



THE UNIVERSITY OF
SYDNEY

CIS Building and Architecture Standard

The University of Sydney

Planning Team



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1 PURPOSE

The Building and Architecture Standard sets out the University's minimum requirements and principles for architects, consultants and contractors involved in planning, design, documentation, construction and management of building and refurbishment projects. The purpose of the standard is to ensure new and refurbished building projects consistently meet the University's design and engineering objectives whilst being aesthetically creative, innovative, environmentally sustainable, flexible and cost-efficient to build, operate and maintain. The standard promotes the creation of a safe environment. This safe environment must be achieved for all users and must include but not be limited to crime prevention and safety-in-design. The standard also supports the University's Vision for the Built Environment and world's best practice.

1.1 OBJECTIVES

The standard seeks to achieve the following key objectives:

- a. **Quality Architectural Design** that responds, enhances and complements the surrounding environment
- b. Appreciation of the **Heritage Context and Cultural History** of the campuses
- c. **Whole of Life** asset value-for-money
- d. Design of **Low Maintenance** building and environments
- e. **Durability** of construction materials and a whole-of-life performance approach to design
- f. **Standardisation of Space** to minimise individual specialization and customisation
- g. **Flexible Space Design** to future proof building usage for expansion or adaption to new uses
- h. **Safety-in-Design** to provide a safe outcome for construction, operation and maintenance
- i. **Energy Efficiency** and solar-passive design
- j. Optimise use of **Natural and Cross Ventilation**
- k. Building services and facilities are **Resource Efficient**
- l. Use of **Environmentally Sustainable Building** materials and furnishings
- m. Plant and equipment design with built-in **Flexibility** to accommodate inevitable future uses
- n. Compliance with applicable mandatory requirements in:
 - i. Workplace Health and Safety Legislation (WHS)
 - ii. Disability Discrimination Legislation (DDA)
 - iii. State Environmental Planning Legislation (SEPP)
 - iv. Commonwealth and State Legislation
 - v. National Construction Codes (NCC)
 - vi. Building Code of Australia (BCA)
 - vii. Australian and New Zealand Standards (AS/NZS) are the minimum and mandatory compliance requirements

Where any ambiguity exists between this standard and the aforementioned mandatory requirements then:

- a. The highest performance requirements apply
- b. Applicable requirements follow this order of precedence:
 - i. Workplace Health and Safety Legislation
 - ii. Disability Discrimination Legislation
 - iii. State Environmental Planning and Assessment Legislation
 - iv. All other Commonwealth and State Legislation



- v. NCC and BCA
- vi. Australian Standards (AS/NZS)
- vii. This standard and other University of Sydney Standards and Design Guidelines

2 SCOPE

This design standard describes minimum requirements for design, construction and maintenance of new buildings and the refurbishment of existing buildings and spaces owned, operated and managed by The University of Sydney. It applies to:

- a. New building construction
- b. Refurbishment projects for University-owned spaces over 50m² excluding external walls
- c. Refurbishments of spaces that form part of a broader medium term (less than five years) programme/plan of progressive upgrades to a University-owned building
- d. Refurbishment projects for long term University leased (more than five years post-refurbishment) spaces over 50m² excluding external walls
- e. Facilities maintenance services

The standard covers most University-specific space types and applications. Where specific applications are not explicitly covered or ambiguity exists, the intent of the design standard must be satisfied. In such cases, a return design brief must be provided for review and approval by the issuer of this standard or their appointed delegate, who must have relevant technical competence in the subject matter.

The standard applies to planners, architects, project managers, consultants, contractors, sub-contractors, tenants, managing agents, University staff and others involved in the design, construction and maintenance of existing, new and proposed University buildings and facilities.



3 GLOSSARY OF TERMS

CIS	Campus Infrastructure and Services
GECA	Good Environmental Choice Australia is an independent ecolabelling program and is the only Australian member of the Global Ecolabelling Network. GECA sets the standards for environmental performance across the life cycle of building products. GECA standards are recognised by the Infrastructure Sustainability Council of Australia. Products certified to GECA standards demonstrate superior environmental performance.
Ecospecifier	Ecospecifier provides a detailed database of certified and verified life-cycle assessed sustainable products, materials and technologies. Products certified to GECA standards demonstrate superior environmental performance.
AHU	Air handling units
FCU	Fan coil units
NCC	National Construction Code
VOC	Volatile organic compounds
AS	Australian Standards
BCA	Building Code of Australia now NCC
BMS	Building Management System
CMP	Conservation Management Plan
EMP	Environmental Management Plan
GFA	Gross Floor Area as measured from the internal face of the external wall excluding risers, stairs and lift shafts.
GTS	General Teaching Space
IEQ	Indoor Air Quality
WHS	Work Health and Safety
NABERS	National Australian Built Environment Rating System
UFA	Useable floor area – as measured
VOC	Volatile Organic Compound
WC	Water Closet (i.e. toilet)

4 AUTHORITIES AND RESPONSIBILITIES

This standard is issued by CIS. It is approved and signed-off by the Director, CIS. The CIS Planning is responsible for maintaining the standard and keeping it up-to-date. The Standard must be reviewed at least biennially.

5 TECHNICAL REQUIREMENTS

5.1 UNIVERSITY SPECIFIC PLANNING REQUIREMENTS

This document must be read in conjunction with the following documents, including but not limited to:

- a. University of Sydney White Paper
- b. Campus Improvement Plan 2014 – 2020
- c. Environmental Sustainability Policy
- d. Section 170 Register and relevant Conservation Management Plan where subject project is located in a heritage listed building
- e. The University of Sydney Grounds Conservation Plan 2002
- f. Heritage Asset Management Strategy 2006 as amended
- g. Faculty Management Strategy
- h. Draft Public Art Policy
- i. Sustainability Framework
- j. All CIS Design Standards, including but not limited to:
 - i. CIS Accessibility Standard;
 - ii. CIS Interior Fitout Standard
 - iii. CIS Design Standard Heritage
 - iv. The University of Sydney Sustainability Framework
 - v. Building Projects Approval and Management Policy
 - vi. CIS Mechanical Services Standard
 - vii. Building Management and Control Systems
 - viii. CIS Electrical Services Standard
 - ix. CIS Lighting Services Standard
 - x. CIS Security Services Standard
 - xi. CIS Vertical Transportation Standard
 - xii. CIS Essential Fire Safety Measures Standard
 - xiii. CIS Hydraulic Services Standard
 - xiv. CIS Roofing and Guttering Standard
 - xv. CIS Landscape Standard
 - xvi. CIS Advanced Utilities Monitoring System Standard

5.2 PLANNING AND URBAN DESIGN

Details of design and construction requirements for buildings are outlined in this section.

5.2.1 EARLY AND PRELIMINARY PLANNING

Early planning must include the review and assessment of the proposed location of buildings with respect to:

- a. Logistics including vehicular access and deliveries
- b. Existing services infrastructure and capacities



- c. Existing in-ground services
- d. Easements in favour of utilities and Authorities
- e. Flood impact, overland flow and stormwater
- f. Environmental impact as per general requirements

5.2.2 RELATIONSHIP TO OUTDOOR SPACES AND THE SURROUNDING ENVIRONMENT

All new building or refurbishment work must complement the primary function of surrounding buildings and green space.

Open spaces within buildings must integrate with the architecture, compliment solar passive design elements and provide a variety of direct sunlight and filtered shade as a minimum whilst minimising external noise impacts. Courtyards must be strategically designed to enhance or create cross ventilation. Ground levels must be permeable, highly active and link open spaces to the University network of spaces.

New buildings and major external refurbishments must be designed to enhance and compliment the surrounding environment and must minimise overshadowing, loss of privacy and adverse impacts on general amenity.

Internal building functions must be zoned within buildings to allow activation and interface with the Public domain.

Spaces between buildings and structures must be considered in their own right to provide a stimulating environment that is distinguishable, safe and accessible. Awnings and colonnades must be considered to protect pedestrians without creating barriers and obstacles.

Landscaping and outdoor space around and within buildings must enhance the University of Sydney campus environment, identity, character and sense of place. Landscaping and water features must also be designed to improve thermal regulation and cross ventilation.

Vehicle movement around buildings must be designed to avoid and minimise conflicts between cars, commercial vehicles, bicycles, pedestrians, Emergency vehicles etc. Vehicle roadways around buildings must also be designed to minimise noise impacts on occupants.

5.2.3 AXES AND VISTAS

Buildings must be designed to enable occupants to enjoy views and, to the extent possible, maintain views from existing buildings and public spaces. The preservation of specific vistas will be referred to on a project-by-project basis.

The University of Sydney Grounds Conservation Plan has a number of existing axes and historical vistas that must be maintained, enhanced or reinstated.

All new developments, refurbishments and extensions must take context, curtilage, view lines and view corridors into consideration in the earliest design stages.

5.3 HERITAGE AND CONSERVATION

5.3.1 GROUNDS CONSERVATION MANAGEMENT PLAN

The University's policy is to maintain and conserve its heritage buildings, details of which are listed in The University of Sydney Grounds Conservation Plan. New buildings or additions must adhere to

requirements of this plan and consider the impacts of new developments and insertions on the heritage buildings and environs.

The University has documented specific conservation management plans developed for each heritage building that describe the appropriate design approach. Architectural designs, insertions and interventions must consider specific requirements for heritage conservation outlined in conservation management plans.

Designs must comply with setbacks and heritage curtilages outlined in the conservation management plans.

All new buildings and additions must submit a Heritage Impact Statement and Archaeology Report to CIS for approval for the development application.

