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PRELIMINARIES
INTRODUCTION

BUILDING STANDARDS

These standards, first published in 1992 and later endorsed by the University of Adelaide Council March 1995, set out the University’s minimum requirements for the design, construction and maintenance of its facilities. Compliance with these standards is mandatory. It is the responsibility of the designer to confirm the suitability of the standards for specific projects by on site investigation, discussion with the users and consultation with the Project Manager.

ALTERNATIVE METHODS

Alternatives shall be submitted to the Building Standards Committee for approval. Any variation proposed therein shall, if allowed, be confirmed in writing. Finishes in existing buildings are to be continued in any alteration, addition or extension to that building. All work shall be designed and constructed to comply with the requirements of all relevant legislation together with other requirements as contained herein.

MAJOR REFERENCES


Work to or within heritage listed buildings or items shall conform with all aspects of the South Australian Heritage Act and in particular with the principles of any conservation study which may exist in relation to a heritage listed item.

Particular attention is drawn to the need to conform with the provisions of the Disability Discrimination Act and the University's policy (Disability Action Plan: <http://www.adelaide.edu.au/policies/136/> on providing access for the community at large, to all of its facilities and services.

CONSTRUCTION AUTHORITY

For all University projects the proprietor shall be nominated as The University of Adelaide. The Construction Authority for all University projects shall be the Division of Finance and Infrastructure, University of Adelaide.

PROPRIETARY ITEMS

The identification of a proprietary item shall not necessarily imply exclusive preference for that item, but shall be deemed to indicate the required properties of the item, such as type, quality, appearance, finish, method of construction, performance and the like. Preference shall be for Australian manufacture where all other specifications are equal.

LIFE CYCLE COSTING

All projects shall address the life cycle costing component of the economic evaluation as set out in AS/NZS 4536.
A.1 REFERENCES
(Non Exhaustive)

A.1.1 Statutory
as applicable

A.1.2 University of Adelaide

- Australian Construction Services report on Earthquake Resistance of Existing Buildings
- Safe Roofwork Practices & Procedures
- University of Adelaide Campus Strategic Plan 2002
- University of Adelaide OH&S Policy & Procedures
  <http://www.adelaide.edu.au/hr/policies/ohs/ohs&w.html>
- Relative Space Model
- Rehabilitation Policy and Procedures
  <http://www.adelaide.edu.au/hr/policies/ohs/rehab.html>
- Regular Inspections of the Workplace Policy and Procedures
  <http://www.adelaide.edu.au/hr/policies/ohs/inspect.html>
- Accident Report and Investigation Policy & Procedures
  <http://www.adelaide.edu.au/hr/policies/ohs/accinves.html>
- Building Evacuation Procedures
- Fire Safety Policy and Procedures
- OHS&W Management Plan
- Design and Construction of New and Refurbish Buildings
- Laboratory Conduct Procedures
  <http://www.adelaide.edu.au/hr/policies/ohs/labcondu.html>
- Manual Handling Procedures
  <http://www.adelaide.edu.au/hr/policies/ohs/manhandl.html>
- University Field Activity Policy and Procedures
  <http://www.adelaide.edu.au/hr/policies/ohs/fieldact.html>
- Thermal Environment Policy, Procedures and guidelines for the protection of outdoor workers
  <http://www.adelaide.edu.au/hr/policies/ohs/thermal.html>
- Tractor and Forklift Driving Policy and Procedures
  <http://www.adelaide.edu.au/hr/policies/ohs/tractor.html>
- Asbestos Management Policy
  <http://www.adelaide.edu.au/hr/policies/ohs/asbestos.html>
- HIV/AIDS/Hepatitis B Policy and Procedures
  <http://www.adelaide.edu.au/hr/policies/ohs/hivhepb.html>
- Children on Campus Policy
  <http://www.adelaide.edu.au/hr/policies/ohs/children.html>
- Drug and Alcohol Policy
  <http://www.adelaide.edu.au/hr/policies/ohs/drug_alc.html>
- Policy on Smoking in the University
  <http://www.adelaide.edu.au/hr/policies/ohs/smoking.html>
- First Aid Policy and Procedures
  <http://www.adelaide.edu.au/hr/policies/ohs/firstaid.html>
- Electrical Safety Policy and Procedures
  <http://www.adelaide.edu.au/hr/policies/ohs/elecpol.html>
- Policy on Occupation Health and Safety Training
  <http://www.adelaide.edu.au/hr/policies/ohs/training.html>
- Antennas on Buildings
- Disability Action Plan
- Environmental Policy
- Space Policy
- 'As Built' Record documents
A.1 REFERENCES (CONT’D)

A.1.3 Reference Library

A comprehensive collection of historical records, microfilmed documents, structural information and existing building services is available for reference from Unispace <https://unispace.adelaide.edu.au/>.

A.1.4 Australian Standards

References to Australian Standards in this document are listed below. Practitioners shall ensure that individual copies of these references are the current issue of Standards Australia.

- **AS 1074** Steel tubes and tubulars for ordinary service
- **AS 1100** Technical Drawing
- **AS 1158** Road lighting
- **AS 1170** SAA Loading Code
- **AS 1469** Acoustics – Various methods for the determination of noise rating numbers
- **AS 1432** Copper tubes for plumbing, gas fitting and drainage applications
- **AS/NZS 1477** PVC pipes and fittings for pressure applications
- **AS/NZS 1571** Copper – Seamless tubes for air conditioning and refrigeration
- **AS 1680** Interior lighting
- **AS 1940** The storage and handling of flammable and combustible liquids
- **AS 2107** Acoustics – Recommended design sound levels and reverberation times for building interiors
- **AS 2243.8** Safety in laboratories – Fume cupboards
- **AS 2243.9** Safety in laboratories – Recirculating fume cupboards
- **AS 2293** Emergency evacuation lighting
- **AS 2700** Colour Standards for general purposes
- **AS 2890.3** Parking facilities – Bicycle parking facilities
- **AS 2982** Laboratory design and construction – General requirements
- **AS 3000** Electrical installations (known as the Australia/New Zealand Wiring Rules)
- **AS 3084** Telecommunications installations – Telecommunications pathways and spaces for commercial buildings
- **AS/NZS 3500.4.2** National Plumbing and Drainage – Hot water supply systems – Acceptable solutions
- **AS 3595** Energy management programs – Guidelines evaluation of a project
- **AS 3660** Protection of buildings from subterranean termites
- **AS 4085** Automatic door assemblies
- **AS/NZS 3080** Telecommunications installations – integrated telecommunication cabling systems for commercial premises
- **AS/NZS 3548** Limits and methods of measurement of radio disturbance characteristics of information technology equipment
- **AS/NZA 4536** Life Cycle Costing
B.1 PLANNING CONTROLS

B.1.1 Master Plan

The University of Adelaide Campus Strategic Plan 2002 is the reference for all planning related to the built infrastructure.

B.1.2 Statutory Controls

All proposals shall conform with those requirements as set out in the relevant Statutory requirements.

B.1.3 Building Standards Approval

All plans for new building, refurbishment and maintenance work shall meet the requirements of these Building Standards.

B.1.4 Brief

The Brief is to be included in the process of project development to aid project control. It is to be initiated by the user to set out the requirements as perceived by the user.

The Brief will also set out the designers understanding of the task, all matters raised by the user, and the solution with its methodology. This is to be agreed to by all parties, thereby allowing formal documentation to proceed.

Schedule forms for accommodation planning and briefing are in Appendices of these standards.
C.1 DOCUMENTATION

C.1.1 Australian Standards

Generally the AS 1100 Series shall be observed for all drawings.

C.1.2 House Style

Exceptions and additions to above shall be:
- All drawings originating from Finance and Infrastructure shall have 'corporate logo' and title block.
- Limitation of minimum line thickness of 0.25mm suitable for scanning.
- Drawings to be presented on either A2 or A3 sheet size (A0 will only be accepted in certain large mechanical layouts).

C.1.3 Building Identification

All documentation shall include the campus location, correct building name, building number, and room number(s).

Apply to Manager Facilities Records for correct reference of any new asset acquired.

C.1.4 CAD

All matters relating to the generation, retrieval and transfer of electronic data shall be discussed with Finance and Infrastructure. Finance and Infrastructure CAD system is Caddsman.

C.1.5 Spares

Any documents relating to procurement of replaceable item(s) shall, where applicable, nominate spares, equivalent to a portion of the total of any product used. The exact quantity to be in agreement with the Project Officer. This mainly applies to finishes such as floor coverings, tiling, specialised fittings etc, but may extend to other items, particularly where the identification of any item is not in accordance with these standards. All spares shall be securely stored in a designated area or space within the building undergoing the works.

C.1.6 Contracts

The following are the preferred form of contract:
- University of Adelaide Minor Works Contract
- University of Adelaide Major Works Preliminaries combining the general conditions Major Works Contracts
- University of Adelaide Consultancy Agreement
C.1 DOCUMENTATION (CONT’D)

C.1.7 Notice to Tenderers

Shall include such items as:
- an invitation to tender
- amendments to tender documents
- extensions of time
and shall form part of the documentation package.

C.1.8 As built drawings


As built’ information is mandatory for every project. The information as per C.1.3 shown on the contract documents shall be forwarded at the start of the Construction Phase. All other ‘as built’ information noting contract variations is required at the end of construction. For all queries contact Space Data email: unispace@adelaide.edu.au
D.1 SPACE PLANNING MODEL

D.1.1 Space Planning Guidelines

Ref:  

For assistant in applying TEFMA (AAPPA) guidelines, contact Manager Space Data - unispace@adelaide.edu.au

D.1.2 V.D.U. Installation in Teaching/Tutorial Areas

D.1.2.1 Benches

Shall be a minimum depth of 700mm and a standard height of 700mm.

D.1.2.2 VDU

Shall be spaced at centres of not less than 900mm to allow for bag storage at side of operator.

D.1.2.3 Access & Egress

a) **Single access** as in Fig. 1 shall leave a minimum distance of 1100mm between benches or bench and wall or other obstacle at rear.

b) **Common access** as in Fig. 2 shall leave a minimum distance of 1700mm between benches where operators at each bench are placed back to back.

c) **Aisles at end of benches** shall have a minimum unobstructed width of 1000mm where this is allowed under provisions of BCA in accordance with the number of occupants.
D.1 SPACE PLANNING MODEL (CONT’D)

D.1.3 Service and Storage Areas

Particular care is to be taken in the design of these areas to provide convenient access to industrial waste bins and other rubbish containers while at the same time providing suitable visual screening.

D.1.4 Ancillary Provisions

D.1.4.1 Sanitary Accommodation
Sanitary accommodation and other staff amenities shall be as described in the Occupational Health, Safety & Welfare Act 1986 and the Building Code of Australia (BCA).
Ref also to N.2.12 Muslin Ablutions.

D.1.4.2 Cleaners Rooms
Shall be provided on each level in all developments and will contain hot and cold water, cleaners sink and implement storage. A minimum area of 3m² is required.

D.1.5 OH&S Act

Refer also to the Occupational Health Safety & Welfare Act regarding minimum space requirements e.g.
• 11 cubic metres of air space per person.
• Walls to be at least 2.4 metres in height.
E.1 ENVIRONMENTALLY SUSTAINABLE DESIGN (ESD)

E.1.1 Scope

The design should incorporate a range of ESD initiatives using established passive design principles and a choice of materials that have a low environmental impact.

Buildings and engineering services should be designed to meet life cycle costing principles contained herein and be flexible, innovative and with provisions for future requirements as applicable.

Design to minimise energy use, peak demand energy requirements and the use of other resources such as water, consistent with best practice, practical design and life cycle costing principles.

Alternatives shall be costed using AS 3595 Energy Management programs – Guidelines for financial evaluation of a project, with a real rate of return of not less than 6%.

The ‘ESD Design Review Checklist’ in appendix ‘D’ must be submitted by the designer for all major projects where Heating, Ventilation and Air Conditioning systems are used.

E.1.2 Building Design

To minimise the thermal gain into or from the building via the building envelope, the following shall be considered:
- Shading of windows and walls.
- Selection of glazing and thermal performance of windows.
- Thermal insulation of walls and roof.
- Increased shell reflectance of walls and roof.

Wherever possible, maximise the use of natural ventilation so that air conditioning equipment can be turned off if ambient conditions are suitable.

The design team should liaise on the above at the design concept stage to ensure an energy efficient building design.

The payback period of building fabric energy conservation measures can be in excess of 10 years.

E.1.3 Embodied Energy

For large projects, carry out an embodied energy studies to justify embodied energy quantities and demonstrate best practice techniques.

Buildings should utilise construction materials and construction methods that minimise the amount of embodied energy in the building.
E.1 ENVIRONMENTALLY SUSTAINABLE DESIGN (ESD) (CONT’D)

E.1.4 Energy Density Targets

The targets below should be used as a guide in the overall building or systems life cycle costing process, but not be used to dictate the final design in favour of capital cost.

Systems shall be designed to approach the following optimum energy targets: -

**Lighting;**
- Office areas; 10 W/m²
- Common Teaching areas 20 W/m²
- Laboratory areas 12 W/m²

**Air Conditioning**
(figures based on typical occupancy levels, optimum building criteria and similar operating times)
- Office areas; 30 kWh/a.m²
- Common Teaching areas 37 kWh/a.m²
- Laboratory areas 34.5 kWh/a.m²

E.1.5 Equipment and Appliances

Equipment and appliances utilised in building fit-outs should be located and selected with the following considerations;

- Five star energy smart product ratings in accordance with AS4474.2 Performance of household electrical appliances.
- ‘Energy star enabled’ capability
- Minimal ‘stand-by’ facilities
- Logically located in the space; for example heating and cooling equipment separated and away from open environments
- Adequate air-circulation to maximise efficiency.
E.2 ESD INITIATIVES; MECHANICAL SERVICES

Mechanical services may utilise in excess of 50% of the energy used in a building. Therefore, it is essential that during the design process, all available options to minimise the energy consumption of the Mechanical Services equipment associated with the building be considered.

Designs shall be consistent with life cycle costing principles and should consider the following design factors, equipment and principles.

E.2.1 Air Conditioning Systems

A number of air conditioning options that enable reduced energy usage and running costs are listed following. The list is by no means exhaustive and other systems that reduce the running costs should be considered.

E.2.1.1 Heat Recovery Systems

Wherever possible, utilise exhaust air or spill air from the building to preheat or precool the incoming outside air with the use of heat exchange equipment.

Also consider using other waste heat for preheating of outside air in winter.

E.2.1.2 Combined Heat Pump/Indirect Evaporative Cooling System

Such systems utilise an indirect evaporative cooler to precool the incoming outside air being delivered to the fan coil unit, subsequently reducing the amount of total energy required to maintain satisfactory space conditions.

E.2.1.3 Gas Engine Driven Chillers

Such systems incorporate a gas driven engine to run the chillers in lieu of electric motors. Running cost savings by utilising gas are achieved, and energy efficiency is improved, as the chillers are able to be speed controlled.

The waste heat from the gas engine could be used hot water heating for example.

E.2.1.4 Absorption Chillers - Direct Gas Fired or Indirect Fired

Such systems utilise an absorbing-generating compartment in lieu of a compressor. Running cost savings are achieved by utilising gas as the heat source instead of electricity. Alternatively, the system can be operated from the waste heat of a gas cogeneration system.

E.2.1.5 Geothermal Air Conditioning Systems

Such systems utilise the earth as a means of rejecting heat from the air conditioning system, in lieu of using ambient air. As the temperature of the earth is considerably lower than that of the ambient air in summer, improved efficiency and running cost savings can be achieved.

E.2.1.6 Air Cooled Reverse Cycle Split System Type Air Conditioners

Where reverse cycle wall mounted or ceiling cassette type systems are required, utilise inverter type units to minimise running costs.
E.2 ESD INITIATIVES; MECHANICAL SERVICES (CONT’D)

E.2.1.7 Variable Refrigerant Volume Systems

Such systems comprise individual fan coil units within the occupied spaces, connected to common outdoor condensing units. Operating costs can be reduced over conventional split systems by the use of a variable speed compressor and the utilisation of heat recovery.

E.2.1.8 Economy Cycle

Economy cycle systems are added to air conditioning systems to enable the use of 100% of outside air to be introduced into the system to provide ‘free’ cooling to an area when ambient conditions are suitable.

Incorporate economy cycle wherever possible on air conditioning systems.

E.2.2 Exhaust/Ventilation Systems

Consider the use of heat recovery systems on exhaust air systems to temper the incoming outside air.

Consider using the ventilation system to provide night time purging of the building to reduce the stored heat in the building.

E.2.3 Fume Cupboards

Consider fume cupboard design to permit direct outdoor air make up into fume cupboards while complying with containment requirements.

As a minimum requirement, incorporate variable volume fans to reduce the total exhaust flow rate when the sash is closed.

E.2.4 Filters

Consider increasing the size of the filters to reduce the velocity through the filter and reducing the required fan power of the system.

The maximum allowable air velocity through the filter is not to exceed 1.75 m/s.

E.2.5 Motors

All motors for pumps, fans etc should be of the higher efficiency type.

Consider variable speed drives for motors where economic.

E.2.6 Air Distribution Systems

Ductwork systems shall be sized based on a maximum pressure loss of 0.65 Pa/m.

Consider the use of a lower pressure loss to minimise the required fan power for the system.

Incorporate long radius bends where possible.

Air diffusion devices shall be selected for low resistance.
E.2 ESD INITIATIVES; MECHANICAL SERVICES (CONT’D)

E.2.7 Pipework Systems

Pipework systems shall be sized for low pressure loss to minimise the required pump power for the system.

Incorporate long radius bends where possible.

E.2.8 Hot Water Systems

Where local hot water to sinks or basins are required, utilise high efficiency, instantaneous type gas hot water units where possible.

Where larger volumes of hot water are required, utilise high efficiency gas hot water storage systems, incorporating a solar energy contribution where possible.

E.2.9 Control Systems

There should be no humidity or close temperature control except where specifically required by equipment or special areas such as animal holding areas.

Provide building management system for control of large systems to enable control of equipment start stop times to minimise running costs.

Provide time clock control for small systems.

Consider movement sensor control for individual room split systems.

E.2.10 Maintenance

Air conditioning and ventilation systems shall be well maintained to ensure optimum performance of equipment.
E.3. ESD INITIATIVES; ELECTRICAL SERVICES

E.3.1 Power Factor Management

Whilst not a means of reducing energy consumption Power Factor management strategies can reduce the size and capacity requirements of power supplies, cables, switchboards and switchgear.

Power factor can be managed at main switchboard, distribution board or equipment levels. The preferred approach is at the equipment level as it maximises the ‘upstream’ benefit. Cost/benefit analysis is required to review the cost of correction equipment compared with electrical infrastructure cost savings available.

All equipment power factor targets should be as close as possible to unity, or as dictated by the cost analysis.

E.3.2 Instrumentation

All power supplies require instrumentation to track the consumption of energy.

Such instrumentation should have the ability to be networked to a single monitoring point using the available University IT infrastructure.

E.3.3 Maximum Demand Control/Energy Load Shedding

Infrastructure should provide the ability to shed non-essential loads to control and manage maximum demand. Non-essential loads may include sections of buildings, unoccupied areas, hot water systems and boiling water units.

Control systems should have the ability to enable strategic load.

E.3.4 Illumination and Controls

Careful design of artificial lighting installations is required to minimise energy consumption. Lighting design should consider the availability of natural light using automated dimming and switching in naturally lit areas.

Consider the use of high efficiency lamps such as ‘T5’ fluorescent lamps.

Ensure the efficiency of the luminaries proposed, and the fixture light output ratio compared to lamp lumen output.

Lighting control systems that provide occupation sensing and an ability to interface the building management system are required, with the ability to provide intelligent control of other facilities such as air-conditioning. Such systems are mandatory with Common Teaching areas and other larger spaces.

E.3.5 Equipment Controls

Provide automated time switching controls for equipment including hot water units and boiling water units, preferably via the building management system.

Control systems utilising both discrete signal cabling and mains signalling should be considered.
F.1 LECTURE THEATRES

Design of each theatre shall be done in consultation with the Project Manager & IT/AV divisions of The University of Adelaide.

F.1.1 Lighting

F.1.1.1 General Lighting

General illumination shall be supplied by means of diffused fluorescent fittings having variable lighting levels controlled by bank switching. Switching shall be provided at each of:

(a) the entry of the lecture theatre, via a movement sensor; (access levels only).

(b) the lecturer's position at the front of the theatre and or an installed touch panel.

(c) the projectionist's position at the rear of the lecture theatre or in the projection room where one is provided.

Any Luminare between the projection screen and the first row of seats must be switched independently of the lighting in the main body of the lecture theatre. There must be no direct light spill from the lighting in the main body of the theatre on to the projection screen.

F.1.1.2 Low Level Lighting

As well as general lighting as described above, compact fluorescent lighting shall be provided throughout the lecture theatre for use during projection and for note taking.

F.1.1.3 Projection Room Lighting

Lighting within the projection room shall be locally switched.

F.1.1.4 Chalkboard, Whiteboard Lighting

Chalkboard, whiteboard lighting shall be provided in all cases and shall be switched from the lecturer's position, front of theatre and projection room.

F.1.2 Power

Shall be provided to the specific requirements of those disciplines normally using the facility and in accordance with other requirements for power contained herein. Separate circuits and outlets shall be provided for cleaning appliances.

F.1.3 Projection Controls

Where there is a separate project room conduits shall be run between the projection room and the lecturer's position and shall be provided with draw wires. Where a lectern position is provided, projector control conduits shall terminate in a flush mounted floor box.
F.1 LECTURE THEATRES (CONT'D)

F.1.4 Audio

Speakers/Amplification shall be provided in the lecture theatre for either image projection audio or voice reinforcement.

F.1.5 Video Projection

Allow in the ceiling or soffit structure, to provide support and cabling for mounting a video projector. Extra consideration for the security of the video projector(s) is required where ceilings are easily accessible.

Consideration shall be given to securing the projector. Custom or Proprietary systems are available ex Maprak Pty Ltd.

F.1.6 Computer/Special Services Cable

Standard dual outlet to be installed in lectern and cabled back to appropriate cable riser.

F.1.7 Air-Conditioning

Generally controlled by timed sensor and to the requirements as contained herein.

F.1.8 Acoustics

Acoustic performance of the theatre shall be referred to an Acoustic Engineer. Refer also to acoustic control contained herein. Ref: H.1.

F.1.9 Projection Screens

F.1.9.1 Motorised or Fixed

Screens shall be provided at the front of the lecture theatre. The physical aspects of the theatre will decide whether the screen installed will be of a motorised or fixed type.

F.1.9.2 Slide Projection

Each lecture theatre and seminar room shall include a screen for slide projection. Allowance for dual slide projection should be considered. Minimum screen size is 2m x 2m. Actual screen size will depend on the size of the theatre.

F.1.9.3 Overhead Projection

Overhead projection shall be provided in all lecture theatres via projection from a mobile trolley with provision to accommodate notes. Screens may be either fixed or retractable depending upon sitelines and other front of theatre requirements. Minimum size of screens shall be 1.8m x 1.8m and should be set inclined, to avoid ‘keystone’ effects.
F.10 Blackout

All lecture theatres must be capable of complete blackout. Where lecture theatres are fitted with windows, effective blackout curtains, screens or shutters shall be provided.

F.11 Lectern Design

Lecterns shall be in accordance with the University's standard design as referenced in appendix ‘E’.

F.12 Lectern Controls

Where touch panel control system is installed in the lectern, it shall offer control of all audio visual equipment installed including motorised screens. Where possible it should offer control of the lighting in the theatre.

Where touch panel control systems are not installed in the lectern controls for all audio visual equipment, motorised screens and lecture theatre lighting shall be located in the lectern and be easily accessible to users. Infrared remotes for all audio visual equipment shall be accessible to users.

F.13 Whiteboard/Chalkboard

To avoid chalk dust contamination of electronic equipment the preference is for whiteboards unless chalkboards are specifically requested. Either board shall include a 70mm wide ledge for pens and erasers. Where video/data projection systems and associated electronic equipment is installed, chalkboards are not allowed.

F.14 Lecture Theatre Seating

Fixed seating with tablet arms shall be Sebel "Griffin" style. Additional 5 spares per 100 shall be supplied with each installation. Where existing, ‘ARISTOC’ seating shall be maintained if major refurbishment is not required.

In addition, provide 10 off L/H writing tablets as part of the total seating plan. Front row 5 and back row 5.

F.15 Clocks

Provide clock(s) to all theatres.

F.16 Waste Paper

Provide waste paper containers at each entrance/exit.
F.1 LECTURE THEATRES (CONT'D)

F.1.17 Equity of Access

All lecture theatres, seminar rooms shall be accessible in accordance with current statutory requirements.

F.1.18 Tutorial & Seminar Rooms

F.1.18.1 Definition

| Tutorial Room | <20 people |
| Seminar Rooms | >20 people |

F.1.18.2 Provisions

- generally flat floor
- no special lighting or facilities
- audio visual equipment to be portable
- grey/black out facilities to be determined on request
- view panel to entry doors
- loose tables and chairs, consider trapezoid
- whiteboard, 1500 x 1200
- ceiling fans where air conditioning is not installed
- light switch for entry lighting, adjacent to door handle
- GPO adjacent whiteboards
- voice & data outlet adjacent GPO
- a standard transparent overhead projector with trolley and screen must be provided
- room signage – diagram of equipment giving seating layout, room capacity and list of equipment
G.1 LABORATORIES

G.1.1 Laboratory Design
Generally shall be in accordance with B.C.A. & AS 2982.

G.1.2 OH&S Requirements
In accordance with OH&S as referenced herein.

G.1.3 Fume Cupboards
To conform with specific requirements contained herein.
Ref: N.10.

G.1.4 Plumbing
All plumbing to conform with sanitary plumbing & fixtures contained herein. Ref: N.2
G.1.4.1 Traps & Wastes - Laboratory
Shall be from polypropylene, polyethylene, or stainless steel. All systems shall have bottle traps with removable bowl sections.

G.1.4.2 Emergency Showers
Shall be “Enware” integral shower / aquawash unit, or similar approved. Each installation shall include locally graded floor (1:80) to a floor trap running to the waste drain within the building. Non - slip flooring shall surround the trap to a minimum radius of 2.5m where practicable. Cove flooring to adjacent walls. Adjacent walls shall have a waterproof coating to a height of 2m above f.f.l., sealed to the edge of the coving.

