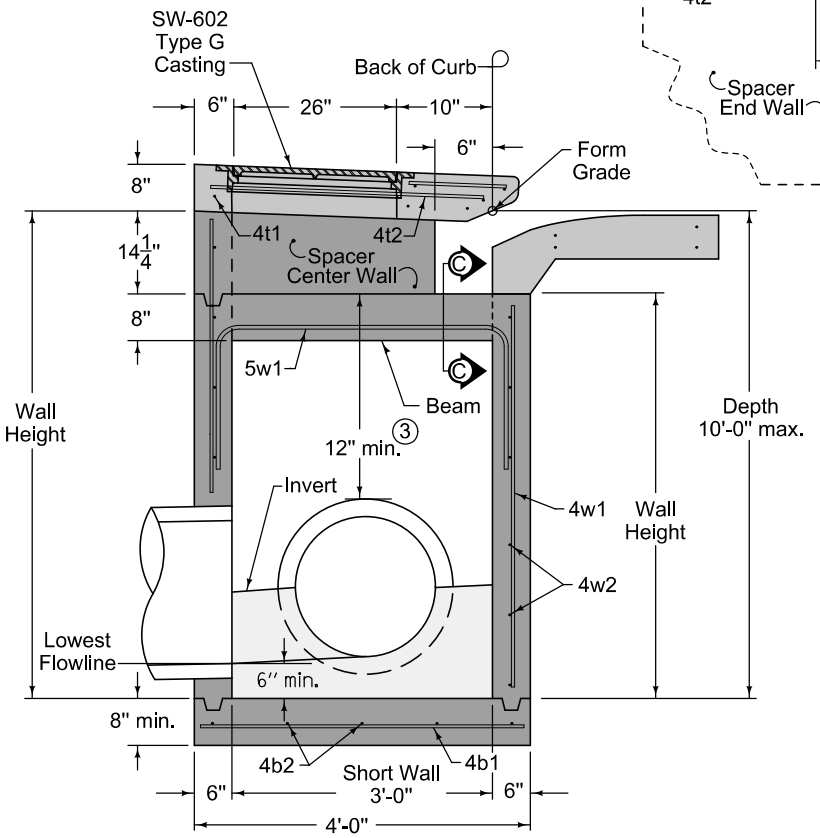
NO.	DATE	TITLE
		Castings
SW-601	10-20-09	Castings for Sanitary Sewer Manholes
SW-602	10-20-09	Castings for Storm Sewer Manholes
SW-603	10-20-09	Castings for Grate Intakes
SW-604	10-20-09	Castings for Area Intakes



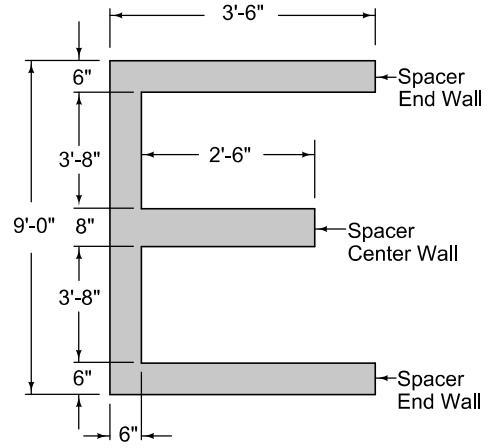
SECTION C-C



SECTION B-B
(INSERT)



SECTION A-A



PLAN
(SPACER)

1. Modify dimensions as required to accommodate other curb heights when specified.
2. Insert shaping may be modified for insert widths less than 36 inches. For an 18-inch insert, reduce dimensions indicated by $\frac{1}{4}$ inch.
3. 12 inch minimum wall height above all pipes.

SUDAS | Iowa Department of Transportation | REVISION 3 10-18-11

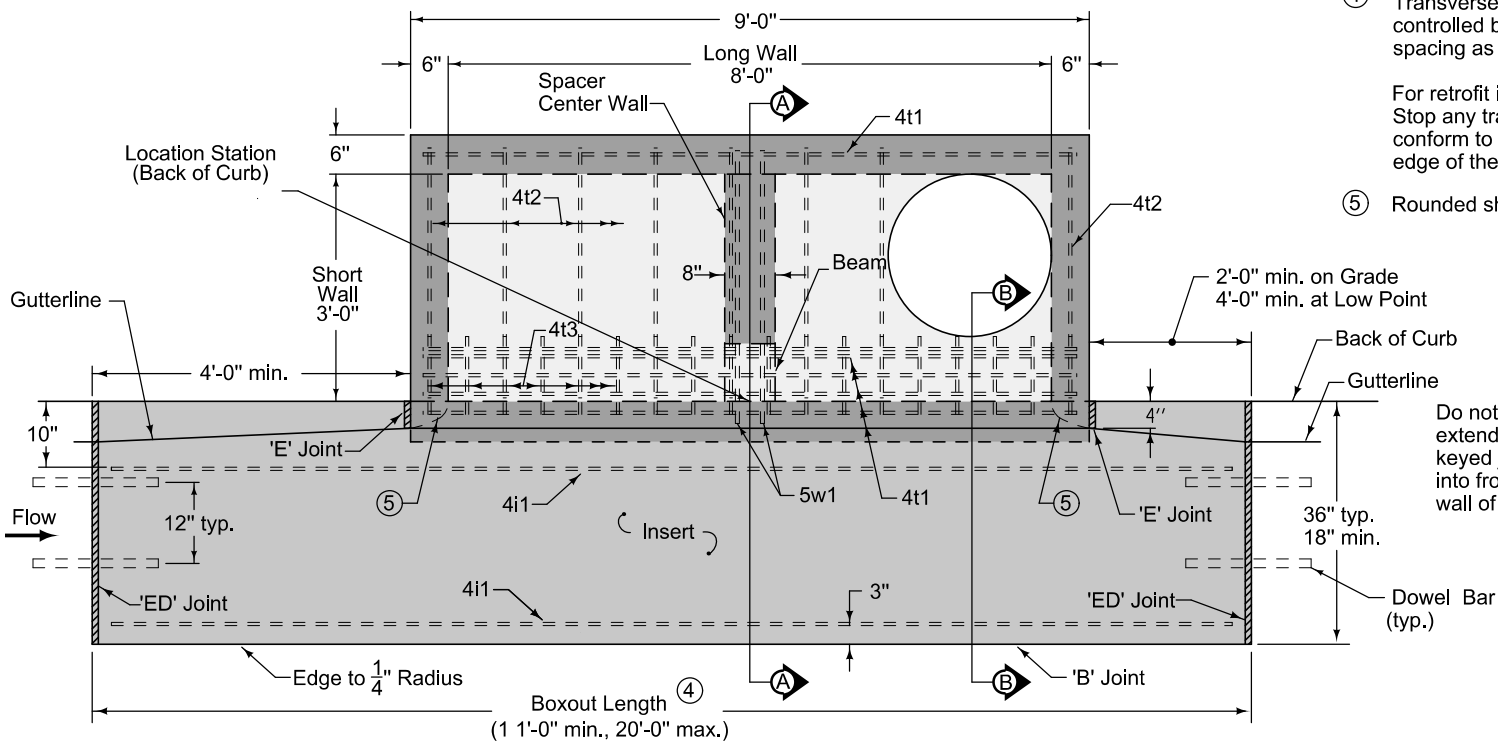
FIGURE 6010.509 | STANDARD ROAD PLAN | SW-509 | SHEET 1 of 2

REVISIONS: Added circle note 5 and note for transitioning curbs. Clarified spacer dimensions and configuration.

Paul D. Wiegand, SUDAS DIRECTOR | Deanna Maifield, DESIGN METHODS ENGINEER

DOUBLE OPEN-THROAT CURB
INTAKE, SMALL BOX

FIGURE 6010.509 | SHEET 1 OF 2

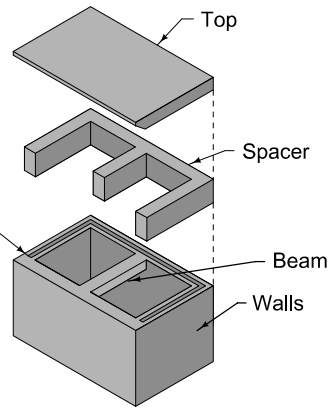


PLAN

4 Transverse joint spacing on new concrete pavement is controlled by the intake boxout. Adjust adjacent joint spacing as required to accommodate boxouts.

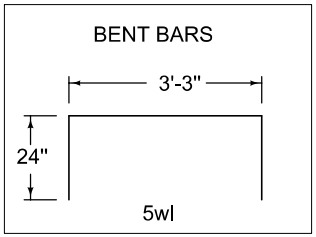
For retrofit intakes, match existing pavement joints. Stop any transverse pavement joints that do not conform to the minimum spacing requirements at the edge of the insert area.

5 Rounded shaping at inlet.



ISOMETRIC
(Refer to SECTION B-B for alignment of Top with Spacer)

REINFORCING BAR LIST						
Mark	Size	Location	Shape	Count	Length	Spacing
4b1	4	Base	——	9	3'-6"	12"
4b2	4	Base	——	5	8'-6"	10"
4i1	4	Insert	——	4	Boxout Length minus 8"	See Insert
4t1	4	Top	——	6	8'-6"	See Plan
4t2	4	Top	——	8	3'-6"	12"
4t3	4	Top	——	18	10"	6"
4w1	4	Walls	——	22	Wall Height minus 4"	13"
4w2	4	Long Walls	——	Varies	4'-8"	12"
4w3	4	Short Walls	——	Varies	3'-8"	12"
5w1	5	Beam	⌐¬	2	7'-3"	4"



MAXIMUM PIPE DIAMETERS		
Pipe Location	Precast Structure	Cast-in-place Structure
Short Wall	24"	30"
Long Wall	60"	66"

SUDAS | Iowa Department of Transportation | REVISION 3 10-18-11

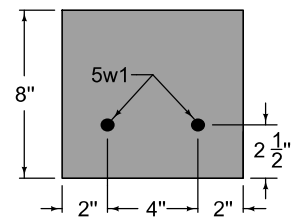
FIGURE 6010.509 | STANDARD ROAD PLAN | SW-509 | SHEET 2 of 2

REVISIONS: Added circle note 5 and note for transitioning curbs. Clarified spacer dimensions and configuration.

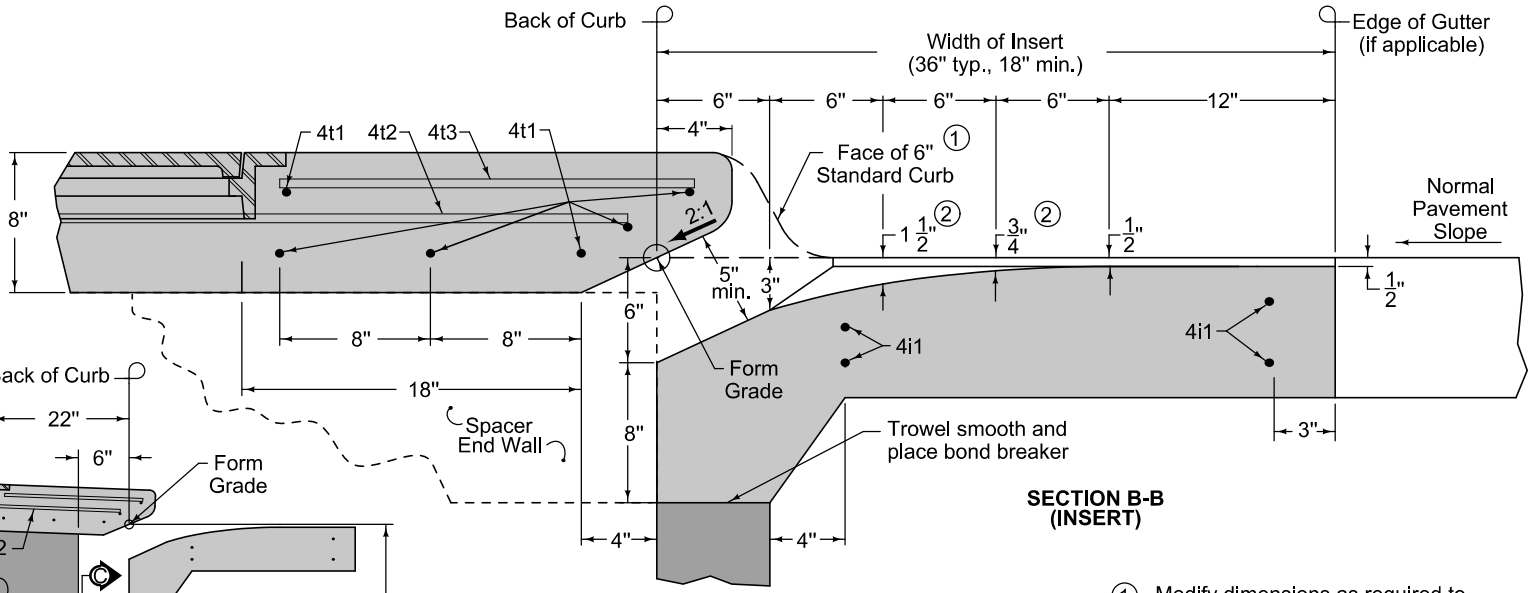
Paul D. Wiegand, SUDAS DIRECTOR | Deanna Maifield, DESIGN METHODS ENGINEER

DOUBLE OPEN-THROAT CURB INTAKE, SMALL BOX

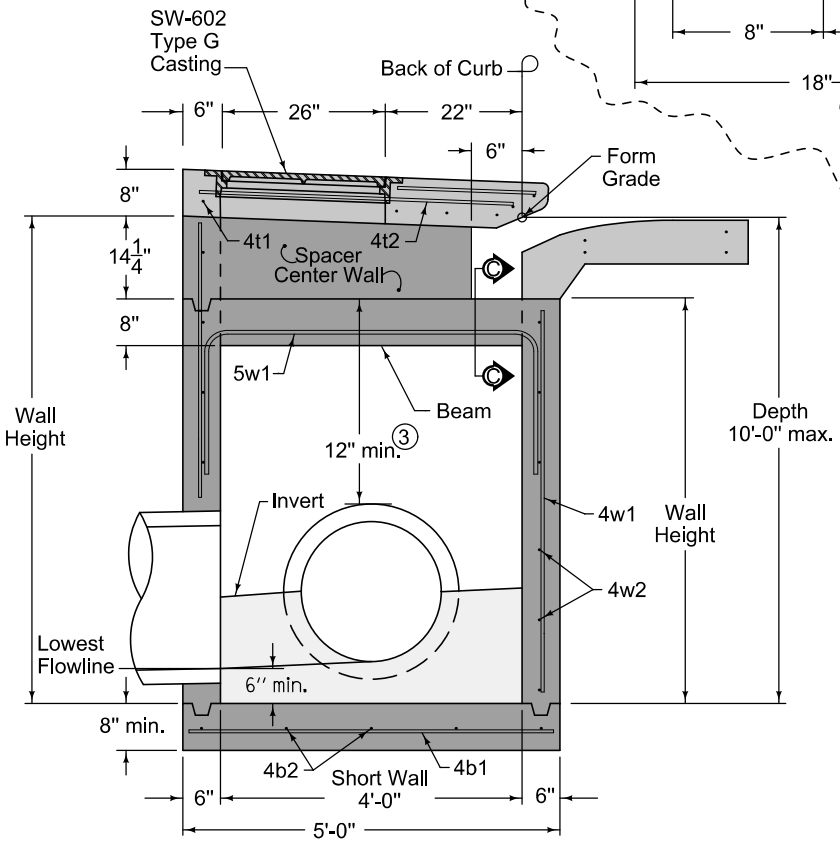
FIGURE 6010.509 SHEET 2 OF 2



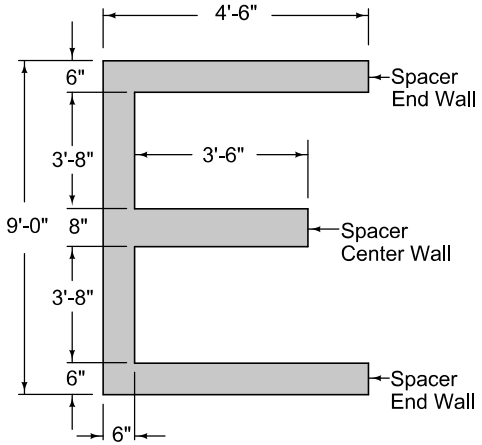
SECTION C-C



SECTION B-B
(INSERT)



SECTION A-A



PLAN
(SPACER)

1. Modify dimensions as required to accommodate other curb heights when specified.
2. Insert shaping may be modified for insert widths less than 36 inches. For an 18-inch insert, reduce dimensions indicated by $\frac{1}{4}$ inch.
3. 12 inch minimum wall height above all pipes.

