CAPRICORN MUNICIPAL DEVELOPMENT GUIDELINES

BOUNDARY FENCING

C265

CONSTRUCTION SPECIFICATION

TABLE OF CONTENTS

Keeping the Capricorn Municipal Development Guidelines up-to-date

The Capricorn Municipal Development Guidelines are living documents which reflect progress of municipal works in the Capricorn Region. To maintain a high level of currency that reflects the current municipal environment, all guidelines are periodically reviewed with new editions published and the possibility of some editions to be removed. Between the publishing of these editions, amendments may be issued. It is important that readers assure themselves they are using current guideline, which should include any amendments which may have been published since the guideline was printed. A guideline will be deemed current at the date of development approval for construction works.

GENERAL

C265.01 SCOPE

C265.01.01 The work to be executed under this Specification includes setting out, clearing of fence line, supply of material and erection of boundary fencing and gates, in accordance with the Drawings or as directed by the Superintendent.

C265.01.02 The following order of priority for interpretation of documents will apply: (Please note that reference to a Guideline or Standard, is reference to the latest version of the relevant document, unless specifically a version number is specifically stated)

Order of Priority

1. CMDG C265 Boundary Fencing Construction Specification
2. MUTCD Manual of Uniform Traffic Control Devices
3. Australian Standards

C265.02 REFERENCE DOCUMENTS

C265.02.01 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) CMDG Specifications

C212 - Clearing and Grubbing
C262 - Signposting
C271 - Minor Concrete Works

(b) Australian Standards

AS 1289.5.4.1 - Compaction control test - Dry density ratio, moisture variation and moisture ratio
AS 1725.1 - Chainwire Link Fabric Fencing - Security Fences and Gates – General requirements
AS 2423 - Coated steel wire fencing products for terrestrial, aquatic and general use

(c) Queensland Department of Main Roads Publications

MUTCD - Manual of Uniform Traffic Control Devices

Where the term 'Drawing is referenced throughout this document, the reference is to CMDG drawings.

MATERIALS

C265.03 GENERAL

C265.03.01 All materials shall be supplied by the Contractor and shall be of dimensions, manufacture and quality in accordance with the requirements of this Specification and all galvanised wire fencing products shall conform to AS 2423.

Dimensions and Quality

C265.04 GALVANISED POSTS AND BRACES

C265.04.01 All posts and bracing shall be galvanised iron pipe in accordance with AS 1725. The pipes shall be to the dimensions shown on the Drawings. ***Dimensions***

C265.04.02 All pipe joints shall be welded. All welds shall be satisfactorily cleaned and painted with a cold galvanising compound to the satisfaction of the Superintendent. ***Welded Joints***

C265.05 CHAIN WIRE

C265.05.01 Galvanised chain wire mesh, 1,450mm wide (1830mm wide for Manproof Fencing) shall be of 3.15mm diameter wire woven to a 50 x 50mm square mesh. The selvedge edges of the chain wire shall be left barbed, and it shall be supplied in lengths of not less than 30m. The zinc coating shall be uniform, continuous, free from imperfections and thoroughly adherent. The coating shall be applied to the wire before the mesh is woven. The weight of the zinc coating shall not be less than 290 g/sq m of wire surface. ***Dimensions and Zinc Coating***

C265.05.02 Where specified, the chain wire shall be coated in black PVC after galvanising. ***PVC Coating***

C265.06 WIRE NETTING

C265.06.01 Wire netting shall be standard quality galvanised 1.40mm diameter wire, 40mm mesh, 1.05m wide for normal use and 1.60mm diameter wire, 50mm mesh, 0.90m wide where used in creek crossings. ***Dimensions***

C265.07 GATES

C265.07.01 Gates shall be of galvanised tubular steel construction, 3.6 metres in width by 1.5 metres or 1.2 metres (as specified) in height, and shall be fitted with substantial hinges, catch, drop bolts and locking chains unless otherwise shown on the Drawings. ***Dimensions and Fittings***

C265.07.02 Where required, gates shall have stout and well supported rabbit-proof mesh to a height of at least 900mm above ground level. ***Rabbit Proofing***

