

Alpha Consulting Engineers Pte Ltd

CAD Manual

CAD Manual

Revision Schedule

Item	Date of Revision	Amendments			Remarks
		Section	Revision	Page(s)	
1	11/24/2004	9	1	2	Add in Electronic submission
2	11/24/2004	Content	1	1	Addition of section 9
3	4/8/2005	Annex R	1	2	Revision to Plumbing Checklist
4	27/09/2005	Annexes	1	1	Revision to Annex K
5		4	1	3	Addition information to CAD file name format
6		Annex K	1	1	In-house identification table added
7		Annex L	1	1	Revision of year for CP52 & CP10
8		Annex M	1	1	Addition of automatic fire alarm notes
9		Annex N	1	1	Revision of sanitary notes
10		Annex P	1	1	Revision of plumbing notes
11		Annex Q	1	1	Revision of gas notes
12	12/9/2006	All	-	-	Change to Alpha Consulting Engineers Pte Ltd
13	3/4/2007	9	2	2	Change Drafting to E-Submission

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Annexes	Title
A	Sample title block and scale bars
B	CAD layer / level naming format
C	CAD layer / level names for Architectural
D	CAD layer / level names for air conditioning and mechanical ventilation
E	CAD layer / level names for fire fighting and alarm system
F	CAD layer / level names for plumbing and swimming pool installation
G	CAD layer / level names for sanitary installation
H	CAD layer / level names for gas installation
J	CAD layer / level names for electrical installation
K	List of type of work codes by discipline and In-house identification
L	Standard endorsement to Authorities
M	Standard notes for fire fighting and alarm submission
N	Standard notes for sanitary submission
P	Standard notes for plumbing submission
Q	Standard notes for gas submission
R	Standard drawing checklist
S	Standard units

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CAD Manual

1 Introduction

The purpose of this manual is to define the minimum requirements on drawings and CAD standards to be achieved for all drawings produced by the company.

By defining a common format for the preparation and presentations of drawings and CAD files, the exchange of drawn information will improve and maximise the use of CAD in the co-ordination process.

The CAD standards defined in this manual are compliant to the **Singapore Standard CP 83 : Part 1 to 5**.

The CAD standards defined in this manual applies to both Autocad and Microstation CAD files.

This manual does not apply to drawings prepared by external parties (Architect, Structure, Sub-contractor, etc).

This manual is subjected to regular revision and re-issuing for continuous improvement. Any discrepancies shall be highlighted to the CAD Leaders for the necessary updates. All revisions/updates shall be indicated in **Revision Schedule** and affected sections/annexes will be circulated to all CAD staff if neccesary.

2 Drawings

All drawing paper sizes and scales are to follow the Local Authorities' submission standard.

For other projects where there are no special requirements, appropriate metric paper sizes are to be used.

2.1 Paper sizes

Paper sizes are based on the **ISO standards**. The standard sizes are **A0** to **A4**. The sizes are proportional, leading to simple reduction and enlargement. The bigger size sheets may be easily folded for filing and dispatch to that of A4 size.

The sizes of sheets in landscape format are as follows:

Paper Size	Dimension
A0	1189mm x 841mm
A1	841mm x 594mm
A2	594mm x 420mm
A3	420mm x 297mm
A4	297mm x 210mm

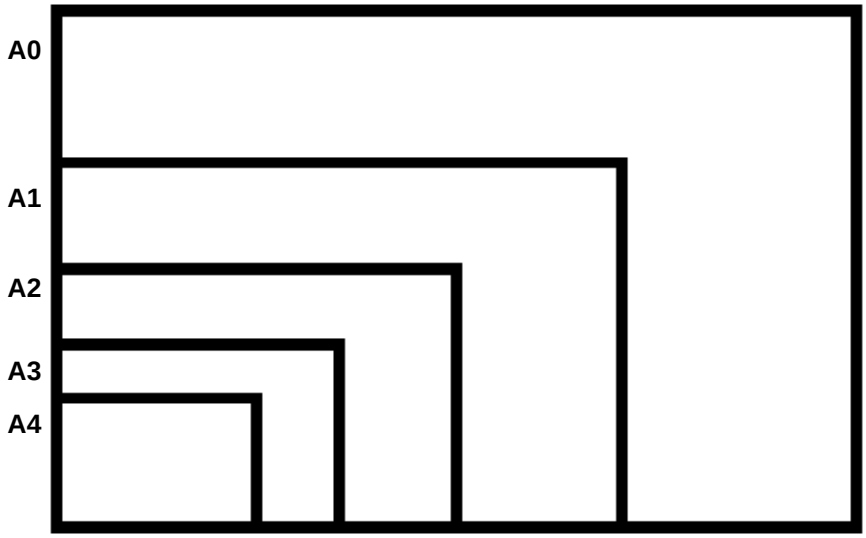


Figure 2.1.1 - Paper sizes

2.2 Title blocks

(i) AEC standard title blocks are to be used whenever possible. For sketches and presentation purposes, simplified title blocks may be used. **(Refer to Annex A)**

(ii) The selection of title block format shall be directed by each project specific requirement. Upon selection, the stated format shall be used to maintain consistency throughout the project.

(iii) All necessary particulars shall be completed on the title block in respect of date, scale, revision number, etc. **(Refer to Annex A).**

(iv) All title blocks can be found in **\\Sapphire\Root\TB** and to be inserted at point origin **0,0,0** and according to appropriate scales.

2.3 Notes and legend

2.3.1 Notes

(a) All notes and notations shall be concised.

(b) Specific notations shall be placed so that they relate to the portion of the drawing or detail to which they apply.

(c) Avoid placing notes overlapping drawing lines.

(d) If possible, organise the notes and notations in grouping and avoid repetitiuos notes. If the same notes are applicable to several drawings, they may be put on a separate drawing, and this drawing cross-referenced by the other drawings.

(e) Avoid usage of abbreviations when space permits full spelling. If abbreviations are to be used, they shall be restricted to the commonly used ones and a legend of abbreviation used shall be provided.

2.3.2 Legend

(a) Drawing legends for various services shall be in accordance with Local Authorities' and **AEC** standard drawing legends for Mechanical and Electrical Services. No departure from these legends shall be permitted without prior approval from the CAD Leaders and are to be closely followed and used as standardised symbols in all drawings.

(b) Legends from external parties shall be maintained upon Clients' request.

(c) The legend shall appear only once in a set of drawings to which all other drawings refer, unless a specific request is provided.

2.4 Layout of drawings

In general, drawings produced shall conform to the following:

(a) Reserve the necessary space for Notes, Legend, Authorities' endorsements and part views if required.

(b) Where part views are shown, match lines with matching drawing numbers shall clearly indicate the limits of work on each sheet. The match line shall match contents as well as position.

(c) Avoid crowding and overlapping of views and details.

(d) Details shall be carefully organised so that related details read coherently in a grouped arrangement.

(e) Use simple orthographic projection to explain sections. Avoid cutting complex sections.

2.5 Building / floor key plans

A "**Key Plan**", if required, shall be used to locate the area of the drawing in relation to the building layout. This plan shall be located in the "**Key Plan**" column of the title block so that it is visible when the sheet is folded.

2.6 Drawing scales

The choice of scale adopted for a particular drawing should be determined by consideration of the type of information to be communicated, the need for the drawing to adequately and accurately communicate the information necessary for the particular work to be carried out and the need for the economy of time and effort in drawing production. The preferred scales for building drawings are shown in **Table 2.6.1**.

Each drawing shall contain a bar scale in addition to a written scale **(Refer to Annex A)**. The bar scale shall be located at the **lower left-hand corner** of the title block.

If more than one scale is required which is not typical of the main scale, it shall be displayed under the title of the item.

Drawings shall be accurate and to scale.
If a sketch is **Not To Scale**, this shall be prominently noted as **Scale : NTS**.

Drawings	Recommended Scales	Use
Key or Location Plan Drawings	1 : 2000 1 : 1000 1 : 500	To locate the site within general district
Site Plan Drawings	1 : 1000 1 : 500 1 : 200	To locate the building work including services and site works on the site
General Building Plan Drawings	1 : 200 1 : 100 1 : 50	To indicate the juxtaposition of the rooms and spaces, and to locate the position of components and assemblies
Detail Building Plan Drawings	1 : 50 1 : 20	To show the detailed location of components and assemblies in complex areas

Table 2.6.1 - Preferred scales for building drawings.

All plans submitted to the **Building Authority** shall be submitted on standard metric size sheets of the **International A** series **bound and folded** (refer to **Figure 2.6.2**) in an approved manner with every sheet having an outlined rectangular space measuring **150mm x 100mm** provided at its top right hand corner for official stamps and endorsements, except that in the case of plans not required to be prepared by a Qualified Person, such requirements shall not be applicable but the plans would have to be submitted in accordance with the **Building Control (Administration) Regulations**.

Plans submitted to the Authorities shall be drawn to the following scales :-

a. Key or Location Plan - 1 : 1000
b. Site Plan - 1 : 500
c. Plans of Buildings - 1 : 100 except in special cases where the size of the building is too large to be accomodated on the required standard size paper, the Authorities may permit plans to be prepared to a scale not smaller than 1 : 200 - **Building Control (Administration) Regulation 7**.

All plans must also be **bound and folded** (refer to **Figure 2.6.3**) in an approved manner for filing purposes. (This will **not** be applicable for online submissions).

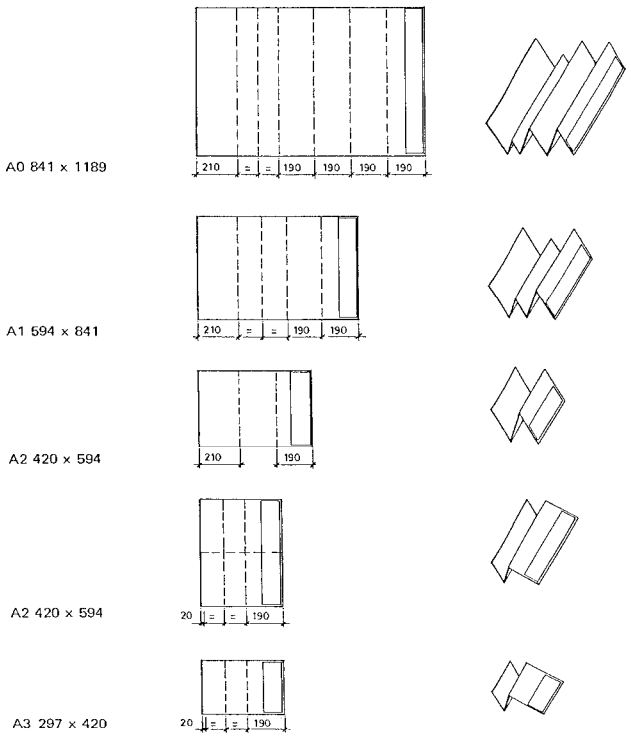


Figure 2.6.2 - Folding method for submission (Units : mm) *[Excerpt from CP 6 - 1978]*

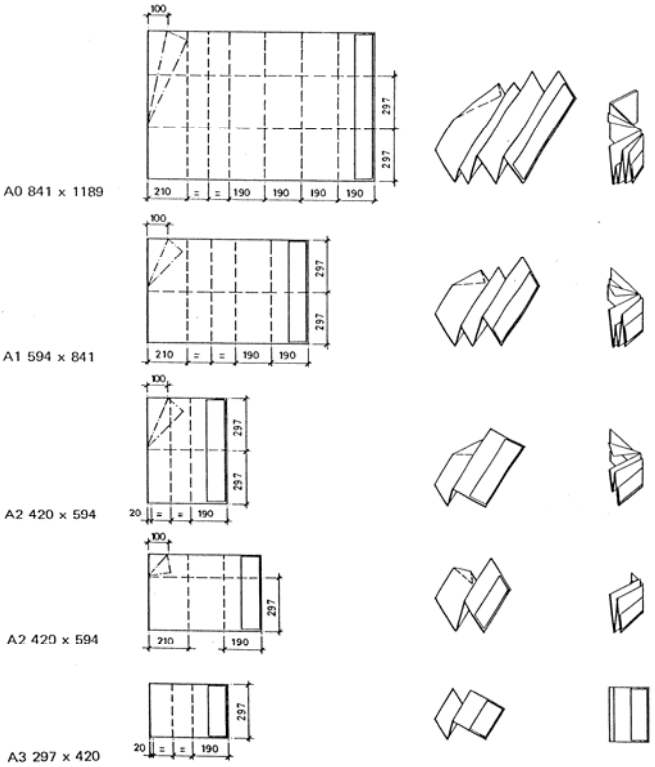


Figure 2.6.3 - Folding method for filing (Units : mm) *[Excerpt from CP 6 - 1978]*

2.7 Revisions

2.7.1 General

All revisions must be highlighted by clouding where possible. The drawing must be signed by the Project Manager and the CAD staff in the appropriate column.

When and if subsequent revisions are made, the previous clouds and triangles shall not be deleted but "freeze" in AutoCAD (proper layers should be used) and the new revision shall be shown, if any.

All dates of revisions and addendums are to be recorded in the **CAD File Revision Logsheet** Form **S8.B**. (Refer to **Figure 2.7.1.1**)

2.7.2 Pre-Tender Drawings

All revisions to pre-tender drawings shall be identified only by the date the drawing is produced. The revision column and index shall be left blank. **(Refer to Annex A)**.

2.7.2 Post-Tender Drawings (Addendum Drawing)

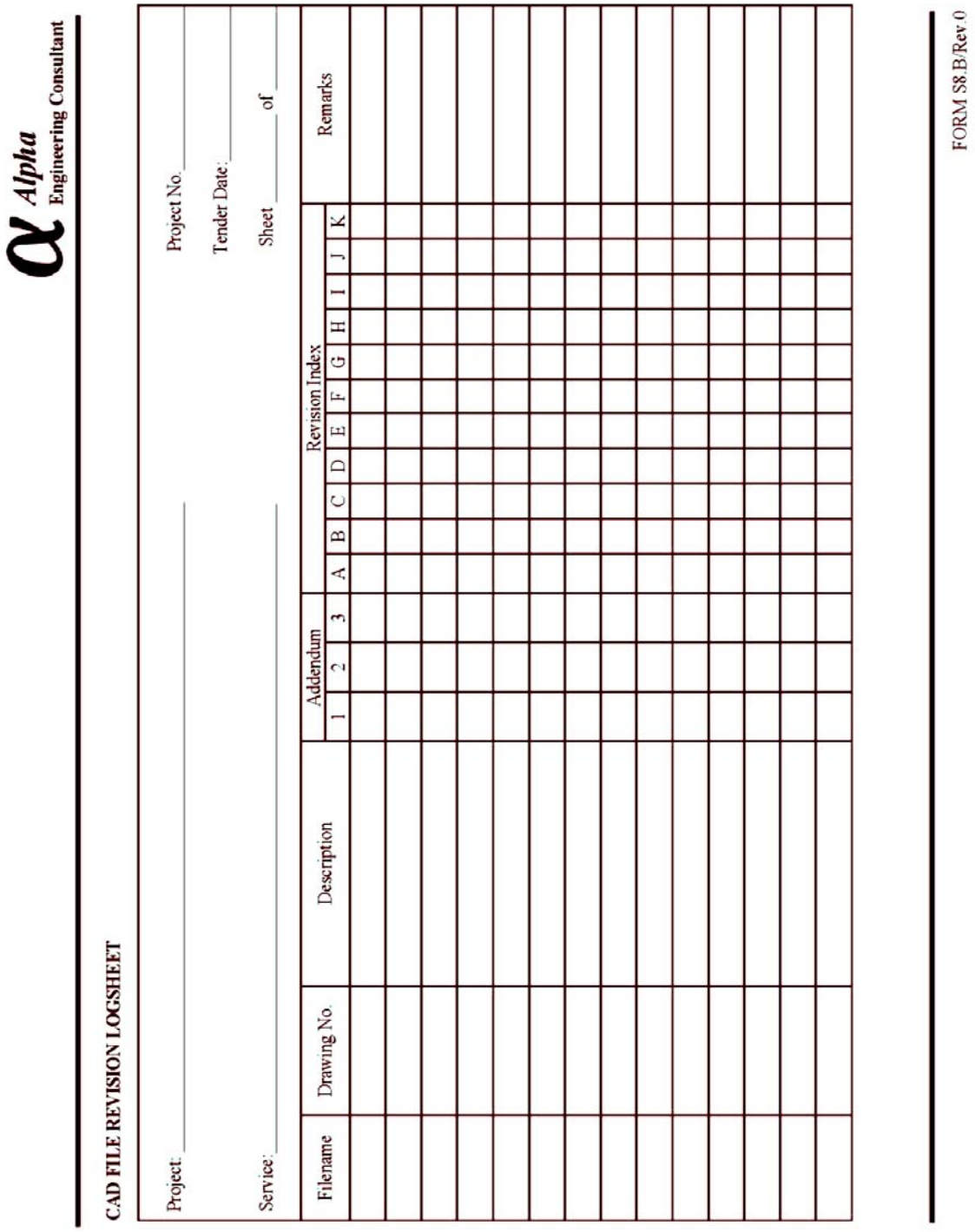
All revisions to post-tender drawings (but prior to award of contract) shall be identified by numbers (i.e. 1, 2, 3, etc.) in the index box, which shall coincide with the Addendum Nos. The revision column, index and date boxes shall be updated according. **(Refer to Annex A)**.

2.7.3 Post-Tender Award Drawings (Contract Drawing)

All revisions to contract drawings shall be identified by alphabets (i.e. A, B, C, etc.) in the index box. The date column on the title block should remain.
The revision column and index box shall be updated according, the date box shall remain unchanged. **(Refer to Annex A)**.

2.7.4 Check Prints

Prior to printing of final hardcopy of drawing for **Tender**, the last pieces of draft/check drawings shall be stamped with the **Check Print**. These drawings shall then be passed to the engineers to sign and keep them for record purposes.



Alpha Engineering Consultant

CAD FILE REVISION LOGSHEET

Project: _____ Project No. _____

Tender Date: _____

Service: _____ Sheet _____ of _____

Filename	Drawing No.	Description	Addendum 1	Addendum 2	Addendum 3	Revision Index A	B	C	D	E	F	G	H	I	J	K	Remarks

FORM S8.B/Rev 0

Figure 2.7.1.1 - CAD File Revision Logsheet (Form S8.B)

3 Organisation and Naming of CAD Layers / Levels

CAD layers / levels need to be structured based on clear and logical organisation of information that fulfils the functional requirements of the information users. They are given unique names so that they can be selectively viewed and plotted. Layer / level names are divided into fields which hold a concept. Fields are either **Mandatory** or **Optional**. **Mandatory** fields shall always be included in the layer names while **Optional** fields can be used as required in each project. The order of fields in a layer / level name and the numbers of characters used for each field shall be maintained unless alternative is specifically agreed by the project partners. However, the alternative adopted shall be documented in a way that future retrieval of the layer-structured information can be ensured.

3.1 Format of layer / level name

A layer / level name consists of the following five fields as shown:

Name of Field		Description of Field	Number of characters
Originator		Individual/company/organisation responsible for preparation and creation of information	**2**
Element	**Main**	Main element classification	**4**
	Sub	Sub element classification	**4**
Presentation		Forms of information presented, e.g. element, dimensions, text, etc.	**2**
Status		Status of the contruction work, e.g. alterations, to be removed, existing, etc.	**1**

3.2 Layer / level name fields

3.2.1 Originator field

This field indicates the individual/company/organisation responsible for the preparation and creation of information in the CAD layer / level. Since there are classifications **M** and **E** in the company, only one of the field will be used and the other to be indicated as 1.

