University of Adelaide
Health Science Infrastructure Stage 2

Return Design Brief

<table>
<thead>
<tr>
<th>Project #</th>
<th>A16-0099</th>
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<tbody>
<tr>
<td>Revision</td>
<td>A</td>
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<tr>
<td>Date</td>
<td>20 April 2017</td>
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| Issue     | Client Review  
             Work in Progress –  
             Further Development  
             during Design  
             Development |
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Name  Name
Gavin Dixon  Wayne Dixon
Title  Title
Architect  Director
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# 1 Introduction

## 1.1 Project Background

The objective of this project is to provide a 5-year space occupation strategy for the health sciences faculty. The successful opening of the Adelaide Health and Medical Sciences (AHMS) building this year resulted in 5,600m² of space becoming available in the existing Med School. This space allows the faculty to consolidate staff across the North Terrace and AHMS sites, promoting collaboration and integration and to realise savings from vacating currently leased spaces in the CBD.

By upgrading 4,200m² of space from adequate to good condition the university will meet the expectation of building users and extend the building life by 10+ years. Laboratory space is to be consolidated in the south building with upgraded office space consolidated in the north building. This upgrade and consolidation will enable a campus wide approach to delivering services on a par with the AHMS building, provide efficiencies across all facilities by maximising shared resources as well as presenting the university with an opportunity to review and reduce operational and resourcing costs.

## 1.2 Location

The location of the work is the existing School of Medicine buildings incorporating Med School North and Med School South located on Frome Road.
2 Scope of Work

2.1 Original Scope

Based on the provided general brief & engagement with user groups, the project work will include:

2.1.1 Multi-modal Teaching Museum

A museum space on the ground floor of Med School South to consolidate and co-locate existing Abbie, pathology & anatomy museums. The space will also accommodate animal bones from the Adelaide Dental Hospital.

A multi-modal open plan space will be used for:
- Display of 250 lineal metres of mainly historical specimens.
- Teaching undergraduate practicals amongst specimens.
- Lectures with appropriate AV capabilities.
- Visiting school groups (years 6-10).
- Hot desk space for post graduate research on an ad-hoc basis.

There is also provision of secure storage for sensitive collections in compactuses in two separate store rooms.

A museum support space is provided across the corridor in room SG7a. this space will be used for overflow storage as well as preparation & maintenance of specimens.

2.1.2 Shared Facilities

Loading Dock & Storage Space

Work includes expansion of the existing receiving, loading and storage area, with new systems adopted based on the AHMS operating model. The new loading and delivery area will be secure access only. Full time managed space preferred (to be confirmed by faculty). Loading dock and storage space will consist of:

- Delivery area accessible by existing delivery entry. New motorized roller door to provide secure access. Access granted by intercom request to delivery manager or remotely by security.
- Gas cylinder storage to be retained in existing location. Gas cylinder exchange to be managed from delivery dock to eliminate laboratory cylinder management inefficiencies.
- Short term storage area for receiving, receipt, breakdown, sorting and redistribution. Will minimize the amount of cardboard packaging entering the building.
- Long term storage of consumables. Consumables store to be self-serve to eliminate lab storage inefficiencies.
- Deli style glass door fridge, -20°C freezer & -80°C freezer for temporary storage of biological deliveries.
- Nitrogen distribution system supplying -200°C freezer storage and decanting. System to be fed from a mobile 240 litre mobile nitrogen tank.
- Secure chemical store room with flammable and corrosive cabinets for short term storage only.
- Waste store to accommodate 25 240 litre biological waste bins. A waste bin exchange system will be implemented whereby staff will be able to swap a full bin for an empty bin. This will reduce the frequency of bin pick-ups and reduce the amount of time full bins remain within the rest of the building. Other waste such as soiled linen will be stored in this room.
- Existing radiation store to remain. University to confirm size requirements post AHMS relocations.
- Animal house store to remain as is.

Core Laboratory / Autoclave Facilities

An external contractor is to be responsible for these spaces. The contractor reports to facilities manager. These spaces include cold rooms, hot rooms, freezer rooms throughout Med School South (except level 4) with a dedicated PCR setup room on level 5 south with microscopy, deep troughs, water supply and cold bench.
2.1.3 Research Laboratories

Research laboratories are to be consolidated in Medical School South (MSS). The Scope of work ranges from light refurbishment to the creation of new laboratory space.

Level 2 – SPRH / Physiology / CNBP

Existing lab split in two with existing user Jeremy Thompson giving up space to accommodate Joanne Bowen.

Joanne Bowen
- 2 researchers
- 3 HDR students
- 1 Honours student
- Cell culture and animal dissection work for drug studies
- Electrophysiology.
- Patient based studies requiring the collection of blood and tissue samples.
- Micro data
- Gene sequencing
- Microscopy
- Tissue storage
- Water baths
- Auto-stainer (located in histo)
- Access to fume hood required

Jeremy Thompson
- 2 researchers
- 3 HDR students
- 1 Honours student
- Cell culture and animal dissection work for drug studies
- Electrophysiology.
- Patient based studies requiring the collection of blood and tissue samples.
- Micro data
- Gene sequencing
- Microscopy
- Tissue storage
- Water baths
- Auto-stainer (located in histo)
- Access to fume hood required

Level 3 – Dentistry & Pharmacology

New Craniofacial Research Dry Laboratory (Early Works Package).
- 4 permanent work points required
- No public interface
- Twin model longitudinal study casts ideally stored in compactus
- 3D scanning and 2D white light laser scanners (sensitive to vibration) & digitisers
- Large proportion of visiting researchers – currently 6 honorary fellows
- Decanting space required for collections
- Radiographic scanning occurring on an ongoing basis
- Security required for sensitive collections
- Human remains in the process of being repatriated to SA Museum
- Bulky Colgate storage required
- Layout space required for Colgate pack assembly
- Layout space required for Colgate pack assembly

Dentistry research labs
- 2 research staff
- 5 honours students
- 3 PHD students
- Molecular biology research
- Prodigions – identifying different proteins – requires clean space
- Microbiology – growing oral bacteria in flow cells - pathogens.
- Incubation requirements
Eradication of biofilms on tooth surfaces
PC2 lab requirements
Ultracold fridges
Centrifuges
Microscopy
Cold room – gels consumables
Dishwashing
Balance bench
Acids cabinet
Fume hood
Bio safety cabinet
Anaerobic gas mixer – for growing micro-biology
Natural gas for sterilization
Short term student access
No radioactive work
Noisy wear testing will need acoustic isolation.

Pharmacology
Clinical research & sample processing
Liquid chromatic mass spectrometer (new version arriving)
Genetics work
Water baths, organ baths
Laminar flow hood
Gel visualising equipment
PCR setup area in separate room
Benchtop & floor centrifuges
Flammable, corrosive and carcinogenic storage
Cytotoxic cabinet required
Fume hoods
Solvent lab
Large flow cabinet
Solvent store
Sample store
Real time PCR
Pipinning robot
Cell culture incubator
Human tissue cell culture
Sample store
Gel rigs
Cryogenic flasks
Balance and drug safe

Level 4 – Physiology / Anatomy

Electro Physiology

2 staff
5 PHD students
1 Master student
1 Honours student
Darkroom
Specialised lighting
Sensory neuroscience
Lasers
Anti-vibration tables (requires nitrogen)
Susceptible to electric noise
Ability to maintain constant warm temperature
Electro physiology rigs require isolation
Robotics lab.
Electro pullers.
3D printers.
Insect rearing facilities.
Alcohol storage.
Exercise Physiology
- 3 staff
- Privacy priority
- Noise considerations – acoustic isolation required
- Biodax chair
- Blood drawing
- Brain stimulator machine
- Ethanol cabinet
- 2 exercise bikes
- Electronics – could be shared space
- Portable gas bottle rig
- Secure storage
- Data rack
- Computers

**Level 5**

**Neuroscience / Pathology**
- cell culture
- tissue culture
- histology
- immuno blotting
- protein work
- fume hoods
- behavioural testing
- cognitive testing of humans
- specialist animal surgery
- microscopy

**Level 6**
- Animal House to remain. Out of scope.
2.1.4 Office Refurbishment

Predominantly in Med School North (MSN) and consisting of offices, open plan workstations, meeting rooms of various sizes & storage rooms. This area will operate predominantly between 9am & 5pm. Demolition of spaces to be kept to a minimum. Existing wet area facilities to Med School North will be upgraded to meet DDA compliance requirements. New communications rooms will be located on MSN levels 1, 2 & 3. An IT upgrade to cat 6A along with VOIP phone system will be carried out to MSN. Med School South will continue to use the existing PABX system.

Ground Level - Student Services & Microscopy

Student Services is to be relocated to the ground floor of Med School North sharing this space with Microscopy. Space to include:
- A shared reception area with Microscopy using kiosk style reception utilised in the student hub.
- Open space allowing student access.
- An open plan space with no access to students.
- Small bookable meeting rooms for student consultation. To be highly visible with duress alarm capabilities.
- Relocation of existing Microscopy meeting room.
- Refurbishment of tutorial rooms for Microscopy
- New main switchboard to be built behind existing main switch board to avoid interruption of service.
- Former space housing old main switchboard to be converted to new café style staff kitchen.
- Upgrade of existing facilities located under Florey Lecture Theatre.
- Refurbished DDA compliant facilities.
- New entry.

Level 1 - Rural Health, General Practice, Adelaide Unicare and the Centre for Traumatic Stress Studies

All of the above are currently located in leased tenancies off campus. General Practice shares synergies with Rural Health.

Centre for Traumatic Stress Studies

- A self-funded centre conducting research only; no teaching.
- Longitudinal studies dealing with physiology testing and mental health
- Neurobiology focus with neuro-cognitive testing requiring quiet environment.
- Sub-contract data collection work with approximately half of staff dedicated to data collection – involves sporadic heavy out of hours work.
- Call centre space required.
- General storage required for diagnostic kits for field work.
- Secure storage required for paper records of study participants - sensitive files – require constant access.
- Require separate server room – class C.
- 2 defence accredited secure rooms containing one compactus and a stand-alone computer.
- Office required for defence work – no external visibility to computer screen or paperwork allowed.
- Large number of visitors.
- Sophisticated video-conferencing facility required (synergy with Rural Health).

Rural Health

- Busy early to mid-January with students returning prior to heading to rural areas for placement.
- Responsible for delivering medical student training for 30% OF Med School across 12 rural areas training sites
- Heavy reliance on online learning and video conference facilities. High speed internet required. Currently have a separate IT agreement with service provider
- Large video-conference space required to accommodate 25 people used on average 2 hours a day.
- General storage required for dummies used in simulation training.
- Indirect access to SA Health network

General Practice

- Research work - ASPREE & ASPREN trials.
- Research space for visiting fellows.
- Placing medical students in years 4, 5 & 6.
- ASPREN requires room for 4 staff & securely held records.
- ASPREE requires workstations for 3 people. 15 4-drawer filing cabinets e accommodated. This will grow to 20 filing cabinets in the future.
Adelaide Unicare
- Access to confidential information requiring a secure overall space.
- Director will need private office
- 2 lecturers
- 3 PhD students & occasional honours students (fluctuates).

Level 2 – School of Medicine
Existing spaces are to be repurposed / refurbished as offices, meeting rooms and store rooms for staff from the School of Medicine with minimal demolition to the existing layout of this floor.

Level 3 – Faculty of Health & Medical Sciences
Existing spaces are to be repurposed / refurbished as offices, meeting rooms and store rooms for faculty staff relocated from Bar Smith South & MSS level 4. Open plan office. Levels 4, 5 & 6 of Med School North are to be vacated and mothballed.

Levels 4, 5 & 6 of Med School North are to be vacated and mothballed.

2.1.5 Workspace Allocations
DesignInc has undertaken a study that involved allocating work points throughout the building in a distributed fashion. The agreed methodology for workplace distribution is via a ‘light demolition’ model. This will assist with value management as extensive demolition of partitions will have knock on effects to cost in relation to ceiling and floor remediation. Below are tables outlining the allocation by building and floor of workstations in the Medical School as proposed by DesignInc.

Our definition of workstation includes:
- desks in shared offices
- desks in open plan
- hotdesks

Our definition of a Single office, is a single desk in a room.

Our definition of a Lab Writeup desk is a 1500mm desk in open plan

<table>
<thead>
<tr>
<th>Medical School South – Workpoints</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
<tr>
<td>Level 00</td>
</tr>
<tr>
<td>Level 01</td>
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<tr>
<td>Level 02</td>
</tr>
<tr>
<td>Level 03</td>
</tr>
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<td>Level 04</td>
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<tr>
<td>Level 05</td>
</tr>
<tr>
<td>Level 06</td>
</tr>
<tr>
<td>Total</td>
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</table>

Med School South is over brief by 56 workpoints largely due to the numbers of Lab writeup desks in MSS Level 4 and 5.
**Medical School North - Workpoints**

<table>
<thead>
<tr>
<th>Level</th>
<th>Single Office</th>
<th>WorkStation</th>
<th>Lab Writeup</th>
<th>Total</th>
<th>Brief</th>
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<tr>
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<td>18</td>
<td>0</td>
<td>18</td>
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<td>Level 01</td>
<td>2</td>
<td>67</td>
<td>0</td>
<td>69</td>
<td>53</td>
</tr>
<tr>
<td>Level 02</td>
<td>7</td>
<td>39</td>
<td>0</td>
<td>46</td>
<td>47</td>
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<td>Level 03</td>
<td>5</td>
<td>82</td>
<td>0</td>
<td>87</td>
<td>72</td>
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<td>19*</td>
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<tr>
<td>Level 05</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>19*</td>
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<tr>
<td>Level 06</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>14</td>
<td>206</td>
<td>0</td>
<td>220</td>
<td>246</td>
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</table>

Med School North is under brief by 26 workpoints largely due to the numbers missing on Level 00. The ‘brief’ allocation of Lab Writeup in MSN is an estimate only (no Lab Writeup numbers were defined in the brief). Further consultation needs to be undertaken to confirm exactly where the write up space is required.

Lab Writeup requirements advised by users the numbers are:

**Lab Writeup Requirement**

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Number</th>
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<tr>
<td>PhD</td>
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<tr>
<td>Honours</td>
<td>34</td>
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<tr>
<td>Masters</td>
<td>8</td>
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<tr>
<td>Total</td>
<td>112</td>
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</table>

**At 1/3 Ratio**

| At 1/3 Ratio | 38 |

**Planned Capacity**

| Planned Capacity | 87 |
Grand Total Workpoints by Level

<table>
<thead>
<tr>
<th>Level</th>
<th>Grand Total</th>
<th>Brief</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level 00</td>
<td>18</td>
<td>36</td>
<td>-18</td>
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<tr>
<td>Level 01</td>
<td>69</td>
<td>53</td>
<td>16</td>
</tr>
<tr>
<td>Level 02</td>
<td>74</td>
<td>67</td>
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<td>59</td>
<td>47</td>
<td>12</td>
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<tr>
<td>Level 06</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>393</td>
<td>363</td>
<td>30</td>
</tr>
</tbody>
</table>

In total, we have allocated 30 points more than briefed. Further discussion is required on the final locations and allocation to “type” to ensure the best colocation of workspace to lab and research spaces.

Grand Total Workpoints by Type

| Total Offices | 26 | 7% |
| Total Workstations | 280 | 71% | Includes hotdesks, desks in open plan and desks in shared offices. |
| Total Lab Write Up | 87 | 22% | Only 38 briefed |
| Grand Total | 393 |

2.1.6 Administration and Research support functions

Our planning proposal has allocated a number of support functions within the office accommodation. They are:

- Meeting & Training Rooms of various sizes
- Media/VC Rooms
- Quiet rooms
- Tea Points
- Staffroom/Café
- Print Bays
- File storage (Local and Central)
- Casual meeting spaces

These functions are dispersed amongst the floors and across the 2 buildings following the shared service model adopted for AHMS. The allocation requires user review and input. Exceptions to the planning principles specifically in relation to Teapoints and Print hubs are as follows:

- MSS Level 5 – No Print Hub or Teapoint
- MSS Level 4 - No Print Hub
- MSS Level 3 - No Teapoint

These functions may be added once reviewed, on the basis that existing office space will have to be used, and budget review will need to be confirmed.
2.1.7 Wayfinding + Environmental graphics

Wayfinding + Environmental Graphics documentation will be provided as part of DesignInc’s scope. A comprehensive system of signage/graphics and wayfinding is required to assist occupants to navigate the facility both inside and outside.

The Wayfinding System and signage within the Facility must:

- be effective and comprehensive;
- form part of, and contribute to, the achievement of an integrated design solution with regard to environmental graphics, and;
- be innovative and address the needs of all user groups including students, visitors, staff, and people with disabilities;
- Comply with University Signage Guidelines.

The wayfinding system must include the following sign types:

- statutory signage
- signs to identify the service delivery point
- signs to direct users to and around the Facility;
- directories and maps for each of the lifts and foyers within the Facility;
- provision for electronic interactive directories at the main entrance on the plaza level
- signs for the discrete reception areas within the Facility;
- signs which identify the name/number of each discrete room and space within the Facility;
- signs for each door which identify each room within the Facility;

2.1.8 Interior Design – Materials and Finishes

The strategy for materials and finishes will be that:

- they be fit for purpose
- they have a lifecycle suitable for a high traffic tertiary environment
- they be durable and easy to clean

The 3 types of environments are as follows:

- Circulation and entry spaces
- Office accommodation spaces
- Laboratory spaces

These materials and schemes selected for these areas should all relate and be reflective of the progressive nature of the University, and reflect the teaching and research focus for the facility. Materials selections will be provided with 50% review set once all planning layouts are confirmed.

