ENGINEERING DRAWING STANDARDS



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DOCUMENTATION CONTROL PAGE

Document Control

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1. PURPOSE

The purpose of this document is to ensure that all CAD files and drawings are created in a logical and consistent format, and in a manner reflecting consistent design and drawing practice during the execution of capital and maintenance projects within Transnet National Ports Authority (TNPA).

2. SCOPE AND OBJECTIVES

This standard applies to all capital and maintenance engineering and design drawings, and to be applied by engineering personnel within Transnet National Ports Authority (TNPA), as well as external contractors and consultants appointed by TNPA, whom are responsible for developing, creating and issuing drawings.

All engineering staff, Contractors and Consultants that are involved in the production of drawings for TNPA, will be issued with this standard and must ensure compliance. It is noted that where fabrication shop details are required, it is not necessary for the contractor to comply with these standards and their own draughting packages may be used. However, TNPA templates should be used for all submissions.

General drawing practice shall comply with current discipline-specific South African Standards.

2.1 Applicability

These Guidelines are applicable to all TNPA Ports.

2.2 Deviations

Where existing infrastructure and project specific conditions require deviation from this document, such deviations must be approved by the relevant Drawing Office Manager of TNPA.

3. LEGISLATION, REGULATION AND REFERENCE DOCUMENTS

- ISO 216: Writing Paper and certain classes of printed matter.
- ISO 9001: Quality management systems- Requirements
- SANS 10144: Detailing of steel reinforcement for concrete.
- SANS 10143: Building Drawing Practice
- SANS 1044-2: Welding Part II: Symbols
- SANS 10111: Engineering Drawing Part 1,2 and 3
- SANS 282: Bending dimensions of bars for concrete reinforcement.
- South African Institute of Steel Construction (SAISC) Standard

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- BS 3939: Graphical symbols for electrical power, telecommunications, and electronic diagrams
- ENG-P-0105: Engineering Drawings *(Referenced procedure to be revised and assigned a new document number)*.
- ENG-GL-0103: Revision of Technical Documents *(Reference procedure to be revised and assigned a new document number).*

4. RESPONSIBILITY

Administrators of the Drawing Standards are responsible for monitoring the implementation of the Standards and ensuring adherence to the Standards.
Any proposed changes to the Drawing Standards must be submitted to the TNPA' Centre of Excellence (COE) for review and approval. Final approval vests with the COE and subject to the extent of the variations, final approval shall be the responsibility of the Centre of Excellence (where deemed necessary).

5. PROCEDURE

This standard should be read together with Engineering Procedure ENG-P-0105: Engineering drawings and ENG-GL-0103 *(Referenced procedure to be revised and assigned a new document number).*

6. DRAWING STANDARDS

6.1 Glossary of Terms

COE	Centre Of Excellence
TNPA	Transnet National Ports Authority
IED	Infrastructure Engineering Design
ISO	International Standards Organization
SANS	South African National Standards
2D	Two Dimensional
3D	Three Dimensional
CAD	Computer Aided Design
DGN	MicroStation format graphics files and suffix
DWG/DXF	AutoCAD format graphics files and suffix
RVT	Revit format graphics files and suffix
DR4	Civil Designer format graphics files and suffix

6.2 Software

Only the most current versions of software shall be used, and the type to be used is subject to the nature of the project end expected end results.
All Civil Engineering related drawing work can be executed in AutoCAD, MicroStation and Civil Designer. Drawing work that has Building, Structural, Marine, Mechanical and Electrical infrastructure can be drawn with the use of Revit and AutoCAD. In cases where an alternative software is used, it should be compatible with the aforementioned software without tempering with the accuracy of contents of the drawing and the CAD standards.

6.3 Units

All drawings will conform to SI units (Systems International).
In model space, objects should be drawn in real world units. i.e., 1 unit = 1 meter.

6.4 Language

All notes, comments and text will be in the English language (UK Standard)
All instructions on a drawing shall be in the imperative tense i.e.: Pipe to be cut, connection to be welded, etc.

6.5 Templates

A template with all title blocks, text attributes, layer or level controls must be used when starting a new drawing. Templates are set up for each specific discipline i.e., Civil must use their specific templates, Architects their specific template etc. These discipline specific templates contain the discipline specific layer or level control.

Drawings/models must be done in model space. Viewports must then be created in the paper space at the required scale.

General notes must be done in paper space i.e., on the actual drawing sheet and any additional notes specific to the contents of the drawing to be done in model space. Text size and font to be maintained throughout

6.6 Drawing Sizes

The drawing sheet sizes tabled below are of the international Standards ISO 216:

Designation	Trimmed Size (W x L)
A0	841 x 1189
A1	594 x 841
A2	420 x 594
A3	297 x 420
A4	210 x 297

Table 1: Sheet Sizes

Long drawings, where necessary for wiring/circuit diagrams, cable run diagrams, track layouts etc. shall be prepared with widths equal to the widths of "A" series sheets, as required.

6.7 Scales

The requirements of scale settings are as follow:
When using model space, the design must always be full size, i.e., active scale = 1:1.
The title block shall not be scaled.

The viewport will be created on the drawing sheet (in paper space) and scaled to the required scale, rather than trying to scale the drawing sheet to a scale.

In the case of non-dimensional drawings such as diagrammatic drawings, the viewport must be scaled to suit the drawing sheet.

Where there are different scales in a drawing, it is preferred to indicate "AS SHOWN" in the title block to prevent errors.

Different vertical and horizontal scales may be chosen in order to exaggerate a profile or to clarify thin layers of a section.

The preferred scales are:

1:1	1:2	1:5
1:10	1:25	1:50
1:100	1:20	1:500
1:1000	1:200	1:5000
1:10000	1:2000	1:50000
1:100000	1:20000	

Table 2: Drawing Scales

6.8 Draw Scales

The following tables will assist in selecting the correct text size, dim scale, and XP Scales.