In addition, all new building design proposals must provide an Arborist's Report outlining the impacts of the design proposal on existing trees and details of replanting and replacements proposed.

New development proposals must include a Traffic and Parking Impact Report outlining the issues and their resolution including construction and post occupancy phases.

5.4 ARCHITECTURAL DESIGN PRINCIPLES

5.4.1 ENTRY AND ARRIVAL

There must be one clear form and point of entry to each building that provides a visible identity and sense of arrival and place. The entry must include appropriate manned or unmanned reception and information and directory to provide wayfinding and orientation to the user.

5.4.2 ECONOMY AND FLEXIBILITY

The University's goal is to achieve the optimal balance between capital and operating costs for construction and refurbishment, whilst providing occupants a high level of environmental quality and service throughout the lifetime of each building.

The University's buildings and external spaces must be robust, durable, cost-effective to maintain, environmentally sustainable and designed for flexibility to accommodate future changes

5.4.3 FUNCTIONAL PLANNING AND ZONING

Generally the most highly utilised spaces, usually undergraduate areas, must be located at ground floor levels to reduce vertical circulation within the building.

Public access must be limited to one entry point, if possible, to minimise security risks and provide control and passive surveillance. Provisions for circulation must be minimized for efficient use of space and ease of movement. Circulation provisions must be adequately sized to accommodate the movement of occupants, furniture and equipment through the building.

Space planning must allow for flexibility and reconfiguration. Design of fitout elements must allow for easy disassembly and redeployment and should avoid fixed fitout elements where possible.

Stairs and staircases must be located in prominent positions to encourage physical activity and be promoted as the primary form of vertical travel. Lifts should be located close by, in a less prominent position, as a secondary option for vertical transport in order to minimise operation and maintenance costs and energy use.

Shared facilities such as toilets, change rooms, kitchens and tea points must be located in accessible locations in or adjacent common areas.

Service zones must be located to minimise adverse impact on other functions within the building, or neighbouring buildings, while providing adequate easy access for servicing and maintenance. Plant areas and plant rooms must be located to facilitate maintenance access and must be visibly screened and acoustically treated to minimize noise impacts.

Planning must include provision for the following spaces:

- a. Building Managers Office
- b. Fire Control Room
- c. Cleaners' Rooms-central stores 30m² and at least one cleaners' cupboard per level
- d. Waste Storage spaces-spaces to accommodate bins for recyclables, general waste, food waste, clinical, specialist as appropriate.
- e. First Aid Room (large projects only greater than 5000m²)
- f. Accessible WC at Ground Floor-Located in foyer or public area adjacent entry with automatic or actuated door access
- g. Grounds or Gardeners' Store-accessible from outside only

5.4.4 ACCESS FOR PERSONS WITH DISABILITIES

Designs must comply with requirements of the NCC, CIS Accessibility Standard and AS1428.1.

5.4.5 VEHICLE ACCESS AND PARKING

Provision must be made for service and delivery vehicle access in an appropriate location consisting of loading or service parking bays as a minimum. Provision of a loading dock may be required for larger projects and must include appropriate vehicle access to comply with **AS2890.2** and headroom clearance of 4.6m.

Parking within the building where provided must comply with **AS2890.1** and **AS2890.6** for Accessible Parking provisions.

Special consideration must be given to access provisions for waste collection trucks servicing the buildings to ensure easy access, egress and manoeuvring.

5.4.6 SPACE DESIGN

All space planning not covered in this Standard is to refer to **TEFMA Australasian Association of Higher Education Facilities Officers (AAPPA) guidelines**, unless advised otherwise.

Workplace and Office space is covered in a separate **CIS Interior Fitout Standard** which must be read in conjunction with this Standard.

Physical Learning Spaces Requirements are a separate CIS Interior Space and Workplace Standard, and must be read in conjunction with this Standard.

5.5 SUSTAINABLE DESIGN IN CONCEPT DESIGN

The University is committed to environmentally sustainable design. All new buildings and refurbishments must conform to current requirements of the CIS Sustainability Standard to ensure designs deliver environmentally sustainable and resource- efficient buildings and functional spaces.

Building designs must employ passive design strategies to respond to environmental conditions of the building including orientation, solar access, prevailing winds, and seasonal and diurnal temperature changes. Architects and designers must maximise passive design elements and address other environmental factors to provide high levels of indoor environmental quality, thermal comfort, energy efficiency and to minimise reliance on mechanical cooling and heating.

Building designers must also exploit topography, landscaping and microclimates for thermal regulation of interior spaces as well as use materials with high thermal mass and insulating capacity. Design performance and quality of the building mass, fabric, internal and external environments must be optimised to achieve high levels of thermal comfort to minimise demand for mechanical heating, ventilation and air conditioning.

The following sustainable features must be incorporated in architectural and engineering services designs:

5.5.1 USE OF NATURAL DAYLIGHT

- a. Design façades and windows to maximise natural daylight in usable floor areas and incorporate use of sky lights, light wells and internal atriums or courtyards where appropriate
- b. Avoid overshadowing and visual intrusion onto adjoining sites
- c. Design buildings to avoid undesirable glare impacts on pedestrians, motorists, people using open spaces and those in other buildings
- d. Minimize the impact of night lighting on adjacent sites and buildings

5.5.2 INDOOR ENVIRONMENTAL QUALITY

- a. Provide appropriate lighting for different uses in accordance with current **CIS Lighting Standard** which details specific lighting levels and controls per functional space
- b. Use materials, fittings and furnishings with low VOC content i.e. paints, adhesives, sealants, carpets, timber products and furniture to avoid and minimise off-gassing impacts on building occupants' health
- c. Design to minimise unacceptable noise
- d. Utilise natural cross ventilation of habitable rooms and corridors to minimize the requirement for mechanical air conditioning

5.5.3 ENERGY EFFICIENCY

- a. Electrical appliances with the highest Australian Government energy star ratings must be used for the relevant capacity ranges of appliances. These appliances include but are not limited to refrigerators, freezers, clothes dryers, dishwashers, electric hot water boilers, televisions, computer monitors and air-conditioning units
- b. Preference must be given to locally manufactured products where multiple products have the highest energy rating
- c. Electrical equipment, including specialised laboratory equipment not covered by Energy Star rating scheme must include energy efficiency as part of the selection criteria and have controls to prevent unnecessary energy consumption
- d. All buildings must provide utility meters to monitor, electricity, gas and water in accordance with the **CIS Standards for Mechanical Electrical Services, Hydraulic Services and Advanced Utility Monitoring System (AUMS)**



- e. Energy efficient lighting and lighting controls must be provided to meet minimum illumination requirements in accordance with the **CIS Lighting Standard**
- f. Buildings must incorporate technology to reduce peak power demand i.e. use of thermal storage for cooling and heating, power factor correction devices, etc.
- g. Roof design must maximise orientation to the northwest to northeast to optimise potential for installing roof top solar energy systems

5.5.4 WATER USE

- a. Water sub-metering must be provided to monitor large water consuming processes in accordance with the **CIS Hydraulic Services and AUMS Standard**
- b. All sanitary fixtures and tap ware must achieve WELS ratings specified in the **CIS Hydraulic Services Standard**
- c. Rainwater tanks to collect roof runoff must be provided for beneficial reuse in toilets, cooling towers, fire test water and the building's landscape irrigation in accordance with the **CIS Hydraulic Services Standard**

5.5.5 MATERIALS

- a. Materials must be selected to meet sustainability requirements specified in the University of Sydney Sustainability Framework
- b. Selection of construction materials must consider 'cradle-to-grave' environmental impacts which look at impacts associated with raw materials extraction, manufacture, use and re-use potential and disposal
- c. Preference must be given to construction materials with recycled content and reused materials where practical
- d. Adopt life cycle costing principles for materials and systems selection that includes capital, operations and maintenance, and disposal costs
- e. Use recycled and recyclable content in building materials, where fit-for-purpose from a durability and performance perspective
- f. Use suitable demolition materials for on-site fill
- g. Rainforest timber and timber from Australian high conservation forests must not be used
- h. Consider appropriate design detailing for engineered products to avoid any off-gassing potential from volatile compounds used in manufacture

5.5.6 ENERGY DEMAND AND THERMAL COMFORT

To minimise energy demand and improve thermal comfort in buildings, the following must be considered:

- a. Use of basements and underground parking areas and labyrinths to precool intake fresh air in mechanical systems if viable and where excessive dehumidification is not required
- b. High levels of thermal insulation to roof, floors and walls
- c. Reflectance of external building materials
- d. Thermal and solar performance of glazing
- e. External shading of north, east and west facing windows and walls
- f. Building orientation and massing
- g. Design glazing to achieve optimal day lighting and solar heat gain and to minimise the need for mechanical heating or cooling

- h. Appropriate design for temperature, air velocity, fresh air ventilation rates, relative humidity for different functional spaces as required by the CIS Mechanical Services Standard

5.5.7 WATER SENSITIVE URBAN DESIGN

University campuses must implement water sensitive urban design principles by:

- a. Reducing potable water demand through water efficient appliances, hydraulic standard
- b. Capturing rainwater for beneficial reuse including irrigation, cooling water and toilet flushing
- c. Minimising waste water generation and treatment of waste water to a standard suitable for effluent re-use and or release to receiving waters
- d. Passively treating urban stormwater using biofiltration and wetlands systems to meet water quality objectives for reuse and or discharge to surface waters
- e. Using stormwater in the urban landscape to maximise the visual and recreation amenity of developments

Grey water must not be reused where expensive waste water treatment involving significant inputs of energy, chemicals and high maintenance is required.