2.1.9 Amenities

Refurbished amenities will be provided throughout the building on every level. Facilities range from male and female toilets, ambulant compliant toilets, accessible compliant toilets. All toilets will be designed in accordance with NCC AS 1428 and University standards. The standard of finish shall be of a high quality and durability for high traffic use areas and fitted with WELS rated sanitaryware. The Amenities area shall feature;

- Commercial grade fixtures and fittings, vandal resistant where specified
- WELS rated fixtures
- Fixtures compliant with AS1428.1 accessibility standards
- Non-slip impervious floor and wall finishes
2.2 Adjustments to Scope

New Entry
An option has been developed for the new entry with scope expanded to create a mini student hub space along with entry at street level. This option has been costed and is approximately $600,000 over budget.

The benefits of this option are:
- Creation of a high-quality Hub space linking MSN and MSS incorporating the existing student common room.
- Creation of a new contemporary entry to the Med School Precinct
- Main entry at street level with a new internal ramp between MSN and MSS providing compliance and efficiencies between the two buildings.
- Outdoor rooftop area facing Frome Road

The executive has taken this component of the works off line and will reconsider options once costing for the major works have been received at 50% documentation.

General Practice and Unicare Temporary Accommodation
General practice and Unicare will be temporarily accommodated in Hughes level 8 once their existing lease at Terrace Towers expires.

Benefits of Open Plan compared to minimal demolition.
Level 3 MSN has been briefed as a more extensive demolition and replanning exercise than the majority of other office spaces in the building. Comparing this approach to Level 2 MSN, which was planned with minimal demolition in mind, we can assess the befits and costs of this approach.

Benefits
- slightly higher number of workstations and offices can be accommodated
- better quality of space and higher occupant wellbeing
- more access to natural light
- more consistent finishes furniture and fixtures
- more support for flexible workplace activities
- better planning to encourage teamwork and higher levels of communication.

Costs
- more expensive
- longer construction time (extended scope for builder)
- more disruption to building occupants during construction

Further review of this approach is required, and an assessment of the cost to expand the demolition (and the associated new works) before any further design will be completed.
3 Methodology / Design Procedures

3.1 Issues & Constraints

Issues & Constraints:
- Budget
- Schedule
- Med School South exceeds 25m height restriction.
- Restriction of noise and vibration impact on animal facilities and microscopy
- BCA requirements for amenities
- Existing infrastructure.
- New Entry budget

3.2 Delivery & Staging

Design Program Milestones

<table>
<thead>
<tr>
<th>Milestone</th>
<th>Return Brief</th>
<th>Contractor Input</th>
<th>Coordination</th>
<th>Pre-tender</th>
<th>Tender</th>
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<td>30%</td>
<td>50%</td>
<td>80%</td>
<td>90%</td>
<td>100%</td>
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<td>25th May</td>
<td>29th June</td>
<td>20th July</td>
<td>17th August</td>
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<tr>
<td>Executive Signoff</td>
<td>4th May</td>
<td>8th June</td>
<td>3rd August</td>
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3.3 Program Review

Refer attached preliminary project program created by Sarah Construction.

3.4 Procurement Strategies

Procurement is via a Managing Contractor with the consultant team novated at 80% documentation.
4 Functional Requirements

4.1 Preliminary BCA Assessment

Building Characteristics

<table>
<thead>
<tr>
<th></th>
<th>Medical School North</th>
<th>Medical School South</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rise in storeys</td>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td>Building Classification</td>
<td>5, 8 &amp; 9b</td>
<td>5, 8 &amp; 9b</td>
</tr>
<tr>
<td>Total Building Area</td>
<td>10,600m²</td>
<td>10,900m²</td>
</tr>
<tr>
<td>Area of Largest Fire Compartment</td>
<td>1,690m² (Basement)</td>
<td>1,480m² (Typical Floor)</td>
</tr>
<tr>
<td>Type of Construction</td>
<td>Type A</td>
<td>Type A</td>
</tr>
<tr>
<td>Effective Height</td>
<td>24.44m</td>
<td>25.17m</td>
</tr>
</tbody>
</table>

Refer to fire masterplan report appendix for:
- General floor area and volume limitations
- Protection of openings in external walls
- Number of exits required
- Exit travel distances
- Distance between alternative exits
- Number of person accommodated
- Dimensions of exits and paths of travel to exits
- Travel via fire isolated exits
- Discharge from exits
- Swinging doors
- Operation of latch
- Fire Hydrants
- Fire hose reels
- Sprinklers
- Portable fire extinguishers
- Fire control centres
- Provision for special hazards
- Smoke hazard management
- Emergency lighting requirements
- Sound systems and intercom systems for emergency purposes
5 Appendix A - Program

Refer to attached program by Sarah Construction.
<table>
<thead>
<tr>
<th>Task Name</th>
<th>Duration</th>
<th>Start</th>
<th>Finish</th>
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<tbody>
<tr>
<td>UNIVERSITY PLANNING CALENDAR - University Holidays</td>
<td>325 days</td>
<td>Mon 10/04/17 to Fri 20/07/18</td>
<td></td>
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<tr>
<td>UOA - CRITICAL DATES</td>
<td>137 days</td>
<td>Fri 21/04/17 to Fri 15/12/17</td>
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<tr>
<td>General Practice - Relocation &amp; out of existing Dental School (9/6)</td>
<td>0 days</td>
<td>Fri 9/06/17 to Fri 9/06/17</td>
<td></td>
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<tr>
<td>Museum - Relocation Complete During Mid Year Break (14/7)</td>
<td>0 days</td>
<td>Fri 14/07/17 to Fri 14/07/17</td>
<td></td>
</tr>
<tr>
<td>122 Frame Road - Entry of Lease (15/11)</td>
<td>90 days</td>
<td>Mon 13/03/17 to Fri 28/04/17</td>
<td></td>
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<tr>
<td>EARY WORKS DESIGN &amp; CONSTRUCT</td>
<td>90 days</td>
<td>Mon 13/03/17 to Fri 14/07/17</td>
<td></td>
</tr>
<tr>
<td>General Practice - Design &amp; Approvals Complete</td>
<td>20 days</td>
<td>Mon 13/03/17 to Fri 17/04/17</td>
<td></td>
</tr>
<tr>
<td>Design &amp; Scope Development / Preliminary Approvals</td>
<td>2 weeks</td>
<td>Mon 13/03/17 to Fri 24/03/17</td>
<td></td>
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<tr>
<td>Balance of Fast Track Documentation. No BRC requirement.</td>
<td>2 weeks</td>
<td>Mon 20/03/17 to Fri 31/03/17</td>
<td></td>
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<tr>
<td>Price &amp; Proceed to an agreed Cost Plan. Mobilise for Start</td>
<td>2 weeks</td>
<td>Mon 27/03/17 to Fri 07/04/17</td>
<td></td>
</tr>
<tr>
<td>General Practice - Construction - Start 2nd April - Operational by 22nd April</td>
<td>3 weeks</td>
<td>Mon 30/04/17 to Fri 21/04/17</td>
<td></td>
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<tr>
<td>General Practice - Move Across - 22nd &amp; 23rd April</td>
<td>0 days</td>
<td>Fri 21/04/17 to Fri 21/04/17</td>
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<tr>
<td>Sign off Concepts / Fit - For Documentation</td>
<td>0 days</td>
<td>Fri 21/04/17 to Fri 21/04/17</td>
<td></td>
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<tr>
<td>Oct</td>
<td>Sign off Scope to Release for Tender &amp; Construction</td>
<td>1 wk</td>
<td>Mon 1/05/17 to Fri 5/05/17</td>
</tr>
<tr>
<td>Forecast Construction Period - Work undefined - tbc - Fast Track Demo</td>
<td>0 days</td>
<td>Fri 21/04/17 to Fri 21/04/17</td>
<td></td>
</tr>
<tr>
<td>13/03</td>
<td>Sign off Scope to Release for Tender &amp; Construction</td>
<td>28 days</td>
<td>Mon 13/03/17 to Fri 28/04/17</td>
</tr>
<tr>
<td>Museum - Relocation Complete During Mid Year Break (14/7)</td>
<td>0 days</td>
<td>Fri 14/07/17 to Fri 14/07/17</td>
<td></td>
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<tr>
<td>122 Frame Road - Entry of Lease (15/11)</td>
<td>120 days</td>
<td>Mon 13/03/17 to Fri 14/07/17</td>
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<tr>
<td>Museum</td>
<td>30 days</td>
<td>Mon 13/03/17 to Fri 14/07/17</td>
<td></td>
</tr>
<tr>
<td>Scope, Design, Approvals, Costing &amp; Acceptances</td>
<td>35 days</td>
<td>Mon 13/03/17 to Fri 18/04/17</td>
<td></td>
</tr>
<tr>
<td>Scope &amp; Design Development / Preliminary Approvals</td>
<td>8 days</td>
<td>Mon 13/03/17 to Wed 22/03/17</td>
<td></td>
</tr>
<tr>
<td>Sign off Concepts - For Documentation</td>
<td>0 days</td>
<td>Wed 22/03/17 to Wed 22/03/17</td>
<td></td>
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<tr>
<td>Balance of Fast Track Documentation.</td>
<td>2 weeks</td>
<td>Thu 23/03/17 to Wed 05/04/17</td>
<td></td>
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<tr>
<td>Sign off Scope to Release for Tender &amp; Construction</td>
<td>0 days</td>
<td>Wed 5/04/17 to Wed 5/04/17</td>
<td></td>
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<tr>
<td>Trade Tender / Cost Plan - BRC - Approvals to Proceed with Works</td>
<td>17 days</td>
<td>Thu 6/04/17 to Fri 28/04/17</td>
<td></td>
</tr>
<tr>
<td>Acceptance to Proceed into Construction</td>
<td>0 days</td>
<td>Fri 29/04/17 to Fri 29/04/17</td>
<td></td>
</tr>
<tr>
<td>Mobilisation, Let Sub Contracts &amp; Establish Site</td>
<td>1 wk</td>
<td>Mon 05/05/17 to Fri 05/05/17</td>
<td></td>
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<tr>
<td>Forecast Construction Period - Work undefined - tbc - Fast Track Demo</td>
<td>0 days</td>
<td>Mon 13/03/17 to Fri 17/04/17</td>
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<tr>
<td>Dentistry - Move Across - From 3rd June</td>
<td>0 days</td>
<td>Fri 05/06/17 to Fri 05/06/17</td>
<td></td>
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<tr>
<td>Dentistry - Removal of Existing Equipment in ADH</td>
<td>60 days</td>
<td>Mon 13/03/17 to Fri 14/07/17</td>
<td></td>
</tr>
<tr>
<td>Define Scope, Design, Cost &amp; Approval</td>
<td>30 days</td>
<td>Mon 13/03/17 to Fri 17/04/17</td>
<td></td>
</tr>
<tr>
<td>Create / Allocate a space in BSL for new Storage Lockers</td>
<td>2 weeks</td>
<td>Mon 13/03/17 to Fri 24/03/17</td>
<td></td>
</tr>
<tr>
<td>Design, Cost &amp; Approve - Fabrication of New Lockers</td>
<td>4 weeks</td>
<td>Mon 13/03/17 to Fri 21/04/17</td>
<td></td>
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<tr>
<td>Source Materials, Measure &amp; Manufacture of Lockers into BSL</td>
<td>4 weeks</td>
<td>Mon 24/04/17 to Fri 19/05/17</td>
<td></td>
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<tr>
<td>Relocate Existing ADH Storage into MSN - Decant Equipment not to New Fitout</td>
<td>2 weeks</td>
<td>Mon 22/05/17 to Fri 06/06/17</td>
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<tr>
<td>Removal of Existing Dentistry Equipment into Storage - Not for Fitout</td>
<td>2 weeks</td>
<td>Mon 22/05/17 to Fri 06/06/17</td>
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<tr>
<td>Verify Incoming &amp; Outgoing Moves are Complete</td>
<td>2 weeks</td>
<td>Thu 15/06/17 to Fri 01/07/17</td>
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<tr>
<td>Museum</td>
<td>30 days</td>
<td>Mon 13/03/17 to Fri 14/07/17</td>
<td></td>
</tr>
<tr>
<td>Scope, Design, Approvals, Costing &amp; Acceptances</td>
<td>35 days</td>
<td>Mon 13/03/17 to Fri 18/04/17</td>
<td></td>
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<tr>
<td>Scope &amp; Design Development / Preliminary Approvals</td>
<td>8 days</td>
<td>Mon 13/03/17 to Wed 22/03/17</td>
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<tr>
<td>Sign off Concepts - For Documentation</td>
<td>0 days</td>
<td>Wed 22/03/17 to Wed 22/03/17</td>
<td></td>
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<tr>
<td>Balance of Fast Track Documentation.</td>
<td>2 weeks</td>
<td>Thu 23/03/17 to Wed 05/04/17</td>
<td></td>
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<tr>
<td>Sign off Scope to Release for Tender &amp; Construction</td>
<td>0 days</td>
<td>Wed 5/04/17 to Wed 5/04/17</td>
<td></td>
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<tr>
<td>Trade Tender / Cost Plan - BRC - Approvals to Proceed with Works</td>
<td>17 days</td>
<td>Thu 6/04/17 to Fri 28/04/17</td>
<td></td>
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<tr>
<td>Acceptance to Proceed into Construction</td>
<td>0 days</td>
<td>Fri 29/04/17 to Fri 29/04/17</td>
<td></td>
</tr>
<tr>
<td>Mobilisation, Let Sub Contracts &amp; Establish Site</td>
<td>1 wk</td>
<td>Mon 05/05/17 to Fri 05/05/17</td>
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<td>Forecast Construction Period - (8 Weeks) - Work undefined at this Stage</td>
<td>8 wk</td>
<td>Mon 05/06/17 to Fri 06/07/17</td>
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<td>Relaxation - Minimum of Two Weeks</td>
<td>2 wk</td>
<td>Mon 30/07/17 to Fri 14/07/17</td>
<td></td>
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<tr>
<td>PRECONSTRUCTION - DESIGN, BUDGET &amp; APPROVAL PHASE (MAIN PROJECT)</td>
<td>120 days</td>
<td>Mon 13/03/17 to Fri 25/07/17</td>
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<td>Status of Current Design</td>
<td>0 days</td>
<td>Mon 13/03/17 to Mon 13/03/17</td>
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<tr>
<td>Consultant Teams Appointment Complete</td>
<td>0 days</td>
<td>Mon 13/03/17 to Mon 13/03/17</td>
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<tr>
<td>Data Collection &amp; Analysis Reviews Complete. Early Works Issued for Comment</td>
<td>0 days</td>
<td>Mon 13/03/17 to Mon 13/03/17</td>
<td></td>
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<tr>
<td>Acoustic Testing &amp; Existing Conditions Struct / Services - Reviews Underway</td>
<td>0 days</td>
<td>Mon 13/03/17 to Mon 13/03/17</td>
<td></td>
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<tr>
<td>Detailed Design</td>
<td>90 days</td>
<td>Mon 13/03/17 to Fri 14/07/17</td>
<td></td>
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<tr>
<td>Project Scoping &amp; Schematic Design - Lodge Fit for Sign off</td>
<td>4 wk</td>
<td>Mon 13/03/17 to Fri 17/04/17</td>
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<tr>
<td>Sign off Concepts / Fit - For Documentation</td>
<td>0 days</td>
<td>Fri 17/04/17 to Fri 17/04/17</td>
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<tr>
<td>Detailed Design &amp; Coordination Preliminary Overlays - 50%</td>
<td>3 wk</td>
<td>Mon 17/04/17 to Fri 05/05/17</td>
<td></td>
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<tr>
<td>Sign off Review of Floor Plans &amp; Base Documentation</td>
<td>0 days</td>
<td>Fri 05/05/17 to Fri 05/05/17</td>
<td></td>
</tr>
<tr>
<td>Detailed Design &amp; Coordination Review - 80%</td>
<td>3 wk</td>
<td>Mon 15/05/17 to Fri 26/05/17</td>
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<tr>
<td>Pre - Tender Issue for Final Review &amp; Coordination</td>
<td>3 wk</td>
<td>Mon 5/06/17 to Fri 23/06/17</td>
<td></td>
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<tr>
<td>Document Review &amp; Acceptance of Design for Tender</td>
<td>0 days</td>
<td>Fri 16/07/17 to Fri 16/07/17</td>
<td></td>
</tr>
<tr>
<td>Preparation of Tender Documents Inclusive of Coordination, Updates &amp; Approvals</td>
<td>1 wk</td>
<td>Mon 10/07/17 to Fri 14/07/17</td>
<td></td>
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<tr>
<td>Issue Tender Documents</td>
<td>0 days</td>
<td>Fri 14/07/17 to Fri 14/07/17</td>
<td></td>
</tr>
<tr>
<td>Post Tender Updates, Final Coordination - For Construction Issue</td>
<td>0 days</td>
<td>Mon 13/03/17 to Mon 13/03/17</td>
<td></td>
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<tr>
<td>Cost Planning, Value Management &amp; UOA Approvals</td>
<td>65 days</td>
<td>Mon 10/04/17 to Fri 07/07/17</td>
<td></td>
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<tr>
<td>Initial Cost Plan Based upon Fit</td>
<td>1 wk</td>
<td>Mon 10/04/17 to Fri 14/06/17</td>
<td></td>
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<tr>
<td>Formal Sign off &amp; Acceptance of Fit (Delegated Representative Authority)</td>
<td>1 wk</td>
<td>Mon 10/04/17 to Fri 14/06/17</td>
<td></td>
</tr>
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</table>
6 Appendix B - Structural Reports

Refer to attached structural reports produced by Wallbridge & Gilbert.
HSIS2 PROJECT - STRUCTURAL REPORT ON PROPOSED CHANGE OF BUILDING USE FROM TUTORIAL ROOM AND TEA ROOM TO CRANIOFACIAL LABORATORY

CLIENT: THE UNIVERSITY OF ADELAIDE (Attn Greg Badger)

PROJECT: HEALTH SCIENCES INFRASTRUCTURE STRATEGY STAGE 2 (HSIS2)

BUILDING: MEDICAL SCHOOL SOUTH

JOB NO: WAD170106

CONTENTS

1. Project Background
2. Reference documents
3. Demolition procedure
4. Floor loading assessment
5. Bracing of new stud walls
6. New structural steelwork

APPROVAL REGISTER

<table>
<thead>
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<th>Rev</th>
<th>Date</th>
<th>Issue</th>
<th>Engineer</th>
<th>Checked</th>
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<tr>
<td>A</td>
<td>3/04/2017</td>
<td>For Approval</td>
<td>MH</td>
<td>LT</td>
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</table>
1. PROJECT BACKGROUND

A new Craniofacial Laboratory and associated Freezer Room is to be constructed on the Third Floor of the Medical School South (MSS) building. The proposed location is on the southern side of the main corridor, towards the rear (eastern) end of the building. The footprint is currently occupied by a Tutorial Room, Tearoom and Central Wash area. The proposed Laboratory will incorporate various benches, laboratory equipment and storage facilities.

