



Florida Department of Transportation

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SECRETARY


August 3, 2011

This Memo Has Expired

DCE MEMORANDUM 10-11

(FHWA Approved: 08/02/11)

TO: DISTRICT CONSTRUCTION ENGINEERS

FROM: David A. Sadler, Director, and Office of Construction 

COPIES: Brian Blanchard, Robert Robertson, Chris Richter (FHWA), Bob Burleson (FTBA), Chad Thompson, Abraham Scott, Rafiq Darji, Steve Plotkin, Andre Pavlov

SUBJECT: MSE WALL DESIGN STANDARDS INDEX 6000 SERIES

The Department recently met with members of the construction industry that manufacture and erect Mechanically Stabilized Earth (MSE) walls to listen to their concerns regarding the current design standards which result in the top panels of the walls having to almost all be cast to a custom height. This presents additional fabrication costs as well as additional costs associated with the tracking for correct installation on the project site.

As a result of the meeting with industry, the Department has agreed to make revisions that are intended to facilitate more tolerance in the coping recess which should aid in reducing the number of custom height panels at the top of the MSE walls. The revisions also include clarification of several notes.

The revised drawings are provided in Attachment A with the changes denoted by clouding. These revisions will also be included in the January 2012 release of the Design Standards e-Booklet publication effective for lettings beginning July 2012.

This memorandum serves as blanket approval to process a \$0.00 contract change, and a copy of this memorandum should be attached to the work order or supplemental agreement. If requested by the contractor to use this change, these revised details shall be included in the shop drawings.

If you have any questions concerning this memorandum or would like to request the MicroStation drawings shown in Attachment A, please contact Steve Plotkin at (904) 360-5501.

DS/ph
Attachment

NOTES

SPECIFICATIONS:

- General Specifications:
The Florida Department of Transportation "Standard Specifications for Road and Bridge Construction", Current Edition and Supplements as Amended.
- Design Specifications:
a. Florida Department of Transportation (FDOT) "Structures Design Guidelines", Current Edition.
b. American Association of State Highway and Transportation Officials (AASHTO) "LRFD Bridge Design Specifications", Current Edition.
c. AASHTO-AGC-ARTBA Task Force 27 (Ground Modification Techniques), "Insitu Soil Improvement Techniques", January 1990.

DESIGN CRITERIA:

- Design is based on the assumption that the material contained within the reinforced soil volume, methods of construction and quality of prefabricated materials are in accordance with Specification Section 548 and Chapter 3 of the FDOT's Structures Design Guidelines.
- It is the responsibility of the Engineer of Record to determine that the maximum factored bearing pressure shown for the wall does not exceed the factored bearing resistance of the foundation for that specific wall location.
- The Wall Company is responsible for internal stability of the wall. External stability design, including foundation and slope stability, is the responsibility of the Engineer of Record.
- If there are manholes and/or drop inlets present, design and analysis for both internal and external stability shall be considered.

SOIL PARAMETERS:

- See Wall Control Drawings for soil characteristics of foundation material to be used in the design of the wall system.
- The Contractor will provide soil design parameters for backfill material based on the actual soil characteristics utilized at the site.

MATERIALS:

- Concrete Class: See Wall Control Drawings.
- See Specification Section 548 for material requirements.
- For additional material requirements see the Wall Company's General Notes.

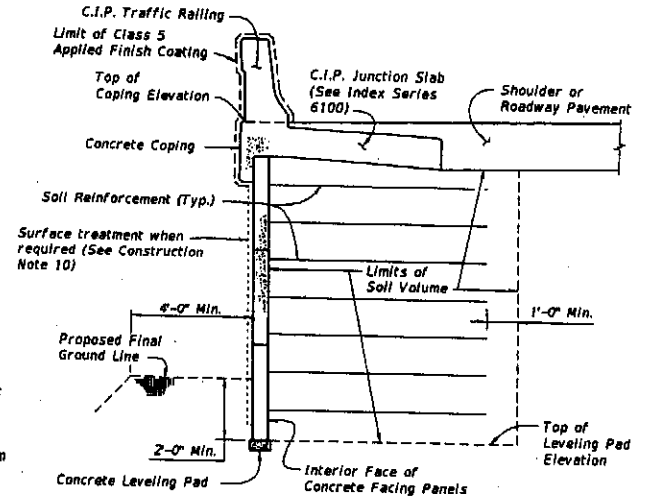
CONSTRUCTION:

- Walls will be constructed in accordance with Specification Section 548 and the Wall Company's instructions.
- For location and alignment of retaining walls, see Wall Control Drawings.
- If present, consider in design and analysis and locate manholes and drop inlets as shown on wall elevations.
- Refer to Wall Control Drawings of individual walls for minimum reinforcement strip/mesh length, factored bearing resistances, minimum wall embedment and anticipated long term and differential settlements.
- The Contractor is responsible for controlling water during storm events as needed during construction.
- It is the Contractor's responsibility to determine the location of any guardrail posts behind retaining wall panels. Prior to placement of the top layer of soil reinforcement, individual reinforcing strips/mesh may be skewed (15° maximum) to avoid the post locations if authorized by the Engineer. No cutting of soil reinforcement is allowed unless shown on Shop Drawings and approved by the Engineer. Any damage done to the soil reinforcement due to installation of the guardrail will be repaired by the Contractor at the Contractor's expense. Repair method will be approved by the Engineer.
- If existing or future structures, pipes, foundations or guardrail posts within the reinforced soil volume interfere with the normal placement of soil reinforcement and specific directions have not been provided on the plans, the Contractor will notify the Engineer to determine what course of action shall be taken.
- The Contractor is responsible for gradually displacing upper layer(s) of soil reinforcement downward (15° maximum from horizontal) to avoid cutting soil reinforcement and conflicts with paving and subgrade preparation. The Contractor's attention is directed especially to situations where roadway superelevation and/or soil mixing are anticipated.

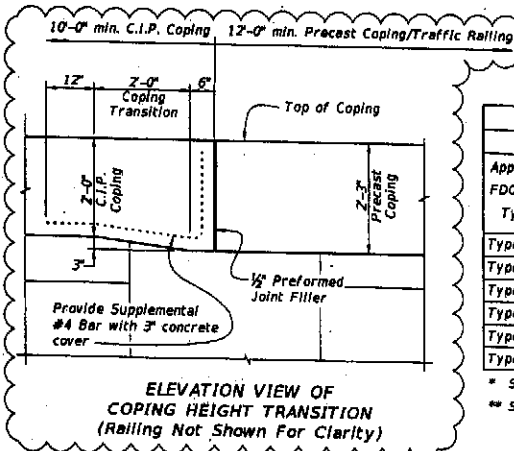
- All exposed concrete surfaces will receive a Class 5 Applied Finish Coating in accordance with Specification Section 400. Refer to Typical Section on this sheet and the following notes for limits of applied finish:
a. The Inside, backside and top of Traffic Railings and Pedestrian/Bicycle Railings.
b. Exposed surfaces of coping on top of retaining wall. Other coatings, colors or textures will be applied as required in the Wall Control Drawings.
- For concrete facing panel surface treatment, see Wall Control Drawings. Extend surface treatment a minimum of 6" below final ground line.
- Drive piles located within the soil volume prior to construction of the retaining wall, unless a method to protect the structure, acceptable to both the Engineer and Wall Company, is proposed and approved in writing. The portion of piles or drilled shafts extensions within the soil volume will be wrapped with polyethylene sheeting in accordance with Specification Section 459.
- A structural extension of the connection of the retaining wall panel to soil reinforcement will be used whenever necessary to avoid cutting or excessive skewing (greater than 15°) of the soil reinforcement around obstructions (i.e., piles, pipes, manholes, drop inlets, etc.).
- Steps in leveling pads will occur at MSE Wall panel interfaces. Panels will not cantilever more than 2" past the end of the upper tier leveling pad.
- The top of the leveling pad or footing will be 2-0" minimum below final ground line.
- Top of leveling pad elevations shown in the Wall Control Drawings are maximum elevations. The constructed leveling pad elevations may be deeper based on the panel layout shown in the shop drawings.
- The height of panels in the bottom course of MSE Walls must not be less than half the height of a standard panel.
- Work this index with Index 6100 & 6200 Series.

SHOP DRAWING REQUIREMENTS:

See Specification Section 548 for shop drawing requirements.



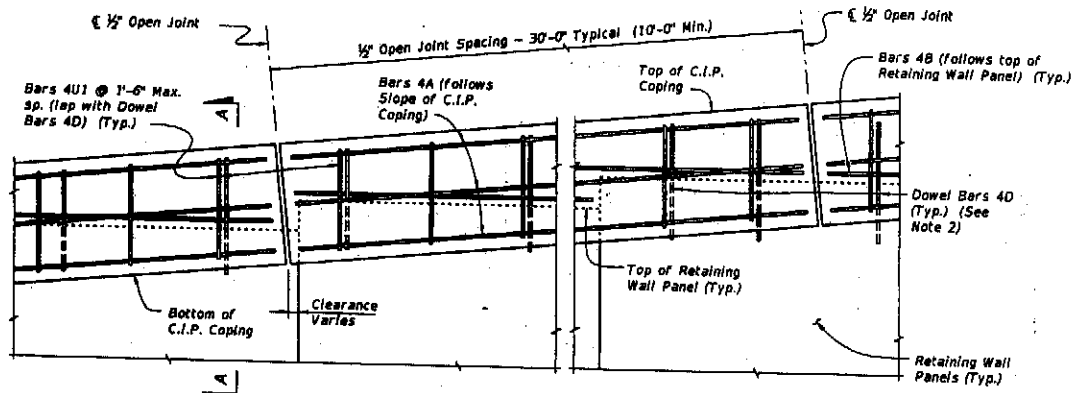
TYPICAL MSE RETAINING WALL SECTION WITH A TRAFFIC RAILING
(Showing Limits of the Reinforced Soil Volume)



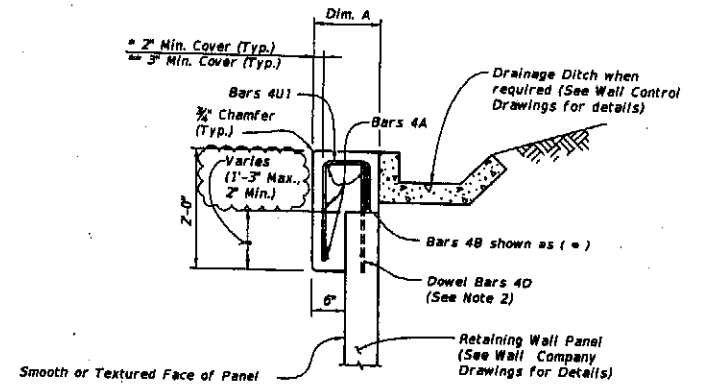
FDOT MSE RETAINING WALL CLASSIFICATION TABLE										
Applicable FDOT Wall Type *	Durability Requirements				Other Allowable FDOT Wall Types					
	Concrete Cover (in.)	Concrete Class for Panels	Pozzolan Additions? **	Soil Reinforcement Type	2A	2B	2C	2D	2E	2F
Type 2A	2	II	No	Metal	✓	✓	✓	✓	✓	✓
Type 2B	2	IV	No	Metal			✓	✓	✓	✓
Type 2C	3	IV	No	Metal				✓	✓	✓
Type 2D	3	IV	Yes	Metal					✓	✓
Type 2E	3	IV	No	Plastic						✓
Type 2F	3	IV	Yes	Plastic						✓

* See Data Table in Contract Plans.

** Silica fume, metakaolin or ultrafine fly ash.



C.I.P. COPING - PARTIAL ELEVATION VIEW

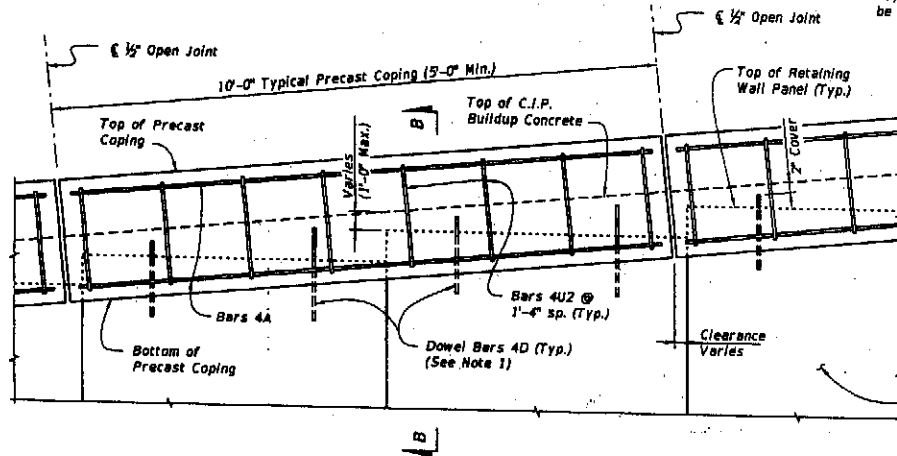


SECTION A-A
C.I.P. COPING

Dim. A	Panel width + 6"
Dim. B	Panel width + 1'-0" Min.