5.5.8 NOISE MITIGATION

- a. During the planning process isolate noise generating activities to avoid impact on sensitive receptors and quiet activities
- b. Protect all occupied spaces from noise pollution from external and internal sources
- c. Plant and equipment located on roofs must have acoustic treatment if they generate excessive noise
- d. Plant locations and noisy equipment must be designed and situated to avoid noise impacts on sensitive receptors and local residents
- e. Minimise noise emitted from external equipment such as fans, air-conditioners, compressors, and from other noise generating sources
- f. Minimise noise transmission within multiple occupancy buildings

5.6 BUILDING LIFE CYCLE ASSESSMENT

Life cycle assessment must be undertaken to account for the overall expected usage, system flexibility and planning provisions, long life expectancy, energy efficiency provisions, operational costs, and maintainability and future replacement provisions.

A life cycle assessment for major services located within each building must be performed to affirm the design direction and drive the development of the design solution. The University must be presented with the life cycle assessment process and options considered. This will include major impacts, energy usage, operation and maintenance, and capital replacement costs.

Selection of materials and design details must demonstrate building longevity, ease of maintenance and cost effectiveness.

Initial capital cost effectiveness must not override longevity of materials, fixtures and fittings and operation and maintenance requirements of the building.

Design and installation of building services must ensure all services can be maintained easily throughout their life span. Coordination of access panels, platforms and the maintainability requirements must

consider design and co-ordination with the building elements and services. Major plant must be readily accessible, have adequate access provisions for plant and equipment maintenance and replacement without needing building modification or demolition of works.

Safety-in-Design must be inherent for the ongoing maintenance of the building. Safety- in-Design must consider access to plant for installation, maintenance and removal or replacement of equipment. New buildings over three levels must incorporate the provision of a swinging stage or other approved building access system for façade cleaning and maintenance to be designed in the conceptual stage of design.

Standard locally manufactured products and materials must be specified wherever possible to ensure ready availability for replacement.

5.7 ACOUSTICS AND VIBRATION

Generally all building interior must comply with the requirements of AS2107 as a minimum. Particular attention must be paid to acoustics and noise transmission to achieve the necessary sound transmission loss between spaces.

Building services plant and the like must be isolated from habitable spaces so that vibration/noise is not transmitted to other areas. Details of intersection of partitions and external windows must ensure sound insulation is maintained at that intersection equivalent to that of the remainder of the partition. Designers must consider the following acoustic requirements:

- a. Partitions must extend from floor slab to underside of slab above if necessary to ensure adequate sound insulation in accordance with NCC (BCA);
- b. Management of ambient noise level impacts on privacy;
- c. All lecture theatres to have an effective airlock, where possible, to attenuate external noise;

Minimum sound reduction requirements for particular areas are provided in **Table 1**.



TABLE 1: MINIMUM WEIGHTED SOUND REDUCTION INDEX FOR SPECIFIC AREAS

Class	Location	Rw Partition	Rw Partition with Door
1	Lecture Theatre and general teaching areas, Seminar and conference rooms executive suites	50	35
	Server Rooms	50	40
	Student Accommodation bedrooms	50	40
	Corridor to lecture rooms	50	40
	Operable walls between lecture theatres Open Offices	45	
	Laboratories		
	Library spaces		
2B	Corridor to meeting/conference room	42	32
	Offices – Professors and Senior Lecturers Common Rooms	40	30
	Meeting Rooms Counselling Rooms		
	Corridor to office	38	28
3	Tutors Rooms, Stores	30	20

Appropriate low or no vibration design and construction techniques must be employed for areas and building with vibration-sensitive activities including some laboratories and microscopy facilities.

5.8 SECURITY

Designs must consider and make appropriate provision for security. Planning and Design must provide a secure environment in the public domain around each building, appropriate secure perimeter, internal security and interface with the University security systems. Crime prevention and security must be addressed and influenced during design in accordance with the CIS Security Services Standard.

5.9 TERMITE CONTROL

Termite control must be provided in accordance with **AS/NZS 3660** to new buildings, extensions to buildings, and major refurbishments to buildings where the ground is exposed. Existing buildings undergoing refurbishment must be inspected for the presence of termites in accordance with **AS/NZS 4349.3 -1998**.

All tree roots, tree stumps, logs and timber which may be exposed under or close to a building in the course of building works must be fully grubbed out and removed from the campus. The CIS Grounds Manager must be notified before any trees or tree roots are cut the so an inspection can be arranged.

5.10 BASE BUILDING REQUIREMENTS

5.10.1 WARRANTIES

The following table sets out minimum acceptable warranty periods for typical building components. Written material and installation warranties must be provided for all building components, materials and systems including but not limited to requirements in **Table 2**.

TABLE 2: WARRANTY PERIODS

Item No.	Building Component	Warranty Period Minimum No. Years from Practical Completion
1	Pre-cast concrete façade panels	15
2	Aluminium curtain walls, windows, doors and associated glass and sealants	12
3	Metal cladding systems	12
4	Glazing – structural system	12
5	Glazing – door system	10
6	Internal aluminium windows and doors	10
7	Termite protection	10
8	Automatic doors	5
9	Wet Area waterproofing membrane	10
10	Sub-grade and membrane waterproofing external areas and roofing	20
11	Metal roofing	10
12	Balustrade systems	10
13	Carpet and Underlay	7
14	Carpet tiles	7
15	Workstation system	5
16	Joinery benches and cupboards	2
17	Access floor system	5
18	Insulated panel system – PIR	10
19	Sanitary fixtures and plumbing items including flushers	2



Item No.	Building Component	Warranty Period Minimum No. Years from Practical Completion
20	Toilet partitions	5
21	Plastering (Hard and Board)	1
22	Suspended ceilings	5
23	Mirrors	1
24	Roller shutters	2
25	Timber doors	2
26	Fire doors, shutters etc.	5
27	Floor Tiles – ceramic, stone etc.	7
28	Wall Tiles – ceramic, stone etc.	7
29	Vinyl flooring	7
30	Painting to wall and ceilings / doors / windows	3
31	Operable walls	5
32	Sealants – Standard	5
33	Sealants – Fire rated	10
34	Door hardware	5
35	Roof mounted safety lines and harnesses	5
36	Concrete structure	15
37	Structural steel fabrication	5
38	Exposed Steelwork painting	7
39	Powder coat finishes	7
40	Roads and External Pavements	2
41	Internal Walls and Finishes	1
42	Electrical – Power Supply	1
43	Electrical – Lighting	1
44	Electrical – Standby Generators and UPS	1



Item No.	Building Component	Warranty Period Minimum No. Years from Practical Completion
45	Electrical – Emergency and Exit Lighting	1
46	Electrical – Switchboard and Metering	1
47	Mechanical – Air Handling and Central Plant Components	1
48	Mechanical – Ventilation	1
49	Mechanical – BMS	1
50	Mechanical – Cool Rooms	1
51	Mechanical – Reticulation	1
52	Mechanical – Pneumatic Tube Systems	1
53	Mechanical – Medical Gases Systems	1
54	Mechanical – Gas Supply System	1
55	Vertical Transportation – Lifts	2
56	Hydraulics – Cold Water System	2
57	Hydraulics – Hot Water System	2
58	Hydraulics – Gas	2
59	Hydraulics – Sanitary Plumbing and Drainage	2
60	Hydraulics – Sanitary Fixtures and Fittings	2
61	Communications – Voice / Data System	1
62	Communications – Nurse Call System	1
63	Communications – Monitoring System	1
64	Communications – Paging System	1
65	Communications – MATV System	1
66	Security Services – Central Monitoring System	1
67	Security Services – Access Control Systems	1
68	Security Services – CCTV System	1
69	Security Services – Security System	1



Item No.	Building Component	Warranty Period Minimum No. Years from Practical Completion
70	Security Services – Duress Alarm System	1
71	Fire Services – Fire Detection System including FIP, EWIS, Fire alarms etc.	2
72	Fire Services – Hydrant and Hose Reel System	2
73	Fire Services – Sprinklers System	2
74	Fire Services - Extinguishers	1

5.10.2 STRUCTURE

All structures must be designed to comply with **AS/NZS1170** and all other relevant standards and provide a 100 year design life unless otherwise approved. Structures, particularly floor slabs and core walls, must be designed for flexibility and incorporate adequate penetrations and ‘soft spots’ for additional future service penetrations. Penetrations provided for main services reticulation must be appropriately sized to include 25% spare capacity for additional, augmented or future services installation. Structural systems that limit future repurposing, reconfiguration and flexibility must be avoided.

5.10.3 EXTERNAL WALLS AND WINDOWS

The façade design and construction must comply with CIS Façade Design Standard. Façade materials must be durable and easily maintained. Designers must ensure all external walls employ graffiti-resistant finishes where practical. The following façade treatments must be satisfied:

- a. Brickwork and concrete must not be painted
- b. Painted and applied coatings must be avoided
- c. All materials must be low maintenance and retain colour, integrity and consistency for 25 years
- d. Façade design and detail must be such that water is shed away from building faces and prevented from etching or discolouring the facade.
- e. Façade materials selected for areas adjacent ground planes must be robust and resistant to mechanical damage and breakage.
- f. Adequate and appropriate separation of materials, particularly metals and cement based materials must be avoided
- g. Physical coverage and protection must be provided to prevent exposure of waterproof membranes practically at interface at ground plane
- h. Render and paint must not be provided unless required for heritage conservation purposes
- i. Aluminium windows with thermal break technology to minimise heat transfer through the aluminium frame

Windows must be warranted for a minimum life of 50 years. The capacity to maintain and clean window features from internal spaces is preferred and must be considered and demonstrated by architects and façade designers. All window frames must be aluminium and have a fully drained framing system and incorporate thermal breaks technology to minimise thermal bridging effects and heat conductivity through the aluminium frame. Finish coatings must be natural anodized or a powder coated. A balance must be achieved between maximizing natural daylight and avoiding of glare and

heat gain. Generally solar control window treatments must be provided to all external or perimeter windows and glazing only for East, West and North facing windows.

