



AMSA Aid to Navigation Drafting Standard
("AMSA Standard")

Document Amendment

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Record of Amendments:

Revision	Date of Issue	Revision Details
A	5 December 2016	Draft for review
0	2 May 2017	Appendix A and B incorporated
1	8 August 2018	Appendix A and B updated Updated sections 3 and 10.11
2	18 April 2019	Updated sections 2, 3, 5, 7, 9, 10.3, 10.4, 10.8, 10.11, 10.12, 10.14, 10.15 and 12 Section 10.17 and 10.18 added Appendix A and B updated

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1 Scope

The AMSA Aid to Navigation Drafting Standard specifies the drafting requirements for drawings produced for the Australian Maritime Safety Authority (AMSA).

The purpose of this standard is to achieve consistency in the drafting content presented on drawings and standardise the drawing submission process.

This standard specifies the requirements for creating drawings using Computer Aided Drafting (CAD).

2 Application

The requirements of this AMSA Standard apply to all drawings created in relation to AMSA's Aid to Navigation (AtoN) network.

Any matters of drafting not covered by this standard are required to comply with the AS1100 series of standards. Guidance information for complying with AS1100 is contained in HB7 Engineering Drawing Handbook.

This standard is written on the basis that the draftsman is utilising Autodesk AutoCAD as their CAD software, irrespective of the CAD software utilised the requirements of this standard apply.

3 Referenced Standards

Unless otherwise specified, the applicable issue of a referenced standard is the latest edition.

AS1100.101	Technical drawing – General principles
AS1100.201	Technical drawing – Mechanical engineering drawing
AS1100.301	Technical drawing – Architectural drawing
AS1100.401	Technical drawing – Engineering survey and engineering survey design drawing
AS/NZS 1100.501	Technical drawing – Structural engineering drawing

4 Definitions

The following definitions apply in this standard:

AtoN	Aid to Navigation
AMSA	Australian Maritime Safety Authority
CAD	Computer Aided Drafting
Contractor/Service Provider	The company or person undertaking drafting works
Australian Standards	All relevant Australian Standards
AMSA Standard	This document

Table 4.1 Definitions

5 General CAD Requirements

All drawings must be created using CAD in third angle orthographic projections unless otherwise approved by AMSA.

6 Drawing File Format

AMSA's preference is that all drawings are created using AutoCAD. However the Draftsperson may use any CAD software but final submission must be .dwg format with the content of the drawing meeting the requirements of this standard.

7 Drawing Templates

All drawings created must utilise the AMSA Drawing Templates.

The AMSA Drawing Templates contain layer definitions, text and dimension style definitions and the drawing sheet frame and title block.

The title blocks contain variable fields, defined using AutoCAD "Attributes" for information input.

8 Drawing sets

Drawings must be organised into sets as per the drawing disciplines identified table 9.1.

The following electronic file name convention must be utilised for drawings submitted to AMSA:

ANZZZ-YYY- REV

ZZZ - three digit AtoN number for the site

YYY - drawing discipline refer to table 9.1

REV - the revision number of the drawing schedule in three digit format i.e. 001

9 Drawing Numbers

The following drawing numbering system must be utilised:

ANZZZ-YYY-XXX

ZZZ - three digit AtoN number for the site

YYY - drawing discipline refer to table 9.1

XXX - three digit drawing sheet number

Discipline	Letter	Comment
Electrical	ELE	Structural and mechanical items relating specifically to electrical installation must be included in the ELE drawing set
Structural	STR	Architectural drawings must be included in the STR drawing set.
Survey	SUR	Civil drawings must be included in the SUR drawing set.

Table 9.1 drawing disciplines

For electrical drawings the sheet number system defined in table 9.2 must be utilised.

Drawing type	Drawing Sheet Number
Drawing Schedule, general notes and symbol legend	100
Single line diagrams	200
Site layouts including equipment locations, plans and elevations	300
Wiring schematics	400
General bill of materials for items not included within bill of materials for the 700, 800 or 900 drawing sheets	500
Cable schedules	600
Electrical board drawings sets (generally consist of a wiring diagram, GA, label diagram & bill of materials for each board)	700
Electrical structural components (battery racks, lantern stands, custom ducts, cable support systems etc) and lightning protection system	800
Electrical mechanical components (drive motors, gearboxes etc)	900

Table 9.2 electrical drawing sheet numbers

Where there are multiple drawings sheets within a drawing type then the sheets shall be sequentially numbered with the first drawing sheet using the number in table 9.2.

