

# TRANSPORT FOR NSW (TfNSW)

## SPECIFICATION D&C 3400

### MANUFACTURE AND DELIVERY OF ROAD SIGNS

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SPECIFICATION D&C 3400

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# MANUFACTURE AND DELIVERY OF ROAD SIGNS

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## FOREWORD

### TfNSW COPYRIGHT AND USE OF THIS DOCUMENT

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### BASE SPECIFICATION

This document is based on Specification TfNSW 3400 Edition 8 Revision 4.

# **TfNSW SPECIFICATION D&C 3400**

## **MANUFACTURE AND DELIVERY OF ROAD SIGNS**

### **1 SCOPE**

This Specification sets out the requirements for the manufacture and delivery of Regulatory, Warning and Guide signs (R, W and G series). It also sets out the requirements for temporary signs used for traffic management in road works (T series).

This Specification does not cover the requirements for manufacture of temporary special use signs, electronic signs, or sign support structures.

The requirements for installation of road signs, including sign support structures, are set out in Specification TfNSW D&C R143.

### **2 STRUCTURE OF THE SPECIFICATION**

This Specification includes a series of annexures that detail additional requirements.

#### **2.1 (NOT USED)**

#### **2.2 SCHEDULES OF HOLD POINTS AND IDENTIFIED RECORDS**

The schedules in Annexure 3400/C list the **HOLD POINTS** that must be observed. Refer to Specification TfNSW D&C Q6 for the definition of **HOLD POINTS**.

The records listed in Annexure 3400/C are **Identified Records** for the purposes of Specification TfNSW D&C Q6 Annexure Q/E.

#### **2.3 (NOT USED)**

#### **2.4 REFERENCED DOCUMENTS AND DEFINITIONS**

Standards, specifications and test methods are referred to in abbreviated form (e.g. AS 1234). For convenience, the full titles are given in Annexure 3400/M.

The term “the Supplier” means the supplier of the product covered by the scope of this Specification.

### **3 (NOT USED)**

## **4 QUALITY MANAGEMENT SYSTEM**

Establish and maintain a Quality Management System conforming to AS/NZS ISO 9001 as a means of ensuring that the product conforms to the Specification requirements.

Where materials required in the manufacture are imported, provide evidence that a substantially equivalent Quality Management System is in operation at the overseas manufacturing source.

The Principal may conduct audits and inspections of the sign manufacturer's procedures and processes during the course of the deed.

## **5 MATERIALS**

### **5.1 SIGN BLANKS**

#### **5.1.1 Temporary Signs for Road Works (T Series)**

For temporary signs used in road works, you may use any of the following materials as sign blanks:

- (a) **Boxed edge steel:** Hot-dip zinc/aluminium coated sheet steel, 0.8 mm thick, with a regular spangle surface finish, conforming to AS 1397 and AS 1365. The steel base must have minimum yield strength of 300 MPa, good ductility, and be suitable for roll forming.
- (b) **Aluminium:** As for "all other road signs" (refer Clause 5.1.3).
- (c) **Aluminium composite:** Consisting of a low density polyethylene (LDPE) core, sandwiched between two aluminium skins, with minimum overall thickness of 3 mm. Bond strength between aluminium skins and polyethylene core is optimised for enhanced adhesion and durability.

Each aluminium skin layer must have minimum thickness of 0.3 mm and of alloy and temper designation that gives minimum ultimate tensile strength of 145 MPa in accordance with AS/NZS 1734 or EN 573-3/EN 515.

The surface finish of the aluminium must be low gloss, and the exposed face of the aluminium skin can be coated with a low luminance colour coating that optimises adhesion to reflective sheeting.

- (d) **Other materials** which have been assessed by TfNSW as suitable for use as sign blanks.

#### **5.1.2 Other Temporary Signs**

The scope of this Specification does not cover signs intended for special events or other short term applications.

#### **5.1.3 All Other Road Signs (e.g. R, W and G Series)**

For all other road signs, sign blanks must be aluminium alloys of 1.6 mm thickness, with alloy and temper designation of either "5052 - H38" or "5251 - H38" in accordance with AS/NZS 1734.

#### **5.1.4 Surface and Edge Finish**

Blanks used for sign manufacture must be free of cracks, tears and other surface blemishes, with their edges true and smooth.



## 5.2 EXTRUDED ALUMINIUM SECTIONS

Extruded aluminium channel and angle sections (“aluminium extrusions”), attached to the back of the sign panels for reinforcement/stiffening and mounting purposes, must be of the shape and size shown in Annexure 3400/G, Drawing No. CW5411 Sheets 1 and 2.

The aluminium material must be of alloy and temper designation “6060 - T5” in accordance with AS/NZS 1866.

## 5.3 RETROREFLECTIVE SHEETING MATERIAL

### 5.3.1 Class 1 and Class 2 Retroreflective Sheeting

Retroreflective sheeting (used for background and legend on signs) specified as Class 1 and Class 2 must meet the photometric performance and other requirements stated in AS/NZS 1906.1 for the respective Classes.

### 5.3.2 Class 1X Retroreflective Sheeting

Retroreflective sheeting specified as Class 1X must meet the photometric performance requirements stated in Table 3400.1 but meet all other requirements of a Class 1W sheeting stated in AS/NZS 1906.1.

**Table 3400.1 - Minimum Coefficient of Luminous Intensity Per Unit Area for Class 1X Sheeting**

Entrance Angle (°)	Observation Angle (°)	Minimum CIL/m <sup>2</sup> Values for Class 1X (cd/lx.m <sup>2</sup> )								
		Non-fluorescent Colours						Fluorescent Colours		
		White	Yellow	Red	Std green	Blue	Brown	Yellow	Yellow-green	Orange
4	0.2	500	390	90	50	20	20	260	400	175
	0.33	350	320	75	40	17	17	200	310	100
	0.5	300	210	60	30	15	15	180	240	90
	1.0	80	60	16	8.0	3.6	3.6	48	64	24
15	0.2	380	265	75	38	19	19	190	305	150
	0.33	350	240	70	35	17	17	175	280	85
	0.5	250	170	50	24	12	12	140	195	70
	1.0	60	45	12	6	3	3	30	50	18
30	0.2	215	162	43	22	10	10	130	170	65
	0.33	175	120	35	17	9	9	105	140	52
	0.5	135	100	27	14	6	6	81	110	41
	1.0	45	34	9.0	4.5	2.0	2.0	27	36	14

**Note:** Values specified in the above table are the average of CIL/m<sup>2</sup> values for 0° and 90° rotation angles, for each Entrance Angle – Observation Angle combination.

### **5.3.3 Approved Retroreflective Sheeting Materials**

A list of retroreflective sheeting materials, approved for use by the TfNSW, is given in TfNSW Technical Direction TDT 2013/08, as amended. This technical direction is available from the TfNSW website at:

<http://www.rms.nsw.gov.au/trafficinformation/downloads/td13-08.pdf>

## **5.4 NON-REFLECTIVE SIGN FACE MATERIAL**

### **5.4.1 Colour**

The colour of all non-reflective sign face material must approximate closely the colours defined in AS 1743 Section 10.1 (and the single-coloured reference cards of AS 2700S).

Where a colour is specified as “matt”, the specular gloss measured in accordance with AS/NZS 1580 - Method 602.2 must have a value of between 12 and 20 when measured with an 85° head, and a value of between 8 and 12 when measured with a 60° head.

Additionally, the paint colours used on the Parking series signs must correspond to the following colours in AS 2700S:

<b>Colour</b>	<b>AS 2700S Designation</b>
White	N14 White
Red	R13 Signal Red
Blue	B11 Rich Blue
Green	G27 Homebush Green or G13 Emerald

### **5.4.2 Background Paint**

Background paint must be long life industrial quality paint which is compatible, in both application and durability, with material used for the legend. Examples are:

- (i) two component polyurethane paint;
- (ii) enamel paint; and
- (iii) powder coating.

### **5.4.3 Background Sheeting**

Adhesive cast vinyl sheet material or other acceptable equivalent to the Principal may be used. The material must be of uniform density and compatible in both application and durability with the material used for the legend.

### **5.4.4 Non-reflective Legend**

Non-reflective material specified for figures, letters, symbols and borders must be of uniform density and compatible, in both application and durability, with the background material.