C265.08 REINFORCED CONCRETE POSTS

(a) Strainer Posts

C265.08.01 Concrete strainer posts shall be approximately 150 x 150 square in section and lengths as shown on the Drawings. Each post shall be provided with 12mm dia holes to suit the spacing of the wires shown on the Drawings for the particular type(s) of fencing to be erected. ***Dimensions***

C265.08.02 The posts shall be reinforced longitudinally with not less than four reinforcing bars each 12mm diameter. All posts shall have suitable stirrup reinforcement to control diagonal cracking. Longitudinal reinforcement shall have 25mm minimum cover. End cover on reinforcement shall be 25mm. ***Reinforcing Steel***

C265.08.03 The concrete shall have a minimum 28 day compressive strength of 20MPa. ***Concrete Strength***

(b) Intermediate Posts

C265.08.04 Intermediate Posts shall generally conform to the requirements for Strainer Posts, except that the longitudinal reinforcing bars may be 9mm dia. ***Quality***

C265.09 PRESTRESSED CONCRETE POSTS

(a) Strainer Posts

C265.09.01 At least four longitudinal high carbon deformed high tensile strands (or equivalent) of 5mm diameter, shall be provided. The strands shall be tensioned to a stress of 800MPa minimum prior to placing concrete. Cross sectional dimensions of the posts shall be as shown on the Drawings. ***Tendons***

C265.09.02 Concrete shall have a minimum compressive strength of 32MPa at 24 hours. ***Concrete***

C265.09.03 In lieu of holes for wires, grooves may be provided to suit the spacing of the wires shown on the appropriate Drawings for the particular types of fencing to be erected. The grooves shall be at least 5mm deep and 5mm wide at the surface of the post. ***Grooves for Wire***

(b) Intermediate Posts

C265.09.04 Intermediate posts and strainer stays shall generally conform to the requirements for Strainer Posts except that two only high tensile, high carbon deformed strands shall be required. ***Quality***

C265.09.05 Cross sectional dimensions shall be as shown on the Drawings. ***Dimensions***

C265.10 STEEL POSTS (RURAL FENCING)

C265.10.01 Steel posts shall be "STAR" pattern. Posts shall be drilled to suit the spacing of the wires shown on the Drawing(s), and shall be black varnished or galvanised. ***Type***

C265.10.02 The total weight of 300 posts each 1.65m long shall be at least one (1) tonne. ***Weight***

C265.11 GALVANISED PIPE POSTS (RURAL FENCING)

C265.11.01 Galvanised pipe posts shall be used where shown on the Drawings. The pipes shall be of the dimensions shown on the Drawings and shall be of first grade quality in accordance with AS 1725. ***Dimensions and Quality***

C265.12 WIRES

(a) Plain Wire

C265.12.01 Plain wire shall be standard galvanised drawn annealed steel wire of diameters shown on the Drawings. ***Type***

(b) High Tensile Plain Wire

C265.12.02 High Tensile wire shall be galvanised and of diameters shown on the Drawings. ***Type***

(c) Barbed Wire

C265.12.03 Barbed wire including barbs shall be 2.5mm diameter galvanised drawn annealed steel wire, with clusters of four barbs spaced at 90mm maximum. Alternatively barbed wire may be of 1.6mm diameter high tensile steel wire, with clusters of barbs spaced at 90mm maximum. ***Type and Dimensions***

(d) Cable Wire

C265.12.04 Cable wire shall consist of three pairs of 2 x 3.15mm galvanised iron wire tightly twisted around posts and located as shown in the Drawings. ***Type and Dimensions***

(e) Tie Wire

C265.12.05 The wire shall be 2mm diameter galvanised wire. ***Type and Dimensions***

C265.13 CONCRETE BACKFILLING

C265.13.01 All concrete backfilling of post holes specified on the Drawings shall be of minimum 20MPa 28 day compressive strength and shall conform to the requirements of the Specification for MINOR CONCRETE WORKS C271. ***Specification***

CONSTRUCTION

C265.14 GENERAL

C265.14.01 Boundary fencing shall be erected prior to the commencement of other work on a particular section of the work. ***Construction Priority***