The structural components of the project consist of increased floor loadings from three compactus units and five Freezer units.

2. REFERENCE DOCUMENTS

- Designinc Adelaide drawings: A16-0099 A2203
- Original structural drawings (1947 – 1948) where available

3. DEMOLITION PROCEDURE

Not applicable. No demolition of walls, floors or ceilings.

4. FLOOR LOADING ASSESSMENT

The existing suspended floors (Levels 1 to 6) consist of a 4 ½” (112mm) slab spanning 10’ (3.05m) between steel beams. The steel beams also support internal masonry walls. No design floor live load is available, and it is assumed to be 3kPa.

The existing ground floor (Level GF) consists of ground beams spanning between pad footings. A basement is present at the eastern end of the building. No design floor live load is available, and it is assumed to be 3kPa.

The following items shown on the Architectural floor plans are considered to be “heavy loads”:

<table>
<thead>
<tr>
<th>ROOM</th>
<th>ITEM</th>
<th>SIZE</th>
<th>OPERATING MASS</th>
<th>DISTRIBUTED LOAD</th>
<th>COMMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>S325</td>
<td>Compactus CMP04 (3 bay)</td>
<td>1.62mW x 1.1mD x 2.2m H.</td>
<td>300kg / bay (assumed)</td>
<td>5.4 kPa</td>
<td>Considered satisfactory due to the localised nature of the loading</td>
</tr>
<tr>
<td>S325</td>
<td>Compactus CMP05 (8 bay)</td>
<td>3.48mW x 1.1mD x 2.2m H.</td>
<td>300kg / bay (assumed)</td>
<td>6.6 kPa</td>
<td>Considered satisfactory due to the localised nature of the loading</td>
</tr>
<tr>
<td>S325</td>
<td>Compactus CMP06 (8 bay)</td>
<td>3.95mW x 0.92mD x 2.3m H.</td>
<td>300kg / bay (assumed)</td>
<td>7.0 kPa</td>
<td>Considered satisfactory due to the localised nature of the loading</td>
</tr>
<tr>
<td>S328</td>
<td>5 x Freezers</td>
<td>Varies</td>
<td>1880kg + 500kg (100kg contents per freezer assumed)</td>
<td>2.9kPa</td>
<td>Satisfactory</td>
</tr>
</tbody>
</table>

Note: The maximum loading of each bay is to be displayed clearly on the compactus units.
5. **BRACING OF NEW STUD WALLS**
   
   Not applicable. No new stud walls being installed.

6. **NEW STRUCTURAL STEELWORK**

   Not applicable. No new structural steelwork being installed.

   M.R.HERRIOT BE, CPEng
HSIS2 Project - Structural Report on Proposed Change of Building Use from Offices to Multi-Modal Museum

Client: The University of Adelaide (Attn Greg Badger)

Project: Health Sciences Infrastructure Strategy Stage 2 (HSIS2)

Building: Medical School South

Job No: WAD170106

Contents

1. Project Background
2. Reference documents
3. Demolition procedure
4. Floor loading assessment
5. Bracing of new stud walls
6. New structural steelwork

Approval Register

<table>
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<tr>
<th>Rev</th>
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<th>Issue</th>
<th>Engineer</th>
<th>Checked</th>
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<tr>
<td>A</td>
<td>3/04/2017</td>
<td>For Approval</td>
<td>MH</td>
<td>LT</td>
</tr>
</tbody>
</table>
1. PROJECT BACKGROUND

A new Multi Modal Museum is to be constructed on the Ground Floor of the Medical School South (MSS) building. The proposed location is on the southern side of the main corridor, west of the existing Plantroom. The footprint is currently occupied by Offices and Tutorial rooms. The proposed Museum will incorporate various display cases, mobile tables and chairs and storage areas.

The structural components of the project consist of demolition of existing masonry walls, installation of new lightweight walls, new ceilings, minor structural steelwork for an auto sliding door and bulkhead and increased floor loadings from two compactus units.

2. REFERENCE DOCUMENTS

- Designinc Adelaide drawings:
  A16-0099 A2201
  A16-0099 A2202

- Original structural drawings (1947 – 1948) where available

3. DEMOLITION PROCEDURE

This procedure covers the structural aspects of demolition of existing internal walls only and is to be read in conjunction with the Project Specification and advice from other Consultants.

**Stud walls:** Remove plasterboard first to confirm no structural columns or beams are concealed within the wall. If structural columns are encountered, leave intact and seek advice from this Office.

**Masonry walls:** The original construction drawings indicate that there are no loadbearing masonry walls present in the vicinity of this Project however this must be confirmed by this Office prior to commencement of demolition. General requirements are as follows:

i. Contact this Office for an inspection once the existing ceilings and stud walls have been removed
ii. Provide neat sawcuts on the lines where brickwork to be demolished meets brickwork to remain. Do not leave toothed brickwork unless specifically advised to
iii. Demolition of the walls is to proceed from the top down, starting at the centre of the wall length and working progressively outwards
iv. Only use manual or lightweight equipment to minimise noise and vibration
v. Any mechanical plant used for transporting demolition materials must be approved by this Office where the total laden mass of the vehicle exceeds 750kgs
vi. Do not stack demolition material on floors such that the total load on the floor exceeds 200kg / sq.m. Remove material as work progresses
vii. Take precautions to minimise the production and spread of dust

4. FLOOR LOADING ASSESSMENT

The existing suspended floors (Levels 1 to 6) consist of a 4 ½” (112mm) slab spanning 10’ (3.05m) between steel beams. The steel beams also support internal masonry walls. No design floor live load is available, and it is assumed to be 3kPa.

The existing ground floor (Level GF) consists of ground beams spanning between pad footings. A basement is present at the eastern end of the building. No design floor live load is available, and it is assumed to be 3kPa.
The following items shown on the Architectural floor plans are considered to be "heavy loads":

<table>
<thead>
<tr>
<th>ROOM</th>
<th>ITEM</th>
<th>SIZE</th>
<th>OPERATING MASS</th>
<th>DISTRIBUTED LOAD</th>
<th>COMMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>SG17</td>
<td>Compactus CMP02 (7 BAY)</td>
<td>3.0mW x 1.2mD x 2.2m H.</td>
<td>300kg / bay (assumed)</td>
<td>6.2kPa</td>
<td>On slab-on-ground. Considered satisfactory due to the localised nature of the loading</td>
</tr>
<tr>
<td>SG18</td>
<td>Compactus CMP01 (5 BAY)</td>
<td>2.7mW x 1.2mD x 2.2m H.</td>
<td>300kg / bay (assumed)</td>
<td>4.9kPa</td>
<td>On slab-on-ground. Considered satisfactory due to the localised nature of the loading</td>
</tr>
</tbody>
</table>

Note: The maximum loading of each bay is to be displayed clearly on the compactus units.

5. **BRACING OF NEW STUD WALLS**

Where new stud walls extend to, and are fixed to, the underside of the floor slab above, an approved deflection head is to be installed to permit deflection of the floor structures to occur without exerting compressive or tension forces into the wall frame.

Where new stud walls terminate at ceiling level (new or existing), the stud wall supplier is to provide details for approval on their proposed method of providing adequate restraint to the top of the wall frame to provide rigidity under horizontal load from accidental impact and earthquake forces.

6. **NEW STRUCTURAL STEELWORK**

The following new structural steelwork is to be installed:

i. Auto door head support beam to museum entrance

ii. Bulkhead support framing above display cabinet

Refer to attached drawing WAD170106 S01 for details.

M.R.HERRIOT BE, CPEng
When sheet printed full size, the scale bar is 100mm.

- **MSS-MULTI MODAL TEACHING MUSEUM**
- **NORTH TERRACE, ADELAIDE, SA 5000**
- **STRUCTURAL FRAMING PLAN**

**STEELWORK NOTES**

**STEEL MEMBER SCHEDULE**

**ACCESS REQUIREMENTS - TABLE S11**

**SURFACE PREPARATION REQUIREMENTS - TABLE S21**

**STEELWORK PART FINISHES NOTES**

When sheet printed full size, the scale bar is 100mm.
PRIOR TO DEMOLITION WORK COMMENCING THE CLIENT SHALL IDENTIFY ANY FIXTURES, FITTINGS AND JOINERY ITEMS TO BE RETAINED.

DETERMINE IF ELEMENTS TO BE DEMOLISHED ARE LOAD BEARING. DO NOT DEMOLISH LOAD BEARING ELEMENTS UNTIL THE LOAD HAS BEEN REMOVED OR BEAMS, COLUMNS, PROPS, ETC. ARE IN PLACE. ENSURE THAT THE SECURITY OF ALL BUILDINGS IS MAINTAINED AT ALL TIMES.

SUCH ITEMS SHALL BE LABELED OR MARKED, CAREFULLY REMOVED AND HANDED TO THE CLIENT.

REMOVE ALL SINKS, BASINS, TROUGHS, GAS AND WATER OUTLETS DENOTED FOR REMOVAL.

EXISTING EXHAUST SYSTEM TO REMAIN UNLESS OTHERWISE SHOWN AND WHERE POSSIBLE, ALL EXISTING WALLS TO BE EXISTING FLOORING TO BE REMOVED, MAKE GOOD

NEW GLASS SPECIMEN DISPLAY CABINETRY DOORS TO HAVE 100mm NIB FROM WALL TO HINGE SIDE

EXISTING LOW MASONRY

REFER TO AR-????? SERIES FOR FURTHER DETAIL

REFER TO SCHEDULE BELOW & AR-50000

REPORT ANY DISCREPANCIES TO THE ARCHITECT FOR DECISION BEFORE PROCEEDING WITH THE WORK.
7 Appendix C - Services

Refer to the attached Return Brief & Fire Masterplan Report produced by Lucid Consultants.
University of Adelaide – Health Science Infrastructure Strategy Stage 2 (HSIS 2)

Project No: LCE12654

Return Brief

Electrical, Mechanical, Fire and Hydraulic Services

Date: 20/04/2017
Document Number: 12654-004
Revision Number: 0
# DOCUMENT ISSUE REGISTER

**PROJECT:** University of Adelaide – Health Science Infrastructure Strategy Stage 2 (HSIS 2)

**PROJECT NO:** LCE12654

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<td>20 April 2017</td>
<td>Preliminary 30% issue for design team review.</td>
</tr>
</tbody>
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1 INTRODUCTION

1.1 BASIS OF THE BRIEF

This return brief has been developed to demonstrate our understanding of the overall electrical, communications, mechanical, hydraulic and fire services scope of works and requirements.

The intent of the document is that it be reviewed by the design team and project stakeholders, with any comments to be provided back for inclusion, to finalise the scope of works prior to detailed design.

1.2 SITE DESCRIPTION

The site consists of two buildings directly adjacent one another with linkways between.

Both buildings have street frontage to Frome Road and there is an external perimeter vehicle access road shared with the hospital precinct.

![Image of University of Adelaide Medical School North and South Ariel Image](image)

Figure 1. University of Adelaide Medical School North and South Ariel Image

1.3 BUILDING DESCRIPTION

The two buildings contain teaching, research and commercial facilities consisting of offices, laboratories, tutorial rooms and lecture theatres. Table 1.1 provides a brief description of the building relative to the BCA.
Table 1.1: Building characteristics.

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Medical School North</th>
<th>Medical School South</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Storeys Contained</td>
<td>8 Storeys</td>
<td>8 Storeys</td>
</tr>
<tr>
<td>Rise in Storeys</td>
<td>7 Storeys</td>
<td>7 Storeys</td>
</tr>
<tr>
<td>Building Classification</td>
<td>9b / 8 / 5</td>
<td>9b / 8 / 5</td>
</tr>
<tr>
<td>Total Building Area</td>
<td>10,600 m²</td>
<td>10,900 m²</td>
</tr>
<tr>
<td>Area of Largest Fire Compartment</td>
<td>1,690 m² (Basement)</td>
<td>1,480 m² (Typical Floor)</td>
</tr>
<tr>
<td>Type of Construction</td>
<td>Type A</td>
<td>Type A</td>
</tr>
<tr>
<td>Effective Height</td>
<td>24.44m</td>
<td>25.17m</td>
</tr>
</tbody>
</table>

The buildings are generally concrete and masonry construction throughout.

The buildings appear to be arranged to form fire compartmentation/separation both on a floor by floor basis and between the North and South buildings. They are connected to one another via:

- Direct opening between the two buildings via the Ground Floor and Level 1 lecture theatre foyers, with sliding fire door at the Medical School South building.

- Direct opening between the two buildings via basement, with swing fire doors between the two buildings.

- An external link bridge at each level from Level 2 to Level 6.

The project is split into two stages of works; early works and main works. The early works services documentation has been issued by Lucid prior to completion of this document. Where specific areas form part of the projects early work stage it has been noted within this return brief.
2 ELECTRICAL & COMMUNICATIONS SERVICES

2.1 GENERAL

The building electrical services will be designed and installed in accordance with the Building Code of Australia and all relevant Australian Standards, including the following:

- **AS/NZS 1680**: Interior Lighting
- **AS/NZS 2293**: Emergency & Exit Lighting
- **AS/NZS 3000**: Electrical Installations (known as the Wiring Rules)
- **AS/NZS 3008**: Cable Selection
- **BCA 2017**: National Construction Code (NCC)

The electrical services shall retain existing equipment where it is reasonable to do so and will be designed to limit disruption to the existing facility.

2.2 DESIGN CRITERIA

<table>
<thead>
<tr>
<th>Item</th>
<th>Design Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>New Distribution Boards</td>
<td>Sized for full number of circuits/outlets required, plus 20% spare pole capacity</td>
</tr>
<tr>
<td></td>
<td>Surge diversion to each distribution board</td>
</tr>
<tr>
<td></td>
<td>Distribution boards will be in appropriately sized riser cupboards located in accessible locations on each level.</td>
</tr>
<tr>
<td></td>
<td>Form 1 IP42 unless noted otherwise</td>
</tr>
<tr>
<td>Submains</td>
<td>Maximum demand as set out in AS/NZS 3000 plus 20% spare</td>
</tr>
<tr>
<td></td>
<td>Neutral sized the same as the active conductors</td>
</tr>
<tr>
<td>Distribution system design</td>
<td>Maximum volt drop of 7% from point of supply to final outlet</td>
</tr>
<tr>
<td>Lighting Design</td>
<td>In accordance with AS/NZS 1680 recommendations.</td>
</tr>
<tr>
<td></td>
<td>In accordance with NCC requirements with respect to energy and as detailed herein.</td>
</tr>
<tr>
<td></td>
<td>Access to be designed in accordance with OH&amp;S requirements.</td>
</tr>
<tr>
<td>Exit and Emergency lighting</td>
<td>In accordance with the requirements of AS/NZS 2293</td>
</tr>
<tr>
<td>Earthing systems</td>
<td>Sized in accordance with AS/NZS 3000.</td>
</tr>
<tr>
<td></td>
<td>Every submain to be provided with its own earthing conductor.</td>
</tr>
<tr>
<td></td>
<td>Earth impedance in accordance with AS/NZS 3000</td>
</tr>
</tbody>
</table>
2.3 **ELECTRICAL INFRASTRUCTURE**

**Description of Existing**

The electrical infrastructure serving Medical School North and South are relatively independent from each other and consist of the following major electrical items:

*Medical School North building*

- A dedicated pad-mounted transformer located adjacent the loading dock on the eastern side of the building.
- An existing main switchboard located on Ground Level including automatic transfer switch (ATS) for changeover to back-up supply operation for essential services.
- Site electricity meter located in basement plant room below main switchboard room.
- Separate Essential and Non-essential supplies to selected distribution boards throughout the building.
- Shared 1097kVA Stand-by diesel generator located externally to the north-east of the building (generator also services Medical School South building).

*Medical School South building*

- A dedicated pad-mounted transformer located along the southern side of the building.
- An existing main switchboard and Essential Services Main Distribution Board located on Ground Level. The Essential Services Main Distribution Board also includes the automatic transfer switch (ATS) for changeover to back-up supply operation for essential services.
- Site electricity meter located in within the Main Switchboard.
- Separate Essential and Non-essential supplies to selected distribution boards throughout the building.
- Shared 1097kVA Stand-by diesel generator located externally to the north-east of the building (generator also services Medical School North building).

**Proposed New Works**

Modification to and provision of additional electrical distribution boards where necessary to suit the fitout works within each building.

2.4 **ELECTRICAL METERING**

Where new switchboards are proposed to be installed within each building they shall be provided with power monitoring units to record individual consumption of power, lighting and mechanical systems as required by the NCC part J8.

