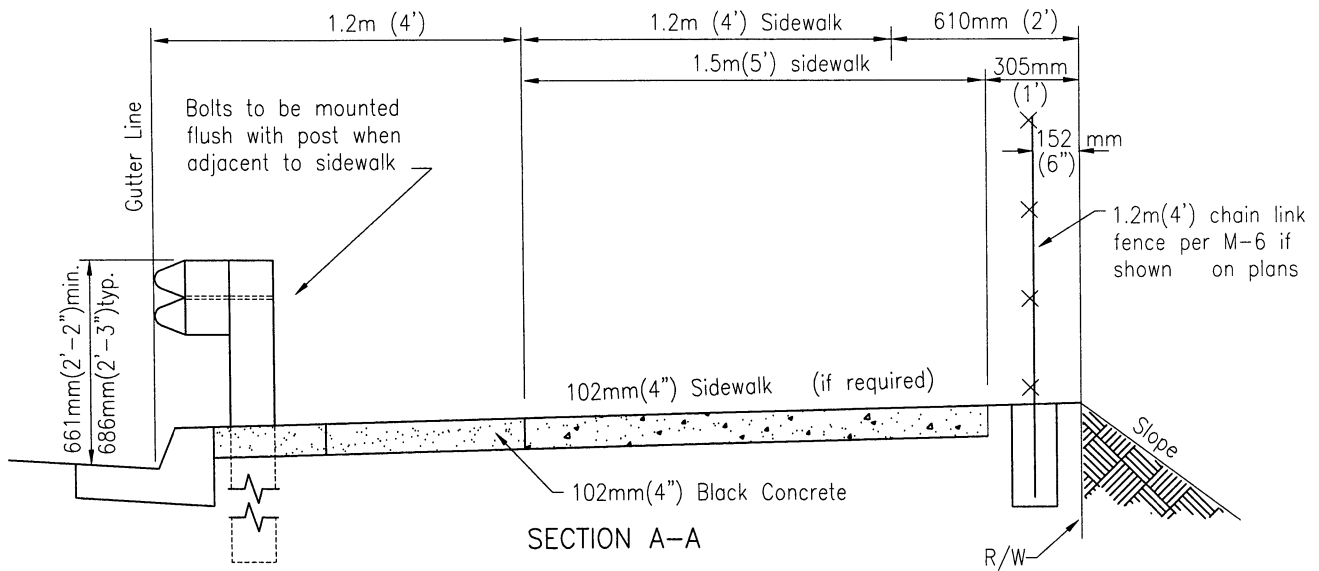
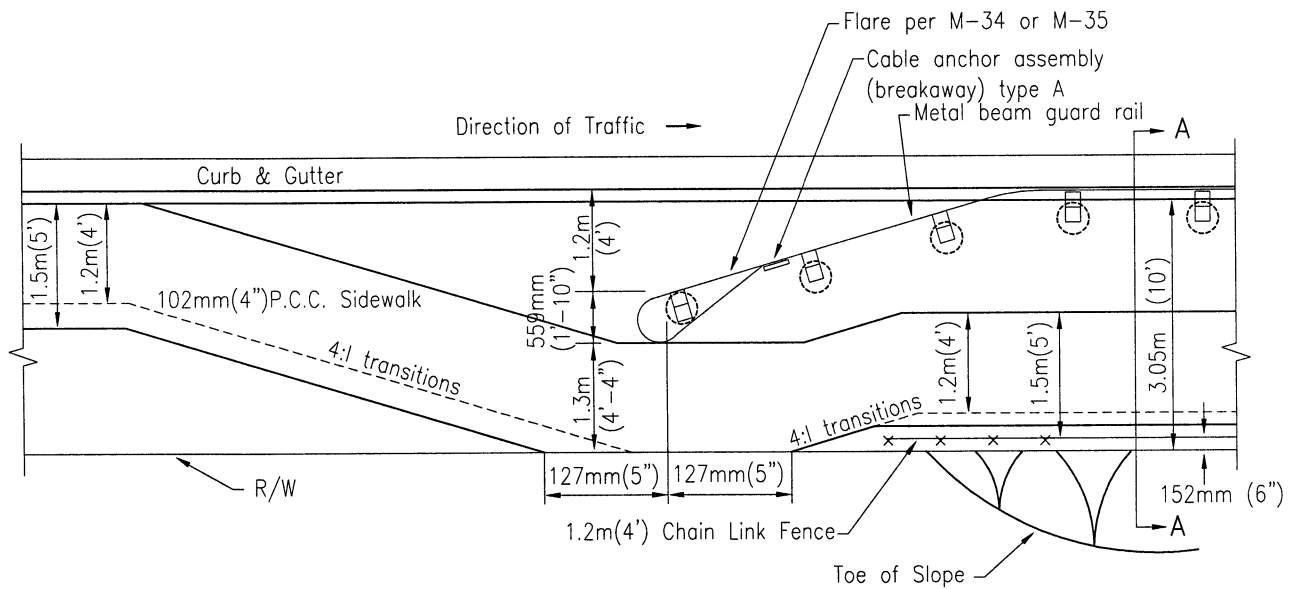
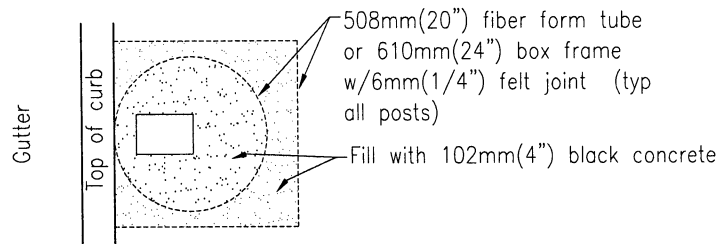


This 2003 edition drawing is NOT in conformance with the latest Caltrans Standard Plans for Guardrails. Use Caltrans latest Standard Plans or seek Agency permission before using this drawing.



Typical for above ground obstructions—4:1 sidewalk transitions typical for use with G-7



Revision	By	Approved	Date
ORIGINAL		G.Parkinson	5/92
Add Metric		T. Stanton	03/03

SAN DIEGO REGIONAL STANDARD DRAWING

GUARD RAIL STANDARDS

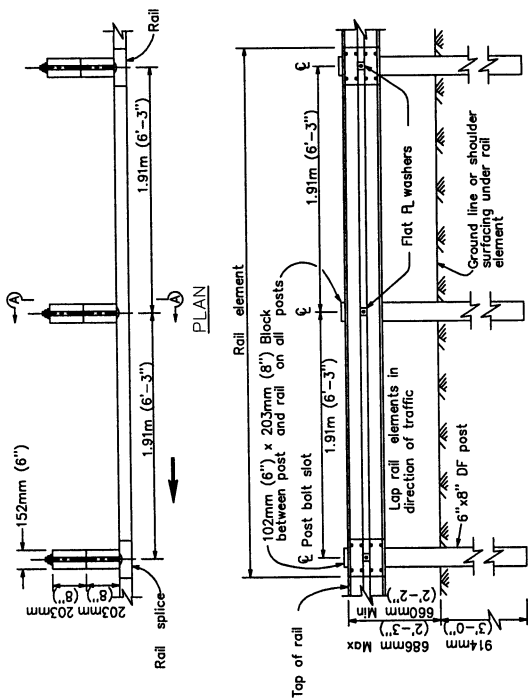
RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

*T. Stanton* 3/01/2003

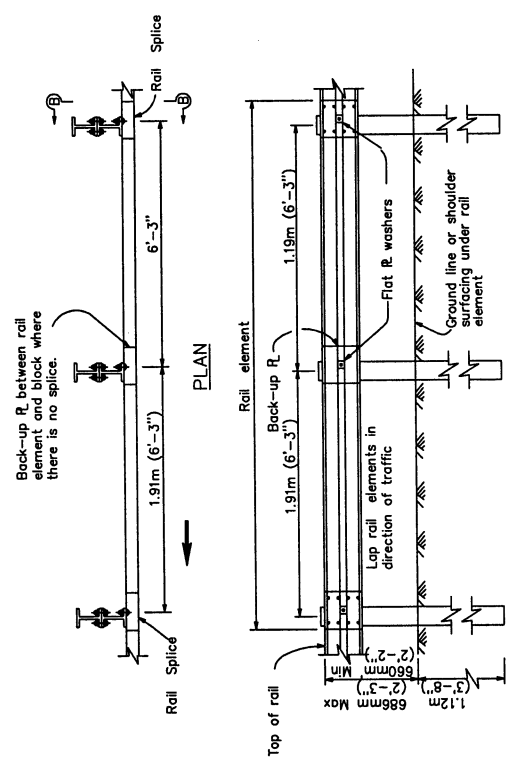
Chairperson R.C.E. 19246 Date

DRAWING NUMBER M-30

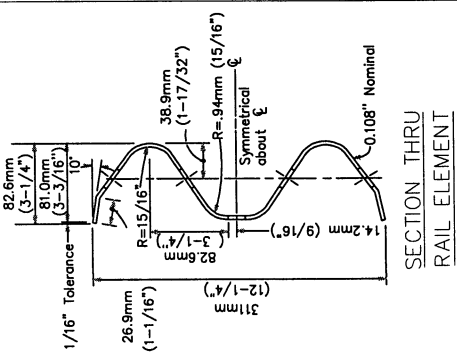
This 2003 edition drawing is NOT in conformance with the latest Caltrans Standard Plans for Guardrails. Use Caltrans latest Standard Plans or seek Agency permission before using this drawing.



METAL BEAM GUARD RAIL WITH WOOD POST AND BLOCKS



METAL BEAM GUARD RAIL WITH W6x8.5 OR W6x9 STEEL POSTS AND BLOCKS



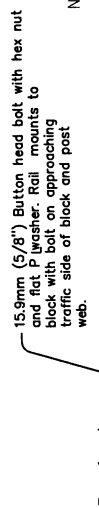
SECTION THRU RAIL ELEMENT

NOTES

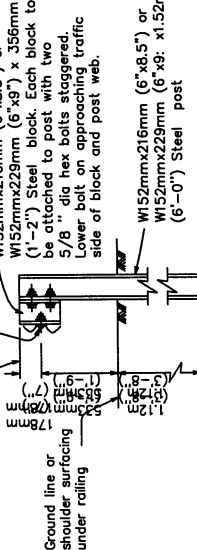
- For details of standard hardware used to construct guard railing, see Std. Dwg. M-32.
- For details of posts and blocks used to construct guard railing, see Std. Dwg. M-33.
- Guard railing post spacing to be 1.91m (6'-3") center to center, except as otherwise noted.
- Top of rail to be 686mm (27") above the ground line or shoulder surfacing under the rail element.
- For guard railing approach flares, see Std. Dwg. M-34 and M-35.
- For embankment widening details to accommodate guard railing approach flares, see Standard Dwg. M-36.
- For guard railing and anchor details, see Std. Dwg. M-37 and M-39.
- For guard railing connection details to bridge railing, retaining walls and abutments, see Std. Dwg. M-40.
- For guard railing connection details to bridge sidewalks and curbs, see Std. Dwg. M-41.
- For dike positioning with guard railing installations, see Std. Dwg. M-36.
- Direction of traffic indicated by

SECTION A-A

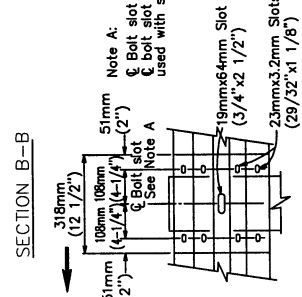
\* Where bolt is reversed or 15.9mm (5/8") threaded rod is used to mount rail, no more than 13mm (1/2") of thread may be exposed on traffic side of rail.



SECTION B-B



RAIL SPLICE DETAIL



ELEVATION VIEW

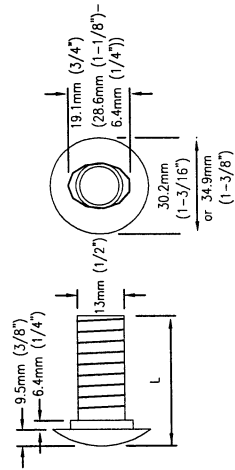
Splice the overlapped ends of the rail elements with 15.9mm (5/8") x 31.8mm (1 1/4") button head oval shoulder bolts and 15.9mm (5/8") x 38mm (1 1/4") recessed hex nut in the 23mm (29/32") x 28.6mm (1 1/8") slots. Total 8 per rail splice; 4 per terminal section and end section. Lap rail elements in direction of traffic.

This 2003 edition drawing is NOT in conformance with the latest Caltrans Standard Plans for Guardrails. Use Caltrans latest Standard Plans or seek Agency permission before using this drawing.

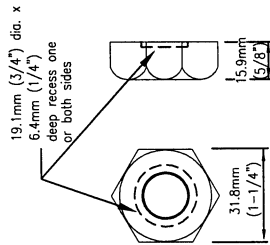
**NOTES**

1. Terminal sections will not be installed on the trailing end of guard railing placed adjacent to one-way roadways.
2. Back-up plate to be used between guard rail element and steel block on steel post where there is no rail element splice. See Standard Dwg. M-31.
3. For end sections details, see Standard Dwg. M-40.
4. For terminal section Type C, see Standard Dwg. M-38.