3.2.2 Element field

This field indicates the type of system for the layer / level. Classification for the system is in the form of eight (8) alphabets. This field has two levels of classifications, namely the main and sub elements.

3.2.3 Main element field

Main element consists of four (4) alphabets and is mandatory. It identifies the main system of the element. **(Refer to Annex C to Annex J)**

3.2.4 Sub element field

Sub element consists of four (4) alphabets and is only used for further classification of the main element. For fields where classification using the main element is sufficient, the sub element shall be coded with four (4) hyphened characters "----". **(Refer to Annex C to Annex J)**

3.2.5 Presentation field

The presentation field represents the format or type of information presented, and is denoted by two (2) alphanumeric characters as shown in **Annex B**.

3.2.6 Status field

The status field is optional and it represents the status of entities used in Additions and Alterations (A & A) works. It is denoted by one (1) character code as shown in **Annex B**.

The first three fields, namely originator, element and presentation shall always be used

For indication of no further subdivision of the information, hyphen shall be used to fill out to the end of the field.

Alphanumeric characters allowed are the letters A - Z, and the digits 0 - 9, in addition to the hyphen and underscore characters.

Unused trailing characters in a mandatory field shall be represented by the hyphen "-" character

Unused trailing fields in the optional part of the layer / level name can be omitted.

4 CAD File Name Format

4.1 Format of filename

CAD file format requires six (6) mandatory fields and an optional user-defined field. To enhance computer processing and readability, the project number field is to be separated from the remaining fields by means of an underscore "_" character.

Name of field	Description of field	Number of characters
Project number	Represent files of the same project	4
Author	Department responsible for creating the file	2
Type of work	Nature and scope of work	2
View plan	Level in a multi-storey building or orientation of an elevation view	2
Zone	Zone of the construction site	2
Version	Major revisions	2
User-defined	User-defined code for in-house applications, e.g. A & A works	-

Table 4.1.1 - Description of fields in a CAD filename

The seven (7) fields in the filename are to be arranged in the format as shown below.

Project Number					Author		Type of Work		View Plane		Zone		Version		User-defined* (Optional)
1	2	7	1	_	E	1	T	C	0	1	-	2	-	A	SCV

Figure 4.1.2 - Arrangement of fields in a CAD filename for a standard project

A file prepared for Hillview Regency (**1271** in the **Project Number** field), by an electrical engineer (**E1** in the **Author** field), containing telecommunication works (**TC** in **Type of Work** field), at level 1 (**01** in the **View Plane** field), of block 2 (**2** in the **Zone** field), and is the first version (**A** in the **Version** field). This is a SCV cabling layout (**SCV** in the **User-defined** field).

Therefore, the CAD filename for this file shall be **1271_E1TC01-2-ASCV**

Project Number					Author		Type of Work		View Plane		Zone		Version		User-defined* (Optional)
1	2	7	1	_	M	1	A	C	B	2	-	2	-	B	601Z

Figure 4.1.3 - Arrangement of fields in a CAD filename for A & A works

A file prepared for Hillview Regency (**1271** in the **Project Number** field), by an mechanical engineer (**M1** in the **Author** field), containing air-conditioning installations (**AC** in **Type of Work** field), at basement 2 (**B2** in the **View Plane** field), of block 2 (**2** in the **Zone** field), and is the second version (**B** in the **Version** field). This is a A & A submission (**601Z** in the **User-defined** field).

Therefore, the CAD filename for this file shall be **1271_M1ACB2-2-B601Z**

4.2 Filename fields codes

4.2.1 Author

The first character indicates the discipline of the originator of the filename. It is a single alphabet in capital letter as shown in **Table 4.2.1.1**. Since there are classifications **M** and **E** in the company, only one of the field will be used and the other to be indicated as 1.

Code	Author description
A	Architect
C	Civil Engineer
E	Electrical Engineer
L	Land Surveyor
M	Mechanical Engineer
N	Equipment Supplier
S	Structural Engineer
T	Telecommunication/Signal Engineer
V	Other Disciplines
X	Contractor

Table 4.2.1.1 - Codes for the first character of author field

4.2.2 Type of work

Type of work field represents the nature and scope of work in the CAD file. Two (2) alphanumeric characters are used for this field. Please refer to **Annex K** for the list of codes.

4.2.3 View plane

View plane field represents the level in a multi-storey building ot the orientation of the elevation view. Two (2) alphanumeric characters are used for this field as shown in **Table 4.2.3.1**.

Code	Description
11	Numeric - Level of storey or lowest level of a typical level
A-	Attic
B1	Basement 1
M1	Mezzanine 1
R-	Roof
--	Whole project (two dashes)
AA	Section view A A
DT	Details

Table 4.2.3.1 - Codes for the view plane field

When the CAD file contains only page information such as notes, legend, diagrams or schedules instead od CAD models, the view plane is no longer relevant and the two characters can be used for description of the form of information presented. **(Refer to Table 4.2.3.2)**

Code	Description
DG	Diagram
LG	Legend
NT	Notes
SH	Schedule
SD	Standard drawings

Table 4.2.3.2 - Forms of information and codes

4.2.4 Zone

Zone field represents the construction zone or block number of the project. One (1) alphanumeric character is used for this field. The codes allowed in this field are A to Z, 1 to 9 and the hyphen "-" character, and it represents all the zones in the project.

4.2.5 Version

Version field represents major revisions of the CAD file. One (1) alphanumeric character is used for this field. The sequence of codes denoting the version is A, B, C,…Z, 1, 2, 3,…9. The character "X" is reserved for referenced files so that the filename does not have to be amended each time it is updated.

4.2.6 User-defined

User-defined field can be used for further identification or to provide additional information, for example Additions and Alterations works and Addendum drawings.
Please refer to **Annex K** for the list of in-house identification.

4.3 Coding conventions

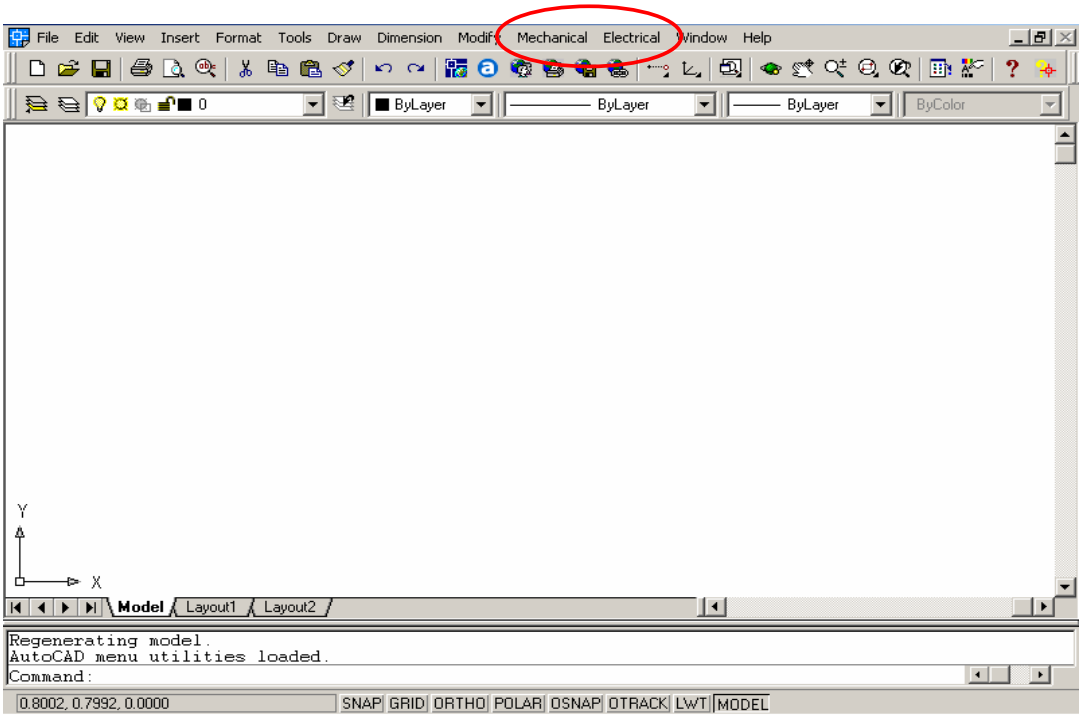
(i) For indication of no further subdivision of the information or for all possible variation of the field, hyphen characters (-) shall be used.

(ii) Alphanumeric characters allowed are the letters A to Z, the digits 0 to 9, in addition to the hyphen (-) and underscore (_) characters.

5 CAD Symbols

All CAD symbols can be found in **\\Sapphire\Root\Library** and the commonly used symbols are available in the Autocad pull-down menu. These symbols will be reviewed regularly for any updates or additions of new ones.

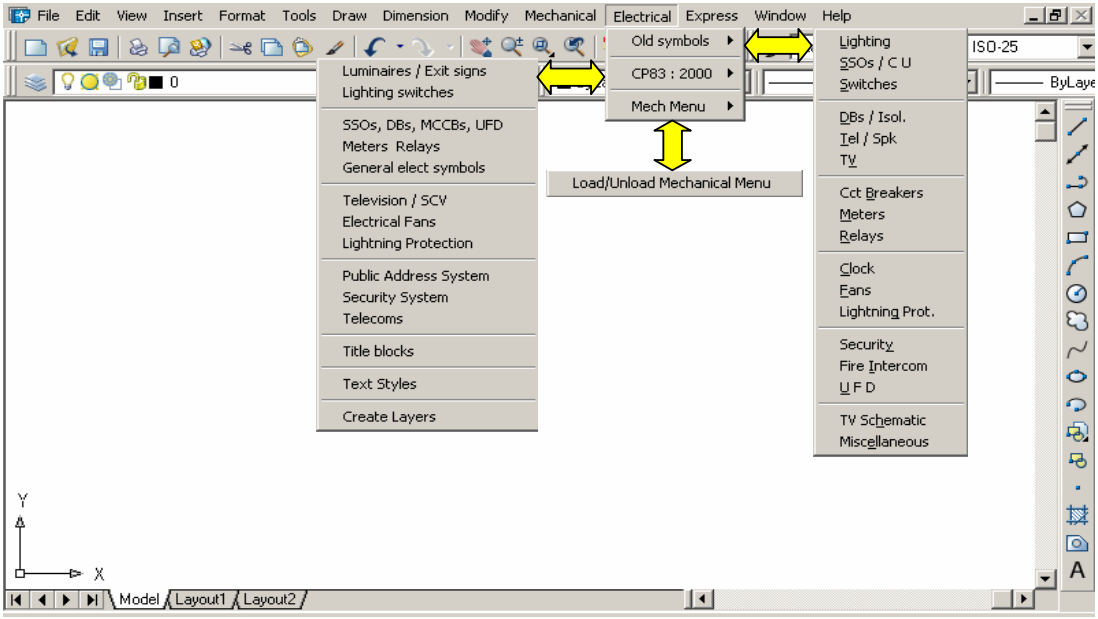
CAD symbols found in the pull-down menu facilitates both the old standards and the new **CP 83 : 2000** standards. **Old standards will eventually be phased out** and new standards are encouraged to be used for all projects in future. Symbols used in AEC can be found in the pull-down menu under **Mechanical** and **Electrical.** All CAD symbols are created in layer zero (0) and to be inserted in their respective layers.



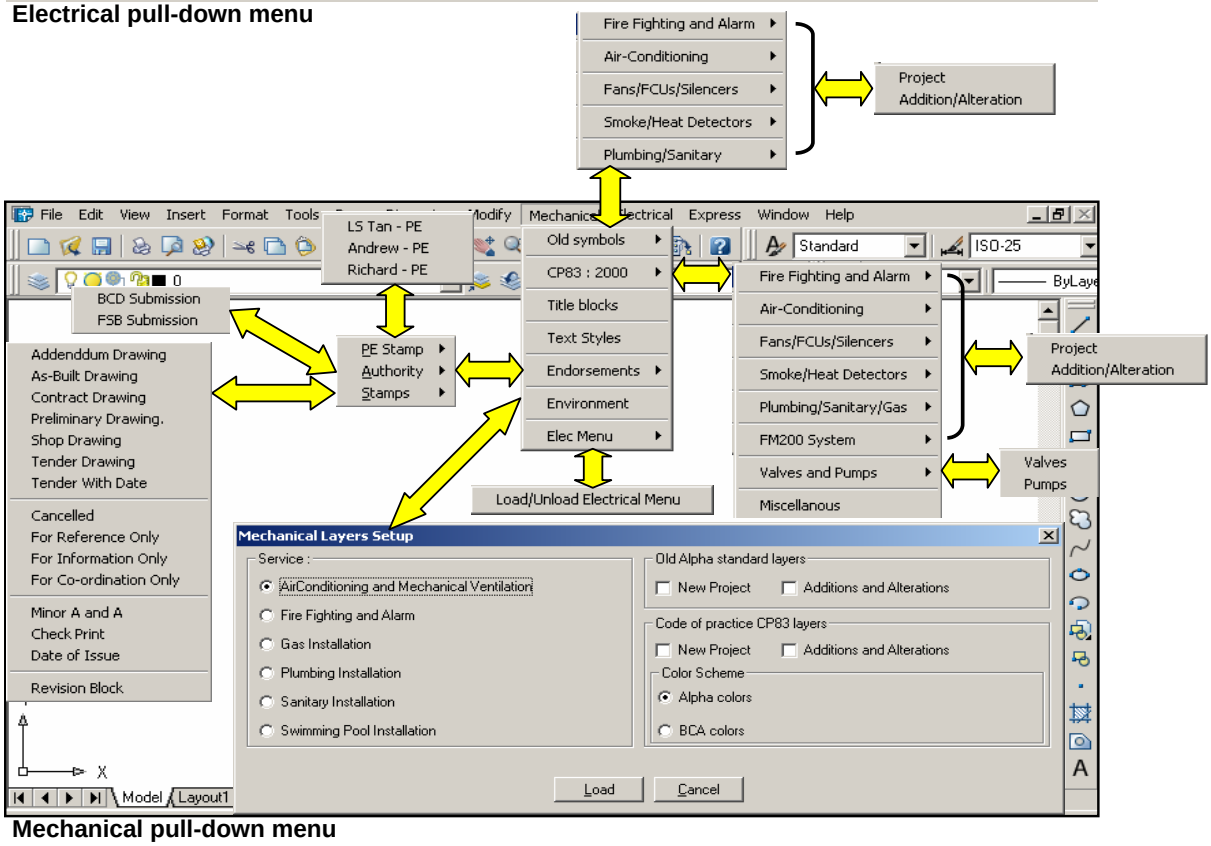
Typical Autocad Menu with additional pull-down

6 Autocad Menu

The Mechanical and Electrical pull-down menus have been integrated to the standard menu by the CAD leader and users have the option of retaining either the Mechanical or Electrical pull-down menu during a session. The resultant stand alone Mechanical and Electrical menus and sub menus are as follows :



Electrical pull-down menu



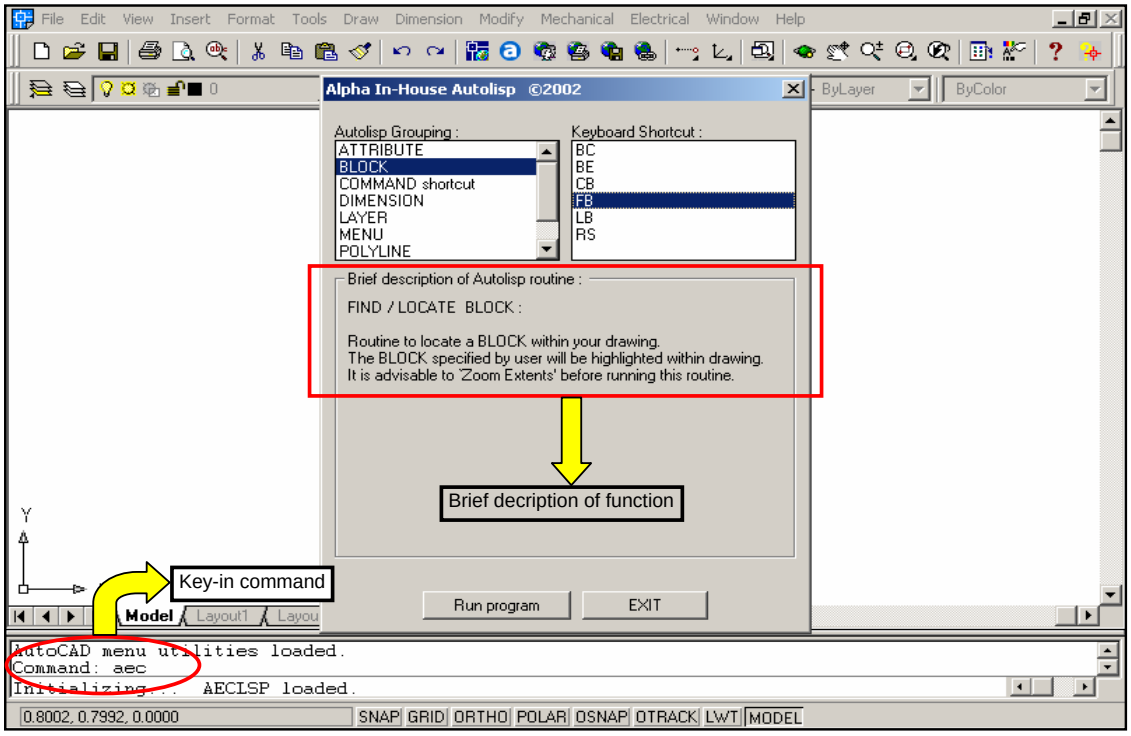
Mechanical pull-down menu

7 Alpha In-House Autolisp

All utilities and autolisp functions that have been compiled in-house are now accessible via the dialog box illustrated below. Users are encouraged to explore these utilities to assist them in their day to day work. All utilities and autolisp functions in the dialog box are attached with a brief description of its functionality to help users to understand the concept of the respective command.

To activate in-house Autolisp

Command Line AEC



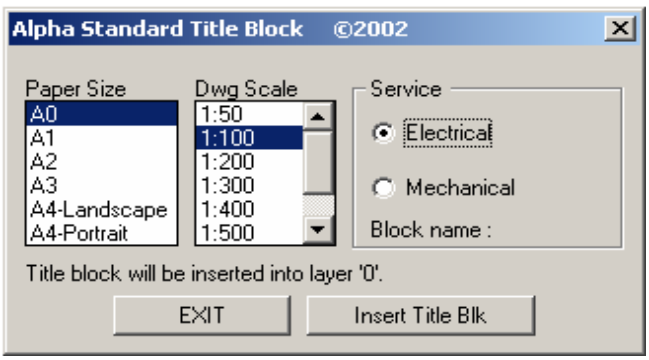
To activate Alpha standard title block

1 From **Mechanical** menu, choose Title blocks or **Electrical** menu, choose **CP83 : 2000 Title blocks.**

2 Select the Title block size, drawing scale and the nature of service.

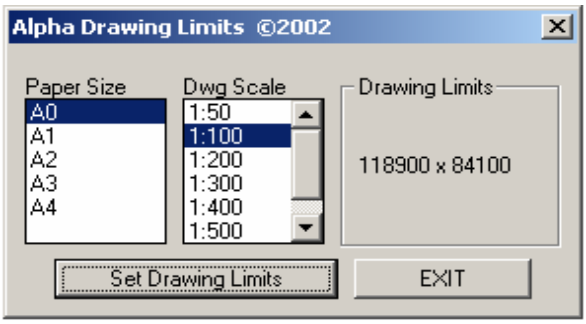
3 Select **Insert Title Blk** to complete the command.