Draw scale = 1:1 (mm)

Required Scale	Dim Scale	XP Scale	Text Size				
			1.8	2.5	3.5	5	7
1:1	1	1	1.8	2.5	3.5	5	7
1:2	2	0.5	3.6	5	7	10	14
1:5	5	0.2	9	12.5	17.5	25	35
1:10	10	0.1	18	25	35	50	70
1:20	20	0.05	36	50	70	100	140
1:25	25	0.04	45	62.5	87.5	125	175
1:30	30	0.0333	54	75	105	150	210
1:50	50	0.02	90	125	175	250	350
1:100	100	0.01	180	250	350	500	700
1:200	200	0.005	360	500	700	1000	1400
1:250	250	0.004	450	625	875	1250	1750
1:500	500	0.002	900	1250	1750	2500	3500
1:1000	1000	0.001	1800	2500	3500	5000	7000
1:2000	2000	0.0005	3600	5000	7000	10000	14000
1:2500	2500	0.0004	4500	6250	8750	12500	17500
1:5000	5000	0.0002	9000	12500	17500	25000	35000
1:10000	10000	0.0001	18000	25000	35000	50000	70000

Table 3: Draw Scales (1:1) mm

Draw scale = 1:1000 (m)

Required Scale	Dim Scale	XP Scale	Text Size				
			1.8	2.5	3.5	5	7
1:1	0.001	1000	0.0018	0.0025	0.0035	0.005	0.007
1:2	0.002	500	0.0036	0.005	0.007	0.01	0.014
1:5	0.005	200	0.009	0.0125	0.0175	0.025	0.035
1:10	0.01	100	0.018	0.025	0.035	0.05	0.07
1:20	0.02	50	0.036	0.05	0.07	0.1	0.14
1:25	0.025	40	0.045	0.0625	0.0875	0.125	0.175
1:30	0.03	33.3333	0.054	0.075	0.105	0.15	0.21
1:50	0.05	20	0.09	0.125	0.175	0.25	0.35
1:100	0.1	10	0.18	0.25	0.35	0.5	0.7
1:200	0.2	5	0.36	0.5	0.7	1	1.4
1:250	0.25	4	0.45	0.625	0.875	1.25	1.75
1:500	0.5	2	0.9	1.25	1.75	2.5	3.5
1:1000	1	1	1.8	2.5	3.5	5	7
1:2000	2	0.5	3.6	5	7	10	14
1:2500	2.5	0.4	4.5	6.25	8.75	12.5	17.5
1:5000	5	0.2	9	12.5	17.5	25	35
1:10000	10	0.1	18	25	35	50	70

Table 4: Draw Scale (1:1000) m.

XP Scale = Draw Scale / Plot Scale

Dim Scale = Plot Scale / Draw Scale

Text Size = Plot Scale / Draw Scale x Text Size required

Draw Scale = 1 if you are drawing in millimetres, 1000 if you are drawing in meters.

Plot Scale = The scale that you wish your drawing to be plotted at e.g., 1:50, 1:50 000

Text Size = The size that you need to draw the text entities at.

Text Size required = The size of the text that you require on your print.

6.9 Text Attributes

All text in drawings should be in the respective layer of the service/structure they belong to i.e., *C_EX_SEWER TXT, A_N_BR TXT* and shall be as described in the table below. All text properties (font size, width factor, font type and colour) contained in the title block shall not be tempered with and all properties be as per template drawing.

FONT TYPE AND FONT SIZE USAGE GUIDELINE

Item	Font Type	Colour	Text Width Factor	Font Size (mm) (when viewed on Paper Space)
Drawing Title Heading	Arial Narrow	Green (3)	1	5
Drawing Title Scale	Arial Narrow	Yellow (2)	1	2.5
Notes on Site Layouts	Arial Narrow	Green (3)	1	2.5
Dimensions	Arial Narrow	Green (3)	1	2.5
Existing Structures and Services (not affected by scope)	Arial Narrow	Grey (8)	0.7	2.5
Existing Structures and Services (part of scope)	Arial Narrow	Red (1)	1	2.5
New Structures and Services	Arial Narrow	Green (3)	1	2.5
Grid (Civil)	Arial Narrow	Grey (8)	1	3.5
Grid (Building)	Arial Narrow	Red (1)	1	3.5
ERF Numbers	Arial Narrow	Grey (8)	1	5

Table 5: Font Types and Sizes

6.10 Dimensioning

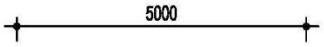
Dimensions should comprise the following properties:

- All detailed dimensions shall be in millimetres.
- All elevations shall be in metres up to 3 decimal places, and clearly indicated, i.e.: EL 23.000 m
- Co-ordinates shall be stated in metres to 3 decimal places.
- Dimensioning must be done whilst in paper space, in an active viewport. This is done so that the dimension size will always be consistent in scale i.e., it will be relative in scale to the scale that the viewport is set at.
- Dimensions are not to be exploded.
- Text size to suit text attributes as tabled in clause 6.9 above.
- Arrow sizes should be 2.5mm when viewed on paper. If it is deemed necessary, standard text sizes should be applicable to arrow/leader sizes, i.e., 1.8mm, 2.5mm, 3.5mm etc.

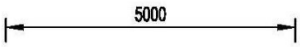
Examples:



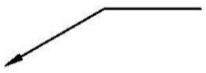
Dimension with oblique line



Dimension with dot



Dimension with arrow



Leader

Figure 1: Dimension Styles

6.11 Hatching

All hatching to be done in accordance with SANS 10143 as a first preference. Specialist hatching can be used where deemed necessary

6.12 Standard Pen Thicknesses

PEN NO. & LINE COLOR		LINE THICKNESS	
1. RED		0.13	
2. YELLOW		0.25	
3. GREEN		0.35	
4. CYAN		0.5	
5. BLUE		0.7	
6. MAGENTA		0.15	
7. WHITE		0.25	
8. DARK GREY		0.05	
9. LIGHT GREY		0.13	

Figure 2: Pen Palette (All Black)

The standard colours indicated above should be printed in black. In cases where a colour print is necessary, the rest of the pen palette can be utilized as needed. It is preferable for existing elements to be drawn in a light colour. e.g., colour 8 (Dark grey), and newer elements to be drawn in colour 3,4, and 5.

