



CWP-GL12 – Drawing Standards & Approvals

Introduction

Purpose

The purpose of this guideline is to detail the requirements for preparation and approval of all Computer Aided Design (CAD) drawings for Department of Transport (DoT), Maritime projects.

DoT may undertake its own CAD work or may commission it via third party consultants or contractors. Regardless of how CAD work is procured, this guideline shall be followed to ensure consistency and a clear understanding of the process.

Compliance

All drawings produced by third parties for Maritime projects will be reviewed for compliance against this Drawing Standards & Approvals guideline. The third party however shall not rely on such review and shall ensure the following requirements are met to ensure compliance prior to submission at each applicable design stage.

Precedence

Project requirements specified in a contract Scope shall take precedence over this guideline, however where a discrepancy exists, advice must first be sought from the nominated DoT Project Manager.

Drafting

Drafting Standards

All drawings shall be prepared in accordance with AS1100, Technical Drawing by a competent draftsman. All drawings must be clear, not congested, presented in a logical sequence and contain all required dimensions and set-out details.

CAD Application

DoT primarily utilises AutoCAD for design and drawing production and requests that commissioned third parties also prepare design drawings in this format.

Alternative drafting applications will be subject to approval, however, must be compatible with AutoCAD version 2007 or later.

Drawing Sheets and Title Blocks

All drawings shall be created and presented utilising the relevant DoT AutoCAD drawing template (title block).

Two standard title blocks are available depending on the contractual arrangement for delivery of the design.

Design Only

Where design is completed in advance of a works contract the 'Design Only' title block shall be used and will be provided upon request.

Design and Construct

Where the design is completed under a design and construct contract model, the 'Design & Construct' title block shall be used and will be provided upon request.

The templates include the following approved styles which shall be applied to all drawings:

- Linetypes
- Text styles
- Dimension styles
- Plot styles (.ctb file)
- North Point

The title block shall be accurately filled in with all the relevant data as described herein. The format of the title block shall not be changed.

Drawing Titles

The first two lines on the title block are set by DoT and will remain the same for all drawings within the contract. The third line shall be the title of the drawing. e.g. General Layout. A fourth line can be added if required.

Drawing titles are generally as follows:

Line 1 – Geographical Location (constant on all drawings)

Line 2 – Project Description (constant on all drawings)

Line 3 – Drawing Title (varies on each drawing)

Line 4 (if required) – Drawing Title (varies on each drawing)

Drawing Numbers

Drawing numbers consist of up to four variables. These are as follows:

- Plan Book Number (provided by DoT, e.g. 1755)
- Drawing Number (used to group various project elements together. e.g. Breakwaters, Service Wharf, Typical Sections, Earthworks.)
- Sheet Number (e.g. 01, 02, 03 etc.)
- Drawing revision (e.g. A, B, C, 0, 1, 2 etc.)

A range of drawing numbers will be issued to the commissioned third party upon request.

It is recommended to group the various project elements together in different drawing numbers with multiple sheets.

e.g.	1755-04-01	Breakwater Cross Sections	Sheet 1 of 2
	1755-04-02	Breakwater Cross Sections	Sheet 2 of 2
	1755-05-01	Wharf Construction Details	Sheet 1 of 2
	1755-05-02	Wharf Construction Details	Sheet 2 of 2

File Naming

When saving AutoCAD and PDF drawings electronically, the drawing file shall be named as per the drawing number.

e.g. Drawing Number 1620-01-01 Rev A = 1620-01-01_A.dwg

Note: use of hyphens, underscores, leading 0's and no spaces.

Datums

All drawings shall be prepared to the following horizontal datum (unless otherwise agreed upon with the DoT project manager);

**Map Grid of Australia 2020 (MGA2020), (correct zone)
based on the Geocentric Datum of Australia 2020 (GDA2020)**

All drawings shall be prepared to an agreed vertical datum.

