

## **SECTION 31**

# **BRIDGE SAFETY SCREENS**

## 31 BRIDGE SAFETY SCREENS

### 31.1 GENERAL

The bridge safety screen types in current use by the Authority include:

**Vertical or Curved Outwards** - placed behind traffic barrier railings close to the traffic face

**Curved Inwards**- placed behind pedestrian barrier railings on bridges with footways

**Enclosed** - used on pedestrian bridges over roads and railways as required by RTA Technical Direction No TD 2002/RS02 and may incorporate handrailings. A typical example is shown in Figure 31.1.

The minimum requirements for safety screens are set out in AS 5100.1 – Clause 12.3 and in RTA Technical Direction No TD 2002/RS02.

Safety screens can be included in either the design of new bridges or specifically designed for retro-fitting to existing bridge stocks. Typical examples of retrofitting safety screens to existing structures are shown in Figure 31.4.1.

### 31.2 GEOMETRY

#### 31.2.1 Grades and Vertical Curves

Posts for all types of bridge safety screens shall be perpendicular to the top of the concrete safety barrier or footway surface on which they are located in all cases where the longitudinal grade on the structure does not exceed 4% at any point.

Posts for all types of bridge safety screens that are located on a bridge structure where the longitudinal grade on the structure exceeds 4% at any point, shall be detailed to be truly vertical for the full extent of the safety screen.

Posts for all types of bridge safety screens that are located on pedestrian structures shall be detailed to satisfy the client's requirements with respect to shape, height and orientation, however the requirements of RTA Technical Direction TD 2002/RS02 and AS 5100.1 shall be strictly adhered to in all cases.

#### 31.2.2 Height

Height requirements shall be in accordance with AS 5100.1 – Clause 12.3 and RTA Technical Direction No TD 2002/RS02.

#### 31.2.3 Horizontal Curves

As safety screens are made up of individual posts or frames, to which moderately flexible mesh panels are attached, the necessity to allow for offsets in panels around large radius curves is not usually warranted.

#### 31.2.4 Curvature of Posts and Screens

Safety screen adjacent to carriageways must provide clearances as specified in Section 6 of the RTA Road Design Guide. This may be achieved by curving the posts and mesh panels outwards. Excessive curvature of posts and panels shall be avoided so that the functionality of the safety screen is not compromised.

Where top steel mesh panels overlap bottom steel mesh panels, the minimum lap shall be 150 millimetres. Adjacent mesh panels shall be affixed to each other using suitable stainless steel ties or equivalent, at 300 mm maximum centres. The preferred method of interconnecting mesh panels at posts, in the longitudinal direction, is shown in Figure 31.3.

A typical lap detail is shown in Figure 31.3.

On simply supported bridges and continuous bridges where expansion and or contraction joints are detailed, a joint in the safety screens shall be provided at each and every joint in the deck. Joints between mesh panels, provided at these locations shall be detailed in accordance with the example shown in Figure 31.3.

### 31.4 POST SPACING

Post spacing for bridge safety screens shall not exceed 3 metres under any circumstances.

#### 31.4.1 Retrofitting application requirements

Where safety screens are retrofitted to existing bridge structures, safety screen elements shall not be connected to any existing bridge furniture (ie traffic barrier railings or pedestrian railings). See Figure 31.4.1.

For aesthetic considerations, post spacing for bridge safety screens shall be as even as is practical to avoid clashing with any existing bridge furniture.

The location of all existing bridge furniture shall be obtained from Work-As-Executed drawings for the subject structure.

Where Work-As-Executed drawings for the subject structure are not available, the approved design drawings for the structure shall be used to locate existing bridge furniture and an appropriate note added to the drawing stating that the location of existing bridge furniture shall be confirmed on site prior to the commencement of fabrication and installation of the safety screen posts.

Should there be any doubt regarding the location of existing bridge furniture, the client shall be requested to provide an electronic site survey of the structure, at their cost, to enable posts to be located appropriately.

Survey items should include:

- Existing anchor bolt locations for both traffic and pedestrian railings
- Inside and outside top edge of concrete parapets
- Outside top edge of concrete at footways (if applicable)
- Existing lighting column locations (if applicable)
- Expansion joint locations and open width

Safety screen posts shall be located to ensure that the minimum clear distance between existing bridge traffic barrier railing and/or pedestrian barrier railing base plates and the safety screen post base plate is not less than 75mm.