Command Line TB



To set drawing limits

Command Line LMT



8 CAD file record and filing

All CAD files received via diskettes/CDs and e-mail shall be scanned for viruses by CAD leaders and shall then be recorded and kept in the **Virus Check File**. Files plotted via e-mail shall be stamped with **Drawing Received Via E-mail** on the **reverse side** of each drawing.

All CAD files shall be kept in the **server** under their respective project numbers and further categorised into sub-directories (**Refer to Figure 8.1a & 8.1b**).

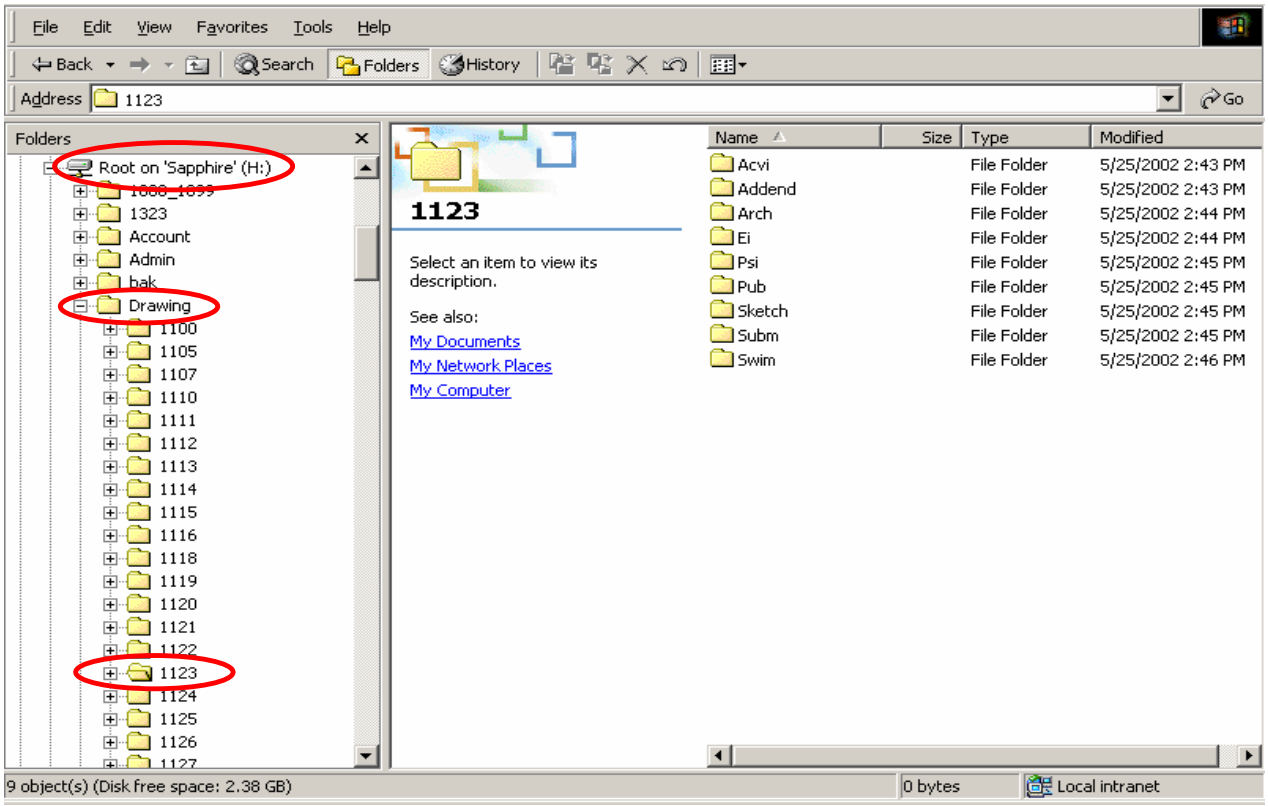


Figure 8.1a - Directories and sub-directories structure for Alpha's in-house drawings

Directory	Description
Acvi	Air conditioning and mechanical ventilation drawings
Addend	Addendum drawings
Arch	Architectural drawings
Contract	Contract drawings
Ei	Electrical drawings
Ffai	Fire fighting & Alarm drawings
Lift	Lift drawings
M&E	M & E co-ordination drawings
Psi	Water, sanitary and gas drawings
Pub	Electrical service drawings for submission to authorities
Showflat	Service drawings for showflat
Sketch	Sketches
Subm	Mechanical service drawings for submission to authorities
Swim	Swimming pool drawings

Note : Sub-directories shall be further divided into smaller sub-directories if necessary

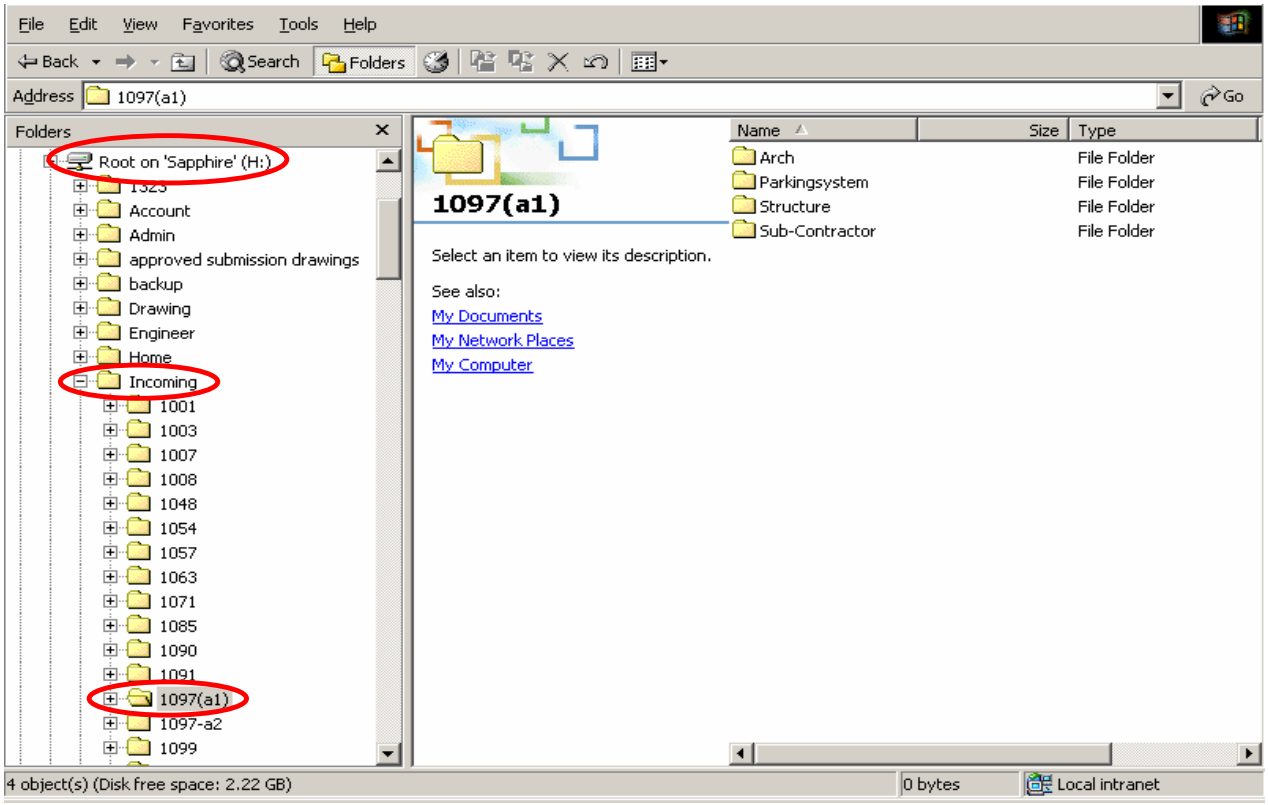


Figure 8.1b - Directories and sub-directories structure for external parties' drawings.

Directory	Description
Arch	Architectural drawings
As-Built	Contractors' as-built drawings
Contractor	Contractor drawings for reference
ID	I.D. drawings
Landscape	Landscape drawings
Structure	Structural drawings
Showflat	Architectural drawings, etc for showflat
Topo-sewer	Sewerage drawings

Note : Sub-directories shall be further divided into smaller sub-directories if necessary

CAD Manual

All drawings done for the day shall be copied to **\\sapphire\root\transfer** for safekeeping everyday under respective individual initials (**Refer to Figure 8.2**). CAD leaders will do the backing-up of the files either at the beginning or the end of the week to the server.

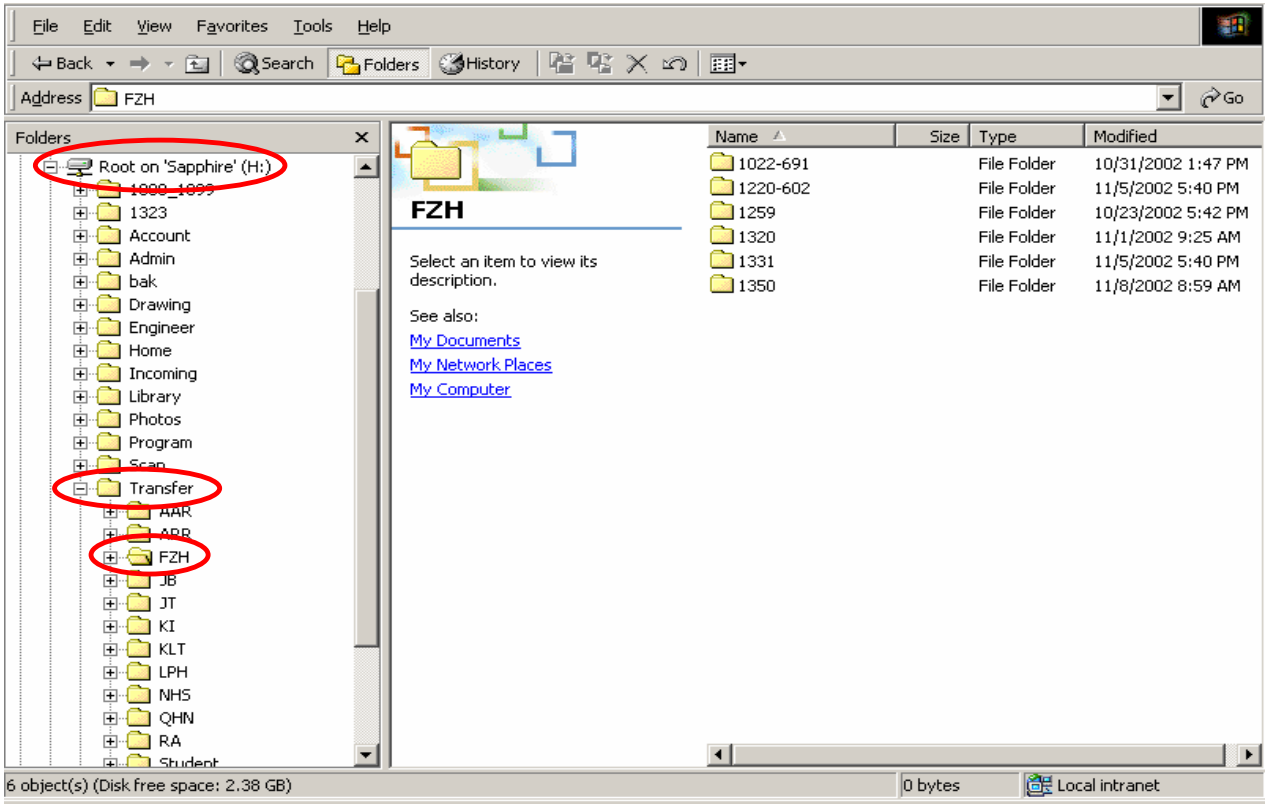
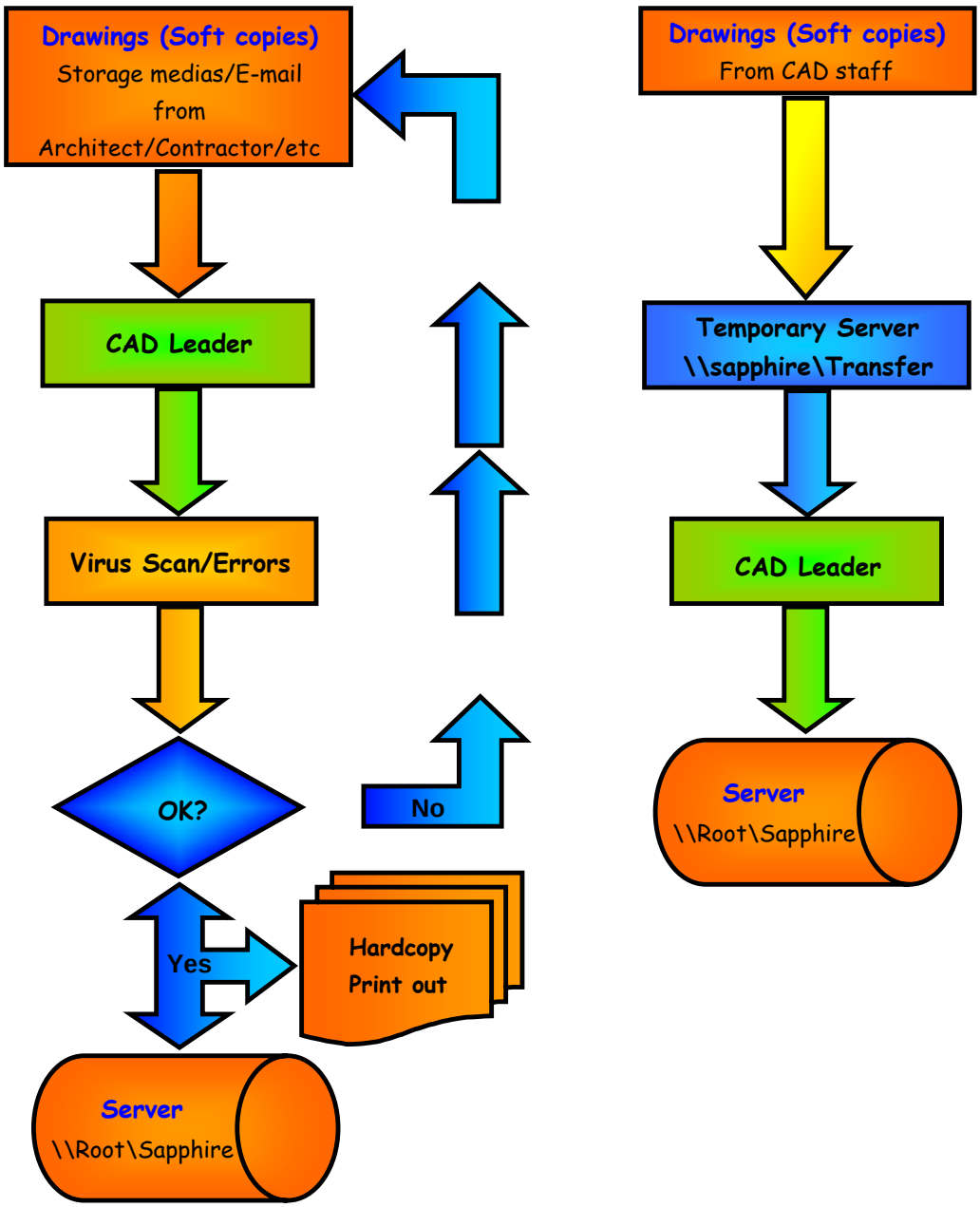
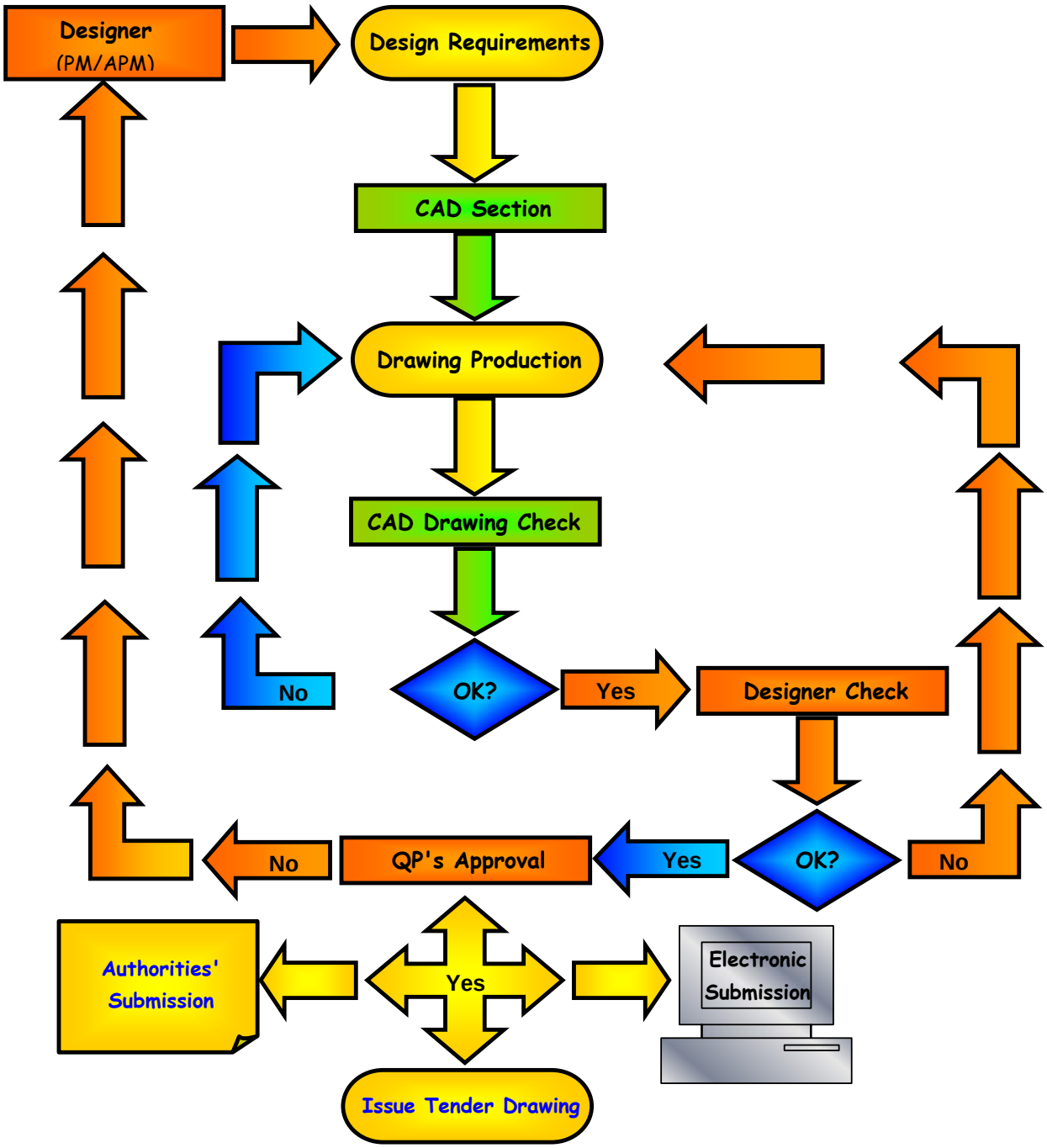


Figure 8.2 - Directories and sub-directories structure for Transfer

8.1 CAD file flow chart



8.2 Drawing production flowchart



9 Electronic submission

Before an application can be submitted, the e-Submission **Project Coordinator**, normally the **Architect**, has to register the project with the e-Submission System. He is required to use a unique project reference to identify the project. Information on all the members involved in the projects shall be submitted when creating the new project in order for the members to have access to the project.