SUDAS	Iowa Department of Transportation	REVISION 3 10-18-11
FIGURE 6010.510	STANDARD ROAD PLAN	SW-510
		SHEET 1 of 2

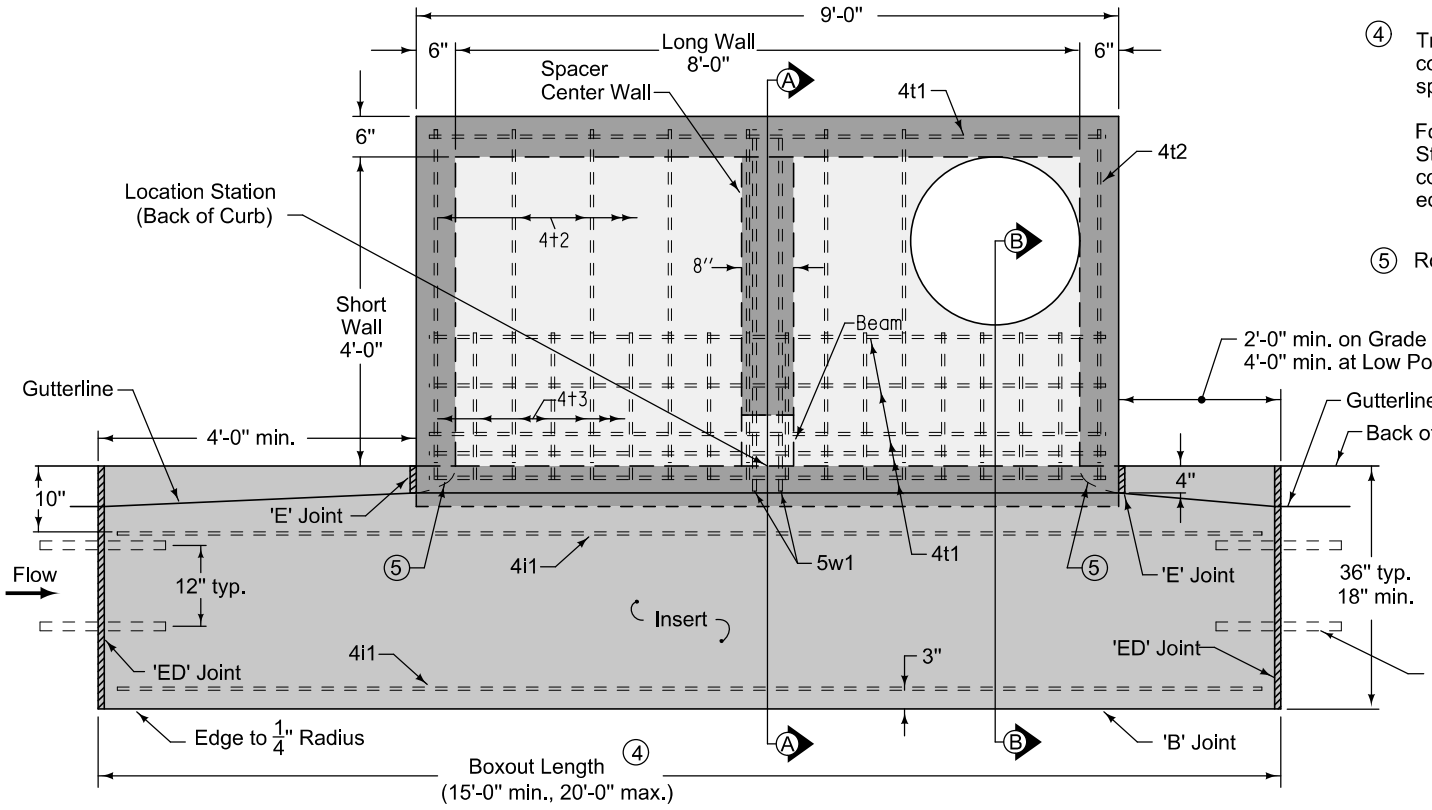
REVISIONS: Added circle note 5 and note for transitioning curbs. Clarified spacer dimensions and configuration.

Paul D. Wiegand
SUDAS DIRECTOR

Deanna Maifield
DESIGN METHODS ENGINEER

DOUBLE OPEN-THROAT CURB INTAKE, LARGE BOX

FIGURE 6010.510 SHEET 1OF 2

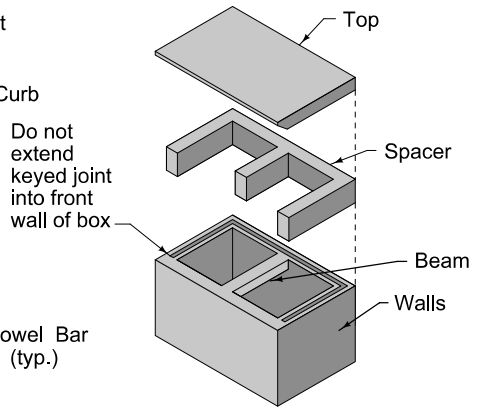


PLAN

4 Transverse joint spacing on new concrete pavement is controlled by the intake boxout. Adjust adjacent joint spacing as required to accommodate boxouts.

For retrofit intakes, match existing pavement joints. Stop any transverse pavement joints that do not conform to the minimum spacing requirements at the edge of the insert area.

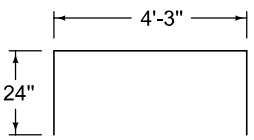
5 Rounded shaping at inlet.



ISOMETRIC
(Refer to Section B-B for alignment of Top with Spacer)

REINFORCING BAR LIST						
Mark	Size	Location	Shape	Count	Length	Spacing
4b1	4	Base	——	9	4'-6"	12"
4b2	4	Base	——	6	8'-6"	11"
4i1	4	Insert	——	4	Boxout Length minus 8"	See Insert
4t1	4	Top	——	7	8'-6"	See Plan
4t2	4	Top	——	8	4'-4"	12"
4t3	4	Top	——	18	1'-10"	6"
4w1	4	Walls	——	24	Wall Height minus 4"	13"
4w2	4	Long Walls	——	Varies	4'-8"	12"
4w3	4	Short Walls	——	Varies	8'-8"	12"
5w1	5	Beam	⌐	2	8'-3"	4"

BENT BARS



MAXIMUM PIPE DIAMETERS		
Pipe Location	Precast Structure	Cast-in-place Structure
Short Wall	30"	36"
Long Wall	60"	66"

SUDAS | Iowa Department of Transportation

REVISION 3 10-18-11

FIGURE 6010.510 | STANDARD ROAD PLAN | SW-510

SHEET 2 of 2

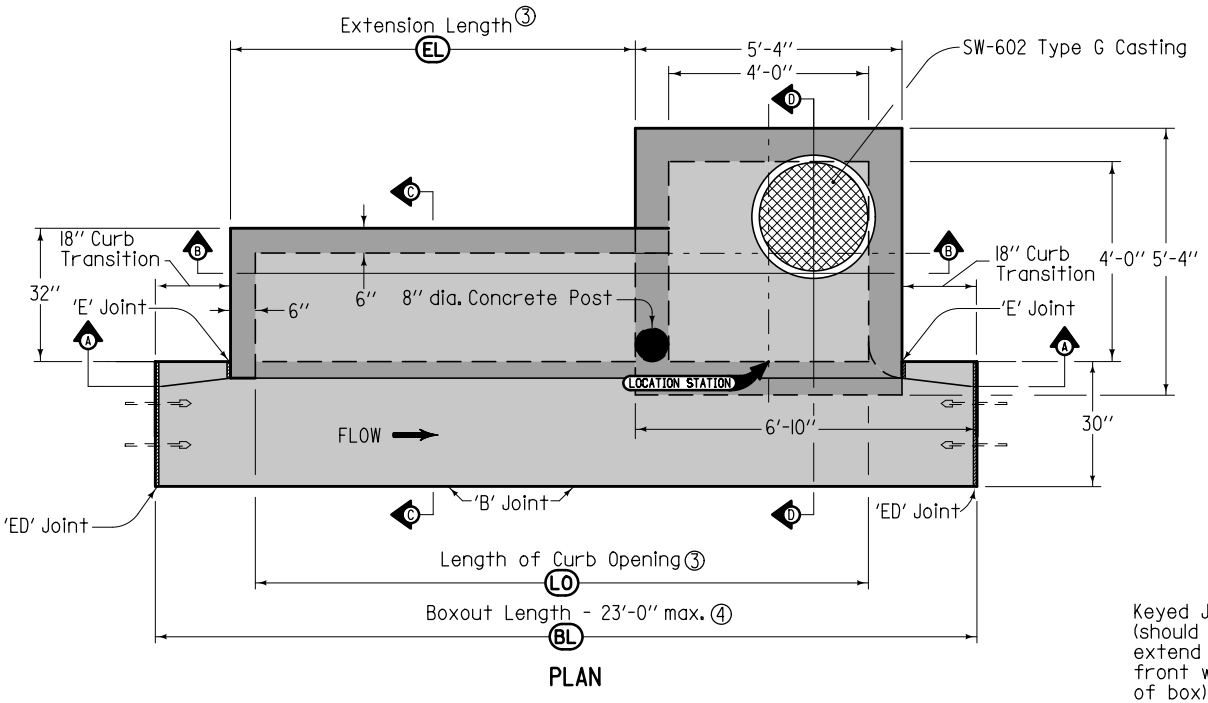
REVISIONS: Added circle note 5 and note for transitioning curbs. Clarified spacer dimensions and configuration.

Paul D. Wigand
SUDAS DIRECTOR

Deanna Maifield
DESIGN METHODS ENGINEER

DOUBLE OPEN-THROAT CURB INTAKE, LARGE BOX

FIGURE 6010.510 | SHEET 2 OF 2



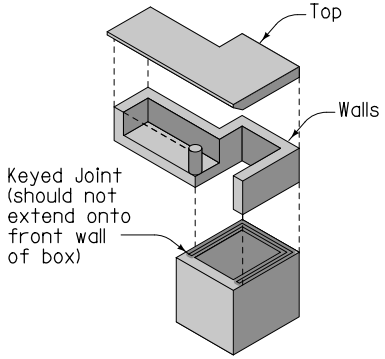
PLAN

Extension unit may be used on either or both sides of intake. Details are similar when extension unit is on the opposite side. For joint details, refer to PV-101.

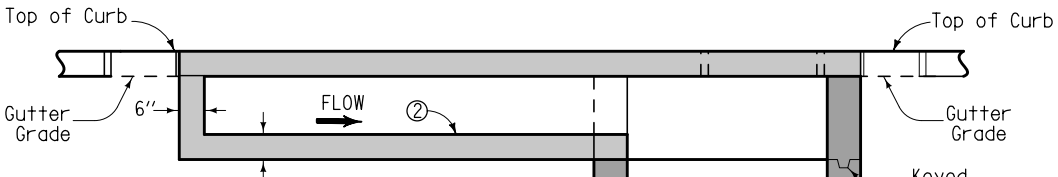
② Match gutter slope. Drain to well.

③ Other lengths of opening may be constructed by varying the length of the extension and the rebar.

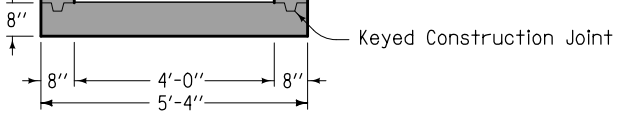
④ Includes 2 inches for 'ED' Joints.



ISOMETRIC
INTAKE WELL, WALLS AND TOP



SECTION A-A
(Typical Extension Unit)



SECTION B-B
(Typical Intake Well)

TABLE OF DIMENSIONS					
LO	Length of Curb Opening	12'-0"	14'-0"	16'-0"	18'-0"
EL	Extension Length	7'-10"	9'-10"	11'-10"	13'-10"
BL	Minimum Boxout Length	16'-2"	18'-2"	20'-2"	22'-2"

Possible Contract Item:

Intake, SW-545

Iowa Department of Transportation

REVISION	
3	10-18-11

STANDARD ROAD PLAN

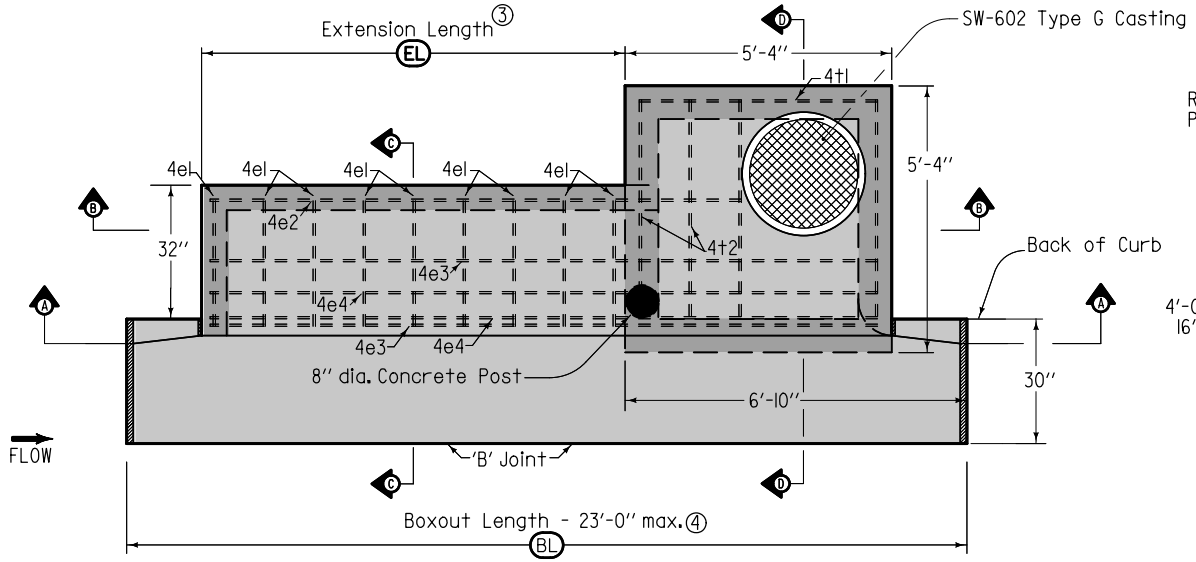
SW-545

SHEET 1 of 3

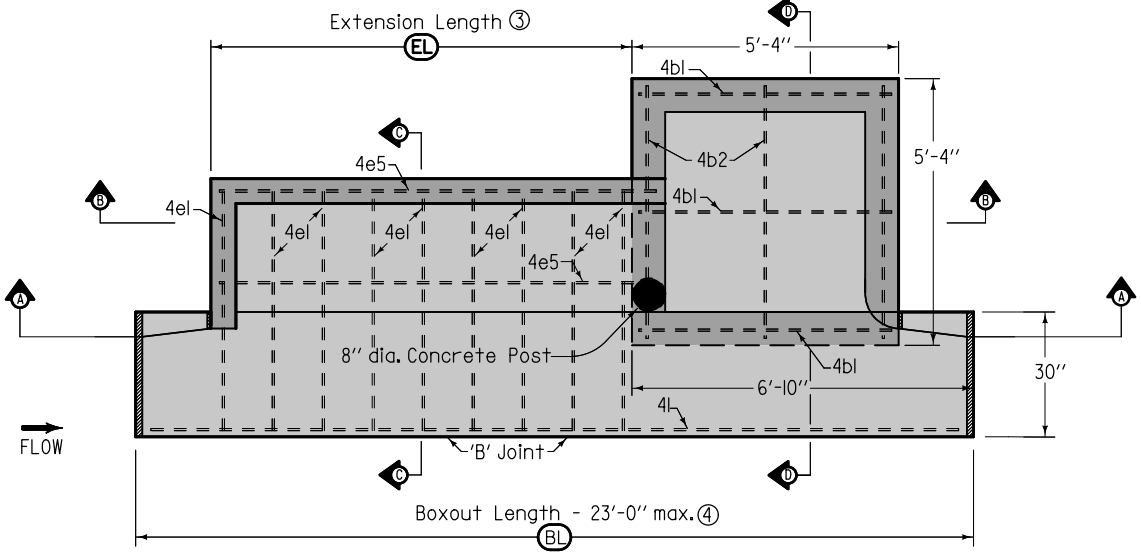
REVISIONS: Added "Type G" (casting) on sheets 1 and 2.

Deanna Maifield
APPROVED BY DESIGN METHODS ENGINEER

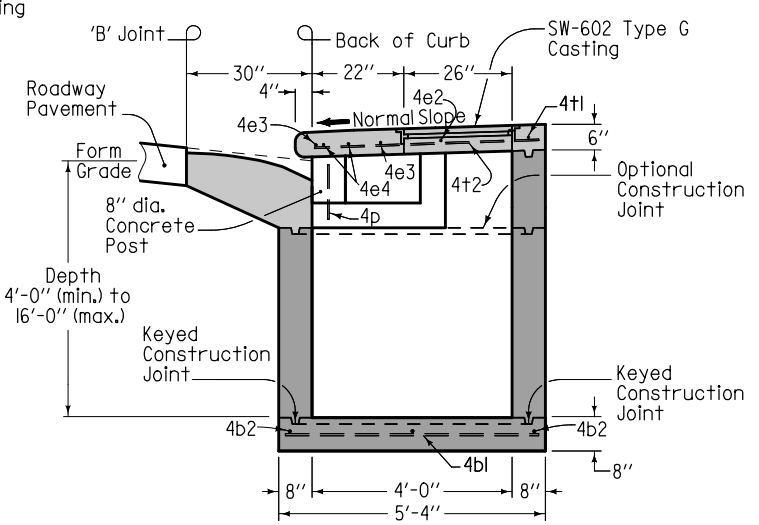
SINGLE OPEN-THROAT CURB INTAKE WITH EXTENDED OPENING



PLAN
TOP REINFORCING PLACEMENT



PLAN
BOTTOM REINFORCING PLACEMENT



SECTION D-D

REINFORCING BAR LIST Intake Well					
MARK	LOCATION	NO.	LENGTH	WEIGHT	SPACING
4b1	Base	3	5'-0"	10.0	2'-4"
4b2	Base	3	5'-0"	10.0	2'-4"
4t1	Top	1	5'-0"	3.3	12"
4t2	Top	4	4'-6"	12.0	See Detail
4p	Post	1	13"	0.7	
			Total	36 lbs.	