## 5.5 OTHER SIGN FACE MATERIALS

### 5.5.1 General

Electronic cuttable (EC) transparent coloured overlay film, graffiti protection film and other sign face sheeting materials used in conjunction with retroreflective sheeting must be part of a matched components system which includes the retroreflective sheeting, and produced by the same supplier of the retroreflective sheeting.

### 5.5.2 Screen Printing Ink

Screen printing ink must be compatible with the background material, both in application and durability.

## 5.6 RIVETS

### 5.6.1 General

Use either pop rivets or self-piercing rivets (refer Annexure 3400/G, Drawing No. CW5411 Sheet 2) for fastening aluminium extrusions to the sign, but do not use a mixture of these two types of rivets on the same sign.

Rivets must conform to the size and load capacity requirements shown in Table 3400.2.

**Table 3400.2 – Rivet Size and Load Capacity Requirements**

Material Thickness <sup>(1)</sup> (mm)	Size (Diameter) (mm)	Minimum Load Capacity (N)	
		Shear	Tension
up to 5.2	4.0 <sup>(2)</sup>	1320	1910
8.0	4.8 <sup>(3)</sup>	2010	2800

**Notes:**

- <sup>(1)</sup> Total thickness of material to be fastened together.
- <sup>(2)</sup> A smaller rivet diameter is permitted for self-piercing rivets provided that it meets the specified load capacity in shear and tension.
- <sup>(3)</sup> For depth markers and kilometre post signs.

### 5.6.2 Pop Rivets

Pop rivets must be of aluminium alloy, with a steel mandrel and domed head and comply with the size and load capacity requirements in Table 3400.2.

Apply a paint coating, of the same colour as the material to which it is attached, to the domed head of the pop rivet after installation. The paint used must be an alkyd enamel, which must be applied after an appropriate treatment of the rivet to ensure long lasting adhesion.

Colours required are listed below, with full gloss level required:

Blue	AS 2700S B11	Yellow	AS 2700S Y14	Red	AS 2700S R13
Black	BS 5252 00E53	Orange	AS 2700S X15	White	BS 5252 00E55
Brown	AS 2700S X65	Silver	AS 2700S N24	Green	AS 2700S G23

### **5.6.3 Self-Piercing Rivets**

Self-piercing rivets must be of stainless steel, and must conform to the size and load capacity requirements shown in Table 3400.2. A smaller rivet diameter is permitted provided that it meets the load capacity requirements in shear and tension. Submit to the Principal test results as evidence of compliance with these requirements.

When using self-piercing rivets, rivet the aluminium extrusion backing rails to the sign blank first before applying the sign face material. The installed rivet must not protrude above the front surface of the sign blank, which will result in damage of the sign face material during application or handling.

## **6 SIGN FACE DESIGN**

### **6.1 GENERAL**

The individual sign face designs must be based on the relevant Australian Standard.

The dimensions, legend and background for each sign must be in accordance with this Specification, AS 1742, AS 1743 and AS 1744, the TfNSW Sign Register (refer Clause 6.2) and the Design Documentation drawings.

### **6.2 TfNSW SIGN REGISTER**

Details of current Regulatory, Warning, Guide (examples only) and Temporary signs are given on the TfNSW Sign Register, available at

<http://www.rms.nsw.gov.au/cgi-bin/index.cgi?action=searchtrafficsigns.form>

## **7 MANUFACTURE OF SIGNS**

### **7.1 COMMENCEMENT OF SIGN MANUFACTURE**

For Guide signs (G1 and G2 series), do not commence manufacture until the design drawings of the Guide signs have been approved by the Manager, Guidance and Delineation (Telephone: 02-8849 2960), or his representative.

For all other signs, check the currency of the design against the TfNSW Sign Register (refer Clause 6.2).

#### **HOLD POINT**

Process Held: Commencement of sign manufacture for the Project Deed.

Submission Details: At least seven days prior to commencement of manufacture, submit the name of the brand(s) of retroreflective sheeting, and details of the non-reflective background and legend material, to be used in the sign manufacture.

Release of Hold Point: The Nominated Authority will consider your submission prior to authorising the release of the Hold Point.

Whenever the supply of the retroreflective sheeting, non-reflective background or legend material is changed during the course of the Project Deed, this Hold Point will again apply.

## **7.2 SIGN BLANKS**

### **7.2.1 Preparation**

Sign blanks must be in a single piece, unless the sign is of such a size as to require more than one full sheet of aluminium, in which case a multi-piece sign (refer Clause 7.3) is permitted.

The face of each sign blank must be chemically cleaned and etched or mechanically abraded in accordance with AS 1627. The back of each sign blank must be rendered dull and non-reflective either by mechanical or chemical means and must be free of scratches and blemishes.

### **7.2.2 Tolerances**

The dimensions of the sign blank must be within  $\pm 1.5$  mm of those specified.

The finished sign must be flat with a maximum allowable bow of .005(D) in any direction, where (D) is the maximum dimension of the sign blank in any direction.

## **7.3 MULTI-PIECE SIGNS**

### **7.3.1 Use Minimum Number of Sheets**

A multi-piece sign must be made up with the minimum number of sheets practicable. Annexure 3400/F provides a guide to determining the number of sheets to be used. Signs made up of more sheets than is necessary will not be accepted.

### **7.3.2 Gap in Joints**

The joints of a multi-piece sign when butted together must have a minimum gap of 0.5 mm and a maximum gap of 1 mm at any point along the joint.

### **7.3.3 Backing Strip**

Cover all vertical sheet joints with a 50 mm wide backing strip of the same material and colour as used for the sign blank.

Fix the backing strip to the sign using 12 mm wide Very High Bond (VHB) joining tape on both sides of the joint, and running along the full length of the backing strip, as shown in Annexure 3400/G, Drawing No. CW5411 Sheet 1. When fixing a VHB joining tape, follow the manufacturer's recommended application procedure.

Do not use backing strips under an aluminium extrusion. Vertical backing strips must terminate at each horizontal extrusion and butt against it with a gap not exceeding 2 mm.

Make good any failures of the VHB joining strip that occur during the warranty period (refer Clause 10).

### **7.3.4 Joining Methods**

Aluminium angles, either in conjunction with aluminium channels or in a double angle arrangement, may be used for joining separate sign pieces as shown in Annexure 3400/G, Drawing No. CW5411 Sheet 2.

The double angle arrangement shown in Annexure 3400/G, Drawing No. CW5411 Sheet 2 is for vertical joints only (refer also Clause 8.2.2).

Alternatively, twin aluminium channels may also be used, as shown in Annexure 3400/G, Drawing No. CW5411 Sheet 2.

When two aluminium sections are used to join separate sign pieces with a horizontal joint, backing strips (refer Clause 7.3.3) are not required, since the horizontal joint is covered by the aluminium sections.

## **7.4 HINGED SIGNS**

Hinged signs may be hinged either vertically or horizontally, as shown on the relevant TfNSW Drawings.

Hinges must be piano hinges (or continuous hinges) in aluminium, and run along the full length of the joint. The hinge must be 40 mm to 50 mm wide when in the opened position, with a blade of thickness 1 mm to 2 mm, and a stainless steel hinge pin of diameter 3 mm to 4 mm.

Provide a fold (i.e. bend) of approximately 12°, on both blades of the hinge, as near as possible to the central hinge pin, to provide for clearance of the rivet heads (for fastening the hinge to the sign panel) when the sign is in the closed position.

Install the hinge at the back of the sign, so that when the sign is in the open position, only the pin roll is visible from the front of the sign. Fasten the hinge to the sign panels using rivets that are staggered between each side of the joint.

Provide corresponding holes at the bottom corners (for a vertical hinge), or near the top and bottom edge (for a horizontal hinge) of the hinged sign, so that when the sign is in the closed position, the two holes will coincide to allow a 38 mm wide padlock (supplied by others) to be installed to lock the two pieces together.

## **7.5 REINFORCEMENT AND PROVISION FOR MOUNTING**

### **7.5.1 Non-reinforced Signs**

For non-reinforced signs (without aluminium extrusions), holes for mounting purposes must be square, 11 mm wide, cleanly punched, to accept a 10 mm diameter cup head square neck bolt.

Unless specified otherwise, locate the two holes required at 520 mm apart, along the nominal vertical centreline, so that the bolt heads do not obscure the legend (refer Figure 3400/H.1 in Annexure 3400/H).