To register the project member, the e-Submission **Project Coordinator** is required to define the role of the member in the project. A project member may hold one or more roles.

Once the project has been registered, all applications pertaining to the project will then be submitted under the registered project reference number. The e-Submission project reference also has to be quoted in all written direction replies and any other correspondences under the project.

9.1 Definition of project members

Project Member	Definition
Architect	A person who is registered as an architect under the Architects Act (Cap. 12) and has in force a practising certificate issued under the Act.
e-Submission Project Coordinator	Project member appointed by the owner/developer to initiate the issuance of the project reference and to register project and project members with the e-Submission System.
Licensed Electrical Worker	Electrical workers are licensed to ensure that only competent persons are allowed to design, install, repair, maintain and operate electrical installations.
Licensed Gas Service Worker	Gas service workers are licensed to ensure that only competent persons carry out gas service work.
Licensed Water Service Worker	Water service plumbers are licensed by PUB to ensure that good standards of plumbing work are maintained in customers' premises.
Plumbing Contractor	Plumbers who are registered to carry out plumbing and sanitary works.
Professional Engineer (Electrical)	A professional engineer under the Professional Engineers' Act in the electrical discipline and has in force a practising certificate.
Professional Engineer (Mechanical)	A professional engineer under the Professional Engineers' Act in the mechanical discipline and has in force a practising certificate.
Registered Inspector (Mechanical)	A professional engineer who is registered under the Fire Safety Act to be qualified and competent to inspect and certify fire safety works in projects.

** Name and IC number of members*
Professional No. / Registration No. / License No.
Profession (e.g. Professional Engineer - Mechanical)
Firm Name / Address / Email Address (for correspondences)

9.2 Preparing documents and CAD files for submission

All Drawings and supporting documents are to be **approved on paper** first by respective **Qualified Persons** before sending for e-submission. Drawings to be plotted out in colour with relevant endorsements/stamps and supporting documents to be printed by engineers for the Qualified Persons to check and approve. Engineers are also required to prepare the e-Submission request form.

Upon QP's approval on paper, engineers are to inform CAD department to convert the CAD files to **PDF** format, supporting documents are to be scanned and e-mailed to either NHS or KLT for retrieval and attach to the submission.

9.3 Request forms for E-submission

Request forms for e-Submission can be found on the company's intranet under the **E-Submission** column. Most of the forms required for submission to relevant authorities can be found there, if a particular form is not found, there is a request option on the web page. Information on the request forms with **asterisk (*)** is **Mandatory** as they are required for record and in the actual e-Submission System. Engineers are then required to send the request form *(request forms are in email format)* for preparation of e-Submission.

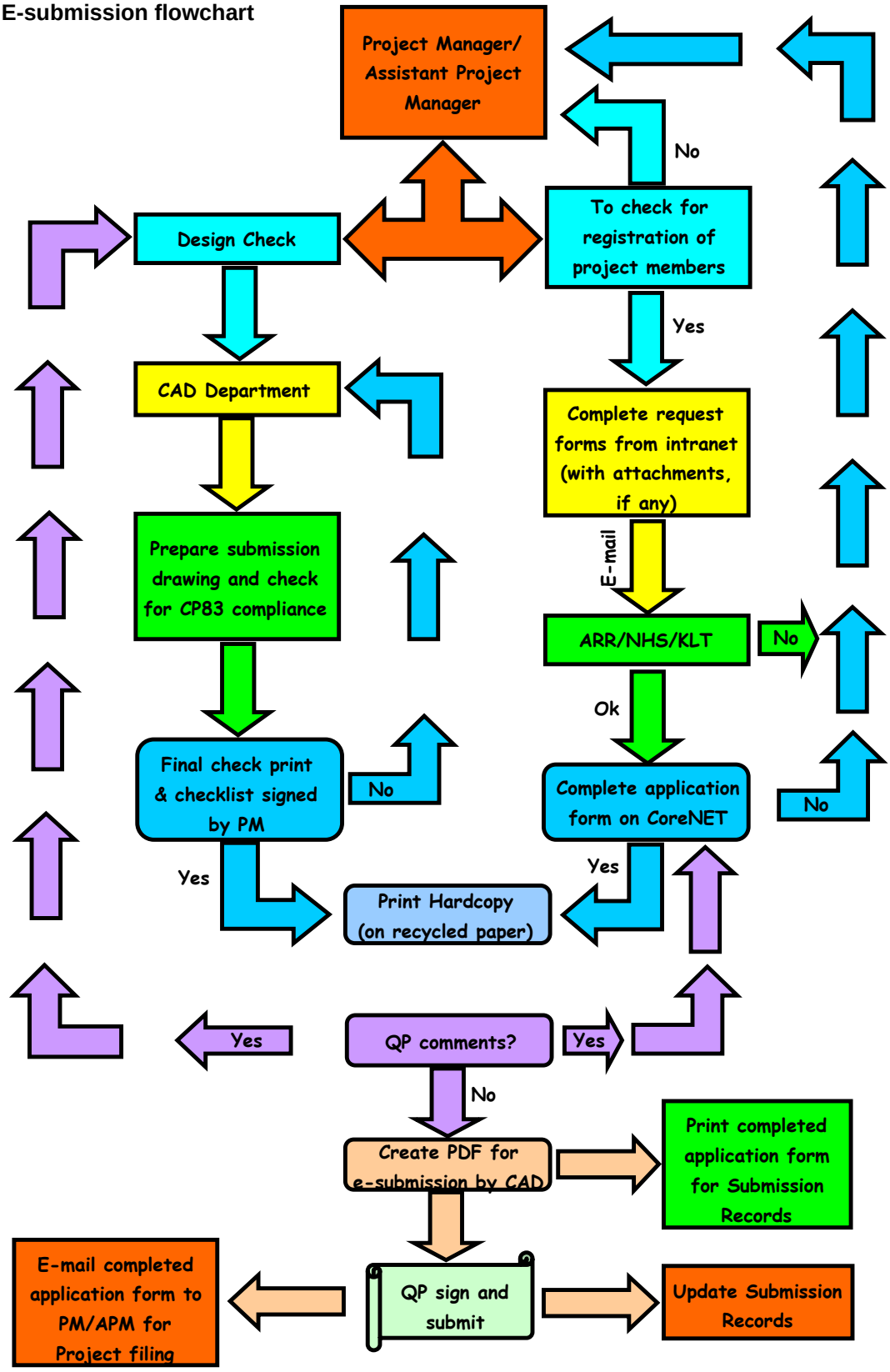
9.4 Sending a submission

Upon receiving the request, the necessary application form, drawings and supporting documents will be consolidated and engineers will be informed when the application is ready for submission. The engineers will then arrange with the **Qualified Persons** for digital signing of the documents. A softcopy of the application form will also be sent to the engineers for their filing to the respective projects. All applications shall be submitted online except those submitting to **BCA** *(Building Control Authority)* which are to be forwarded to the Architect for inclusion with their submission. Engineers will be notified upon successful submission.

9.5 Fee Payment

Should the e-Submission requires a fee payment, cheques are to be sent with reference to the generated **ES** *(Electronic Submission)* number which can be found in the e-submission page. The cheque should then be sent either by post or made personally at the regulatory authorities' payment counter.

9.6 E-submission flowchart



Annex A
Sample title block and scale bars

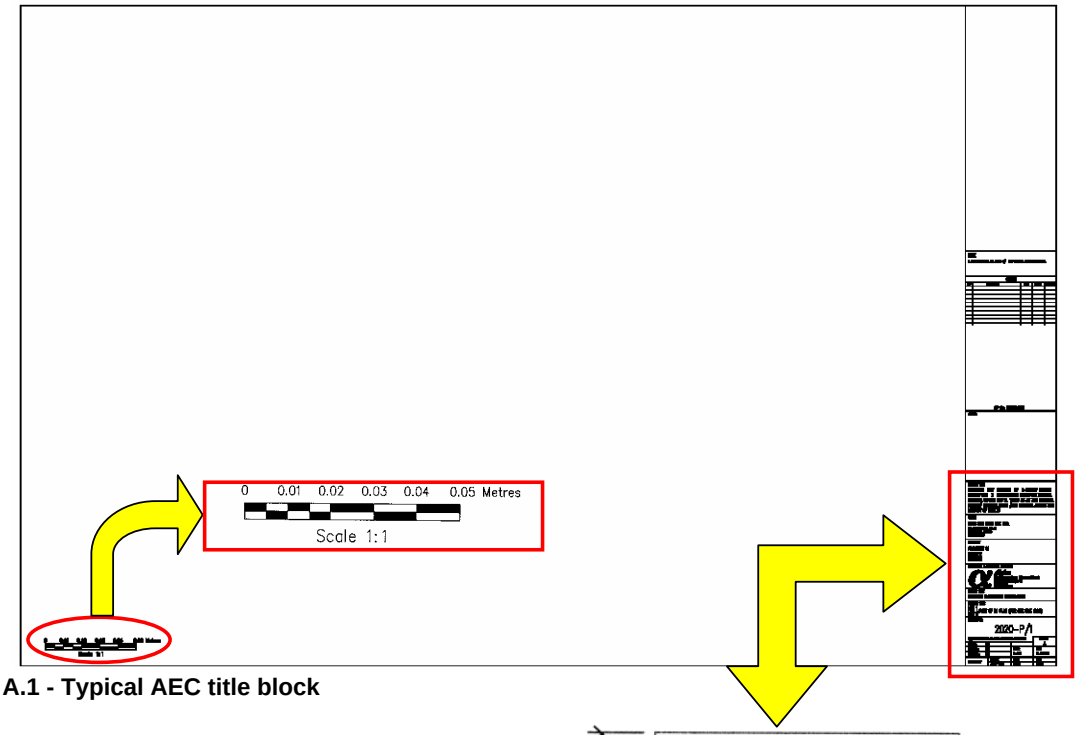
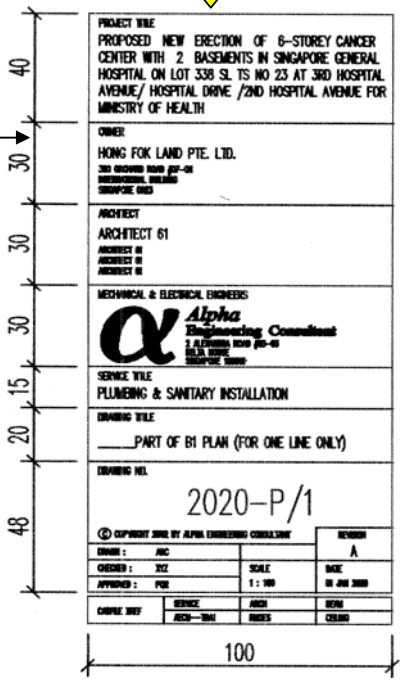


Figure A.1 - Typical AEC title block



Dimensions shown shall always be maintained

Annex A
Sample title block and scale bars

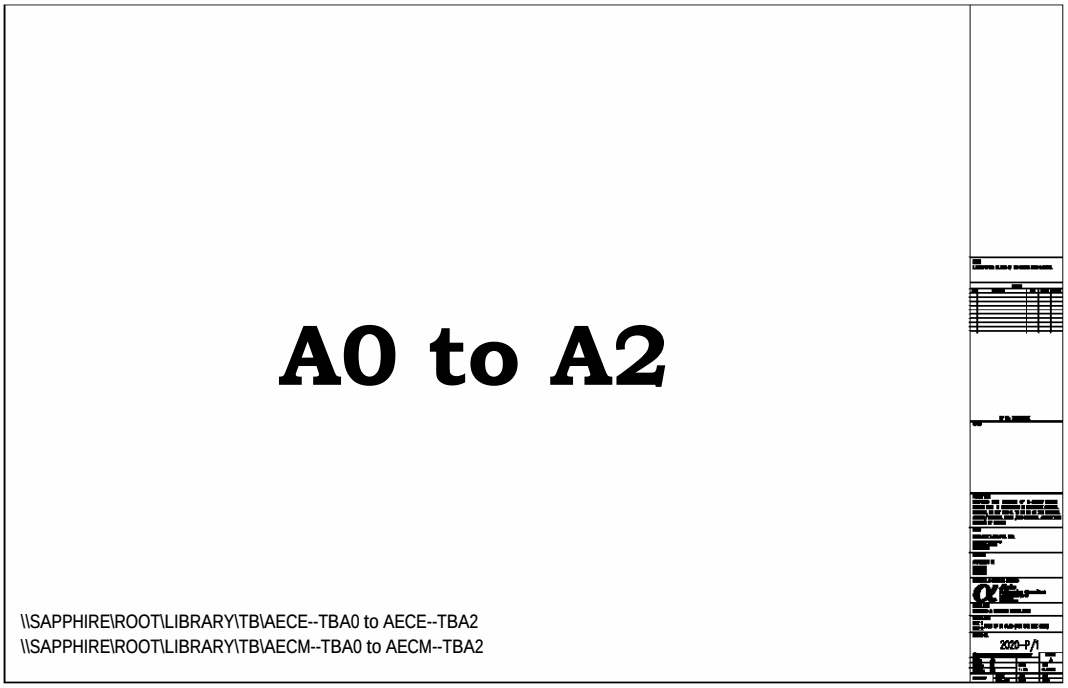


Figure A.2 - Typical A0 to A2 size title block for all building plans

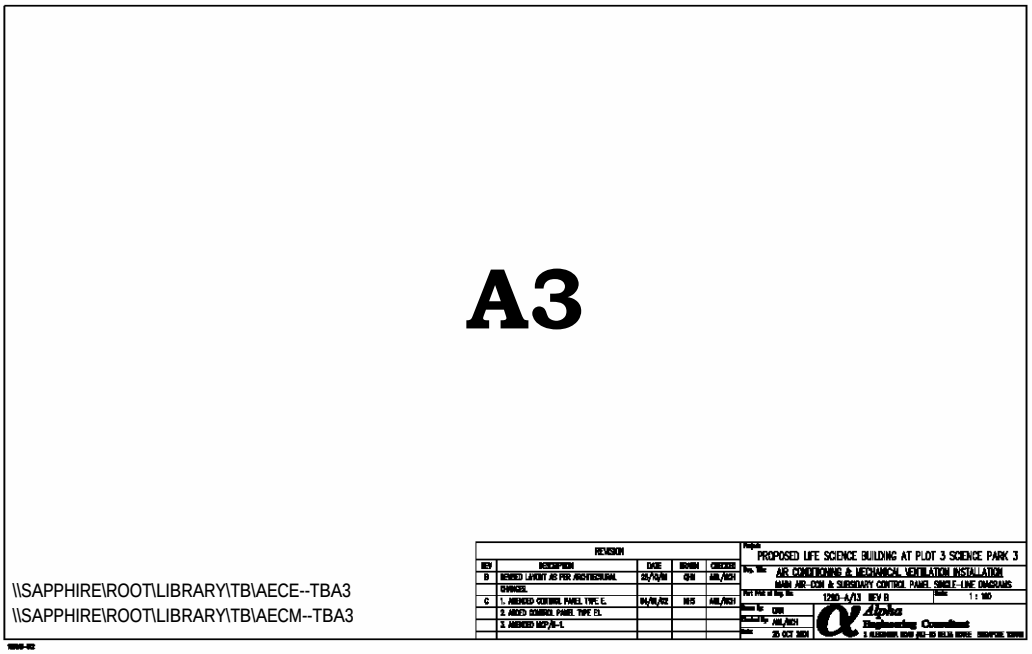
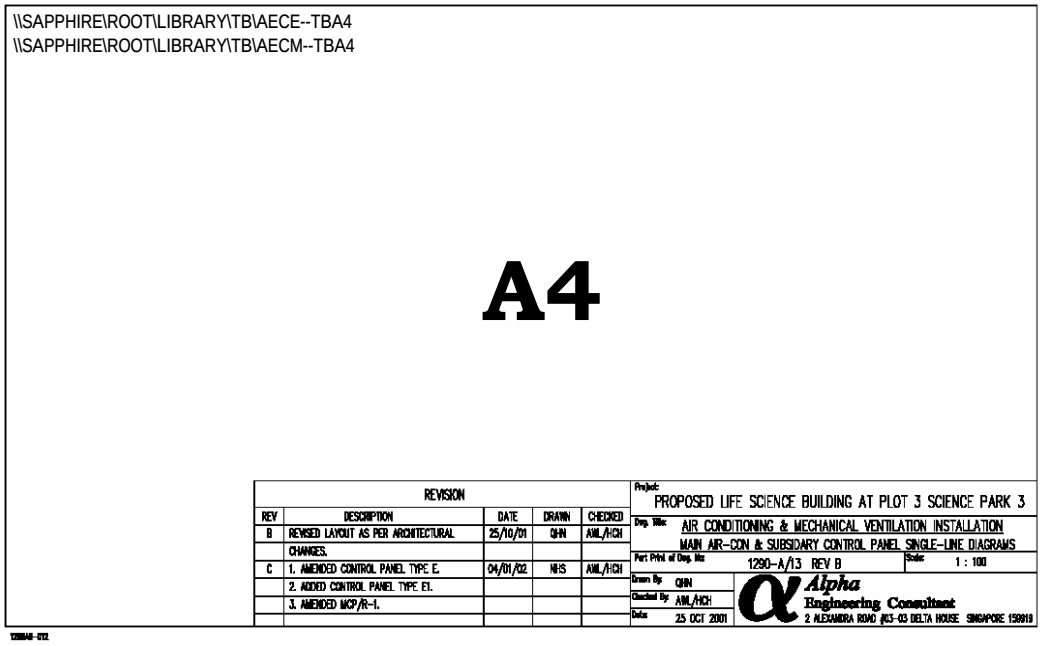