Typically, and where maritime elements are designed, Chart Datum (CD) is used as the vertical datum. However, for projects involving only land-based elements (e.g. civil works) Australian Height Datum (AHD) may be appropriate subject to DoT approval.

The vertical datum adopted shall be consistent for all design drawings associated with a project to avoid confusion.

An appropriate vertical datum and the relationship to AHD shall be shown clearly on each drawing.

Drawing Presentation

Model Space, Paper Space and Scale

Drawings shall be in model space and the title block in paper space (A1 paper size) both prepared at full scale (1 unit = 1m or 1 unit = 1mm). Drawings shall be scaled and rotated by viewport to best fit the drawing sheet. If drawings are required in A3 they shall be plotted at half scale (Do not scale the drawing sheet).

Scales used shall enable sufficient detail to be read from the drawings without overlapping lines and detail.

Line Weights and Plot Style

All line work shall be drawn in the colour according to pen weights below.

Colour	Line Weight (mm)
1 - Red	0.18
2 - Yellow	0.35
3 - Green	0.35
4 - Cyan	0.70
5 - Blue	0.50
6 - Magenta	0.50
7 - White	0.25
253 - Grey	0.09

Plot using the DoT A1 Std.ctb file provided in the drawing template.

If the commissioned third party requires the use of colour in their drawing, they should use colours other than those in the table above.

The use of colour in drawings may be used to distinguish between various services or where hatching and line types may become confusing. If colour is utilised in the drawing, a block shall be inserted on the drawing to indicate that the drawing has been produced in colour and should be reproduced (printed) in colour to not lose any detail.

Text Styles

All text shall be drawn in the colour according to pen weights. Text shall be font isocp, preferred minimum height of 3mm and no less than 2.5mm. See table below.

Colour	Text Height (mm)
253 - Grey or 7 - White	2.5
253 - Grey or 7 - White	3.0
2 - Yellow or 3 - Green	3.5
5 – Blue or 6 - Magenta	5.0
4 - Cyan	7.0

External References

External References (Xref) shall be prepared in the same datum as the main drawing and inserted in model space with no scaling or rotation.

Xref files shall be named with the location prefix, plan book number, an abbreviated description of the file and date or option number. If an Xref is modified it shall be renamed to the current date or next option number

e.g. WP_1755_Serv-YYYY-MM-DD
WP_1755_ConceptPlan_opt1a

Layering Protocol

All entities shall be in their correct layer. Colour and linetype shall be ByLayer. Layer names shall be logical, and clearly define the data within the layer. The use of prefixes when naming layers is recommended to group elements together.

e.g. Serv-P-water = Proposed Water Services
Serv-X-water = Existing Water Services

- A – Architectural detail
- B – Boats or marine related
- C – Civil detail
- E – Electrical
- F – Fire

- G – General
- M – Mechanical
- S – Structural
- W – Water

Drawing Book Contents

Subject to the specific requirements of the contract Scope, a set of drawings shall be produced, suitable for construction. Each project has different requirements depending on the method of delivery, exact scope of works etc.

Each set of drawings shall be preceded by a cover page consisting of:

- Department of Transport title and logo
- Project Title
- Works contract description
- Drawing Index
- Locality Plan
- Site Plan
- Tide Levels (Chart Datum) (if applicable)

In some instances, for example where there are many drawings and the drawing index is large, a separate cover page may be required. In this instance, the logo, title and works component will go on the cover page and the locality plan and drawing index will go on the second page.

Submission of Drawings

Drafts

Drawings submitted during design development, may¹ be accompanied by a Drawing Transmittal clearly summarising the documents contained, the date of transfer and their current revisions. Where the commissioned third party does not have a transmittal template, DoT can provide one on request.

Drawings shall be submitted as PDF copies for review, with .dwg versions only submitted if requested.