③ Other lengths of opening may be constructed by varyingthe length of the extension and the rebars.

④ Includes 2 inches for 'ED' Joints.

Iowa Department of Transportation

REVISION
3 | 10-18-11

STANDARD ROAD PLAN

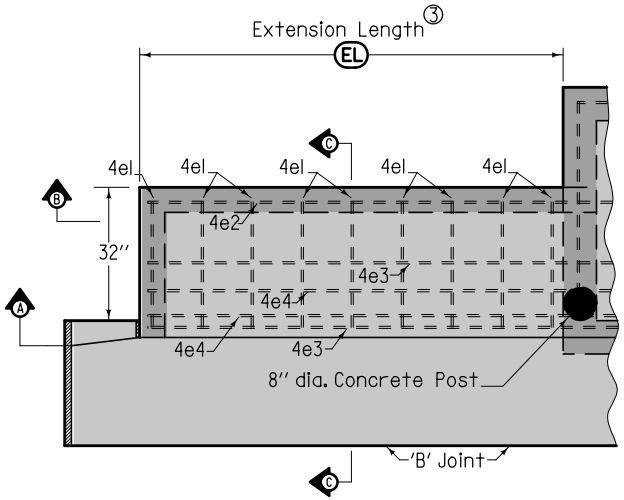
SW-545

SHEET 2 of 3

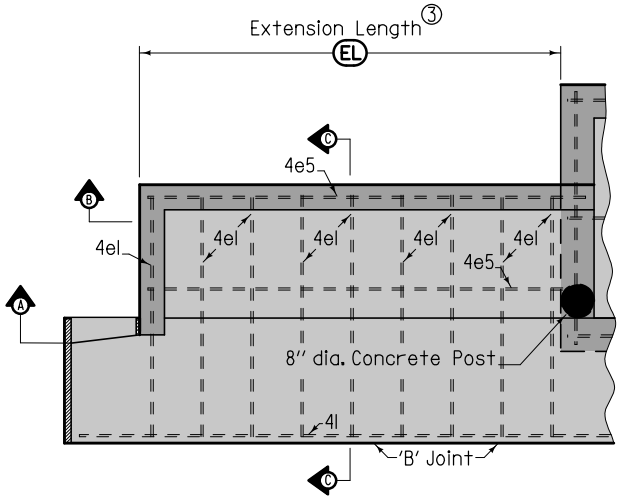
REVISIONS: Added "Type G" (casting) on sheets 1 and 2.

Deanna Maifield
APPROVED BY DESIGN METHODS ENGINEER

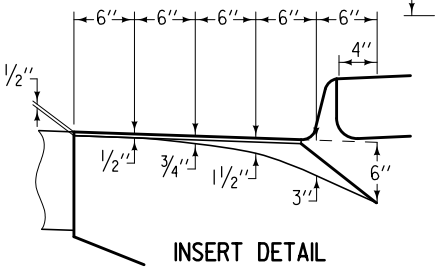
SINGLE OPEN-THROAT CURB INTAKE WITH EXTENDED OPENING



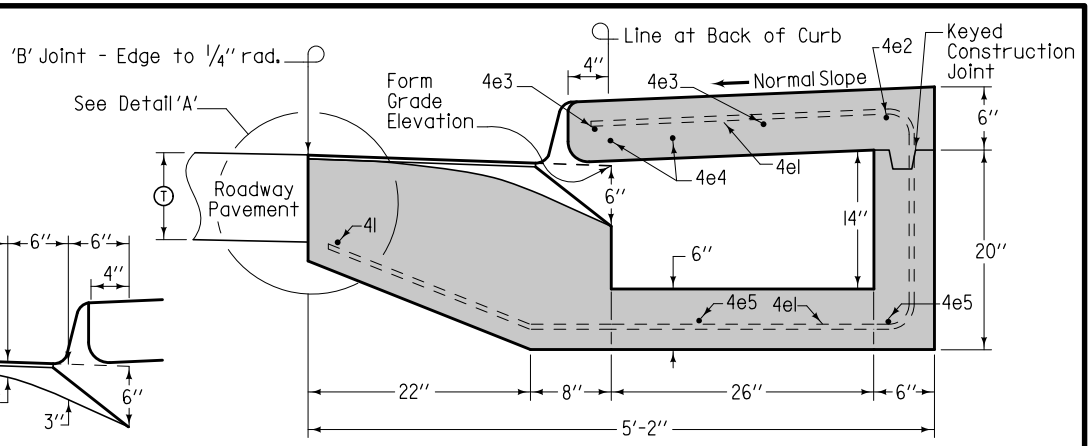
PLAN
TOP OF EXTENSION REINFORCING PLACEMENT



PLAN
BOTTOM OF EXTENSION REINFORCING PLACEMENT



INSERT DETAIL



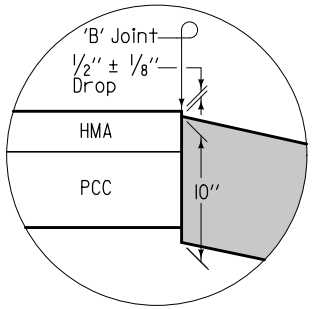
SECTION C-C

REINFORCING BAR LIST (LO) = 12'-0''						
MARK	SIZE	LOCATION	NO.	LENGTH	MASS	SPACING
4e1	4	Top/Base	9	9'-5½''	56.9	12''
4e2	4	Top	1	10'-0''	6.7	
4e3	4	Top	2	12'-9''	17.0	15½''
4e4	4	Top	2	12'-9''	17.0	6''
4e5	4	Base	2	8'-2''	10.9	22''
4l *	4	Insert	1	15'-10''	10.6	
* With 16'-6'' Boxout.				Total	119.1 lbs.	

REINFORCING BAR LIST (LO) = 14'-0''						
MARK	SIZE	LOCATION	NO.	LENGTH	MASS	SPACING
4e1	4	Top/Base	11	9'-5½''	69.5	12''
4e2	4	Top	1	12'-0''	8.0	
4e3	4	Top	2	14'-9''	19.7	15½''
4e4	4	Top	2	14'-9''	19.7	6''
4e5	4	Base	2	10'-2''	13.6	22''
4l *	4	Insert	1	17'-10''	11.9	
* With 18'-6'' Boxout.				Total	142.4 lbs.	

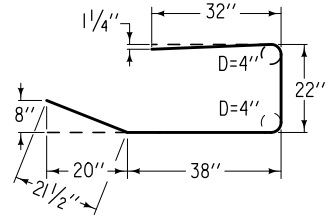
REINFORCING BAR LIST (LO) = 16'-0''						
MARK	SIZE	LOCATION	NO.	LENGTH	MASS	SPACING
4e1	4	Top/Base	13	9'-5½''	82.1	12''
4e2	4	Top	1	14'-0''	9.3	
4e3	4	Top	2	16'-9''	22.4	15½''
4e4	4	Top	2	16'-9''	22.4	6''
4e5	4	Base	2	12'-2''	16.2	22''
4l *	4	Insert	1	19'-10''	13.2	
* With 20'-6'' Boxout.				Total	165.6 lbs.	

REINFORCING BAR LIST (LO) = 18'-0''						
MARK	SIZE	LOCATION	NO.	LENGTH	MASS	SPACING
4e1	4	Top/Base	15	9'-5½''	94.8	12''
4e2	4	Top	1	16'-0''	10.7	
4e3	4	Top	2	18'-9''	25	15½''
4e4	4	Top	2	18'-9''	25	6''
4e5	4	Base	2	14'-2''	18.9	22''
4l *	4	Insert	1	21'-10''	14.6	
* With 22'-6'' Boxout.				Total	189.0 lbs.	



DETAIL 'A'
Use when adjacent pavement is HMA or composite.

BENT BAR DETAILS



NOTE: ALL DIMENSIONS ARE OUT TO OUT
D = PIN DIAMETER

③ Other lengths of opening may be constructed by varying the length of the extension and the rebars.

Iowa Department of Transportation

REVISION
3 | 10-18-11

STANDARD ROAD PLAN

SW-545
SHEET 3 of 3

REVISIONS: Added "Type G" (casting) on sheets 1 and 2.

Deanna Maifield
APPROVED BY DESIGN METHODS ENGINEER

SINGLE OPEN-THROAT CURB INTAKE WITH EXTENDED OPENING

Traffic Control

NO.	DATE	TITLE
		Two-Lane and Multi-Lane Roadways
TC-1	10-18-11	Work Not Affecting Traffic (Two-Lane or Multi-Lane)
TC-30	10-18-11	Closure of Continuous Two-Way Left Turn Lane
TC-61	04-19-11	Two-Lane, Two-Way Operation
TC-62	04-20-10	Permanent Two-Lane to Four-Lane Transition
TC-81	04-20-10	Restricted Width Signing (Less Than 14.5 Feet)
		Two-Lane Roadways
TC-202	04-20-10	Shoulder Closure (One Lane)
TC-203	10-16-07	Aerial Seeding Operations
TC-211	04-19-11	Spot Location Lane Closure on Low Volume Roadway
TC-212	10-16-07	Spot Location Lane Closure with Flaggers
TC-213	10-21-08	Lane Closure with Flaggers
TC-214	04-19-11	Lane Closure with Flaggers for use with Pilot Car
TC-215	04-19-11	Lane Closure with Signals (Up to Three Days)
TC-216	04-21-09	Lane Closure with Signals
TC-217	10-19-10	Lane Closure with Signals and TBR
TC-218	04-19-11	Lane Closure with Pilot Car and Flagger Operated Signals
TC-228	10-21-08	Lane Closure Utilizing Continuous Two-Way Left Turn Lane
TC-231	10-16-07	Slow Moving Vehicle Operating in the Traffic Lane
TC-232	10-17-06	Shoulder Rumble Strip Operations
TC-233	10-18-11	Pavement Marking Operations Two-Lane
TC-251	10-16-07	Temporary Road Closure
TC-252	10-20-09	Road Closure
TC-253	04-20-10	Paved On-Site Detour
TC-271	04-19-11	Signalized Equipment Crossing
TC-272	10-16-07	Unsignalized Equipment Crossing
TC-273	04-20-10	Construction Site Entrance
TC-282	04-19-11	Uneven Lanes

Traffic Control

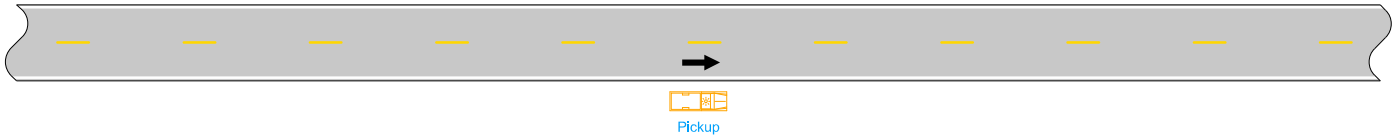
NO.	DATE	TITLE
TC-283	10-18-11	Surveying Operations
		Multi-Lane Roadways
TC-402	04-20-10	Shoulder Closure (Multi-Lane)
TC-403	10-16-07	Aerial Seeding Operations
TC-416	10-18-11	Partial Lane Closure on Ramps
TC-417	10-18-11	Ramp Closure
TC-418	10-18-11	Lane Closure on Divided Highway
TC-419	10-20-09	Lane Closure on Undivided Highway
TC-420	04-20-10	Lane Closure at Ramps
TC-421	10-18-11	Lane Closure with TBR
TC-422	10-18-11	Closure of Two Adjacent Lanes on Divided Highway
TC-423	10-20-09	Closure of Two Adjacent Lanes on Undivided Highway
TC-429	10-20-09	Closure of Continuous Two-Way Left Turn Lane and Adjacent Lane
TC-431	10-21-08	Slow Moving Vehicle Operating in the Traffic Lane
TC-432	10-17-06	Shoulder Rumble Strip Operations
TC-433	10-18-11	Pavement Marking Operations
TC-451	10-21-08	Temporary Road Closure on Divided Highway
TC-454	10-18-11	Temporary Detour Using Ramps on Divided Highway
TC-482	04-19-11	Uneven Lanes
TC-601	10-18-11	Pedestrian Detour
TC-602	10-18-11	Sidewalk Diversion

Do not allow work to interfere with the flow of traffic.

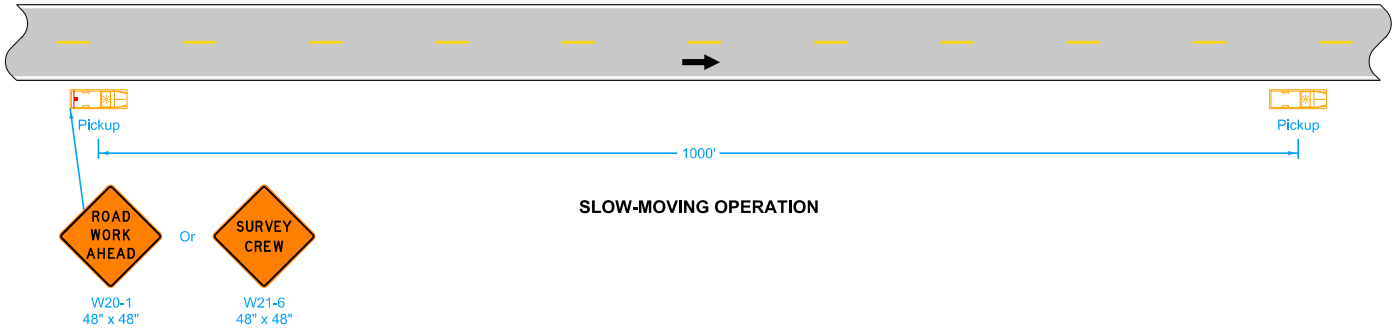
When parked, locate vehicles as far from the open traffic lane as possible. Entrances and driveways should be used whenever appropriate.

Equip all vehicles with an amber Vehicle Warning Light.

(1) For work lasting longer than one hour, refer to TC-202 or TC-402.



VEHICLE STOPPED ON SHOULDER FOR LESS THAN ONE HOUR (1)



SLOW-MOVING OPERATION

LEGEND

- Traffic Sign
- Direction of Traffic

Possible Contract Item:
Traffic Control

Iowa Department of Transportation

REVISION	
1	10-18-11

STANDARD ROAD PLAN

TC-1

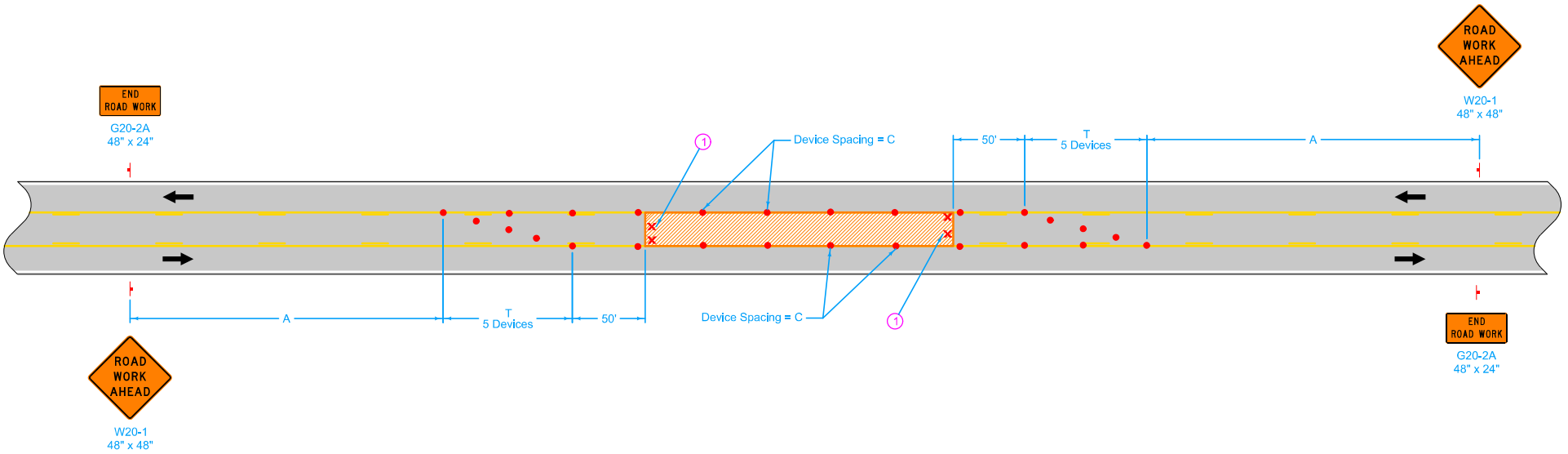
SHEET 1 of 1

REVISIONS: Changed size of W21-6 sign. Updated language of general notes. Made Into a color standard.