G.1.5 Doors
Each door to a laboratory, chemical storage, preparation room or laboratory work area shall have a glazed vision panel.

G.1.6 Benches & Shelving
Shall be in accordance with the design and ergonomic data as set out in appendix ‘E’.

G.1.7 User and Return Brief
As referenced, to form part of the project brief, shall be in accordance with part 1 Preliminaries B.1.4 and as per appendix ‘B’ of Building Standards.
H.1 ACOUSTIC CONTROL

H.1.1 Background

The probable ambient noise level should be determined and recognised in establishing types of partition and subdivision walls. (External ambient noise from traffic, aircraft and other buildings should be considered in determining details and materials of external facades, windows, roofs, etc.) There are a number of variables effecting the noise resulting in a particular space.

H.1.1.1 Variables

The number, type and location of noise sources, e.g. low frequency, loud and close noises. All noises are not the same.

H.1.1.2 Isolation

The Isolation of noise achieved via the various paths, such as small cracks and openings, very considerably reduce the performance of partition systems. Partition performance is often specified by a single figure (STC) number, but this is a simplification of a performance at different frequencies. The partition will perform differently to different sounds. Due to these variables the degree of noise isolation achieved may not relate well to published information of partition performance.

H.1.1.3 Acoustic Conditions

The acoustic conditions in the receiving room. The sound energy transmitted into the room will result in a noise level that depends on how acoustically softly furnished the receiving room is.

H.1.1.4 Air Conditioning

Air conditioning noise contributes to the noise in the space.

H.1.1.5 Appropriate Noise Levels

There are differing appropriate noise levels for different uses of space. For these reasons an end requirement is specified, allowing the designer the necessary flexibility to achieve the result required.

H.1.2 Maximum Allowable Noise Level

A maximum allowable noise level appropriate to the intended use of each separate area under consideration potentially effected by proposed building works is to be selected from TABLE 1 AS 2107. Where the selection of an appropriate level is made awkward by intended multiple use of a particular area or an inexact description only is able to be selected from TABLE 1, confirmation of selection is to be obtained from the Properties Services Branch the University of Adelaide.

H.1.2.1 Maximum Equivalent

Continuous noise level, A weighted, over a period of 1 minute, or alternatively.
H.1 ACOUSTIC CONTROL (CONT’D)

H.1.2.2 NR (Noise Rating) Figure

For some areas where the frequency of background noise is of importance.

This Noise Rating figure is determined by measurement in octave frequency bands in accordance with the provisions of AS 1469, with each octave measurement determined over one minute. Both the measurement of 1. and 2. above are common acoustic measurements.

Both acoustic design of building elements effecting the noise in space under consideration of the measurement to establish compliance with the maximum allowable noise level, should include regard for acoustic conditions of occupation (reasonably to be expected) of areas likely to acoustically influence the subject area, but exclude noises of occupancy in the particular space under consideration, apart from air conditioning noise.

H.1.3 Integrated Acoustic Design

Penetration of noise into a enclosed space is considerably affected by:

H.1.3.1 Cracks
Cracks between suspended ceilings and partitions taken to the underside of suspended ceilings.

H.1.3.2 Grilles
Return air grilles in doors.

H.1.3.3 Ceiling Plenum
Room to room via ceiling plenum and other acoustically weak paths such as doors.

H.1.3.4 Receiving Room

In addition it is significantly effected by the acoustic conditions in the receiving room.

Table H.1.3.5, prepared for a particular noise source, room dimensions and conditions in the receiving room is included solely to illustrate the importance of treating the appropriate acoustic path. Improving partition performance may achieve very little.

In general it is difficult to compensate for an acoustically weak element by over specification of another. Integrated acoustic design is all that is likely to achieve a desired acoustic result. Large areas of glazing may determine that the required noise level is unobtainable without wide partitions to accommodate suitable double glazing. Offices should generally include either carpet or acoustic ceiling tiles.
H.1 ACOUSTIC CONTROL (CONT’D)

H.1.3.5 TABLE

(ILLUSTRATION ONLY)

<table>
<thead>
<tr>
<th>Feature</th>
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<tbody>
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<td>44</td>
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</tr>
</tbody>
</table>

H.1.3.6 Acoustically Limited Works

Where existing building elements of significance are to be retained in a revised arrangement and where these existing elements significantly limit acoustic performance, work will be limited to properly performing the agreed contract, without the requirement to meet a maximum allowable noise level.

H.1.3.7 Internal Acoustic Treatment

Rooms may require a specific extent of acoustic treatment (sound absorption) on the internal surfaces to provide acceptable internal acoustic conditions. This is particularly likely to be important in:

1. large rooms where speech intelligibility is important (lecture theatres, theatres).
2. rooms which are sensitive to the incursion of external noise (studios).

Carpet and acoustic ceiling tiles are often used to fulfil this function, suitable placement and area is important, and these alone may be insufficient.

The characteristic quantifying the required internal treatment is termed "The Reverberation Time".
J.1 STAIRCASE

J.1.1 Open Risers

Where open risers are allowed or exist, the first riser from each floor level shall be closed to prevent accidental capture of canes of the visually impaired.
J.2 ROOFS

J.2.1 Roof Types

J.2.1.1 Pitched Roofs

Pitched roofs are preferable to flat deck roofs. Minimum pitch shall be not less than manufacturers’ recommendations for materials adopted.

J.2.1.2 Built-up Roof

Built-up roofs when approved by the Building Standards Committee shall be 1.5mm thick 'Butynol' guaranteed for a minimum of 20 years against faulty workmanship, materials and deterioration. On existing membrane roofs, sheeting shall be adequately protected from damage. Adhesives and sealants in contact with the membrane shall be as recommended by the manufacturer. Where plant etc. is to be fixed on top of the membrane an additional layer of membrane shall be provided. Fixing details shall be submitted for approval by the Project Manager, before work commences.

J.2.2 Roof Deck Materials

Metal pan roof decking shall be 0.6mm thick colourbond zinclume profile steel decking equivalent to Lysaght Klip-Lok fixed in accordance with manufacturer's instructions.

J.2.3 Roof Drainage & Gutter Sizing

Shall be as appropriate to sheet size and pitch as recommended by the manufacturer, with allowance for 100 year rainfall occurrence.
All gutters shall be from 0.6mm thick steel with either 'Zincalume' or 'Galvanised' coating compatible with the roofing material.

J.2.4 Roof Insulation

Shall provide adequate thermal insulation to ceiling spaces to minimise heat transfer through the ceiling. Sound transmission of external ambient noise together with rain impact shall be attenuated suitable for all teaching areas, lecture theatres and the like, immediately below a roof space.

J.2.5 Roof Maintenance

Shall be incorporated in design of new or replacement roofs to provide adequate provision for future maintenance works to be carried out in accordance with the University of Adelaide current OH&S policy <http://www.adelaide.edu.au/hr/policies/ohs/ohs&w.html> and any other statutory requirements. Refer Facilities Records document: 'Safe Roof Work Practices & Procedures'.
J.2 ROOFS (CONT’D)

J.2.6 Protection of Roof Membranes

Membranes shall be protected from damage at all times when working in the area of the membrane.
Cutting and grinding of steel and welding shall not be permitted on the roof.
Roof surface to be kept clean at all times and free from all objects with sharp edges.
Where plant and/or equipment is to be installed additional layers of the membrane shall be laid under supports.
Penetrations & repairs to the membrane shall to be carried out by approved fixers in accordance with the manufacturer's recommendations.

J.2.7 Roof Alterations

Where alteration occurs, ensure all decking, gutters, flashings etc. are adequately supported to allow foot traffic during routine maintenance.

J.2.8 Walkways & Ladders

Shall be of galvanised finish and suitably supported to allow foot traffic during routine maintenance and separated from non compatible materials to avoid any staining through electrolytic action or the like.

J.2.9 Gutter Protection

In areas where leaf litter or similar is likely to cause clogging or corrosion to rainwater discharge goods, a gutter protection system such as 'Leafscreener' or similar approved, shall be fitted as a integral part of the roofing system. Consideration must also be given to oversizing down pipes and rainwater heads. e.g. in vicinity of excessive leaf drop.
J.3 EXTERNAL WALLS

No special provisions
J.4 WINDOWS

Steel windows are not allowed in new structures.
J.5 EXTERNAL DOORS

J.5.1 Timber
Shall be 42mm minimum thick solid core, faced with exterior grade plywood, edged all round with hardwood edge strip.

J.5.2 Aluminium
Shall be commercial grade, heavy duty with 200mm wide top, bottom and mid rails. Locks to be fitted at mid rail location.

J.5.3 Automatic Sliding Doors
Doors shall generally comply with the requirements of AS 4085 and also incorporate the following:

- Integral motor shaft non-slip lock system
- Interface to central access control system
- Clearly labelled manual release push button installed internally, located to prevent break and entry, eg. away from glass walling
- Manual release button to activate doors without sensor interface
- Sensor to be deactivated when door(s) are in auto lock mode
- Service operator over-ride switch to be incorporated
- Detectors to be radiant energy passive infra-red type
- Transom assembly to incorporate a replaceable 'runner rail'

Solenoid locking pins are not allowable.

J.5.4 Security and Fire Protection
All external doors shall be interfaced with the requirements of SECURITY & EMERGENCY ALARM SYSTEMS N.8 and FIRE PROTECTION N.17 contained herein.
J.6 INTERNAL WALLS & PARTITIONS

J.6.1 Flexibility

Buildings shall be designed to be as flexible as possible internally. Load bearing walls shall be minimised and restricted to areas such as the building core for stairwells, lift shaft and toilets. All other internal walls and partitions shall be non-load bearing and fully demountable within the limits of economical design.

J.6.2 Materials

J.6.2.1 General

Partitions and internal walls shall be of plasterboard on metal stud with glazing as required.

J.6.2.2 Synthetic Mineral Fibres

No unbonded fibres are permitted.

J.6.3 Toilet Walls & Ablution/Shower Room

Where a suspended ceiling is installed throughout the area of a building where toilet & ablution/shower rooms are accommodated, the perimeter walls of those areas both male & female shall extend to the underside of the slab or roof structure above on that level of the building.

J.6.4 Skirtings

Vinyl skirtings of 100mm height shall be provided to all internal partitions irrespective of type except where metal skirting duct is used, where walls are tiled, or where other floor finishes return up walls.

In areas where other materials (timber, etc.) exist, consideration shall be given to matching existing finish.
J.7. INTERNAL DOORS

J.7.1 Internal Doors

Internal doors shall be plywood and/or customwood faced solid-core, 42mm thick & edge stripped all round with 12mm thick timber edging.

Doors to lecture theatres, seminar rooms and similar teaching spaces and plant rooms shall be designed to match the acoustics of the room and shall include seals as required.

J.7.2 Frames

To be pressed mild steel with butt hinges screw fixed.

J.7.3 Door Protection

Where there is a likelihood of damage to door surface by use of trolley(s) etc., incorporate a protective surface such as vinyl sheeting or stainless steel sheeting applied to the lower section of the doors.
J.8 FLOORS

J.8.1 Design

Floor shall be designed for the most economical construction and flexibility of use with due consideration to long-term deflections and the need to provide for penetrations both initially and during the course of the building’s life.

J.8.2 Floor Loads

All buildings shall be designed for floor loadings generally in accordance with those specified by AS 1170.

Library stack areas shall be designed for floor loadings of 6.0 kN/m² provided that stack height is limited to 2.3m. Floor loads for special areas shall be determined on an ad hoc basis in consultation with users.

Appropriate signage stating load limitations shall be strategically placed as required.

J.8.3 Termite Control

Anti-termite treatment shall be provided to all buildings. All workmanship and materials shall conform to the requirements of AS 3660 for soil treatment for the protection of buildings against subterranean termites.
J9  CEILINGS

J9.1  Suspended Ceilings

Ceiling systems shall generally be a two-way grid exposed T-bar of pre-painted aluminium with 600 x 600mm module. Ceiling tiles shall be plasterboard.

J9.2  Plasterboard Ceilings

Plasterboard Ceilings on metal lathe shall be provided with access panels. This type of ceiling should be avoided unless demanded for specific purposes.

J9.3  Acoustic Tiles

Fibrous plaster 'chocolate pattern' mineral fibre fill.

J9.4  Existing Ceilings

Notwithstanding the provisions of Heritage listed buildings, all plasterboard, suspended or false ceiling and the like shall be completely removed when a new ceiling is installed in an area.

J9.5  Setout

Consideration shall be given to alignment of grid in relation to lighting, A/C registers etc, to maximise tile size at wall abutments. Seal all edge moulding to walls to avoid falling dust stains to walls.
K.1 WALLS

K.1.1 Paintwork (internal)

<table>
<thead>
<tr>
<th>Space/Area</th>
<th>Walls</th>
</tr>
</thead>
<tbody>
<tr>
<td>Offices</td>
<td>B,C,F or G</td>
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<tr>
<td>Classrooms</td>
<td>G</td>
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<td>Workshops</td>
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<td>F above</td>
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<tr>
<td>Cleaners Rooms</td>
<td>H</td>
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<td>Lect. Theatres</td>
<td>H to Dadoo</td>
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<tr>
<td></td>
<td>F above</td>
</tr>
<tr>
<td>Student Housing</td>
<td>F or G</td>
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<td>Staff Housing</td>
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</tr>
<tr>
<td>Bathrooms</td>
<td>H</td>
</tr>
<tr>
<td>Toilets</td>
<td>H</td>
</tr>
</tbody>
</table>

LEGEND

A  ACRYLIC FLAT (WASHABLE)
B  ACRYLIC LOW GLOSS
C  ACRYLIC SEMI-GLOSS
D  ACRYLIC HI-GLOSS
E  ALKYD ENAMEL FLAT
F  ALKYD ENAMEL LOW SHEEN
G  ALKYD ENAMEL SEMI GLOSS
H  ALKYD ENAMEL FULL GLOSS
I  CLEAR POLYURETHANE FULL GLOSS
J  CLEAR POLYURETHANE LOW SHEEN
K  TWO PACK ACID RESISTANT POLYURETHANE

K.1.2 Other

Unless to specific agreed design, all other existing finishes and colours shall be retained.

K.1.3 Colour

Preferred colours for room decoration
AS 2700

<table>
<thead>
<tr>
<th>NAME</th>
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<td>Driftwood</td>
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<td>Off White</td>
<td>Y35</td>
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<td>Pearl Grey</td>
<td>N11</td>
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<tr>
<td>Pastel Grey</td>
<td>N12</td>
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<tr>
<td>Lily Green</td>
<td>Y31</td>
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</table>

K.1.4 Common Teaching Areas

Where whiteboards are wall hung, that wall shall have acrylic hi - gloss washable paint finish.
K.2 FLOORS

K.2.1 Carpets

K.2.1.1 Carpet Tile

Carpet tile shall be any of the following:
- Interface Heuga Australia Pty. Ltd.
- Ontera Carpet Pty. Ltd.

K.2.1.2 Broadloom Carpet

Broadloom carpet shall be:
“Invicta”, Tutor Spectra or Tribal Tones II, fixed directly to prepared substrate.

K.2.1.3 Synthetic Carpet

For use in field laboratories, indoor/outdoor, low budget projects etc., the carpet shall be:
“Autex Carpets/AVONDALE”.

K.2.2 Vinyl, Sheets

<table>
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<tr>
<th>HEAVY</th>
<th>MEDIUM</th>
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</thead>
<tbody>
<tr>
<td>Armstrong Nylex</td>
<td>Accolade Plus</td>
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<tr>
<td>Tarkett</td>
<td>Optima or Eminent*</td>
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</table>

*Eminent is the preferred finish in laboratories, or where there is a likelihood of chemical spillage.

K.2.3 Vinyl, Tiles

Shall be ‘Armstrong Nylex’ 3mm thick ‘Excelon’ or equivalent.

K.2.4 Ceramic Tiles

Ceramic tiles shall be used on walls and floors of all toilet areas and showers and all other wet areas, to the requirements of the B.C.A. Wall tiles shall be glazed or semi-glazed of 200 x 100 module. Floor tiles to toilet and shower areas shall be minimum 50mm x 50mm unglazed or semi-glazed.

K.2.5 Joints

Joints of dissimilar floor finishes shall be achieved using brass angles or strips set into the slab.
K.2 FLOORS (CONT’D)

K.2.6 Colour
Colour of all floor finishes shall form part of the overall colour scheme for the building and shall be selected in consultation with the Building Standards Committee to minimise soiling tracking & maintenance.

K.2.7 Finishes
Although dependant upon particular use of space, the following is to be considered a part of any fit out, in accordance with life cycle costing assessment.

K.2.7.1 Soil Arresting Entrances
Point of entry to be engineered to reduce soiling to floor finish in remainder of interior and should extend three metres into the building from outside. Other transfer from dirty to clean areas within should have similar soil arresting surfaces at transition.

K.2.7.3 Colours
To be selected, regardless of finish, to minimise appearance of soiling and reduce cleaning maintenance.

K.2.7.4 High Traffic Early Ware Areas
Shall be designed and fitted to allow replacement of worn sections (regardless of availability of same colour or finish) to work with adjacent low traffic areas without detracting from original design.

K.2.7.5 Non Slip Surfaces
Shall be “Polyfloor”, Polysafe.

K.2.8 Colour Schedules
Shall be submitted to Building Standards Committee for approval for all fit outs.

K.2.9 Stair Tread Nosings
Shall be ‘Ferodo’.
K.3  CEILINGS AND CEILING FINISHES

K.3.1  Suspended Ceilings
Shall generally be pre-painted aluminium grid with painted plasterboard tiles as described in table 3.3.

K.3.2  Plasterboard Ceilings
Plasterboard Ceilings to be paint in accordance with the area as described in table 3.3.

K.3.3  Table of Paint Finishes

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<thead>
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<th>Space/Area</th>
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<td>Laboratories</td>
<td>E or F</td>
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<tr>
<td>Corridors &amp; Passages</td>
<td>A,B,E or F</td>
</tr>
<tr>
<td>Cleaners Rooms</td>
<td>E or F</td>
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<tr>
<td>Lecture Theatres</td>
<td>A,B,E or F</td>
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<tr>
<td>Student Housing</td>
<td>A</td>
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<tr>
<td>Staff Housing</td>
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<tr>
<td>Bathrooms</td>
<td>F or G</td>
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<tr>
<td>Toilets</td>
<td>E or F</td>
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</table>

LEGEND

A  ACRYLIC FLAT (WASHABLE)
B  ACRYLIC LOW GLOSS
C  ACRYLIC SEMI-GLOSS
D  ACRYLIC HI-GLOSS
E  ALKYD ENAMEL FLAT
F  ALKYD ENAMEL LOW SHEEN
G  ALKYD ENAMEL SEMI GLOSS
H  ALKYD ENAMEL FULL GLOSS
I  CLEAR POLYURETHANE FULL GLOSS
J  CLEAR POLYURETHANE LOW SHEEN
K  TWO PACK ACID RESISTANT POLYURETHANE
K.4  DOORS

K.4.1  External Doors (timber)

Shall be either:
- Alkyd Enamel Full Gloss
- Two Pack Acid Resistant Polyurethane

K.4.2  External Doors (metal)

Finish shall be either “Marine” grade anodising or power coat.

K.4.3  Internal Doors

As per table J.4.4

K.4.4  Table of Paint Finishes

<table>
<thead>
<tr>
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<td>Workshops</td>
<td>H or I</td>
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<tr>
<td>Laboratories</td>
<td>H or I</td>
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<tr>
<td>Corridors &amp; Passages</td>
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<td>Cleaners Rooms</td>
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<td>Lecture Theatres</td>
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<td>Student Housing</td>
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<td>Staff Housing</td>
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<td>Bathrooms</td>
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<td>Toilets</td>
<td>H or I</td>
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I  CLEAR POLYURETHANE FULL GLOSS
J  CLEAR POLYURETHANE LOW SHEEN
K  TWO PACK ACID RESISTANT POLYURETHANE
K.5 WINDOWS

K.5.1 External Windows (timber)

Shall be either:
- Alkyd Enamel Full Gloss
- Two Pack Acid Resistant Polyurethane

K.5.2 External Windows (metal)

Finish shall be either “Marine” grade anodising or power coat.

K.5.3 Internal Windows

As per table J.5.4

K.5.4 Table of Paint Finishes

<table>
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<td>Classrooms</td>
<td>H or I</td>
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<td>Laboratories</td>
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<td>Bathrooms</td>
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<td>Toilets</td>
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J  CLEAR POLYURETHANE LOW SHEEN
K  TWO PACK ACID RESISTANT POLYURETHANE
K.6  FIXTURES & FITTINGS

K.6.1  Table of Paint Finishes

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<td>Cleaners Rooms</td>
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<tr>
<td>Lecture Theatres</td>
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<td>K</td>
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<tr>
<td>Student Housing</td>
<td>G or H</td>
<td>J or I</td>
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<tr>
<td>Staff Housing</td>
<td>F, G or H</td>
<td>J or I</td>
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<tr>
<td>Bathrooms</td>
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<td>K</td>
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<tr>
<td>Toilets</td>
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LEGEND  
A  ACRYLIC FLAT (WASHABLE)  
B  ACRYLIC LOW GLOSS  
C  ACRYLIC SEMI-GLOSS  
D  ACRYLIC HI-GLOSS  
E  ALKYD ENAMEL FLAT  
F  ALKYD ENAMEL LOW SHEEN  
G  ALKYD ENAMEL SEMI GLOSS  
H  ALKYD ENAMEL FULL GLOSS  
I  CLEAR POLYURETHANE FULL GLOSS  
J  CLEAR POLYURETHANE LOW SHEEN  
K  TWO PACK ACID RESISTANT POLYURETHANE

K.6.2  Exposed Ductwork

To be finished in full gloss enamel.
M.1 FITMENTS

This section applies to built-in items only. Other items of loose furniture are as specified in appendix ‘E’.

M.1.1 Chalkboards, Whiteboards

All chalk/whiteboards shall be complete with a chalk.marker ledge 70mm minimum width. Whiteboards in teaching/research facilities shall be ceramic surface type.

M.1.2 Directory Boards and Room Names

Provision shall be made in the design to allow space for directory boards in lobbies, etc. (including room names, nos.) in accordance with University of Adelaide policy on signage and as set out in Q.6 contained herein.

M.1.3 Curtains, Blinds

Provision shall be made in the contract for adequate battens, pelmets, etc. to allow fixing. Ensure all blinds are commercial grade and ultra-violet light resistant.

M.1.4 Fixing of Furniture

All BC1, CL1, DC1, and CU1/BC3 combination units ref: appendix ‘E’ and the like shall not be free standing but shall be firmly fixed to adjoining building structure.

M.1.5 Ergonomics

All separately designed items other than listed in these Building Standards shall be designed to specific ergonomic criteria. Such criteria shall be verified suitable to the task.

M.1.6 Clocks

All clocks shall be battery type.

M.1.7 External Fittings

All external ferrous metals other than stainless steel shall be hot dip galvanized. ‘Cold galvanizing’ or ferrous protective coatings are not allowed.
M.2 SPECIAL EQUIPMENT

M.2.1 Audio Visual

Refer 'Lecture Theatres' contained herein.

M.2.2 Wheelchairs

No special provisions.

M.2.3 Other

No special provisions.
M.3  DOOR HARDWARE & LOCKS

M.3.1 Ownership

All door hardware, furniture and locks shall remain the property of The University of Adelaide.

All keys and locks will be issued by University of Adelaide Security Services and includes the following:
1) Determination of appropriate keying system.
2) Supply of construction cylinders to the Builder.
3) Supply of lock cylinders to the Building.
4) Issue of keys to Users.

M.3.2 Door Furniture

M.3.2.1 Levers

Lockwood No 80 S.C. Series lever (North Terrace, Waite and Thebarton).
Lockwood No 70 S.C. Series lever (Roseworthy).

M.3.2.2 Mortice Lock and Latch Furniture

Lockwood 1800 or 1900 S.C. square end lever plates.

M.3.2.3 Narrow Styles

Lockwood No 4800 S.C. furniture with 80 S.C. levers (North Terrace, Waite and Thebarton).
Lockwood No 4800 S.C. furniture with 70 S.C. levers (Roseworthy)

M.3.2.4 Push/Pull Plates

EFCO 263 Series S.S.S.

M.3.3 Hinges

All doors, including fire doors, shall be fitted with a minimum of three (3) hinges, correctly aligned to avoid binding or bias to the open or closed position.

Gauge of material shall be 2.5mm for light general use and 3.2mm for 'heavy duty' & 'fire doors'.

Hinge type shall be low friction bearing, screw fixed with metal thread screws to the door frame to allow for on site adjustment & maintenance.

Pins shall be fixed for all outward opening doors & loose for inward opening doors.
M.3 DOOR HARDWARE & LOCKS (CONT’D)

M.3.4 Door Closers

Door closers shall be provided to entrance doors, external doors, lecture theatre doors and doors to all teaching spaces, plant rooms, toilets, air-locks and fire-doors. Type shall be Dorma TS73 or Lockwood with hold open and back check controls as required. Door closers shall be provided to all air-conditioned spaces. Delayed action type closers are to be used in accessible toilets.

M.3.5 Hold-Open Devices

Hold-open devices provided to all fire-doors shall be ‘Magnamatic’.

M.3.6 Door Stops

To each door which may strike a wall or other fixture, provide a skirting mounted cushion door stop, or if inappropriate, an aluminium/rubber door stop. Toilet cubicle doors shall be fitted with Lockwood 432 SCDP coat hook/door stop.

M.3.7 Locks

Locks shall be Lockwood 3500 Series, and keyed to the University's Grand Master Key system. All locks are to be free exit and dead latching.

M.3.8 Keys

Lock and key schedules will be determined in conjunction with Security Division.

M.3.9 Electric Door Systems

3.9.1 Locks shall be either ‘Lockwood’ 3500 series mortice lock collection complete with monitoring facilities. Electric Strikes are not preferred, but where necessary shall be Padde 2000 with monitoring and dead locking facilities.

3.9.2 Keypads shall be ‘Presco’.

3.9.3 Card swipe entry system shall be Siemens.

M.3.10 Disabled Access

Operation of all of above shall be in accordance with current statutory requirements for disabled access.