C265.14.02 All fencing shall be erected in a workmanlike manner, and when completed shall be sound, strong and of neat appearance. ***Quality***

C265.14.03 For a clear width of one metre on either side of the fence line, and for the full length of the line, all logs, boulders, stumps, roots, undergrowth and rubbish shall be removed and disposed of by the contractor in accordance with the Specification for CLEARING AND GRUBBING C212. Trees within this area shall be removed only as directed by the Superintendent and approved by Local Government. ***Clearing***

C265.14.04 If trees on or adjacent to the fence line are to be retained the arrangement of the fencing at the trees shall be as directed by the Superintendent. ***Trees Retained***

C265.14.05 Wire shall not be strained around or against any trees to be left in the fence line, and strainer posts are to be provided on both sides of each tree.

Trees on Fence Line

C265.14.06 Where minor irregularities occur in the ground the vertical alignment of the fence shall not follow these irregularities, but shall be aligned to a uniform grade between definite changes in the natural slope of the ground.

Uniform Grade

C265.14.07 All survey pegs shall be left undisturbed and the post spacing shall be altered slightly where necessary to avoid pegs.

Survey Pegs

C265.14.08 The Contractor shall maintain the fencing at all times in a condition secure against the ingress or egress of stock, and shall take such precautions as are necessary to prevent people or stock from stepping into holes excavated for the construction of fencing.

Stock Proof

C265.14.09 Where old fencing is to be replaced by new fencing, all holes left after removal of the old fencing shall be backfilled and rammed firmly in layers of maximum depth 150mm.

Backfilling of Old Holes

C265.15 CHAIN LINK FENCING

(a) Erection of Posts

C265.15.01 All posts shall be erected vertically and set in concrete blocks approximately 250mm diameter and 600mm deep except for end, corner, strainer and gate posts which shall be set in concrete blocks approximately 250mm diameter and 900mm deep unless otherwise shown on the Drawings. Concrete shall have a minimum compressive strength of 20MPa at 28 days and shall conform to the requirements of the Specification for MINOR CONCRETE WORKS C271.

Concrete Blocks and Quality

C265.15.02 Galvanised weather caps shall be fitted to all galvanised posts.

Weather Caps

C265.15.03 Strainer posts shall be used at ends of fencing, angles, intersections with other fencing, gates and at intermediate points. Distances between strainer posts shall not exceed 120 metres.

Strainer Posts

(b) Erection of Wire

C265.15.04 All wire shall be spaced as shown in the Drawings. Wire shall be securely fastened and strained to an even tension between strainer posts.

Fasten and Strain

C265.15.05 Where specified, or shown on the Drawings, chain wire mesh shall be erected on the outside of the posts and fastened with two turns of the wire to each cable wire on both sides of each post and at intervals of not more than 900mm between posts and to each post midway between cable wires.

Chain Wire Mesh

C265.16 STOCK-PROOF FENCING

(a) Erection of Posts

C265.16.01 All posts shall be erected vertically. Reinforced concrete posts shall be erected in neatly cut holes sunk in earth, or in rock where this is

Method

encountered. Steel posts, except where placed in rock, shall be driven with suitable driving equipment, care being taken not to damage the tops of the posts during driving

C265.16.02 Where prestressed posts are proposed to be used, they shall be either erected as for reinforced concrete posts or shall be driven. Where driven, the Contractor shall use a suitable post driver which shall be equipped with two (2) sets of guiding rollers, to hold the post vertical and in position during driving.

Driving Prestressed Posts

C265.16.03 A steel cap with a plywood cushion shall be used to protect the top of the post during driving.

Protection Cap

C265.16.04 If the post cannot be driven for the full depth specified, or if it becomes significantly damaged, or cannot be driven vertically, it shall be removed. The same post if undamaged, or a new post, shall be erected as described for reinforced concrete posts.

Removal of Posts

C265.16.05 Posts shall be sunk to the depths shown in Table C265. 16.1.

