

Engineering Construction Specification C19 Signposting

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1 General

1.1 Responsibilities

1.1.1 General

Requirement: Provide signs and support structures for regulatory, warning and guide signs, and proprietary street name and community facility name signs, as documented.

1.2 Cross references

1.2.1 General

Requirement: This worksection is not a self-contained specification. In addition to the requirements of this worksection, conform to the following:

- *C01 General requirements (Construction)*
- *C02 Quality management (Construction)*
- *C03 Control of traffic*
- *Council's Standard Drawings*

1.3 Standards

1.3.1 General

Speed control signs: To AS 1742.4.

Street name and community facility name signs: To AS 1742.5.

Road signs: To AS 1743.

Letters and numerals for road signs: To AS 1744.

1.4 Submissions

1.4.1 Execution details

Sign support structures: Submit proposed fabrication details.

Submission time: 2 weeks before fabrication.

1.4.2 Products and materials

Sign details: Submit details of sign materials and sign attachment systems before start of sign manufacture.

Evidence of conformance: Submit evidence that proposed materials and parts conform to the requirements of this worksection:

- Regulatory, warning and guide signs.
- Sign support structures.
- Steel reinforcement cages for sign support structures.

Retroreflective material for background and legend: Submit details of materials and evidence that materials for background and legend are compatible in application and durability.

1.4.3 Suppliers

Requirement: Submit details of the following:

- Name and details of proposed regulatory, warning and guide signs supplier.
- Name and details of proposed support structure supplier.
- Evidence of competency from these suppliers to carry out the work in conformance with this worksection.

Submission time: 1 week before engaging supplier.

1.4.4 Tests

Results: Submit results of testing to **ANNEXURE – MAXIMUM LOT SIZE AND MINIMUM TEST FREQUENCIES.**

1.5 Inspections

1.5.1 Notice

General: Give notice so that inspection may be made of the following:

- Pre-delivery inspection: Completed fabrication of purpose-designed sign and associated structures.
- Existing underground services: Protection of services before constructing sign structure footings.
- Clearing: Completed vegetation clearance after setting out.
- Set-out: Completed sign support structure set-out before placing footings.
- Excavation: Completed excavation before placing sign structure footings.
- Steel reinforcement: Reinforcement in place before placing concrete of sign structure footings.
- Sign damage: Completed sign damage repairs.
- Adjustment of existing signs: Completed adjustments, relocation or replacement of signs and/or support structures.
- Completed sign after installation

2 Materials

2.1 General

2.1.1 Storage and handling

Sign support structures and reinforcement cages: Store until required to be incorporated into the Works.

Completed reinforcement cages: Store under a waterproof shelter, supported above the ground. Protect from exposure damage and deterioration.

2.2 Street and community facility name signs

2.2.1 Standards

Road name assignment: To AS/NZS 4819.

2.2.2 Proprietary sign requirements

Manufacture and installation: To AS 1742.5 and the **Proprietary sign requirements schedule.**

As per Council's standard drawings

2.2.3 Signage system

Local authority requirements: Conform to the following:

- Council's signage system.
- Incorporate Council's supplied logo.

2.3 Regulatory, warning and guide signs

2.3.1 Standards

Sign and legend dimensions and details: To AS 1743.

2.3.2 Sign blanks

Aluminium quality: Free of cracks, tears and other surface blemishes, and with true and smooth edges.

Aluminium sheet alloy thickness: 1.6 mm.

Type and temper: Type 5251 or Type 5052 and Temper H38 or Temper H36 to AS 1743.

Sign blank tolerance: ± 1.5 mm of the documented dimensions.

Finished sign: Flat, within a maximum allowable bow of 0.5% of the maximum dimension of the sign blank in any direction.

One piece blanks: Provide one piece sign blanks unless sign size is larger than one full sheet of aluminium.