Installed power monitoring units shall be compatible with and interfaced to the existing site wide Schneider Electric energy metering system.
2.5 COMMUNICATIONS INFRASTRUCTURE

Description of Existing

Medical School North building

- The building is supplied with an incoming copper cable terminating onto a Main Distribution Frame (MDF) located on Ground Floor. This frame provides telephony connections to the building and adjacent Dental Hospital building via a PABX system also located on Ground Floor. Copper tie cables are also provided across to the Medical School South building to a local PABX.

- The building is supplied with incoming optical fibre cabling from the Engineering Maths building hub located on the main campus across Frome Road via the basement. The fibre connection for the Medical School South building also enters via this location.

- The incoming optical fibres terminate into the communications cabinet location on Level 2 with additional fibres connecting from this location to the communications rooms on Level 5 and the basement.

- Communications room located in the basement which provides UTP structured cabling system to the basement level.

- Communications room located on Level 2 which provides UTP structured cabling system to levels: Ground Floor, Level 01 and Level 2.

- Communications room located on Level 5 which provides UTP structured cabling system to levels: Level 3, Level 4, Level 5 and Level 6.

Medical School South

- The building is supplied with copper cabling for telephony via a copper tie cables from the Medical School North building MDF.

- The building is supplied with incoming optical fibre cabling from the Engineering Maths building hub located on the main campus across Frome Road via the Medical School North building's basement. The fibre connects to the Level 5 communications room which then connects back to the Level 1 communications room.

- Communications room located on Level 1 which provides category 6 UTP structured cabling system to levels: Basement, Ground Floor, Level 01 and Level 2.

- Communications room located on Level 5 which provides category 6 UTP structured cabling system to levels: Level 3, Level 4, Level 5 and Level 6.

Proposed New Works

Medical School North building

As part of the site works establishment of a new main communications room is in the basement where the incoming copper and fibre cabling pass. New floor distribution rooms will also be required on each floor affected by the works including, Ground Floor, Level 1, Level 2 and Level 3. For levels currently designated for no new works to occur (Levels 4, 5 and 6) the existing
communications cabling from the existing Level 5 communications room shall remain for consideration as part of future project works.

New communications outlets on these floors shall be connected from the newly established communications infrastructure and existing outlets intercepted and diverted for connection here also.

The university has advised that the PABX system shall be made redundant and any existing telephone outlets throughout shall be replaced, and if required re-cabled, to suit the new structured cabling system and enable VoIP telephony.

Medical School South

Existing communications rooms shall remain and the current cabling standards be used for any additional communications cabling requirements. Available capacity of the existing communications room is currently minimal so consideration for reusing existing outlets or removal of surplus outlets in areas will need to be monitored to ensure additional communications outlets can be accommodated by the existing infrastructure.

2.6 GENERAL POWER

Generally, where additional outlets are required to suit staff relocations and they will be provided throughout in accordance with the following:

▪ All typical Workstations will be provided with two (2) double socket outlets mounted under bench.

▪ Additional outlets will be provided to locations for printers and other equipment that require a dedicated circuit.

▪ General outlets will be located throughout each floor for connection of cleaning equipment.

▪ Outlet will be provided at each TV screen location.

▪ Outlets will be provided to Kitchen, Staff Lounge, Student Services and general Tea Points to suit final equipment in each area.

▪ Computer dedicated outlets and integral USB charging facilities are not proposed for the development.

General Power

Maximum of six off double outlets to be connected to a single circuit

RCD protection shall be provided to all general lighting and power circuits in accordance with AS/NZS 3000

<table>
<thead>
<tr>
<th>Area</th>
<th>Accessories Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>General</td>
<td>Clipsal ‘C2000’ Series</td>
</tr>
<tr>
<td>External and Plant</td>
<td>Clipsal 56 series</td>
</tr>
</tbody>
</table>
2.7 COMMUNICATIONS

From the distribution cabinets, dual category 6A UTP horizontal cabling shall be provided to each outlet location, terminating with RJ45 connections and in accordance with ITS cabling requirements. In areas where existing category 6 UTP cabling systems are in use and minor outlet alterations are required then the system shall be maintained for any additional outlets.

Generally, outlets will be provided throughout in accordance with the following:

- All typical workstation shall be provided with dual outlets mounted under bench.
- Additional dual outlets will be provided to locations for printers and other equipment that require a network connection.
- Dual outlet will be provided at each meeting room screen location where required for connection of AHMS booking system displays.
- Dual outlets for additional Wi-Fi points to each floor as nominated by university.

All final outlets shall be the same series as per the nominated power accessory type for that area.

All active networking and telephony equipment shall be provided by the ITS client.

2.8 SECURITY AND ACCESS CONTROL

The sites currently have existing Security Control Panel (SCP) for access control and intruder detection monitoring.

Additional access control door hardware and intruder detection devices to be provided to areas as directed by the university.

Connections shall be provided to equipment such as freezers and mechanical plant for monitoring of faults by university central security office.

2.9 EMERGENCY AND ESCAPE LIGHTING

Emergency and exit lighting shall be provided throughout each of the building as prescribed by the Building Code of Australia and in accordance with the requirements of AS/NZS 2293 – Emergency Evacuation Lighting within Buildings.

The emergency lighting systems shall incorporate self-contained single point fittings, each with own batteries and charger. Local push-button test facilities shall be provided within distribution boards where not currently present.

Generally, where Emergency and Exit lighting is provided it shall be of long life LED type technology and the following arrangement:

<table>
<thead>
<tr>
<th>Emergency Lighting</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Area Type</strong></td>
</tr>
<tr>
<td>Egress Stairwells</td>
</tr>
</tbody>
</table>
2.10 LIGHTING

Lighting shall be provided throughout, including controls in accordance with the BCA guidelines for energy efficiency recommended lighting levels outlined in AS/NZS 1680.

Lighting shall be provided to specific areas in accordance with the following criteria:

<table>
<thead>
<tr>
<th>Area Type</th>
<th>Light Level</th>
<th>Energy Density</th>
<th>Luminaire Type</th>
<th>Controls</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basement</td>
<td>160 Lux</td>
<td>9 W/m²</td>
<td>LED Linear surface mounted</td>
<td>Local switch with Motion Sensor Control</td>
</tr>
<tr>
<td>Waiting Areas</td>
<td>160 Lux</td>
<td>15 W/m²</td>
<td>LED Downlights</td>
<td>Local switch with Motion Sensor Control</td>
</tr>
<tr>
<td>Receptions</td>
<td>320 Lux</td>
<td>9 W/m²</td>
<td>LED Panel</td>
<td>Local switch with Motion Sensor Control</td>
</tr>
<tr>
<td>Offices</td>
<td>320 Lux</td>
<td>9 W/m²</td>
<td>LED Panel</td>
<td>Local switch with Motion Sensor Control</td>
</tr>
<tr>
<td>Amenities</td>
<td>80 Lux</td>
<td>6 W/m²</td>
<td>LED Downlights</td>
<td>Local switch with Motion Sensor Control</td>
</tr>
<tr>
<td>Corridors</td>
<td>40 Lux</td>
<td>8 W/m²</td>
<td>LED Downlights</td>
<td>Motion Sensor Control</td>
</tr>
<tr>
<td>Stairwell</td>
<td>80 Lux</td>
<td>8 W/m²</td>
<td>LED Downlights</td>
<td>Local switch with Motion Sensor Control</td>
</tr>
<tr>
<td>Meeting Room (Typical)</td>
<td>320 Lux</td>
<td>9 W/m²</td>
<td>LED Panel</td>
<td>Local switch with Motion Sensor Control</td>
</tr>
<tr>
<td>Kitchen / Staff Lounge</td>
<td>240 Lux</td>
<td>8 W/m²</td>
<td>LED Panel</td>
<td>Motion Sensor Control</td>
</tr>
<tr>
<td>Plantrooms</td>
<td>160 Lux</td>
<td>5 W/m²</td>
<td>LED Linear surface mounted (sealed)</td>
<td>Local switch with Motion Sensor Control</td>
</tr>
<tr>
<td>External</td>
<td>N/A</td>
<td>-</td>
<td>LED Downlights</td>
<td>PE Cell / Time clock controlled</td>
</tr>
<tr>
<td>Facade</td>
<td>N/A</td>
<td>-</td>
<td>Wall mounted LED Up/Down Lighters</td>
<td>Time clock controlled</td>
</tr>
<tr>
<td>External Area Lighting</td>
<td>N/A</td>
<td>-</td>
<td>LED Floodlights</td>
<td>PE Cell / Time clock controlled</td>
</tr>
</tbody>
</table>

2.11 EXCLUSIONS

The following systems and components are not proposed within the electrical services design scope:
- Active networking equipment, telephone systems, etc.
- Telephone system(s) and handsets.
- Private Automatic Branch Exchange (PABX)
- Wireless networking equipment.
- Audio visual systems including cabling and active equipment.
- MATV or FTA television distribution systems
- Standby electricity generation and essential service supply.
- Uninterruptible power supplies
- Photo-voltaic or any other onsite electricity generation systems.
- Lightning Protection System
- Closed circuit television (CCTV) and surveillance system
2.12 READER REVIEW COMMENTS

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3 MECHANICAL SERVICES

3.1 GENERAL

The proposed mechanical services will be designed and installed in accordance with the Building Code of Australia (BCA).

The design criteria assumed for the mechanical services systems shall be as presented in Table 3.1.

Table 3.1: Design Criteria

<table>
<thead>
<tr>
<th>Item</th>
<th>Design Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extreme ambient conditions under which all plant shall operate</td>
<td>46.0°C dry bulb (db) maximum</td>
</tr>
<tr>
<td></td>
<td>24.0°C wet bulb (wb) maximum</td>
</tr>
<tr>
<td></td>
<td>Full solar load</td>
</tr>
<tr>
<td></td>
<td>0.0°C db maximum</td>
</tr>
<tr>
<td>External ambient conditions for air conditioning plant full load</td>
<td>Summer</td>
</tr>
<tr>
<td>performance</td>
<td>37.0°C db maximum</td>
</tr>
<tr>
<td></td>
<td>21.0°C wb maximum</td>
</tr>
<tr>
<td></td>
<td>Full solar load</td>
</tr>
<tr>
<td>Winter</td>
<td>5.0°C db minimum</td>
</tr>
<tr>
<td></td>
<td>Zero solar load</td>
</tr>
<tr>
<td>Internal air conditioning set points.</td>
<td>25.0°C db (cooling)</td>
</tr>
<tr>
<td>Unless specified elsewhere (ie. special function areas)</td>
<td>19.0°C db (heating)</td>
</tr>
<tr>
<td></td>
<td>No humidity control</td>
</tr>
<tr>
<td></td>
<td>Note: Conditions can only be guaranteed to be maintained when all doors and windows are closed and properly sealed.</td>
</tr>
<tr>
<td>Controls tolerance for air conditioning plant performance</td>
<td>± 2.0°C db at point of temperature control</td>
</tr>
</tbody>
</table>
3.2 MECHANICAL SCOPE OF WORKS

3.2.1 Medical School North

**Basement Office Areas**

Lucid require details regarding the proposed changes to these areas to understand the requirements for modification or new mechanical services work in this area.

**Ground Floor DDA Facilities**

Generally, these areas are served by base building hydronic Fan Coil Unit (FCU) systems. Lucid require details regarding the proposed changes to these areas to understand the requirements for modification or new mechanical services work in this area.

**Ground Floor Health and Science Faculty Areas**

Generally, these areas are served by base building hydronic FCU systems. Lucid require details regarding the proposed changes to these areas to understand the requirements for modification or new mechanical services work in this area.

**Ground Floor Microscopy Areas**

Generally, these areas are served by base building hydronic FCU systems. Lucid require details regarding the proposed changes to these areas to understand the requirements for modification or new mechanical services work in this area.

**Ground Floor Student Hub Shared Kitchen**

Generally, this area is served by base building hydronic FCU system. Lucid require details regarding the proposed changes to this area to understand the requirements for modification or new mechanical services work.

**Ground Floor Circulation Areas**

Generally, no modification or new mechanical works is proposed in these areas. However, some modification may be required in the main foyer area. Lucid require details regarding the proposed changes to these areas to understand the requirements for modification or new mechanical services work in this area.

**First Floor Circulation Areas**

No modification or new mechanical works is proposed in these areas. However, Lucid require details regarding the proposed changes to these areas to understand the requirements for modification or new mechanical services work in this area.

**First Floor Medicine Office Areas**

Generally, these areas are served by base building hydronic FCU systems. Lucid require details regarding the proposed changes to these areas to understand the requirements for modification or new mechanical services work in this area.
Second Floor Circulation Areas

No modification or new mechanical works is proposed in these areas. However, Lucid require details regarding the proposed changes to these areas to understand the requirements for modification or new mechanical services work in this area.

Second Floor Medicine Office Areas

Generally, these areas are served by base building hydronic FCU systems. Lucid require details regarding the proposed changes to these areas to understand the requirements for modification or new mechanical services work in this area.

Second Floor Shared Research Laboratory Areas

Generally, these areas are served by base building hydronic FCU systems. Lucid require details regarding the proposed changes to these areas to understand the requirements for modification or new mechanical services work in this area.

Third Floor

No works are proposed within the third floor as part of this project.

Fourth Floor

No works are proposed within the fourth floor as part of this project.

Fifth Floor

No works are proposed within the fifth floor as part of this project.

Roof

No works are proposed for the roof as part of this project. Refer deferred maintenance section within this report for deferred maintenance works at roof level.

3.2.2 Medical School South

Basement

No works are proposed within the basement as part of this project.

Ground Floor Museum (SG20) and Museum Preparation Room(SG7A) - Early Works

The museum and museum preparation room forms part of the projects Early Works package. It is proposed that the museum be provided with a refrigerated split ducted system. The indoor unit will be located within the ceiling space above the museum and draw fresh air from the southern façade via new weatherproof louvres. The outdoor air quantity will be modulated based on the detected CO² level within the space to reduce the amount of outdoor air requiring treatment by the air conditioning system and hence, reduce running costs without negatively affecting indoor air quality. The associated outdoor unit is proposed to be located on the roof of the Florey lecture theatre adjacent existing mechanical services plant in this area.

The new air conditioning equipment will be connected to the existing building BMS network to allow fault alarms to be raised, CO² control strategy to be implemented and interface with
the existing room booking system to control air conditioning set point dead band when the room is unoccupied.

Ground Floor Delivery and Storage

No works are proposed for these areas. Lucid require details from the university regarding their storage requirements in this area to ensure gas stores and the like are compliant. This is to be reviewed in due course.

Ground Floor DDA Facilities

Lucid require details regarding the proposed changes to these areas to understand the requirements for modification or new mechanical services work in this area.

Ground Floor Student Hub Areas

Lucid require details regarding the proposed changes to these areas to understand the requirements for modification or new mechanical services work in this area.

First Floor Tutorial and Lecture Rooms

Existing tutorial areas are generally served by existing air conditioning units. Details of the proposed fitout in these areas is required to determine if existing air conditioning systems will be suitable for reuse and whether any relocation or modification to these systems is required.

Second Floor Paediatrics and Reproductive Health Areas

Lucid require details regarding the proposed changes to these areas to understand the requirements for modification or new mechanical services work in this area.

Second Floor Shared Research Laboratory Areas

These areas are generally served by specialised air conditioning equipment incorporating HEPA filtration to the southern lab areas. Laboratory gas is also reticulated through these areas. Lucid require details regarding the proposed changes to these areas to understand the requirements for modification or new mechanical services work in this area.

Second Floor Microbiology Lab

Lucid require details regarding the proposed changes to these areas to understand the requirements for modification or new mechanical services work in this area.

Third Floor Freezer Room (S328)

The University has currently requested the following:

- N+1 redundancy for air conditioning equipment to be operated in lead/lag configuration.
- Air conditioning to be alarmed via security.
- Freezers to be alarmed via security.
- Maintain a maximum 25°C room temperature at all times.
The following existing mechanical services are provided:

- Two ceiling cassette air conditioning units served by a VRF multihead type refrigerated system serving the eastern end of the third floor within Medical School South.

- Fresh air ventilation system associated with the ceiling cassettes.

It is proposed that the existing air conditioning system be retained. An additional standalone refrigerated split system could be provided if N+1 redundancy is truly required. Fault alarm for new and existing air conditioning system can be interfaced with the existing building BMS system and raise an alarm via security. Further investigation regarding interfacing of freezers with the BMS for fault alarm is required. Lucid require detailed schedule of freezer equipment within the room to confirm if the existing air conditioning systems will be of suitable cooling capacity for reuse. It is further proposed that fresh air to the room is shut off to minimise the amount of hot air introduced to the room during summer months.

Third Floor Medicine Office Areas

Existing office areas are generally served by existing air conditioning units. Details of the proposed fitout in these areas is required to determine if existing air conditioning systems will be suitable for reuse and whether any relocation or modification to these systems is required.

Third Floor Shared Research Lab and Dentistry Areas

Shared research labs and dentistry areas are generally served by ceiling cassette air conditioning units connected to VRF multihead type refrigerated system serving the eastern end of the third floor within Medical School South. Each indoor unit is generally served by a fresh air ventilation system to introduce outdoor air into the associated room. At the western end of the building the labs are generally served by refrigerated splits systems and RAC’s. Details of the proposed fitout in these areas is required to determine if existing air conditioning systems will be suitable for reuse and whether any relocation or modification to these systems is required.

Third Floor Craniofacial Biology Dry Lab (S325) and Material Lab (S355) – Early Works

Areas are generally served by ceiling cassette air conditioning units connected to VRF multihead type refrigerated system serving the eastern end of the third floor within Medical School South. Each indoor unit is generally served by a fresh air ventilation system to introduce outdoor air into the associated room. No exhaust ventilation is proposed as directed by the university.

Fourth Floor Fire Isolated Corridor

Existing and new mechanical services traversing this space are to be appropriately fire isolated.

