PWA BUILDINGS CAD STANDARDS MANUAL

Version 2.0

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Acknowledgement

These Standards represents the extensive effort and support of many individuals within Public Works Authority. Engineering Information Section expresses appreciation of the valuable assistance given by the Directors, Managers and Head of departments. Without their co-operation, the extensive work involved in compiling the background information and preparing the standards would not be possible.

We would also like to place on record our appreciation to the coordinators who rendered valuable advice and guidance in bringing these standards to completion and in editing the text for publication.

Special thanks to

Director of Building Affairs

Director of Roads Affairs

Director of Drainage Affairs

Document Control

Version	Date	Modified by	Agency	Purpose
Version 1.0	March 5, 2007	Ashghal		
Version 2.0	September 25, 2014	Ashghal		

Additions / Revisions

This standard is intended to be neither static nor all-inclusive and thus will be updated and enhanced as appropriate. Suggestions for improvements are strongly encouraged so that subsequent updates will reflect the input and needs the current format will undergo versioning or changes when new technologies become available. Addendum to these standards will be issued when such changes are made.

In general, changes to these standards shall occur because of three primary factors:

1) Additional users and functionality.
2) Discovery of, and subsequent fixing of latent errors and omissions.
3) Changes to utilize advantage of latest technologies and software versions.

Therefore, it is reasonable to expect updates to this document. Users are cautioned to inquire about changes within. In order to ensure the reader is using the latest version, a revision date will be shown in the document control.

CAD STANDARDS : Control and Authorization

The Standards are under Information Services Department Management.

Document Title : **PWA BUILDINGS CAD STANDARDS MANUAL Ver. 2.0.**

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CAD STANDARDS: Distribution

The Master or Original Version of the PWA BUILDINGS CAD Standards Manual is held electronically in ASHGHAL's Information Services Department. The copy of this PWA BUILDING CAD Standards Manual is available on our website (www.Ashghal.gov.qa or www.Ashghal.com) and with all PWA department directorates.

CAD STANDARDS: Authorization and Change

This PWA BUILDINGS CAD Standards Manual will undergo continuous reviews and updates, subject to change, by the Management of ASHGHAL. Any changes or updates will be announced on our website (www.Ashghal.gov.qa or www.Ashghal.com).

DISCLAIMER:

Table of Contents

1 OVERVIEW

1.1 Purpose

Public Works Authority - Engineering Information Section (PWA - ISD / EIS) produced this manual with the objective to ensure compatibility and transference of digital data between all parties. The goal is to create an environment for seamless integration between CAD and BIM. The document will achieve this through setting out the standards for drawing data production. This will then enable drawing data to be incorporated into the BIM through:

i. Simple data translation.

ii. Common language.

iii. Ease of data storage.

iv. Common medium of information exchange.

v. Drawings and data integration with other applications.

1.2 Application

The Computer Aided Design (CAD) Standards Manual shall be applied to all disciplines in all offices and design houses, working on PWA projects. The scope of this document is to provide guidelines and procedures for adopting AutoCAD standards in preparing design and as-built drawings for seamless integration with BIM. These standards will address the following:

i. Layers names and layer properties.

ii. Standard symbology.

iii. Drafting standards.

iv. Templates.

v. Colour usage associated with line widths for all Buildings drawings.

The standards are to be applied for all drawings from Concept through to As Built handover stage.

2 STANDARDS

2.1 Introduction

These standards are aimed to serve all the departments within Ashghal and consultants / contractors. It has recognized that all workflows have some common characteristics, enabling them potentially to achieve a level of interoperability through the use of common standards for various functions. It is intended that such standards and specifications will enable interoperability between heterogeneous workflows and improved integration of workflows, thereby improving the opportunities for the effective use of workflow process within Ashghal and the outside domains.

Ashghal is committed to enforce the standards of information delivery that ensures predictability and the ability to easily reuse information. As a result this CAD standard will be included as part of the contractual requirement for delivery of digital information to Ashghal.

This document stipulates the CAD standards to be adopted on projects from design to construction.

This standard is intended to be neither static nor all-inclusive and thus will be updated and enhanced as appropriate. Suggestions for improvements are strongly encouraged so that subsequent updates will reflect the input and needs. Addendum to these standards will be issued when such changes are made.

2.2 Objectives

This document is intended to address the following principal objectives:

i. To ensure that the CAD drawing files produced by all CAD users are formed and referenced in a consistent and compatible manner
ii. To standardise the format and content of CAD files throughout where these are common to all disciplines; such as drawing borders, title blocks, north arrows, grid lines etc.,

iii. To ensure a consistent approach to CAD activities and best practices across all users. Benefits include common levels of understanding and competency, which will facilitate more effective working.

iv. To provide the means by which all CAD users and other staff involved in drawing production are kept informed of changes to these standards and requirements.

3 CAD

3.1 General

Drawings that are produced by CAD that are subsequently amended with manual corrections will not be permitted, as this can lead to future revision discrepancies.

3.1.1 File Setup

Ashghal will provide consultants and contractors an AutoCAD template on a CD- ROM with project boundaries containing policy plan and topographic features as base map (site Plan) which are geo referenced as per QNG (Qatar National Grid). All the features of the projects must be drawn onto that template only.

It is the responsibility of the submitting party to organize drawing information coherently as mentioned in the standard and maintain a reasonable file size.

3.2 Ashghal Standard Layer Templates

CAD drawings will be created using the latest versions of the Ashghal Standard Layer Templates provided with this manual (refer to Appendices). CAD users are not permitted to edit or modify the templates.

3.3 Drawing Borders

Details of drawing border and its filename for AutoCAD are as Table 1 below.

Table 1 :

Drawing Borders – AutoCAD		
Drawing Size	Description	File Name (.dwg)
A1	A1 – right hand title block	PWA_TEMPLATE-A1.dwg

4 FILING AND STORAGE OF DRAWINGS

4.1 Filing and Storage of Drawings

In order that the project information is readily accessible it is essential that all drawing data is filed and stored in a consistent and logical manner.

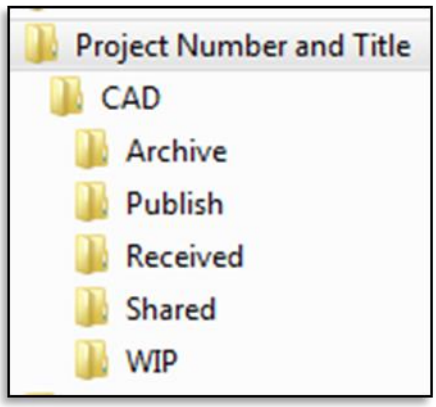
4.2 Electronic Copies

All electronic drawing and sketch files associated with a particular project will be filed within the project folder.

4.3 Folder Structure

The standard folder structure for CAD data is as shown in Figure 1 below, it adopts the Code of Practice BS1192:2007 on Common Data Environment for collaborative working.

Figure 1:



4.4 Folder Name: Project Number and Title

This can be under the main office or discipline folder, or, if the number of files would render lists unwieldy, then further sub-folder are permissible. Folder names are not to include any symbols.

4.5 Sub Folder Name: CAD

Contains drawings and digital information organized as shown in Figure 1.

In a multi-disciplinary office the main sub-folders defined below may be sub-divided as necessary into the relevant disciplines:

4.5.1 Sub Folder Name: **WIP** (Work in Progress)

Contains the current working project drawings and sketches. This is where all files currently in the iterative process of design have not yet been approved to be shared.

This folder will contain further sub-folders which can be amended to suit Consultant's individual requirements.

4.5.2 Sub Folder Name: Shared

Contains verified, checked and approved CAD data for use by others for reference. This folder will hold the project specific drawings such as title frames, references, images, etc.

This folder will contain further sub-folders which can be amended to suit Consultant's individual requirements.

4.5.3 Sub Folder Name: Published

Contains all final published sheet files, figures or sketches. This folder must contain the last issued Models / Xref's. Data filed in this area will never be deleted or overwritten, but will remain until archived.

4.5.4 Sub Folder Name: Archive

Contains all previous issues and superseded data. This folder is to allow retrieval of previously issued drawings at certain stages of design decisions. This folder will provide an audit trail of documentation and changes through the life of the project.

4.5.5 Sub Folder Name: Received

Contains read only copies of design data which have been received from Third Party sources or Stakeholders and will contain further sub-folders to identify the source and date of receipt.

The Received folder can be directly under the main project folder structure, under CAD or wherever the Consultant's find it suitable.

The vital concern is that a folder must be dedicated for incoming issues, where a full archive of all received information is stored with an audit trail that is related to the sending company and the date received and the current copy is easily identifiable throughout the project.

4.6 Collaborative Working

i. Within WIP folder each discipline can create a folder structure to suit its needs.

ii. Models and sheets in a discipline WIP area may reference own discipline models in WIP, but models from other disciplines must be referenced from the Shared area.

iii. Common resource files such as title sheets, mapping, surveys, imagery and other shared CAD data must be available to all disciplines in the Shared area.

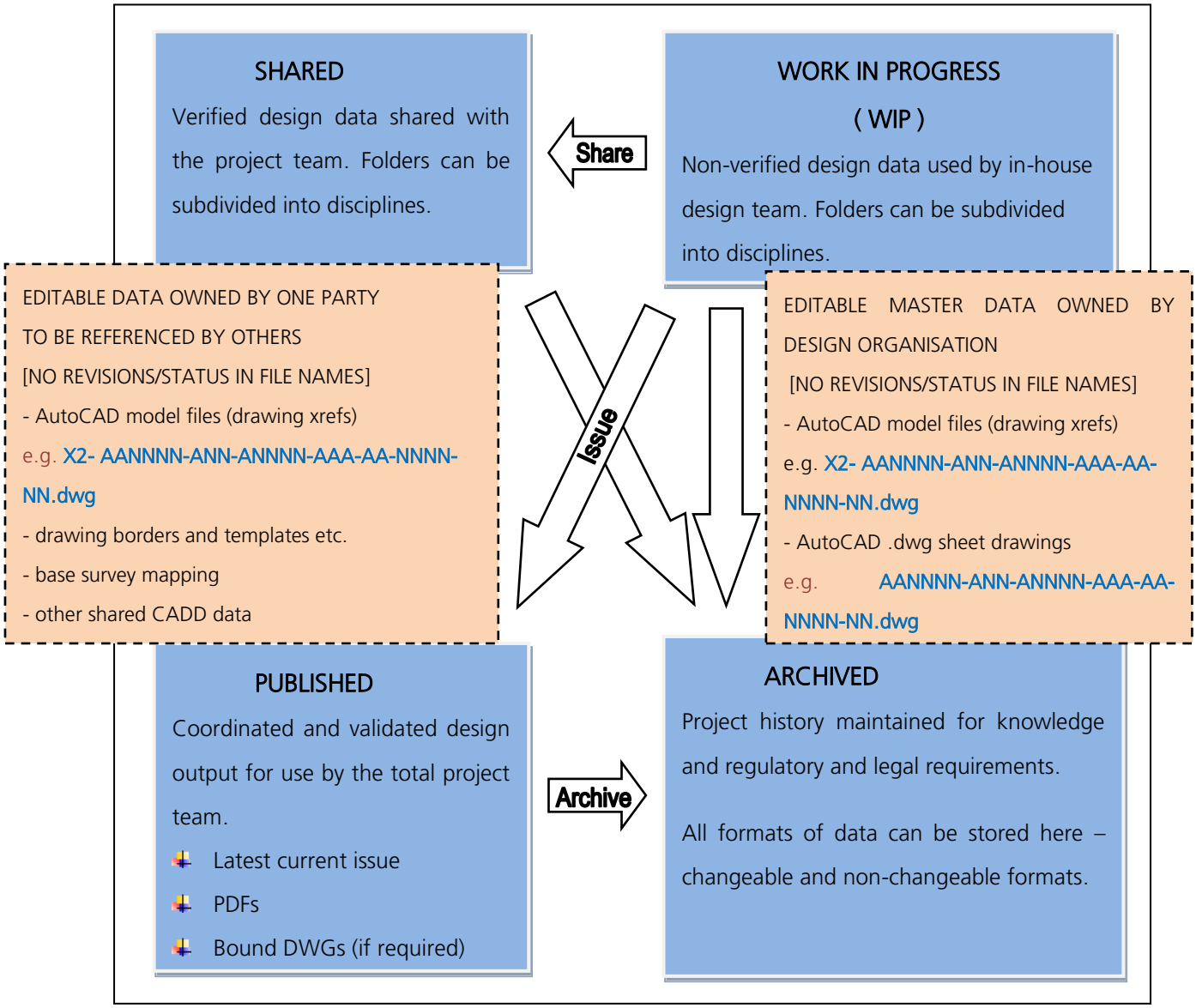
iv. Once data has been checked, verified and approved, it must be copied to the Shared area and other disciplines notified.

v. When models are revised or updated; other disciplines referencing the model will be affected, so effective communication between disciplines is essential.

vi. When data files have been authorised and verified for issue, it is copied to the Published area, to maintain a local copy within the design organization's server.

vii. The previous version of the data in the Published area will be moved to the Archive area as a historical record and to maintain an audit trail.