M.3.11 Concertina Doors

Locks to be 6 pin type, keyed to University Master Key System.
M.4 VALVES

M.4.1 Valves water/gas internal & external above ground
Up to 50mm: Lever action ball valve with stainless steel disc and shaft.
65mm to 75mm: Lever action resilient seated lugged butterfly valve.
100mm and above: Gear operated resilient seated lugged butterfly valve.

M.4.2 Valves water underground
Up to 50mm: Lever action ball valve with stainless steel disc, shaft and handle to be stainless steel. 200mm below surrounding surface level.
65mm and above: Resilient seated sluice valve, turn cock operated.

M.4.3 Valves gas underground
Up to 50mm: Lever action ball valve with stainless steel disc, shaft and handle to be stainless steel. 200mm below surrounding surface level.
65mm and above: Gear operated resilient seated lugged butterfly valve.

M.4.4 Valve boxes inground trafficable areas
Up to 50mm: 220mm dia cast iron. Prefer valves up to 50mm to be installed in non trafficable areas.
65mm and above: 550mm dia cast iron with 150mm valve turn key port hole. With HDPE riser.

M.4.5 Valve boxes in non trafficable areas
Up to 50mm: 150mm x 250mm cast iron hose tap box.
65mm and above: 550mm dia cast iron with 150mm valve turn key port hole. With HDPE riser.

M.4.6 Valve labels internal
Up to 50mm: 5mm blue lettering on white background. Permanently fixed to valve.
65mm and above: 7mm blue lettering on white background. Permanently fixed to valve.

M.4.7 Valve labels external exposed
Up to 50mm: 5mm lettering. Material to be brass permanently fixed to valve.
65mm and above: 7mm lettering. Material to be brass permanently fixed to valve.

M.4.8 Valve labels for valve boxes
10mm lettering. Material to be brass permanently fixed to valve box.

All labels to be as per University identification system. Register of valves to be submitted to allow allocation of University identification.
N.1 SERVICES AND MAINTENANCE INFORMATION

The supply, installation and maintenance of all items includes the supply of all relevant information in the installation of any service plant or equipment.

N.1.1 As Installed Drawings and Installation Manuals

As Installed drawings

'As installed' drawings are required for all services installations, both in electronic drawing file and hard copy format and shall include the following:

- Project name and number
- Building/Site location
- Date of Practical completion
- Author and date of information.


Installation Manuals

Installation Manuals are required for all projects. The Manuals shall provide manufacturers data detailing the equipment installed and details of starting up, servicing and maintenance of the installation.

- Project name and number
- Building/Site location
- Date of Practical completion
- Author and date of information.


Include a type-written copy of distribution board legends.

For Plant and/or Equipment fitted with digital controls and/or access codes and/or diagnostic codes;

1) digital codes/passwords are to be made available at the completion of the Defect Liability Period (DLP) and;
2) sufficient instructions to enable The University of Adelaide to effectively diagnose, test, inspect, maintain, adjust, and repair plant and/or equipment are to be provided in the O and M Manuals.

N.1.2 Maintenance and Servicing

Maintenance and services of the installation is required for 12 months from the date of practical completion.

Attendance by the installing contractor is required on the basis of call-out for breakdown service and on a regular basis for routine maintenance. A final inspection is required at completion of the maintenance period. The quantity of maintenance visits and call-out response time will depend on the requirements of each installation.

Maintenance and servicing includes the supply of all consumables as appropriate, excluding consumable items such as fuel and lamps, which shall be provided to the University at cost for the duration of the warranty period.
N.1 SERVICES AND MAINTENANCE INFORMATION (CONT’D)

N.1.3 Maintenance and Servicing during Defects Liability Periods

Maintenance shall be as per the manufacturer’s recommendations and the contractor shall satisfy the following requirements and procedures.

a) Provide programme of maintenance works in calendar form
b) When work is completed provide service report to MSC and sign out
c) Provide details of all corrective or repair maintenance carried out during DLP
d) Coordinate with all Service Provider in particular the ESP Service Provider
e) Supply the ESP Service Providers with copies of all documentation necessary for the provider to satisfy requirements of Minister’s Specification SA 76
f) At end of DLP principal contractor to provide a certificate of compliance that all ESP requirements have been met.
N.2 SANITARY PLUMBING & FIXTURES

N.2.1 Standards

The following standards are mandatory design, manufacture and installation criteria for all plumbing works.

AS 3500-4

0. Terminology
   1. Water Supply
   2. Sanitary Plumbing & Drainage
   3. Stormwater Drainage
   4. Hot Water Supply Systems

N.2.2 Statutory Controls

Attention is drawn to the special requirements for provision of backflow systems and water closet cistern and bowl capacities.

N.2.3 Auto Flush Urinals

To be considered in all new installations and for major upgrading of existing facilities. The preferred type to be 'Dorf Econaflush' or any other similar approved design having a concealed movement activated sensor.

N.2.4 Tapware - General

N.2.4.1 Tapheads

Shall be "Consolidated Brass" manufacture, Bellevue large indicator crosshead style

N.2.4.2 Cocks

"Consolidated Brass" manufacture.

N.2.4.3 Bibs

"Consolidated Brass" manufacture

N.2.4.4 Goosenecks

"Consolidated Brass" manufacture.

N.2.4.5 Stops

"Consolidated Brass" manufacture.

N.2.4.6 Basin Sets

"Consolidated Brass" manufacture.

N.2.4.7 Finish

To be bright chrome.
N.2 SANITARY PLUMBING & FIXTURES (CONT’D)

N.2.5 Tapware - Laboratory

N.2.5.1 Tapheads

Shall be ‘Consolidated Brass’ manufacture, Bellevue large indicator crosshead style or lever action where required.

N.2.5.2 Identification

Individual supply to have International colour code indicators.

N.2.5.3 Finish

To be bright chrome generally with epoxy coat finish for use in high corrosive conditions, e.g. fume cupboards etc.

N.2.5.4 R.O. Water

‘Consolidated Brass’ distilled water tap.

N.2.6 Showers

N.2.6.1 Shower Rose

To be water miser type on wall mounted flanged recess shower arm.

N.2.6.2 Shower Base

To be performed from stainless steel, acrylic, or similar.

N.2.7 Emergency Eyewash & Showers

To be corrosion resistant construction in accordance with AS 2982 (lab const code). Overhead showers to be hand activated deluge type; eye/face wash units to be foot activated. All emergency showers/eyewash installations shall include the provision of a floor waste.

Ref: G 1.1.4.2

N.2.8 Hand Basins

N.2.8.1 Hand Basins - Vanity Units

Bench top shall house complete basin unit, ‘Caroma Concorde 500’, with no projection of basin past the front alignment of the bench top.

N.2.8.2 Hand Basins - Wall Mounted

Shall be Caroma Integra 500 and as with vanity units, hand basins shall have separate hot and cold stops with a breeching piece to a single basin mounted outlet.
N.2 SANITARY PLUMBING & FIXTURES (CONT’D)

N.2.8.3 Soap Dispensers
To be mounted directly above hand basin. Adelaide Soap Dispensers, Model ART 513 screw fixed over each basin.

N.2.9 Sinks & Pans

N.2.9.1 Kitchen Sinks
To be stainless steel inset type with integral drainer complete with hob mount tap & mixer mounting holes.

N.2.9.2 Cleaners & Workshop Sinks
To be stainless steel on metal framed wall mounted brackets.

N.2.9.3 Pans, Cisterns

N.2.10 Drinking Water Supply

N.2.10.1 Filters
To be a cartridge type filter; ‘Cuno ’ AP11S opaque housing with AP117 cartridge.

N.2.10.2 Boiling Water Units
Shall be ‘Rheem Lazer Classic’ with overflow vent tundish installed away from underside of unit.

N.2.10.3 Chilled Water Units
Shall be free standing units of the proprietary type supplied with spring water contracts.

N.2.10.4 Main Water Systems, valves
All control valves up to 50mm to be lever action ball valves; Over 50mm lever action butterfly valves with stainless steel disc and shaft. All branches to have control valves as close as practical after branch. All back flow prevention valves to be WATTS/R.M.C. units.
N.2 SANITARY PLUMBING & FIXTURES (CONT’D)

N.2.11 Toilet Fixtures

N.2.11.1 Wash-basin area

(a) Hot & Cold mixer sets to each hand basin where hot water is provided.
(b) Required number of hand basins with full width mirror
(c) MacDonald Auto Beam 1000 automatic electric hand dryer
(d) Suitable shelving for handbags and books.

N.2.11.2 Toilet cubicle

(a) Toilet Roll Holder Bowater Scott Dualine stainless steel with lock
(b) Cubicle doors shall be fitted with Lockwood 432 SCDP coat hook/door stop.

N.2.11.3 Shower recess

(a) Built-in soap holder
(b) Coat hooks (2)
(c) Seat
(e) Sliding or pivot shower screen door
(f) Preformed shower base

N.2.11.4 Wet area Sealants

Shall be of the antifungal type.

N.2.12 Muslim Ablutions

N.2.12.1 Squat Bowl and Fixing

The bowl shall be Parbury 'American Standard' squat bowl, set in a concrete formed plinth tiled with falls back to a trough and gully waste to take spill and overflow.(see fig.1) Tiling shall be to a height of 1200mm f.f.l. on all walls surrounding the unit. A wall mounted hand basin is required for each toilet area.

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fig. 1
N.2 SANITARY PLUMBING & FIXTURES (CONT’D)

N.2.12.2 Perinial Cleansing

1 metre of 12mm I.D. flexible hose capable of extending to the bottom of the bowl shall be connected to a water service adjacent to the toilet bowl via a suitable control valve. The service shall be fitted with a back-flow prevention system.

N.2.12.3 Cistern

The 9 ltr cistern with a pull cord flusher shall be fixed at a minimum 1800mm above floor level.

N.2.12.4 Foot Washing

Caroma metro bowl shall be set in the floor flush with all falls to a floor gully waste in front of the bowl. All falls shall be as per Ministers specification SA F1.7 Waterproofing of wet areas in buildings, Fig. 6 (a) "Shower base with set down"

Taps shall be wall mounted above the bowl, minimum height above bowl 450mm. Provide a wall mounted hand basin adjacent to the foot bowl.
N.3 WATER SUPPLY

N.3.1 Metering

Install a meter to record consumption at the entry point to each building.

N.3.2 Shower Flow Rates

Consumption shall be based on a peak shower load, using an average of 10 L/min for 10 minutes per user.

N.3.3 Flow Velocities

To reduce velocity generated noise, keep flow velocities below 1.8 m/s.

N.3.4 Vibration Isolation

Pipes are to be vibration isolated and securely fixed and supported to prevent the transmission of vibration and noise to the structure or other services.
N.4 GAS SERVICE

N.4.1 Standards

The following codes are mandatory for the design of gas services.

AG601: Gas Installation Code
AG501: Code for Industrial & Commercial Gas Fired Appliances

N.4.2 Piping

Copper pipe is to be used inside buildings.
N.5 AIR CONDITIONING AND VENTILATION

N.5.1 Environment

N.5.1.1 Areas to be Air Conditioned

Air conditioning is to be provided for the areas listed:
1. New major capital projects.
2. Major refurbishment.
3. All teaching spaces, including Libraries Computer Suites and Animal holding facilities.

N.5.1.2 Areas to be Ventilated

Either supply or exhaust ventilate the rooms where natural ventilation will not satisfy the BCA or the intent of the OHS&W Regulations.

N.5.1.3 Conditions in Air Conditioning Spaces

The conditions for the different forms of air conditioning plant are:

- Refrigerated plant
  - Summer: 23°C db ± 1°C db
  - Winter: 20°C db ± 1°C db

- Indirect evaporative
  - Summer: 24°C db ± 1.5°C db
  - Winter: 20°C db ± 1°C db

- Hybrid
  - Summer: 24°C db ± 1°C db
  - Winter: 20°C db ± 1°C db

- Direct Evaporative
  - Summer: 26 - 28°C, 3°C switching band.

No relative humidity control is required for comfort applications. In heat load calculations that require a rh % input, use 50%.

N.5.1.4 Filtration

Use disposable filters of ‘Pyracube’ bag type, with magnehelic gauges.

N.5.1.5 Indoor air quality (IAQ)

Design should be cognisant of the parameters affecting IAQ, references such as the Property Council of Australia ‘Managing Indoor Air Quality’, and ‘ASHRAE’ comfort data.

N.5.2 Plant

N.5.2.1 Chilled Water System

A chilled water supply temperature of 7°C is required.
N.5 AIR CONDITIONING AND VENTILATION (CONT’D)

N.5.2.2 Chillers

Water chillers are to be selected on the basis of:
- design
- standard proprietary equipment
- reliability of load variation system
- readily cleanable heat exchange units, which do not rely on annual chemical cleaning or complete disassembly.
- maintainability, availability of parts and local service facilities.

The aggressive nature of Adelaide water is to be acknowledged in the choice of materials for tube sheets, and the treatment to control corrosion within the chiller and the condenser water systems in particular.

N.5.2.3 Pumps - Chilled and Condenser Water

Provide duty and standby pumps for chilled and condenser water piping systems with piping and valve arrangements that allow a ready change when required.

The pump installation should include:
- isolating valves for maintenance
- strainer to collect foreign matter
- pressure and temperature gauges

On larger installations
- flow adjustment valve to establish correct flow
- flow measurement provisions eg Annubar
- pressure and temperature gauges
- back flush piping and valves for plate heat exchanger units

Evaluate pump vibration transmission to the piping system and floor and provide isolation in and on the piping and under the pump base as appropriate.

Provide pumps with the following features:
- back pull-out, and suction design
- mechanical seal
- construction comprising cast-iron casing, bronze impeller and stainless steel shaft, or more corrosion resistant if it can be justified
- the impeller fitted is to be no larger than 90% of the diameter of the largest impeller available in that casing size.

Use pump motors operating at 24 r/s, for preference. If higher speed motors are necessary for a particular selection, check noise and vibration transmission potential, and treat appropriately.
N.5 AIR CONDITIONING AND VENTILATION (CONT’D)

N.5.2.4 Cooling Towers and Water Treatment Systems
The design, maintenance and location shall consider that cooling towers are a potential source of Legionella.

N.5.2.5 Air Cooled Systems
Air cooled plant offers advantages in reduced maintenance and should be considered over water cooled systems for small to medium installations where the life cycle costing shows a definite advantage.

N.5.2.6 Room Air Conditioners
Shall be 'Mitsubishi' and installed with the outer face of the unit in alignment with external face of the building. The internal dimension from the underside of the unit to the finished floor surface shall not exceed 2 metres and any internal air discharge shall not be directly onto persons immediately adjacent to the unit.

N.5.2.7 Piping, Valves and Fittings

General
Any installed equipment shall be provided with isolating valves immediately before and after the equipment and where applicable a bypass is to be fitted to allow continuation of service.

Incorporate drain facilities, air vents and grading of lines to aid flow or drainage. Include expansion loops, bends or bellows to accommodate expansion and contraction, and vibration isolation equipment to attenuate transmitted vibration from plant.

Painting and Identification
Paint pipework to provide corrosion resistance, together with the support systems. Paint colour code bands on piping and apply adhesive labels to indicate the fluid and direction of flow.

Valves and Fittings
The following types are preferred for the nominated applications:

<table>
<thead>
<tr>
<th>Valves</th>
<th>Application</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gate or Butterfly</td>
<td>Fall, flow, isolating</td>
</tr>
<tr>
<td>Globe</td>
<td>Flow control</td>
</tr>
<tr>
<td>Y-valve (graduated)</td>
<td>Flow control at equipment</td>
</tr>
<tr>
<td>Ball</td>
<td>Drains, vents</td>
</tr>
<tr>
<td>Swing check, Duo-check</td>
<td>Non-return valves</td>
</tr>
</tbody>
</table>

Use valves with packed glands or 0-ring seals
Valve selections and operation should inhibit water hammer.
Fittings used should not cause galvanic reaction.
N.5 AIR CONDITIONING AND VENTILATION (CONT'D)

N.5.2.8 Drains

Provide drains to all water systems and plant that produces condensation or waste water, or by its nature allows water out, e.g. automatic air vent. Drains shall be minimum 20mm dia. or larger to suit the needs of particular plant, such as cooling tower and fire sprinkler tests drains.

All drains shall be of one piece construction with spigots and corners welded/soldered, and be continuous to ground level.

Include a requirement for all drains to be flow tested as an item on the inspection and test plan.

N.5.3 Noise And Vibration

The Environment Protection Authority (EPA) defines how these levels should be assessed and what are acceptable values.

N.5.3.1 Air Borne Noise

Ensure that noise levels at neighbouring boundaries are acceptable.

Air borne noise should be minimised through the selection of suitable air and fluid system velocities, and the use of equipment that has been balanced and installed with suitable vibration isolation and noise attenuation.

N.5.3.2 Structure Borne Noise and Vibration

Isolate all mechanical equipment from the building structure to eliminate or minimise the transmission of energy into the structure. This may require the use of vibration isolation mounts at points beyond the plantrooms.

N.5.3.3 Testing on Completion

In some applications, test results may have to be submitted to the EPA or local Council. Ref: N.12
N.5 AIR CONDITIONING AND VENTILATION (CONT’D)

N.5.4 Heating

N.5.4.1 Boilers

Use gas fired boilers for heating water used in air conditioning systems. The type can be either atmospheric’, such as ‘Raypak’ or ‘Teledyne Laars’, or forced draft sectional cast-iron such as ‘Ferroli’ or ‘Hoval’. The selection of the type will depend on location and requirements to be met under AG 601.

It is preferred that an established service organisation exists in Adelaide to commission and maintain the boiler(s).

Provide fully modulating burners on larger boilers, and on/off control on smaller units where this will provide suitable water conditions for the installation.

Low frequency noise shall be isolated from transmission to the building structure. The fan on forced draft boilers is also a noise source that requires consideration. Ref: N.5.4.3.

N.5.4.2 Piping, Valves and Fittings

Use copper piping for heating water systems, and insulate the piping to prevent heat loss and danger to people working around heating plant.

Joints in the system can be screwed for small piping, or welded or rolled groove joints for larger systems.

Provide valves suitable for the water temperature.

N.5.4.3 Flues and Ventilation

For preference, each boiler should have its own flue, but if it is impractical, given the location, the flues from multiple boilers may be run into a common exhaust flue.

Plantroom ventilation shall be to the requirements set out in AG 601. Where necessary, provide ventilation and combustion air by a mechanical system, again complying with AG 501.

Insulate the flue(s) to minimise condensation and to prevent creating a hazard for maintenance persons. Arrange to collect, and drain, condensate.

N.5.4.4 Space Heating

The control of temperatures in occupied spaces may be by any of the following methods:

- heating coil in the air supply system.
- radiant heating in areas such as workshops or maintenance areas (gas-fired units are preferred to electric heaters and the use of overhead gas-fired radiant tube heating may offer a suitable design solution.
N.5  AIR CONDITIONING AND VENTILATION (CONT’D)

N.5.5  Pipework

N.5.5.1  Materials

The materials for piping systems are:

- Chilled Water: copper, to AS 1432 Type B
- Condenser Water: copper, to AS 1432, Type B
- Heating Water: copper, to AS 1432, Type B
- Gas: steel, galvanised, to AS 1074 (medium), or copper, to AS 1432, Type B
- Cold Water: copper, to AS 1432, Type B
- Fire Services: steel, galvanised, to AS 1074 (medium)
- Drains: copper, to AS 1432, Type A
  uPVC to AS 1477, Class 6
- Compressed Air: steel, galvanised, to AS 1074 (medium) or copper, to AS 1432
- Refrigeration Piping: copper, to AS 1571

N.5.5.2  Insulation

Provide insulation to piping to minimise heat transfer on hot and cold lines, and to prevent a burn hazard, as applicable. Insulation for cold pipe surfaces, e.g. carrying a fluid below 15°C, is to be vapour sealed to stop condensation along the piping.

The insulation may be one of the following to suit the application:

- sectional expanded polystyrene (self extinguishing type)
- flexible, closed cell, chemically blown PVC nitrate rubber (self extinguishing type)
- sectional resin bonded fibreglass or mineral wool.

For insulated piping in plantrooms or in areas where physical contact is probable, cover the insulation with metal sheathing.

Insulation exposed to sunlight must have UV protection.
N.5  AIR CONDITIONING AND VENTILATION (CONT’D)

N.5.5.3  Support and Mounting

Support all piping systems to hold them securely in place, capable of resisting the operating pressures of the system. Provide fixings at centres that prevent sagging, while allowing in the design for movement as a result of temperature or pressure fluctuations.

Fit insert material (neoprene strip) between galvanised hangers or brackets and copper piping.

Spring mounts may be required on piping close to vibrating plant to minimise transmissions to the structure. Use mounts that have published selection data, defining type suitable to application.

Where supports are exposed and likely to corrode, they shall have hot dipped galvanised finish.

N.5.5.4  Corrosion Protection, Inground Piping

Use double wrap Denso tape on in-ground fire services.

N.5.6  Evaporative Cooling

N.5.6.1  Location

Not to be located within 10m of any other discharge, outlet, vent or system.

N.5.6.2  Ductwork and Air Distribution

Install flexible connections to fan units. Keep air velocities down to minimise air side pressure losses.

N.5.6.3  Mounting, Water Supply and Drains

Mount the evaporative cooler on a support frame that spreads the load to the structure or base. Include vibration isolation pads.

Provide a cold water supply to the fill connection in the basin, using a minimum 15N3 copper line. Run a drain line from the drain/overflow connection. Drains are to be continuous to ground level. Provide a "bleed off" facility to reduce the build up of salts. Run drains to tundishes.
N.6 PUMPS AND ALARMS

N.6.1 Sump Pumps

Provide duplicate pumps in stormwater and sewer pits of a capacity to suit design flows. The preferred arrangement is to use pumps installed on guide rails for installation and withdrawal.

Fit check valves and isolating valves as appropriate.

N.6.2 Domestic Hot Water Circulating Pumps

Provide in-line circulators in domestic hot water systems to circulate water and reduce deadly effect. Suitable units are of Grundfos manufacture, with 240V motors. Fit by pass or stand by pump(s) to allow the system to be operational during maintenance.

N.6.3 Control Arrangements

The start signal for fire service pumps is to come from the FIP for that area, this being activated by the flow of water in the fire system or by an alarm registering at the FIP.

Provide level sensing probes to control the duplicate pump operation, giving:
- high level alarm (local bell; BAS; telephone line)
- pump 1 start
- pump 2 start
- pump 1 and 2 stop

Install on control panel adjacent the pit, run (standby) alternating facilities, a flashing light and a local alarm bell if this will achieve prompt response at all times.

Domestic hot water circulators can run continuously or be switched by a programme to suit the intended use of the service.
N.7 ELECTRICAL SERVICES

N.7.1 Scope

This standard sets out the minimum requirements for the design, construction and testing of electrical installations, including the selection and installation of equipment.

All electrical installations shall comply with the requirements of:
- Australian Standards,
- The Electricity Act and Regulations,
- The Building Code of Australia
- Occupational Health and Safety Act and Regulations.

The designer is responsible for ensuring the design and final installation is fit for the intended purpose.

N.7.2 Safety

Designers and installers of electrical services installations at the University of Adelaide shall ensure that safety is considered in accordance with Electrical Safety and Electrical Procedure documents published by the University.

All electrical works require the preparation of Safe Work Procedures and a Job Safety Analysis. All procedures must be approved prior to the commencement of any works.

Live electrical work is not permitted on any University electrical installation.

N.7.3 Spare Capacity

Electrical demands at the University are likely to change over the life of the installation. Incorporate spare capacity in all new electrical services systems for future expansion, generally a minimum of 30% except where noted or otherwise approved.

In particular this requirement should be recognised and incorporated in electrical infrastructure items such as switchboards, major cables and distribution boards.

N.7.4 Electricity Supply

N.7.4.1 New Supplies

New Electricity supplies shall not be arranged without the approval of the University. The designer shall provide details of capacity, condition and proposed re-arrangement of existing supplies as applicable in order to assess the need for additional new supplies or supply capacity.

Where the University has agreed that a new supply is required, and upon their instruction, make formal application to ETSA Utilities on behalf of the University. Ensure the University is kept informed of all proposals.

The designer shall present maximum demand calculations to the University for review prior to finalisation of supply details. Ensure that accurate details of mechanical and other plant are incorporated.

The designer must consider the full impact of increased loads on electrical infrastructure and advise the University.
N.7 ELECTRICAL SERVICES (CONT’D)

N.7.4.2 Existing Supplies and Electrical Installations

Where it is proposed to utilise an existing supply the capacity and condition of all components of the supply, including those upstream, require formal review to ensure their suitability.

Submit review details to the University for record purposes, and to aid in update of existing records and system knowledge.

N.7.5 New Technologies

The use of emerging and alternative technologies will be considered using life cycle costing principles, ease of maintenance, availability of spare parts and equipment and acceptance in the local market place.

An assessment of any proposed new technologies is to be presented to the University for consideration and/or acceptance.

N.7.6 Power Factor Correction

Electrical installations shall be designed to meet the power factor requirements stipulated by ETSA Utilities and other regulatory authorities.

Provide power factor correction equipment within Area Main Switchboards and Building Main Distribution Boards. Design power factor correction to achieve an average power factor of minimum 0.95.

N.7.7 Energy Tariff

Liaise with the University's nominated officer in respect of tariff details for new supplies.

N.7.8 Switchboards and Switchgear

N.7.8.1 Location

Main Switchboards
Locate within buildings in a dedicated room. External main switchboards are not acceptable. Main switchboards located within basement areas are not acceptable.

Distribution Switchboards
Locate distribution boards in accessible service areas, plant rooms or corridor areas. Do not locate in areas where access for maintenance personnel may be restrictive. Do not locate in hazardous or wet areas.

N.7.8.2 Design Criteria

Switchboards shall have the following design criteria;
N.7 ELECTRICAL SERVICES (CONT’D)

Main Switchboards and Main Distribution Boards
- Fault current capacity in excess of the prospective fault current at the point of supply so as to allow upgrade of supply without change to the switchboard.
- Operational Main Switches for each section of the installation.
- Minimum IP rating 42. Increase to suit the actual installed environment.
- Lockable doors over all operational sections. Keyed to the University’s specific requirements. The University has a requirement for a licensed lock to be fitted to all Main Switchboard doors. Designers shall allow for the provision of a lock which will be supplied by the University when the switchboard is installed on site.
- Copper bus bar assemblies and proprietary circuit breaker chassis.
- Segregation for essential and fire and life safety circuit breakers/main switches from other services.
- Segregation for critical equipment circuit breakers such as computer rooms to increase the security of supplies to these areas.
- Fully shrouded load side terminals.
- Allowance for future expansion by minimum 30%.
- Instrumentation consisting of power analyser with networking facility for direct connection into the University data network or building management system.
- Surge protection to suit the supply capacity.
- Consecutively numerically label switchboards using IPA studs.