### **7.5.2 Reinforced Signs**

For all signs (other than High Wind signs) wider than 750 mm, or with a width-to-height ratio of 2.5 or greater, provide aluminium extrusions, fastened to the back of the sign with rivets at spacing not

exceeding 200 mm for reinforcement and mounting purposes. For High Wind signs wider than 600 mm, provide aluminium extrusions with rivets at spacing not exceeding 150 mm. (Refer Annexure 3400/G, Drawing No. CW5411 Sheet 1.)

The number of extrusions required and their spacing must be in accordance with Annexure 3400/H, or Annexure 3400/J. The tolerance for spacing is  $\pm 0.5$  mm.

Rivets must comply with Clause 5.6.

### **7.5.3 Temporary Signs for Road Works (T-Series)**

No provision for mounting is required for temporary road works signs.

## **7.6 FORMS OF LETTERS AND NUMERALS**

The forms and dimensions of letters and numerals, including their stroke widths, must conform to AS 1744.

All individual letters must have neat clearly defined edges with smooth curves on round letters.

## **7.7 APPLYING SIGN FACE MATERIALS**

The type, grade or class of sign face material for legend and background must be in accordance with Annexure 3400/K.

### **7.7.1 Reflective Background and Legend**

#### **7.7.1.1 Retroreflective Sheeting Material**

Use only retroreflective sheeting consisting of either individually coloured sheetings laid over each other, or white retroreflective sheeting with a electronic cuttable (EC) transparent coloured overlay film (which is part of the matched component system - refer Clause 5.5.1) applied over the top of the white sheeting.

Apply the retroreflective sheeting, coated with a pressure sensitive adhesive, in accordance with the sheeting manufacturer's instructions. Securely fix the sheeting to the sign substrate using a method that produces a sign surface free of any bubbles, wrinkles and blemishes.

#### **7.7.1.2 Electronic Cuttable (EC) Transparent Overlay Film**

Apply the EC film, coated with a pressure sensitive adhesive, in accordance with the retroreflective sheeting manufacturer's instructions to produce a resulting sign face free of bubbles, wrinkles and blemishes.

#### **7.7.1.3 Screen Printing Ink**

Apply transparent screening ink over the retroreflective sheeting or matched component inks, using the off-contact silk screening process or other techniques recommended by the retroreflective sheeting manufacturer.

#### **7.7.1.4 Digital Printing**

Digital printing technologies may be used for manufacture of signs.

If using digital printing, use only matched component inks and printer devices recommended by the retroreflective sheeting manufacturer. The ink and any protective coating must be compatible with the background material, both in application and durability.

## **7.7.2 Non-reflective Background and Legend**

### **7.7.2.1 Background Paint**

Where paint is used, it must be applied with a minimum dry film thickness of 38 microns. Touching up of small areas by brush to fully match the spray painted surface is permissible using the colour base and hardener mixture without reducer.

### **7.7.2.2 Background Sheet Material**

Apply the non-reflective sheeting in accordance with the manufacturer's instructions with pressure sensitive adhesive, using a method that securely fix it to the sign to produce a surface that is free of bubbles, wrinkles and blemishes.

### **7.7.2.3 Screening Ink**

Apply the legend by the screen-printing process, using the materials and techniques recommended by the ink manufacturer. The legend must be compatible with the background material, both in application and durability.

### **7.7.2.4 Vinyl Letters**

For non-reflective sign legends, black vinyl letters and numbers may be used.

## **7.7.3 Graffiti Protection Film**

*Graffiti protection films are clear films applied over the retroreflective sign face during sign manufacture and act as a barrier layer between graffiti and the underlying sign face material. The use of such film over a screen printed face allows graffiti to be removed without removing the screened ink as well, allowing reasonable sign reclamation without needing to replace it with a new sign.*

Where signs are specified to have a graffiti protection film overlay on the sign face, the film used must be a matched component film recommended by the retroreflective sheeting manufacturer of the underlying retroreflective material, and must be applied during sign manufacture in the manufacturing facility.

## **7.8 SIGN IDENTIFICATION CODING**

Mark all signs covered by this Specification clearly and permanently with an identification coding.

### **7.8.1 Methods of Identification Coding**

Provide the identification coding on the sign in one of the following ways:

- (a) stamped directly onto the substrate;
- (b) engraved onto a cover plate which is permanently fixed to the substrate;
- (c) on a durable label (approved by the Principal) permanently fixed to the substrate.



The coding must be in characters 6 mm to 10 mm high.

### **7.8.2 Location of Identification Coding**

For rectangular signs, the coding must appear as near as practicable to the rear bottom left hand corner.

For other shaped signs, the coding must be positioned as near to the rear bottom left hand edge as practicable.

The identification coding must be clearly legible on the rear of the finished sign, and must not be obscured by rivets, bolts, extrusions, brackets and posts and must be carried out in such a manner that the front face of the sign is not damaged.

### **7.8.3 Format of Coding**

The identification coding must include the following information:

- (a) Sign manufacturer's name. Where a sign manufacturer has more than one manufacturing facility location, the location of primary manufacture must also be indicated. The abbreviated name coding must be as approved by the Principal.
- (b) Month and year of sign manufacture.
- (c) Manufacturer of sign face materials, and class of retroreflective sheeting used.
- (d) High Wind designation, if applicable.

and provided in a format similar to the example shown below:

<b>XYZ</b>	<b>11 – 14</b>	<b>3M1</b>	<b>HIGH WIND</b>
<i>Abbreviated to signify sign manufacturer</i>	<i>Month of manufacture – Year of manufacture</i>	<i>Abbreviated to signify sign face materials manufacturer and class of retroreflective sheeting</i>	<i>If built to withstand high wind</i>

In addition, Direction, Service and Tourist series signs must have the Drawing Number displayed on a label, of aluminium or non-reflective sheeting, stuck to the back of the sign to the right of the identification coding.

### **7.8.4 Sign Number**

Mark the sign number (as shown on the Design Documentation drawings) on an aluminium extrusion to facilitate sign identification.

## **7.9 INSPECTION OF SIGNS**

On completion of manufacture of signs for the Project Deed and prior to the delivery of signs, submit to the Principal a statement certifying that the signs comply with the requirements of this Specification and the Design Documentation drawings.

For Guide Signs (G1 and G2 series), the Principal will arrange for a TfNSW accredited inspector to carry out an inspection of the signs. For signs other than Guide Signs, the Principal may arrange for them to be inspected at his discretion.

## **HOLD POINT**

Process Held:	Delivery of signs.
Submission Details:	On completion of manufacture of signs for the Project Deed, submit to the Nominated Authority a statement certifying that the signs comply with the requirements of this Specification and the Design Documentation drawings.
Release of Hold Point:	The Nominated Authority will consider the results of the inspection by a TfNSW accredited inspector prior to authorising the release of the Hold Point.

Provide an appropriate covered area for the carrying out of sign inspection. Attach a copy of the sign design in a plastic sleeve at the rear of the sign.

The Project Verifier will inspect all joints and spacing of multi-piece signs to ensure that they have been fabricated to the correct tolerances.

## **8 ASSEMBLY, PACKAGING, HANDLING, TRANSPORT AND STORAGE**

### **8.1 GENERAL**

All signs must be packaged, handled, transported and stored in accordance with the retroreflective sheeting manufacturer's recommendations and requirements.

### **8.2 ASSEMBLY BEFORE DELIVERY**

#### **8.2.1 Two-piece Signs Less Than 2.4 Metres Panel Height**

Two-piece Regulatory, Warning and Guide signs less than 2.4 m in height and 2.0 m in length must be delivered assembled as a single piece for each sign.

Two-piece Direction, Service, Tourist and General Information signs less than 2.4 m in height and 3.0 m in length may be delivered disassembled in more than one piece.

#### **8.2.2 Signs Exceeding 2.4 Metres Panel Height**

Signs exceeding 2.4 m in height must be made and delivered in three or more horizontal sections of up to 1.2 m in height.

Where the horizontal section consists of more than one piece, pre-assemble the separate pieces of the horizontal section into one piece, unless noted otherwise on the Design Documentation drawings.

Where a horizontal section is to be delivered in more than one piece, trial assemble the pieces prior to delivery, with one leg of the aluminium angle joined to the aluminium sheet with rivets and the other leg of the angle drilled, ready for bolting with the corresponding leg of the angle fastened to the adjoining piece.

