

COFFS HARBOUR CITY COUNCIL



**DEVELOPMENT SPECIFICATION
DESIGN**

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

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1163 RIGID CONCRETE AND ROAD SAFETY BARRIER SYSTEMS (PUBLIC DOMAIN)

1 SCOPE AND GENERAL

1.1 SCOPE

The work to be executed under this worksection consists of the setting out and construction of concrete safety barriers from precast units, by fixed forms or slipforming in accordance with the requirements for rigid road safety barrier systems in AS/NZS 3845.

Safety barriers may be constructed adjacent to or on new or existing pavements.

This worksection details the requirements for public domain, Type F and VCB, rigid road safety barrier systems.

Non-rigid road safety barrier systems are specified in 1194 *Non-rigid road safety barrier systems (Public domain)*.

1.2 PATENTED SYSTEMS

Where a patented 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.

Where a patented crash attenuator 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.

1.3 QUALITY

Requirements for quality system or quality control are given in 0161 *Quality (Construction)*.

1.4 REFERENCE 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*

1191 *Pavement markings*

1192 *Signposting*

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

Standards

AS 1289	Methods of testing soils for engineering purposes
AS 1289.5.4.1	Soil compaction and density tests—Compaction control test—Dry density ratio, moisture variation and moisture ratio
AS 1379	Specification and supply of concrete
AS 1906	Retroreflective materials and devices for road traffic control purposes
AS 1906.2	Retroreflective devices (non pavement application)
AS 3610	Formwork for concrete
AS 3799	Liquid membrane-forming curing compounds for concrete
AS/NZS 3845	Road safety barrier systems

2 MATERIALS

2.1 CONCRETE

Concrete

Supply and placement of concrete, steel reinforcement, formwork, tolerances, construction joints and protection shall conform to the requirements of 0310 *Minor concrete works*.

Strength

The minimum strength of concrete at 28 days shall be 30 MPa for cast-in-situ formed concrete or precast concrete and 40 MPa for slip formed concrete construction unless shown otherwise on the Drawings.

Slump

The maximum nominal size of aggregate shall be 20 mm, and the specified slump at the point of placement shall be 25 mm for slipforming and 80 mm for fixed forms.

Ready mixed concrete

If ready-mixed concrete is used, the concrete shall be mixed and delivered in accordance with AS 1379.

Sampling and testing contractor's cost

Concrete shall be sampled and tested by personnel from a NATA registered laboratory and the test results certified by a NATA endorsed signatory. All costs for sampling and testing shall be borne by the Contractor.

Testing frequency

A pair of cylinders shall be provided and tested for compressive strength for every 50 m³ of concrete placed. Strength results shall be submitted to the Superintendent if so requested by the Superintendent.

3 CONSTRUCTION

3.1 GENERAL

Traffic control

The Contractor shall at all times conform to the requirements of 1101 *Control of traffic*.

Construction of rigid barrier shall comply with AS/NZS 3845 except where explicit departures are detailed in the Drawings.

Type of construction

Unless otherwise stated on the Drawings, the barrier may be precast, constructed in fixed forms or slip-formed to the dimensions and details as shown on the Drawings.

Connections to non-rigid barriers

Where a non-rigid road safety barrier is to be connected to a rigid road safety barrier, anchorage assemblies shall be cast into the road safety barrier to the dimensions and details as shown on the Drawings. All other components for non-rigid road safety barriers are specified in a separate worksection part.

Set out approval

The set out of the safety barrier shall be presented to the Superintendent for approval before construction commences.

This action constitutes a HOLD POINT.

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

3.2 PREPARATION OF THE BASE

Cleaning

For safety barriers constructed on new or existing pavements, before placing the mortar pad for precast units or placing concrete or slipforming, the base shall be cleaned of all loose materials and dust.

Dowels and core holes

Safety barriers constructed on new or existing pavements shall be provided with dowels in cored holes at regular staggered spacings as shown on the Drawings. When precast units are used care must be taken to align and space the core holes accurately.

Compaction of foundations

For safety barriers constructed adjacent to new or existing pavements, the foundation material shall be shaped and compacted to form a firm base.

Other than for barriers constructed on pavement courses, the relative compaction shall be at the 95 % in accordance with AS 1289.5.4.1 for standard compactive effort. Where placed on pavement courses, the foundation shall be compacted to the requirements of the respective pavement course.

Electrical conduits

For safety barriers containing street lighting standards, the conduit carrying electrical cables must be located in the base rather than in the barrier, as detailed on the Drawings, unless otherwise approved by the Superintendent.

For slip-formed barriers the conduit trench forms a key and no dowels are required unless shown otherwise on the Drawings.