Distribution Boards
- Minimum rating 160 Amps (except domestic installations).
- Hinged doors, keyed to the University's specific requirements. The University has a requirement for a licensed lock to be fitted to all distribution board doors. Designers shall allow for the provision of a lock which will be supplied by the University when the switchboard is installed on site.
- Hinged escutcheon panels with captive screws.
- IP rating to suit location, minimum IP44.
- Covered wiring channels.
- IPA numbering studs proprietary installation.
- Legend card holder, sized for A4 sheet(s).
- Minimum capacity 48 ways circuit-breaker chassis.
- Circuit breakers size availability up to 63 Amps using the same chassis.
- Combined MACB/RCD units taking a single pole-space only.
- Provided with a separate isolator.
- Instrumentation consisting of power analyser with maximum demand facility where distribution boards capacity exceeds 250 Amps.
- Consecutively numerically label distribution boards in the installation using IPA studs.

N.7.8.3 Cascade Protection and Discrimination

Cascade protection and discrimination shall be provided for the reticulation system in accordance with the requirements of AS3000.

Discrimination shall be certified by the switchboard with manufacturer and installer with details included in the as-installed documentation.
N.7 ELECTRICAL SERVICES (CONT’D)

N.7.8.4 Coordination

The installation shall provide coordination between conductors and all overload protective devices.

N.7.8.5 Residual Current Device (RCD) Protection

All socket outlet circuits require individual RCD protection using combined MACB/RCD units located in the distribution board. Combined RCD/SSO’s are not acceptable. Where encountered in existing areas to be altered, they shall be replaced and protection provided via combined MACB/RCD units.

Provide RCD protection to lighting circuits in wet areas, and circuits serving lighting tracks.

Provide RCD protection for all lighting circuits in accommodation and domestic areas.

Provide body and cardiac RCD protection in areas where medical procedures are undertaken.

N.7.8.6 Metering and Sub-metering

Establish all metering in accordance with the Electricity Distribution Code requirements.

Provide for sub-metering requirements on a department basis to User Brief requirements. Sub-meters shall be of revenue quality and incorporate the ability to synchronise with NMI retailer meters.

N.7.8.7 Power Shutdowns

Property Services has procedures that must be adhered to wherever power shutdowns are proposed.

All affected parties shall be consulted as part of the planning process. Stakeholders to be considered include, but are not limited to:

- Property Services including the Maintenance Service Centre
- Departments affected
- ITS Department
- Security Services
- Mechanical Services maintenance contractor
- Fire Services maintenance contractor
- Insurers
- Cleaners

Develop a shutdown plan in coordination with the University to identify all building services and occupant equipment that will be affected by the shutdown. Arrange for temporary power where necessary.

N.7.9 Stand-by Generation Equipment For Critical Installations

The University electrical installation includes some services that must be supported by stand-by power generation equipment.

University installations are served by the wider electricity network and therefore critical services may require the provision of permanent stand-by generation equipment.
N.7 ELECTRICAL SERVICES (CONT'D)

Generation equipment shall have the following characteristics and facilities:

- Align with the University’s strategic plan for stand-by facilities on the campus or within the facility.
- Provide self-contained fuel supply for at least 24 hours operation at full load. Fuel supply to be bunded.
- Have automatic start and transfer facilities.
- Provide spare capacity to align with the strategic plan for the Campus.
- Incorporate an essential bus in the electrical services installation that allows expansion to serve other facilities.
- Include provision to interface to the building management system and University network.

N.7.10 Wiring systems

N7.10.1 General Requirements

Provide fire-rated consumers mains where serving essential fire and life safety equipment and lifts.

In rural or other areas where there is a likelihood of invasion or infestation the installation shall be protected from vermin or termite attack.

Size neutral conductors to suit the maximum out of balance current. Provide minimum full size neutral conductors for consumers mains, sub-mains and sub-circuits.

Cables with aluminium conductors are not permitted.

Cable joints are not permitted except at switchboards and equipment connections.

Wiring within ceiling spaces or other voids shall be suitably supported clear of ceilings. Provide cable trays for sub-main cables and larger cables for equipment. Utilise multi-strand copper conductors throughout, minimum size 2.5mm$^2$ for lighting and 2.5mm$^2$ for power final sub-circuits.

Mechanically protect all wiring where exposed to a minimum height of 2m AFL or to the ceiling as applicable.

Enclose all wiring in wall chases in continuous heavy-duty conduit to allow for future rewiring. Secure surface conduits and ducts with screws at intervals no less than 200mm to eliminate deformation.

N.7.10.2 Design Criteria

Voltage Drop and De-rating
Design the reticulation system to achieve the voltage drop limits required by AS3000 and AS3008. Design consumers mains and sub-mains to provide a voltage drop allowance for final sub-circuits of minimum 2.5%.

De-rate cables where multiple or bunches circuits are installed.

Fault Loop Impedance
The installation shall comply with the requirements of AS3000 for fault loop impedance.
N.7 ELECTRICAL SERVICES (CONT'D)

Electromagnetic Radiation and Interference
Design reticulation routes and plan switchboard and equipment locations to minimise the effects of electromagnetic radiation and interference.

N.7.10.3 Underground Wiring Systems

Install underground reticulation in heavy-duty conduits to allow future cable replacement. Provide a spare conduit of equivalent size for consumers mains and major sub-mains. Provide draw-in pits for long runs to assist in installation of cables, particularly at changes of direction. Trenching shall be backfilled with fine sand and compacted in layers to match the surrounding density. Provide marker tape above all underground conduits.

Coordinate new underground services with existing and/or other new services. Obtain records of existing services underground and ensure a survey is provided to trace all underground services prior to any excavation or boring.

N.7.11 Earthing

Provide a suitably sized earthing conductor for each sub-main including those to outbuildings and each final sub-circuit.

Separate earthing systems for outbuildings are not acceptable.

Main earth and MEN facilities shall be provided at Main Switchboards only.

Ensure that earth impedance is less than the maximum level prescribed in AS3000.

N.7.12 Final Sub-Circuits and Accessories

Limit quantities of outlets on socket outlet circuits to ensure that the circuit does not trip during normal operation. Limit the number of double SSO’s on general power circuits to maximum 6 off. Dedicated circuits including computer circuits shall be designed to suit the equipment served. Provide separate circuits in kitchens, labs or heavy load area.

Limit hand dryer and 15-Amp outlets to one per sub-circuit. Generally mounting heights of hand driers shall be 1050mm to the base except for disability areas.

Subject to compliance with spare capacity requirements, assess the use of each individual area with the intended building occupants to verify the number of outlets that can be installed on each power circuit.

Provide a minimum of 2 double socket outlets for each workstation location with one of the outlets on a dedicated circuit for use by computers. The outlets shall be colour 'blue' and engraved with 6mm white text ‘COMPUTER POWER’.

All RCD protected outlets shall be suitably labelled. The label shall consist of 6mm text with black engraving ‘RCD PROTECTED’. Provide red coloured outlets with round earth pins where generator back-up is provided to essential power outlets and suitably labelled. The label shall consist of 6mm text with the engraving ‘GENERATOR POWER’.

Provide room air conditioner outlets with no-volt coil and reset switches, unless a separate control system is implemented.

Provide operable shutdown facilities for all socket outlets in laboratory areas.
N.7  ELECTRICAL SERVICES (CONT’D)

Provide socket outlets at 15m centres in corridors for cleaning purposes.

Generally flush-mount all accessories using wall boxes in masonry walls or proprietary clips in lightweight walls.

Limit the number of light switches to 4 per accessory plate. Provide separate plates for different distribution areas and where there is more than 1 phase.

Provide separate retaining screws for light switches.

Mount equipment isolators on the building structure independent of the connected item to allow removal for maintenance without affecting the electrical services. Flexibly connect to the equipment.

Provide IPA stud labelling for all switches, socket outlets and isolators indicating separately the circuit and distribution board number.

N.7.13  Alteration Works

All existing equipment remains the property of the University unless classified as redundant. Remove all redundant equipment wiring systems entirely.

Remove and dispose of asbestos and PCB based materials in accordance with Occupational Health and Safety Act requirements. Liaise with the University nominated consultant as required for the removals.

Ensure that areas adjacent to alteration works remain operational without overloading.

Where the electrical works and alterations are of a minor nature, such as those not involving additional circuits, the need to provide dual socket outlet circuits to workstations is not required. Label all existing and new socket outlets throughout the distribution board zone concerned.

Alteration works shall require the installation of combined RCD/MACB circuit breakers in the distribution board for each affected circuit, unless proprietary RCD/MACB units are not manufactured for the type of circuit-breaker used in the distribution board. In this case consideration of replacing the distribution board is required if the works affect a majority of the circuits served from the distribution board.

N.7.14  Lighting

N.7.14.1  ‘Maintenance Illuminance’ Levels

‘Maintenance Illuminance’ levels shall comply with the recommendations of AS1680 ‘interior lighting’, unless specifically briefed by the users.

Consider local task lighting where appropriate and where this can provide energy savings;

N.7.14.2  Luminaires

Fluorescent lighting shall be used in general office areas.

Fluorescent lighting shall be provided with T5 lamps.

Linear fluorescent fittings installed in modulator type T-Bar ceilings are preferred to compact fluorescent type down-lights. Recessed fluorescent
N.7 ELECTRICAL SERVICES (CONT’D)

Luminaires require spring clips and lanyards for louvres to prevent falling out. Fluorescent luminaires require torsion spring type frames for diffusers to prevent sagging or falling out.

Where down-lights are utilised the lamps should be covered with an appropriate diffuser.

‘Low voltage’ (12 Volt) lighting shall be generally avoided and only used in locations where particular feature lighting is required. Where ‘low voltage’ lighting is proposed the installation shall provide:

- Separate transformers for all lamps, unless in a track configuration.
- Isolation of transformers clear of ceiling insulation.
- UV limiting lamps where appropriate
- Covered lamps.

N.7.14.3 Control Gear

Fluorescent internal control gear shall be electronic type.

Provide plug-socket connections to hard wiring for recessed luminaries.

N.7.14.4 Glare Control

For areas where the majority of tasks are screen based use large cell semi-specular ultra-low brightness parabolic louvres and comply with the glare indice recommendations of AS1680.

The minimum requirement is K19 type diffusers within a hinged torsion spring frame.

N.7.14.5 Lighting Control Systems

Provide life cycle costing analysis of the incorporation of automated lighting controls systems for assessment by the University.

Provide automated lighting controls system integrated with audio visual equipment for all common teaching areas.

Minimum lighting control requirements for larger projects will consist of presence detection in individual office areas and common teaching areas, and staged time switching systems in open office areas, in accordance with the Building Code. Consider automated dimming systems to areas served by natural light.

N.7.14.6 Exit and Emergency Lighting

Arrange wiring for exit and emergency lighting for connection with local lighting circuits in accordance with AS2293.

Provide a separate control system at each relevant distribution board for testing of the exit and emergency lighting powered from that distribution board in accordance with AS2293.

Obtain specialist advice and approval for the installation of exit and emergency lighting in heritage or other unique areas.
N.7 ELECTRICAL SERVICES (CONT'D)

N.7.14.7 External Lighting

External lighting shall be arranged to provide compliance with the requirements of AS1158.

Control external lighting from dusk to dawn using photo-electric cells or other fully automated means. Time switches in distribution boards are not acceptable.

N.7.15 Testing and Commissioning

To verify that the requirements of relevant codes and standards have been met all electrical installations, including alterations, additions and repairs, shall be tested and commissioned prior to energisation.

Tests shall include:

- Visual inspections during the course and at completion of the work.
- Verify of the installation following the guidelines of AS3000.
- Testing of the installation, including as a minimum, the following items:
  - Continuity of the earthing systems and earth resistance of the main earth, protective earthing conductors and bonding conductors.
  - Insulation resistance.
  - Polarity.
  - Correct circuit connections.
  - Fault loop impedance.
  - Testing of operation of residual current devices.
  - Correctness of distribution board legends.
  - Exit and emergency lighting discharge testing.

N.7.15.1 Certificate of Compliance

Provide a completed Certificate of Compliance in accordance with statutory requirements for each aspect or stage of the installation to the University prior to granting Practical Completion.

N.7.16 As Installed Drawings and Installation Manuals

As Installed Drawings

‘As installed’ drawings in electronic drawing file and as hard copies are required for all electrical services installations.

Drawing details, layouts, symbols and drawing conventions shall comply with the specific requirements of the University.

Installation Manuals

Installation Manuals are required for all projects. The Manuals shall comply with the specific requirements of the University. These requirements can be found on the University’s website: <http://www.adelaide.edu.au/infrastructure/projects/info/>

Include a type-written copy of distribution board legends.

Include a laminate and copy of the single line diagram and mount within Main Switchboard rooms.
N.7 ELECTRICAL SERVICES (CONT’D)

N.7.17 Maintenance and Servicing

Maintenance and servicing of the installation is required for 12 months from the date of practical completion.

Attendance by the installing contractor is required on the basis of call-out for breakdown service and on a regular basis for routine maintenance. A final inspection is required at completion of the maintenance period. The quantity of maintenance visits and call-out response time will depend on the requirements of each installation.

Maintenance and servicing includes the supply of all consumables as appropriate, excluding items such as fuel and lamps, which shall be provided to the University at cost for the duration of the maintenance and warranty period.

N.7.18 Preferred Electrical Equipment Schedule

<table>
<thead>
<tr>
<th>Item</th>
<th>Typical Preferred Equipment</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Accessories</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>General Purpose Socket Outlets</td>
<td>Clipsal 2000 series</td>
<td>Colour white generally, engraved ‘RCD PROTECTED’</td>
</tr>
<tr>
<td>Socket Outlets for Computer Equipment</td>
<td>Clipsal 2000 series</td>
<td>Colour blue generally, engraved ‘COMPUTER POWER RCD PROTECTED’</td>
</tr>
<tr>
<td>Socket outlets and switches supplied with standby generator power</td>
<td>&lt;10A Clipsal 200 series with round pin earths</td>
<td>Colour red engraved “Generator Power”</td>
</tr>
<tr>
<td></td>
<td>&gt;10A Clipsal 56 series with 3 round pins</td>
<td>Labelled ‘GENERATOR POWER, RCD PROTECTED’</td>
</tr>
<tr>
<td>Light Switches</td>
<td>Clipsal 2000 series</td>
<td>Including Mechanism retaining screws Maximum of 4 switches per plate</td>
</tr>
<tr>
<td>Isolators</td>
<td>Clipsal 56 series or equal</td>
<td></td>
</tr>
<tr>
<td><strong>Switchboard Equipment</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Distribution Board Chassis:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Less than 250 Amps</td>
<td>Merlin Gerin Isobar</td>
<td>Match existing equipment if appropriate to be reutilised</td>
</tr>
<tr>
<td>- More than 250 Amps</td>
<td>Merlin Gerin NS and NMC series</td>
<td></td>
</tr>
<tr>
<td>Circuit Breakers:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Less than 63 Amps</td>
<td>Merlin Gerin Isobar</td>
<td>Match existing equipment if appropriate to be reutilised</td>
</tr>
<tr>
<td>- More than 63 Amps</td>
<td>Merlin Gerin NS and NMC series</td>
<td></td>
</tr>
<tr>
<td>KWh Meters</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Internal Departments</td>
<td>Merlin Gerin “PM9P”</td>
<td>Modbus output</td>
</tr>
<tr>
<td>- Tenants</td>
<td>‘Email’ “Q4A’ smart meter</td>
<td></td>
</tr>
</tbody>
</table>
N.7 ELECTRICAL SERVICES (CONT’D)

Panel mount meters
Clipsal or NHP

Power Analyser
Merlin Gerin PM 820 Series

Contactors
Clipsal or NHP

Surge Protectors
Erico or NHP

Power Factor Correction
ABB RVT Series
Colour orange

**Lighting Equipment**

Fluorescent Control Gear
Osram Quicktronics or equal

Fluorescent Lamps
T5 Osram LUMIUX or equal
Colour 840
Triphosphour 4000K
Preferred lamp wattages
28W and 54W

Low Voltage Control Gear
ATCO Possum or equal
Electronic control gear

Low Voltage Lamps
Osram DECOSTAR IRC
4000K

Compact Fluorescent Downlights
Specular reflector with louvre or diffuser
Electronic control gear

Compact Fluorescent Lamps
Osram DUUX D/E or equal
Colour 840
Preferred lamp wattages 18W and 26W

Fluorescent Diffusers
ULB-semi-specular
Screen based areas and general areas

Fully sealed K19
Laboratory, kitchens, kitchenettes and food preparation areas

Lighting Control Equipment
Clipsal C-Bus
Common Teaching Areas to interface with A/V equipment

Lighting Motion Sensors
Clipsal or ECS Ultrasonic and Microwave
Office, Common and Teaching areas

External Lighting
Thorn Avenue
100W metal halide c/w electronic control gear

Thorn Wallpack
Up to 250w metal halide

In ground Uplighters
Generally not permitted
N.7 ELECTRICAL SERVICES (CONT'D)

Exit and Emergency Lighting

<table>
<thead>
<tr>
<th>Description</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emergency</td>
<td>Lower spaces with ceilings: 10W halogen c/w dome cover over (surface and flush type as appropriate). Pierlite ‘Firefly’ or Stanilite ‘Spitfire’. NiMH or NiCad batteries. Battery pack to fit through ceiling opening.</td>
</tr>
<tr>
<td></td>
<td>Larger open areas: Pierlite ‘Guardian’ series (flood), or equal. Must provide code compliance in the arrangement proposed.</td>
</tr>
<tr>
<td></td>
<td>Large storage or open areas: Fluorescent battens – Pierlite ‘Regency’ or ‘SDW’ (weatherproof) or ‘Vandalux’ (vandal resistant).</td>
</tr>
<tr>
<td></td>
<td>Where built-in to general luminaries for general use Not permitted.</td>
</tr>
</tbody>
</table>

Exit and Emergency Lighting cont.

<table>
<thead>
<tr>
<th>Description</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exit</td>
<td>Pierlite ‘LED’ or LeGrand Mintronics Slide-connect G2’ (Pierlite has no emergency classification)</td>
</tr>
<tr>
<td>Hand Dryers</td>
<td>J D MacDonald Autobeam 1000 Outlet adjacent</td>
</tr>
<tr>
<td>Skirting Duct</td>
<td>Moduline TAL Series Use standard colours</td>
</tr>
<tr>
<td>Surface Ducting</td>
<td>Clipsal 900 series Screw fixed with double-sided tape</td>
</tr>
</tbody>
</table>
N.8 SECURITY & EMERGENCY ALARM SYSTEMS

N.8.1 Security Specification - Preliminaries

N.8.1.1 Glossary of Definitions

The following terms are used in this document have the meaning defined below:

TABLE 1: Glossary of Definitions

<table>
<thead>
<tr>
<th>Item</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACC</td>
<td>Advance Central Controller</td>
</tr>
<tr>
<td>ACMA</td>
<td>Australian Communications and Media Authority</td>
</tr>
<tr>
<td>AFFL</td>
<td>Above Finished Floor Level</td>
</tr>
<tr>
<td>CCTV</td>
<td>Closed Circuit Television</td>
</tr>
<tr>
<td>CMS</td>
<td>CCTV Management System</td>
</tr>
<tr>
<td>EACS</td>
<td>Electronic Access Control System</td>
</tr>
<tr>
<td>EC</td>
<td>Equipment Cubicle</td>
</tr>
<tr>
<td>ECP</td>
<td>Emergency Call Point</td>
</tr>
<tr>
<td>ELV</td>
<td>Extra Low Voltage</td>
</tr>
<tr>
<td>FIP</td>
<td>Fire Interface Panel</td>
</tr>
<tr>
<td>FOC</td>
<td>Fibre Optic Cable</td>
</tr>
<tr>
<td>IP</td>
<td>Internet Protocol</td>
</tr>
<tr>
<td>IPS</td>
<td>Images Per Second</td>
</tr>
<tr>
<td>IPM</td>
<td>Input Point Module</td>
</tr>
<tr>
<td>LAN</td>
<td>Local Area Network</td>
</tr>
<tr>
<td>MMOF</td>
<td>Multi-Mode Optical Fibre</td>
</tr>
<tr>
<td>OPM</td>
<td>Output Point Module</td>
</tr>
<tr>
<td>OTDR</td>
<td>Optical Time Domain Reflectometer</td>
</tr>
<tr>
<td>PABX</td>
<td>Private Automatic Branch eXchange</td>
</tr>
<tr>
<td>PDF</td>
<td>Portable Document Format</td>
</tr>
<tr>
<td>PE</td>
<td>Photoelectric</td>
</tr>
<tr>
<td>PIR</td>
<td>Passive Infra-Red</td>
</tr>
<tr>
<td>PoE</td>
<td>Power over Ethernet</td>
</tr>
<tr>
<td>RIM</td>
<td>Reader Interface Module</td>
</tr>
<tr>
<td>RU</td>
<td>Rack Units conforming to dimensions standardised in IEC 60297. 1RU = 44.45 mm</td>
</tr>
<tr>
<td>SMOF</td>
<td>Single Mode Optical Fibre</td>
</tr>
<tr>
<td>SMS</td>
<td>Security Management System</td>
</tr>
<tr>
<td>TCP</td>
<td>Transport Control Protocol</td>
</tr>
<tr>
<td>UoA</td>
<td>University of Adelaide</td>
</tr>
<tr>
<td>UPS</td>
<td>Uninterruptible Power Supply</td>
</tr>
<tr>
<td>UTP</td>
<td>Unshielded Twisted Pair</td>
</tr>
<tr>
<td>UPVC</td>
<td>Un-Plasticised Polyvinyl Chloride</td>
</tr>
<tr>
<td>UV PVC</td>
<td>UV Stabilised Polyvinyl Chloride</td>
</tr>
</tbody>
</table>
N.8 SECURITY & EMERGENCY ALARM SYSTEMS (CONT’D)

N.8.1.2 Standards and Referenced Documents

This document (i.e. Building Standards Part N8 – Security & Emergency Alarm Systems) forms the basis for all security and access control installations at UoA. It should be read and understood to properly tender for electronic security projects.

This specification shall be read in conjunction with the University of Adelaide’s Building Standards and the University of Adelaide’s ITS Specification.

Any request to deviate from these standards and reference documents, as part of a project requires consultation and formal agreement from the University of Adelaide’s Security Manager (Security Manager).

All equipment and installation shall comply with the following standards and referenced documents that are listed below:

- AS 1049:2003 – Telecommunication cables - Insulation, Sheath and Jacket;
- AS1768:2007 - Lightning protection;
- AS 1627 – Metal finishing - Preparation and pre-treatment of surfaces;
- AS 1170.2 – SAA Loading Code Wind Forces;
- AS 3996:2006 – Access covers and Grates;
- AS 3000:2000 - Electrical Installations – Buildings, Structures & Premises (SAA Wiring Rules);
- AS 3085:2003 - Telecommunications Installations – Administration of Communications Cabling Systems;
- AS 3086:2008 - Closed circuit television (CCTV) (all parts);
- AS/NZS 4383 - Preparation of documents used in electrotechnology;
- AS 1939:1990 -Classification of degrees of protection provided by enclosures of electrical equipment;
- AS/NZS/ISO 14763-3:2007 Testing of optical fibre cabling (complying with ISO 11801/AS 3080);
- AS/ACIF S008: Requirements for authorised cabling products;
- AS/ACIF S009: Installation requirements for customer cabling;
- ACMA Telecommunications Cabling Provider Rules 2000;
N.8 SECURITY & EMERGENCY ALARM SYSTEMS (CONT’D)

- AS4251.1: Electromagnetic compatibility – Generic emission standard
- Building Code of Australia
- University of Adelaide’s Building Standards with attention paid to the following sections:
  I. M3 – Door Hardware and Locks;
  II. N7 – Electrical;
  III. N8 – Security & Emergency Alarm Systems (this document);
  IV. N13 – Maintenance and Service; and
  V. N15 – Communications.
- University of Adelaide’s ITS Standard and Specification

Where a conflict arises between the requirements standards and reference documents, the most stringent requirements shall be applied.

The latest issue of the standards and referenced documents shall apply.

N.8.1.3 Security Contractor

The Security Contractor (Contractor) shall be a specialist security integrator (company). The Contractor shall submit, prior to awarding the contract the following details:

- A list of previous installations successfully completed as evidence of the previous successful installations of similar size and scope, including a summary of the extent of work for each installation and the value of the security installation;
- References or contact names and numbers for those sites.

The Contractor must also be formally assessed by the manufacturer as competent to undertake the configuration and integration of the security system(s) to the level required by the application.

Formal notification from the manufacturer shall be provided and included in the submission. Without that assessment and notification the Contractor shall be deemed to be ineligible to undertake the work.

N.8.1.4 Licences and Certificates

Where equipment to be supplied requires licensing, those licences shall be submitted prior to Practical Completion. Complete and submit all license applications.

All equipment shall be licensed to the University of Adelaide and not to the supplier/installer of the equipment.
N.8 SECURITY & EMERGENCY ALARM SYSTEMS (CONT’D)

N.8.1.5 Technical Data Sheets
Submit the technical data sheets for all equipment not nominated as part of this specification, for review and approval prior to awarding the contract.

N.8.1.6 Contractor’s Requirements
N.8.1.6a Equipment quality
All equipment, materials, cabling and ancillary components shall be “new”. All product supplied and installed shall be previously unused and carry the full manufacturer’s warranty.

N.8.1.6b Making Good
When execution of the Works causes damage, or removal of redundant equipment leaves an unsatisfactory finish, repair such damage or finish with materials compatible with the surrounding material and finished off flush with the adjacent surface.

This shall include, but not be limited to repair or replacement of door frames, doors, re-establishment or making good of all panels, housings, and other areas necessary to be re-established which are in the opinion of the Security Manager, damaged in the course of the Works.

