Charles Sturt University

Revision 1.0

Infrastructure Design Standards

Module S22: Project Digital Asset and Data Requirements

Division of Finance (Strategic Infrastructure)
Charles Sturt University

Document Control

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Contents

1. Introduction

1.1. Overview

The Charles Sturt University Infrastructure Design Standards (the Standards) outline the University's expectations for its built forms to achieve consistency in the quality of the design and construction of those built forms.

The Standards have been developed to provide guidance to the design team and to assist Facilities Management to drive a consistent approach to the design, construction, commissioning, handover, and operation of new capital projects to ensure the new asset is fully integrated into campus life and conforms to the University's standards and policies.

The successful integration of any new project into the day-to-day operation of campus life cannot be underestimated and is vital to ensuring the new asset provides a fully functional platform for Facilities Management clients and the University. The Standards will ensure Facilities Management is successful in supporting the University's strategic objectives now and into the future. The pitfall of viewing any new project as a standalone entity must be avoided as any new project is an extension of the existing campus.

The Standards are aligned with Charles Sturt's requisites for aesthetic appeal, life cycle maintenance and environmental sustainability, while ensuring that there is sufficient scope for innovation and technological advancements to be explored within each project.

1.2. The University

The history of Charles Sturt University dates to 1895, with the establishment of the Bathurst Experiment Farm. Formed progressively through the merge of regional institutions in south-western and western NSW, Charles Sturt was formally incorporated on 19 July 1989 under the Charles Sturt University Act 1989. As one of Australia's newer universities, Charles Sturt has been built on a tradition of excellence in teaching and research spanning more than 100 years.

With over 40,000 current students studying both on-campus and online, Charles Sturt University is the largest tertiary education institution in regional Australia. The University operates six main campuses across New South Wales in Albury-Wodonga, Bathurst, Dubbo, Orange, Port Macquarie, and Wagga Wagga, alongside specialist campuses in Canberra, Parramatta, and Goulburn. Charles Sturt University is structured around three Faculties: Arts and Education; Business, Justice and Behavioural Sciences; and Science and Health.

1.3. University Vision and Values

Charles Sturt University is committed to building skills and knowledge in its regions by offering choice and flexibility to students, while collaborating closely with industries and communities in teaching, research, and engagement. As a significant regional export industry, the University brings both strength and learning back to

its regions, positioning itself as a market-oriented institution. Its goals are to remain the dominant provider of higher education in its regions and a sector leader in flexible learning.

Charles Sturt University believes that wisdom has the power to transform communities. With perseverance and dedication, the University contributes to shaping resilient and sustainable regions for the future. Acknowledging the deep culture and insight of First Nations Australians, the University's ethos is encapsulated by the Wiradjuri phrase *yindyamarra winhanganha,* which translates to "the wisdom of respectfully knowing how to live well in a world worth living in." Through its values, Charles Sturt University fosters a welcoming community and learning environment that supports innovation, drives societal advancement, and gives back to the regions it serves.

1.4. Using the Infrastructure Design Standards

The Infrastructure Design Standards are written to advise Charles Sturt University performance requirements and expectations that exist above and beyond existing industry codes and standards.

The Infrastructure Design Standards do not repeat codes and standards.

Performance to Codes and Standards are a non-negotiable regulatory minimum of any design solution, to be determined for each project by the design team.

The Standards are to be used by all parties who are engaged in the planning, design, and construction of Charles Sturt's facilities. This includes external consultants and contractors, Charles Sturt's planners, designers, and project managers as well as faculty and office staff who may be involved in the planning, design, maintenance, or refurbishment of facilities. All projects must comply with all relevant Australian Standards, NCC, EEO as well as Local Government and Crown Land Legislation.

1.5. Modules

The Standards are divided into the following modules for ease of use, but must be considered in its entirety, regardless of specific discipline or responsibilities:

- S01 Overview and Universal Requirements
- S02 Active Transport
- S03 Acoustics
- S04 Building Management System
- S05 Electrical and Lighting
- S06 Energy Management
- S07 Ergonomics
- S08 Fire and Safety Systems
- S09 Floor and Window Coverings
- S10 Furniture
- S11 Heritage and Culture
- S12 Hydraulic

- S13 Information Technology
- S14 Irrigation
- S15 Mechanical Services
- S16 Roof Access
- S17 Termite Protection, Vermin Proofing and Pest Management
- S18 Security Systems
- S19 Signage
- S20 Sustainable Building Guidelines
- S21 Waste Management
- **S22 Project Digital Asset and Data Requirements**
- S23 Commissioning, Handover and Training

1.6. Related Documents

1.6.1. University Documents

The Standards are to be read in conjunction with the following relevant University documents, including but not limited to:

- Facilities and Premises Policy along with supporting procedures and guidelines
- Charles Sturt University Accessibility Action Plan 2020 - 2023
- Relevant operational and maintenance manuals
- Charles Sturt University Asbestos Management Plan
- Charles Sturt University Signage Guidelines
- Charles Sturt University Modern Slavery Statement
- Charles Sturt University Sustainability Statement
- Charles Sturt University Work Health and Safety Policy
- Charles Sturt University Risk Management Policy
- Charles Sturt University Resilience Policy
- Charles Sturt University Health, Safety and Wellbeing Policy

1.6.2. Federal Legislation

The planning, design and construction of each Charles Sturt University facility must fully comply with current relevant Federal legislation, including but not limited to:

- National Construction Code (NCC)
- Disability Discrimination Act 1992 (DDA)
- Environment Protection and Biodiversity Conservation Act 1999 (EPBC)
- Work Health and Safety Act 2011

1.6.3. NSW State Legislation

The planning, design and construction of each Charles Sturt University facility must fully comply with current relevant Federal legislation, including but not limited to:

- Work Health and Safety Act 2011
- Environmental Planning and Assessment Act 1979 (EP&A Act)
- Building and Development Certifiers Act 2018
- Heritage Act 1977
- Protection of the Environment Operations Act 1997 (POEO Act)
- Design and Building Practitioners Act 2020
- State Environmental Planning Policies (SEPPs)
- Local Government Act 1993

1.6.4. Federal Regulations and Standards

- Relevant Australian or Australian/New Zealand Standards (AS/NZS)
- Safe Work Australia Model Codes of Practice
- Work Health and Safety Regulations 2011
- Disability (Access to Premises – Buildings) Standards 2010
- National Environment Protection Measures (NEPMs)

1.6.5. NSW State Regulations and Standards

- SafeWork NSW Codes of Practice
- Disability (Access to Premises – Buildings) Standards 2010
- Building and Development Certifiers Regulation 2020
- NSW Work Health and Safety Regulation 2017
- Protection of the Environment Operations (General) Regulation 2022
- NSW State Environmental Planning Policies (SEPPs)
- Fire and Rescue NSW Fire Safety Guidelines
- NSW Local Council Development Control Plans (DCPs)

1.6.6. Manufacturer Specifications and Data Sheets

All installation must be carried out in accordance with manufacturer specifications and data sheets to ensure product performance over its intended life and so as not to invalidate any warranties.

1.6.7. Project-Specific Documents

Requirements specific to a particular project, campus, or other variable, will be covered by project specific documentation, such as client briefs, specifications, and drawings. These Standards will supplement any such

project specific documentation. The Standards do not take precedence over any contract document, although they will typically be cross-referenced in such documentation.

Extracts from the Standards may be incorporated in specifications; however, it must remain the consultant's and contractor's responsibility to fully investigate the needs of the University and produce designs and documents that are entirely 'fit for purpose' and which meet the 'intent' of the project brief.

1.7. Discrepancies

The Standards outline the University's generic requirements above and beyond the above-mentioned legislation. Where the Standards outline a higher standard than within the relevant legislation, the Standards will take precedence. If any discrepancies are found between any relevant legislation, the Standards and project specific documentation, these discrepancies should be highlighted in writing to the Manager, Capital Works.

1.8. Departures

The intent of the Standards is to achieve consistency in the quality of the design and construction of the University's built forms. However, consultants and contractors are expected to propose 'best practice / state of the art' construction techniques, and introduce technological changes that support pragmatic, innovative design. In recognition of this, any departures from relevant legislation, or the Standards, if allowed, must be confirmed in writing by the Manager, Capital Works. Any departures made without such written confirmation shall be rectified at no cost to the University.

1.9. Professional Services

All projects at Charles Sturt University require the involvement of adequately skilled and experienced professionals to interpret and implement the Standards. Consultants or contractors lacking proper qualifications and licenses are not permitted to conduct any work.

1.10. Structure of Document

This document is structured into 4 sections:

Section 1 Introduction (this Section).

Section 2 General Requirements – outlines the general requirements or design philosophies adopted at Charles Sturt University.

Section 3 Supporting Documentation – Legislation, Standards, Codes of Practice, University Policies, and other applicable technical references.

Section 4 Specifications (if applicable) – materials specifications and/or preferred lists for materials, processes or equipment used by Charles Sturt University.

2. General Requirements

2.1. Overview

These Standard outlines essential guidelines and requirements pertaining to digital asset data, CAD data, spatial data, survey data, and photography. It serves as a framework to ensure consistency, accuracy, and compatibility across all University capital projects and initiatives. These standards encompass the collection, storage, management, and utilisation of data relating to assets, CAD designs, spatial information, survey data, and photography. By adhering to these standards, the University aims to enhance efficiency, facilitate collaboration, and maintain the integrity of its data resources across projects and operations.