6.13 Layer Control

Standard layers with their own identities will be used in all drawings, indicating if *New or Existing*. The following categories apply:

a) Common layers (without discipline prefix)
b) Architectural layers (A_)
c) Civil layers (C_)
d) Structural layers (S_)
e) Electrical, light and power layers (E_)
f) Mechanical layers (M_)
g) Overhead Track Equipment layers (O_)
h) Signal layers (N_)
i) Telecommunications layers (V_)
j) Perway layers (P_)
k) G.I.S. / Land surveying layers (G_)

There are no specific layers set out in this document; save to say that text and all different objects and features must be named in its own layer.

Should further Layers or Levels be required the discipline specific prefix should be used.

LAYER NAME	DESCRIPTION	COLOUR	LINE TYPE	PLOT STYLE	PLOT
0	STANDARD LAYER	WHITE	CONT	MONO	YES
VPORT	VIEWPORTS IN LAYOUTS	254	CONT	NORMAL	NO
FRAME	TITLE BLOCK FRAME	WHITE	CONT	MONO	YES
LOGOS	LOGO LAYER	WHITE	CONT	MONO	YES

Table 6: Common Layers

It is not preferred to use any of the layers above for discipline specific layers. All layers should be categorized by the discipline, new or existing and the service or structure to which they present.

LAYER NAME	DESCRIPTION	COLOUR	LINE TYPE	PLOT STYLE	PLOT
A_N_BR	NEW BRICKWALLS	RED	CONT	MONO	YES
A_X_BR	EXTG BRICKWALLS	YELLOW	CONT	MONO	YES
A_X_BR-TXT	NEW BRICKWALL TEXT	GREEN	CONT	MONO	YES
A_N_CONC	NEW CONCRETE	GREEN	CONT	MONO	YES
A_X_CONC	EXTG CONCRETE	YELLOW	CONT	MONO	YES
A_DOOR	DOORS	MAGENTA	CONT	MONO	YES
A_FIT	FITTINGS	CYAN	CONT	MONO	YES
A_FLFIN	FLOOR FINISH	8	CONT	MONO	YES
A_GRID	GRIDLINES	9	CENTRE	MONO	YES
A_HIDE	HIDDEN LINES	CYAN	HIDDEN	MONO	YES
A_N_PART	NEW PARTITIONS	BLUE	CONT	MONO	YES
A_X_PART	EXTG PARTITIONS	YELLOW	CONT	MONO	YES
A_REM	DEMOLISH/REMOVE	9	DASHED	MONO	YES
A_WIN	WINDOWS	MAGENTA	CONT	MONO	YES
A_SITE	SITE AND LOCALITY PLANS	RED	CONT	MONO	YES
A_DIM	DIMENSIONS	RED	CONT	MONO	YES
A_BR-N2	CAVITIES	RED	CONT	MONO	YES
A_SEW	DRAINAGE PLAN	GREEN	CONT	MONO	YES
A_SW	STORMWATER PLAN & SECTION	RED	CONT	MONO	YES
A_BL	BUILDING LINE	8	HIDDEN	MONO	YES

Table 7: Typical Architectural Layers

NAME	DESCRIPTION	COLOUR	LINE TYPE	PLOT STYLE	PLOT
C_X_BENCH	BENCHMARKS	WHITE	CONT	MONO	YES
C_N_BLD	PROPOSED BUILDINGS	GREEN	CONT	MONO	YES
C_X_BLD	EXISTING BUILDINGS	RED	CONT	MONO	YES
C_N_CHAIN	CHAINGE	MAGENTA	CONT	MONO	YES
C_N_CULV	PROPOSED CULVERTS	GREEN	CONT	MONO	YES
C_X_CULV	EXISTING CULVERTS	MAGENTA	CONT	MONO	YES
C_X_FNC-PC	EXISTING FENCING- PRECAST	MAGENTA	DIVIDE	MONO	YES
C_X_FNC-ST	EXISTING FENCING-STEEL/WIRE	CYAN	FENCE3	MONO	YES
C_N_FNC-PA	FENCING-PALISADE	YELLOW	FENCE2	MONO	YES
C_N_FNC-PC	FENCING-PRECAST CONCRETE	YELLOW	DIVIDE	MONO	YES
C_N_FNC-ST	FENCING-STEEL/WIRE	YELLOW	FENCE3	MONO	YES
C_GRID	GRID LINES	251	CONT	MONO	YES
C_N_KERB	PROPOSED KERBING	GREEN	CONT	MONO	YES
C_X_KERB	EXISTING KERBING	8	CONT	MONO	YES
C_N_PAV	NEW PAVING	WHITE	CONT	MONO	YES
C_N_SEW	PROPOSED SEWER	40	DASH/DOT	MONO	YES
C_X_SEW	EXISTING SEWER	41	DASH/DOT	MONO	YES
C_N_SW	PROPOSED STORMWATER	150	DIVIDE	MONO	YES
C_N_SW-TXT	PROPOSED STORMWATER TEXT	GREEN	CONT	MONO	YES
C_X_SW	EXISTING STORMWATER	151	DIVIDE	MONO	YES
C_X_SW-TXT	EXISTING STORMWATER TEXT	RED	CONT	MONO	YES

Table 8: Typical Civil Layers

NAME	DESCRIPTION	COLOUR	LINE TYPE	PLOT STYLE	PLOT
S_STEEL1	DETAIL1:5/1:10	GREEN	CONT	MONO	YES
S_STEEL2	PLAN/SECT/ELEV	WHITE	CONT	MONO	YES
S_STEEL3	DET/PLAN/SECT	YELLOW	DASHED	MONO	YES
S_STEEL4	DETAIL1:2	CYAN	CONT	MONO	YES
S_STEEL5	PLAN/SECT/ELEV	RED	CONT	MONO	YES
S_STEEL6	PLAN/SECT/ELEV	RED	DASHED	MONO	YES
S_STEEL7	DETAILS	YELLOW	DASHED	MONO	YES
S_STEEL8	EXISTING	RED	DASH/DOT	MONO	YES
S_CONC1	FOUND/PLAN	GREEN	CONT	MONO	YES
S_CONC2	REBAR DETAIL	GREEN	CONT	MONO	YES
S_CONC3	REBAR FOUND	YELLOW	CONT	MONO	YES
S_CONC4	REBAR FOUND	YELLOW	DASHED	MONO	YES
S_CONC5	REBAR FOUND	WHITE	CONT	MONO	YES
S_WALLS	WALLS	RED	CONT	MONO	YES
S_HATCH	PROPOSED HATCH	8	CONT	MONO	YES
S_HATCH EX	EXISTING HATCH	15	CONT	MONO	YES
S_SLABLINE	SLAB LINE	MAGENTA	CONT	MOMO	YES
S_REBAR	REBAR	CYAN	CONT	MONO	YES
S_COLUMN	COLUMN PLAN	GREEN	CONT	MONO	YES