N.8.1.6c Site Inspection
Where work is to be undertaken at an existing facility, a site visit prior to any submission is highly recommended. The Contractor is responsible to be aware of the site conditions to ensure that all work and equipment necessary to complete the installation is included in the offer.

No extra costs will be allowed because of failure to conduct a proper site inspection or for work that does not comply with the referenced documents.

N.8.1.6d Acknowledgement
A submission will be considered as an acknowledgment by the Contractor that the Contractor has fully ascertained the scope of work required to ensure compliance with all the requirements of the specification, standards and reference documents.

N.8.1.7 Mains Supplies
Where essential supply is provided all security equipment shall be connected to the essential supply. A separate circuit (or circuits) shall be provided for the security system.

N.8.1.8 U.P.S.
All security equipment, and all other nominated equipment, shall be connected to a UPS. At minimum the UPS shall be used for all University of Adelaide S.M.S and C.M.S workstation(s).

The UPS shall be an in-line (double conversion) supply and shall be sized to provide full operation of the equipment for a minimum of 15 minutes (where a back-up generator is installed) or two hours (where no back-up generator is installed).
N.8 SECURITY & EMERGENCY ALARM SYSTEMS (CONT’D)

Provide a UPS manual bypass switch to enable the UPS to be taken out of service for maintenance/replacement without disrupting power to the load.

Unless otherwise specified the provision of the UPS forms part of the scope of work of the security services and shall be provided by the Contractor.

N.8.1.9 Extra Low Voltage Power Supplies

N.8.1.9a General

All power supplies, transformers, and voltage rectifiers required to supply any voltage other than 240V\textsubscript{AC} (e.g. low voltage power/extra low voltage power) for equipment detailed in the specification shall be supplied and installed as part of the security services scope of Works.

Extra low voltage power supplies shall be self contained and installed within the secure equipment cabinets. The power supplies shall be a switch mode with a minimum capacity of two (2) amperes and shall have standby batteries capable of sustaining continuous operation for at least 8 hours in the event of a mains supply failure.

All power supplies must have their mains and battery condition monitored and shall activate an alarm on the security system if a problem occurs (e.g. loss of mains and or low battery alarm).

The University of Adelaide may require the use of linear power supplies in some installations to reduce any possible interfaces to the Facilities electronic equipment used in high technology buildings. This shall be determined by the Security Manager and shall reflect on the supplied drawings. The minimum specifications as above shall be utilised when supplying linear units.

Details must be provided in the material list/schedule of the capacity and type of each power supply included in the design.

N.8.1.9b Load

The load on each power supply shall be such that 25% minimum spare capacity is provided.

N.8.1.9c DC Power Supplies

All DC power supplies shall be the regulated voltage type.

N.8.1.9d Camera Power Supplies

All camera power supplies shall be connected to the same supply phase. Where connection to the same supply phase is not practicable, the Contractor shall co-ordinated a alternative solution with the Security Manager.

All internal and/or fixed CCTV network cameras shall be powered by PoE (Power over Ethernet).

Power supplies for external and/or PTZ cameras shall be rack mounted units Tactical Technologies RPS24-10-D10-2RU or approved equivalent, to suit the voltage and current requirements.
N.8 SECURITY & EMERGENCY ALARM SYSTEMS (CONT'D)

The contractor shall liaise with the University of Adelaide Security Manager and the ITS Department to confirm PoE requirements, power supply location and cabling route.

N.8.1.9e Access Control Panels Power Supplies
Each access control panel shall be powered separately using dedicated extra low voltage power supplies.

Provide a sealed battery and charger system to all doors fitted with electromagnetic locks, and as necessary to power all alarm and access control equipment required. The batteries shall be capable of sustaining operation for at least 8 hours in the event of a mains supply failure.

All power supplies fail and low battery alarm shall activate an alarm on the security system.

N.8.1.9f Lock power supplies
All electric locking hardware primary power (i.e. the main low voltage power to the electric mortice lock, electric strike or electromagnetic lock) is included as part of the scope of work.

The scope of work for security services also includes:
- All wiring connections between the lock and all monitoring and control devices;
- Connection of the primary AC/DC power to the electric locks; and
- The provision of any AC/DC power supplies required for signalling control, such as lock/unlock functions.

N.8.1.10 Batteries and Chargers
N.8.1.10a Access control
Provide a sealed battery and charger system contained within a separate compartment to all doors fitted with electric locking hardware and control panels to power equipment required by this specification.

N.8.1.10b Capacity
The battery capacity shall equal at least 8 hours in normal stand-by operation or at least 2 hour for normal access control of entry/exit activity.

N.8.1.11 Labelling
Engrave all power outlets to which security equipment is connected with the words 'SECURITY EQUIPMENT - Do Not Switch Off' as 5mm high black lettering. All UPS outlet faceplates shall be RED and engraved "UPS" in 5mm high white lettering.

N.8.1.12 Power Supply Monitoring
Where a UPS is provided to supply equipment or services required by the specification(s), whether by others or as part of the scope of work of the specification(s), the security system shall monitor the following alarms:
N.8 SECURITY & EMERGENCY ALARM SYSTEMS (CONT’D)

- UPS low battery alarm;
- Mains fail alarm; and
- Generator fail alarm.

N.8.1.13 Electromagnetic Interference

All equipment is to be protected against mains transients and induced voltage surges. Protective devices matched to the electromagnetic environment shall be used to achieve protection of equipment against surge voltages.

N.8.1.14 Personal Computers (Workstations)

PC hardware supplied for any security services system shall be coordinated with the UoA ITS department. The client workstation shall be the ITS SOE standard desktop system.

The CCTV workstation shall be run Windows XP with VideoInsight Monitor Station v4.

N.8.1.15 Server

The Contractor shall supply the server. The server shall be either an HP DL360 or a HP DL 830 server with ISCSI disk sub-system or approved equivalent.

The Contractor shall coordinate the supply of the server with the Security Manager and the ITS department.

N.8.1.16 Software

N.8.1.16a General

All software updates released within the contract period up to the completion of the defects liability period, shall be deemed to be included in the contract and shall be provided and installed, at no cost.

A copy of all software necessary to re-establish system/sub-system operation after a catastrophic failure, shall be provided to the Security Manager as a 'deliverable' in accordance with this specification. A copy of firmware is not required.

N.8.1.16b Software Requirements

Software supplied shall be:
- The latest version of stable software available at the time of installation (Beta software shall not be provided);
- Non-proprietary (other than the ‘core’ specialised software code);
- The operating system developer shall offer full support (not “self help”) for the proposed operating system for a minimum of 4-years from the date of Practical Completion;
- The operating system(s) provided shall be suitable for the intended applications for each computer; and
N.8 SECURITY & EMERGENCY ALARM SYSTEMS (CONT’D)

- Constructed/modified to include nomenclature and operating features which reflect the accepted user terminology and operating procedures.

N.8.1.16c Programming

Carry out programming to meet the University of Adelaide’s requirements. Program all equipment supplied including initial set-up and data entry in accordance with the requirements for each user, local/remote operation, or network interface to other systems.

N.8.1.16d Naming conventions and descriptors

Coordinate all naming conventions and descriptors to ensure that they are consistent.

N.8.1.16e Completion

All programming shall be completed prior to the commencement of on-site testing. The Contractor shall demonstrate software and programming to the Security Manager one month prior to the commencement of on-site testing.

N.8.1.17 Equipment Enclosures and Cubicles

N.8.1.17a General

All equipment enclosures for internal use shall provide a minimum of 25% spare capacity for future expansion.

All cubicles shall be complete with dust seals. All internal enclosures shall meet protection category IP55 standards and all external enclosures shall meet protection category IP65 standards. Where necessary, enclosures are to be supplied with rear mounting plates and top entry cable gland plates to facilitate top entry of cables from over-head cable trays, cable ducts or conduits.

Holes provided for cable access shall be suitably protected with grommets to prevent moisture ingress and to provide protection for cables. Screws shall be complete with captive fibre washers. Enclosures shall be securely fixed in position. Each section of cubicle, panel and rack shall be labelled to indicate equipment/device identification and number and local power supply circuit number.

N.8.1.17b Tamper alarms

All equipment cubicles and enclosures used to house security equipment shall be complete with tamper alarm connected to, and monitored by, the security system.

N.8.1.18 High Level Interface (HLI) Requirements

All HLI’s shall be duplex, that is, commands and responses shall be capable of being transmitted and received in both directions simultaneously.
N.8 SECURITY & EMERGENCY ALARM SYSTEMS (CONT’D)

N.8.2 Security Specification – Installation

N.8.2.1 Fit For Purpose

The installation shall be fit for purpose. It is not possible within the text of the specification to describe every occasion where the installation practices of an inexperienced Contractor may adversely impact the environment in which the security services are to be installed.

It is expected that every Contractor has appropriate project experience, including installation experience, gained through successfully completing previous projects of a similar scope and complexity, and that the experience acquired shall ensure that the installation complements the ‘environment’.

Where a Contractor has not previously completed a project of similar scope and complexity there is an increased risk that the Contractor’s knowledge, both practical and intuitive, shall be inadequate, and that situations may arise where the installation is not fit for purpose.

N.8.2.2 Obvious Work

All supplementary miscellaneous items and devices which are incidental to, or necessary for, the complete operational installation as described in the specification shall be provided whether such work is, or is not, specifically shown or specified.

Unless otherwise noted, the drawings are diagrammatic only. All components shall be supplied and installed in a location and manner as necessary to provide the specified function and performance. Where components are shown on drawings those components are generally not drawn to scale and the final position of each component shall be fully coordinated with all other architectural, structural and services elements.

N.8.2.3 Surge and Lightning Protection

Provide adequate surge, lightning and transient protection on all systems equipment and hardware installed to meet the requirements of these Works.

Equipment necessary to prevent or minimise damage from power surge to all systems and system components shall be provided as part of these Works.

Particular attention shall be given to all external cabling devices that are interconnected and/or interfaced to the various systems and equipment mounted at high level (e.g. Video Cameras mounted at high level).

Protection shall be in accordance with AS/NZ 1768-1991 for the protection of equipment and include both primary and secondary protection and suppression of both differential and common mode transients.

Where necessary, additional earth stakes shall be installed at external locations so that the resistance to earth at any equipment enclosure complies with the requirements detailed in the relevant standard.

All external cabling shall be provided with in-line lightning protection.
N.8 SECURITY & EMERGENCY ALARM SYSTEMS (CONT’D)

N.8.2.4 Painting

All new metal work, and the rework of existing metal work, shall meet the Australian Standards, including but not restricted to AS1627 and AS3750, for paint and rust work, and be free from grease, rust scale, and shall be finished with an approved factory applied paint system of approved colours.

Paint finish shall include the following:

- One coat of self etching primer.
- One coat of lacquer primer surfacer.
- Three coats of lacquer finished to high gloss.

Ensure finished surfaces of all paint work, not otherwise specified, are free from bubbles, runs or any other imperfections and have a high gloss finish.

All touching up of paints shall be accurately matched to the factory applied finish. Alternatively, a powder coat finish may be applied to metal work.

Preparation and application of powder coat finish shall be carried out in accordance with the manufacturer’s recommendations and AS4506, with a minimum thickness of 50 microns.

Submit colour and finish sample for comment by the Security Manager prior to implementation.

N.8.2.5 Wind Load

The Security Services Works shall be designed and constructed to comply with the requirements of AS/NZS 1170.2 Wind Loads where applicable.

N.8.2.6 Soldering

Solder shall be resin cored solder with 65% tin content. No separate flux is permitted.

The solder shall provide a good electrical bond between the conductor and the tag, and meet with the following:

- Prior to soldering, the joint shall be mechanically sound.
- The soldered joint shall not to be subject to mechanical stress.
- No excess solder shall remain on the tag.
- No solder droppings shall be left on or about the work.

Work showing evidence of a corrosive flux being used shall be rejected.

N.8.2.7 Vermin and Insects

All enclosures, cabinets, ducting and conduits shall be sealed or otherwise protected to prevent the entry of vermin or other insects which could damage the equipment or cabling.

The proposed method for protection against vermin and insects shall be submitted for approval to the Security Manager.
N.8 SECURITY & EMERGENCY ALARM SYSTEMS (CONT’D)

N.8.2.8 Environmental Considerations

Environmental protection shall be provided to all external equipment where that equipment may be damaged by vandalism, or by environmental conditions such as rain and dust.

N.8.2.9 Cable Installation

N.8.2.9a Cable Supports

All cable installation shall comply with the following:

- **In walkway ceilings:** dedicated security services cable tray, secured to ceiling with different cable types (e.g. video, control etc) loomed separately within the tray;

- **In riser cupboards and risers:** dedicated security services cable tray, minimum size 450mm, secured to wall with different cable types loomed separately within the tray.

- **Generally in all ceilings:** connected to catenary cables except for major cable trunks which shall be supported using dedicated security services cable tray secured to ceiling with different cable types loomed separately within the tray.

N.8.2.9b Cabling

Cable installation shall comply with the following:

- Run cables in concealed routes. Do not use surface conduit without written approval. Provide cable tray, cable routing and layout management to minimise congestion at entry and exit points to equipment cubicles, equipment racks and ‘equipment rooms’.

- Cabling to all Equipment Cubicles and all wall mounted swing racks shall be concealed;

- Exposed cables (interior) – enclosed in PVC conduit except where cables are installed in any external areas of a where cables shall be enclosed in galvanised steel conduit; and

- Cables installed in concrete shall be enclosed in rigid PVC.

N.8.2.9c Security Cabling

Security backbone cabling (RS485) will be Belden 8723 with a 2.5mm Earth or security product manufacturer approved equivalent.

All security field devices are to be cabled using manufacturer approved multi-pair multi-strand copper cable (e.g. 14/0.20 gauge cable to devices except power to electric locks which is to be a minimum of 24/0.20 gauge). Electric lock power cabling is to be sized appropriately to prevent voltage loss due to distance.

All security cabling shall be AS/ACIF S008 compliant multi stranded security type cable, installed in accordance with AS 2201.1, Section 7.

N.8.2.9d Video cable

Optical fibre cable shall be used for connection to external cameras.
N.8 SECURITY & EMERGENCY ALARM SYSTEMS (CONT'D)

N.8.2.9e External cables
All external cables for all security services, regardless the type or use of the cable and regardless of the method of installation (e.g. installed in conduits), shall contain an approved waterproofing agent and shall be suitable for direct buried application. Cables designated by the manufacturer ‘for internal use’ or ‘for in-ground, in conduit use’ and the like are not acceptable and shall not be provided.

N.8.2.9f Separation
Provide 150mm separation between Low Voltage (LV) services and security services to ensure that system performance is not adversely affected by interference and the like.

Where necessary provide additional cable tray to maintain the separation requirements. Separation from High Voltage (HV) services shall be ‘to approval’.

N.8.2.9g Joints
No joints or connections are permitted between the two end points of a cable run. Adequate loose cable shall be provided to facilitate inspection, adjustment and removal.

N.8.2.10 Conduits and Pits

N.8.2.10a Type
Provide conduits for cable access for cable protection at entry/exit points and penetrations where cable tray is not specified. Provide either UPVC or steel conduits as detailed. All site conduits and pits for security services are included in the scope of Work.

All visible conduit and duct routes shall be identified prior to installation by the Contractor and approved by the Security Manager.

The contractor must supply to the Security Manager Shop Drawings showing the proposed conduit runs. Approval must be granted before commence of work. Any deviation from this shop drawing as part of a project requires consultation and formal agreement from the Security Manager.

N.8.2.10b Installation
Observe the following points:

- Do not use surface conduit without express written approval;
- Where written approval to use surface conduit has been provided, support the surface conduit and fix with two (2) hole saddles spaced no more than 600 mm apart;
- Where saddles cannot be fixed to the building structure a suitable bracket shall be supplied and installed;
- Half saddles shall not be used;
- Provide connecting blocks/mounting plates for the flexible conduit at penetrations;
- Paint exposed internal conduits to match the colour of the surface to which the conduit is attached;
N.8  SECURITY & EMERGENCY ALARM SYSTEMS (CONT’D)

- Paint exposed external conduits to match the colour of the surface to which the conduit is attached;
- Ensure conduits and cables are neat, straight and securely fixed parallel to building members and walls and do not install in shelving and/or cupboards and the like;
- Metallic conduit exposed to the weather shall be galvanised; and
- Provide draw cords in conduits including spare conduits. Leave 1m of cord coiled at each end. Use polypropylene cord or insulated stranded earth wire 2.5 mm² minimum size.

Install conduits far enough above ceilings and below floors to avoid accidental piercing by nails and the like and to avoid restricting the removal of ceiling tiles or floor panels.

Where possible install conduits at least 150mm clear of underside of roof decking.

N.8.2.10c  Internal Conduits
The conduit shall be rigid LD-UPVC, white conduit.

The internal conduit shall be a minimum of 25mm diameter.

All fittings draw boxes, bends and couplings are to be purpose made.

The internal conduit shall be joined using an approved solvent cement.

The conduit shall be secured using full metal saddles, spaced at a maximum of 600mm and at a minimum of 150mm from other fittings.

The conduit shall be installed so that cables can be drawn in at draw boxes only. Inspection elbows shall not be classified as draw points.

The conduit shall be filled with cables to not more than 60% of its capacity.

N.8.2.10d  External Conduit
All conduits installed externally of a building shall be steel conduit (plated or painted depending on environment) to prevent tampering.

The conduit shall be secured using full metal saddles, spaced at a maximum of 600mm and at a minimum of 150mm from other fittings.

The conduit shall be installed so that cables can be drawn in at draw boxes only. Inspection elbows shall not be classified as draw points.

The conduit shall be filled with cables to not more than 60% of its capacity.

N.8.2.10e  Cable Duct
The cable duct shall be fitted with removable covers.

The cable duct shall be fitted with the manufactured standard bends, elbows, couplings and reducers.

The cable duct shall be manufactured from extruded PVC when exposed. Concealed cavities and ceiling spaces maybe metal.
N.8 SECURITY & EMERGENCY ALARM SYSTEMS (CONT’D)

The cable duct shall be filled with cables to not more than 60% of its capacity.

Cable duct shall not be used on external building installations.

N.8.2.10f Fixings
Fixings shall comprise metal thread screws or bolts into expanding type masonry anchors for fixing to concrete or masonry.

Fixings shall comprise tapered woodscrews for fixing to timber. (Full thread).

Fixings shall comprise metal expanding anchors for fixings to gyprock.

All fixings shall be corrosive resistant.

N.8.2.10g Cable Pits
The Contractor shall provide a system of drained underground pits and conduits:

- To each external and each perimeter equipment enclosures
- For all external underground conduit runs every 50 metres or wherever there is a change of direction;
- For the telecommunications carrier services to site; and
- Elsewhere as detailed.

Cable pits shall be heavy duty concrete pits as detailed on the drawings. Provide pit covers to AS 3996 to suit expected loads. Covers shall be concrete filled cast iron frames. Fit flush with the top of the pit and finish to ground level. The maximum weight of any section of the pit cover shall be 40kg. Provide a lifting handle for each size of cover section, stored in the Security Equipment Room or Communications Equipment Room.

The Contractor shall provide Barri Security bolts. A minimum of two bolts shall be provided for each pit cover. All pit covers shall be keyed alike.

The Contractor shall provide drainage from the bottom of cable pits to the storm water drainage system.

Lay conduits with a drainage fall of at least 1:100 to drain the pit system to the lowest pit or pits. Drain the lowest pit or pits with a 50mm PVC pipe in one corner, with the floor of the pit having a fall towards this pipe. Connect the drain pipe to the stormwater pipe at a lower level than the bottom of the pit to be drained.

N.8.2.11 Underground Cable Routes

N.8.2.11a Survey
Accurately record the routes of underground cables before backfilling.

N.8.2.11b Location Marking
Accurately mark the location of underground cables with route markers consisting of a marker plate set flush in a concrete base. Place markers at each joint, route junction, change of direction, termination and building entry point and in straight runs at intervals not exceeding 50 metres.
N.8 SECURITY & EMERGENCY ALARM SYSTEMS (CONT’D)

Concrete bases: 200mm diameter x 200mm deep (minimum dimensions).

Direction marking: Show the direction of the cable run by means of direction arrows on the marker plate. Indicate distance to the next marker.

Plates: Brass, minimum size 74mm x 75mm x 1mm thick.

Plate fixing: Waterproof adhesive and four brass or stainless steel countersunk screws.

Marker height: Set the marker plate flush with paved surfaces, and 25mm above other surfaces.

N.8.2.11c Marking Tape for Buried Conduits

Accurately mark the location of underground conduits with route marking tape. Provide communications services marking tape and install at the midpoint between the surface and the buried conduit, for the entire length of the conduit run.

N.8.2.12 Contractor’s Responsibility

N.8.2.12a General

The installation methods, guidelines and standards issued by the manufacturer’s/supplier’s representatives of the supplied equipment are to be adopted and utilised throughout the contract. All work is to be performed to a level consistent with accepted industry standards of trade practice. Where conflict arises between the this specification, the standards and referenced documents, the manufacturer’s/supplier’s requirements and the industry standards of trade practice, the most stringent requirements shall be applied.

N.8.2.12b Temporary cabling

Provide temporary cabling and/or equipment to maintain all the systems during any upgrade process. All temporary cabling shall be removed after completion of the upgrade and testing. The disconnection of, removal of, or relocation of any specified items shall be carried out at a time directed by the Security Manager. The Contractor shall provide in writing, to the Security Manager for approval, details of planned interruptions to the services. A minimum of 24 hours advance notification shall be provided.

N.8.2.12c Maintenance of Services

Maintain all existing services at all times. Efficient cutover of services shall necessitate the ‘buzzing out’ of existing services to determine the nature of the cable allocation, where complete records are not available. Cutover of existing services to the new infrastructure may need to be accomplished outside normal working hours (i.e. after hours or during weekends). Cutover of services shall be coordinated with the Security Manager.

N.8.2.12d Redundant Cabling and Equipment

All redundant cabling and equipment shall be removed and returned to the Security Manager. The Contractor shall provide an inventory of all items including serial numbers. All items shall be suitably packed to prevent damage in transit and all items and packages shall be clearly labelled.
N.8 SECURITY & EMERGENCY ALARM SYSTEMS (CONT'D)

N.8.2.13 Identification

N.8.2.13a Cabling
Identify all cables at all connection points (including marshalling panels such as access control data gathering panels). All connection points shall be uniquely identified and labelled at each end of each cable. The Contractor shall use ‘Critchley’ product or approved equivalent.

N.8.2.13b Documentation
The Contractor shall supply documentation which shall include as-built drawings, shop drawings, equipment schedules, wiring and system schematics which clearly identify all cable numbers, equipment identification, equipment serial numbers and connection point identification.

N.8.2.13c Labelling
Label all equipment installed in the equipment racks and equipment cubicles, all wall-mounted panels and all marshalling panels. Labels shall be glue-fixed traffolyte labels engraved with alpha or alphanumeric characters which clearly identify the functions and functional groups. Lettering is to be white on a blue background and affix labels for rack mounted equipment to 1RU blank plates installed in the racks.

N.8.2.13d Terminology
Standard terminology, generally adopted by the University of Adelaide, is to be used throughout.

N.8.2.14 Power Supply Labelling

N.8.2.14a General
The Contractor shall provide engrave labelling all power outlets to which 'security' equipment is connected with the words “SECURITY EQUIPMENT - Do Not Switch Off” as 5mm high black lettering. Uniquely colour code the faceplates of UPS supported GPOs to distinguish them from all other GPOs. Pay all costs.

N.8.2.14b Switchboards
Coordinate with the electrical contractor to provide labelling at switchboards of all circuit breakers supplying security equipment with the words “Security Equipment - Do Not Switch Off”.

N.8.2.15 Alarm/Access Control Panels

N.8.2.15a Door controllers and input-output modules
Unless otherwise specified, locate in the respective block or in designated Equipment Cubicles (ECs) or ‘equipment rooms’. Each monitored device and each controlled device shall represent a separate ‘point’. All detection and monitoring devices such as motion detectors and magnetic reed switches shall be individual monitored ‘points’.

N.8.2.15b Installation
Where control and monitoring equipment requires installation in close proximity to the controlled or monitored device, that control equipment is not be installed on ceilings/walls of any room or corridor.
N.8 SECURITY & EMERGENCY ALARM SYSTEMS (CONT’D)

Where equipment cannot be located in designated areas (i.e. designated EC locations or ‘equipment rooms’) the equipment is to be located in an alternative, concealed location. The location of these devices shall be identified in the as-installed drawings and in the security manuals. Unless otherwise recommended by the manufacturer all marshalling panels shall be installed in the locations nominated for ECs.

N.8.2.16 Door Contacts

N.8.2.16a Magnetic reed switches

Provide magnetic reed switches to all doors as nominated on the drawings. Magnetic reed switches shall operate when:

- A personnel door is opened > 20 mm at the lock/latch edge;
- The fixed leaf of a double door is opened > 20 mm at the lock/latch edge; or
- A vehicular door is opened > 100 mm.

N.8.2.16b Lock Monitoring

Where electric locking devices incorporate integral door, bolt and handle position sensors or "magnetic bond sense" sensors, these shall be monitored by the alarm/access control systems.

N.8.2.16c Construction

Provide concealed type magnetic reed switches for pedestrian access doors and heavy duty roller door type magnetic reed switches for larger equipment access doors and roller doors.

N.8.2.17 End of Line Devices

N.8.2.17a General

End of Line (EOL) devices shall be installed at the reed switch connection points. There shall be no excessive cable length between the reed switch and the end of line device. A maximum ‘tail’ of 25mm is permitted.

N.8.2.18 Anti-Tamper Devices

Provide anti-tamper devices to all equipment cubicles.

N.8.2.19 Vehicle Control and Barrier Systems

N.8.2.19a PE Safety Beams

The Contractor shall provide a photo electric beam safety interlock to prevent door or gate from closing until the vehicle has cleared the exit point. Provide a separate PE beam transmitter and receiver (i.e. reflective type PE beams shall not be used).
N.8 SECURITY & EMERGENCY ALARM SYSTEMS (CONT'D)

N.8.2.19b PE Beam Installation

Installation of the PE beams, logic controllers and reed switches shall conform with the following:

- Where possible, PE beams to be located at 600mm AFFL and 600mm from each side of the shutter opening. Where this cannot be achieved and PE beams are located within 600mm of openings, beams shall be fitted with heavy duty protective shrouds designed to protect beams from vehicle damage and accidental misalignment;

- Logic controller to be on the same side as the supply power and installed at a height of 1500mm AFFL;

- A conduit is required between the PE beam transmitter and receiver, and from the PE beam (logic controller side) to the logic controller; and

- A conduit is required for each reed switch cable. Reed switches shall be installed at floor level and within 75mm of the shutter opening.