Deanna Maifield
APPROVED BY DESIGN METHODS ENGINEER

WORK NOT AFFECTING TRAFFIC (TWO-LANE OR MULTI-LANE)

(1) Place two drums in the closed lane at 1000-foot intervals. Where core outs, holes, or uncured concrete exists within the work area, place an additional pair of drums just ahead of each.



Possible Contract Item:
Traffic Control

LEGEND

- 42" Channelizer or Vertical Panel
- Traffic Sign
- Work Area
- Drum
- Direction of Traffic

SPEED LIMIT (mph)	A	C	T
25 or less	100'	40'	50'
30 - 35	250'	40'	50'
40 - 50	700'	80'	100'
55 or greater	1000'	100'	100'

Iowa Department of Transportation

REVISION
3 | 10-18-11

STANDARD ROAD PLAN

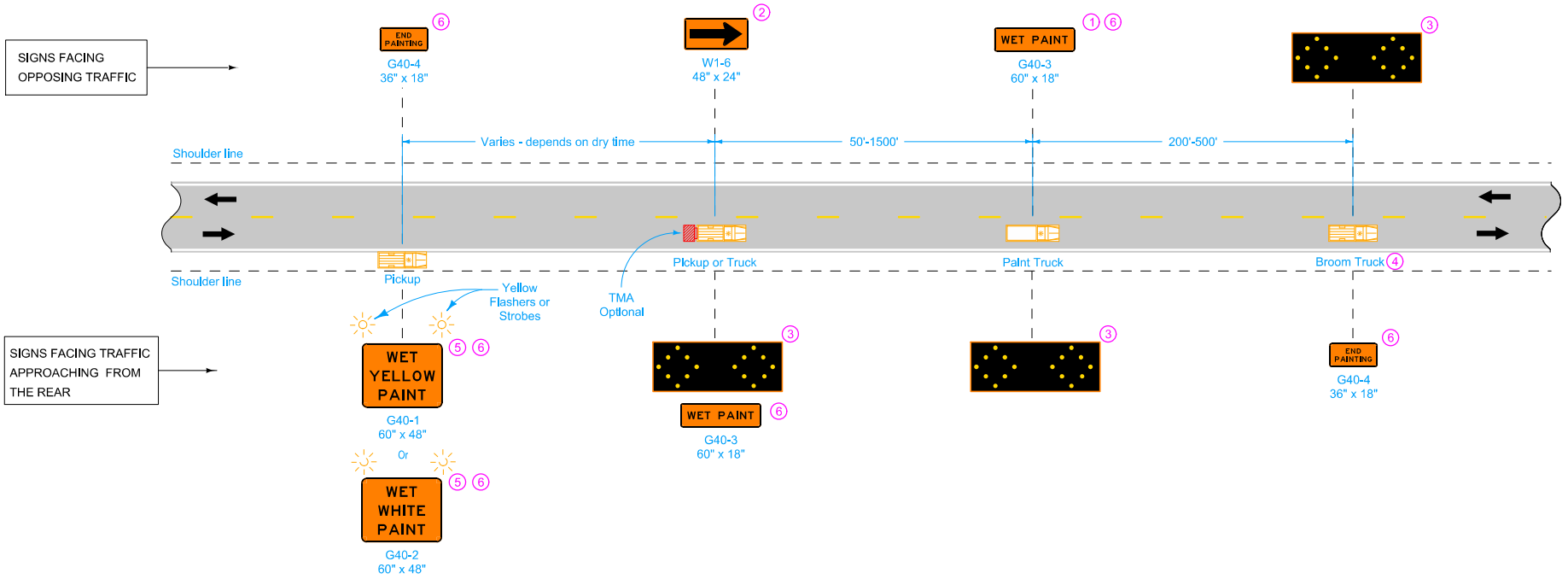
TC-30

SHEET 1 of 1

REVISIONS: Updated to color standard. Updated values in table.

Deanna Maifield
APPROVED BY DESIGN METHODS ENGINEER

CLOSURE OF CONTINUOUS TWO-WAY LEFT-TURN LANE



VEHICLES NOT STRADDLING CENTERLINE

This layout may be used when painting edgeline or centerline markings.

Equip all vehicles with an amber Vehicle Warning Light.

(1) Use this sign when painting centerline markings.

(2) Optional Fluorescent Yellow Green (FYG) sign background may be used.

(3) This arrow display may be operated in a four-corner caution mode.

(4) Move this vehicle to the shoulder to accommodate passing traffic.

(5) A vehicle mounted Changeable Message Sign (CMS) may be used in lieu of this sign.

(6) Refer to SI-881 for sign details.

Possible Contract Item:
Traffic Control

LEGEND

Direction of Traffic

Truck-Mounted Attenuator (TMA)

Iowa Department of Transportation

STANDARD ROAD PLAN

REVISION 2 10-18-11

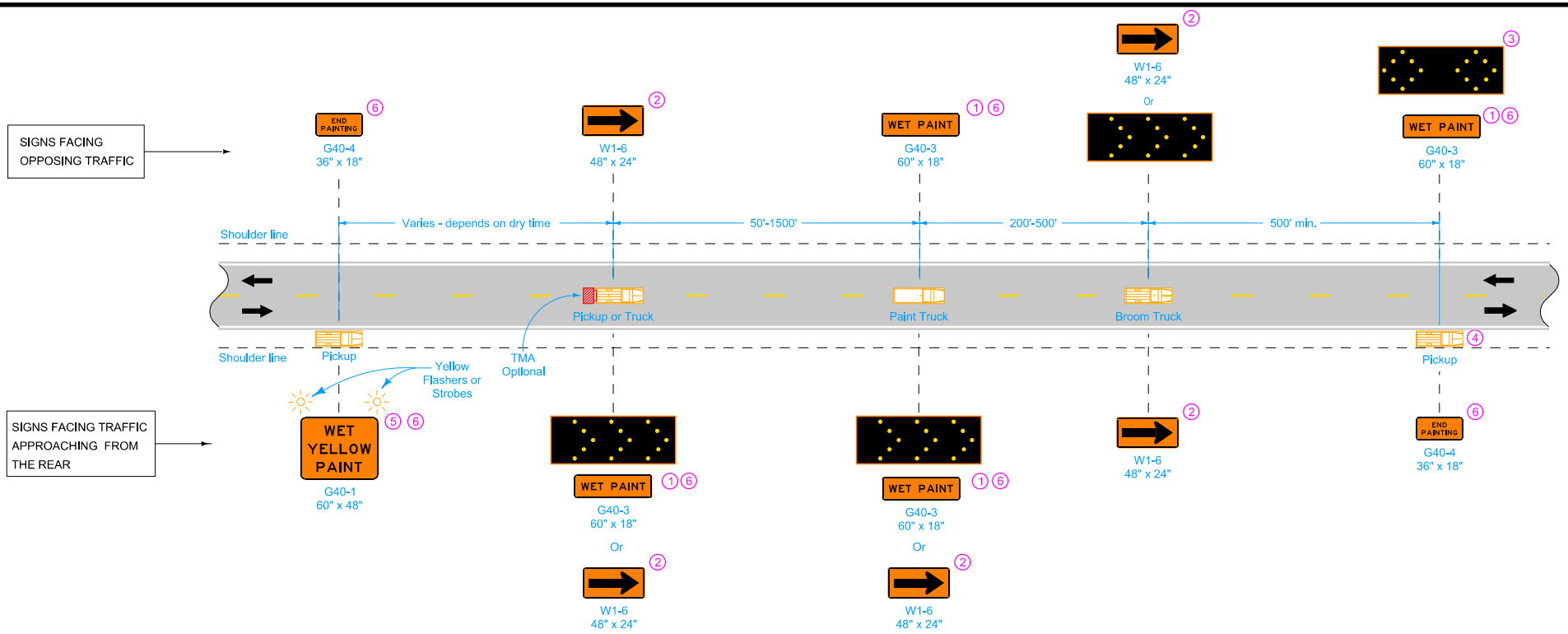
TC-233

SHEET 1 of 2

REVISIONS: Adjusted amber light wording in general notes.

Deanna Maifield
APPROVED BY DESIGN METHODS ENGINEER

PAVEMENT MARKING OPERATIONS TWO-LANE



VEHICLES STRADDLING CENTERLINE

LEGEND

- Direction of Traffic
- Truck-Mounted Attenuator (TMA)

1. Use this sign when painting centerline markings.
2. Optional Fluorescent Yellow Green (FYG) sign background may be used.
3. This arrow display may be operated in a four-corner caution mode.
4. Move this vehicle to the shoulder to accommodate passing traffic.
5. A vehicle mounted Changeable Message Sign (CMS) may be used in lieu of this sign.
6. Refer to SI-881 for sign details.

Iowa Department of Transportation

REVISION: 2 | 10-18-11

STANDARD ROAD PLAN

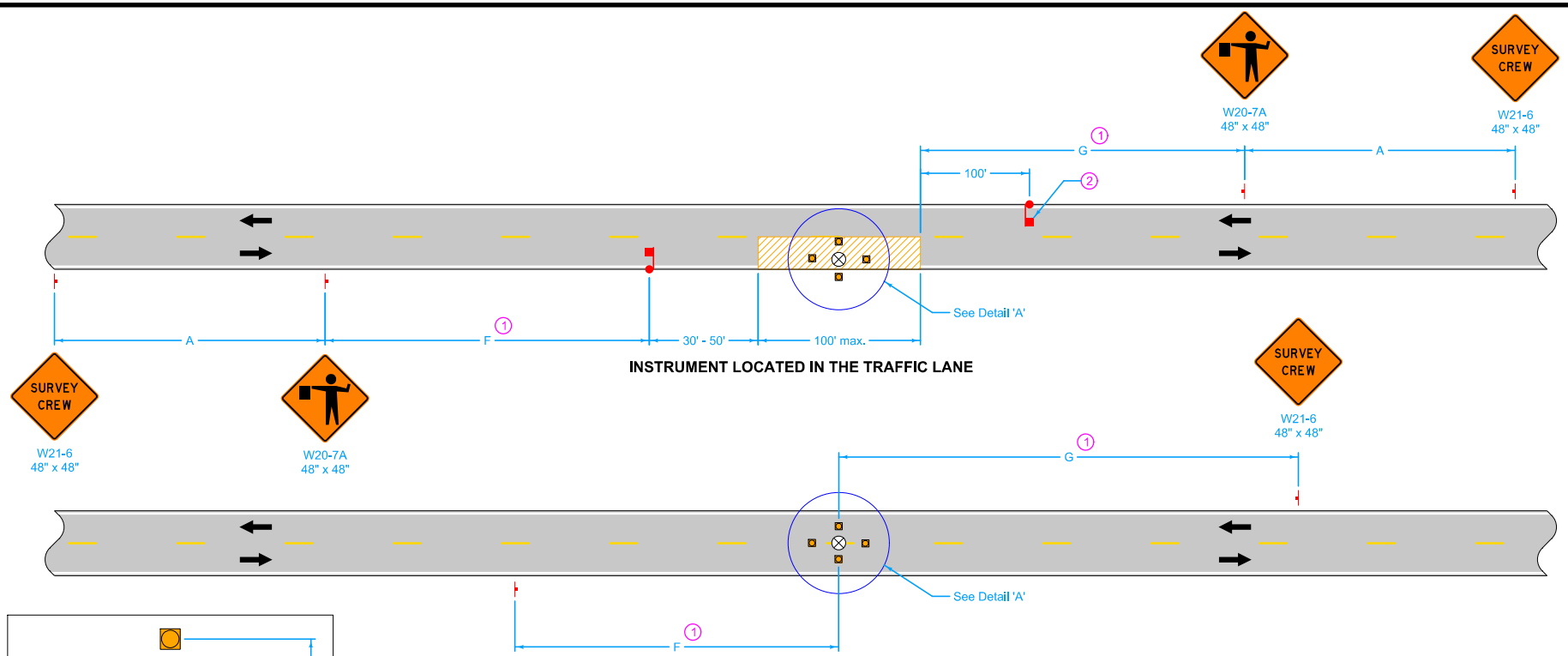
TC-233

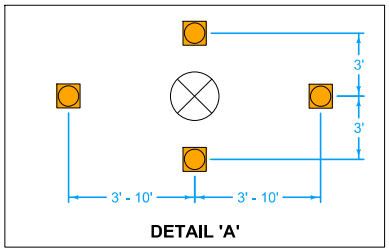
SHEET 2 of 2

REVISIONS: Adjusted amber light wording in general notes.

Deanna Maifield
APPROVED BY DESIGN METHODS ENGINEER

PAVEMENT MARKING OPERATIONS TWO-LANE





LEGEND

- Traffic Sign
- Instrument Person
- Cone
- Work Area
- Flagger
- Direction of Traffic

SPEED LIMIT (mph)	A	WITH LANE CLOSURE F and G (1)	WITHOUT LANE CLOSURE F and G (1)	F + G MAXIMUM
35 or less	250'	250' - 3250'	500' - 3000'	3500'
40 - 45	350'	350' - 3350'	700' - 3000'	3700'
50 or greater	500'	500' - 3500'	1000' - 3000'	4000'

When another person is required outside of the signing setup (e.g. for a survey target), a separate signing setup may be necessary unless the traffic lane can be vacated to accommodate traffic.

(1) Keep F and G distances as near to minimum values as work permits. However, to be able to move the work area without moving the advance signing, F and G values may be varied within the limits of the table. Maximum movement can be achieved by setting one F or G value at the minimum and the other value at its maximum.

(2) Use a second flagger if:

- The flagger's view of approaching traffic in the open lane is less than a quarter mile or the work site is in an area of restricted sight distance (such as a "No-Passing" zone); or
- Excessive traffic delays are encountered.

Possible Contract Items:
Flaggers
Traffic Control

Iowa Department of Transportation

STANDARD ROAD PLAN

REVISION 2 10-18-11

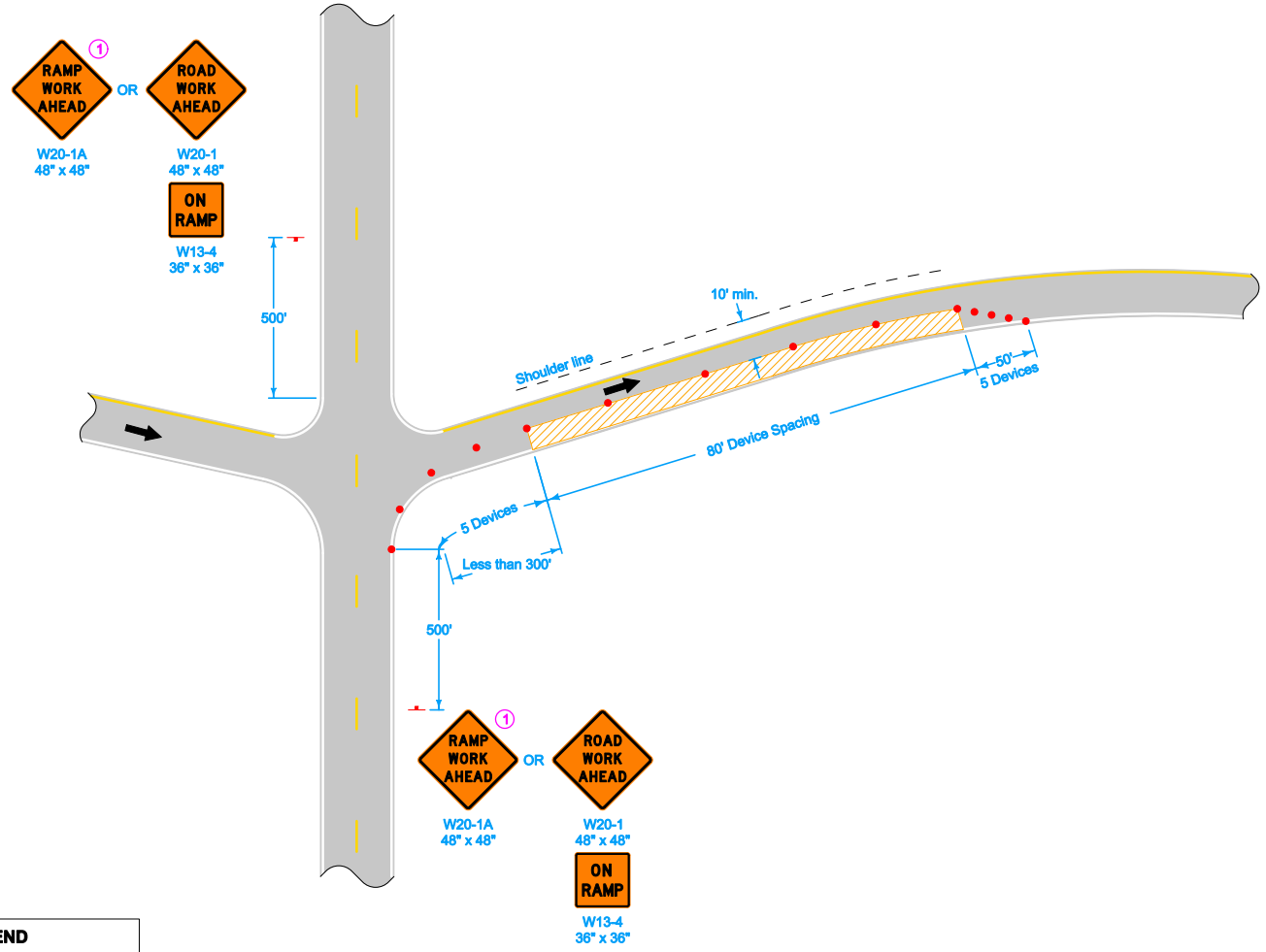
TC-283

SHEET 1 of 1

REVISIONS: Made into color standard. Changed size of signs to 48" X 48".