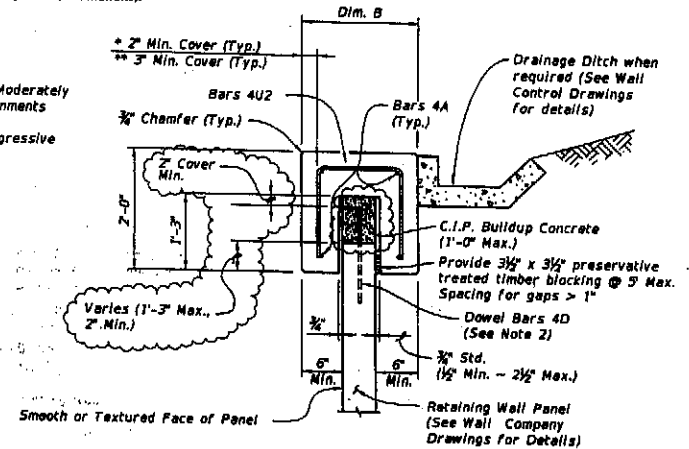
PRECAST AND C.I.P. COPING NOTES:

1. Provide Class II concrete for slightly aggressive environments or Class IV for moderately or extremely aggressive environments.
2. Dowel Bars 4D extend 1'-0" above the top of retaining wall panel. Field cut as necessary to maintain 2" minimum cover. See Wall Company Drawings for number and spacing of Dowel Bars 4D.
3. Payment for Dowel Bars 4D, Buildup Concrete and Coping will be made under Retaining Wall System (Permanent).



PRECAST COPING - PARTIAL ELEVATION VIEW

- * For Slightly and Moderately Aggressive environments
- ** For Extremely Aggressive environments.



SECTION B-B
PRECAST COPING

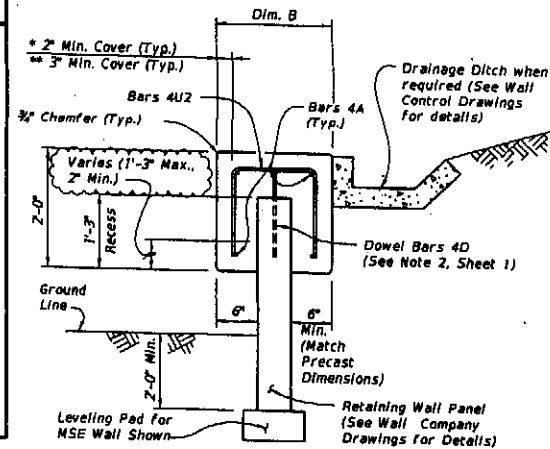
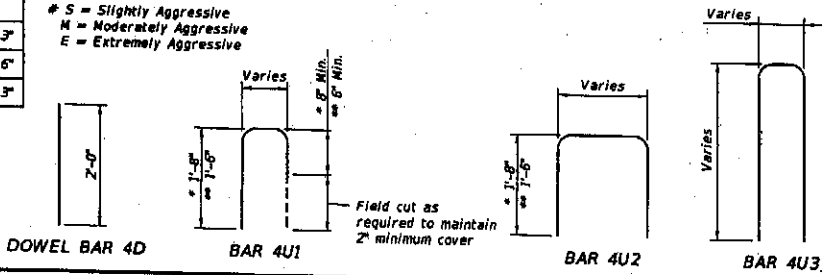
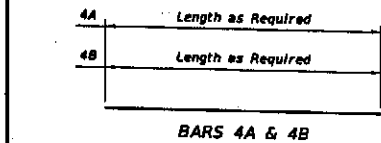
REINFORCING STEEL BENDING DIAGRAMS - PRECAST AND C.I.P. COPINGS

BILL OF REINFORCING STEEL			
MARK	SIZE	LENGTH # S or M	LENGTH # E
A	4	AS REQD.	AS REQD.
B	4	AS REQD.	AS REQD.
D	4	2'-0"	2'-0"
U1	4	Panel width + 4"	Panel width + 3"
U2	4	Panel width + 8"	Panel width + 6"
U3	4	Panel width + 4"	Panel width + 3"

REINFORCING STEEL NOTES:

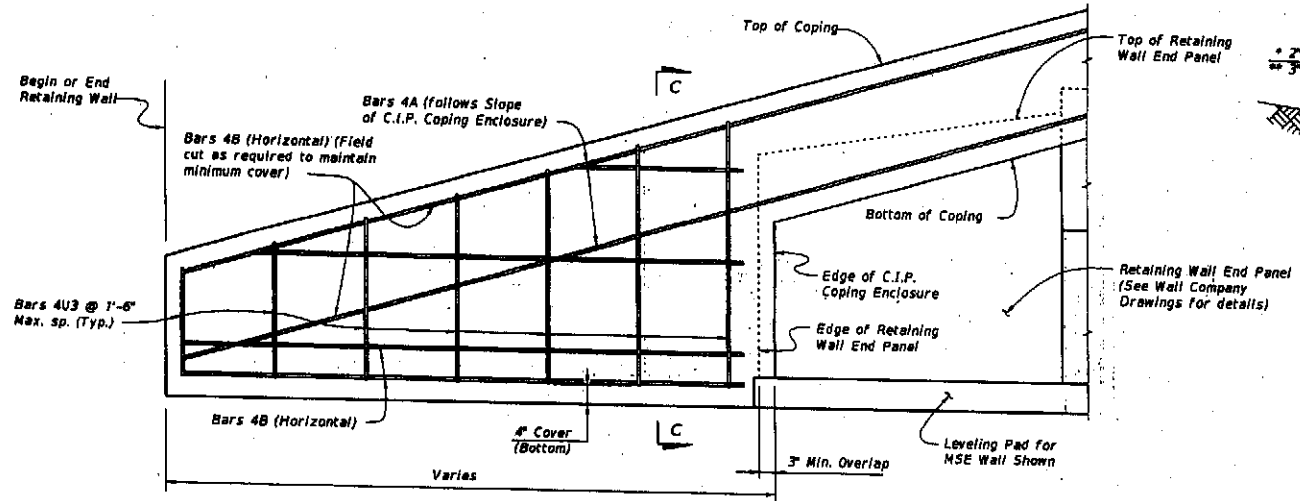
1. All bar dimensions in the bending diagrams are out to out.
2. All reinforcing steel at the open joints will have a 2" minimum cover.
3. Bars 4A may be continuous or spliced at the construction joints. Lap splices for Bars 4A will be a minimum of 1'-8".
4. The Contractor may use Welded Wire Reinforcement when approved by the Engineer. Welded Wire Reinforcement will conform to ASTM A 497.

S = Slightly Aggressive
 M = Moderately Aggressive
 E = Extremely Aggressive

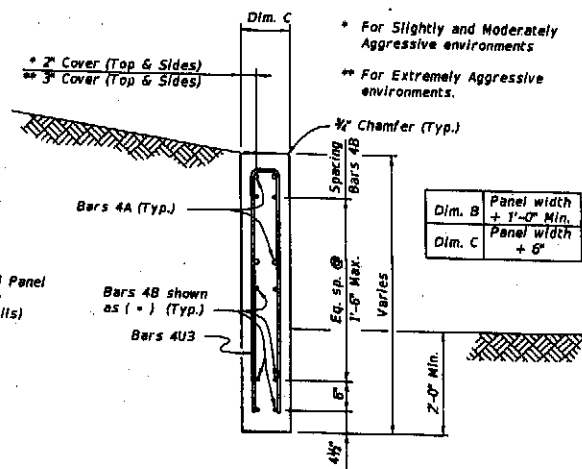


C.I.P. COPING USED WITH PRECAST COPING

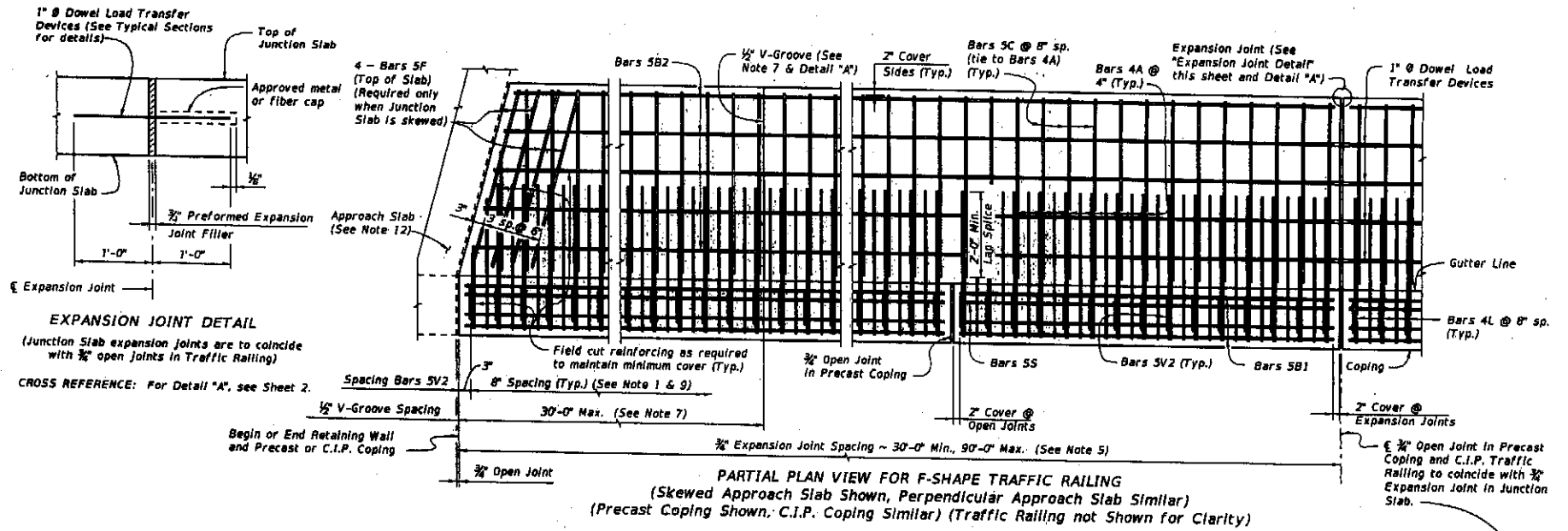
Note: When precast coping units do not fit the entire length of the retaining wall, use this similar C.I.P. coping for short portions between precast coping units. This C.I.P. coping may also be used for vertical copings.



C.I.P. COPING ENCLOSURE DETAIL

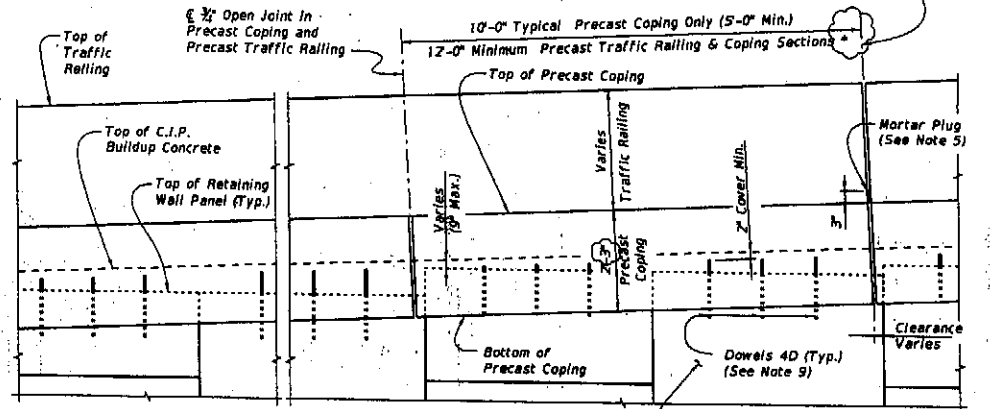


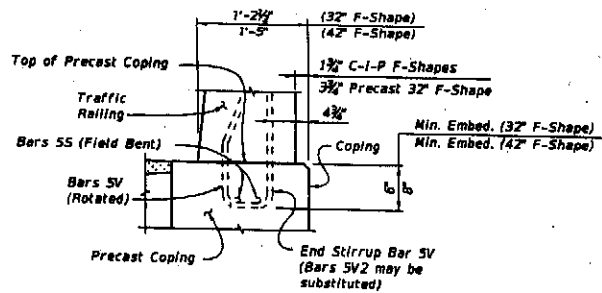
SECTION C-C



JUNCTION SLAB NOTES:

- APPLICATIONS: This junction slab is only applicable for a TL-4 crash test rating. For TL-5 crash test rating increase Expansion Joint Spacing to 60'-0" minimum and provide Bars 5C at 6" (max. spacing) within 6'-0" of Open Joints for precast coping with the 42" F-Shape Traffic Railing.
- CONSTRUCTION REQUIREMENTS: Construct the Junction Slab level transversely and expansion joints plumb; do not construct the junction slab or C.I.P. coping perpendicular to the roadway surface. Slip forming of Coping and/or junction slabs is not permitted.
- Provide Class II concrete for slightly aggressive environments or Class IV for moderate or extremely aggressive environments.
- Dowel Load Transfer Devices will be ASTM A 36 smooth round bar and hot-dip galvanized in accordance with Specification Section 962. Install Dowel Load Transfer Devices in accordance with Specification Section 350.
- Construct 3/8" Expansion Joints in junction slabs and C.I.P. copings plumb and perpendicular or radial to the Gutter Line. Provide at 90'-0" maximum intervals as shown. Provide 3"x3" Mortar plugs in open joints at the base of traffic railings to contain runoff.
- Provide and Install Preformed Expansion Joint Filler in accordance with Specification Section 932.
- Construct 1/2" V-Grooves in junction slabs and C.I.P. copings plumb and provide at 30'-0" maximum intervals as shown. Space V-Grooves equally between 3/8" Expansion Joints and/or Begin or End Junction Slab. V-Groove locations are to coincide with V-Groove locations in the Traffic Railing.
- Shoulder or Roadway Pavement is required on top of the junction slab for its entire length on the traffic side of the Traffic Railing. See Typical Sections on Sheet Nos. 2 and 3 for details.
- Spacing shown is along the Gutter Line.
- On MSE Walls provide, Dowel Bars 4D and extend to 7" above the top of retaining wall panel. Field cut as necessary to maintain 2" minimum cover to the top of the buildup concrete. See Wall Company Drawings for number and spacing of Dowel Bars 4D.
- Work this Index with the following:
 Index No. 420 - Traffic Railing - (32" F-Shape)
 Index No. 425 - Traffic Railing - (42" F-Shape)
- The following indexes contain details of the intersection of the retaining wall at approach slabs:
 Index No. 20900 - Approach Slabs (Flexible Pavement Approaches)
 Index No. 20910 - Approach Slabs (Rigid Pavement Approaches)



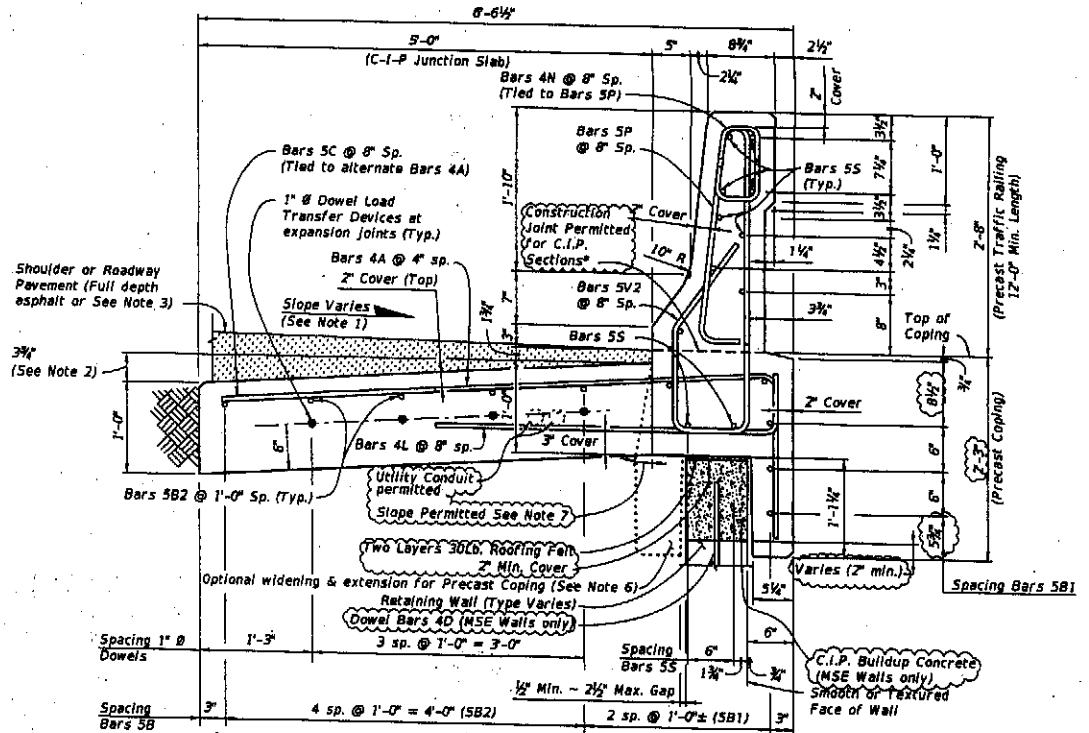
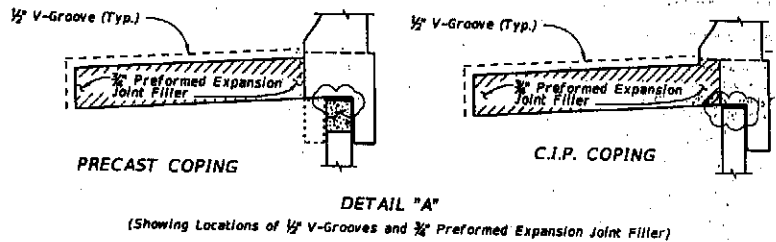


PARTIAL END VIEW OF TRAFFIC RAILING END TRANSITION FOR GUARDRAIL ATTACHMENT
(Showing Bars 5V and Bars 5S)
(Precast Coping Shown, C.I.P. Coping Similar)

NOTE: See Index No. 420 and Index No. 425, Detail "A" for details.

ESTIMATED QUANTITIES FOR PRECAST COPING		
ITEM	UNIT	QUANTITY
Concrete (Precast Coping Only)	CY/FT	0.079
Concrete (Precast Barrier & Coping)	CY/FT	0.165
Concrete (C.I.P. Junction Slab)	CY/FT	0.185
Reinforcing Steel (Precast Coping & Traffic Railing)	LB/FT	52.67
Reinforcing Steel (C.I.P. Junction Slab) (Typ.)	LB/FT	12.52
Additional Reinf. @ Expansion Joints	LB	21.36

(The above concrete quantities are based on a max. superelevation of 6.25% and a 32" F-Shape Traffic Railing.



TYPICAL SECTION THRU PRECAST 32" F-SHAPE TRAFFIC RAILING AND COPING WITH C-I-P JUNCTION SLAB

C.I.P. Traffic Railing and Coping Sections are permitted at End Sections, Drainage Inlets and Light Pole Pedestals if slip forming is not used.

NOTES:

1. Match Cross Slope of Travel Lane or Shoulder.
2. The 3 3/4" dimension corresponds to a maximum superelevation of 6.25%. For steeper superelevations increase this dimension to match roadway superelevation.
3. For Rigid Pavement (Concrete), Junction Slab may be thickened to match finish grade.
4. Minimum length of Junction Slab between expansion joints is 30'-0".
5. At the Contractor's option, mechanical couplers may be used to splice reinforcing. Complete details, including reinforcement lengths are required in the Shop Drawings. Provide mechanical couplers in accordance with Specification Section 415. Mechanical couplers shall develop 125% of the bar yield strength.
6. Contractor to maintain stability of precast coping/traffic railing prior to junction slab completion. In the Shop Drawings, show reinforcement for optional extension required for stability, shipping and handling. Maintain a minimum concrete cover.
7. Angle varies - 0° min., 20° max.

F-SHAPE TRAFFIC RAILINGS

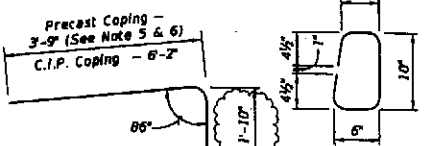
REINFORCING STEEL BENDING DIAGRAMS

BILL OF REINFORCING STEEL

MARK	SIZE	LENGTH		
		PRECAST COPING & 32" F-SHAPE	COPING	
			C-I-P	Precast
A	4	5'-7"	8'-0"	5'-7"
B1	5	11'-6"	N/A	9'-6"
B2	5	AS REQ.	AS REQ.	AS REQ.
C	5	4'-8"	N/A	4'-8"
F	5	4'-8"	4'-8"	4'-8"
L	4	4'-5"	4'-5"	4'-5"
H	4	2'-6"	N/A	N/A
P	5	5'-7"	5'-7"	5'-7"
S	5	11'-6"	AS REQ.	9'-6"
S1	8	N/A	AS REQ.	9'-6"
V2	5	5'-10"	9'-10"	5'-10"
1" Ø Dowel	Smooth Bar	2'-0"	2'-0"	2'-0"

SB1	9'-6" (Precast Coping only)
SB2	11'-6" (Precast Traffic Railing)
	Length as Required
SC	Precast Coping - 4'-8" (See Note 7)
SF	4'-8"
SS	Precast Coping, - 11'-6" (with 32" F-Shape), 9'-6" (Coping Only)
BS1	C-I-P Coping - Length as Required

BARS 5B, 5C, 5F & 5S



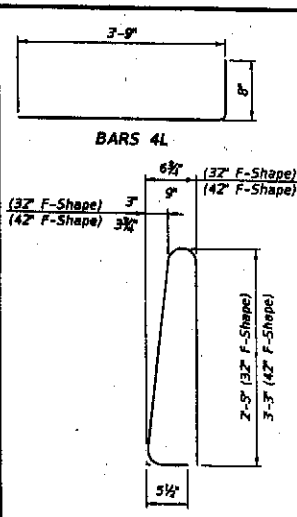
BAR 4A

STIRRUP BAR 4N

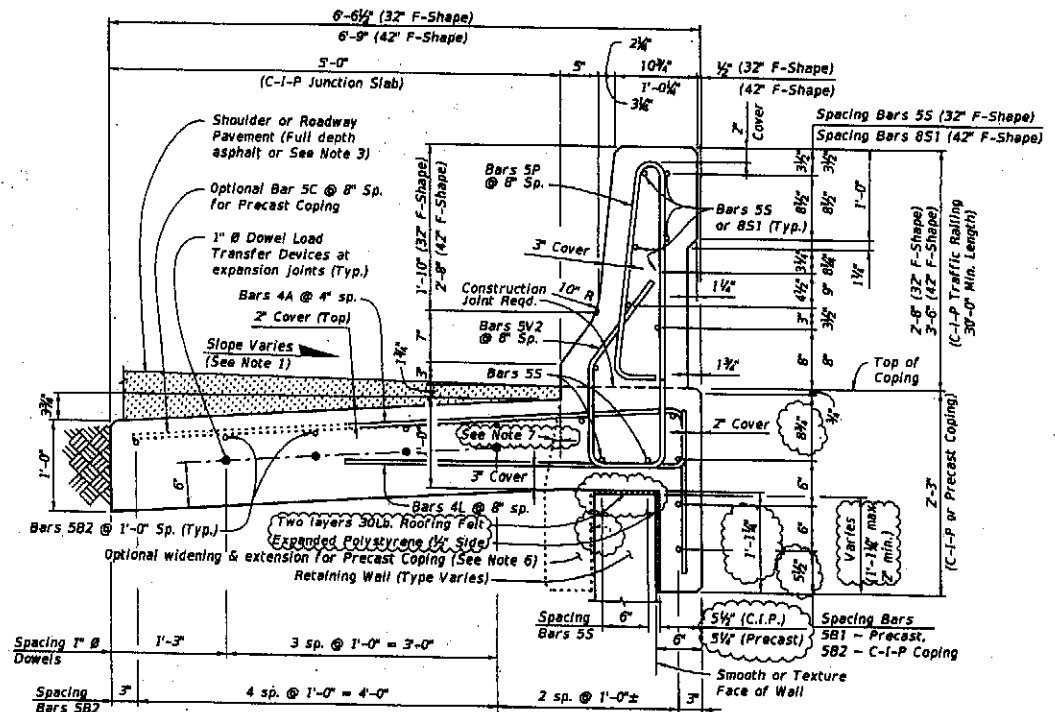
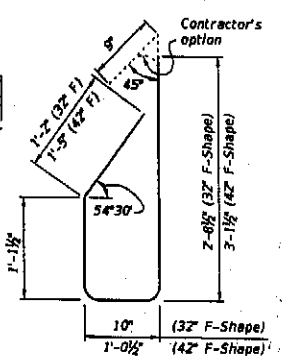
STIRRUP BAR 5V2

REINFORCING STEEL NOTES:

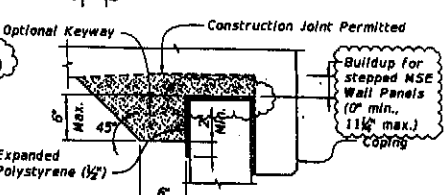
- All bar dimensions in the bending diagrams are out to out.
- All reinforcing steel at expansion and open joints will have a 2" minimum cover.
- Lap splices for Bars 5B & 5S will be a minimum of 2'-0".
- For Precast Copings only, lap splice Bars 4A with Bars 5C. Lap splices will be a minimum of 2'-0".
- The Contractor may use either full length Bars 4A or lap splice with Bars 5C at alternate Bars 4A for C-I-P Copings.
- Dimension shown is for lap splice option. For mechanical coupler option, this dimension is 1'-4 1/2" (32" F-Shape) or 1'-7" (42" F-Shape).
- Dimension shown is for lap splice option. For mechanical coupler option, this dimension is 4'-8".
- The Contractor may use Welded Wire Reinforcement when approved by the Engineer. Welded Wire Reinforcement will conform to ASTM A 497.



