UNIVERSITY OF TECHNOLOGY SYDNEY

FACILITIES MANAGEMENT OPERATIONS

CAD DRAWING STANDARDS

P-ST01.09

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INTRODUCTION

These Standards describe the requirements of the University of Technology, Sydney (UTS) for the submission of drawings prepared by consultants and contractors on UTS building projects. The first section of the standards describes the general purpose for which the copies are required and the respective procedures for submission. The second part describes the technical requirements for all drawings submitted. The third section describes the required procedures for electronic data transfer.

The standards should be read in conjunction with the UTS consultant agreement or building contract (as applicable.)

1.0 GENERAL

1.1 PURPOSE

The University of Technology, Sydney (UTS) and Facilities Management Operations (FMO) requires all consultants and contractors engaged in any of its building projects to provide UTS with copies of their CAD drawing files. The files are required by UTS as a record of the work undertaken and are also used for its maintenance programs, refurbishment work and for facilities space planning purposes.

These standards are stipulated to ensure a consistency through all CAD drawings submitted by drafting personnel for UTS. They are also intended to ensure that appropriate controls are exercised over all electronic files and their transfer.

1.2 SCOPE

These standards apply to all drawings produced for UTS by any consultant, builder and/or contractor. The standards apply to all design drawings, working drawings, contract drawings and “as built” drawings. The UTS nominated CAD software is AutoCAD 2016 with AutoCAD 2010 formatted files.

1.3 UNIVERSITY CAD MODEL

The UTS CAD model consists of geometric information about the UTS buildings, grounds and services. These include:

- Architectural components (i.e. walls, doors, windows, columns, etc.) which form the basis for as-built drawings.
- Engineering components (i.e. structural elements, mechanical, and electrical)
- Building services components (i.e. fire, communication)
- Assets (i.e. furniture, equipment, computers etc.)

The head consultant is responsible for establishing a geometric set out point (a 0,0 common point to all spatial data) consistent with all consultants’ CAD systems. This point is to be set out with surveyor's co-ordinates as a building reference point, related to the real world set out point that enables FMO to establish the geometric relationship with all other projects. This is to be agreed between FMO and the head consultant before any contract drawing is to commence (and before all as-built drawings commence by the contractor). The coordinating architectural consultant is responsible for the geometrical coordination of all other consultants’ CAD data and all consultants agree to use the coordination plans to geometrically coordinate all data. **All drawings are to be drawn at 1 AutoCAD unit to 1 millimetre (real world size)** and any CAD drawing files that are not at 1:1 scale will not be accepted until they are amended.

1.4 DRAWING CONTROL

1.4.1 CONSULTANT SUBMISSIONS

Prior to the commencement of work consultants must complete a sample AutoCAD drawing to establish 100% drawing file set-up and file exchange.

All consultants are required to submit nominated CAD drawing files by E-mail/USB flash drive or Digital Distribution (such as Dropbox or Aconex) for review by the UTS CAD Manager on completion of each Stage of the project. Aconex files must be forwarded by USB flash drive or hard drive upon final completion.

During final documentation for tendering, Consultants are required to submit their drawings at 25% and 75% completion. The 100% complete set of CAD drawing files shall also be submitted for review and approval as soon as reasonably practicable after their completion. This shall include:

- AutoCAD (DWG) test sample drawing
- the CAD Model of the project
- the CAD Drawing Files that represent the Contract Documentation Set

  (the DA, Construction Certificate and the Tender Set)
- the CAD drawing register and CAD drawing files

Following Practical Completion of the project a complete set of updated CAD files shall also be submitted by each Consultant in accordance with the terms of the UTS Consultancy Agreement/Contract. The updated set shall contain all changes made during the course of the project including any variations to any design or specification within these CAD files.

All Files submitted to UTS shall be labelled as described in 1.4.3 of this Standard.

1.4.2 BUILDER AND CONTRACTOR SUBMISSIONS

“As Built” drawings are required to be provided by all Builders and Contractors in accordance with the terms of UTS Building Contracts and the Specifications for the Works. The drawings are to provide a complete record of all work as constructed and installed. This shall include all services installed by the Builder/Contractor and their interface with any existing services.

Under no circumstances may the Builder/Contractor rely on any dimensions provided on any drawing at the time of tender by any consultant, for the purposes of the preparation of “as built” drawings. The dimensions, levels and other information shown on all “as built” drawings submitted shall have been actually measured by the Builder/Contractor from adjoining buildings and/or structures. Dimensions between all new elements constructed by the Builder/Contractor shall have been similarly measured.

All Files submitted to UTS shall be labelled as described in 1.4.3 of this Standard. The procedure for the submission of all “as built” drawings shall be as follows:

1 Draft copies of the “as built” drawings to be provided to the Project Manager for forwarding to the relevant Consultant.

2 The draft “as built” drawings are to be reviewed by the Consultant for accuracy and compliance with the UTS CAD Standards.

3 The draft “as built” drawings are returned to the Builder/Contractor with the Consultants comments for any further revision and/or adjustment which may be required.

4 The final drafts are submitted to the Project Manager for final approval by the relevant Consultant.

5 The Builder/Contractor/Consultant certifies in writing that the “as built” drawings are in its opinion both accurate and fully comply with the UTS CAD standards.

6 The “as built” drawings are submitted to the UTS CAD Manager by the Project Manager for review. No drawings will be submitted unless the written certification by the relevant consultant has first been obtained and is attached.

7 If any modifications are required by the UTS CAD Manager, his/her requirements will be conveyed to the Builder/Contractor by the Project Manager.

8 Once the UTS CAD Manager has finally approved the "as built" drawings he/she shall notify the Project Manager. The Project Manager will advise the Builder/Contractor that the drawings have been approved and accepted.

1.4.3 LABELLING OF CAD FILES

All CAD drawing files to be submitted on USB memory device a final completion and shall be clearly labelled with the following information

- UTS Project Number
- Project Name
- Professional discipline (e.g. Architectural, Structural)
- the CAD drawing file name,
- the date and
- the status of the drawings, e.g. “Detail Design” or “As Built”.

1.4.4 QUALITY ASSURANCE

It is the responsibility of all Consultants, Builders and Contractors to strictly maintain the layering structure and data held within the layers as set out in these Standards. The UTS CAD Manager should be contacted immediately if any doubt exists or arise as to the requirements of UTS in regard to either the preparation or submission of drawings in accordance with these Standards.

2.0 CAD DRAWING GUIDELINES

CAD drawings set-up in a local co-ordinate system must be related back to a world co-ordinate system, which is common to all UTS sites. The person responsible must discuss this with FMO and/or UTS CAD Manager before documentation commences.

All overall plans, sections and elevations are to be drawn at 1 AutoCAD unit to 1mm scale with the complete extent of each consultant's work (where applicable) and services clearly defined in their contract document set. The contract document CAD file drawing is to be structured so that data not specifically relating to the consultant's extent of work can be easily removed.

Each CAD drawing file showing building plans is to contain only the plan information for that level. Where any other plan is placed on the drawing sheet representing another level, its full extent must be shown and it is not to exist on the same layers or in the same file as the main plan. Where details, sections or elevations exist on the same drawing sheet as the main plan they must not be produced on the same layers or on the same file as the main plan.

Text, dimensions, drawing reference symbols, hatching and border sheets are to be on separate layers. Note that all hatching and symbols specific to a building entity should be placed on a specific hatch or symbol layer for that entity. e.g., all blockwork wall hatching is to be placed on a layer blockwork wall hatching.

2.1 CO-ORDINATION PLAN DRAWING FILE

The base co-ordination plan is to be issued to all persons or firms working on the project and is to be used to locate their extent of works in relation to the building set-out reference point. This drawing will identify the following:

- the surveyed site boundary
- the building set-out reference point
- the building grid
- the site grid referenced to the NSW Integrated Surveys Grid
- the building external outline at each floor level
- the building heights are to be reduced to the Australian Standard Datum

This drawing is to be used to locate all contract documents and contractors/subcontractors as-built drawings, and accessed as an 'x-reference' file through AutoCAD. The drawing file name for this co-ordination plan will be:

Example:

XZZYYCOAP.dwg

where: X=Xref file ZZ= Campus/Site Code YY = Building Number (Refer to Appendix 2.)

The person in charge of the project will then be responsible for the CAD file drawing co-ordination of all consultants.

The CAD drawing files shall be geometrically coordinated both in the x and y direction and in the z height of zero.

2.2 STANDARD DRAWING FILES

Standard drawing A1p-Bord.dwg will be supplied by UTS. This file loads all standard layers, dim styles, text styles and line types.

The standard drawing size shall be A1 and all contract drawings shall include **the standard UTS titleblocks**. This titleblock (**A1p-Bord.dwg**) will be inserted in paper space on layer BORD-SHT at a scale of 1:1 with the bottom left hand corner at 0,0,0. The titleblock must not be exploded or altered in any way and all title information must be added using the attributes provided. Consultants can include their company logos and other information in the space allocated under Consultant on the titleblock.

A3 sized sheets shall be used only at the direction of the UTS CAD Manager.

See example below for titleblock standards.

2.3 CAD DRAWING FILE NAME AND TITLEBLOCK INFORMATION

The CAD drawing file name will consist of 17 characters. This file name is in 3 parts, 1st part is a descriptive 8 character, 2nd part is a unique 5 character number and the 3rd part is a 2 character amendment number.

These notes refer to the CAD drawing file first 8 characters. This is followed by a dash and a unique 5 character number followed by an underscore and a 2 character number. The unique 5 character number can be obtained from the UTS CAD Manager (block allocation).

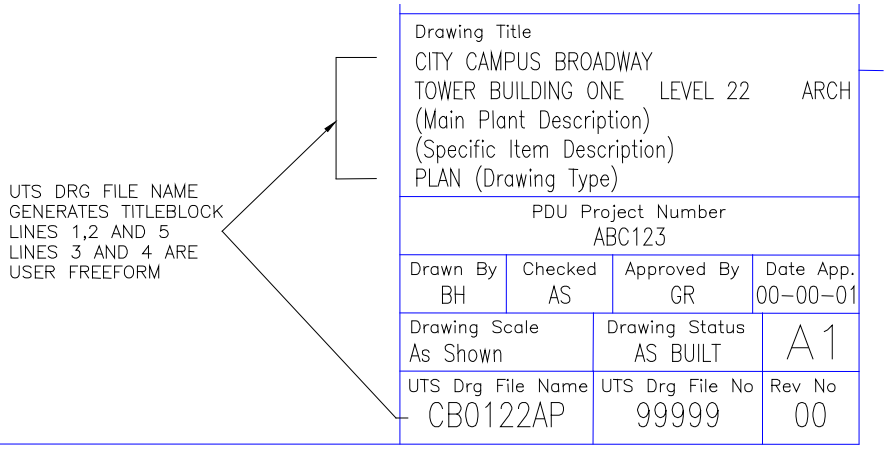
All titleblock information shall be capital letters. Titleblocks are in accordance with AS1100.

The 1st part CAD drawing file name is limited to 8 characters. See Appendix 2 for codes and description.

2 character field for Campus/site code	- 1st line in Drawing Title
2 character field for Building number	- 2nd line in Drawing Title 1st section
2 character field for level number/ description	- 2nd line in Drawing Title 2nd section
1 character field for discipline code	- 2nd line in Drawing Title 3rd section (4 chars)
1 character field for drawing type	- 5th line in Drawing Title

CAD Campus/Building Identification is available at: http://www.fmu.uts.edu.au/campus/room-id.html

Examples:-



Note: Electronic versions of these border sheets are available from the FMO.