Figure 2 : Application of Code of Practice BS1192:2007 on Common Data Environment (CDE)



4.7 Hard Copies

The print containing the original stamped, checked and approved signatures becomes the hard-copy 'master plot' for the drawing. See *Section 5.3.13*.

Note:
It is vital at all times to maintain absolute correlation between the hard-copy stamped and signed master and the current electronic version of the drawing or sketch held on the electronic data storage system. ALL DWG/XREF/Model files will be submitted on a separate CD (or best) via zip files along with a separate detailed letter of transmittal describing contents along with any written variation to standard that was not already provided within this document. See section 6.11.1 & 6.11.2 Submissions & File Format.

4.7.1 Drawings

The Consultant's Project Implementation Plan (PIP) will define the area where the hard-copies for projects are to be filed.

The electronic version (DWG files) of the master plot of the drawing will be known as the 'reference master'. The reference master, is required as part of the submittal, and will be utilized for the electronic issue of the file.

Superseded master plots will be retained and endorsed "superseded".

Following the close of the project the master plots will be removed from the drawing office and archived.

4.7.2 Check Prints

All completed and signed check prints will be filed within the drawing office by the drafting checker in an area in accordance with the Project Implementation Plan (PIP).

All check prints are to be retained at least for the term of the project unless otherwise agreed with the PWA. No check prints are to be disposed of without the consent of the Project Manager.

5 DRAWING DEVELOPMENT

5.1 Drawing Numbering System

The drawing names and numbers are to be entered into the drawing register during creation of the drawings so as to eliminate duplicate drawing numbers being assigned. The drawing number will be unique for each drawing and will normally be as per the building projects drawing naming and numbering convention below.

Table 2 :

PMC PROJECT CODE	SITE	ORIGINATOR	ZONE	FUNCTION	DSCIPLINE	DISCIPLINE CODE	NUMBER	SHEET
AA*NNNN*	*NN*	A*NN*	AA	*NN*	AAA	AA	*NNNN*	*NN*
Part 1	Part 2	Part 3	Part 4	Part 5	Part 6	Part 7	Part 8	Part 9

For Master Planning Projects
&
Doha Zoo

Part 1	
PMC Project Code:	AA NNNN

Sector - Project Number

A = Alphabetic

N = Numeric

Part 2	
Site	Ref:
NN	01
	02
	03
	Etc.

Part 3	
Originator	Ref:
ANN	A01
	A02
	A03
	Etc.

Part 4	
Zone	Ref:
MP	Master Plan
PP	Public Park
ZE	Zoo Entrance
DS	Driving Safari
AF	African Walking Safari
AS	Asian Walking Safari
RS	South American Walking Safari
CS	Children's Safari
V1	Village 1
V2	Village 2
TH	Tree House Hotel
RH	Rain Forest Hotel
NH	Montane Hotel
BH	Back of House
SE	Driving Safari Entrance
PG	Parking Garage
SW	Site Wide

ZOO Project

Part 5	
Function	Ref:
01	Guest Support
02	Entertainment
03	Retail
04	Food & Beverage
05	Administrative Offices
06	Animal Support & Operations
07	Back of House
08	Storage& Outdoor Areas
09	Hospitality
10	Utilities
	Etc.

ZOO Project

Part 6			
Discipline	Ref:	Discipline	Ref:
Architectural	ARC	Façade Engineering	FAC
Structural	STR	Building Engineering	BMS
Electrical	ELE	Security	SEC
Mechanical	MEC	Civils	CIV
Public Health	PHE	Environmental	ENV
Combined Services	CME	Acoustic	ACT
Interior Design	INT	Traffic	TRA
Landscape	LAN	Information Communication Technology	ICT
Lighting Specialists	LIG	Land Survey	SUR
Audio Visual	AUV	Fire Life Safety	FLS
Vertical transportation	VTT	Infrastructure	INF

Part 7	
Discipline Code	Ref:
LD	List of Drawings
GE	General (more than one discipline or project wide document)
HS	Health and Safety
QA	Quality Assurance
TX	Testing / Calibration
Architecture	
AR	Architectural General
LA	Layout
FP	Floor Plan
CJ	Carpentry and Joinery
CW	Curtain Wall, Windows, Glass Wall, Vertical Cladding and Skylights
DP	Dry Wall Partitioning
FR	Fire Doors
TL	Tiling
FC	False Ceiling
FL	Floor Covering
MA	Marble and Stone
RS	Raised Floor
SN	Signage
FG	Finishing General
PA	Internal Painting and Wall Covering
PE	External painting and Wall Covering
ID	Interior Design
FU	Furniture

Civil	
CG	Civil – General
EX	Excavation, Shoring, Earthwork & Site Formation
DM	Demolition
PL	Blockwork, Plastering Paving and Screeding (Wet trades)
BW	(Combined) Builders Work
SW	Site Installation & temporarily Works
RD	Road Works
FE	Fencing
Structural	
SG	Structures – General
FD	Foundations
RF	Reinforcement
CN	Concrete
ST	Structural Steel
FW	Formwork
Electrical	
EL	Electrical General
EA	Electrical Accessories
FA	Fire Alarm
LV	Low Voltage
HV	High Voltage
LF	Light Fittingd
FF	Fire Fighting
FS	Fire Services
AV	A / V / T - General
CV	CCTV, CABD, Audiovisual
SC	Security
TF	Telephone / PABX

Mechanical	
AC	HVAC – General
HP	HVAC – Piping
PD	Plumbing General
SF	Sanitary fittings and Washroom Accessories
UD	Underground Drainage and Utilities
Landscaping	
GL	Landscaping General
HL	Hard Landscaping
SL	Soft Landscaping
Package Units	
PG	Packages General
SE	Sport Equipment
FP	Fountains and Pool
KL	Kitchen and Laundry Equipment
CL	Cleaning System
LT	Lifts and Escalators
BM	BMS
FT	Fitting Out

Part 8	
Number	
NNNN	four digit numeric code for unique drawing number The first digit will identify the type of drawing
0NNN	General (General Notes, Drawing Lists, Legends, Standard Details etc.)
1NNN	Plans
2NNN	Elevations
3NNN	Sections

4NNN	Enlarged Details
5NNN	Schematics / Schedules
6NNN	Sketches
7NNN	3D Drawing
8NNN	Etc.,

Part 9	
Sheet	
NN	Two numeric digits for drawings with multiple sheets (will always start 01, 00 not to be used). If only one sheet exists for a drawing will read 01

5.2 Model File (XRef) Naming

Model Files will be named in accordance with the convention described below.

Table 4 :

	Model Type Identifier	PMC PROJECT CODE	SITE	ORIGINATOR	DSCIPLINE	DISCIPLINE CODE	NUMBER	SHEET
Example	X2	AA*NNNN*	*NN*	A*NNNN*	AAA	AA	*NNNN*	*NN*
See Reference	5.2.1	Part 1	Part 2	Part 3	Part 4	Part 5	Part 6	Part 7

Example:

X2- AANNNN-NN-ANNNN-AAA-AA-NNNN-NN

5.2.1 Model Identifier Code

This code identifies the model file if it is in 2D or 3D drawing as defined below.

Table 5 :

Description	Model Type Identifier
2D Model	X2
3D Model	X3

5.3 Drawing Title Blocks, Signatures, and Logos

A standard drawing arrangement (Drawing Border and Title Block) will be adopted for all drawings and will be consistent across all drawings within the project. Title block entries will be concise and informative to indicate fully the content of the drawing.

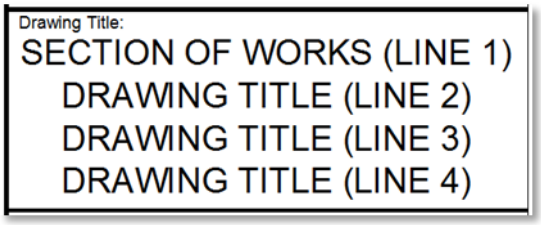
5.3.1 Drawing Title

i. The top line will identify the specific area or section within the contract, i.e. "SCHOOLS", or it may be left blank where no such area or section exists.

ii. The second third and fourth lines will identify the content or purpose of the drawing, i.e. "CONSTRUCTION OF SCHOOLS WITH PLAY GROUNDS"

iii. Where several drawings depict similar detail and no other qualifications are available for distinguishing between them, the distinction will be made by labelling each drawing consecutively with sheet numbers, such as "SHEET 1" , "SHEET 2", etc.

Figure 3 :



5.3.2 Drawing Status

The issue DRAWING STATUS box shown below (Figure 4) will be completed to describe the current status of the drawing. Refer to Table 6 for the list of drawing status/stages:

Figure 4 :

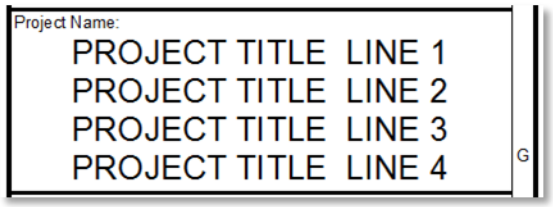
Table 6 :

Drawing Status
PRE-DESIGN STAGE
CONCEPT DESIGN STAGE
SCHEME DESIGN STAGE
TECHNICAL DESIGN STAGE
TENDER & CONSTRUCTION DOCUMENTS STAGE
CONTRACT
AS BUILT

5.3.3 Project Name Field

For Project Name refer to Baseline Assessment Report on detailed list of projects.

Figure 5 :



5.3.4 Project Code Field

PWA-specific project codes will be assigned by Ashghal Contracts department.

Figure 6 :

5.3.5 Drawing Date Issued Field

The DATE field will reflect the issue date of a drawing and will be formatted by Month and Year as highlighted below (Figure 7):

Figure 7 :

Drawn:	R. BAUTISTA	Checked:	R. LAMONT	H
Designed:	A. SNIDER	Approved:	A. GREENWOOD	
Date:	AUGUST 2013	Scale:	1:1000 on A1	
Drawing Number:	QA000-P00-PBI-HW-1001		Revision: P00	
11		12		

5.3.6 Revision History Table

A concise description of each approved and issued revision will be entered into the revision description column. The revision columns indicate the history and development of the drawing; therefore, the description will be as informative as is practical. The drawing revision codes will be numbers at design stages and letters at construction stages.

Drawings that are issued under specific Submissions or Milestones sets will have clear, consistent revision description that states the purpose of the submission. e.g. ISSUED FOR APPROVAL, etc.

Figure 8 :

Rev.	Date	Revision Details	Drawn	Chkd.	Appd.
P00	30AUG13	ISSUED FOR REVIEW	RB	JE	AG

The date shown in the revision history table will be in the format **DDMMMYY** as highlighted in Figure 9 below:

Figure 9 :

Rev.	Date	Revision Details	Drawn	Chkd.	Appd.
P00	30AUG13	ISSUED FOR REVIEW	RB	JE	AG

The months will be abbreviated as shown in table 7 below:

Table 7 :

Abbreviation	Month	Abbreviation	Month
JAN	January	JUL	July
FEB	February	AUG	August
MAR	March	SEP	September
APR	April	OCT	October
MAY	May	NOV	November
JUN	June	DEC	December

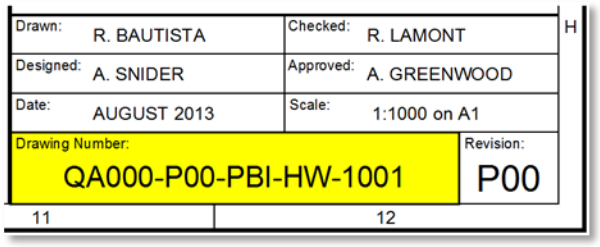
The date of completion of the revision and the initials of the person effecting the revision will be stated. The earliest revision descriptions will be deleted when there is no space to include the current revision within the revision column.

