DEVELOPMENT CONSTRUCTION SPECIFICATION

C264

GUARDFENCE

SPECIFICATION C264 - GUARDFENCE

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GENERAL

C264.01 SCOPE

1. The work to be executed under this Specification consists of the setting out, supply of all materials and erection of guardfence at the locations shown on the Drawings or as directed by Council's Development Engineer.

C264.02 REFERENCE DOCUMENTS

1. Documents referenced in this specification are listed in full below whilst being cited in the text in the abbreviated form or code indicated.

Documents Standards Test Methods

(a) Council Specifications

C201	-	Control of Traffic
C271	-	Minor Concrete Works

(b) Australian Standards

AS/NZS 1110	-	ISO metric precision hexagon bolts and Screws.
AS 1111	-	ISO metric hexagon commercial bolts and screws.
AS 1143	-	High temperature creosote for the preservation of timber.
AS 1214	-	Hot-dip galvanised coatings on threaded fasteners.
AS 1365	-	Tolerances for flat-rolled steel products.
AS 1391	-	Method for tensile testing of metals.
AS 1594	-	Hot-rolled steel flat products.
AS 1627.1	-	Cleaning using liquid solvents and alkaline solutions.
AS 1627.4	-	Abrasive blast cleaning.
AS 1650		Hot-dipped galvanised coatings on ferrous articles.
AS 1906.2	-	Retroreflective devices (non-pavement application).
AS 2082	-	Visually stress-graded hardwood for structural purposes.

MATERIALS

C264.03 STEEL COMPONENTS

1. Posts and blocking pieces shall be mild steel conforming to AS 1594, minimum Grade HU1, to the dimensions as detailed on the drawings. ***Posts***

2. Rail elements and terminal pieces shall be mild steel conforming to AS 1594, minimum Grade HA250, to the dimensions as detailed on the drawings. ***Rails***

3. The mechanical properties of the rail elements and terminal pieces, when tested in accordance with AS 1391, shall conform to the following requirements: ***Tests***

Yield Stress, typical	272 MPa
Ultimate Tensile Stress, typical	372 MPa
Elongation in 80mm, typical	31%

4. The rail elements shall comply with AS 1365 to the following tolerances: ***Tolerances***

Metal thickness	2.6mm ± 0.21mm
Mill tolerance on strip width	+2.50mm, -0.0
Mill camber tolerance on 2000mm length	4.0mm max

5. All guardfence components are to be hot-dip galvanised after fabrication in accordance with AS 1650 to Class Z 600. Prior to galvanising, the surfaces shall be treated in accordance with AS 1627.1 and AS 1627.4. ***Protection***

6. Splice and post bolts shall comply with AS/NZS 1110 Grade 8.8 and other bolts to AS 1111 Grade 4.6. All bolts, nuts and washers shall be hot-dip galvanised in accordance with AS 1214. ***Bolts***

C264.04 TIMBER POSTS

1. Timber posts are to be used only in end panels, as detailed on the drawings. Timber posts and blocking pieces shall be cut from Select Grade hardwood and conform to structural Grade No. 1 of AS 2082. All surfaces shall be smooth and free from obvious saw marks. ***Timber***

CONSTRUCTION

C264.05 GENERAL

1. The Contractor shall at all times conform to the requirements of Specification C201-CONTROL OF TRAFFIC. ***Traffic Control***

2. Guardfence is to be erected after construction of 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 Council's Development Engineer. ***Timing of Construction***

C264.06 ERECTION OF STEEL POSTS

1. Underground cables and ducts laid in the guardfence area shall be located prior to the erection of posts and all care must be taken not to damage such cables and ducts. ***Cables and Ducts***

2. Steel posts are to be erected by driving, with the open section pointing in the same direction as adjacent traffic. ***Orientation***

3. The face of guardfence posts are to be located 285mm from the edge of shoulder and the top of the post 700mm above the edge or ground level, unless otherwise shown on the Drawings. ***Positioning of Posts***

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

5. The posts should be driven to the full depth 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 Council's Development Engineer, shall be used. ***Underground Obstruction***

6. When erected in position the posts shall be on a smooth line both horizontally and vertically at a height of 530mm (± 10mm) from the nominal level of the pavement at the shoulder line to the centre of the guardfence attachment bolts. On flared ends the level of the posts shall be such as to conform to the extended crossfall of the main pavement. ***Tolerances***