Examples:-

CAD FILE NAME	DESCRIPTION
CB0601AP-99991_00	City campus Broadway Building 6 level 01 architectural plan
KG0202AP-99992_00	Kuring Gai campus building 2 level 02 architectural plan
CB03ETAE-99993_00	City campus Broadway building 3 east architectural elevation
CM0501EP-99994_00	City campus Markets building 5 level 01 electrical plan
KG0502RP-99995_00	Kuring Gai campus building 5 level 02 Fire protection Services plan
SL0102SD-99996_00	St. Leonards campus North Sydney TAFE land Dunbar building level 02 Structural Details

Drawing Status can be one of the following:-

SKETCH

PRELIMINARY

TENDER ONLY

CONTRACT

ISSUED FOR CONSTRUCTION

AS BUILT

All information shown on drawing files must be clear and legible when printed to A3 size.

2.4 DRAWING LAYERING SYSTEM

The intent of the layering system is to have an intelligent naming structure that will allow any item/object to be turned off in AutoCAD and not affect any other information on the drawing.

All data should be differentiated into groups suitable for analysis by FMO at a later stage with a minimum of reorganisation. Data should be organised into intelligent named layers to facilitate data management.

Each consultant will be responsible for the consistent use of layer names throughout all of their drawing files (only layer names complying with the specification will be approved).

The consultant will be responsible for consistent layer data. **Data that is only relevant to each individual layer name should be on that layer.**

All properties of drawing entities shall be defined "**BYLAYER**". In AutoCAD, colours and line types are to be defined "**BYLAYER**".

The project layering system implemented will be developed through the following guidelines. It will be based on the “FMO Standard CAD Layering System” and extended where necessary.

No drawing or drawing reference shall be done on layer 0, this layer is to be kept free.

No drawing or drawing reference shall be done on layer defpoints, other than paperspace viewports.

The layer names will be constructed as follows:

Layer name:-

Layer name is to be the **descriptive name** and not a layer/level number. All layer names are to be representative of the function or element type.

Base Layer Name	Data
Wall*	all wall data
Door*	all door data
Bound*	all boundary data
Grid*	all grid data

Note: The extension to base layer name of (*) signifies that every type of wall represented on individual wall layers is named with the base name and an extension. The extension is flexible and must be different for each of the base layer names. Layer names are not to exceed 24 characters.

New layer names created must be agreed with the UTS CAD Manager.

When a line other than continuous is to be used the layer name will reflect that line type. Refer to clause 2.5

The layer name shall conform to the layer structure described.

Refer to Appendix 5 for examples of layer names.

2.4.1 PAPERSPACE LAYERS

The following layers are to be used in AutoCAD Paperspace only.

LAYER NAME	COLOUR	LINEWEIGHT	LINE TYPE	USE
TEXT-2	7 (white)	0.25	CONT	TEXT 2.5
TEXT-3	1 (red)	0.35	CONT	TEXT 3.5
TEXT-5	3 (green)	0.5	CONT	TEXT 5.0
TEXT-7	5 (blue)	0.7	CONT	TEXT 7.0
0	7	0.25	CONT	
CL	6 (magenta)	0.18	CENTRE2	CENTRELINES
Dim	254	0.18	CONT	DIMENSIONS
H1	6	0.18	DASHED	0.18 HIDDEN LINES
H2	7	0.25	DASHED	0.25 HIDDEN LINES
H3	1	0.35	DASHED	0.35 HIDDEN LINES
H5	3	0.5	DASHED	0.5 HIDDEN LINES
H7	5	0.7	DASHED	0.7 HIDDEN LINES
H10	2 (yellow)	1.0	DASHED	1.0 HIDDEN LINES
L1	6	0.18	CONT	0.18 LINES
L2	7	0.25	CONT	0.25 LINES
L3	1	0.35	CONT	0.35 LINES
L5	3	0.5	CONT	0.5 LINES
L7	5	0.7	CONT	0.5 LINES
L10	2	1.0	CONT	1.0 LINES
Ph	6	0.18	PHANTOM	PHANTOM LINES
SYM	7	0.25	CONT	SYMBOLS
BORD-SHT	7	0.25	CONT	TITLE BLOCK
DEFPOINTS				VIEW PORTS

2.4.2 LAYER COLOURS

Full Size Plotting	A3 Size Plotting
(6) Magenta .18	(6) Magenta .05
(7) White .25	(7) White .13
(1) Red .35	(1) Red .15
(3) Green .5	(3) Green .25
(5) Blue .7	(5) Blue .35
(2) Yellow 1.0	(2) Yellow .5
(4) Cyan .5 (special purpose)	(4) Cyan .25
(8) Grey .25	(8) Grey .13
(241) Pink .13	(241) Pink .05
(254) Grey .18	(254) Grey .05
(31) Pale Yellow .09	(31) Pale Yellow .05
(252) Light Grey. .18 30% Screening	(252) Light Grey .05 30% Screening

Any colour ending with a 0 e.g. 10, 20, 30, 40…… 250 etc. is set to **USE OBJECT COLOUR** and is to be used when colour printing is required.

All colours are to be set to "**BYLAYER**".

For drawings that are printed in colour the contractor or consultant can submit a different schedule for approval from CAD Manger.

UTS will supply ctb files UTSA1.ctb and UTSA3.ctb which will be used to print all dwg files. These must be attached in the CAD file so when opened to print this will appear as the default ctb file.

2.5 LINETYPES

All linetypes are to be metric where 1 unit = 1mm and conform to AS1100. Entity linetypes are to be set to "**BYLAYER**" and using acadiso.lin. Under no circumstances shall any new linetypes be created unless approved by the CAD Manager. No lineweights will be used for plotting purposes. Only line types standard to AutoCAD will be consisted. The following table lists the linetypes to be used.

Fig (A)

DESCRIPTION	AUTOCAD NAME
CONTINUOUS	CONTINUOUS
CENTRE	CENTRE2
HIDDEN	DASHED
SHORT HIDDEN	HIDDEN2
PHANTOM	PHANTOM

When a line other than continuous is to be used the layer name will reflect that line type.
e.g.

LINETYPE	LAYER NAME
CONTINUOUS	BEAM-GEN
CENTRE2	BEAM-GEN_**cl**
HIDDEN2	BEAM-GEN_**hi**
PHANTOM	BEAM-GEN_**ph**

2.6 ANNOTATION

All annotation such as text, hatching, symbols, revision numbers and must be produced on the separate allocated layers.

Sections are to be called up alphabetically and details are to be called up numerically.

Text plotted size should be confined to:

Descriptive text, general notes, dimensions, etc.	2.5mm plotted size
Labels and names of structures	3.5mm plotted size
Main titles	5.0mm plotted size
Extra large	7.0mm plotted size

2.7 TEXT STYLES AND FONTS

All contract documents drawings should use the font type ROMANS in a text style name Romans. No other styles or fonts are to be used without approval of the CAD Manager. Only fonts that come standard with AutoCAD will be consisted.

STYLE	**ROMANS**	**ROMANS**	**ROMANS**	**ROMANS**
FONT	Romans	Romans	Romans	Romans
PLOTTED HEIGHT	2.5 mm	3.5 mm	5 mm	7 mm
COLOUR	7 (white)	1 (red)	3 (green)	5 (blue)
LAYER	As-per Appendix 5	As-per Appendix 5	As-per Appendix 5	As-per Appendix 5
A1 PLOT PEN WT.	0.25	0.35	0.5	0.7
A3 PLOT PEN WT.	0.12	0.15	0.25	0.35

2.8 DRAWING DIMENSIONS

All dimensions are to be associative and must not be exploded. They are to be created on layer prefixed 'Dim'(i.e. Dim-10, Dim-20, Dim-50, etc.) which reflects the intended Paper Space viewport scale.

All dimensions are to be created using the dim styles available on the standard template drawings.

Dimension shall be created in Model Space for viewing in Paper Space.

Dimensioning in Paper Space will be allowed at the direction of the CAD Manager.

All dimensions are to be expressed in millimetres.

2.9 STANDARD SYMBOLS

All symbols are to conform to the current Australian Drawing Standard recommended symbols. All symbols are to be external blocks and they are to have their hatching pattern on a specific hatch layer.

2.10 HATCHING

All hatching shall have their hatching pattern on a specific hatch layer and not a common hatch layer.

2.11 SCALES

All viewports created in Paperspace shall be scaled to one of the approved scales shown below. Any change to the following standard drawing scales must be approved by the CAD Manager.

1:1	1:10	1:100	1:1000	1:10000
1:2	1:20	1:200	1:2000	
1:5	1:50	1:500	1:5000	
	1:25	1:250		

2.12 HOLDS

'Hold' clouds shall be used to segregate tentative information so that any drawing can be issued for tender or construction prior to the drawing being completed. The word 'HOLD' and the reason for the hold shall be shown inside the cloud. Clouds shall not be drawn through text or detailed information where legibility of the information will be compromised.

2.13 AMENDMENTS

All drawings after the first release – either Tentative or Approved – must show any amendments by words in the amendment/revisions block and by an amendment symbol in the body of the drawing. Previous amendment symbols must be removed.

2.14 LEVELS

Levels shall be expressed in metres to 3 decimal places.

2.15 COORDINATES

When giving coordinates the 'x' coordinate in AutoCAD shall be the Easting and 'y' the Northing.

2.16 REFERENCE DRAWINGS

All drawings which are required to be read in conjunction with another drawing shall be cross referenced under a heading of "Referenced Drawing" using the UTS drawing number only.

2.17 ABBREVIATIONS

All abbreviations shall be per Australian Standards AS1100.

2.18 RASTER FORMATS AND FILE ATTACHMENTS

No dwg files will have raster type files or any other files formats other than dwg files attached or inserted to them.

2.19 PAPERSPACE LAYOUTS

A dwg drawing file will have one paperspace layout only unless a floor plan is divided into sections, the paperspace layout tabs can be renamed to suit the area of the floor plan. Viewports in paperspace shall be locked to prevent changing of viewport scale.

2.20 PLOTSTAMP

All files when plotted will use Plotstamp. Minimum settings for A3 Plotting:

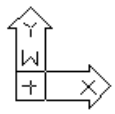
Drawing Name	Date and Time	Plot Scale	Paper Size
Bottom Left	Horizontal	X off set 10	Y offset 6
Roman Font	1.5 height text	Millimetres	

2.21 PLOT STYLES

All files are to be plotted using colour dependent plot styles in accordance with 2.4.2. Other plot configurations will not be used without permission from the CAD Manager. UTS will supply ctb files UTSA1.ctb and UTSA3.ctb which will be used to print all dwg files. These must be attached in the CAD file so when opened to print this will appear as the default ctb file.

2.22 DRAWING AND GRID ORIENTATION

Project grid is to be orientated with north to the top and AutoCAD at World Coordinate System.



2.23 CAD FILE TRANSLATION

CAD drawings produced by other than the nominated CAD software shall be translated into AutoCAD dwg file format, before hand over to UTS or when requested by the UTS CAD Manager at the completion of any stage of the project.

The Contractor shall be responsible for the correctness of the translation process in all respects to meet the relevant UTS CAD Standards. Any cost of processing required due to incorrect and or poor translation and or drafting will be borne by the contractor.

The final plots submitted to UTS shall be generated from the translated CAD file and not from the original CAD file.