5.3.7 Drawing Number Field

Drawing number field will be completed as highlighted in the box below.

Refer to Section 5.1 for drawing numbering convention.

Figure 10 :

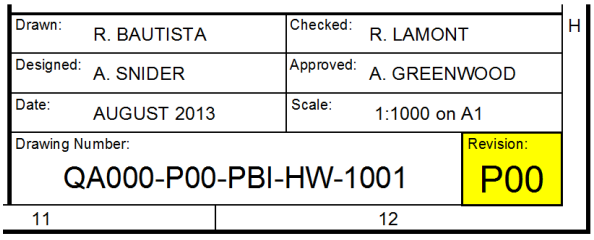


5.3.8 Revision Field Box

Revision field box will be completed as highlighted below.

For drawing revision codes refer to Section 5.12.3.

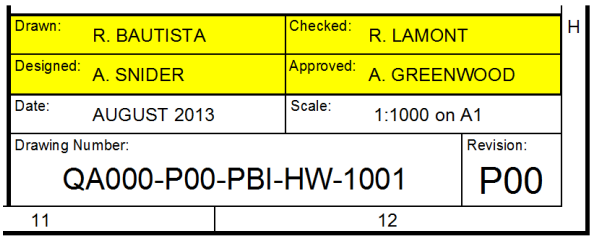
Figure 11 :



5.3.9 Name Fields

The 'Drawn', 'Designed', 'Checked' and 'Approved' field boxes on the title block, as highlighted below, will include the first name initial and the full last name of the person who performed or is responsible for the major portion of the work.

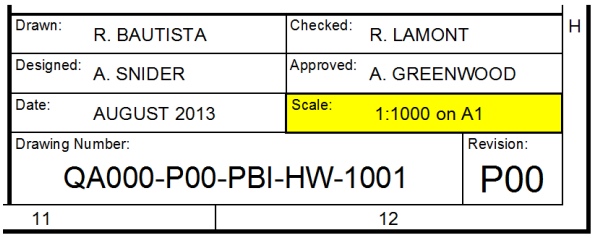
Figure 12 :



5.3.10 Drawing Scale Field

For completing the drawing scale field box in the title frame, refer to *Section 5.7*

Figure 13 :



5.3.11 Signatures

The revision history table will contain the current issue revision number, date of issue, Drafter/Author, Checker, Approver signatures or initials and description of current revision.

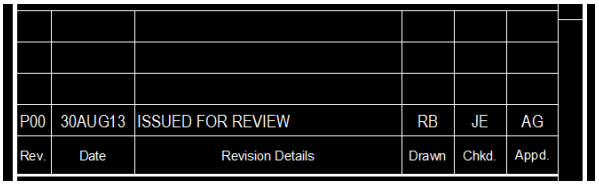
Table 8 :

TITLE BLOCK	CAD FILE	HARD COPY	PDF COPY
DRAWN BY	See 5.3.12	See 5.3.13	See 5.3.14
CHECKED BY	See 5.3.12	See 5.3.13	See 5.3.14
APPROVED BY	See 5.3.12	See 5.3.13	See 5.3.14

5.3.12 Drawing File

When issued, drawing files will bear the typed CAD initials of the author, checker and approver on the revision history box.

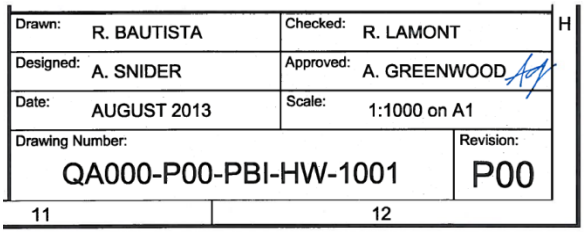
Figure 14 : CAD file



5.3.13 Hard Copy

The original hard copy set to be submitted to PWA will be signed by hand and stamped. This set will become the control set for reference. The drawing will bear hand signature of the drawing Approver beside his/her name in the Approved field box on the title frame as shown in *Figure 15*. Each drawing will be stamped with the issuing company's official stamp.

Figure 15 : Signed hard copy by Approver



Original hand-signed copy is required for all 'Final' drawings submitted for: Concept design, Schematic design, Technical design, Tender set, Contract set, Shop drawings (during construction) and As-Built.

Subsequent hard copies of the submitted original do not have to be hand signed. Scanned copies of the hand signed drawing are permitted as long as the clarity of the drawing is not compromised. Alternatively, copies may be printed directly from CAD files as shown in Figures 16 & 17. It is acceptable for these not to contain a copy of the hand signature, but to bear typed initials instead.

e.g. in the Revision history box:

Figure 16 : CAD file

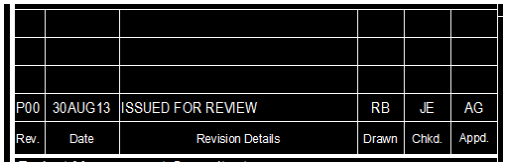
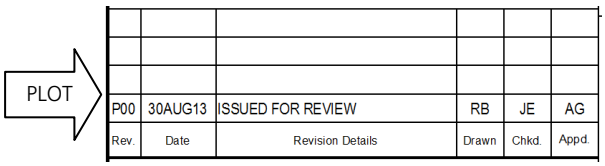


Figure 17 : Plotted drawing (subsequent hard Copy)



e.g. in the Approved box:

Figure 18 : CAD File

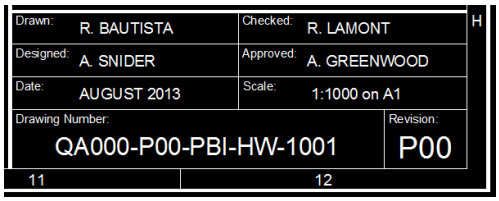
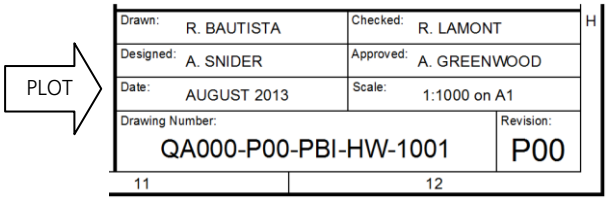


Figure 19 : Plotted drawing (subsequent hard copy)



5.3.14 PDF copy

When Issued, PDF copy can be generated electronically from the cad file bearing the typed initials of the author, checker and approver.

Figure 20 : CAD file

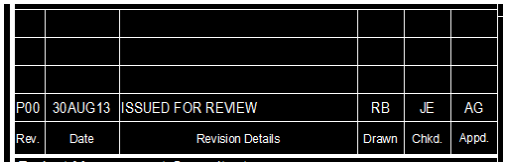
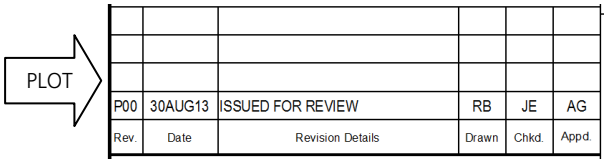


Figure 21 : PDF copy



5.3.15 LOGOS

All Consultant / Agency / Programme Logos are incorporated into the Title Block and placed on layers that can be turned off.

Figure 22 :

At Tender, all logos of Consultant's & Contractor's other than the PWA's will be removed.

Figure 23 :

5.4 Units

All general drawing work (e.g. Xrefs) are to be in model space and be produced in meters to three decimal places. Drawing borders to be in paper space and in millimetres.

e.g.

27.500
8.150
0.678

(metres)

Dimensions in metres and using whole numbers, can be expressed using the 'm' (metre) suffix as in the following:

15.000m

The position of the decimal point will be the same as a full stop and no space will be left between the number and its units, to ensure clarity, as in the following example:

9.900m

All other non-linear measurements, e.g. areas and volumes, will be followed by the unit symbol. The most common non-linear measurements are as follows:

Square metre – m2

Cubic metre – m3

All detail drawing work (e.g. standard details) is to be in model space and be produced in millimetres in whole numbers (i.e. no decimal places).

e.g.

275
10000 } (millimetres)
150

Dimensions in millimetres using whole numbers, can be expressed using the 'mm' (millimetre) suffix as in the following:

150mm

5.5 Drawing Sizes

Drawing sizes will conform to the International Standards Organisation (ISO).

Sizes (in mm) are as follows: -

A0 – 1189 x 841

A1 – 841 x 594

A2 – 594 x 420

A3 – 420 x 297

A4 – 297 x 210

In general, all drawings will be produced at the preferred A1 original size. The use of A0 size drawings will be avoided wherever possible.

Each group or set of drawings will use only one drawing size unless situations make this impractical.

5.6 Scales

Scales used on drawings will be selected as indicated in the table below. Only standard metric scales will be used. In all cases, the selected scale will be large enough to permit easy and clear interpretation of the information depicted.

Specific scale requirements of particular drawings such as layouts will be as stated in the Consultant's Project Brief.

Table 10 :

Permitted scales				
1:1	1:2		1:5	2:1
1:10	1:20	1:25	1:50	5:1
1:100	1:200	1:250	1:500	10:1
1:1,000	1:2,000	1:2,500	1:5,000	20:1
1:10,000	1:20,000	1:25,000	1:50,000	50:1

In exceptional cases where for functional reasons the recommended scale cannot be applied, intermediate scales may be chosen, provided that the required scale is of a whole number, such as 1:125, 1:150, etc.

The following scale notes will be considered:

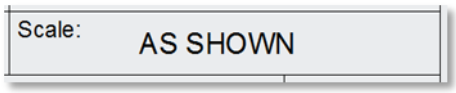
i. Number of scales on any one drawing will be kept to a minimum.

ii. CAD entities will be drawn at full scale **(1 Drawing unit = 1 Measurement unit).** Final plotted scale will be established during composition of the drawing layout for plotting.

iii. Originators using AutoCAD will employ the **PAPER SPACE/ MODEL SPACE** facility to establish drawing layout and scales. All drawing entities will reside in **MODEL SPACE** with the exception of view ports, general notes, revision clouding and its labels, title block and border.

iv. Where different scales exist, each scale will be specified under the title of the area of the drawing to which it applies and noted in the Title Block field as shown below:

Figure 24 :



v. Where a single scale is used on a drawing, it will be specified within the title block only. (See below). The scales selected will depend on the object area and will be large enough to permit easy and clear interpretation of information and ensure clarity of prints on the original as well as reduced copies i.e. A3 versions of A1 drawings.

Figure 25 :

vi. Where different scales are used **for horizontal and vertical dimensions**, such as in profiles, each scale will be clearly indicated on the drawing as shown below:

Figure 26 :

vii. When the drawing is not drawn to any scale, **'NTS'** (Not to Scale) will be placed in the title block as shown below:

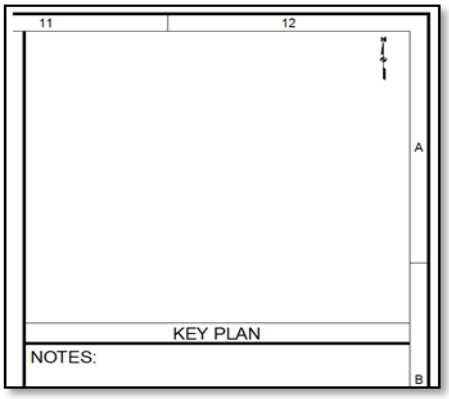
Figure 27 :

viii. Scale bars will be shown on all drawings containing plans.

5.7 Key Plan

Where layout plans are produced on a number of drawings to cover the extent or section of the project, a Key Plan will be included on each sheet, clearly indicating the section of the works under consideration. A dedicated box in the title frame is provided for the Key Plan as shown below.