C265.16.06 Cutting of concrete posts will not be permitted, and in order to take advantage of the lesser depth of sinking permitted in rock, it will be necessary to use posts manufactured in lengths to suit the depth of sinking. Where rock is encountered, steel posts shall be sunk in drill holes of sufficient diameter to permit them to be refilled with cement mortar consisting of one part of cement to two parts of clean sand.

Variations to Post Length

C265.16.07 Earth shall be backfilled around intermediate posts in layers of maximum depth 150mm for the full depth of the hole and up to ground level. The relative compaction of the rammed material shall be not less than that of the original undisturbed ground.

Backfilling at Intermediate Posts

C265.16.08 Where concrete posts are placed in rock, the space around the posts shall be tightly filled with cement mortar consisting of one part of cement to two parts of sand, or concrete where this is available.

Mortar Backfill

C265.16.09 Strainer posts shall be used at ends of fencing, angles, intersections with other fencing, gates and at intermediate points. These posts shall be backfilled with approved concrete to their full depth.

Strainer Posts

C265.16.10 Distances between strainer posts shall not exceed 120m in the case of fencing using steel intermediate posts, and 90m in the case of fencing for the retention of cattle (for which only concrete posts are permitted). Junctions with existing fencing shall be made in an approved manner.

Spacing of Posts

Table C265. 16.1 - Post Depth in Ground

Type of Post	Depth	
	Earth	Rock
Concrete Corner Posts & Strain Posts	900	*600
Concrete Intermediate Posts	600	*450
Steel Posts	450	450
Note* Permitted only in cases where posts of the correct length are provided (see below), otherwise the depth of sinking shall be the same as for earth.		

(b) Erection of Wires

C265.16.11 All wire shall be placed as shown on the Drawings. Wires shall be securely fastened and strained to an even tension between strainer posts with an approved wire strainer. Where barbed wire is to be used, it shall be tied in position at the top of intermediate posts, and where additional barbed wires are called for they shall be secured to the sides of the posts as shown on the Drawings.

Fastening and Straining

C265.16.12 Where concrete posts are used and the barbed wires are secured either to the tops or sides of the posts by tie wire, the tie wire shall be stretched tight and shall fit snugly against the sides of the posts to prevent movement of the barbed wire.

Barbed Wire

C265.16.13 Where prestressed posts are used, wires shall be securely tied so that they seat firmly in the grooves.

Prestressed Posts

C265.16.14 All joints in wires shall be as shown on the Drawings.

Wire Joints

C265.17 RABBIT-PROOF FENCING

(a) General

C265.17.01 Wire netting shall be erected on the side of the fence remote from the roadway in the case of road reserve boundary fences. In other cases netting shall be erected on the side of which the Superintendent shall direct.

Netting Position

C265.17.02 The netting shall be erected so that there is a 200mm lap laid on the ground surface, or trenched 215mm into the ground as shown on the Drawings for the type of fence to be erected.

Lap/Trench

C265.17.03 Netting shall be tied with tie wire or fixing clips approved by the Superintendent.

Fixing of Netting

C265.17.04 The netting shall be loosely tied to fence wires then carefully strained without disturbing or breaking the mesh, and shall then be tied to the wires immediately on each side of the post and at intervals not exceeding 1.00m.

Straining and Tying

C265.17.05 At each strainer post strut, additional netting shall be attached to the fence adjacent to the strainer post, to a height of 450mm above the strut.

Additional Netting

C265.18 CROSSING OF WATERCOURSES AND DEPRESSIONS

C265.18.01 The crossing of all watercourses and depressions shall be made secure by longer posts, suitably strutted as directed by the Superintendent. Additional cable wire and chain wire/wire netting shall be provided as necessary to make the fence stock proof.

Marsupial Proof

C265.18.02 The fence shall allow the passage of floodwater without the accumulation of debris. If shown on the drawings, flood gates shall be provided in accordance with Clause C265.20.

Floodwater

C265.19 CONNECTIONS TO EXISTING FENCES

C265.19.01 Existing cross fences shall be connected to the new fence using a strainer post with braces in each direction of strain (including cross fence) and the wires in both fences properly fastened to the post.

