

MWPA TECHNICAL GUIDELINE

MWPA200 – Drafting Guidelines & AutoCAD Standards

Standards



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1 PREFACE

This document has been compiled to provide technical guidance with the requirements governing drawings produced for the MWPA. It is intended to provide a benchmark to ensure that all drawings produced by or for the MWPA are developed and controlled in a consistent manner and subject to formal proposal and change management processes, revision control, drawing registration and drawing maintenance.

The MWPA contracts out a large portion of its design and drafting to external Consultants/Contractors who provide those services using a variety of CAD systems. To achieve uniformity, so that the MWPA's drawing storage system can more readily catalogue, retrieve and plot all drawings produced, it has been necessary to implement a set of MWPA guidelines to govern the production of CAD drawings.

The demands of port users for CAD drawings, quality assurance procedures and innovative approaches have necessitated the development of these standard criteria for Consultant/Contractor selection. This document will be used as a basis for identifying any shortcomings in technical information and ultimately accepting or rejecting drawings.

2 SCOPE

This guideline defines the conditions and requirements governing drawings produced for the MWPA. It shall be read in conjunction with the MWPA CAD Data Pack as outlined in section 5.1.

2.1 CONDITIONS OF COMPLIANCE

All Consultants/Contractors are required to meet the specifications outlined in this document as part of their conditions of engagement.

Subject matter shall be produced using a 3D CAD model to give the required isometric or orthogonal views on the drawings. Exceptions to the use of the 3D models are drawings produced for PFDs, P&IDs, electrical drawings and fabricator's detail drawings. Some map and architectural applications may also be exempt.

CAD drawings shall not be amended manually.

Where required, upon written request, MWPA will provide Consultants/Contractors with copies of existing drawings. These drawings and all the information thereon shall remain the property of the MWPA and shall be returned on demand. They are issued on the condition that, except with written permission, they must not be reproduced, copied or communicated to any other party, nor used for any other purpose than that stated on the particular order, enquiry or contract with which they are issued.

The MWPA provides Consultants/Contractors with copies of MWPA files for reference only and accepts no liability for their accuracy for purposes of designing or construction. All Consultants/Contractors are required to carry out the normal standard of site investigations as required by their profession and in accordance with their conditions of contract.

The Consultant/Contractor shall provide the MWPA with 'As Constructed' CAD drawings, **no later than six weeks after practical completion** unless otherwise agreed with the MWPA Project Coordinator.

2.2 EXCLUSIONS

The requirements under this guideline may not necessarily apply to the production and supply of CAD drawings for individual port users. The Consultant/Contractor should refer to the particular agency with which the enquiry was made to identify their requirements for the production of CAD drawings.

The requirements under this guideline may not necessarily apply to the production and supply of survey data and maps. Reference should be made to MWPA Technical Guideline – MWPA201 Survey (currently under development) for specific requirements.

3 GLOSSARY

For the purposes of this Guideline the following particular definitions apply.

Term	Definition
MWPA Draftsperson	The body (person or organisation) appointed by the MWPA to act in the role as determined by the contract.
MWPA Project Coordinator	The body (person or organisation) appointed by the MWPA to act in the role as determined by the contract.
Consultant/Contractor	The body (person or organisation) that has been elected to carry out the work, including the Consultant/Contractor's permitted assigns, successors, legal representatives and sub-contractors.
Site	The lands, buildings, assets and other places owned, occupied or leased by the MWPA or used by the MWPA for its operations or activities.
Port Users	Client Agencies who facilitate trade or operations, or lease or own infrastructure associated with or located within MWPA Sites.

For the purposes of this Guideline the following particular abbreviations apply.

Abbreviation	Meaning
MWPA	Mid West Ports Authority
AS	Australian Standards
CAD	Computer Aided Drafting
3D	Three Dimensional
XRef	External Reference
UCS	User Coordinate System
WCS	World Coordinate System
RL	Reduced Level
AHD	Australian Height Datum
LAT	Lowest Astronomical Tide
SLD	Single Line Diagram
P&ID	Piping & Instrumentation Diagram
PFD	Process Flow Diagram
GA	General Arrangement
IFA	Issued for Approval
IFT	Issued for Tender
IFC	Issued for Construction
DWG	Drawing [format]
PDF	Portable Data [format]

4 STANDARDS AND GUIDELINES

All drawings shall be in accordance with the latest issue, including amendments, of the relevant Australian Standards and MWPA Guidelines including but not limited to:

Standards and Guidelines	
Standards	
AS ISO 1000	The international system of units (SI) and its application.
AS1100.101	Technical drawing – General principles
AS1100.201	Technical drawing – Mechanical drawing
AS1100.301	Technical drawing – Architectural drawing
AS1100.401	Technical drawing – Engineering survey and engineering survey design drawing
AS1100.501	Technical drawing – Civil/Structural technical drawings
AS1101	Graphic symbols for general engineering
AS1102	Graphical symbols for electro-technical documentation
AS1654	ISO system of limits and fits - Bases of tolerances, deviations and fits
AS4383	Preparation of documents used in electro-technology
Guidelines	
MWPA100	MWPA Technical Guideline – General Guidelines
MWPA201	MWPA Technical Guideline – Surveying Guidelines (currently under development)

5 GENERAL DRAWING PRACTICE

5.1 MWPA CAD DATA PACK

The MWPA CAD Data Pack has been created using the principles set out in this document and is reviewed and revised periodically to reflect preferred best practice measures based on users' practical feedback. The most current, relevant version should be confirmed prior to undertaking new drafting works for the MWPA.

The MWPA CAD Data Pack will be supplied to Consultants/Contractors upon initial introduction or on request.

5.2 STANDARD SHEET SIZES

Standard sheets shall conform to AS 1100. The following sizes shall be used for drawings produced for the MWPA:

- A0 (1189mm x 841mm) Non-preferred - survey drawings & maps
- A1 (841mm x 594mm) Preferred use for all drawings & maps (including fabricator's GAs)

Consultant/Contractors borders shall not be used without prior written approval from the MWPA Draftsperson. All GA drawings, marking plans and layouts shall be produced using the MWPA A1 border. For Fabricator's Detail Drawings, the Consultant/Contractor may make an application to use their preferred nominated border.

5.2.1 BASE DRAWING SHEET

The base drawing sheet has been created as the starting point for drawing development with the drawing aspects outlined in this document having been predefined in this base drawing sheet.

The limits of the base drawing in paper space have been set to the extents of the A1 page size (from bottom left corner point 0, 0).

The predefined MWPA_Page Setup shall be used to plot all A1 drawings. The drawing will be plotted at true (1:1) scale to PDF and uses the MWPA_MONO plot style as outlined in section 11.1.

The Consultant/Contractor may use other page set ups providing that a true scale plot is still the product of the Page Set up.

5.2.2 A1 BORDER

The MWPA A1 Border provides the structure for the drawing size and title block information. It may either be inserted into the drawing as a block in PAPERSPACE on layer ANN-MWPA_BORDER or externally referenced into the drawing into PAPERSPACE. The insertion point for the border shall be the bottom left hand corner of the border at (0,0). The A1 border shall be used in conjunction with the A1 Title Block Attributes block.

5.2.3 A1 TITLE BLOCK ATTRIBUTES

The A1 Title Block Attributes block shall be inserted into the base drawing in PAPERSPACE on layer ANN-MWPA_BORDER. The insertion point for the attributes block shall be the bottom left hand

corner of the border at (0,0) so as to align with the MWPA A1 Border. It provides the necessary relevant title block information as attribute editable fields. All fields shall be completed by the Contractor/Consultant in accordance with section 8 of this document.

5.2.4 DRAWING ISSUING INFORMATION STAMPS

Drawing issuing Information stamps are supplied as part of the MWPA CAD Data Pack in order to better control the drawing issuing processes. The following Drawing Issuing information Stamps are supplied in the MWPA CAD Data Pack for Consultant/Contractor use. Additional stamps may be used only with prior written approval from the MWPA Draftsperson.

'Preliminary' Stamp: To be used on preliminary drawings only where the information is unchecked. The title block revision description shall reflect the stamp and read 'PRELIMINARY AND UNCHECKED'. This stamp shall only be used in conjunction with drawings that are in alphabetical revision sequence. The stamp shall be inserted on layer ANN-MWPA_STAMP PRE.

'Drawing in Progress' Stamp: To be used where drawings are not at full issue and further drafting works is required. The title block revision description should reflect this with the revision number, drafter and approver remaining blank until the drawing is ready for its first alphabetical or numerical issue. Additional description information may be included such as 'ISSUED FOR 50% REVIEW'. The revision number (in the stamp only) shall be shown as **A** suffixed by the next sequential 'in progress' revision number i.e.: **A1, A2...** until the drawing is ready for its first alphabetical or numerical issue. The date of the 'in progress' issue shall be noted in the stamp only. All fields within the stamp are editable attributes. The stamp shall be inserted on layer ANN-MWPA_STAMP DIP.

'Uncontrolled Copy' Stamp: To be used where the intention is for the drawing to be issued as hard copy only or the drawing has been issued outside of the specific project scope for which it was created. The title block revision description is not required to be modified to reflect the stamp. This stamp shall be inserted on layer ANN-MWPA_STAMP UC.

'For Information Only Not for Construction' Stamp: To be used where the drawing is at an IFA or equivalent stage. This stamp shall only be used in conjunction with drawings that are in alphabetical revision sequence. Once the drawing has reached an IFC revision (i.e.: rev 0 onwards) the stamp may be removed from the drawing. The title block revision description is not required to be modified to reflect the stamp. This block shall be inserted on layer ANN-MWPA_STAMP NFC

The preferred location of stamps is the lower right hand corner of the drawing, as outlined in Appendix A, but may be moved so as not to compromise on drawing content.

5.3 DRAWING UNITS

The system of drawing units is predefined in the base drawing sheet and shall meet the following criteria.

All drawings shall be drawn at a scale of one drawing unit = one millimetre.