Figure 28 :



5.8 Drawing Notes

Notes are to be numbered and positioned appropriately and will include the following notes:

i. All Dimensions are in metres unless otherwise stated. (Only on drawings drawn in metres.)

ii. All levels in metres above Qatar National Datum. (Only on drawings where this note is applicable.)

iii. All dimensions are in millimetres unless otherwise stated. (Only on drawings drawn in millimetres.)

5.9 General Notes

Where notes are extensive and apply on several drawings, a General Notes Drawing will be provided which consolidates all notes. Deviation from these notes on a particular drawing may be permitted, provided this amendment is shown in the Notes section of the drawing.

Where a General Notes Drawing is used, the first note on each applicable drawing will contain the following statement:

"1. FOR GENERAL NOTES, REFER TO DRAWING NO. XXX "

5.10 Reference Files

Referencing of other CAD files or external files is the method employed for data sharing. Effective use of CAD reference files ensures that data integrity and accuracy across disciplines is maintained and the latest, up-to-date revision of the CAD background is automatically displayed. These will be attached into the appropriate layer when referenced into the drawing sheets containing the drawing border. Refer to *Section 5.2* for Model File reference naming and *Section 6.8* for layering standards.

5.11 Drawing Revision

5.11.1 Revision Clouds and Triangles

All revisions on the body of the plotted drawing will be clearly identified by a revision cloud and triangle.

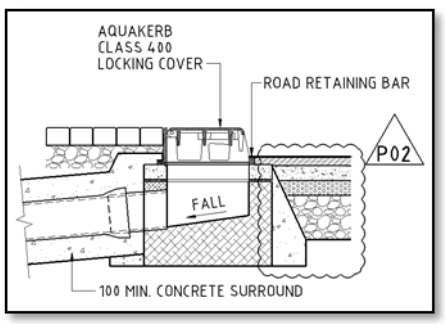
Each area in which a revision occurs will be ringed with a cloud and marked with an equilateral triangle containing the current revision letter.

Revision clouds and its triangle label will be placed on the paper space.

Revision clouds and triangles will be placed on layer Z_REV.

Clouding and revision triangles denoting the previous revision will be removed from the CAD file.

Figure 29 :



5.11.2 Revision Description

The date and description of the revision / issue will be given in the identified space within the Title Frame. Refer to *Section 5.3.6* for completing the revision history table on the title frame.

5.11.3 Drawing Revision Code

This code identifies the drawing revision and will be as defined in Table 11 below.

Subsequent issue of a drawing will have the revision coding incremented by the next sequential number or letter.

All drawings at first issue of all design stages will begin with - alpha character + '00'.

Table 11 :

Design Stage	Revision Code
PRE-DESIGN STAGE	01,02,03, etc.,
CONCEPT DESIGN STAGE	01,02,03, etc.,
SCHEME DESIGN STAGE	01,02,03, etc.,
TECHNICAL DESIGN STAGE	01,02,03, etc.,
TENDER & CONSTRUCTION	A,B,C,D,E, etc.,
CONTRACT	
AS BUILT	A,B,C,D,E, etc.,

Note : As drawings move from one stage to another, all historical revision history under that stage is to be removed from the revision history on the title block.

5.12 Drawing Register and Transmittal Record

The issue of drawings will be recorded on the drawing register and a transmittal provided by drawing originators containing like information. The drawing register will be a concise and continuous record of drawing revisions and issue history.

The current revision indicator will be recorded for each issue.

Drawings and Documents transmittals shall be through a web based application " BIW " (Conject) or in accordance with the requirements of PWA.

5.13 Checking and Approval of Drawings

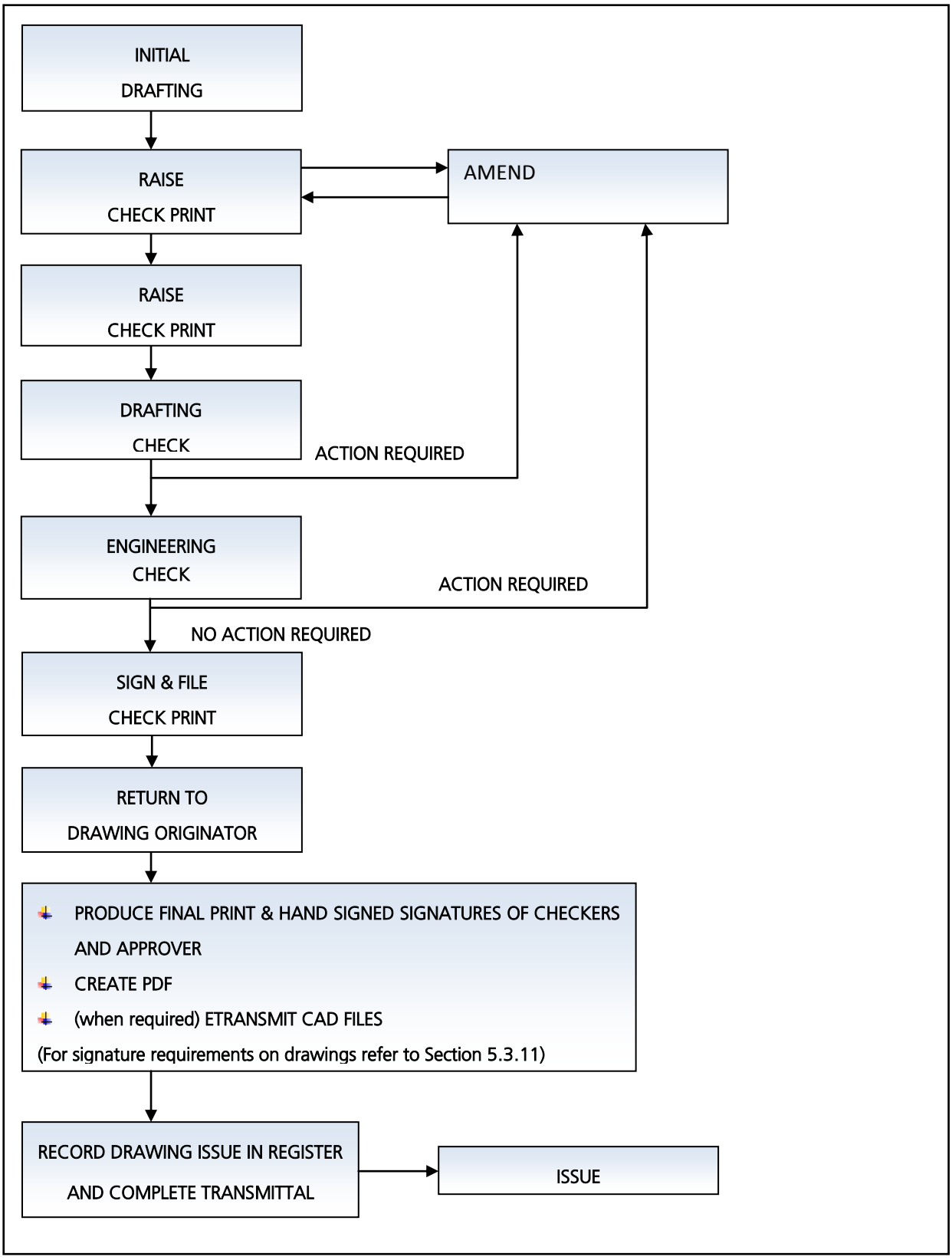
During drawing production a system of continuous checking will be employed by the Consultant to confirm that all CAD information fully complies with the conditions set out in this document.

It is imperative that all drawings are subjected to a Quality Assurance and Quality Control (QA/QC) check and are duly signed and authorized prior to issue.

The PWA, upon receipt of CAD data, will run an audit on all drawings. All data found on non-conformance and without an attached variance notation via transmittal, will be rejected and returned to the Consultant for notation in transmittal/request variance and/or correction.

Any drawing leaving the drawing office will have been properly checked for presentation, clarity, accuracy, technical correctness and compliance with the relevant CAD Standard. Refer to the flow chart overleaf in Figure 30 for an overview of the checking procedure.

Figure 30 : Flow diagram showing overview of CAD drawing checking procedure



5.13.1 Self Check

After preparation, the drawing will be checked by the drawing originator and any required amendment to the drawing is to be carried out prior to handing over the check print for checking.

5.13.2 Drafting Check

Generally the Drafting Check must precede the Engineering Check.

The Drafting Check will normally be carried out by a person designated by the CAD Office representative/Manager.

The Drafting Check will verify adherence to the Project Brief in conjunction with any applicable supplied criteria. The checker will also make an assessment with respect to presentation, standard of workmanship and adherence to the CAD Standard Manual.

The Drafting Check will, where deemed necessary, include an electronic check of the CAD File to ensure compliance with applicable standards and/or client requirements.

The check print will be clearly marked by the checker with any required modifications.

Upon completion of the Drafting Check the checker will then sign, date and highlight the required action to be taken.

Any amendment to the drawing requirements may, if required, be carried out prior to the Engineering Check and a new print raised, duly stamped and signed.

5.13.3 Engineering Check

The Engineering check will normally be carried out by a competent and relevant experienced Senior Engineer within the Consultant's organization.

The Engineering check will verify adherence to the design calculations, design standards and associated construction issues.

Upon completion of the Engineering Check, the checker will then sign, date and highlight the required action to be taken.

5.13.4 Further drawing amendments

Upon completion of the Drafting Check and Engineering Check the completed check print will be returned to the originator of the drawing for amendment of the drawing.

Where required, further check prints will be raised and the checks repeated.

5.13.5 Approval

Upon completion of the checking process, a clean print of the drawing will be submitted to the relevant checkers for signature and to the designated authority for approval. This then becomes the controlled drawing for reference. The checker's and approver's initials together with the relevant dates will be entered in the appropriate areas of the CAD file.

5.14 Safety, Health & Environmental (SHE) Box

The QCS stipulates that, provision of information can be achieved by inclusion of notes on drawings, as a preferred method, since the notes will then be immediately available to those carrying out the work. One common technique that is used is the SHE Box. Details about the SHE box can be found in the 'Design for Health and Safety' Standard (PMC-ST-HSS-020-020).

Figure 31 : SHE Box

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION
In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following specific residual risks (Reference shall also be made to the design hazard log).
Construction
None
Maintenance / Cleaning
None
Use
None
Decommissioning / Demolition
None

The SHE box appears at Design Stage on drawings to be issued to contractors. Once construction works are completed, any residual risk needs to be reported in a similar way on the As-Built drawings. Placement of the SHE box ideally will be placed in the upper right corner of the drawing area of each sheet. Should this placement obscure key drawing information, the GEC may move it to a more ideal location on the drawing to provide clarity. There are no restrictions on how many lines may be used within the SHE box.

6 CAD STANDARDS

6.1 Drawing set up

i. Drawing templates will be used for setting the layers of identifiable drawings (e.g. Building Affairs – Architectural , MEP etc.,).
ii. Units in AutoCAD will be set to metres for layouts and profiles and millimetres for detail drawings such as standard details.
iii. The CAD files provided will be in the current version of AutoCAD file format used on the project.
iv. Fonts and line types are to be followed as provided in this manual.
v. Files will be purged before issue only.
vi. Drawing features / entities must be in model space. Title frames must be in paperspace.
vii. The colour and line type of each entity is drawn on BYLAYER.
viii. For all general drawing annotations, ISOCP.shx will be used. True type fonts such as Arial.ttf will be used for presentation drawings and Title frame.
ix. All polygons will be closed polylines.
x. Do not place entities on layer 0. This layer is for the creation of blocks only.

6.2 Line Work

6.2.1 Line Types

The following guidelines will apply to the use of line types:

i. LINETYPE to be set BYLAYER. (Deviation: Standard AutoCAD Blocks)

ii. All layers will have their entities set to 'BYLAYER'

iii. All colours of AutoCAD objects to be BYLAYER. (Deviation: Standard AutoCAD Blocks)

iv. The plotted appearance of linetypes will be consistent across all drawings.

v. Modification of AutoCAD default source file is not permitted.

vi. Lines on a drawing that cannot be represented by those in the default AutoCAD source file may be loaded from the approved Custom line types provided.