Final

Any drawings submitted from IFC onwards, shall be accompanied by a Drawing Transmittal clearly summarising the documents contained, the date of transfer and their current revisions. Where the commissioned third party does not have a transmittal template, DoT can provide one on request.

All electronic drawings shall be submitted as follows:

- Both AutoCAD (.dwg) and PDF copies to be provided.
- One (1) drawing per .dwg file (i.e. no multiple tabs)
- AutoCAD (.dwg) eTransmitted in a zip file including all external references.
- A1 PDFs plotted from AutoCAD at 1:1 scale using DoT's colour table (.ctb file).

¹ For Design & Construct contracts, all drawing submissions shall be accompanied by a transmittal.

All wet-signed hard copy drawings shall be:

- Printed at 1:1 scale A1 size.
- Wet signed where appropriate.
- Ordered sequentially and rolled, not folded.

Drawing Reviews

Drawings shall be thoroughly reviewed by various parties at different stages of design. DoT will generally compile its review comments on the drawings into a design Document Review Report for ease of tracking and closing out each comment.

Drawings will also be reviewed for conformance to this drafting guideline prior to approval.

Reviews typically occur at 15%, 85% and 100% design stage.

As stipulated in the Construction Preliminaries specification, construction of elements depicted in drawings shall not commence until IFC drawings have been approved (wet signed) by all parties. Final approval will be contingent on closing out comments in the design Document Review Report.

Initial Drawing Approvals

Drawing approvals will vary depending on whether the project is conceptual (in-house) design, Design Only, or a Design & Construct project.


All 'Issued for Construction' (IFC) drawings shall be printed at A1 and receive wet signatures from all parties indicated on the title block templates.

The electronic copies of the IFCs shall then be updated to include the typed names (using signature style font) of those signatories and issued as IFC drawings to the Client.

Design Only

The standard title block for a 'Design Only' drawing contains areas for both the designer's approval and DoT (client) approval.

- Designer Approval:

DESIGNER:		DoT:	Department of Transport		
	DESIGNED	PROJECT MANAGER	TITLE 1 - GEOGRAPHIC LOCATION		
	DRAWN	PROJECT DIRECTOR	TITLE 2 - PROJECT DESCRIPTION		
	APPROVED	DIRECTOR OF PROJECT DELIVERY	TITLE 3 - DRAWING TITLE		
			DRAWING NUMBER	XXXX - XX - XX	REV ?

Logo: The designer shall insert their company logo in the space provided. If the name of the designer's company is not included within the logo or the company does not have a logo, then the name of the designer's company (i.e. XYZ Pty. Ltd) shall be included below or in place of a logo.

Designed: The full (first and last) name of the person responsible for the design of the elements shown on that drawing shall be typed on this line above the word 'Designed'. Initials are not acceptable. Wet signature is not required. Where pre-designed elements are presented on the drawings (i.e. proprietary or off-the-shelf products from a supplier) and

the original design individual is unknown then the company name responsible for its design can be inserted here.

Drawn: The full (first and last) name of the draftsman that prepared the drawing shall be typed on this line above the word 'Drawn'. Initials are not acceptable. Wet signature is not required.


Approved: The full (first and last) name of the person approving the drawing on behalf of the designer shall be typed on this line leaving room for the wet signature and date. Initials are not acceptable. Should discrepancies be picked up by this approver prior to sign off, they can include marked up comments on the drawings which shall be incorporated in any future revisions.

The designer's approver is generally the Certifying Engineer and is a Principal on behalf of the company responsible for the design. When the designer's approver wet signs (and dates) the drawing, they are certifying that the design:

- Has been prepared by suitably qualified personnel in accordance with the design requirements of the project;
- Conforms with the relevant design and drafting standards;
- Has been checked for accuracy of content;
- Incorporates amendments based on DoT review comments where considered reasonable (as justified in the design Document Review Report); and
- Conforms with accepted good practice.

In some instances, the designer's approver may require a CPEng or as otherwise stated in the contract Scope.