The unit of length type shall be set to Decimal with the precision set to 4 decimal places (i.e.: 0.0000). The unit of angle type shall be set to Decimal Degrees with the precision set to 2 decimal

places (i.e.: 0.00) and positive angles calculated in a counter-clockwise direction. The Drawing Direction shall be set with the base angle at East 0.00 degrees.

Particular units may apply for the production of survey drawings. For system of units used in survey drawings refer to MWPA Technical Guideline – MWPA201 Surveying Guidelines (currently under development).

5.4 TEXT STYLES

For all drawings, the MWPA text style **MWPA-ISOCP** shall be used. The text width shall be set to 0.9000, the tracking (spacing) set to 1.0000 and the oblique angle set to 0.0000. This text style is predefined in the base drawing sheet.

Text heights shall be limited to 1.8, 2.5, 3.5, 5.0 and 7.0 high and shall be inserted on the corresponding layer.

All text used in the CAD files shall be SHX type fonts as supplied by the standard installation of AutoCAD. True type fonts will not be accepted. Text substitutions shall not be accepted.

5.5 DIMENSION STYLES

For all drawings, the MWPA dimension style **MWPA-DIMENSION** shall be used. This dimension style is predefined in the base drawing sheet and shall meet the following criteria.

For all dimensions; dimension lines and extension lines shall have the colour, line type and line weight set to ByLayer. Extension lines shall extend beyond the dimension line 2.0000. The offset from the origin shall be 2.0000. All dimensions shall be associative with the associative dimensions command variable 'DIMASSOC' set to value: 2.

The scale and scale factor for dimensions shall be set to one and the precision set to zero decimal places (i.e.: 0). For angle dimensions the units format shall be set as Decimal Degrees and the precision of angle dimensions set to zero decimal places (i.e: 0) unless otherwise required by the discipline of the subject matter.

For dimensions that are required be broken for clarity, the dimension break size shall be 3.7500. Wherever possible, this shall be done using the 'DIMBREAK' command. Exploding of dimensions should be avoided.

Not to scale dimensions shall be underlined with a full thickness line in accordance with AS 1100. It is preferred that all drawings are produced to scale.

For all disciplines other than architectural, dimension end symbols shall be closed fill arrowheads, size 3.0000. Where there isn't enough room to place both text and arrows inside extension lines, the best fit method shall apply. Where dimensions are too close to be clearly visible and arrowheads overlap, the internal, overlapping arrow heads may be replaced with 'dot small'. Circles, dashes or heavy dots shall otherwise not be used unless authorised by the MWPA Draftsperson. For architectural dimensions the end symbols shall be architectural ticks, size 3.0000.

For all dimensions, the text style shall be MWPA_ISOCP and shall comply with Section 5.4. Text shall be displayed as yellow on the screen and fill colour shall be set as None. Text height shall be 3.5000. Text placement for vertical dimensions shall be above the dimension line and text placement for horizontal dimensions shall be central to the dimension line. The View Direction shall be Left-to-Right. Text shall be offset from the dimension line 1.5000 and aligned with the dimension line.

5.6 LEADER STYLES

For all leaders, the MWPA multi leader style **MWPA-LEADER** shall be used. This leader style is predefined in the base drawing sheet and shall meet the following criteria.

Leader arrowhead symbols shall be closed fill arrowheads, size 3.0000. The lead length/landing distance shall be at least 3.0000mm with a preferred lead length of 3.000mm.

Text for all leaders shall be MWPA-ISOCP and shall comply with section 5.4. Text shall be displayed as yellow on the screen and fill colour shall be set as None. Text height shall be 3.5000. Text shall be justified left with a landing gap of 1.5000. The leader connection shall be horizontal to the middle of the top line and the leader extended to the text where the bottom row of text is greater than the top.

5.7 HATCH PATTERNS

Hatch patterns shall be selected from the standard AutoCAD library and shall clearly represent the subject that is being section planed. Hatching entities shall be associative and shall not occupy multiple views. Additional hatch patterns shall not be used unless approved by the MWPA Draftsperson nor shall they be inserted or amended manually.

5.8 SCALE

Only approved scales shall be used on drawings except those not to scale such as PFDs, P&IDs, SLDs, schematics and sketches. Approved scales are:

1:1,	1:2,	1:2.5,	1:5,	1:10,	1:20,
1:25,	1:50,	1:75,	1:100,	1:200,	1:250,
1:500,	1:1000,	1:2000,	1:2500,	1:4000,	1:5000

Non-preferred scales may be used only with prior approval from the MWPA Draftsperson.

The number of different scales used, particularly on any one drawing, shall be kept to a minimum. Civil, electrical and mechanical GA drawings should be drawn at the same scale.

The drawing scale shall be stated in the field provided in the title block. If more than one scale is used, then the relevant scale shall be stated below respective sub-titles or view titles and 'AS SHOWN' inserted in the field referred to above.

In addition, all GA drawings may display scale bars (either A1 or A1 & A3), applicable to the scale and nature of revision of the drawing. Scale bars are supplied as part of the MWPA CAD Data Pack.

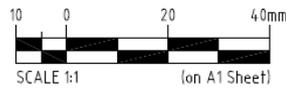


Figure 1: Sample scale bar (A1 sheet)

5.9 REVISIONS AND HOLD MARKERS

Each revision in the drawing space shall be highlighted by a revision cloud. The cloud arc is to be of neat form and arcs shall be of consistent size wherever possible. The revision number is to be indicated with a revision triangle which will directly relate to the revisions block in the title block. The triangle must be within the clouded area. The nature of the revision must be noted in the revisions block, the next revision number inserted in the title block and the drawing resubmitted for approval. All previous revision clouds shall be removed.

The revision marker is supplied as part of the MWPA CAD Data Pack and shall be inserted on layer ANN-DIM.



Figure 2: Revision Marker (shown at revision B)

Each hold in the drawing space shall be highlighted by a hold cloud which will be a reverse revision cloud. The cloud arc is to be of neat form and arcs shall be of consistent size wherever possible. All holds shall be referenced to a legend, located near an appropriate edge of the border identifying the hold point/s and the reason for the hold. Multiple holds may be assigned to a drawing as applicable.

The hold marker is supplied as part of the MWPA CAD Data Pack and shall be inserted on layer ANN-DIM.



Figure 3: Hold Marker (shown at hold point 01)

6 LAYERING PROTOCOL

Predetermined base layers form part the MWPA Base Drawing Sheet and are categorised by discipline. These layers set the preferred line weights, line types, colour display and plot status to be used when producing drawings of the respective disciplines and should be used, wherever practicable, in the first instance. Additional layers may be created and shall meet the criteria outlined in section 6.11.

Idle layers shall be purged from drawings by the Consultant/Contractor, prior to submission of DWG files to the MWPA.

6.1 ANNOTATIVE LAYERS

Layers used for annotative drawing elements are predefined in the MWPA base drawing sheet and are listed below. Annotative drawing elements shall be inserted on one of the following layers:

Drawing Layers	Screen Colour	Plotting Pen No.	Line Thickness	Line Type	Description
0	White	7	0.25	Continuous	AutoCAD default layer. Block/Symbol Insertion
ANN-DIM	Grey	8	0.18	Continuous	Dimensions and leaders
ANN-GRID	Light Blue	161	0.25	CENTER2	Grid lines
ANN-MV	Magenta	6	0.25	Continuous	Viewports. <i>Set to non-plottable for entire drawing</i>
ANN-MWPA_BORDER	Cyan	4	0.70	Continuous	Drawing border and title block
ANN-MWPA_STAMP DIP	Red	12	0.25	Continuous	Stamp – Drafting in progress
ANN-MWPA_STAMP NFC	Red	12	0.25	Continuous	Stamp Information Only not for Construction
ANN-MWPA_STAMP PRE	Red	12	0.25	Continuous	Stamp – preliminary and unchecked
ANN-MWPA_STAMP UC	Red	12	0.25	Continuous	Stamp - Uncontrolled Copy
ANN-TX18	Grey	8	0.18	Continuous	Text 18mm high on A1 sheet
ANN-TX25	White	7	0.25	Continuous	Text 25mm high on A1 sheet
ANN-TX35	Yellow	2	0.35	Continuous	Text 35mm high on A1 sheet. Preferred for all notations unless impracticable
ANN-TX50	Red	1	0.50	Continuous	Text 50mm high on A1 sheet
ANN-TX70	Blue	5	0.70	Continuous	Text 70mm high on A1 sheet

6.2 ARCHITECTURAL LAYERS

Layers used to create architectural drawing models and views shall be named in accordance with section 6.11. All layers created shall be prefixed with ARC- and catalogued in the ARCHITECTURAL filter folder using the layer manager.

The following layers have been predefined for the production of architectural drawing models and views.

Drawing Layers	Screen Colour	Plotting Pen No.	Line Thickness	Line Type	Description
ARC-CL25	White	7	0.25	CENTER2	Architectural centre lines
ARC-DOOR	White	7	0.25	Continuous	Doors and Windows
ARC-DR18	Grey	8	0.18	Continuous	Architectural detail line work 0.18 line thickness.
ARC-DR25	White	7	0.25	Continuous	Architectural detail line work 0.25
ARC-DR35	Yellow	2	0.35	Continuous	Architectural general line work 0.35 line thickness
ARC-DR50	Red	1	0.50	Continuous	Architectural detail line work 0.5 line thickness
ARC-DR70	Blue	5	0.70	Continuous	Architectural detail line work 0.7 line thickness
ARC-ENTOURAGE	Grey	8	0.18	Continuous	Entourage as Applicable
ARC-FURNITURE	White	7	0.25	Continuous	Loose Furniture
ARC-HAT	Grey	8	0.18	Continuous	Architectural hatching
ARC-HD18	Grey	8	0.18	HIDDEN2	Architectural hidden detail
ARC-LSCAPE	White	7	0.25	Continuous	Landscaping
ARC-PH18	Grey	8 252	0.18	PHANTOM2	Architectural existing detail. Pen No. may change to 252 for clarity on printed drawings

6.3 CIVIL LAYERS

Layers used to create civil drawing models and views shall be named in accordance with section 6.11. All layers created shall be prefixed with CIV- and catalogued in the CIVIL filter folder under the appropriate sub filter using the layer manager. Predefined sub filter folders are; DRAINAGE; PEDESTRIANS; PLANT STRUCTURES; RAIL; and ROAD.