The default AutoCAD source file ACADISO.LIN will be used with the following:

Table 12 :

System Variable	LTSCALE	PSLTSCALE	MEASUREMENT	MEASUREINIT
Value	1	1	1	1

Custom line types provided:

- PWA_Buildings.lin

6.2.2 Line Weights

Table 13 :

Colour No.	Display Screen	Plotted Line Weight (mm)	Plotted Colour	
			PWA_COL_A1.CTB	PWA_BW_A1.CTB
1	Red	0.13	BLACK	BLACK
2	Yellow	0.20	BLACK	BLACK
3	Green	0.45	BLACK	BLACK
4	Cyan	0.20	BLACK	BLACK
5	Blue	0.60	BLACK	BLACK
6	Magenta	0.30	BLACK	BLACK
7	White	0.30	BLACK	BLACK
8	Dark	0.10	Object Colour	BLACK
9	Light	0.10	Object Colour	BLACK
11-79 & 81-249	Object	0.25	Object Colour	BLACK
10	Object	0.25	Object Colour	BLACK
80	Object	0.25	Object Colour	BLACK
250-255 (Greys)	Object	0.10	Object Colour	Object Colour

6.2.3 Xref as Background

The external reference, when used as a background, will be shown as screened or subdued such that the proposed work is more legible against the background reference.

6.3 Text

6.3.1 General

i. The AutoCAD Styles will have a default height setting = 0.

ii. Sloping, italic, and elaborate fonts are not permitted.

iii. The objective will be to make all lettering highly legible so that information can be communicated with the minimal possibility of error in reading. Lettering

sizes will be chosen such that it will remain legible when drawings are reduced to A3 size.

iv. Lettering will be consistent, both in size and placement. Lettering sizes for specific applications, such as notes or titles, will not vary within the same drawing.

v. Lettering will be uniform, clear, sharp and distinct. The mixing of lettering styles, sloping, italic, and elaborate fonts will not be permitted.

vi. All text will be regularly spaced, upright and uppercase and not be underlined. Deviation Titles under plans, details etc. are to be underlined.

vii. All text will be left justified. Deviation: Titles will be centre justified and underlined.

viii. Specific notations will be carefully placed so they relate to the portion of the drawing or detail to which they apply.

ix. The placing of notes through drawing lines is to be avoided.

x. Leader arrows relating to specific text or annotation will be placed in model space with the detail it is referencing on the same layer as the text to which it relates.

6.3.2 Fonts

Permitted text fonts are as shown below:

Table 14 :

AutoCAD Style Name	AutoCAD Font File	CAD Usage
STANDARD	ISOCP.SHX	Technical / Engineering drawings
ARIAL / ARIAL NARROW	ARIAL.TTF	Presentation Drawings

6.3.3 Text Assignments

The table below indicates approved texts with their appropriate colour/application assignments:

Table 15 :

Plotted Text Height (mm)	Width Factor	Plotted Line weight	Usage
1.8	1	0.18	General text, Dimensions, Notes – used on A3 & A4 only where drawing is not plotted at a reduced scale.
2.5	1	0.25	General text annotations, Dimensions, Notes Special Notes
3.5	1	0.35	For more prominent notes or labels requiring special emphasis.
5.0	1	0.50	Normal Titles, Drawing Numbers, Section titles, Detail Titles
7.0	1	0.7	Major Titles

i. The preferred text height for general text and notes is 2.5mm.

ii. The text height adopted for a project will be consistent across all drawings unless situations make this impractical.

6.4 Dimensioning

Automated dimensioning commands within CAD software programs will be used for creation and editing of dimensions, as shown in table 16 below.

The editing of dimension values via basic text editing commands is not permitted. Dimensions will be associative and placed on their own unique layer.

Table 16 :

Dimension Text Height	Extension Line Offset	Extension Line Extension	Stack Offset	Arrow Size	Centre Mark
2.5mm	Dimexo = 2	Dimexe = 2	Dimdli = 6.25	Dimasz = 2.5	Dimcen = 1

6.5 Standard Symbols and Blocks

In order to promote consistency, standard symbols will be utilized. All blocks are to be inserted into the drawing on its appropriate drawing layer. Where a symbol required is not available from the blocks provided with this manual, symbols compliant to international standards will be used. These new blocks will be submitted to PWA through a proper transmittal and action assignment. Email requests will be considered. PWA will confirm and verify then update the list of standard symbols library and then reissue a block/symbols library.

All symbols will be consistent within a drawing or set of drawings.

All blocks that need to be created as new blocks will have all their elements saved on layer "0".

All symbols used within a drawing must be defined using a legend.

6.6 Hatching

Wherever possible, all hatching created will be associative and placed on its own unique layer. Exploding of hatches must be avoided.

6.7 Colours

In AutoCAD, entity colour will be assigned "ByLayer". Deviation can be on standard blocks, i.e. are Road signs blocks where specific standard colours are assigned for each.

6.8 Layering

CAD Layering will be in accordance with PWA AutoCAD Layering Standards as included in Appendix A of this manual.

Additional layers may be required and the naming of such layers will follow format as shown in Section 6.8.1.

Note :
All new layer names must be forwarded to PWA for review and approval. So as not to hold up production of drawings, work must continue on any new layers created while design offices seek PWA approval. If issue is unresolved as project goes to submittal – Consultant to provide transmittal stating variance from standard and provide detailed description of non-conforming layers, blocks, linestyles etc. ALL requests for new symbology to go through a proper transmittal and action assignment to PWA.

6.8.1 Layer Name Layout

Where new layers are to be created the AutoCAD layer naming convention is as follows:

1 2 3

B_AR_DOORS

Where:

1 = Department Designator

2 = Status / Section Designator

3 = Feature / Entity Designator

Department Designator *(Field 1)*

This code identifies the PWA department (i.e. B = Building Affairs, D = Drainage and RD = Roads.

Status / Section Designator *(Field 2)*

This code identifies the main classification of the type of element within a discipline. For example 'AR" describes as Architectural.

Feature / Entity Designator *(Field 3)*

This code further identifies the entity description feature name. For example 'DOORS" describes the Doors feature.

List of PWA Standard Layers

See Appendix A.

6.9 Reference Files (Xrefs)

i. Where CAD data is to be shared between drawings the use of reference files is to be adopted.

ii. All reference files are to be inserted in model space with the UCS set to 'world'. All files are to be inserted at 0,0,0.

iii. Unused reference files will be detached upon completion of drawings.

iv. The number of reference files on a project will be kept to a minimum.

v. The preferred method of attaching Xrefs will be Overlay option.

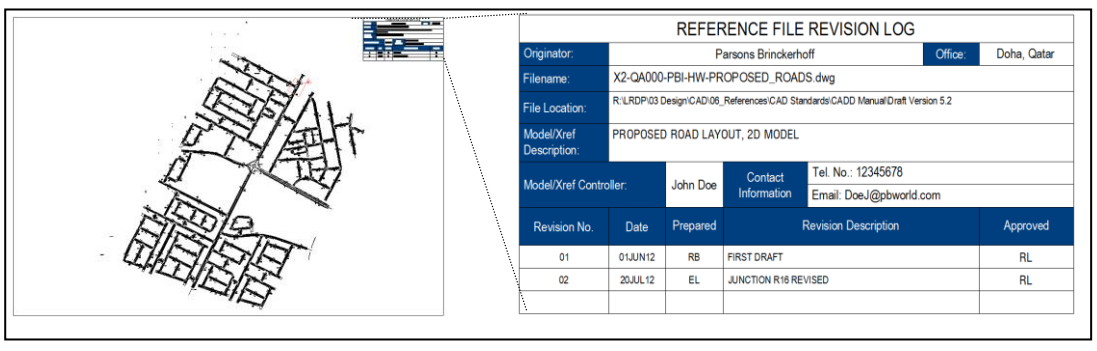
vi. Reference files will be inserted on unique layer that does not conflict with the general content of the drawing. (i.e. layer **Z_XREF** in AutoCAD).

vii. Reference files will be "**CLIPPED**" within the Active drawing sheet file to ensure that only the design data relevant to the drawing is displayed.

viii. Reference files issued externally or shared between departments will indicate revised areas with a **revision cloud** and **triangle**. A revision history will be maintained within the reference file. In AutoCAD, the revision history log will be placed in **paper space,** see *Figure 32* below.

ix. For Model File Naming refer to *Section 5.2*

Figure 32 :



6.10 Plotting

The following standard colour source files will be used:

Table 17 :

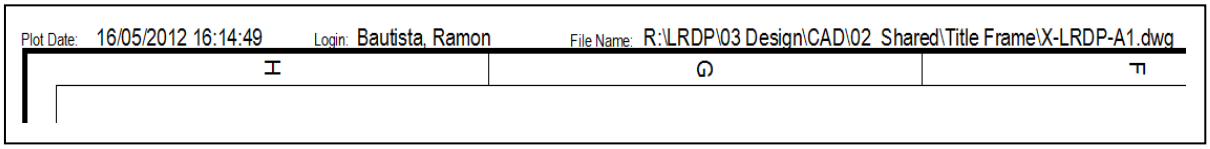
Colour	Black and White
PWA _COLOUR_A1.ctb	PWA _BW_A1.ctb

This standard colour source (CTB) file will be flexible and can be adjusted to suit Consultant's need during plotting. When drawing (DWG) files are required as part of a submittal, the CTB file used for the plotting of the drawings will also be required in the submittal.

6.10.1 Date and File location update

These are field entities contained within the drawing border and are used to print the file name, file location, date and time of print, etc.

Figure 33 :



6.11 Data Submission Standards

All drawing files must conform to the PWA BUILDING CAD Standards set forth in this document.

6.11.1 Submission

Submittals at each level of design will be in hard copy and soft copy digital format per requirements in the Project Brief. The digital submittal will not be locked to prevent PWA from extracting or editing content of the submittal. Furthermore, the digital submittal will be produced in PDF format and the original format of the deliverable for each level of design.

Table 18 : Levels of Design

Drawing Status
PRE-DESIGN STAGE
CONCEPT DESIGN STAGE
SCHEME DESIGN STAGE
TECHNICAL DESIGN STAGE
TENDER & CONSTRUCTION DOCUMENTS STAGE
AS BUILT

Due to file size and volume of data sets, CAD Drawings & Technical Engineering Models, as the deliverables are defined as per the Consultant Project Brief, will be delivered via best means (transmittal + CD, Portable drive). This Visualization Simulation and Technical Engineering Model data is to be delivered from other documents that are delivered at the same time. It is required that there be a Letter of Transmittal and a full description of data included; listing of files, project area, Consultant project number, title and date of submission to be included, along with any variances to standards as published.

6.11.2 File Format

Digital submittals will be in both DWG and PDF format. DWG files will be delivered via best means (Consultant to submit with transmittal + CD, Portable drive) in ZIP format.

Table 19 : Technical Model Data Formats

DELIVERABLE:			
Technical Engineering Model Data			
Approved Software listing	**File Format Type(s)**	**Submittal format**	**Discipline(s)**
Autodesk : AutoCAD/Civil3D	DWG, XML, PDF	per CADStandards/GIS Database Standards Manual (v8.0 or better)	ALL
Bentley : MicroStation/InRoads/Inrail/Geopak/ MX	DGN, RWK,DTM,ALG,IRD,ITL, XIN,XML,PDF	"save as" DWG, with perscribed CADStandards/GIS Database Standards Manual (v8.0 or better)	ALL
ArcGIS	GDB/PDF	per CADStandards/GIS Database Standards Manual (v8.0 or better)	GIS INFORMATION SYSTEM DATA MODEL
VISUM	VER		TRAFFIC MODEL
SYNCHRO	SYN		TRAFFIC MODEL
SDRA	SIP		TRAFFIC MODEL
HCS	INF		TRAFFIC MODEL
INFOWORKS	IWC/IWT	recommend use of the compact .iwc format. The .iwt format is retained for downward compatibility .	DRAINAGE MODEL
Civil3D, Inroads	DWG, DGN, RWK,DTM,ALG,IRD,ITL, XIN,XML,PDF	"save as" DWG, with perscribed CADStandards/GIS Database Standards Manual (v8.0 or better)	ROADWAY MODEL

7 OTHER STANDARDS

7.1 Summary

For consistency in production the following external CAD standards will be followed:

7.2 Survey

Qatar Survey Manual : Urban Planning & Development Authority / The Centre for GIS – State of Qatar

All surveys conducted in accordance to the standards and specifications as laid out in Qatar Survey Manual will be assured of the same level of consistency and accuracy.

