

***COFFS HARBOUR CITY COUNCIL***



**DEVELOPMENT SPECIFICATION  
DESIGN**

***1194 Non-rigid road safety barrier systems  
(Public domain)***

***Version 1      01 January 2009***

**1194 NON-RIGID ROAD SAFETY BARRIER SYSTEMS (PUBLIC DOMAIN)**

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**1 SCOPE AND GENERAL**

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**1.1 SCOPE**

The work to be executed under this worksection consists of the setting out, supply of all materials and erection of road safety barriers and terminals, in accordance with the requirements for non-rigid road safety barrier systems in AS/NZS 3845, at the locations shown on the Drawings or as directed by the Superintendent.

This worksection details the requirements for public domain non-rigid road safety barrier systems.

Where a patented non-rigid road safety barrier system is specified and shown on the Drawings, all materials shall be in accordance with the manufacturer's specifications and, it shall be constructed strictly in accordance with the manufacturer's instructions.

Rigid road safety barrier systems are specified in 1163 *Rigid concrete and road safety barrier systems (Public Domain)*.

**1.2 QUALITY**

Requirements for quality control and testing, including maximum lot sizes and minimum test frequencies, are given in 0161 *Quality (Construction)*.

**1.3 REFERENCED DOCUMENTS**

The following documents referred to in this worksection shall be deemed as the latest edition of the Australian Standards, including amendments and supplements.

**Worksections**

0161 *Quality (Construction)*

0310 *Minor concrete works*

1101 *Control of traffic*

1163 *Rigid concrete and road safety barrier systems (Public Domain)*.

**Standards**

AS/NZS 1906 Retroreflective materials and devices for road traffic control purposes

AS/NZS 1906.2 Retroreflective devices (Non pavement application)

AS/NZS 3845 Road safety barrier systems

AS/NZS 4680 Hot-dip galvanized (zinc) coatings on fabricated ferrous articles

**2 MATERIALS**

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**2.1 COMPONENTS**

**Steel**

All steel components for public domain non-rigid road safety barrier systems, W-beam and Thrie-beam, shall be in accordance with AS/NZS 3845 and shall be of the type as shown on the Drawings.

**Timber**

Timber posts are to be used only in W-beam terminal sections, as detailed on the Drawings and shall be of the timber type, grade, size and treatment level in accordance with AS/NZS 3845.

All surfaces shall be smooth and free from obvious saw marks.

**Certification**

Steel and timber road safety barrier components shall not be erected until the Contractor has produced documentary evidence to the Superintendent that the steel and timber road safety barrier components conform to the requirements of this worksection.

This action constitutes a HOLD POINT.

The Superintendent's approval of the documentary evidence is required prior to the release of the hold point.

### 3 CONSTRUCTION

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#### 3.1 TRAFFIC CONTROL

Traffic control shall comply with 1101 *Control of traffic*.

#### 3.2 STANDARD OF CONSTRUCTION

Construction of non-rigid road safety barrier shall comply with AS/NZS 3845 except where explicit departures are detailed on the Drawings.

#### 3.3 SEQUENCE OF CONSTRUCTION

Road safety barriers shall be erected after the construction of the base on concrete pavements and after the placing of the initial layer of asphaltic concrete or sprayed seal on a flexible pavement, unless otherwise approved by the Superintendent.

#### 3.4 LOCATION OF BARRIERS

##### **In accordance with drawings**

The Contractor shall set out the work to ensure that all road safety barriers and terminal sections are located in accordance with the Drawings or as directed by the Superintendent.

This action constitutes a HOLD POINT.

The Superintendent's approval of the set out is required prior to the release of the hold point.

##### **Post accuracy**

Posts shall stand vertical and the spacing shall be such that when the safety barrier is erected no post movement is necessary in order to align holes or for any other reason.

#### 3.5 CABLES AND DUCTS

Underground cables and ducts laid in the road safety barrier area shall be located prior to the erection of posts and all care must be taken not to damage such cables and ducts.

#### 3.6 ALTERNATIVE METHODS OF SETTING POSTS

The posts should be set to the full depth as shown on the Drawings.

If this is not possible due to the presence of an underground obstruction, an alternative method of setting the posts, as approved by the Superintendent, shall be used.

#### 3.7 ERECTION OF STEEL POSTS

##### **Positioning of posts**

The safety barrier posts are to be located as shown on the Drawings.

The top of the post shall be 710 mm, 805 mm or 865 mm as appropriate for W-beam, Thrie-beam or modified blockout Thrie-beam respectively, above the ground level, unless otherwise shown on the Drawings.