Bird deterrents must be designed as an integral part of the façade system. Energy efficiency requirements for building fabric and glazing must, as a minimum, achieve greater than 10% better performance than the National Construction Code (NCC) Section J requirements.

Window sills must be at a minimum of 45° angle unless agreed otherwise. Ledges must be avoided in the façade, window system or roof to prevent the perching or roosting of birds or treated with anti-roosting/perching devices.

All new facades must include and incorporate a safe access system for cleaning and maintenance and must be fully documented.

5.10.4 GLAZING IN WINDOWS AND EXTERNAL CURTAIN WALL AND GLAZING SYSTEMS

All façades must comply with the requirements of AS1288 including provision of safety glass.

5.10.5 ROOF AND GUTTER DESIGN

Roof and gutter design must comply with the **CIS Roofing Standard**.

5.10.6 INTERNAL WALLS AND PARTITIONS

Partitions and internal walls must be lightweight and constructed of plasterboard on metal studs to facilitate future modification and reconfiguration.

Glazing adjacent doorways must be provided to offices and meeting spaces where appropriate. Lightweight partitions must be designed and constructed to achieve the required Acoustic Rating (Rw) as prescribed or to comply with AS2107 whichever is the greater.

Internal walls must be designed to support imposed loads such as shelving and the like. Load bearing walls must be restricted to the building core and stairwells lift shafts and toilet and amenity walls where possible.

Corridor walls and areas prone to impact damage must be lined using an impact resistant sheeting material to a minimum height of 1200mm and be provided with appropriate bump rails at skirting and 1000-1200mm AFFL. Compressed fibre cement (CFC) or proprietary impact resistant board with a minimum 12mm thickness must be used and must have recessed edges and jointed flush using perforated paper reinforcing tape. The junction between the impact board and the sheeting above must be finished with an appropriate trim to allow movement. Walls must be designed and constructed to be easily and cost-effectively altered and modified.

- a. Lightweight partitions must be designed and installed to comply with **AS/NZS2589.1**
- b. Internal finishes must generally be designed with acoustically absorbent finishes where practicable.
- c. Lightweight walls must incorporate adequate nogging to support wall mounted shelving between 1200 and 1800 AFFL where appropriate
- d. Fire rated partitions and doors must comply with **AS1905**
- e. Operable Walls are not preferred. Where agreed to be used the operable wall must be a proprietary system equivalent to 'HUF COR' or similar with complete compliance with acoustic performance criteria
- f. Corner protection is to be provided in traffic areas

- g. Partition design is to comply with manufacturer's requirements and include provision of engineering certification of design including size, building material thickness and sheeting to achieve structural, acoustic and fire resistance performance.

5.10.7 GLAZED PARTITION WALLS

Glazed Partition Walls must be aluminium frame proprietary systems with appropriate safety glass to comply with **AS1288**. All glazing must be provided with safety decals as a minimum to comply with **AS1428.1** and **AS1288**. Applied graphics or frit must be provided where privacy is required. Glazed partition heights must be coordinated with adjacent door heads and frames. Glazed partitions must have a hob where the floor finish adjacent comprises a resilient sheet material such as sheet vinyl.

5.10.8 COLOUR PALETTE FOR BUILDINGS

The CIS Colour Palette Standard for building interiors and exteriors must be used. Colour schemes must meet these requirements:

- a. All colour schemes must be approved by CIS Planning at conceptual design stage
- b. Walls must have 50/75% reflectance and a semi/gloss finish
- c. Ceilings must have high reflectance (i.e. reflecting approximately 80% of light)
- d. Must consider the preferred colour schedule
- e. The Principal Consultant must submit a colour schedule and sample board of all applied finishes, including carpet, upholstery and window furnishings for approval to CIS Planning
- f. All paints must be high-performance durable and stain resistant, easy to maintain and have low VOC content.

5.10.9 DOORS

Doorways and doors must be situated so as not to impede access to lift panels, switchboards, switch-rooms, plant rooms or any wall mounted maintenance panels when they swing open fully. Doors must be generally solid core construction with a painted, laminate or veneer finish where appropriate. All doors must be framed in pressed metal or aluminium door frames unless required to be timber for heritage reasons. All doors must be provided with door protection in the form of backplates, push plates or kick plates.

5.10.10 FIRE DOORS

Fire doors must be set in pressed metal frames and must comply in the design and installation with the requirements of the NCC, BCA and AS1905 and must be tagged and certified accordingly.

5.10.11 DOOR HARDWARE

All door hardware including locks and keying associated with joinery and lockable cupboards must use 'LOCKWOOD' locks and replaceable 'Bilok' keying. For further detail refer to **CIS Security Standard**. All doors must include appropriate door protection in the form of kickplates, sized appropriately.

5.10.12 SKIRTINGS

Skirtings must be provided to all areas including joinery installations and must consist of a robust, damage-resistant material.

Skirting boards must meet the following requirements:



- a. Painted skirtings are not permitted except where required to comply with heritage and conservation design requirements
- b. Skirtings must be a minimum height of 100mm high, preferably 150mm, and provided to all internal partitions including glazed partitions unless specifically directed otherwise
- c. Skirtings must be vinyl, aluminium flat bar or extrusion, tile or stone or ducted aluminium except where timber skirtings are required to comply with heritage design requirements.
- d. Colour and dimensionally coordinated ceramic coved skirtings must be provided to all toilets, amenities and wet areas

5.10.13 FLOORS

Internal paving must be vitrified, reconstituted or sealed natural stone and have a minimum size of 150x150mm. Terrazzo or polished concrete finishes are preferred.

5.10.14 TILING

Internal floor tiling must be non-slip, vitrified, rectified floor tiles and must comply with relevant Australian Standards and HB 197 slip resistance requirements.

5.10.15 SHEET VINYL

Vinyl to wet areas including cleaners' rooms, server counters, common rooms and isolated basins, must be approved non-slip sheet vinyl with welded joints, and 150mm high vinyl integral coved skirtings where possible.

Sheet vinyl must be a minimum 2mm thick and must have a variegated colour pattern. Seams and joints must be thermally or ultrasonically welded using colour coordinated weld.

Vinyl flooring must be delivered, stored, handled and installed to comply with manufacturer's written method and instructions. Sheet vinyl flooring must be turned up walls using fillet to form 150mm high coved skirting and must fully adhere to the floor and wall surfaces.

Chemical resistant sheet vinyl must be selected for use in laboratory spaces and associated chemical stores.

Antistatic sheet vinyl must be selected for all communications rooms and cupboards.

Sheet vinyl must be supplied by the following suppliers or an equivalent performing product supplier:

- a. Armstrong Nylex
- b. Tarkett
- c. Polyflor

5.10.16 CARPET

All carpet specified and installed in University buildings must comply with the fire hazard properties of the NCC. Test certificates must be provided for verification prior to final selection.

Carpet tiles must be used generally throughout the University to provide flexibility and ease of maintenance. Material selection and installation of all carpeting must comply with the following requirements:

- a. AS1385 Textile Floor Coverings - Metric Units and Commercial Tolerances for Measurements
- b. AS2454 Textile Floor Coverings - Definitions, Terminology and structure clarification



- c. AS/NZS455 Textile Floor Coverings - Laying Practice and maintained in accordance with AS 3733
- d. ASNZS3733 Textile Floor Covering – cleaning and maintenance of residential and commercial carpeting
- e. Carpet and carpet tiles must be hardwearing and easy to clean
- f. Carpet tiles fixed directly to the substrate
- g. Carpets tiles must be anti-static in computer laboratories and computer intensive work areas
- h. Carpets tiles must be flecked, speckled or patterned to lessen the visual impact of dust or any debris rather than of solid colour
- i. Wool mix is preferred in areas where static
- j. Carpets must be low loop pile
- k. Broadloom carpets must only be used in stepped and tiered auditoria or by exception and as approved by CIS Planning. When proposed, broadloom carpet must be 40 oz. minimum loop pile, 100% pure wool broadloom and installed on heavy duty rubber underlay. Installation must ensure carpet seams are guaranteed flat, tight and ravel free for the life of the carpet;
- l. All carpet and carpet tiles must have a minimum of 10 year warranty
- m. The minimum environmental performance requirements through GECA and/or Ecospecifier Carpet Institute of Australia Limited - Environmental Certification Scheme certification (Levels A or B).

5.10.17 CARPET TILES

Carpet tiles must be modular, 500mm module preferred, 100% nylon with a low loop pile and have integral soft rubberized backing. Solution dyed or injection dyed nylon is preferred.

Carpet tiles from the following suppliers or equal approved:

- a. Interface Heuga Australia Pty Ltd
- b. Ontera Carpet Pty Ltd
- c. Feltex Carpets Pty Ltd

5.10.18 STAIR TREADS NOSINGS

Carpeted stairs must have nosings and must be in a contrasting lighter colour than the stair tread.