This will ensure the reliability of all the survey data and enhance the confidence level of all its users. With this standardized survey data, it can be uploaded onto the Qatar GIS system as seamlessly as possible.

Link: http://www.gisqatar.org.qa/english/projects/projects.htm

7.3 MMUP

7.3.1 Ministry of Municipality & Urban Planning (MMUP) - Urban Planning & Development Sector

In accordance with the Memorandum of Understanding between MMUP-Urban Planning Sector and Public Works Authority – December 2012 Notes, Section 6. Land Expropriation CAD Format and Drawing template is attached. Soft Copy should be requested from PWA. The following CAD layers, line types and hatching are to be used for all Land Acquisition Drawings.

Table 20 :

Description	Plotted color	Pen color	Layer	MMUP GIS LAYER INFO.	
				Feature Dataset	Feature Class
Survey parcel (Cadastral)	Green	90	0-Survey Parcel (Cadastral)	LIC.Landplan	LIC.LPLN_CadastrePlot
Road ROW	Cyan	130	0- Right Of Way – By Zone	LIC,Causeway	LIC,REF_PolicyPlan_Merged
Proposed ROW	Red	10 Linetype Hidden2	0-PROPOSED-ROW	N/A	N/A
Existing Buildings impacted by proposed ROW	Purple Ref Notes	201	0-EX BLDG TO BE EXPROPRIATED WITHIN ROW	N/A	N/A
Land to be expropriated outside existing ROW	Yellow Ref Notes	50	0-EX PROP ROW EXPROPRIATED	N/A	N/A
Land to be expropriated within the existing ROW	Cyan Ref Notes	113	0-EX ROW EXPROPRIATED	N/A	N/A
Land to be expropriated within existing buffer zones	Green Note 1	84	0-EX BUFFER ROW EXPROPRIATED	N/A	N/A

Notes on drawing set up:

To ensure consistency for all land expropriations drawing produced, the following layering sequence to be used for the drawing objects (1 being the top layer followed by 2,3, and so on):

1. Viewport text and notes (top)
2. Proposed right of way (red dotted lines)
3. Land expropriation hatching (purple on top, then yellow, green, blue)

4. Existing right of way (blue lines)
5. Survey parcel / plot boundary (green lines)
6. Road design Layout (greyscale/fine black lines)
7. Aerial image (bottom)

The drawings to be kept clean by placing text (coordinates, etc.) and annotations away from engineering lines and colour hatching (land expropriation).

A transparency value of 60 to be used for hatching layers (yellow, Cyan and green) to allow showing the aerial image background. The purple hatch for buildings to be in front of the yellow, cyan, and green hatch to avoid colour change. The purple hatch will not have transparency to avoid change in colour if placed on top of the other transparent colour hatch.

The proposed right of way (red dotted lines) to be on top of the existing right of way (blue dotted lines). The proposed right of way to only include the additional right of way required for the new road project.

7.3.2 MMUP Typical Road Cross-sections and Utility Corridors

Consultant's to contact MMUP for standards. When submitting typical cross section drawings to MMUP, Consultant's to use MMUP standard color coding as MMUP specified.

7.4 Utility CAD Standards

Consultant's to contact Utility Authority (i.e. KAHRAMAA, Ooreedoo, Vodafone, or others) for CAD Plan Preparation Standards. If no other Utility standard is in place by the given Utility Authority, then the Utility standards as outlined in this manual will take precedent.

Appendix A – AUTOCAD LAYERS DEFINITIONS

A.1 General Layers

CORE LAYERS NON DISCIPLINE				
Layer Name	Screen Colour	Linetype	Plotted Line weight	Description
Z_18TEXT	RED	CON	0.10	TEXT AT RESPECTIVE HEIGHT
Z_25TEXT	WHITE	CON	0.25	TEXT AT RESPECTIVE HEIGHT
Z_35TEXT	GREEN	CON	0.35	TEXT AT RESPECTIVE HEIGHT
Z_50TEXT	CYAN	CON	0.50	TEXT AT RESPECTIVE HEIGHT
Z_70TEXT	BLUE	CON	0.70	TEXT AT RESPECTIVE HEIGHT
Z_DIMS	RED	CON	0.10	ALL DIMENSIONS
Z_DWG_GRID	251	CON	0.15	DRAWING / MAP GRID LINES
Z_DWG_SHT	WHITE	CON	0.25	DRAWING SHEET & TITLE BLOCK
Z_NORTH	GREEN	CON	0.35	NORTH DIRECTION SYMBOL
Z_REV	YELLOW	CON	0.25	REVISION CLOUDS AND
Z_SECMK	GREEN	CON	0.35	SECTION AND DETAIL MARKS
Z_XREF	WHITE	CON	0.25	EXTERNAL REFERENCE (XREF)
Z_VPORT	WHITE	CON	0.25	VIEWPORT

A.2 GIS Layers

GIS LAYERS				
Layer Name	Screen Colour	Linetype	Plotted Line weight	Description
GIS_ACQ_BDRY	20	ACAD_ISO13W100	0.25	LAND ACQUISITION BOUNDARY
GIS_CADASTRAL	RED	CON	0.10	CADASTRAL PLOT
GIS_CNTRS	9	CON	0.15	CONTOURS
GIS_CNTRS_TEXT	RED	CON	0.10	CONTOURS TEXT
GIS_CSTL	90	CON	0.35	COASTLINE

GIS LAYERS (Continuation…)				
Layer Name	Screen Colour	Linetype	Plotted Line weight	Description
GIS_CTRL	RED	CON	0.10	STATION NAME, EASTING, NORTHING, HEIGHT, ACCURACY RATINGS, ETC
GIS_FLOWLINE	8	CON	0.05	FLOWLINES
GIS_PPLN	252	CON	0.15	POLICY PLAN
GIS_PRJ_BDRY	222	ACAD_ISO14W100	0.35	PROJECT BOUNDARY
GIS_RD01	121	CON	0.35	MAJOR ROAD
GIS_RD02	151	CON	0.35	MINOR ROAD
GIS_RD03	181	CON	0.35	STREETS
GIS_ROW_BDRY	170	PHANTOM2	0.35	PROPOSED RIGHT OF WAY
GIS_ZONE	13	CON	0.35	ZONE
GIS_MUNC	200	ACAD_ISO10W100	0.35	MUNICIPALITY
GIS_DIST	72	ACAD_ISO12W100	0.35	DISTRICT

A.3 Building Architectural Layers

ARCHITECTURAL LAYERS				
Layer Name	Screen Colour	Linetype	Plotted Line weight	Description
B_AR_ACESS	RED	CON	Default	Main Gates
B_AR_ACESR	RED	CON	Default	Door stopper, roll holder, coat hooks, soap tray etc.
B_AR_BEXST	31	CON	Default	Existing Buildings
B_AR_BPROP	GREEN	CON	Default	Proposed Building
B_AR_BFUTR	YELLOW	HIDDEN2	Default	Future Building
B_AR_BWALL	YELLOW	CON	Default	Boundary wall or Fence

ARCHITECTURAL LAYERS (Continuation…)				
Layer Name	Screen Colour	Linetype	Plotted Line weight	Description
B_AR_CARS	CYAN	CON	Default	Car blocks in Plans or Elevations
B_AR_COL	YELLOW	CON	Default	Column Positions in Architectural
B_AR_C-SHD	253	CON	Default	Column Hatch
B_AR_DTLS	GREEN	CON	Default	Architectural Details
B_AR_DIM	CYAN	CON	Default	Dimension for Plan, Elevation, Section & Detail
B_AR_DOORS	RED	CON	Default	Door Blocks
B_AR_DTAGS	YELLOW	CON	Default	References for Door Elevations, Detail & Schedules
B_AR_ELEV1	WHITE	CON	Default	Nearest Elevation View
B_AR_ELEV2	MAGENTA	CON	Default	Second Elevation View
B_AR_ELEV3	YELLOW	CON	Default	Third Elevation View
B_AR_ELEV4	RED	CON	Default	Fourth Elevation View
B_AR_ELEV5	CYAN	CON	Default	Fifth Elevation View
B_AR_F-SAN	RED	CON	Default	Sanitary fittings for Toilet Blocks, Baths & Kitchens
B_AR_F-LTS	RED	CON	Default	Showing light Positions in Architectural Plan
B_AR_FURN	CYAN	CON	Default	Furniture Layout
B_AR_FRFIN	YELLOW	CON	Default	Floor Finishing Schedule & Descriptions
B_AR_GRIDS	CYAN	CENTER2	Default	Grid Lines
B_AR_GDNOS	YELLOW	CON	Default	Grid References
B_AR_HATCH	RED	CON	Default	Different Hatch Patterns
B_AR_H-SLD	253	CON	Default	Solid Hatch Pattern

ARCHITECTURAL LAYERS (Continuation…)				
Layer Name	Screen Colour	Linetype	Plotted Line weight	Description
B_AR_HIDN	RED	HIDDEN2	Default	Show all dotted lines
B_AR_ILOCK	14	CON	Default	Paving Tiles (Interlock)
B_AR_K-STN	RED	CON	Default	Kerb Stone Layout
B_AR_L-GRN	96	CON	Default	Green Area (Grass etc.)
B_AR_L-SRB	96	CON	Default	Shrubs
B_AR_L-TRS	96	CON	Default	Trees
B_AR_LGNDS	YELLOW	CON	Default	Legends, Symbols References etc..
B_AR_PRCL	GREEN	CENTER2	Default	Policy Plan
B_AR_PARKG	CYAN	CON	Default	Parking Area
B_AR_PEL	CYAN	CON	Default	People Blocks in Plans or Elevations
B_AR_PLAN	WHITE	CON	Default	Floor Plans
B_AR_STAIR	YELLOW	CON	Default	Stair Case & Steps in Plan
B_AR_CEILG	CYAN	CON	Default	Reflecting Ceiling Plan
B_AR_IMAGE	CYAN	CON	Default	Place For Images
B_AR_ROOF1	MAGENTA	CON	Default	Highest Level For Roofing
B_AR_ROOF2	YELLOW	CON	Default	Second Level For Roofing
B_AR_ROOF3	RED	CON	Default	Third Level For Roofing
B_AR_ROOF4	CYAN	CON	Default	Fourth Level For Roofing
B_AR_SECT	WHITE	CON	Default	Architectural Sections & Details
B_AR_S-EL1	YELLOW	CON	Default	Nearest Elevation in Sections
B_AR_S-EL2	RED	CON	Default	Far Elevation in Sections
B_AR_TEXT1	MAGENTA	CON	Default	Title, References Text etc..
B_AR_TEXT2	YELLOW	CON	Default	Labelling Text
B_AR_T-NTS	YELLOW	CON	Default	General Notes
B_AR_T-CRD	YELLOW	CON	Default	Coordinates Text

ARCHITECTURAL LAYERS (Continuation…)				
Layer Name	Screen Colour	Linetype	Plotted Line weight	Description
B_AR_T-LVL	YELLOW	CON	Default	Floor, Elevation or Section Levels
B_AR_TILES	8	CON	Default	Floor Tiles
B_AR_URBAN	CYAN	CON	Default	GIS Data
B_AR_WNDOW	RED	CON	Default	Window Blocks
B_AR_WTAGS	YELLOW	CON	Default	References for Window Elevations, Details & Schedules

A.4 Building Structural Layers

STRUCTURAL LAYERS				
Layer Name	Screen Colour	Linetype	Plotted Line weight	Description
B_ST-Angles	MAGENTA	CON	Default	Angles
B_ST-Beam Text	WHITE	CON	Default	Beam Text
B_ST-Beams	WHITE	CON	Default	Beams
B_ST-Bitu	GREEN	HIDDEN2	Default	Bitumen
B_ST- Blinding	MAGENTA	CON	Default	Blinding
B_ST-Block Work	RED	CON	Default	Block Work
B_ST-Bolts	RED	CON	Default	Bolts
B_ST-Bott Reinf	GREEN	CON	Default	Bottom Reinforcement
B_ST-Boulders	RED	CON	Default	Boulders
B_ST-Circle	RED	CON	Default	Slab Thickness Circle
B_ST-Col Text	GREEN	CON	Default	Columns Text
B_ST-Col-H	9	CON	Default	Column Hatch
B_ST- Column PC	GREEN	CON	Default	Planted Column