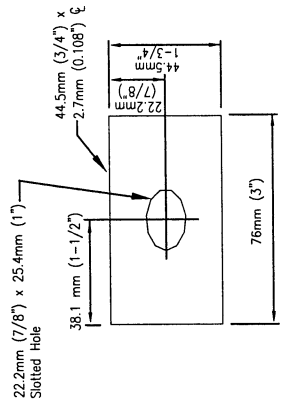
L	THREADED LENGTH
31.8mm (1-1/4")	Full Thread Length
51mm (2")	38.1mm (1-1/2") min. Thread Length
241mm (9-1/2")	44.5mm (1-3/4") min. Thread Length
305mm (12")	63.5mm (2-1/2") min. Thread Length



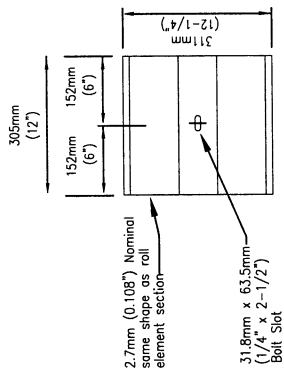
5/8" Ø BUTTON HEAD BOLT



15.9mm (5/8") O RECESS NUT

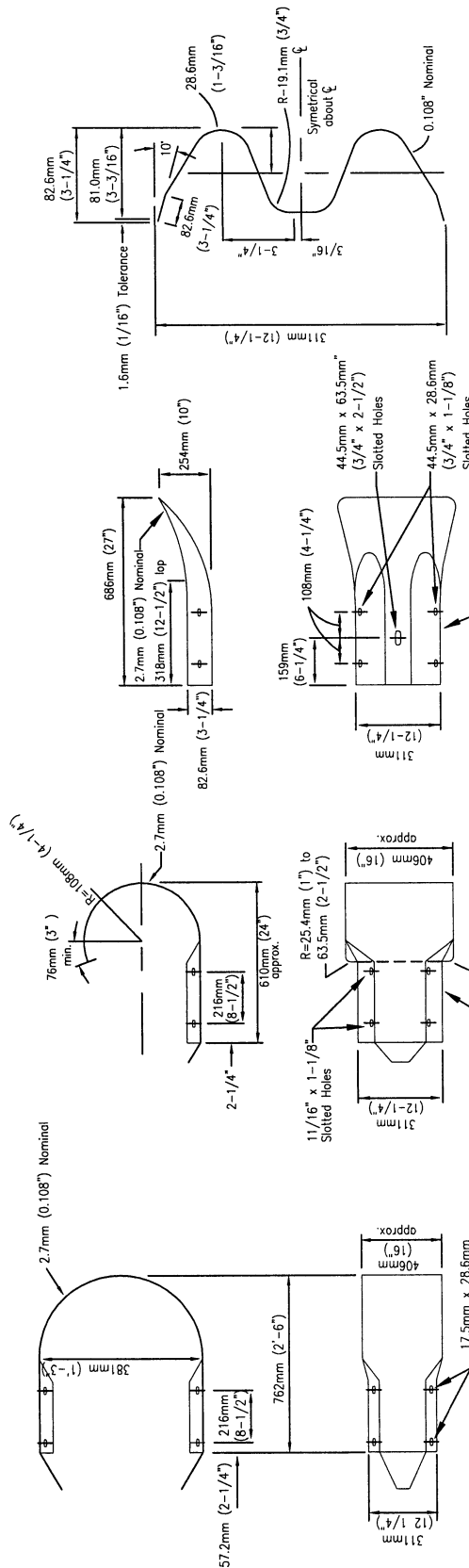


FLAT PLATE WASHER



BACK-UP PLATE

See Note 2



SECTION THRU RAIL ELEMENT

TERMINAL SECTION TYPE B

TERMINAL SECTION TYPE A

RETURN SECTION

Revision	By	Approved	Date
ORIGINAL		G.Parkinson	4/92
Add Metric		T. Stanton	03/03

SAN DIEGO REGIONAL STANDARD DRAWING

METAL BEAM GUARD RAILING  
STANDARD HARDWARE

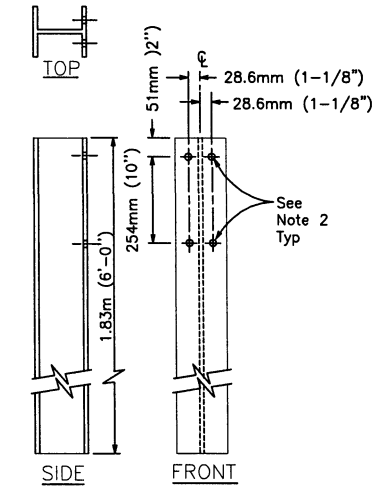
RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

*R.C.E.* 310112003

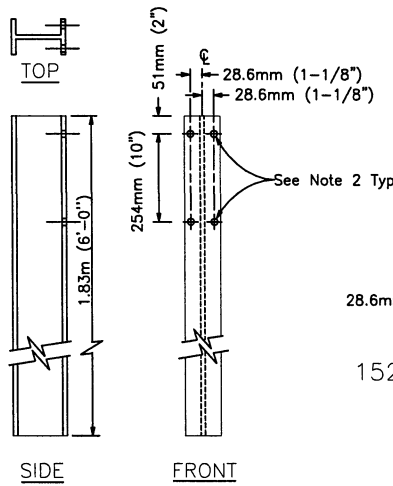
Chairperson R.C.E. 19246 Date

DRAWING NUMBER M-32

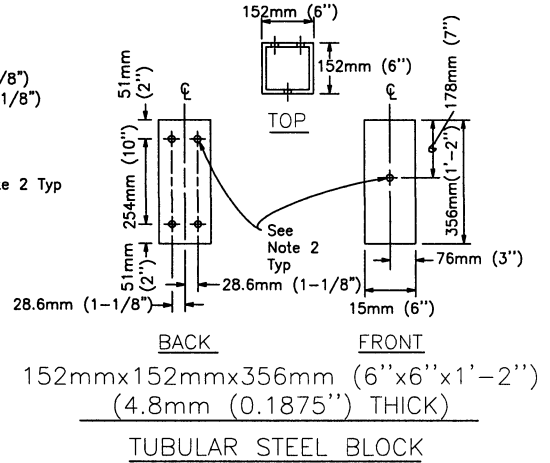
This 2003 edition drawing is NOT in conformance with the latest Caltrans Standard Plans for Guardrails. Use Caltrans latest Standard Plans or seek Agency permission before using this drawing.



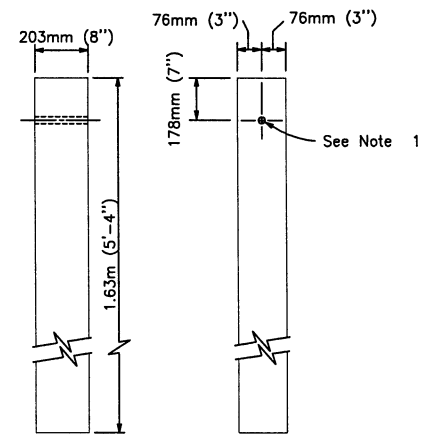
W6x15 STEEL POST



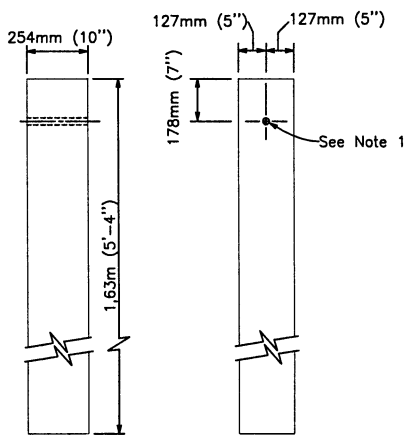
W6x8.5 OR W6x9 STEEL POST



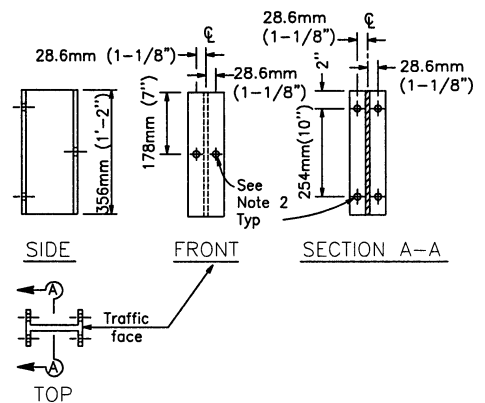
TUBULAR STEEL BLOCK



6"x 8" DOUGLAS FIR POST



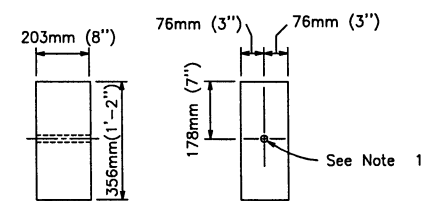
10"x 10" DOUGLAS FIR POST



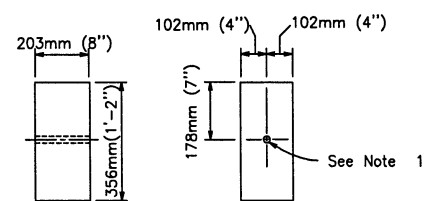
W6x8.5 OR W6x9 STEEL BLOCK

NOTES

1. All holes in wood posts and blocks shall be 44.5mm (3/4").
2. dia. ±1.6mm (1/16"). All holes in steel posts and blocks shall be 20.6mm (13/16) dia. maximum.
3. Contractor may submit alternative steel post details for Engineer's approval.
4. Dimensions shown for wood post are nominal.



6"x 8" DOUGLAS FIR BLOCK



8"x 8" DOUGLAS FIR BLOCK

Revision	By	Approved	Date
ORIGINAL		G.Parkinson	4/92
Add Metric		T. Stanton	03/03

SAN DIEGO REGIONAL STANDARD DRAWING

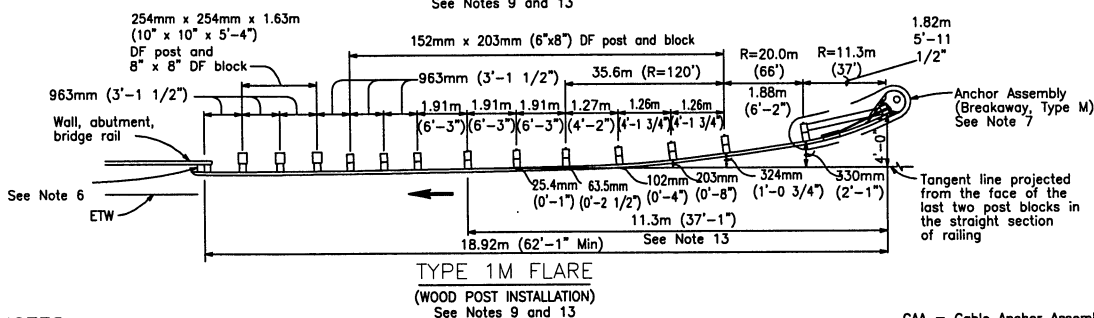
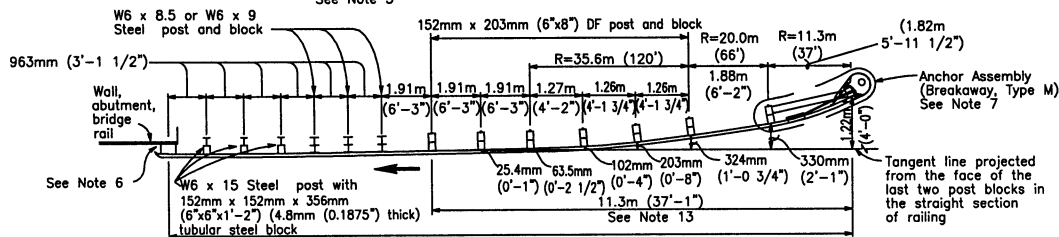
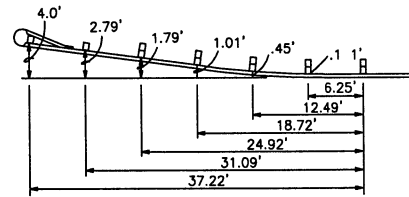
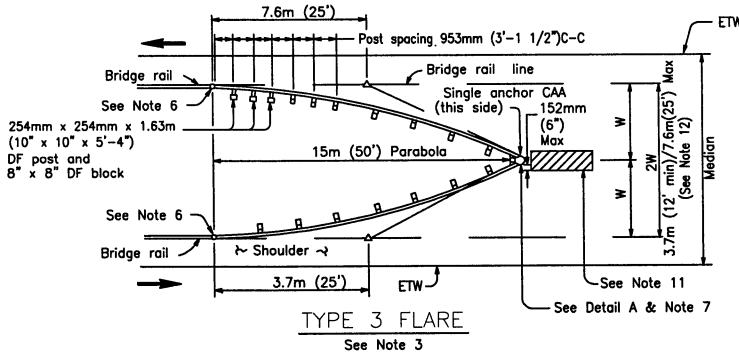
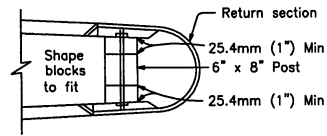
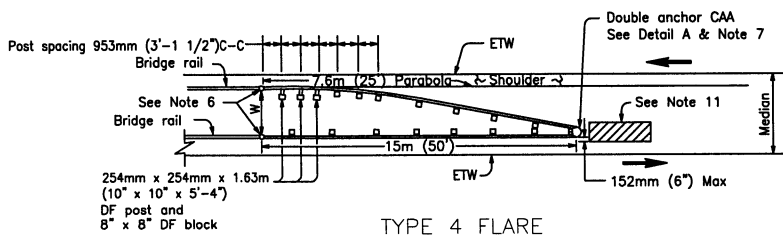
METAL BEAM GUARD RAILING  
POSTS AND BLOCKS

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

*R.C.E. Stanton* 3/10/2003  
Chairperson R.C.E. 19246 Date

DRAWING NUMBER M-33

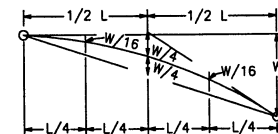
This 2003 edition drawing is NOT in conformance with the latest Caltrans Standard Plans for Guardrails. Use Caltrans latest Standard Plans or seek Agency permission before using this drawing.



**NOTES**

CAA = Cable Anchor Assembly

- Post, blocks and hardware to be used are shown on Standard Drawing M-31 and M-32.
- Guard rail post spacing to be 1.91m (6'-3") center to center, except as otherwise noted.
- Except as noted, posts shown are 152mm x 203mm (6" x 8") DF. W6 x 8.5 or W6 x 9 steel posts and blocks may be specified for 152mm x 203mm (6" x 8") DF posts and blocks where applicable. Where 254mm x 254mm (10" x 10") DF posts and 8" x 8" DF blocks are shown, W6 x 15 steel posts and tubular steel 152mm x 152mm x 356mm (6" x 6" x 1'-2") (4.8mm (0.1875 inch) thick) blocks may be specified where applicable.
- Top of rail to be 686mm (27") above ground line or shoulder surfacing under the rail element.
- Direction of traffic indicated by
- For connection details see Standard Drawing M-40 and M-41.
- For end anchor details see Standard Drawing M-37 and M-39.
- Terminal Sections not to be installed on trailing end of guard rail placed adjacent to one-way roadways.
- The 11.3m (37'-1") flared portion of Type 1M Flare is used at approach end of guard railing for embankment installations.
- For embankment widening details to accommodate approach flares, see Revised Standard Drawing M-36.
- Sand filled crash cushion, as shown on Standard Plan A81, or other crash cushion approved by the Engineer is required for Type 3 and 4 flares, when the end of the guard rail is within 9m (30 feet) of the edge of traveled way (ETW) of approaching traffic. →
- When width W, exceeds 3.7m (12 feet); to calculate the length of parabolic flare use "L=3W" and round to nearest 3.81m (12'-6").
- For additional requirements for the Type 1M flare installations see Standard Drawing M-37.