2.2. Asset Data

All projects shall include in the specification a requirement for the contractor to provide detailed asset information which is to be submitted in an electronic asset register. The preferred asset data management tool for projects is WebFM. Where WebFM is not specified then asset data will be required in a format provided by the University.

Prior to the entry of any asset data within the WebFM system the contractor shall ensure the system is established to meet the University's exacting requirements. Furthermore, the WebFM asset element structure shall be customised to the University's requirements to facilitate direct input into the University's work order management system and space management system.

To facilitate this process the contractor shall obtain a clear understanding of this requirement from the Manager, Assets and Systems, Charles Sturt University and submit the final data layout to the Project Officer for approval within six weeks of award of the contract. The contractor shall ensure that an unlocked copy of the completed asset register is provided to the Project Officer, in Microsoft Excel format, prior to the granting of Practical Completion under the terms and conditions of this contract.

2.3. Space Data Schedule

The Space Data Schedule is a document crafted to outline every area within the building and furnish the necessary asset details essential for Charles Sturt University. This data aids in orchestrating our facility's timetables and schedules, along with fulfilling the requirements for TEFMA reporting. The Lead Design Consultant is responsible for drafting the Space Data Schedule, which is subsequently endorsed by the designated Project Officer in consultation with Space Planning Team.

The Space Data Schedule is required to be finalised and presented during the Tender/Issued for Construction Stage. It will undergo revisions throughout the construction phase and must be resubmitted upon Practical Completion, along with the 'As-constructed' documents. The template must remain unaltered and unchanged. Please see below for additional clarification regarding the schedule prerequisites.

- Site Code
- Building Code

- Building Name
- Floor Code
- Room Code
- Room Name
- Room Area (m²)
- Room Ceiling height (m)
- Number of Workstations or Maximum Workstation Capacity (per room)
- TEFMA Room Category
- TEFMA Room Type
- Organisational Unit Allocation
- Occupants – Name of occupants if known

2.4. CAD Data

Consultants and contractors engaged in university projects must adhere to the following CAD principles. They are required to submit "As-Built" AutoCAD drawings accurately depicting the finalised construction within four weeks after practical completion. All parties involved are accountable for adhering to the layering hierarchy and data within each layer, as outlined in these guidelines. Any uncertainties regarding Charles Sturt University's expectations should be promptly clarified by contacting the University CAD Coordinator.

Validation and Accountability

Project Officers are responsible for verifying the accuracy of CAD drawing details in the as-built plans to ensure alignment with actual construction.

File Requirements

- AutoCAD files must be saved in AutoCAD release 2004 format.
- Prior to submission, CAD files must be purged of non-essential data and should not include frozen layers.
- External References (Xrefs) must be bound using the “Insert” method before submission.
- A plot style file (*.ctb) defining line weights for each color used in the CAD files must be included.

Drawing Format

- All CAD drawing elements should be drawn at full size (1:1) using millimeter drawing units without decimal places. For campus-level plans, meter drawing units should be used.
- Paper space should contain sheet borders, title blocks, logos, and other sheet components. Model space should include graphic representations of the project or facility, along with related notes, dimensions, and symbols.
- Elements that repeat in drawings (e.g., windows, doors) must be converted into blocks with a consistent insertion point at 0,0,0. These blocks should use layer 0 for all elements, with color, linetype, and lineweight set to “ByLayer”.

- Ensure that each physical component is represented only once and is not duplicated.

Styling

- Maintain “ByLayer” settings for colors and line weights of drawing elements.
- Dimensioning and hatching should be associative and must not be exploded.

Layer Organisation

- Organize drawing elements into logical layers based on their function rather than grouping everything on a single layer.
- Compliance with the Charles Sturt University Protocols for CAD Layering is mandatory. Refer to Section 4.5 in this module for detailed guidelines.

2.5. Geospatial and Coordinate Standards

For all spatial data and feature surveys, the following coordinate systems and datums must be used:

- All Campuses (excluding Port Macquarie): Map Grid Australia, Zone 55 (MGA 55) GDA 2020 for horizontal coordinates.
- Port Macquarie Campus: Map Grid Australia, Zone 56 (MGA 56) GDA 2020 for horizontal coordinates.
- Australian Height Datum (AHD) for vertical coordinates.

2.6. Spatial Data

Spatial data is crucial for Charles Sturt University, aiding in operational efficiency and strategic planning. Project Officers are responsible for validating the precision of spatial details represented in the as-built plans to ensure consistency with actual construction. During the Gate 2 phase of the project, Project Officers will collaborate with Space Planning and Essential Systems to verify the necessary space 'type' information which will be deliverable.