STIRRUP BAR 5P



TYPICAL SECTION THRU C-I-P TRAFFIC RAILING WITH C-I-P JUNCTION SLAB AND C-I-P COPING (PRECAST COPING SIMILAR WITH C-I-P BUILDUP)



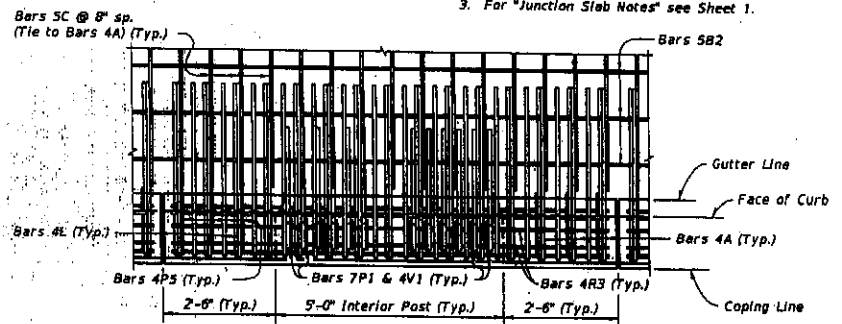
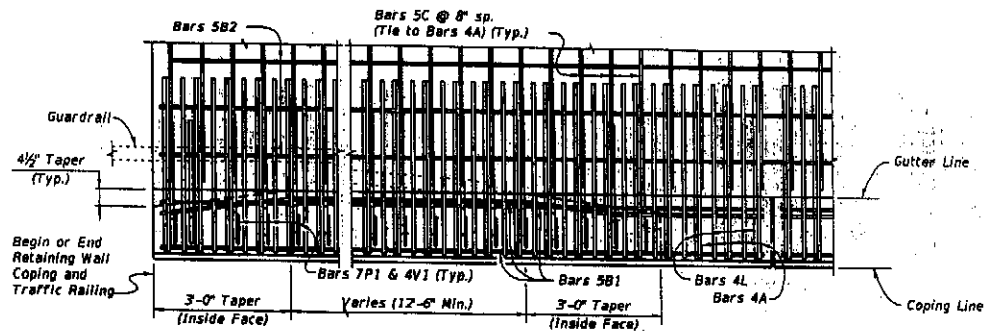
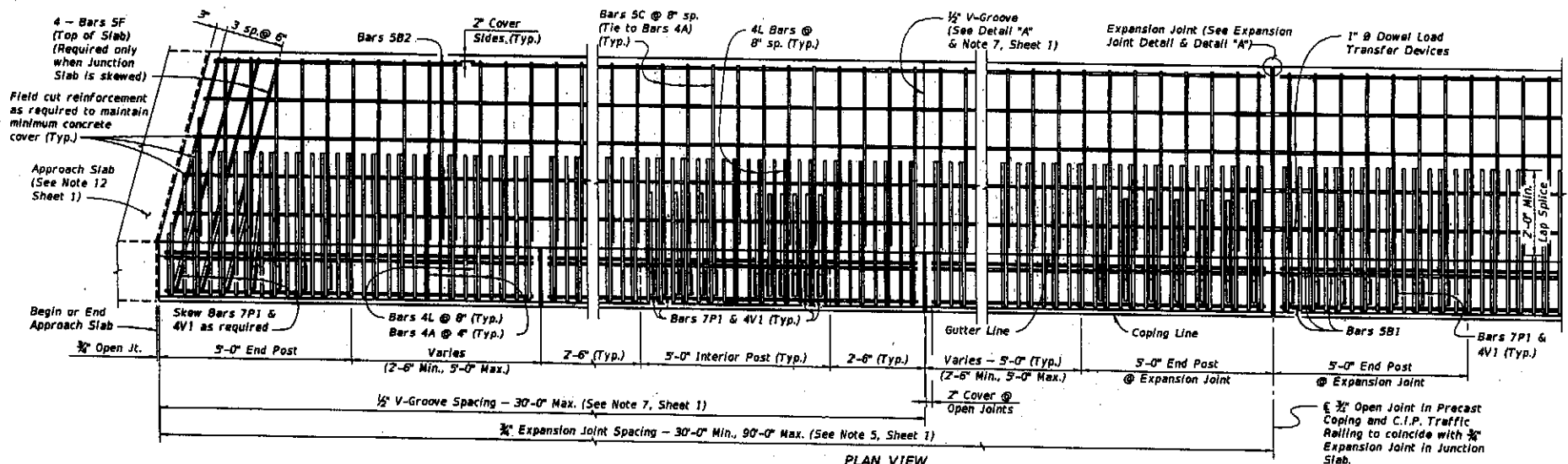
ESTIMATED QUANTITIES FOR C-I-P COPING		
ITEM	UNIT	QUANTITY
Concrete (Traffic Railing not Included)	CY/FT	0.264
Reinforcing Steel (Typical) excluding Bars 5V2 and 5S (Typ.)	LB/FT	30.89
Additional Reinf. @ Expansion Joint	LB/FT	21.36

(The above concrete quantities are based on a max. superelevation of 6.25% beneath a 32" F-Shape Traffic Railing on an MSE Wall.)

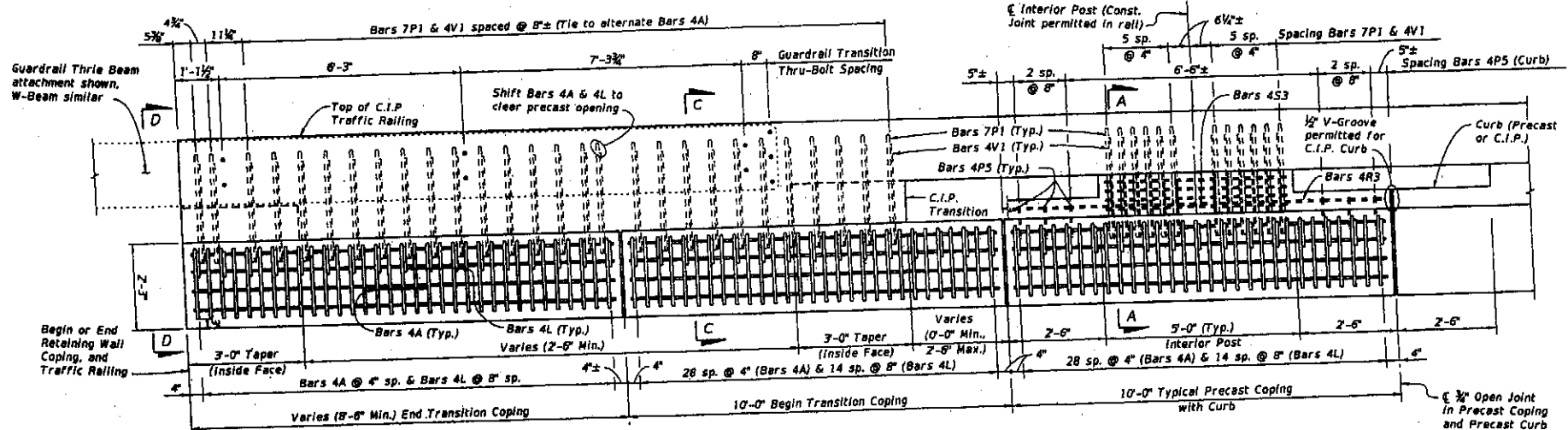
NOTES:

- Match Cross Slope of Travel Lane or Shoulder.
- The 3 1/2" dimension corresponds to a maximum superelevation of 6.25%. For steeper superelevations increase this dimension to match roadway superelevation.
- For Rigid Pavement (Concrete), Junction Slab may be thickened to match finish grade.
- Minimum length of Junction Slab between expansion joints is 30'-0".
- See Index No. 420 & 425 for additional Traffic Railing Details.
- Contractor to maintain stability of precast coping prior to junction slab completion. In the Shop Drawings, show reinforcement for optional extension required for stability, shipping and handling. Maintain 2" minimum concrete cover.
- Angle varies - 0° min., 20° max.

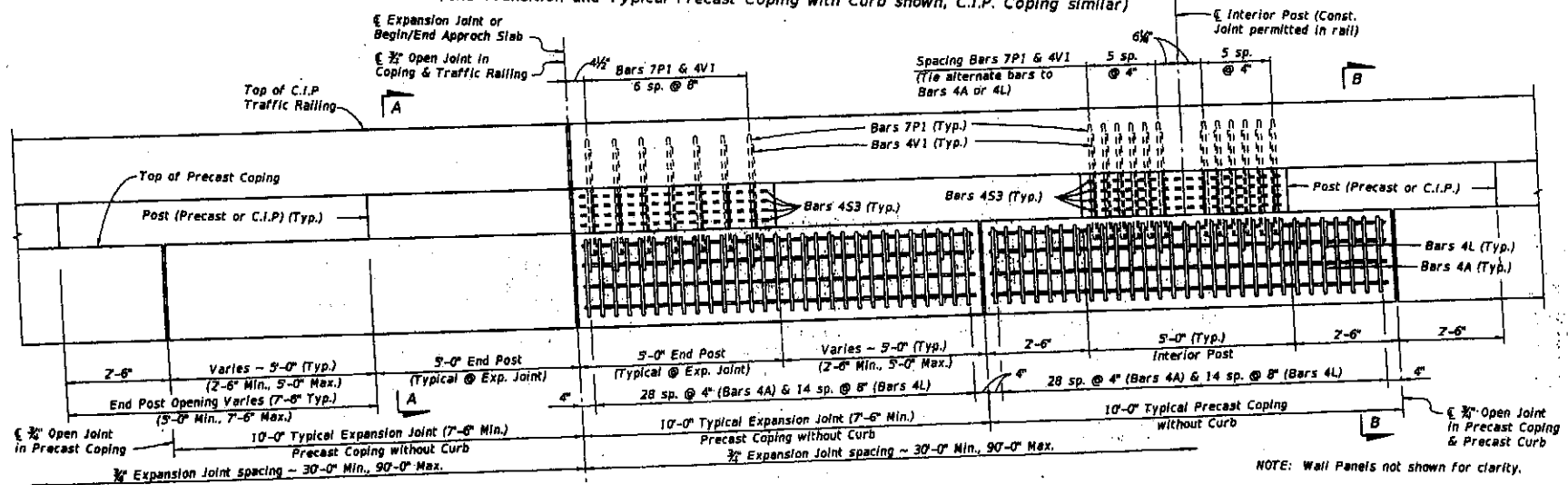
F-SHAPE TRAFFIC RAILINGS



CORRAL SHAPE TRAFFIC RAILINGS



PARTIAL ELEVATION VIEW OF OUTSIDE FACE OF COPING
 (End Transition and Typical Precast Coping with Curb shown, C.I.P. Coping similar)



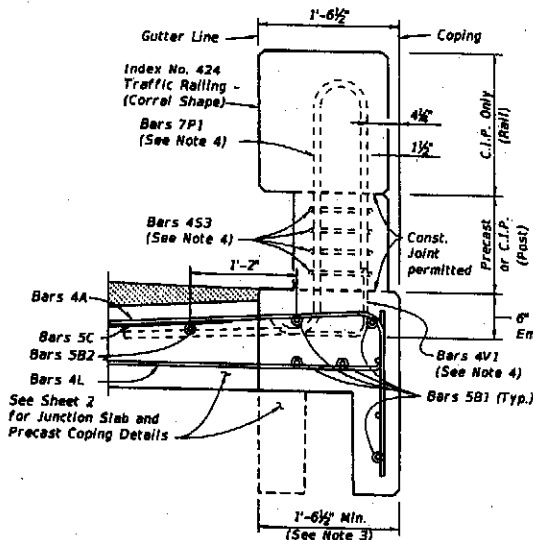
PARTIAL ELEVATION VIEW OF OUTSIDE FACE OF COPING
 (Precast Coping at Expansion Joint and Typical Precast Coping without Curb shown, C.I.P. Coping similar)

NOTE: Wall Panels not shown for clarity.