2.24 CAD DRAWING REGISTER

All drawing files must be accompanied with a CAD drawing register for each project. This register will schedule the following information in Excel or Access :

EXAMPLE CAD DRAWING REGISTER

Project: **Issue:**

Job Number: **Reference Co-ordination Point:**

UTS Drg File Name	UTS Drg File No	Rev. No	Drawing Status	Drawing Title 1st line	Drawing Title 2nd line 1st sect.	Drawing Title 2nd line 2nd sect	Drawing Title 2nd line 3rd sect	Drawing Title 3rd line

Drawing Title 4th line	Drawing Title 5th line	Drawn	Checked	Approved	Approved Date	FMO Project No	Xref's

2.25 DRAWING FILE INFORMATION

2.25.1 X-REFERENCE FILES

Drawing files are to be created working off one drawing base file (i.e. Xref Models) for their extent of work:

Plans

Elevations

Sections

These files will have a different file name with a X placed before the file name e.g. **X**CB0602AP with no other numbers as they will always stay "live". Xref files will be stored in a folder named **Xref_Models**. Any drawing files submitted to UTS with active Xrefs must also have a bound copy submitted for approval, (i.e. 2 copies of the same files, 1 copy active and 1 copy bound). Xref drawings are not to be renamed.

Xrefs must be overlayed into the drawing file on a layer named with an X i.e. **X**CB0602AP and the first 8 characters of the fill name. A insertion point of 0,0,0 , scale of 1,1,1 and rotation of 0. This must never be altered. Xref files shall be free of any annotation, dimensions and hatching and all data shall be created in Modelspace only.

2.25.2 WBLOCKS AND BLOCKS

An intelligent naming structure shall be used for all wblocks and blocks used within drawing files.

2.25.3 LIBRARY OF SYMBOLS

A CD/DVD/USB disk/device containing dwg files of the library items and details used together with a description of when the symbols have been used. Also provide hard copy of such symbols.

2.26 ROOM SPACE POLYLINES (FLOOR PLANS ONLY)

Consultants are required to produce polylines (entities on spaces to define room area) on all spaces within each building. This is to be developed for the University CAD Model on specific layers.

Requirement	Layer name	Layer colour
A polyline on the external wall of the building and a polyline on the inside of the external wall of the building.	GROS	Magenta
Polylines defining internal rooms	RM	Cyan

See appendix 3 for polyline requirements.

2.27 ROOM NUMBERING SYSTEM

Room numbers must be shown on the CAD file after discussion and approval from the UTS FMO Facility Information Manager or UTS CAD Manager.

2.28 CAD DRAWING FILES REQUIRED

Further to the requirements set out in clause 1.4.2 , at the completion of documentation of the project (or at stages of a project) an electronic dwg CAD file of the contract drawings is required along with the base model CAD files and a pdf of each CAD file.

Where as-built or as-installed drawings are required, the consultant, builder and/or contractor shall submit to the UTS within the time agreed (upon the completion of the project),and further to requirements set out in any other contractual documents unless otherwise specified, the contractor shall provide 1 paper set consisting of 1 x A1 and 2 x A3 plus one electronic AutoCAD dwg file. These paper prints will be plotted at a 1:1 scale for A1 prints and 1:2 for A3 prints from Paperspace. All information shown on drawing files must be clear and legible when printed to A3 size.

Electronic CAD dwg file drawings shall be in an uncompressed format on USB disk/device. A pdf file created from the CAD file.

Also required will be an A3 print copy of library symbols used in the contract documents accompanying a USB disk/device.

A preliminary set of the proposed layer names and the CAD drawing register is to be submitted to the FMO CAD Manager for approval.

Note: When CAD dwg drawing files are submitted, these shall be labelled with the UTS Project Number, the CAD drawing file name and the stage the drawings are at, i.e. “Preliminary” or “As Built”.

2.29 COLOUR PRINTS

The use of colour prints must be approved by the Project Manager or UTS CAD Manager.

3. ELECTRONIC DATA TRANSFER

3.1 VIRUSES

All media shall be checked and free of any VIRUSES

3.2 DRAWING FILE FORMAT

All drawing files shall be in a digital format. UTS nominated CAD software is AutoCAD 2016.

All CAD files must be produced in AutoCAD unless otherwise approved.

Files drawn in 3D format must be approved by the CAD Manager.

All CAD files must be saved in Paperspace (tilemode 0) before submitting to UTS.

3.3 PURGING AND AUDIT

All CAD files shall be purged of unnecessary data and an audit performed before transferring.

3.4 COMPRESSED FILES

Files may be compressed to WINZip or RAR format for submission.

3.5 CAD FILE TRANSFER

All incoming electronic drawings are to be given to the nominated UTS officers Email address. Once the Email is processed the drawing files will be located in an appropriate directory under the control of the CAD Manager.

All drawings files must be accompanied by a transmittal document.

The drawings are to be supplied on electronic media in at least one of the following form:

USB device or Electronic mail.

APPENDIX 1

COMPUTING TERMS AS USED IN THIS REPORT

This specification uses the following CAD terms with the definition given below:

CAD	Computer Aided Drafting
CAD DRAWING FILE	Electronically Saved Drawing Data
ANNOTATION	Text, dimensions, arrows, symbols, drawing sheet, reference symbols, hatching and the border sheet.
DXF	(Drawing Interchange Format) DXF is used to exchange CAD drawing data with other software applications.
LAYER	A Logical grouping of data within a drawing file which can be turned on and off as required.
LAYERING SYSTEM	The method established to retrieve specific data from a drawing file.
WBLOCK	A named external drawing created from a set of entities that can be inserted and manipulated into the current drawing.
VIEWPORT	Specific viewing window within a drawing.
X-REFERENCE	An external drawing attached to another drawing, which is read transparently without altering its contents.

APPENDIX 2

CAD DRAWING FILE NAME CODES

CAD Campus/Building Identification is available at:

http://www.uts.edu.au/about/maps-and-facilities/campus-maps-and-facilities

DISCIPLINE CODE: (7th character)

A	=	Architectural
I	=	Interior Design
L	=	Landscape
S	=	Structural engineering
M	=	Mechanical engineering
E	=	Electrical engineering
H	=	Hydraulic engineering
R	=	Fire
C	=	Acoustic
T	=	Lift
U	=	Security
F	=	Furniture Fitting and Equipment
V	=	Audio Visual
K	=	Civil engineering and site work
P	=	Polylines, Facilities drawing
D	=	Data

DRAWING TYPE CODE: (8th character)

A = Arrangements

B = Layouts

C = Schedules

D = Details

E = Elevations

G = Diagrams / schematic

K = Sketches

L = Legend

P = Plans

S = Sections

The 2-character field for level number/ description varies depending on the drawing type: (5th & 6th character)

For Drawings:

__ = Multiple fields (e.g. levels 01 & 02)

GD = Ground level

RF = Roof level

01 = Level 01

02 = Level 02

etc.

For the rest of the drawing types, this field is flexible and utilised to specify initials of the drawing name.

APPENDIX 3

POLYLINE REQUIREMENTS

Requirement	Layer name	Layer colour
A closed polyline on the external wall (external outline) of the building (does not include colonnades, decks, bridges or other open spaces) and a closed polyline on the inside of the external wall of the building.	GROS	Magenta
Closed polylines on the internal walls at finished level defining internal areas: Habitable rooms such as offices, classes, seminar rooms, staff and meeting rooms. Internal corridors and circulation spaces. A new "space" shall be formed at a change of direction, or when doors delimit the circulation. Plantrooms, ducts, lifts and other services; stores, tea, cleaner, toilets and stairs.	RM	Cyan

Note: These layer names do not conform the layer naming structure described in section 2.4 of this specification as this is a special requirement of Archibus FM, the software used by UTS, FMO for space management.

APPENDIX 4

MANAGING UTS CAD STANDARDS WITH AUTOCAD

This section of the document is intended for the use of built-in commands in AutoCAD by the consultants and contractors for maintaining consistency among the deliverable CAD drawing files. This document describes on how to utilize the AutoCAD CAD Standards tools, configuring the UTS CAD Standards file and then use it to check drawings for conformance to standards. This will also provide information on the use the Layer Translator to further promote consistency and conformance to the standards.

Objectives

- To understand the AutoCAD CAD standards tools
- To utilize the UTS CAD standards file (UTS_STD.dws)
- Understand what aspects of an AutoCAD drawing can be standardized with the CAD standards file
- How to associate a CAD standards file with other drawings
- To check a drawing for adherence to the associated CAD standards file
- Use the Layer Translator command to “map” a layering scheme or portions of a layering scheme from one drawing to another

CAD STANDARDS

AutoCAD drawings have four areas that lend themselves to rather easy customization: layer schemes, dimension styles, text styles and linetypes. Because of this ease of customization, company standards and drawing consistency can sometimes take a backseat to personal preference. Standardization of these concepts needs to be developed and maintained within any organization using AutoCAD.

AutoCAD has provided the concept of a template file. The template file holds all the initial standards like those mentioned previously. Starting a new drawing by using a template file allows the CAD operator to have all these standards in place when he or she begins the drawing. But what if a CAD operator gets a little rebellious or strays from the standards by creating a few non-standard layers or linetypes, or makes up his or her own dimension style? How does the drawing get brought back to the consistency of the company standards? That is exactly where two commands, introduced in AutoCAD 2002, come into play: STANDARDS and CHECK STANDARDS.

UTS CAD Standards File

The first step in maintaining to UTS CAD standards is to have the latest approved UTS CAD Standard file in the first place.

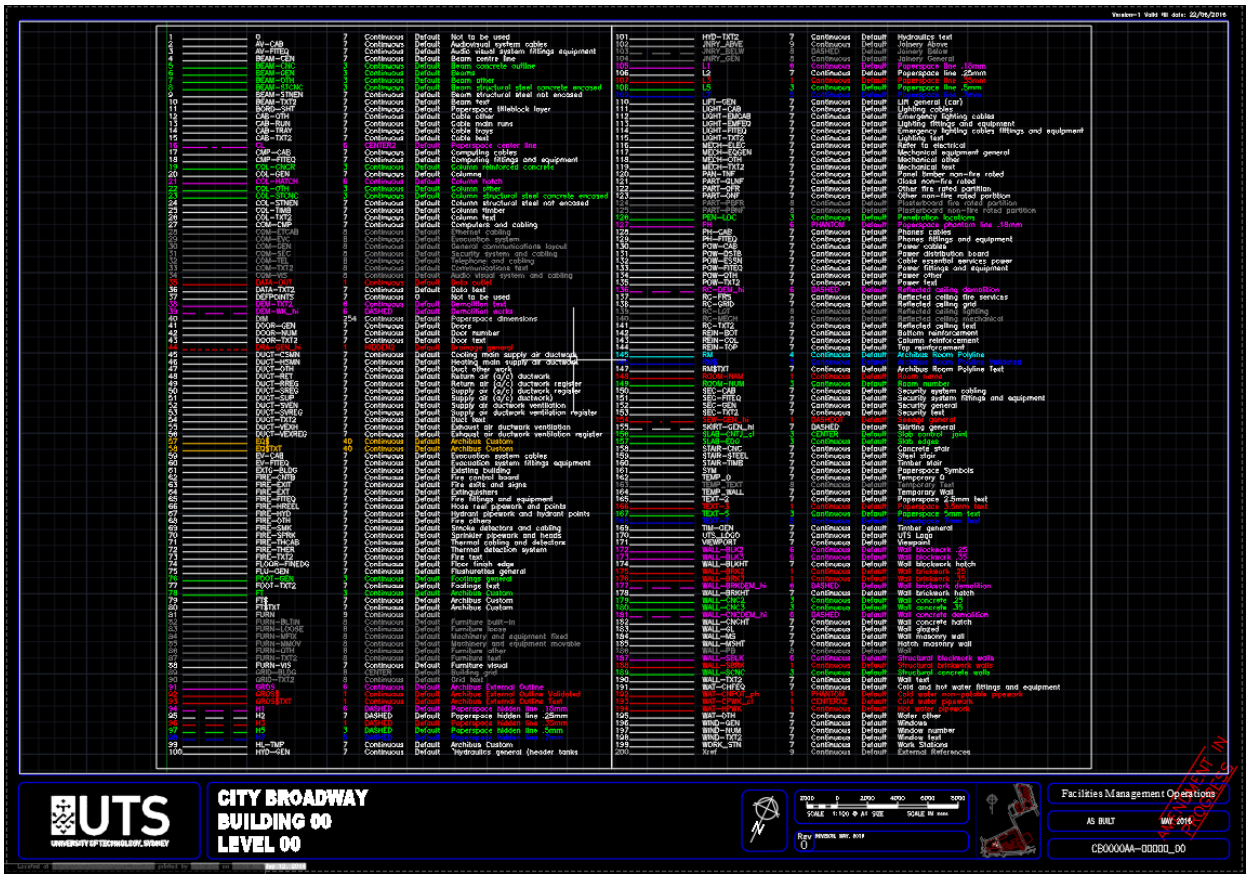


Figure 1. Preview of UTS CAD Standard (UTS_STD.dws)