For structural drawings the sheet number system defined in table 9.3 must be utilised.

Drawing type	Drawing Sheet Number
Drawing Schedule, general notes and design parameters	100
Site plan and details	200
Structural plans, elevations, sections and details	300
Other	400

Table 9.3 structural drawing sheet numbers

Where there are multiple drawings sheets within a drawing type then the sheets shall be sequentially numbered with the first drawing sheet using the number in table 9.3.

For other drawing disciplines a similar drawing sheet numbering system shall be utilised that best suits the drawing set being produced.

Prior to preparation of drawings AMSA must be consulted to confirm availability of drawing sheet numbers.

10 Drawing file specification

10.1 Drawing sheet size

All drawing sheet sizes must comply with AS1100.101. All drawings shall be A3 Sheet size, however must also be clearly legible when printed at A4 size.

10.2 Drawing environment

All drawings must utilise the “paper space/model space” feature of AutoCAD or similar feature of other CAD programs. Under this environment, all structures and details must be created in model space at a scale of one to one in millimetres and displayed in paper space using suitably scaled viewports.

The dimension label and annotation text associated with the details drawn shall be scaled to suit, annotative and inserted in paperspace. The drawing frame, title block, general notes, references, material lists and other general notation shall be inserted as paper space entities created in Mtext format at a scale of one to one on the drawing layout.

All drafting content must not be burst or exploded.

10.3 Text

The text on drawings shall appear in upper case and be consistent in size and placement. Lower case text may be utilised where trademarks, SI notation or recognised abbreviations dictate the requirement. The text must not overlap with lines or symbols. The text in drawings shall be readable with the title block at the bottom of the page or when the drawing is rotated 90° clockwise and the title block is to the left of the page as per the figure 10.3 below.

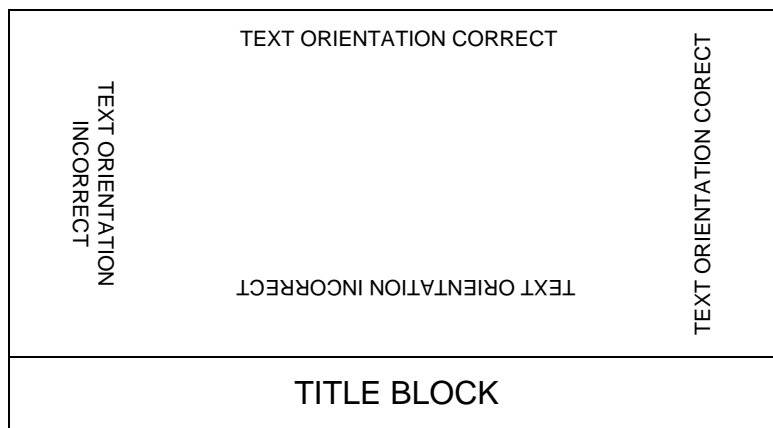


Figure 10.3 text direction

Text styles must be as per AS1100.101 utilising the ISOCIP or ISOCPEUR font as per the AMSA Drawing Template files.

10.4 Headings

All headings must be underlined. Headings for sections and details shall include a circle enclosing the identifying letter/number and where applicable a reference drawing sheet number. The scale must be indicated below each heading or alternative NTS shall be inserted where a drawing is not to scale. Examples are included on the AMSA Drawing Templates.

10.5 Sections

Sections must be identified by a letter placed inside a circle, when the section is placed on a different sheet to that of the original view then the sheet number must be shown in the lower half of the section circle; otherwise a dash '-' shall be placed in the lower half of the circle.

The orientation of a section should be consistent with the rules of projection. The section should be drawn to the same or larger scale than that of the original view and placed as near as possible to the view where it was cut.

10.6 Details

Details may be used to identify a particular area that requires clarity or areas that cannot be covered by a section. A detail must be identified by a number placed inside a circle, when the detail is placed on a different sheet to that of the original view then the sheet number must be shown in the lower half of the circle; otherwise a dash '-' shall be placed in the lower half of the circle.