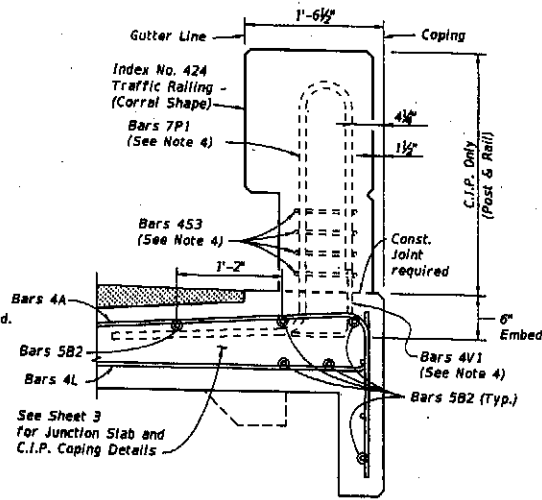
CROSS REFERENCES:

1. For Sections A-A, B-B, C-C & D-D, see Sheet 6.
2. For Junction Slab Notes, see Sheet 1.

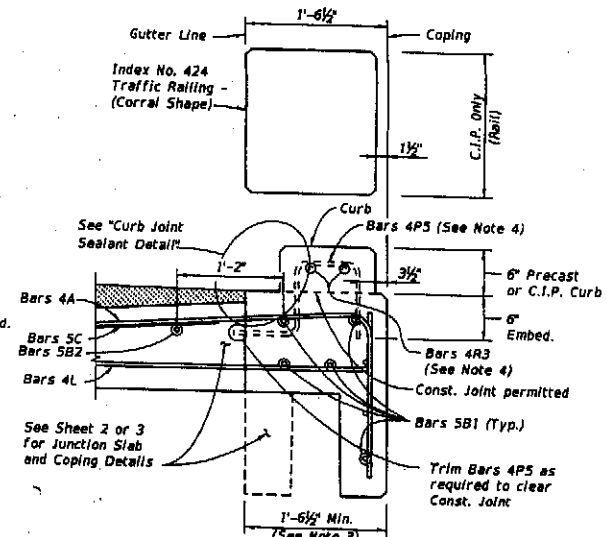
CORRAL SHAPE TRAFFIC RAILINGS



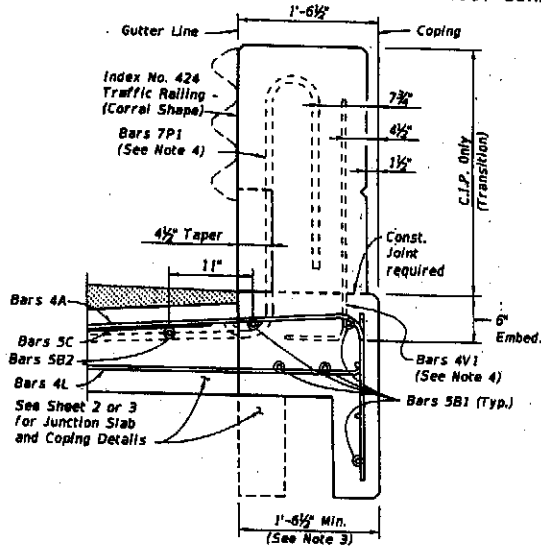
SECTION A-A
(TYPICAL SECTION PRECAST COPING WITHOUT CURB)



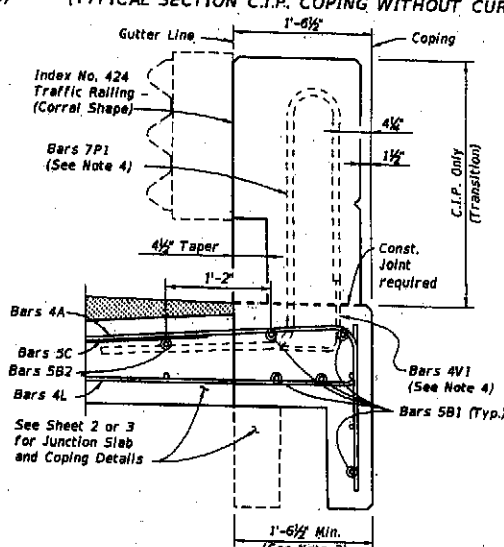
SECTION A-A
(TYPICAL SECTION C.I.P. COPING WITHOUT CURB)



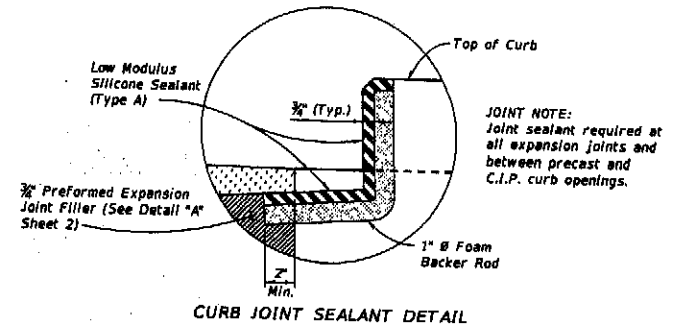
SECTION B-B
(TYPICAL SECTION WITH CURB)
(Precast Coping Shown, C.I.P. Coping Similar)



SECTION C-C
(TYPICAL SECTION TRANSITION COPING)
(Precast Coping shown, C.I.P. Coping similar)

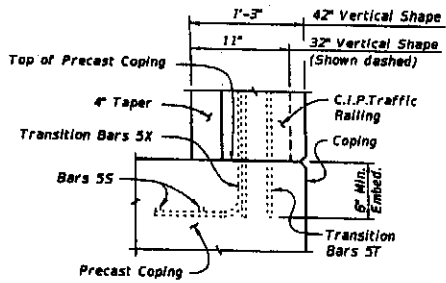


END VIEW D-D
(TYPICAL SECTION TRANSITION COPING)
(Precast Coping shown, C.I.P. Coping similar)



- NOTES:
1. See Sheets 2 & 3 for Junction Slab and additional Coping details.
 2. Slip Forming of C.I.P. Traffic Railing is not permitted.
 3. Actual width varies depending on type of Retaining Wall used.
 4. See Index No. 424 for Traffic Railing details and Bars 7P1, 4P5, 4R3, 4S3 & 4V1. Bars 5R2 and 5U are not required in Retaining Wall Coping.

CORRAL SHAPE TRAFFIC RAILINGS

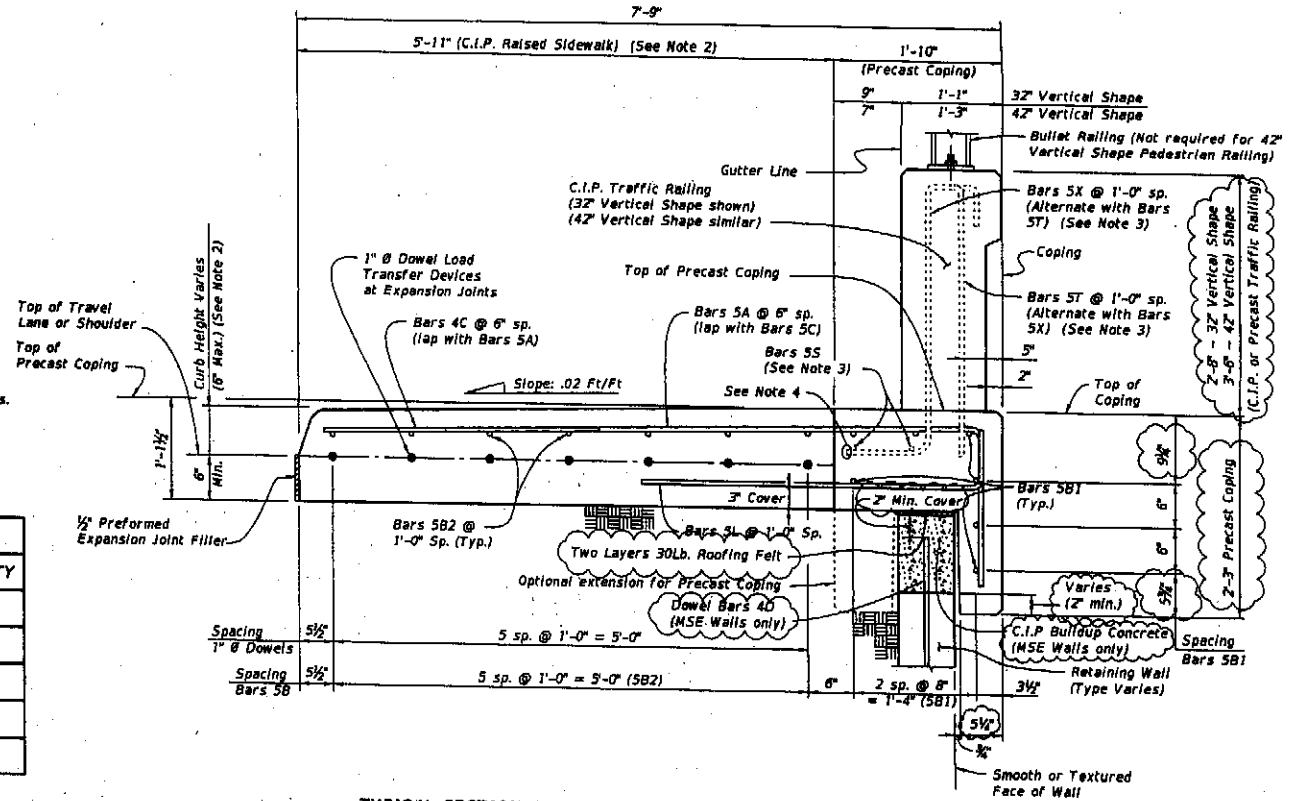


PARTIAL END VIEW OF TRAFFIC RAILING END TRANSITION FOR GUARDRAIL ATTACHMENT (Showing Bars 5S, Bars 5T and Bars 5X) (Precast Coping Shown, C.I.P. Coping Similar)

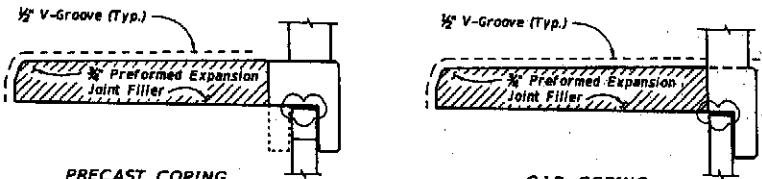
NOTE: See Index No. 422 and Index No. 423, Railing End Detail for details.

ESTIMATED QUANTITIES FOR PRECAST COPING		
ITEM	UNIT	QUANTITY
Concrete (Precast Coping)	CY/FT	0.091
Concrete (C.I.P. Raised Sidewalk)	CY/FT	0.232
Reinforcing Steel (Precast Coping) excluding Bars 5T, 5X and 5S (Typ.)	LB	22.00
Reinforcing Steel (C.I.P. Raised Sidewalk) (Typ.)	LB/FT	11.92
Additional Reinf. @ Expansion Joints	LB	32.04

The above concrete quantities are based on a Type D Concrete Curb (See Note 2).



TYPICAL SECTION THRU PRECAST COPING WITH C.I.P. RAISED SIDEWALK AND RETAINING WALL AT EXPANSION JOINTS



(Showing Locations of 1/2" V-Grooves and 3/4" Preformed Expansion Joint Filler)

NOTES:

1. Actual width varies depending on type of Retaining Wall used.
2. Match roadway curb shape (Type) and height. See Roadway Plans and Index No. 300. 5'-11" dimension is based on a 32" Vertical Shape Traffic Railing with a Type D curb adjacent to a 6'-0" wide sidewalk. Adjust this dimension as required for other curb types or transitions at Begin or End Retaining Wall.
3. See Index No. 422 and Index No. 423 for Bars 5S, 5T & 5X and Bullet Railing details. Adjust vertical dimension of Bars 5T and 5X, see Reinforcing Steel Note 5.
4. Trim end of Bars 5T and 5X to clear construction joint for 42" Vertical Shape Traffic Railing.
5. At the Contractor's option, mechanical couplers may be used to splice reinforcing. Complete details, including reinforcement lengths are required in the Shop Drawings. Mechanical couplers shall develop 125% of the bar yield strength.
6. Contractor to maintain stability of precast coping prior to junction slab completion.