Deanna Maifield
APPROVED BY DESIGN METHODS ENGINEER

SURVEYING OPERATIONS



① Refer to SI-881 for sign details.

LEGEND

- Traffic Sign
- 42" Channelizer or Vertical Panel
- Direction of Traffic
- Work Area

Possible Contract Item:
Traffic Control

Iowa Department of Transportation

REVISION
1 | 10-18-11

STANDARD ROAD PLAN

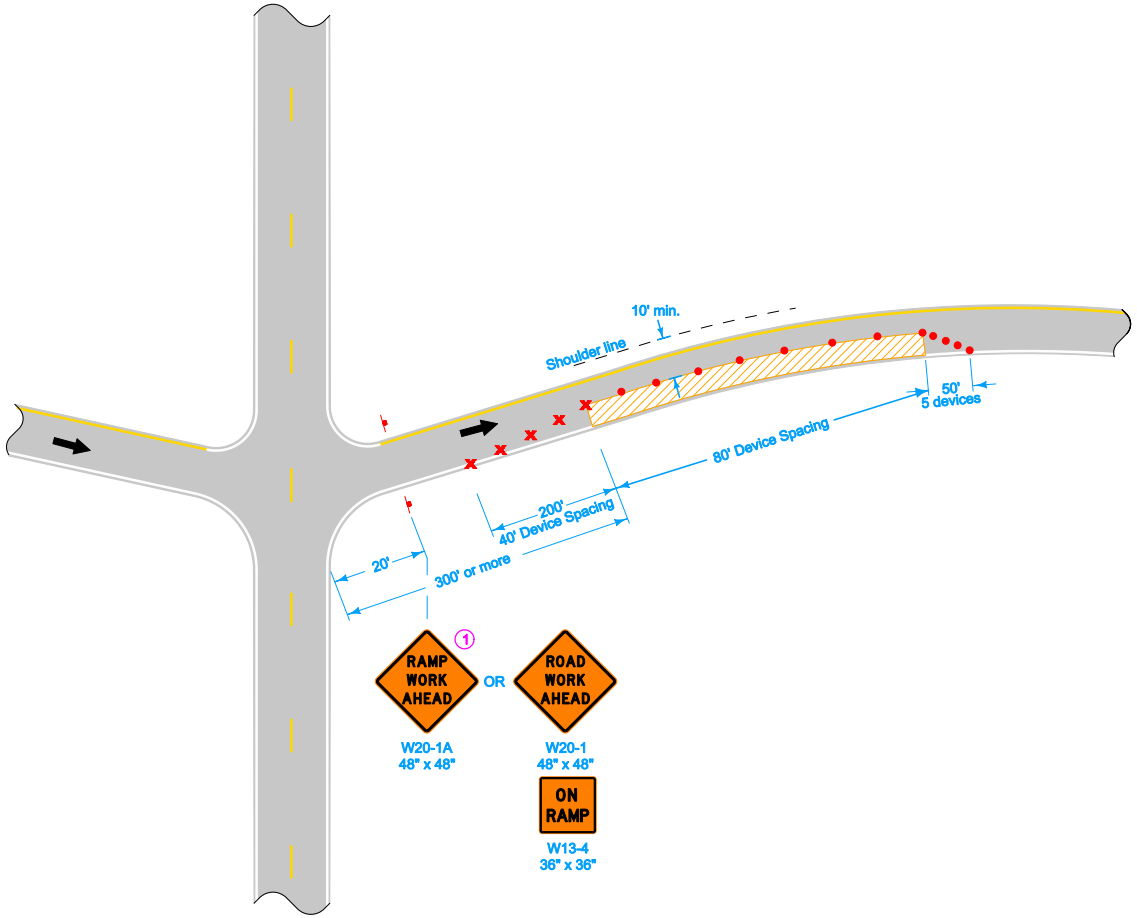
TC-416

SHEET 1 of 4

REVISIONS: Added circle note and sign names to prior "special" signs. Modified work area and signs (sht 1). Modified device spacing and shoulders on all sheets.

Deanna Maifield
APPROVED BY DESIGN METHODS ENGINEER

PARTIAL LANE CLOSURE ON RAMPS



(1) Refer to SI-881 for sign details.

LEGEND

- Drum
- Traffic Sign
- 42" Channelizer or Vertical Panel
- Direction of Traffic
- Work Area

Iowa Department of Transportation

STANDARD ROAD PLAN

REVISION

1	10-18-11

TC-416

SHEET 2 of 4

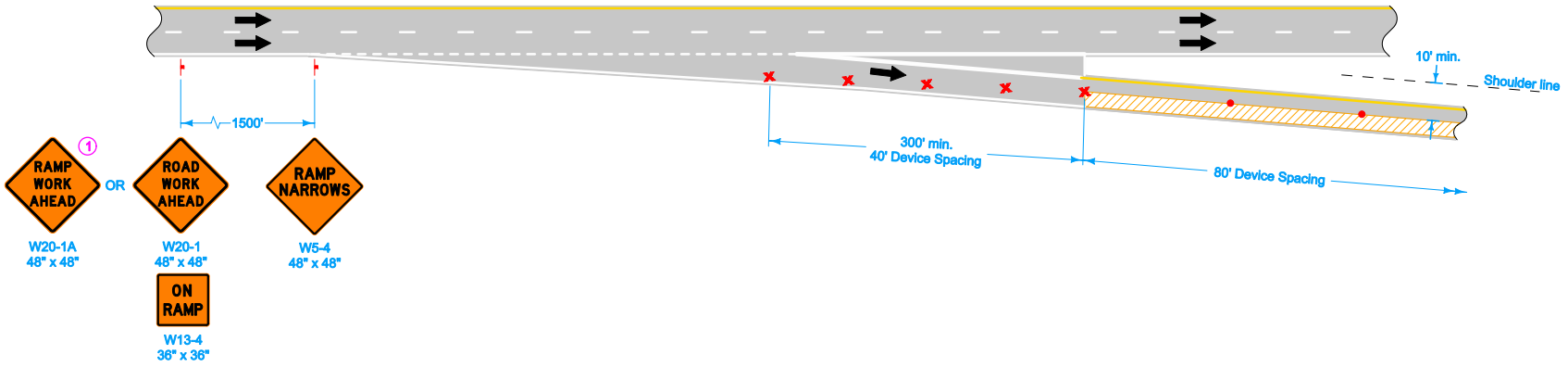
REVISIONS: Added circle note and sign names to prior "special" signs. Modified work area and signs (sht 1). Modified device spacing and shoulders on all sheets.

Deanna Maifield

APPROVED BY DESIGN METHODS ENGINEER

PARTIAL LANE CLOSURE ON RAMPS

① Refer to SI-881 for sign details.



LEGEND

- Drum
- Traffic Sign
- 42" Channelizer or Vertical Panel
- Direction of Traffic
- Work Area

Iowa Department of Transportation

STANDARD ROAD PLAN

REVISION	
1	10-18-11

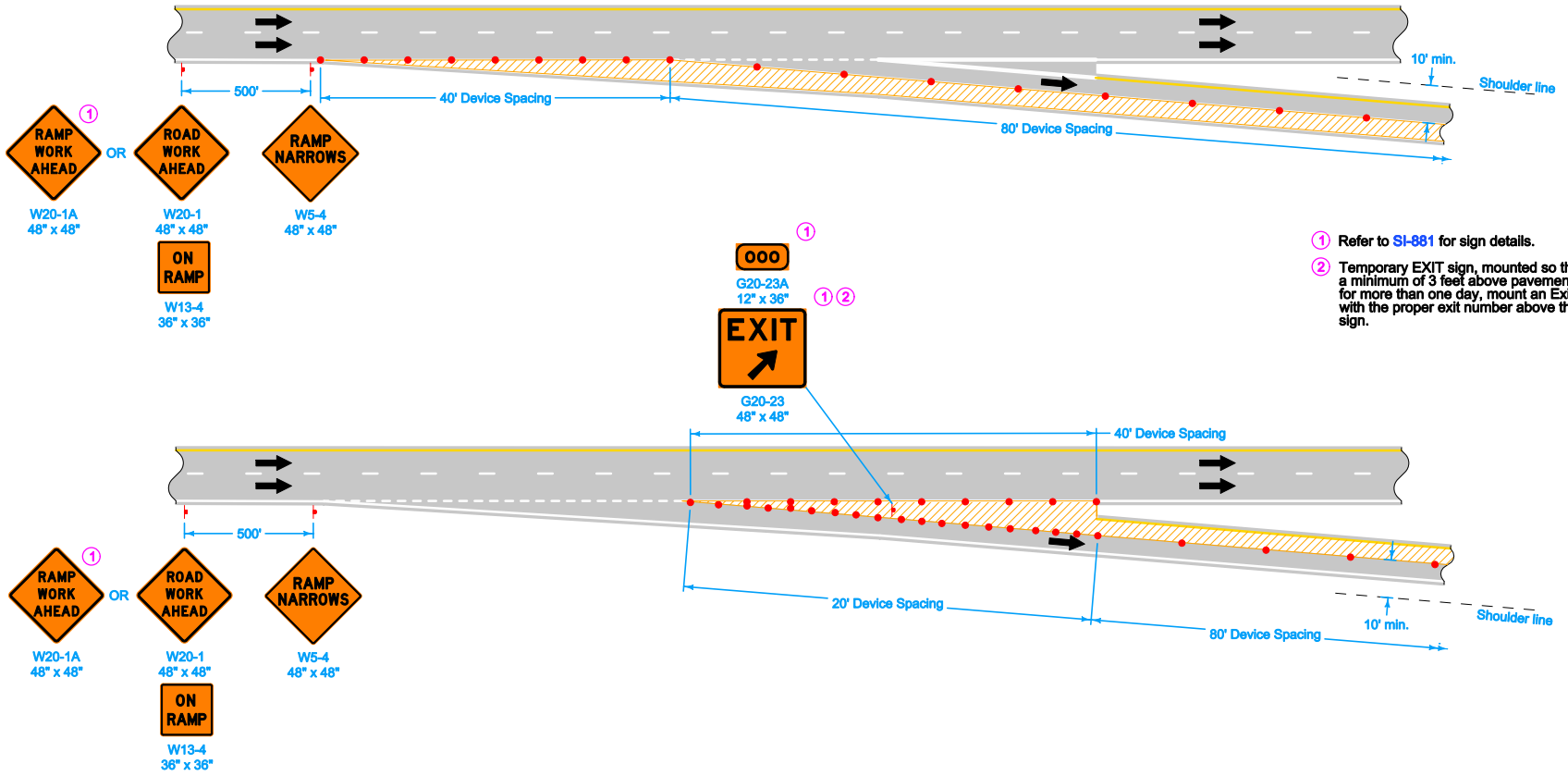
TC-416

SHEET 3 of 4

REVISIONS: Added circle note and sign names to prior "special" signs. Modified work area and signs (sht 1). Modified device spacing and shoulders on all sheets.

Deanna Maifield
APPROVED BY DESIGN METHODS ENGINEER

PARTIAL LANE CLOSURE ON RAMPS



① Refer to SI-881 for sign details.

② Temporary EXIT sign, mounted so that bottom of sign is a minimum of 3 feet above pavement surface. If in place for more than one day, mount an Exit Number Panel with the proper exit number above the temporary EXIT sign.

LEGEND

- Traffic Sign
- 42" Channelizer or Vertical Panel
- Direction of Traffic
- Work Area

Iowa Department of Transportation

STANDARD ROAD PLAN

REVISION	
1	10-18-11

TC-416

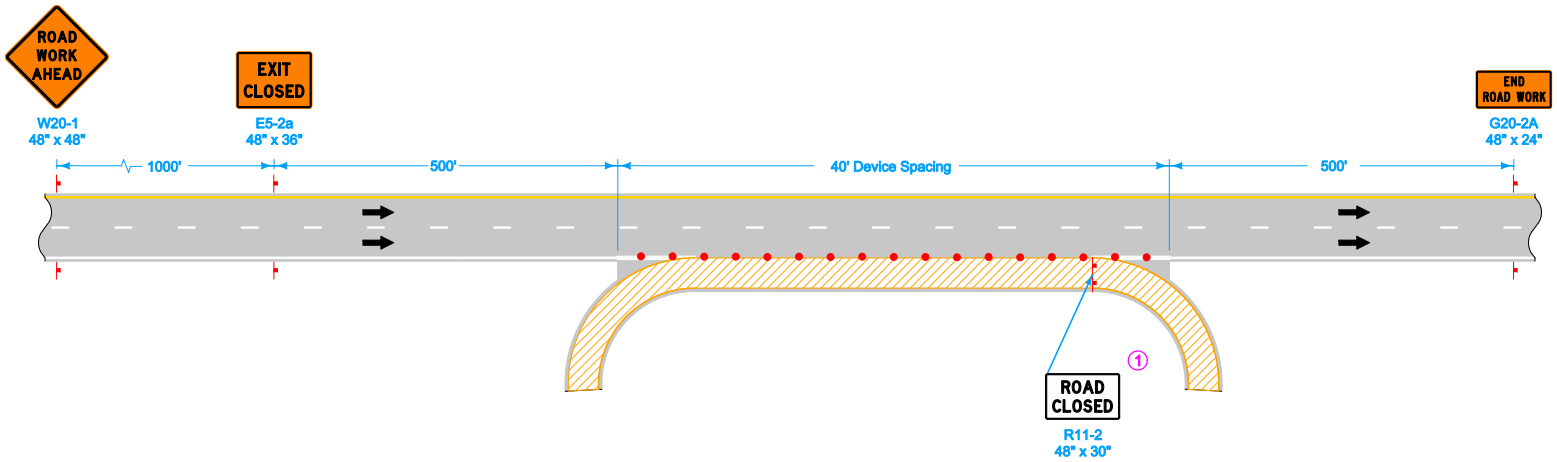
SHEET 4 of 4

REVISIONS: Added circle note and sign names to prior "special" signs. Modified work area and signs (sht 1). Modified device spacing and shoulders on all sheets.

Deanna Maifield
APPROVED BY DESIGN METHODS ENGINEER

PARTIAL LANE CLOSURE ON RAMPS

① A vehicle with an amber Vehicle Warning Light may be substituted for the Type III barricade.



EXIT RAMP CLOSURE

Possible Contract Items:
Safety Closure
Traffic Control

Possible Tabulation:
108-13A

LEGEND

- Type III Barricade
- Traffic Sign
- 42" Channelizer or Vertical Panel
- Direction of Traffic
- Work Area

Iowa Department of Transportation

STANDARD ROAD PLAN

REVISION	
1	10-18-11

TC-417

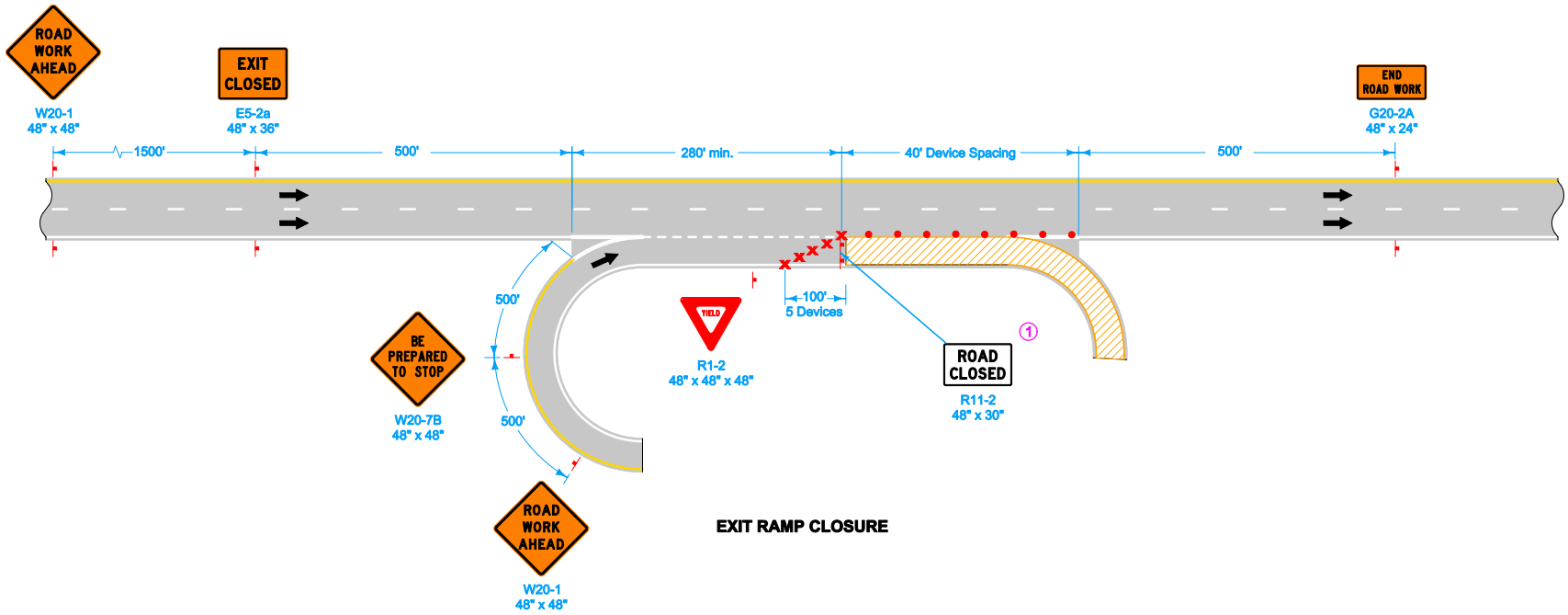
SHEET 1 of 3

REVISIONS: Added Type III Barricade to page 1, location of yield sign, device spacing, and circle note 1. Changed offset of vertical panels on page 3.