An arrow may be utilised as a detail pointer if the item that is being detailed is small; otherwise a circle, square or rectangle utilizing a dashed line should be placed around the item/area to be detailed.

10.7 Dimensioning

All relevant drawing features shall be completely detailed with dimensions. All dimensions for a single feature should be shown on a single view where possible. Dimensions must not be scaled from the drawing.

All dimensions should be in millimetres, produced with the AutoCAD dimensioning command and be readable as specified for text in section 10.3. Dimensions must not be dropped or exploded.

Dimension styles must be as per the latest revision of the AMSA Drawing Template files including fonts and font sizes. Dimensions must be associative and use style ISO-25.

10.8 Drawing orientation

AMSA's preferred orientation is landscape.

Site plans shall be oriented with north to the top or left of the sheet. Site plans must include a north arrow in a suitable location on the sheet.

10.9 Drawing Layout

Drawings must be properly laid in a third angle orthographic projection to show all relevant aspects of the feature being depicted. Auxiliary sections, isometric and oblique views, photographs or rendered sections should be used to supplement the orthographic projections and provide clarity for features that would otherwise be difficult to understand; however, they should not be used as an alternative to orthographic projections.

10.10 Drawing Layers

All drawing information is to be structured by utilising a logical layer naming convention as per the AMSA Drawing Template. Where the AMSA Drawing Template does not include sufficient layers; new layers may be added utilising a similar naming convention to the existing layers contained within the AMSA Drawing Template.

All linework and text entities are to be drawn 'ByLayer' with no associated lineweights or thicknesses.

Graphic thickness of all linework must be as per the AMSA Drawing Templates in conjunction with the AMSA.ctb file.

10.11 Title block information

The AMSA Drawing Template must be utilised for all drawings, each cell in the title block must be populated as outlined below:

SITE: AtoN number - Site Name

TITLE:

- Description line 1: Overall descriptor i.e. ATON EQUIPMENT & POWER SUPPLY, HELIPAD, REGULATOR BOARD
- Description line 2: Type of drawing i.e. SINGLE LINE DIAGRAM, GENERAL ARRANGMENT, SECTION or a description of what the drawings is depicting i.e. FOUNDATION, ACCESS PLATFORM
- Description line 3: Type of Drawing when line 2 is utilised as a description i.e. GENERAL ARRANGEMENT, SECTION

Examples of acceptable titles are:

ATON EQUIPMENT & POWER SUPPLY SINGLE LINE DIAGRAM	HELIPAD FOUNDATION GENERAL ARRANGEMENT
REGULATOR BOARD LABELLING GENERAL ARRANGEMENT	HELIPAD GENERAL ARRANGEMENT

REVISION: Prior to “issued for construction” all drawings shall have a revision letter starting at A, each subsequent revision shall use the next consecutive letter. The first “issue for construction” drawing shall have a revision number 0, each subsequent revision shall use the next consecutive number.

DRAWN: initial of first name and full last name of the draftsman

DESIGNED: initial of first name and full last name of the designer (where applicable the designer’s certification number such as RPEQ shall also be included in this cell). For drawings such as drawing schedules, electrical symbol library’s and AMSA standard regulators boards the designed cell shall have NA inserted.

CHECKED: initial of first name and full last name of the Contractors person undertaking the design check

APPROVED: initial of first name and full last name of the Contractors person who approved the drawings

DATE APP'D: The date the drawing is approved by the Contractor

SCALE: the scale used, if all components of the drawing are to one scale, otherwise, AS SHOWN where multiple scales are utilised or NTS where the drawings is not to scale.

STATUS: a brief description of the status of the drawing i.e. preliminary, concept, Issued for construction, as built etc

Refer to section 10.12 for requirements in filling out the amendment table.

The AMSA logo must not be removed or altered.