Fourth Floor Medicine Meeting, Office and Lab Areas.

Existing office and lab areas are generally served by existing air conditioning units and sweep fans. Details of the proposed fitout in these areas is required to determine if existing air conditioning systems will be suitable for reuse and whether any relocation or modification to these systems is required.

Fourth Floor Circulation
No mechanical works currently proposed to the corridor areas.

_Fourth Floor Shared Research Labs_

Existing lab areas are generally served by existing air conditioning units and sweep fans. Details of the proposed fitout in these areas is required to determine if existing air conditioning systems will be suitable for reuse and whether any relocation or modification to these systems is required.

_Fifth Floor Medicine Meeting, Office and Lab Areas._

Existing office and lab areas are generally served by existing air conditioning units and sweep fans. Details of the proposed fitout in these areas is required to determine if existing air conditioning systems will be suitable for reuse and whether any relocation or modification to these systems is required.

_Fifth Floor Circulation_

No mechanical works currently proposed to the corridor areas.

_Fifth Floor Shared Research Labs_

Existing lab areas are generally served by existing air conditioning units and local exhaust systems. Details of the proposed fitout in these areas is required to determine if existing air conditioning or exhaust systems will be suitable for reuse and whether any relocation or modification to these systems is required.

_Sixth Floor_

No works are proposed within the sixth floor as part of this project.

_Roof_

No works are proposed for the roof as part of this project. Refer deferred maintenance section within this report for deferred maintenance works at roof level.
3.3 READER REVIEW COMMENTS
4 FIRE SERVICES

4.1 GENERAL

The building fire services for the new installations will generally be designed and installed in accordance with the Deemed to Satisfy provisions of the Building Code of Australia (BCA).

Refer to Appendix for “Fire Master Plan Report” detailing proposed scope of works.
4.2 READER REVIEW COMMENTS
5 HYDRAULIC SERVICES

5.1 GENERAL

The building electrical services will be designed and installed in accordance with the Building Code of Australia 2016 (BCA) and relevant hydraulic design and safety standards including AS 3500 Plumbing Code and AS 5601 Gas Code.

The Hydraulic services shall retain existing water and waste drainage system and or equipment where it is reasonable to do so and will be designed to limit disruption to the existing facility.

5.2 HYDRAULIC INFRASTRUCTURE

5.2.1 Existing Medical School North Infrastructure

The major infrastructure supplying the building includes:

- 2 off 50mm water meters located off Frome street within an inground valve box
- 150mm Sewer connection located off Frome street
- Gas meter location TBC.

5.2.2 Existing Medical School North Infrastructure

The major infrastructure supplying the building includes:

- 2 off 50mm water meters located off Frome street within an inground valve box
- 150mm Sewer connection located off Frome street
- Gas meter location TBC.

5.3 HYDRAULIC SCOPE OF WORKS

5.3.1 Medical School North

Baseline

Renovation of rm NB41a and NB41 to suit office and reception areas.

Ground floor

Renovation of the existing reception and utility area to accommodate Microscopy and Directors Office.

Renovation of common teaching space to incorporate Microscopy area.

Relocation of Microscopy reception to shared area occupied by Student Services.

Relocation of Microscopy meeting room to NG27 and 35

Renovation of the existing student services to suit new layout including
Provision of new services to suit Alfresco are including required trade waste treatment provisions for cooking and food preparation.

Upgrade of amenities and facilities in rm 3,4,6 and 7 to suit new layout including sewer and hot and cold water services.

First floor

Renovation of the Rural Health area to provide new office space and 3rd Science Laboratory.

Renovation of existing office to GTSS Staff rm and relocation of staff in rm N107,08 to MSS level 5.

Renovation of the existing offices, laboratories, utility room and Chemical store to suit new layout as indicated in drawing ST02.

Relocation of existing office to suit Adelaide Unicare staff requirements.

Renovation of existing office N12 to suit new School Seminar/ tea room.

Renovation of existing office Abbie Museum of Anatomy.

Renovation of office to N125 to suit new laboratory.

Upgrade of exiting amenities and facilities.

Second Floor

Upgrade of floor to suit new layouts as listed in Architectural drawing A234

• Shared Research Laboratory.

• Upgrade of amenities and ablution amenities.

• Medical office and meeting areas.

• Workstation tearooms areas as required.

Third Floor

Renovation and upgrade of work areas to suit Health Science Faculty fitout requirements.

Upgrade of amenities and ablution amenities.

Renovation of rooms 307a/b to suit requirements.

Relocation of Anatomy laboratory area to Level 2.

Relocation of Pathology Museum as part of early works.

Fourth Floor

Relocation of Exercise Offices to MMS L4.
Relocation of Physiology Office and laboratory to MSS L2.

Anatomy laboratory area relocation too MSS L2.

Electro Physiology laboratory and office relocation to MSS L4.

Relocation of Office and research laboratory in N434,435 to MSS L4.

Fifth Floor

Relocation of general office areas to new areas.

Pharmacology laboratory and office relocation to MSS L3.

Roof

No works are proposed for the roof as part of this project. Refer deferred maintenance section within this report for deferred maintenance works at roof level.

5.3.2 Medical School South

Basement

No works are proposed within the basement as part of this project.

Ground floor

Renovation of areas as defined in early works to suit Museum preparation and Museum tutorial areas.

Renovation of student common area, corridors and tutorial room SG4 to suit new.

First floor

No hydraulic works are proposed on this floor currently.

Second Floor

Renovation of existing offices areas to suit Paediatrics, Medicine and Reproductive Health, including team rom S244

Third Floor

Upgrade and renovation of existing work spaces to suit new layouts

- Forensics laboratory
- Offices
- Utility, lunch and tea rooms.
- WHO facility.
- Core Facility Laboratories
• Proteomics Laboratory
• Immunology Laboratory.
• Craniofacial Unit.

Fourth floor
Upgrade and renovation of existing work spaces to suit new layouts
• Offices
• Utility and tea rooms.
• Meeting rooms
• Laboratories
• Work rooms

Fifth Floor
Upgrade and renovation of existing work spaces to suit new layouts
• Offices
• Utility and tea rooms.
• Meeting rooms
• Laboratories
• Work rooms

Sixth Floor
No works are proposed within the sixth floor as part of this project.

Roof
No works are proposed for the roof as part of this project.

5.4 EXCLUSIONS
The following systems and components are not proposed within the fire services design scope:
• Stormwater drainage and downpipes.
• Rainwater collection reuse systems
• Sub-soil drainage systems
• Trade waste drainage and pre-treatment devices.
• Water treatment, water softeners, filters or reverse osmosis units.
5.5 READER REVIEW COMMENTS

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# DOCUMENT ISSUE REGISTER

**PROJECT NAME:** UNIVERSITY OF ADELAIDE  
HEALTH SCIENCE INFRASTRUCTURE STRATEGY STAGE 2 (HSIS 2),

**PROJECT REF:** LCE12654-002 Fire and Life Safety Services

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EXECUTIVE SUMMARY

This report reviews the existing fire and life safety systems of University of Adelaide Medical School North and Medical School South buildings located on Frome Street, Adelaide, against the current legislative fire and life safety requirements for a building of this nature.

Although the building was constructed under different applicable legislation at the time, the current edition of the National Construction Code - Building Code of Australia (2016) has been utilised in this analysis as a benchmark.

The two buildings each have a rise in storeys of 7 (inclusive of ground floor) and contain a basement below ground level and have a total floor area of approximately marginally less than 11,000m² each. They each contain teaching, research and commercial facilities consisting of offices, laboratories, tutorial rooms and lecture theatres therefore the building occupancy is classified as multi-use class 5, 8 and 9b.

In general the existing fire and life safety measures installed at this premises do not satisfy all requirements of the current Building Code of Australia, the following issues were identified as being non-compliant or requiring attention:-

- Expected fire rating performance of existing building construction for laboratory use.
- Lack of fire rating of external exposures between the two buildings and of external egress paths adjacent the building.
- Insufficient fire rating of Medical School South eastern fire stair discharge corridor.
- Incorrect direction of door swing on egress path of Medical School South ground floor.
- Lack of available exit width at level 1 and level 4 of Medical School South for anticipated number of occupants.
- Excessive egress distances within Medical School South.
- Short comings of exit and emergency lighting and use of mixture of Pictogram and text type exit signs.
- Insufficient coverage of occupant warning speaker system.
- General use of thermal detection in lieu of smoke detection.
- Lack of smoke detection coverage to Medical School North building.
- Breach of smoke separation between floors within Medical School North via central air conditioning ductwork.
- Fire hydrants located within the general corridors in lieu of within the fire isolated stairs of the Medical School North Building.
- External hydrants required outlets to be modified and painted red.
- Lack of fire hydrant pumps serving the Medical School South building.
- Medical School South Building exceeds 25m effective height as such is required to have yet is not provided with:
  - Sprinkler system
  - Zone pressurisation smoke control system
  - Duty/Standby fire water storage tanks and pumps
- Proximity of booster to glazed opening to the building.

The existing fire ratings due to the laboratory occupancy, excessive egress distance and booster location issues identified within this report may be addressed through development of a building solution utilising alternative solutions in order to obtain the necessary approvals required to consider this building as complying with the current Building Code of Australia (BCA).

Priority levels and budget estimates have been provided in this report itemised to each recommendation. The total budgetary allowance for works required to achieve compliance with the current BCA is approximately $2,700,000.00 + GST and recommendations have been made to distribute the expenditure over a period of 7 years in the order or priority as detailed within section 3 this report. Whilst we believe that all items outlined in this report should be undertaken in the shortest amount of time possible, we understand that there may be budgetary constraints involved in undertaking these upgrades.
1. OVERVIEW

1.1 INTRODUCTION

We provide the following report with respect to fire and life safety services for the University of Adelaide Medical School South and Medical School North buildings located on Frome Street, Adelaide, South Australia.

This report compares the existing fire and life safety provisions of the building against the current National Construction Code Volume 1 Building Code of Australia 2016 (BCA) requirements, with consideration to existing conditions and approvals within the building.

We note that the building plans available are relatively well maintained however as the buildings have undergone a number of alterations some details may be not be recorded acutely. Information presented within this report is based on site inspection, site measurements and analysis of the existing documentation.

1.2 REFERENCED STANDARDS

Below is a list of referenced standards and codes that this report is based upon:

<table>
<thead>
<tr>
<th>Standard/Code</th>
<th>Year of Publication</th>
</tr>
</thead>
<tbody>
<tr>
<td>AS2118.1 – Automatic fire sprinkler systems – Part 1</td>
<td>1999</td>
</tr>
<tr>
<td>AS2419.1 – Fire Hydrant Installations – Part 1</td>
<td>2005</td>
</tr>
<tr>
<td>AS2441 – Installation of Fire Hose Reels</td>
<td>2005</td>
</tr>
<tr>
<td>AS2444 – Portable Fire Extinguishers and Fire Blankets</td>
<td>2001</td>
</tr>
<tr>
<td>AS1670.1 – Fire Detection, Warning, Control and Intercom Systems</td>
<td>2015</td>
</tr>
<tr>
<td>AS1670.4 – Fire Detection, Warning, Control and Intercom Systems</td>
<td>2015</td>
</tr>
<tr>
<td>AS2293.1 – Emergency Escape Lighting and Exit Signs for Buildings</td>
<td>2005</td>
</tr>
</tbody>
</table>
1.3 ASSUMPTIONS/LIMITATIONS

Due to the limited access provisions to inspect all areas, a number of assumptions have been made in the assessment. Below is a list of assumptions upon which this report is based:

1. External construction provides sufficient fire resistance levels to resist external exposures from fire source features including between the Medical School South and Medical School North buildings to satisfy the BCA requirements.

2. The items in this report have been based upon visual inspections only. Inspection of concealed cabling, pipework, passive fire protection or functionality testing of the installed systems has not been undertaken.

3. It is assumed that the preventative maintenance has been undertaken as required by SA Minister’s specifications and that subsequent defects have been rectified.

4. Sufficient water supply within the towns mains to satisfy the performance requirements of the hydrant system.

5. Smoke dampers are not provided within the central air conditioning ductwork risers at each level of the Medical School North building.

1.4 SITE DESCRIPTION

The site consists of two buildings directly adjacent one another with linkways between. Both buildings have street frontage to Frome Street and there is an external perimeter vehicle access road shared with the hospital precinct.

Figure 1. University of Adelaide Medical School North and South Ariel Image
1.5 **BUILDING DESCRIPTION**

The two buildings contain teaching, research and commercial facilities consisting of offices, laboratories, tutorial rooms and lecture theatres. Table 1.1 provides a brief description of the building relative to the BCA.

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Medical School North</th>
<th>Medical School South</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Storeys Contained</td>
<td>8 Storeys</td>
<td>8 Storeys</td>
</tr>
<tr>
<td>Rise in Storeys</td>
<td>7 Storeys</td>
<td>7 Storeys</td>
</tr>
<tr>
<td>Building Classification</td>
<td>9b / 8 / 5</td>
<td>9b / 8 / 5</td>
</tr>
<tr>
<td>Total Building Area</td>
<td>10,600 m²</td>
<td>10,900 m²</td>
</tr>
<tr>
<td>Area of Largest Fire Compartment</td>
<td>1,690 m² (Basement)</td>
<td>1,480 m² (Typical Floor)</td>
</tr>
<tr>
<td>Type of Construction</td>
<td>Type A</td>
<td>Type A</td>
</tr>
<tr>
<td>Effective Height</td>
<td>24.44m</td>
<td>25.17m</td>
</tr>
</tbody>
</table>

The buildings are generally concrete and masonry construction throughout.

The buildings appear to be arranged to form fire compartmentation/separation both on a floor by floor basis and between the North and South buildings. They are connected to one another via:

- direct opening between the two buildings via the ground floor and level 1 lecture theatre foyers, with sliding fire door at the Medical School South building.
- direct opening between the two buildings via basement, with swing fire doors between the two buildings.
- an external link bridge at each level from level 2 to level 6.

1.6 **BUILDING FIRE SAFETY COMMITTEE DEFICIENCIES**

The University of Adelaide have advised the buildings are not subject to any outstanding defect notices from the Adelaide City Council Building Fire Safety Committee or the like.
2. BCA ASSESSMENT

2.1 PREAMBLE

The following BCA Assessment has been undertaken with regards to items relating to fire and life safety of the building occupants only. Items such as Energy Efficiency, Health and Sanitary, Requirements for Persons with Disabilities, etc. have not been assessed.

This analysis has been undertaken to the currently legislated BCA 2013 which was not the legislated Building Code of Australia at the time of design or construction however the current legislation provides a benchmark that a building should be assessed against for any due diligence review by the building occupants.

2.2 BUILDING AND CONSTRUCTION TYPE

Clause A3.2 – Classifications

The building is considered to be a mixed-use:

- class 9b - tertiary school
- class 8 - laboratory
- class 5 - office

with supporting storage, plant rooms and amenities.

NOTE

Clause C1.2 – Calculation of Rise in Storeys

The BCA definitions consider the building to have a rise in storeys of 7.

Note the basement level and roof levels to not contribute to the assessment of rise in storeys.

NOTE

Clause C1.1 – Type of Construction Required

Table C1.1 of the BCA requires that for a Class 9b, 8 or 5 building with a rise in storeys of 7, the minimum type of construction required is Type A. The general fire ratings required for class 8 buildings is 4hrs, whereas for class 9b and 5 buildings the generally fire rating requirement is 2hrs.

The actual type of construction is generally concrete, concrete encased steel and masonry block/brickwork, as such, it is assumed to meet the requirements of Type A for class 9b and 5, however unlikely to satisfy the requirements for 4hr fire rating associated with class 8 use.

CONSIDERED NON-COMPLYING

Recommendation

Given the use of the laboratory spaces appear to generally utilise small quantities of flammable or combustible materials it is recommended a formal fire engineered assessment is undertaken and to determine the suitability of a lesser fire rating which aligns with the existing building fire ratings.

Clause C2.2 – General Floor Area and Volume Limitations
Clause C2.2 and table C2.2 of the BCA specifies the maximum permissible fire compartment size for different building construction types and classifications. In the case of this building the maximum permissible floor area and volume for type A construction is over 5,000m² and 30,000m³ respectively.

**CONSIDERED COMPLYING**

**Clause C3.2 – Protection of Openings in External Walls**

Clause C3.2 requires openings exposed to external fire hazards (defined as the property boundary or adjacent buildings on the same site) be separated by a minimum distance (3m to property boundaries and 6m from adjacent buildings on the same site) or provided with a means of preventing fire spread between such as fire shutters, fire doors or wall wetting sprinklers.

The buildings are provided with separation from the adjacent sites by way of the perimeter vehicle driveway and parking appears to be no openings within the perimeter walls within 3 metres of the property boundary.

The two buildings are separated at each of the linkways by fire rated doors at ground and basement levels for internal links, the external links are open sided and of concrete and steel construction as such are not considered a risk to fire spread.

The Medical School South building however has glazed openings (windows) within 6m of the Medical School North Florey Lecture Theatre roof. The fire rating of the existing lecture theatre roof is unknown at this time, as such is assumed not to be fire rated and hence an exposure hazard exists between the two buildings.
CONSIDERED NON-COMPLYING

Recommendation
Clarify existing fire rating of lecture theatre roof, if not present provide external window wetting sprinklers to all windows on the North façade of the Medical School South building within 6m of the Florey Lecture Theatre roof. No protection is proposed to the roof.

2.3 EGRESS PATHS AND CONSTRUCTION OF EXITS

Clause D1.2 – Number of Exits Required
Based upon the classification, height and number of occupants of the buildings the Medical School South building requires 2 off exits from each level including the basement, whereas the Medical School North Building requires only a single exit from the above ground levels and 2 exits from the basement level.