Check for the latest version and the valid date at the top right corner of the layout in the UTS CAD Standard file (UTS_STD.dws).

Figure 2. UTS CAD Standard Version and Valid Date (UTS_STD.dws)

The four standards areas that AutoCAD allows the CAD user to maintain control over are layers, dimension styles, text styles and linetypes. The properties associated with each of these standards and which subsequent drawings are checked against for adherence to these standards and are as follows:

Text Styles: The text style names and all attributes of the style are stored in the drawing standard file, including fonts, font styles, height and effects (upside down, backwards, vertical, width and oblique angle).

Linetypes: The linetype names and their segment length and spacing definitions are stored in the drawing standards file.

Dimension Style Manager

The following figure shows the completed Dimension Styles:

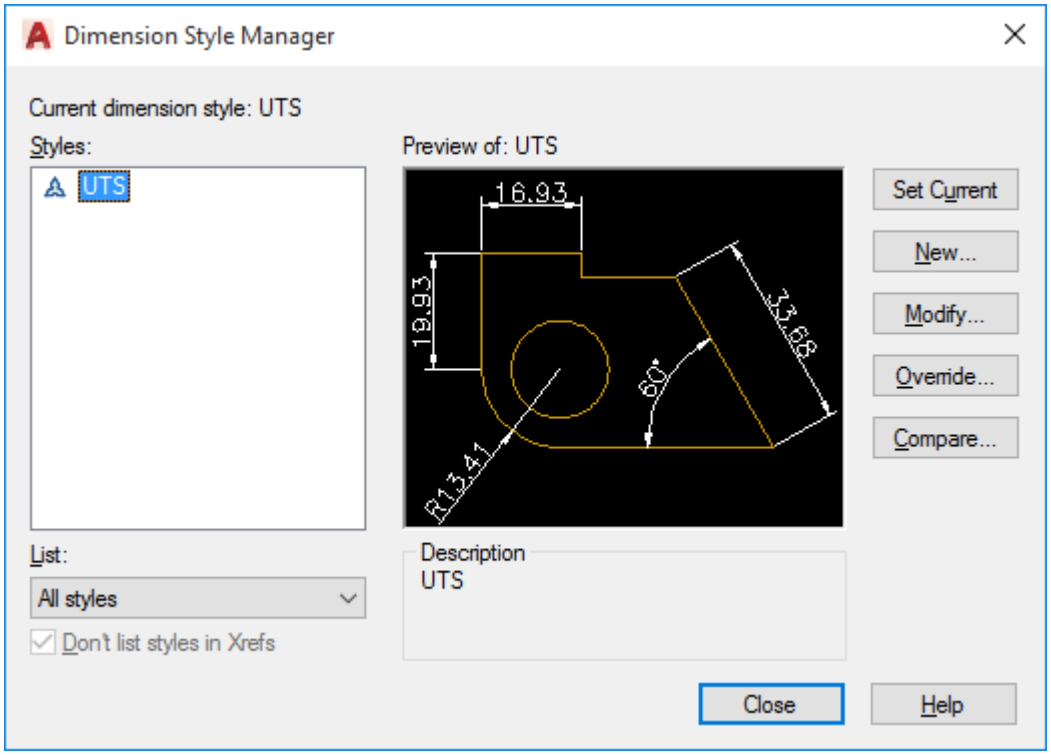


Figure 3. Dimension Styles for UTS Drawing Standard file (UTS_STD.dws)

Text Style Manager

The following figure shows the completed Text Styles:

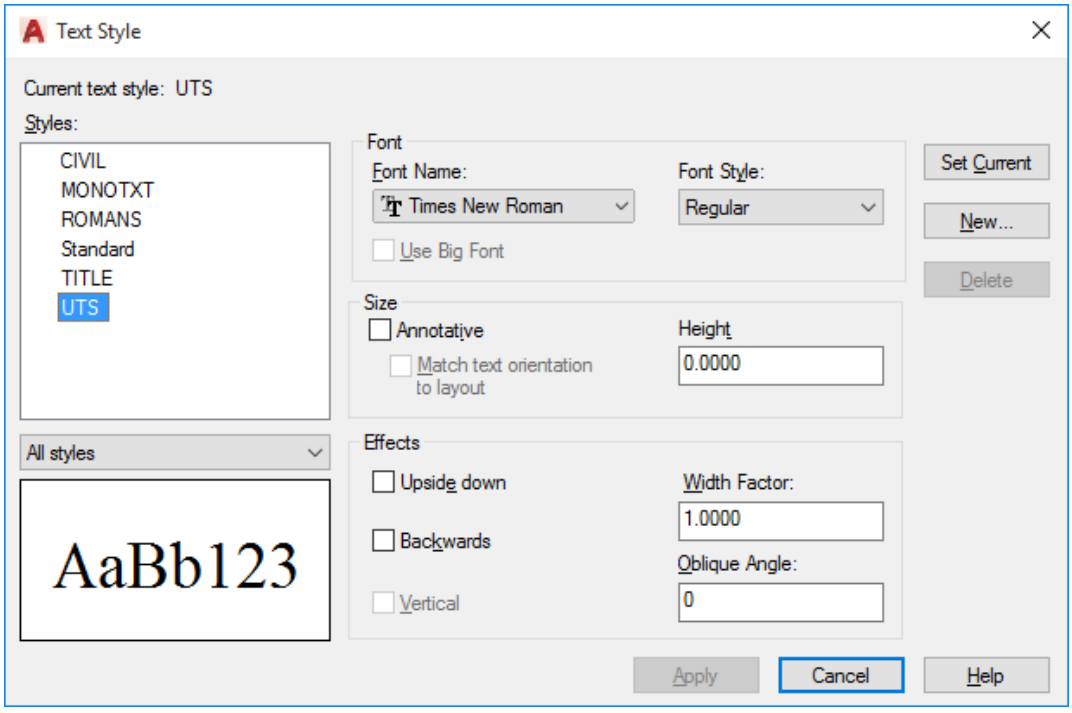


Figure 4. Text Styles for UTS Drawing Standard file (UTS_STD.dws)

Configuring CAD Standards

Before checking whether the desired CAD standards are being adhered to, the UTS CAD standards file must be associated with the current drawing. This is done with the STANDARDS command. To launch this command type STANDARDS at the Command: prompt, or using the pull down menus (Tools > CAD Standards > Configure…) or by using the first (left-most) button on the CAD Standards toolbar or using the Configure button in CAD Standards panel in Manage ribbon as shown below in figure 5.

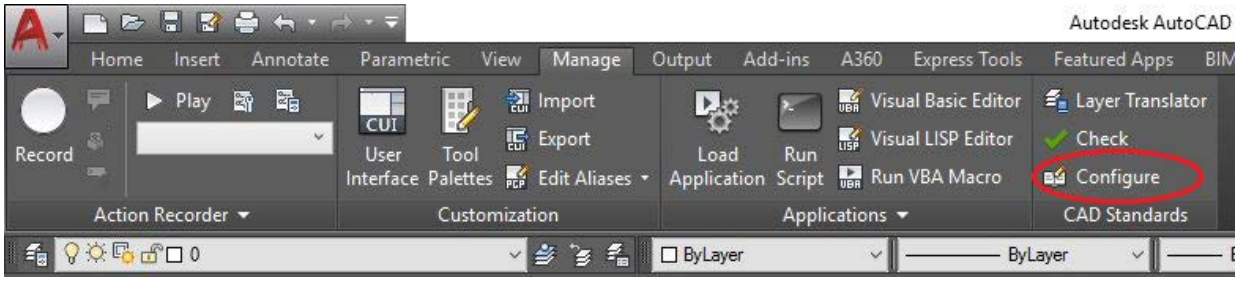


Figure 5 – Configure Standard Button in Manage Ribbon.

When the Configure Standards dialog box opens you will notice two tabs: Standards and Plug-ins.

The Plug-ins tab

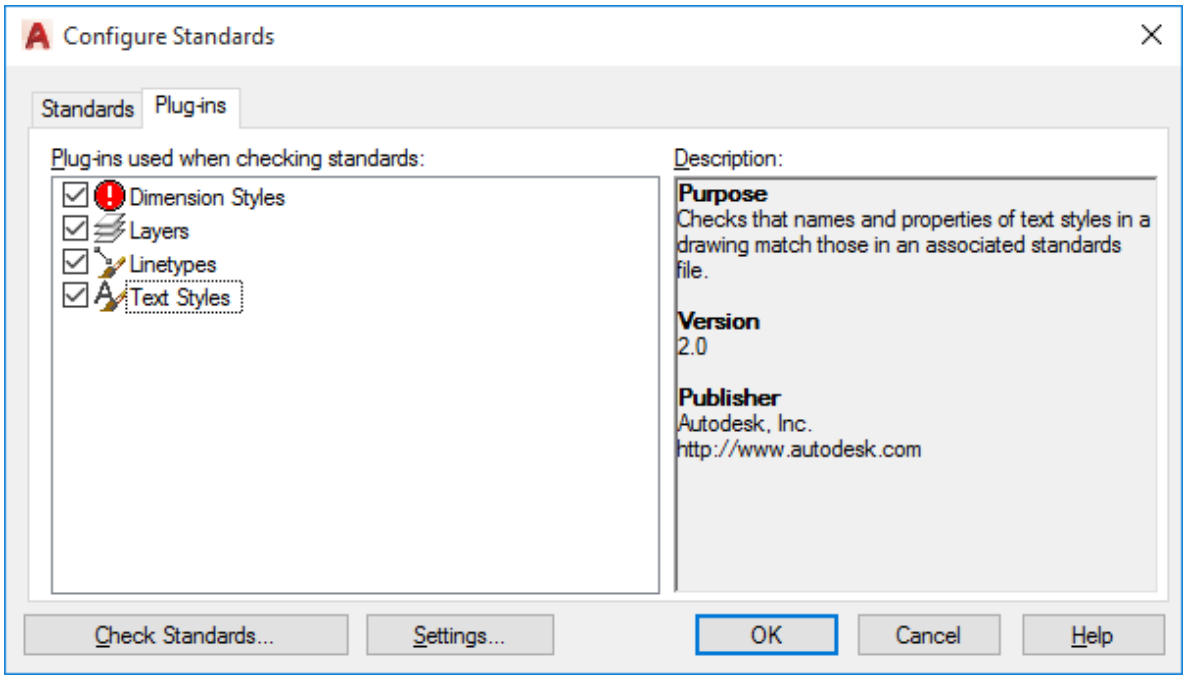


Figure 6. The Configure Standards dialog box displaying the Plug-ins tab

This tab shows the currently supported objects included in the checking process.