The following layers have been predefined for the production of civil drawing models and views.

Drawing Layers	Screen Colour	Plotting Pen No.	Line Thickness	Line Type	Description
CIV-CL25	White	7	0.25	CENTER2	Civil centre lines
CIV-CONC-APRON	Yellow	2	0.35	Continuous	Concrete apron
CIV-CONC-BUND	Yellow	2	0.35	Continuous	Bund
CIV-CONC-FLOOR SLAB	Yellow	2	0.35	Continuous	Slab
CIV-CONC-FOOTING	Yellow	2	0.35	Continuous	Footing

CIV-CONC-TILT	Yellow	2	0.35	Continuous	Tilt Up Concrete Panels
CIV-DR18	Grey	8	0.18	Continuous	Civil detail line work 0.18 line thickness. Used for hatching
CIV-DR25	White	7	0.25	Continuous	Civil detail line work 0.25
CIV-DR35	Yellow	2	0.35	Continuous	Civil general line work 0.35 line thickness
CIV-DR50	Red	1	0.50	Continuous	Civil detail line work 0.5 line thickness
CIV-DRAIN-ACCESS HOLE	Magenta	6	0.70	Continuous	Civil detail line work 0.7 line thickness
CIV-DRAIN-ALIGNMENT	Magenta	6	0.25	Continuous	Access Hole/Man Hole
CIV-DRAIN-LEVEE	Yellow	2	0.35	Continuous	Levee/Bank
CIV-DRAIN-SUMP	Light blue	143	0.25	Continuous	Open Sump
CIV-FENCE	Green	82	0.25	Continuous	Fence other than MSIC
CIV-FENCE-MSIC	Olive green	56	0.25	Continuous	MSIC fence
CIV-HD18	Grey	8	0.18	HIDDEN2	Civil hidden detail
CIV-PED-BRIDGE	Yellow	2	0.35	Continuous	Pedestrian Crossover
CIV-PED-FOOTPATH	Light Yellow	61	0.25	Continuous	Footpath
CIV-PED-TRAFFIC	Magenta	6	0.25	Continuous	Pedestrian Line Marking
CIV-PH18	Grey	8 252	0.18	PHANTOM2	Civil existing detail. Pen No. may change to 252 for clarity on printed drawings
CIV-RAIL-ALIGNMENT	White	7	0.25	Continuous	Rail alignment
CIV-RAIL-BALLAST	White	7	0.25	Continuous	Ballast
CIV-RAIL-CHAINAGE	Yellow	2	0.25	Continuous	Chainage & Tick
CIV-RAIL-CORRIDOR	Grey	8	0.25	Continuous	Rail Corridor Clearance
CIV-RAIL-SIDING	Magenta	6	0.25	Continuous	Rail siding
CIV-RAIL-SIGNAL	White	7	0.25	Continuous	Signals
CIV-RAIL-SLEEPER	White	7	0.25	Continuous	Sleepers
CIV-RAIL-SWITCH	Magenta	6	0.25	Continuous	Point of Switch
CIV-RAIL-TUNNEL	Yellow	2	0.35	Continuous	Tunnel
CIV-RETAINING WALLS	Red	1	0.50	Continuous	Retaining Walls
CIV-ROAD-ALIGNMENT	White	7	0.25	Continuous	Road Alignment
CIV-ROAD-CARPARK	Yellow	2	0.35	Continuous	Car parking
CIV-ROAD-KERB	White	7	0.25	Continuous	Kerb and alignment
CIV-ROAD-PAVEMENT	Yellow	2	0.35	Continuous	Road pavement
CIV-ROAD-RRPM	Magenta	6	0.25	Continuous	Retro reflective pavement markers
CIV-ROAD-SECT	Yellow	2	0.35	Continuous	Road intersection

CIV-ROAD-SIGNS	Blue-green	122	0.25	Continuous	Traffic signs and signals
CIV-ROAD-SUBGRADE	White	7	0.25	Continuous	Subgrade
CIV-ROAD-TRACK	Blue	146	0.25	Continuous	Vehicle access track
CIV-ROAD-TRAFFIC	Yellow	2	0.35	Continuous	Road line marking

6.4 ELECTRICAL LAYERS

Layers used to create electrical drawing models and views including SLDs and schematics shall be named in accordance with section 6.11. All layers created shall be prefixed with ELE- and catalogued in the ELECTRICAL filter folder using the layer manager.

The following layers have been predefined for the production of electrical drawing models and views including SLDs and schematics.

Drawing Layers	Screen Colour	Plotting Pen No.	Line Thickness	Line Type	Description
ELE-CL25	White	7	0.25	CENTER2	Electrical centre lines
ELE-DR18	Grey	8	0.18	Continuous	Electrical detail line work 0.18 line thickness. Used for hatching
ELE-DR25	White	7	0.25	Continuous	Electrical detail line work 0.25
ELE-DR35	Yellow	2	0.35	Continuous	Electrical general line work 0.35 line thickness
ELE-DR50	Red	1	0.50	Continuous	Electrical detail line work 0.5 line thickness
ELE-DR70	Blue	5	0.70	Continuous	Electrical detail line work 0.7 line thickness
ELE-HD18	Grey	8	0.18	HIDDEN2	Electrical hidden detail
ELE-LIGHT	Yellow	2	0.35	Continuous	Lighting and small power
ELE-PH18	Grey	8 252	0.18	PHANTOM2	Electrical existing detail. Pen No. may change to 252 for clarity on printed drawings
ELE-SYMB	White	7	0.25	Continuous	Electrical symbol insertion

6.5 PFD/P&ID LAYERS

Layers used to create PFD and P&ID drawings shall be named in accordance with section 6.11. All layers created shall be prefixed with PRO- and catalogued in the PFD PID filter folder using the layer manager.

The following layers have been predefined for the production of PFDs and P&IDs.

Drawing Layers	Screen Colour	Plotting Pen No.	Line Thickness	Line Type	Description
PRO-CL25	White	7	0.25	CENTER2	PFD/P&ID centre lines
PRO-DR18	Grey	8	0.18	Continuous	PFD/P&ID detail line work 0.18 line thickness. Used for hatching
PRO-DR25	White	7	0.25	Continuous	PFD/P&ID detail line work 0.25
PRO-DR35	Yellow	2	0.35	Continuous	PFD/P&ID general line work 0.35 line thickness

PRO-DR50	Red	1	0.50	Continuous	PFD/P&ID detail line work 0.5 line thickness
PRO-DR70	Blue	5	0.70	Continuous	PFD/P&ID detail line work 0.7 line thickness
PRO-HD18	Grey	8	0.18	HIDDEN2	PFD/P&ID hidden detail
PRO-PH18	Grey	8 252	0.18	PHANTOM2	PFD/P&ID existing detail. Pen No. may change to 252 for clarity on printed drawings
PRO-SYMB-AIR	White	7	0.25	Continuous	PFD/P&ID Compressed air symbol insertion
PRO-SYMB-FUEL	White	7	0.25	Continuous	PFD/P&ID fuel symbol insertion
PRO-SYMB-GAS	White	7	0.25	Continuous	PFD/P&ID gas symbol insertion
PRO-SYMB-HYDR	White	7	0.25	Continuous	PFD/P&ID hydraulic symbol insertion
PRO-SYMB-PNEU	White	7	0.25	Continuous	PFD/P&ID pneumatic symbol insertion
PRO-SYMB-WATER	White	7	0.25	Continuous	PFD/P&ID water line symbol insertion

6.6 GENERAL PLANT ARRANGEMENT LAYERS

Layers used to create General plant arrangements shall be named in accordance with section 6.11. All layers created shall be prefixed with GEN- and catalogued in the GENERAL ARRANGEMENT filter folder using the layer manager.

The following layers have been predefined for the production of General Plant Arrangement drawing models and views.

Drawing Layers	Screen Colour	Plotting Pen No.	Line Thickness	Line Type	Description
GEN-CL25	White	7	0.25	CENTER2	GA centre lines
GEN-DR18	Grey	8	0.18	Continuous	GA detail line work 0.18 line thickness. Used for hatching
GEN-DR25	White	7	0.25	Continuous	GA detail line work 0.25
GEN-DR35	Yellow	2	0.35	Continuous	GA general line work 0.35 line thickness
GEN-DR50	Red	1	0.50	Continuous	GA detail line work 0.5 line thickness
GEN-DR70	Blue	5	0.70	Continuous	GA detail line work 0.7 line thickness
GEN-EXIST	Grey	8	0.18	PHANTOM2	GA existing detail. Line type may change from PHANTOM2 to suit the scale of the GA. Pen No. may change to 252 for clarity on printed drawings
GEN-HAT-BUILDINGS	Grey	135, 135, 135	0.25	Continuous	Preferred hatch for existing major infrastructure on coloured maps
GEN-HAT-LAND	Cream	255, 242, 204	0.25	Continuous	Preferred hatch for land on coloured maps
GEN-HAT-WATER	Light Blue	208, 241, 236	0.25	Continuous	Preferred hatch for water on coloured maps
GEN-HD18	Grey	8	0.18	HIDDEN2	GA hidden detail

6.7 MARINE LAYERS

Layers used to create marine drawing models and views shall be named in accordance with section 6.11. All layers created shall be prefixed with MAR- and catalogued in the MARINE filter folder using the layer manager.

The following layers have been predefined for the production of marine drawing models and views.