It should be noted additional exits may be required above this minimum to satisfy egress distances. Each building is provided with a minimum of 2 exits from each level, generally via fire isolated sitars for upper levels and direct to outside for basement and ground floor.

CONSIDERED COMPLYING

Clause D1.4 – Exit Travel Distances
The class of the building requires that “no point on a floor must be more than 20 metres from an exit, or a point from which travel in different directions to 2 exits is available, in which case the maximum distance to one of those exits must not exceed 40 metres”.

Review of existing floor plans indicates the Medical School North Building satisfies the above, however the east and west extremities of the Medical School South building generally exceed the permissible 20m to a point of choice by 5-10m.

CONSIDERED NON-COMPLYING

Recommendation
Prepare a fire engineered alternative solution to justify the extended travel distances to a point of choice to suite the current or proposed building layout. This will require upgrade of the existing fire safety systems such as:

- Replace existing thermal detection with smoke detection.
- Upgrade occupant warning to current AS1670.4 requirements.

Clause D1.5 – Distances Between Alternative Exits
The BCA Clause D1.5 requires that for this classification of building, the distance between alternative exits must not exceed 60 metres.

In the case of these two buildings, compliance with BCA Clause D1.5 is achieved.

CONSIDERED COMPLYING
Clause D1.13 – Number of Persons Accommodated

BCA Clause D1.3 stipulates the method for calculating occupant numbers to establish the required egress widths. Using this method, it has been established that the maximum occupant numbers are as indicated below:-

Table 2.1: Building occupant numbers.

<table>
<thead>
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<th>FLOOR LEVEL</th>
<th>Use</th>
<th>Medical School North</th>
<th>Medical School South</th>
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<tbody>
<tr>
<td></td>
<td>Area (m²)</td>
<td>Area per person (m²/person)</td>
<td>No. of occupants</td>
</tr>
<tr>
<td>Basement</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Office</td>
<td>128</td>
<td>10</td>
<td>13</td>
</tr>
<tr>
<td>Lab</td>
<td>378</td>
<td>10</td>
<td>38</td>
</tr>
<tr>
<td>Store/Plant room</td>
<td>478</td>
<td>30</td>
<td>16</td>
</tr>
<tr>
<td>Ground</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Computer/Teaching/Research</td>
<td>396</td>
<td>2</td>
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<tr>
<td>Office</td>
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<td>Lab</td>
<td>93</td>
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<td>9</td>
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<tr>
<td>Store/Plant room</td>
<td>93</td>
<td>30</td>
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<tr>
<td>1</td>
<td>Lecture Theatre</td>
<td>217</td>
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<tr>
<td>Office</td>
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<td>Lab</td>
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<td>Store/Plant room</td>
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<tr>
<td>Museum</td>
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<td>3</td>
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<td>FLOOR LEVEL</td>
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<td>Area per person (m²/person)</td>
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<td>72</td>
<td>30</td>
</tr>
<tr>
<td>6</td>
<td>Office</td>
<td>280</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>Lab</td>
<td>430</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>Store/Plant room</td>
<td>55</td>
<td>30</td>
</tr>
<tr>
<td>Roof</td>
<td>Plant (enclosed and external)</td>
<td>53</td>
<td>30</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>945</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Clause D1.6 – Dimensions of Exits and Paths of Travel to Exits**

Based upon the occupancy calculated above, the required minimum aggregate unobstructed width of the exits must be as scheduled below. The site measured available egress width is also scheduled below for comparison.

Table 2.2: Exit widths.

<table>
<thead>
<tr>
<th>Part</th>
<th>Medical School North</th>
<th>Medical School South</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Required Egress Width (m)</td>
<td>Available Egress Width</td>
</tr>
<tr>
<td>Basement</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Ground Floor</td>
<td>2.5</td>
<td>8</td>
</tr>
<tr>
<td>Level 1</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Level 2</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Level 3</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Level 4</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Level 5</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Level 6</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Roof / Plant</td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>
It can be seen generally the exit width requirements are satisfied with the exception of level 1 and Level 4 of Medical School South.

**CONSIDERED NON-COMPLYING**

**Recommendation**

Reconfigure the exit doors to Utilise the link bridge between the two buildings as a required exit path from the Medical School South building to the Medical School North building at levels 1 and 4, this will require re-swinging the doors to open outwards and additional exit signage.

The above will resolve level 4, however the additional egress width will not satisfy level 1, as such it is suggested the level 1 occupancy is limited to the permissible maximum of 320 persons if the above egress path via the link is created.

**Clause D1.7 – Travel via Fire Isolated Exits**

The BCA requires that fire isolated exits, in this case the fire isolated stairs, are configured such that:

- Access is only via a public corridor.
- Discharges outside the building to a road or open space.
- External path of travel from the exit discharge is protected from the effect of fire from openings within 6m of the building.
- Number of access doors to an exit at each level is limited to 2.

Generally, the exits are configured in accordance with the above, with the exception of the following:

- The point of discharge from the Medical School South fire isolated stairs from ground level and basement level requires evacuating occupants to travel within 6m of openings (windows) into the building however no protection is provided to the openings.
- The Medical School South eastern stair discharges internally into a non-fire isolated stairway.

**CONSIDERED NON-COMPLYING**

**Recommendation**

*Provide internal window wetting sprinklers to the rooms adjacent the external exit paths, ramps and stairs.*
Figure 3. Recommended internal window wetting sprinklers to Medical School South Ground Floor

*Retain the current Medical School South east stair exit path and:*

- Retrospectively upgrade the fire rating of the corridor, including fire doors to the lecture theatres.
- Provide a new set of fire doors to separate the adjacent main switch room access.
- Provide signage to the main corridor (west) to provide an alternative exit path to the main (west) internal corridor, should there be a fire event that compromises the fire rated exit corridor.
- Provide vision panels to all fire doors to provide occupants an opportunity to make a decision which path to take
Clause D1.10 – Discharge from Exits

The BCA requires that:

- Exits are not “blocked at the point of discharge” and that suitable barriers are provided if there is a risk of exits being obstructed.
- External path of travel to a road or open space is not less than the required exit width.
- External stair and ramps are of a specific dimensions and grades.
- Alternative exits are separated as far as possible from one another.
- Exits from auditoriums with more than 500 people are provided with not less than 2/3 from the main entry foyer.

The exit discharges are generally considered complaint with the above, however the dimensions and gradient of external exit paths have not been assessed.

CONSIDERED COMPLYING

Clause D2.20 – Swinging Doors

The BCA requires that swinging doors in required exits must swing in the direction of egress.

All swinging doors forming required exits open in the direction of egress with the exception of the ground floor Medical School South south-east and West external exit doors which swing
inwards, it should be noted this door serves one of the two building’s fire isolated sitars and 2 off lecture theatres as such has a high utilisation.

Figure 5. Medical School South existing south-east external exit door
Recommendation

Amend the door to swing outwards.

Clause D2.21 – Operation of Latch

The BCA states that “doors in required exits, forming part of a required exit or in the path of travel to a required exit must be readily openable without a key from the side that faces a person seeking egress, by a single hand downward action or pushing action on a single device.”

The doors provided with exit signage throughout the buildings are generally considered complying with the above.

CONSIDERED COMPLYING
2.4 **FIRE SERVICES**

**Clause E1.3 – Fire Hydrants**

Both buildings are required to be served via an on-site fire hydrant system in accordance with BCA E1.3, complying with AS2419 given it is greater than 500 m² in floor area.

Due to the floor area of the largest fire compartment the fire hydrant flow rate design criteria within AS2419.1 requires that the two most disadvantaged fire hydrants flow at 10L/s @ 350 kPa each (without the assistance of a fire brigade pumping appliance).

As the Medical School South building exceeds 25m it is required to be provided with onsite water storage tanks and duty/standby pump sets.

Given the height of the Medical school south building it is not possible to achieve the required performance of the hydrant system directly from the towns mains, as such is required to be provide with a hydrant pump and a break tank.

The two building are currently configured with independent fire hydrant systems.

The Medical School South building is supplied directly from the town mains with a booster located adjacent the south-west corner of the building and fire hydrants located internally within the fire isolated stairs. It is not provided with tanks and pumps and does not achieve the required hydrant performance.

The Medical School North building is provided with 2 off 15,000L fire hydrant water storage tanks and a single diesel pump at roof level, with a break tank and electric transfer pump at basement level to serve the hydrant system. The booster is located at the terrace level, above street level, and consists of a inlet point only and not suction provisions. The fire hydrants are generally located within the general corridors, not within the fire isolated stairs as required.

Both buildings booster assemblies are located within 10m of openings (windows) to the building and are not provide with a radiant heat barrier of 90/90/90FRL.

Hydrant coverage throughout the buildings is generally achieved.
As such the hydrant system is not considered to satisfy the requirements of BCA E1.3. **CONSIDERED NON-COMPLYING**

**Recommendation**

The following measures are recommended to be implemented:

- Connect the two building to become a single system to utilise the booster of the Medical School South building and the tanks/pump of the Medical School North building.

- Upgrade the existing Medical School North roof level fire hydrant tanks and pumps to satisfy the requirements for building over 25m by way of increasing the hydrant capacity to 50kL and including a standby pump set. (note this should be considered with the sprinkler requirements nominated below)

- Provide internal window sprinklers to the medical school south adjacent the booster to provide a radiant heat barrier and prepare a fire engineered alternative solution to permit use of drenchers in lieu of passive fire rated construction.

- Install new fire hydrant risers within the fire isolated stairs of the Medical School North building.

Further to the should the fire hydrants within the Medical School North building be located within the fire isolated sitars shortfall in hydrant coverage will be created, a fire engineered alternative solution will be required to address this are on non-compliance.

**Clause E1.4 – Fire Hose Reels**

The BCA requires the building to be provided with fire hose reels installed in accordance with AS2441 as the building exceeds 500 m² in floor area. AS2441 also requires that all areas of the
building be in reach of a 36 metre fire hose reel with 4 metre hose stream, located 4 metres from
and exit, additional supplementary fire hose reels can be provided if required.

There are a number of fire hose reels distributed throughout the buildings providing the required
coverage and generally located within 4 metres of exits.

CONSIDERED COMPLYING

Clause E1.5 – Sprinklers

BCA Clause E1.5 stipulates 2 requirements for the automatic fire sprinklers and states the all
buildings over 25m effective height to be provided with automatic fire sprinklers throughout, as
such the Medical School South Building is required to be provided with automatic fire sprinklers.
Further to this should the North and South building not be fire separated from one another the
Medical School North building is required to be sprinkler protected also.

Neither building is provided with automatic fire sprinklers.

The two building appear to be fire separated from one another and are provide with fire doors at
each of the interconnections at basement and ground level, however requires further invasive
inspections. It is anticipated the roof of the Florey lecture theatre is not fire rated creating an
exposure to the Medical School South façade and the ground floor sliding fire door adjacent Florey
lecture theatre foyer appears to be obstructed. As such, a breach in compartmentation exists.

CONSIDERED NON-COMPLYING

Recommendation

It is recommended:

- Sprinkler protection is provided throughout the Medical School South building.
- Fire compartmentation is achieved to between the two buildings to negate the need for
  sprinklers within the Medical School North building, including:
  - External window wetting sprinklers the Medical School South northern facade.
  - Rectification of the ground floor sliding fire door.

Clause E1.6 – Portable Fire Extinguishers

The BCA requires that as a minimum, portable fire extinguishers be provided to cover to suit the
content of the building in accordance with AS 2444.

The building is currently provided numerous fire extinguishers. These are located generally with the
fire hose reels.

CONSIDERED COMPLYING

Clause E1.8 – Fire Control Centres

The BCA requires all buildings over 25m to be provided with a fire control centre in the main entry
to the building to house the Fire Indicator Panel and Master Evacuation Control Panel for fire
brigade utilisation.

The Florey lecture theatre entry foyer which forms part of the Medical School North building
contains the Fire Indicator Panel and Master Evacuation Control Panel which serve both buildings
and satisfies the requirements for a fire control centre for the two buildings, however is located within the Medical School North Building however is only required for the South building.

**CONSIDERED NON-COMPLYING**

**Recommendation**

Prepare a fire engineered alternative solution retain the existing arrangement.

**Clause E1.10 – Provisions for Special Hazards**

In our experience, the current use of the building does not represent a "special hazard" and we do not believe there are special fire fighting issues that may arise.

**CONSIDERED COMPLYING**

**Part E2 – Smoke Hazard Management**

Table E2.2b, requires buildings over 25m to be provided with a stair pressurisation system, zone pressurisation system and a smoke detection system to control the systems. For buildings over 3 storey however below 25m the requirements are less onerous and can be provided with either an automatic fire sprinkler system, AS1670 smoke detection system, or a stair pressurisation system. All buildings are required to be provide with smoke separation between fire compartments.

The Medical School South building currently has:

- Stair pressurisation system.
- Conventional fire detection system generally consisting of thermal detection with smoke detection in some discrete areas generally in accordance with AS1670, in lieu of smoke detection throughout.
- Some air handling plant controls, however is understood not to be a complete zone pressurisation system.
- No central air handling plant as such no risk of smoke spread via ductwork between fire compartments.

The Medical School South building currently has:

- Stair pressurisation system.
- Conventional smoke detection adjacent the fire stairs only for activation of the stair pressurisation system, in lieu of smoke detection throughout in accordance with AS1670 for smoke control systems.
- Some air handling plant controls, however is understood not to be a complete zone pressurisation system.
- Central air handling plant with common ductwork serving multiple floors with no smoke dampers at each level take-off, as such presents risk of smoke spread between fire compartments.

It should be noted the existing fire detection systems are conventional and zone based systems and not an addressable system, addressable systems are preferred by the SAMFS as it expedites the firefighting activities within complex buildings of this nature.

The systems have not been functionally tested as part of this investigation.

**CONSIDERED NON-COMPLYING**
Recommendation

*To achieve compliance it is recommended to:*-

- Provide additional smoke detection throughout the Medical School North building to satisfy the requirements of AS1670 for smoke control systems.
- Upgrade the existing conventional detection within the Medical School North building with addressable smoke detection.
- Upgrade the existing conventional thermal detection within the Medical School South building with addressable smoke detection.
- Provide smoke dampers to each floor of MSN central air conditioning system ductwork risers.
- Undertake functional testing of the stair pressurisation and air handling control systems to verify performance.

**Clause E4.2 – Emergency Lighting Requirements**

The BCA requires that emergency lighting must be installed as the building has a floor area of over 300 m².

Currently the building is provided with sparse emergency lighting provisions and it is doubtful that the required lighting levels are achieved in all areas.

*CONSIDERED NON-COMPLYING*

**Recommendation**

Additional emergency lighting should be provided to increase the emergency lighting light levels to satisfy the requirements of AS2293.1. This may be achievable by utilising the existing emergency lighting circuits and fitting new emergency lighting however some modifications may be required and an emergency lighting test switch should be provided in areas where there is no test switch facility at the existing switchboards.

**Clause E4.5 and E4.5 – Exit Signs and Direction Signs**

Exit and directional signage is required to be provided in this building above the doors leading to open space and must comply with AS2293.1.

The current exit signage provided is generally adequate however some are located such that view is obstructed and the type of signage utilised is a mixture of pictogram (running man) and “EXIT” text type.

*CONSIDERED NON-COMPLYING*

**Recommendation**

It is recommended the existing exit signs located such that the views are obstructed from approach are repositioned and all are upgraded to pictogram type.

**Clause E4.9 – Sound Systems and Intercom Systems for Emergency Purposes**

The BCA does require a sound system and intercom system for emergency purposes in buildings over 25m effective height. As such a system is required within the South building but
not the North building. However the north building is required to be provided with an occupant warning system as part of the smoke control (stair pressurisation system) which hold similar performance requirements.

The University generally requires a sound system and intercom system for emergency purposes in buildings of this nature

Currently both buildings are provided with a sound system and intercom system for emergency purposes, however the spacing and location of loud speakers are insufficient to satisfy the required sound levels throughout and the warden intercommunication point handsets many some areas do not comply with the current requirements.

CONSIDERED NON-COMPLYING

Recommendation

To satisfy the sound level requirements throughout the building additional speakers are required with every room.

To satisfy the requirements for the warden intercommunication point handsets the white handsets should be replaced with new red handsets.
3. RECOMMENDATIONS AND ESTIMATES

3.1 RECOMMENDATIONS

In summary the existing building’s fire and life safety systems require upgrade to satisfy the current requirements of BCA 2016. The items identified have been assessed and attributed an order of priority of either High, Medium or Low to enable the required works to be planned. The following table is arranged in high to low priority and provides an indicative breakdown of costs for undertaking the works.