TYPICAL PARABOLIC LAYOUT

Revision	By	Approved	Date
ORIGINAL		G.Parkinson	4/92
Add Metric		T. Stanton	03/03

SAN DIEGO REGIONAL STANDARD DRAWING

GUARD RAIL FLARES

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

*T. Stanton* 3/01/2003

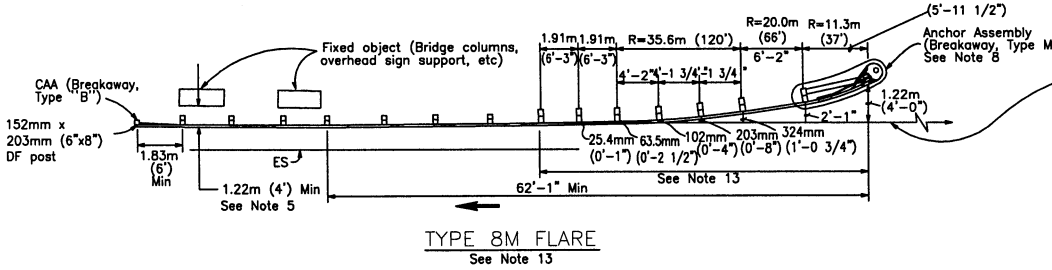
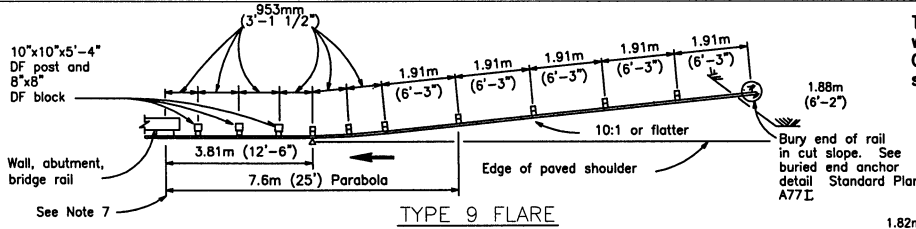
Chairperson R.C.E. 19246 Date

DRAWING NUMBER M-34

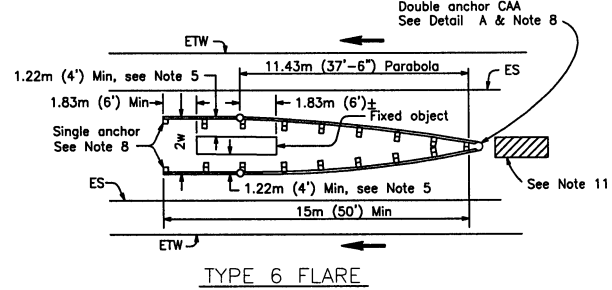
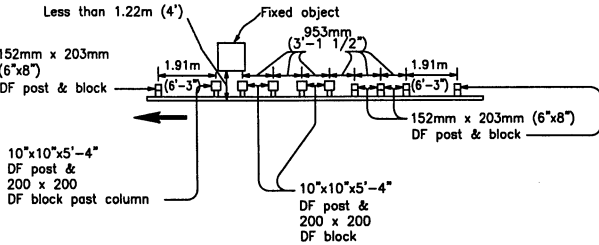
This 2003 edition drawing is NOT in conformance with the latest Caltrans Standard Plans for Guardrails. Use Caltrans latest Standard Plans or seek Agency permission before using this drawing.

ABBREVIATION

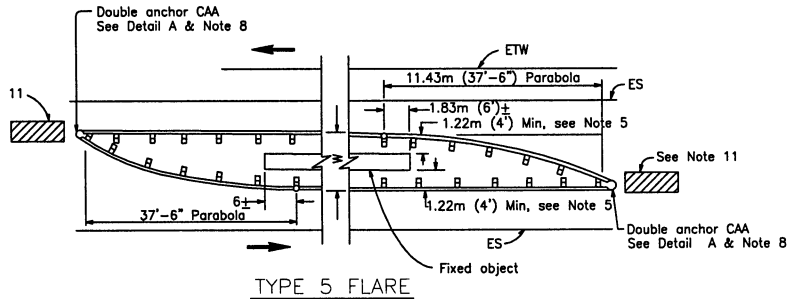
CAA = Cable Anchor Assembly



Tangent line projected from the face of the last two post blocks in the straight section of railing.

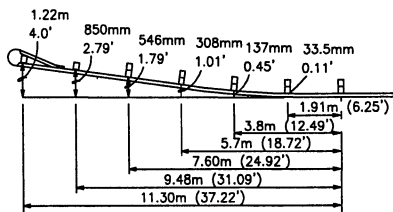
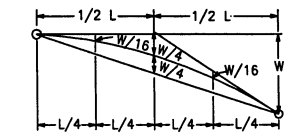
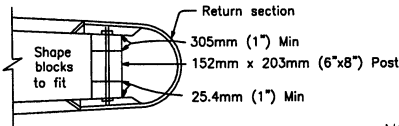


Use with Type 5, 6, and 8M flares when guard rail is less than 4' from fixed object. See Note 5. For a series of columns, additional 254mm x 254mm x 1.63m (10"x10"x5'-4") DF post at 89mm (3'-1 1/2") center to center spacing to be used between columns. Where 254mm x 254mm (10"x10") DF posts and 203mm x 203mm (8"x8") DF blocks are shown, W6x15 steel posts and tubular steel 152mm x 152mm 356mm (6"x6"x1'-2") (4.8mm (0.1875") thick) blocks may be specified where applicable. Where 152mm x 203mm (6"x8") DF posts and blocks are shown, W6x8.5 or W6x9 steel posts and blocks may be specified where applicable.



NOTES

1. Post, blocks and hardware to be used are shown on Standard Drawing M-31 and M-32.
2. Guard rail post spacing to be 1.91m (6'-3") center to center, except as noted.
3. Except as noted, posts and blocks shown are 152mm x 203mm (6"x8") DF. W6x8.5 or W6x9 steel posts and blocks may be specified where applicable. Where 254mm x 254mm (10"x10") DF posts and 203mm x 203mm (8"x8") DF blocks are shown, W6x15 steel post and tubular steel 152mm x 152mm 356mm (6"x6"x1'-2") (0.1875") thick blocks may be specified where applicable.
4. Top of rail to be 686mm (27") above ground line or shoulder surfacing under the rail element.
5. A 1.22m (4") minimum clearance is required between face of rail and a fixed object located directly behind a guard rail post. A fixed object located behind the rail but not behind a guard rail post requires a 914mm (3") minimum clearance. Where minimum clearance cannot be obtained use approach railing transition details for fixed objects.
6. Direction of traffic indicated by →
7. For connection details see Standard Drawing M-40.
8. For end anchor details see Standard Drawing M-37 and M-39.
9. Terminal sections not to be installed on trailing end of guard rail placed adjacent to one-way roadways.
10. Type 7 flare has been deleted.
11. Sand filled crash cushion, or other crash cushion approved by the Engineer, is required for Type 5 and 6 flares, when the end of the guard rail is within 9.14m (30 feet) of the edge of traveled way (ETW) of approaching traffic.
12. When width, exceeds 3.66m (12 feet); to calculate the length of parabolic flare use "L=3W" and round to nearest 3.81m (12'-6").
13. For additional requirements for the Type 8M flare installations see Standard Drawing M-37.



(Parabolic offsets not to be used with Type 8M flares.)

Revision	By	Approved	Date
ORIGINAL		G.Parkinson	4/92
Add Metric		T. Stanton	03/03

SAN DIEGO REGIONAL STANDARD DRAWING

GUARD RAIL FLARES

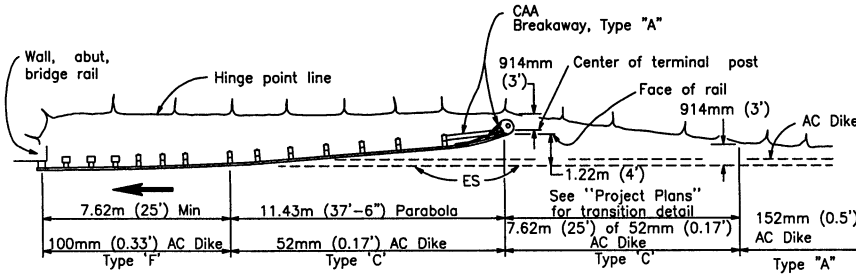
RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

*T. Stanton* 310112003

Chairperson R.C.E. 19246 Date

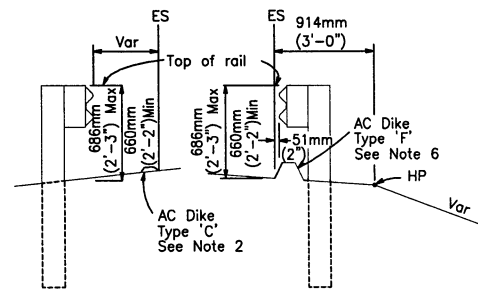
DRAWING NUMBER M-35

This 2003 edition drawing is NOT in conformance with the latest Caltrans Standard Plans for Guardrails. Use Caltrans latest Standard Plans or seek Agency permission before using this drawing.



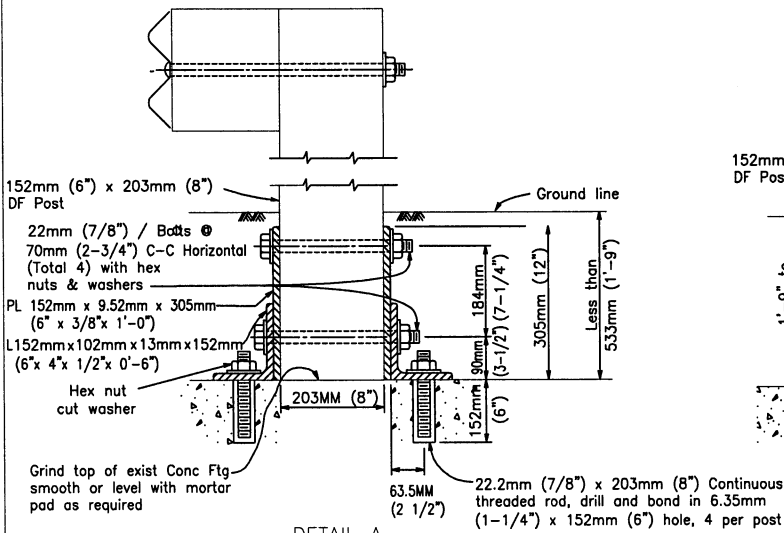
EMBAKMENT WIDENING AND DIKE PLACEMENT DIAGRAM

See Notes 1 and 2

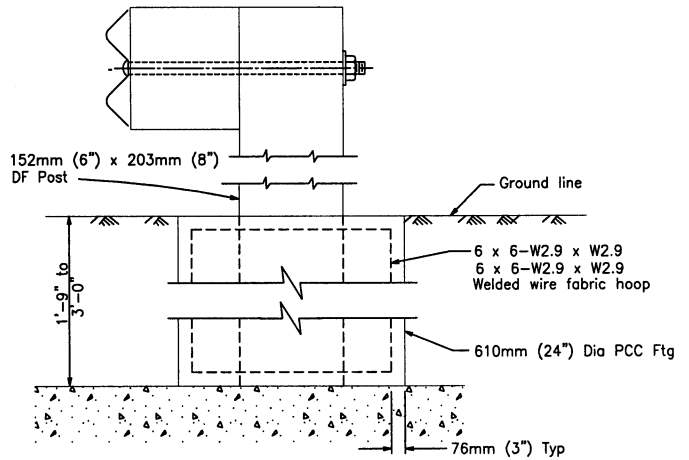


DIKE POSITIONING

(See Note 2)



DETAIL A



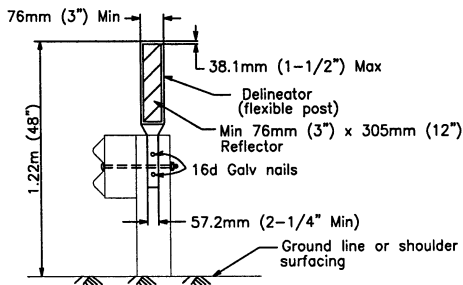
DETAIL B

Form socket in concrete to receive 152mm (6 inch) x 203mm (8 inch) post or place concrete around 152mm (6 inch) x 203mm (8 inch) post wrapped with one layer of 13mm (1/2) thick expanded polystyrene foam sheeting. Do not nail polystyrene to post. Post to be centered in concrete footing.

POST FOOTINGS

(See note 3)

Use where standard embedment of railing post is restricted by underground concrete facilities such as footing of walls, columns, etc. Use Detail A where embedment of post is less than 533mm (1'-9"). Use Detail B where embedment of post is between 533mm (1'-9") and 914mm (3'-0").



GUARD RAILING DELINEATION

See Note 4

NOTES

1. For guard rail flare details, see Standard Drawings M-34 and M-35.
2. When necessary to place dike in front of guard rail face, only Type 'C' dike may be used. For dike details, see Standard Drawing G-5.
3. For standard railing post embedment, see Standard Drawing M-31.
4. Guard railing delineation to be used where shown on the project plans.
5. Direction of traffic indicated by
6. When dike or curb is placed under guard railing, the maximum height of the dike or curb shall be 101mm (0.33').

Revision	By	Approved	Date
ORIGINAL		G.Parkinson	4/92
Add Metric		T. Stanton	03/03