Safety screen furniture installed along the outer edge of bridge structure adjacent to pedestrian barrier railings shall be placed to ensure that the minimum clear distance between the pedestrian barrier railing and the safety screen is not less than 80mm.

The base plate for safety screen posts shall not protrude any further into the footway area than existing bridge furniture to ensure that they do not cause a trip hazard to pedestrian traffic.

Where post spacing at the ends of structures is different to that adopted for the majority of the structure, the post spacing shall be reduced rather than increased and if necessary an intermediate post spacing shall be used to reduce the visual impact of the change in spacing.

### **31.5 STEEL MESH PANEL SIZES**

A typical top steel mesh panel, incorporating transom beams, is detailed in Figure 31.3.

A typical bottom steel mesh panel, incorporating transom beams and an added leg to enable the attachment of the panel to the concrete surface, is detailed in Figure 31.3.

Railway authorities may require a 25mm x 25mm mesh at certain locations on bridges over railways, rather than the typical 50mm x 50mm mesh shown in Figure 31.3.

### **31.6 FIXING OF STEEL MESH PANELS**

Mesh panels shall be affixed to posts at a spacing not exceeding 300mm using Smorgon ARC product code CLUG fasteners or suitable equivalent.

Fasteners shall be affixed to posts using Vandal Proof Stainless Steel Self Drilling Fasteners, 6mm diameter or as requested by the client.

Mesh panels shall be affixed to the top concrete surface of parapets or footways at a spacing not exceeding 300mm using Panduit Stainless Steel Ties, product Code MLTIS-CP or suitable equivalent.

Stainless steel ties shall be affixed to concrete surfaces using M6 x 50 Dynabolts, Mushroom Head Stainless Steel Spikes – 6.5mm diameter x 50 long or suitable equivalent.

### **31.7 TERMINATION OF SAFETY SCREENS AT ENDS OF STRUCTURE**

The termination point for bridge safety screens is dependent upon actual site conditions and client requirements. Consideration shall be given to road/bridge geometry, proximity to road or railway beneath structure, other structures landing on the bridge (eg stairs and ramps) as well as any other consideration requested or directed by the client.

**Clause 1.1 of RTA Technical Direction TD 2002/RS02 states that “the barriers on the overbridge shall extend at least 6m beyond the width of the underlying roadway pavement and shoulders. Consideration may be given to enclosing the full length of the overbridge.”**

For skewed bridge crossings, the 6m minimum extension of the safety screens beyond the road shoulder is measured perpendicular to the road shoulder and not along the safety screen.

### **31.8 END TREATMENT**

The end treatment of the safety screen shall be in accordance with client requests where it is possible and practical within the overall design of the safety screen.

The preferred method of attachment of end mesh panels to end posts is shown in Figure 31.3.

### ***31.9 APPLICATION OF DECORATIVE PANELS***

Bridge safety screens may, at the client request, carry additional steel mesh panels for decorative purposes.

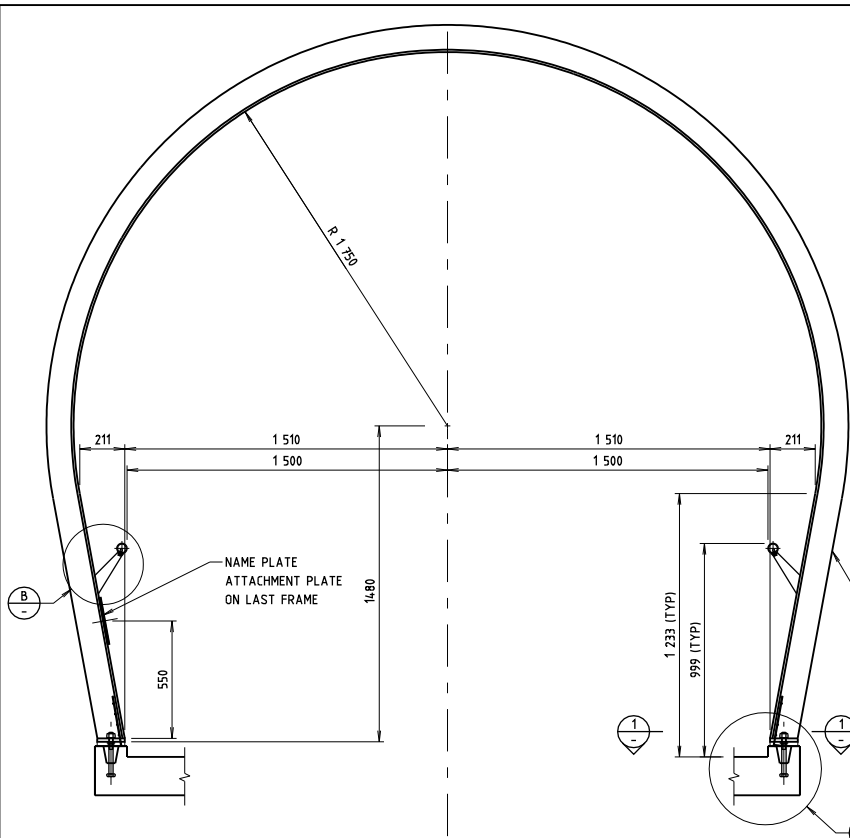
Where decorative screens are to be added to safety screens, additional design and detailing of posts and connections are required as nominal standard designs do not allow for the additional loading caused by the attachment of decorative steel mesh panels.