- DoT Approval:



DESIGNER:		DoT:	Department of Transport		
	DESIGNED	PROJECT MANAGER	TITLE 1 - GEOGRAPHIC LOCATION		
	DRAWN	PROJECT DIRECTOR	TITLE 2 - PROJECT DESCRIPTION		
	APPROVED	DIRECTOR OF PROJECT DELIVERY	TITLE 3 - DRAWING TITLE		
			DRAWING NUMBER	XXXX - XX - XX	REV ?

Project Manager: The full (first and last) name of the DoT Project Manager shall be printed on this line. Initials are not acceptable. Wet signature and date are required. While it is preferable for all accepted Project Manager comments to be reflected in the IFC drawing presented for signing, the DoT Project Manager may make further marked up amendments prior to wet signing. In signing, the Project Manager is endorsing the design is in accordance with the required standards and contract Scope, is satisfied that review comments have been addressed and closed out for the Project Director's approval.

Project Director: The full (first and last) name of the DoT Project Director shall be printed on this line. Initials are not acceptable. Wet signature and date are required. While it is preferable for all accepted Project Director comments to be reflected in the IFC drawing presented for signing, the DoT Project Director may make further marked up amendments prior to wet signing. In signing, the Project Director is endorsing the design for the Director Project Delivery's approval.


Director Project Delivery: The full (first and last) name of the DoT Director Project Delivery shall be printed on this line. Initials are not acceptable. Wet signature and date are required. While it is preferable for any accepted Director Project Delivery comments to be reflected in the IFC drawing presented for signing, the Director Project Delivery may make further marked up amendments prior to wet signing. In signing, the Director Project Delivery is approving the design for construction.

An example showing the correct use of the title block for a 'Design Only' drawing can be seen below:

DESIGNER:		DoT:		Department of Transport		
 DESIGN CONSULTANT	JOHN CONNOR DESIGNED	<i>J. F. Field</i> 11/2/21 PROJECT MANAGER JUSTIN FIFIELD	TITLE 1 - GEOGRAPHIC LOCATION			
	KYLE REESE DRAWN	<i>O. Lope</i> 11/2/21 PROJECT DIRECTOR OLAYA LOPE	TITLE 2 - PROJECT DESCRIPTION			
	MILES DYSON <i>M. Dyson</i> APPROVED 10/2/21	<i>Cameron Smith</i> 11/2/21 DIRECTOR OF PROJECT DELIVERY	TITLE 3 - DRAWING TITLE			
		DRAWING NUMBER		XXXX - XX - XX	REV ?	

Design & Construct

The standard title block for a 'Design & Construct' (D&C) drawing contains areas for the Contractor's 'Designer', the Contractor and DoT (the Client) as illustrated below.

DESIGNER:		CONTRACTOR:		DoT:		Department of Transport		
	DESIGNED			PROJECT MANAGER	TITLE 1 - GEOGRAPHIC LOCATION			
	DRAWN			PROJECT DIRECTOR	TITLE 2 - PROJECT DESCRIPTION			
	APPROVED		CONTRACTOR'S REPRESENTATIVE	DIRECTOR OF PROJECT DELIVERY	TITLE 3 - DRAWING TITLE			
				DRAWING NUMBER		XXXX - XX - XX	REV ?	

The approval process for D&C drawings is much the same as the Design Only process above. The key difference being that as the Contractor is ultimately responsible to DoT for the design under their D&C contract, the Contractor also signs the drawings. A separate signature box has been provided for the Contractor's approval.

The following process applies:

Following review and acceptance of the 100% drawings (including closing out of all design review comments in the design Document Review Report), the drawings are ready for sign off which proceeds from left to right.

The Designer enters their information in the left-hand 'Designer' block including logo, designed (by), drawn (by), and approved (by) as per the Design Only process above. Following the wet signature (and date) from the designer's approver, the drawings are then passed onto the D&C Contractor.