SAN DIEGO REGIONAL STANDARD DRAWING

METAL BEAM GUARD RAILING  
MISCELLANEOUS DETAILS

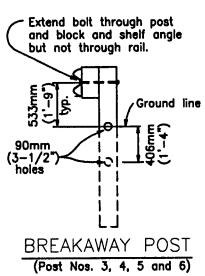
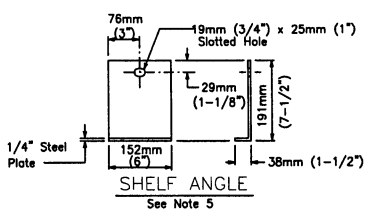
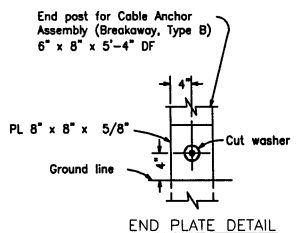
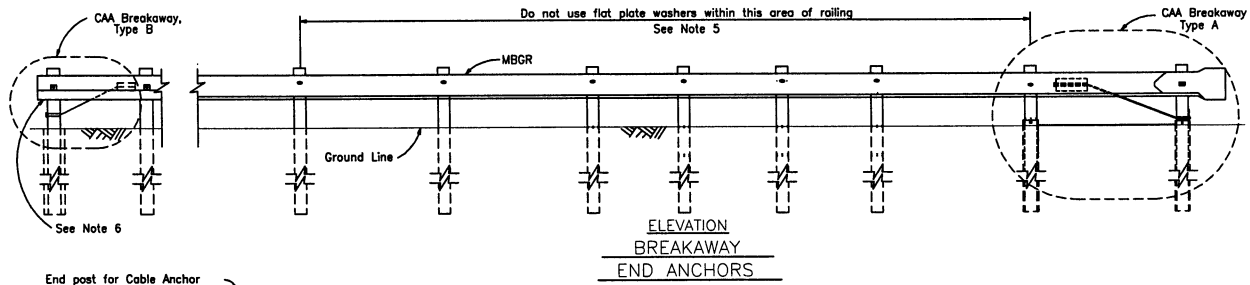
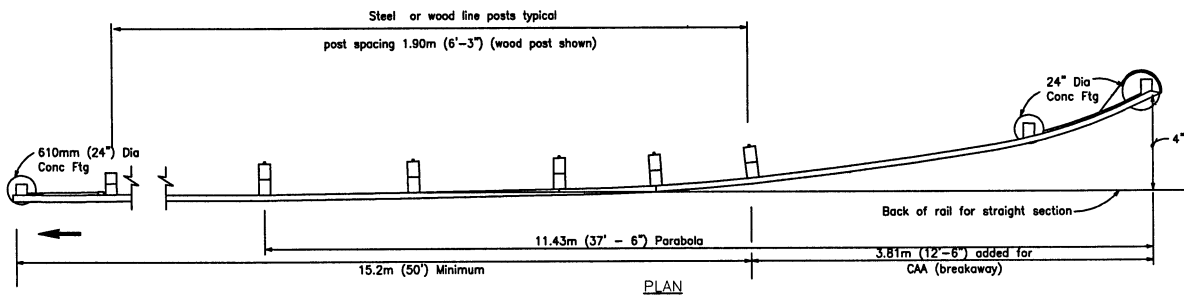
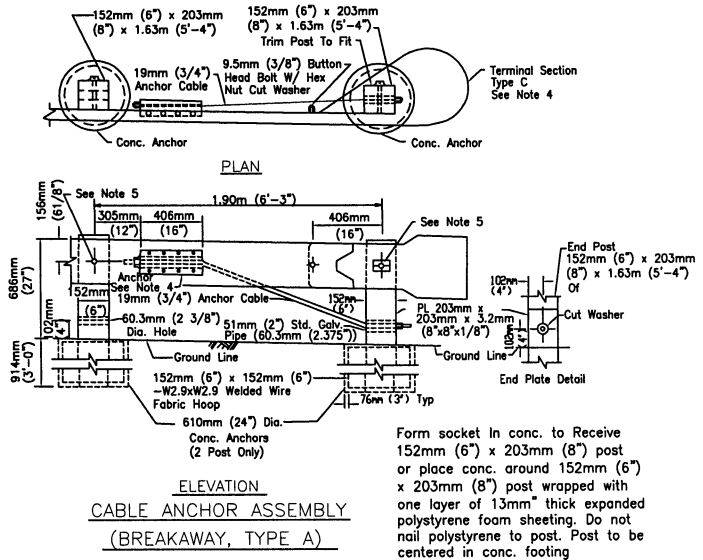
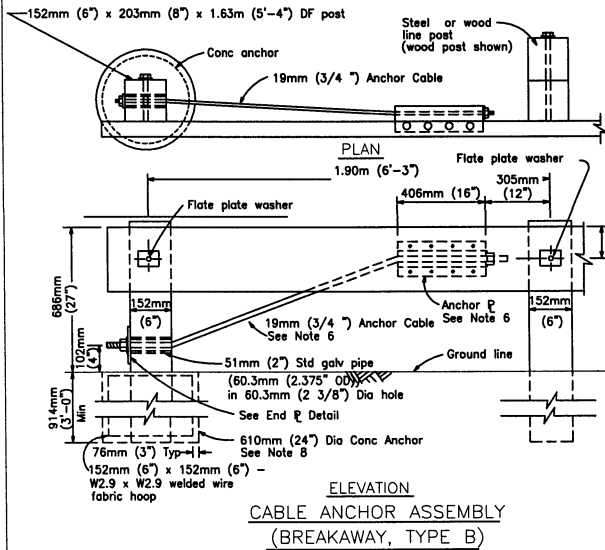
RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

3/11/2003

Chairperson R.C.E. 19246 Date

DRAWING NUMBER M-36

This 2003 edition drawing is NOT in conformance with the latest Caltrans Standard Plans for Guardrails. Use Caltrans latest Standard Plans or seek Agency permission before using this drawing.



**NOTES**

1. For typical use of cable anchor assembly (Breakaway, Type A), see Revised Standard Drawings M-34 and M-35.
2. Cable anchor assembly (Breakaway, Type B) is typically used on the trailing end of guard railing for embankment installations except two-way road beds less than 18.3m (60 feet) in width.
3. Direction of traffic indicated by →
4. For details of Terminal Section Type C, anchor plate and 19mm (3/4") cable, see Standard Dwg. M-38.
5. Do not use flat plate washers under head of rail mounting bolt at the second anchor post of Type A anchors and next five line posts. Use flat plate washers on other line posts and at the first anchor post of Type A anchor and at the Type B anchor post.
6. For trailing end of guard rail adjacent to one-way roadway omit terminal section.

Revision	By	Approved	Date
ORIGINAL		G.Parkinson	4/92
Add Metric		T. Stanton	03/03

SAN DIEGO REGIONAL STANDARD DRAWING

GUARD RAIL END ANCHORS (BREAKAWAY)

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

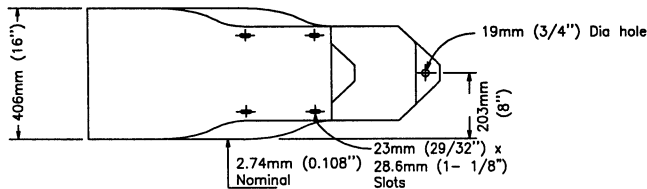
*T. Stanton* 3/10/2003  
Chairperson R.C.E. 19246 Date

DRAWING NUMBER M-37

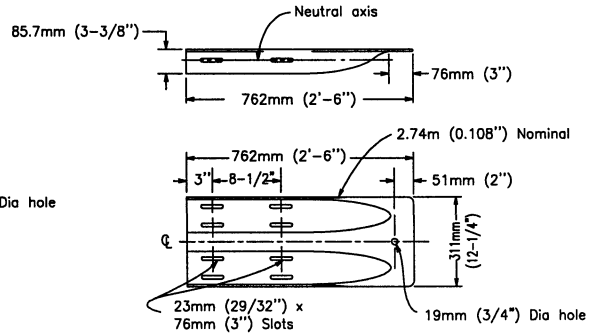


This 2003 edition drawing is NOT in conformance with the latest Caltrans Standard Plans for Guardrails. Use Caltrans latest Standard Plans or seek Agency permission before using this drawing.

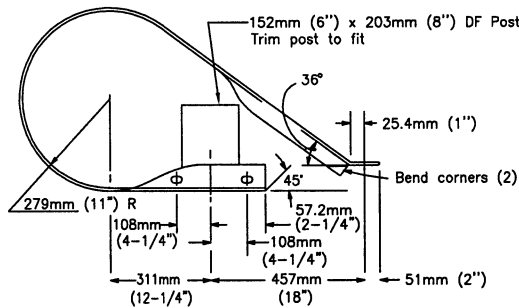
NOTE  
See Standard Drawing M-37 for Breakaway End Anchor details.



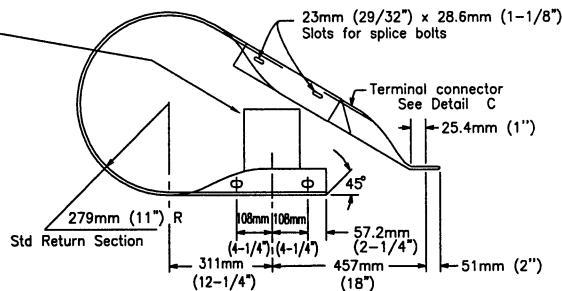
TERMINAL SECTION TYPE C - ELEVATION VIEW



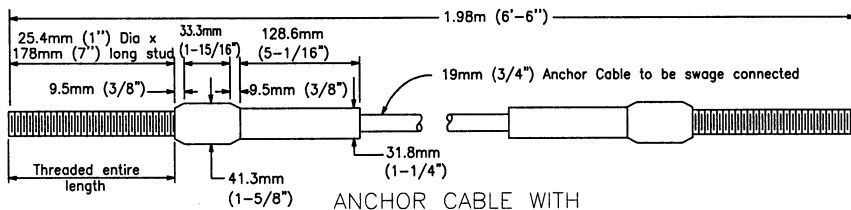
TERMINAL CONNECTOR FOR  
OPTIONAL DESIGN TERMINAL SECTION TYPE C  
DETAIL C



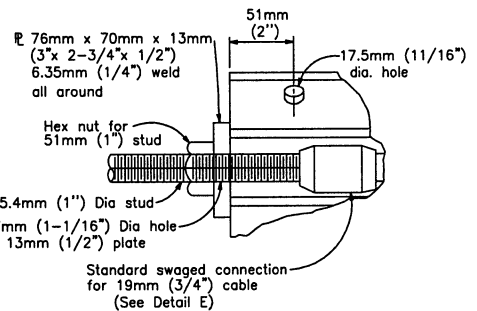
TERMINAL SECTION TYPE C  
DETAIL A



OPTIONAL DESIGN TERMINAL SECTION TYPE C  
DETAIL B

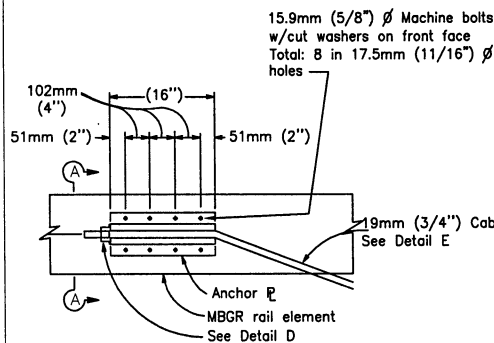


ANCHOR CABLE WITH  
SWAGED FITTING AND STUD  
DETAIL E

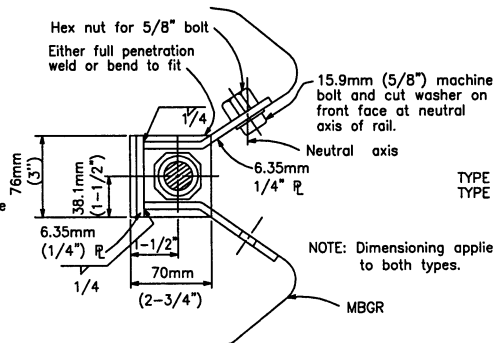


Standard swaged connection  
for 19mm (3/4 inch) cable  
(See Detail E)

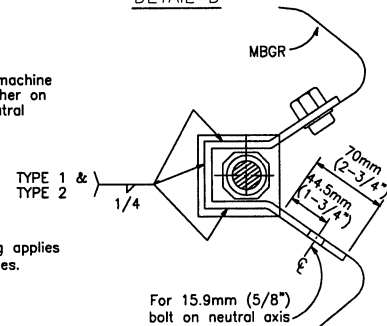
DETAIL D



ANCHOR PLATE DETAIL



SECTION A-A  
(ALTERNATIVE TYPE 1)



SECTION A-A  
(ALTERNATIVE TYPE 2)

Revision	By	Approved	Date
ORIGINAL		G.Parkinson	4/92
Add Metric		T. Stanton	03/03

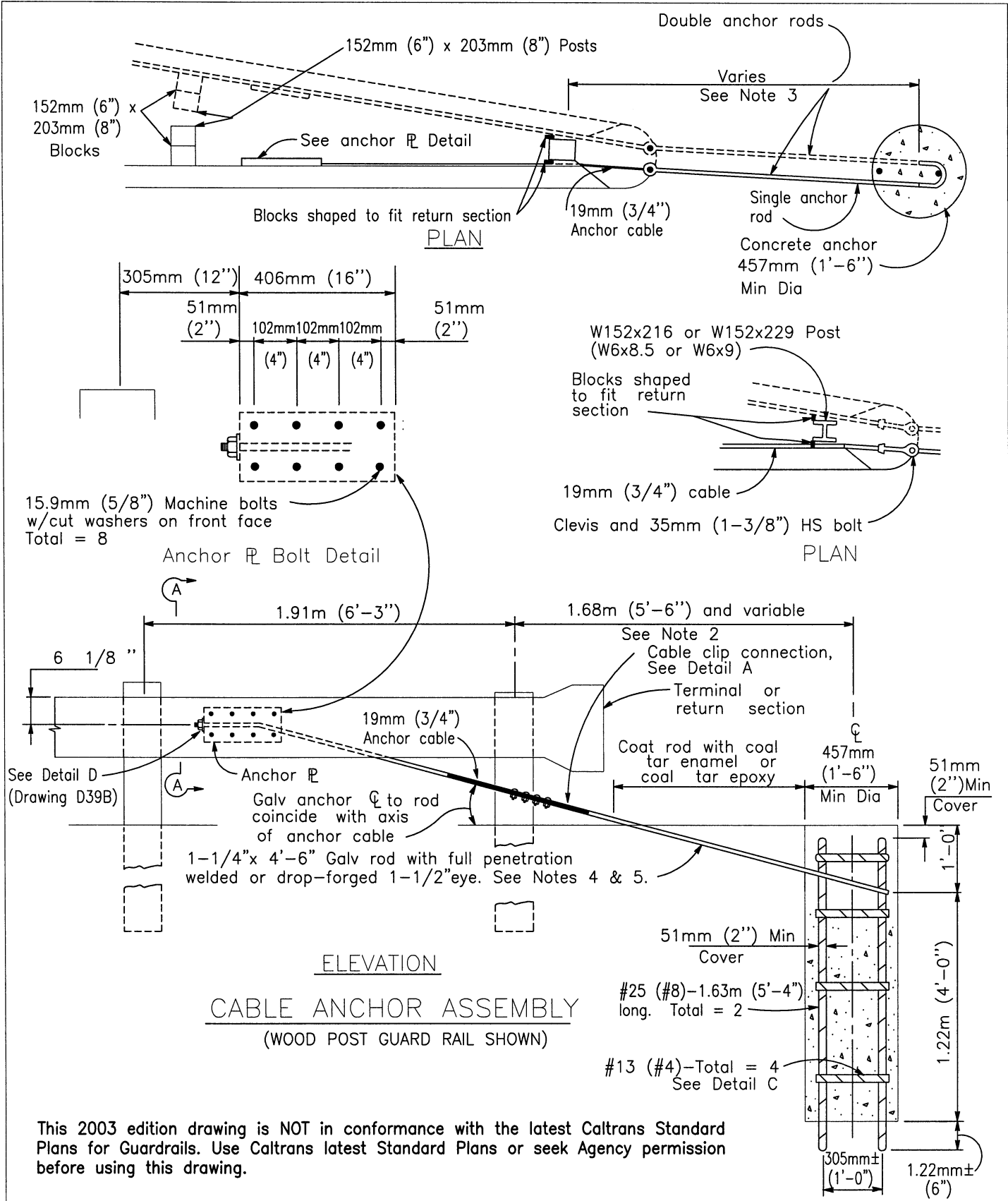
SAN DIEGO REGIONAL STANDARD DRAWING

GUARD RAIL END ANCHORS  
( BREAKAWAY HARDWARE )

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

*T. Stanton* 3/11/2003  
Chairperson R.C.E. 19246 Date

DRAWING NUMBER M-38



This 2003 edition drawing is NOT in conformance with the latest Caltrans Standard Plans for Guardrails. Use Caltrans latest Standard Plans or seek Agency permission before using this drawing.