Each case shall be examined separately and detailed accordingly.

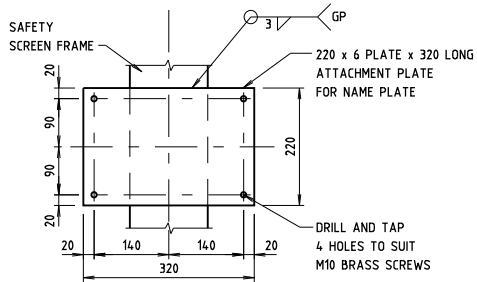
### ***31.10 ALTERNATIVE SAFETY SCREENS***

The requirements in this section refer to typical galvanised mesh screens used by the Authority. Urban design requirements may require alternative screens to be used.

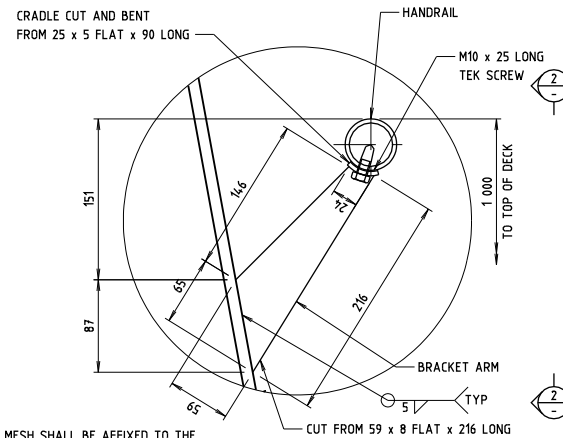
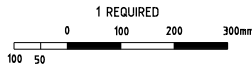
Where applicable, the requirements for these alternative screens shall generally be in accordance with information provided in this section.



FRAME ASSEMBLY - ELEVATION



ATTACHMENT PLATE DETAIL

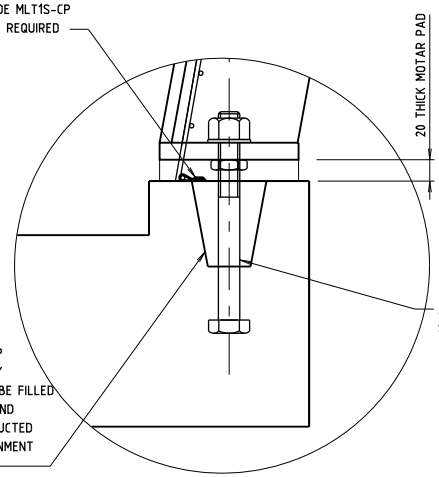


DETAIL B

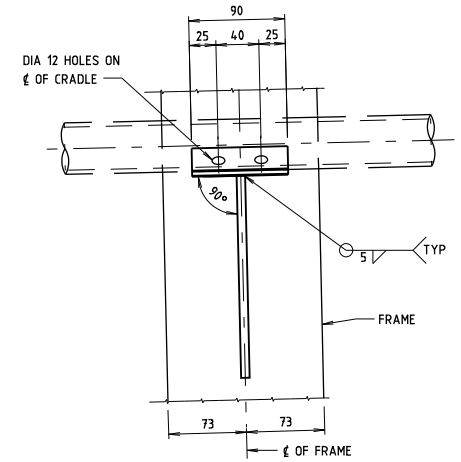
STEEL MESH SHALL BE AFFIXED TO THE CONCRETE SURFACE AT 300 MAXIMUM CENTRES USING DIA 6 x 50 DYNABOLTS OR EQUIVALENT AND PANDUIT STAINLESS STEEL TIES, PRODUCT CODE MLT1S-CP OR EQUIVALENT, BENT AS REQUIRED