Number each individual piece and provide a sketch showing how the various pieces fit together to enable correct assembly on site later.

Joining of two or more horizontal sections of a sign must be in accordance with Annexure 3400/G, Drawing No. CW5411 Sheet 2.

Clearly mark each section of the sign on the back of the section with the sign number and section number for storage and erection purposes.

### **8.3 PACKAGING**

#### **8.3.1 Single Sign**

The minimum packaging requirement for signs is a slip sheet (as recommended by the retroreflective sheeting manufacturer) against the sign face and an overlying sheet of protective material covering the entire sign face and securely fastened to the sign at its edges or completely surrounding the sign.

#### **8.3.2 Multiple Signs**

Where there is more than one sign per package, pack the signs in pairs, face to face, with slip sheets between faces. Use an additional layer of protective material to separate signs incorporating Class 1 and Class 1X retroreflective materials.

Where packages contain an odd number of signs, place the final odd numbered sign facing outwards, with the sign face protected as for a single sign. When being transported, large signs must be braced by attaching vertical pieces of wood or other appropriate material such as aluminium extrusion to the back of the sign, extending beyond the sign bottom edges.

#### **8.3.3 Package Cover Information**

The outer face of each package must show information as follows:

- (a) **Signs with standard, non-site specific legends (such as Regulatory or Warning signs):** the standard sign number, quantity of each type of sign in the package, and delivery instructions as given in the Order or advised otherwise, legibly marked.
- (b) **Signs with site specific legends (such as Guide signs or Regulatory signs with special time information):** the reference number of the sign drawing, if shown, or other identification agreed to by the Principal legibly marked; alternatively, a copy of the sign drawing attached securely to it in a clear weatherproof envelope.

Attach a notice to each package, warning of damage that may result from improper storage and handling, and setting out the requirements for storage and handling generally as described in Clause 8.4.

### **8.4 HANDLING, TRANSPORT AND STORAGE**

#### **8.4.1 General**

Handle, transport and store all finished signs in a vertical position standing on their edges wherever possible, to prevent damage to the sign face or other components.

Do not transport any screen-printed signs in a flat position or as a “flat-pack”.

Avoid transporting signs that are packaged in a large bundle in a flat position, as the resulting high pressure on each sign face will result in damage to the retroreflective sheeting, reducing night time sign performance.

For a large multi-piece sign, transport and store all component panels together.

#### **8.4.2 Storage**

Store signs indoors wherever possible.

Signs required to be stored outdoors must have the packaging removed and be stored so as to permit free air circulation and normal moisture evaporation. At all times, prevent moisture from remaining in contact with the face of the sign. Remove packaging that has become wet immediately and allow the signs to dry completely.

Take precautions to ensure that high temperature and/or high humidity conditions do not occur in either indoor or outdoor storage.

## **9 QUALITY RECORDS**

Keep records of all materials used in the sign manufacture and make them available to the Principal upon request. Such materials include the following:

- (a) Aluminium sheets, or any other materials, for the sign substrate;
- (b) Retroreflective sheeting, matched component overlay film, transparent ink, and digital printing inks and devices;
- (c) Non-reflective sheeting, film and ink;
- (d) Background paint and powder coating;
- (e) Aluminium sections (e.g. channels and angles), rivets, VHB backing strips.

Records of each of the above materials must include:

- (i) manufacturer's name;
- (ii) batch number;
- (iii) manufacturer's certificate of conformity with this Specification;
- (iv) material grade;
- (v) date of delivery;
- (vi) date of use;
- (vii) manufacturer's Material Data Sheet or specification.

When requested by the Principal, provide reports of the most recent technical sign audit conducted by the retroreflective sheeting manufacturer for the intended sign manufacturing facility. Where no technical audit report is available, provide records or evidence of the most recent training conducted by the retroreflective sheeting manufacturer to sign manufacturer's staff.

When requested by the Principal, provide evidence of an extended performance warranty from the respective retroreflective sheeting manufacturer for signs manufactured and supplied.

## 10 WARRANTY PERIOD

The sign manufacturer must provide a warranty for the respective periods stated in Table 3400.3. During this warranty period, the sign manufacturer must rectify any defect in materials, workmanship and sign face performance.

**Table 3400.3 – Sign Warranty Period**

<b>Sign Face Material</b>	<b>Sign Warranty Period (No of years, from date of manufacture)</b>	<b>Sign Face Photometric Value <sup>(1)</sup> (% of new value retained)</b>
Class 1X	12	80
Class 1X (White with EC <sup>(2)</sup> overlay film)	12	80
Class 1X digital printed	12	80
Class 1X screen printed	10	80
Class 1X fluorescent reflective Orange	3	80
Class 1X fluorescent reflective Yellow and Yellow Green	10	80
Class 1	12	80
Class 1 (White with EC <sup>(2)</sup> overlay film)	12	80
Class 1 digital printed	12	80
Class 1 screen printed	10	80
Class 2	7	50
Class 2 screen or digital printed or White with EC <sup>(2)</sup> overlay film	7	50
Non-reflective <sup>(3)</sup> (sheeting or coating)	7	Not applicable
VHB joining strip	12	Not applicable

**Notes:**

- <sup>(1)</sup> In accordance with AS 1906.1
- <sup>(2)</sup> EC = electronic cuttable
- <sup>(3)</sup> Includes non-reflective parking signs

Retroreflective materials must retain a photometric performance of at least the percentage shown above throughout the warranty period. Non-reflective material must retain its integrity and effective colour and appearance.

In the event of defects, you must undertake any replacement or repair of signs, including all labour and material involved at the time of replacement, at a pro-rata cost related to the length of service of the sign. The repairs must be guaranteed for the remainder of the warranty period nominated above.

This warranty does not apply to damage by vandalism or vehicle accidents.

Keep the records as detailed in Clause 9 for inspection throughout the warranty period.

**ANNEXURES 3400/A TO 3400/B – (NOT USED)**

**ANNEXURE 3400/C – SCHEDULES OF HOLD POINTS AND IDENTIFIED RECORDS**

Refer to Clause 2.2.

**C1 SCHEDULE OF HOLD POINTS**

<b>Clause</b>	<b>Description</b>
7.1	Commencement of sign manufacture for the Project Deed
7.9	Delivery of signs

**C2 SCHEDULE OF IDENTIFIED RECORDS**

The records listed below are Identified Records for the purposes of TfNSW D&C Q6 Annexure Q/E.

<b>Clause</b>	<b>Description of Identified Record</b>
9	Quality Records listed in Clause 9

**ANNEXURES 3400/D TO 3400/E – (NOT USED)**

**ANNEXURE 3400/F – SIGN BLANK CUTTING CHART**

Height of sign panel (in metres)	7.9	7 to 8 sheets				
	7.4	6 to 7 sheets				
	6.8	5 to 6 sheets				
	5.7	4 to 5 sheets				
	4.6	3 to 4 sheets				
	3.5	2 to 3 sheets				
	2.4	1 to 2 sheets				
	1.2	1 sheet	1 to 2 sheets	2 to 3 sheets	3 to 4 sheets	4 to 5 sheets
0						
	2.40	4.80	7.20	9.60	12.00	
	Width of sign panel (in metres)					