Revision	By	Approved	Date
ORIGINAL		G.Parkinson	4/92
Add Metric		T. Stanton	03/03

SAN DIEGO REGIONAL STANDARD DRAWING

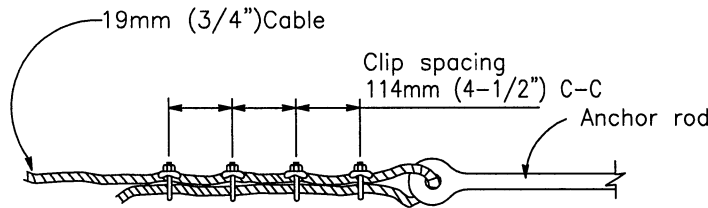
BARRIER AND GUARD RAIL  
 END ANCHORS

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

*T. Stanton* 3/10/2003  
 Chairperson R.C.E. 19246 Date

DRAWING NUMBER M-39A

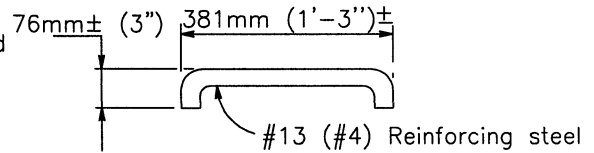
This 2003 edition drawing is NOT in conformance with the latest Caltrans Standard Plans for Guardrails. Use Caltrans latest Standard Plans or seek Agency permission before using this drawing.



"U" bolts of clip on short end of cable only  
 "U" bolts tightened to 67.8 N-m (50 ft. lb.) torque

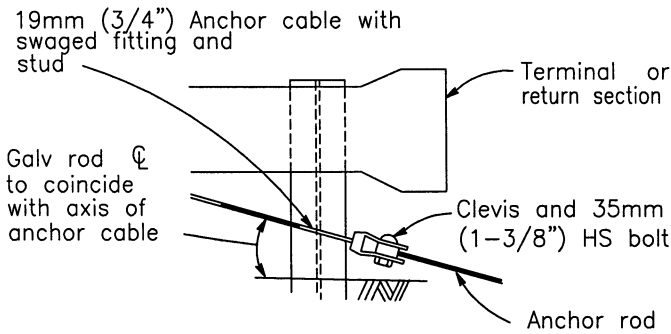
CABLE CLIP CONNECTION

DETAIL A  
 See Note 5



DETAIL C

17.5mm  $\phi$  (11/16") hole

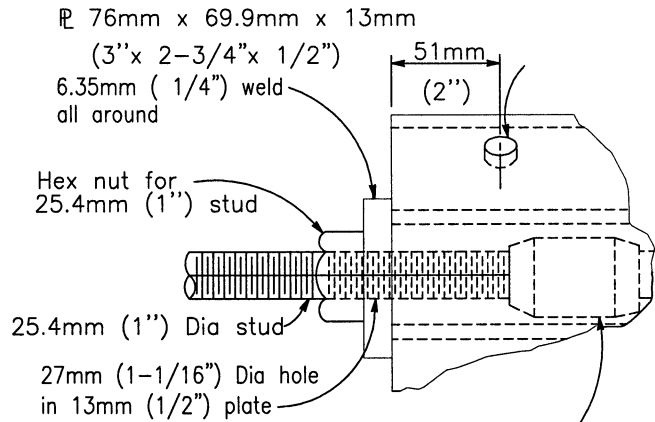


ELEVATION

CLEVIS AND BOLT CONNECTION

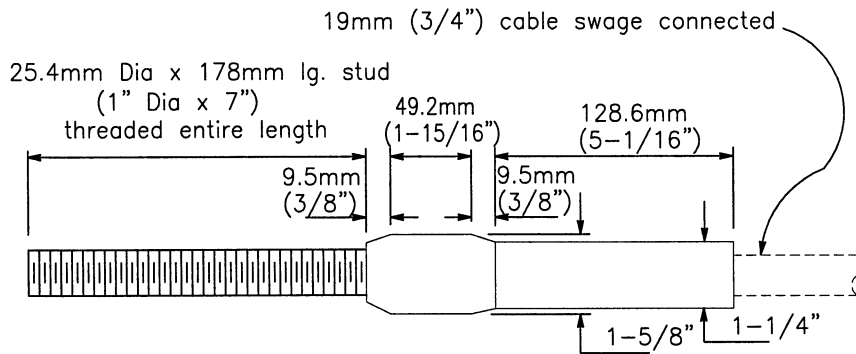
DETAIL B

(STEEL POST GUARD RAIL SHOWN)  
 See Note 5



Standard swaged connection for 19mm (3/4") cable (See Detail E)

DETAIL D



ANCHOR CABLE WITH SWAGED FITTING AND STUD

DETAIL E

Revision	By	Approved	Date
ORIGINAL		G.Parkinson	4/92
Add Metric		T. Stanton	03/03

SAN DIEGO REGIONAL STANDARD DRAWING

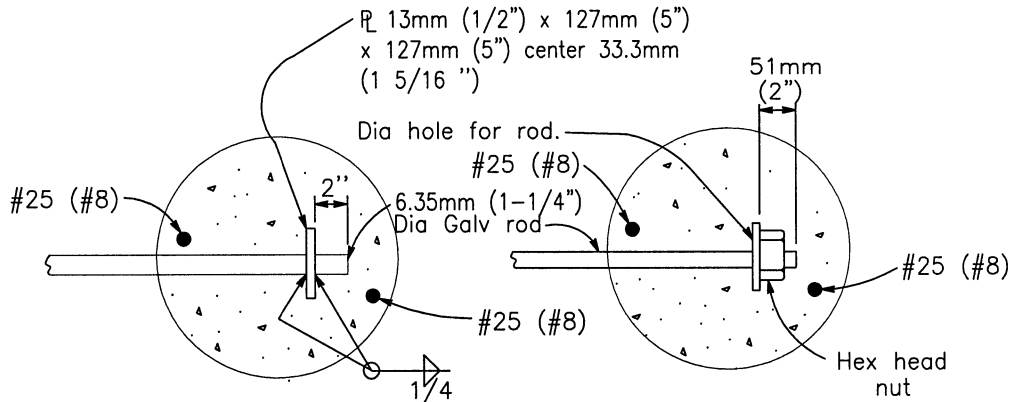
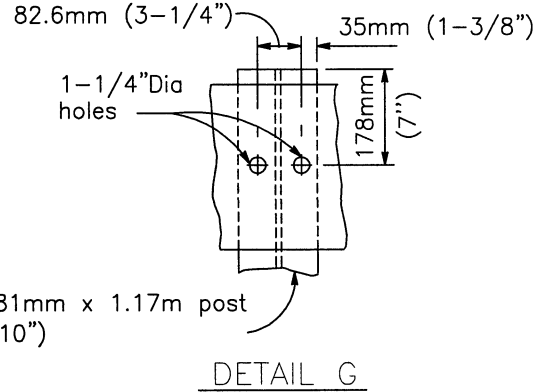
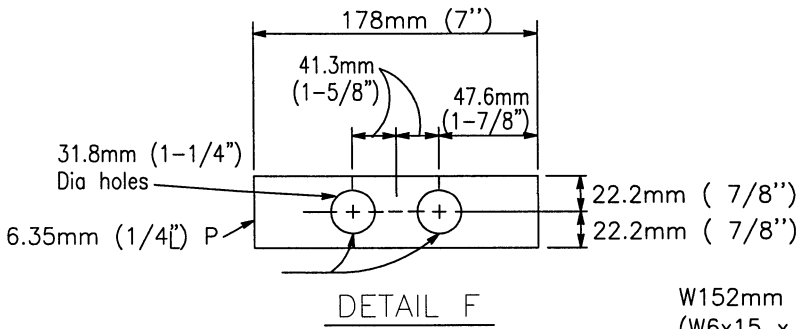
BARRIER AND GUARD RAIL  
 END ANCHORS

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

*T. Stanton* 3/11/2003  
 Chairperson R.C.E. 19246 Date

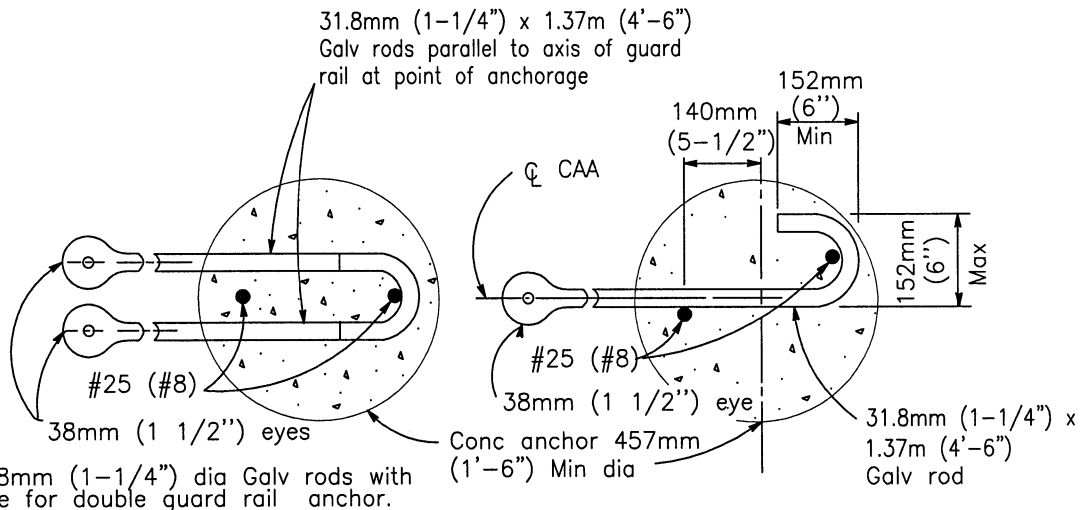
DRAWING NUMBER M-39B

This 2003 edition drawing is NOT in conformance with the latest Caltrans Standard Plans for Guardrails. Use Caltrans latest Standard Plans or seek Agency permission before using this drawing.



OPTIONAL SINGLE ANCHOR ROD END DETAILS

Not to be used for double anchors



NOTE:

Use two 31.8mm (1-1/4") dia Galv rods with hook and eye for double guard rail anchor.

DOUBLE ANCHOR

SINGLE ANCHOR

ANCHOR RODS

Revision	By	Approved	Date
ORIGINAL		G.Parkinson	4/92
Add Metric		T. Stanton	03/03

SAN DIEGO REGIONAL STANDARD DRAWING

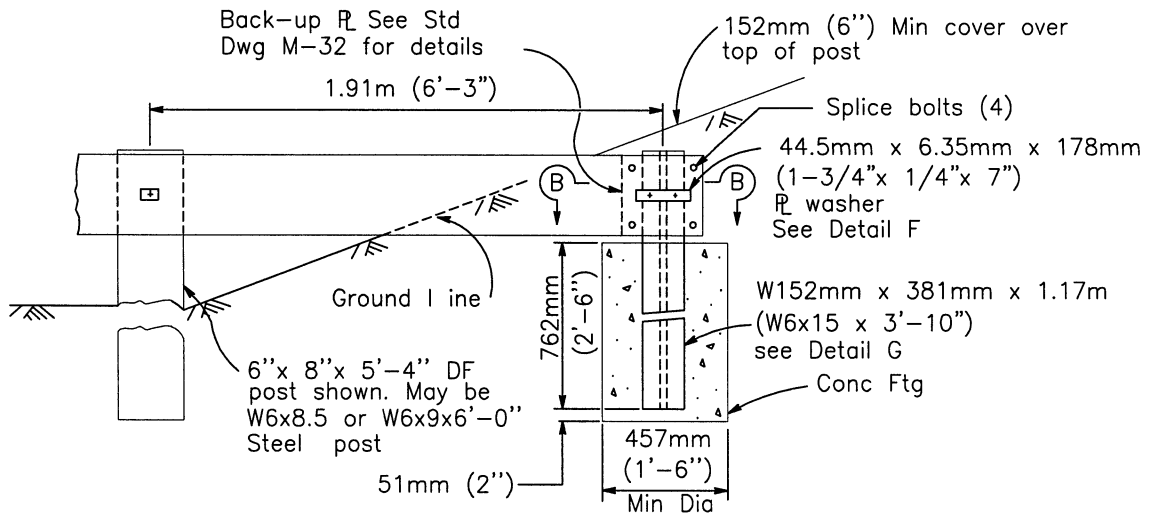
BARRIER AND GUARD RAIL  
END ANCHORS

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

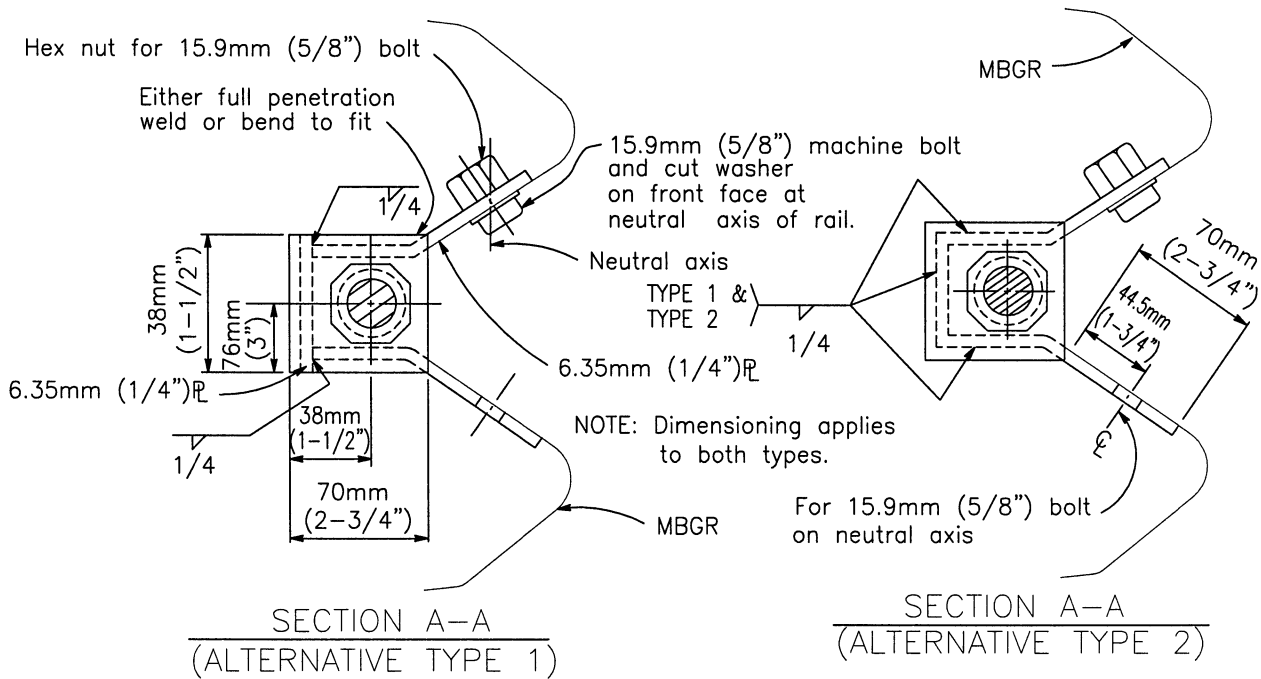
*T. Stanton* 310112003  
Chairperson R.C.E. 19246 Date

DRAWING NUMBER M-39C


This 2003 edition drawing is NOT in conformance with the latest Caltrans Standard Plans for Guardrails. Use Caltrans latest Standard Plans or seek Agency permission before using this drawing.