2.7. Survey Data

Surveys must precisely record all landscape characteristics and their connections to underground utilities, buildings, and other elements on the site. Surveyors are required to conduct thorough investigations, including Dial Before You Dig inquiries and electronic service detection, to ensure accurate identification of landscape features and their associations with underground services.

2.7.1. Feature Surveys

These surveys documents both natural and man-made elements within a designated area, including terrain contours, buildings, underground utilities, landscaping features, and property boundaries. This information is compiled into detailed maps and reports, aiding in campus planning and land use determinations, construction projects, and environmental management decisions.

- All plans must be oriented with North at the top of the screen; no rotation is permitted when using campus survey drawings.
- If available on or in proximity to campus, a Permanent Survey Mark (PSM) must be utilised. If no PSM exists, the contractor must place three control points in stable areas, with their coordinates and positions submitted upon completion.
- Contours must be included on all drawings at appropriate intervals where applicable.
- Trees with a dimeter of over 100mm or more must be surveyed, with their positions marked at the middle of the trunk, measured one meter above ground level. Areas of shrubland shall be surveyed based on their perimeter.
- Landscape features including but not limited to fences, paths, stairs, signage, garden beds, outdoor infrastructure, hard and soft landscape elements must be accurately surveyed and depicted in the drawings.

2.7.2. Underground Services

All constructed underground services must be accurately mapped, clearly illustrating their connections to landscape features. Site survey data is mandatory for all new in-ground services, modifications to existing in-ground services, and developmental locations. Surveys should yield the following details for each detected service, irrespective of whether any portion of the service is visible above ground or concealed underground:

- Align tolerance with AS 5488.1:2022 Classification of Subsurface Utility Information (SUI), Part 1: Subsurface Utility Information and ensure quality of asset and infrastructure location along with attribute data.
- The relevant Campus Facility Manager can provide records of known services upon request.
- Position of service on the plan, with a distance measurement from the nearest building edge.
- Material of pipe or conduit.
- Depth or covering of pipe, conduit, or cable.
- Diameter of pipe or conduit.
- Recorded elevation on pit covers.
- Precise location and depth of the pit, including its boundaries.
- Inverted level of pipes or conduits merging at a pit.
- Comprehensive documentation outlining pit type, material, depth, lid specifications, and pit condition.
- For conduit arrays, the surveyor must specify the number of unused conduits versus those in operation.
- Identification and recording of all isolation valves, both internal and external to buildings, relative to landscape features.
- Clear identification and documentation of landscape features potentially impacted by underground services.
- Photography as specified by the Project Officer (e.g., pits).

The submitted documentation for underground services will be furnished in two forms, comprising an AutoCAD drawing file and an Excel spreadsheet. To link Excel data with the corresponding service entity on the CAD file accurately, each record in Excel will possess a distinct entity code.

2.7.3. Landscape Features

Landscape surveys shall include accurate data on the following features:

- External amenities encompassing both overhead and subterranean utilities, signage, waste receptacles, furnishings, hydration stations, emergency call points, bicycle repair stations, poster stands, grilling areas, compost containers, water installations, planters, barriers, birdbaths, irrigation systems, and more.
- Solid landscape attributes such as walkways, fencing, entrances, furnishings, retaining structures, curbs, buildings (including entrances), and other constructions within the site's boundaries.
- Soft landscape elements, inclusive of natural path borders, trees, flower beds, lawns, ponds, and all vegetation surpassing one meter in height.
- Ground level data to accurately depict the topography of the terrain.

2.8. Site Evacuation Diagrams

Refer to Module S08 - Fire and Safety Systems.

2.9. Photography

Photography standards are integral to facilities management, serving as indispensable tools for documentation and navigation purposes. These standards, aimed at enhancing operational efficiency and facilitating effective communication, encompass various photographic forms. Five primary categories are noted: Architectural Photography captures the essence of structures and their design intricacies; Wayfinding Photography guides individuals through physical spaces with clarity; Aerial Photography offers unique perspectives; 360-Degree Photography provides immersive visual representations; and Repeat Photography enables systematic monitoring of changes over time.

Project photography will be stored within the appropriate project S-Drive and should be shared with other University entities such as Customer Experience (Marketing) as images of the built environment appear regularly on University promotional material.

2.9.1. Architectural Photography

Architectural photography captures the design and details of buildings and structures, serving various purposes like promotion or documentation. It typically includes exterior and interior shots, showcasing overall design, materials, and spatial qualities. Prior to enlisting the services of a photographer, it's advisable to draft a brief outlining the essential specifications and scope of work accompanied by architectural drawings. This serves as the foundation against which the photographer will provide pricing. Create a list of essential shots. This practice not only prompts deeper consideration but also aids in crafting a comprehensive shot roster.