10.12 Amendment Table

The amendment table must be utilised as follows:

- Revision A and 0 the amendment table shall be left blank
- For each drawing submitted after revision A the amendment table shall be completed as follows

NO. :	next consecutive letter
AMENDMENT DESCRIPTION:	description of change. (For the drawing schedule this must only list the sheet number for those drawings that have been amended)
DRAWN:	Initials of Draftsperson
DESIGNED:	Initials of the Contractors person who undertook the design change, if the revision does not involve a design change then NA shall be inserted
CHECKED:	Initials of the Contractors person who is undertaking the design check
APPR:	initials of the Contractors person who approved the drawing
Date	The date the revised drawing is approved by the Contractor

- Upon release of the rev 0 drawings the amendment list shall be cleared
- For each subsequent issue of the drawing the amendment table shall be revised as above however utilising the next sequential number for NO:

The amendment description must be a concise and accurate description of the changes made to the drawing for that revision or a description of the phase of review or approval that the drawing is being issued as. Examples of suitable amendment descriptions include:

ISSUED FOR TENDER	DETAIL 1 – BOLT ARRANGEMENT REVISED
ISSUED FOR CONSTRUCTION	COLUMN ADDED GRID A12
DETAIL 3 DELETED	DETAIL 2 ADDED

10.13 External References

Drawings containing external references shall be considered as working drawings only and will not be accepted as final drawings. Prior to submission of final drawings to AMSA all external references must be bound to individual drawings.

10.14 Multiple sheet layouts

Drawings shall be created as a single file utilising multiple sheet layouts for each discipline listed in table 9.1.

Each tab within a drawing file must be labelled as per the drawing number.

10.15 Electrical drawing cell Library

A cell is a symbol used to represent a frequently used feature. AMSA has created a cell library for frequently used electrical symbols and electrical boards/components. Where a cell is available it must be utilised for all electrical drawings. If a cell is not available an alternative symbol agreed with AMSA shall be utilised and the symbol added to the legend for that drawing set.

The cells contained within the AMSA electrical cell library have been drawn to display at the correct size for AMSA's preferred drawing sheet size and as such must not be scaled unless approved otherwise.

Cells may be amended where the connection/termination details are different to those depicted in the cell due to varying equipment configurations. However the general appearance, size and labelling must remain consistent with the original cell.

The AMSA electrical cell library is included in Appendix B.

A symbol legend must be included in each electrical drawing set. The symbol legend must include only the cells/symbols utilised in that drawing set. The symbol legend must be a separate sheet/s within the drawing set and must be included within the 100 drawing sheets after the drawing schedule and general notes sheets.

10.16 Notes

AMSA's preference is for all notes to be placed at the bottom right above the title block in the area depicted on the AMSA Drawing Template, however alternative positions may be utilised to suit the drawing. Each note must be provided with a sequential reference number.

10.17 Materials Schedules

All bills of materials must utilise the below table format:

BILL OF MATERIALS				
REFERENCE or ITEM No.	DESCRIPTION	PART No.	QUANTITY	MANUFACTURER

The bill of materials must be populated as follows:

REFERENCE: a brief description of the component i.e. PV1, JB1, CABLE TRAY
ITEM No.: this heading shall be utilised when the components are individually labelled with on the drawing with an item number
DESCRIPTION: extended description of the component i.e. 40 WATT 12 VOLT SOLAR panel or TERMINAL MOUNTED FUSE HOLDER
PART No.: the manufacturers designated part or model number
QUANTITY: the quantity of that component utilised
MANUFACTURER: the name of the manufacturer (this is not the supplier or vendor)
Alternative formats may be proposed by the Contractor where the above is not suitable.

Member schedules for structural drawings must utilise a similar format to the below table and as a minimum incorporate the below headings:

MEMBER SCHEDULE				
ITEM No. or MARK	DESCRIPTION	SIZE	COMMENTS	MATERIAL

The Member schedule must be populated as follows:

ITEM No.: this heading shall be utilised when the components are individually labelled on the drawing with an item number

MARK: this heading shall be utilised when the components are individually labelled on the drawing with an alphanumeric mark

DESCRIPTION: a description of the component i.e. FLOOR JOIST, PERIMETER BEAM

SIZE: the size of the member i.e. 100x100x8 EA

COMMENTS: general comments regarding the member such as fastener or cleat details

MATERIAL: The material type and Grade

10.18 Drawing Schedule

All drawing schedules must utilise the below table format unless approved otherwise:

DRAWING SCHEDULE		
DRAWING NUMBER	DRAWING TITLE	REVISION NUMBER

The drawing schedule must include every drawing within the drawing set and must be updated when drawings are added to the set or a drawing within the set has a revision change.

The drawing schedule must be on a separate sheet and the first drawing within a drawing set i.e. sheet 100.