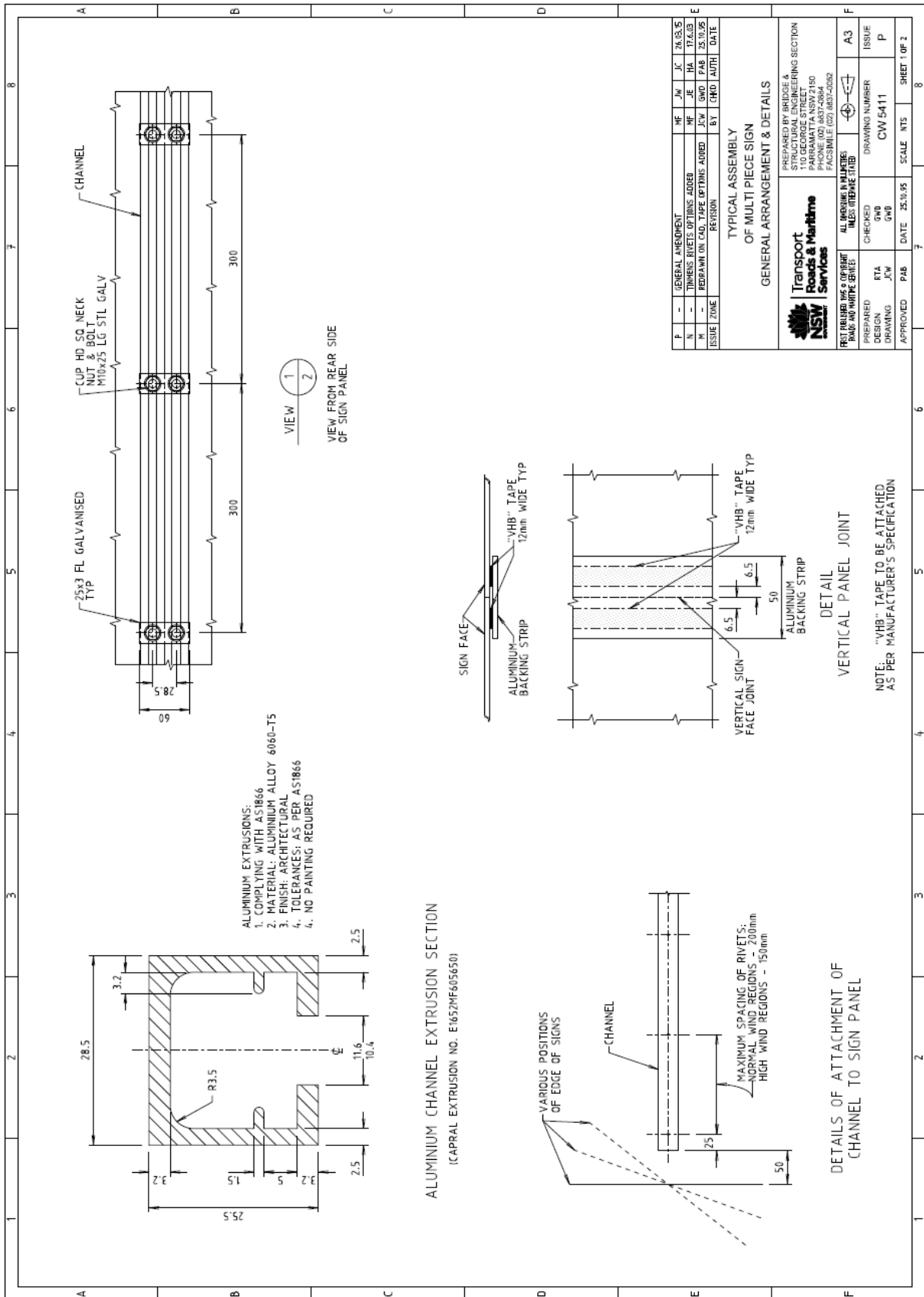
**Notes:**

- (1) Dimensions shown in Cutting Chart are based on TfNSW sign installation and transport requirements.
- (2) Where dimensions of the actual sign panel are intermediate between those shown above, the number of sheets required will be that governed by the greater dimension.
- (3) Height dimension of a sign greater than 2.4 m is permissible, provided that the length dimension does not exceed 2.4 m.
- (4) The height of any single section of a multi-piece sign must not exceed 2.4 m.
- (5) Where a sign is made from more than one sheet, the joints must be located symmetrically (both vertically and horizontally) about the sign centre line.

**Example on use of table:**

A sign 3.2 m in height and 5.6 m in width would be manufactured using a maximum of 9 sheets.

# ANNEXURE 3400/G – DETAILS OF ALUMINIUM EXTRUSION AND ATTACHMENT TO SIGNS



P	GENERAL AMENDMENT		JF	JW	JC	JH	JL	JG	JN
	NO.	DATE							
N	PREPARED BY: [NAME]								
D	DESIGNED BY: [NAME]								
C	CHECKED BY: [NAME]								
B	DRAWN BY: [NAME]								
A	ISSUED BY: [NAME]								

REVISION	BY	DATE
1	JP	25/02/95
2	JP	25/02/95

**TYPICAL ASSEMBLY OF MULTI PIECE SIGN GENERAL ARRANGEMENT & DETAILS**

PREPARED BY BRIDGE & STRUCTURAL ENGINEERING SECTION  
 110 GEORGE STREET  
 SYDNEY NSW 2000  
 PHONE (02) 433-2244  
 FACSIMILE (02) 433-2002

**Transport Roads & Maritime Services**

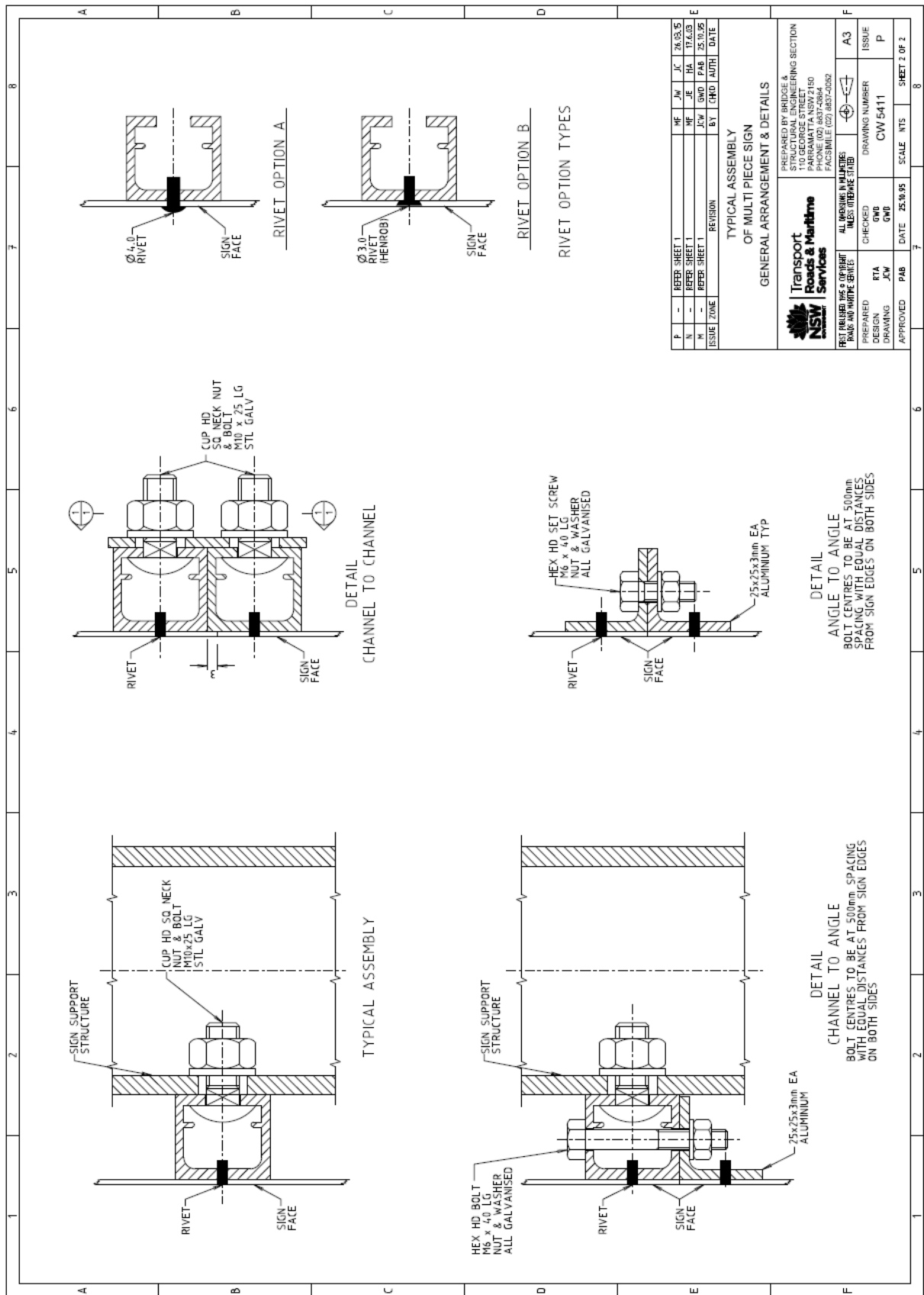
PREPARED BY: [NAME]  
 DESIGN: [NAME]  
 DRAWING: [NAME]  
 APPROVED: [NAME]