3.2 BUDGET ESTIMATES

In order to determine whether sufficient funds are available to complete the works indicated above, the following table provides an indicative breakdown of costs for undertaking the works:

<table>
<thead>
<tr>
<th>Item</th>
<th>Importance</th>
<th>Estimated Budget Cost</th>
<th>Comment</th>
<th>Current RLB Cost Plan Allowance</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Prepare fire engineering report for:</td>
<td>High</td>
<td>$15,000.00</td>
<td></td>
<td>Nil</td>
</tr>
<tr>
<td>- Rationalise Fire Ratings</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Extended egress distances</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Proximity of Booster to building</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Hydrant coverage short falls</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Fire indicator panel serving MSS located with MSN</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Fire rate and provide alternative exit pathway for MSS east fire stair discharge at ground floor.</td>
<td>High</td>
<td>$100,000.00</td>
<td>RLB to review scope and advise estimate.</td>
<td>Nil</td>
</tr>
<tr>
<td>3. Re-swing MSS ground floor south-east exit door to open outwards.</td>
<td>High</td>
<td>$5,000.00</td>
<td></td>
<td>Nil</td>
</tr>
<tr>
<td>4. Provide egress path from MSS Levels 1 and 4 to MSN via link bridge.</td>
<td>High</td>
<td>$10,000.00</td>
<td></td>
<td>Nil</td>
</tr>
<tr>
<td>5. Upgrade exit signage/lighting throughout MSS and MSN.</td>
<td>High</td>
<td>$75,000.00</td>
<td></td>
<td>$22,640.00</td>
</tr>
<tr>
<td>6. Upgrade emergency lighting throughout MSS and MSN.</td>
<td>High</td>
<td>$130,000.00</td>
<td></td>
<td>$28,300.00</td>
</tr>
<tr>
<td>7. Upgrade occupant warning speakers throughout all areas of both MSN and MSS.</td>
<td>High</td>
<td>$250,000.00</td>
<td>Assumes works occur with detection upgrades for economy</td>
<td>$350,000.00</td>
</tr>
<tr>
<td>8. Provide addressable smoke detection throughout the un-protected areas of MSN for stair pressurisation control.</td>
<td>High</td>
<td>$75,000.00</td>
<td></td>
<td>$37,940.00</td>
</tr>
<tr>
<td></td>
<td>Description</td>
<td>Cost Class</td>
<td>Cost</td>
<td>Notes</td>
</tr>
<tr>
<td>---</td>
<td>-----------------------------------------------------------------------------</td>
<td>------------</td>
<td>------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>9</td>
<td>Replace existing conventional thermal detection with new addressable smoke detection throughout MSS.</td>
<td>High</td>
<td>$250,000.00</td>
<td>Option to retain existing conventional zone based system - $150,000 saving</td>
</tr>
<tr>
<td>10</td>
<td>Undertake functional testing of existing smoke control systems</td>
<td>High</td>
<td>$10,000.00</td>
<td>Nil</td>
</tr>
<tr>
<td>11</td>
<td>Install smoke dampers to each take-off from the central air conditioning ductwork risers within MSN.</td>
<td>Medium</td>
<td>$150,000.00</td>
<td>Nil</td>
</tr>
<tr>
<td>12</td>
<td>Replace existing conventional thermal detection with new addressable smoke detection throughout MSN.</td>
<td>Medium</td>
<td>$45,000.00</td>
<td>Assumes works occur with other detection upgrades for economy</td>
</tr>
<tr>
<td>13</td>
<td>Provide new fire hydrant risers within both MSN fire isolated stairs.</td>
<td>Medium</td>
<td>$40,000.00</td>
<td>Nil</td>
</tr>
<tr>
<td>14</td>
<td>Interlink MSN and MSS hydrant systems to use MSN pump and tanks with MSS booster.</td>
<td>Medium</td>
<td>$25,000.00</td>
<td>Nil</td>
</tr>
<tr>
<td>15</td>
<td>Upgrade Warden Intercommunication point handsets within MSN.</td>
<td>Medium</td>
<td>$10,000.00</td>
<td>Nil</td>
</tr>
<tr>
<td>16</td>
<td>Provide window wetting sprinklers to:</td>
<td>Medium</td>
<td>$50,000.00</td>
<td>RLB cost plan allowance is under MSS $40,000.00</td>
</tr>
<tr>
<td></td>
<td>- MSS ground floor north and south façade adjacent egress paths.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- MSS Level 2 and 3 North façade.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- MSS ground floor adjacent booster.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>Rectify the fire compartmentation at the ground floor sliding fire door between MSN and MSS.</td>
<td>Low</td>
<td>$10,000.00</td>
<td>Nil</td>
</tr>
<tr>
<td>18</td>
<td>Provide sprinkler protection throughout MSN.</td>
<td>Low</td>
<td>$650,000.00</td>
<td>Nil</td>
</tr>
<tr>
<td>19</td>
<td>Upgrade fire water infrastructure to duty/standby and capacity to serve combined sprinkler and hydrants.</td>
<td>Low</td>
<td>$300,000.00</td>
<td>$300,000.00</td>
</tr>
<tr>
<td>20</td>
<td>Incorporate nominal zone smoke control/pressurisation system to MSS.</td>
<td>Low</td>
<td>$500,000.00</td>
<td>Nil</td>
</tr>
<tr>
<td>21</td>
<td>Other.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Fire Hose Reels</td>
<td></td>
<td></td>
<td>Included within RLB Cost Plan $20,000.00</td>
</tr>
<tr>
<td></td>
<td>- Compartmentation rectification</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td><strong>$ 2,700,000.00</strong></td>
<td><strong>$ 1,000,560.00</strong></td>
</tr>
</tbody>
</table>
Costs above are exclusive of:

- GST.
- Consultancy design, certification and managing contractor fees.
- Latent conditions such as asbestos and the like.

### 3.3 FIRE AND LIFE SAFETY UPGRADE TIMEFRAME

Whilst we believe that all items outlined in this report should be undertaken in the shortest amount of time possible, we understand that there may be budgetary constraints involved in undertaking these upgrades and benefits in incorporating the works within any planned works in areas. As such we have categorised the above items into different priority groups to establish what items cause a higher level of risk than others.

We recommend that all of the above works are undertaken within a 7-year period in order of priority. The recommended scope and associated capital expenditure for each financial year is as follows:

<table>
<thead>
<tr>
<th>Financial Years</th>
<th>Items to be Rectified</th>
<th>Budget Estimated Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>2017/2018</td>
<td></td>
<td>$...000.00</td>
</tr>
<tr>
<td>2018/2019</td>
<td></td>
<td>$...000.00</td>
</tr>
<tr>
<td>2019/2020</td>
<td></td>
<td>$...000.00</td>
</tr>
<tr>
<td>2020/2021</td>
<td></td>
<td>$...000.00</td>
</tr>
<tr>
<td>2021/2022</td>
<td></td>
<td>$...000.00</td>
</tr>
<tr>
<td>2022/2023</td>
<td></td>
<td>$...000.00</td>
</tr>
</tbody>
</table>
**PROJECT NAME:** UNIVERSITY OF ADELAIDE
HEALTH SCIENCE INFRASTRUCTURE STRATEGY STAGE 2 (HSIS 2),

**PROJECT REF:** LCE12654-002 Fire and Life Safety Services

<table>
<thead>
<tr>
<th>REVISION</th>
<th>DESCRIPTION</th>
<th>DATE ISSUED</th>
<th>AUTHOR</th>
<th>REVIEWED</th>
</tr>
</thead>
<tbody>
<tr>
<td>P1</td>
<td>Preliminary Issue</td>
<td>12.04.2017</td>
<td>TT</td>
<td>-</td>
</tr>
</tbody>
</table>
EXECUTIVE SUMMARY

This report reviews the existing fire and life safety systems of University of Adelaide Medical School North and Medical School South buildings located on Frome Street, Adelaide, against the current legislative fire and life safety requirements for a building of this nature.

Although the building was constructed under different applicable legislation at the time, the current edition of the National Construction Code - Building Code of Australia (2016) has been utilised in this analysis as a benchmark.

The two buildings each have a rise in storeys of 7 (inclusive of ground floor) and contain a basement below ground level and have a total floor area of approximately marginally less than 11,000m² each. They each contain teaching, research and commercial facilities consisting of offices, laboratories, tutorial rooms and lecture theatres therefore the building occupancy is classified as multi-use class 5, 8 and 9b.

In general the existing fire and life safety measures installed at this premises do not satisfy all requirements of the current Building Code of Australia, the following issues were identified as being non-compliant or requiring attention:-

- Expected fire rating performance of existing building construction for laboratory use.
- Lack of fire rating of external exposures between the two buildings and of external egress paths adjacent the building.
- Insufficient fire rating of Medical School South eastern fire stair discharge corridor.
- Incorrect direction of door swing on egress path of Medical School South ground floor.
- Lack of available exit width at level 1 and level 4 of Medical School South for anticipated number of occupants.
- Excessive egress distances within Medical School South.
- Short comings of exit and emergency lighting and use of mixture of Pictogram and text type exit signs.
- Insufficient coverage of occupant warning speaker system.
- General use of thermal detection in lieu of smoke detection.
- Lack of smoke detection coverage to Medical School North building.
- Breach of smoke separation between floors within Medical School North via central air conditioning ductwork.
- Fire hydrants located within the general corridors in lieu of within the fire isolated stairs of the Medical School North Building.
- External hydrants required outlets to be modified and painted red.
- Lack of fire hydrant pumps serving the Medical School South building.
Medical School South Building exceeds 25m effective height as such is required to have yet is not provided with:

- Sprinkler system
- Zone pressurisation smoke control system
- Duty/Standby fire water storage tanks and pumps

Proximity of booster to glazed opening to the building.

The existing fire ratings due to the laboratory occupancy, excessive egress distance and booster location issues identified within this report may be addressed through development of a building solution utilising alternative solutions in order to obtain the necessary approvals required to consider this building as complying with the current Building Code of Australia (BCA).

Priority levels and budget estimates have been provided in this report itemised to each recommendation. The total budgetary allowance for works required to achieve compliance with the current BCA is approximately $2,700,000.00 + GST and recommendations have been made to distribute the expenditure over a period of 7 years in the order or priority as detailed within section 3 this report. Whilst we believe that all items outlined in this report should be undertaken in the shortest amount of time possible, we understand that there may be budgetary constraints involved in undertaking these upgrades.
1.**OVERVIEW**

1.1 **INTRODUCTION**

We provide the following report with respect to fire and life safety services for the University of Adelaide Medical School South and Medical School North buildings located on Frome Street, Adelaide, South Australia.

This report compares the existing fire and life safety provisions of the building against the current National Construction Code Volume 1 Building Code of Australia 2016 (BCA) requirements, with consideration to existing conditions and approvals within the building.

We note that the building plans available are relatively well maintained however as the buildings have undergone a number of alterations some details may be not be recorded acutely. Information presented within this report is based on site inspection, site measurements and analysis of the existing documentation.

1.2 **REFERENCED STANDARDS**

Below is a list of referenced standards and codes that this report is based upon:

<table>
<thead>
<tr>
<th>Standard/Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>AS2118.1 – Automatic fire sprinkler systems – Part 1</td>
</tr>
<tr>
<td>AS2419.1 – Fire Hydrant Installations – Part 1</td>
</tr>
<tr>
<td>AS2441 – Installation of Fire Hose Reels</td>
</tr>
<tr>
<td>AS2444 – Portable Fire Extinguishers and Fire Blankets</td>
</tr>
<tr>
<td>AS1670.1 – Fire Detection, Warning, Control and Intercom Systems</td>
</tr>
<tr>
<td>AS1670.4 – Fire Detection, Warning, Control and Intercom Systems</td>
</tr>
<tr>
<td>AS2293.1 – Emergency Escape Lighting and Exit Signs for Buildings</td>
</tr>
</tbody>
</table>
1.3 ASSUMPTIONS/LIMITATIONS

Due to the limited access provisions to inspect all areas, a number of assumptions have been made in the assessment. Below is a list of assumptions upon which this report is based:

1. External construction provides sufficient fire resistance levels to resist external exposures from fire source features including between the Medical School South and Medical School North buildings to satisfy the BCA requirements.

2. The items in this report have been based upon visual inspections only. Inspection of concealed cabling, pipework, passive fire protection or functionality testing of the installed systems has not been undertaken.

3. It is assumed that the preventative maintenance has been undertaken as required by SA Minister’s specifications and that subsequent defects have been rectified.

4. Sufficient water supply within the towns mains to satisfy the performance requirements of the hydrant system.

5. Smoke dampers are not provided within the central air conditioning ductwork risers at each level of the Medical School North building.

1.4 SITE DESCRIPTION

The site consists of two buildings directly adjacent one another with linkways between. Both buildings have street frontage to Frome Street and there is an external perimeter vehicle access road shared with the hospital precinct.

Figure 1. University of Adelaide Medical School North and South Ariel Image
1.5 BUILDING DESCRIPTION

The two buildings contain teaching, research and commercial facilities consisting of offices, laboratories, tutorial rooms and lecture theatres. Table 1.1 provides a brief description of the building relative to the BCA.

Table 1.1: Building characteristics.

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Medical School North</th>
<th>Medical School South</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Storeys Contained</td>
<td>8 Storeys</td>
<td>8 Storeys</td>
</tr>
<tr>
<td>Rise in Storeys</td>
<td>7 Storeys</td>
<td>7 Storeys</td>
</tr>
<tr>
<td>Building Classification</td>
<td>9b / 8 / 5</td>
<td>9b / 8 / 5</td>
</tr>
<tr>
<td>Total Building Area</td>
<td>10,600 m²</td>
<td>10,900 m²</td>
</tr>
<tr>
<td>Area of Largest Fire Compartment</td>
<td>1,690 m² (Basement)</td>
<td>1,480 m² (Typical Floor)</td>
</tr>
<tr>
<td>Type of Construction</td>
<td>Type A</td>
<td>Type A</td>
</tr>
<tr>
<td>Effective Height</td>
<td>24.44m</td>
<td>25.17m</td>
</tr>
</tbody>
</table>

The buildings are generally concrete and masonry construction throughout.

The buildings appear to be arranged to form fire compartmentation/separation both on a floor by floor basis and between the North and South buildings. They are connected to one another via:

- direct opening between the two buildings via the ground floor and level 1 lecture theatre foyers, with sliding fire door at the Medical School South building.
- direct opening between the two buildings via basement, with swing fire doors between the two buildings.
- an external link bridge at each level from level 2 to level 6.

1.6 BUILDING FIRE SAFETY COMMITTEE DEFICIENCIES

The University of Adelaide have advised the buildings are not subject to any outstanding defect notices from the Adelaide City Council Building Fire Safety Committee or the like.
2. BCA ASSESSMENT

2.1 PREAMBLE

The following BCA Assessment has been undertaken with regards to items relating to fire and life safety of the building occupants only. Items such as Energy Efficiency, Health and Sanitary, Requirements for Persons with Disabilities, etc. have not been assessed.

This analysis has been undertaken to the currently legislated BCA 2013 which was not the legislated Building Code of Australia at the time of design or construction however the current legislation provides a benchmark that a building should be assessed against for any due diligence review by the building occupants.

2.2 BUILDING AND CONSTRUCTION TYPE

Clause A3.2 – Classifications

The building is considered to be a mixed-use:

- class 9b - tertiary school
- class 8 - laboratory
- class 5 - office

with supporting storage, plant rooms and amenities.

NOTE

Clause C1.2 – Calculation of Rise in Storeys

The BCA definitions consider the building to have a rise in storeys of 7.

Note the basement level and roof levels to not contribute to the assessment of rise in storeys.

NOTE

Clause C1.1 – Type of Construction Required

Table C1.1 of the BCA requires that for a Class 9b, 8 or 5 building with a rise in storeys of 7, the minimum type of construction required is Type A. The general fire ratings required for class 8 buildings is 4hrs, whereas for class 9b and 5 buildings the generally fire rating requirement is 2hrs.

The actual type of construction is generally concrete, concrete encased steel and masonry block/brickwork, as such, it is assumed to meet the requirements of Type A for class 9b and 5, however unlikely to satisfy the requirements for 4hr fire rating associated with class 8 use.

CONSIDERED NON-COMPLYING

Recommendation

Given the use of the laboratory spaces appear to generally utilise small quantities of flammable or combustible materials it is recommended a formal fire engineered assessment is undertaken and to determine the suitability of a lesser fire rating which aligns with the existing building fire ratings.

Clause C2.2 – General Floor Area and Volume Limitations
Clause C2.2 and table C2.2 of the BCA specifies the maximum permissible fire compartment size for different building construction types and classifications. In the case of this building the maximum permissible floor area and volume for type A construction is over 5,000m² and 30,000m³ respectively.

CONSIDERED COMPLYING

Clause C3.2 – Protection of Openings in External Walls

Clause C3.2 requires openings exposed to external fire hazards (defined as the property boundary or adjacent buildings on the same site) be separated by a minimum distance (3m to property boundaries and 6m from adjacent buildings on the same site) or provided with a means of preventing fire spread between such as fire shutters, fire doors or wall wetting sprinklers.

The buildings are provided with separation from the adjacent sites by way of the perimeter vehicle driveway and parking appears to be no openings within the perimeter walls within 3 metres of the property boundary.

The two buildings are separated at each of the linkways by fire rated doors at ground and basement levels for internal links, the external links are open sided and of concrete and steel construction as such are not considered a risk to fire spread.

The Medical School South building however has glazed openings (windows) within 6m of the Medical School North Florey Lecture Theatre roof. The fire rating of the existing lecture theatre roof is unknown at this time, as such is assumed not to be fire rated and hence an exposure hazard exists between the two buildings.

Figure 2. Florey Lecture Theatre Roof exposure to Medical School South
CONSIDERED NON-COMPLYING

Recommendation
Clarify existing fire rating of lecture theatre roof, if not present provide external window wetting sprinklers to all windows on the North façade of the Medical School South building within 6m of the Florey Lecture Theatre roof. No protection is proposed to the roof.

2.3 EGRESS PATHS AND CONSTRUCTION OF EXITS

Clause D1.2 – Number of Exits Required
Based upon the classification, height and number of occupants of the buildings the Medical School South building requires 2 off exits from each level including the basement, whereas the Medical School North Building requires only a single exist from the above ground levels and 2 exits from the basement level.

It should be noted additional exits may be required above this minimum to satisfy egress distances. Each building is provided with a minimum of 2 exits from each level, generally via fire isolated sitars for upper levels and direct to outside for basement and ground floor.

CONSIDERED COMPLIING

Clause D1.4 – Exit Travel Distances
The class of the building requires that “no point on a floor must be more than 20 metres from an exit, or a point from which travel in different directions to 2 exits is available, in which case the maximum distance to one of those exits must not exceed 40 metres”.

Review of existing floor plans indicates the Medical School North Building satisfies the above, however the east and west extremities of the Medical School South building generally exceed the permissible 20m to a point of choice by 5-10m.