The Standards tab

The Standards tab has two main areas. The left side shows any standards files currently associated with the current drawing, and the right side shows a description of the highlighted standards file from the left side of the dialog tab. See Figure 7.

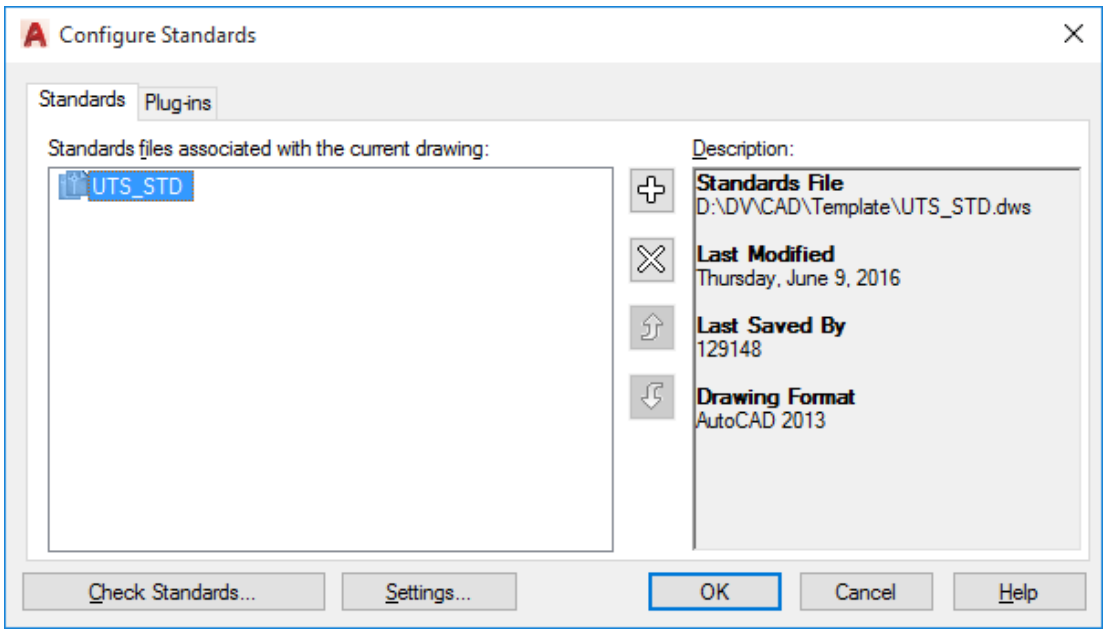


Figure 7. The Configure Standards dialog box displaying the Standards tab

The description area consists of the standard file name and its path, the date the standards file was last modified and the drawing format of the standards file.

Adding a Standards File

To add a standards drawing to the list of files on the left, use the Add Standards File button. It appears at the top of the column of buttons in the middle of the dialog box. (You can also press the F3 key). Picking this button brings up the standard Windows "Select file" dialog box. Simply navigate to the location of the file you want to use as a standard and select it. It will then be added to the list.

Checking CAD Standards

Once a standards file or set of standards files has/have been associated with the current drawing, the process of checking the current drawing for adherence to these standards can begin. This process can be done immediately from the *Configure Standards* dialog box. Pick the *Check Standards…* button at the bottom left of the dialog. You can also type CHECKSTANDARDS at the Command: prompt, or select Tools > CAD Standards > Check, or pick the middle button on the CAD Standards toolbar.

The Check Standards dialog is divided into three main areas: Problem:, Replace with: and Preview of changes. See Figure 8. All three of these areas interact with one another, but let's look at them one at a time.

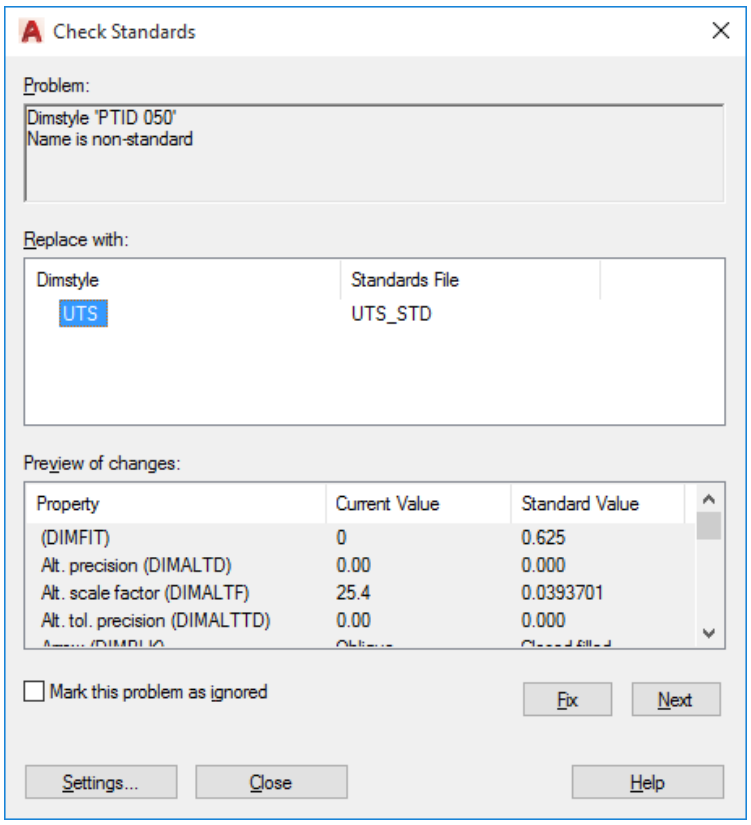


Figure 8. The Check Standards dialog box

Troubleshooting:

This area of the dialog will display the problems, one at a time, which is in non-compliance with the associated standard file(s).

The first problem that may appear in this area is the fact that "There are no standards files associated with the current drawing," Figure 9.

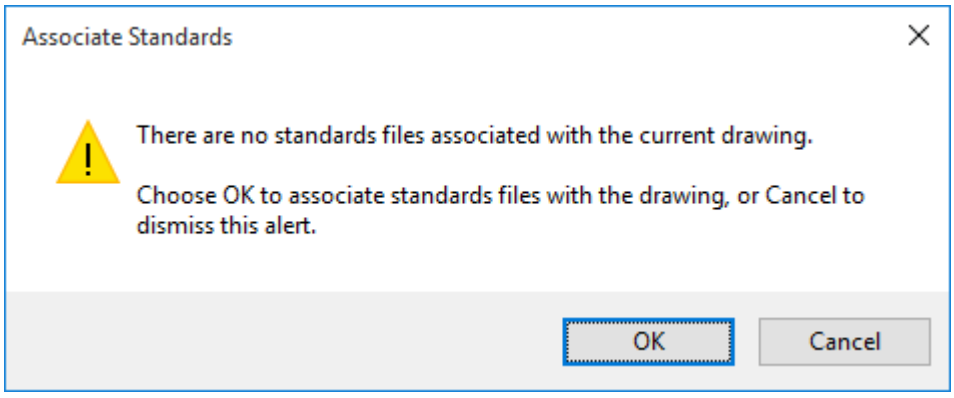


Figure 9. The "no standards file…" error message

If you select "OK", AutoCAD will launch the Configure Standards dialog so that you can associate a CAD standards file with the drawing. Choosing "Cancel" will return you to the Command prompt.

If a standards file has been associated with the drawing, the Problem: area of the dialog box will point out a specific problem with the drawing. The Replace with: area will allow you to make a change that conforms to the standard file(s) associated with the drawing. And the Preview: area will show you the changes that will take effect if the change in the Replace with: area is approved.

Replace with:

Here, the possible choices for correcting the non-compliance will be shown. To use this area all you need to do is select one of the items in the list and pick the “Fix” button with the checkmark on it that is located next to the list of choices.

Preview of changes:

This area displays the property and value change that will take place should the currently selected item in the Replace with: area to be used to fix the problem, and bring the drawing into compliance with the standard file(s).

The “Fix” button

Use this button to update the drawing according to the changes shown in the Preview of changes: areas, which are based on the highlighted item in the list of choices in the Replace with: area. When a “fix” is made, the non-standard named items are purged from the drawing.

Mark this problem ignored

This toggle allows a problem to be marked as ignored. The login name of the user will be recorded with the fact that the problem has been ignored.

Next button

This button is used to go on to the next problem without initiating a fix. The current problem will be shown in subsequent standards checks if it is not marked ignored, unless the Show ignored problems toggle is checked in the Settings dialog box. Examples are shown of some of the commonly encountered type of problems, some possible “fixes” shown in the Replace with: area, and the preview of the changes that will be made.

Some of the types of problems that can occur are shown in the following figures:

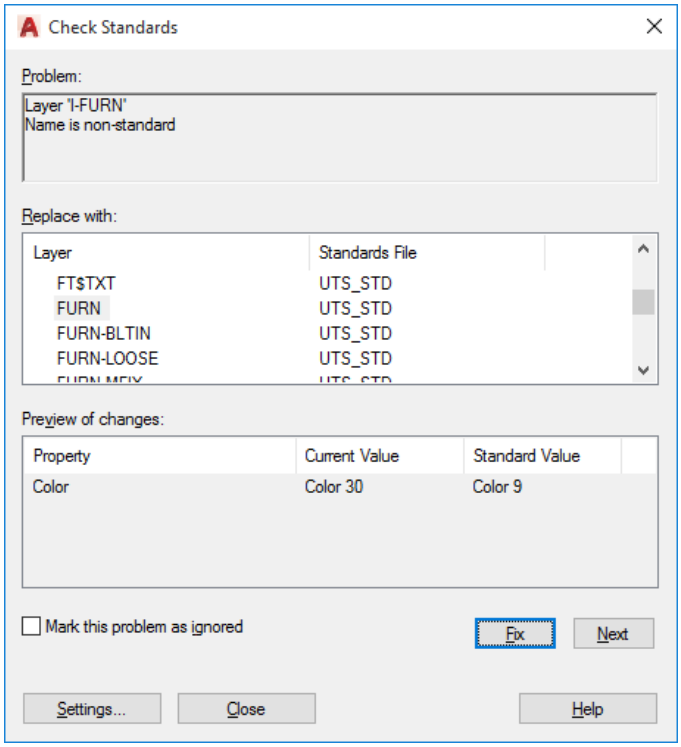


Figure 10. a non-standard layer name problem

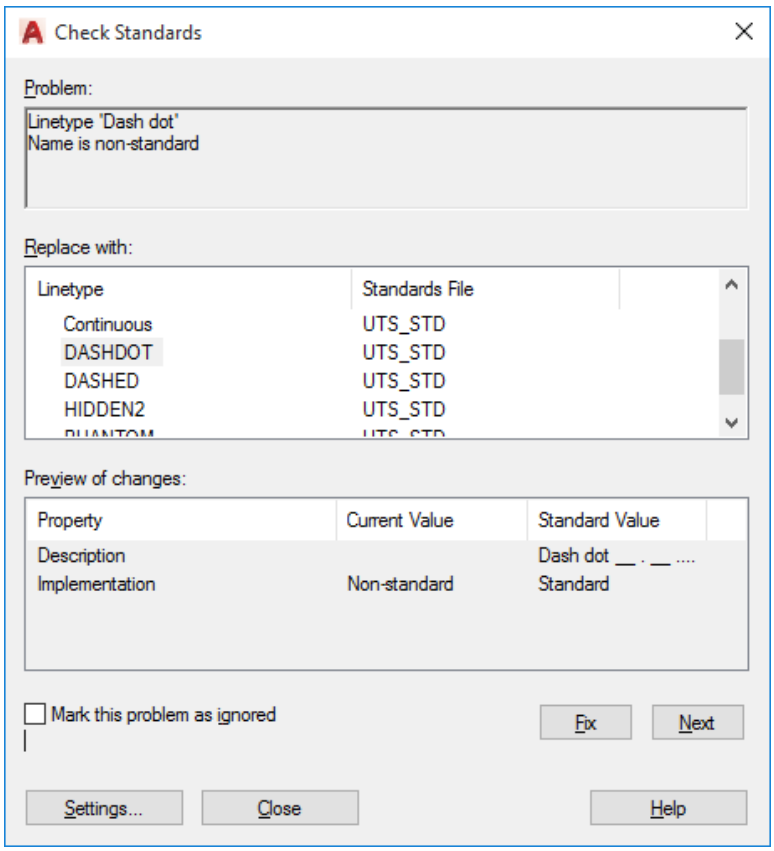


Figure 11. a non-standard layer property problem

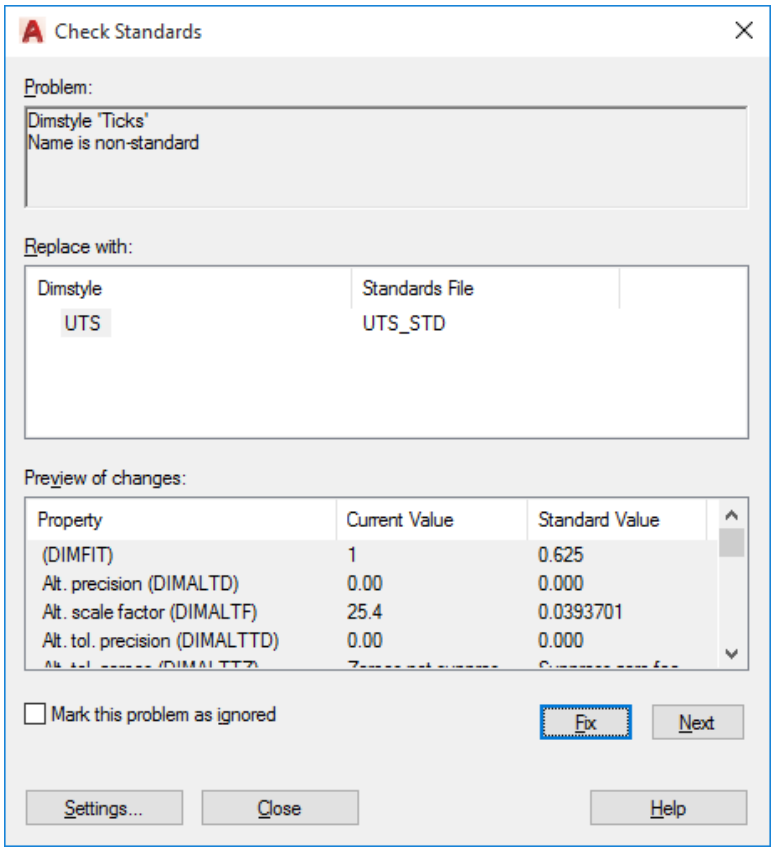


Figure 12. a non-standard dimension properties problem

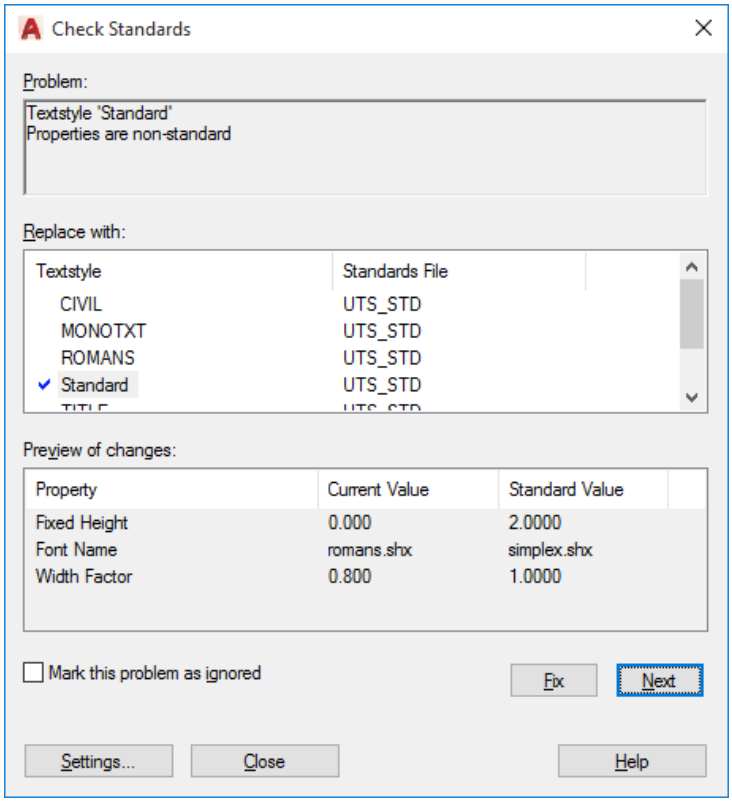


Figure 13. a non-standard text style properties problem

Settings…

This button calls up the Check Standards - Settings dialog box that lets you adjust the way certain standard checking events occur. Select from either the Standards or Check Standards Dialog boxes.

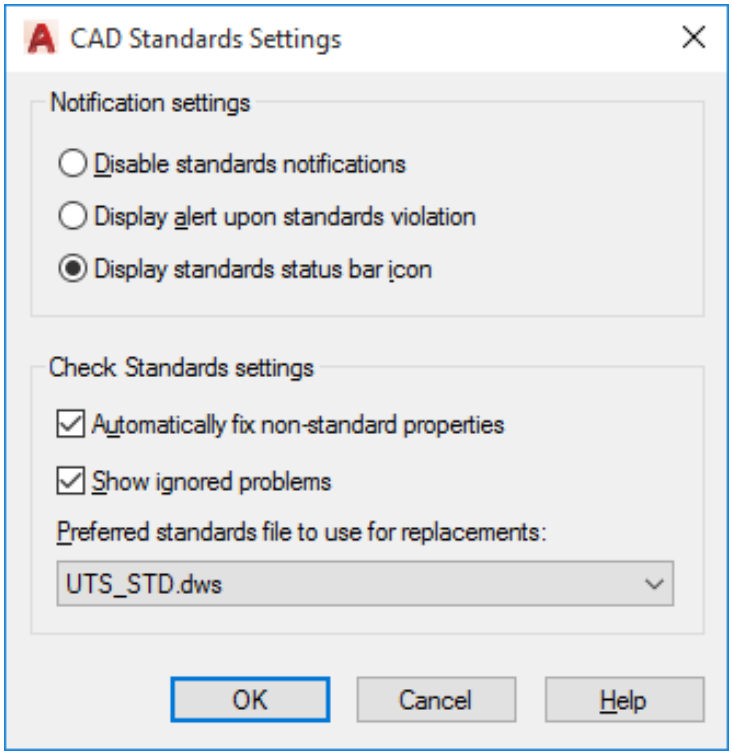


Figure 14. CAD Standards Settings dialog box

Automatically fix non-standard properties

"Automatic" fixes can only take place if the drawing being checked has a standard object with an identical name to a standard object found in the standards file listed in the Preferred standards file to use for replacements: drop-down list. When this toggle is checked all the properties of the identically named objects will be changed to match the properties settings in the preferred file.

Show ignored problems

This toggle, when checked, will allow previously ignored problems to be displayed when subsequent standards checking takes place. The problem, and the login name of the person who previously checked it as ignored, will be shown in the Check Standards dialog.

Preferred standards file to use for replacements

This drop down list is used to designate which standards file is used when the Automatically fix non-standard properties toggle is checked.

Check complete

On successful completion on chack standards, a dialog box will be pop up as shown in the figure-15.

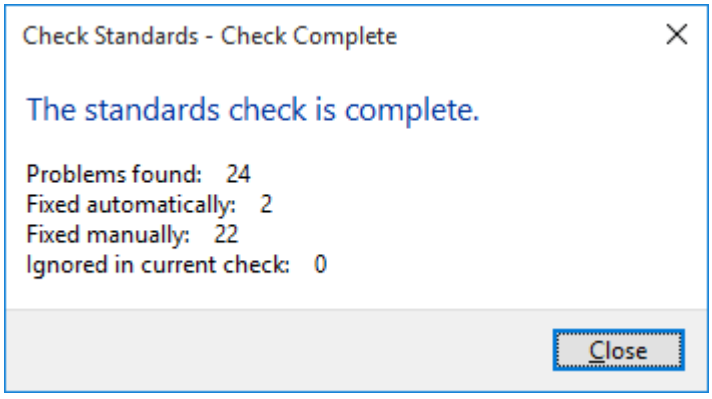


Figure 15. Check Standards complete dialog box

Some Tips:

- No Undo available within Check Standards dialog – upon exiting either all the "fixes" will be undone or none.
- Do not forget to hit the "next" arrow after checking the "ignore" toggle
- You can get to the "Check Standards" dialog from "Configure Standards", but not vice- versa
- To avoid an unnecessary flag be sure to include the Defpoints layer needs in the standards file

USING THE LAYER TRANSLATOR

The Layer Translator is another tool that allows you to manage your drawings. Unlike the STANDARDS command, the **LAYTRANS** command only allows you to manage your layer scheme. LAYTRANS allows you to map the layers in the current drawing to those in another drawing or to a whole new layer scheme. This is extremely useful when two companies are collaborating on a project. Each company can translate the layers from the other to match the layering scheme that they are comfortable with.

Loading a Drawing To Use For Translating

To launch the Layer Translator by typing LAYTRANS at the command prompt, via the pull down menu by selecting Tools>CAD Standards>Layer Translator or by picking the button on the CAD Standards tool bar.

Once the LAYTRANS command has been launched a dialog box will appear that has the current drawing's layer scheme shown. See Figure 16. A "layer" icon will appear to the left of each layer name. A "white" icon means that the layer has not yet been referenced (drawn on) in this drawing. A "coloured" or filled-in icon means that it is referenced (there are object drawn on that layer). There are a couple other list boxes and a few buttons also in this dialog. Let's take a look at each of these items individually.