Figure A.3 - Typical A3 size title block for all part plans of building plan

Annex A
Sample title block and scale bars



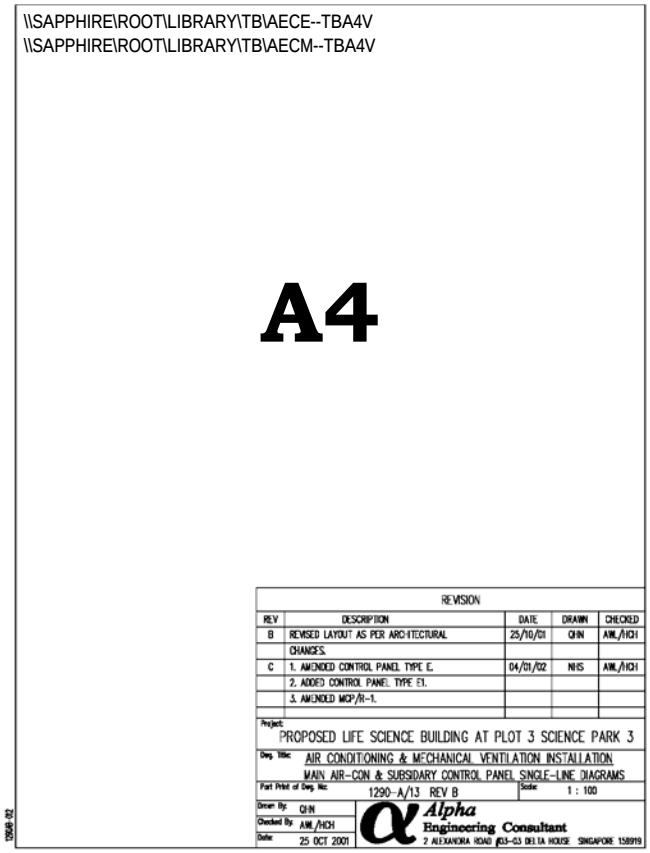


Figure A.4 - Typical A4 size title block for all part plans of building plan

Annex A
Sample title block and scale bars

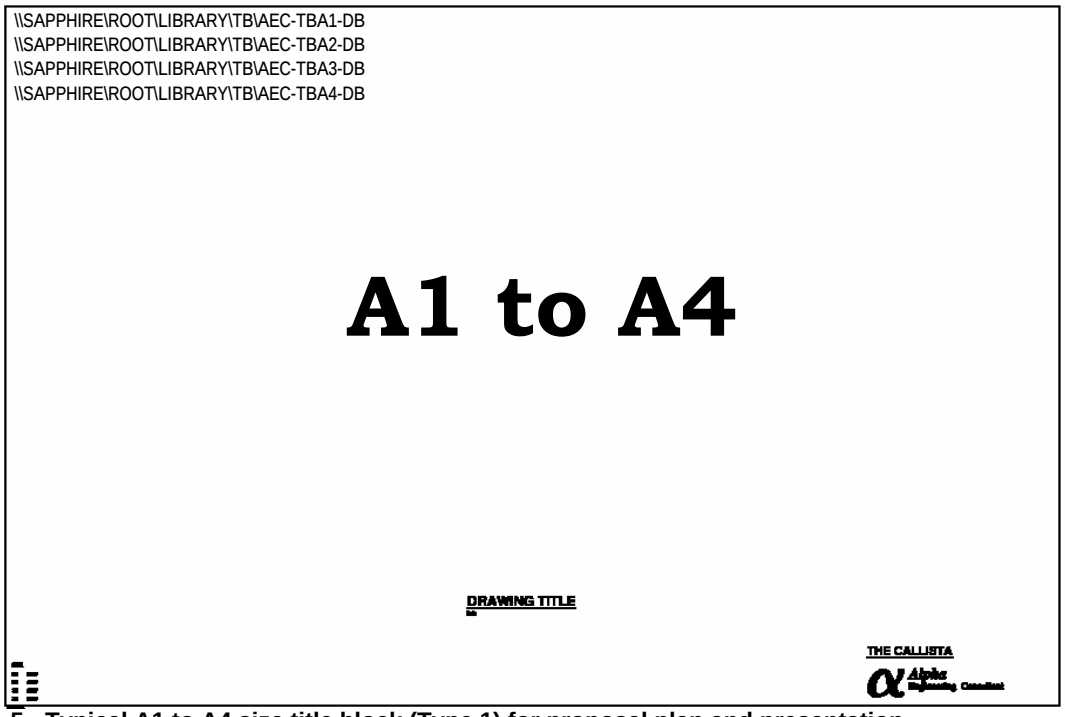


Figure A.5 - Typical A1 to A4 size title block (Type 1) for proposal plan and presentation

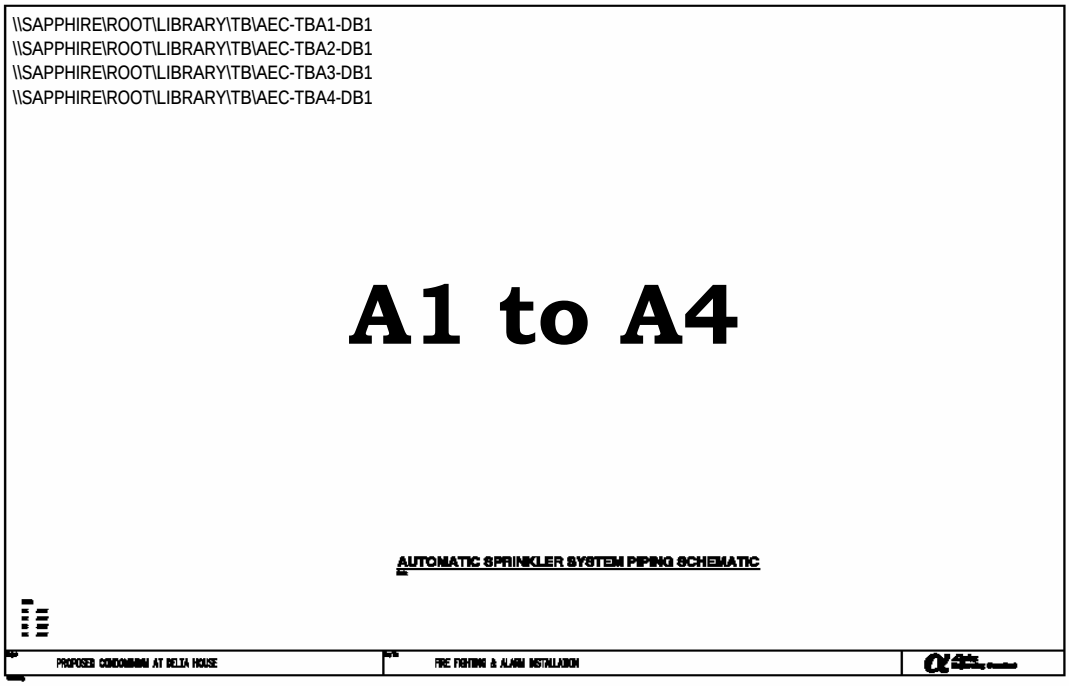


Figure A.6 - Typical A1 to A4 size title block (Type 2) for proposal plan and presentation

Annex A
Sample title block and scale bars

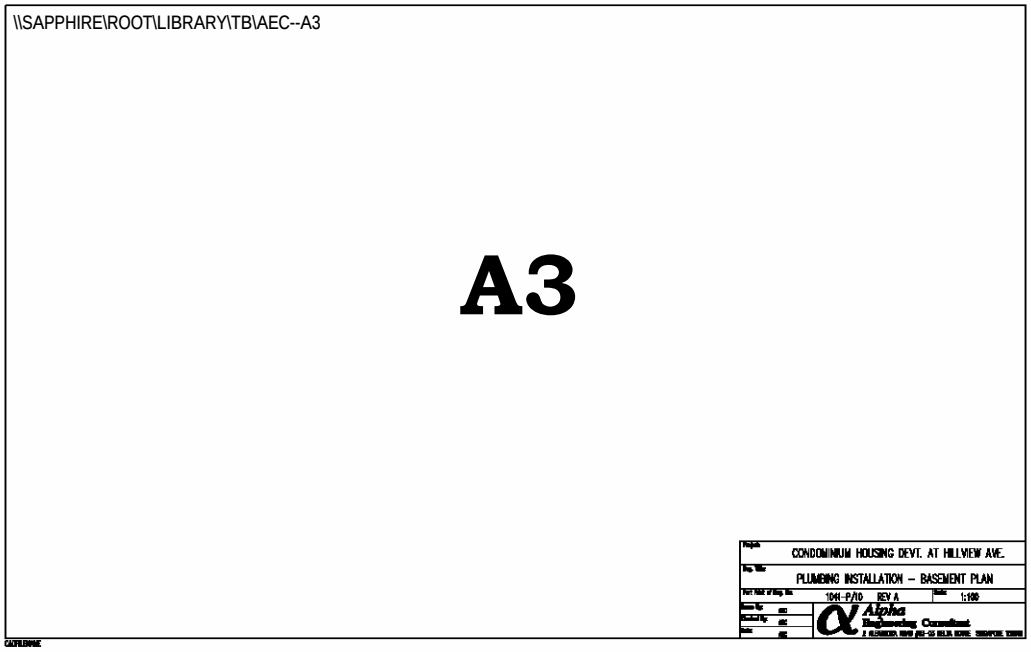


Figure A.7 - Typical A3 size title block (Type 3) for proposal plan and presentation

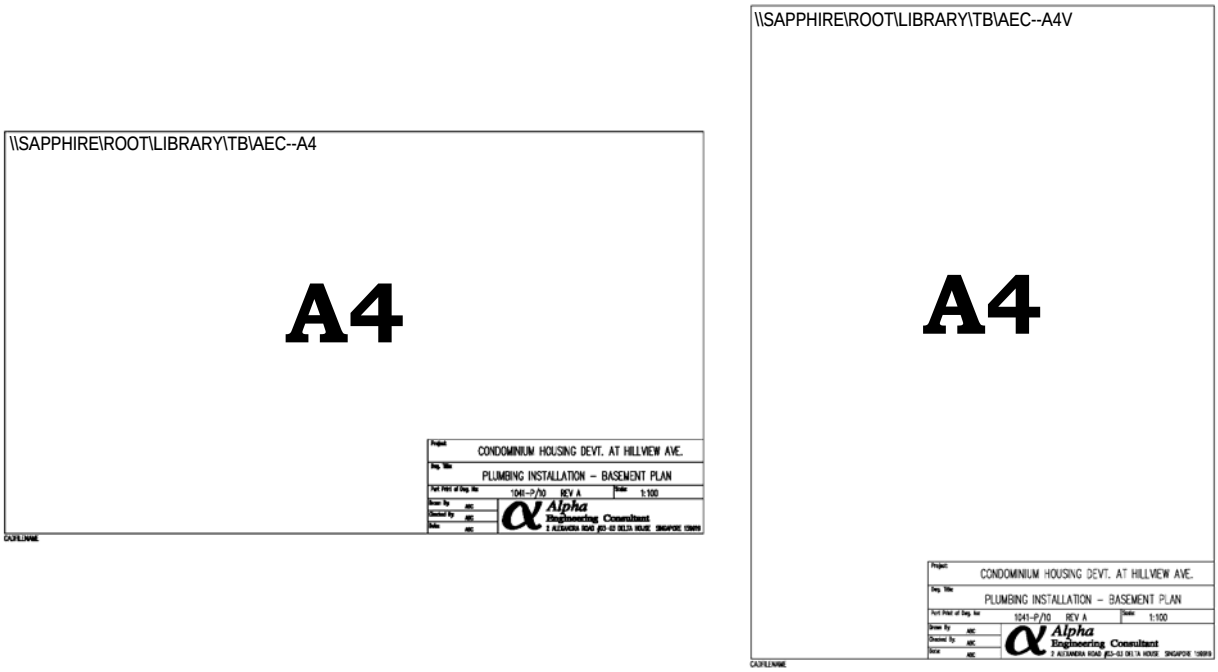


Figure A.8 - Typical A4 size title block (Type 3) for proposal plan and presentation

Annex A
Sample title block and scale bars

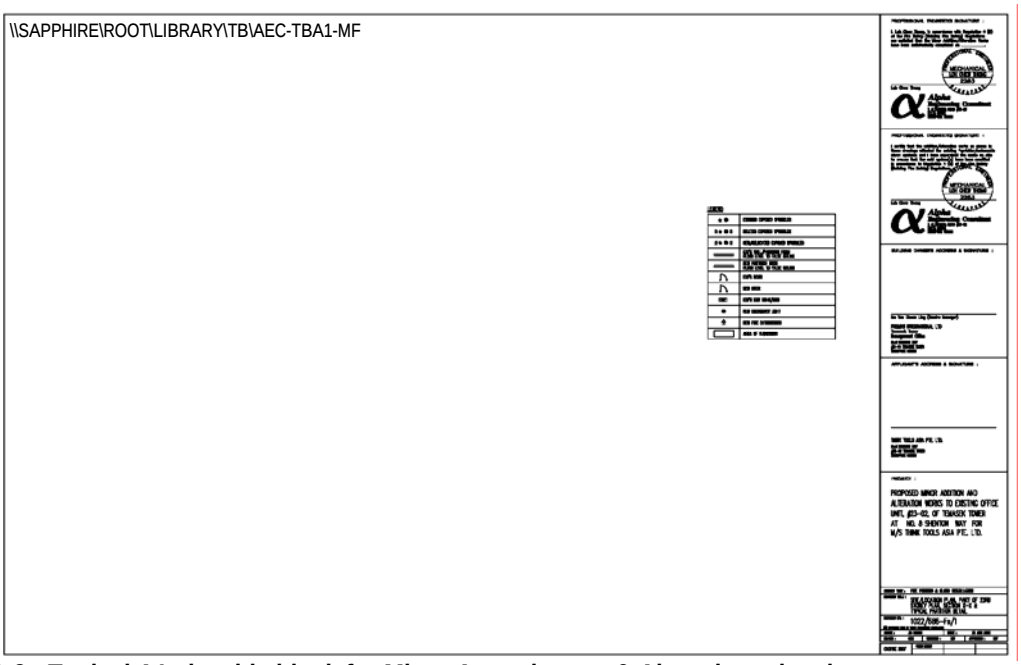


Figure A.9 - Typical A1 size title block for Minor Amendments & Alterations drawing (For fire safety works)

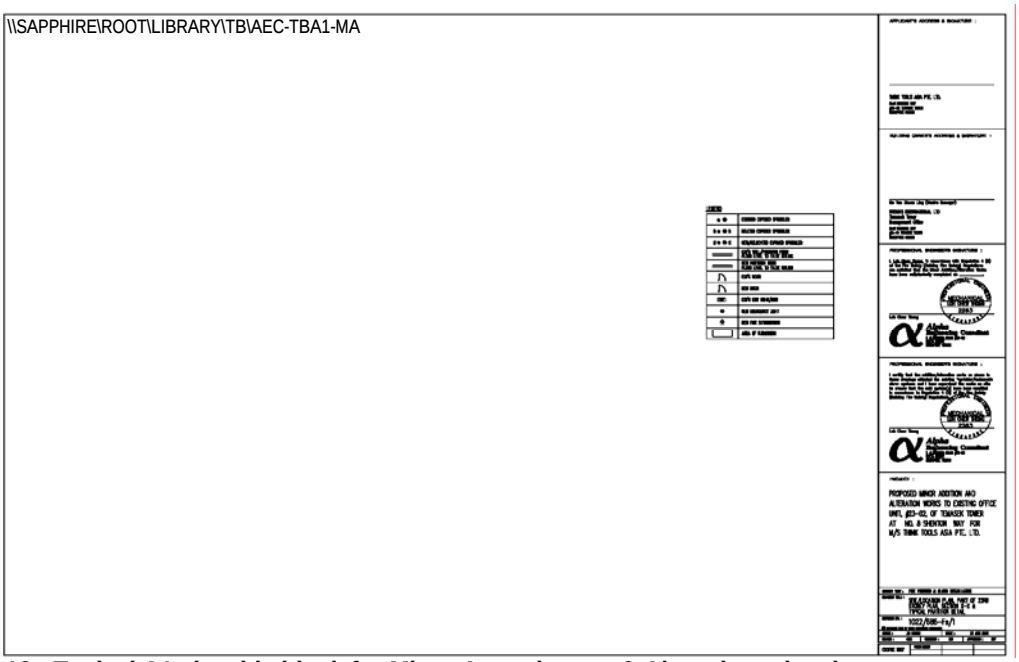


Figure A.10 - Typical A1 size title block for Minor Amendments & Alterations drawing (For fire protection / mechanical ventilation works)

Annex A
Sample title block and scale bars

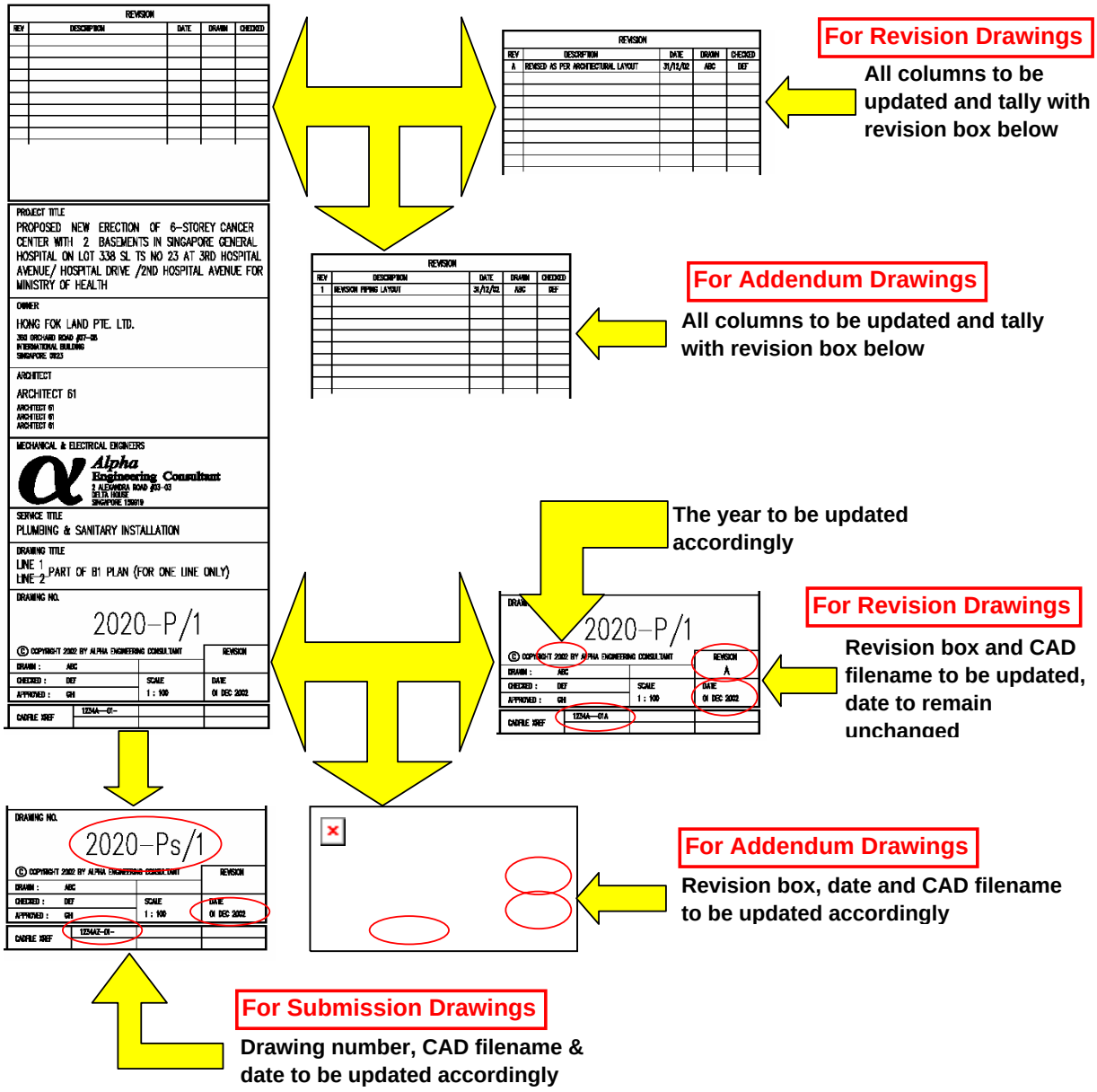


Figure A.11 - Typical examples of information for revision, addendum and submission drawings

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Annex B
CAD layer / level naming format

The five fields of a CAD layer / level name are to be arranged in the format shown in figure 1.
The underscore character "_" is used between fields to enhance readability.

Originator			Element									Presentation			S*
			Main Element				Sub Element								
M	1	_	A	C	O	N	S	A	D	-	_	E	-	_	N

Figure 1 - Standard layer / level name format
(Note : S - Status field, * - Optional field)

The valid codes for the presentation field are tabulated in Tables 1 and 2.

Code	Content
-	Whole model and drawing page
M	Model
E	Element graphics
A	Annotation
T	Text
H	Hatching
D	Dimensions
N	Notes
L	Legend

Table 1 - Codes for first character of presentation field

Code	Description of views
-	All views
0	Plan
1	Elevations
2	Sections
D	Details

Table 2 - Codes for second character of presentation field

The valid codes for the status field are tabulated in Table 3.