FRAME CUT AND BENT FROM 125 BT 18.7

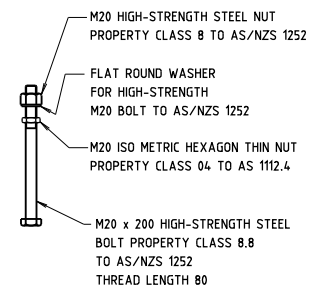
FORMED RECESSES APPROX 80 DEEP TO ALLOW ADJUSTMENT OF SAFETY SCREEN FRAMES. RECESSES SHALL BE FILLED WITH CEMENT GROUT OR MORTAR AND 15 NOM DEEP MORTAR PAD CONSTRUCTED AT BASE PLATE AFTER FINAL ALIGNMENT OF SAFETY SCREEN FRAMES.



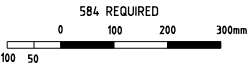
DETAIL A



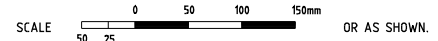
VIEW 2



ANCHOR BOLT ASSEMBLY

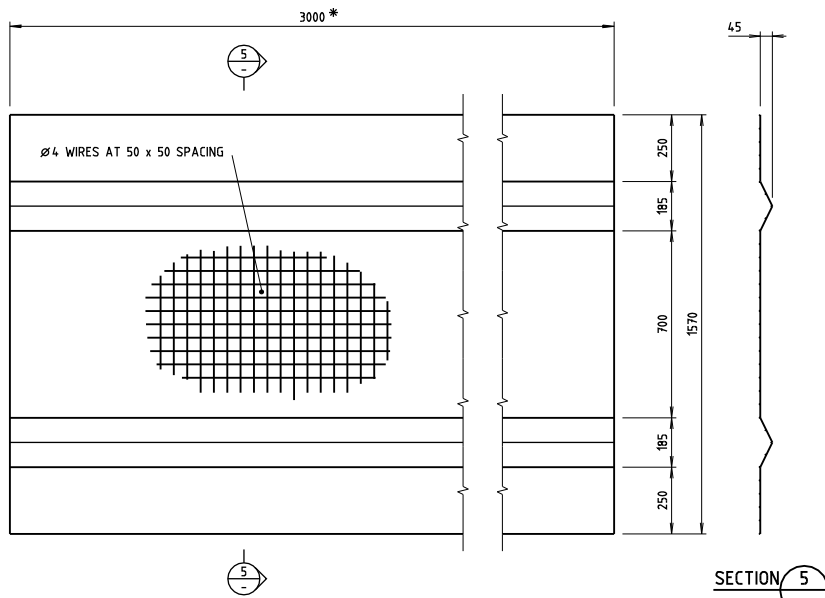


GENERAL NOTES

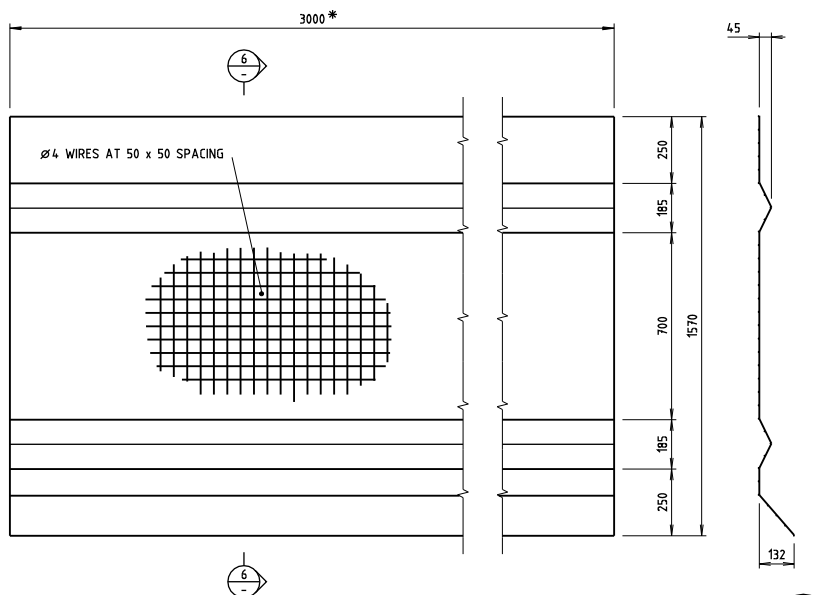


FOR OTHER GENERAL NOTES RELATING TO THIS SHEET SEE SHEET No 45.