3.3 CONCRETE PLACEMENT

High/low spots

For fixed form construction, the concrete shall be thoroughly compacted and the surface screeded off. Immediately following compaction and screeding the concrete shall be tested for high or low spots and any necessary corrections shall be made before the concrete has hardened.

Concrete finish

For fixed form construction, the concrete surface shall be finished true and uniform to a class 2 finish in accordance with AS 3610.

Hand finishing

For slip form construction, where hand finishing is required, every effort shall be made to provide a uniform appearance of the barrier.

Precast units

Precast units shall be placed on a mortar pad of 10 mm minimum thickness.

3.4 ALIGNMENT AND LEVEL

Finish and appearance

The top and face of the barrier shall be true to line and the top surface shall be of uniform width, free from humps, sags and other irregularities.

Line and level tolerance

The line and level at any point on the safety barrier shall be within ± 50 mm of the plan location and within ± 20 mm of the design levels as shown on the Drawings.

Surface tolerance

When a 3 m long straight edge is laid on top of or along any face of the barrier the surface shall not vary more than 5 mm from the edge of the straight edge except at grade changes or curves in which case the faces shall transition uniformly.

3.5 JOINTS

Contraction joints

Where construction is in fixed forms or by slip-forming, contraction joints of minimum 50 mm depth shall be formed on all exposed surfaces at 4 m spacing.

Expansion joints

Expansion joints of 15 mm width for the full depth of the barrier shall be constructed where specified on the Drawings. Expansion joints shall consist of a preformed jointing material of bituminous fibreboard or equivalent approved by the Superintendent.

Pavement joints

Where the barrier is cast on concrete pavement the contraction, isolation, tied or expansion joints as they appear in the pavement shall be continued through the barrier.

Adjacent to pavement

Where the barrier is cast adjacent to a concrete pavement the contraction joints shall be formed at 4 m centres.

Precast units

Precast units shall be placed such that all connections are tight, secure and true in line and level.

3.6 CURING

Curing compound

For slip-formed barriers either wax emulsion, hydrocarbon resin or water borne curing compounds to the requirements of AS 3799 Class A Type 1, Class B Type 1-D or Class Z Type 1-D respectively shall be used.

Compliance

The Contractor shall provide a certificate of compliance for the curing compound from a laboratory with appropriate NATA registration.

Application rate

The curing compound shall be applied in a fine spray to provide even coverage at a rate of 0.2 l/m² or the rate determined on the test certificate to achieve 95 % water retention, whichever is the greater.

Equipment on site

Equipment and materials for the curing operations shall be kept on site at all times during slip-forming of the barrier.

Precast units

Moist curing systems are acceptable when demonstrated as an effective process during manufacture of precast barrier units.

3.7 DELINEATORS

Fixing

Delineators complying with AS 1906.2 shall be fixed with brackets to the concrete safety barrier at locations, and to the details, as shown on the Drawings.

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.

3.8 SIGNAGE AND LINEMARKING AT BARRIER

Permanent signage, and longitudinal linemarking

Permanent signage, and longitudinal linemarking adjacent to the concrete safety barrier shall be provided in accordance with 1191 *Pavement markings* and 1192 *Signposting*.

Removal of temporary traffic control devices

Temporary traffic control devices installed for the control of traffic shall not be removed before the concrete safety barrier, permanent signing and longitudinal linemarking have been inspected and approved by the Superintendent.

This action constitutes a HOLD POINT.

The Superintendent's approval of the concrete safety barrier, signing and linemarking is required prior to the release of the hold point.

4 MEASUREMENT AND PAYMENT

4.1 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 1163.1 and 1163.2 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.

Traffic control is measured and paid in accordance with 1101 *Control of traffic*.

Concrete safety barrier is measured and paid in accordance with this worksection and not 0310 *Minor concrete works*.

Linemarking and signage are measured and paid in accordance with 1191 *Pavement markings* and 1192 *Signposting*.

4.2 PAY ITEMS

1163.1 Road safety barrier

- 1163.1(1) Type F
- 1163.1(2) Type VCB

The unit of measurement shall be the linear metre measured along the top of the barrier, excluding terminal ends.

A separate schedule shall be provided for differing base conditions.

The schedule rate shall include all operations and provision of materials as described in this worksection and shown on the Drawings to provide the safety barriers complete in all respects.

1163.2 Terminal ends

The unit of measurement shall be 'each' terminal end provided.

The schedule rate shall include all operations and provision of materials as described in this worksection and shown on the Drawings to provide the terminal ends complete in all respects.

The schedule rate shall also include, where specified and shown on the Drawings, cast in anchorage assemblies for the connection of non-rigid road safety barriers.