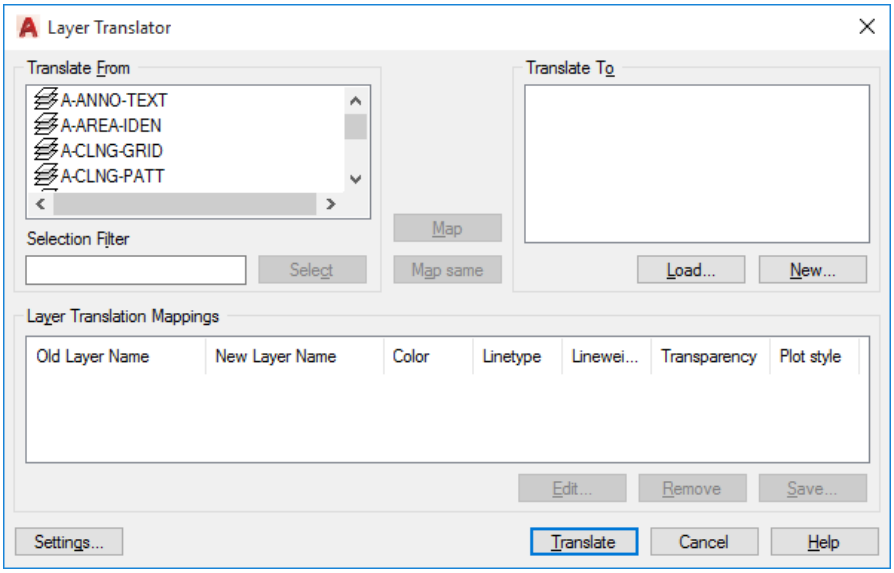


Figure 16. The Layer Translator dialog box

The New… button launches a dialog box that lets you create a layering scheme from scratch. You can enter a new layer name and assign a colour, linetype and lineweight to the layer – and a plot style if you are using named plot style tables. See Figure 17.

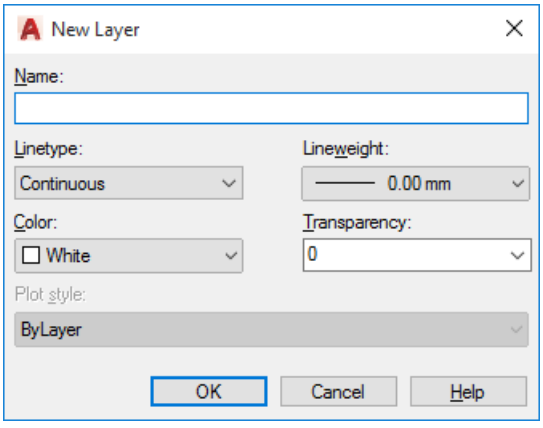


Figure 17. The New Layer dialog box

The Translate To: List Box

This list will show you all the layers that are available for translating to. The list can be created from more than one drawing or from scratch using either the Load… or the New… buttons described earlier.

The Map Button

To pick a layer out of the "Translate From:" list and a layer out of the "Translate To:" list and have the layer that was listed in the "Translate From:" list take on all the properties, including the name, of the layer listed in the "Translate To:" list. You are allowed to pick more than one layer from the "Translate From:" list. You can select multiple layers with individual picks or by typing in a wildcard combination in the "Selection Filter" edit box located just below the "Translate From:" list and then picking the "Select" button which is located right next to the "Selection Filters:" edit box. See AutoCAD's online HELP for more information on wildcard combinations.

The Map same button

This button allows you map all the layers that are identically named in the two lists and update them to the properties of the layer listed in the "Translate To:" list. No selecting needs to take place – the selections are automatic, based on identical layer names.

The Layer Translator Mappings List Box

This list shows all of the layer translations that have been mapped. You will see the Old Layer Name, the New Layer Name, along with columns displaying the Colour, Linetype, Lineweight and Plot style that the objects on the old layer name will take on.

The Edit Button

This button becomes active when you select a line of information in the Layer Translation Mappings list. When the button is picked you can change the colour, linetype, lineweight and plot style assignment using a dialog similar to the one shown in Figure 24-11 except that the Name: area will be greyed out. You cannot change the old or the new layer name. Once you change any of these assignments the change(s) will hold true for any and all mappings using that same new layer name.

The Remove Button

This button allows you to remove a proposed translation from the list. Just select the layer translation to be removed and pick the Remove button.

The Save… Button

The Save… button allows you to create a drawing file that contains all the layers and their properties from the "Translate To:" list. But that is all this new drawing will have – just the layer scheme. None of the drawn objects from the current drawing will become a part of the new drawing. This can be useful if you find yourself having to load 2 or 3 drawings quite often, or if you have had to create a whole new layer scheme from scratch. Save the list using this button and you will not have to go through quite so much work the next time around.

The Translate Button

Once all the mappings have been set up this button will “make it so”. The old layer names and their properties will be replaced by the mapped new layers and their properties. If you have not mapped some of your old layers to new layers, they will be left as they were. If you have not used the “Save…” button to save the mappings as they have been set up, you will be prompted to do so.

The Settings Button

This button will bring up a dialog box of toggles. See Figure 18.

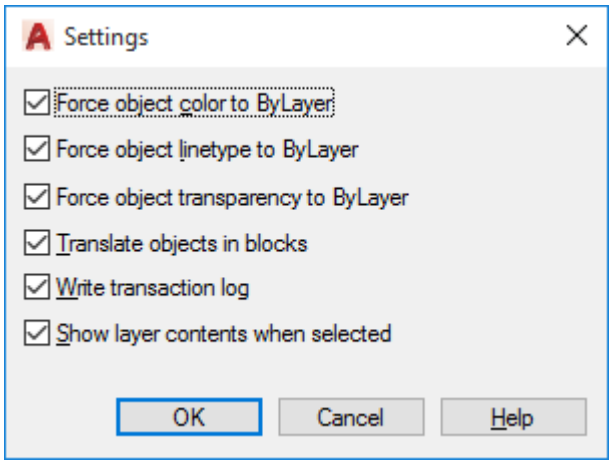


Figure 18. The Settings dialog box

Force object colour to ByLayer

If checked, not only will the layer name and its properties be translated but also all objects found on that layer will have their colour property forced to “ByLayer”. This is a very powerful feature.

Force objects linetype to ByLayer

Same as above except the linetypes of the objects on the translated layers will be forced to “ByLayer”.

Translates objects in blocks

If checked, objects that are nested within block definitions will translate also.

Write transaction log

If checked, a log file will be created in the same folder of the current drawing that has all the layer translation data recorded in it. The file will have the same name as the current drawing and will have “.log” extension. This is very useful in case you would like to “go back” to the layer scheme that was being used before the translation. There is no other record of “how things were”, so you can use this file to “re-translate”.

Show layer contents when selected

If checked, when the Layer Translator dialog is first called up the drawn objects of the current drawing disappear in the background. As layers are selected from the “Translate From:” list, the objects that are on these layer(s) will show up in the background. If unchecked all objects in the current drawing that are not turned off or frozen will show up in the background. Objects that are on layers that are turned off will still show up when their layer name is selected if this box is checked. Objects that are on layers that are frozen will never show up.

APPENDIX 5

EXAMPLE OF LAYER NAMES

Note: All linework to be continuous unless otherwise stated and colours or numbers for colours are as defined by AutoCAD.

Layer name	Description	Colour	Linetype	LWT
Sample architectural layer names:				
0	Not to be used	7 (white)	CONTINUOUS	Default
BEAM-GEN	Beams	3 (green)	CONTINUOUS	Default
BORD-SHT	Paperspace titleblock layer	7 (white)	CONTINUOUS	Default
CL	Paperspace center line	6 (magenta)	CENTER2	Default
COL-GEN	Columns	7 (white)	CONTINUOUS	Default
COL-HATCH	Column hatch	7 (white)	CONTINUOUS	Default
COL-TXT2	Column text	7 (white)	CONTINUOUS	Default
COM-CMP	Computers and cabling	7 (white)	CONTINUOUS	Default
COM-ETCAB	Ethernet cabling	8	CONTINUOUS	Default
COM-EVC	Evacuation system	8	CONTINUOUS	Default
COM-GEN	General communications layout	8	CONTINUOUS	Default
COM-SEC	Security system and cabling	8	CONTINUOUS	Default
COM-TEL	Telephone and cabling	8	CONTINUOUS	Default
COM-TXT2	Communications text	8	CONTINUOUS	Default
COM-VIS	Audio visual system and cabling	8	CONTINUOUS	Default
DEFPOINTS	Not to be used	8	CONTINUOUS	Default
DEM-TXT2	Demolition text	6 (magenta)	CONTINUOUS	Default
DEM-WK_hi	Demolition works	6 (magenta)	DASHED	Default
DIM	Paperspace dimensions	254	CONTINUOUS	Default
DOOR-GEN	Doors	7 (white)	CONTINUOUS	Default
DOOR-NUM	Door number	7 (white)	CONTINUOUS	Default
DOOR-TXT2	Door text	7 (white)	CONTINUOUS	Default
EXTG-BLDG	Existing building	7 (white)	CONTINUOUS	Default
FLOOR-FINEDG	Floor finish edge	7 (white)	CONTINUOUS	Default
FURN-BLTIN	Furniture built-in	8	CONTINUOUS	Default
FURN-LOOSE	Furniture loose	8	CONTINUOUS	Default
FURN-MFIX	Machinery and equipment fixed	8	CONTINUOUS	Default
FURN-MMOV	Machinery and equipment movable	8	CONTINUOUS	Default
FURN-OTH	Furniture other	8	CONTINUOUS	Default
FURN-TXT2	Furniture text	8	CONTINUOUS	Default
FURN-VIS	Furniture visual	7 (white)	CONTINUOUS	Default
GRID-BLDG	Building grid	7 (white)	CONTINUOUS	Default
GRID-TXT2	Grid text	7 (white)	CONTINUOUS	Default
H1	Paperspace hidden line .18mm	6 (magenta)	DASHED	Default
H2	Paperspace hidden line .25mm	7 (white)	DASHED	Default
H3	Paperspace hidden line .35mm	1 (red)	DASHED	Default
H5	Paperspace hidden line .5mm	3 (green)	DASHED	Default
H7	Paperspace hidden line .7mm	5 (blue)	DASHED	Default