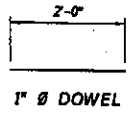
REINFORCING STEEL BENDING DIAGRAMS - RAISED SIDEWALK

BILL OF REINFORCING STEEL

MARK	SIZE	LENGTH	
		PRECAST COPING/RAILING	C.I.P. COPING
A	5	4'-10"	8'-4"
B1	5	9'-8" / 11'-6"	N/A
B2	5	AS REQD.	AS REQD.
C	4	5'-5"	N/A
F	5	5'-0"	5'-0"
L	5	4'-5"	4'-5"
1" Ø Dowel	Smooth Steel Bar	2'-0"	2'-0"

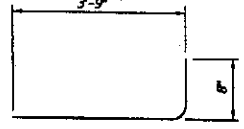
5B1	Precast Coping - 9'-6"
5B2	Precast Traffic Railing/Coping - 11'-6" Length as Required
5C	Precast Coping - 5'-5" (See Note 7)
5F	5'-0"

BARS 5B1, 5B2, 5C & 5F



Precast Coping - 3'-9"
(See Note 6)

C.I.P. Coping - 7'-3"



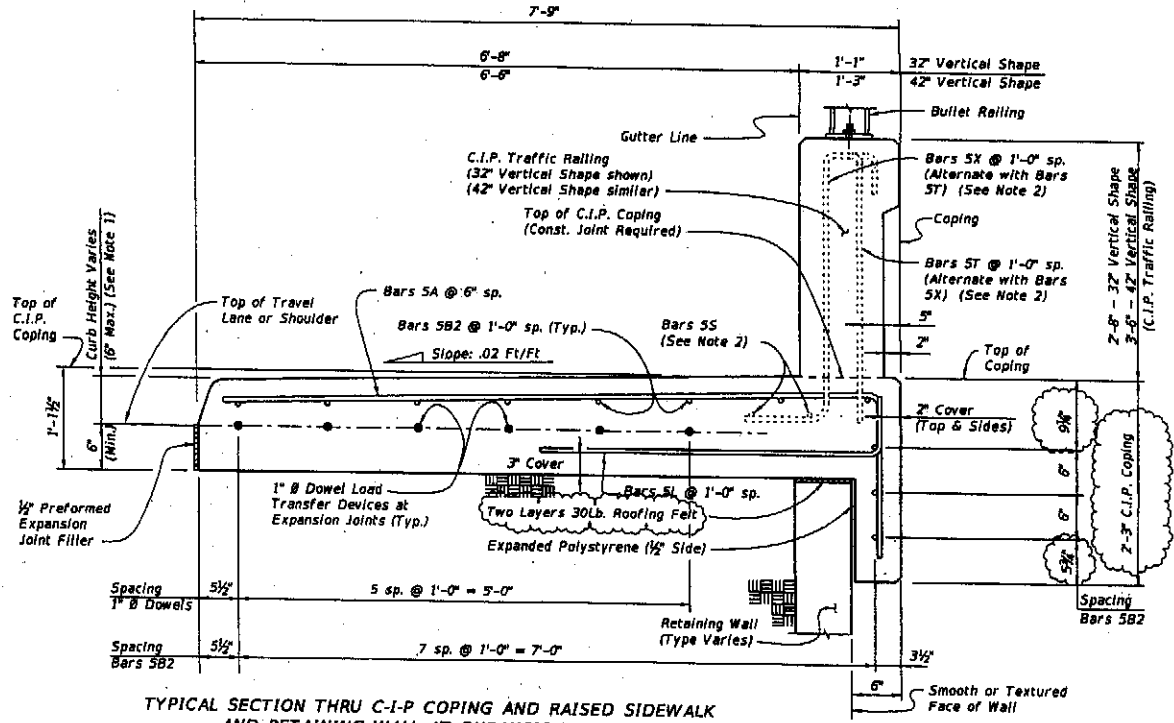
REINFORCING STEEL NOTES:

1. All bar dimensions in the bending diagrams are out to out.
2. All reinforcing steel at expansion joints will have a 2" minimum cover.
3. Lap splices for Bars 5B will be a minimum of 2'-2".
4. Lap splice Bars 5A with Bars 5C. Lap splices will be a minimum of 2'-2".
5. See Index No. 422 and Index No. 423 for Bars 5S, 5T and 5X. Adjust vertical dimensions of Stirrup Bars 5T and 5X to 3'-0" for 32" Vertical Shape or 3'-10" for 42" Vertical Shape.
6. Dimension shown is for lap splice option. For mechanical coupler option, this dimension is 1'-8".
7. Dimension shown is for lap splice option. For mechanical coupler option, this dimension is 5'-5".
8. The Contractor may use Welded Wire Reinforcement when approved by the Engineer. Welded Wire Reinforcement will conform to ASTM A 497.

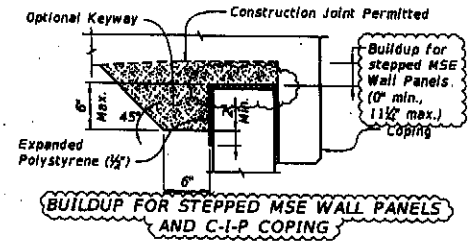
ESTIMATED QUANTITIES FOR C.I.P. COPING

ITEM	UNIT	QUANTITY
Concrete	CY/FT	0.322
Reinforcing Steel (Typical) excluding Bars 5T, 5X and 5S (Typ.)	LB/FT	28.85
Additional Reinf. @ Expansion Joints	LB	32.04

The above concrete quantities are based on a Type D Concrete/Curb on an MSE Wall (See Note 1).

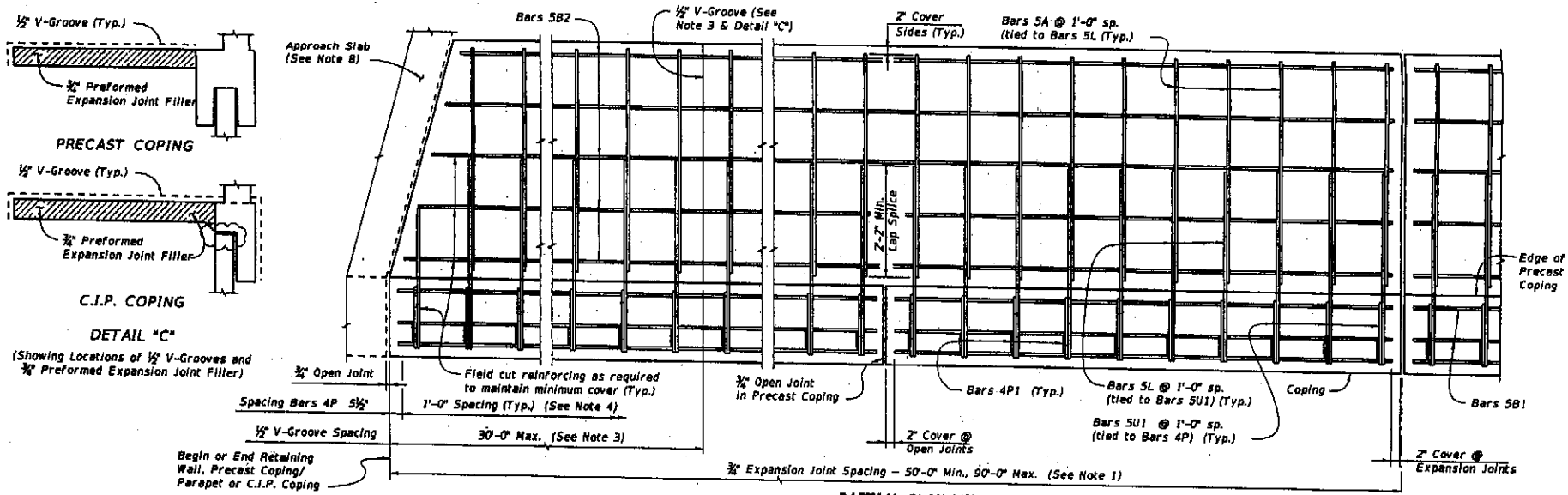


TYPICAL SECTION THRU C-I-P COPING AND RAISED SIDEWALK AND RETAINING WALL AT EXPANSION JOINTS



NOTES:

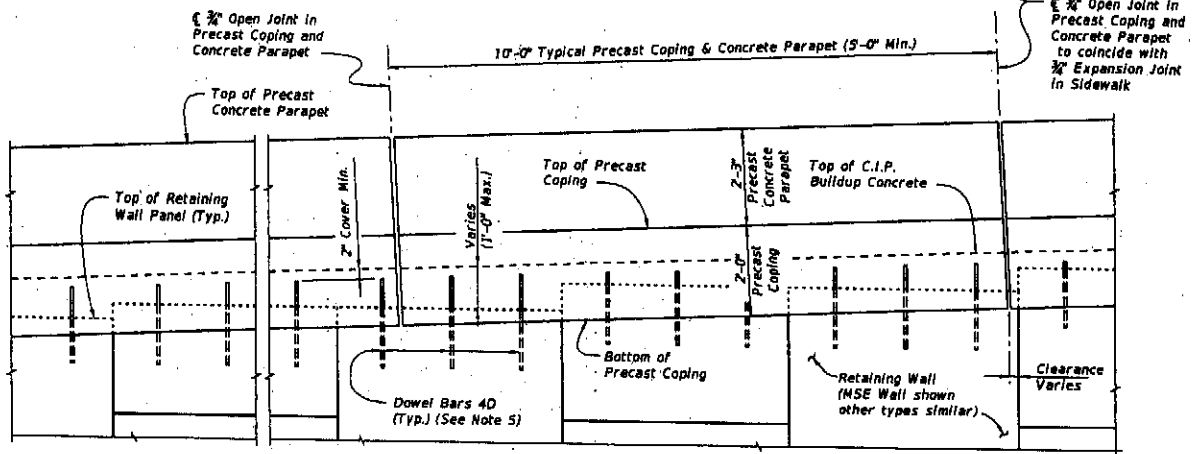
1. Match roadway curb shape (Type) and height. See Roadway Plans and Index No. 300. 6'-8" dimension is based on a 32" Vertical Shape Traffic Railing with a Type D curb adjacent to a 6'-0" wide sidewalk. Adjust this dimension as required for other curb types or transitions at Begin or End Retaining Wall.
2. See Index No. 422 and Index No. 423 for Bars 5S, 5T & 5X and Bullet Railing details. Adjust vertical dimension of Bars 5T and 5X, see Reinforcing Steel Note 5.



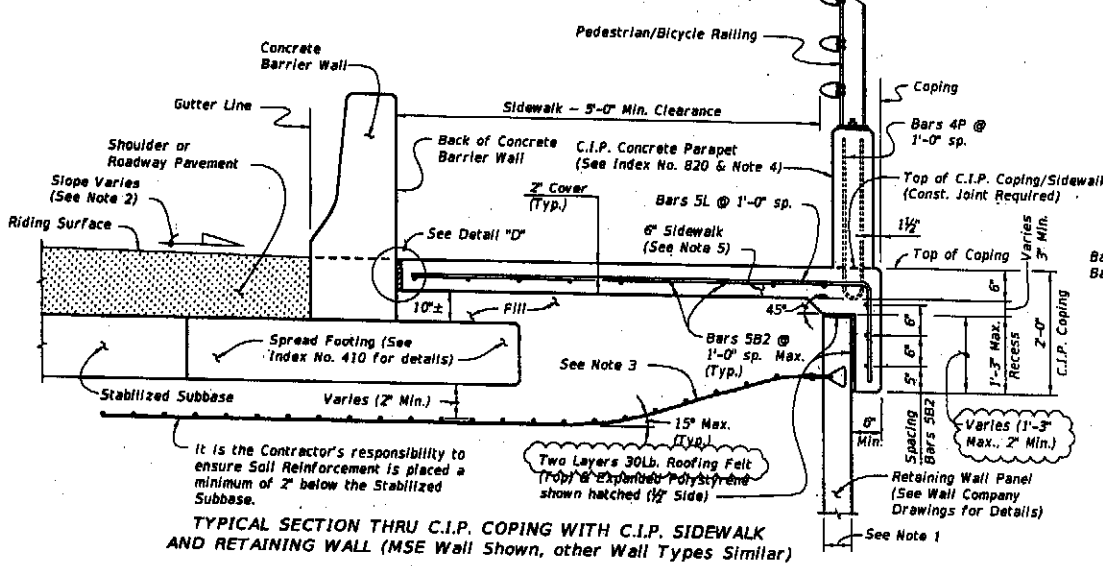
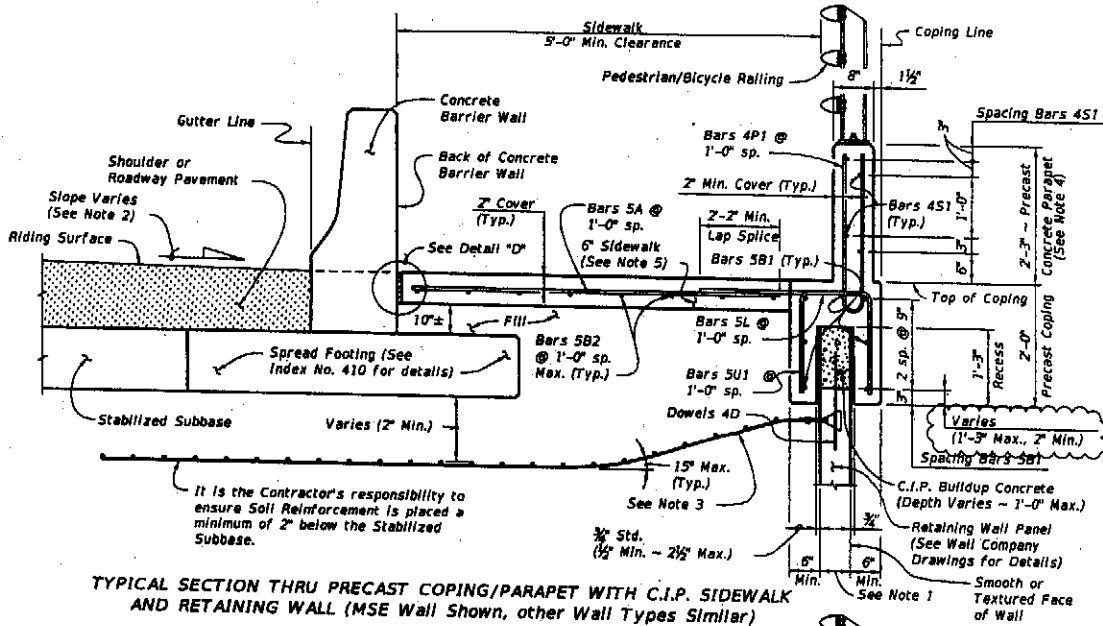
PARTIAL PLAN VIEW
 (Skewed Approach Slab Shown, Perpendicular Approach Slab Similar)
 (Precast Coping Shown, C.I.P. Coping Similar) (Concrete Parapet not Shown for Clarity)

PRECAST COPING/PARAPET AND SIDEWALK NOTES:

1. Provide Class II concrete for slightly aggressive environments or Class IV for moderately or extremely aggressive environments.
2. Construct $\frac{3}{8}$ " Expansion Joints in sidewalk and C.I.P. coping plumb and perpendicular or radial to the Gutter Line. Provide at 90'-0" maximum intervals as shown.
3. Provide and install Preformed Expansion Joint Filler in accordance with Specification Section 932.
4. Construct $\frac{1}{2}$ " V-Grooves in sidewalk and C.I.P. coping plumb and provide at 30'-0" maximum intervals as shown. Space V-Grooves equally between $\frac{3}{8}$ " Expansion Joints and/or Begin or End Sidewalk. For C.I.P. Coping only, V-Groove locations are to coincide with V-Groove locations in the Concrete Parapet.
5. Spacing shown is along the Gutter Line.
6. For Precast Coping only, Dowel Bars 4D are to extend 1'-0" above the top of retaining wall panel. Field cut as necessary to maintain 2" minimum cover to the top of the buildup concrete. See Wall Company Drawings for number and spacing of Dowel Bars 4D.
7. Work this Index with the following:
 Index No. 410 - Concrete Barrier Wall
8. For C.I.P. Coping only, work this Index with the following:
 Index No. 820 - Pedestrian/Bicycle Railing
9. Finish Sidewalks in accordance with Specifications Section 522.
10. The following indexes contain details of the intersection of the retaining wall at approach slabs:
 Index No. 20900 - Approach Slabs (Flexible Pavement Approaches)
 Index No. 20910 - Approach Slabs (Rigid Pavement Approaches)



PARTIAL ELEVATION VIEW
 (Precast Coping and Sidewalk Reinforcing not Shown for Clarity)
 (Precast Coping Shown, C.I.P. Coping Similar)



REINFORCING STEEL BENDING DIAGRAMS - COPING/PARAPET AND SIDEWALK

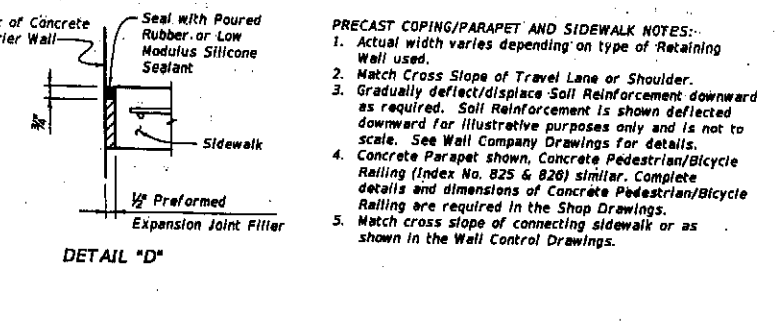
BILL OF REINFORCING STEEL			
MARK	SIZE	LENGTH	
		PRECAST COPING	C.I.P. COPING
A	5	VARIES	N/A
B1	5	9'-8"	N/A
B2	5	AS REQD.	AS REQD.
D	4	2'-0"	N/A
L	5	VARIES	VARIES
P1	4	5'-5"	N/A
S1	4	9'-6"	N/A
U1	5	VARIES	N/A

MARK	DESCRIPTION
5A	Precast Coping - Varies
5B1	Precast Coping - 9'-6"
5B2	Length as Required
4S1	Precast Coping - 9'-6"

BARS 5A, 5B1, 5B2 & 4S1

REINFORCING STEEL NOTES:

- All bar dimensions in the bending diagrams are out to out.
- All reinforcing steel at expansion joints will have a 2" minimum cover.
- Lap splices for Bars 5B2 will be a minimum of 2'-2".
- For Precast Coping only, lap splice Bars 5L with Bars 5A. Lap splices will be a minimum of 2'-2".
- For C.I.P. only, see Index No. 820 for Bars 4P and 4S.
- The Contractor may use Welded Wire Reinforcement when approved by the Engineer. Welded Wire Reinforcement must conform to ASTM A 497.

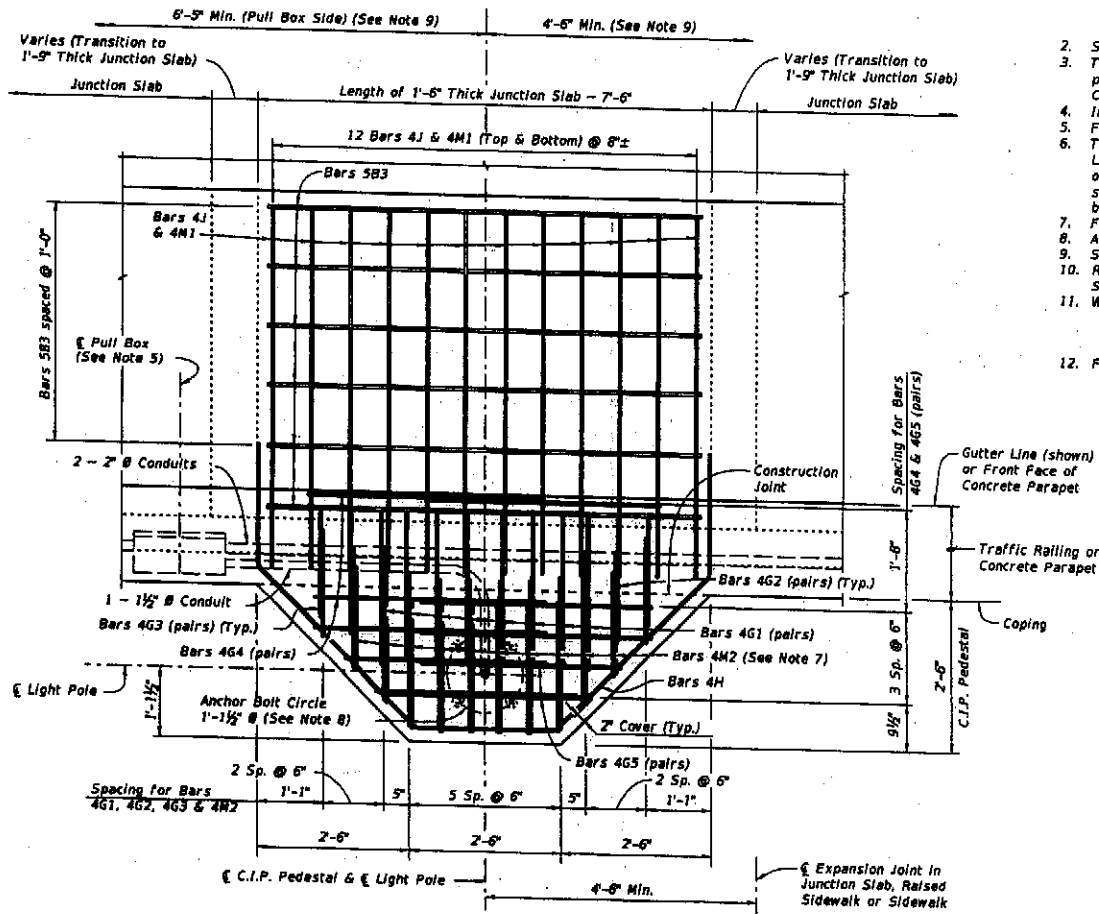


LIGHT PEDESTAL NOTES:

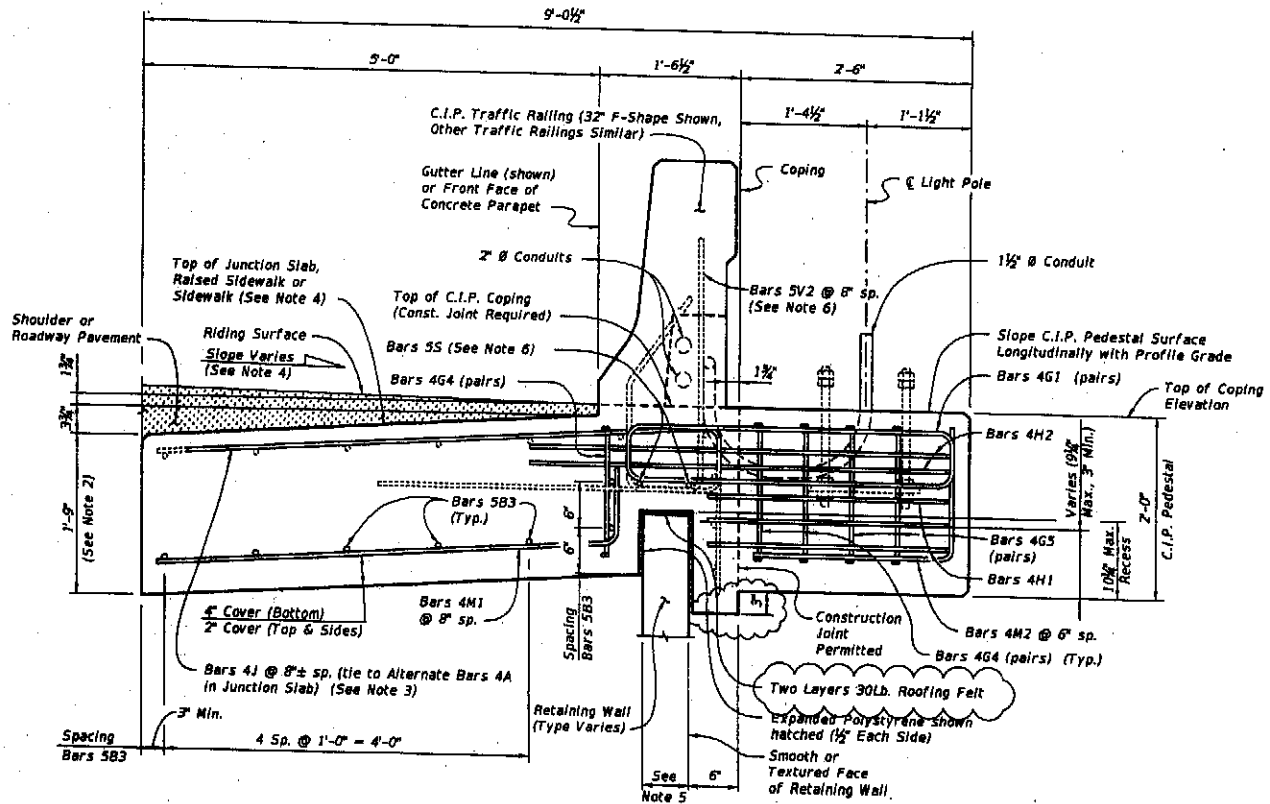
- The pedestal and junction slab are designed to resist the following working loads from the light pole applied at the top of the Pedestal:

Axial Deadload	= 1,560 kip
Wind load Moment about Transverse Axis (*)	= 40.60 kip-ft
Wind load Moment about Longitudinal Axis (**)	= 28.30 kip-ft
Dead load Moment about Longitudinal Axis (**)	= 1,690 kip-ft
Maximum Shear	= 1,380 kip
Torsion about Pole Axis	= 3,560 kip-ft

(*) - Axis refers to Bridge Axis.
- See Index No. 21200 for anchor bolt design and notes.
- The Contractor is responsible for ensuring the anchor bolt design is compatible with the light pole base plate. Modifications to the anchor bolt design must be signed and sealed by the Contractor's Specialty Engineer and submitted to the Engineer for approval prior to construction.
- Install Anchor Bolts plumb.
- For conduit, pull box and expansion/deflection fitting details, see Utility Conduit Detail Drawings. The cost of anchor bolts, nuts, washers and anchor plates will be included in the Bid Price for Light Poles. Include the cost of all labor, concrete and reinforcing steel required for construction of the pedestals, pull boxes and miscellaneous hardware required for the completion of the electrical system in the Bid Price for either the Traffic Railing or Concrete Parapet that the pedestal is behind.
- Field Cut Bars 4M2 as required to maintain clearance.
- Anchor Bolt pattern orientation will be as shown.
- Slip Forming Method of construction requires the Engineer's approval within the limits shown.
- Reinforcing shown for light pole pedestals is in addition to typical reinforcing for C.I.P. Junction Slabs and Raised Sidewalks.
- Work this Index with the following as appropriate:
 - Index No. 6110
 - Index No. 6120
 - Index No. 6130
- For Estimated Quantities, see Sheet No. 3.