11 Modification to drawings

When a drawing is amended the amendment revision table must be updated as per section 10.12. The amendments must be highlighted with a revision cloud and a revision triangle with the revision letter/number inside placed beside the cloud. For each subsequent revision the previous revision clouds and triangles shall be removed for clarity.

12 Submission of drawings to AMSA

All drawings must be submitted to AMSA in .pdf format with the exception of final submission drawings which must be submitted in both .pdf and .dwg format.

Files sizes greater than 10mb must not be submitted by email, alternative means agreed with the AMSA Officer must be utilised.

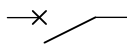
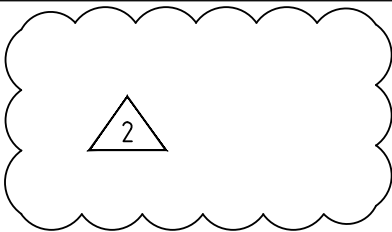



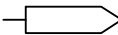
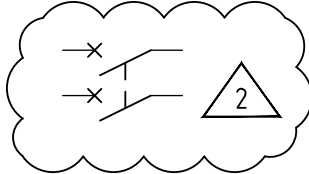





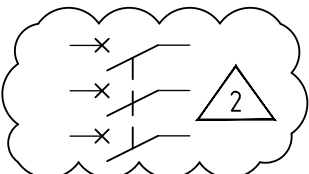




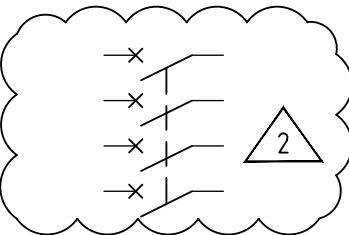


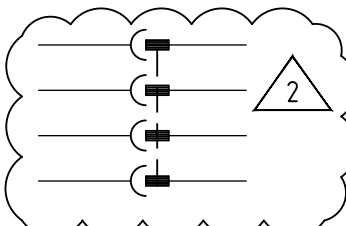

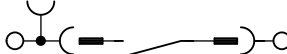


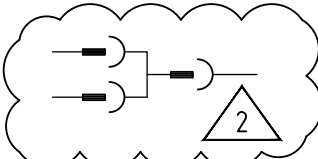

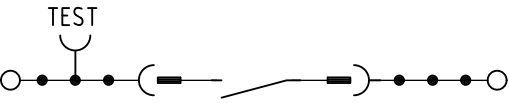


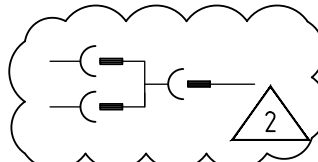

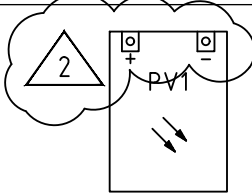

Contractors may utilise their own transmittal form for submission of final drawings to AMSA.