L1	Paperspace line .18mm	6 (magenta)	CONTINUOUS	Default
L2	Paperspace line .25mm	7 (white)	CONTINUOUS	Default
L3	Paperspace line .35mm	1 (red)	CONTINUOUS	Default
L5	Paperspace line .5mm	3 (green)	CONTINUOUS	Default
L7	Paperspace line .7mm	5 (blue)	CONTINUOUS	Default
LIFT-GEN	Lift general (car)	7 (white)	CONTINUOUS	Default
PAN-TNF	Panel timber non-fire rated	7 (white)	CONTINUOUS	Default
PART-GLNF	Glass non-fire rated	7 (white)	CONTINUOUS	Default
PART-OFR	Other fire rated partition	7 (white)	CONTINUOUS	Default
PART-ONF	Other non-fire rated partition	7 (white)	CONTINUOUS	Default
PART-PBFR	Plasterboard fire rated partition	8	CONTINUOUS	Default
PART-PBNF	Plasterboard non-fire rated partition	8	CONTINUOUS	Default
PH	Paperspace phantom line .18mm	6 (magenta)	PHANTOM	Default
RC-DEM_hi	Reflected ceiling demolition	6 (magenta)	DASHED	Default
RC-FRS	Reflected ceiling fire services	7 (white)	CONTINUOUS	Default
RC-GRID	Reflected ceiling grid	7 (white)	CONTINUOUS	Default
RC-LGT	Reflected ceiling lighting	8	CONTINUOUS	Default
RC-MECH	Reflected ceiling mechanical	8	CONTINUOUS	Default
RC-TXT2	Reflected ceiling text	7 (white)	CONTINUOUS	Default
ROOM-NAM	Room name	1 (red)	CONTINUOUS	Default
ROOM-NUM	Room number	3 (green)	CONTINUOUS	Default
SEC-GEN	Security general	7 (white)	CONTINUOUS	Default
SEC-TXT2	Security text	7 (white)	CONTINUOUS	Default
SKIRT-GEN_hi	Skirting general	7 (white)	DASHED	Default
STAIR-CNC	Concrete stair	7 (white)	CONTINUOUS	Default
STAIR-STEEL	Steel stair	7 (white)	CONTINUOUS	Default
STAIR-TIMB	Timber stair	7 (white)	CONTINUOUS	Default
SYM	Paperspace Symbols	7 (white)	CONTINUOUS	Default
TEXT-2	Paperspace 2.5mm text	7 (white)	CONTINUOUS	Default
TEXT-3	Paperspace 3.5mm text	1 (red)	CONTINUOUS	Default
TEXT-5	Paperspace 5mm text	3 (green)	CONTINUOUS	Default
TEXT-7	Paperspace 7mm text	5 (blue)	CONTINUOUS	Default
TIM-GEN	Timber general	7 (white)	CONTINUOUS	Default
VIEWPORT	Viewpoint	7 (white)	CONTINUOUS	Default
WALL-BLK2	Wall blockwork .25	6 (magenta)	CONTINUOUS	Default
WALL-BLK3	Wall blockwork .35	6 (magenta)	CONTINUOUS	Default
WALL-BLKHT	Wall blockwork hatch	7 (white)	CONTINUOUS	Default
WALL-BRK2	Wall brickwork .25	1 (red)	CONTINUOUS	Default
WALL-BRK3	Wall brickwork .35	1 (red)	CONTINUOUS	Default
WALL-BRKDEM_hi	Wall brickwork demolition	6 (magenta)	DASHED	Default
WALL-BRKHT	Wall brickwork hatch	7 (white)	CONTINUOUS	Default
WALL-CNC2	Wall concrete .25	3 (green)	CONTINUOUS	Default
WALL-CNC3	Wall concrete .35	3 (green)	CONTINUOUS	Default
WALL-CNCDEM_hi	Wall concrete demolition	6 (magenta)	DASHED	Default
WALL-CNCHT	Wall concrete hatch	7 (white)	CONTINUOUS	Default
WALL-GL	Wall glazed	7 (white)	CONTINUOUS	Default
WALL-MS	Wall masonry wall	7 (white)	CONTINUOUS	Default
WALL-MSHT	Hatch masonry wall	7 (white)	CONTINUOUS	Default

WALL-PB		1 (red)	CONTINUOUS	Default
WIND-GEN	Windows	7 (white)	CONTINUOUS	Default
WIND-NUM	Window number	7 (white)	CONTINUOUS	Default
WIND-TXT2	Window text	7 (white)	CONTINUOUS	Default

Sample structural layer names:

BEAM-CEN	Beam centre line	7 (white)	CONTINUOUS	Default
BEAM-CNC	Beam concrete outline	3 (green)	CONTINUOUS	Default
BEAM-OTH	Beam other	3 (green)	CONTINUOUS	Default
BEAM-STCNC	Beam structural steel concrete encased	3 (green)	CONTINUOUS	Default
BEAM-STNEN	Beam structural steel not encased	7 (white)	CONTINUOUS	Default
BEAM-TXT2	Beam text	7 (white)	CONTINUOUS	Default
COL-CNCR	Column reinforced concrete	3 (green)	CONTINUOUS	Default
COL-HATCH		6 (magenta)	CONTINUOUS	Default
COL-OTH	Column other	3 (green)	CONTINUOUS	Default
COL-STCNC	Column structural steel concrete encased	3 (green)	CONTINUOUS	Default
COL-STNEN	Column structural steel not encased	7 (white)	CONTINUOUS	Default
COL-TIMB	Column timber	7 (white)	CONTINUOUS	Default
COL-TXT2	Column text	7 (white)	CONTINUOUS	Default
FOOT-GEN	Footings general	3 (green)	CONTINUOUS	Default
FOOT-TXT2	Footings text	7 (white)	CONTINUOUS	Default
PEN-LOC	Penetration locations	3 (green)	CONTINUOUS	Default
REIN-BOT	Bottom reinforcement	7 (white)	CONTINUOUS	Default
REIN-COL	Column reinforcement	7 (white)	CONTINUOUS	Default
REIN-TOP	Top reinforcement	7 (white)	CONTINUOUS	Default
SLAB-CNTJ_cl	Slab control joint	3 (green)	CENTER	Default
SLAB-EDG	Slab edges	3 (green)	CONTINUOUS	Default
WALL-SBLK	Structural blockwork walls	6 (magenta)	CONTINUOUS	Default
WALL-SBRK	Structural brickwork walls	1 (red)	CONTINUOUS	Default
WALL-SCNC	Structural concrete walls	3 (green)	CONTINUOUS	Default
WALL-TXT2	Wall text	7 (white)	CONTINUOUS	Default

Sample electrical layer names:

POW-CAB	Power cables	1 (red)	CONTINUOUS	Default
POW-DSTB	Power distribution board	6 (magenta)	CONTINUOUS	Default
POW-ESSN	Cable essential services power	1 (red)	CONTINUOUS	Default
POW-FITEQ	Power fittings and equipment	6 (magenta)	CONTINUOUS	Default
POW-OTH	Power other	7 (white)	CONTINUOUS	Default
POW-TXT2	Power text	7 (white)	CONTINUOUS	Default
LIGHT-CAB	Lighting cables	1 (red)	CONTINUOUS	Default
LIGHT-EMCAB	Emergency lighting cables	1 (red)	CONTINUOUS	Default
LIGHT-EMFEQ	Lighting fittings and equipment	6 (magenta)	CONTINUOUS	Default
LIGHT-FITEQ	Emergency lighting cables fittings and equipment	6 (magenta)	CONTINUOUS	Default
LIGHT-TXT2	Lighting text	7 (white)	CONTINUOUS	Default
PH-CAB	Phones cables	7 (white)	CONTINUOUS	Default
PH-FITEQ	Phones fittings and equipment	6 (magenta)	CONTINUOUS	Default
CMP-CAB	Computing cables	7 (white)	CONTINUOUS	Default
CMP-FITEQ	Computing fittings and equipment	6 (magenta)	CONTINUOUS	Default

SEC-CAB	Security system cabling	7 (white)	CONTINUOUS	Default
SEC-FITEQ	Security system fittings and equipment	6 (magenta)	CONTINUOUS	Default
SEC-GEN	Security general	7 (white)	CONTINUOUS	Default
SEC-TXT2	Security text	7 (white)	CONTINUOUS	Default
AV-CAB	Audiovisual system cables	7 (white)	CONTINUOUS	Default
AV-FITEQ	Audio visual system fittings equipment	6 (magenta)	CONTINUOUS	Default
EV-CAB	Evacuation system cables	7 (white)	CONTINUOUS	Default
EV-FITEQ	Evacuation system fittings equipment	6 (magenta)	CONTINUOUS	Default
CAB-OTH	Cable other	7 (white)	CONTINUOUS	Default
CAB-RUN	Cable main runs	7 (white)	CONTINUOUS	Default
CAB-TRAY	Cable trays	7 (white)	CONTINUOUS	Default
CAB-TXT2	Cable text	7 (white)	CONTINUOUS	Default

Sample date layer names;

DATA-OUT	Data outlet	1 (red)	CONTINUOUS	Default
DATA-TXT2	Data text	7 (white)	CONTINUOUS	Default

Sample hydraulic layer names:

WAT-CHFEQ	Cold and hot water fittings and equipment	6 (magenta)	CONTINUOUS	Default
WAT-CNPOT_ph	Cold water non-potable pipework	1 (red)	PHANTOM	Default
WAT-CPWK_cl	Cold water pipework	1 (red)	CENTERX2	Default
WAT-HPWK	Hot water pipework	1 (red)	CONTINUOUS	Default
WAT-OTH	Water other	7 (white)	CONTINUOUS	Default
SEW-GEN_hi	Sewage general	1 (red)	DASHDOT	Default
DRA-GEN_hi	Drainage general	1 (red)	HIDDEN2	Default
FLU-GEN	Flushurettes general	7 (white)	CONTINUOUS	Default
HYD-GEN	Hydraulics general (header tanks, pumps recirculating water)	6 (magenta)	CONTINUOUS	Default
HYD-TXT2	Hydraulics text	7 (white)	CONTINUOUS	Default

Sample fire services layer names:

FIRE-CNTB	Fire control board	7 (white)	CONTINUOUS	Default
FIRE-EXIT	Fire exits and signs	7 (white)	CONTINUOUS	Default
FIRE-EXT	Extinguishers	6 (magenta)	CONTINUOUS	Default
FIRE-FITEQ	Fire fittings and equipment	6 (magenta)	CONTINUOUS	Default
FIRE-HREEL	Hose reel pipework and points	7 (white)	CONTINUOUS	Default
FIRE-HYD	Hydrant pipework and hydrant points	7 (white)	CONTINUOUS	Default
FIRE-OTH	Fire others	7 (white)	CONTINUOUS	Default
FIRE-SMK	Smoke detectors and cabling	7 (white)	CONTINUOUS	Default
FIRE-SPRK	Sprinkler pipework and heads	6 (magenta)	CONTINUOUS	Default
FIRE-THCAB	Thermal cabling and detectors	7 (white)	CONTINUOUS	Default
FIRE-THER	Thermal detection system	6 (magenta)	CONTINUOUS	Default
FIRE-TXT2	Fire text	7 (white)	CONTINUOUS	Default

Sample mechanical layer names:

DUCT-CSMN	Cooling main supply air ductwork	5 (blue)	CONTINUOUS	Default
DUCT-HSMN	Heating main supply air ductwork	6 (magenta)	CONTINUOUS	Default
DUCT-OTH	Duct other work	7 (white)	CONTINUOUS	Default
DUCT-RET	Return air (a/c) ductwork	6 (magenta)	CONTINUOUS	Default

DUCT-RREG	Return air (a/c) ductwork register	6 (magenta)	CONTINUOUS	Default
DUCT-SREG	Supply air (a/c) ductwork register	5 (blue)	CONTINUOUS	Default
DUCT-SUP	Supply air (a/c) ductwork)	5 (blue)	CONTINUOUS	Default
DUCT-SVEN	Supply air ductwork ventilation	5 (blue)	CONTINUOUS	Default
DUCT-SVREG	Supply air ductwork ventilation register	5 (blue)	CONTINUOUS	Default
DUCT-TXT2	Duct text	7 (white)	CONTINUOUS	Default
DUCT-VEXH	Exhaust air ductwork ventilation	7 (white)	CONTINUOUS	Default
DUCT-VEXREG	Exhaust air ductwork ventilation register	7 (white)	CONTINUOUS	Default
MECH-ELEC	Refer to electrical	7 (white)	CONTINUOUS	Default
MECH-EQGEN	Mechanical equipment general	6 (magenta)	CONTINUOUS	Default
MECH-OTH	Mechanical other	7 (white)	CONTINUOUS	Default
MECH-TXT2	Mechanical text	7 (white)	CONTINUOUS	Default