Multipiece sign: Construct as follows:

- Minimise the number of sheets, butt sheets together with 1 mm maximum gap at any point along the joint.
- Cover the full length of all joints with a 50 mm wide minimum backing strip of the same material and colour as that used for the sign blank.
- Fix the backing strip to each sheet with rivets, coloured to match, at 200 mm maximum spacing.

Aluminium extrusion as backing strips: The aluminium extrusion used for mounting may be used as the backing strip for horizontal joints if it conforms to the spacing requirements.

Face treatment: Chemically clean and etch or mechanically abrade the face of each sign blank. If sign blank is to receive a paint background, spray paint face with a compatible primer.

Back treatment: Uncoat the back of each sign blank and render the surface finish dull and non-reflective by mechanical or chemical means. Make sure surface is free of scratches and blemishes.

Mounting: Supply the signs with square holes or aluminium extrusion backing for mounting at the documented spacings.

2.3.3 Aluminium extrusion backing

Design section: Include special aluminium extruded sections for mounting, as documented.

Aluminium type: 6063-T5 to AS/NZS 1866.

Fixing: Fix aluminium extrusion at the documented spacings. Fix to sign blank with matching colour rivets at 200 mm maximum spacings.

2.3.4 Rivets

Type: With domed head, aluminium alloy shank with a steel mandrel which is discarded after securing the rivet.

Colour matching: Paint head and shank with alkyd enamel over an etch primer prior to insertion. When the rivet is in position it shall show the same colour as the material to which it is attached. Paint may cover the shank of the rivet, providing the coating thickness does not restrict the insertion of the shank into the standard drilled hole for that rivet.

2.3.5 Retroreflective material for background and legend

Retroreflective material: Class 2 materials to AS/NZS 1906.1.

Material colours: To AS 1743.

Application: Apply retroreflective material to the sign blank to the manufacturer's recommendations so that it adheres completely, without bubbles, cracks or blemishes.

Standard: Retro-reflective material shall conform in colour and class to the requirements of AS 1743 for Class 1, Class 2 and Class 2A materials. Unless shown otherwise on the Drawings, provide Class 2 material.

Non-reflective background material – background paint

Paint properties: High adhesion, abrasion resistance, resistance to weathering and colour fastness under varying conditions of exposure, and compatible with etched primer used on sign blank.

Paint system:

- Standard: To AS/NZS 2311 clause 5.2.3(b).
- Primer: One coat of two-pack epoxy.
- Finishing coats: Two coats of two-pack polyurethane (B20) or acrylic polyurethane (B44).

Paint application: Use conventional compressed air spray application to give a uniform cover, free of blemishes. Other painting systems will be considered upon application to Council.

Minimum dry film thickness: 38 µm when tested to AS 1580.108.2.

Colours: As per Council's standard drawings

Colorimetric data: To AS 2700 Table 1.

Gloss levels:

- Matt coatings: 12% to 15% of gloss as determined by AS/NZS 1580.602.2, using a reflector geometry of 85°.
- Gloss coatings: 85% to 95% of gloss as determined by AS/NZS 1580.602.2, using a reflector geometry of 20°.

2.3.6 Non-reflective background material – background sheet material

Quality: Adhesive cast vinyl sheet material such as 'Scotchcal' or other equivalent approved material can be provided in place of background paint

Material properties: Adhesive cast vinyl sheet material of uniform density, compatible with the legend material in application and durability.

Alternative background material: Equivalent approved material may be used in place of background paint.

Colours and gloss: Uniform colour and gloss levels, conforming to **Non-reflective background material – background paint**.

Application: Apply sheet material to sign blank to the manufacturer's recommendations so that it adheres completely, without bubbles, cracks or blemishes.

2.3.7 Non-reflective material for legend – legend screening ink

Ink properties: Full gloss, non-fade, non-bleed and scratch resistant high quality screening ink, compatible with the material to which it is applied.

Durability: At least equal to the material to which the ink is applied.

Application: Apply screening ink legends to background material to the manufacturer's recommendations.