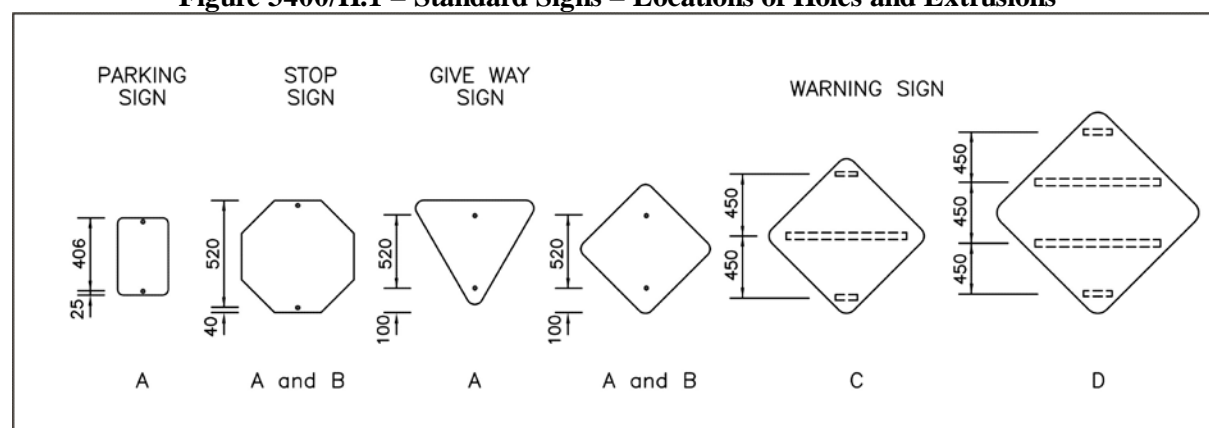
ALL DIMENSIONS IN MILLIMETRES UNLESS OTHERWISE STATED

CHECKED: [NAME]  
 RTA: [NAME]  
 GWB: [NAME]  
 DATE: 25.10.95

DRAWING NUMBER: CW/5411  
 SCALE: NTS  
 SHEET 1 OF 2





**ANNEXURE 3400/H – QUICK GUIDE TO EXTRUSION SPACING****Figure 3400/H.1 – Standard Signs – Locations of Holes and Extrusions****Table 3400/H.1 – Quick Guide to Number and Spacing of Extrusions**

<b>QUICK GUIDE TO NUMBER AND SPACING OF EXTRUSIONS</b>			
<b>Sign Panel Height (mm)</b>	<b>Number of Extrusions Required</b>	<b>Spacing (mm)</b>	<b>Distance from Top &amp; Bottom Edge of Sign</b>
100 – 287	1	Centre line	Equal
288 – 362	2	150	Equal
363 – 437	2	225	Equal
438 – 512	2	300	Equal
513 – 587	2	375	Equal
588 – 862	2	450	Equal
863 – 1037	3	375	Equal
1038 – 1312	3	450	Equal
1313 – 1487	4	375	Equal
1488 – 1512	4	450	Equal
1513 – 1637	5	2 @ 300 3 @ 375	Equal
1638 – 1937	5	375	Equal
1938 – 2262	5	450	Equal
2263 – 2387	7	2 @ 300 5 @ 375	Equal
2388 – 2587	7	375	Equal
2588 – 2687	7	2 @ 300 5 @ 450	Equal
2688 – 2837	7	2 @ 375 5 @ 450	Equal
2838 – 3199	7	450	Equal
3200 – 3499	10	2 @ 225 8 @ 375	Equal
3500 – 3699	10	375	Equal
3700 – 3899	11	2 @ 225 9 @ 375	Equal

QUICK GUIDE TO NUMBER AND SPACING OF EXTRUSIONS			
Sign Panel Height (mm)	Number of Extrusions Required	Spacing (mm)	Distance from Top & Bottom Edge of Sign
3900 – 3999	11	375	Equal
4000 – 4199	12	2 @ 225 10 @ 375	Equal
4200 – 4399	12	375	Equal
4400 – 4599	13	2 @ 225 11 @ 375	Equal
4600 – 4799	13	375	Equal
4800 – 4999	14	2 @ 225 12 @ 375	Equal
5000 – 5199	14	375	Equal
5200 – 5399	15	2 @ 225 13 @ 375	Equal
5400 – 5499	15	375	Equal
5500 – 5799	16	2 @ 225 14 @ 375	Equal
5800 – 5999	16	375	Equal
6000 – 6099	17	2 @ 225 15 @ 375	Equal
6100 – 6399	17	375	Equal
6400 – 6499	18	2 @ 225 16 @ 375	Equal
6500 – 6599	18	375	Equal
6600 – 6899	19	2 @ 225 17 @ 375	Equal
6900 – 6999	19	375	Equal
7000 – 7199	20	2 @ 225 18 @ 375	Equal
7200 – 7399	20	375	Equal
7400 – 7599	21	2 @ 225 19 @ 375	Equal
7600 – 7799	21	375	Equal
7800 – 7999	22	2 @ 300 20 @ 375	Equal
8000 – 8199	22	375	Equal
8200 – 8399	23	2 @ 300 21 @ 375	Equal
8400 – 8599	23	375	Equal
8600 – 8799	24	2 @ 300 22 @ 375	Equal
8800 – 8999	24	375	Equal
9000 – 9199	25	2 @ 300 23 @ 375	Equal
9200 – 9399	25	375	Equal
9400 – 9599	26	2 @ 300 24 @ 375	Equal
9600 – 9799	27	2 @ 225 25 @ 375	Equal
9800 – 9999	27	2 @ 300 25 @ 375	Equal

**Note:** Sign extrusion centres for signs 6900 mm and larger may differ from previous versions of this chart. If replacing old signs on existing structures, refer to appropriate Structure drawings for correct extrusion centre dimensions.

## ANNEXURE 3400/J – SCHEDULE OF HOLE LOCATIONS AND EXTRUSION SPACING FOR REGULATORY, WARNING AND GUIDE SIGNS

**Note:** Where aluminium extrusion is used, the extrusion must be attached parallel to the horizontal axis and spaced equally about the horizontal centre line at the distances nominated, unless stated otherwise.

### J1 REGULATORY SIGNS - “R” SERIES

Sign Code Number	Holes (2 off, 11 mm square)		Aluminium Extrusion	
	Distance from Bottom of Sign	Hole Centres	Number of Extrusions	Extrusion Spacing
R1-1A	40	520	-	-
B	40	520	-	-
C	-	-	2	450
R1-2A	100	520	-	-
B	100	520	-	-
C	-	-	*3	375
	*Centre line of top extrusion to be 150 mm down from top edge			
R1-3A	100	520	-	-
B	100	520	-	-
R1-201A	100	520	-	-
B	100	520	-	-
R2-2A	40	520	-	-
B	40	520	-	-
R2-3A	40	520	-	-
B	40	520	-	-
R2-4A	40	520	-	-
B	40	520	-	-
C	-	-	3	450
R2-5A	40	520	-	-
B	40	520	-	-
R2-6A	40	520	-	-
B	40	2 @ 520	-	-
R2-7A	40	520	-	-
B	40	520	-	-
R2-8A	40	520	-	-
B	40	520	-	-
R2-9A	40	520	-	-
B	40	520	-	-
R2-10A	40	520	-	-
R2-11A	40	520	-	-
B	40	520	-	-
R2-16	-	-	2	450
R3-1A	40	520	-	-
B	115	520	-	-
C	190	520	-	-
R3-202A	25	230	-	-

**Manufacture and Delivery of Road Signs****D&C 3400**

Sign Code Number	Holes (2 off, 11 mm square)		Aluminium Extrusion	
	Distance from Bottom of Sign	Hole Centres	Number of Extrusions	Extrusion Spacing
R4-1A	40	520	-	-
B	40	520	-	-
C	-	-	3	450
D	-	-	4	450
R4-3B	60	230	-	-
C	-	-	2	375
R4-201B	60	230	-	-
C	-	-	2	375
R4-205B	40	520	-	-
C	-	-	4	450
R4-211	30	130	-	-
R4-212B	60	230	-	-
C	-	-	2	375
R4-240	-	-	2	300
R4-241	-	-	2	300
R5-1A	22	406	-	-
R5-2A	22	406	-	-
R5-3A	22	406	-	-
R5-5A	-	-	3	450
R5-51A	-	-	3	375
R5-207A	-	-	3	450
R5-650A	40	520	-	-
B	-	-	3	450
R6-1A	-	-	3	375
B	-	-	4	450
R6-2A	-	-	3	375
B	-	-	4	450
R6-3A	40	520	-	-
B	-	-	4	375
R6-4A	40	520	-	-
B	-	-	4	375
R6-5A				
B				
R6-6A	40	520	-	-
B	-	-	3	450
R6-202A	40	520	-	-
R6-200-1A	40	520	-	-
B	-	-	3	450
R6-254A	-	-	2	375
R7-7A	40	520	-	-