STRUCTURAL LAYERS (Continuation…)				
Layer Name	Screen Colour	Linetype	Plotted Line weight	Description
B_ST- Column	GREEN	CON	Default	Stub Column
B_ST- Columns	GREEN	CON	Default	Columns
B_ST-Concrete	RED	CON	Default	Concrete
B_ST-Dim	RED	CON	Default	Dimensions
B_ST-Dim Beam	RED	CON	Default	Dim Beams
B_ST-Dim C	RED	CON	Default	Dim Columns
B_ST-Dim F	RED	CON	Default	Dim Footings
B_ST-Dim L	RED	CON	Default	Dim Leader
B_ST-Dim Sect	RED	CON	Default	Dim Sections
B_ST-Dim Slab	RED	CON	Default	Dim Slabs
B_ST-Earth	8	CON	Default	Earth
B_ST-Foot Text	GREEN	CON	Default	Footings Text
B_ST- Footings	WHITE	CON	Default	Footings
B_ST-Grid Circle	YELLOW	CON	Default	Grid Circle
B_ST-Grids	8	CENTER2	Default	Grid Line
B_ST-Grids Text	GREEN	CON	Default	Grids Text
B_ST-Hatch 1	RED	CON	Default	Hatch
B_ST-Hatch 2	8	CON	Default	Hatch
B_ST-Hidden	RED	HIDDEN2	Default	Misc. Hidden Line
B_ST-Level 1	MAGENTA	CON	Default	Level in plan
B_ST-Level 2	MAGENTA	CON	Default	Level in Sections
B_ST-Mesh	GREEN	CON	Default	Mesh Reinforcement
B_ST-Notes	MAGENTA	CON	Default	Notes
B_ST-Plan	WHITE	CON	Default	Plan
B_ST-Plates	WHITE	CON	Default	Plates
B_ST- Polythene	RED	CON	Default	Polythene Sheet

STRUCTURAL LAYERS (Continuation…)				
Layer Name	Screen Colour	Linetype	Plotted Line weight	Description
B_ST-Purlins	MAGENTA	CON	Default	Purlins
B_ST-Rafter	WHITE	CON	Default	Rafter
B_ST-Reinf 1	BLUE	CON	Default	Reinforcement
B_ST-Reinf 2	GREEN	CON	Default	Reinforcement
B_ST-Reinf C	MAGENTA	CON	Default	Cross Reinforcement
B_ST-Ribs	8	HIDDEN2	Default	Ribs
B_ST-Sand	RED	CON	Default	Sand
B_ST-Sect Mark	MAGENTA	CON	Default	Section Mark in Plan
B_ST-Section 1	WHITE	CON	Default	Sections
B_ST-Section 2	WHITE	CON	Default	Sections
B_ST- Sheeting	YELLOW	CON	Default	Sheeting
B_ST-Slab Text	WHITE	CON	Default	Slab Text
B_ST-Solid	253	CON	Default	Solid
B_ST-Steel Col	WHITE	CON	Default	Steel Columns
B_ST-SteelBeam	WHITE	CON	Default	Steel Beams
B_ST-Steps	MAGENTA	CON	Default	Stairs
B_ST-Text 1	WHITE	CON	Default	Text
B_ST-Text 2	GREEN	CON	Default	Text
B_ST-Top Reinf	GREEN	HIDDEN2	Default	Top Reinforcement
B_ST-Wall	WHITE	CON	Default	Walls
B_ST-Welds	MAGENTA	CON	Default	Welds

A.5 Building Mechanical Layers

HVAC LAYERS				
Layer Name	Screen Colour	Linetype	Plotted Line weight	Description
B_HVAC_AHU	140	CON	0.30	Air Handling Unit
B_HVAC_ATT	132	CON	0.20	Sound Attenuator
B_HVAC_BMS	137	CON	0.25	Building Management System
B_HVAC_C_P	138	CENTER	0.25	Chiller Pipe
B_HVAC_CH	140	CON	0.30	Chiller Unit
B_HVAC_CHP	137	CON	0.25	Chilled Water Pump
B_HVAC_CiP	137	CON	0.25	Circulating Pumps
B_HVAC_Cond	132	HIDDEN	0.20	Cond drain pipe
B_HVAC_dAC	137	CON	0.13	Standard Air Conditioning Details
B_HVAC_DDC	138	CON	0.20	Direct Digital Control
B_HVAC_DG	138	CON	0.20	Door Grill
B_HVAC_DIM	132	CON	0.09	HVAC Dimension
B_HVAC_Duct	139	CON	0.25	Main Duct
B_HVAC_ED	138	CON	0.20	Extract Diffuser
B_HVAC_Edu	132	CON	0.25	Exhaust Duct
B_HVAC_EF	138	CON	0.25	Extract Fan
B_HVAC_ExD	133	HIDDEN	0.18	Existing Duct
B_HVAC_FCU	137	CON	0.25	Fan Coil Unit
B_HVAC_FD	240	CON	0.20	Fire Damper
B_HVAC_FlD	132	CON	0.05	Flexible Duct
B_HVAC_Fs	132	CON	0.09	Air Conditioning Fittings
B_HVAC_ILF	137	CON	0.20	Inline Fan
B_HVAC_nAC	137	CON	0.18	Standard Note Air Conditioning
B_HVAC_OP	139	CON	0.25	Access Opening

HVAC LAYERS (Continuation…)				
Layer Name	Screen Colour	Linetype	Plotted Line weight	Description
B_HVAC_PAC	137	CON	0.09	Package AC Unit
B_HVAC_RD	137	CON	0.20	Return Diffuser
B_HVAC_ReP	139	HIDDEN	0.20	Refrigerant Pipes
B_HVAC_RG	137	CON	0.20	Return Grille
B_HVAC_SAC	140	CON	0.25	Split Air Conditioning
B_HVAC_SD	137	CON	0.20	Supply Diffuser
B_HVAC_SFD	240	CON	0.20	Smoke / Fire Damper
B_HVAC_SG	137	CON	0.20	Supply Grille
B_HVAC_Dm	137	CON	0.20	Dummy Diffuser
B_HVAC_TXT	137	CON	0.18	Air Conditioning Text
B_HVAC_VAV	137	CON	0.15	Variable Air Volume
B_HVAC_VCD	132	HIDDEN2	0.15	Volume Control Damper
B_HVAC_WAC	140	CON	0.25	Window Air Conditioning

A.6 Drainage Layers

DRAINAGE LAYERS				
Layer Name	Screen Colour	Linetype	Plotted Line weight	Description
B_MeD_CP	138	CON	0.20	Catch Pit
B_MeD_CO	138	CON	0.18	Drainage Clear out
B_MeD_DC	140	CON	0.25	Dilution Chamber
B_MeD_Det	132	CON	0.13	Standard Drainage details
B_MeD_DF	132	CON	0.05	Drainage Fittings
B_MeD_DIM	131	CON	0.09	Standard Drainage Dimensions
B_MeD_eDRL	134	HIDDEN	0.20	Existing Drainage layout internal

DRAINAGE LAYERS (Continuation…)				
Layer Name	Screen Colour	Linetype	Plotted Line weight	Description
B_MeD_eHT	135	HIDDEN	0.20	Existing holding tank
B_MeD_eST	135	HIDDEN	0.20	Existing Septic Tank
B_MeD_ESVC	139	CON	0.20	External drainage piping
B_MeD_FD	138	CON	0.20	Floor Drain
B_MeD_FG	138	CON	0.20	Floor Gully
B_MeD_GO	140	CON	0.20	Gutter Outlet
B_MeD_GI	140	CON	0.25	Grease Interceptor
B_MeD_HT	139	CON	0.20	Holding Tank
B_MeD_IC	140	CON	0.25	Inspection Chamber
B_MeD_MH	140	CON	0.25	Manhole internal within the
B_MeD_MPVC	138	CON	0.20	Common Pipe Drawings
B_MeD_OI	140	CON	0.25	Oil Interceptor
B_MeD_pDRL	134	HIDDEN	0.20	Proposed Drainage layout internal
B_MeD_pMH	134	HIDDEN	0.20	Proposed manhole internal
B_MeD_pST	134	HIDDEN	0.20	Proposed Septic tank
B_MeD_RC	140	CON	0.25	Retarding Chamber
B_MeD_RG	139	CON	0.20	Road Gully
B_MeD_RSA	139	CON	0.20	Rain water soakaway
B_MeD_RWO	140	CON	0.20	Rain Water Outlet
B_MeD_SAAC	137	CON	0.20	Air-Conditioning soakaway
B_MeD_SP	137	CON	0.20	Sump pumps
B_MeD_SSA	139	CON	0.20	Septic tank soakaway
B_MeD_ST	139	CON	0.20	Septic tank
B_MeD_TXT	137	CON	0.18	Standard drainage text
B_MeD_UPVC	138	CON	0.20	Internal drainage piping

A.7 Plumbing Layers

PLUMBING LAYERS				
Layer Name	Screen Colour	Linetype	Plotted Line weight	Description
B_MeP_CWS	138	CON	0.20	Cold Water Supply
B_MeP_DCSU	140	CON	0.25	Drinking Central System Unit
B_MeP_dFF	130	CON	0.09	Fire Fitting Dimension
B_MeP_DFU	140	CON	0.25	Drinking Fountain Unit
B_MeP_DIM	132	CON	0.09	Plumbing Dimension
B_MeP_dLPG	130	CON	0.09	LPG Dimension
B_MeP_Dry	140	CON	0.09	Main Pipe Dry Line
B_MeP_DWLR	138	HIDDEN	0.20	Drinking Water Line Return
B_MeP_DWLS	138	CON	0.20	Drinking Water Line Supply
B_MeP_eEWT	135	HIDDEN	0.20	Existing Elevated Water Tank
B_MeP_eFP	135	CON	0.20	Existing Fire Pumps
B_MeP_eGWT	135	HIDDEN	0.20	Existing Ground Water Tank
B_MeP_eIWS	135	CON	0.20	Existing Internal Water Supply
B_MeP_eMWS	135	DIVIDE	0.20	Existing Main Water Supply
B_MeP_eRWT	135	HIDDEN	0.20	Existing Roof Water Tank
B_MeP_EWH	140	CON	0.25	Electric Water Heater
B_MeP_eWME	137	HIDDEN	0.20	Exiting Water Meter Enclosure
B_MeP_eWP	135	CON	0.20	Existing Water Pumps
B_MeP_EWT	140	CON	0.25	Elevated Water Tank
B_MeP_FB	140	CON	0.09	Fire Blanket
B_MeP_FEx	140	CON	0.09	Fire Extinguisher
B_MeP_FF	132	CON	0.09	Fire Fittings
B_MeP_FHR	138	CON	0.25	Fire Hose Reel
B_MeP_FHyd	138	CON	0.25	Fire Hydrant

PLUMBING LAYERS (Continuation…)				
Layer Name	Screen Colour	Linetype	Plotted Line weight	Description
B_MeP_fLPG	132	CON	0.09	LPG Fittings
B_MeP_FWL	138	CON	0.25	Fire Water Line
B_MeP_GWT	140	CON	0.25	Ground Water Tank
B_MeP_HWR	138	DASHDOT	0.25	Hot Water Return
B_MeP_HWS	138	HIDDEN	0.25	Hot Water Supply
B_MeP_IRR_F	132	CON	0.09	Irrigation Fitting
B_MeP_IRR_LL	140	HIDDEN	0.25	Irrigation Lateral Line
B_MeP_IRR_ML	40	HIDDEN	0.09	Irrigation Main Line
B_MeP_IRR_QC	132	CON	0.09	Irrigation Quick Coupling Valve
B_MeP_IRR_S	132	CON	0.09	Irrigation Sprinkler Head
B_MeP_IRR_TL	234	HIDDEN	0.09	Irrigation Tree Line
B_MeP_MTap	138	CON	0.25	Mixed Tap
B_MeP_OF	138	HIDDEN	0.20	Over Flow Drain Pipe
B_MeP_PF	132	CON	0.09	Plumbing Fittings
B_MeP_pLPG	138	HIDDEN	0.25	LPG Pipes
B_MeP_RWT	140	CON	0.25	Roof Water Tanks
B_MeP_SBL	138	CON	0.25	Sprinkler Branch Pipe
B_MeP_SMPL	140	CENTER	0.25	Sprinkler Main Pipe Line
B_MeP_SN	131	CON	0.20	Sprinkler Nozzle
B_MeP_Tap	138	CON	0.25	Tap
B_MeP_tLPG	138	CON	0.25	LPG Tank
B_MeP_TXT	137	CON	0.18	Standard Plumbing Text
B_MeP_VC	128	CON	0.25	Valve Chamber
B_MeP_Wet	140	CON	0.09	Fire Main Pipe Wet Line
B_MeP_WME	140	CON	0.25	Water Meter Enclosure
B_MeP_WP	137	CON	0.25	Water Pumps