Provide aluminium safety stair tread nosings to the following locations:

- a. all stairs with carpet finish
- b. all steps on circulation aisles in auditoriums and lecture theatres fitted with carpet, rubber or vinyl flooring

Aluminium safety stair tread nosings must be mechanically fixed and equal to, or equivalent to, Latham Model No. 1005 ST-1VB 25 with contrasting coloured silicon carbide mineral slip resistant inserts. All nosings must comply with the dimensional requirements and colour contrast requirements of AS1428.1

5.10.19 DOOR MATS

Door mats must be provided in recessed mat-wells at appropriate external access doors. Mat recesses must be formed by an approved metal angle appropriate for the application, and set into the floor.

Mats must be a width that allows moisture and debris must be removed from foot traffic entering the building.

Mat wells and panels must be sized to allow easy and safe removal for cleaning and maintenance. Recessed mat wells and mats must be provided to all doors accessed from the outside the building.

Door mats must be equivalent to Latham Type RDCC.

5.10.20 CERAMIC TILES

Floor tiles in showers, toilets and airlocks must be a minimum of 50 x 50mm in size and vitrified, unglazed or semi-glazed. Large format tiles must be avoided to ensure falls to floor wastes and minimise cutting. Colour selection must be mid to dark shade and incorporate a coordinated coved tile.

Wall tiles must be vitrified, glazed or semi-glazed and be a minimum 200 x 100mm in size. Wall tiles must be carried to or past ceiling height.

Tiling trims, accessories and strips must be coordinated with ceramic tile or non-ferrous metal strip and provide appropriate protection to tile edge.

5.10.21 FLOORING TO LABORATORIES

Unless specified otherwise, floor finishes must be slip and chemical resistant sheet vinyl with a polyurethane reinforced surface.

Floor sheeting must be covered up walls, plinths and service pipes to a height of 150mm to form an integrated skirting. Vinyl selection must not require sealer, polishers or residual detergents. All seams must be welded with colour-coordinated material using the approved manufacturer's thermal or ultrasonic method.

5.10.22 ACCESS FLOORS

Access floors should be considered for areas requiring flexibility for reconfiguration such as seminar rooms, computer labs and flat floor teaching spaces. Access floors where required must be 'Unistrut MK 25A' gridless system or approved. The access floor must comply with current Australian Standard on 'General Access Floors'.

5.10.23 FLOORS IN COMMUNICATIONS ROOMS

Floors must be solid and fixed and not have any grates. Anti-static floor vinyl must be laid before communications cabinets and racks are installed. This is to ensure sections of floor are not laid bare if cabinets need to be relocated elsewhere in the room (to accommodate other features or additional services). Carpet of any type is not permitted.

5.11 CEILINGS IN COMMUNICATIONS ROOMS

False ceilings, plastering or internal tiling that hides cable-work are not acceptable. ICT utility cables must be housed within external conduits to allow greater flexibility in system size and ease of maintenance. A minimum of 2400mm clear floor to any cable tray, or the like height, must be achieved.

5.11.1 CEILING AND WALLS PAINTING IN COMMUNICATIONS ROOMS

Ceilings, soffits and walls must be painted and/or sealed to prevent dust adhering to the surface. Specify paints and finishes with high light reflectance values.

5.11.2 CEILINGS AND CEILING FINISHES-GENERALLY

Ceilings must comply with the following requirements:



- a. Suspended set plasterboard and suspend lay-in grid tile ceiling systems are acceptable
- b. Recessed pelmets must be installed to all perimeter windows to allow for installation of window treatments including blinds and or curtains.
- c. Recessed pelmets or provision for blinds is required for internal glazed meeting rooms. Specific requirements must be canvassed with user groups
- d. Ceiling heights must be minimum 2700mm AFFL.
- e. Ceiling space for services reticulation must be minimum 600mm clear.
- f. Where there are no ceilings provided, exposed services must be located and fixed neatly in groups on cable trays or pipe and duct suspension systems. Painting of services in exposed soffit areas must be allowed for.
- g. Ceilings must be painted and or sealed to prevent dust adhering to the surface.
- h. Set plasterboard ceilings on metal lathe are not permitted unless required for specific purposes.
- i. Adequately sized and located access panels and manholes must be provided in set ceilings equivalent to 'Trafalgar' steel access panel. Sealed and air tight access panels must be provided where required in areas such as PC1 and PC2 laboratories and cleanrooms.

Suspended Grid Ceiling Systems must comply with the following requirements:

- a. Suspended ceiling systems must generally be a two way T-Bar grid, 1200 x 600mm powder coated steel or aluminium as appropriate, unless otherwise approved.
- b. Ceiling tiles must be mineral fibre acoustic panels square edge equal or equivalent to Armstrong 'Fine Fissured' for general teaching and office areas and Armstrong 'Bioguard Acoustic' for laboratories. For laboratories with a classification PC2 and above, painted metal pan ceiling tiles must be provided.
- c. Specialist advice must be sought for research laboratories and reviewed with CIS Planning during the design phase, however, use of medical grade, metal pan and set plasterboard ceilings are typical in these areas
- d. Ceiling mounted building services including lighting, A/C grilles and fire services must be closely coordinated to minimise tile cutting, wastage and non-standard sizing

5.12 LIGHTING

All lighting and lighting controls must comply with the **CIS Lighting Standard** to ensure lighting system design and configuration provides sufficient illumination and is energy efficient.

Refer CIS Lighting Standard.

5.13 SIGNAGE

Refer to **CIS – University of Sydney Signage Standard**.

Designers must work to ensure consistency with the **CIS Signage Standard** for any building work across the University campuses.

Signage for new buildings may be purpose designed, and may respond to the design intent of the new building but must incorporate the general principals of the Signage Design Standards
Building signage must be integrated into the building design and provide a clear and legible identity, destination and sense of place for the building within the campus.

Signage inside a building must be sufficient for staff, students and visitors to be oriented within it. There must be sufficient directional and wayfinding signage, and identification signage at the destination.

Signage types to be provided are as follows:

- a. Statutory Signage-to comply with NCC and AS1428.1 requirements including signage for hearing loops, accessible WCs.
- b. Operational and Regulatory Signage-to comply with Dangerous Goods, HAZCHEM, Laboratory operation and risk placarding to comply with Australian Standards including AS 1319.
- c. Building Signage-Building name and number, external directional and entry signage.
- d. Room Name Signage -Room name and numbering to identify all usable spaces including accommodation, amenities and service cupboards.
- e. Wayfinding Signage-Directional and other signage required to signpost and navigate the entire building.
- f. Asset Labelling-Provide asset labelling to comply with **CIS Asset Labelling Design Standard**
- g. Traffic Signage-Provide traffic and parking control signage to roadways and parking facilities to comply with Australian Standards including **AS1743**.

6 BUILDING SERVICES

6.1 BUILDING SERVICES PLANNING

Location and presentation of external plant and services must be considered as an integral part of the total design. Appearance or impact of plant on the surrounding open space and neighbouring buildings must be considered as well as access for maintenance or use.

When considering an integrated approach to implementing building services, there must be no adverse impacts from one service on another. Services must be grouped together in vertical or horizontal service zones within the building. Services must be designed with sufficient tap-in points in required locations.

Provision to upgrade, maintain and meet future needs of plant and services without major disruption or impact on the building fabric, must be incorporated in design.

The following building access and services must be incorporated in design:

- a. Dedicated risers must be provided throughout the building for each building service system, i.e. mechanical, electrical, communications, hydraulics, wet fire services, dry fire services, security. Risers must be aligned vertically and be provided with 20% spare capacity above full building capacity for future expansion
- b. Major mechanical plant must be sized in accordance with the **CIS Mechanical Services Standard**.
- c. Coordinated provision for future service risers or penetrations must be included in the form or 'soft spots' through floor slabs
- d. Plant rooms must only be accessible from common areas where practical rather than through occupied spaces such as offices or lecture theatres or labs to avoid disruption
- e. Corridor ceiling space is the preferred location for services distribution – ducts, pipe work, cabling, etc.
- f. Building services must be contained within ceiling space, wall cavities or ducted skirting and exposed services, conduits or trunking are not permitted
- g. Services must be located in accessible risers spaces with lockable doors and hatches
- h. All wiring and cabling must be concealed and services must not be chased



- i. Location of final outlets must allow for future flexibility and space changes, i.e. power point locations along a wall must be located in ducted skirting rather than in a fixed location on a wall
- j. Building heritage guidelines must be complied with
- k. Active security elements must be concealed
- l. Emergency valves and switches must be accessible
- m. Emergency operation and shut-off and turn-on provisions must be designed for all applicable services.
- n. Appropriate clearances must be provided around mechanical, electrical and hydraulic plant and equipment.

6.2 AIR INTAKES AND GRILLES TO PLANT AREAS

Air intakes must be located in shaded or protected locations. Although there is a regulatory requirement for separation, prevailing winds and localised wind patterns must be considered to prevent odours returning through the penetrations. Air intakes must be located away from the following areas:

- a. High trafficable areas
- b. Near smoking zones
- c. Waste and gross pollutant pits and pump out positions
- d. Kitchen, general building exhausts and flues
- e. Cooling towers
- f. Fume cabinet exhaust
- g. Streets and car parking stations
- h. High temperature areas
- i. Malodorous areas
- j. Dangerous, hazardous or chemical storage areas

6.3 WASTE STORAGE AND MANAGEMENT

Waste management for facilities and construction and demolition projects must conform to requirements of the **CIS Waste Management Standard**.