Code	Content
N	New works
E	Existing to remain
R	Existing to be removed
O	Existing to be moved - Original position
F	Existing to be moved - Final position
T	Temporary works

Table 3 - Codes for status field

Examples of CAD layer / level naming

Originator			Element									Presentation			S*
			Main Element				Sub Element								
M	1	_	A	C	O	N	S	A	D	-	_	E	-	_	N

This layer / level is for Mechanical works and contains graphic information on new work of supply air ductwork.

Originator			Element									Presentation			S*
			Main Element				Sub Element								
E	1	_	E	L	E	C	L	T	G	-	_	E	-	_	N

This layer / level is for Electrical works and contains graphic information on new work of lighting luminaires layout.

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CAD Manual

Annex C
CAD layer / level names for architectural

Description	Layer Name	Autocad Colour	Microstation Colour	Line-weight	Linetype
Grid Lines	LAYERS TO REMAIN AS ARCHI'S UNLESS THEY ARE IN NUMBERS	15	-	-	Center
Grid Text		11	-	-	-
Grid Line Dimensions		8	-	-	-
Brickwall, Partition		8	-	-	-
Structural/Lift Core Wall		5	-	-	-
Column		5	-	-	-
Sanitary Fixtures		9	-	-	-
Staircase		8	-	-	-
Lift		8	-	-	-
***Room Designation**		70	-	-	-
***Floor Plan's Title**		11	-	-	-
***Floor Level**		8	-	-	-
****Ceiling Plan**		9	-	-	-
Door		8	-	-	-
Glass / Window		8	-	-	-
Fire Door Symbols		7	-	-	-
Boundary Line		1	-	-	-
Buffer Line, etc.		5	-	-	-
Carpark Lot		9	-	-	-
***Carpark Lot Number**		9	-	-	-
Ramp		9	-	-	-
****Beam / Pile Cap**		132	-	-	-
Outline of Above		9	-	-	-
Outline of Below		9	-	-	-
Section / Elevation Line		5	-	-	-
****Furniture**		15	-	-	-
Fire Extinguishers		7	0	0.2	Continuous
Others		8	-	-	-

Note :
1. ***** denotes layers to be in **RMDES**'s file
2. ****** denotes layers to be in their individual files, e.g. **1001X--01-**, **1001V--01-**
3. Erase all architectural annotations except those that states "**Void above**", "**Line of canopy above**", etc.
4. Ensure that the **Linetype Scale** is with respect to the drawing scale
5. Ensure that the **Linetype Scale** under "**Modify**" is **1**

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Annex D

CAD layer / level names for air conditioning and mechanical ventilation

Description	Layer Name	Autocad Colour	Microstation Colour	Line-weight	Linetype
Supply Air Ductwork	**M1_ACON**SAD-_E-	**150**	**107**	**0.4**	Continuous
Return Air Ductwork	**M1_ACON**RAD-_E-	**190**	**63**	**0.4**	Continuous
Fire-Rated Material (A/C)	**M1_ACON**FRD-_E-	**240**	**119**	**0.2**	Ansi37
Exhaust Air Ductwork	**M1_MEVS**EAD-_E-	**40**	**39**	**0.4**	Continuous
Fresh Air Ductwork	**M1_MEVS**FAD-_E-	**80**	**195**	**0.4**	Continuous
Fire-Rated Material (MV)	**M1_MEVS**FRD-_E-	**240**	**119**	**0.2**	Ansi37
Flexible Ductwork	**Follow Respective Ductworks**				
Supply Air Diffuser	**M1_ACON**SAG-_E-	**140**	**89**	**0.2**	Continuous
Return Air Grille	**M1_ACON**RAG-_E-	**191**	**27**	**0.2**	Continuous
Exhaust Air Grille	**M1_MEVS**EAG-_E-	**30**	**70**	**0.2**	Continuous
Fresh Air Grille	**M1_MEVS**FAG-_E-	**3**	**5**	**0.2**	Continuous
Fresh Air Opening	**M1_MEVS**FAO-_E-	**3**	**5**	**Polyline-0.5**	Center
Fire Damper	**M1_ACON**FDMP_E-	**240**	**119**	**0.2**	Continuous
Fire Damper	**M1_MEVS**FDMP_E-	**240**	**119**	**0.2**	Continuous
Non-Return/Volume Damper	**M1_ACON**DAMP_E-	**7**	**0**	**0.2**	Continuous
Non-Return/Volume Damper	**M1_MEVS**DAMP_E-	**7**	**0**	**0.2**	Continuous
Miscellaneous	**M1_ACON**MISC_E-	**7**	**0**	**0.2**	-
Fan Coil Unit	**M1_ACON**EQPT_E-	**44**	**140**	**0.2**	Continuous
Condensing Unit					
Air Handling Unit					
Cooling Tower					
Chiller					
Thermostat					
Pump					
VAV Boxes	**M1_ACON**VAV-_E-	**44**	**140**	**0.2**	Continuous
Subsidiary Control Panel	**M1_ACON**SCP-_E-	**44**	**140**	**0.2**	Continuous
Fans	**M1_FANS**----_E-	**44**	**140**	**0.2**	Continuous
Silencers, Attenuators	**M1_FANS**ATT-_E-	**44**	**140**	**0.2**	Continuous
Condenser Water Supply Pipe	**M1_CWAT**CWS-_E-	**11**	**67**	**0.2**	Center2
Condenser Water Return Pipe	**M1_CWAT**CWR-_E-	**5**	**6**	**0.2**	Phantom2
Chilled Water Supply Pipe	**M1_CWAT**CHS-_E-	**11**	**67**	**0.2**	Continuous
Chilled Water Return Pipe	**M1_CWAT**CHR-_E-	**5**	**6**	**0.2**	Dashed2
Compressed Air Pipe	**M1_CWAT**CAPI_E-	**7**	**0**	**0.2**	Continuous
Cooling Tower Drain Pipe	**M1_CWAT**DRPI_E-	**7**	**0**	**0.2**	Continuous
Make-up Water Pipe	**M1_CWAT**MUPI_E-	**70**	**227**	**0.15**	Continuous
Refrigerant Pipe	**M1_CWAT**REF-_E-	**5**	**6**	**0.2**	Dashdot2
Condensate Drain Pipe	**M1_CWAT**CDP-_E-	**70**	**227**	**0.2**	Stripped
Smoke Detector in AHU room	**M1_ACON**SMEX_E-	**70**	**227**	**0.2**	Continuous

* Note : Characters in **BOLD** are fixed

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CAD Manual

Annex D

CAD layer / level names for air conditioning and mechanical ventilation

Description	Layer Name	Autocad Colour	Microstation Colour	Line-weight (mm)	Linetype
2-hours Fire Compartment	**M1_ACON**2HR-_E-	**240**	**119**	**0.2**	Dashdot2
4-hours Fire Compartment	**M1_ACON**4HR-_E-	**240**	**119**	**0.2**	Divide2
Smoke Control Zone	**M1_ACON**SMZ-_E-	**7**	**0**	**0.2**	Center2
Area of Submission	**M1_ACON**SUBM_E-	**6**	**2**	**0.4**	Center
Fire Damper Text	**M1_ACON**FDMP_T-	**240**	**119**	**0.2**	-
Fire Damper Text	**M1_MEVS**FDMP_T-	**240**	**119**	**0.2**	-
Volume Damper Text	**M1_ACON**DAMP_T-	**7**	**0**	**0.2**	-
Volume Damper Text	**M1_MEVS**DAMP_T-	**7**	**0**	**0.2**	-
Text	**M1_ANOT**T2S-_T-	**2**	**3**	**0.2**	-
Equipment Designation	**M1_ANOT**T3S-_T-	**70**	**227**	**0.3**	-

* Note : Characters in **BOLD** are fixed

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Annex E
CAD layer / level names for fire fighting and alarm installation

Description	Layer Name	Autocad Colour	Microstation Colour	Line-weight	Linetype
Main Sprinkler Pipe	**M1_SPRK**MAIN_E-	**1**	**4**	**0.6**	Continuous
Exposed Pipework	**M1_SPRK**EXPI_E-	**1**	**4**	**0.4**	Continuous
Concealed Pipework	**M1_SPRK**COPI_E-	**80**	**195**	**0.4**	Dashed2
Pipework Under Duct, Ramp	**M1_SPRK**UDPI_E-	**150**	**107**	**0.4**	Dashed2
Pipework Under Floor	**M1_SPRK**UFPI_E-	**40**	**39**	**0.4**	Dashed2
Fire-Rated Pipework	**Follow Respective Pipeworks**	**240**	**119**	**0.2**	Cross-strip
Exposed Sprinkler Head	**M1_SPRK**EXP-_E-	**240**	**119**	**0.2**	Continuous
Concealed Sprinkler Head	**M1_SPRK**CON-_E-	**3**	**5**	**0.2**	Continuous
Pre-Action Sprinkler Head	**M1_SPRK**PRE-_E-	**240**	**119**	**0.2**	Continuous
Sprinkler Under Duct, Ramp	**M1_SPRK**UDR-_E-	**140**	**89**	**0.2**	Continuous
Sprinkler Under Floor	**M1_SPRK**UDF-_E-	**30**	**70**	**0.2**	Continuous
Sprinkler Under Tray	**M1_SPRK**UDT-_E-	**191**	**27**	**0.2**	Continuous
Alarm Bell	**M1_FIRE**BELL_E-	**240**	**119**	**0.2**	Continuous
Manual Call Point	**M1_FIRE**CAPT_E-	**70**	**227**	**0.2**	Continuous
Dry Riser System	**M1_FIRE**DRPI_E-	**4**	**1**	**0.3**	-
Wet Riser System	**M1_FIRE**WRPI_E-	**191**	**27**	**0.3**	-
Hosereel System	**M1_FIRE**HRPI_E-	**70**	**227**	**0.25**	-
Hydrant System	**M1_FIRE**HYPI_E-	**70**	**227**	**0.3**	-
Smoke Detector (Exposed)	**M1_FIRE**SMEX_E-	**240**	**119**	**0.2**	Continuous
Smoke Detector (Concealed)	**M1_FIRE**SMCO_E-	**3**	**5**	**0.2**	Continuous
Smoke Detector (Underfloor)	**M1_FIRE**SMUF_E-	**30**	**70**	**0.2**	Continuous
Smoke Detector (Underduct)	**M1_FIRE**SMUD_E-	**140**	**89**	**0.2**	Continuous
Heat Detector (Exposed)	**M1_FIRE**HDEX_E-	**240**	**119**	**0.2**	Continuous
Heat Detector (Concealed)	**M1_FIRE**HDCO_E-	**3**	**5**	**0.2**	Continuous
Heat Detector (Underfloor)	**M1_FIRE**HDUF_E-	**30**	**70**	**0.2**	Continuous
Heat Detector (Underduct)	**M1_FIRE**HDUD_E-	**140**	**89**	**0.2**	Continuous
Sprinkler Tank	**M1_FIRE**EQPT_E-	**44**	**140**	**0.2**	Continuous
Fire Tank					
Wet Riser Tank					
Hosereel Tank					
Domestic Water Tank					
Pump					
Accessories	**M1_FIRE**EQPT_E-	**2**	**3**	**0.2**	Continuous
FIB, SIB, FCP, FACP	**M1_FIRE**FCP-_E-	**44**	**140**	**0.2**	Continuous
SCP	**M1_FIRE**SCP-_E-	**2**	**3**	**0.15**	Hidden
Valves	**Follow Respective Pipeworks**	**2**	**3**	**0.15**	-
Breeching Inlet	**Follow Respective Pipeworks**				

* Note : Characters in **BOLD** are fixed

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Annex E
CAD layer / level names for fire fighting and alarm installation

Description	Layer Name	Autocad Colour	Microstation Colour	Line-weight	Linetype
Exposed nozzle	**M1_FIRE**NZEX_E-	**240**	**119**	**0.2**	Continuous
Concealed nozzle	**M1_FIRE**NZCO_E-	**3**	**5**	**0.2**	Continuous
Underfloor nozzle	**M1_FIRE**NZUF_E-	**30**	**70**	**0.2**	Continuous
Exposed pipe for nozzle	**M1_FIRE**NZEP_E-	**1**	**4**	**0.2**	Continuous
Concealed pipe for nozzle	**M1_FIRE**NZCP_E-	**80**	**195**	**0.2**	Dashed2
Underfloor pipe for nozzle	**M1_FIRE**NZUP_E-	**40**	**39**	**0.2**	Dashed2
Beacon / strobe light	**M1_FIRE**BEAC_E-	**240**	**119**	**0.2**	Continuous
Signage for FM 200	**M1_FIRE**SIGN_E-	**240**	**119**	**0.2**	Continuous
Area of submission	**M1_FIRE**SUBM_E-	**6**	**2**	**0.4**	Center
Text for exposed sprinkler	**M1_ANOT**T2E-_T-	**2**	**3**	**0.15**	-
Text for concealed sprinkler	**M1_ANOT**T3C-_T-	**7**	**0**	**0.15**	-
Text for underfloor sprinkler	**M1_ANOT**T3F-_T-	**7**	**0**	**0.15**	-
Design Point	**M1_ANOT**DSPT_T-	**2**	**3**	**0.2**	-
Text for Zoning	**M1_FIRE**ZONE_T-	**7**	**0**	**0.2**	-
Equipment Designation	**M1_ANOT**T3S-_T-	**70**	**227**	**0.3**	-

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Annex F

CAD layer / level names for plumbing and swimming pool installation

Description	Layer Name	Autocad Colour	Microstation Colour	Line-weight	Linetype
Existing Water Main	**M1_DWAT**MAIN_E-	**4**	**1**	**0.4**	Dashed2
Cold Water Supply Pipe (G)	**M1_DWAT**CWG-_E-	**150**	**107**	**0.4**	Continuous
Cold Water Supply Pipe (P)	**M1_DWAT**CWP-_E-	**190**	**63**	**0.4**	Continuous
Hot Water Pipe	**M1_DWAT**HOPI_E-	**40**	**39**	**0.3**	Divide2
Flushed Valve Pipe	**M1_DWAT**FVPI_E-	**240**	**119**	**0.4**	Dashdot2
Fire Hydrant Pipe	**M1_DWAT**HYPI_E-	**140**	**89**	**0.3**	Continuous
Cold Water Transfer Pipe	**M1_DWAT**CWT-_E-	**80**	**195**	**0.4**	Continuous
Taps, Droppers (G)	**M1_DWAT**CWG-_E-	**140**	**89**	**0.15**	Continuous
Taps, Droppers (P)	**M1_DWAT**CWP-_E-	**191**	**27**	**0.15**	Continuous
Domestic Water Tank Other Tanks Pump Water Meters	**M1_DWAT**EQPT_E-	**44**	**140**	**0.2**	Continuous
Accessories	**M1_DWAT**EQPT_E-	**2**	**3**	**0.2**	Continuous
Valves	**Follow Respective Pipeworks**	**2**	**3**	**0.15**	-
HCP, HACP, etc	**M1_DWAT**HCP-_E-	**44**	**140**	**0.2**	Continuous
Text	**M1_ANOT**T2W-_T-	**2**	**3**	**0.15**	-
Equipment Designation	**M1_ANOT**T3S-_T-	**70**	**227**	**0.3**	-
Cold Water Pipe to Tank	**M1_POOL**CWP_E-	**150**	**107**	**0.4**	Continuous
Swimming Pool Drain Pipe	**M1_POOL**DRPI_E-	**70**	**227**	**0.25**	Continuous
Swimming Pool Equipment	**M1_POOL**EQPT_E-	**44**	**140**	**0.2**	-
Swimming Pool Lighting	**M1_POOL**LTG-_E-	**11**	**-**	**0.3**	-
Miscellaneous Items	**M1_POOL**MISC_E-	**8**	**-**	**0.15**	-
Overflow Pipes	**M1_POOL**OFPI_E-	**190**	**63**	**0.4**	Continuous
Delivery/Suction Pipe	**M1_POOL**PIPE_E-	**150**	**107**	**0.4**	Continuous
Surflo Channel & Nozzles	**M1_POOL**PISC-_E-	**9**	**-**	**0.3**	Continuous
Single Line Diagrams	**M1_POOL**SLD-_E-	**70**	**227**	**0.3**	-
Swimming Pool Sumps	**M1_POOL**SUMP_E-	**7**	**0**	**0.25**	Continuous
Text for Swimming Pool	**M1_ANOT**T2P-_T-	**2**	**3**	**0.15**	-
Equipment Designation	**M1_ANOT**T3S-_T-	**70**	**227**	**0.3**	-

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Annex G
CAD layer / level names for sanitary installation

Description	Layer Name	Autocad Colour	Microstation Colour	Line-weight	Linetype
Existing Manhole, Sewer, etc (In Operation)	**M1_SEWR**EXO-_E-	**140**	**89**	**0.4**	Continuous
Existing Manhole, Sewer, etc (Approved but NOT Operating)	**M1_SEWR**EXN-_E-	**11**	**67**	**0.4**	Continuous
New Manhole, Sewer, etc (Submitted separatedly)	**M1_SEWR**PRO-_E-	**4**	**1**	**0.4**	Divide2
Soil and Waste Stack	**M1_SANI**SWSK-_E-	**240**	**119**	**0.4**	Continuous
Soil and Waste Pipework	**M1_SANI**SWPI_E-	**1**	**4**	**0.4**	Continuous
Venting Stack	**M1_SANI**VESK_E-	**3**	**5**	**0.2**	Continuous
Venting Pipework	**M1_SANI**VEPI_E-	**3**	**5**	**0.2**	Hidden2
Indirect Drain Pipework	**M1_SANII**DPI_E-	**240**	**119**	**0.2**	Dashdot2
Inspection Chamber	**M1_SANI**-IC-_E-	**240**	**119**	**0.2**	Continuous
Waste Sump	**M1_SANI**-WS-_E-	**240**	**119**	**0.2**	Continuous
Floor Trap	**M1_SANI**-FT-_E-	**240**	**119**	**0.2**	Continuous
Floor Waste	**M1_SANI**-FW-_E-	**240**	**119**	**0.2**	Continuous
Urinal Trap	**M1_SANI**-UT-_E-	**240**	**119**	**0.2**	Continuous
Gully Trap	**M1_SANI**-GT-_E-	**240**	**119**	**0.2**	Continuous
Accessories	**M1_SANI**EQPT_E-	**2**	**3**	**0.2**	Continuous
Sump Pump Pipework	**M1_SANI**SPPI_E-	**11**	**67**	**0.4**	Continuous
Ejector Pump Pipework	**M1_SANI**EJPI_E-	**11**	**67**	**0.4**	Continuous
Solid Divertor Pipework	**M1_SANI**SDPI_E-	**11**	**67**	**0.4**	Continuous
Sump, Ejector, Divertor Pumps	**M1_SANI**EQPT_E-	**70**	**227**	**0.15**	Continuous
Venting for Equipment	**M1_SANI**EQVP_E-	**7**	**0**	**0.2**	Hidden
Text	**M1_ANOT**T2S-_T-	**2**	**3**	**0.15**	-
Equipment Designation	**M1_ANOT**T3S-_T-	**70**	**227**	**0.3**	-
Text for Top & Invert Level	**M1_SANII**CLV_T-	**7**	**0**	**0.2**	-

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Annex H
CAD layer / level names for gas installation