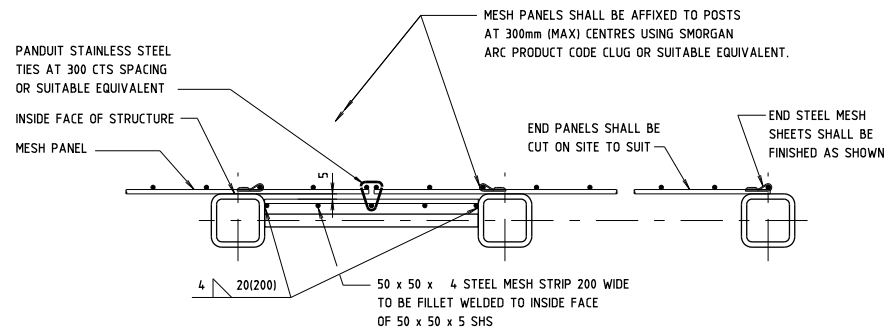
ISSUE	DATE	REVISION	PREP	CHECK	AUTH
<b>ROADS AND TRAFFIC AUTHORITY OF NSW</b>					
<b>FIGURE 31.1</b>					
<b>RTA</b>		PREPARED BY BRIDGE ENGINEERING 110 GEORGE STREET PARRAMATTA NSW 2150 PHONE (02) 8837-0802 FACSIMILE (02) 8837-0065			
PREPARED	CHECKED	REGISTRATION No of PLANS			
DESIGN		RTA BRIDGE NUMBER			
DRAWING		ISSUE STATUS:			
MANAGER, BRIDGE DESIGN PROJECTS		SHEET No		ISSUE	