6.3.1 FACILITY CENTRALISED WASTE RECYCLING STATIONS

The University is moving towards centralised waste and recycling stations. Each station comprises a yellow mixed recycling and a red general waste and must be situated within 30 metres walking distance of occupants. All kitchen areas must be equipped with waste and recycling stations. Blue bins for paper and card board must be provided at strategic locations and at every communal printer. Floor plans / layout must allow sufficient room for centralised waste and recycling stations at convenient locations across each functional area, including circulation spaces and common areas. Individual office / desk waste bins must not be provided. Sizes for mixed recycling and landfill waste must be based on occupancy of the functional space and one change per day.

6.3.2 FACILITY WASTE STORAGE AND COLLECTION

Designers must incorporate sufficient centralised segregated waste recycling and general waste collection storage facilities in new building designs or major refurbishments so they can be readily accessed by building users. Waste storage rooms must be provided with appropriate impervious floor and wall finishes and must be provided with wash-down facilities including hot and cold water supplies and wastes. Provision must be made for a main waste recycling and general waste collection storage

space sized to safely accommodate expected daily maximum quantities of waste and recyclables. The main waste recycling and general waste collection storage room must include bin cleaning facilities and compactor as appropriate.

Adequate and safe vehicle access, entry and egress provisions must be provided for movement and manoeuvring of heavy waste collection vehicles.

6.4 CONSTRUCTION AND DEMOLITION WASTE

Building contractors and designers must provide infrastructure for recovery of building, construction and demolition materials to minimise waste disposal to landfill. They must:

- a. Prepare and implement a materials recycling and waste management plan in the construction phase for all construction and demolition waste as part of the project environmental management plan.
- b. identify the range of materials which will be collected for recycling and describe procedures, management practices and reporting
- c. formally apply dimensional co-ordination where it will practically assist the efficiency of material use, preference for modular components and materials supplied in set sizes or dimensions;
- d. consider ease of disassembly and recycling of construction materials and components at the time of refurbishment or completion of a facility's life;
- e. ensure project planning, specification and programming for the recovery, storage and transfer of reusable materials from demolition works including their transport from site to recycling and re-use facilities;
- f. Implement procedures for disposal or recycling of hazardous materials at properly licensed facilities.

6.5 PLANT AND EQUIPMENT

Plant and equipment must be located in an enclosed plant room designed for the purpose. Roof mounted plant will only be accepted with approval from CIS Planning and Services Engineers. Designers must consider functionality of a space with respect to the noise levels, air distribution and thermal qualities.

The following requirements apply to plant rooms:

- a. Enclosed plant rooms must be acoustically sealed or treated to allow for out-of-hour operation
- b. All rooftop plant must be visually and acoustically screened to minimise visual and noise impacts on surrounding environments
- c. Where enclosed plant rooms cannot be achieved, and approval has been granted, or where existing plant is located on a roof, the plant and equipment must be located so that the roof surface, materials and the plant are fully accessible for maintenance or replacement
- d. For multi storey buildings, provide goods lift access to the rooftop plant rooms
- e. A clear path of travel must be provided from the roof top plant room to the lift or stairways
- f. Roof top plant and equipment must be placed on steel or aluminium platform structures elevated above the roof surface. A clear space of minimum 600mm must be provided between the roof surface and the lowest part of the platform structure, or any item of equipment or reticulation suspended below the platform
- g. Platforms must be designed by a suitably qualified structural engineer to consider proposed and likely future equipment loads. Platforms must be designed in accordance relevant



Australian Standards and provided with perimeter guardrails where necessary. Steel platforms must be constructed from hot dip galvanised members

- h. Internal AHUs must be located in a dedicated plant room within the building: not in the ceiling space and must be designed for easy maintenance and replacement.
- i. Laboratories and other research environments must have FCUs or large fans located outside the laboratory in unoccupied space, in a common area or hallway to avoid disruption to research experiments during servicing and maintenance.
- j. Access hatches must be provided in set ceilings to service plant and controls in the ceiling space
- k. Provide suitable labelling to identify plant in ceiling spaces, i.e. Traffolyte type label on T-bar section or next to access hatches stating FCU number and or plant control

6.6 ROOFTOP SOLAR ENERGY SYSTEMS

New buildings must include rooftop solar energy systems (solar photovoltaic and solar hot water) where practical. Architects and designers must maximise the capacity of rooftops where possible to accommodate solar energy systems on roof areas that are:

- a. flat or oriented to the northwest to northeast
- b. free from overshadowing from surrounding buildings, structures, parapets, trees, and plant and equipment between 9AM and 3PM
- c. free of plant and equipment
- d. free of maintenance access ways

Roof top solar energy systems must optimise the relative capacities of solar photovoltaic and solar hot water based on the buildings demand and maximum economic benefit. Installation of solar energy systems must include easy access for maintenance, replacements and repairs.

6.7 GENERAL POWER OUTLETS (GPO's)

GPOs must be easily accessible, refer to the **CIS Electrical Standard** and with the **Communications Cabling Standard** for detailed information about fittings and fixtures.

6.8 JUNCTIONS

Junctions between dissimilar finishes must use brass or aluminium angles fixed to, or set into, the slab. Provision must be made for movement, construction and control joints to minimise cracking in structures and finishes. Control joints must comply with manufacturers' recommendations, appropriate Australian Standards and Codes of Practice.

6.9 CORRIDORS AND CIRCULATION GENERALLY

Corridors must meet the following requirements:

- a. All primary corridors with storage units along one side must have a minimum width of 1500mm.
- b. All secondary corridors in open plan areas must have a minimum width of 1200mm.
- c. All other circulation areas must have a minimum width of 1000mm but also comply with requirements or AS1428.
- d. Head to head distances (i.e. the distance between heads of adjacent workstation users) must be a minimum of 1500mm.

6.10 FURNITURE, FITTINGS AND EQUIPMENT

Refer to the **CIS Fitout Standard**.

6.11 COMMUNICATIONS ROOMS

The number of communications rooms per building must be kept to a minimum. They must be located so outlets and offices are located within 80m cabling distance of any communications room. This may allow communications rooms to be distributed on every second floor of a building.

Communications Rooms must be provided and sized to comply with the **Communications Cabling Standard**.

Sufficient space must be provided in the communications room for future expansion. Allow 8m² as a minimum, with typical communications room space allowance of 38 m² m per 1000 m² of floor space. Allowance must be made for equipment racks 2100mm high, 850mm wide and 800mm deep and weighing up to 400kg per rack. Front and rear clearance of all racks must be 700mm minimum to allow door access.

6.12 PRINTING SPACES

Noisy printing or photocopying equipment must be isolated in separate rooms with adequate noise screening, ventilation and extraction, and space for segregated bin facilities, paper and cardboard, and toner cartridge recycling bins.

6.13 TEA MAKING FACILITIES AND KITCHENETTES

Tea making provisions must include:

- a. A bench and cupboard storage for crockery and consumables
- b. Sink and drainer with hot and cold water
- c. Hot water boiler i.e. Zip boiler or similar
- d. Chilled water facility i.e. Zip or similar
- e. Dishwasher
- f. Refrigerator
- g. Segregated waste bin facilities for general waste and mixed recycling bins

7 AMENITIES

7.1 TOILET AND SHOWER AREAS

For detailed description of standards relating to amenities refer to **CIS Amenities Standards**. Over and above current regulatory requirements each large project must consider providing a proportion of toilet cubicles as 'squat' toilets. Smaller projects must consider the provision of such toilets in the precinct and provide one for each gender if CIS Planning deems it necessary. All entries to toilets should, where possible, have door less vestibules for privacy and ease of access, rather than enclosed airlocks. Ventilation and noise impacts to be considered where no airlock is provided

The following toilet fabric requirements must be met:



- a. All tiles used within toilet and shower areas, must be non-slip and easily cleaned either terrazzo or vitrified finish.
- b. Tiles must be no less than 150x150mm to decrease the amount of grouting required and minimise the risk of harbouring mould, fungi and stains.
- c. Cubicle partitions must be non-porous compact laminate, and allow for easy removal of graffiti.

Water fixtures must comply with the **CIS Hydraulic Services Standard**.

The following fixtures must be included in toilet circulation areas:

- a. Full width mirror with shelf
- b. Soap dispenser equal to the preferred University type, located between each set of two basins mounted on tiled surface only, mounting to mirrors is not permitted
- c. A shelf or shelf space must be provided to Female WC facilities and Accessible facilities
- d. Coat hooks
- e. Energy efficient air blade type hand dryers in lieu of paper hand towels.
- f. GPO adjacent to the mirror
- g. Sufficient space to accommodate a free-standing garbage bins, one per four WHBs.

Building toilet circulation areas must provide sufficient showering facilities and lockers in accordance with requirements of section 7.4 End-of-trip and Bicycle facilities.

In each toilet cubicle must provide:

- a. Toilet Suite complying with the CIS Hydraulic Services Standard
- b. Toilet roll holder with lock equivalent to the preferred University type
- c. A coat hook on the back of the door
- d. Individual Urinals are preferred
- e. Recessed urinal troughs with a stainless steel step down including grills at floor level for standing

Provide shower cubicles for each shower. No communal showers are permitted. Shower cubicles must include a dry area seat and privacy door. Each shower recess must provide:

- a. Soap holder
- b. Coat hooks (2)
- c. Seat where possible

7.2 BABY CARE/BREASTFEEDING FACILITIES

A parent's room must be designed and include the following fittings:

- a. Baby Changing Table
- b. Seating provision for breastfeeding as chair or fold down seat
- c. Basin with hot and cold water supply, TMV on hot water supply
- d. Hand drying facilities
- e. Waste disposal
- f. Stroller/Pram parking area
- g. Easy opening/automated access door
- h. Baby food preparation area separate from changing area
- i. Toddler waiting/play area



- j. Toddler WC

7.3 RESPITE ROOM

All new buildings must provide a Respite Room consisting of a teapoint, lie down space and seating area for one to two people. The purpose of the facility is to provide a quiet rest space for staff and/or students. The function of this space can be combined with the babycare/breastfeeding facility provided adequate screening and privacy can be provided to facilitate simultaneous use.