A.8 Building Electrical Layers

ELECTRICAL LAYERS				
Layer Name	Screen Colour	Linetype	Plotted Line weight	Description
B_E-BBR	MAGENTA	CON	0.30	Electrical Bus Bar Riser
B_E-CBPB	CYAN	CON	0.30	Elect. Call Bell & Push Button
B_E-CCU	MAGENTA	CON	0.35	Elect. Cooker Control Unit
B_E-CD	WHITE	CENTER	0.30	Cable Ducts
B_E-CJB	YELLOW	CON	0.30	Electrical Cables Junction Box
B_E-CL	YELLOW	DASHED	0.15	Elect. Circuit line
B_E-CP	BLUE	CON	0.15	Electrical control panels
B_E-CPANEL	CYAN	CON	0.20	Electrical Cubical Panel
B_E-CTGR	BLUE	CENTER	0.15	Electrical Cables Trunking Route
B_E-CTR	BLUE	DASHED	0.15	Electrical Cables Tray Route
B_E-DBB	RED	CON	0.30	Electrical Distribution Board
B_E-DBD	YELLOW	CON	0.25	Electrical Distribution Board Details
B_E-EXF-CF	MAGENTA	CON	0.30	Elect .Extract Fans, Ceiling Fans
B_E-FCO	MAGENTA	CON	0.15	Flexible Cable Outlets
B_E-GNT	YELLOW	CON	0.25	Electrical General Notes/Text
B_E-LEGEND	WHITE	CON	0.30	Electrical Symbols
B_E-LF	WHITE	CON	0.40	Light Fittings
B_E-LFCL	YELLOW	CON	0.15	Light Fittings Control Line
B_E-LFSMR	YELLOW	CON	0.30.	Light Fittings Schedule / Model Reference
B_E-MH	CYAN	CON	0.40	Electrical Manhole
B_E-MSB-DB	WHITE	CON	0.35	Electrical Main Switch or Distribution Board
B_E-MSCR	GREEN	CENTER	0.50	Main & Sub-main Cables Routes

ELECTRICAL LAYERS (Continuation…)				
Layer Name	Screen Colour	Linetype	Plotted Line weight	Description
B_E-POWER	WHITE	CON	0.35	All low power+ AC outlets,
B_E-SL	WHITE	CON	0.40	Light Fittings & E.FAN Switches
B_E-SLD	WHITE	CON	0.30	Electrical Single Line Diagram
B_E_SPST	WHITE	DASHED	0.15	Small Power Skirting, Trunking
B_E-WH	MAGENTA	CON	0.35	Elect. Water Heaters

FIRE ALARM LAYERS				
Layer Name	Screen Colour	Linetype	Plotted Line weight	Description
B_F-HSD	CYAN	CON	0.40	Fire Heat & Smoke Detectors
B_F-AB-CP	CYAN	CON	0.40	Fire Alarm Bell & Call Point
B_F-AMP	CYAN	CON	0.35	Fire Alarm Main panel
B_F-ES	CYAN	CON	0.35	Fire Exit sign
B_F-EM-L	GREEN	CON	0.20	Fire Emergency lights
B_F-GNT	CYAN	CON	0.25	Fire General Notes/Text
B_F-SC	CYAN	CENTER	0.30	Fire System Cables
B_F-CJB	BLUE	CON	0.30	Fire Cables Junction Box

PUBLIC ADDRESS LAYERS				
Layer Name	Screen Colour	Linetype	Plotted Line weight	Description
B_PA-SPK	WHITE	CON	0.30	Speakers
B_PA-APF	GREEN	CON	0.30	Amplifier
B_PA-MIC	MAGENTA	CON	0.25	Microphone
B_PA-MIX	GREEN	CON	0.30	Amplifier Mixer
B_PA-CPR	CYAN	CON	0.30	Cassette player/Radio
B_PA-GNT	YELLOW	CON	0.25	P.A System General notes/text

PUBLIC ADDRESS LAYERS (Continuation…)				
Layer Name	Screen Colour	Linetype	Plotted Line weight	Description
B_PA-VC	RED	CON	0.30	P.A System Volume control
B_PA-SC	WHITE	DASHED	0.15	P.A System cables
B_PA-CJB	BLUE	CON	0.30	P.A System Cables Junction

EARTHING LAYERS				
Layer Name	Screen Colour	Linetype	Plotted Line weight	Description
B_L-LIEP	WHITE	CON	0.25	Lightning Inspection Earth Pit
B_L-LCTR	GREEN	DASHED	0.35	Lightning Conductor
B_L-LPETP	RED	CON	0.25	Lightning Protection Earth Test
B_L-LER	YELLOW	CON	0.25	Lightning Earth Rod
B_L-LGNT	YELLOW	CON	0.25	Lightning General notes/text

CCTV LAYERS				
Layer Name	Screen Colour	Linetype	Plotted Line weight	Description
B_CCTV-CA	WHITE	CON	0.30	CCTV Camera
B_CCTV-OC	GREEN	CON	0.10	CCTV Object Censor
B_CCTV-M	MAGENTA	CON	0.35	CCTV Monitor
B_CCTV-R	GREEN	CON	0.30	CCTV Recorder
B_CCTV-VR	CYAN	CON	0.25	CCTV Video Display & Recorder
B_CCTV-MP	YELLOW	CON	0.30	CCTV Main control panel
B_CCTV- GNT	YELLOW	CON	0.30	CCTV General notes/text
B_CCTV-SC	WHITE	CENTER	0.15	CCTV System cables
B_CCTV-CJB	BLUE	CON	0.30	CCTV Cables junction box
B_CCTV-	WHITE	CON	0.30	CCTV Motion Detector Devices
B_CCTV- SAC	MAGENTA	CON	0.30	CCTV Security Access control
B_CCTV- PGB	WHITE	CON	0.25	CCTV Car Parking Gate Barrier

TELEVISION LAYERS				
Layer Name	Screen Colour	Linetype	Plotted Line weight	Description
B_TV-CCO	WHITE	CON	0.20	TV Coaxial Cable Outlet
B_TV-CDA	GREEN	CON	0.20	TV/Cable/Dish Antenna
B_TV_GNT	MAGENTA	CON	0.25	TV General Notes / Text
B_TV-SP	MAGENTA	CON	0.30	TV Splitter
B_TV-CJB	BLUE	CON	0.30	TV Cables Junction Box
B_TV-SC	WHITE	DASHED	0.25	TV System Cables
B_TV-SDB	GREEN	CON	0.30	TV system Distribution Board
B_TV-CR	WHITE	CON	0.30	TV cables Riser

COMPUTER LAYERS				
Layer Name	Screen Colour	Linetype	Plotted Line weight	Description
B_COMP-CT	YELLOW	HIDDEN	0.15	Computer Cable Trays
B_COMP-PI	WHITE	CON	0.35	Computer Point Individual
B_COMP- POB	GREEN	CON	0.35	Computer+Tel+Power Outlet Box
B_COMP- PUF	MAGENTA	DASHED	0.35	Computer+Tel+Power Under Floor
B_COMP-MS	GREEN	CON	0.30	Computer main server
B_COMP- GNT	YELLOW	CON	0.25	Computer General notes/text
B_COMP- CJB	WHITE	CON	0.30	Computer Junction Box
B_COMP- SCR	WHITE	CENTER	0.35	Computer System Cables Route

A.9 Telecom Layers

TELECOM LAYERS				
Layer Name	Screen Colour	Linetype	Plotted Line weight	Description
B_TEL-ACCESS	CYAN	CON	Default	Entrance Gates & Exits
B_TEL-ADTS	CYAN	CON	0.30	Access to Development for tel. Service
B_TEL-BL	GREEN	CON	Default	Building Layout
B_TEL-BLDG_COMMERCIAL	GREEN	CON	Default	Building of Commercial Use
B_TEL-BLDG_FLATS	GREEN	CON	Default	Multi Story Apartment Building
B_TEL-BLDG_GARAGE	GREEN	CON	Default	Three Sided Concrete Structure used for Car Parking
B_TEL-BLDG_MAJLIS	GREEN	CON	Default	External Separate Majlis
B_TEL-BLDG_MIXED_USE	GREEN	CON	Default	Building of Mixed Use
B_TEL-BLDG_OTHERS	GREEN	CON	Default	Any non-Standard Building Type
B_TEL-BLDG_SQ_EX_KITCHE	GREEN	CON	Default	Servant Quarter & External Kitchen
B_TEL-BLDG_UTILITIES	GREEN	CON	Default	Structures
B_TEL-BLDG_VILLA	GREEN	CON	Default	Single Story Villa
B_TEL-BLP	YELLOW	CON	Default	Boundary Layout of the Plot
B_TEL-BOUNDARY	YELLOW	CON	Default	Boundary Wall
B_TEL-BWL	YELLOW	CENTER	0.15	Telephone Block Wiring Line
B_TEL-CT	YELLOW	DASHED	0.15	Telephone Cable Trays
B_TEL-GNT	YELLOW	CON	0.25	Q.tel

TELECOM LAYERS (Continuation…)				
Layer Name	Screen Colour	Linetype	Plotted Line weight	Description
B_TEL-LIGHT_STR	GREEN	CON	Default	Any Light Structure other than Car Parking
B_TEL-MHJB	WHITE	CON	0.40	Telephone Manhole/Joint Box
B_TEL-MID	MAGENTA	CENTER	0.40	Q.tel Main Incoming Duct
B_TEL-MJB	GREEN	CON	0.35	Telephone Main Junction Box
B_TEL-O	WHITE	CON	0.35	Telephone Outlets
B_TEL-PABX	BLUE	CON	0.35	Q.tel main PABX
B_TEL-PARCEL	RED	CON	Default	Ownership as per Coordinates
B_TEL-PSD	RED	CON	Default	Plot's GIS sheet data
B_TEL-QTEL_LEADIN	MAGENTA	CON	0.40	Proposed Telephone Duct for the Cable Entry
B_TEL-R	MAGENTA	CON	0.15	Telephone Riser

Appendix B – USEFUL TABLES FOR AUTOCAD

Useful tables for AutoCAD

Table 1 - Model Space Zoom XP Factors (Metres)

Scale of Drawing	Zoom XP Scale
1 : 1000	1
1 : 1250	0.8
1 : 2500	0.4
1 : 5000	0.2
1 : 10000	0.1
1 : 25000	0.04
1 : 50000	0.02
1 : 500	2
1 : 200	5
1 : 100	10
1 : 50	20
1 : 20	50
1 : 10	100
1 : 5	200
1 : 2	500
1 : 1	1000

Table 2 – Model Space Zoom XP Factors (Millimetres)

Scale of Drawing	Zoom XP Scale
1 : 500	0.002
1 : 200	0.005
1 : 100	0.01
1 : 50	0.02
1 : 20	0.05
1 : 10	0.1
1 : 5	0.2
1 : 2	0.5
1 : 1	1

All text on drawings are to be produced in upper case only, unless specifically requested not to do so (e.g. presentation drawings). Text sizes are to be relative to the scale of the drawing as follows:

Table 3 – Text relation to drawing size (Millimetres)

Drawing Size	Titles	Pen Size	General Text & Notes	Pen Size
A0	5mm	0.5mm	2.5mm	0.25mm
A1	5mm	0.5mm	2.5mm	0.25mm
A2	5mm	0.5mm	2.5mm	0.25mm
A3	3.5mm	0.35mm	2.5mm	0.25mm
A4	3.5mm	0.35mm	2.5mm	0.25mm