On terminal ends, the level of the posts shall be such as to conform to the extended crossfall of the main pavement unless otherwise shown on the Drawings.

##### **Smooth line/tolerances**

When erected in position the posts shall be on a smooth line both horizontally and vertically with the tops of posts within  $\pm 20$  mm of the heights specified in **Sequence of construction**.

##### **Foundation and testing**

Steel posts shall be erected by driving, or by other means, as directed by the Superintendent, in accordance with the requirements for foundation posts in AS/NZS 3845.

The open section of the post shall point in the same direction as adjacent traffic.

The posts are to be firm in the ground and any movement at ground level shall not exceed 3 mm in any direction when force tested in accordance with AS/NZS 3845.

### **Damage to posts**

The posts shall not have any obvious deformation as a result of driving.

Any damage which does occur to the posts is to be repaired within 24 hours using an organic zinc-rich primer in accordance with the repair requirements of Clause 8 of AS/NZS 4680.

Any post which has been excessively damaged will be rejected by the Superintendent and shall be replaced by the Contractor at its own expense.

## **3.8 ERECTION OF TIMBER POSTS**

### **Positioning of posts**

The safety barrier posts are to be located as shown on the Drawings.

The top of the posts shall be 710 mm  $\pm$ 20 mm above the ground level, unless otherwise shown on the Drawings.

On terminal ends the level of the posts shall be such as to conform to the extended crossfall of the main pavement, unless shown otherwise on the Drawings.

### **Smooth line**

When erected in position the posts shall be on a smooth line both horizontally and vertically.

### **Polystyrene foam**

The section of the timber posts to be cast into a reinforced concrete footing shall be wrapped in 12 mm thick polystyrene foam sheeting before concrete casting.

### **Concrete**

Concrete used in the footings for timber posts shall have a minimum compressive strength of 32 MPa at 28 days and shall conform with 0310 *Minor concrete works*.

### **Footing size**

Concrete footings shall be 600 mm diameter, and shall have tolerances of minus zero or plus 50 mm.

Over excavation (overbreak) and excessive depth shall be filled with 32 MPa concrete at no cost to the Principal.

### **Reinforcing fabric**

Wire fabric reinforcing shall be as detailed on the Drawings.

### **Painting**

The surface area of the posts which will be above ground shall be painted with two coats of grey acrylic paint.

## **3.9 ERECTION OF ROAD SAFETY BARRIER RAILS**

### **Blockouts**

Steel blockout pieces shall be erected with the open section pointing in the same direction as adjacent traffic.

### **Rail laps**

All rail laps shall be in the same direction as adjacent traffic such that approach rail ends are not exposed to traffic.

### **Stiffening pieces**

Stiffening pieces, 300 mm long, shall be used on intermediate posts.

### **Minor damage to galvanising**

Road safety barrier rails and blockout pieces shall be handled and erected in such a manner that no damage occurs to the galvanising.

Any minor damage occasioned to the galvanising shall be repaired within 24 hours using an organic zinc-rich primer in accordance with the repair requirements of Clause 8 of AS/NZS 4680.

### **Excessive damage to rails or blockout pieces**

Any road safety barrier rails or blockout pieces which have been excessively damaged will be rejected by the Superintendent and shall be replaced by the Contractor at its own expense.

### **Erection procedure**

Road safety barrier rail attachment bolts and splice bolts are to be tightened initially such that the barrier can be erected.

Adjustments are then to be made to the rails using the slotted holes provided to produce a smooth regular line, free of any kinks or bumps.

The overall line of the top of the safety barrier rails is to visually conform with the vertical alignment of the road pavement.

### Splice bolt tightening

When the alignment both vertically and horizontally is obtained the splice bolts are to be fully tightened. The bolt head (not the shoulder) should be in full bearing with the rail.

## 3.10 END TREATMENT OF ROAD SAFETY BARRIERS

### Leading, trailing terminals

Both approach and departure ends of the road safety barrier shall be constructed with leading and trailing terminal sections at locations shown and as detailed on the Drawings.

### Melt

Modified eccentric loader terminals (MELT) shall be constructed, as detailed on the Drawings and, at approach end locations of road safety barriers as shown on the Drawings.

Where the departure end of a road safety barrier is within the clear zone of opposing traffic, a MELT shall be constructed in place of a trailing terminal section.

### Double sided safety barrier

The approach and departure ends of double sided road safety barriers shall have terminal sections as detailed on the Drawings.

### Connections to rigid barriers

Non-rigid road safety barrier connections to rigid road safety barriers or bridge parapets shall be as detailed on the Drawings and specified in 1163 *Rigid concrete and road safety barrier systems (Public Domain)*.