7.4 END-OF-TRIP AND BICYCLE FACILITIES

Suitable end-of-trip facilities must be provided for people who use active transport (cyclists, walkers and runners) as required by the **CIS Sustainability Framework**. Provisions in the following tables must be made:



TABLE 3: END OF TRIP FACILITIES

	Showers	Lockers	Changing Room
Staff	Provide showering facilities for at least 1% full time building staff. Where possible, designers should locate showering facilities in open access areas, e.g. student-accessible areas.	Provide storage lockers for at least 10% of full time building staff	Preference for separate male/female changing room / shower facilities, otherwise individual unisex changing / shower rooms.
Students	No specific requirement	Where bike racks are specified, provide 1 locker per student bicycle parking rack / rails. Where possible designers should locate the lockers close to the bicycle racks.	No specific requirement

TABLE 4: BICYCLE PARKING FACILITIES

	Bicycle Parking Provision	Secure, Covered and Protected Parking
Staff	Provide bicycle parking racks / rails for at least 10% full time building staff.	At least of 50% of parking must be secure, covered and protected against the elements.
Students	Provide bicycle parking racks / rails for at least 3% of the peak no. of students.	At least 50% should be covered providing protection against the elements.

As a minimum bicycle racks / rails must as a minimum allow both a wheel and the frame to be locked securely to the structure.

TABLE 5: BICYCLE RACK CONFIGURATION

Low volume bicycle parking installations (<10 bicycles)	Medium Volume bicycle parking installations (10-20 bicycles)	Higher volume bicycle parking installations (>20 bicycles)
Spacing of horizontal racks / rails must have a minimum of 1000mm spacing between the centres of each rack.	Spacing of horizontal racks / rails must have a minimum of 1000mm spacing between the centres of each rack. Alternative spacing: minimum of 850mm spacing is accepted if parking racks are mounted at horizontal angles of between 15 and 45 degrees to reduce conflict between adjacent handlebars and pedals. Angle mounting also reduces the depth	Spacing of horizontal racks / rails must have a minimum of 1000mm spacing between the centres of each rack. Alternative spacing: minimum of 750mm spacing is accepted if parking racks are vertically staggered and supports the front bike wheel above the ground. Each alternate bike is mounted higher or lower to ensure



	of this footprint and enables more bicycles to be stored in a given space, see figure 1.	handlebars do not conflict. Due to closeness of bicycles, the racks must not be mounted at an angle horizontally because it makes racks difficult to use, see figure 2.
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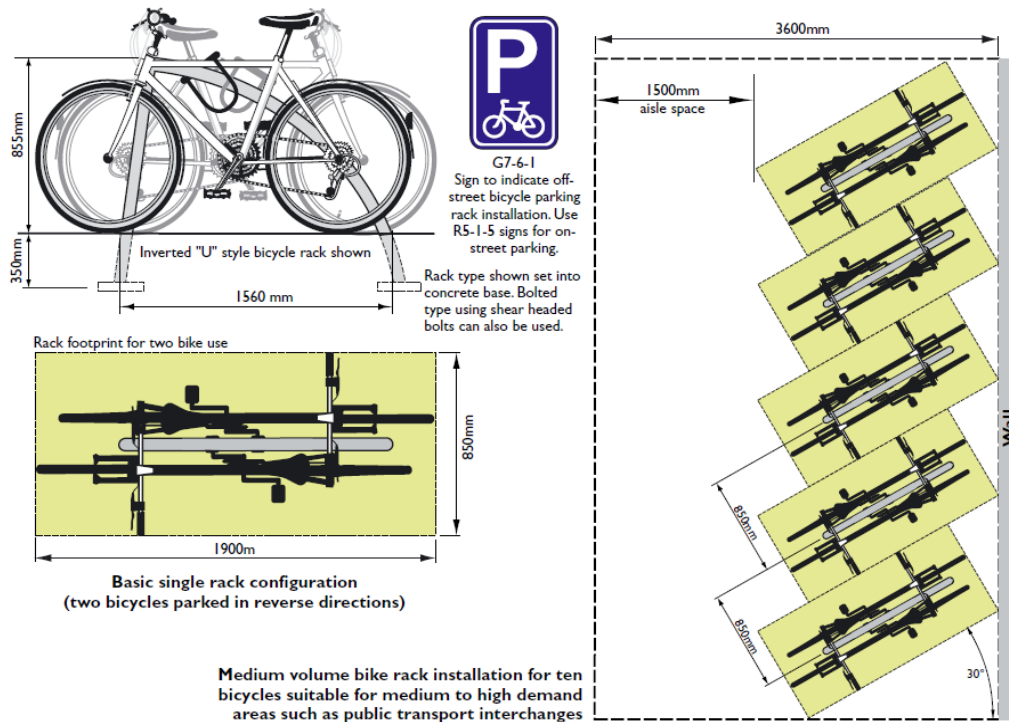


Figure 1: Example of bicycle parking configuration for medium volume bicycle parking installations (source: RTA NSW Bicycle Guidelines v1.2, 2005)

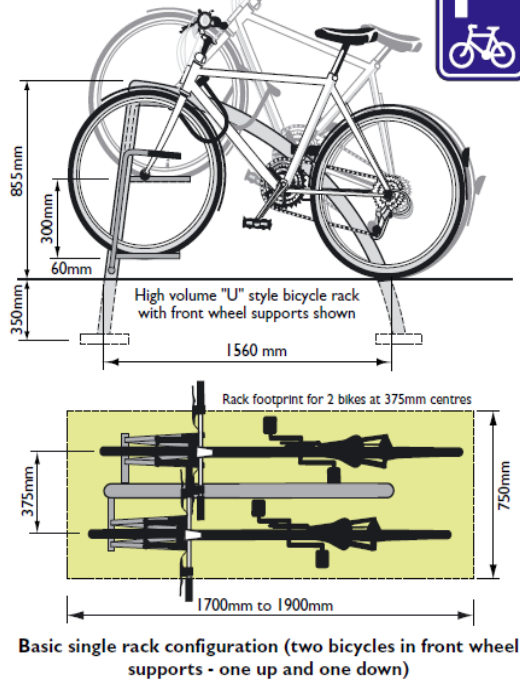


Figure 2: Example of bicycle parking configuration for high volume bicycle parking installations (source: RTA NSW Bicycle Guidelines v1.2, 2005)

7.4.1 FLOOR FALLS AND SLOPES

Floors pavements of bicycles parking areas must be adequately drained to prevent ponding.

7.4.2 ENCLOSURES / LOCK UP CAGE

Secure, covered and protected parking can be achieved through walled enclosure within a building or an external lock-up cage. Enclosure/ age designs must meet Class 2 medium security of the AS/NZS 2890.3 standard.

7.4.3 BICYCLE PARKING WITHIN A BUILDING

Cyclist must be able to access the bicycle parking area via the ground level without having to dismount for stairs. If the area is not on ground level then a ramp or lift access must be provided.

7.4.4 BICYCLE ACCESS OVER STAIRS TO ROAD OVERPASSES

Where cycle paths or pedestrian/cycle paths lead to stairs e.g. stairs leading to road overpasses, connecting cycleways, cycle parking facilities, etc. must include wheeling ramps to make stairs safely and easily accessible to cyclists. They must enable cyclists to go up or down staircases without having to physically carry their bicycles.

7.4.5 LOCK UP CAGES

Fencing must be either of mesh or see-through design to allow for passive surveillance. For fencing design, please refer to the CIS Landscape Standard. For external cages, the roof must provide adequate protection from the elements and be adequately drained.



7.4.6 SECURITY

Bicycle parking should be situated where there is active and passive surveillance, i.e. people passing by and where possible, people overlooking the facilities. The entrance should have a self-closing, self-locking door. Doors or gates must be fitted with the University electronic proximity card access system.

7.4.7 LIGHTING

All bicycle parking facilities used at night must be well lit to minimize theft and vandalism, to reduce pedestrian hazard and for the safety of the cyclists. To ensure energy efficiency, LED lighting with PIR movement sensors must be installed.

7.4.8 MAINTENANCE

All bicycle parking facilities must be constructed from low-maintenance materials whilst being of aesthetic design.

7.4.9 LOCATION / SAFETY CLEARANCES

Bicycle parking must be clear of:

- a. entrances/exits or other pedestrian concentrations;
- b. opening car doors;
- c. attachments for blinds or awnings;
- d. access covers set in the pavement;
- e. Other street furniture, loading zones, public transport stops and pedestrian crossings.

7.4.10 PROXIMITY TO BUILDING

Bicycle parking should be located within 100m of building front entrance or be included to the campus central precinct storage area, if available.

7.4.11 PROTECTION FROM VEHICULAR ENCROACHMENT

Bicycle parking facilities must be designed to ensure that motor vehicles cannot encroach into bicycle parking areas.

7.4.12 SAFETY OF PEDESTRIANS

Bicycle parking facilities must be located so that they do not hinder pedestrian movement and minimise the likelihood of injury to passing pedestrians.