NAME	DESCRIPTION	COLOUR	LINE TYPE	PLOT STYLE	PLOT
S_CONC	CONCRETE SECTION	CYAN	CONT	MONO	YES
S_REBAR	REBAR SECTION	RED	CONT	MONO	YES
S_DIMENSIO	DIMENSION	RED	CONT	MONO	YES
S_BEAM_DS	BEAM DS	BLUE	CONT	MONO	YES
S_BEAM_US	BEAM US	BLUE	CONT	MONO	YES

Table 9: Typical Structural Layers

NAME	DESCRIPTION	COLOUR	LINE TYPE	PLOT STYLE	PLOT
E_CABLE	ELECTRICAL CABLES BELOW SURFACE	222	ELEC-1	MONO	YES
E_CDUCT	DOWN CONDUCTORS	BLUE	CONT	MONO	YES
E_COND	CONDUITS	WHITE	DASH	MONO	YES
E_DBOARD	DISTRIBUTION BOARDS	YELLOW	CONT	MONO	YES
E_EARTH	EARTH SPIKE	RED	CONT	MONO	YES
E_EX	EXISTING ELECTRICAL	9	CONT	SCREEN60	YES
E_LUM	LUMINAIRES	RED	CONT	MONO	YES
E_PSKIRT	POWER SKIRTING	245	DASH	MONO	YES
E_REM	REMOVED/OBSOLETE ELEC ITEMS	CYAN	DASH	MONO	YES
E_SW-SOC	LIGHT SWITCHES, SOCKET OUTLETS	WHITE	CONT	MONO	YES
E_WIRE	ELECTRICAL WIRING	YELLOW	CONT	MONO	YES
E_ELP	ELECTRICAL LIGHT POLE	RED	CONT	MONO	YES
E_HLM	HIGH LIGHT MAST	RED	CONT	MONO	YES

Table 10: Typical Electrical Layers

NAME	DESCRIPTION	COLOUR	LINE TYPE	PLOT STYLE	PLOT
M_AIRCON	AIRCONDITIONERS	MAGENTA	CONT	MONO	YES
M_DUCT	AIRCON DUCTING	WHITE	CONT	MONO	YES
M_FANS	EXTRACTOR & CEILING FANS	CYAN	CONT	MONO	YES

Table 11: Typical Mechanical Layers

NAME	DESCRIPTION	COLOUR	LINE TYPE	PLOT STYLE	PLOT
O_X_STRC	EXISTING STRUCTURES	WHITE	CONT	MONO	YES
O_N_STRC	PROP. STRUCTURES	RED	CONT	MONO	YES
O_X_MOFF	EXISTING MAKE OFF WIRES	WHITE	CONT	MONO	YES
O_N_MOFF	PROP MAKE OFF WIRES	RED	CONT	MONO	YES
O_X_EARTH	EXISTING EARTH WIRE	WHITE	CONT	MONO	YES
O_N_EARTH	PROP EARTH WIRE	BLUE	DASH	MONO	YES
O_X_TLINE	EXISTING TRANS -MISSION LINE	WHITE	CONT	MONO	YES
O_N_TLINE	PROP TRANS -MISSION LINE	GREEN	CONT	MONO	YES
O_X_NEG	EXISTING NEG. RETURN	WHITE	C-DOT	MONO	YES
O_N_NEG	PROP NEG. RETURN	BLUE	C-DOT	MONO	YES

Table 12: Typical Track Equipment Layers

NAME	DESCRIPTION	COLOUR	LINE TYPE	PLOT STYLE	PLOT
N_N_EQ	PROPOSED SIGNAL EQUIPMENT	232	CONT	MONO	YES
N_X_EQ	EXISTING SIGNAL EQUIPMENT	231	CONT	MONO	YES
N_X_CAB	SIGNAL CABLES EXISTING	201	PHANTOM	MONO	YES
N_N_CAB	SIGNAL CABLES NEW	201	DIVIDE	MONO	YES

Table 13: Typical Signals Layers

NAME	DESCRIPTION	COLOUR	LINE TYPE	PLOT STYLE	PLOT
V_N_CB	PROPOSED COMMS CABLES	202	PHANTOM	MONO	YES
V_X_CB	EXISTING COMMS CABLES	201	PHANTOM	MONO	YES
V_NAV	NAVIGATION EQUIPMENT	214	CONT	MONO	YES
V_N_OPTIC	PROPOSED FIBER OPTIC CABLE	192	PHANT2	MONO	YES
V_X_OPTIC	EXISTING FIBRE OPTIC CABLE	191	PHANT2	MONO	YES
V_N_PNT	PROPOSED VOICE/DATA POINT	YELLOW	CONT	MONO	YES
V_X_PNT	EXISTING VOICE/DATA POINT	9	CONT	MONO	YES
V_REM	REMOVED/OBSOLETE COMMS ITEMS	CYAN	DASH	MONO	YES