7. The posts are to be firm in the ground to the satisfaction of Council's Development Engineer. ***Firmness***

8. The posts shall not have any obvious deformation as a result of driving. Any damage, which occurs to the posts, is to be repaired within 24 hours using an approved cold galvanising compound. ***Damage to Posts***

9. Any post, which has been excessively damaged, will be rejected and shall be replaced by the Contractor. ***Rejection***

C264.07 ERECTION OF TIMBER POSTS

1. Timber posts shall be cut to the dimensions shown on the Drawings.. ***Dimensions of Posts***

2. The surface area of the posts that will be in the ground shall be painted with creosote, conforming to AS 1143, prior to erection. ***Creosote Treatment***

3. The section of the timber posts in the ground shall be wrapped in 6mm thick polystyrene foam sheeting before being cast into a reinforced concrete footing. ***Polystyrene Foam***

4. Concrete used in the footings for timber posts shall have a minimum compressive strength of 20MPa at 28 days and shall conform to the requirements of Specification C271 - MINOR CONCRETE WORKS. ***Concrete***

5. Concrete footings shall be 500mm diameter, and shall have tolerances of minus zero or plus 50mm. Overbreak and excessive depth shall be filled with 20MPa concrete at no cost to the Principal. ***Footing Size***

6. Wire fabric reinforcing shall be as detailed on the Drawings. ***Reinforcing Fabric***

7. The surface area of the posts that will be above ground shall be painted with two coats of grey acrylic paint. ***Painting***

C264.08 ERECTION OF GUARDFENCE PANELS

1. Steel blocking pieces are to be erected with the open section pointing in the same direction as adjacent traffic. ***Orientation***

2. All rail laps shall be in the same direction as adjacent traffic. ***Rail Laps***

3. Backing/stiffening pieces, 300mm long, shall be used on intermediate posts. ***Backing Pieces***

4. Guardfence panels and steel blocking pieces are to 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 approved cold galvanising compound. ***Minor Damage to Galvanising***

5. Any guardfence panels or steel blocking pieces that have been excessively damaged shall be rejected and shall be replaced by the Contractor. ***Rejection***

6. Guardfence attachment bolts and splice bolts are to be tightened initially such that the fence 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 kicks or bumps. The overall line of the top of the guardfence panels is to visually conform to the vertical alignment of the road pavement. ***Erection Procedure***

7. 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. The recess in the nut should face the bolt shoulder; otherwise the splice will not be tight. ***Splices***

C264.09 END TREATMENT OF GUARDFENCE

1. For undivided carriageways, both approach and departure ends of the guardfence shall be flared and end anchorage panels with terminal sections Type A shall be constructed as detailed on the Drawings. ***Undivided Carriageway***

2. For divided carriageways, the approach end of the guardfence shall be flared and end anchorage panels with terminal sections constructed. The departure end of the guardfence shall be as specified in the R.T. A. Road Design Guide and as detailed on the Approved Drawings. ***Divided Carriageway***

3. The approach and departure ends of double sided guardfences shall have end panels as specified in the R.T. A. Road Design Guide and as detailed on the Approved Drawings. ***Double Sided Guardfence***

C264.10 DELINEATORS

1. Where shown on the Drawings, delineator brackets shall be attached to the centre of the guardfence under the special washer of the post bolt of the first post and then in accordance with the following table: - ***Spacing***

Radius of Curve	Spacing of Reflectors on Guardfence
m	every
30 - 90	3rd post
90 - 180	5th post
180 - 275	8th post
275 - 365	11th post
over 365 (including straight road)	16th post

2. Circular corner cube delineators, complying with AS 1906.2 shall be fixed to the brackets.

3. 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.

LIMITS AND TOLERANCES

C264.11 SUMMARY OF LIMITS AND TOLERANCES

Item	Activity	Tolerances	Spec Clause
1.	**Vertical Alignment** (a) Nominal shoulder line level to centre of guardfence attachment bolts	530mm ± 10mm	C264.06
2.	**Concrete Footings** (a) Diameter	500mm -0mm or +50mm	C264.07

Table C264.1 - Limits and Tolerances