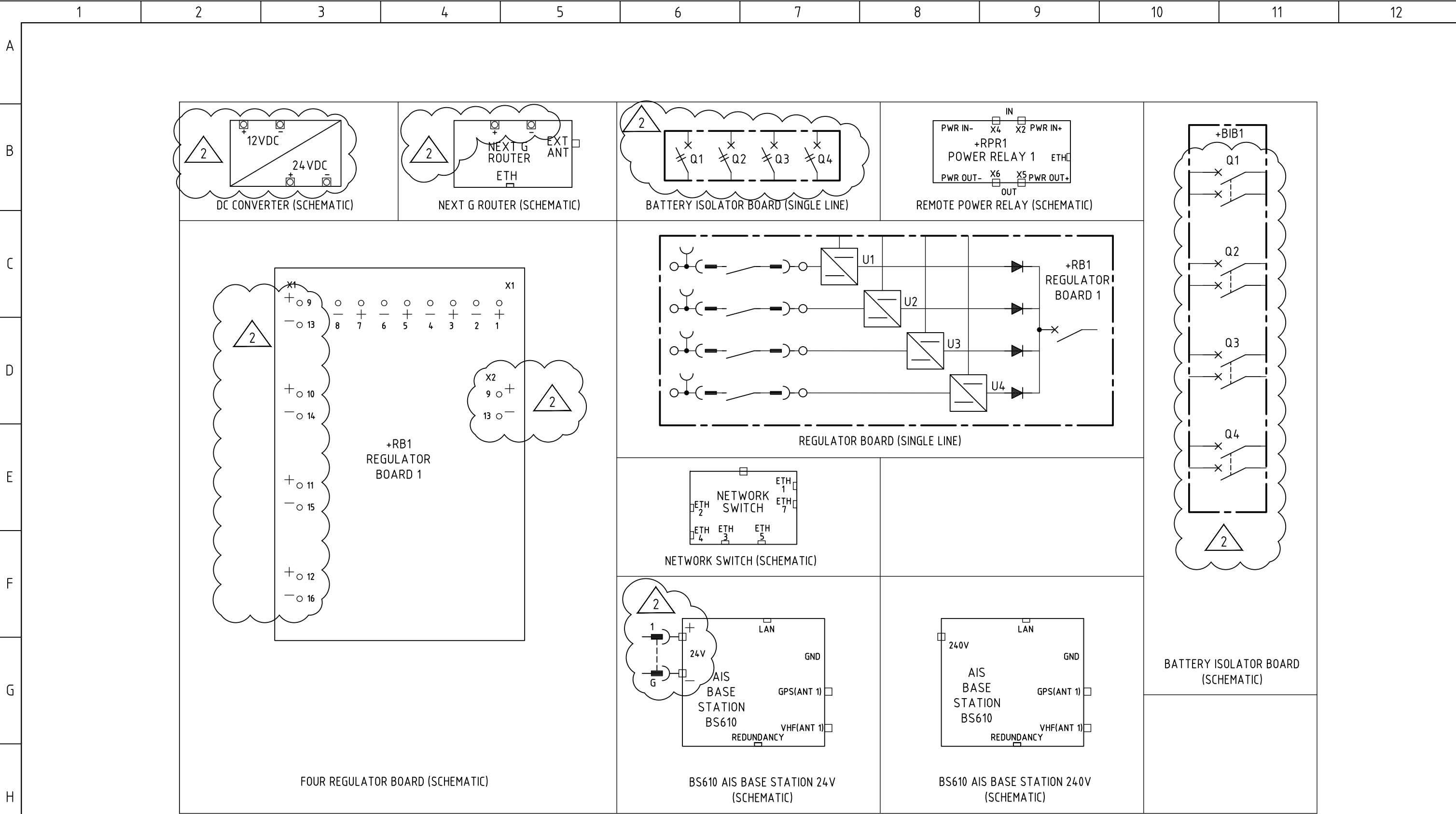
Prior to submission of final drawings to AMSA the following must be undertaken:

- all external references must be converted to AutoCAD 'BLOCKS' using the AutoCAD 'BIND' command
- all files must be cleaned and purged using the AutoCAD 'PURGE' command
- All redundant drawing information is to be removed from drawings including any unused blocks or linework outside the extents of the drawing sheet
- all files shall be checked for database errors using the AutoCAD 'AUDIT' command and any encryption or passwords removed.

APPENDIX A - AMSA Drawing Templates


APPENDIX B - AMSA Electrical Symbol Cell Library

	1	2	3	4	5	6	7	8	9	10	11	12			
A															
B															
C	CIRCUIT BREAKER - 1 POLE		DISCONNECT TERMINAL			MALE CONTACT SOCKET			RECTIFIER (SINGLE LINE)			FUSE	WIRING DESTINATION		
D													WIRING INPUT		
E	CIRCUIT BREAKER - 2 POLE (SCHEMATIC)	CIRCUIT BREAKER - 2 POLE (SINGLE LINE)	ISOLATION PIN TERMINAL			FEMALE CONTACT SOCKET			INVERTER (SINGLE LINE)			RELAY			
F												+	ANTENNA - GENERAL / VHF		
G	CIRCUIT BREAKER - 3 POLE (SCHEMATIC)	CIRCUIT BREAKER - 3 POLE (SINGLE LINE)	TERMINAL			PLUG & SOCKET			D.C. CONVERTER (SINGLE LINE)			POSITIVE SIGN			
H												-	ANTENNA - GPS		
												ANTENNA - SATELLITE			
	DISCONNECT TEST TERMINAL (SINGLE LINE)				CONNECTION POINT		EARTH		BRANCH CONNECTOR +		DIODE				
															