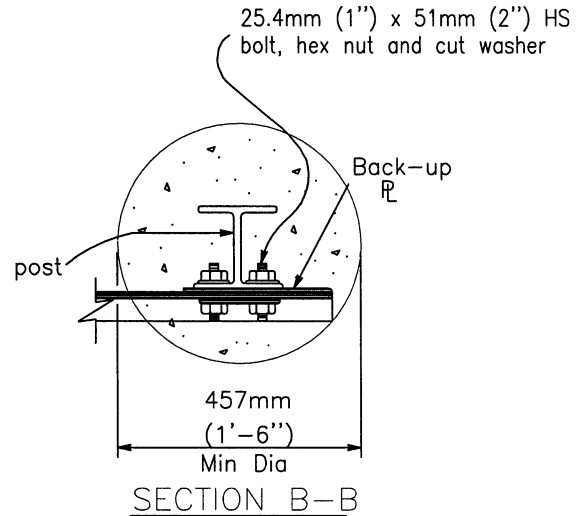
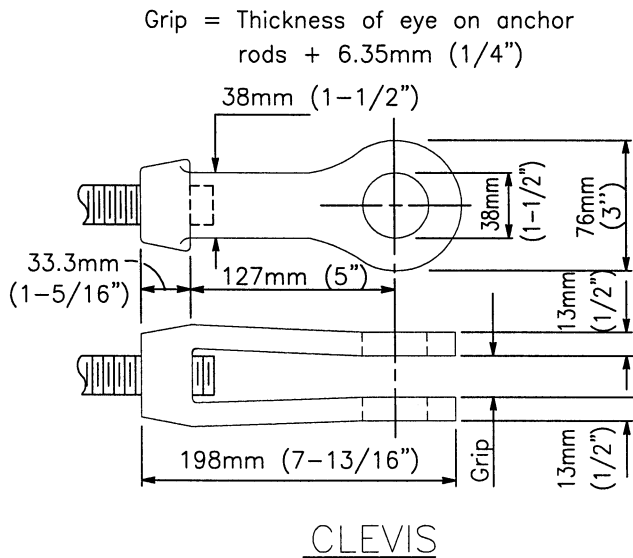
BURIED POST ANCHOR



ANCHOR PLATE DETAILS

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
ORIGINAL		G. Parkinson	4/92		
Add Metric		T. Stanton	03/03	BARRIER AND GUARD RAIL END ANCHORS	 31/11/2003 Chairperson R.C.E. 19246 Date DRAWING NUMBER M-39D

This 2003 edition drawing is NOT in conformance with the latest Caltrans Standard Plans for Guardrails. Use Caltrans latest Standard Plans or seek Agency permission before using this drawing.



NOTES

1. For typical use of end anchors shown on this plan, see Standard Drawings M-34 and M-35.
2. Anchor cable to be parallel to guard rail for straight runs of rail. Anchor cable may have angle point at anchor plate if guard rail is curved.
3. 1.68m (5'-6") with terminal section. May be less than with return sections if separate rods connect to concrete anchor.
4. Anchor rod hooks to be in contact with anchor reinforcement when concrete is placed. Wire ties may be used to position anchor rods.
5. Cable clip connection (Detail A) or clevis and bolt connection (Detail B) to be used with wood post guard railing installation. For steel post guard railing installations, clevis and bolt connection (Detail B) is to be used. Other alternative for attaching cable to anchor rod must be approved by the engineer.

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE	
ORIGINAL		G. Parkinson	4/92		BARRIER AND GUARD RAIL END ANCHORS	<i>T. Stanton</i> 31/01/2003
Add Metric		T. Stanton	03/03	Chairperson R.C.E. 19246 Date		
				DRAWING NUMBER		M-39E

This 2003 edition drawing is NOT in conformance with the latest Caltrans Standard Plans for Guardrails. Use Caltrans latest Standard Plans or seek Agency permission before using this drawing.

254mm x 254mm x 1.63m  
(10' x 10' x 5'-4") DF Post with  
203mm x 203 x 356mm  
(8' x 8' x 1'-2") DF block  
(See Notes 2 and 5)

25.4mm  $\phi$  (1") Galv HS bolts  
with washers and nuts

38.1mm (1 1/4")  
Pipe spacer

229mm 229mm  
(9") (9")  
Typ Typ

Metal box  
spacer

114mm (4-1/2")  
Typ

PLAN

953mm (3' 1-1/2")  
Typ

953mm (3' 1-1/2")  
Typ

953mm (3' 1-1/2")  
Typ

953mm (3' 1-1/2")  
Typ

533mm  
(1'-9")  
Typ

6.35mm  
(1/4")  $\phi$   
washer

6.35mm (1/4")  $\phi$  washer

6.35mm (1/4")  $\phi$  washer

6.35mm (1/4")  $\phi$  washer

6.35mm (1/4")  $\phi$  washer

ELEVATION

GUARD RAIL CONNECTION TO BRIDGE RAILING

1"  $\phi$  Galv HS bolt with washers and nuts

229mm 229mm  
(9") (9")

13mm (1/2")  $\phi$  washer

13mm (1/2")  $\phi$  washer

13mm (1/2")  $\phi$  washer

13mm (1/2")  $\phi$  washer

13mm (1/2")  $\phi$  washer

13mm (1/2")  $\phi$  washer

13mm (1/2")  $\phi$  washer

DEPARTING END SECTION  
Flush end section  
connection

End section  
See Note 8

Bridge Railing

Terminal section Type B  
See Note 7

Revision	By	Approved	Date
ORIGINAL		G.Parkinson	4/92
Add Metric		T. Stanton	03/03

SAN DIEGO REGIONAL STANDARD DRAWING

GUARD RAIL CONNECTIONS  
TO BRIDGE RAILS, RETAINING WALLS  
AND ABUTMENTS

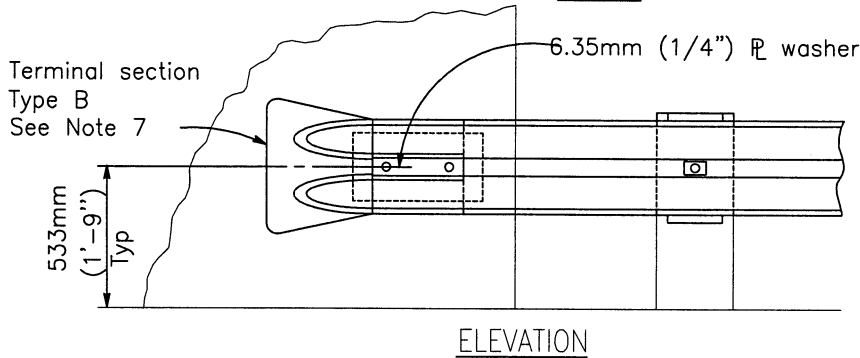
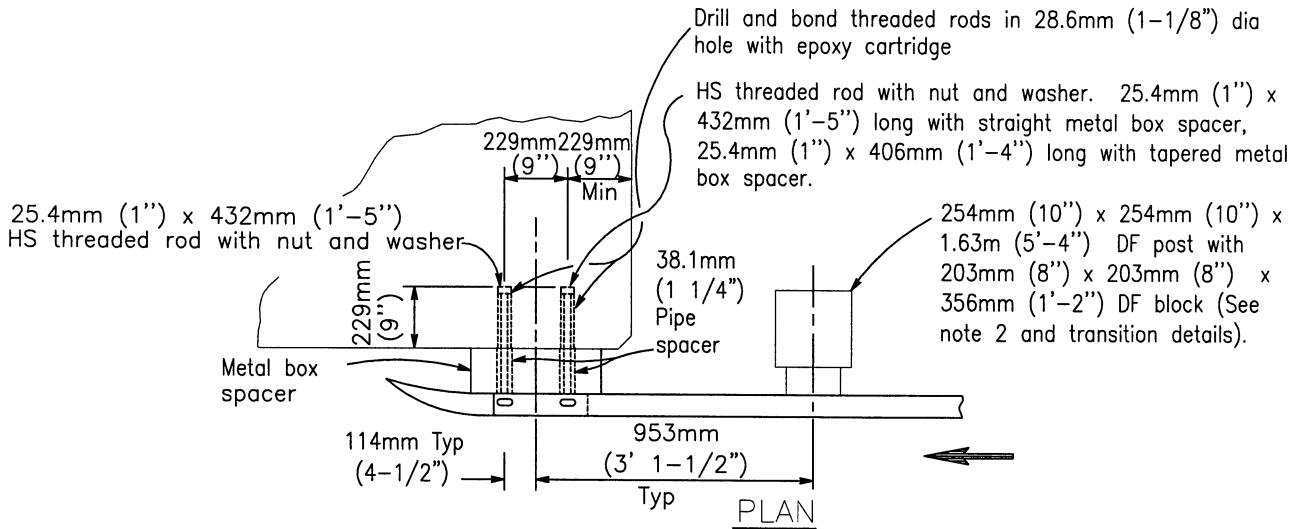
RECOMMENDED BY THE SAN DIEGO  
REGIONAL STANDARDS COMMITTEE

*T. Stanton* 3/10/2003

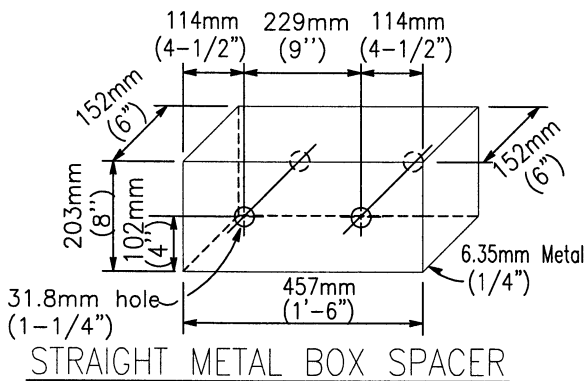
Chairperson R.C.E. 19246 Date

DRAWING  
NUMBER M-40A

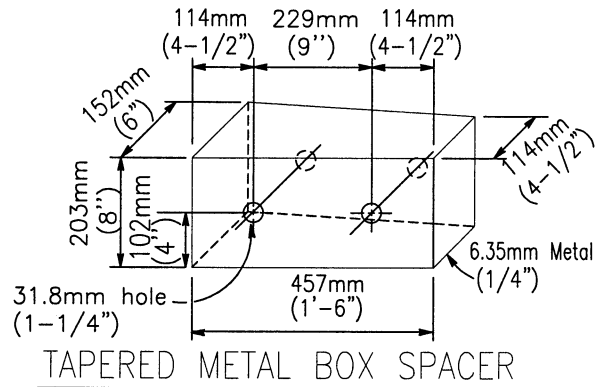
This 2003 edition drawing is NOT in conformance with the latest Caltrans Standard Plans for Guardrails. Use Caltrans latest Standard Plans or seek Agency permission before using this drawing.



GUARD RAIL CONNECTION TO WALL OR ABUTMENT FACE



See Note 6  
Use when approach guard rail is not tapered



See Note 6  
Use when approach guard rail is tapered

Revision	By	Approved	Date
ORIGINAL		G.Parkinson	4/92
Add Metric		T. Stanton	03/03

SAN DIEGO REGIONAL STANDARD DRAWING

GUARD RAIL CONNECTIONS  
TO BRIDGE RAILS, RETAINING WALLS  
AND ABUTMENTS

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

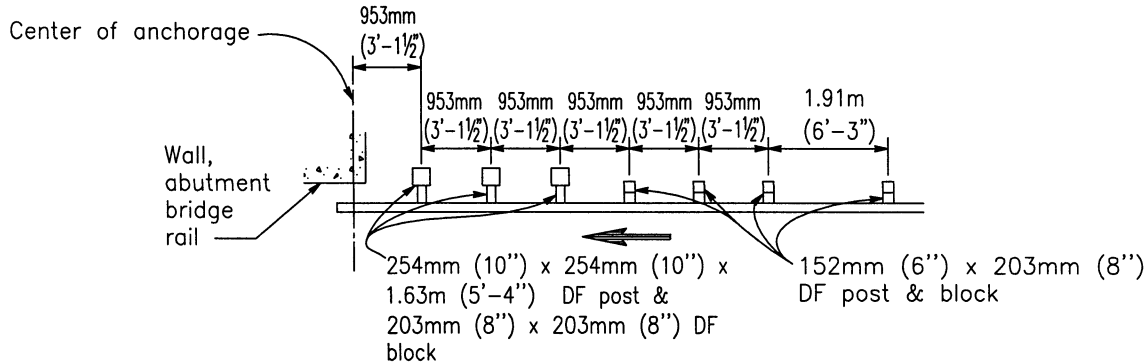
*T. Stanton* 3/01/2003

Chairperson R.C.E. 19246 Date

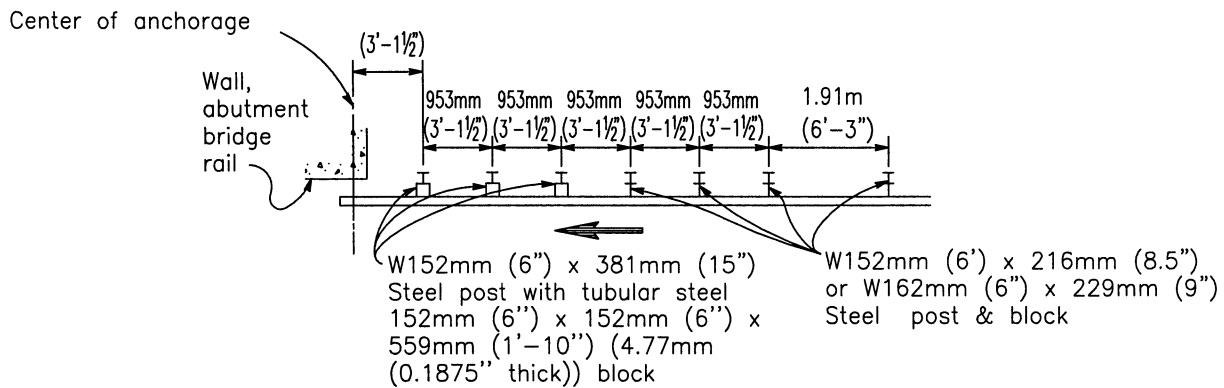
DRAWING NUMBER M-40B



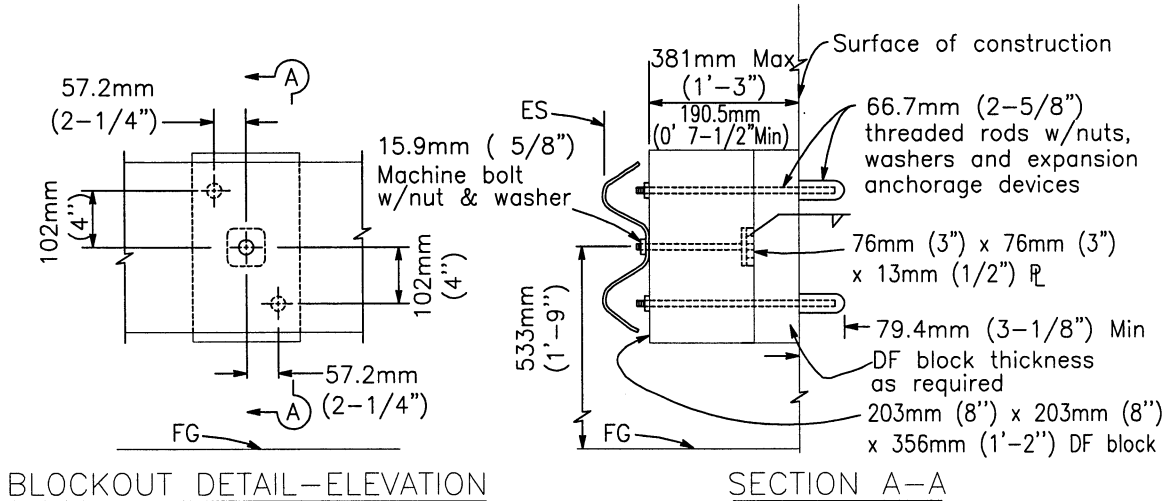
This 2003 edition drawing is NOT in conformance with the latest Caltrans Standard Plans for Guardrails. Use Caltrans latest Standard Plans or seek Agency permission before using this drawing.