While the photographer will likely capture additional photos they believe will benefit, having a shot list ensures that all mandatory shots are accounted for.

Preparing the building or location is a crucial step that significantly influences the success of a photoshoot. Moreover, prepping the building and its surroundings reduces editing time, resulting in cost savings. Key preparation considerations include:

- Envision the building as you'd like others to see it.
- Turn on all interior lights.
- Deactivate motion sensors or absence detection (especially if photos are needed with all lights on).
- Arrange curtains and blinds neatly.
- Arrange soft furnishings and cushions.
- Clear away vehicles, bins, skips, scaffolding, or debris piles.
- Remove hosepipes (which can be challenging to remove in post-processing).
- Attend to gravel spillage, which can be time-consuming to address later.
- Sweep paths, roads, and driveways.
- Clear work surfaces.
- Showcase branding items.
- A general tidying up always enhances the overall appearance.

2.9.2. Wayfinding Photography

The following guidelines have been taken from the FMCentral - Procedure - Attachment Management in FMCentral and Archibus in Confluence (University account required):

General

- Photos should contain current branding only. If you are unsure, please refer to the Brand Guidelines.
- No people should be visible
- Photos should not include construction activity.
- Avoid including vehicles in the photo, in particular no registration plates
- Avoid taking photos of bins, rubbish or cardax sensors.
- Take advantage of the best light conditions.

Site Photos

- Where possible, photos should be taken with ‘blue-sky’ background.

Building Photos

- Should be clear, consistent images of buildings based on what people would normally see and can relate to.
- Primary (thumbnail) photo should show the main building facade / entrance, where possible, ensure the building number and or name is visible in the primary photo. Secondary photos will consider alternate views of the building (sides and rear).

- In most cases the entire building should be included in the photo, including any verandas or balconies, with a relatively small margin between the edge of the building and the edge of the photo.
- Where possible, photos should be taken with ‘blue-sky’ background.
- Where possible avoid including signage.
- Try to avoid having shadows on the building.

Room Photos

- Include room facilities e.g., white board, lectern.
- Room should be neat and tidy.
- No photos of toilets, cubicles, cupboards etc.
- Where possible avoid including signage.

2.9.3. Aerial Photography

The use of aerial photography, facilitated by drones or UAVs, has become increasingly prevalent as a means of assessing campus infrastructure and land use. Depending on the building/space/land parcel being photographed, it may be useful to commission aerial shots. Adherence to the protocols is imperative to guarantee the safe and ethical operation of aerial data capture:

- Permission from the University is required before any remotely piloted aircraft (RPA) or drones are used on or above University premises.
- Photographs must be captured using a UAV certified by the Civil Aviation Safety Authority (CASA) and operated by a remote pilot license holder with all necessary licenses and certifications, permits and licenses.
- Safety protocols will be implemented to prevent accidents and injuries during aerial photography, such as maintaining a safe distance from people and property, avoiding restricted airspace, and conducting pre-flight checks.
- Respecting privacy rights by obtaining consent when photographing individuals or private property and avoiding capturing sensitive or intrusive imagery.
- Minimising environmental impact by adhering to guidelines for wildlife protection, avoiding sensitive habitats, and properly disposing of waste generated during aerial photography activities.
- Image quality, resolution, and accuracy will be agreed to ensure that aerial photographs meet the intended purpose.
- Further information for project officers can be found in the Facilities and Premises Procedure - Access, Use and Security Policy: Filming on University premises.

2.9.4. 360 Degree Spherical Imagery

With the growing integration of virtual reality in architectural design and facility operations, the use of 360 degree imagery is a rapidly emerging discipline that will be integrated into all construction projects. The following guidelines will ensure consistency and quality throughout the acquisition of imagery for creation of immersive experiences.

- 360 imagery to be captured by appropriate high resolution 360 degree cameras or laser scanners with 360 degree imagery capability.
- Thorough capture planning will determine capture locations with a spacing of 5m-10m apart, adjusting for tighter spaces, and identifying key areas for coverage.
- Imagery will be captured at designated locations, ensuring proper alignment, exposure, and coverage.
- Imagery will not contain photos of people.
- Thorough post-processing activities will be undertaken to stitch captured imagery to create seamless panoramas. Quality checks will be performed to minimise errors.
- Imagery will be supplied in a format compatible with the approved University navigation interface.