Confirm details with the Security Manager prior to commencement of construction.

N.8.2.19c Exit Loops

Provide exit loops to operate the roller shutters/boom gates.

N.8.2.19d Boom gates

Boom gates shall provide the following minimum features;

- Heavy gauge steel housing;

- Powder coated finish;

- Boom gates shall have a folding aluminium arm to the suit space available but without restricting vehicular access when in the ‘open’ position;

- Direct coupling motor to boom;

- Simple interface connection to the Access Control System;

- Simple interface connection to the Intercommunication System with remote control capability;

- Provide physical restriction to the car park area, through and around the boom gate when closed, to vehicles of width 0.5m or greater;

- Open to the vertical position;

- Shall be able to be opened by separate momentary action type remote release buttons;

- Egress boom gates shall be automatically opened by vehicles leaving the car park by in-ground detection loops;

- Shall have manual override (mechanical operation) in case of system failure;
N.8 SECURITY & EMERGENCY ALARM SYSTEMS (CONT’D)

- Shall not close on a vehicle under the boom and if partially closed shall return to the vertical position;
- Shall close automatically with timeout timer and photo optical obstruction sensor;
- Shall be weatherproof and vandal resistant; and
- Shall incorporate up/down status indicator on the access control system.

N.8.2.19e Roller shutters
The scope of work shall include but not limited to the following:
- Integration of the roller shutter operation with the access control system to provide the monitoring and control functions, including the provision of, and cabling to, the logic controller for connection by the roller door contractor;
- The provision of additional equipment as required for interfacing to the roller shutter doors;
- Configuration of the system to allow operation of the roller shutters during after hours with the boom gates permanently raised. The reverse shall be provided during normal working hours (i.e. roller shutter up and boom gates controlling access);
- Override to allow the roller shutter to be closed at any time;
- Connection of the boom gates and roller shutters to the exit induction loop and provision and installation of the exit loop;
- Monitoring the status of the roller shutter.

N.8.2.19f Vehicle Exit Pedestrian Warning
Provide a vehicle exit pedestrian warning system for each egress boomgate/roller shutter that provides vehicular egress across a public pedestrian footpath. The warning system shall consist of an externally mounted rotating orange light and an externally mounted audible alarm. The light shall be installed to provide maximum pedestrian visibility and each audible alarm sound level shall be suitable for intended use. The light and audible alarm shall automatically operate during vehicle egress (i.e. from the time the vehicle reaches the exit loop) and shall continue for a pre-settable duration (minimum duration 10 seconds). The audible alarm level shall be adjustable. The vehicle exit pedestrian warning system shall be interfaced to, and controlled by, the access control system.

N.8.2.19g Monitoring
Provide Sentrol 2700 heavy duty reed switches on both internal sides of vehicle doors, which generate a door closed indication at the control panel. All roller doors shall be provided with Sentrol 2700 (or equivalent) reed switches. Provide reed switches to identify both the fully CLOSED position and the fully OPEN positions.
N.8 SECURITY & EMERGENCY ALARM SYSTEMS (CONT’D)

N.8.2.20 Fixed Duress Alarm System

N.8.2.20a Type
The fixed duress alarms shall be either:
- Fixed location push button, overt - these shall be wall mounted and visible to all persons;
- Fixed location push button, covert - these shall be desk mounted and shall be installed in a concealed location, not visible to detainee or visitors.

The type of fixed duress shall be as detailed in the specification.

N.8.2.20b Duress Buttons
The Duress Alarm push buttons shall be:
- Robust, easily recognised switch hardware; and
- Key resettable.

The push button shall be an ADEMCO 269R. Wall mounted duress buttons shall be provided with stainless steel flush plate and flush mounted wall box.

N.8.2.21 Movement Detectors

N.8.2.21a General
- PIR walk test LEDs shall be disabled on completion of testing and shall be controllable from the alarm panel;
- Install mounting brackets where direct corner or direct wall mounting does not provide optimum PIR detector performance; and
- Wall mounting detectors with a ceiling mount adaptor bracket are not acceptable where ceiling mounted detectors are scheduled.

N.8.2.22 Intercom System

N.8.2.22a General
Intercoms shall be:
- Flush mounted with back-boxes;
- Suitably weatherproofed for all external locations and located on external walls or pedestal stands in suitable recessed mounting boxes, which shall include a rain “drip” cover;
- Robust and vandal resistant. All cabling shall be installed with adequate extra length to allow complete removal for service access without undue stress on the cabling; and;
- Sealed around the faceplate to prevent the ingress of dust, moisture and the like.

N.8.2.22b Mounting height
The intercom unit (call point) shall not exceed 1400mm to bottom of the unit. Actual height of the intercom unit shall be determined on site.
N.8 SECURITY & EMERGENCY ALARM SYSTEMS (CONT'D)

N.8.2.22c Weatherproofing
If exposed to the elements, provide a weather-resistant hood above the intercom unit.

N.8.2.23 CCTV System

N.8.2.23a Identification
The Contractor shall provide security camera identification so that the camera identification is displayed at every monitor (including playback monitors). Provide a minimum of 16 alphanumeric characters for identification for each camera.

N.8.2.23b Positioning and adjustment
The Contractor shall position and aim cameras to provide optimum coverage and to minimise the effect of shadows or direct light sources. Ensure that cameras are installed at a height which will eliminate unauthorised tampering of the camera and associated components. Generally, a minimum height of 4 metres above ground level is necessary bearing in mind the coverage area required. Selection of camera components shall consider the environmental conditions that can normally be expected throughout the year. Pay particular attention to variable and difficult lighting conditions resulting from sunlight and floodlighting. Submit a schedule of proposed cameras indicating location, view, housing type, lens type, lens focal length, camera identifier and the like for approval by the Security Manager prior to installation.

N.8.2.23c Lenses
The Contractor shall provide auto-iris lenses as detailed, with focal lengths selected to provide coverage of designated areas and to enable persons within the field of view to be readily distinguishable on monitors. Lens size shall be determined on-site using a lens calculation program. Lenses shall be fitted with graduated Neutral Density (ND) spot filters.

Motorised zoom lenses fitted to PTZ cameras shall have a minimum 20:1 zoom ratio and be fitted with preset potentiometers and ND spot filters. All lenses shall be manufactured from glass.

All internal fixed cameras shall be fixed focal length with the focal length selected to provide the field of view required. Nominally all lens focal length shall be selected to provide the required view, however, should lens changes be necessary as a result of on-site testing, the Contractor shall provide alternative lenses, (ie of different focal length), at no additional cost to the Security Manager.

Zoom lenses for the PTZ cameras shall be remotely. Zoom lenses for the PTZ cameras shall conform to the following:
- Focal length As determined from the field of view calculations;
- Iris Auto;
- Focus Motorised with presets; and
- Zoom Motorised with presets.

The lens and camera combination shall be tested under night operating conditions to confirm satisfactory operation to the Security Manager.
N.8 SECURITY & EMERGENCY ALARM SYSTEMS (CONT’D)

N.8.2.23d Fixing
Provide mounting brackets and hardware which rigidly fix cameras, monitors and accessories to buildings or structures. Provide camera mounting brackets with the following minimum specification:

- Commercially manufactured;
- Heavy duty;
- Allow for adjustment of camera position, tilt, rotation etc; and
- Pole, wall, ceiling, roof mount or other as required.

N.8.2.23e Disassembly
Cameras shall not require any form of disassembly or modification to the camera to enable fitment into the housing.

N.8.2.23f Surge protection
Provide surge protection for camera cables for all external cameras, (including pole/tower mounted cameras and all roof mounted cameras) by providing a line protector. Provide Novaris Technologies ‘Plug-In’ type DIN rail mounted modules or approved equivalent, for each cable at the equipment room only.

N.8.2.24 Camera Housings

N.8.2.24a General Requirements
All camera housings shall be fully sealed to prevent ingress of dust, insects and moisture. All camera housings shall be commercially available and powder coated. Mounting brackets for external camera housings/cameras shall, in all cases be heavy duty type.

All PTZ camera housings shall be selected to minimise wind resistance. Housings shall be of weatherproof design and shall incorporate a sunshield that shall also divert rain away from the viewing window. All cable entries shall be via flexible steel conduit.

N.8.2.24b Dome housings
The Contractor shall provide small and unobtrusive recessed dome camera housings (150mm diameter maximum for internal and 195mm diameter maximum for external), with toughened acrylic finish. Ensure that housing is compatible with the camera/lens combination. All cables and equipment are to be accessible from beneath the ceiling via the removable dome.

N.8.2.24c Fixed housings
Standard housings shall be for internal and external camera locations, dependent on camera/lens combination length.

N.8.2.24d PTZ Mechanisms
PTZ units for external use shall have the following features:

- IP66 rating;
- High resolution preset facilities for both pan and tilt functions;
- Adjustable internal limits;
N.8 SECURITY & EMERGENCY ALARM SYSTEMS (CONT’D)

- Backlash of less than 0.2 degrees;
- Speed of operation of to 40 degrees per second pan and to 20 degrees per second tilt;
- Variable speed type units;
- 360 degrees continuous pan; and
- tilt angle from minus 90 degrees to plus 40 degrees.

N.8.2.25 Camera Poles and Footings

N.8.2.25a Requirements
The Contractor shall provide camera poles and footings that meet these requirements:
- Circular, hollow, tapered and reinforced rigid concrete poles;
- Height 6 metres minimum above ground level;
- Poles with internal earth strap (and electrically earthed in accordance with AS3000);
- Poles fitted with a pole cap manufactured from hot dip galvanised mild steel;
- Poles with integral mounting attachment for the pole cap; and
- Pole caps with drilled and tapped mounting holes for fitment to the pole and for fitment of heavy duty camera mounting brackets to the pole cap.

N.8.2.25b Footings
Footings shall be designed by a qualified Structural Engineer. Submit shop drawings and certification of the pole and footing design, for approval, at least 20 working days prior to the anticipated installation. The design must allow for local soil type and wind loading.

N.8.2.25c Pole Location
Pole locations shall be determined by the field of view requirements as specified. Proposed locations shall be confirmed using a ‘cherry picker’ (or similar) and a view finder to confirm the field of view. Actual pole heights shall be determined on site to provide required view. The location of poles, shown on the drawings, is indicative only.

N.8.3 Security Specification – Technical Requirements

N.8.3.1 Mechanical Key Locks

N.8.3.1a General
The University of Adelaide uses ProMaster 5, a master keying software program for the management of their master key systems and design.
N.8 SECURITY & EMERGENCY ALARM SYSTEMS (CONT'D)

N.8.3.1b Master Keying System

All University of Adelaide key locks shall be Abloy Pro-Tec. The Abloy Pro-Tec lock and master keying system profile shall be ordered directly from the manufacturer and configured to the University's own key profile.

The University of Adelaide Thebarton Campus (nominated areas) use Lockwood Generation Six master keying system with a Thebarton Campus key profile.

The contractor shall liaise with the Security Manager before installing any key locking.

N.8.3.1c Locksmith

The University of Adelaide's locksmith can be contacted via the Security Manager.

N.8.3.2 Electronic Access Control System

The Electronic Access Control System provided shall be based on a modular distributed processing network.

All access control equipment shall be from the Siemens SiPass Integrated range of hardware unless otherwise advised or approved by University of Adelaide Security Manager.

All electronic locked doors, either internal or external shall be free egress.

All building perimeter entry/exit doors shall be electronic access controlled. These doors shall have CCTV coverage, if coverage is available.

Each electronic access control door shall provide but not limited to the following:

- Remote control electric locking;
- Door status monitoring;
- Emergency break-glass door release;
- Vehicle access control;
- Audible and visual alarms; and
- Contactless card reader.

The contractor shall provide a Siemens SiPass Integrated, integrated electronic security solution. The SiPass Integrated system shall include but not limited to:

- SiPass Integrated Server;
- ACC5100 - Advanced Central Controller (ACC);
- Single Reader Interface (SRI);
- ADDS5100 - Dual Reader Interface (DRI);
- ADDS5160 - Dual Reader Interface (DRI) in weatherproof housing;
N.8 SECURITY & EMERGENCY ALARM SYSTEMS (CONT’D)

- Smart Card Reader Interface (SMI);
- ADE5300 - Eight Reader Interface (ERI); and
- Power Supply Unit (PSU).

The Contractor must provide to the Security Manager Shop Drawings showing the proposed panel layout and panel locations. Approval must be granted before commence of work.

Any deviation from this shop drawing as part of a project requires consultation and formal agreement of Security Manager.

N.8.3.2a Access Requirements

When the system is activated access to the building shall be gained by:
- Presentation of a valid card at a reader; and/or
- Operation of a remote release button.

Both actions above shall result in the release of the electric door lock for a specified pre-settable time. Valid exit micro-switches shall be connected for electric locking doors with free egress handles so that a valid exit does not register as an alarm.

Key override monitoring micro-switches shall be connected to register an alarm when key override is initiated.

N.8.3.2b Operation Requirements

Doors under the control of the Siemens SiPass Integrated system shall be installed and programmed for:
- Forced Door;
- Door Open;
- Door Open to long;
- Lock or Bond Sense;
- Individual break glass alarm; and
- Auto door controller fail.

The Door Open Too Long alarm shall be a two-stage alarm. At the expiration of the first stage alarm an audible alarm shall sound until the door is correctly closed. The stage one time period shall be adjustable from 1 second to 255 seconds.

The second stage alarm shall start to time out at the completion of the first stage alarm. At the expiration of the second stage alarm an alarm shall be activated at the central SMS. The second stage alarm shall be adjustable from 6 second to 60 seconds.

Should the door be illegally opened an immediate alarm shall be transmitted to the central processor.
N.8 SECURITY & EMERGENCY ALARM SYSTEMS (CONT’D)

N.8.3.2c  Door alarms and buzzers
A local low voltage (e.g. 12VDC) “buzzer” (not siren) shall be provided for each electric locking access control door to register an audible tone when the lock is released. The intention is to provide an indication that the door is unlocked and entry is permitted.

N.8.3.3  Door Control Devices

N.8.3.3a  General
The Contractor shall provide proximity card readers, and locate next to entry/exit points on the opening side of the door. Where the drawings indicate that readers are to be installed in a location other than the door opening side, confirm the requirement prior to commencing installation.

The Contractor shall provide weatherproof external units, if the proximity card reader is mounted external to any building.

Mounting height (pedestrian access): 1.0m if stand-alone, immediately below if combined with the intercom slave unit, or at the same height as other fittings (e.g. light switches) if installed in close proximity.

Mounting height (vehicular access): Generally 1400mm but to be determined on site, in coordination with the Security Manager.

N.8.3.3b  Access Control Card Readers
Each electronic access control door shall be provided with access control card reader(s).

All access control card readers shall be flush mounted and provide a tamper output facility.

The access control card reader and its controller shall be “intelligent” with sufficient memory to store valid key numbers and time zone information to the maximum system expansion capability. The card reader shall operate unaffected when communication with the central processing unit fails. Restoration of the communication link shall result in automatic update of information in both directions. The control device which directly commands the lock coil shall not be contained within the reader head, so as to preclude the risk of unauthorised access by tampering with the data reader head wiring.

All contactless card readers shall be HID SmartID Mullion S10 ISO/IEC 14443 contactless card readers or approved equivalent.

Readers shall be suitable for the installed location. Outdoor type readers shall be used for all external applications. Medium range readers shall be used for all vehicular applications.

N.8.3.3c  Access Key Pads
The Contractor shall flush-mount all key pads. Provide key pads in the locations shown on the drawings. Ensure that the key pads control the electric lock associated with the reader. The Contractor shall provide key pads with a tamper output facility.

Key pads shall be suitable for the installed location. Outdoor type key pads shall be used for all external applications.
N.8 SECURITY & EMERGENCY ALARM SYSTEMS (CONT'D)

All key pads shall be SiPass Integrated system M43 keypad, or approved equivalent.

N.8.3.3d Access Cards and Tokens

All contactless access cards shall be flexible PCV business card sized high security encrypted infra-red barcode type, suitable for the application of photo ID.

N.8.3.3e Break-glass panels

The Contractor shall provide emergency break-glass panels, colour green, at egress doors. The call point shall be cabled in series with the power to the lock. Activation of the break-glass shall report to the access control system.

The break-glass panel (Green KAC KWB1/SW) shall, when operated, cut power to the door lock and release the door. The call point shall be located at the door position and shall be engrave labelled on the face plate with the words ‘Emergency Door Release. Break glass to activate.’ Replacement of the glass shall reset the door.

The power from the door controller to the lock (via the call point) shall also be in series with a normally closed relay contact within the FIP. The normally closed relay contact shall open in the event of an alarm at the FIP and shall only be ‘resettable’ at the FIP. Coordination associated with the provision of this feature is included as part of the scope of work of this specification.

N.8.3.3f Locking General Requirements

All locks shall be fail-safe equipment.

All locks shall be fitted with tamper proof screws if on the non-secure side and to include appropriate mounting equipment for inward and outward swing doors.

All Electric strikes shall be fitted with a diode across the coil to reduce “Back EMF”

An additional lock set (key override) shall provided to ensure that the door can be secured should the access or power system fail

N.8.3.3g Electric Mortice Locks

All electric mortice locks shall be Lockwood 3572/3574 Electric Vestibule/Combination Dead-latch Mortice lock with Key Override Monitoring, or approved equivalent.

N.8.3.3h Solenoid Door Latch (Electric Door Strike)

All electric door strikes shall be Padde ES 2000 / ES2000 Series solenoid door latch or approved equivalent.

N.8.3.3i Electromagnetic Locks

Were magnetic door locks are utilised the unit must have a minimum holding force of 1200LBS.
N.8 SECURITY & EMERGENCY ALARM SYSTEMS (CONT’D)

- The unit is to be 12 volt compatible and is have a power consumption of no more than 500mA
- Unit is to be fitted with a door status sensor.
- Where the egress handle is in “Free Egress” mode a lock tongue sensing microswitch is to be installed. This microswitch is to release the magnetic lock and override the forced door alarm during a legitimate exit through the door.
- Where there is no egress handle a momentary push button switch is to be provided adjacent the handle side of the door. This push button is to release the magnetic lock and override the forced door alarm during a legitimate exit through the door.
- Either an adjustable volume buzzer or a high intensity LED is to be provided in a prominent viewing position to provide a indication of the magnetic lock being released for exit.

N.8.3.3j  Glass Doors and Double Swing Doors
The Contractor shall provide electromagnetic locks.

N.8.3.3k  Double Leaf Doors (Solid Frame)
The Contractor shall provide an electric mortice lock / electric strike on the non-fixed leaf, connected to the door using concealed flexible wiring.

N.8.3.3l  Single Leaf Doors (Solid Frame)
The Contractor shall provide an electric mortice lock / electric strike connected to the door using concealed flexible wiring.

N.8.3.3m  Bi-Parting Doors
The Contractor shall provide motor lock hardware, input/output modules logic controller and interface to allow control of the doors by the access control system, and provide battery backup.

N.8.3.3n  Hinges
Power transfer hinges shall be used for each door fitted with electric mortice lock. Power transfer hinges shall be Lockwood or Abloy 8810. Power transfer hinges shall be additional to hinges required to support the weight of the door.

Supply and install adjustable RAVEN seals to all doors fitted with electric mortice locks.

N.8.3.3o  Door Furniture
Regardless of the type of door furniture for other doors, all doors fitted with electric mortice locks shall be fitted with Lockwood 3580 series door furniture including the LED lock status visual indication.
N.8 SECURITY & EMERGENCY ALARM SYSTEMS (CONT’D)

N.8.3.3p Lift Controllers
All new and/or refurbished lifts shall have electronic access control.

The Contractor shall provide a High Level Interface (HLI) between the Lift system and the Siemens SiPass Integrated. If this cannot be provided, notify the Security Manager.

The Low level Interface shall include the use of an OPM and IPM or a multipurpose input/output module.

The Contractor shall supply and install access control to lifts as detailed. Where contactless card readers are required to be installed inside or outside the lift, the flush-mount the contactless card reader shall be located on the lift control panel. Liaise with the Lift Contractor for the provision of lift trailing cable requirements.

N.8.3.4 Fire Alarm Interface
An interface to the building fire alarm systems is necessary to initiate the unlocking of all electric locks in the event of a fire alarm. This interface must be made to all connected fire systems including sprinkler and Fire Indicator Panels (to the bell output only).

All lock power supplies shall pass through a relay contact, which shall be controlled by the fire system/s and shall be the two-pole type. The second pole shall be used to monitor the state of the fire relay and shall be programmed to activate an alarm input on the Command Centre.

N.8.3.5 Fire Exit / Emergency Exit Doors and Alarms
The Contractor shall provide where exit doors required for emergency egress from controlled facilities (multimedia/library and the like) an alarm that operates on door opening. These doors shall be provided with a local and/or remotes audible alarm, as appropriate to alert staff of a breach of security. Visual alarm indication only required as necessary. Confirm these requirements with the University of Adelaide Security Manager.

All doors classified as Fire Doors or Emergency Exit Doors are to be configured in the following way:

- On an activation of the Fire Alarm Panel (FIP) an signal is to transmitted to the Security Monitoring System (SMS) and all fire and emergency exit doors are to be electronically released, to allow free egress from the building.

- An emergency release glass break unit is to provided adjacent each Fire Exit or Emergency Exit Door located in a prominent position on the lock side of the door. The glass break unit when activated is to remove power from the door-locking device.
N.8.3.6 Access for the Physically Challenged

Unless otherwise specified, special provisions shall apply to all reader controlled access doors to improve accessibility for the physically challenged.

For physically challenged persons, the release time of reader controlled electric locks shall be automatically increased through identification of the user from details stored in the system software.

The DOTL alarm time shall also be automatically increased.

N.8.3.7 Door Contacts

N.8.3.7a Magnetic Reed Switches

The Contractor shall provide magnetic reed switches which operate when:

- A personnel door is opened > 20 mm at the lock/latch edge;
- The fixed leaf of a double door is opened > 20 mm at the lock/latch edge; or
- A vehicular door is opened > 100 mm.

N.8.3.7b Construction

The Contractor shall provide concealed type magnetic reed switches for pedestrian access doors, and heavy duty roller door type magnetic reed switches for larger equipment access doors and roller doors.

N.8.3.7c Door Monitoring (Reed Switch)

All Door Monitoring reed switches shall be GE Sentrol 1078 Series (19 mm or 25mm) hermetically sealed magnetic reed switch, or approved equivalent.
N.8 SECURITY & EMERGENCY ALARM SYSTEMS (CONT’D)

Surface mounted reed switches may be used where flush mount is not suitable. Approval is required from the University of Adelaide’s Security Manager.

N.8.3.8 Vehicle Control

N.8.3.8a General
The Contractor shall provide a vehicle access control system combining connection to vehicular access doors, boom-gates and interconnection to the main access control system.

N.8.3.8b Push-buttons and readers
The Contractor shall provide direct wall mounting for push-buttons or readers; otherwise provide a mounting bollard and extension arm.

N.8.3.8c Monitoring
The Contractor shall provide heavy duty reed switches on both inside extremities of vehicle doors, which generate a door closed indication at the control panel.

N.8.3.8d Exit Loops
The Contractor shall provide exit loops as indicated on the drawings.

N.8.3.8e Boom-gates
The boom-gates shall be controlled via data readers and remote release. Provide boom-gates at the locations indicated on the drawings.

N.8.3.8f Roller shutters
Interface to all electrically operated roller shutters as required providing the Security service required. Provide separate UP/DOWN controls for each roller shutter.

N.8.3.8g Vehicle Exit Pedestrian Warning
The Contractor shall provide vehicle exit pedestrian warning devices at locations shown on the drawings.

N.8.3.9 Intruder Detection System

N.8.3.9a General Requirements
The Contractor shall provide an intruder detection system which is integral to the access control system. Intruder detection devices shall be connected to the access control system as individual alarm ‘points’ but shall be programmed into groups or zones. The intruder detection system shall provide the following minimum requirements:

- Provide full supervision of network cabling;
- Support monitored alarm circuits;
- Provide output relays for integration with other systems; and
- Provide 24 hour supervised alarm zones (programmable).
N.8 SECURITY & EMERGENCY ALARM SYSTEMS (CONT’D)

The Contractor shall provide a Siemens SiPass Integrated, integrated electronic security solution. The SiPass Integrated system shall include but not limited to:

- SiPass Integrated Server;
- ACC5100 - Advanced Central Controller (ACC);
- Four Serial Reader Interface (FSR);
- AFII5100 - Input Point Module (IPM);
- AFO5100 - Output Point Module (OPM);
- AFO5200 - Multipurpose Input/output Module; and
- Power Supply Unit (PSU).

The Contractor must provide to the Security Manager Shop Drawings showing the proposed panel layout and panel locations. Approval must be granted before commencement of Work. Any deviation from this shop drawing as part of a project requires consultation and formal agreement of University of Adelaide Security Manager.

N.8.3.9b Alarm Control Panel

The Alarm Control Panel shall be a Siemens SiPass Integrated Advanced Central Controller, or approved equivalent.

The SiPass Integrated Server shall communicate with Advanced Central Controllers via Ethernet using TCP/IP communications.

The Advanced Central Controller communicates with local field devices, as listed above using RS-485 communications.

N.8.3.10 Anti-Tamper Devices

The Contractor shall provide anti-tamper devices to panels, detectors, control and activating devices, and access control devices.

N.8.3.11 Alarm Circuit Supervision

At each detection device, the Contractor shall provide four-state alarm circuit supervision using an "end-of-line" device connected via a separate circuit within the cable.

N.8.3.12 Configuration

The Contractor shall liaise with the Security Manager for confirmation and approval of the IDS and EACS system configurations including but not limited to:

- Areas and zones settings;
- Arm/disarm requirements; and,
- Entry/Exit delays.
N.8 SECURITY & EMERGENCY ALARM SYSTEMS (CONT’D)

N.8.3.13 Audible and Visual Alarms

The Contractor shall provide audible and visual alarms at locations shown on the drawings, which operate when an alarm condition exists. Provide a mute facility to reset the audible alarm. Provide volume control.