Description	Layer Name	Autocad Colour	Microstation Colour	Line-weight	Linetype
Gas Main	**M1_GASP**GSPI_E-	**4**	**1**	**0.3**	Dashed2
Gas Pipeworks	**M1_GASP**GSPI_E-	**1**	**4**	**0.4**	Continuous
Gas Meter	**M1_GASP**EQPT_E-	**44**	**140**	**0.2**	Continuous
Gas Detector	**M1_GASP**DET-_E-	**240**	**119**	**0.2**	Continuous
Control Panel	**M1_GASP**HCP-_E-	**44**	**140**	**0.2**	Continuous
Pipe Channel, Box-up (Gas Pipe Enclosure)	**M1_GASP**BOX-_E-	**8**	**236**	**0.1**	Dot4
Text	**M1_ANOT**T2G-_T-	**2**	**3**	**0.15**	-
Equipment Designation	**M1_ANOT**T3S-_T-	**70**	**227**	**0.3**	-

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Annex J
CAD layer / level names for electrical installation

Description	Layer Name	Autocad Colour	Microstation Colour	Line-weight	Linetype
Revision Column	**E1_ANOT**REVN_E-	**9**			Continuous
Revision Column Text	**E1_ANOT**REVN_T-	**7**			Continuous
Alpha Logo in Titleblock	**E1_ANOT**SYBL_E-	**70**			Continuous
	E1_ANOTSYBL_T-	**2**			Continuous
Electrical Text Style E175	**E1_ANOT**T175_T-	**7**			Continuous
Electrical Text Style E200	**E1_ANOT**T200_T-	**2**			Continuous
Electrical Text Style E225	**E1_ANOT**T225_T-	**2**			Continuous
Electrical Text Style E270	**E1_ANOT**T270_T-	**70**			Continuous
Electrical Text Style E360	**E1_ANOT**T360_T-	**11**			Continuous
Electrical Text Style E450	**E1_ANOT**T450_T-	**11**			Continuous
Electrical Text Style E900	**E1_ANOT**T900_T-	**6**			Continuous
Title Block Frame Lines	**E1_ANOT**TBLK_E-	**11**			Continuous
Title Block Text	**E1_ANOT**TBLK_T-	**7**			Continuous
Air circuit Breaker	**E1_ELEC**ACCB_E-	**4**			Continuous
Associated Text for Above	**E1_ELEC**ACCB_T-	**2**			Continuous
Power Circuit Line / Arc and Switching Control	**E1_ELEC**CIRC_E-	**7**			Continuous
Associated Text for Above	**E1_ELEC**CIRC_T-	**2**			Continuous
Electrical Cable Routing	**E1_ELEC**LADR_E-	**4**			Continuous
Associated Text for Above	**E1_ELEC**LADR_T-	**2**			Continuous
Moulded Case Circuit Breaker	**E1_ELEC**MCCB_E-	**70**			Continuous
Associated Text for Above	**E1_ELEC**MCCB_T-	**2**			Continuous
Meters, Relays, DOL, etc for Single Line Diagrams	**E1_ELEC**METR_E-	**70**			Continuous
Associated Text for Above	**E1_ELEC**METR_T-	**2**			Continuous
DBs, SCPs, Switchboards	**E1_ELEC**PANL_E-	**11**			Continuous
Associated Text for Above	**E1_ELEC**PANL_T-	**2**			Continuous
SSOs, Connection Units, Shaver Units, etc	**E1_ELEC**POWR_E-	**11**			Continuous
Associated Text for Above	**E1_ELEC**POWR_T-	**2**			Continuous
Residual Circuit Breaker	**E1_ELEC**RCCB_E-	**70**			Continuous
Associated Text for Above	**E1_ELEC**RCCB_T-	**2**			Continuous
Schematic Diagram Linework	**E1_ELEC**SCH1_R-	**7**			Continuous
Schematic Diagram Text	**E1_ELEC**SCH1_T-	**2**			Continuous
Schematic Diagram Linework	**E1_ELEC**SCH2_R-	**7**			Continuous
Schematic Diagram Text	**E1_ELEC**SCH2_T-	**2**			Continuous
Schematic Diagram Linework	**E1_ELEC**SCH3_R-	**70**			Continuous
Schematic Diagram Text	**E1_ELEC**SCH3_T-	**2**			Continuous
Schematic Diagram Linework	**E1_ELEC**SCH4_R-	**4**			Continuous
Schematic Diagram Text	**E1_ELEC**SCH4_T-	**2**			Continuous

* Note : Characters in **BOLD** are fixed

Annex J
CAD layer / level names for electrical installation

Description	Layer Name	Autocad Colour	Microstation Colour	Line-weight	Linetype
Single Line Diagram	**E1_ELEC**SL01_R-	**7**			Continuous
Single Line Diagram	**E1_ELEC**SL02_R-	**2**			Continuous
Single Line Diagram	**E1_ELEC**SL03_R-	**3**			Continuous
Single Line Diagram	**E1_ELEC**SL04_R-	**4**			Continuous
Isolator, Switch fuse, etc	**E1_ELEC**SWIT_E-	**11**			Continuous
Associated Text for Above	**E1_ELEC**SWIT_T-	**2**			Continuous
General Electrical Symbols	**E1_ELEC**SYMB_E-	**70**			Continuous
Associated Text for Above	**E1_ELEC**SYBL_T-	**2**			Continuous
Electrical Cable Tray	**E1_ELEC**TRAY_E-	**1**			Continuous
Associated Text for Above	**E1_ELEC**TRAY_T-	**2**			Continuous
Electrical Cable Trunking	**E1_ELEC**TRKG_E-	**11**			Continuous
Associated Text for Above	**E1_ELEC**TRKG_T-	**2**			Continuous
Underfloor Duct / Conduit	**E1_ELEC**UNDR_E-	**11**			Continuous
Associated Text for Above	**E1_ELEC**UNDR_T-	**2**			Continuous
Ceiling Mounted Fan	**E1_FANS**CFAN_E-	**4**			Continuous
Associated Text for Above	**E1_FANS**CFAN_T-	**2**			Continuous
Fan Switches, Regulators	**E1_FANS**SWIT_E-	**11**			Continuous
Associated Text for Above	**E1_FANS**SWIT_T-	**2**			Continuous
General Fan Symbols	**E1_FANS**SYMB_E-	**70**			Continuous
Associated Text for Above	**E1_FANS**SYMB_T-	**2**			Continuous
Wall Mounted Fan	**E1_FANS**WFAN_E-	**11**			Continuous
Associated Text for Above	**E1_FANS**WFAN_T-	**2**			Continuous
General Symbols	**E1_LGTN**SYMB_E-	**70**			Continuous
Associated Text for Above	**E1_LGTN**SYMB_T-	**2**			Continuous
Copper / Aluminium Tape	**E1_LGTN**TAPE_E-	**6**			Continuous
Associated Text for Above	**E1_LGTN**TAPE_T-	**2**			Continuous
Mic. Points, Amplifiers, etc.	**E1_PUBA**EQPT_E-	**11**			Continuous
Associated Text for Above	**E1_PUBA**EQPT_T-	**2**			Continuous
Schematic Diagram for P.A.S.	**E1_PUBA**SCH1_R-	**7**			Continuous
Schematic Diagram for P.A.S.	**E1_PUBA**SCH2_R-	**2**			Continuous
Schematic Diagram for P.A.S.	**E1_PUBA**SCH3_R-	**3**			Continuous
Schematic Diagram for P.A.S.	**E1_PUBA**SCH4_R-	**4**			Continuous
Speaker Point for P.A.S.	**E1_PUBA**SPKR_E-	**11**			Continuous
Associated Text for Above	**E1_PUBA**SPKR_T-	**2**			Continuous
General Symbols	**E1_PUBA**SYMB_E-	**70**			Continuous
Associated Text for Above	**E1_PUBA**SYMB_T-	**2**			Continuous

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Annex J
CAD layer / level names for electrical installation

Description	Layer Name	Autocad Colour	Microstation Colour	Line-weight	Linetype
Security Cameras	**E1_SECU**CCTV_E-	**11**			Continuous
Associated Text for Above	**E1_SECU**CCTV_T-	**2**			Continuous
Detectors, Contactors	**E1_SECU**CONT_E-	**70**			Continuous
Associated Text for Above	**E1_SECU**CONT_T-	**2**			Continuous
Schematic Diagram for CCTV	**E1_SECU**SCH1_R-	**7**			Continuous
Schematic Diagram for CCTV	**E1_SECU**SCH2_R-	**2**			Continuous
Schematic Diagram for CCTV	**E1_SECU**SCH3_R-	**3**			Continuous
Schematic Diagram for CCTV	**E1_SECU**SCH4_R-	**4**			Continuous
General Symbols	**E1_SECU**SYMB_E-	**70**			Continuous
Associated Text for Above	**E1_SECU**SYMB_T-	**2**			Continuous
Telecomm. Cabling	**E1_TCOM**CABL_E-	**70**			Continuous
Associated Text for Above	**E1_TCOM**CABL_T-	**2**			Continuous
Computer Point / Outlet	**E1_TCOM**COMP_E-	**11**			Continuous
Associated Text for Above	**E1_TCOM**COMP_T-	**2**			Continuous
Telephone Point / Outlet	**E1_TCOM**FONE_E-	**11**			Continuous
Associated Text for Above	**E1_TCOM**FONE_T-	**2**			Continuous
Telecomm. Cable Ladder	**E1_TCOM**LADR_E-	**4**			Continuous
Associated Text for Above	**E1_TCOM**LADR_T-	**2**			Continuous
MDF, PABX Panel	**E1_TCOM**PANL_E-	**11**			Continuous
Associated Text for Above	**E1_TCOM**PANL_T-	**2**			Continuous
Schematic Diagram for Tele.	**E1_TCOM**SCH1_R-	**7**			Continuous
Schematic Diagram for Tele.	**E1_TCOM**SCH2_R-	**2**			Continuous
Schematic Diagram for Tele.	**E1_TCOM**SCH3_R-	**3**			Continuous
Schematic Diagram for Tele.	**E1_TCOM**SCH4_R-	**2**			Continuous
General Symbols	**E1_TCOM**SYMB_E-	**70**			Continuous
Associated Text for Above	**E1_TCOM**SYMB_T-	**2**			Continuous
Telecomm. Cable Tray	**E1_TCOM**TRAY_E-	**1**			Continuous
Associated Text for Above	**E1_TCOM**TRAY_T-	**2**			Continuous
Telecomm. Cable Trunking	**E1_TCOM**TRKG_E-	**11**			Continuous
Associated Text for Above	**E1_TCOM**TRKG_T-	**2**			Continuous
Exit Signage Light Fitting	**E1_SIGN**EXIT_E-	**4**			Continuous
Associated Text for Above	**E1_SIGN**EXIT_T-	**2**			Continuous
General Symbols	**E1_SIGN**SYMB_E-	**70**			Continuous
Associated Text for Above	**E1_SIGN**SYMB_T-	**2**			Continuous

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Annex K
List of type of work codes by discipline and In-house identification

Type of work codes in this list are classified according to the 2 disciplines.

Mechanical	Code
Air-conditioning & mechanical ventilation	**AC**
Building automation systems	**BA**
Combined services	**CS**
Compressed air	**CA**
Fire services	**FS**
Fuel oil installation	**FO**
Gas supply	**GS**
Miscellaneous - Mechanical	**MM**
Plumbing services	**PS**
Process works	**PW**
Sanitary services	**SA**
Scrubbers	**SR**
Sewage treatment	**ST**
Steam services	**SS**
Structural coordination	**SD**
Swimming pool	**SM**
Electrical	
Electrical power supply	**EL**
Extra-low voltage installation	**EV**
Lifts and escalators	**LE**
Lighting	**LT**
Lightning and earthing	**LN**
Miscellaneous - Electrical	**ME**
Telecommunication	**TC**

Types of In-house identification

Code	Description
"blank"	For tender drawings
601	For tenancy jobs
Z	For mechanical submission drawings
601Z	For mechanical tenancy submission drawings
SF	For showflat/showhouse
SS	For substation submission
SCV	For SCV submission
TEL	For telecom submission
AB	For PSI as-built submission

Annex L
Standard endorsement to authorities

L.1 - Endorsement for submission to FSSD (Air conditioning and Mechanical Ventilation)

I, Loh Chew Thong, NRIC No. S0149230F, being a qualified person, herby certify that the building works and fire safety works as shown on these plans have been designed in accordance with the provisions of the Code of Practice for Fire Precautions in Buildings 2002, including all amendments applicable up to the date of this submission, the Fire Safety Act and its Regulations, the relevant code of practice or designed guidelines, subject to waivers granted under Section 27 of the Act.

I, Loh Chew Thong, hereby certify that the proposed air conditioning and mechanical ventilation system has been designed in accordance with the provisions of Code of Practice for Mechanical Ventilation and Air Conditioning in Buildings CP 13 : 1999

L.2 - Endorsement for submission to FSSD (Fire Fighting and Alarm Installation)

I, Loh Chew Thong, NRIC No. S0149230F, being a qualified person, herby certify that the building works and fire safety works as shown on these plans have been designed in accordance with the provisions of the Code of Practice for Fire Precautions in Buildings 2002, including all amendments applicable up to the date of this submission, the Fire Safety Act and its Regulations, the relevant code of practice or designed guidelines, subject to waivers granted under Section 27 of the Act.

I, Loh Chew Thong, hereby certify that

a) The proposed Automatic Fire Sprinkler System has been designed in accordance with the provisions of Code of Practice for Automatic Fire Sprinkler Systems CP 52 : 2004
b) The proposed Automatic Fire Alarm System has been designed in accordance with the provisions of Code of Practice for The Installation and Servicing of Electrical Fire Alarm Systems CP 10 : 2005
c) The proposed Wet Riser/Dry Riser System has been designed in accordance with the provisions of Code of Practice for Fire Hydrant Systems and Hose Reels CP 29 : 1998

Annex M
Standard notes for fire fighting & alarm submission

M.1 For FFAI submission to FSSD and Tender

1. The sprinkler system is designed & installed in accordance with CP 52 : 2004 Code of Practice for Automatic Fire Sprinkler System.
2. The fire alarm system is designed & installed in accordance with The Singapore Standard CP 10 - 2005 `The Installation & Servicing of Electrical Fire Alarm System'
3. Wet rising main & hosereel is designed & installed generally in accordance with CP 29 : 1998 Code of Practice for Fire Hydrant Systems & Hosereels.
4. Fire fighting & alarm installation drawings are to be read in conjunction with the architectural, structural & other related drawings as well as the specification. The architect/engineer shall be notified immediately of any discrepancy found therein.
5. The sprinkler system is connected to the building's general fire alarm system.
6. All concealed ceiling spaces exceeding 800mm in depth are to be provided with adequate sprinkler protection.
7. All sprinkler pipes & it's components within refuse chamber are to be protected against corrosion.
8. The automatic fire alarm system shall :
   a) be electrically supervised
   b) be complete with detectors & components of approved type
   c) initiate the general alarm system on activation of systems by detectors or manual call points
   d) be connected to the nearest fire station via an approved alarm monitoring company
9. Minimum distance of sprinkler shall not be less than 100mm from the wall/partition.

M.2 For FFAI submission to FSSD for additions & alterations (A&A) work

1. The proposed sprinkler system shall be designed and installed in accordance with the Singapore Standard CP 52 : 2004 - Code of Practice for Automatic Fire Sprinkler System - Ordinary Hazard Group ___ .
2. Sprinklers at ____ storey are served by the sprinkler control valve located at ____storey along grid lines ____. Total no. of existing & new sprinklers served by this control valve is : _____ .
3. Spacing of sprinklers shall comply with clauses 6.2, 6.3 & 6.4 of SS CP 52 : 2004.
4. The original approved sprinkler system is designed and installed in accordance with the Australian Standard AS 2118 - Rules for Automatic Fire Sprinkler System - Ordinary Hazard Group _____ .
5. The proposed alterations/additions to the sprinkler systen does not increase the hydraulic pressure loss of the original system.
6. The proposed fire alarm system shall be installed in accordance with the Singapore Standard CP 10 : 2005 - 'Code of Practice for the Installation and Servicing of Electrical Fire Alarm System'.
7. The automatic fire alarm system shall :
   a) be electrically supervised
   b) be complete with detectors & components of approved type
   c) initiate the general alarm system on activation of systems by detectors or manual call points
   d) be connected to the nearest fire station via an approved alarm monitoring company
8. a) The automatic fire alarm system is of addressable and program controlled type.
   b) Facilities provided for the alteration of the stored program shall be protected against unauthorised alteration.
   c) All functions of the system which are required in CP 10 shall not depend on programs stored on rotating disks, other storage media using moving parts or any other form of easily corruptible memory.
   d) The operation of processors shall be continuously monitored to ensure correct operation of the system. In the event of a failure, a fault warning shall be given which shall be automatically reset after the system has been restarted.

Note : Greyed-out notes to be deleted if not applicable.

Annex N
Standard notes for sanitary submission

N.1 For sanitary submission to CBPU

1. All soil and waste pipes shown on plan shall be routed below the floor slab of the respective plan unless otherwise stated.
2. All vent pipes shown on plan shall be routed at the ceiling of the respective plan unless otherwise stated.
3. All branch vent shall be 50mm diameter unless otherwise stated.
4. Contractor must verify all dimensions on site before commencement of works. Any discrepancies found shall be referred to the architect for clarification.
5. All drawings are to be read in conjunction with architectural/structural plans and other related drawings. The architect shall be notified immediately of any discrepancy found therein.
6. The contractor shall comply with the latest requirements and drawings issued by Water Reclamation (Network) Department (PUB).
7. All horizontal soil and waste pipes are to be constructed to a gradient as shown in the `Code of Practice on Sewerage and Sanitary Works (1st Edition - Mar 2000)'.
8. The sanitary plumbing installation shall be erected to comply with `The Sewerage and Drainage Act (Chapter 294)', `The Sewerage and Drainage (Sanitary Works) Regulations' and `Code of Practice on Sewerage and Sanitary Works (1st Edition - Mar 2000)'.
9. All pipes passing through retaining walls or watertight structures shall be made watertight with puddle flange at the point of penetration through structures.
10. Access opening shall be provided in pipe shaft for the purpose of testing, maintenance and cleaning of the pipes.
11. *Type of pipe work*
    a) Soil waste and vent pipe above ground (75 dia and above) -
    Cast iron hubless pipe to CISPI : 301, CISPI : 310, BS EN 877 & ASTM C 564.
    b) Waste pipe and vent pipe above ground (50 dia and below) - UPVC pipe to SS 213.
    c) All underground sanitary pipes shall be of ductile iron pipes to BS EN 598 unless otherwise stated.
12. *Cross venting of soil & waste and vent pipes shall be at ceiling of 1st, 5th and 10th storey.*
13. *All termination of vent stack at roof to c/w vent cowl.*
14. *All sumps for carpark drainage at basement shall be of size 900mm x 700mm. And all sumps with gully trap/garage gully shall be of size 900mm x 700mm.*
15. *All proposed levels of sump/i.c. are for reference only*
16. *All floor/gullt trap fixed with perforated cover shall be provided with an approved anti-mosquito device to sewerage department's approval.*

Note : Greyed-out notes to be amended to suit each project.
Notes in ***Italic*** to be amended to suit individual A & A project.

