

SECTION 7

DRAWING PRACTICE

7 DRAWING PRACTICE

7.1 *LINWORK*

Generally, all linework on drawings shall be in accordance with Table 3.1 in AS 1100 Part 101 and Figure 7.1 (Table of Line Types) in this Manual.

7.2 *TEXT*

In accordance with Table 4.1 of AS 1100 Part 101 and given that final drawings are to be produced in A1 size, the text on all drawings shall be in upper case with the size and application being in accordance with the following:

3.5mm HIGH - General text, dimensions and General Notes

5mm HIGH - Titles of sections, views etc and title block information as shown in Figures 7.3.1 and 7.3.2

7mm HIGH - Element titles as appropriate, bridge name and registration number of plans or sketch numbers in title blocks as shown in Figures 7.3.1 and 7.3.2

For drawings prepared by the Authority, the font type used for general text shall be International ISO. The font type used in title blocks shall be Arial.

For drawings prepared by consultants for the Authority, or drawings for bridges that will become property of the Authority, the font type used for general text shall be similar to International ISO. For example, ISO 3098B Upright would be an acceptable font type.

The use of a symbol within a text string to denote the word "and" (&) on any drawing is unacceptable and shall not be used under any circumstances.

7.3 *DIMENSIONS*

7.3.1 *General*

Each dimension necessary for the complete definition of a particular element shall be clearly shown on the drawing and shall be shown once only. The dimensioning of any element shall be such that no dimension relating to that element shall need to be deduced from other dimensions nor that the drawing must be scaled to determine the dimension.

In all cases, dimensions shown on drawings shall be in millimetres and they shall be shown in accordance with AS 1100 Part 101 ie the use of a space between the third and fourth digit in a four digit number is optional however the space is mandatory in a five digit number.

The method of showing dimensions shall be in accordance with AS 1100 Part 101.

Dimensions shall be placed on drawings using the 'aligned' method with each dimension being placed parallel to it's dimension line in order that it may be read from either the bottom or the right hand side of the drawing.

A chain of dimensions shall be covered by an overall dimension except where dimensional tolerances are of critical importance.

Where several dimensions are to be given to a common datum surface, either the "aligned" method or the "point" method may be used.

Dimensions and notes shown with leaders shall be inscribed using the "unidirectional" method.

Where it is necessary to indicate that a particular dimension on a drawing is not shown to the same scale as the view or detail in which it appears, the dimension shall be underlined with a full thick line. This method of representing details drawn out of scale shall not be applied to entire details that are shown 'NOT TO SCALE'.

Radii shall, in the majority of cases, be dimensioned by the use of a dimension line which passes through or is in line with the centre of the arc and terminates at the lead end with a single arrowhead, however radii of arcs which need not have their centres located shall be dimensioned using one of the methods shown in AS 1100 Part 101.

Dimensions for radii shall be preceded by the conventional abbreviation 'R'.

7.3.2 *Order of accuracy for dimensions*

The following order of accuracy shall be used on all drawings:

Concrete dimensions	1mm
Reinforcing bar spacing	5mm
Steel plate widths	1mm
Steel plate lengths	1mm (as necessary for cambered plates etc)
Steel sections	0.1mm (or as shown in manufacturer's catalogues)

7.3.3 *Reduced levels and chainages*

Reduced levels and Chainages shall be shown in metres on all drawings with the following order of accuracy being used:

Design Surface Levels	0.001 metres
Contract Levels	0.100 metres
Existing surface levels	0.1 metres
Contours	1.0 or 0.5 metres (dependant upon slope of existing surface)
Chainages	0.001 metres
Flood and water levels	0.1 metres

7.4 *DIMENSION LINES, PROJECTION LINES AND NOTE LEADERS*

Dimension lines shall not be interrupted for the insertion of dimensions and shall terminate in easily readable arrowheads or a fully shaded small circle as appropriate. Dimension lines shall not be shown as centrelines or as part of an elements outline.

Projection lines for dimensions shall extend from a point not less than 2mm (at normal scale) from the surface of the object to a point not less than 2mm beyond the dimension line. Projection lines shall, in the majority of cases, be unbroken.

Leaders for notes shall commence from either the beginning or the end of note and shall terminate in either an arrowhead or a small fully shaded circle as appropriate. Leaders for notes that terminate in an arrowhead shall terminate either on the outline of the element or the outer edge of a fully shaded or hatched detail.