APPROACH RAILING TRANSITION  
WOOD POSTS



APPROACH RAILING TRANSITION  
STEEL POSTS



BLOCKOUT DETAIL-ELEVATION

SECTION A-A

See Notes 9 and 10

GUARD RAIL ANCHORAGE TO WALL OR ABUTMENT

Revision	By	Approved	Date
ORIGINAL		G.Parkinson	4/92
Add Metric		T. Stanton	03/03

SAN DIEGO REGIONAL STANDARD DRAWING

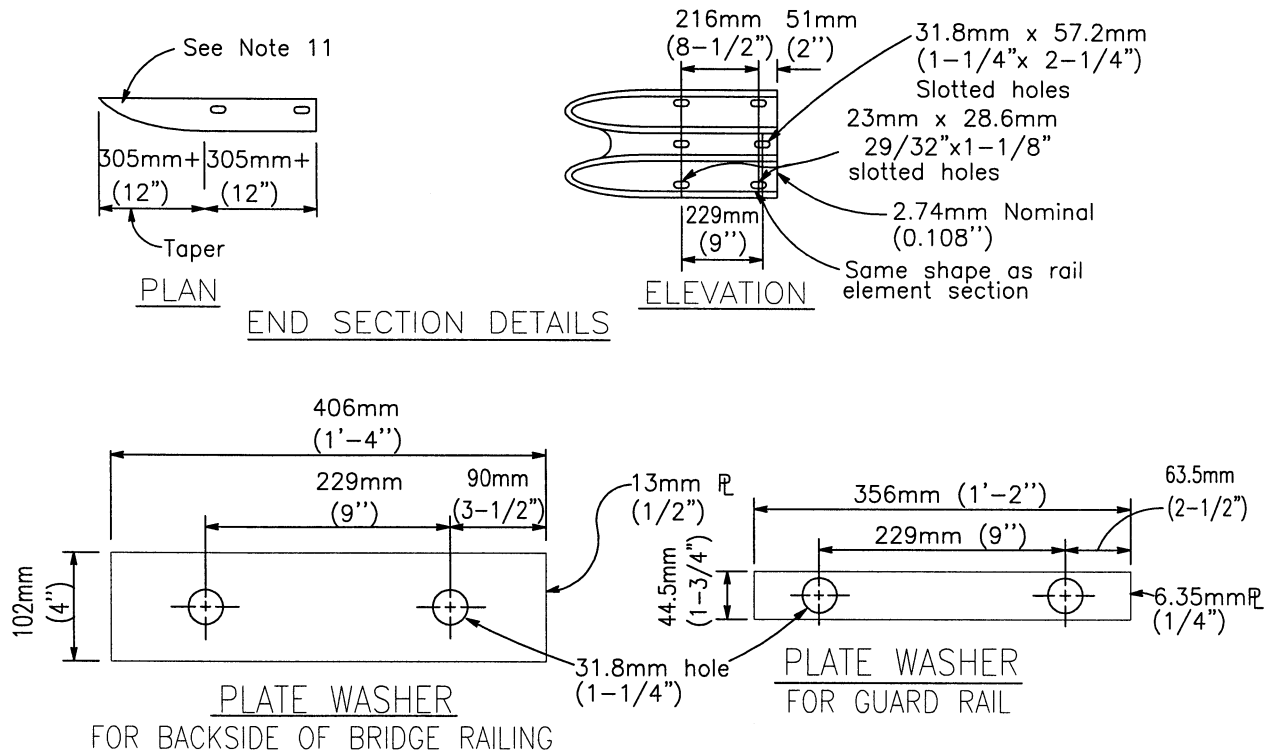
GUARD RAIL CONNECTIONS  
TO BRIDGE RAILS, RETAINING WALLS  
AND ABUTMENTS

RECOMMENDED BY THE SAN DIEGO  
REGIONAL STANDARDS COMMITTEE

*T. Stanton* 3/01/2003  
Chairperson R.C.E. 19246 Date


DRAWING  
NUMBER M-40C

This 2003 edition drawing is NOT in conformance with the latest Caltrans Standard Plans for Guardrails. Use Caltrans latest Standard Plans or seek Agency permission before using this drawing.

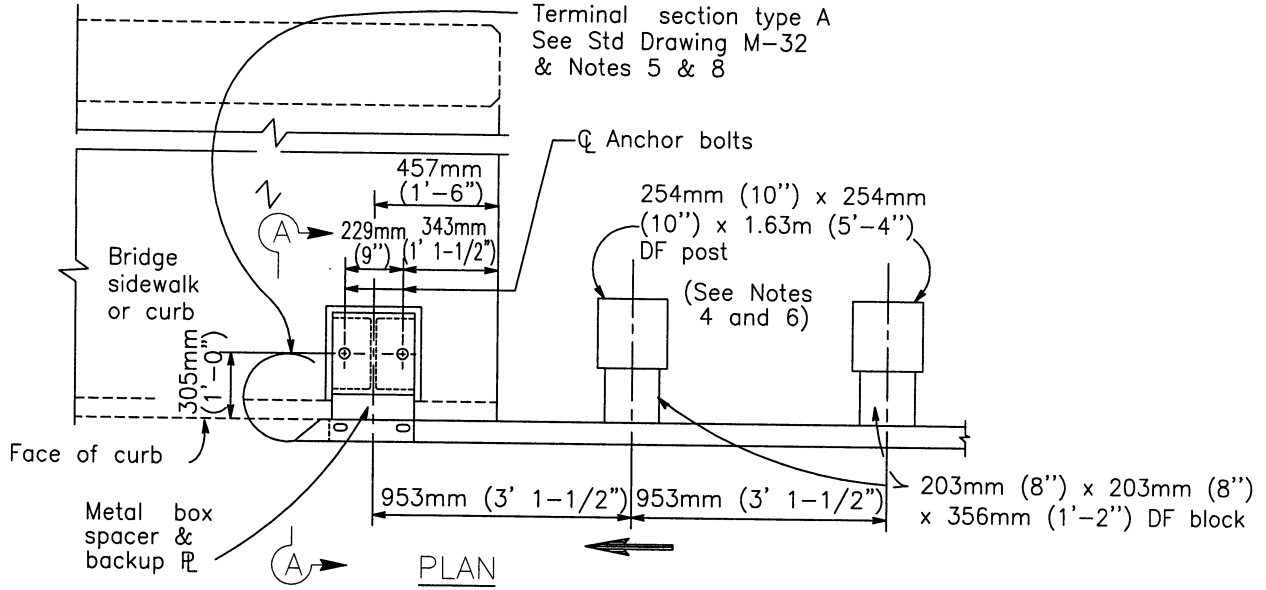


**NOTES**

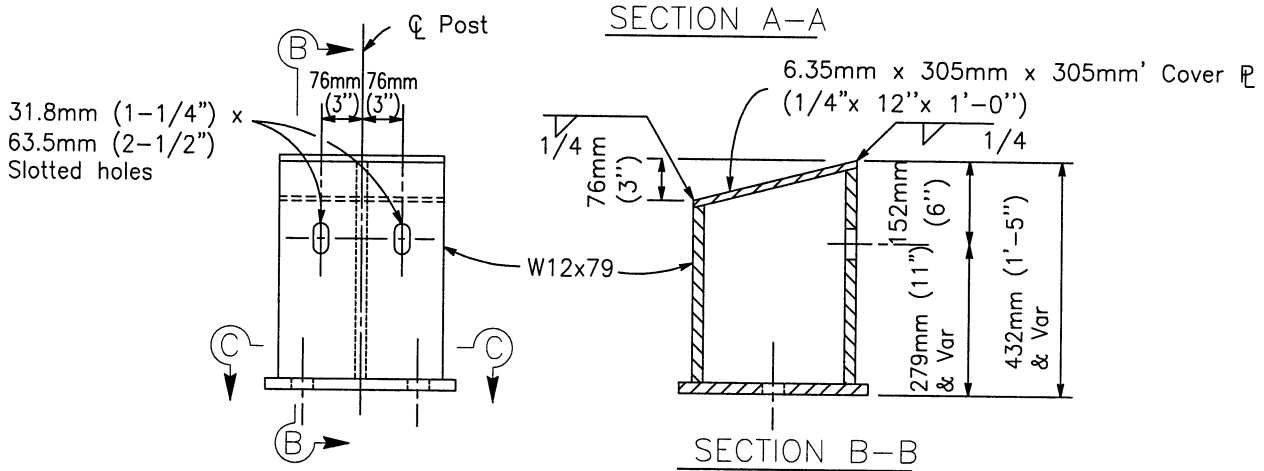
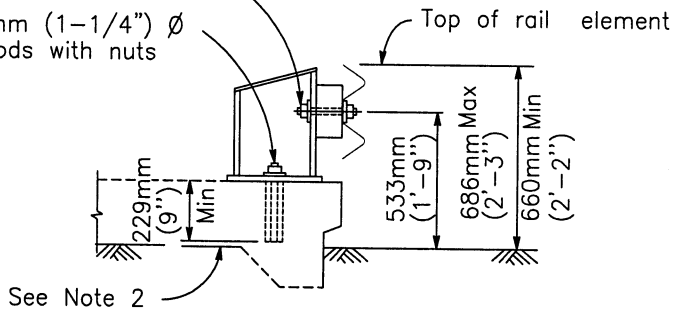
1. These connection details apply to bridge rails, abutments and retaining walls. For additional connection details for bridge railing, see the project plans.
2. Where 254mm (10") x 203mm (10") DF post and 203mm (8") x 203mm (8") DF blocks are shown, W152mm (6") x 381mm (15") steel posts and tubular steel 152mm (6") x 152mm (6") x 356mm (1'-2") (2.74mm (0.1875") thick) blocks may be specified where applicable.
3. Additional details of post, blocks and hardware are shown on Standard Drawings M-32 and M-33.
4. Direction of traffic indicated by  $\rightarrow$
5. For approach railing details, see Type 1 flare on Standard Drawing M-34 and transition details on this plan.
6. When metal box spacer is installed, place 31.8mm (1-1/4") x 127mm (5") and 31.8mm (1-1/4") x 102mm (4") pipe spacers on 25.4mm (1") bolts passing through interior of tapered box spacer and 31.8mm (1-1/4") x 133.4mm (5-1/4") pipe spacers on 25.4mm (1") bolts passing through interior of straight box spacer.
7. Terminal sections will not be installed on trailing end of approach guard rail placed adjacent to one-way roadways. When terminal section is not installed, use backup plate between rail element and metal box spacer. See Standard Drawing M-32 for backup plate details.
8. This type of connection may be used for both the approach and departing ends of structures on roadways 8.53m (28 feet) or less in width. Use timber shims without posts where rail to wall or abutment clearance is less than 381mm (15) inches.
9. Do Not attach rail to bridge columns.
10. Use separate posts as shown on Standard Drawing M-35.
11. End sections may be cut from Type B terminal section or fabricated.

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE	
ORIGINAL		G.Parkinson	4/92		GUARD RAIL CONNECTIONS TO BRIDGE RAILS, RETAINING WALLS AND ABUTMENTS	 3/10/2003 Chairperson R.C.E. 19246 Date
Add Metric		T. Stanton	03/03	DRAWING NUMBER		M-40D

This 2003 edition drawing is NOT in conformance with the latest Caltrans Standard Plans for Guardrails. Use Caltrans latest Standard Plans or seek Agency permission before using this drawing.



Two 25.4mm (1")  $\varnothing$  Galv HS bolts with nuts and washers.  
Drill and bond two 31.8mm (1-1/4")  $\varnothing$  bolts with HS threaded rods with nuts and washers.  
Coat rods with laquer.



ANCHOR POST ASSEMBLY

See Note 7

Revision	By	Approved	Date
ORIGINAL		G.Parkinson	4/92
Add Metric		T. Stanton	03/03

SAN DIEGO REGIONAL STANDARD DRAWING

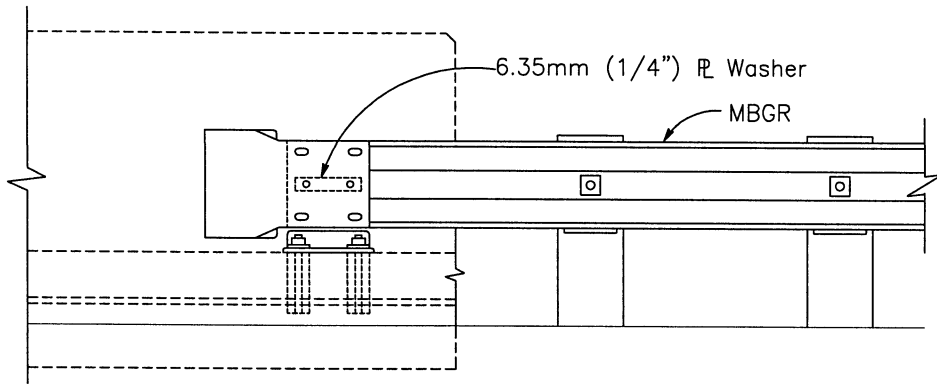
GUARD RAIL CONNECTION  
TO BRIDGE, SIDEWALK AND CURBS

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

*T. Stanton* 3/01/2003  
Chairperson R.C.E. 19246 Date

DRAWING NUMBER M-41A

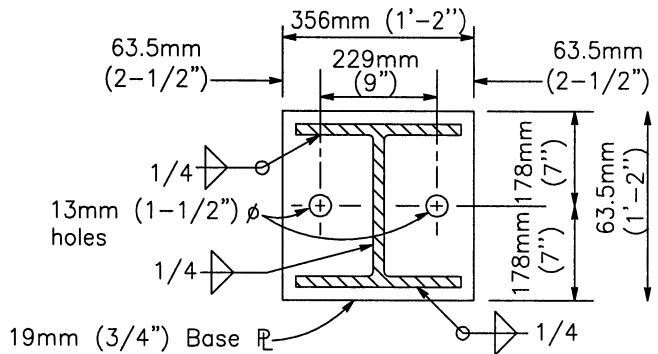
This 2003 edition drawing is NOT in conformance with the latest Caltrans Standard Plans for Guardrails. Use Caltrans latest Standard Plans or seek Agency permission before using this drawing.