Drawing Layers	Screen Colour	Plotting Pen No.	Line Thickness	Line Type	Description
MAR-CL25	White	7	0.25	CENTER2	Marine centre lines
MAR-DR18	Grey	8	0.18	Continuous	Marine detail line work 0.18 line thickness. Used for hatching
MAR-DR25	White	7	0.25	Continuous	Marine detail line work 0.25
MAR-DR35	Yellow	2	0.35	Continuous	Marine general line work 0.35 line thickness
MAR-DR50	Red	1	0.50	Continuous	Marine detail line work 0.5 line thickness
MAR-DR70	Blue	5	0.70	Continuous	Marine detail line work 0.7 line thickness
MAR-HD18	Grey	8	0.18	HIDDEN2	Marine hidden detail
MAR-PH18	Grey	8 252	0.18	PHANTOM2	Marine existing detail. Pen No. may change to 252 for clarity on printed drawings

6.8 MECHANICAL LAYERS

Layers used to create mechanical drawing models and views shall be named in accordance with section 6.11. All layers created shall be prefixed with MEC- and catalogued in the MECHANICAL filter folder using the layer manager.

The following layers have been predefined for the production of mechanical drawing models and views.

Drawing Layers	Screen Colour	Plotting Pen No.	Line Thickness	Line Type	Description
MEC-CL25	White	7	0.25	CENTER2	Mechanical centre lines
MEC-DR18	Grey	8	0.18	Continuous	Mechanical detail line work 0.18 line thickness. Used for hatching
MEC-DR25	White	7	0.25	Continuous	Mechanical detail line work 0.25
MEC-DR35	Yellow	2	0.35	Continuous	Mechanical general line work 0.35 line thickness
MEC-DR50	Red	1	0.50	Continuous	Mechanical detail line work 0.5 line thickness
MEC-DR70	Blue	5	0.70	Continuous	Mechanical detail line work 0.7 line thickness
MEC-HD18	Grey	8	0.18	HIDDEN2	Mechanical hidden detail
MEC-PH18	Grey	8 252	0.18	PHANTOM2	Mechanical existing detail. Pen No. may change to 252 for clarity on printed drawings

6.9 PIPING LAYERS

Layers used to create piping drawing models and views shall be named in accordance with section 6.11. All layers created shall be prefixed with PIP- and catalogued in the PIPING filter folder under the appropriate sub filter using the layer manager. Predefined sub filter folders are; FUEL; SALT WATER; and WASTE WATER.

The following layers have been predefined for the production of piping drawing models and views.

Drawing Layers	Screen Colour	Plotting Pen No.	Line Thickness	Line Type	Description
PIP-CL25	White	7	0.25	CENTER2	Piping centre lines
PIP-DR18	Grey	8	0.18	Continuous	Piping detail line work 0.18 line thickness. Used for hatching
PIP-DR25	White	7	0.25	Continuous	Piping detail line work 0.25
PIP-DR35	Yellow	2	0.35	Continuous	Piping general line work 0.35 line thickness
PIP-DR50	Red	1	0.50	Continuous	Piping detail line work 0.5 line thickness
PIP-DR70	Blue	5	0.70	Continuous	Piping detail line work 0.7 line thickness
PIP-FUEL-CL25	White	7	0.25	CENTER2	Fuel piping centre lines
PIP-FUEL-DR35	Olive Green	65	0.35	Continuous	Fuel piping General line work 3.5 Pen
PIP-FUEL-HD18	Grey	8	0.18	HIDDEN2	Fuel piping hidden detail
PIP-HD18	Grey	8	0.18	HIDDEN2	Piping hidden detail
PIP-PH18	Grey	8 252	0.18	PHANTOM2	Piping existing detail. Pen No. may change to 252 for clarity on printed drawings
PIP-SALT-CL25	White	7	0.25	CENTER2	Salt water piping centre lines
PIP-SALT-DR35	Blue-green	111	0.35	Continuous	Salt water piping General line work 3.5 Pen
PIP-SALT-HD18	Grey	8	0.18	HIDDEN2	Salt water piping hidden detail
PIP-WWTR-CL25	White	7	0.25	CENTER2	Waste water piping centre lines
PIP-WWTR-DR35	Blue	153	0.35	Continuous	Waste water piping General line work 3.5 Pen
PIP-WWTR-HD18	Grey	8	0.18	HIDDEN2	Fuel piping hidden detail

6.10 STRUCTURAL LAYERS

Layers used to create structural drawing models and views shall be named in accordance with section 6.11. All layers created shall be prefixed with STR- and catalogued in the STRUCTURAL filter folder using the layer manager.

The following layers have been predefined for the production of structural drawing models and views.

Drawing Layers	Screen Colour	Plotting Pen No.	Line Thickness	Line Type	Description
STR-CL25	White	7	0.25	CENTER2	Structural centre lines

STR-DR18	Grey	8	0.18	Continuous	Structural detail line work 0.18 line thickness. Used for hatching
STR-DR25	White	7	0.25	Continuous	Structural detail line work 0.25
STR-DR35	Yellow	2	0.35	Continuous	Structural general line work 0.35 line thickness
STR-DR50	Red	1	0.50	Continuous	Structural detail line work 0.5 line thickness
STR-DR70	Blue	5	0.70	Continuous	Structural detail line work 0.7 line thickness
STR-HD18	Grey	8	0.18	HIDDEN2	Structural hidden detail
STR-PH18	Grey	8 252	0.18	PHANTOM2	Structural existing detail. Pen No. may change to 252 for clarity on printed drawings

6.11 ADDITIONAL LAYERS

Depending on the scale of the model or drawing, additional layers may be created in order to;

- a) More readily identify, classify or isolate drawing elements by discipline;
- b) Present information more clearly on drawings by using different line types and line weights (as assigned ByLayer); and
- c) Allow the drawing to be read in conjunction with other models and drawings that may need to be readily referenced, modified or combined.

For additionally created layers, the drawing entities displayed on the screen shall be representative in colour of the plotting pen size/line weight used to produce the final hard copy. All layers shall be created with the colour, line type and line weight set to ByLayer.

(Note that this does not apply to entities that form part of a block where colour, line weight and line type may be changed to most clearly display and differentiate between block elements. Blocks shall be inserted in the appropriate discipline layer so that all blocks of identical discipline will be shown together when required. For block creation information, refer section 7.10.)

Line weights shall be limited to pen thicknesses of 0.09, 0.18, 0.25, 0.35, 0.50 and 0.70 unless otherwise impracticable to do so.

Layers shall be catalogued in the appropriate predefined filter folder and names shall conform to the following naming convention:

THREE LETTER DISCIPLINE CODE-INFRASTRUCTURE-DRAWING ENTITY

For example:

Marine assets - 75 tonne bollards - located on Berth 5 could be drawn on a layer named:

MAR-BERTH5-BOLLARD-75TONNE

Where layers are created using line types other than continuous, the layer name shall also be suffixed by **-LINETYPELINEWEIGHT**.

Using the same example:

Where it is necessary to indicate the centre line of the bollards the layer could be named:

MAR-BERTH 5-BOLLARD-75TONNE-CL25

In these instances:

- For centre lines use the line type prefix 'CL'.
- For hidden lines use the line type prefix 'HD'.
- For phantom lines use the line type prefix 'PH'.

Further suffixed descriptors may be used in the layer name to more clearly identify the drawing entity by layer. For example, this could reflect a part number or a consecutive ID number depending on the number of similar drawing/model parts. Symbols and punctuation marks (other than hyphens) shall not be included in layer naming. Layer names shall be written in uppercase only and separated appropriately by hyphens.

7 CONTENT OF DRAWINGS

7.1 SET OUT OF DRAWINGS

The layout of the drawing including projections, section views, detail views, as well as associated dimensions and tolerances shall be in accordance with AS 1100 and the requirements of this guideline.

Set out dimensions applicable to plant layout or location shall be shown once only, preferably on the GA drawing or layout plan for any set of plant or project drawings. All other drawings in the set shall give reference to this drawing. Unnecessary repetition of dimensions shall be avoided.

7.2 USE OF MODEL SPACE AND PAPER SPACE

All drawing entities shall be drawn in MODEL SPACE at full scale.

Drawing titles, sheet information, scale bars, north arrows and notes shall be inserted or created in PAPER SPACE. All dimensions and annotations shall be inserted or created in PAPER SPACE.

PFDs and P&IDs shall be drawn in PAPER SPACE. Any PFD or P&ID should be devoted to a single section plant and function only. Reference to other areas of plant shall be made with a continuation tag to the next plant section.

The PAPER SPACE/Layout tab shall be renamed to reflect the drawing number only.

For example:

For drawing **010-M-0289** Revision A;

The layout tab shall be renamed **010-M-0289** (*Note hyphens included in Layout tab name*)

7.3 VIEWS

All drawings shall be drawn using third angle projection. Architectural discipline drawings may be drawn using first angle projection.

Views shall be clearly indicated by arrows, letters and titles in the direction the subjects are viewed. The number of views shall be minimised by the drawing composition and presentation and shall be of such a standard that any possibility of misinterpretation is eliminated.

Views shown on drawings shall be to scale in accordance with section 5.8, with one view only shown per viewport. All viewports shall be locked.

UCSs in MODEL SPACE or PAPER SPACE shall be set to WCS prior to submission of drawings to MWPA. Reference should be made to MWPA Technical Guideline – MWPA201 Surveying Guidelines (currently under development) for UCS and preferred grid system requirements for survey drawings and maps.

For projections that are broken and don't show the full length of the object a break symbol shall be used. Break symbols shall be produced as polylines on the same drawing line weight as the

object that is being broken. Break symbols shall be drawn at the ratio shown below and inserted at the midpoint of the broken projection at an appropriate scale.