2.9.5. Repeat Photography

Repeat photography examines changes in built and natural environments over time and space. It facilitates historical analysis and necessitates detailed documentation for potential replication. This process involves locating historic photo sites, determining camera angles based on seasonal variations, and maintaining comprehensive field records, including GPS coordinates and camera height. Repeat photography is recommended for refurbishments of buildings on noted historical importance to the University. Historical photos can be located through the Charles Sturt University Regional Archives and University Art Collection.

3. Supporting Documentation

These below lists are not all-inclusive and those associated with the project are responsible for identifying and complying with all standards relevant to the scope of works.

3.1. Supporting Legislation

National Construction Code of Australia (NCC) 2022

Work Health and Safety Act 2011 (NSW)

State Records Act 1998 (NSW)

Government Information (Public Access) Act 2009 (GIPA Act) (NSW)

Data Sharing (Government Sector) Act 2015 (NSW)

3.2. Supporting Standards

Standard Number	Standard Title
AS 1100 Series	Technical Drawing Standards
AS 3745-2010	Planning for emergencies in facilities (Amd 2:2018)
AS 4590.1:2017	Interchange of client information, Part 1: Data elements and interchange formats (Amd 1:2020)
AS 5488.1:2022	Classification of Subsurface Utility Information (SUI), Part 1: Subsurface Utility Information
AS/NZS 4270.1:1995	Geographic information systems - Spatial data transfer standard, Part 1: Logical specifications
AS/NZS ISO 19115.1:2015	Geographic information - Metadata, Part 1: Fundamentals
AS/NZS ISO 19115.2:2019	Geographic information - Metadata, Part 2: Extensions for acquisition and processing
ISO 11799:2003	Information and documentation - Document storage requirements for archive and library materials
ISO 19650 Series	Organization and digitization of information about buildings and civil engineering works, including building information modelling (BIM) - Information management using building information modelling

3.3. Industry Codes of Practice

Geoscience Australia Data Standards

https://www.ga.gov.au/data-pubs/datastandards

NSW Custodianship Guidelines for Spatial Data

https://www.spatial.nsw.gov.au/__data/assets/pdf_file/0003/219279/NSW_Custodianship_Guidelines_for_Spatial_Data_-_Under_Review.pdf

State Records NSW Standard on records management

https://staterecords.nsw.gov.au/guidance-and-resources/standard-records-management

TEFMA Space Planning Guidelines (Account required)

https://www.tefma.com/

Photography & Copyright

https://www.copyright.org.au/browse/book/ACC-Photographers-&-Copyright-INFO011

3.4. University Documentation

Facilities and Premises Schedule - Filming on University Premises

https://policy.csu.edu.au/download.php?id=868&version=1&associated

3.5. Other Resources

Data NSW

https://data.nsw.gov.au/

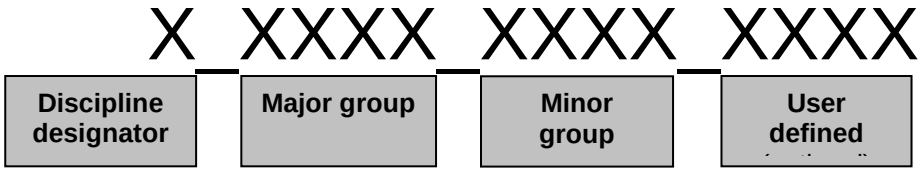
4. Specifications

4.1. Protocols for CAD Layering

Layer name format

The layer name format is based on a hierarchy common to many CAD layering systems which provides room for varying levels of detail within a consistent format. The format is expressed through distinct data field codes separated by underscores. Each data field code is an abbreviation of construction terminology.

There are four data field codes: Discipline Designator, Major Group, Minor Group and User Defined Group. The Discipline Designator and Major Group are mandatory while the other two are optional.



1. Discipline designator (X_XXXX_XXXX_XXXX)

The discipline designator shall define the layers discipline as follows:

Code	Description
A	Architectural
C	Civil
E	Electrical
F	Fire protection
G	General Information (non-discipline specific)
H	Hydraulic
L	Landscape
M	Mechanical
P	Plumbing
Q	Communications
S	Structural
Z	Space management

2. Major group

Major group headings shall define assemblies or construction systems such as walls, doors, ceilings...