ELEVATION  
**TOP STEEL MESH PANEL DETAIL**  
 ?? REQUIRED



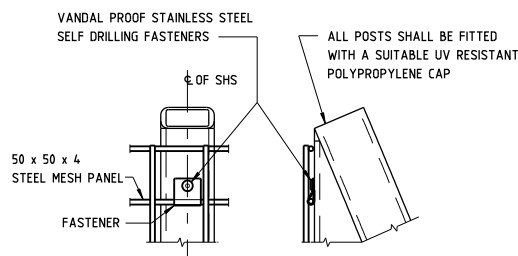
ELEVATION  
**BOTTOM STEEL MESH PANEL DETAIL**  
 ?? REQUIRED



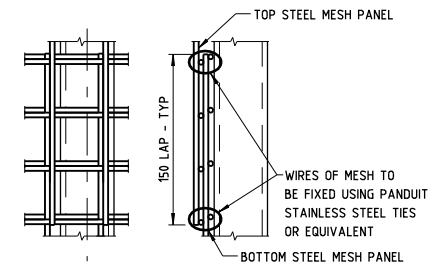
TYPICAL CONNECTION AT  
 INTERMEDIATE POSTS



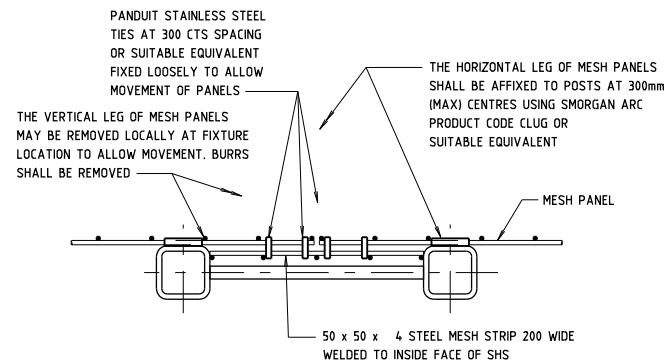
MESH TERMINATION AT ENDS  
 TYPICAL CONNECTION



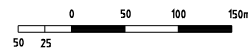
TOP OF POST  
 BOTTOM OF POST SIMILAR  
**STEEL MESH PANEL ATTACHMENT DETAIL**



MIDDLE OF POST

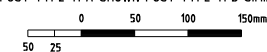


TYPICAL CONNECTION AT  
 EXPANSION JOINTS



**STEEL MESH PANEL ATTACHMENT DETAIL AT POST TYPE TPA AND TPB**

POST TYPE TPA SHOWN POST TYPE TPB SIMILAR

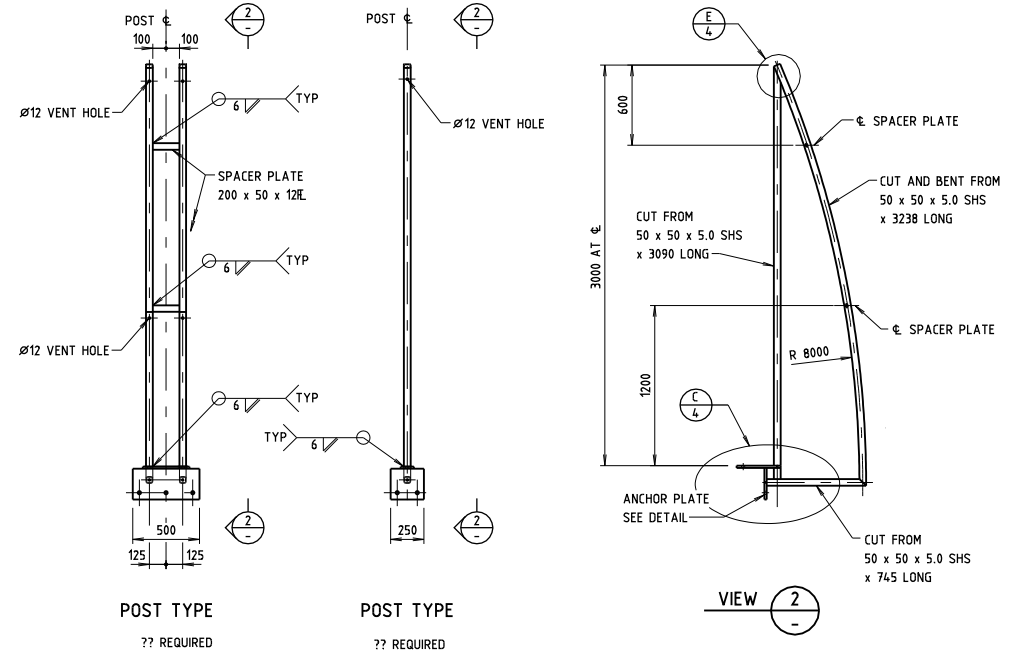
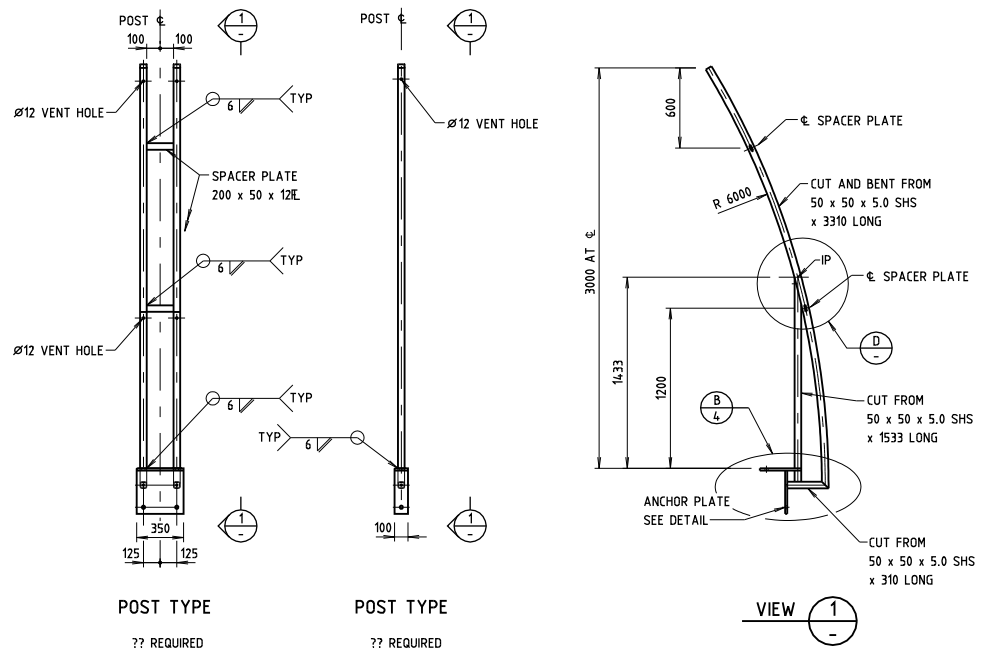


**GENERAL NOTES**

SCALE 0 100 200 300mm OR AS SHOWN.