The Contractor then enters their information into the 'Contractor' box including appropriate role title(s). These role titles can be modified to suit. As a minimum, a wet signature is required from the Contractor's Representative appointed under that D&C contract.

Lastly, DoT then wet signs the drawings as per the Design Only process.

The wet signing of IFC drawings should occur as soon as possible following close out of 100% review comments with the designer(s) **and prior to** construction commencing.

Note:

1. Where multiple design consultants are utilised on a project, their designs should be represented on separate drawings to other consultants wherever possible to maintain transparency of design responsibilities and approvals.
2. Where the Contractor and the designer are the same entity then the Contractor's logo and final approval may appear twice (i.e. in the Designer box and the Contractor box).

Drawing Revisions

When drawings are updated by the designer, a new drawing shall be issued to the client.

Amendments on drawings that occur during the design development phase (prior to IFC) shall be "Alpha" characters starting with revision "A" and increasing until the drawings are Issued for Construction and signed off at Rev 0.

Following drawing approval (Issued for Construction – Rev 0), all ensuing revisions will be numeric characters starting at 1 and increasing accordingly. All alpha character revisions shall be removed from the drawing, amendment and title blocks for the Rev 0 issue.

When updating a drawing, the updated parts of the drawing shall be clouded (where practicable) and the revisions table in the bottom left of the drawing updated to include a brief description of the update and the revision number. The revision number shall also be updated in the bottom right of the title block and in the electronic file name.

When subsequent revisions are made to a drawing, the clouds from the previous revision are removed, and new clouds are inserted for the most recent changes (where practicable). Again, the revisions description and revision number are updated.

For each drawing revision following IFC, the consultant is to print the drawing at A1 and wet sign in the amendments box. Both hard copy A1 wet signed drawings and electronic versions (both .dwg and .pdf) shall be submitted to DoT such that at the conclusion of works, and prior to as constructed drawings, a full set of up to date (latest revision) electronic and wet signed IFC drawings has been provided to DoT.

As-Constructed Drawings

Upon completion of construction for a project (or gradually as works progress) and generally within 4 weeks following Practical Completion (subject to specific contractual requirements), the Contractor is required to update all drawings to reflect any changes from the original design implemented during the construction phase. This is detailed further in the Construction Preliminaries Specification.

Each drawing in the drawing set shall be amended to reflect the as constructed changes in red and a description added to the amendments box succinctly describing the changes to the drawing.

Each drawing in the drawing set, even if unchanged shall also have an "As Constructed" drawing block inserted within the drawing area, to reflect that it is now an as constructed drawing. The amendment to an unchanged drawing should read "No Change" in the description box. The drawing revision number shall also be updated.

A full set of A1 drawings shall then be printed off, signed and dated by the Contractor to certify that the drawings accurately reflect the as-built status of the works.

The Contractor shall not amend the title block other than to update the revisions box and drawing number.

For new drawings that are required to present additional as-constructed information, such as significant variations for new works, or as-constructed survey data, the Contractor may be required to prepare new drawings in addition to the commissioned third-party design drawings. In this case, the standard title block template can be used and the Contractor logo and sign off inserted (as if they were the design consultant). DoT will also provide drawing numbers if required.

All as-constructed drawings should be received as wet signed A1 hard copies as well as .dwg and .pdf format for archiving.

Supply of Existing Drawings and Aerial Photography

Upon request, DoT may approve the use and supply of its existing drawings and aerial photography. The supplied data may only be used for the specified works and not passed on or sold to others. Not all historical or reference drawings supplied will comply with these guidelines. It shall be the commissioned third party's responsibility to convert these drawings as necessary. DoT cannot guarantee the accuracy or reliability of any data supplied.

Document Control

Title	CWP-GL-12 - Drawing Standards & Approvals
Document Owner	Director Project Delivery
Last Updated	10 February 2021
Status	Rev0