2.3.8 Non-reflective material for legend – legend sheet material

Quality: Adhesive cast vinyl sheet material such as 'Scotchcal' or other equivalent approved material can be provided in place of background paint

Material properties: Adhesive cast vinyl sheet material of uniform density, compatible with the background material in application and durability.

Alternative sheet material: Equivalent approved material can be provided in place of screening ink.

Application: Apply sheet material legends to background material to the manufacturer's recommendations so that it adheres completely, without bubbles, cracks or blemishes.

2.3.9 Non-reflective material for legend – colours and finish

Requirement: To **Non-reflective background material – background paint** with additional colours conforming to AS 2700.

2.3.10 Reference markings – identification codes

Code requirement: Clearly and permanently stamp or engrave all warning, regulatory and guide signs with an identification coding. Do not damage the front face.

Code cipher height: 6 to 10 mm.

Code location: At the bottom left hand corner of rectangular signs and on or below the horizontal centreline, to the left hand edge of other shaped signs, on the rear face of the sign.

Information required: Show the following coding information:

- Sign reference number.
- Manufacturer's name.
- Month and year of manufacture.
- Manufacturer and class of retroreflective material.

Proprietary signs: Reference markings are not required for proprietary street name or community facility name signs.

2.3.11 Protection of signs

Protection: Protect signs from damage during storage and transportation to site.

2.4 Sign support structures

2.4.1 General

Requirement: Fabricate components and provide materials, sign support structure protection, anchor bolt assemblies, and footing reinforcement cages, as documented.

Support structure type: Use one of the following, as documented:

- Standard round galvanized steel posts with 50, 65 or 80 mm nominal bore, fitted with a cap for waterproofing. Council may require powder coated colour posts in some applications.
- Purpose-designed steel structures manufactured to AS 4100.

2.4.2 Fabrication

Purpose-designed steel structures: Fabricate from steel sections which conform to AS/NZS 1163, AS/NZS 3678 and AS/NZS 3679.1.

Splices: Provide full penetration butt weld splices conforming to the following:

- Maximum splice number: One splice per member.
- Welding: As documented and to AS/NZS 1554.1 as follows:
 - Sign structure welds: Category SP.
 - Anchor bolt assemblies: Category GP.

Anchor bolts: Fabricate anchor bolt assemblies for purpose-designed structures, as documented.

Steelwork finish: Free from pitting, sharp corners and projections. Remove mill scale, loose rust and foreign particles by blast cleaning.

2.4.3 Protective treatment - galvanizing

Preparation for galvanizing: Conform to the following:

- Chemical clean: To AS 1627.1.
- Abrasive blast cleaning: To AS 1627.4.
- Grade: Sa 2½ to AS 1627.9.

Standard galvanized steel posts: Electro galvanize.

All other steel components: Including for brackets and anchor bolt assemblies. Hot-dip galvanize after fabrication processes are completed. Hot-dip galvanizing: To AS/NZS 4680 to provide a bright finished surface free from white rust and stains with average minimum coating thickness of 85 µm.

- Bolts and nuts: To AS/NZS 1214.

Splices in galvanized posts: Paint with an organic zinc-rich primer or inorganic zinc silicate paint conforming to AS/NZS 4680 clause 8.

Damaged surfaces: Scratched and slightly damaged surfaces of galvanised coatings shall be renovated by using a zinc-rich paint in accordance with AS/NZS 4680. to provide a zinc-rich coating at least equal to the thickness specified for the galvanised layer. This method of renovation shall be restricted to areas not exceeding 2500 square millimetres. Any structure with totally-damaged coating areas exceeding 2500 square millimetres shall be regalvanised by the Contractor. The cost of regalvanising such damaged coating areas shall be borne by the contractor.

2.4.4 Attachment of signs – typical systems

Posts and other components: Provide with the required sign attachment holes or fittings to suit the typical attachment systems as documented.

Sign panels: Attach to each supporting member at each extrusion section or bolt hole in the sign panel.