Deanna Maifield
APPROVED BY DESIGN METHODS ENGINEER

RAMP CLOSURE

① A vehicle with an amber Vehicle Warning Light may be substituted for the Type III barricade.



EXIT RAMP CLOSURE

LEGEND

- Type III Barricade
- Traffic Sign
- Drum
- 42" Channelizer or Vertical Panel
- Direction of Traffic
- Work Area

Iowa Department of Transportation

STANDARD ROAD PLAN

REVISION	
1	10-18-11

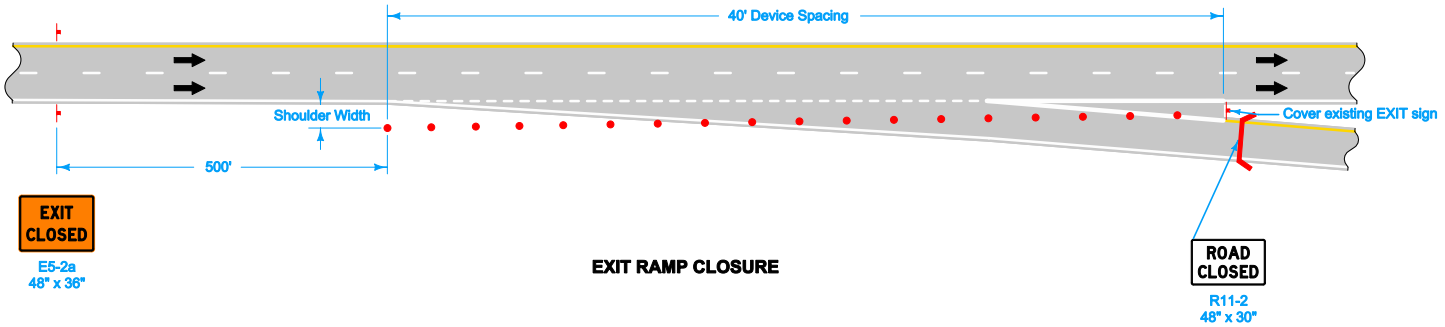
TC-417

SHEET 2 of 3

REVISIONS: Added Type III Barricade to page 1, location of yield sign, device spacing, and circle note 1. Changed offset of vertical panels on page 3.

Deanna Maifield
APPROVED BY DESIGN METHODS ENGINEER

RAMP CLOSURE



EXIT RAMP CLOSURE

LEGEND

- Safety Closure
- Traffic Sign
- 42" Channelizer or Vertical Panel
- Direction of Traffic

Iowa Department of Transportation

STANDARD ROAD PLAN

REVISION 1 10-18-11

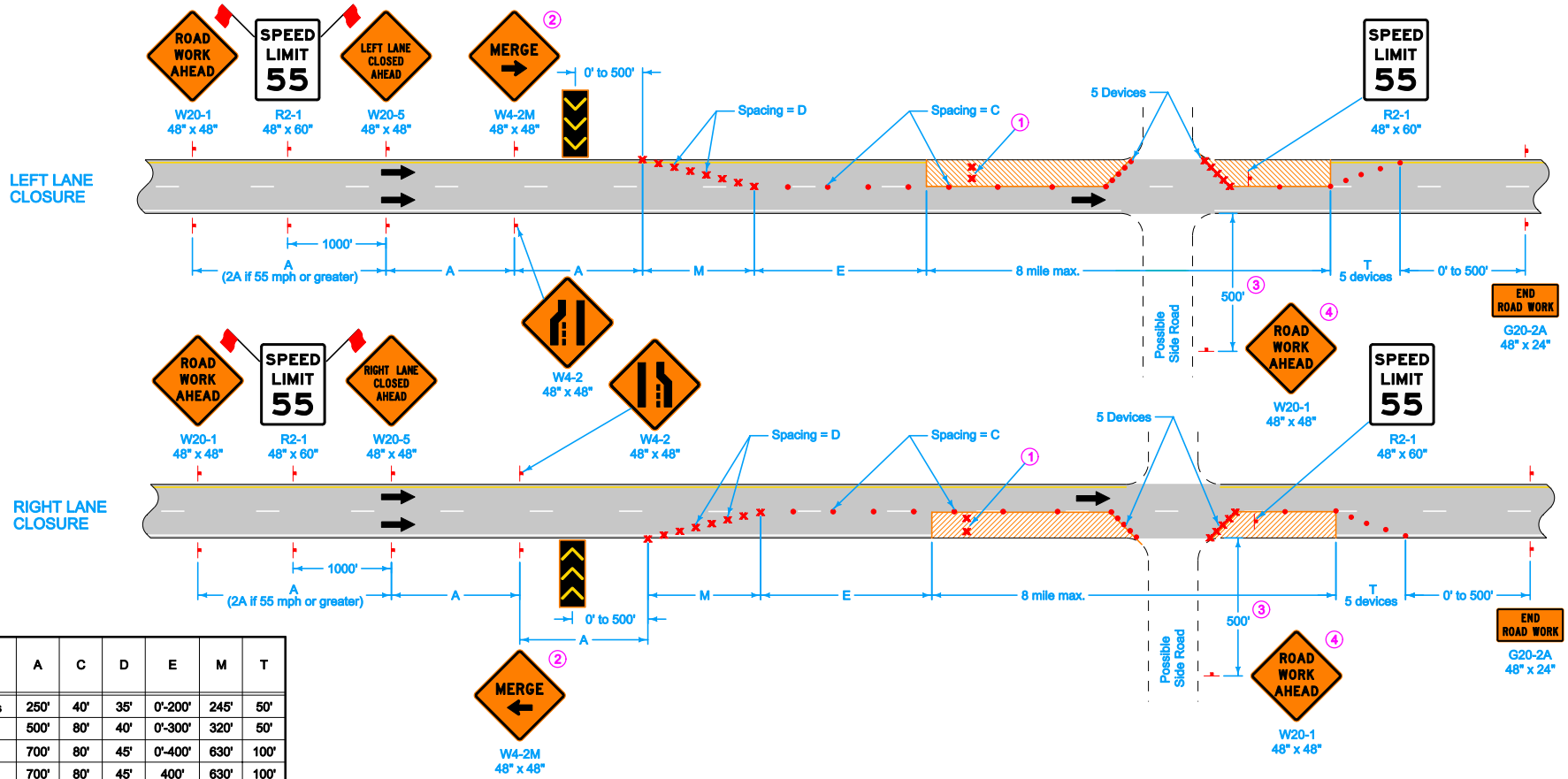
TC-417

SHEET 3 of 3

REVISIONS: Added Type III Barricade to page 1, location of yield sign, device spacing, and circle note 1. Changed offset of vertical panels on page 3.

Deanna Maifield
APPROVED BY DESIGN METHODS ENGINEER

RAMP CLOSURE



SPEED LIMIT (mph)	A	C	D	E	M	T
35 or less	250'	40'	35'	0'-200'	245'	50'
40	500'	80'	40'	0'-300'	320'	50'
45	700'	80'	45'	0'-400'	630'	100'
50	700'	80'	45'	400'	630'	100'
55 - 60	1000'	100'	55'	600'	770'	100'
65 - 70	1000'	100'	65'	700'	910'	100'

LEGEND

- Direction Of Traffic
- Traffic Sign
- Drum
- 42" Channelizer or Vertical Panel
- Arrow Display
- Work Area

When the Average Daily Traffic (ADT) exceeds 20,000 vehicles per day or when a traffic queue extends beyond the advanced signing, place RIGHT/LEFT LANE CLOSED 4 MILES and RIGHT/LEFT LANE CLOSED 2 MILES signs (W20-5) on both sides of the roadway 4 miles and 2 miles in advance of the lane closure, respectively, as appropriate.

For roadways with a posted speed limit of 60 mph or greater before road work:

Place SPEED LIMIT 55 signs prior to the lane closure as shown.

When the length of closure is greater than 1 mile, install SPEED LIMIT 55 signs in the closed lane at 1-mile intervals.

Remove or cover all existing signs that conflict with 55 mph speed limit while 55 mph speed limit is in effect.

Where there is a lane line drop-off or rise, do not allow traffic to cross over the drop-off or rise; except for ramp locations where a BUMP (W8-1) sign is placed.

Drop-offs greater than a nominal 4 inches are not allowed during non-working hours.

(1) Place two drums in the closed lane at 1000-foot intervals. Where core outs, holes, or uncured concrete exists within the work area, place an additional pair of drums just ahead of each.

(2) Refer to SI-881 for sign details.

(3) Where side road speed limit is 40 mph or less, a distance of 200 feet is allowed.

(4) Place a ROAD WORK AHEAD sign on the opposite side of the intersection in a similar location.

Possible Contract Item:
Traffic Control

Iowa Department of Transportation

STANDARD ROAD PLAN

REVISION	
5	10-18-11

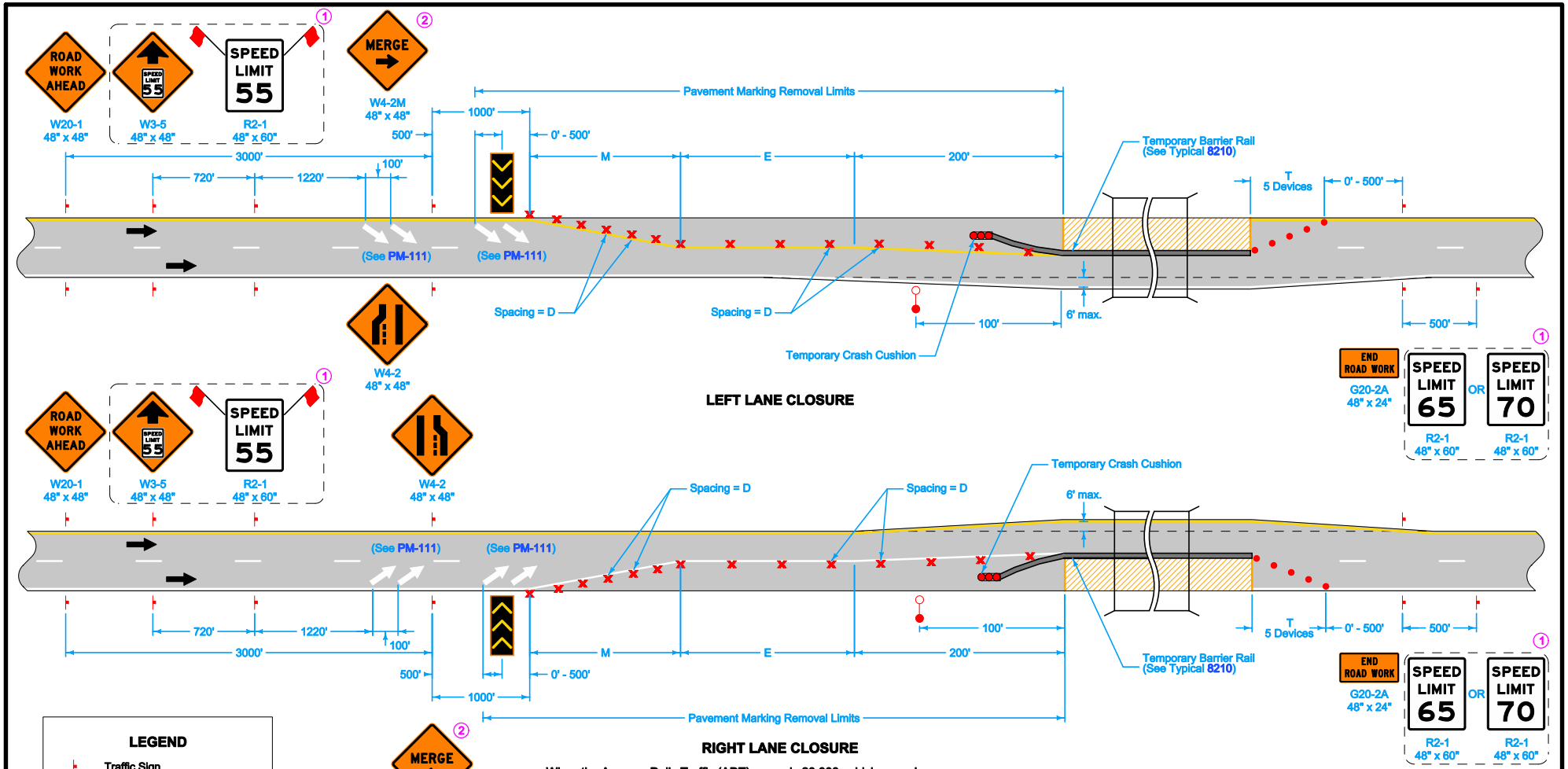
TC-418

SHEET 1 of 1

REVISIONS: Updated traffic signs. Reworded general notes. Added circle note 4. Made into color standard.

Deanna Maifield
APPROVED BY DESIGN METHODS ENGINEER

LANE CLOSURE ON DIVIDED HIGHWAY



LEGEND

- Traffic Sign
- Drum
- 42" Channelizer or Vertical Panel
- Arrow Panel
- Temporary Floodlighting
- Temporary Crash Cushion
- Work Area
- Direction of Traffic

SPEED LIMIT (mph)	D	E	M	T
45 - 50	45'	300'	630'	100'
55 - 60	55'	400'	770'	100'
65 - 70	65'	500'	910'	100'

When the Average Daily Traffic (ADT) exceeds 20,000 vehicles per day or when a traffic queue extends beyond the advanced signing, place RIGHT LANE CLOSED 4 MILES and RIGHT LANE CLOSED 2 MILES signs (W20-5) on both sides of the roadway 4 miles and 2 miles in advance of the lane closure, respectively.

(1) For roadways with a posted speed limit of 60 mph or greater before road work:

Place SPEED LIMIT AHEAD sign and SPEED LIMIT 55 sign prior to the lane closure as shown. Place SPEED LIMIT 65 or 70 beyond the work area as shown.

Remove or cover all existing signs that conflict with 55 mph speed limit while 55 mph speed limit is in effect.

(2) Refer to SI-881 for sign details.

Possible Contract Items:
- Painted Symbols and Legends
- Pavement Marking Items
- Pavement Markings Removed
- Symbols and Legends Removed
- Temporary Barrier Rail
- Temporary Crash Cushions
- Temporary Floodlighting

Possible Tabulations:
- 108-22
- 108-27
- 108-29
- 108-30
- 108-33

Iowa Department of Transportation

STANDARD ROAD PLAN

REVISION	
7	10-18-11

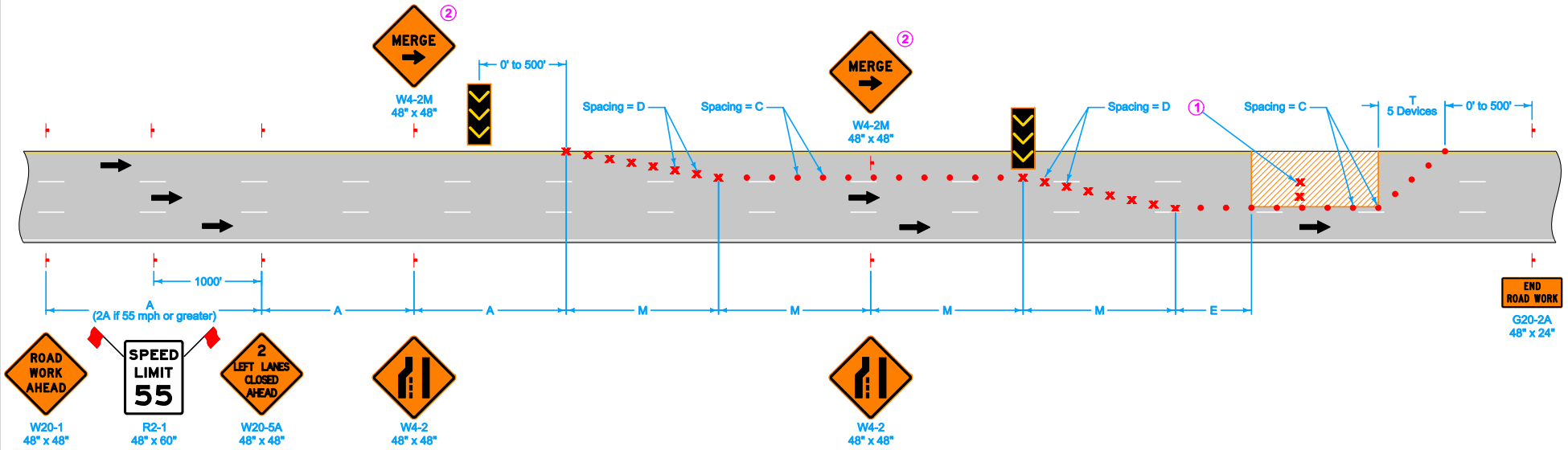
TC-421

SHEET 1 of 1

REVISIONS: Removed LANE CLOSED 2000 FT sign. Made into color standard.