Table 14: Typical Communications Layers

NAME	DESCRIPTION	COLOUR	LINE TYPE	PLOT STYLE	PLOT
B_ABUT	ABUTMENT	GREEN	CONT	MONO	YES
B_BOL	BOLLARD	GREEN	CONT	MONO	YES
B_BORE	BOREHOLES	YELLOW	CONT	MONO	YES
B_CENT	CENTRE LINE	RED	CENTRE	MONO	YES
B_CONC	CONCRETE	GREEN	CONT	MONO	YES
B_CONTH	CONCRETE THIN	RED	CONT	MONO	YES
B_CONTHK	CONCRETE THIC	GREEN	CONT	MONO	YES
B_CONMED	CONCRETE MED	YELLOW	CONT	MONO	YES
B_CONHIDT	CONC HIDE THIN	RED	DASHED	MONO	YES
B_CONCHID	CONC HIDE MED	WHITE	DASHED	MONO	YES
B_CONCHAT	CONC HATCH	RED	CONT	MONO	YES
B_CONCSHA	CONC SHADE	11	GREYSCALE	GREY	YES
B_CONCPIPE	CONC PIPES	WHITE	CONT	MONO	YES
B_CADAS	CADASTRALS	RED	CONT	MONO	YES
B_CAISS	CAISSONS	WHITE	CONT	MONO	YES
B_DECK	DECK SLAB	WHITE	CONT	MONO	YES
B-FEND	FENDERS	WHITE	CONT	MONO	YES
B_GRID	GRID LINES	RED	CENTRE	MONO	YES
B_KEYPL	KEY PLAN	YELLOW	CONT	MONO	YES
B_LOGRID	LO GRIDLINES	RED	CONT	MONO	YES

Table 15: Typical Marine Layers

NAME	DESCRIPTION	COLOUR	LINE TYPE	PLOT STYLE	PLOT
P_CAT-G	CATTLE GRID	GREEN	CONT	MONO	YES
P_GR-LAY	LAYERWORKS	35	CONT	MONO	YES
P_TACHY-T	TACHY TEXT	WHITE	CONT	MONO	YES
P_TACHY-L	TACHY LEVEL	WHITE	CONT	MONO	YES
P_TACHY-L	TACHY POINTS	WHITE	CONT	MONO	YES
P_RD-G	ROAD GRAVEL	41	DASHED	MONO	YES
P_RD-M	ROAD MAIN	WHITE	CONT	MONO	YES
P_RD-S	ROAD SIGNS	WHITE	CONT	MONO	YES
P_TR-DES	TRACK DESIGN	RED	CONT	MONO	YES
P_TR-CO	TRACK CO-ORDS	WHITE	CONT	MONO	YES
P_TR-F	TRACK FUTURE	ORANGE	CONT	MONO	YES
P_TR-C	TRACK CENTRE LINE	WHITE	CENTER	MONO	YES
P_TR-TO	TRACK TURNOUTS	WHITE	CONT	MONO	YES
P_TR-UP	TRACK UPLIFT	252	HIDDEN	MONO	YES
P_TR-S	TRACK SLEEPERS	WHITE	CONT	MONO	YES
P_TR-R	TRACK RAILS	WHITE	CONT	MONO	YES
P_TR-EQ	TRACK EQUIPMENT	WHITE	CONT	MONO	YES
P_TR-SUR	TRACK SURVEYED	WHITE	CONT	MONO	YES
P_TEL-T	CABLE ROUTE TELCOM	201	PHANTOM	MONO	YES
P_TEL-N	CABLE ROUTE NEOTEL	201	DIVIDE	MONO	YES
P_TEL-TR	CABLE ROUTE TRANSNET	201	DASHDOT	MONO	YES
P_SUBS-D	SUBSOIL DRAIN, GEOFABRIC,	111	CONT	MONO	YES

Table 16: Typical Perway Layers

6.14 Section Lines

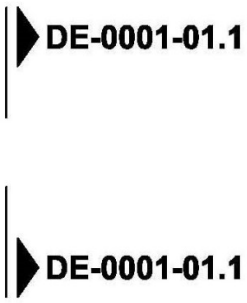


Figure 3: Section Lines

Section lines are to be as above. They are to be inserted as a block from the symbols' library.

6.15 North Sign



Figure 4: North Sign

The North Point above is to be used. It is to be inserted as a block from the symbols' library.

6.16 The Title Block

The Title Block must reflect the following:

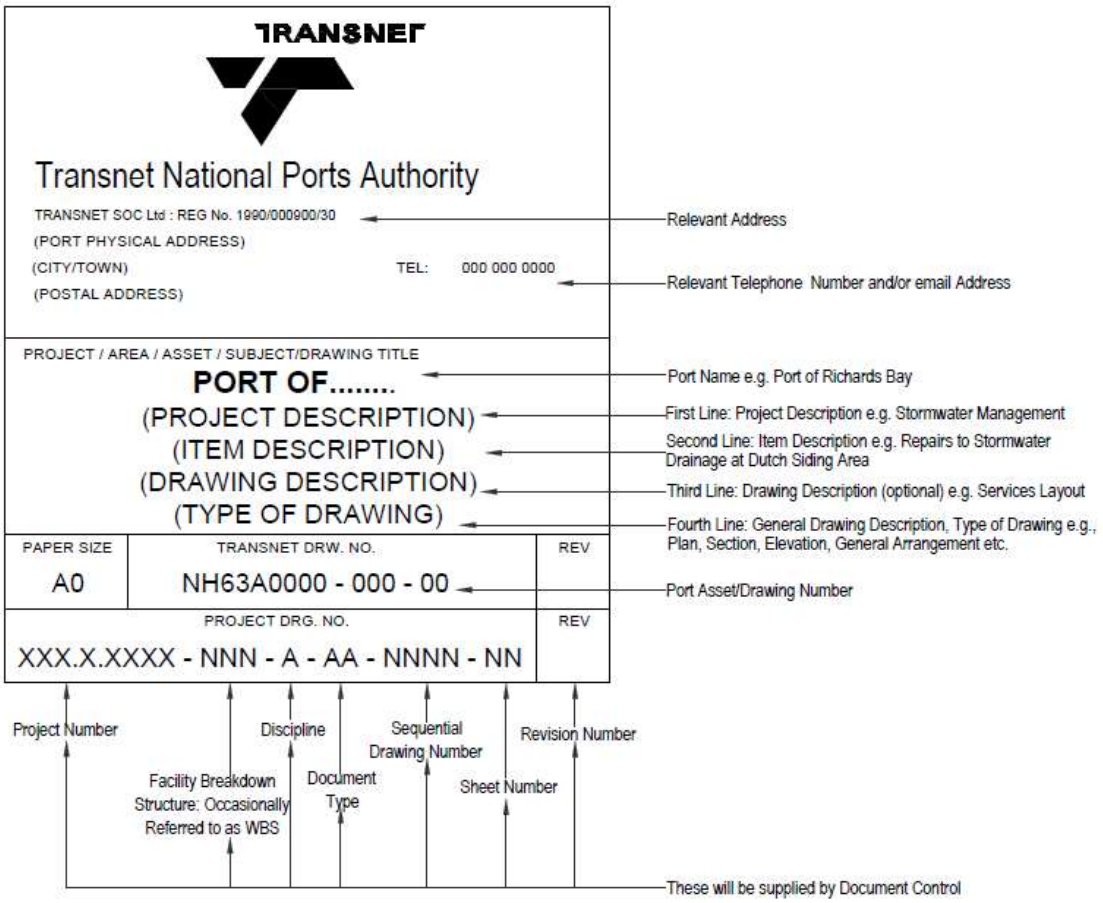


Figure 5: Title Block

6.17 Fields in the Signature Block

The Fields in the title block must reflect the following:

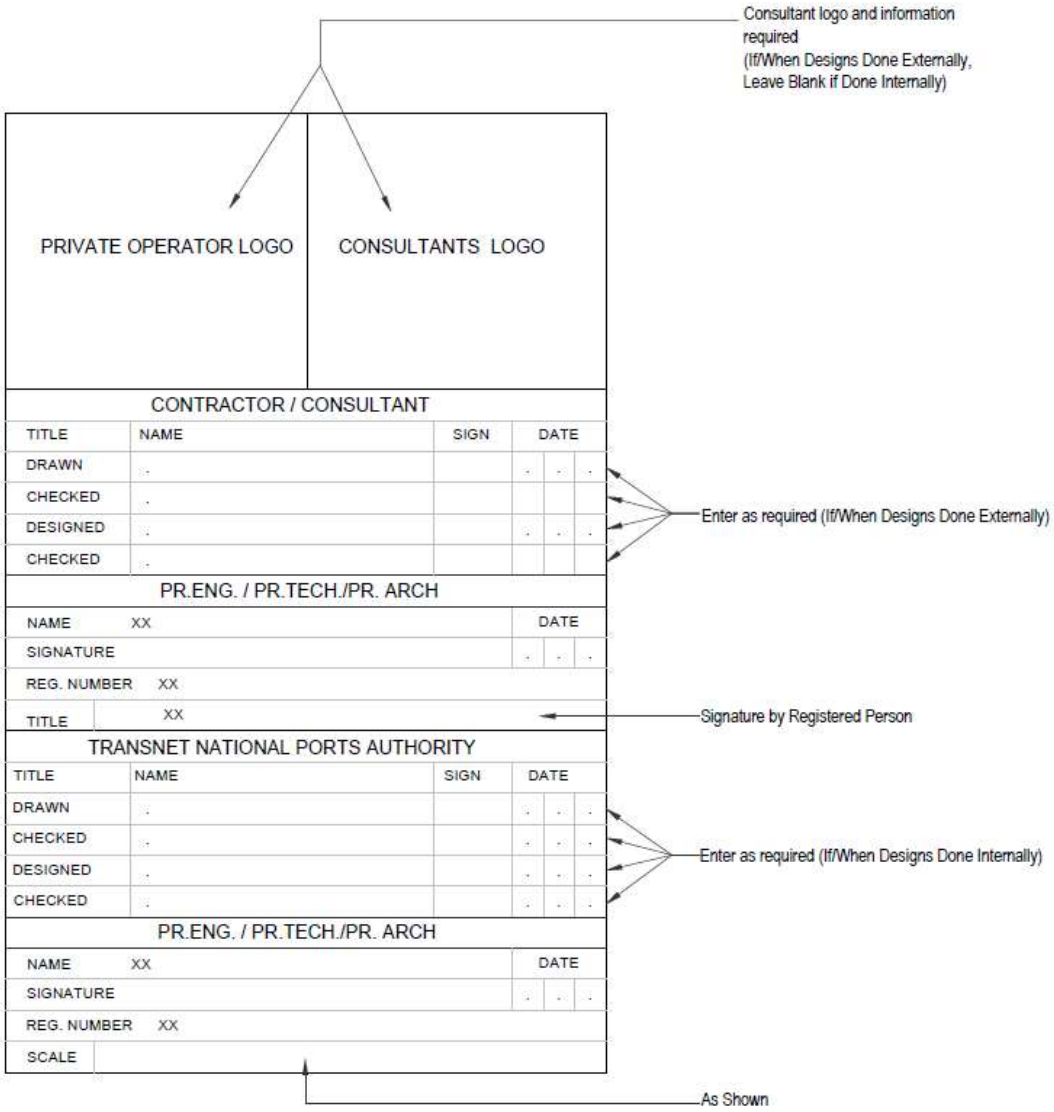


Figure 6: Signature Block

6.18 Revised Drawings

- All amendments to drawings must be clearly referenced and indicated on the original drawing together with the draughtsperson's name and date. The amendment block has provision for a checker's signature, an approval signature and a date.
- Drawings and amendments to drawings shall be indexed as follows:
- Internal TNPA issue to have and issued for issued for tender shall be in alphabetical sequence marked with applicable review description. Numbering such as `A, B, C etc.
- Construction drawings: No. to be numerical i.e..: 1, 2, 3 etc.
- As built drawings: ZZ (it is to be noted that revisions numbers may vary subject to the project and/or Transnet drawing number)
- All drawings shall have the revision raised to the next applicable revision reference (as stated above) which shall be inserted in the revision box of the drawing title block before any drafting is started.