7.4.13 CLEARANCES FROM VEHICULAR AND PEDESTRIAN TRAFFIC

On or off street bicycle parking facilities must be located so that:

- a. the minimum clearance between a parked bicycle and the edge of a motor vehicle traffic lane, parking lane or roadway is 600 mm (1000 mm if next to an on-street traffic lane in which the speed limit is greater than 60 km/h); and
- b. On a walkway or footpath, the minimum clearance for passage of pedestrians between a parked bicycle and any other obstruction is 1200 mm (greater clearance must be needed at high pedestrian volumes).

7.4.14 SIGNAGE

Information signs should be provided where necessary to direct cyclists to bicycle parking facilities. Legends, design and size should adhere to **AS2890.3**.

7.4.15 LOCKERS

Secure lockers must be adequately sized to accommodate normal work clothing; minimum 800mm tall by 250mm wide (for box lockers) or 1800mm tall by 400mm wide (for I-shaped double lockers).

7.4.16 CHANGING FACILITIES

Showers and lockers should be within close proximity to bicycle parking. Toilets do not count as changing facilities, unless there is sufficient private space and lockers.

7.4.17 PARKING AND SERVICES VEHICLE FACILITIES

Generally parking must be provided to comply with the requirements of AS/NZS2890 for under cover and external parking facilities. The following specific requirements must be provided:

- a. Line marking to define pedestrian, vehicular and parking areas
- b. Painted soffit for improved lighting, reflectance and safety outcomes
- c. Painted columns or structure for improved visibility, protection and safety
- d. Wheel stops and kerbs to protect assets, pathways and pedestrians
- e. Bollards and barriers where appropriate to protect assets and pedestrians
- f. Signage to comply with Australian Standards including relevant parts of AS2890, AS1428 and AS1743
- g. Appropriate minimum headroom clearance to comply with NCC, AS1428 and AS2890.6
- h. Electrical and data provision for appropriately place ticketing machines
- i. Electrical and security provisions for entry and exit control
- j. Energy efficient lighting and controls in accordance with the CIS Lighting standard

7.4.18 FIRST AID ROOMS

Each site where more than 200 staff work is required to provide a first aid room, i.e. Main Campus, Cumberland College of Health Sciences. It is advisable for sites where fewer than 200 staff work to also have a first aid room if emergency medical services are more than 5 minutes distant, e.g. Camden.

The University Health Service provides a first aid room for the Main Campus of the University. Requirements for first aid rooms are given in the legislation.

Accessible Resting Rooms, First Aid Rooms and Breastfeeding facilities must be co-located with properly designed privacy considerations.

8 OPERATIONS REQUIREMENTS

Facilities Management and building managers must operate buildings consistent with requirements of the building user's guide which provides easy-to-understand information about the operation and maintenance of various building services and systems and components, key infrastructure, utilities and resource conservation measures, sustainability features and emergency response information.

8.1 CLEANERS STORE ROOM

A cleaners' store room for cleaning equipment, chemicals and consumables must be provided on every floor of a building. The room must be lockable, with a cleaners' sink, hot and cold running water, drainage for floor waste and spillage, and appropriate wall shelving. In some cases in larger buildings a central cleaners' store must also be located on the ground or basement levels close to lifts.

8.2 MAINTENANCE STORE

A store area of 10m² must be provided for the specific use of Building Services. Finishes to this store must be as for Plant Rooms.

8.3 GARDENERS' STORE

A room of 12 m² in area must be provided at ground level with external access in each building. The room must have one GPO at a height of 1000mm, and cleaners' sink with 20mm cold water hose cock. The external door must have a clear opening width of 1000mm and must be outward opening. The gardeners' store must be accessible by vehicle at grade. A 50mm conduit from the floor level within the store to a suitably accessible external point must be provided. Provision must be made for suitable storage of poisonous chemicals storage compliant with applicable safety and environmental design requirements.

8.4 SPARES STORE

All new buildings must be provided with a dry storage room to store spares and replacement items such as carpet, ceiling tiles, wall and floor tiles and the like provided under the contract. The room must be adequately sized and fitted out to accommodate the material quantity and must include appropriate racking and shelving. Finishes to this store must be as for Plant Rooms.

9 BUILDING USERS' GUIDE

A building user's guide must be prepared to provide occupants easy-to-understand information about the operation and maintenance of building services, key infrastructure, utilities and resource conservation measures, sustainability features and emergency response information. It must include at least the following information:

- a. Building services overview
- b. Mechanical systems (Heating, Ventilation and Cooling Systems)
- c. Electrical systems
- d. Lighting systems
- e. Hydraulic systems
- f. Building Management and Control Systems
- g. Energy management and conservation
- h. Water management and conservation
- i. Indoor environmental quality
- j. Transport Facilities (cyclist facilities, public transport and parking)
- k. Waste management
- l. Re-Fit and Expansion Considerations/ Fit-out Guide
- m. Emergency response information

10 COMMISSIONING

An independent commissioning agent not involved with the design or construction of the project must test, verify and certify that mechanical, electrical, lighting hydraulic, fire and lift services meet or exceed the required performance criteria of all applicable Australian Standards, National Construction Codes and CIS Design Standards.

Detailed testing and commissioning requirements must be specified for each project by the CIS-appointed consultant/designer.

Project hand over inspection and testing plans (ITPs) must be developed by the consultant/contractor to allow the system to be handed over to the University. Detailed testing and commissioning records must be provided for each system and each component taking into account requirements of CIS Design Standards. All such records must be witnessed and verified by the CIS-appointed project consultant/designer.

11 DOCUMENTATION AND RECORDS

All design documents required by CIS Design Standards must be provided at practical completion as a minimum. These include but are not limited to:

- a. Design documentation of building and services
- b. Building Users' guide
- c. Maintenance manuals
- d. Commissioning records
- e. Room data sheets



- f. Product Manufacturer specific information and warranties
- g. Complete As-built drawings and surveys including building services
- h. Installers' Statutory certificates
- i. Utility supply authority completion forms and inspection records
- j. Requests for all variations to CIS Design Standards submitted using the **CIS Request Dispensation from Standard Form (CIS-ENG-F001)**
- k. Certification of compliance to the design standard by completing and submitting the CIS Project Design Certification Form, **CIS-PROJ-F001**

12 AUTHORISATION OF VARIATIONS

Architects, designers, project managers, consultants, contractors, commissioning agents and facilities maintenance personnel must ensure compliance with these requirements is achieved.

Variations or departures to this standard must only be considered where:

- a. University Standard's requirement cannot physically or technically be achieved.
- b. Alternative solution delivers demonstrated and proven superior performance for the same capital and life cycle cost or better.

Consultants and contractors must identify and justify requirements of the standard that do not apply to the project or which need to be varied and these which must be approved by the issuer of this standard. Formal requests for all variations to this Standard must be submitted using the **CIS Request Dispensation from Standard Form (CIS-ENG-F001)**. The issuer of this standard or their delegated authority must review and consider requirements of stakeholders from clients, projects and facilities management before deciding whether to approve variations. Their formal sign-off is required for acceptance of any non-compliances and departures from this standard's requirements.

13 QUALITY CONTROL

13.1 DESIGN STANDARD COMPLIANCE

Compliance with requirements of this standard must be checked throughout the design, construction and commissioning phases of projects by CIS' services consultant. Any issues or deviations from this standard must be reviewed and approved in writing by the issuer of this standard.

Competent CIS consultants and representatives must check compliance with this standard during design reviews and formal site inspections. Any non-conformances with requirements of this standard must be documented and provided to the CIS Project Manager for issue to contractors and their consultants.

Project Managers must maintain a formal register of non-conformances and manage close out of outstanding non-conformances. Contractors and their consultants issued with non-conformances must take appropriate corrective actions. The CIS Project Manager must ensure:

- a. proposed corrective actions are implemented
- b. close out of non-conformances in relation to this standard is formally approved and signed off by the author of the standard or their delegate



13.2 DESIGN STANDARD CERTIFICATION

Contractors and their consultants must certify compliance to the design standard by completing and submitting the CIS Project Design Certification Form, **CIS-PROJ-F001** to the CIS Project Manager at each of the following project phases:

- a. Design and Documentation
- b. Tender
- c. Construction

Notwithstanding CIS' internal quality control processes, contractors and their consultants must implement their own robust quality assurance and control procedures to ensure compliance with requirements of this standard.

14 NOTES

N/A

15 DOCUMENT AMENDMENT HISTORY

Revision	Amendment	Commencing
001	First Issue	18 September 2015

16 ATTACHMENTS

Attachment 1 UNIVERSITY CAMPUS, PRECINCT AND BUILDING ABBREVIATIONS



ATTACHMENT 1

APPENDIX A - UNIVERSITY CAMPUS, PRECINCT AND BUILDING ABBREVIATIONS

Campus abbreviations are:

Main Campus	= CAMP
Darlington	=DARL
Dentistry	= DENT
Kirkbride	= KIRK
Camden	= CAMD
Conservation	= CONS
Cumberland	= CUMB
Law	= LAW
Orange	= ORAN
Others	= OTH

The Precincts of Main Campus are:

Abercrombie	= ABE
Carillon Avenue	= CARI
Codrington	= COD
Eastern Avenue	= EAST
Hockey Square	= HOCK
Institute	= INST
Mallet St	= MALL
Manning	= MANN
Maze Crescent	= MAZE
Medical	= MED
Ovals	= OVAL
Quadrangle	= QUAD
Shepherd	= SHEP
Science Rd	= SC
Veterinary Science	= VET

Existing protocol to remain with the building numbers listed as:

Main Building	A14
Pharmacy and Bank Building	A15 B#, C#, etc... to Z#

Building Levels must follow the existing system and be abbreviated to:

The lowest level	= L1
The successive vertical levels	= L2, L3,..., Ln