Deanna Maifield
APPROVED BY DESIGN METHODS ENGINEER

LANE CLOSURE WITH TBR



When the Average Daily Traffic (ADT) exceeds 20,000 vehicles per day or when a traffic queue extends beyond the advanced signing, place RIGHT/LEFT LANE CLOSED 4 MILES and RIGHT/LEFT LANE CLOSED 2 MILES signs (W20-5) on both sides of the roadway 4 miles and 2 miles in advance of the lane closure, respectively, as appropriate.

For roadways with a posted speed limit of 60 mph or greater before road work:

Place SPEED LIMIT 55 signs prior to the lane closure as shown.

When the length of closure is greater than 1 mile, install SPEED LIMIT 55 signs in the closed lane at 1-mile intervals.

Remove or cover all existing signs that conflict with 55 mph speed limit while 55 mph speed limit is in effect.

Where there is a lane line drop-off or rise, do not allow traffic to cross over the drop-off or rise; except for ramp locations where a BUMP (W8-1) sign is placed.

Drop-offs greater than a nominal 4 inches are not allowed during non-working hours.

(1) Place two drums in the closed lane at 1000-foot intervals. Where core outs, holes, or uncured concrete exists within the work area, place an additional pair of drums just ahead of each.

(2) Refer to SI-881 for sign details.

LEGEND

- Direction Of Traffic
- Traffic Sign
- Drum
- 42" Channelizer or Vertical Panel
- Arrow Display
- Work Area

SPEED LIMIT (mph)	A	C	D	E	M	T
35 or less	250'	40'	35'	0'-200'	245'	50'
40	500'	80'	40'	0'-300'	320'	50'
45	700'	80'	45'	0'-400'	630'	100'
50	700'	80'	45'	400'	630'	100'
55 - 60	1000'	100'	55'	600'	770'	100'
65 - 70	1000'	100'	65'	700'	910'	100'

Possible Contract Item:
Traffic Control

Iowa Department of Transportation

STANDARD ROAD PLAN

REVISION 5 10-18-11

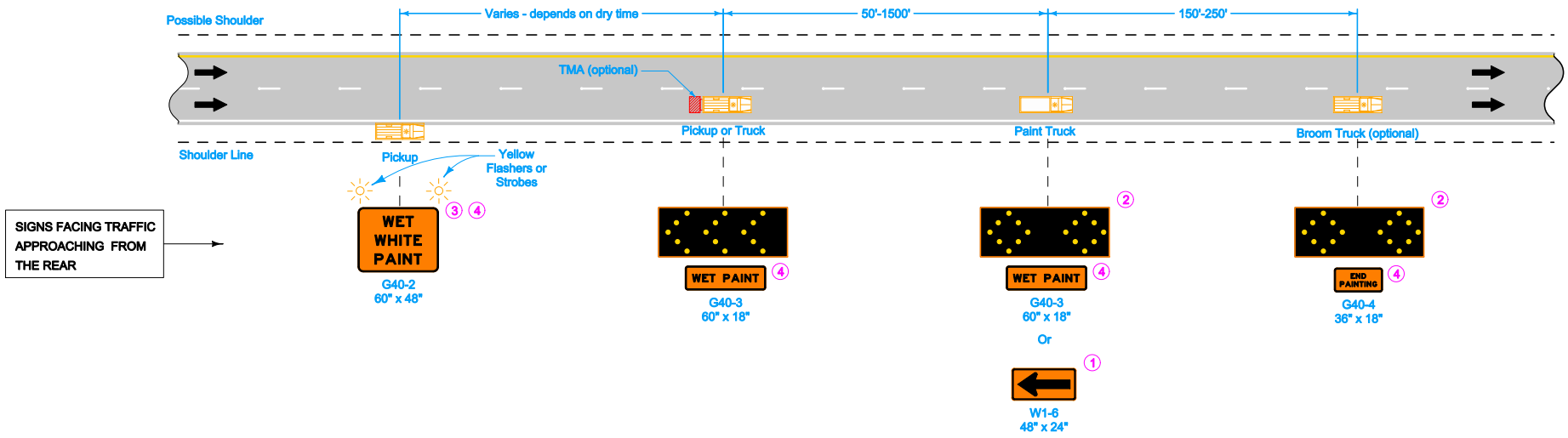
TC-422

SHEET 1 of 1

REVISIONS: Updated traffic signs. Reworded general notes. Made into color standard.

Deanna Maifield
APPROVED BY DESIGN METHODS ENGINEER

CLOSURE OF TWO ADJACENT LANES ON DIVIDED HIGHWAY



OUTSIDE EDGELINE OR LANELINE - DIVIDED OR UNDIVIDED

Possible Contract Item:
Traffic Control

Equip all vehicles with an amber Vehicle Warning Light.

(1) Optional Fluorescent Yellow Green (FYG) sign background may be used.

(2) This arrow display may be operated in a four-corner caution mode.

(3) A vehicle mounted Changeable Message Sign (CMS) may be used in lieu of this sign.

(4) Refer to SI-881 for sign details.

LEGEND

- Direction of Traffic
- Truck-Mounted Attenuator (TMA)

Iowa Department of Transportation

STANDARD ROAD PLAN

REVISION	
2	10-18-11

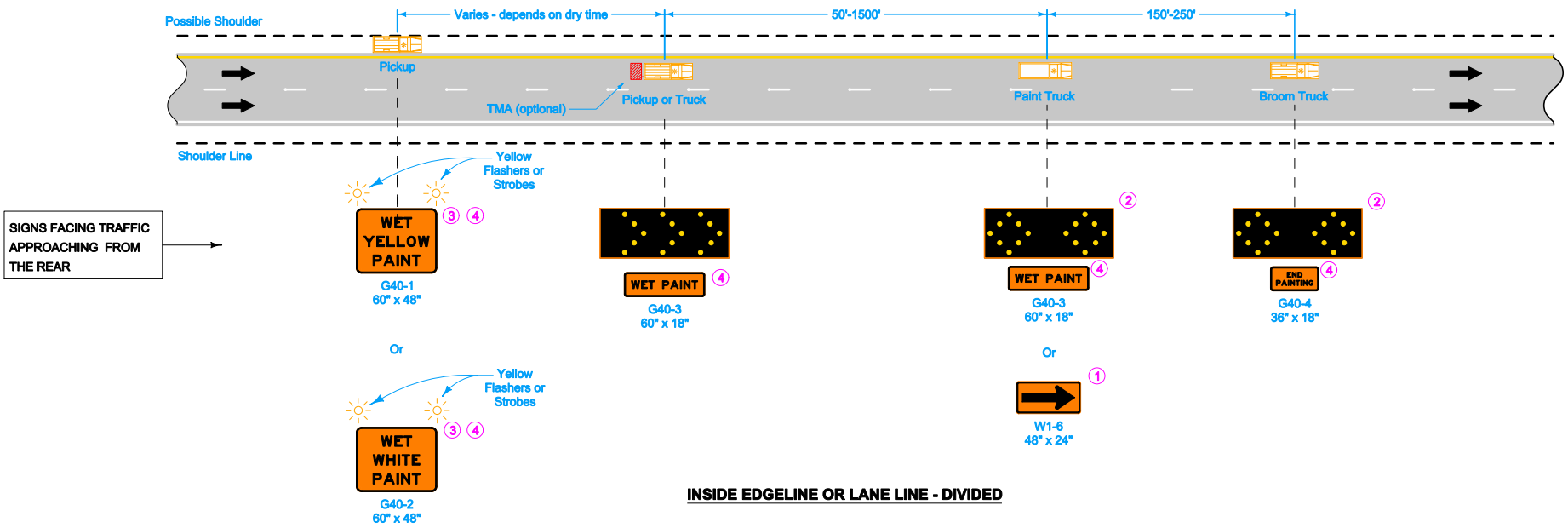
TC-433

SHEET 1 of 3

REVISIONS: Adjusted amber light wording in general notes.

Deanna Maifield
APPROVED BY DESIGN METHODS ENGINEER

PAVEMENT MARKING OPERATIONS



INSIDE EDGELINE OR LANE LINE - DIVIDED

LEGEND

- Direction of Traffic
- Truck-Mounted Attenuator (TMA)

(1) Optional Fluorescent Yellow Green (FYG) sign background may be used.

(2) This arrow display may be operated in a four-corner caution mode.

(3) A vehicle mounted Changeable Message Sign (CMS) may be used in lieu of this sign.

(4) Refer to SI-881 for sign details.

Iowa Department of Transportation

STANDARD ROAD PLAN

REVISION 2 10-18-11

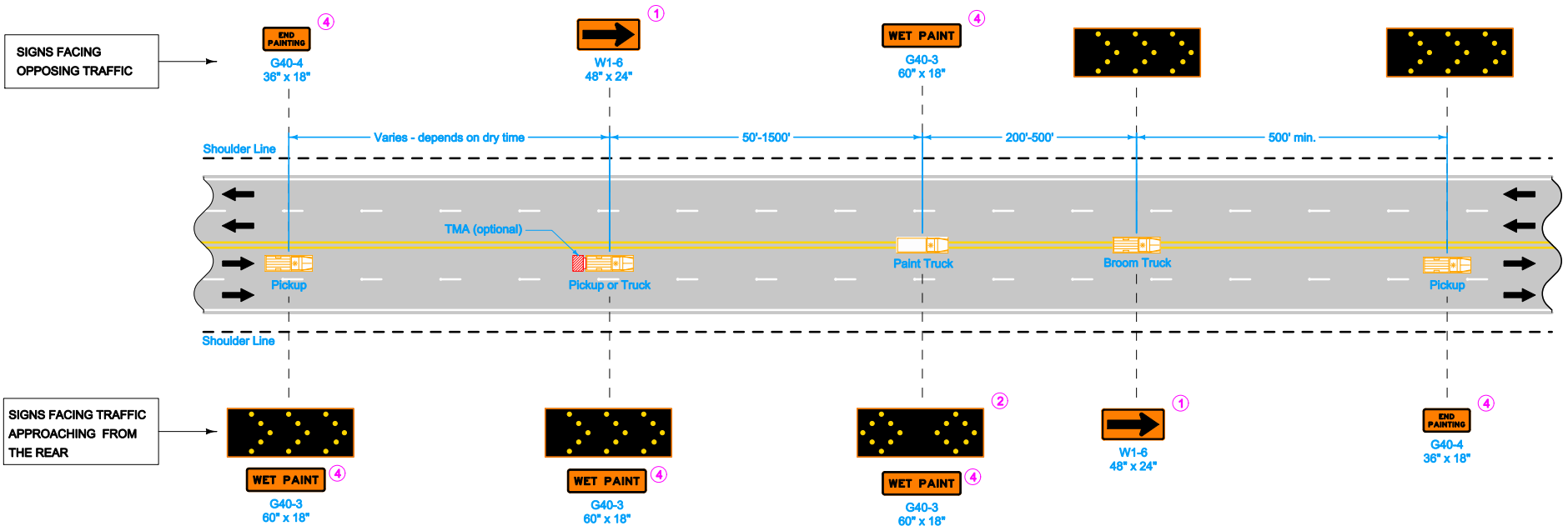
TC-433

SHEET 2 of 3

REVISIONS: Adjusted amber light wording in general notes.

Deanna Maifield
APPROVED BY DESIGN METHODS ENGINEER

PAVEMENT MARKING OPERATIONS



CENTERLINE - UNDIVIDED ONLY

LEGEND

- Direction of Traffic
- Truck-Mounted Attenuator (TMA)

(1) Optional Fluorescent Yellow Green (FYG) sign background may be used.

(2) This arrow display may be operated in a four-corner caution mode.

(4) Refer to SI-881 for sign details.

Iowa Department of Transportation

STANDARD ROAD PLAN

REVISION	
2	10-18-11

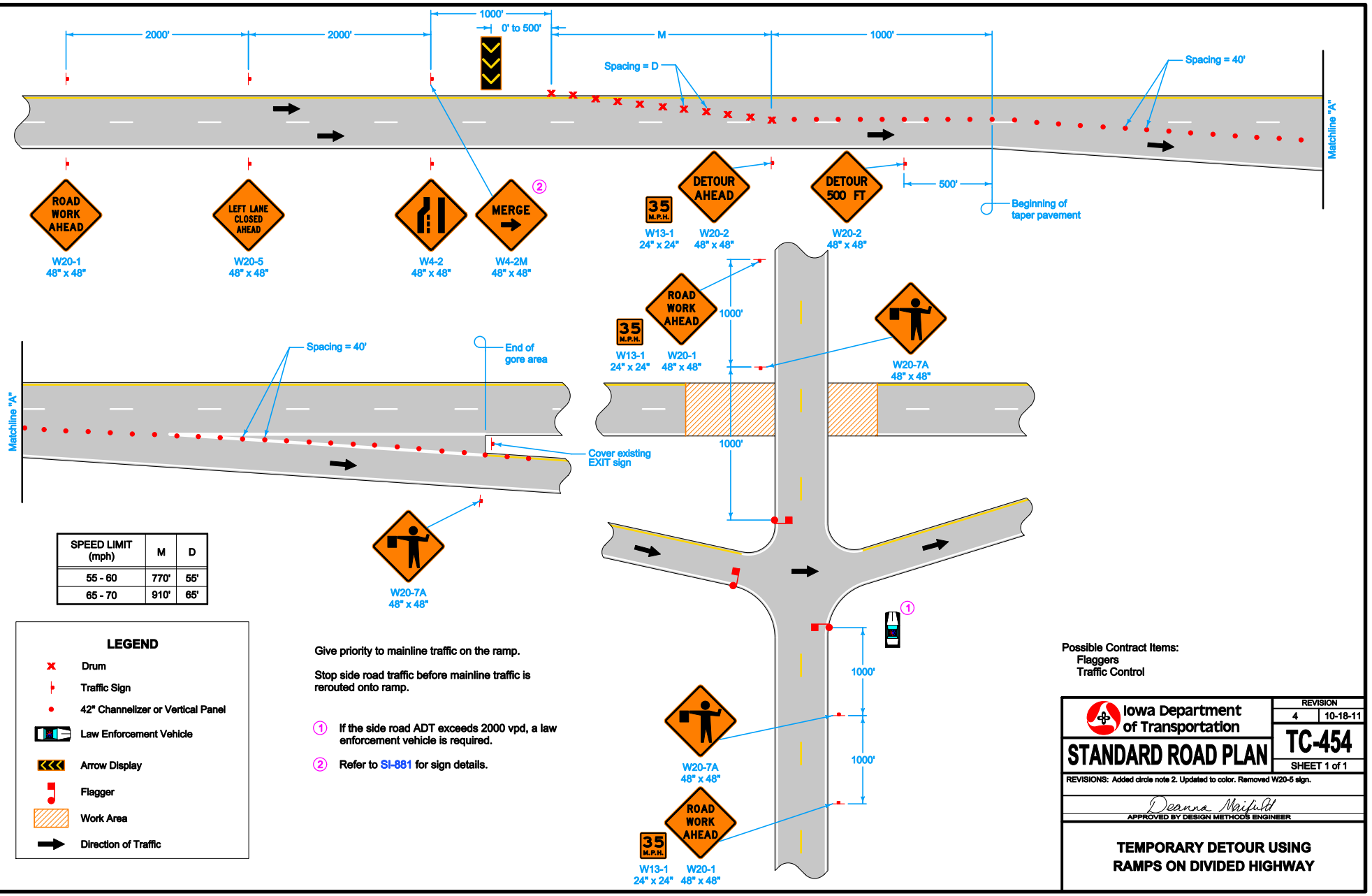
TC-433

SHEET 3 of 3

REVISIONS: Adjusted amber light wording in general notes.

Deanna Maifield
APPROVED BY DESIGN METHODS ENGINEER

PAVEMENT MARKING OPERATIONS



SPEED LIMIT (mph)	M	D
55 - 60	770'	55'
65 - 70	910'	65'

LEGEND

- Drum
- Traffic Sign
- 42" Channelizer or Vertical Panel
- Law Enforcement Vehicle
- Arrow Display
- Flagger
- Work Area
- Direction of Traffic

Give priority to mainline traffic on the ramp.

Stop side road traffic before mainline traffic is rerouted onto ramp.

(1) If the side road ADT exceeds 2000 vpd, a law enforcement vehicle is required.

(2) Refer to SI-881 for sign details.