The visual alarm shall reset automatically once the alarm condition is removed. Provide a system warning output, to indicate alarms that have not been reset, which can continually re-activate at pre-programmed times until the alarm is reset. Provide lock release buzzers as detailed.

N.8.3.14 Fixed Duress Alarms

The Contractor shall provide fixed duress alarms at locations shown on the drawings. Connect duress alarms as individual alarm points.

N.8.3.14a Type

The fixed duress alarms shall be either:

- Fixed location push button, overt - these shall be wall mounted and visible to all persons;
- Fixed location push button, covert - these shall be desk mounted and shall be installed in a concealed location, not visible to detainee or visitors.
- The type of fixed duress shall be as detailed in the specification.

N.8.3.14b Duress Buttons

The Duress Alarm push buttons shall be:

- Robust, easily recognised switch hardware; and
- Key resettable.

The push button shall be an ADEMCO 269R, or approved equivalent. Wall mounted duress buttons shall be provided with stainless steel flush plate and flush mounted wall box.

N.8.3.15 Movement Detectors

N.8.3.15a Movement Detectors - General

The volumetric detectors / devices shall comply with the following:

- Detect rapid changes of infra-red energy radiated within the detectors field of view;
- Have an adjustable detection field;
- Dual element and mirrored imaging sensor (dual technology);
- Capable of sensing background to target differential of 2 deg. Celsius and target motion in the range of 30 cm/sec to 2.3 meters/sec;
- Tamper alarms as separate output contact;
- Event verification to analyse the shape and size of the incoming signal to filter out false alarms without reducing security;
N.8 SECURITY & EMERGENCY ALARM SYSTEMS (CONT’D)

- Use detectors with non-latching contacts;
- LED alarm indication which is latching in alarm mode, and auto resetting for commissioning and testing;
- Have facilities to allow all cable entry and mounting holes to be sealed after installation to prevent ingress of insects etc;
- Be designed for wall or ceiling mounting as required by the drawings;
- Detectors must be physically robust and vandal resistant;
- Removal of the lens cover shall result in the generation of a tamper condition;
- Sufficient horizontal and vertical adjustment to allow coverage of the areas to be optimised;

Detectors shall be positioned to ensure that mounting height corresponds to the manufacturer’s recommendations.

N.8.3.15b Passive Infra-Red Motion Sensors
All Passive Infra-Red Motion Sensors shall be Ademco IS-2535 PIR motion detectors, or approved equivalent.

N.8.3.15c Dual Technology Motion Sensors
All Dual Technology Motion Sensors shall be Ademco Intellisense DT-7450 dual technology motion detectors, or approved equivalent.

N.8.3.16 Glass Break Detectors
The glass break detector shall be dual flex/audio detection separate microphone, with a minimum 7.6 metre detection range.

All Glass break detector shall be Ademco Intellisense FG-1625 (incl RFM) glass break detectors, or approved equivalent.

N.8.3.17 Remote Arming Station
The remote arming station shall be SiPass Integrated ‘Entro’ system M43 keypad, or approved equivalent.

N.8.3.18 Intercommunication System
N.8.3.18a General Requirements
All call points and intercommunications are managed by the University of Adelaide’s ITS department.

All emergency call points shall have CCTV coverage, if coverage is available.

N.8.3.18b Emergency Call Points
The Contractor shall refer to the University of Adelaide’s ITS specification for the manufacture, model, operation and interfacing.
N.8 SECURITY & EMERGENCY ALARM SYSTEMS (CONT’D)

N.8.3.18c Lift Call Points
The Contractor shall refer to the University of Adelaide’s ITS specification for the manufacture, model, operation and interfacing.

N.8.3.19 Closed Circuit Television (CCTV)

N.8.3.20 General Requirements
The University of Adelaide ITS Department are responsible for the;
- CCTV VLAN;
- Video Storage;
- VideoInsight Client Workstations; and
- Network design and bandwidth.

The contractor shall liaise with the Security Manager and the ITS Department before the installation of additional network camera(s).

N.8.3.21 Internal Cameras
All internal cameras shall be Axis 216MFD fixed megapixel network camera, PoE compliant or approved equivalent.

N.8.3.22 External Cameras
All external cameras shall be Axis 233D PTZ network camera or approved equivalent.

N.8.3.23 Camera Enclosures
All camera housings shall be fully sealed to prevent ingress of dust, insects and moisture. All camera housings shall be commercially available and powder coated. Mounting brackets for external camera housings/cameras shall, in all cases, be heavy duty type.

All PTZ camera housings shall be selected to minimise wind resistance. Housings shall be of weatherproof design and shall incorporate a sunshield that shall also divert rain away from the viewing window. All cable entries shall be via flexible steel conduit.

The Contractor shall provide Axis T95A10 camera housing for the Axis 233D PTZ megapixel network camera.

N.8.3.24 CCTV Management Software (CMS)
The server software shall be Windows 2003 server, running VideoInsight IP Sever v4 camera management software.

N.8.3.25 Recording and Storage Requirements
All storage requirements are managed by the University of Adelaide’s ITS Department. The Contractor shall coordinate with the University of Adelaide ITS Department to confirm recording rates and image quality.
N.8 SECURITY & EMERGENCY ALARM SYSTEMS (CONT'D)

The internal and external cameras shall be configured, as a minimum for the following recording rates:

- 1 ips at 4CIF for standard recording.
- 3 ips at 4CIF for event triggered recording.

N.8.4 Testing, Commissioning & Acceptance

N.8.4.1 Equipment and Operation Manuals

- Provide manuals comprising plastic ring binder(s) with the project title, location, proprietor's name and contractor's name embossed on the covers. Pages not forming part of a multi-page brochure or technical manual are to be originals (i.e. not photocopies), and protected using plastic protectors designed for inclusion in the plastic ring binder. Incorporate the following information:
  - Overall index for every inclusion in each of the volumes including drawings, technical brochures and the like;
  - Index for each volume which indexes every inclusion in that volume including drawings, technical brochures and the like;
  - A written text in the form of a system overview for each security services sub-system installed, and a detailed description of each sub-system's connectivity, location of lowest level equipment assemblies, technical operation and basic fault finding steps;
  - Recommended maintenance periods and planned preventive maintenance procedures;
  - Copies of manufacturers' warranties or guarantees, service manuals, brochures, recommendations, etc.;
  - A copy of each work-as-executed drawing, cabling schedules, system configuration and programming schedules, equipment drawing, schematic drawing, and the like relevant to the installation;
  - A list of service companies and agencies for maintenance of components, equipment and systems in the installation; and
  - A copy of all commissioning test results.

Simple references to manufacturers' handbooks or drawings are not acceptable.

N.8.4.1a Quantity

The Contractor shall provide quantity three of each volume of the Manual.

N.8.4.1b Submission

Submit a draft copy of each of the manuals for approval to the Security Manager, before submission of the final copies of the manuals. The draft manuals shall be submitted 14 days prior to Practical Completion.
N.8 SECURITY & EMERGENCY ALARM SYSTEMS (CONT’D)

N.8.4.2 As-Installed Drawings

The Contractor shall provide copies of the as-installed drawings as follows:

- A hard copy of each as-installed drawing in each equipment manual;
- A soft copy (on CD) of each as-installed drawing in each equipment manual; and
- An additional soft copy (on CD) of each as-installed drawing for retention by the Security Manager.

All as-installed drawings shall accurately reflect the installation in terms of equipment locations, mounting heights, cable and conduit routes (including pits and external conduits).

N.8.4.3 Operational Instruction

N.8.4.3a Personal instruction

The Contractor shall provide personal operational instructions for each operator position to personnel nominated by the Security Manager.

N.8.4.3b Written Instruction

The Contractor shall provide written operational instructions, matched to the training syllabus, for each operator position for all equipment. Include, with the written instructions, A4 schematic layouts showing the location and type of all the installed equipment through the building(s).

The written instruction shall form the basis of the Operator Manual. The training is to include system configuration, operation and routine maintenance.

N.8.4.3c Timing of Instruction

The training session shall be provided prior to Practical Completion.

N.8.4.3d Length of Instruction

The length of instruction shall be determined in conjunction with the Security Manager.

N.8.4.3e Notice

The Contractor shall provide 14 working days notice of the proposed date for the instructions.

N.8.4.4 Acceptance Testing

N.8.4.4a General

Inspections, document submissions and tests shall be carried out, including out-of-hours tests, to demonstrate compliance with the security services documentation, including all specifications, standards and referenced documents. The Acceptance Test Document, described below, forms the basis for confirming that compliance.

Equipment Test Sheets shall be provided as part of the Acceptance Test Document. These test sheets shall form a separate section which details...
each test procedure and each piece of equipment, including its unique serial number and drawing reference, to be subjected to that test procedure. Test results, for each test and for each piece of equipment, shall be recorded and are to include details of the actual measurements taken and not a general comment such as 'okay'.

This section shall also include, for each test and each piece of equipment, a specific area for entering a defect report number. These defect report numbers shall be cross-referenced to defect notices.

As part of the Acceptance Test Document there shall be a separate section for recording each defect report. The report shall contain the unique defect reference number, a cross-reference to the test procedure, equipment serial number, details of the defect, a corrective action area, a sign-off area for the technician and the contractor's supervisor and a witness sign-off area.

The acceptance test document shall be used for the Contractor’s testing and commissioning. The completed document shall then be used as the basis for acceptance testing, and sign-off, prior to Practical Completion.

N.8.4.4b Equipment
The Contractor shall supply all necessary facilities, labour, apparatus and properly calibrated instruments required to test the installation, all of which shall be deemed to be included in the scope of work of this specification.

N.8.4.4c Video Recording
The Contractor shall provide a DVD(s) which demonstrate manually recorded audio and video monitoring of all camera and all intercom where the camera is associated with an intercom. The recording is to be no less than five minutes per camera.

N.8.4.5 Test Results
The Contractor shall provide typed and signed copies of commissioning and acceptance test/inspection schedule results, witnessed by the installation Supervisor. Video prints for CCTV tests shall be enclosed in loose-leaf plastic page covers.

N.8.4.6 Intruder Detection
The Contractor shall provide perform the following specific tests:

- Undertake the walk testing of all movement detectors to ensure adequate coverage of the areas specified. Disable the walk test facilities upon completion of the commissioning; and

- Carry out detector voltage checks at numerous randomly selected points throughout the installation to ensure detector voltages are within the specified limits.

N.8.4.7 Telecommunications Cabling
N.8.4.7a Twisted Pair AS3080 Permanent Link performance tests (T)
The Contractor shall provide perform ‘Permanent Link’ compliance tests for all installed AS3080 four pair twisted (UTP, FTP, STP) cables and connecting hardware.
N.8 SECURITY & EMERGENCY ALARM SYSTEMS (CONT’D)

N.8.4.7b Pass/fail

The installation must satisfactorily pass permanent link compliance test requirements to gain an overall 'PASS'. Note that marginal pass results (Pass *) are not acceptable and shall be treated as a 'FAIL'.

N.8.4.7c Visual Inspection

Perform a visual inspection to ensure that the required twist rate is maintained to within 13mm of the termination point, and that the minimum amount of cable sheath has been removed.

N.8.4.7d Multi-Core (Block) Cabling

Confirm sequencing requirement for block cable terminations. Ensure pairs from other cables do not break any pair sequence.

N.8.4.7e Optical Fibre Cables and Connectors

All fibre cores shall be tested in accordance with compliance requirements of AS/NZS/ISO 14763-3:2007.

N.8.4.8 System Monitoring

N.8.4.8a Commissioning

Except where the system is presently being monitored, the commissioning will proceed in two stages.

N.8.4.8b Stage 1 – Pre Commissioning

On completion of the installation and staff training, two days of system performance monitoring is to commence. This monitoring is to be undertaken on site. All costs are to be paid for by the Contractor. All faults associated with the installation including equipment failure, false alarms and insufficient staff training should be rectified during this stage.

N.8.4.8c Stage 2 – Final Commissioning (to be done out of normal working hours)

The Contractor is to give a minimum of 5 days written notice of the date of final commissioning. During this stage a full inspection including walk tests and voltage checks will be conducted. Disable the walk test facilities upon completion of the commissioning.

The Contractor is to provide the following at the time of commissioning:
All events report from the monitoring company for the preceding 7 days;

- All manuals required as part of this specification; and

- Maintenance Log Book.

A defects list will be given to the Contractor following this inspection. Monitoring and response will continue to function as in Stage 1 (without cost to the Security Manager) until all defects have been rectified.
N.8 SECURITY & EMERGENCY ALARM SYSTEMS (CONT’D)

N.8.4.9 Separable Portions

If a building is part of a Separable Portion and thus has an early Date of Practical Completion, ensure the security services for that building are fully operational at its Date of Practical Completion. If the permanent location of the ‘control’ equipment is not in the first Separable Portion to be handed over, make temporary arrangements so that the system can operate for the first handed over.

N.8.4.10 Practical Completion

The Security Services shall be deemed to be ready for Practical Completion commissions and acceptance testing only when:

- All systems are fully operational;
- The Acceptance Test document has been submitted and approved;
- Completed test sheets forming part of the Acceptance Test document from the subcontractor(s) and witnessed by the installation supervisor as part of the installation QA procedure, have been submitted; and
- Completed test sheets forming part of the Acceptance Test document from the subcontractor(s) and witnessed by the installation supervisor as part of the installation QA procedure, for the ‘specific tests’ have been submitted.

N.8.5 Warranty

N.8.5.1 Scope

This section sets out the requirements for the provision of warranties.

Make good any defects caused by faulty workmanship and/or materials during the Defects Liability Period upon notice to do so.

N.8.5.2 Defects Liability

The Contractor shall provide a minimum of a 12 month defects liability period from the date of acceptance by the University of Adelaide’s Security Manager.

In the event of inclusion of equipment normally covered by a lesser time warranty, allow for and include the cost of extending such warranty to that specified for the whole installation.

N.8.5.3 Equipment Warranties

Warrant the performance of all items of equipment used in the Works are not less than those specified when operating under the specified conditions and that such equipment can be installed with adequate clearances for operation and maintenance.

Replace any items of equipment not meeting the requirements, at no cost to the Security Manager.
N.8 SECURITY & EMERGENCY ALARM SYSTEMS (CONT’D)

Note: Replacement and/or repair of equipment during the Defects Liability Period may result in the Defects Liability Period being extended for that respective item/s.

N.8.5.4 Product Application Warranties

The systems offered shall be provided with the maximum Product Application Warranty that can be offered by the equipment manufacturers.

N.8.6 Preferred Equipment Schedule

- Electronic Security System: Siemens SiPass Inegra Advanced Central Controller (ACC)
- Four Serial Reader Interface (FSR)
- Input Point Module (IPM)
- Output Point Module (OPM)
- Multipurpose Input/output Module
- Single Reader Interface (SRI)
- Dual Reader Interface (DRI)
- Smart Card Reader Interface (SMI)
- Eight Reader Interface (ERI).

- Card Reader: HID SmartID Mullion S10
- Key Pad: SiPass Integrated M43
- Electric Mortice Lock: Lockwood 357/2574
- Solenoid Door Latch: Padde ES200/ES2000
- Break Glass (call point): KAC Series
- Door Monitor Reed Switch: GE Sentrol 1078 Series
- Entry/exit delay: 27 Seconds Nominal.
- PIR Detector: Ademco IS-2535
- Dual Technology: Ademco Intellisense DT-7450
- Glass Break Detector: Ademco Intellisense FG-1625
- Duress Call Point: Ademco 269R
- External Alarm: EDMSAT
- Video Surveillance - Internal: Axis 216MFD fixed megapixel
- Video Surveillance - External: Axis 233D PTZ megapixel
- PTZ Housing External: Axis T95A10
- CMS Server: HP DL360 or HP DL380
N.8 SECURITY & EMERGENCY ALARM SYSTEMS (CONT'D)

N.8.7 Preferred Contractor Contact Details

**SiPass Integrator**
BST Australia
Security Systems &/or Consultants
U2/ 32 Smith St, Thebarton, SA, 5031.
Australia.

Ph: (08) 8352 7700

**Video Insight Integrator**
Dave Savage

Ph: 0419830093
N.9 PLANT ROOMS

N.9.1 Maintenance Access

Enclosed spaces such as large air handing units, shall incorporate internal luminaires.

Protect exposed drains with suitable covers.

Provide access provisions that allow ready access to all plant, and its service needs.

N.9.2 Plant Drainage

Where possible provide sufficient drain points to allow short drain runs that do not cross access ways. If this is unavoidable, provide protection to the pipe that is adequate, clearly marked and is not a hazard to service personnel.

N.9.3 Floor Drainage

All plant room floors shall have grading to a drained floor sump.

N.9.4 Dust And Dirt Control

With the preferred natural ventilation for plantrooms, dust control will be an ongoing feature. Document that on completion of the contract, the plantroom, and all service areas, are to be left clean and free of debris.

The sealing of concrete floors is a considerable help to housekeeping in plantrooms, as well as protecting it against chemicals and oils. If a mechanical ventilation system is provided, include filters in the air supply to reduce the dust load into the plantroom.

N.9.5 Colour Scheme

Paint all ductwork in plant areas. Where exposed to the weather, paint the duct in a colour suitably blended with the surrounding area.

Allow to finish painting all equipment, plant and apparatus which is not factory finished, in an approved colour scheme.

N.9.6 Labelling And Identification

Identify all equipment with two colour traffolyte labels of an agreed size and type. Show the name given to that item, plus any mechanical reference code number to suit the Universities asset inventory.

On all valves, attach a single label by a key-ring. Thermometer pressure gauges, filter manometers, a summary list is to be fixed to the wall for reference by service personnel.

For equipment such as pumps, boilers and fans which come with a manufacturers nameplate, the identifying label is required as an additional fixing.
N.9 PLANT ROOMS (CONT’D)

N.9.7 Door Locks

Plant room doors shall be fitted with Lockwood 3572 mortice locks and Lockwood 1800 or 1900 S.C. square end lever plates (Ref: C3). Doors to lower security areas, such as service shafts and sub-boards enclosures, shall be fitted with a night latch to suit the University standard plant room keys.

N.9.8 Lighting And Power Outlets

Lighting is to be adequate for the tasks of inspection and repair. Provide 240V power outlets for power tools. A 415V three phase welding outlet is required in major plant rooms.
N.10 FUME EXHAUST AND FUME CUPBOARDS

N.10.1 Objectives

The fume cupboard and associated equipment shall:
• comply with the intent of the Australian Standard AS 2243.8.
• provide flexibility for future change of use.
• be suited for the intended use as identified in the user brief.
• incorporate energy saving features.
• be maintainable with clear and safe access.
• be located on upper floors to avoid costly fire rated risers (where appropriate).
• be of minimised size to avoid excessive energy waste (where appropriate).

N.10.2 User Brief

A comprehensive user brief, ref: appendix ‘C’ shall be compiled and signed by the user identifying the intended use in accordance with AS2243.8, thus ensuring that the fume cupboard design will be suited to the application. A standard briefing document is appended to this section.

N.10.3 Decontamination For Demolition

Catalogue the known hazards to allow the correct demolition procedures to be used. A safe work procedure is then to be provided by the demolisher with regard to the known contaminants, eg perchloric acid contamination may require a 24 hr wetting prior to demolition and a continuous wetting during demolition.

N.10.4 Recirculating Fume Cupboards

The use of recirculating fume cupboards shall be assessed in accordance with the limitations of use as stated in AS2243.9. Recirculating fume cupboards with suitable filters may be acceptable, if a means of automatically monitoring and limiting the filter loading (with regard to fire potential) is incorporated. The filter fire loading is to be assessed accordingly.

N.10.5 Fume Cupboard Construction

Construction features shall suit requirements of the user brief but should include:
• 1 hour fire rating - achieving integrity and stability of construction.
• smooth, easily cleanable surfaces, large radius corners and no internal crevasses.
• a ceiling that drains condensation to the rear.
• interior work surface shall be non-absorbent to chemicals if surface is damaged, i.e. construction to include nexus vail or similar.
• Work surface shall have a lip at front edge designed to contain small spills & not disrupt air stream.

N.10.6 Duct Systems

Where solvents are to be used in general purpose fume cupboards, the duct is to be heavy gauge circular galvanised steel, with flange joints and a suitable internal epoxy coating. As an alternative, a suitable grade of stainless steel may be used. Internal ductwork shall have a fire rated enclosure in accordance with AS2243.8.

The selected design, shall make allowance for a scrubber to be installed at a later date.
N.10 FUME EXHAUST AND FUME CUPBOARDS (CONT’D)

N.10.7 Duct Discharge

Minimum discharge velocities of 10 m/s are required. All discharge outlets shall be vermin proofed.

N.10.8 Fans

Preferably centrifugal with 3 phase motors, belt driven (adjustable) and spark proof construction.

N.10.9 Control System

An “off the shelf” electronic dezoning control system is to be fitted to all cupboards fitted with services.

Number control circuit wires and incorporate a wiring diagram.

Adjacent fume cupboards within the same room are to be interlocked (fail safe operation) such that they can not operate individually.

N.10.10 Washdown and Drainage

Subject to the user brief cupboard installations should allow for baffle washdown to be incorporated - adding greater flexibility of future use. Drainage is to comply with SA Water requirements.

N.10.11 Cupboard Air Entry And Variable Air Volume

The fume cupboard installation is to be designed to prevent reverse eddying and to ensure containment.

Preferably a variable volume air flow system shall be incorporated to minimise outdoor air drawn into the lab. If not practical, a standard sash bypass system may be incorporated.

Where a VAV system is proposed utilising a duct bypass damper, the damper is not to be located within a ceiling space and must be located in an accessible location.

N.10.12 Make Up Air

Where laboratories incorporate greater than 1 cupboard per 100m² then tempered make up air shall be considered. Otherwise cupboards may draw on the space for make up air subject to the room being adequately vented.
N.10  FUME EXHAUST AND FUME CUPBOARDS (CONT’D)

N.10.13 Services

GPO’s shall generally be located outside the cupboard (to the side, minimising cord interference) and not directly above the sash, they shall be interlocked with the dezoning control.

Line isolating valves shall be incorporated for all services to the cupboard and located to allow clear maintenance access (not enclosed under cupboard in a potentially corrosive atmosphere). Water valving is to comply with SA Water dezincification requirements.

N.10.14 Mesh Screen Behind Rear Baffle

A PVC mesh shall be incorporated behind the sash in order to catch lost tissues etc. This mesh shall be easily maintainable and accessible (baffles must be easily removable).

N.10.15 Low Level Scavenging and Solvent Stores

A floor level fume scavenging system is to be considered in laboratories where flammables are being used, this system may be incorporated into the fume cupboard exhaust system (where appropriate) to aid in heavier than air fume extraction from the laboratory. Solvent stores may require a separate ducting system in compliance with AS1940.

N.10.16 Fire Detection

Where a fire detection system exists within a building provide type D sealed epoxy detectors to the ceiling of each fume cupboard - maintainable and accessible from the sashe opening.

N.10.17 Testing and Commissioning

The building shall be in normal operational mode during testing, i.e. all services and openings as per daily use.

Testing and commissioning of fume cupboards, exhaust cupboards and fume hoods are to be carried out prior to practical completion and results presented on University of Adelaide project form 5.7. With the test results the contractor must present evidence that measuring equipment has been calibrated.

All measurement equipment shall be hot wire anemometer type, calibrated by an NATA certified laboratory.

A further test must be undertaken prior to the end of the defects liability period.

All measurement equipment shall be hot wire anemometer type and calibrated by an NATA certified laboratory.
N.11 CONTROL AND MONITORING

N.11.1 Air Conditioning And Ventilation

All new and updated systems at the North Terrace Campus shall be ‘Robert Shaw’ to match existing equipment. For larger systems use a Network Communications Module such as ‘DMS3500’. For smaller systems a Multi-purpose controller shall be used. All major plant rooms shall be provided with an ‘OptiView’ interface. Provide ethernet cards to facilitate networking of all new and updated systems.

All control systems should have the capability of being linked by landline to a central monitoring station. Whether a project is to be linked or not will be advised by the Superintendent. Where proportional control is not required, electro-mechanical devices shall be used for heating/cooling staging.

N.11.2 Hours Of Operation

Plant such as air conditioning is to be controlled by a programmable timer with a one year span and the ability to accept regular stops such as weekends and irregular stops such as public holidays.

Any requirement for out-of-hours operation will be given in the User Brief. Its non-requirement should be noted in the Return Brief.

N.11.3 Controls And Indications

Provide the following:
- Where extra low voltage controls are employed the preferred voltage is 24V.
- Indicating light assemblies of a ventilated type.
- The ability to change globes from the front of the panel.
- A test button to check that all lights glow.
- The main electrical supply to the control panel to have a voltmeter and ammeter along with phase change switches for both meters.
- An ammeter and phase changeover switch for the electrical supply to a chiller.
- Flow switches are not acceptable as a means of interlocking or of providing statuses to the BAS. Pressure differential switches are required.
- Fit hour run meters on lead-lag operation equipment.
N.12 TESTING AND COMMISSIONING

N.12.1 Provisions For Testing

It is essential that all installations be capable of testing to show compliance with the design intent and that the equipment performance matches the specification.

Provide test points in duct and piping systems and for equipment performance verification, by pressure tappings, temperature sensor locations or the use of direct reading instruments.

If the system is to come into operation in a between season period, testing will be required at the time of seasonal design conditions as a part of the contract.

N.12.2 Requirement For Factory Testing Of Plant

On large air conditioning installations, there may be major items of equipment that warrant a factory test to prove performance and give benchmark values for pressure losses at design air flows and conditions, and the power drawn at these conditions.

This facility is available on chillers, boilers and pumps. Nominate requirements as appropriate to the application.

N.12.3 Requirement For Site Testing Of Plant

All plant provided for a project should be tested when installed in a system, and that system is commissioned.

The results of site testing will be dependent on the class and calibration of the test equipment and the experience of the test person. Where testing is required it shall be witnessed by both the Consultant and the Superintendent.

N.12.4 Testing Under Peak Seasonal Conditions

Include a requirement to test plant capacity and control operation under "peak" seasonal conditions, which may/may not occur at the time of initial commissioning.