The use of long leaders shall be avoided and leaders should in the majority of cases not be drawn parallel to dimension and/or projection lines.

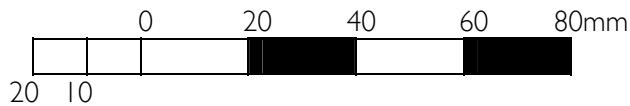
7.5 SCALES ON DRAWINGS

Scales used on drawings will vary in accordance with the size and character of the feature being detailed or the degree of detailing required.

All drawings should be drawn to a defined natural scale with the scale being selected so that the drawing may be easily read when reduced to half of it's original size.

Distorted scales should not be used except where special circumstances require distortion for clarity of presentation e.g Deck Setting Out drawings

Scales shall be shown on all drawings, they shall be represented in accordance with AS 1101 Part 101. Scales shall be shown in the following manner:



The following scales are recommended for use:

DETAIL DRAWINGS

1:1, 1:2, 1:2.5, 1:5, 1:7.5, 1:12.5 and their decimal multiples.

GENERAL ARRANGEMENT DRAWINGS

1:1, 1:2, 1:2.5, 1:3*, 1:4*, 1:5, 1:7.5* and 1:12.5* and their decimal multiples

(* indicates scales may be used for the Plan and Elevation on General Arrangement drawings **only** if required however their use should be kept to an absolute minimum)

LOCALITY PLANS

1:1 000 000, 1:500 000, 1:250 000, 1:100 000, 1:50 000, and 1:25 000.

SITE PLANS

1:500, 1:1000, 1:2000 and 1:2500.

Drawings shall not contain two scales which are similar,

eg a scale of 1:2 shall not be used on the same drawing as a scale of 1:2.5

7.6 PLAN VIEWS

Plan views shall be drawn as a horizontal view taken immediately above the element under consideration.

Hidden details shall be shown using broken lines in accordance with Figure 7.1 (Table of Line Types) in this Manual.

7.7 ELEVATIONS

Elevations shall be drawn as a view seen from a vertical plane immediately in front of the element under consideration and shall be projected from that elements 'PLAN' view.

Hidden details shall be shown using broken lines in accordance with Figure 7.1 (Table of Line Types) in this Manual.

7.8 SECTIONS

Sections shall be drawn as a view from a cutting plane located through an element previously drawn as an Elevation, Plan, Section or View.

Generally, only the details at the cutting plane of the section should be shown, however, details beyond the cutting plane may be included (represented by diotted lines) provided that the included details are not confusing to the main details being shown.

Sections, where possible, shall be drawn adjacent to the plan or elevation to which they relate. Where section details cannot be shown on the sheet of origin, they shall be cross referenced in accordance with Appendix A of AS 1100 Part 301.

If a series of cutting planes are used to define section details, any change in direction of the cutting plane shall be shown by 0.7mm thick lines.

The circular symbol used to indicate where the section is taken shall be in accordance with Section 2 of AS 1101 Part 501.

The designation of Sections shall be numerical.

Where a series of sheets is necessary to adequately detail an element, eg Abutments Concrete – Sheet A, Abutments Concrete – Sheet B etc, the same section number shall not be used more that once in the sheet series.

7.9 VIEWS

Views shall be drawn representing what is seen from outside an element previously drawn as an Elevation, Plan or Section.

Hidden details shall be shown using broken lines in accordance with Figure 7.1 (Table of Line Types) in this Manual.

The circular symbol used to indicate where the view is taken shall be in accordance with that used for sections as shown in Section 2 of AS 1101 Part 501.

The designation of Views shall be numerical with View numbers not replicating any Section number already used.

Where a series of sheets is necessary to adequately detail an element, eg Abutments Concrete – Sheet A, Abutments Concrete – Sheet B etc, the same view number shall not be used more that once in the sheet series.

7.10 DETAILS

Where the scale used to draw elements on drawings is too small to adequately show minute details, the item requiring enlargement shall be enclosed in a circle, or other suitable shape and a detail mark shall be placed in a convenient location.

The hexagonal symbol used to designate the detail shall be in accordance with that used for details as shown in Section 2 of AS 1101 Part 501.


The designation of Details shall be alphabetical.

Where a series of sheets is necessary to adequately detail an element, eg Abutments Concrete – Sheet A, Abutments Concrete – Sheet B etc, the same detail letter shall not be used more than once in the sheet series.