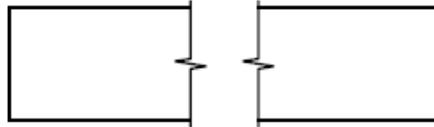


Figure 4: Sample use of break symbol

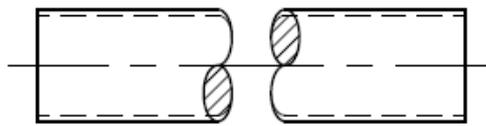


Figure 5: Sample use of break symbol for circular section

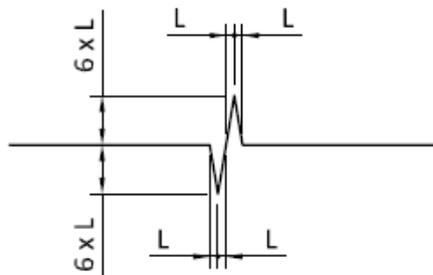


Figure 6: Break symbol ratio

Expanded Detail Views shall be used where the scale or complexity of the drawing subject is too congested to clearly show the necessary detail information. ID Bubbles and Titles for expanded detail views are outlined in section 7.10.

7.4 ORIENTATION

The orientation of plant and project drawings defined at the plant layout stage of design should be maintained throughout on all the subsequent drawings.

The North arrow shall accurately reflect north of the applicable view and be inserted into the drawing in PAPER SPACE. Where possible, the north arrow should point either to the top or to the right of the drawing sheet. A north arrow may be scaled and inserted into the key plan for reference to the drawing view. The north arrow is supplied as part of the MWPA CAD Data Pack and shall be inserted on layer ANN-DIM.



Figure 7: North arrow

7.5 EXISTING PLANT

Drawings which depict modifications or additions shall show line work for existing objects in accordance with section 6.0 of this specification. Existing plant may be plotted 'grey' in order to more clearly delineate between new and existing plant.

A key plan shall be used on GA drawings only, to locate the subject of the drawing in relation to existing site or building layouts.

7.6 EXTERNAL REFERENCES

External references may be used in the production of drawings including the use of other file formats (e.g.: aerial photography for maps etc).

All 3D models shall be created as separate files to the drawing and if any 3D views are required in the drawing then the model shall be externally referenced into the drawing. XRefs shall not be bound into drawings and shall be supplied as separate files (DWG or other acceptable format).

Once referenced into a drawing the referenced model shall not be moved from the original location so that it can be accurately located by referencing if the file path is lost. When submitting drawings to the MWPA, the Consultant/Contractor shall ensure that applicable drawing files still contain the full file path to the Xref file.

Layer names from XRefs shall conform to the layering protocols. Any layers that have been inserted into a drawing after an external drawing file has been bound and exploded shall be renamed to remove the external reference file prefix from the layer name.

XRefs shall be named using the following naming convention:

XR-THREE LETTER DISCIPLINE CODE-MODEL DESCRIPTION-ID or PART NUMBER

For example:

A 3D model of the head chute for CV504 could be named:

XR-MEC-CV504-HEADCHUTE

Further suffixed descriptors may be used in the XRef name to more clearly identify the drawing subject, depending on the complexity of the model. For example, this could reflect a part number or a consecutive ID number depending on the number of similar drawing/model parts. Symbols and punctuation marks (other than hyphens) shall not be included in XRef naming. XRef names shall be written in uppercase only and separated appropriately by hyphens.

7.7 LINE TYPES & LINE WEIGHTS

The line type options available from the AutoCAD standard library shall be selected wherever possible. The following line types are predetermined in the MWPA Base Drawing Sheet:

Continuous —————

CENTER2 — — — — —

HIDDEN2 - - - - -

PHANTOM2 — — — — — (May be shown in grey – 252 – on plotted drawings)

The Line type scale value and all derivatives of the line type scale value, for all drawings, shall be set to 1.0000. Individual object line types shall not be changed from the layer dependent properties.

Line weights shall be set to the Object Style and the end styles of lines shall be square. Line weights on all drawings shall be limited to pen thicknesses of 0.09, 0.18, 0.25, 0.35, 0.50 and 0.70 and are predefined in the MWPA_MONO plot style table.

Heavier line weights may be accepted as required for greater drawing definition. Where additional line weights are required in plotting, a new plot style table may be created in accordance with section 11.1 and shall be supplied to the MWPA when submitting drawings. The predefined MWPA_MONO plot style table shall not be modified in any way.

Reference should be made to MWPA Technical Guideline – MWPA201 Surveying Guidelines (currently under development) for specific requirements for line types and line weights for survey drawings as the requirements under this guideline may not necessarily apply.

7.8 DIMENSIONS AND LEADERS

All dimensions shall be in millimetres with the exception of RLs, grids, chainages and co-ordinates which shall be in metres. RLs, grids, chainages and co-ordinates shall be shown to 3 decimal places.

All dimensions and leaders shall be created using layer ANN-DIM. Leaders shall be created as MText multi leaders where possible.

7.9 PROJECT NOTES

Notes relating to selected disciplines are supplied as part of the MWPA CAD Data Pack and are available for Consultant/Contractor use. Applicability of these should be confirmed and edited to meet the specific requirements of the project. It is the responsibility of the Contractor/Consultant to confirm the suitability of the project when read in conjunction with the drawing content.

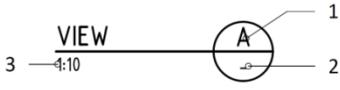
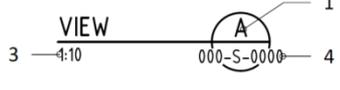
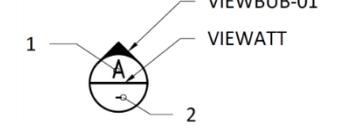
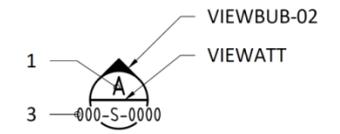
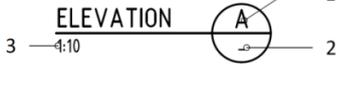
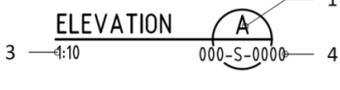
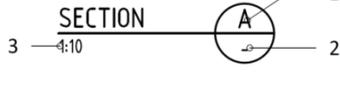
Notes relevant to the drawing subject shall be inserted as multiline text into the top right hand corner of the drawing sheet. The preferred MText width for all notes inserted into drawings is 160mm as outlined in Appendix A.

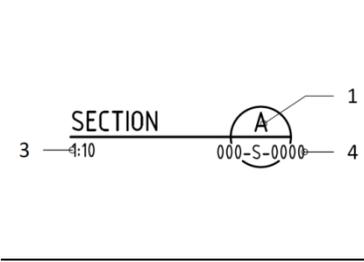
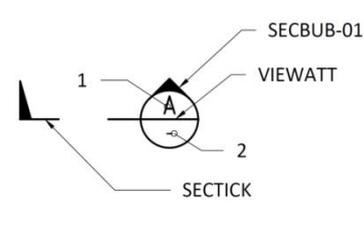
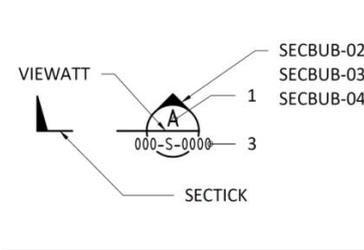
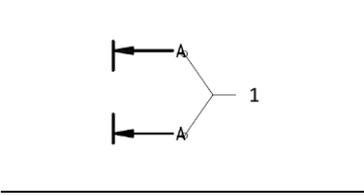
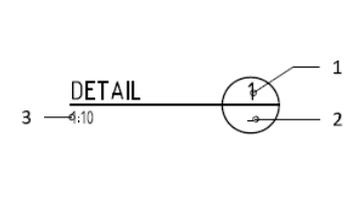
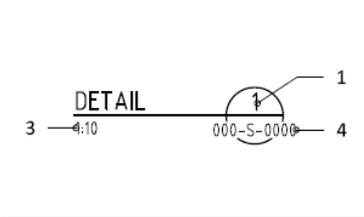
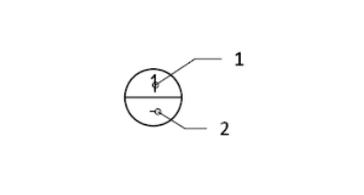
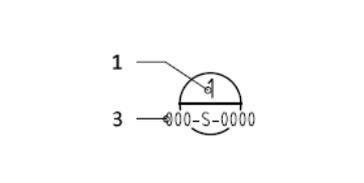
7.10 BLOCKS

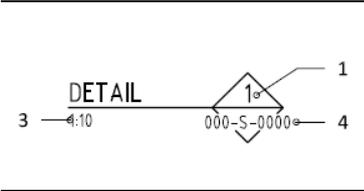
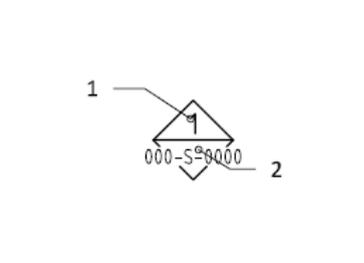
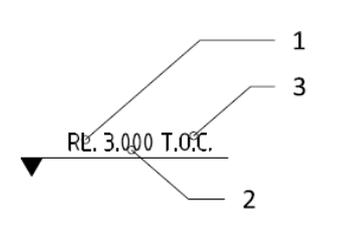
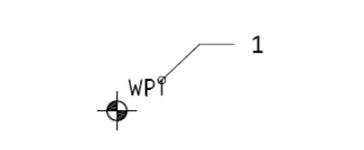
Wherever possible, annotative blocks shall be sourced from the MWPA CAD Data Pack. Blocks that are supplied as part of the MWPA CAD Data Pack are provided to Consultants/Contractors for use in drawings produced for MWPA only and shall not be modified, scaled or manipulated in any way. Where blocks are unavailable for the required device of structure, reference shall be made applicable to Australian Standards for the correct symbol.

Annotative blocks shall be inserted in layer ANN-DIM and shall not be scaled.

The following blocks are supplied as part of the MWPA CAD Data Pack.