Strainer Posts

C265.20 FLOOD GATES

(a) General

C265.20.01 Suitable provision for the passage of flood waters past the fence shall be made at all watercourses. In all cases flood gates shall be of the type indicated on the Drawings, and shall be erected so as to prevent the accumulation of flood debris, while remaining stock-proof.

Requirements

(b) Small Watercourses

C265.20.02 Flood gates, in accordance with the Drawings, shall be provided in small gullies at the locations indicated on the Drawings. The opening of each flood gate shall provide a waterway area at least twice that of the culvert opposite to which it is placed.

Waterway Area

(c) Large Gullies and Creeks

C265.20.03 Flood gates, in accordance with the Drawings, shall be provided in gullies and creeks at the locations indicated on the Drawings.

Location

C265.20.04 A 9mm galvanised wire rope shall be carried over the gully in one span, threaded through a strainer post and tied back to an anchor at an adjacent concrete intermediate post. Turnbuckles are to be provided at each end to tension the wire rope. Netting shall be suspended from the wire rope and shall be overlapped and securely tied. The netting shall be of sufficient length to lie on the ground for a distance of not less than 1.0m on the downstream side.

Construction Detail

C265.20.05 Ballast, of sound timber securely tied to the netting, shall be provided at the downstream end of the netting.

Netting Ballast

C265.20.06 The sides of the gully shall be trimmed, as necessary, to ensure that the flood gate shall be stock-proof or rabbit-proof. The flood gate shall have sufficient movement of the suspended portion under the flow of flood waters to prevent damage to the fence and the accumulation of debris against it. Each strainer post shall be stayed in three directions, as shown on the Drawings.

Construction Requirements

C265.21 ERECTION OF GATES

C265.21.01 Where gates are specified or shown on the Drawings, they shall be erected so that they swing away from the road. ***Swing Away From Road***

C265.21.02 At the location of gates the surface shall be levelled and shall be nearly horizontal. The area where the gates swing shall be similarly levelled. ***Level Surface***

C265.21.03 The gates shall be hung as indicated in the Drawings. ***Hanging***

C265.22 REMOVAL OF EXISTING FENCING

C265.22.01 Where required, existing fencing is to be removed as shown on the Drawings. ***Location***

C265.22.02 No fencing is to be removed if there is a risk of egress or ingress of stock. If the existing fence is a rabbit-proof fence, then the contractor shall ensure that at night and weekends and other such times when work is not in hand that the whole of the fence is maintained in a rabbit-proof condition, even if temporary fencing is required. ***Contractor's Responsibility***

C265.22.03 All material removed in demolishing existing fencing shall be disposed by the Contractor as provided by Clause C265.23. ***Old Material***

C265.23 REMOVAL AND DISPOSAL OF SURPLUS MATERIAL AND RUBBISH

C265.23.01 All surplus material, offcuts, timber, roots and other debris resulting from the fencing contract shall be removed or otherwise disposed of to the satisfaction of the Superintendent. ***Contractor's Responsibility***

C265.23.02 The Contractor shall be responsible for any damage which may result from the lighting of fires associated with the work. ***Fire Damage***

C265.24 CATTLE GRIDS

C265.24.01 Where shown on the Drawings, cattle grids shall be erected in accordance with the Drawings. ***Standard***

C265.24.02 The cattle grid shall be evenly bedded on a continuous layer of compacted sand or other granular material approved by the Superintendent. The bedding material shall be compacted so that the relative compaction as determined by AS 1289.5.4.1 is not less than 95 per cent. ***Bedding***

C265.24.03 Cattle grids shall be installed on raised abutments with approach ramps where possible. Alternatively, a cattle grid may be placed over an excavated pit, in which case adequate drainage shall be provided. ***Raised Abutments***

C265.24.04 Crossfall for single lane cattle grids shall be level and for two lane cattle grids each section shall have a crossfall conforming to the crossfall of the approach road. ***Crossfall***

C265.24.05 The cattle grid construction shall include all activities associated with the cattle grid including any adjustments to the fencing as shown on the Drawings.

Extent of Work

C265.24.06 Advance signposting, in accordance with MUTCD, shall be provided on each approach to the cattle grid in accordance with the Specification for SIGNPOSTING C262.