There is a problem, often, with providing an internal load to equal the design values for some projects. Consider this possibility and include a strategy in the project documents.

N.12.5 Commissioning

Commissioning should proceed in stages to verify the operation of system components prior to a full system test.

All test results are to be recorded and prepared for inclusion in the project manuals. Where the systems includes plant such as chillers, boilers, DDC controls, require that the suppliers representative either commission that item or be in attendance to ensure the manufacturer’s recommendations are followed, and disputes on warranty avoided.
N.12 TESTING AND COMMISSIONING (CONT’D)

N.12.6 Training Users And Maintenance Providers

Maintenance providers are to be involved with the commissioning and be trained in the operation of plant and controls. Training shall include operation and maintenance under normal and fault conditions, and, instruction on setting of all controls and protection devices.

Provide the User Department with a knowledge of the day-to-day operation and what procedures to follow if they suspect faulty operation.
N.13 MAINTENANCE AND SERVICE

N.13.1 Warranty

For all service work, service report forms are required to be submitted as a part of contractual compliance and to provide an indication of performance.

N.13.2 Availability Of Parts

For the designs including imported components for which a ready local alternative is not available, discuss with the Maintenance Manager to obtain a direction on the use of such an item, or how the supply of spares should be covered.

N.13.3 Procedure For Call-Out Attendance At The University

The contractors are to provide advice on how to contact their service organisation at all times.

On completion of the service call-out, a report is to be made to the Maintenance Supervisor. For after hours call-outs, provide the report on the next working day.

N.13.4 Operating And Maintenance Manuals

Provide a project specific Operating and Maintenance manual, within 30 days of handover, containing (as appropriate):

- a maintenance schedule for all items of equipment;
- a schedule of the settings for all controlling and alarm devices, including the settings of all relief valves;
- a schedule of pipe and flange specifications used for various services;
- manufacturers' pamphlets for the various proprietary items of equipment installed;
- a schedule showing air conditioning design air flows and final measured air flows for each air register and major fan, also the final measured air pressure at each pressure test point;
- schematic diagrams of the air, chilled water, condenser water, and hating water systems showing the manner in which they are designed to operate; the major items of equipment in each circuit; the flow rates; methods of control; measuring and control instruments and their locations;
- schematic wiring diagrams;
- schematic of inputs and outputs to the BAS;
- a schedule of all pressure vessels;
- a schedule of filters including the frequency of cleaning and replacement;

Check that the manuals are complete before a Certificate of Final completion is issued, and the manuals are handed over. Ref: N.1.
N.13 MAINTENANCE AND SERVICE (CONT’D)

N.13.4 Operating And Maintenance Manuals (Cont’d)
   a) O&M manuals to contain
      (i) Description of design philosophy
      (ii) Description of scope of work
      (iii) Details and description of how equipment operates and is controlled and calibrated
      (iv) Commission results including those required in Australian Standards
      (v) Details on any deviations from Australian Standards or legal compliance requirements
   b) Identification of critical functions served by equipment
   c) Letters from consultants or contractors (if consultant not engaged) verifying that all as built information submitted has been checked as being correct and complete prior to forwarding to University of Adelaide
   d) Letters from consultants or contractors (if consultant not engaged) verifying that the project as built and commissioned complies with all Standards, Codes and statutes.
   e) Supply of all equipment codes and passwords
   f) All manuals should be bound (loose leaf not acceptable).

N.13.5 Procedure For Programmed Maintenance Visit

Advising the Mechanical services Maintenance Supervisor of service visits after the Certificate of Practical Completion has been issued. Where possible, provide a programme for the warranty period.

N.13.6 Breakdown Emergencies During Warranty/Maintenance Period

The University, without obligation and without prejudice, may make service staff available for emergency work under the following rules:

- notification to the Contractor that the fault exists and agreement as to who will take remedial action;
- where the Contractor cannot be contacted the University may, at its discretion, take remedial action;
- if more than two hours work is involved the University may claim reimbursement at normal overtime rates;

N.13.7 Submission Of Annual Service Report

On large projects, the Contractor is to provide a service report on the installation and its performance during the warranty period.
N.14 RETICULATED SERVICE DUCTING

N.14.1 General
All ducts & conduits shall be concealed and shall not be installed across windows, lights, doorways or the like. Provide PVC marker tapes in trenches above all service ducting runs. All bends to be large sweep. Equip all spare conduits with a draw-wire or cord for future use. Cable route markers generally not required. Seal all ends of conduits entering buildings. Where conduits or ducts are left exposed they shall be painted to a suitable colour.

N.14.2 Electrical Services

N.14.2.1 Conduits
Heavy duty PVC conduits required for mechanical protection for all underground cabling.

Provide designs which size conduits to allow for future withdrawal and replacement of cables wherever possible. This requirement is not expected for larger consumers mains and submains.

N.14.2.2 Spare Conduits
Provide as necessary for future use relative to the project needs.

N.14.2.3 Pits
Where considered necessary for future installations or to avoid disturbance to surfaces, pits installed with covers identifying 'ELECTRICAL' service, and of appropriate duty for the location (roadways, garden, etc.,) should be utilised.

Provide pits at all major changes in direction which do not allow for easy draw-in of cabling.

Minimum size pit 900 x 900.

All pit lids to be gatic style.
N.15 COMMUNICATIONS

N.15.1 General Requirements

N.15.1.1 Introduction

These requirements outline the policy for the design and installation of telecommunications infrastructure and cabling systems. It shall apply within all campuses and premises of the University of Adelaide including premises occupied but not owned by the University. The specification is intended to provide common infrastructure and a flexible cabling system.

This communications standard shall be read in conjunction with the ITS Infrastructure and Cabling standard located at:

This document will outline additional ITS and Vendor specific requirements and may change frequently.

N.15.1.2 Conformity to Standards

The following standards (and any other standard referred to within those standards) form part of these requirements. Should conflict arise between the requirements of a nominated standard and these requirements, the latter shall prevail. Note that where a Standard reads “should” it shall be substituted with the word “shall”.

AS 3000 SAA Electrical Wiring Rules
AS/NZS 3080 Integrated Telecommunications Cabling Systems for Commercial Premises
AS3084 Telecommunications Pathways and Spaces for Commercial Buildings
AS/ACIF S009 Installation requirements for customer cabling (Wiring Rules)
ITS Infrastructure and Cabling Standard

N.15.1.3 General Considerations

Information Technology Services (ITS) of the University of Adelaide is solely responsible for regulation of the University’s telecommunications and cabling infrastructure standards. In most instances ITS will, through the use of subcontractors, install cabling. Work taken on by Property Services as part of a Project shall conform to this document in order to be connected to the University’s network.

The configuration of the UTP cabling is to be a pair management solution, that is, to provide the ability to individually or collectively jumper pairs from equipment cabling and backbone cabling to the horizontal cabling without pre-assigned pairs or channels. Interconnectivity between buildings is provided by a optical fibre backbone and a voice grade copper backbone.

In buildings with multiple Telecommunications rooms the copper riser cables shall be a voice grade twisted pair type. Optical fibre riser cable shall consist of both single and multimode either under the same sheath or as separate cables. All cables shall conform to AS/NZS 3080.
N.15 COMMUNICATIONS (CONT’D)

N.15.1.3 General Considerations (Cont’d)

Horizontal cabling between the Floor Distributor (FD) and the Telecommunications Outlet (TO) shall be a Category 6, four pair UTP cable to conform to AS/NZS 3080.

Quantity calculations for telecommunication outlets, copper and fibre pairs, shall be as per AS/NZS 3080 and AS3084.

ITS shall be consulted at an early stage of any project involving telecommunications infrastructure and/or cabling. ITS shall authorise the final documentation (both specifications and drawings) in writing before any tender process. Non-compliance with the above may result in the non-acceptance of the design and/or installation.

N.15.2 Design

N.15.2.1 Building Telecommunications Room(s)

Refer to AS 3084 Section 6 Equipment Room and AS/NZS3080. For the purpose of this document Telecommunications room and Equipment room are to be treated as one and the same.

If a Telecommunications room is intended solely for the use of Computing equipment (Servers), separate guidelines shall apply.

At least one telecommunications room shall have direct access to building lead in (external) infrastructure. This infrastructure shall consist of 2 x white compliant conduits with a minimum of 100mm diameter each.

Where multiple rooms exist, cabling access between rooms shall be via easily accessible dedicated risers. In case of a single room cabling between floors shall be via easily accessible dedicated risers.

The room(s) shall not be located within another room. It shall be accessible from a passage way or other similar space.

The room(s) shall have an access floor with a minimum under floor height of 200mm.

Fire protection shall be via a VESDA style (or equivalent approved) system, sprinklers are not permitted.

Access control shall be integrated into the existing University system (electronic and/or keys). Power shall be provided via a dedicated switchboard located within the room(s) and circuits shall typically be distributed below the access floor.

The switchboard shall have provision for the connection of a UPS.

Adequate lighting as per AS/NZS 3080 and AS3084 shall be provided.

No other services shall be allowed within the rooms.
N.15 COMMUNICATIONS (CONT’D)

N.15.2.2 Building Distributor (BD)

The BD shall be located within the building Telecommunications room. The BD shall act as the FD for the floor it is located on. In multi-level buildings where the distance of 90m or less can be achieved between BD and TO the BD shall be containing all FD’s.

N.15.2.3 Floor Distributor (FD)

If FD’s are required they shall be located in the Telecommunications room for their respective floor.

N.15.2.4 Communications Outlets

Each office is to have a minimum of two communications outlets. Open areas are to be provided with at least two communications outlets per working position. Additional communications outlets are to be provided as specified. The UTP cabling from the FD is not to exceed 90 metres in length.

All outlets to be wired back to the communications room via the riser Telecommunications Cabinet on the same floor. Communications outlets at the workstation shall be Krone Highway Category 5 black RJ45 (8 pin) modular sockets. These can be either flush or surface mounted, to suit architectural requirements. In the case of flush mount they must be capable of being inserted into either a HPM or Clipsal standard faceplate without the use of adaptors.

N.15.2.5 Telecommunications Outlets (TO)

Telecommunications outlets shall be Category 6 and shall be installed in multiples of two.

N.15.2.6 Cable Support

Cable support systems shall be installed. Major cable support systems shall not be installed above office space but be installed above corridors and other non occupied space.

N.15.3 Installation

N.15.3.1 Telecommunications Room(s)

Each building requires at least one Telecommunications room to securely house equipment required to provide communication services to the building.

All cabling shall enter the room via ducts, cable trays or conduits. All copper cabling shall terminate on dedicated wall mounted termination frames and modules (copper patch panels shall not be used). All fibre cabling shall terminate on dedicated patch panels to be located within 19” racks.

Equipment and fibre racks shall be considered part of the telecommunications room and shall be a 19”, 45RU high type with a minimum depth of 675mm.
N.15 COMMUNICATIONS (CONT’D)

N.15.3.1 Telecommunications Room(s) (Cont’d)

All active equipment, its cabling and connectivity shall be the sole responsibility of ITS. An allowance shall be made for the 19” rack to house the equipment and for termination frames to allow for the equipment cable termination.

N.15.3.2 Cable Installation

All cabling shall be installed on tray and/or cable ladder and/or catenary wire. Where cable tray or cable ladder is not suitable for horizontal cabling, cables shall be installed on catenary wire. They shall be bundled with cable ties not exceeding 200mm intervals. Bundles shall not exceed twenty (20) individual cables per catenary wire. Catenary wires shall be tensioned via turnbuckles or U-bolts with half thread available for tensioning.

N.15.3.3 Optical Fibre Cabling

Internal and external optical fibre shall be 9/125 micron for singlemode (SM) and 62.5/125 micron for multimode (MM). Cables shall terminate either fusion spliced using pre-terminated pigtails or utilizing the direct termination method. Connectors shall be the ST style for MM cable and be the SC style for SM cables. Multimode cables shall be OM2 compliant.

N.15.4 Administration

N.15.4.1 Documentation, Cabling Records and Labelling

Documentation (marked up floorplans) shall be provided in both electronic and printed format to ITS and Property Services. Floorplans are typically available in both formats from Property Services.

Each TO shall be labelled with IPA studs or other ITS approved means. TO’s shall be numbered per socket. Numbering shall be based on their frame location.

Pair identification is controlled by cabling records maintained by ITS.

N.15.4.2 Acceptance Testing

For acceptance by the University of Adelaide all cabling shall be installed and tested in accordance with the requirements of all relevant Australian Standards (and any other standard referred to within those standards) any relevant vendor requirement and any other requirement outlined or referred to in this document.

Test results for both copper and fibre cables shall be provided in electronic and/or printed format for acceptance by ITS.
N.16 VERTICAL TRANSPORTATION

N.16.1 Codes and Standards

Passenger and Passenger Goods Lifts shall comply with relevant sections of AS 1735 Part 2 and or AS 1735 Part 1 Appendix A and AS 1735 Part 12 in entirety.

N.16.2 Lift Performance Parameters

All passenger lifts shall be suitable for the application and provide a critical period performance within the following parameters:

- Average passenger Waiting Interval: 30-50 seconds
- Building Population, 5 minute Handling Capacity: >15%

Where special building parameters require rapid movement of population, escalators or walkways shall be considered.

N.16.3 Lift Type

Passenger and Passenger Goods Lifts shall be of the following type:

2 Levels
- Direct Acting Hydraulic
- Roped Hydraulic
- Variable Frequency Drive Traction

Nominal Speeds 0.4 – 1.0 metres per second

2 - 5 Levels
- Roped Hydraulic
- Variable Frequency Drive Traction

Nominal Speeds 0.6 – 1.6 metres per second

> 5 Levels
- Variable Frequency Drive Traction
- Static Drive Variable Voltage Traction

Nominal Speeds 1.0 – 2.5 metres per second

N.16.4 Lift Capacity

Passenger and Passenger Goods Lift capacity shall be suitable for intended performance parameters and applicable with respect to:

a) Load (kg) or passenger rating (persons)
b) Dimensions (internal)
c) Size of openings (door width)
d) Levelling accuracy < ± 6mm
e) Emergency lift facility
f) Wheelchair access.

N.16.5 Passenger Lift Control

- Single lift: Simplex full collective
- 2 Lifts: Duplex full collective
- 3 Lifts and above: Demand group supervisory.
N.16 VERTICAL TRANSPORTATION (CONT’D)

N.16.6 Finishes – Car and Landing

Lift Car Interiors
Flooring: Pirelli rubber flooring (Black)
Wall cladding material in order of preference:
- Ceramicpanel or similar
- Rigietex Stainless Steel
- Glass
- Laminex (least preferred)
- Combinations of above.

Emergency Telephones
- Hands free telephones are to be to “Information Technology Service” specification.

Handrails and Bump rails
- Acrovyn
- Stainless steel
- Timber not acceptable.

Control Panels
- Vandal proof buttons and indicators
- All numerals and letters shall be clearly legible dimensions
- Fire Service
- Service key lock off.

Car Ceiling
- Aluminium T Bar Construction
- “K15” light diffusers
- Light fittings to be to University of Adelaide Standards
- Allowances must be made for:
  a) Ventilation
  b) Access to trapdoor
  c) Access to ceiling fan and lights.

Car Door Opening and Landings
- Stainless steel doors and door frames
- Vandal proof buttons and indicators
- All numerals and letters shall be clearly legible dimensions
- Bump rails – Acrovyn or stainless steel.

N.16.7 Service Lifts – Power-operated

To conform to the Australian Standards 1735 Part 4 as minimum requirements.

a) Lifts to be suitable for application with respect to:
   (i) Load
   (ii) Dimensions (internal)
   (iii) Size of openings
   (iv) Levelling (possibly with inching facilities)
   (v) Suitable handles on landing and car door (decent grip)
   (vi) Access to car and loading of items into car must be ergonomically optimised

b) Lift car interior and door to be stainless steel

c) Landing doors and frames to be stainless steel

d) Call and send controls at each landing.
N.16 VERTICAL TRANSPORTATION (CONT’D)

N.16.8 Commissioning and Testing

All tests shall be in accordance with AS 1735 Part 10 with commissioning / test data to be provided in accordance with ref: N 13.4.

N.16.9 Maintenance Requirements

12 months warranty maintenance to be in accordance with ref: N 13.
N.17 FIRE PROTECTION

N.17.1 Systems
EWIS
FIP shall be APAC - FIREFINDER
MECP shall be QUINTRIX

N.17.1.1 Ancillary Devices
Control of Ancillary Devices shall be via electrically isolated systems e.g. relays, with ancillary connection to relay contacts only. Locate the isolation equipment within the FIB. External circuits powered from the FIB batteries are not acceptable even if protected by current limiters.

Ancillary devices such as door access control systems shall not be powered from the FIB batteries.

N.17.2 Piping Systems

N.17.2.1 Fire Services Main Reticulation - Underground (Incorporating Sprinkler and Hydrant Connection).
Straightforward installation shall be ductile iron cement lined with polyethylene sleeving.
Complicated installation shall be medium galvanised steel pipe roll groove or flanged joints double Denso wrapped.

N.17.2.2 Fire Services Main Reticulation - Above Ground
Internal and external installation shall be medium galvanised steel pipe

N.17.2.3 Sprinkler System Pipework
Internal \( \leq 50\text{mm} \) diameter shall be medium black steel pipe, malleable fittings screwed joints
Internal \( \geq 65\text{mm} \) diameter shall be medium black steel pipe, welded fittings, roll groove or flanged joints
External \( \leq 50\text{mm} \) diameter shall be medium galvanised steel pipe, malleable fittings screwed joints
External \( \geq 65\text{mm} \) diameter shall be medium galvanised steel pipe, welded filling, roll groove or flanged joints.

N.17.2.4 Hose Reel
Underground shall be medium galvanised steel, double Denso wrapped
Above ground shall be medium galvanised steel Fire Hydrant Standpipes shall be medium galvanised steel, underground section double Denso wrapped.
N.17  FIRE PROTECTION (CONT’D)

N.17.2.5  Domestic Water

Underground ≥ 100mm shall be ductile iron cement lined, with polyethylene sleeve.
Underground ≤ 100mm shall be cooper tube type ‘B’ double Denso wrapped. Straightforward installation includes straight runs of pipework with minimal fittings and changes of direction, with appropriate concrete thrust blocks. Complicated installation includes localised sections of pipework requiring numerous offsets or bends and is unsuitable for DICL installation.

N.17.2.6  Painting

All exposed pipework shall be painted in standard code colours high gloss enamel, unless separately agreed with the Building Standards Committee for aesthetic reasons. In this event the finish shall remain full gloss. Fire Hydrant standpipes and posts shall be painted white enamel full gloss with valves, caps etc red enamel full gloss.

N.17.3  Portable Systems

Should not exceed a weight which would prohibit any personnel from carrying & operating in an emergency situation.

N.17.4  Testing and Commissioning

All equipment installed shall have:
- Statutory compliance certificates
- Program of maintenance work
- Reports of scheduled maintenance including interface with other service contracts.
section P  SITE WORKS

[part 3  Elements]

P.1  ROADS, FOOTPATHS, PAVING AND EXCAVATION

P.1.1  Bollards Fixed

R.Haines-Street Park Furniture ‘Forum’ style cast iron stock item Separately cast University Crest, shaped to fit midside of bollard Uni. Crest affixed by supplier and hot dipped galvanised Polyester powder coated or polyurethane AS2700 G12 Holly Green.

P.1.2  Bollards removable

Ductile Tubular steel 960x101x5mm OD. welded top & base Separate mounting plate fabricated to fit bollard base Anchorage to 300x300x500mm concrete block set in ground via loxons through holes in plate Bollard & Base hot dipped galvanised Polyester powder coated or polyurethane AS2700 G12 Holly Green.

P.1.3  Hoops garden

Correctional Services Industries 18mm circular steel rod 800x600 anchored in ground to a depth of 350mm. Welded side lugs at specified height for anchorage into ground Polyester powder coated or polyurethane AS2700 G12 Holly Green.

P.1.4  Guards - Tree

R.Haines-Street Park Furniture ‘Parade/Heritage’ style with ms hold down pegs 1500x450mm (base O.D.630mm) hoops 75x6mm ,struts 32x6mm Hot dipped galvanised, finish polyester powder coat or polyurethane Holly Green.

P.1.5  Seating

No agreed standard

P.1.6  Bins

Rogers & Brewster

P.1.7  Paving pavers

Hallet Brick Industries Extruded grey clay paver, south of Univ. escarpment. Amatek Concrete Romanstone Charcoal tinted 190x220x60 rebated apposing edges on face only Boral Concrete flagstone Charcoal tinted 220x220x60 rebated all edges on face only

P.1.8  Irrig e.l.v. wiring - Various

Indiv. or multicored, PVC single insulated cable. Each cable shall be uniquely colour coded & installed with ends numbered and min. insulation thickness 0.4mm comply to with AS3000 (7.15.1 & 7.15.6). Cables under roadways or footpaths will be run in suitable conduit. Cables run in garden areas will be placed below irrigation pipes.
P.1 ROADS, FOOTPATHS, PAVING AND EXCAVATION (CONT’D)

P.1.9 Irrig controllers - Townsend Controls

Internal installn.-Ircon wall mounted 32stn.controller unit as supplied. External installn.-as above housed within weather proof lockable metal enclosure.

P.1.10 Racks bicycle

Tubular steel O.D. 76*4mm bent to U shape. Gnd height 750mm, width 800mm as per AS 2890.3 hot dipped galvanised finish.

P.1.11 Skateboard Deterrent

In areas of target by skateboarders such as long strait edges of concrete benching or similar, consideration shall be given to the placement of obstructions such as to prevent continued travel of a skateboard. The obstruction shall be so contrived that it deters or obstructs skateboarders but allows continued use of the facility or structure as originally intended.

P.1.12 Garden Edging (timber)

To retain mulches in garden beds, provide 100mmx12mm hardwood timber edges to boundaries where no footpath or other sealed edge occurs. Fix with the top level to lawn surface and the bottom 100mm below the finished garden level. Secure in place with 300mmx12mmx12mm stakes at 1500mm centres on straight edging and 2000mm centres at curves.
P.2 BOUNDARY WALLS, FENCING & GATES

P.2.1 Boundary

Any fence between a University property and a public space or a neighbouring entity shall conform to the minimum statutory requirement. Where for the purposes of security of any other, a higher standard is required, that standard shall be at the direction of Finance and Infrastructure.

P.2.2 Internal

Any fence between University common land and land assigned to a faculty or area, as the occupying agent shall be to a standard as jointly agreed by the Area/Faculty and Finance and Infrastructure.

P.2.3 Area Faculty

Any fence on land which is the responsibility of an Area/Faculty shall be the responsibility of the Area/Faculty so long as it is maintained in accordance with other responsibilities for maintenance as set out in any agreement for use/lease of that land.
P.3 OUTBUILDINGS & COVERED WAYS

No special provisions
P.4  LANDSCAPING & PLANTING

P.4.1  Garden Plots

No gardens or tree plantings are to be created immediately adjacent to buildings. Consideration shall be given to access for maintenance to buildings, such as painting, gutter and roof cleaning etc.

P.4.2  Smokers Bins

To be installed as directed and away from any building opening where smoke may drift into the building. Type shall be ‘Butt Out Bin’ from Butt-Out Australia Pty Ltd, 411 Collins Street Melbourne Vic 3000.
P.5 SIGNAGE

P.5.1 Implementation

All signs are to comply with the provision, manufacture and installation as set out herein. It is the maintenance responsibility of Finance and Infrastructure to ensure that these conditions are met with respect to updating the information on all external signs.

P.5.2 Cost

The cost of new signage as a result of building works is to be borne by that building project in both new and alteration work. All other changes or new signage are to be borne by the instigator of the change.

P.5.3 Sign Types

There is a standard style of signage and an hierarchical progression of sign types as follows.

P.5.3.1 Campus Directory Boards

The graphic layout and information for these signs is contained within the Branch’s CAD data base and is continually updated as information comes to hand. The manufacture of new or replacement boards occurs each year over the long vacation to ensure current information at the start of the first semester. Manufacture is by screen printing on aluminium sheet fixed to existing frames installed on campus.

P.5.3.2 Building & Site Names

All from propriety ‘Slatz’ Sign frames, Aluminium finish with black ‘Palatino’ font.
- Top line on ‘Middle Slatz’ with end caps
- Bottom line on ‘Super Slatz’ with end caps
- University Crest - Black & White R/H justified
- Fixings to suit each application

P.5.3.3 Building Directory Boards

From Aluminium channel (‘ticket strip’ ex ‘Alcan’) fixed with 3M double sided tape to white acrylic sheet. Inserts to be 1mm thick black high impact polystyrene (‘HIPS’) ex City Plastics. Lettering to be 12mm high white vinyl computer cut in ‘Helvetica’ font. Case or frame to be suited to each application or location.

P.5.3.4 Door Signs

From Aluminium channel (‘ticket strip’ ex ‘Alcan’) fixed with 3M double sided tape. Inserts to be 1mm thick black high impact polystyrene (‘HIPS’) ex City Plastics. Lettering to be 12mm high white vinyl computer cut in ‘Helvetica’ font. Standard length is 275m.
P.5  SIGNAGE (CONT'D)

P.5.3.5  Computer Cut Vinyl

To be cast vinyl with dimensional stability suitable for external application.

P.5.3.6  Finger Signs

Ex ‘Heat Pac’ 700L x 150H with reflective white face.
Lettering font to be ‘helvetica’.

P.5.4  Temporary Signage

Where temporary signage is required to inform for short term e.g. special events, approval is required from Finance and Infrastructure. Such signage will be installed at the requestors cost and in some instances a bond may be required to ensure removal of the signage at the end of the agreed temporary period.

P.5.5  Posted Emergency Evacuation Procedures

All to show:

- Area floor plan
- Emergency exits
- Action to be taken in the event of alarm or discovery of fire
- Name and titles of the building’s Emergency Control Organisation Personnel
- Names of building’s designated First Aiders
- “You are here” indicators
- Location of Assembly Areas
- Location of Manual Call Points
- Location of Warden Intercommunication Points.

P.5.6  Road Traffic Signs

All to be as directed under the terms of the University's Car Parking Contractor.
APPENDIX ‘A’

APPENDIX ‘B’

APPENDIX ‘C’

APPENDIX ‘D’

APPENDIX ‘E’

APPENDIX ‘F’