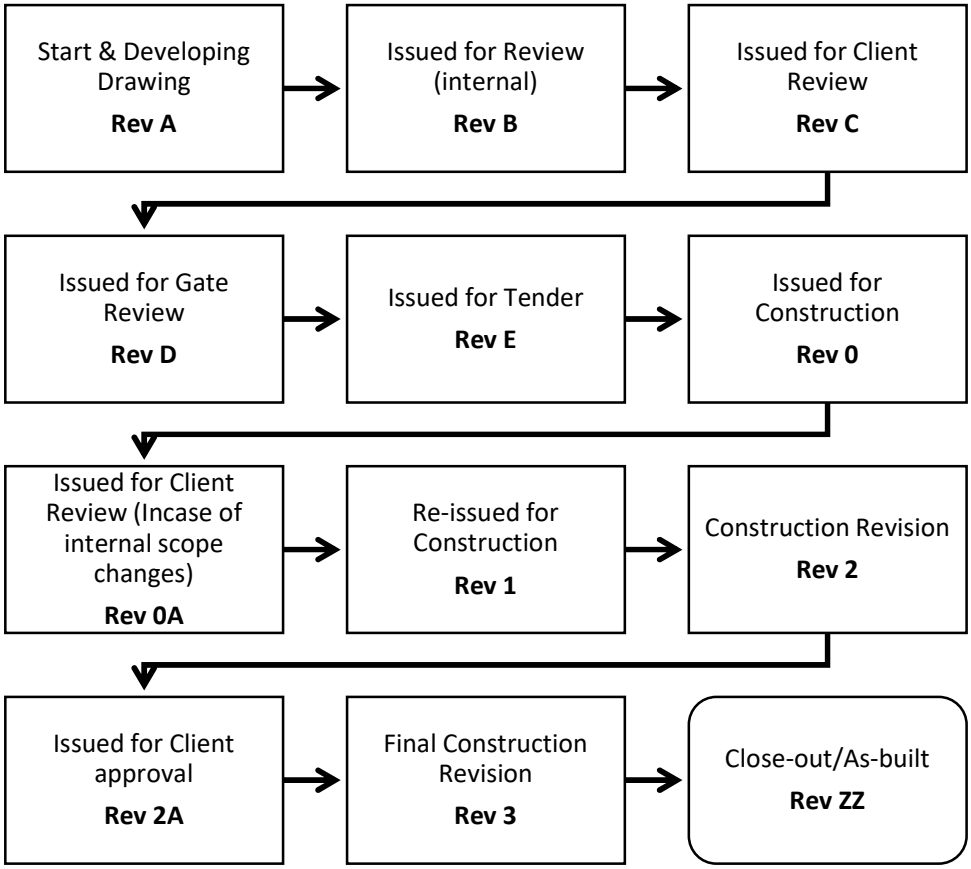


Figure 7: Typical Drawing Revision Sequence

Previously revised drawings to be saved as and re-named to reflect the current revision number. Revisions to be noted from bottom to top and previous revision clouds to be removed from drawings.

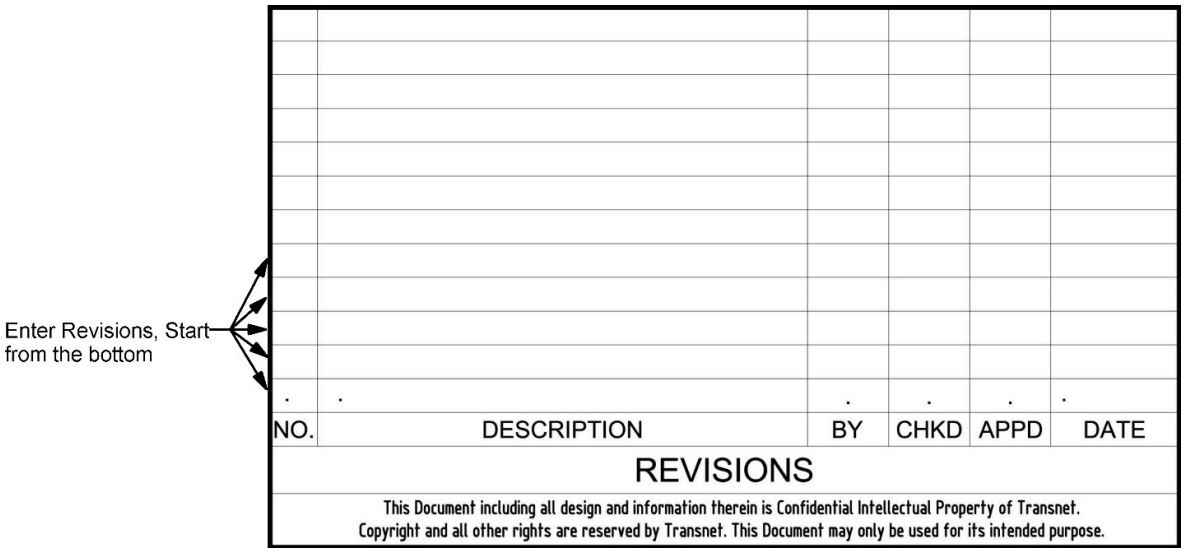


Figure 8: Revisions in the Title Block

6.19 Revision & Hold Clouds

- All revised aspects on a drawing must be annotated by means of a “Revision” cloud wherever practical and a triangle with the revision number therein.
- “Hold” clouds should be used wherever applicable and practical to indicate hold status within the drawing.

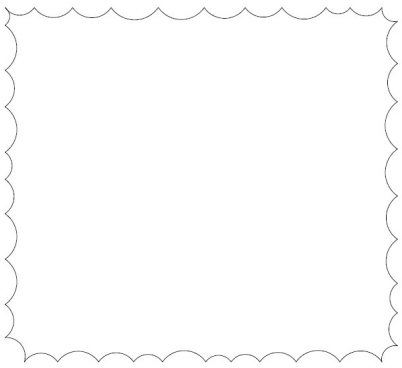


Figure 9: “On-Hold” Cloud

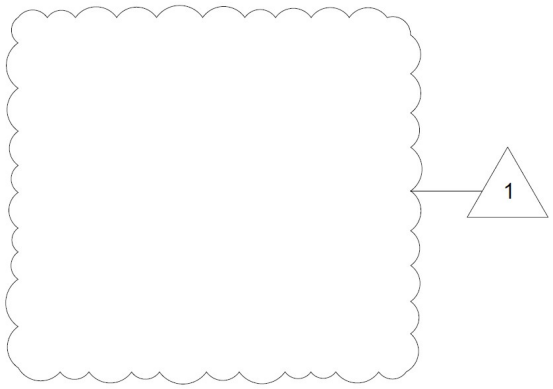


Figure 10: “Revision” Cloud

6.20 Reference Drawings

Drawing number as reflected in drawing title.
Drawing description as per general drawing description in title block.