Block	Block Description	Attribute Description
	<p>MWPA-ANN-VIEWTIT-01 : View Title Reference to same drawing as detail To be read in conjunction with MWPA-ANN-VIEWBUB-01</p>	<p>1. View ID number (to be uppercase, alphabetical only) 2. Drawing number reference (left as dash as view is on same drawing) 3. Scale of View</p>
	<p>MWPA-ANN-VIEWTIT-02 : View Title Reference to different drawing as detail To be read in conjunction with MWPA-ANN-VIEWBUB-02</p>	<p>1. View ID number (to be uppercase, alphabetical only) 3. Scale of View 4. Full drawing number reference</p>
	<p>MWPA-ANN-VIEWBUB-01 : View ID Bubble Reference to same drawing as detail To be read in conjunction with MWPA-ANN-VIEWTIT-01 or MWPA-ANN-ELEVTIT-01</p>	<p>1. View ID number (to be uppercase, alphabetical only) 2. Drawing number reference (left as dash as view is on same drawing) <i>Note use of MWPA-ANN-VIEWWATT block</i></p>
	<p>MWPA-ANN-VIEWBUB-02 : View ID Bubble Reference to different drawing as detail To be read in conjunction with MWPA-ANN-VIEWTIT-02 or MWPA-ANN-ELEVTIT-02</p>	<p>1. View ID number (to be uppercase, alphabetical only) 3. Full drawing number reference <i>Note use of MWPA-ANN-VIEWWATT block</i></p>
	<p>MWPA-ANN-ELEVTIT-01 : Elevation Title Reference to same drawing as detail To be read in conjunction with MWPA-ANN-VIEWBUB-01</p>	<p>1. Elevation ID number (to be uppercase, alphabetical only) 2. Drawing number reference (left as dash as view is on same drawing) 3. Scale of Elevation</p>
	<p>MWPA-ANN-ELEVTIT-02 : Elevation Title Reference to different drawing as detail To be read in conjunction with MWPA-ANN-VIEWBUB-02</p>	<p>1. Elevation ID number (to be uppercase, alphabetical only) 3. Scale of Elevation 4. Full drawing number reference</p>
	<p>MWPA-ANN-SECTIT-01 : Section Title Reference to same drawing as detail To be read in conjunction with MWPA-ANN-SECBUB-01</p>	<p>1. View ID number (to be uppercase, alphabetical only) 2. Drawing number reference (left as dash as view is on same drawing) 3. Scale of Section</p>

	<p>MWPA-ANN-SECTIT-02 : Section Title Reference to different drawing as detail To be read in conjunction with MWPA-ANN-SECBUB-02; MWPA-ANN-SECBUB-03; or MWPA-ANN-SECBUB-04 depending on the orientation of the section</p>	<p>1. Section ID number (to be uppercase, alphabetical only) 3. Scale of Section 4. Full drawing number reference</p>
	<p>MWPA-ANN-SECBUB-01 : Section ID Bubble Reference to same drawing as detail To be read in conjunction with MWPA-ANN-SECTIT-01</p>	<p>1. View ID number (to be uppercase, alphabetical only) 2. Drawing number reference (left as dash as view is on same drawing) <i>Note use of VIEWATT block</i> <i>Note use of SECTICK block</i></p>
	<p>MWPA-ANN-SECBUB-02; MWPA-ANN-SECBUB-03; or MWPA-ANN-SECBUB-04 depending on the orientation of the section : Section ID Bubble Reference to same drawing as detail To be read in conjunction with MWPA-ANN-SECTIT-02</p>	<p>1. View ID number (to be uppercase, alphabetical only) 3. Full drawing number reference <i>Note use of MWPA-ANN-VIEWATT block</i> <i>Note use of MWPA-ANN-SECTICK block</i></p>
	<p>MWPA-ANN-SECSMALL : Small Section ID Reference to same drawing as detail only To be read in conjunction with MWPA-ANN-SECTIT-01</p>	<p>1. View ID number (to be uppercase, alphabetical only)</p>
	<p>MWPA-ANN-DETTIT-01 : Detail Title Reference to same drawing as detail To be read in conjunction with MWPA-ANN-DETBUB-01</p>	<p>1. Detail ID number (to be uppercase, numerical only) 2. Drawing number reference (left as dash as view is on same drawing) 3. Scale of Detail</p>
	<p>MWPA-ANN-DETTIT-02 : Detail Title Reference to different drawing as detail To be read in conjunction with MWPA-ANN-DETBUB-02</p>	<p>1. Detail ID number (to be uppercase, numerical only) 3. Scale of Detail 4. Full drawing number reference</p>
	<p>MWPA-ANN-DETBUB-01 : Detail ID Bubble Reference to same drawing as detail To be read in conjunction with MWPA-ANN-DETTIT-01</p>	<p>1. Detail ID number (to be uppercase, numerical only) 2. Drawing number reference (left as dash as view is on same drawing)</p>
	<p>MWPA-ANN-DETTIT-02 : Detail ID Bubble Reference to different drawing as detail To be read in conjunction with MWPA-ANN-DETTIT-02</p>	<p>1. Detail ID number (to be uppercase, numerical only) 3. Full drawing number reference</p>

 <p>A diamond-shaped bubble with '1' inside. Callouts: 1 points to the bubble, 2 points to the bottom vertex, 3 points to the left vertex, and 4 points to the right vertex. The text 'DETAIL' is to the left and '000-5-0000' is below the bubble.</p>	<p>MWPA-ANN-DETTIT-01 : Standard Detail Title with reference to MWPA standard design drawing To be read in conjunction with MWPA-ANN-DETBUB-01</p>	<p>1. Standard Detail ID number (to be uppercase, numerical only) 3. Full drawing number reference 4. Scale of Detail</p>
 <p>A diamond-shaped bubble with '1' inside. Callout 1 points to the bubble, and callout 2 points to the bottom vertex. The text '000-5-0000' is below the bubble.</p>	<p>MWPA-ANN-STDETTIT-01 : Standard Detail ID Bubble To be read in conjunction with MWPA-ANN-STDETTIT-01 on applicable MWPA standard design drawing</p>	<p>1. Standard Detail ID number (to be uppercase, numerical only) 2. Full drawing number reference</p>
 <p>A horizontal line with a downward-pointing triangle on the left. Callout 1 points to the line, callout 2 points to the triangle, and callout 3 points to the text 'RL. 3.000 T.O.C.' above the line.</p>	<p>MWPA-ANN-RLEVEL – RL Marker Identifies the height of a point relative to a datum.</p>	<p>1. Shows RL 2. Relative height in metres to 3 decimal places 3. Referenced surface (e.g.: concrete steel etc)</p>
 <p>A circle with a crosshair inside. Callout 1 points to the circle. The text 'WPI' is to the left of the circle.</p>	<p>MWPA-ANN-WP – Work Point or Information Point Identifies location of WP or IP. May be referenced geographically for set out points</p>	<p>1. Attribute may be changed to identify relevant WP or IP number</p>
 <p>A circle containing the number '1'.</p>	<p>MWPA-ANN-GRID : Grid Line ID Identifies relevant grid which can be referenced to GA drawings</p>	<p>Grid line ID can be changed to numerical or alphabetical IDs</p>

7.10.1 ADDITIONAL BLOCKS

Blocks used or created by Consultants that do not form part of the MWPA CAD Data Pack may be used only with prior approval by the MWPA Draftsperson.

All blocks shall have their entities drawn on layer 0. Colour, line weight and line type may be changed to most clearly display and differentiate between block elements. Blocks shall be inserted in the appropriate discipline layer so that all blocks of identical discipline will be shown together when required.

All blocks that have been created externally shall be submitted to the MWPA as individual files accompanied by a register naming, describing and identifying the locations of the blocks used for that specific project.

Block names shall conform to the following naming convention:

MWPA-THREE LETTER DISCIPLINE CODE-BLOCK DESCRIPTION-ID NUMBER

Where a new block is created and defined, the insertion point shall be relative to the block and its location (i.e.: suitable corner point/centre point of block etc.) Symbols and punctuation marks

(other than hyphens) shall not be included in block naming. Block names shall be written in uppercase only and separated appropriately by hyphens.

7.11 SYMBOLS

Symbols shall be created and inserted into drawings, complying with the requirements of the relevant Australian Standard. Symbols shall be created or inserted as blocks (attribute editable as applicable) and the same development criteria for blocks shall apply in accordance with section 7.10.1.

Any symbols used in drawings and diagrams shall be accompanied by a legend to readily identify those symbols used in the drawing or project. The legend is to be located in the top right hand corner of the drawing. Project notes may be relocated to accommodate the legend.

8 DRAWING TITLE INFORMATION

All drawings shall be titled in accordance with these requirements.

8.1 TITLE BLOCK INFORMATION

All information in the title block shall be completed when submitting drawings to the MWPA including titles, drawing & project numbers, scale, endorsements (drafting, checking & engineering approving authorities), dates, revision details and reference drawings.

For the drawing title information, the attributes shall be entered as follows:

The **first line** is the site name and can be changed to reflect the appropriate MWPA site (e.g.: OAKAJEE). The default entry is GERALDTON PORT.

The **second line** shall denote the project name under which the drawing is part, or, shall more accurately define the plant location (e.g.: BERTH 5 UPGRADE. e.g.: FISHING BOAT HARBOUR).

The **third line** shall identify the main piece of equipment or service and/or the subject of the drawing. (e.g.: [EQUIPMENT ID] ACCESS PLATFORM).

The **fourth line** shall define the type of drawing (e.g.: GENERAL ARRANGEMENT).

All **names** entered into the endorsement block of the title block shall conform to the following format:

F(initial).(single space)LASTNAME (All uppercase)

For example:

D. TAILER

All initials entered into the revision block of the title block shall conform to the following format:

FL (initials-no spaces no separators) (All uppercase)

For example:

DT

All **dates** entered into the revision block of the title block shall conform to the following format:

DD.MM.YY

For example:

01.01.12

8.2 DRAWING REVISIONS

8.2.1 ISSUED FOR APPROVAL/INFORMATION/COMMENT/REVIEW

Drawings issued for Approval or Information or Comment or Review shall use alphabetic numbering. The first “ISSUED FOR APPROVAL (or information or comment or review)” is marked with the letter **A** in the main title block and the drawing revisions block, with subsequent revisions marked in alphabetic progression

e.g.: B, C ...and onwards.