2.5 Footing reinforcement

2.5.1 Steel reinforcement cages for sign support structures

Standards: To AS/NZS 4671.

Cleanliness: Provide reinforcement free from loose or thick rust, grease, tar, paint, oil, mud, millscale, mortar or any other coating but not smooth and polished.

Accuracy: Bend reinforcement to the documented dimensions and shapes. Do not heat reinforcement for bending unless Grade 400 deformed bar reinforcement is required.

Full bars: Provide reinforcement in the lengths as documented. Only use splice bars at approved locations using approved method.

Splicing of reinforcing fabric: Measured as the overlap between the outermost wire in each sheet of fabric transverse to the direction of splice. Make sure overlap is not less than the pitch of the transverse wires plus 25 mm.

Welded splices and tack welding of bars: To the AS/NZS 1554 series.

2.6 Off-site requirements for sign structures

2.6.1 Manufacturer's identification

Purpose-designed structure: For each structure, provide clear identification marking on the post column 1 m above the base plate, outreach arm, and sign support vertical.

Identification information: Show the following:

- Sign reference number.
- Manufacturer's name.
- Month and year of manufacture.
- Drawing number.

Marking: Legible, durable and applied by etching, stamping, engraving or welding.

2.6.2 Pre-delivery inspection certificate

Sign structure conformance: Do not install signs until a certificate listing particulars of the items inspected, verifying conformance, has been issued.

Non-conformance: Rectify non-conforming items included in the certificate.

2.7 Testing

2.7.1 Quality

Requirement: Test for all characteristics in conformance with **ANNEXURE - MAXIMUM LOT SIZES AND MINIMUM TEST FREQUENCIES**.

Quality verification: If material/product quality verification can be obtained from the supplier, documented tests need not be repeated.

3 Execution

3.1 General

3.1.1 Provision for traffic

Minimise delays: Organise the work to avoid or minimise delays and inconvenience to vehicular and pedestrian traffic.

3.1.2 Premature sign exposure

Wrap sign: Where a sign is erected before it is intended for use by traffic and is visible to traffic, completely and securely wrap the face of the sign in porous cloth sheeting or other approved opaque covering material until the sign is operational.

3.1.3 Temporary signs

Requirement: Install signs for the control of traffic nominated in the *C03 Control of Traffic* worksection.

3.2 Establishment

3.2.1 Existing underground services

Services laid in close proximity to the signs: Locate and protect services from damage before placing footings and erecting signs.

3.2.2 Alignment

Angle of placement: Align signs in conformance with the following:

- Generally: At right angle to the direction of traffic they are intended to serve $\pm 5^\circ$.
- On curved alignments: Determine angle of placement by the course of approaching traffic rather than the orientation of the road at the point where the sign is located.

3.2.3 Set-out

Setting out: Set-out the work so that all signs and support structures are placed as documented.

3.2.4 Clearing

Clearing vegetation: Following set-out approval and advice from Council's Tree Preservation Officer, clear and remove any tree and undergrowth within 3 m of the sign support structure or along a driver's line of sight to the front of the sign.

3.3 Sign structure footings

3.3.1 Construction

Requirement: Construct footings for simple pipe support or for each post of a purpose-designed sign support structure, as documented.

3.3.2 Excavation

Excavation and disposal: Neatly excavate footings to the documented depth and width. Do not excavate by machine within 1 m of existing underground services. Dispose of the excavation material from the site using approved methods.

3.3.3 Anchor bolt assemblies

Requirement: Provide in conformance with the following:

- Accurately place and provide firm support.
- With levelling nuts under the sign structure baseplates to allow adjustment of structure after installation.
- Protect all exposed bolt threads from damage or adhesion of concrete during footing construction.

3.3.4 Steel reinforcement

Requirement: Place reinforcement as documented.

3.3.5 Concrete properties

Concrete sign support structure footings:

- Minimum compressive strength:
Pipe support footings: 20 MPa at 28 days.
Purpose-designed support footings: 32 MPa at 28 days.
- Slump: 60 mm.