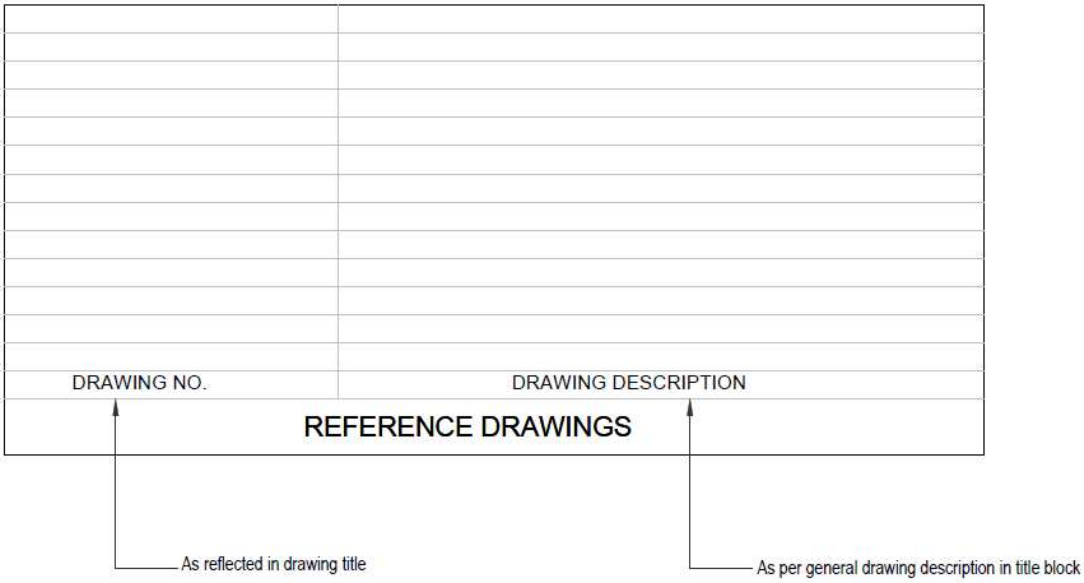


Figure 11: Reference Drawings

6.21 Key Plan Use

Key plans for different areas in the project are provided and should be referenced in. This approach allows any changes to the key plan to appear immediately on all drawings plotted from that point on.
Note: The drawing subject area is to be hatched on the current drawing.

6.22 Symbols and abbreviations

For Standard symbols Refer to:

- SANS 10143: Building drawing practice.
- SANS 1044: Welding Part II: Symbols
- BS 3939: Graphical symbols for electrical power, telecommunications and electronic diagrams.

If it is necessary to use symbols which are not standard national symbols, or located on the Transnet template, a new symbol may be created with its description tabled on the applicable drawing.

6.23 Legend

Legends should be set up as indicated in the image below.

Note: These are typical Civil Engineering services, the list can be adjusted to suit.

A Cad format of the legends is comprised in the Drawing Office library.

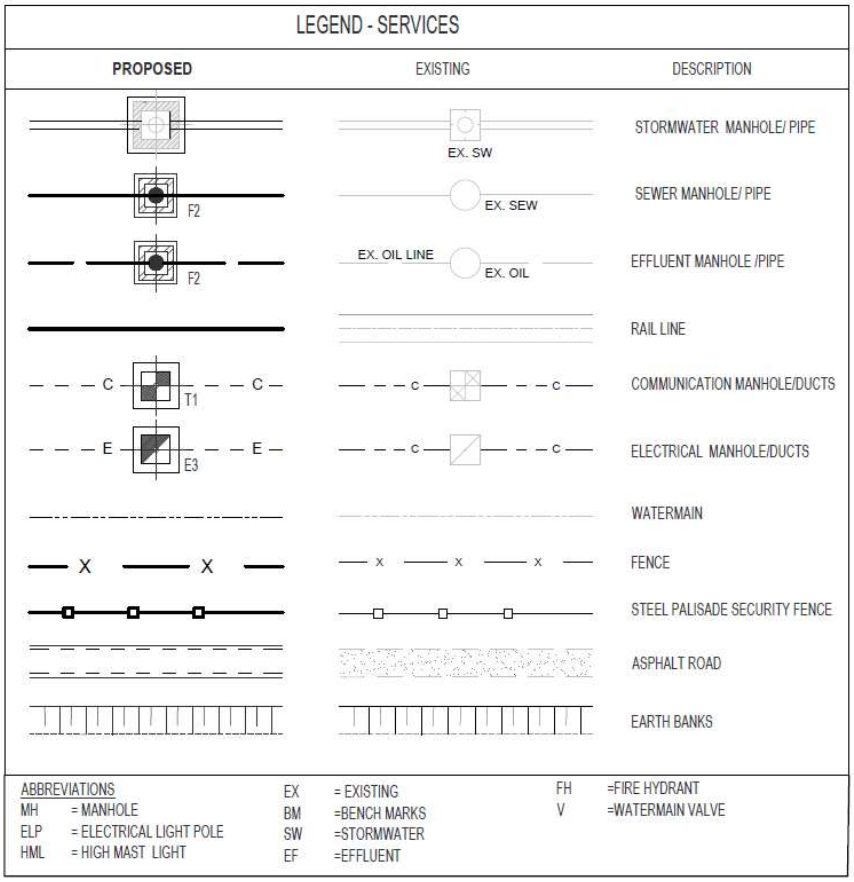


Figure 12: Typical Legend

6.24 Identification of Views

All views shall be identified in the following format:

- The two main forms of projection shall be used namely third and first angle projection.
- Indicate scale only if scale varies from title block scale.
- Reference to a drawing where a section or a detail was taken is required if the view is shown on another drawing.
- Letters shall be used for details. Numbers shall be used for elevations and sections. Do not use letters “I” and “O”.

Type	Format	Example
Details	Alpha	DETAIL A
Section	Numeric	SECTION 1
View	Alpha	VIEW X
Items	Alpha	ITEM A – TROLLEY FRAME

Table 17: Identification of Views