**J2 REGULATORY SIGNS - “W” SERIES**

Sign Code Number	Holes (2 off, 11 mm square)		Aluminium Extrusion	
	Distance from Bottom of Sign	Hole Centres	Number of Extrusions	Extrusion Spacing
W1-1A	100	520	-	-
B	100	520	-	-
C	-	-	3	450
D	-	-	4	450
W1-2A	100	520	-	-
B	100	520	-	-
C	-	-	3	450
D	-	-	4	450
W1-3A	100	520	-	-
B	100	520	-	-
C	-	-	3	450
D	-	-	4	450
W1-4A	100	520	-	-
B	100	520	-	-
C	-	-	3	450
D	-	-	4	450
W1-5A	100	520	-	-
B	100	520	-	-
C	-	-	3	450
D	-	-	4	450
W1-7A	100	520	-	-
B	100	520	-	-
C	-	-	3	450
D	-	-	4	450
W2-1A	100	520	-	-
B	100	520	3	450
C	-	-	3	450
D	-	-	4	450
W2-3A	100	520	-	-
B	100	520	-	-
C	-	-	3	450
D	-	-	4	450
W2-4A	100	520	-	-
B	100	520	-	-
C	-	-	3	450
D	-	-	4	450
W2-7A	100	520	-	-
B	100	520	-	-
C	-	-	3	450
D	-	-	4	450
W2-8A	100	520	-	-
B	100	520	-	-
C	-	-	3	450
W2-9A	100	520	-	-
B	100	520	-	-
C	-	-	3	450

**Manufacture and Delivery of Road Signs****D&C 3400**

Sign Code Number	Holes (2 off, 11 mm square)		Aluminium Extrusion	
	Distance from Bottom of Sign	Hole Centres	Number of Extrusions	Extrusion Spacing
W3-1A	100	520	-	-
B	100	520	-	-
C	-	-	3	450
D	-	-	4	450
W3-2A	100	520	-	-
B	100	520	-	-
C	-	-	3	450
D	-	-	4	450
W3-3A	100	520	-	-
B	100	520	-	-
C	-	-	3	450
D	-	-	4	450
W3-4A	100	520	-	-
B	100	520	-	-
C	-	-	3	450
W4-1A	100	520	-	-
B	100	520	-	-
C	-	-	3	450
D	-	-	4	450
W4-3A	100	520	-	-
B	100	520	-	-
C	-	-	3	450
D	-	-	4	450
W4-4A	100	520	-	-
B	100	520	-	-
C	-	-	3	450
D	-	-	4	450
W4-5A	100	520	-	-
B	100	520	-	-
C	-	-	3	450
D	-	-	4	450
W4-6A	100	520	-	-
B	100	520	-	-
C	-	-	3	450
D	-	-	4	450
W4-8B	100	520	-	-
C	-	-	3	450
D	-	-	4	450
W4-9B	100	520	-	-
C	-	-	3	450
D	-	-	4	450
W4-10B	100	520	-	-
C	-	-	3	450
D	-	-	3	450
W4-11A	100	520	-	-
B	100	520	-	-
C	-	-	3	450
D	-	-	4	450
W5-1A	100	520	-	-

Sign Code Number	Holes (2 off, 11 mm square)		Aluminium Extrusion	
	Distance from Bottom of Sign	Hole Centres	Number of Extrusions	Extrusion Spacing
B	100	520	-	-
C	-	-	3	450
W5-2A	100	520	-	-
B	100	520	-	-
C	-	-	3	450
W5-6A	100	520	-	-
B	100	520	-	-
C	-	-	3	450
W5-7-1A	100	520	-	-
B	100	520	-	-
C	-	-	3	450
W5-8A	100	520	-	-
B	100	520	-	-
C	-	-	3	450
W5-9A	100	520	-	-
B	100	520	-	-
C	-	-	3	450
W5-10A	100	520	-	-
B	100	520	-	-
C	-	-	3	450
W5-11A	100	520	-	-
B	100	520	-	-
C	-	-	3	450
D	-	-	4	450
W5-12A	100	520	-	-
B	100	520	-	-
C	-	-	3	450
D	-	-	4	450
W5-13A	100	520	-	-
B	100	520	-	-
C	-	-	3	450
D	-	-	4	450
W5-14A	100	520	-	-
B	100	520	-	-
C	-	-	3	450
W5-16A	100	520	-	-
B	100	520	-	-
C	-	-	3	450
W5-18A	100	520	-	-
B	100	520	-	-
C	-	-	3	450
D	-	-	4	450
W5-19A	100	520	-	-
B	100	520	-	-
C	-	-	3	450
D	-	-	4	450
W5-20A	100	520	-	-
B	100	520	-	-
C	-	-	3	450



**Manufacture and Delivery of Road Signs****D&C 3400**

Sign Code Number	Holes (2 off, 11 mm square)		Aluminium Extrusion	
	Distance from Bottom of Sign	Hole Centres	Number of Extrusions	Extrusion Spacing
W5-22A	100	520	-	-
B	100	520	-	-
C	-	-	3	450
D	-	-	4	450
W5-25A	100	520	-	-
B	100	520	-	-
C	-	-	3	450
D	-	-	4	450
W5-29A	100	520	-	-
B	100	520	-	-
C	-	-	3	450
W5-30A	100	520	-	-
B	100	520	-	-
C	-	-	3	450
W5-31C	-	-	3	450
D	-	-	4	450
W5-34A	100	520	-	-
B	100	520	-	-
C	-	-	3	450
D	-	-	4	450
W5-38A	100	520	-	-
B	100	520	-	-
C	-	-	3	450
W5-47A	100	520	-	-
B	100	520	-	-
C	-	-	3	450
W5-48A	100	520	-	-
B	100	520	-	-
C	-	-	-	450
W5-204B	100	520	-3	-
C	-	-	3	450
D	-	-	4	450
W5-205B	100	520	-	-
C	-	-	3	450
D	-	-	4	450
W5-206B	100	520	-	-
C	-	-	3	450
D	-	-	4	450
W5-207B	100	520	-	-
C	-	-	3	450
D	-	-	4	450
W5-213B	100	520	-	-
C	-	-	3	450
W5-214A	100	520	-	-
B	-	-	3	450
C	-	-	4	450
W5-230A	100	520	-	-
B	100	520	-	-
C	-	-	3	450

Sign Code Number	Holes (2 off, 11 mm square)		Aluminium Extrusion	
	Distance from Bottom of Sign	Hole Centres	Number of Extrusions	Extrusion Spacing
D	-	-	4	450
W6-1B	100	520	-	-
C	-	-	3	450
D	-	-	4	450
W6-2B	100	520	-	-
C	-	-	3	450
D	-	-	4	450
W6-3A	100	520	-	-
B	100	520	-	-
C	-	-	3	450
W6-6A	100	520	-	-
B	100	520	-	-
W7-4A	100	520	-	-
B	100	520	-	-
C	-	-	3	450
D	-	-	4	450
W8-2A	40	370	-	300
B	-	-	2	300
C	-	-	2	450
D	-	-	3	375
W8-3A	50	300	-	-
B	-	-	2	300
C	-	-	2	450
W8-5A	35	130	-	-
B	-	-	1	C/L *
C	-	-	2	150
W8-7A	50	300	-	-
B	-	-	2	300
C	-	-	2	450
W8-8A	50	300	-	-
B	-	-	2	300
C	-	-	2	450
W8-9A	50	300	-	-
B	-	-	2	300
C	-	-	2	450
W8-13A	50	300	-	-
B	-	-	2	300
C	-	-	2	450
W8-14A	-	-	1	C/L *
B	-	-	2	150
C	-	-	2	150
W8-17B	-	-	2	300
W8-24A	50	300	-	-
B	-	-	2	300
C	-	-	2	450
W8-201B	-	-	2	450
C	-	-	2	450
D	-	-	3	375
W8-202B	-	-	2	375