ELEVATION

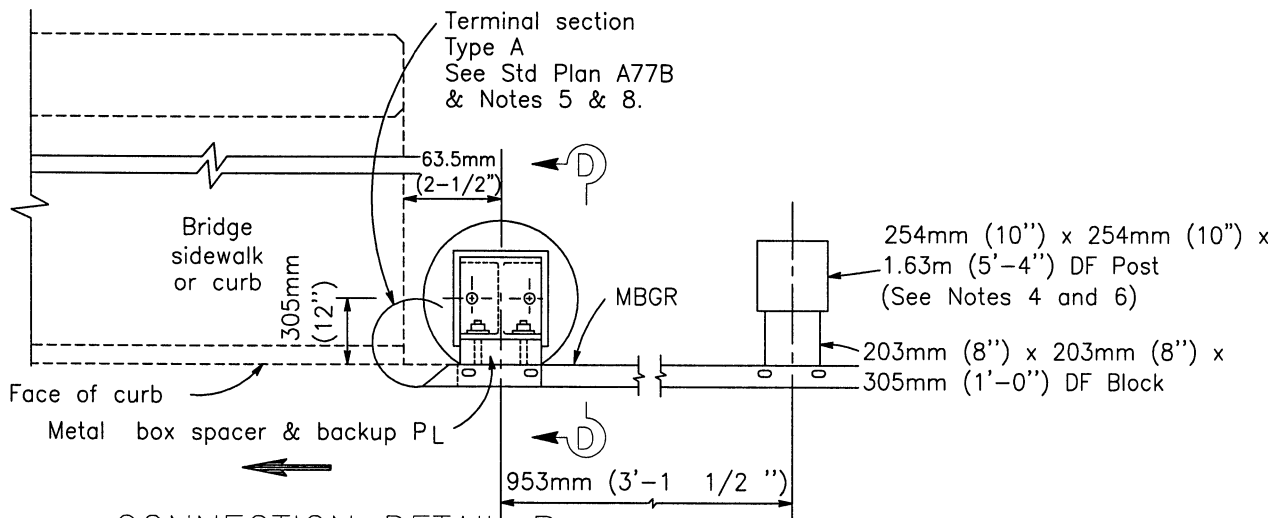
CONNECTION DETAIL A

See Note 2



SECTION C-C

ANCHOR POST DETAILS  
(FOR CONNECTION DETAIL A)



CONNECTION DETAIL B

PLAN

Revision	By	Approved	Date
ORIGINAL		G.Parkinson	4/92
Add Metric		T. Stanton	03/03

SAN DIEGO REGIONAL STANDARD DRAWING

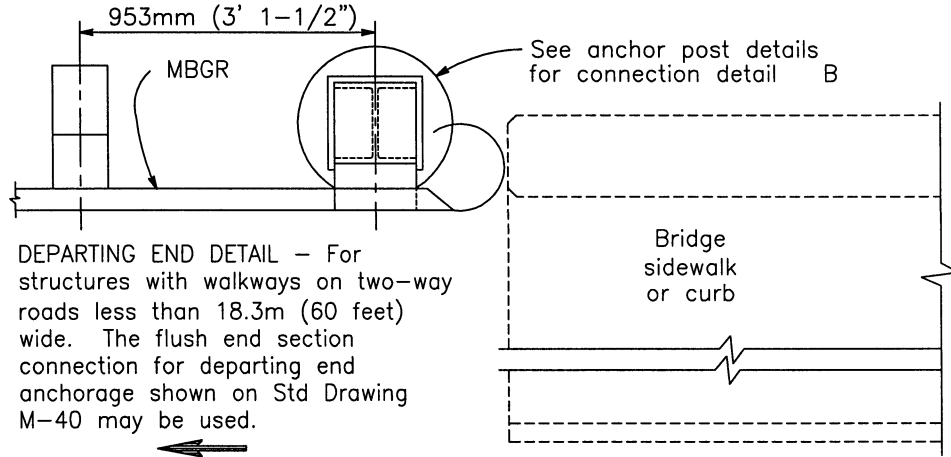
GUARD RAIL CONNECTION  
TO BRIDGE, SIDEWALK AND CURBS

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

*T. Stanton* 3/01/2003  
Chairperson R.C.E. 19246 Date

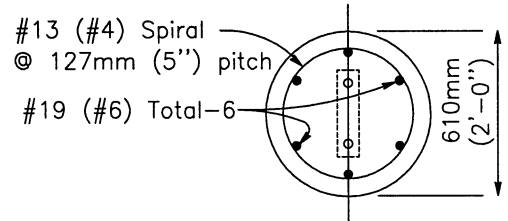
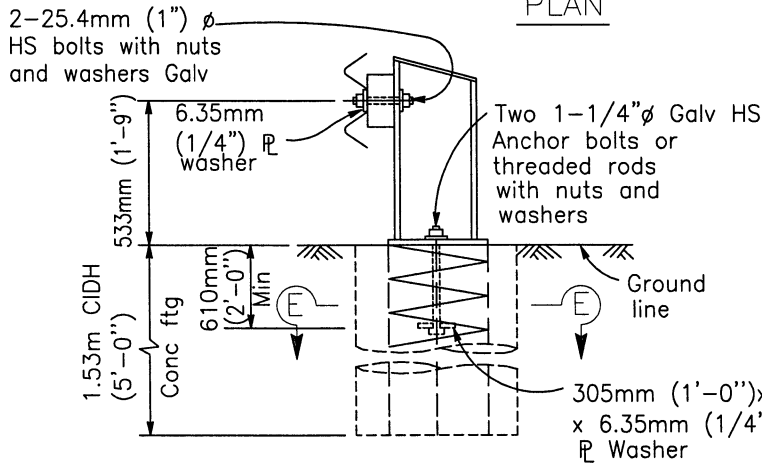
DRAWING NUMBER M-41B

This 2003 edition drawing is NOT in conformance with the latest Caltrans Standard Plans for Guardrails. Use Caltrans latest Standard Plans or seek Agency permission before using this drawing.



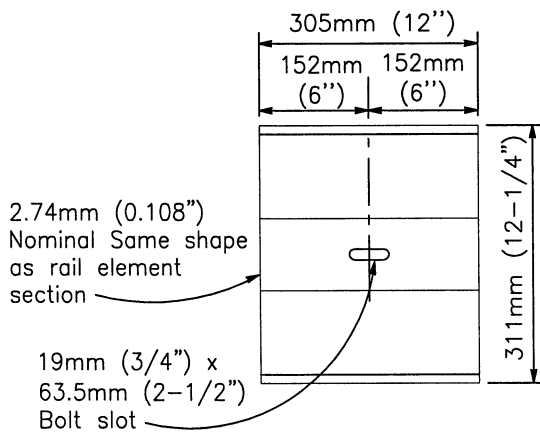
CONNECTION DETAIL C

PLAN



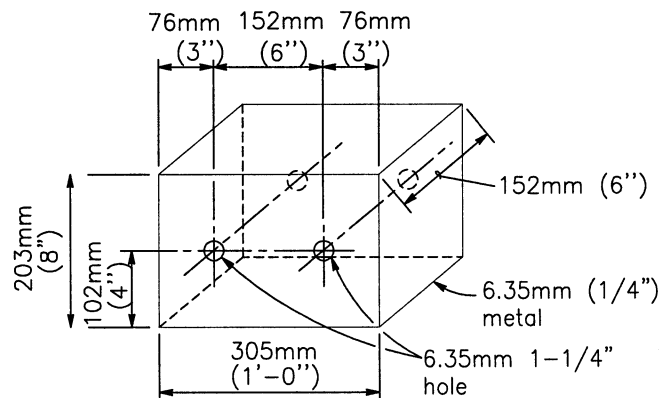
SECTION E-E

SECTION D-D



BACK-UP PLATE

For use between guard rail element and metal box spacer



METAL BOX SPACER

Place 31.8mm (1-1/4") x 133.4mm (5-1/4") pipe spacers on 25.4mm (1") bolts passing through box interior

Revision	By	Approved	Date
ORIGINAL		G.Parkinson	4/92
Add Metric		T. Stanton	03/03

SAN DIEGO REGIONAL STANDARD DRAWING

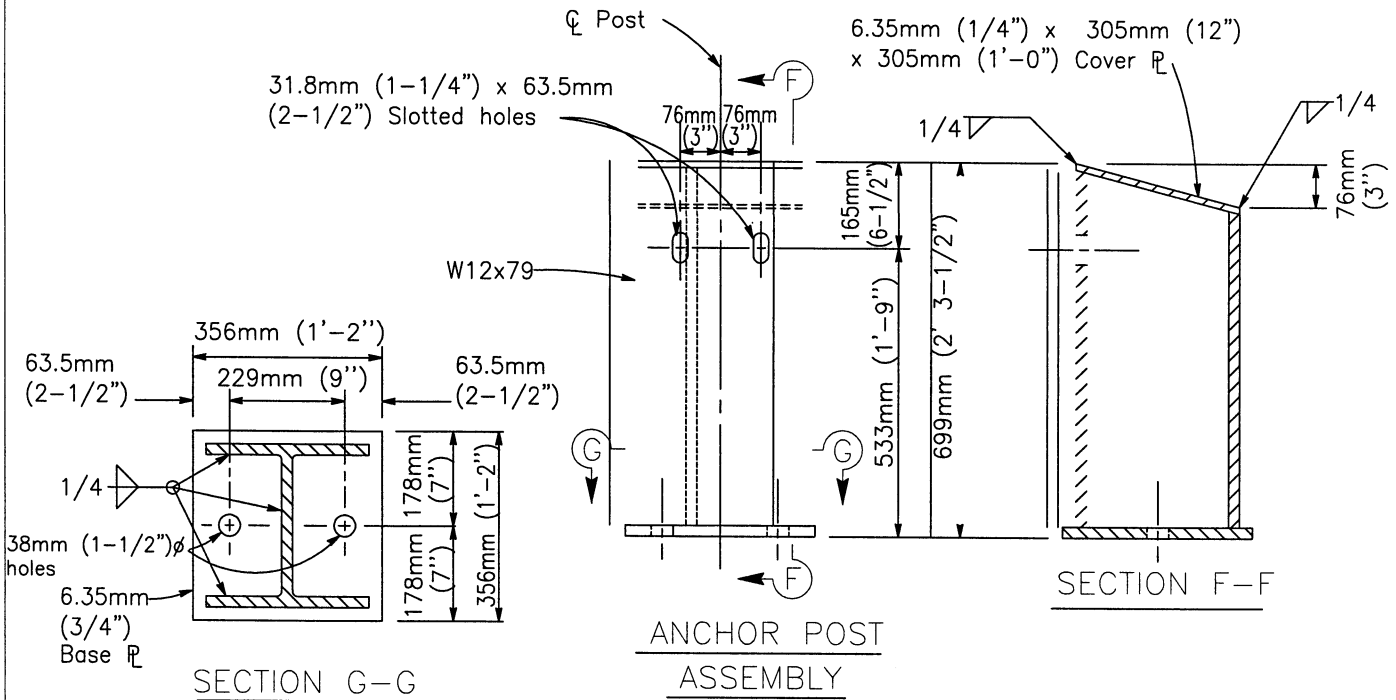
GUARD RAIL CONNECTION  
TO BRIDGE, SIDEWALK AND CURBS

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

*T. Stanton* 3/01/2003  
Chairperson R.C.E. 19246 Date

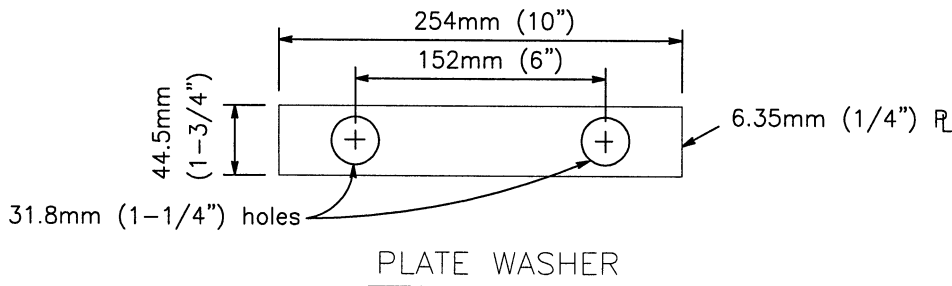
DRAWING NUMBER M-41C

This 2003 edition drawing is NOT in conformance with the latest Caltrans Standard Plans for Guardrails. Use Caltrans latest Standard Plans or seek Agency permission before using this drawing.



See Note 7

ANCHOR POST DETAILS  
(FOR CONNECTION DETAIL B)



NOTES

1. Connection Details A and B applies to the traffic approach end of bridges. For departure end of bridges, see Connection Detail C.
2. When curb or sidewalk depth is less than 229mm (9"), use Connection Detail B. Direction of traffic indicated by →
3. For approach railing details, see Type 1 Flare on Standard Drawing M-34.
4. Terminal sections will not be installed on the trailing end of approach guard rail placed adjacent to one-way roadways.
5. Where 254mm (10") x 254mm (10") DF posts and 203mm (8") x 203mm (8") DF blocks are shown, W152mm (6") x 381mm (15") steel post and Tubular Steel 152mm (6") x 152mm (6") x 356mm (1'-2") (4.76mm (0.1875") thick) blocks may be specified where applicable.
6. Rail post assembly to be galvanized after fabrication.
7. Terminal section Type A to be used where pedestrian traffic is present.
8. For additional connection details for bridge barrier railing, see the project plans.

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
ORIGINAL		G.Parkinson	4/92		
Add Metric		T. Stanton	03/03	GUARD RAIL CONNECTION TO BRIDGE, SIDEWALK AND CURBS	<i>T. Stanton</i> 3/01/2003 Chairperson R.C.E. 19246 Date
					DRAWING NUMBER M-41D