Annex P
Standard notes for plumbing submission

P.1 For plumbing submission to Water Department (PUB)

1. All cold water pipes shown on plan shall be routed at the ceiling of the respective plan unless otherwise stated.
2. All water distribution pipes shall be installed to comply with the requirements of the Water Supply (Network) Department of the Public Utilities Board.
3. All works shall be carried out in accordance with the public utilities (water supply) regulations and SS CP 48 : 1989 - Code of Practice for Water Services.
4. Type of pipeworks :
   a) Cold water pipe - 66.7mm dia and below
      i) underground - copper pipes to BS EN 1057 - heavy duty
      ii) above ground - copper pipes to BS EN 1057 - light duty
      iii) copper capillary fittings to BS 864 Part 2

   b) Cold water pipe - 75mm dia and above
      Ductile iron pipe and fittings to BS EN 545 c/w cement mortar lining.

   c) For water tank drain pipes and overflow pipes - UPVC pipes in accordance with SS 141.

   d) Hot water pipes -
      copper pipes in accordance with BS EN 1057 - light duty and copper capillary fittings to BS 864 Part 2.
5. All brass fittings, except exposed terminal draw-off fittings shall be dezincification resistant complying with CZ 132 of BS EN 12420 or CZ 132 of BS EN 12163.
6. All cold/hot water pipework shall be concealed in walls/partition or run within false ceiling space unless otherwise stated.
7. All plumbing fittings (eg taps, showers, sinks, water mixers, etc) other than self closing delay action taps shall be provided with constant flow regulators.
8. The hose union taps at the planting areas should be located at a distance of not less than 600mm above ground level and complete with caps & locks.
9. All flush valves shall be complete with vacuum breakers that comply with The American Society of Sanitary Engineering Standard No. 1001 and stop valve to SS 75 : 1978.
10. All water tanks shall be c/w float valves, shut-off valves, floatless level switches, level indicators, overflow/warning pipes, etc.
11. The rubber diaphragms of the pneumatic tanks shall comply with SS 375.
12. All valves are to be located such that it can be readily accessed by the maintenance personnel.
13. The contractor shall provide flush-out valves and air valves where deemed necessary by the architect.
14. All pipes passing through retaining walls or watertight structures shall be made watertight with puddle flange at the point of penetration through structures.
15. The estimated daily water consumption is _____ cubic metres.
16. All draw-offs from water storage tank shall be provided with vertical vent pipes of 50mm dia (minimum) to be terminated at tank height.
17. Permanent unit no. tags shall be provided for all sub water meters. (For residential projects)
18. The material of the potable pumps including all parts in contact with water shall be of a mixture of stainless steel/bronze materials that are corrosion resistant type.
19. Storage capacity for long bath shall not be more than 250 litres each

Note : Greyed-out notes to be amended to suit each project.

Annex Q
Standard notes for gas submission

Q.1 For gas submission to City Gas

1. All works shall be erected to comply with all the requirements of City Gas Pte Ltd and Singapore Standard CP 51 : 1995, Code of Practice for manufactured gas pipe installation.
2. Type of pipeworks
   a. Buried pipes and fittings install from the property boundary line to the building shall be of ductile iron pipes to BS EN 969.
   b. Riser pipes and distribution pipes installed within the building shall be of galvanised iron pipes and fittings to BS 1387 Class C.
   c. Gas pipeworks installed in basements, within ceiling spaces or within unventilated risers shall be of API SEAMLESS SCHEDULE 40 steel pipe with welded joints.
3. All pipes shall be installed with a fall of 1 : 120 towards the meter and a syphon leg shall be provided (at suitable location).
4. For G.I. pipes of 80mm dia and below, joining shall be by screwed taper threads and pipe sizes of 100mm dia and above shall be by flanged joints.
5. Solenoid valve, complying to BS EN 60079-14, The Code of Practice for Selection, Installation and Maintenance of Electrical Apparatus for Use in Potentially Explosive Atmospheres, shall be provided after the isolation valve and it shall be interlocked to the following system :
   (a) Mechanical Ventilation System
   (b) Gas Detection System
6. In the event of activation of the fire alarm system, the solenoid valve will be activated to shut off the gas supply.
7. All pipeworks shall be painted canary yellow to BS 381C colour no. 356.
8. The contractor shall also be responsible for the gas pipe connection to all gas appliances.

Note : Greyed-out notes to be amended to suit each project.

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Annex R
Standard drawing checklist

Tender and submission checklist for Air Conditioning & Mechanical Ventilation Installation

		Complied	Not Applicable
1	BP / FSSD / Project reference number	☐	☐
2	Drawing number	☐	☐
3	Drawing title	☐	☐
4	Service title	☐	☐
5	Project title	☐	☐
6	Owner/Tenant/Applicant's particulars	☐	☐
7	Architect/Other's particulars	☐	☐
8	Drawn/Checked/Approved column	☐	☐
9	Proper scale annotated	☐	☐
10	Date	☐	☐
11	Revision column/box	☐	☐
12	CAD reference file names	☐	☐
13	Relevant Authority/PE endorsement (For Submission)	☐	☐
14	Relevant standard legend/details used.	☐	☐
15	The correct layers/colours have been used	☐	☐
16	Proper layout title & scale shown (below each layout)	☐	☐
17	Proper annotations to denote cross-referencing of notes/legend/details	☐	☐
18	Site plan required (1 : 500 preferred) with site boundary highlighted in Red, for FSSD submission	☐	☐
19	For A&A works, a floor key plan required (1 : 200 preferred), if any, with the relevant unit/area "hatched" in Red	☐	☐
20	For A&A works, a blown-up plan of the unit/area involved required (1 : 50 preferred), if any, showing the service layout with the area of submission highlighted in magenta	☐	☐
21	Area/room usages & mode of ventilation are clearly labeled	☐	☐
22	Existing/new/deleted works clearly identified	☐	☐
23	Fire doors' annotations (can be retrieved from architectural files)	☐	☐
24	Different types, if any, of fire-rated ducts have been used and indicated in legend	☐	☐
25	No other services running above fire-rated ducts	☐	☐
26	Schematic air distribution diagram	☐	☐
27	Fire-compartmented wall highlighted	☐	☐
28	Raised floor area highlighted clearly with depth indicated	☐	☐
29	Relevant sectional view with ceiling height clearly indicated	☐	☐
30	Location of SCPs	☐	☐
31	To include typical detail of car park exhaust air duct dropper (From \\Sapphire\root\library\m-sym\cp83block\83ea-drop.dwg)	☐	☐
32	For Smoke Fume Extract system, to show fresh air ventilation openings on plans	☐	☐

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Annex R
Standard drawing checklist

Tender and submission checklist for Fire Fighting & Alarm Installation

		Complied	Not Applicable
1	BP / FSSD / Project reference number	☐	☐
2	Drawing number	☐	☐
3	Drawing title	☐	☐
4	Service title	☐	☐
5	Project title	☐	☐
6	Owner/Tenant/Applicant's particulars	☐	☐
7	Architect/Other's particulars	☐	☐
8	Drawn/Checked/Approved names	☐	☐
9	Proper scale annotated	☐	☐
10	Date	☐	☐
11	Revision column/box	☐	☐
12	CAD reference file names	☐	☐
13	Relevant Authority/PE endorsement (For Submission)	☐	☐
14	Relevant standard notes/legend/details used.	☐	☐
15	The correct layers/colours have been used	☐	☐
16	Proper layout title & scale shown (below each layout)	☐	☐
17	Proper annotations to denote cross-referencing of notes/legend/details	☐	☐
18	Site plan required (1 : 500 preferred) with site boundary highlighted in Red for FSSD submission	☐	☐
19	For A&A works, a floor key plan required (1 : 200 preferred), if any, with the relevant unit/area "hatched" in Red	☐	☐
20	For A&A works, a blown-up plan of the unit/area involved required (1 : 50 preferred), if any, showing the service layout with the area of submission highlighted in magenta	☐	☐
21	Area/room usages & mode of ventilation are clearly labeled	☐	☐
22	Existing/new/deleted works clearly identified	☐	☐
23	Piping schematic & fire alarm diagrams	☐	☐
24	Raised floor area highlighted clearly with depth indicated	☐	☐
25	Relevant sectional view with ceiling height clearly indicated	☐	☐
26	Relevant beam layouts superimposed on floor plans	☐	☐
27	Ductwork greater than 800mm incorporated to indicate protection under the duct, if required	☐	☐
28	Pipe sizes properly annotated	☐	☐
29	Sprinkler design points clearly identified and marked	☐	☐
30	Layout run of PUB incoming to fire tanks	☐	☐
31	Layout run of breeching inlets to respective systems	☐	☐
32	Sprinkler control valves / Dry riser stacks labeled per FSSD's memo	☐	☐
33	Spacing of sprinklers per Code of Practice	☐	☐

Annex R
Standard drawing checklist

Tender and submission checklist for Fire Fighting & Alarm Installation

		Complied	Not Applicable
34	Fire tanks & accessories are indicated clearly	☐	☐
35	Heat / Smoke detectors, manual call points, etc. are clearly marked with zone numbers	☐	☐
36	Location of FIB / SIB	☐	☐
37	Spacing of detectors per Code of Practice	☐	☐
38	Location of wet / dry riser landing valves	☐	☐
39	Wet riser pipes do not pass thru' any occupancy or high risk areas and shall be located in a protected shaft	☐	☐

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Annex R
Standard drawing checklist

Tender and submission checklist for Gas Installation

		Complied	Not Applicable
1	BP / Project reference number	☐	☐
2	Drawing number	☐	☐
3	Drawing title	☐	☐
4	Service title	☐	☐
5	Project title	☐	☐
6	Owner/Tenant/Applicant's particulars	☐	☐
7	Architect/Other's particulars	☐	☐
8	Drawn/Checked/Approved column	☐	☐
9	Proper scale annotated	☐	☐
10	Date	☐	☐
11	Revision column/box	☐	☐
12	CAD reference file names	☐	☐
13	Relevant Authority/PE endorsement (For Submission)	☐	☐
14	Relevant standard notes/legend/details used.	☐	☐
15	The correct layers/colours have been used	☐	☐
16	Proper layout title & scale shown (below each layout)	☐	☐
17	Proper annotations to denote cross-referencing of notes/legend/details	☐	☐
18	Site plan required (1 : 500 preferred) with site boundary highlighted in Red, for Powergas submission	☐	☐
19	For A&A works, a floor key plan required (1 : 200 preferred), if any, with the relevant unit/area "hatched" in Red	☐	☐
20	For A&A works, a blown-up plan of the unit/area involved required (1 : 50 preferred), if any, showing the service layout with the area of submission highlighted in magenta	☐	☐
21	Area/room usages & mode of ventilation are clearly labeled	☐	☐
22	Existing/new/deleted works clearly identified	☐	☐
23	Piping schematic	☐	☐
24	Layout run from PUB gas mains to development indicated on site plan	☐	☐
25	Pipe sizes properly annotated	☐	☐
26	Detail of PUB gas meters' installation in gas shaft/gate pillar	☐	☐
27	Detail of spool/isolation valve installation at gas pipe	☐	☐
28	Typical section of gas shaft showing internal/external ventilation	☐	☐
29	Typical section showing gas pipes' "box-up"	☐	☐
30	Typical section showing underground gas pipe channel	☐	☐
31	Typical detail of Gas Instant Water Heater installation	☐	☐
32	Sectional view of gas pipe over crossing drain	☐	☐

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Annex R
Standard drawing checklist

Tender and submission checklist for Plumbing Installation

		Complied	Not Applicable
1	BP / Project reference number	☐	☐
2	Drawing number	☐	☐
3	Drawing title	☐	☐
4	Service title	☐	☐
5	Project title	☐	☐
6	Owner/Tenant/Applicant's particulars	☐	☐
7	Architect/Other's particulars	☐	☐
8	Drawn/Checked/Approved names	☐	☐
9	Proper scale annotated	☐	☐
10	Date	☐	☐
11	Revision column/box	☐	☐
12	CAD reference file names	☐	☐
13	Relevant Authority/PE endorsement (For Submission)	☐	☐
14	Relevant standard notes/legend/details used.	☐	☐
15	The correct layers/colors have been used	☐	☐
16	Proper layout title & scale shown (below each layout)	☐	☐
17	Proper annotations to denote cross-referencing of notes/legend/details	☐	☐
18	Site plan required (1 : 500 preferred) with site boundary highlighted in Red, showing existing PUB mains & bulk water meter location for PUB Water Department submission	☐	☐
19	For submission, only site plan, piping schematics & details required	☐	☐
20	For A&A works, a floor key plan required (1 : 200 preferred), if any, with the relevant unit/area "hatched" in Red	☐	☐
21	For A&A works, a blown-up plan of the unit/area involved required (1 : 50 preferred), if any, showing the service layout with the area of submission highlighted in magenta	☐	☐
22	Area/room usages & mode of ventilation are clearly labeled	☐	☐
23	Existing/new/deleted works clearly identified	☐	☐
24	Layout run from PUB bulk water meter to water tanks indicated on site plan	☐	☐
25	Piping schematic with floor ht (PL) indicated clearly for each floor level	☐	☐
26	Reduce level (RL) of highest fitting, taking direct supply from PUB mains & inlet to water tanks indicated clearly on schematic diagram (For submission only)	☐	☐
27	Pipe sizes properly annotated	☐	☐
28	Detail of water/fire tanks & accessories	☐	☐
29	Detail of PUB bulk water meter and valve chambers	☐	☐
30	Detail of pumps	☐	☐
31	Detail of hydrant	☐	☐
32	Detail of refuse chute sprinkler system (Detail and schematic)	☐	☐
33	Detail of water heater, if any	☐	☐

Annex R
Standard drawing checklist

Tender and submission checklist for Plumbing Installation			
34	Detail of PUB sub-meters' installation in water shaft	☐	☐
36	Flow rate/capacity of fittings indicated clearly	☐	☐
37	Hose union taps provided, if any, (based on client's requirement) at PUB sub-meter water shaft to be shown on schematic	☐	☐
38	Fire (sprinkler/hosereel) piping schematic drawings attached for reference	☐	☐
39	Double check & gate valves to be provided for hose union tap in AHU rooms	☐	☐
40	Isolating valves to be provided immediately after the tee-off for pipes serving toilets, tanks, etc.	☐	☐
41	`PRV(*Pressure valve*) settings' to be indicated in schematic near the `PRV' valve symbol (For submission only)	☐	☐
42	Overflow/drain & warning pipes of the water tanks located in water pump room shall be terminated within the water pump room	☐	☐
43	The estimated daily consumption's breakdown for direct & indirect supply (For submission only)	☐	☐

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CAD Manual

Annex R
Standard drawing checklist

Tender and submission checklist for Sanitary Installation

		Complied	Not Applicable
1	BP / Project reference number	☐	☐
2	Drawing number	☐	☐
3	Drawing title	☐	☐
4	Service title	☐	☐
5	Project title	☐	☐
6	Owner/Tenant/Applicant's particulars	☐	☐
7	Architect/Other's particulars	☐	☐
8	Drawn/Checked/Approved names	☐	☐
9	Proper scale annotated	☐	☐
10	Date	☐	☐
11	Revision column/box	☐	☐
12	CAD reference file names	☐	☐
13	Relevant Authority/PE endorsement (For Submission)	☐	☐
14	Relevant standard notes/legend/details used.	☐	☐
15	The correct layers/colours have been used	☐	☐
16	Proper layout title & scale shown (below each layout)	☐	☐
17	Proper annotations to denote cross-referencing of notes/legend/details	☐	☐
18	Site plan required (1 : 500 preferred) with site boundary highlighted in Red, showing existing sewer & proposed sewer for CBPU submission Department submission	☐	☐
19	Relevant PUB Sew. Dept. Dwg. Nos. clearly annotated with respect to fittings used	☐	☐
20	For A&A works, a floor key plan required (1 : 200 preferred), if any, with the relevant unit/area "hatched" in Red	☐	☐
21	For A&A works, a blown-up plan of the unit/area involved required (1 : 50 preferred), if any, showing the service layout with the area of submission highlighted in magenta	☐	☐
22	Area/room usages & mode of ventilation are clearly labeled	☐	☐
23	Existing/new/deleted works clearly identified	☐	☐
24	Piping schematic (for 6 storeys and above)	☐	☐
25	Raised floor area/ceiling height indicated clearly	☐	☐
26	Pipe sizes properly annotated	☐	☐
27	Top/Invert levels of Ics in tender drawings	☐	☐
28	Last IC located within 2.5m of the lot boundary	☐	☐
29	VC pipe from last IC to MH is of minimum 200mm dia.	☐	☐
30	IC dimension 900x700mm (min) & 1350x1350 (max)	☐	☐
31	IC dimension is sufficient for branch drain line connections	☐	☐
32	Vent pipe to 1st IC is of minimum 100mm dia.	☐	☐
33	No acute flow of branch drain line to IC	☐	☐
34	Branch drain line 10m or less = 100mm dia.	☐	☐

Annex R
Standard drawing checklist

Tender and submission checklist for Sanitary Installation

		Complied	Not Applicable
35	Branch drain line 10m and above = 150mm dia.	☐	☐
36	Main drain line to be minimum 150mm dia.	☐	☐
37	Distance between ICs to be at maximum 50m	☐	☐
38	Floor trap provided at shower	☐	☐
39	No toilet/soil waste pipes above potable water tank or run inside pump/tank room	☐	☐
40	No connection to existing sewer pumping mains	☐	☐

Annex S
Standard units

QUANTITY	BASIC UNITS		OTHER RELATED UNITS	
Length	metre	m	kilometre millimetre	km mm
Area	metre^2	m^2	kilometre^2 millimetre^2 hectare	km^2 mm^2
Volume	metre^3	m^3	millimetre^3 litre	mm^3 l* (L)
Time	second	s	hours (not SI)	h
Angle (plane)	radian degree	rad ^{o}	minute second	* *
Velocity	metre/second	m/s	kilometre/hour	km/h (not SI)
Acceleration	metre/second^2	m/s^2		
Frequency	hertz	Hz	kilohertz	kHz
Rotation	revolution/second	r/s	revolution/minute	rpm
mass	kilogramme	kg	gramme tonne milligramme	g t* mg
Density	kilogramme/metre^3	kg/m^3		
Concentration	parts per million	ppm		
Mass flow rate	kilogramme/second	kg/s		
Volume flow rate	metre^3/second	m^3/s		
Force	newton	N	kilonewton	kN
Pressure	newton/metre^2	N/m^2	bar millibar pascal kilonewton/metre2 head of mercury head of water	bar mb Pa kN/m^2 mmHg mH_2O

Note : These symbols could be misinterpreted and it is preferable to use the unit in full

Annex S
Standard units

QUANTITY	BASIC UNITS		OTHER RELATED UNITS	
Stress	newton/metre^2	N/m^2	newton/millimetre^2 meganewton/millimetre^2 giganewton/millimetre^2	N/mm^2 MN/mm^2 GN/mm^2
Temperature	kelvin	K	degree celsius	$^\circ$C
Energy	joule	J	kilojoulelitre megajoule gigajoule	kJ MJ GJ
Power	watt	W	kilowatt	kW
Thermal conductivity	watt/metre degree celcius	W/m $^\circ$C		
Thermal conductance	watt/metre^2 degree celcius	W/m^2 $^\circ$C		
Thermal resistivity	metre^2 degree celcius/watt	m^2 $^\circ$C/W		
Thermal resistance	degree celcius/watt	$^\circ$C/W		
Latent heat	joule/kilogramme	J/kg		
Humidity ratio	(dimensionless)			
Luminous intensity	candela	cd		
Luminous	lumen	lm		
Illumination	lux	lx		
Luminence	candela/metre^2	cd/m^2		
Electric current	ampere	A	milliamp	mA
Electric potential	volt	V	millivolt kilovolt	mV kV
Electric resistance	ohm	Ω	kilohm megohm	kΩ MΩ
Electric capacitance	farad	F	microfarad	μF

Note : These symbols could be misinterpreted and it is preferable to use the unit in full