Architectural Layers (A_XXXX_XXXX_XXXX) – Also refer to section 5 Abbreviations

Code	Description	Color	Linetype
CEIL	Ceiling Elements, Soffits, and Bulkheads	8, Dark grey	Hidden
COLN	Structural Columns	2, Yellow	Continuous
DIMS	Dimensions	11,	Continuous
DOOR	Door	4, Cyan	Continuous
DPIP	Drain, Down pipes	8, Dark grey	Continuous
DUCT	Ductwork	8, Dark grey	Continuous
EQPT	Equipment	8, Dark grey	Continuous
FLOR	Floor Information	7, White	Continuous
FURN	Furniture	8, Dark grey	Continuous
GLAZ	Window, Glass partitions	4, Cyan	Continuous
GRID	Grids	5, Blue	Center
HATC	Hatch Pattern	8, Dark grey	Continuous
HIDD	Hidden Lines	8, Dark grey	Hidden

HRAL	Handrails, grabrails	8, Dark grey	Continuous
LIFT	Lift Cars	8, Dark grey	Continuous
LOUV	Louvre	8, Dark grey	Continuous
NOTE	Note and Call-outs	3, Green	Continuous
PART	Partition	2, Yellow	Continuous
ROOF	Roof Information	9, Light grey	Continuous
STRS	Stair risers, treads, ramps, arrows	9, Light grey	Continuous
SYMB	Symbols	11,	Continuous
WALL	Wall	1, Red	Continuous

Civil Layers (C_XXXX_XXXX_XXXX) – Also refer to section 5 Abbreviations

Code	Description	Color	Linetype
BLDG	Building Footprints	6, Magenta	Continuous
PAVE	Paving, Footpaths, Courts etc.	7, White	Continuous
PKNG	Parking Layouts indicators, arrows	9, Light grey	Continuous
PROP	Property Lines and Benchmarks	1, Red	Hidden
ROAD	Roads	7, White	Continuous
SETB	Easements, Setbacks ...	5, Blue	Hidden
TOPO	Topographic info, contours, levels...	8, Dark grey	Continuous
VEGE	Vegetation, soft landscaping	3, Green	Continuous
WATR	Site Water Features, Rivers, Streams	4, Cyan	Continuous

Electrical Layers (E_XXXX_XXXX_XXXX) - Also refer to section 5 Abbreviations

Code	Description	Color	Linetype
GRAL	Electrical equipment, fixture in general	3, Green	Continuous

Fire Protection Layers (F_XXXX_XXXX_XXXX) - Also refer to section 5 Abbreviations

Code	Description	Color	Linetype
EGRS	Egress		
EVAC	Evacuation		
PROT	Protection		

General Layers (G_XXXX_XXXX_XXXX) - Also refer to section 5 Abbreviations

Code	Description	Color	Linetype
TTLB	Title Block [Paper space only]	4, Cyan	Continuous
VPRT	Viewport	1, Red	Continuous

Hydraulic Layers (H_XXXX_XXXX_XXXX) - Also refer to section 5 Abbreviations

Code	Description	Color	Linetype

Landscape Layers (L_XXXX_XXXX_XXXX) - Also refer to section 5 Abbreviations

Code	Description	Color	Linetype
GRND	Ground	8, Dark grey	Continuous
PAVE	Pavement	8, Dark grey	Continuous

Mechanical Layers (M_XXXX_XXXX_XXXX) - Also refer to section 5 Abbreviations

Code	Description	Color	Linetype

HOTW	Hot water		Continuous
NGAS	Natural Gas		

Plumbing Layers (P_XXXX_XXXX_XXXX) - Also refer to section 5 Abbreviations

Code	Description	Color	Linetype
DOMW	Domestic Water System		
GSWR	Grey Water System		
SSWR	Sanitary Sewer System		
STRM	Storm Drain System		

Communication Layers (Q_XXXX_XXXX_XXXX) - Also refer to section 5 Abbreviations

Code	Description	Color	Linetype
COMM	Communication system		

Structural Layers (S_XXXX_XXXX_XXXX) - Also refer to section 5 Abbreviations

Code	Description	Color	Linetype
BEAM	Structural Beams		
FRAM	Framing		
JOIS	Joists		
PURL	Purlins		
RFTR	Rafters		

Space management Layers (Z_XXXX_XXXX_XXXX)

Code	Description	Color	Linetype
FECA	Polylines for Fully enclosed covered areas	3, Green	Hidden
PATT	Patterns,hatches indicating occupants (schools, divisions..)	Varies	Solid hatches
PBLD	Polylines for Building footprint	11,	Hidden
RNAM	Room names, functions	7, White	Continuous
RNUM	Room numbers	4, Cyan	Continuous
ROCC	Room occupants (schools, divisions, occupant names...)	3, Green	Continuous
UCA	Polylines for Unenclosed covered areas	4, Cyan	Hidden

Archibus Layers (No prefix)

Code	Description	Color	Linetype
GROS	Gross area	6, Magenta	Continuous
RM	Room area	4, Cyan	Continuous

3. Minor group

Minor group headings shall further define the major group headings such as:

Generic information (X_XXXX_XXXX_XXXX)