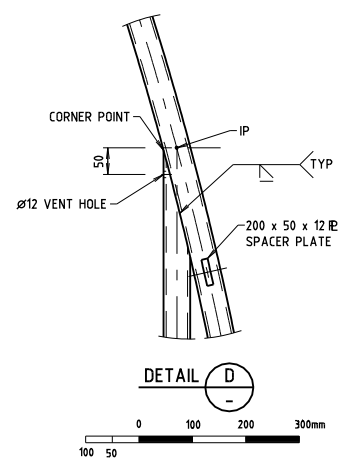
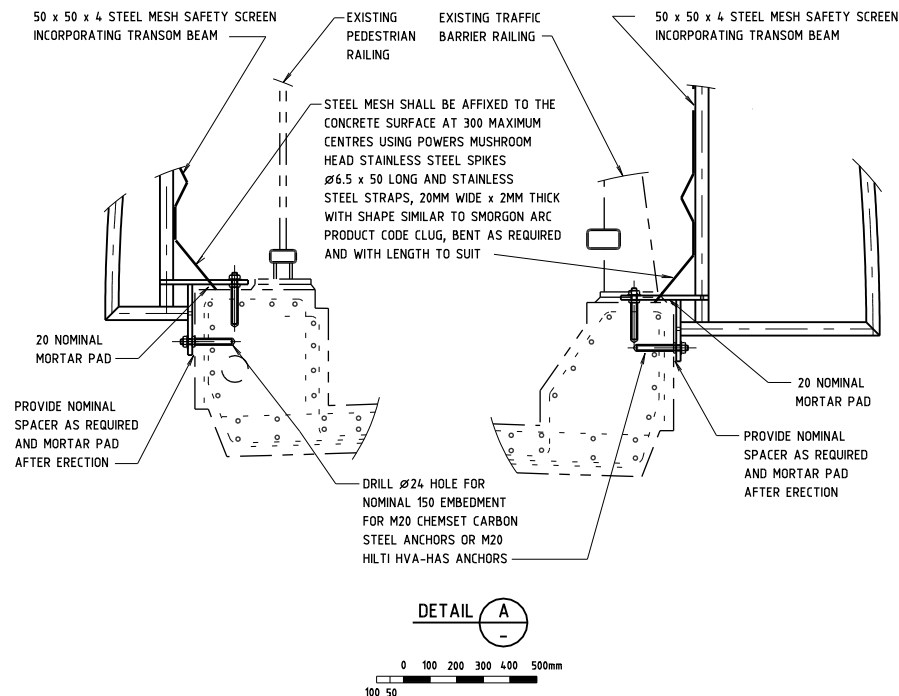
- \* DENOTES END PANELS SHALL BE CUT ON SITE TO SUIT
- DAMAGED GALVANIZED SURFACES SHALL BE RENOVATED IN ACCORDANCE WITH RTA SPECIFICATION B241.
- FOR OTHER GENERAL NOTES RELATING TO THIS SHEET, SEE SHEET No 2.

ISSUE	DATE	REVISION	PREP	CHECK	AUTH
<b>ROADS AND TRAFFIC AUTHORITY OF NSW</b>					
<b>FIGURE 31.3</b>					
<b>RTA</b>		PREPARED BY BRIDGE ENGINEERING 110 GEORGE STREET PARRAMATTA NSW 2150 PHONE (02) 8837-0802 FACSIMILE (02) 8837-0065			
PREPARED	CHECKED	REGISTRATION No of PLANS			
DESIGN		RTA BRIDGE NUMBER			
DRAWING		ISSUE STATUS:			
MANAGER, BRIDGE DESIGN PROJECTS		SHEET No		ISSUE	



POST TYPES ADJACENT TO FOOTWAYS

POST TYPES ADJACENT TO TRAFFIC FACE



GENERAL NOTES

SCALE: 0 200 400 600 800 1000mm OR AS SHOWN.  
200 100

FOR OTHER GENERAL NOTES RELATING TO THIS SHEET, SEE SHEET No. 2.

TYPICAL RETRO-FIT APPLICATIONS

FIGURE 31.4