Ready mixed concrete: If used, mix and deliver to AS 1379.

3.4 Erection

3.4.1 Sign installation

Position and support: Accurately position and support all components during erection.

Top of post level: Conform to the following:

- Extend each pipe support post beyond the upper extrusion section or bolt holes on the sign panels to allow attachment of the signs.
- Finish the top of each post below the top edge of the sign panel.
- Multi-post installations: Finish the tops of the posts at the same level, unless required otherwise for the sign shape or sign panel arrangement.

3.4.2 Sign damage

Protection during erection: Support and brace sign panels and protect the sign face from damage.

Signs damaged during erection: Repair to a standard equivalent to the original sign or replace sign.

Repair of damaged galvanized coatings: Conform to the following:

- Scratched and slightly damaged purpose-designed support structures: For areas less than 2500 mm² on any one structure, repair with an organic zinc-rich primer or inorganic zinc silicate paint to AS/NZS 4680 clause 8.
- Totally-damaged coating: For areas exceeding 2500 mm², regalvanize.

- Cost of regalvanising such damaged coating areas shall be borne by the contractor.

3.4.3 Regulatory Signs

Commissioning: the contractor shall notify the date, time and location of each regulatory sign to be placed.

3.5 Existing signs and support structures

3.5.1 Adjustment of existing signs

Requirement: If required, carry out the following as documented:

- Adjust sign panel and/or sign support structures.
- Dismantle signs and sign support structures.
- Relocate or replace sign support structures, including removing and providing footings and re-erection of signs.

3.6 Sign structure warranty

3.6.1 Sign face material warranty table

Sign face material	Warranty from date of manufacture (years)	Sign face photometric value (% of new value retained ¹)
Class 1X	10	80
Class 1X (white with EC02 overlay film)	12	80
Class 1X	10	80
Class 1X	3	80
Class 1X	10	80
Class 1	12	80
Class 1 (white with EC02 overlay film)	12	80
Class 1 screen printed	10	80
Class 2	7	50
Class 2 screen printed or white with EC02 overlay film	7	50
Non-reflective ³ (sheeting or coating)	7	Not applicable
VHB joining strip	12	Not applicable
Notes:		
¹ To AS/NZS 1906.1.		
² EC = electronic cuttable.		
³ Includes non-reflective parking signs.		

3.6.2 Sign structure

Warranty period: Equal to that warranted for the sign face material.

Warranty provisions: Cover the following in event of structure failure or defect:

- Remove any sign structure which has failed in service or is found defective.
- Rectify defect and re-erect the repaired/replaced unit at the original location.

- Process and return defective structures within 30 calendar days from the date of defect notification.

Warranty provision exclusions: Any structure which has failed as a result of a traffic accident, abuse or act of vandalism caused by a third party after delivery to the site.

Date of dispatch mark: To facilitate checking of warranty claims, legibly stamp, etch or engrave the date of manufacture on all separate items of the sign structure.

3.7 Testing

3.7.1 Quality

Requirement: Test for all characteristics in conformance with **ANNEXURE - MAXIMUM LOT SIZES AND MINIMUM TEST FREQUENCIES.**

4 Annexures

4.1 Annexure – Summary of hold and witness points

Reference No:	Clause and description	Type*	Submission/Inspection details	Submission/Notice times	Process held
C19-HP01	SUBMISSIONS, Products and materials Sign details	H	Details of sign manufacturer, materials and attachment system.	2 weeks before fabrication	Sign fabrication
C19-HP02	SUBMISSIONS, Products and materials Regulatory, warning and guide signs	H	Evidence that sign materials and parts conform to this worksection.	1 week before ordering	Sign fabrication
C19-HP03	SUBMISSIONS, Products and materials Retroreflective material for background and legend	H	Details of materials and evidence that materials for background and legend are compatible.	1 week before ordering	Sign fabrication
C19-HP04	SUBMISSIONS, Products and materials Sign support structure	H	Evidence that materials and parts conform to this worksection.	1 week before ordering	Sign support structure fabrication
C19-HP05	SUBMISSIONS, Products and materials	H	Evidence that materials conform to this worksection.	1 week before fabrication	Sign support structure fabrication