Possible Contract Items:
Flaggers
Traffic Control

Iowa Department of Transportation

STANDARD ROAD PLAN

REVISION 4 10-18-11

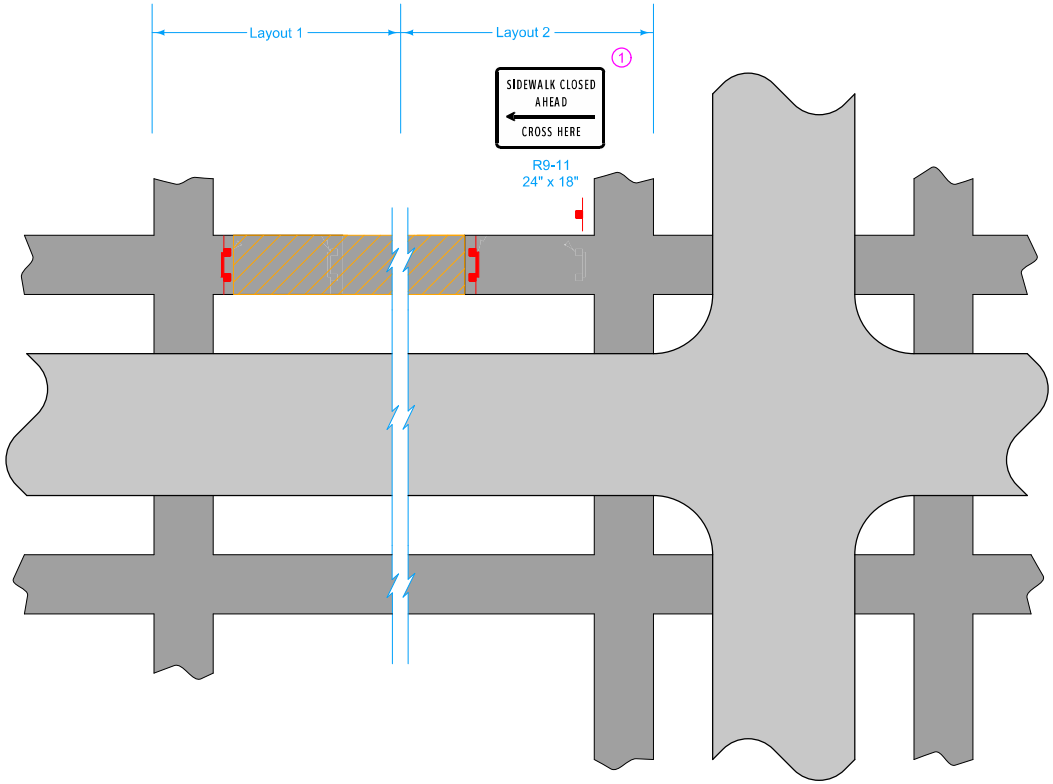
TC-454

SHEET 1 of 1

REVISIONS: Added circle note 2. Updated to color. Removed W20-5 sign.

Deanna Maifield
APPROVED BY DESIGN METHODS ENGINEER

TEMPORARY DETOUR USING RAMPS ON DIVIDED HIGHWAY



1 Omit "SIDEWALK CLOSED AHEAD CROSS HERE" (R9-11) sign when closure is at sidewalk intersection as shown in layout 1.

Possible Contract Item:
Traffic Control

Possible Tabulation:
113-2

MID-BLOCK CLOSURE

LEGEND

- Roadway
- Sidewalk
- Sign
- Pedestrian Path Closure
- Work Area

Iowa Department of Transportation

REVISION
NEW 10-18-11

STANDARD ROAD PLAN

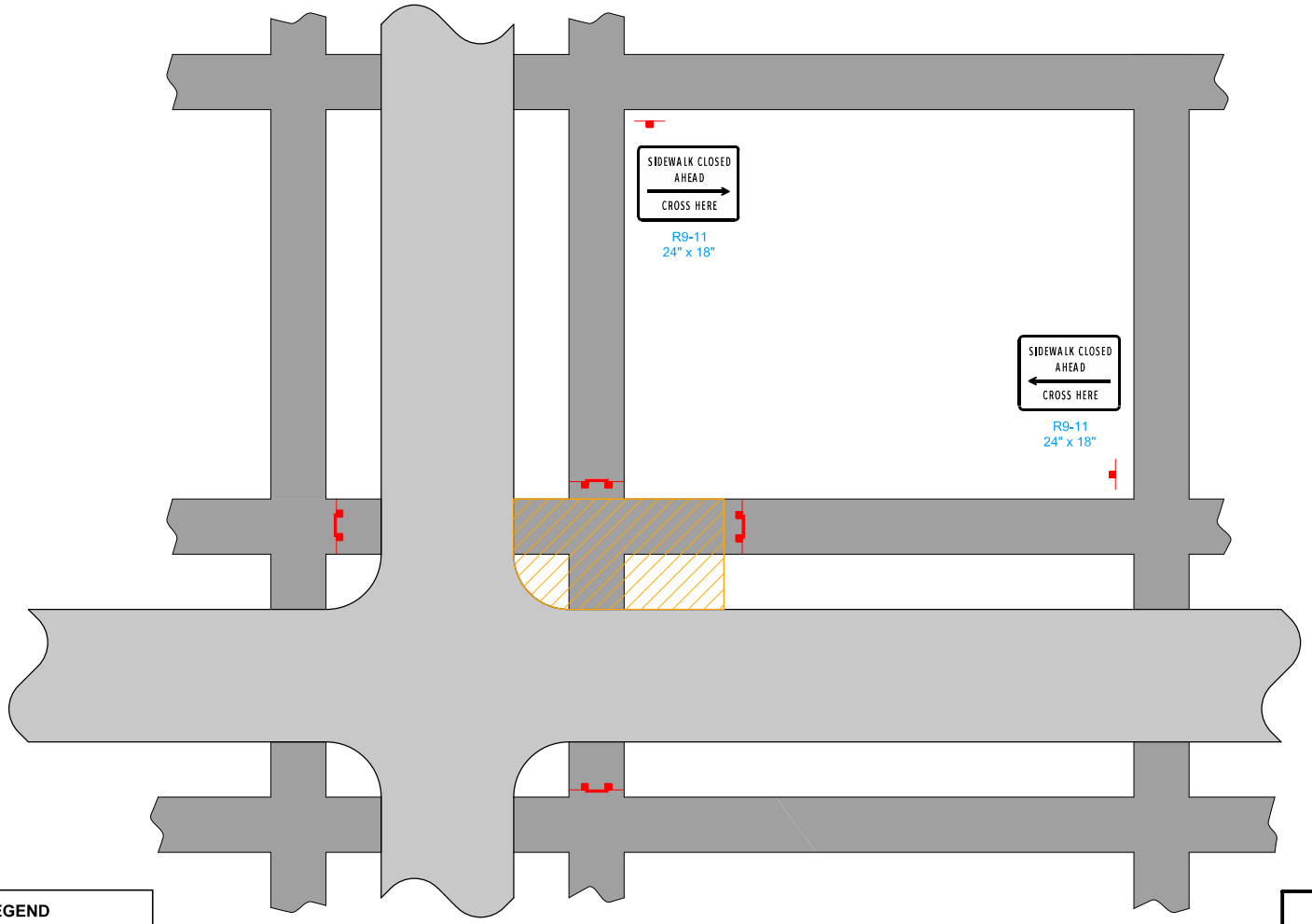
TC-601

SHEET 1 of 2

REVISIONS: New

Deanna Maifield
APPROVED BY DESIGN METHODS ENGINEER

PEDESTRIAN DETOUR



LEGEND

- Roadway
- Sidewalk
- Sign
- Pedestrian Path Closure
- Work Area

CLOSURE AT INTERSECTION

Iowa Department of Transportation

STANDARD ROAD PLAN

REVISION: NEW 10-18-11

TC-601

SHEET 2 of 2

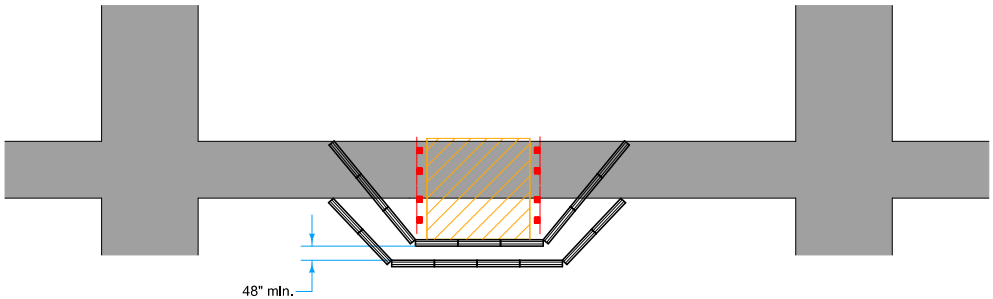
REVISIONS: New

Deanna Maifield

APPROVED BY DESIGN METHODS ENGINEER

PEDESTRIAN DETOUR

Acceptable materials and construction method for Pedestrian Channelizer will be defined in the contract documents. When Temporary Barrier Rail is specified as the Pedestrian Channelizer, Section 2528 of the Standard Specifications applies. For other types of Pedestrian Channelizers, the length of Pedestrian Channelizer installed will be measured in feet. Payment will be at the contract price per linear foot.



Possible Contract Items:

- Pedestrian Channelizer
- Temporary Barrier Rail
- Maintenance of Pedestrian Traffic

Possible Tabulation:

- 113-3

LEGEND

- Sidewalk
- Direction of Traffic
- Work Area
- Type III Barricade
- Pedestrian Channelizer

Iowa Department of Transportation

REVISION: NEW 10-18-11

STANDARD ROAD PLAN

TC-602

SHEET 1 of 1

REVISIONS: New

Deanna Maifield

APPROVED BY DESIGN METHODS ENGINEER

SIDEWALK DIVERSION

Iowa Department of Transportation
Highway Division

TO:	**Holders of Standard Road Plans**	**TRANSMITTAL DATE:**	
FROM:	**Office of Design**	**REVISION DATE:**	**10-18-11**
SUBJECT:	**Revision of Manual (Metric)**		

INSTRUCTIONS: The attached Standard Road Plans have received approval and may be referred to in the plans by number. Questions concerning the distribution of revisions to the manual should be directed to the Office of Document Services, telephone (515) 239-1940. Questions concerning information contained on the Standard Road Plans should be directed to the Methods Section, Office of Design, telephone (515) 239-1133 or email amy.tinken@dot.iowa.gov.

Item Description	Description of Revision
Note	The following revisions are effective with the October 18, 2011 letting. Projects let prior to this date may reference earlier versions of these Standard Road Plans.
RM INDEX	
RM-39	Void.
RV INDEX	
RV-10	Updated references to new standards. Was not added to previous revision letter.
RV-11	Void. Was not added to previous revision letter.

SECTION

Signals and Lighting

RM

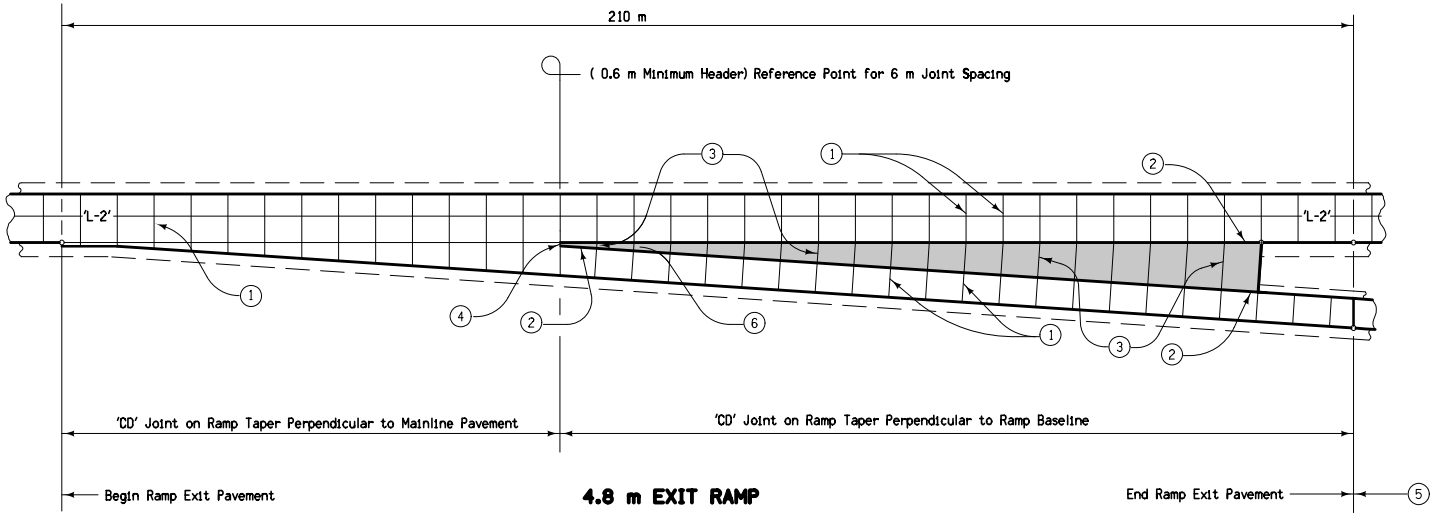
NO.	DATE	TITLE
RM-31	09-21-99	Location Details for Poles on Transformer Bases (Roadway Lighting)
RM-32	04-27-99	Location Details for Poles on Slip Bases (Roadway Lighting)
RM-33	10-03-00	Electrical Installation Details (Roadway Ducts)
RM-34A	10-19-04	Electrical Installation Details via Handhole (Slip-Base)
RM-34B	09-21-99	Electrical Installation Details (Transformer Base)
RM-35 (English)	04-19-11	Control Station Details (Pole-Mounted)
RM-36 (English)	04-19-11	Control Station Details (Pad-Mounted)
RM-37 (English)	10-21-08	Junction Box (Cast Iron)
RM-38	04-27-99	Junction Box (Fiber Reinforced Concrete)
RM-39	---	Void
RM-40	09-21-99	Cable Splices and Connectors
RM-41	04-25-00	Underdeck Lighting (High Pressure Sodium Luminaire)
RM-42 (English)	10-18-11	Precast Handhole
RM-43	10-18-05	Transformer Base (Cast Aluminum)
RM-44 (English)	10-20-09	Lighting Tower
RM-46	10-16-07	Slip Base for Light Poles
RM-47(English)	10-18-11	Footing for Slip-Base Light Poles
RM-48	10-17-06	Temporary Floodlighting

SECTION

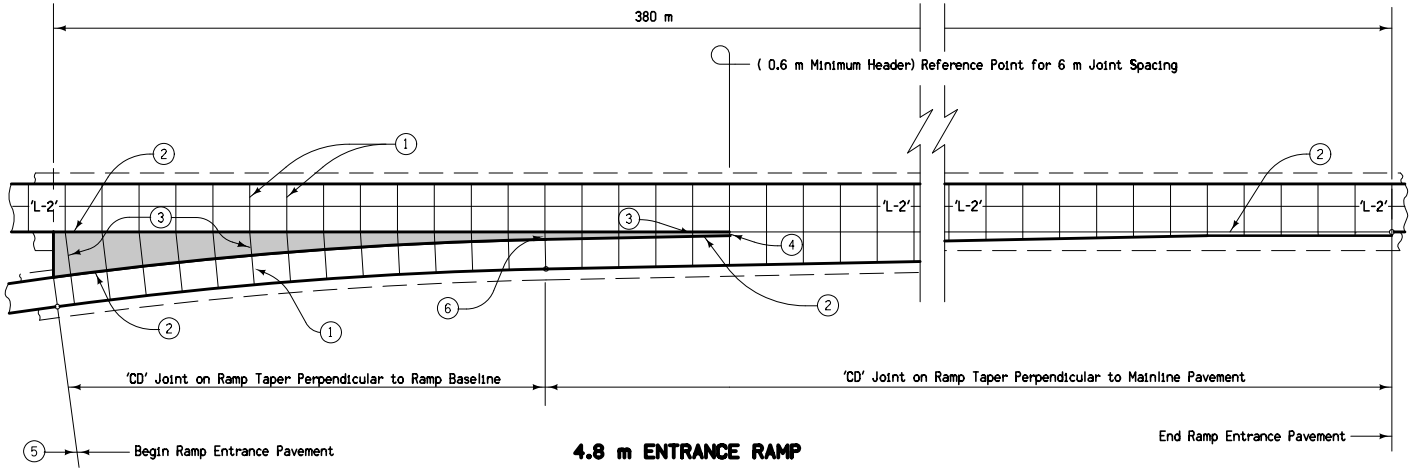
Ramp and Median Crossover Geometrics

RV

NO.	DATE	TITLE
RV-4	04-21-09	Deceleration Taper for 4.8 m Exit Ramp
RV-5	04-21-09	Acceleration Taper for 4.8 m Entrance Ramp
RV-8	04-21-09	Deceleration Taper for 5.5 m Exit Loop
RV-9	04-21-09	Acceleration Taper for 5.5 m Entrance Loop
RV-10	04-19-11	Jointing Details for 4.8 m Exit and Entrance Ramp



4.8 m EXIT RAMP



4.8 m ENTRANCE RAMP

1. 'CD' Joints at 6 m spacing.
2. 'BT-2' or 'KT-2' Joint.
3. 'C' Joint.
4. 'B' Joint.
5. Refer to plans for ramp jointing.
6. The transverse joints on the ramp shall be perpendicular to the ramp baseline where the gore area is 1.2 m or greater.

For joint details, see Standard Road Plan PV-101.

All dimensions given in millimeters unless noted.

M

METRIC VERSION

Iowa Department of Transportation

REVISION 1 04-19-11

STANDARD ROAD PLAN

RV-10

SHEET 1 of 1

REVISIONS: Updated references to new standards.

Deanna Maifield

APPROVED BY DESIGN METHODS ENGINEER

JOINTING DETAILS FOR 4.8 m EXIT AND ENTRANCE RAMP