	DISCONNECT TEST TERMINAL (SCHEMATIC)							COMPONENT		CHASSIS - EARTH		BRANCH CONNECTOR -		SOLAR PANEL (SINGLE LINE)	SOLAR PANEL (SCHEMATIC)
NO	AMENDMENT REVISION - DESCRIPTION	DRAWN	DESIGNED	CHECK	APPR	DATE	 Australian Government Australian Maritime Safety Authority		DRAWN	S.ANDRZJCAK	SITE				
									DESIGNED	D. ATKINS					
									CHECKED	D. ATKINS					
									APPROVED	D. ATKINS					
									DATE APP'D	26.04.17					
2	UPDATED TO SUIT REVISED STANDARDS	SJA	DA	DA	DA	17.04.19	This drawing and any information or descriptive matter set out hereon are the confidential and copyright property of Australian Maritime Safety Authority and must not be disclosed, loaned, copied or used for manufacturing / tendering or for any other purpose without their written permission.		SCALE	NTS	TITLE AMSA ELECTRICAL CELL LIBRARY SHEET 1				
1	DRAWING SYMBOL SIZE CHANGED	MBT	DA	DA	DA	28.02.18			STATUS	NA					
0	ISSUED FOR USE	SJA	DA	DA	DA	26.04.17									
REVISIONS TO BE MADE ON CAD ONLY BY APPROVED PERSONS															
									SIZE	DRAWING NUMBER	REVISION				
									A3	AMSA-ELE-100	2				



NO	AMENDMENT REVISION - DESCRIPTION	DRAWN	DESIGNED	CHECK	APPR	DATE
2	UPDATED TO SUIT REVISED STANDARDS	SJA	DA	DA	DA	17.04.19
1	DRAWING SYMBOL SIZE CHANGED	MBT	DA	DA	DA	28.02.18
0	ISSUED FOR USE	SJA	DA	DA	DA	26.04.17

REVISIONS TO BE MADE ON CAD ONLY BY APPROVED PERSONS

<div></div> <div>Australian Government</div> <div>Australian Maritime Safety Authority</div>	DRAWN	S.ANDRZJCAK	SITE		
	DESIGNED	D. ATKINS			
	CHECKED	D. ATKINS			
	APPROVED	D. ATKINS	TITLE AMSA ELECTRICAL CELL LIBRARY SHEET 3		
	DATE APP'D	26.04.17			
	SCALE	NTS			
This drawing and any information or descriptive matter set out hereon are the confidential and copyright property of Australian Maritime Safety Authority and must not be disclosed, loaned, copied or used for manufacturing / tendering or for any other purpose without their written permission.	STATUS	NA	SIZE A3	DRAWING NUMBER AMSA-ELE-102	REVISION 2

	1	2	3	4	5	6	7	8	9	10	11	12
A												
B												
C												
D												
E												
F												
G												
H												

X1

+○ 13

○ 19

○ 12

+○ 11

○ 10

+○ 9

○ 8

+○ 7

○ 6

+○ 5

○ 4

+○ 3

○ 2

+○ 1

X1

+○ 14

○ 20

+○ 15

○ 21

+○ 16

○ 22

+○ 17

○ 23

+○ 18

○ 24

+RB1

REGULATOR


BOARD 1

X2

13○ +

19○ -

SIX REGULATOR BOARD (SCHEMATIC)

NO	AMENDMENT REVISION – DESCRIPTION	DRAWN	DESIGNED	CHECK	APPR	DATE	<div><div></div><div>Australian Government</div><div>Australian Maritime Safety Authority</div></div> <div><small>This drawing and any information or descriptive matter set out hereon are the confidential and copyright property of Australian Maritime Safety Authority and must not be disclosed, loaned, copied or used for manufacturing / tendering or for any other purpose without their written permission.</small></div>	DRAWN	S.ANDRZJCZAK	SITE		
								DESIGNED	D. ATKINS	TITLE AMSA ELECTRICAL CELL LIBRARY SHEET 4		
								CHECKED	D. ATKINS			
								APPROVED	D. ATKINS			
								DATE APP'D	17.04.19			
							SCALE	NTS	SIZE	DRAWING NUMBER		REVISION
0	ISSUED FOR USE	SJA	DA	DA	DA	17.04.19	STATUS	NA	A3	AMSA-ELE-103		0
REVISIONS TO BE MADE ON CAD ONLY BY APPROVED PERSONS												