Code	Description	Color	Linetype
ADDL	Additional		
DEMO	Items to be Demolished		
DIMS	Dimensions		
ELEV	Elevation linework		
EXST	Existing elements to Remain		
FIXD	Fixed items		

IDEN	Identification numbers, codes etc		
LEVL	Levels, RL's etc		
MBND	Materials Beyond cut in Section		
MOVE	Movable items		
NEWW	New Work in existing Buildings		
NOTE	Notes, Call Outs, Keynotes, Leaders		
NPLT	Non plotting Information		
OTLN	Outlines, rooms floors, roofs, buildings etc		
OVER	Items over the work plane		
PATT	Hatches, Patterns, Tones		
SCHD	Schedules, lists etc		
SECT	Section linework		
SYMB	Detail symbols, northpoints, section lines		
TEXT	General Notes & Specifications		
TTLB	Titleblock info (fixed information)		
VARI	Title info (variable) date,dwg no.etc		
UNDR	Items under the work plane		
VPRT	Autocad Viewports		

Material information (X_XXXX_XXXX_XXXX)

Code	Description	Color	Linetype
BLOK	Blockwork		
BRCK	Brickwork		
CONC	Concrete		
METL	Metal Work, Handrails		
PBRD	Plasterboard		
PLST	Plaster render		
STEL	Steelwork, structural		
TILE	Tile		
TIMB	Timber		

4. User defined group

User defined characters are provided for extended clarification (second minor group) and shall be represented by four alphabetic and/or numeric characters.

Generic information (X_XXXX_XXXX_XXXX)

5. Abbreviations

List of abbreviations:

Code	Description
ABLT	Anchor Bolts
ACCS	Access
ACID	Acid, Alkaline, And Oil Waste Systems
ALRM	Alarm System
APPL	Appliances
AREA	Area Calculations & Occupancy Info
AUXL	Auxiliary Systems
BEAM	Beams
BELL	Bell System
BLDG	Building Foot Print
BRIN	Brine System
CABL	Cable Trays
CCTV	Closed Circuit Television
CHIM	Prefabricated Chimneys

CIRC	Circuits
CLNG	Ceiling Information
CLOK	Clock System
CNTR	Centrelines
CMPA	Compressed Air System
COLS	Columns
COMM	Telephone & Communication System
CO2S	Co2 System
CTRL	Control & Instrumentation System
CWTR	Chilled Water System
DATA	Data System
DETL	Details
DHED	Door Header
DICT	Central Dictation System
DOMW	Domestic Hot & Cold Water System
DOOR	Doors
DUCT	Duct Work
DUST	Dust & Fume Collection System
DIMS	Dimensions
ELEV	Interior & Exterior Elevations
ENER	Energy Management System
EQPM	Equipment
EVTR	Elevator Equipment
EXHS	Exhaust System
EXIT	Exiting
FENC	Fencing
FIRE	Fire Protection Or Alarm System
FIXT	Fixtures
FLOR	Floor Information
FNDN	Foundation
FRAM	Framing Plan (Beams & Joists)
FUEL	Fuel System Piping
FURN	Furniture
GLAZ	Windows & Curtain Walls
GRID	Column Grid
GRND	Ground (Elec.)And/Or (Planting)
GSWR	Grey Water System
HALN	Halon System
HOTW	Hot Water Heating System
HVAC	Hvac System
INTC	Intercom System
IRRG	Irrigation System
LEGN	Legend Of Symbols
LLIN	Single Line Diagram
LTNG	Lighting Protection System
MACH	Machine Shop Equipment
MDGS	Medical System
METL	Miscellaneous Metal
NGAS	Natural Gas & Storage Tanks
NURS	Nurse Call System
NOTE	Notes, Call Outs, & Keynotes
PGNG	Paging System
PKGN	Parking
PLNT	Planting
POWR	Power
PROC	Processing System
PROP	Property Line
PROT	Fire Protection System

REFG	Refrigeration System
RISR	Riser Diagram Or Plan
ROAD	Roads
ROOF	Roof
SANR	Sanitary Drainage
SCHD	Scheduled & Title Block Sheets
SECT	Sections
SERT	Security System
SHBD	Sheet Boarder & Title Block Line Work
SITE	Site Improvements
SLAB	Slab
STEM	Steam Systems
STRM	Storm Drain System
SPCL	Special System
SPRN	Fire Protection Sprinkler System
SSWR	Sanitary Sewer
SOUN	Sound Or Pa System
STAN	Fire Protection Standpipe System
SYMB	Symbols, Bubbles, And Targets
TEST	Test Equipment
TOPO	Proposed Contour Lines & Elevations
TVAN	Television Antenna System
TREE	Tree
TEXT	General Notes & Specifications
WALK	Walks And Steps
WALL	Walls
WATR	Domestic Water