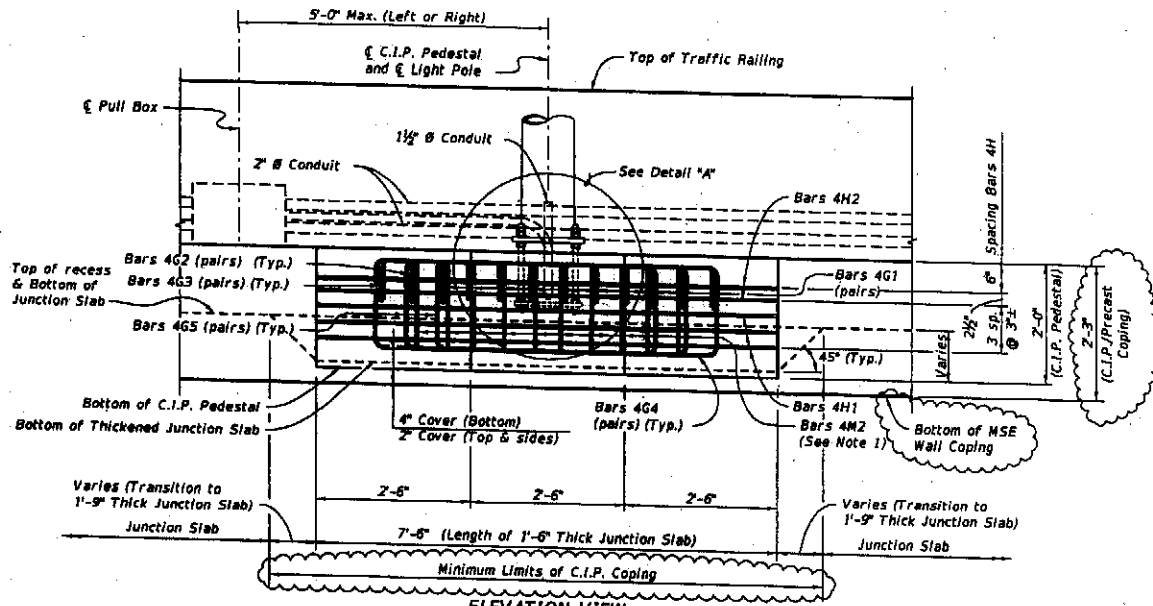
PLAN VIEW
 (Junction Slab reinforcing not shown for clarity)
 (Junction Slab Shown, Raised Sidewalk or Sidewalk Similar)



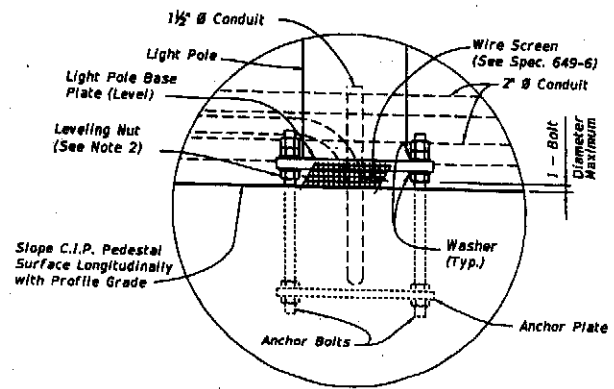
TYPICAL SECTION AT LIGHT POLE PEDESTAL
 (Traffic Railing Shown, Concrete Parapet Similar)
 (Junction Slab Shown, Raised Sidewalk or Sidewalk Similar)

NOTES:

1. Provide Concrete Class to match adjacent coping.
2. For junction slabs, increase the 1'-0" depth dimension to 1'-9". For sidewalks see Index No. 6130 for C.I.P. Coping, but increase 6" depth dimension to 1'-0". The minimum length of the Junction Slabs, Raised sidewalks and Sidewalks is 30'-0", measured along the Gutter Line.
3. Bars 4J are only required when pedestals are behind a Traffic Railing.
4. Match the slope of the adjoining junction slab and shoulder or roadway pavement, raised sidewalk or sidewalk.
5. Actual width varies depending on type of Retaining Wall used.
6. See Index No. 6110 for Bars 5V2 and 5S.



ELEVATION VIEW
 (Junction Slab Reinforcing & Bars 4J not Shown for Clarity)
 (Traffic Railing Shown, Concrete Parapet Similar)
 (Junction Slab Shown, Raised Sidewalk or Sidewalk Similar)



DETAIL "A"

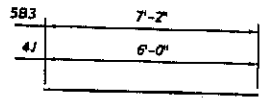
- NOTES:**
 1. Field Cut Bars 4M2 as required to maintain minimum cover.
 2. Maximum clearance between leveling nut and top of pedestal will not exceed anchor bolt diameter.

ESTIMATED QUANTITIES		
ITEM	UNIT	QUANTITY
Concrete (Pedestal)	CY	0.926
Concrete (Thickened Junction Slab)	CY	1.222
Reinforcing Steel	Lb.	349

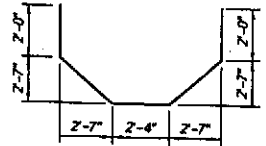
(The quantities above are for one C.I.P. Light Pole Pedestal. The concrete quantity for the thickened junction slab is based on a 6" increase in thickness and a 5" wide retaining wall panel. Adjust thickened concrete quantity as required for raised sidewalks and sidewalks.)

REINFORCING STEEL BENDING DIAGRAMS - LIGHT POLE PEDESTAL

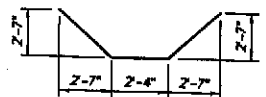
BILL OF REINFORCING STEEL			
MARK	SIZE	NO. REQD.	LENGTH
B3	5	7	7'-2"
G1	4	16	5'-8"
G2	4	4	4'-8"
G3	4	4	4'-2"
G4	4	6	8'-10"
G5	4	4	7'-4"
H1	4	3	9'-8"
H2	4	2	13'-8"
J	4	12	6'-0"
M1	4	12	5'-10"
M2	4	10	3'-8"



BARS 5B3 & 4J



BAR 4H2

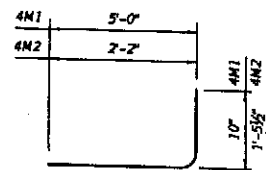


BAR 4H1

2'-6"	4G1
2'-0"	4G2
1'-9"	4G3
3'-8"	4G4
2'-11"	4G5

7 1/2"
 1'-6"
 4G1, 4G2 & 4G3
 4G4 & 4G5

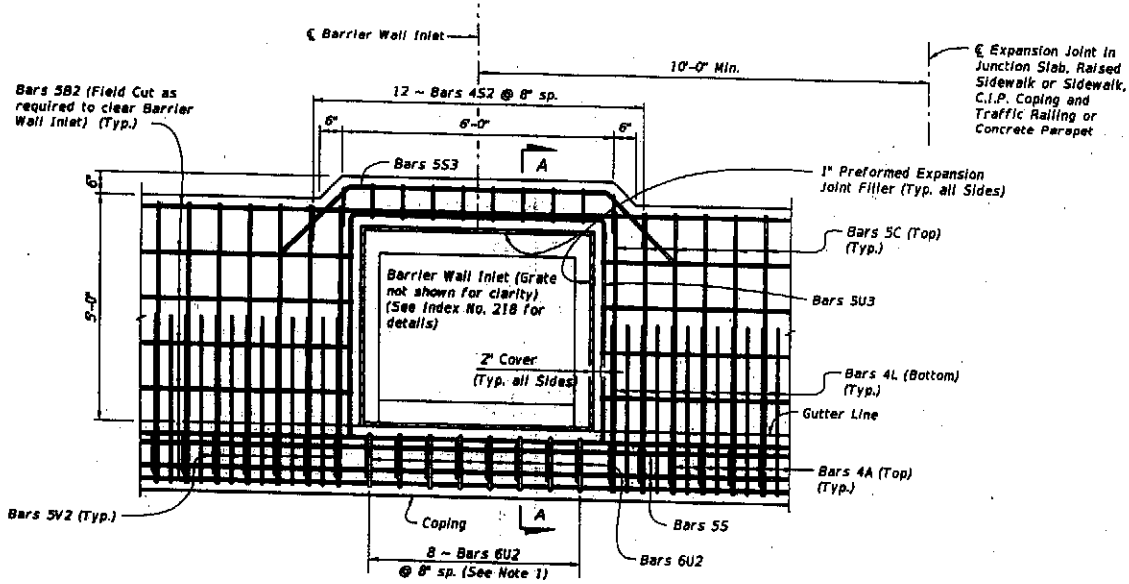
BARS 4G1, 4G2, 4G3, 4G4 & 4G5



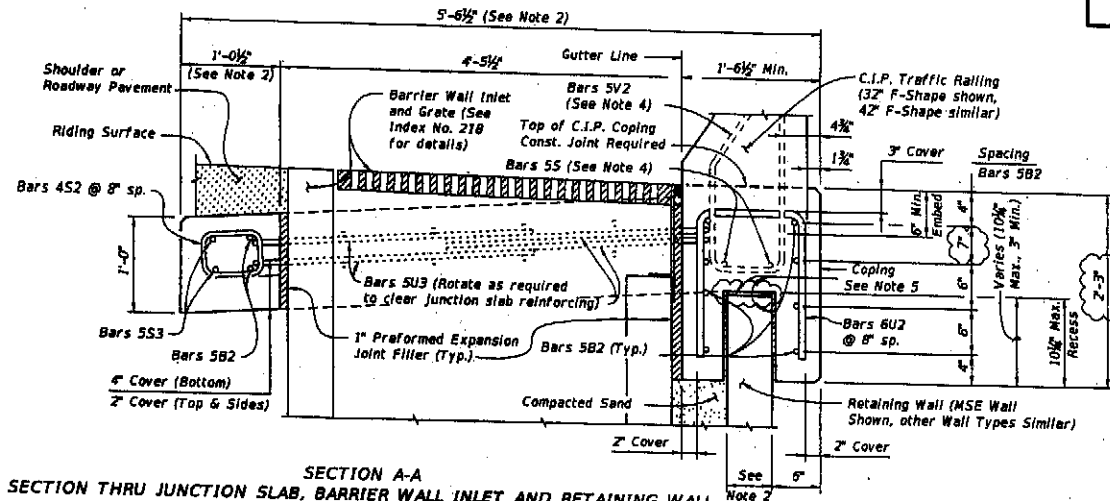
BAR 4M1 & 4M2

REINFORCING STEEL NOTES:

- All bar dimensions in the bending diagrams are out to out.
- Lap splices for Bars 4G1, 4G2 & 4G3 will be a minimum of 1'-4". Lap splices for Bars 4G4 & 4G5 will be a minimum of 1'-8".
- The Contractor may use Welded Wire Reinforcement when approved by the Engineer. Welded Wire Reinforcement will conform to ASTM A 497.



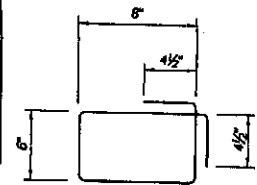
PLAN VIEW
(Junction Slab Shown, Raised Sidewalk Similar)



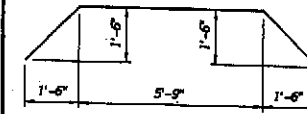
SECTION A-A
SECTION THRU JUNCTION SLAB, BARRIER WALL INLET AND RETAINING WALL
(Junction Slab Shown, Raised Sidewalk Similar)

REINFORCING STEEL BENDING DIAGRAMS - DRAINAGE

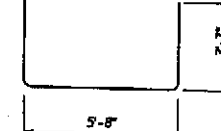
BILL OF REINFORCING STEEL			
MARK	REQD.	SIZE	LENGTH
S2	12	4	3'-1"
S3	2	5	10'-0"
U2	8	6	VARIES
U3	4	5	12'-10"



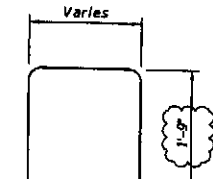
STIRRUP BAR 4S2



BAR 5S3



BAR 5U3



BAR 6U2

REINFORCING STEEL NOTES:

1. All bar dimensions in the bending diagrams are out to out.
2. All reinforcing steel at open joints will have a 2" minimum cover.
3. See Index Nos. 6110, 6120 & 6130 for Bars 4A (or 5A), 5B, 5C and 4L (or 5L).
4. The Contractor may use Welded Wire Reinforcement when approved by the Engineer. Welded Wire Reinforcement will conform to ASTM A 497.

NOTES:

1. Spacing shown is along the Gutter Line. Spacing shown is for C.I.P. Junction Slab. For C.I.P. Raised Sidewalks or Sidewalks, match bar spacing and size shown in Typical Sections (i.e., 11 - Bars SU2 and 15 - Bars 4S2 @ 6" spacing for Raised Sidewalks).
2. Dimensions shown are for junction slab. Increase width as required for C-I-P Raised Sidewalk and Sidewalks.
3. Actual location & width vary depending on type of Retaining Wall used.
4. See Index No. 6130 for Bars 5V2 and 5S.
5. Two Layers 30Lb. Roofing Felt (Top) & Expanded Polystyrene shown hatched (Each Side).
6. Locate ϵ Barrier Wall Inlet a minimum of 10'-0" away from ϵ Expansion Joints in Junctions Slab, Raised Sidewalk or Sidewalk, C.I.P. Coping and Traffic Railing or Concrete Parapet.
7. Work this index with the following as appropriate:
Index No. 6110
Index No. 6120
Index No. 6130

Williams, Wynette

From: Sadler, David A
Sent: Tuesday, August 02, 2011 2:34 PM
To: Martin, Douglas T
Cc: Hicks, Heather; Williams, Wynette
Subject: Signature Authority

This is to delegate signature authority for documents (excluding personnel actions) to you for when I am outof the office or on business travel status form this date through July 1, 2012.

Please ensure that my office receives a copy of all correspondence signed by you for these dates.

David A. Sadler
Director, Office of Construction
Office: 850-414-5203