TABLE OF LINE TYPES

TYPE OF LINE	EXAMPLE OF LINE	APPLICATION
CONTINUOUS	0.25mm THICK <hr style="border: 0.25px solid black;"/> WHITE IN COLOUR	DIMENSION LINES NOTE LEADERS
	0.35mm THICK <hr style="border: 0.35px solid black;"/> RED IN COLOUR	CONCRETE OUTLINES (SCALES BELOW 1:20) STEELWORK IN SECTION (SCALES BELOW 1:10)
	0.5mm THICK <hr style="border: 0.5px solid black;"/> GREEN IN COLOUR	CONCRETE OUTLINES (SCALES ABOVE 1:20) REINFORCEMENT AND LIMIT LINES (SCALES BELOW 1:20) STEELWORK IN SECTION (SCALES ABOVE 1:20)
	0.7mm THICK <hr style="border: 0.7px solid black;"/> BLUE IN COLOUR	REINFORCEMENT AND LIMIT LINES (SCALES ABOVE 1:20)
DASHED - LONG	0.25mm THICK <hr style="border: 0.25px dashed black;"/> WHITE IN COLOUR	CONSTRUCTION JOINTS (SCALES BELOW 1:20)
	0.5mm THICK <hr style="border: 0.5px dashed black;"/> GREEN IN COLOUR	CONSTRUCTION JOINTS (SCALES ABOVE 1:20)
DASHED - SHORT	0.35mm THICK <hr style="border: 0.35px dashed black;"/> RED IN COLOUR	HIDDEN DETAILS
CHAIN - THIN	0.25mm THICK <hr style="border: 0.25px dashed black;"/> WHITE IN COLOUR	CENTRELINES
CONTINUOUS ZIG ZAG	0.25mm THICK <hr style="border: 0.25px solid black;"/> WHITE IN COLOUR	BREAK LINES
CHAIN - THIN DOUBLE DASHED	0.35mm THICK <hr style="border: 0.35px dashed black;"/> RED IN COLOUR	EXISTING WORK
CONTINUOUS WAVY	0.25mm THICK <hr style="border: 0.25px solid black;"/> WHITE IN COLOUR	DENOTATION OF AMENDMENTS INCLUDING W-A-E


FIGURE 7.1

ISSUE	DATE	REVISION	PREP	CHECK	AUTH
ROADS AND TRAFFIC AUTHORITY OF NSW					
HIGHWAY No 2			SHIRE OF YASS		
BRIDGE OVER YASS RIVER					
AT 4.6KM SOUTH OF YASS					
PIERS - CONCRETE					
		PREPARED BY BRIDGE ENGINEERING 110 GEORGE STREET PARRAMATTA NSW 2150 PHONE (02) 8837-0802 FACSIMILE (02) 8837-0055		CLIENT XXX XXX XXX PHONE (02) FACSIMILE (02)	
PREPARED DESIGN _____ DRAWING _____ _____ <small>SENIOR BRIDGE ENGINEER</small>		CHECKED _____ _____		REGISTRATION No OF PLANS 0002 246 BC 1002 RTA BRIDGE NUMBER 5946 ISSUE STATUS: FOR CONSTRUCTION SHEET No 5 ISSUE A	

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FIGURE 7.3.1

ISSUE	DATE	REVISION	PREP	CHECK	AUTH
ROADS AND TRAFFIC AUTHORITY OF NSW					
HIGHWAY No 2			SHIRE OF YASS		
BRIDGE OVER YASS RIVER					
AT 12.6KM WEST OF YASS					
TRAFFIC BARRIER UPGRADE					
GENERAL ARRANGEMENT					
		PREPARED BY BRIDGE ENGINEERING 110 GEORGE STREET PARRAMATTA NSW 2150 PHONE (02) 8837-0802 FACSIMILE (02) 8837-0055		CLIENT XXX XXX XXX PHONE (02) FACSIMILE (02)	
PREPARED DESIGN _____ DRAWING _____ _____ <small>SENIOR BRIDGE ENGINEER</small>		CHECKED _____ _____		REGISTRATION No OF PLANS 0002 246 BC 1256 RTA BRIDGE NUMBER 5961 ISSUE STATUS: FOR CONSTRUCTION SHEET No 1 ISSUE A	

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FIGURE 7.3.2