8.2.2 ISSUED FOR QUOTE/TENDER

When the drawing is “ISSUED FOR TENDER” all clouds except hold shall be removed from the drawings. Revisions shall remain in alphabetic progression.

8.2.3 ISSUED FOR CONSTRUCTION

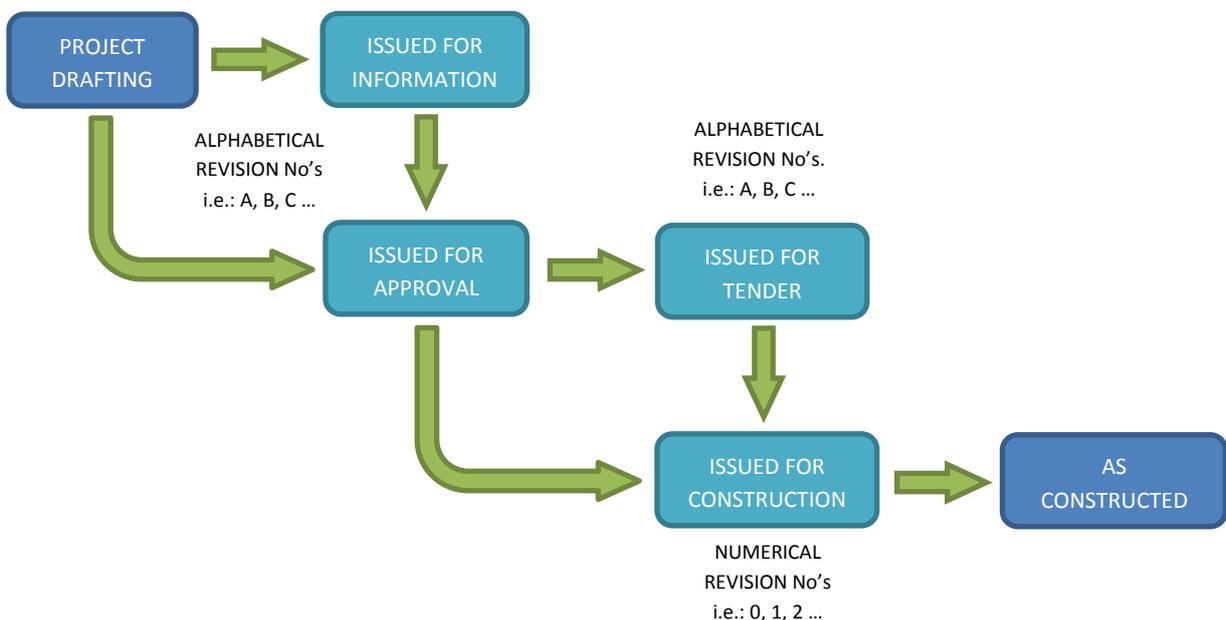
Drawings issued for construction or any revision following shall be marked using numerical progression. When the drawing is “ISSUED FOR CONSTRUCTION” the revision changes to **0** (zero) in the title block and drawing revisions block, with subsequent revisions marked in numerical progression. Any alpha revision clouds and triangles shall be removed from the drawing.

e.g.: 1, 2 ...and onwards.

8.2.4 AS CONSTRUCTED

Drawings issued as constructed shall be marked using numerical progression. Drawings marked “AS CONSTRUCTED” will have the revision changed to the next numerical number in the title block and drawing revisions block. Any revision clouds shall be removed from the drawing.

The MWPA drawing revision process is therefore shown as follows:



9 DRAWING NUMBERS

All drawings shall be numbered in accordance with these requirements.

9.1 ALLOCATION OF DRAWING NUMBERS

Drawing numbers will be allocated by the MWPA Draftsperson from the master register.

All drawings shall be numbered in the following manner:

THREE DIGIT BATTERY LIMIT-DRAWING DISCIPLINE-FOURDIGIT SEQUENTIAL DRAWING NUMBER

- **000** - three digit Battery Limit ID (refer table 2)
- **A** - Drawing Discipline (refer table 3)
- **0000** - four digit Sequential Drawing Number (allocated by MWPA Draftsperson)

Battery Limits have been defined by the geographical port location that the particular project or drawing subject is located. Descriptions of each battery limit are listed in table 2.

Table 2

Battery Limit	Description
Standards	
000	MWPA Design Standards
Site Reference Location	
001	Bulk Handling Facility (BHF)
002	Berth 1 & Berth 2
003	Berth 3
004	Berth 4
005	Berth 5
006	Berth 6
007	Berth 7
008	Fishing Boat Harbour (FBH) and Fishing Boat Harbour Reclaim
009	Commercial Harbour
010	Port General & External Interest
011	Tug Boat Harbour & Eastern Breakwater

Drawing discipline designations shall be appropriately assigned as per Table 3.

Table 3

Designation	Discipline
A	Architectural (general buildings)/Leases
C	Civil
E	Electrical
F	Process Flow Diagrams/Piping and Instrumentation Diagrams
G	General Plant Arrangement/Survey drawings
MA	Marine
M	Mechanical
P	Piping
S	Structural
V[Discipline]	Vendor Supply – e.g. VM indicates Vendor Mechanical

The sequential drawing number shall be assigned by the MWPA Draftsperson.

The Consultant/Contractor shall make a written request to the MWPA Draftsperson specifying the number and discipline/s of drawing numbers required. Consultants/Contractors will then be supplied with a **Drawing Number Allocation Register** outlining the assigned MWPA drawing numbers.

When submitting drawings back to the MWPA, the Consultant/Contractor shall fill in the relevant drawing details and submit a native copy of the completed register back to the MWPA; accompanying the drawings produced under the contract. The formats of the cells are predefined in the register and shall not be modified. A sample Drawing Number Allocation Register is outlined in Appendix B.

10 FABRICATOR'S DETAIL DRAWINGS

Fabricators contracted by the MWPA are expected to produce fabrication/detail drawings prior to fabrication, based on supplied design information and site investigation/measure. Whilst fabricator's detail drawing sheets shall only be submitted for review as required by the MWPA Project Coordinator, all GA drawings shall be submitted to the MWPA Project Coordinator for review prior to fabrication. All GA drawings and marking plans shall be produced using the MWPA A1 border as outlined in Appendix A.

Fabricator's detail drawings should consist of the following drawing types, unless otherwise impracticable.

Marking Plans

Marking Plans, arrangements or assemblies shall comprise of the necessary views to clearly show all members and their ID mark numbers related to the detail sheets. The mark numbers stamped on or tagged to each item shall be the same as that shown on the fabricator's drawings.

Marking Plans, arrangements or assemblies shall include any necessary set out dimensions necessary to carry out the works

Member Detail Sheets

Detail Sheets shall be full fabrication drawings in accordance with the relevant Australian Standard. Blocks are available in the MWPA CAD Data Pack for listing parts and materials (depending on the discipline) and should be referenced where possible. Where limits and fits are shown on the drawings, these shall comply with AS1654.

Fitting Sheets

Fitting Sheets shall be produced to industry standard, detailing individual fittings. Fitting sheets should be clearly presented in a grid, with no more than twelve fittings shown per drawing sheet. Fitting sheets shall be referenced to the Member detail sheets.

11 PLOTTING

11.1 PLOT SETTINGS

The plotting setting for AutoCAD shall be set to colour use dependent for plot files for AutoCAD 2007 and all entities shall have colour set to BYLAYER. The following is a specification of the plotting configuration used by the MWPA and is predefined in the MWPA plot style table **MWPA_MONO**. All Consultants/Contractors shall use this plot style table in the first instance.

Pen Number	Screen Colour	Plotted Colour	Line Weight
1	Red	Black	0.50
2	Yellow	Black	0.35
3	Green	Black	0.50
4	Cyan	Black	0.70
5	Blue	Black	0.70
6	Magenta	Black	0.25
7	White	Black	0.25
8	Grey	Black	0.18
9	Light grey	Black	0.09
12	Red (12)	Red (12)	0.25
252	Grey	Grey	0.18
255	White	White	0.18

All other colours shall be set to be printed Black with a default line weight of 0.25 and end types of square ends.

Further plot styles are available from the MWPA for the production and maintenance of survey drawings. Refer MWPA Technical Guideline – MWPA201 Survey (currently under development).

11.1.1 ADDITIONAL PLOT STYLES

Additional plot styles may be created and utilised by the Consultant/Contractor only with the approval of the MWPA Draftsperson. Additional plot style tables shall limit the use of different line weights to 0.09, 0.18, 0.25, 0.35, 0.50 and 0.70 pen thickness wherever possible. Additional plot style tables shall also limit the number of different colours shown on drawings for clarity without compromising the presentation or interpretation of information..

Additional plot styles shall be named using the following naming convention and submitted to the MWPA with any DWG files to which it is to be used for plotting:

MWPA-DISCIPLINE-PROJECTDESCRIPTION

For example: **MWPA-MAR-BERTHS BOLLARD UPGRADE**

Symbols and punctuation marks (other than hyphens) shall not be included in Plot Style Table naming. Plot Style Table names shall be written in uppercase only and separated appropriately by hyphens.

12 DOCUMENT RECORDS

The Consultant/Contractor shall ensure that all files submitted to the MWPA shall conform to the following:

12.1 CAD FILE FORMAT REQUIREMENTS

MWPA currently operates AutoCAD 2015 and AutoCAD Map 2015. It is the responsibility of the Consultant/Contractor to ensure that all electronic files (drawing and data files) can be effectively used in the MWPA AutoCAD system and are virus free. Drawings shall be supplied by the Consultant/Contractor in AutoCAD 2007 format or later.