**Manufacture and Delivery of Road Signs****D&C 3400**

Sign Code Number	Holes (2 off, 11 mm square)		Aluminium Extrusion	
	Distance from Bottom of Sign	Hole Centres	Number of Extrusions	Extrusion Spacing
C	-	-	2	450
D	-	-	2	450
W8-204B	-	-	2	300
C	-	-	2	450
W8-205B	-	-	2	375
C	-	-	2	450
W8-206B	-	-	2	300
C	-	-	2	450
D	-	-	2	450
W8-207B	-	-	2	375
C	-	-	2	450
D	-	-	2	450
W8-208C	-	-	2	150
W8-241-1B	-	-	2	375
C	-	-	2	450
D	-	-	3	375

\* C/L: centre line

**J3 REGULATORY SIGNS – “G” SERIES**

Sign Code Number	Holes (2 off, 11 mm square)		Aluminium Extrusion	
	Distance from Bottom of Sign	Hole Centres	Number of Extrusions	Extrusion Spacing
G6-202	-	-	4	375
G6-205	60	130	-	-
G6-206	35	130	-	-
G6-213	-	-	2	300
G6-214	-	-	2	300
G6-215	-	-	2	300
G6-216	50	300	-	-
G6-217	50	300	-	-
G6-218	-	-	2	375
G6-220	50	300	-	-
G6-223	40	520	-	-
G7-1	-	-	2	450
G7-2	-	-	2	450
G7-3	-	-	2	225
G7-218	-	-	2	450
G7-219	-	-	2	450
G7-220	-	-	3	375
G7-221	-	-	2	450
G7-222	-	-	2	450
G7-223	-	-	2	450
G7-226/1	-	-	2	225
2	-	-	2	225
G9-1	-	-	2	450
G9-2	-	-	2	450
G9-3	-	-	3	375
G9-4	-	-	3	375
G9-5/1	-	-	2	150
2	-	-	2	150
G9-9A	-	-	2	450
B	-	-	3	375
G9-10	-	-	3	375
G9-11	-	-	3	450
G9-12	-	-	3	450
G9-15A	40	520	-	-
B	-	-	3	450
C	-	-	3 } 2 }	375 300
G9-16A	40	520	-	-
B	-	-	3	450
C	-	-	3 } 2 }	375 300
G9-17	-	-	2	225
G9-18	-	-	2	450
G9-19	-	-	2	150
G9-20	-	-	2	375
G9-21-1	-	-	2	450

**Manufacture and Delivery of Road Signs****D&C 3400**

Sign Code Number	Holes (2 off, 11 mm square)		Aluminium Extrusion	
	Distance from Bottom of Sign	Hole Centres	Number of Extrusions	Extrusion Spacing
G9-22A	-	-	1	Vertical on centre line
B	-	-	1	
C	-	-	1	
D	-	-	1	
G9-24-1A	-	-	2	450
B	-	-	5	375
G9-25A	-	-	2	450
B	-	-	5	375
G9-26	-	-	3	450
G9-27A	-	-	2	450
B	-	-	3	450
G9-28A	-	-	2	450
B	-	-	3	450
G9-29	-	-	2	300
G9-32	-	-	2	300
G9-33	-	-	2	300
G9-35	-	-	3	450
G9-36-1A	-	-	2	450
B	-	-	3	450
G9-37	-	-	3	450
G9-38	-	-	3	450
G9-79B	60	130	-	-
C	-	-	2	150
G9-204	-	-	3	375
G9-205	22	406	-	-
G9-206	22	406	-	-
G9-207	40	3 @ 520	-	-
G9-214	-	-	2	450
G9-219	-	-	2	225
G9-220A	-	-	2	450
B	-	-	3	375
G9-221	-	-	2	450
G9-222	-	-	4	450
G9-223	-	-	4	450
G9-229	-	-	3	375
G9-230	-	-	2	150
G9-237	-	-	3	375
G9-238	-	-	4	450
G9-239	-	-	4	450
G9-242	-	-	2	450
G10-3A	40	300	-	-

## ANNEXURE 3400/K – SIGN FACE MATERIALS FOR LEGENDS AND BACKGROUNDS

Sign Type	Sign Face Material <sup>(1)</sup>	
	Legend	Background
<b>1. Guide signs (including Advance direction, Intersection direction, Reassurance direction, Service and Freeway guide signs)</b>		
Left side mounted	Class 1 sheet or black non-reflective	Class 1 sheet
Overhead, cantilever and right side mounted	Class 1X sheet or black non-reflective	Class 1X sheet
<b>2. Warning signs</b>		
Standard Warning signs other than those stated below	Class 1 sheet or black non-reflective	Class 1 sheet
Standard Warning signs W6-1, W6-2, W6-3, W6-4, W6-9, W8-13, W8-14, W8-18, W8-19, W8-20, W8-22, W8-24 and W8-25	Class 1X sheet or black non-reflective	Class 1X fluorescent yellow green reflective sheet
<b>3. Regulatory signs</b>		
Standard Regulatory signs other than those stated below	Class 1 sheet or black non-reflective	Class 1 sheet or screen print
Standard Regulatory signs R1-1, R1-2, R1-3, R2-3A(L), R2-4	Class 1X sheet or black non-reflective	Class 1X sheet
Standard Regulatory sign R3-1	Class 1X sheet or black non-reflective	Class 1X fluorescent yellow green reflective sheet
Reflective Parking signs	Class 2 sheet or black non-reflective	Class 2 sheet or screen print
Non-reflective Parking signs	Non-reflective sheeting or coating	Non-reflective sheeting or coating
<b>4. Temporary signs for road works</b>		
Standard Temporary signs	Class 1 sheet or Class 1X or black non-reflective	Class 1 sheet or Class 1X fluorescent yellow reflective sheet
Special Temporary signs for night work T1-200-3, T1-223, T1-224, T1-225	Class 1 sheet	Black
<b>5. Hazard Markers</b>		
Chevron alignment marker D4-6, Marker (slash) G9-257	Black non-reflective	Class 1 yellow reflective sheet or Class 1X fluorescent yellow green reflective sheet by special approval
Others	Black non-reflective	Class 1 sheet

**Note:**

<sup>(1)</sup> All sheeting material other than those stated as “non-reflective” must be retroreflective.

## **ANNEXURE 3400/L – (NOT USED)**

## **ANNEXURE 3400/M – REFERENCED DOCUMENTS**

Refer to Clause 2.4.

### **TfNSW Specification**

TfNSW D&C Q6      Quality Management System (Type 6)

### **TfNSW Traffic Technical Directions**

TDT 2013/08      Approved Retro-reflective Sheeting Materials for Road Signs

### **Australian Standards**

AS 1365              Tolerances for flat-rolled steel products

AS 1397              Continuous hot-dip metallic coated steel sheet and strip – Coatings of zinc and zinc alloyed with aluminium and magnesium

AS/NZS 1580        Paints and related materials – Methods of test

AS 1627              Metal finishing – Preparation and pretreatment of surfaces

    AS 1627.1            Part 1: Removal of oil, grease and related contaminants

    AS 1627.2            Part 2: Power tool cleaning

    AS 1627.4            Part 4: Abrasive blast cleaning

AS/NZS 1734        Aluminium and aluminium alloys - Flat sheet, coiled sheet and plate

AS 1742.1 to 13    Manual of uniform traffic control devices (*multiple parts*)

AS 1743              Road signs - Specifications

AS 1744              Forms of letters and numerals for road signs

AS/NZS 1866        Aluminium and aluminium alloys - Extruded rod, bar, solid and hollow shapes

AS/NZS 1906.1     Retroreflective materials and devices for road traffic control purposes – Retroreflective sheeting

AS 2700S            Colour standards for general purposes

AS/NZS ISO 9001    Quality management systems – Requirements

### **British/European Standards**

BS 5252              Framework for colour coordination for building purposes

EN 573-3            Aluminium and Aluminium Alloys – Chemical Composition and Form of Wrought Products – Part 3: Chemical Composition and Form of Products

EN 515                Aluminium And Aluminium Alloys – Wrought Products – Temper Designations