## 3.11 DELINEATORS

### Fixing

Delineators complying with AS 1906.2 shall be fixed with brackets to the road safety barrier, to the details and at the locations shown on the Drawings beginning at the first post and then in accordance with Table 3.1.

**Table 3.1 Location of delineators**

Radius of curve m	Spacing of reflectors on barrier every
30–90	3rd post
90–180	5th post
180–275	8th post
275–365	11th post
over 365 (including straight road)	16th post

### Arrangement and colour

The delineators shall be so arranged that drivers approaching from either direction will see only red reflectors on their left side, and white reflectors on their right.

## 4 LIMITS AND TOLERANCES

The limits and tolerances applicable to the various clauses in this worksection are summarised in Table 4.1.

**Table 4.1 Summary of limits and tolerances**

Activity	Limits/Tolerances	Worksection Clause reference
<b>Vertical alignment</b>		
- Tops of steel posts.	± 20 mm	<b>Erection of steel posts</b>

-Tops of timber posts	± 20 mm	Erection of timber posts
<b>Post movement</b>	≤ 3 mm	<b>Erection of steel posts</b>
<b>Concrete footings</b>		
-Diameter	-0 mm or +50 mm	<b>Erection of timber posts</b>

## 5 MEASUREMENT AND PAYMENT

### 5.1 MEASUREMENT

Payment shall be made for all the activities associated with completing the work detailed in this worksection on a schedule of rates basis in accordance with Pay Items 1194.1 to 1194.7 inclusive.

A lump sum price for any of these items shall not be accepted.

If any item, for which a quantity of work listed in the Schedule of Rates, has not been priced by the Contractor, it shall be understood that due allowance has been made in the prices of other items for the cost of the activity which has not been priced.

Concrete footings for timber posts are measured and paid in accordance with this worksection and not 0310 *Minor concrete works*.

Miscellaneous minor concrete work not included in the pay items in this worksection shall be in accordance with pay items described in 0310 *Minor concrete works*.

Traffic control is measured and paid in accordance with 0310 *Minor concrete works*.

### 5.2 PAY ITEMS

#### 1194.1 Single sided road safety barrier

- 1194.1(1) Single W-beam
- 1194.1(2) Nested W-beam
- 1194.1(3) Single Thrie-beam
- 1194.1(4) Nested Thrie-beam
- 1194.1(5) Single Modified Blockout Thrie-beam
- 1194.1(6) Nested Modified Blockout Thrie-beam
- 1194.1(7) Single W-Thrie-beam Transition
- 1194.1(8) Nested W-Thrie-beam Transition

The unit of measurement shall be the linear metre.

The distance shall be measured along the centre line of the rail, centre to centre of posts, excluding terminal sections and connectors to rigid safety barriers or bridge parapets.

The schedule rate shall include the supply of all components and fixings and all activities associated with the erection of each type of road safety barrier.

#### 1194.2 Modified eccentric loader terminal (MELT)

The unit of measurement shall be 'each' MELT section supplied and erected as detailed on the Drawings.

#### 1194.3 Terminal section

- 1194.3(1) Leading Terminal
- 1194.3(2) Trailing Terminal

The unit of measurement shall be 'each' terminal section supplied and erected as detailed on the Drawings.

#### 1194.4 Connectors to rigid road safety barriers (rsb) or bridge parapet

- 1194.4(1) W-beam to RSB
- 1194.4(2) W-beam to Thrie-beam to RSB
- 1194.4(3) Thrie-beam to RSB

The unit of measurement shall be 'each' connector supplied and erected as detailed on the Drawings, excluding the anchorage assemblies cast into the rigid road safety barrier or bridge parapet.

**1194.5 Delineator brackets**

The unit of measurement shall be 'each'.

**1194.6 Double sided road safety barrier**

- 1194.6(1) Single W-beam
- 1194.6(2) Nested W-beam
- 1194.6(3) Single Thrie-beam
- 1194.6(4) Nested Thrie-beam
- 1194.6(5) Single Modified Blockout Thrie-beam
- 1194.6(6) Nested Modified Blockout Thrie-beam
- 1194.6(7) Single W-Thrie-beam Transition
- 1194.6(8) Nested W-Thrie-beam Transition

The unit of measurement shall be the linear metre.

The distance shall be measured along the centre line of the rails, centre to centre of posts, excluding terminal sections and connectors to rigid safety barriers or bridge parapets.

The schedule rate shall include the supply of all components and fixings and all activities associated with the erection of each type of road safety barrier.

**1194.7 Double sided road safety barrier terminal section**

The unit of measurement shall be 'each' terminal section supplied and erected as detailed on the Drawings.