Reference No:	Clause and description	Type*	Submission/Inspection details	Submission/Notice times	Process held
	Steel reinforcement cages for sign support structures				
C19-WP06	INSPECTIONS, Notice Pre-delivery inspection	W	Fabricated purpose-designed structures.	2 days after fabrication	Sign structure delivery to site
C19-WP07	INSPECTIONS, Notice Existing underground services	W	Services protection.	1 week before sign erection	Sign structure footing placement
C19-WP08	INSPECTIONS, Notice Clearing	W	Cleared vegetation.	1 day after clearing	-
C19-WP09	INSPECTIONS, Notice Set-out	W	Sign support structure set-out.	1 week before sign erection	Footing placement
C19-WP10	INSPECTIONS, Notice Excavation	W	Completed excavation for footings.	1day before placing footings	-
C19-WP11	INSPECTIONS, Notice Steel reinforcement	W	Footings steel reinforcement in place.	1day before placing	-
C19-WP12	INSPECTIONS, Notice Sign damage	W	Repaired sign damage.	3 days before inspection	-
C19-WP13	INSPECTIONS, Notice Adjustment of existing signs	W	Adjusted, relocated or replaced signs.	3 days before inspection	-
C19-HP14	SUBMISSIONS, Work as Executed details and Road Asset attribute	H	Submit details showing locations of new signage with GPS co-ordinates	2 weeks after completion of works	Completion

Reference No:	Clause description and Type*	Submission/Inspection details	Submission/Notice times	Process held
	schedule			
*H = Hold point, W = Witness point				

4.2 Annexure - Referenced documents

The following documents are incorporated into this worksection by reference:

AS/NZS 1163	2016	Cold-formed structural steel hollow sections
AS/NZS 1214	2016	Hot-dip galvanized coatings on threaded fasteners (ISO metric coarse thread series)
AS 1379	2007	Specification and supply of concrete
AS/NZS 1554		Structural steel welding
AS/NZS 1554.1	2014	Welding of steel structures
AS 1580		Paints and related materials - Methods of test
AS 1580.108.2	2004	Dry film thickness - Paint inspection gauge
AS/NZS 1580.602.2	1995	Measurement of specular gloss of non-metallic paint films at 20 degrees, 60 degrees and 85 degrees (ISO 2813:1994)
AS 1627		Metal finishing - Preparation and pretreatment of surfaces
AS 1627.1	2003	Removal of oil, grease and related contamination
AS 1627.4	2005	Abrasive blast cleaning of steel
AS 1627.9	2002	Pictorial surface preparation standards for painting steel surfaces
AS 1742		Manual of uniform traffic control devices
AS 1742.4	2008	Speed controls
AS 1742.5	2017	Street name and community facility name signs
AS 1743	2018	Road signs - Specifications
AS 1744	2015	Standard alphabets for road signs
AS/NZS 1866	1997	Aluminium and aluminium alloys - Extruded rod, bar, solid and hollow shapes
AS 1906		Retroreflective materials and devices for road traffic control purposes
AS/NZS 1906.1	2017	Retroreflective sheeting
AS/NZS 2311	2017	Guide to the painting of buildings
AS 2700	2011	Colour standards for general purposes
AS/NZS 3678	2016	Structural steel - Hot-rolled plates, floorplates and slabs
AS/NZS 3679		Structural steel
AS/NZS 3679.1	2016	Hot-rolled bars and sections
AS 4100	1998	Steel structures
AS/NZS 4671	2001	Steel reinforcing materials
AS/NZS 4680	2006	Hot-dip galvanized (zinc) coatings on fabricated ferrous articles
AS/NZS 4819	2011	Rural and urban addressing
Council's Standard Drawings		
RMS Standards		