There shall only be one CAD file for each individual drawing: multiple drawings saved to one CAD file will not be accepted. Unused items shall be purged from drawings by the Consultant/Contractor, prior to submission of DWG files to the MWPA.

CAD drawings are not be amended manually including the addition of hatching, pencil works or material indication.

12.2 DRAFTING DELIVERABLES

The Consultant/Contractor shall supply the following to the MWPA Draftsperson, complying with requirements outlined in this guideline:

Contract Documentation

A black and white PDF copy of each drawing shall be provided to the MWPA for each revision in alphabetic progression.

A copy of each native DWG produced plus a PDF copy of each drawing shall be provided to the MWPA for each revision from Revision 0 onwards.

Practical Completion

A copy of any **3D models/drafting** produced shall be provided to the MWPA at the completion of the project or periodically as requested by the MWPA Project Coordinator depending on the scale of the project.

A complete set of confirmed, accurate As Constructed drawings shall be supplied in the form of a copy of each native DWG produced plus a PDF copy of each drawing.

All drawings submitted to the MWPA shall have the file named in the following convention.

DRAWING NUMBER (HYPHENS REMOVED)-REVISION

For example: Drawing number '010-M-0289 Revision A' shall have the file named **010M0289-A**

This naming convention shall be applicable for all drawings submitted to MWPA irrespective of format or revision.

12.3 MODIFYING EXISTING DRAWINGS

Where an existing MWPA drawing is to be revised, it shall be updated to the current MWPA drafting standards in accordance with this guideline. In particular the following shall apply:

- Match MWPA current drafting standards including line weights, types and colours, text/dimension styles, block styles and layer naming conventions.
- Existing drawing border/title block and title block data fields shall be replaced with the latest MWPA equivalents.

Where an existing drawing is required to be updated to current MWPA drafting standards, the MWPA Project Coordinator shall establish the requirements prior to the drafting works being undertaken.

12.4 DRAWING TRANSMITTAL REQUIREMENTS

Primarily, drawing documentation shall be transmitted by email to the MWPA Draftsperson, depending on file size. Drawings shall be first sent to a compressed folder and emailed. Drawing series for single projects shall be sent to a single compressed folder (file size dependent). Multiple contracts or requisitions shall not be combined into one compressed folder.

For larger scale projects, where it not practicable to transmit via email, files shall be recorded on compact disk (CD) for transmittal to the MWPA at the completion of the project.

Other methods may be accepted but only with prior approval from the MWPA Draftsperson.

12.4.1 REGISTER OF ALLOCATED DRAWING NUMBERS

When submitting drawings to the MWPA, drawings shall be accompanied by a **Drawing Number Allocation Register** as outlined in Appendix B.

A single Drawing Number Allocation Register shall accompany a single project and shall not be combined for multiple contracts, projects or requisitions.

An entry against the electronic MWPA Master Drawing Register will be made by the MWPA Draftsperson, using the information supplied by the Consultant/Contractor in the Drawing Number Allocation Register.

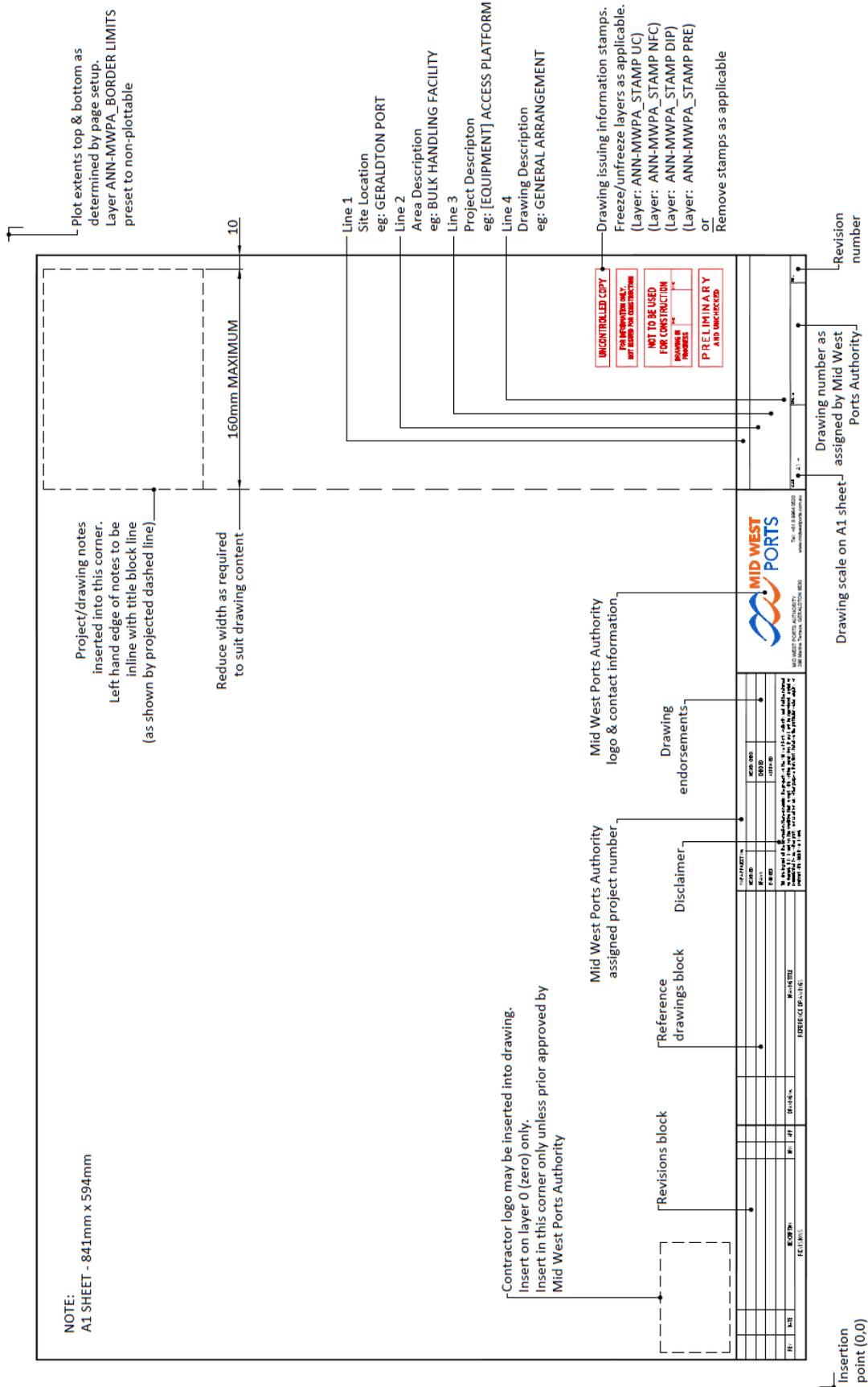
12.4.2 CAD DRAWING COMPLIANCE CHECKLIST

Drawings submitted to the MWPA, regardless of revision shall be accompanied by a completed **CAD Drawing Compliance Checklist**, as outlined in Appendix C, to show that the Consultant/Contractor has complied with the requirements of this guideline.

A single CAD Drawing Compliance Checklist shall accompany a single project and shall not be combined for multiple contracts, projects or requisitions.

APPENDIX A DRAWING & TITLE BLOCK SETOUT

ITEM A1 – DRAWING AND TITLE BLOCK SETOUT



APPENDIX B SAMPLE REGISTER OF ALLOCATED DRAWING NUMBERS

APPENDIX C SAMPLE CAD DRAWING COMPLIANCE CHECKLIST

ITEM C1 – SAMPLE CAD DRAWING COMPLIANCE CHECKLIST

MID WEST PORTS
CAD Drawing Compliance Checklist



Consultant Name:			
CAD System Used:		Date:	
MWPA Project Title:			
MWPA Project No:		MWPA Contact:	
MWPA Drawing No. Series:			

So that the MWPA can more readily catalogue, retrieve and plot all drawings produced, it has been necessary to implement a set of MWPA guidelines in relation to the production of CAD Drawings. The information below has been referenced from [MWPA200 – Drafting Guidelines and AutoCAD Standards](#). This document will be used as a basis for auditing and identifying shortcomings in technical drawings and ultimately accepting or rejecting drawings submitted to the MWPA.

The following outlines the minimum criteria for the submission of drawings and CAD data to the MWPA.

CAD Criteria	
<i>Check the box to indicate compliance to MWPA Drafting Guidelines and AutoCAD Standards</i>	
<input type="checkbox"/>	All files have been scanned and are free of viruses and harmful material
<input type="checkbox"/>	All drawing files contain one only layout/paper space.
<input type="checkbox"/>	Layout tabs have been renamed to match the corresponding drawing number
<input type="checkbox"/>	All entities have been placed in drawings on the corresponding layers in accordance with MWPA Guideline MWPA200 – Drafting Guidelines and AutoCAD Standards
<input type="checkbox"/>	All externally referenced files have been catalogued and the completed register has been included with the drawings submission
<input type="checkbox"/>	Drawings from Rev 0 (zero) onwards have been submitted in both CAD and PDF formats
<input type="checkbox"/>	Drawings from Rev A onwards have been submitted in PDF formats or CAD if requested by the MWPA Project Coordinator
<input type="checkbox"/>	Drawing files (in CAD and PDF formats) have been named in accordance with MWPA Guideline MWPA200 – Drafting Guidelines and AutoCAD Standards
<input type="checkbox"/>	All drawing files have had unused drawing layers, line types, blocks, text styles etc. purged from the drawing(s)
<input type="checkbox"/>	All additional layers comply to the layer naming convention as outlined in MWPA Guideline MWPA200 – Drafting Guidelines and AutoCAD Standards
<input type="checkbox"/>	All additional plot style tables have been prior approved by the MWPA and have been included with the drawings submission
<input type="checkbox"/>	The correct MWPA allocated drawing number has been assigned to each drawing
<input type="checkbox"/>	The register of Approved Allocated MWPA Drawing Numbers has been completed and included with the drawings submission

Signed:		Date:	
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