CONSIDERED NON-COMPLYING

Recommendation
Prepare a fire engineered alternative solution to justify the extended travel distances to a point of choice to suite the current or proposed building layout. This will require upgrade of the existing fire safety systems such as:

- Replace existing thermal detection with smoke detection.
- Upgrade occupant warning to current AS1670.4 requirements.

Clause D1.5 – Distances Between Alternative Exits
The BCA Clause D1.5 requires that for this classification of building, the distance between alternative exits must not exceed 60 metres.

In the case of these two buildings, compliance with BCA Clause D1.5 is achieved.

CONSIDERED COMPLIING
Clause D1.13 – Number of Persons Accommodated

BCA Clause D1.3 stipulates the method for calculating occupant numbers to establish the required egress widths. Using this method, it has been established that the maximum occupant numbers are as indicated below:-

Table 2.1: Building occupant numbers.

<table>
<thead>
<tr>
<th>FLOOR LEVEL</th>
<th>Use</th>
<th>Area (m²)</th>
<th>Area per person (m²/person)</th>
<th>No. of occupants</th>
<th>Use</th>
<th>Area (m²)</th>
<th>Area per person (m²/person)</th>
<th>No. of occupants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basement</td>
<td>Office</td>
<td>128</td>
<td>10</td>
<td>13</td>
<td>Lab</td>
<td>326</td>
<td>10</td>
<td>33</td>
</tr>
<tr>
<td></td>
<td>Lab</td>
<td>378</td>
<td>10</td>
<td>38</td>
<td>Store/Plant room</td>
<td>39</td>
<td>30</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Store/Plant room</td>
<td>478</td>
<td>30</td>
<td>16</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ground</td>
<td>Computer/Teaching/Research</td>
<td>396</td>
<td>2</td>
<td>198</td>
<td>Lecture Theatre</td>
<td>368</td>
<td>1</td>
<td>368</td>
</tr>
<tr>
<td></td>
<td>Office</td>
<td>197</td>
<td>10</td>
<td>20</td>
<td>Office</td>
<td>51</td>
<td>10</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Lab</td>
<td>93</td>
<td>10</td>
<td>9</td>
<td>Computer/Teaching/Research</td>
<td>345</td>
<td>2</td>
<td>173</td>
</tr>
<tr>
<td></td>
<td>Store/Plant room</td>
<td>93</td>
<td>30</td>
<td>3</td>
<td>Store/Plant room</td>
<td>128</td>
<td>30</td>
<td>4</td>
</tr>
<tr>
<td>1</td>
<td>Lecture Theatre</td>
<td>217</td>
<td>1</td>
<td>217</td>
<td>Computer/Teaching/Research</td>
<td>649</td>
<td>2</td>
<td>325</td>
</tr>
<tr>
<td></td>
<td>Office</td>
<td>397</td>
<td>10</td>
<td>40</td>
<td>Store/Plant room</td>
<td>80</td>
<td>30</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Lab</td>
<td>264</td>
<td>10</td>
<td>26</td>
<td>Office</td>
<td>72</td>
<td>10</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>Store/Plant room</td>
<td>105</td>
<td>30</td>
<td>4</td>
<td>Lecture</td>
<td>123</td>
<td>1</td>
<td>123</td>
</tr>
<tr>
<td>2</td>
<td>Office</td>
<td>365</td>
<td>10</td>
<td>37</td>
<td>Office</td>
<td>240</td>
<td>10</td>
<td>24</td>
</tr>
<tr>
<td></td>
<td>Lab</td>
<td>339</td>
<td>10</td>
<td>34</td>
<td>Labs</td>
<td>651</td>
<td>10</td>
<td>65</td>
</tr>
<tr>
<td></td>
<td>Store/Plant room</td>
<td>34</td>
<td>30</td>
<td>1</td>
<td>Store/Plant room</td>
<td>180</td>
<td>30</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Computer/Teaching/Research</td>
<td>4</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>Office</td>
<td>248</td>
<td>10</td>
<td>25</td>
<td>Office</td>
<td>257</td>
<td>10</td>
<td>26</td>
</tr>
<tr>
<td></td>
<td>Lab</td>
<td>308</td>
<td>10</td>
<td>31</td>
<td>Labs</td>
<td>327</td>
<td>10</td>
<td>33</td>
</tr>
<tr>
<td></td>
<td>Store/Plant room</td>
<td>93</td>
<td>30</td>
<td>3</td>
<td>Store/Plant room</td>
<td>145</td>
<td>30</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Museum</td>
<td>63</td>
<td>4</td>
<td>16</td>
<td>Computer/Teaching/Research</td>
<td>267</td>
<td>2</td>
<td>134</td>
</tr>
<tr>
<td>4</td>
<td>Office</td>
<td>257</td>
<td>10</td>
<td>26</td>
<td>Computer/Teaching/Research</td>
<td>383</td>
<td>2</td>
<td>192</td>
</tr>
<tr>
<td></td>
<td>Lab</td>
<td>465</td>
<td>10</td>
<td>47</td>
<td>Office</td>
<td>267</td>
<td>10</td>
<td>27</td>
</tr>
<tr>
<td></td>
<td>Store/Plant room</td>
<td>17</td>
<td>30</td>
<td>1</td>
<td>Lab</td>
<td>460</td>
<td>10</td>
<td>46</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Store/Plant room</td>
<td>56</td>
<td>30</td>
<td>2</td>
</tr>
</tbody>
</table>
Clause D1.6 – Dimensions of Exits and Paths of Travel to Exits

Based upon the occupancy calculated above, the required minimum aggregate unobstructed width of the exits must be as scheduled below. The site measured available egress width is also scheduled below for comparison.

Table 2.2: Exit widths.

<table>
<thead>
<tr>
<th>Part</th>
<th>Medical School North</th>
<th>Medical School South</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Required Egress Width (m)</td>
<td>Available Egress Width</td>
</tr>
<tr>
<td>Basement</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Ground Floor</td>
<td>2.5</td>
<td>8</td>
</tr>
<tr>
<td>Level 1</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Level 2</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Level 3</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Level 4</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Level 5</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Level 6</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Roof / Plant</td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>
It can be seen generally the exit width requirements are satisfied with the exception of level 1 and Level 4 of Medical School South.

**CONSIDERED NON-COMPLYING**

**Recommendation**

Reconfigure the exit doors to Utilise the link bridge between the two buildings as a required exit path from the Medical School South building to the Medical School North building at levels 1 and 4, this will require re-swinging the doors to open outwards and additional exit signage.

The above will resolve level 4, however the additional egress width will not satisfy level 1, as such it is suggested the level 1 occupancy is limited to the permissible maximum of 320 persons if the above egress path via the link is created.

**Clause D1.7 – Travel via Fire Isolated Exits**

The BCA requires that fire isolated exits, in this case the fire isolated stairs, are configured such that:

- Access is only via a public corridor.
- Discharges outside the building to a road or open space.
- External path of travel from the exit discharge is protected from the effect of fire from openings within 6m of the building.
- Number of access doors to an exit at each level is limited to 2.

Generally, the exits are configured in accordance with the above, with the exception of the following:

- The point of discharge from the Medical School South fire isolated stairs from ground level and basement level requires evacuating occupants to travel within 6m of openings (windows) into the building however no protection is provided to the openings.
- The Medical School South eastern stair discharges internally into a non-fire isolated stairway.

**CONSIDERED NON-COMPLYING**

**Recommendation**

*Provide internal window wetting sprinklers to the rooms adjacent the external exit paths, ramps and stairs.*
Figure 3. Recommended internal window wetting sprinklers to Medical School South Ground Floor

Retain the current Medical School South east stair exit path and:

- Retrospectively upgrade the fire rating of the corridor, including fire doors to the lecture theatres.
- Provide a new set of fire doors to separate the adjacent main switch room access.
- Provide signage to the main corridor (west) to provide an alternative exit path to the main (west) internal corridor, should there be a fire event that compromises the fire rated exit corridor.
- Provide vision panels to all fire doors to provide occupants an opportunity to make a decision which path to take.
Clause D1.10 – Discharge from Exits

The BCA requires that:

- Exits are not “blocked at the point of discharge” and that suitable barriers are provided if there is a risk of exits being obstructed.
- External path of travel to a road or open space is not less than the required exit width.
- External stair and ramps are of a specific dimensions and grades.
- Alternative exists are separated as far as possible from one another.
- Exits from auditoriums with more than 500 people are provided with not less than 2/3 from the main entry foyer.

The exit discharges are generally considered complaint with the above, however the dimensions and gradient of external exit paths have not been assessed.

CONSIDERED COMPLYING

Clause D2.20 – Swinging Doors

The BCA requires that swinging doors in required exits must swing in the direction of egress.

All swinging doors forming required exits open in the direction of egress with the exception of the ground floor Medical School South south-east and West external exit doors which swing
inwards, it should be noted this door serves one of the two building’s fire isolated sitars and 2 off lecture theatres as such has a high utilisation.

Figure 5. Medical School South existing south-east external exit door
Recommendation

Amend the door to swing outwards.

Clause D2.21 – Operation of Latch

The BCA states that “doors in required exits, forming part of a required exit or in the path of travel to a required exit must be readily openable without a key from the side that faces a person seeking egress, by a single hand downward action or pushing action on a single device.”

The doors provided with exit signage throughout the buildings are generally considered complying with the above.

CONSIDERED COMPLYING
2.4 FIRE SERVICES

Clause E1.3 – Fire Hydrants

Both buildings are required to be served via an on-site fire hydrant system in accordance with BCA E1.3, complying with AS2419 given it is greater than 500 m² in floor area.

Due to the floor area of the largest fire compartment the fire hydrant flow rate design criteria within AS2419.1 requires that the two most disadvantaged fire hydrants flow at 10L/s @ 350 kPa each (without the assistance of a fire brigade pumping appliance).

As the Medical School South building exceeds 25m it is required to be provided with onsite water storage tanks and duty/standby pump sets.

Given the height of the Medical school south building it is not possible to achieve the required performance of the hydrant system directly from the towns mains, as such is required to be provide with a hydrant pump and a break tank.

The two building are currently configured with independent fire hydrant systems.

The Medical School South building is supplied directly from the town mains with a booster located adjacent the south-west corner of the building and fire hydrants located internally within the fire isolated stairs. It is not provided with tanks and pumps and does not achieve the required hydrant performance.

The Medical School North building is provided with 2 off 15,000L fire hydrant water storage tanks and a single diesel pump at roof level, with a break tank and electric transfer pump at basement level to serve the hydrant system. The booster is located at the terrace level, above street level, and consists of a inlet point only and not suction provisions. The fire hydrants are generally located within the general corridors, not within the fire isolated stairs as required.

Both buildings booster assemblies are located within 10m of openings (windows) to the building and are not provide with a radiant heat barrier of 90/90/90FRL.

Hydrant coverage throughout the buildings is generally achieved.
As such the hydrant system is not considered to satisfy the requirements of BCA E1.3. CONSIDERED NON-COMPLYING

Recommendation

The following measures are recommended to be implemented:

- Connect the two building to become a single system to utilise the booster of the Medical School South building and the tanks/pump of the Medical School North building.

- Upgrade the existing Medical School North roof level fire hydrant tanks and pumps to satisfy the requirements for building over 25m by way of increasing the hydrant capacity to 50kL and including a standby pump set.
  (note this should be considered with the sprinkler requirements nominated below)

- Provide internal window sprinklers to the medical school south adjacent the booster to provide a radiant heat barrier and prepare a fire engineered alternative solution to permit use of drenchers in lieu of passive fire rated construction.

- Install new fire hydrant risers within the fire isolated stairs of the Medical School North building.

Further to the should the fire hydrants within the Medical School North building be located within the fire isolated sitars shortfall in hydrant coverage will be created, a fire engineered alternative solution will be required to address this are on non-compliance.

Clause E1.4 – Fire Hose Reels

The BCA requires the building to be provided with fire hose reels installed in accordance with AS2441 as the building exceeds 500 m² in floor area. AS2441 also requires that all areas of the
building be in reach of a 36 metre fire hose reel with 4 metre hose stream, located 4 metres from and exit, additional supplementary fire hose reels can be provided if required.

There are a number of fire hose reels distributed throughout the buildings providing the required coverage and generally located within 4 metres of exits.

CONSIDERED COMPLYING

Clause E1.5 – Sprinklers

BCA Clause E1.5 stipulates 2 requirements for the automatic fire sprinklers and states the all buildings over 25m effective height to be provided with automatic fire sprinklers throughout, as such the Medical School South Building is required to be provided with automatic fire sprinklers.

Further to this should the North and South building not be fire separated from one another the Medical School North building is required to be sprinkler protected also.

Neither building is provided with automatic fire sprinklers.

The two building appear to be fire separated from one another and are provide with fire doors at each of the interconnections at basement and ground level, however requires further invasive inspections. It is anticipated the roof of the Florey lecture theatre is not fire rated creating an exposure to the Medical School South façade and the ground floor sliding fire door adjacent Florey lecture theatre foyer appears to be obstructed. As such, a breach in compartmentation exists.

CONSIDERED NON-COMPLYING

Recommendation

It is recommended:

- Sprinkler protection is provided throughout the Medical School South building.
- Fire compartmentation is achieved to between the two buildings to negate the need for sprinklers within the Medical School North building, including:
  - External window wetting sprinklers the Medical School South northern façade.
  - Rectification of the ground floor sliding fire door.

Clause E1.6 – Portable Fire Extinguishers

The BCA requires that as a minimum, portable fire extinguishers be provided to cover to suit the content of the building in accordance with AS 2444.

The building is currently provided numerous fire extinguishers. These are located generally with the fire hose reels.

CONSIDERED COMPLYING

Clause E1.8 – Fire Control Centres

The BCA requires all buildings over 25m to be provided with a fire control centre in the main entry to the building to house the Fire Indicator Panel and Master Evacuation Control Panel for fire brigade utilisation.

The Florey lecture theatre entry foyer which forms part of the Medical School North building contains the Fire Indicator Panel and Master Evacuation Control Panel which serve both buildings
and satisfies the requirements for a fire control centre for the two buildings, however is located within the Medical School North Building however is only required for the South building.

**CONSIDERED NON-COMPLYING**

**Recommendation**

Prepare a fire engineered alternative solution retain the existing arrangement.

**Clause E1.10 – Provisions for Special Hazards**

In our experience, the current use of the building does not represent a “special hazard” and we do not believe there are special fire fighting issues that may arise.

**CONSIDERED COMPLYING**

**Part E2 – Smoke Hazard Management**

Table E2.2b, requires buildings over 25m to be provided with a stair pressurisation system, zone pressurisation system and a smoke detection system to control the systems. For buildings over 3 storey however below 25m the requirements are less onerous and can be provided with either an automatic fire sprinkler system, AS1670 smoke detection system, or a stair pressurisation system. All buildings are required to be provide with smoke separation between fire compartments.

The Medical School South building currently has:

- Stair pressurisation system.
- Conventional fire detection system generally consisting of thermal detection with smoke detection in some discrete areas generally in accordance with AS1670, in lieu of smoke detection throughout.
- Some air handling plant controls, however is understood not to be a complete zone pressurisation system.
- No central air handling plant as such no risk of smoke spread via ductwork between fire compartments.

The Medical School South building currently has:

- Stair pressurisation system.
- Conventional smoke detection adjacent the fire stairs only for activation of the stair pressurisation system, in lieu of smoke detection throughout in accordance with AS1670 for smoke control systems.
- Some air handling plant controls, however is understood not to be a complete zone pressurisation system.
- Central air handling plant with common ductwork serving multiple floors with no smoke dampers at each level take-off, as such presents risk of smoke spread between fire compartments.

It should be noted the existing fire detection systems are conventional and zone based systems and not an addressable system, addressable systems are preferred by the SAMFS as it expedites the firefighting activities within complex buildings of this nature.

The systems have not been functionally tested as part of this investigation.

**CONSIDERED NON-COMPLYING**
Recommendation

To achieve compliance it is recommended to:

- Provide additional smoke detection throughout the Medical School North building to satisfy the requirements of AS1670 for smoke control systems.
- Upgrade the existing conventional detection within the Medical School North building with addressable smoke detection.
- Upgrade the existing conventional thermal detection within the Medical School South building with addressable smoke detection.
- Provide smoke dampers to each floor of MSN central air conditioning system ductwork risers.
- Undertake functional testing of the stair pressurisation and air handling control systems to verify performance.

Clause E4.2 – Emergency Lighting Requirements

The BCA requires that emergency lighting must be installed as the building has a floor area of over 300 m².

Currently the building is provided with sparse emergency lighting provisions and it is doubtful that the required lighting levels are achieved in all areas.

**CONSIDERED NON-COMPLYING**

Recommendation

Additional emergency lighting should be provided to increase the emergency lighting light levels to satisfy the requirements of AS2293.1. This may be achievable by utilising the existing emergency lighting circuits and fitting new emergency lighting however some modifications may be required and an emergency lighting test switch should be provided in areas where there is no test switch facility at the existing switchboards.

Clause E4.5 and E4.5 – Exit Signs and Direction Signs

Exit and directional signage is required to be provided in this building above the doors leading to open space and must comply with AS2293.1.

The current exit signage provided is generally adequate however some are located such that view is obstructed and the type of signage utilised is a mixture of pictogram (running man) and “EXIT” text type.

**CONSIDERED NON-COMPLYING**

Recommendation

It is recommended the existing exit signs located such that the views are obstructed from approach are repositioned and all are upgraded to pictogram type.

Clause E4.9 – Sound Systems and Intercom Systems for Emergency Purposes

The BCA does requires a sound system and intercom system for emergency purposes in buildings over 25m effective height. As such a system is required within the South building but
not the North building. However the north building is required to be provided with an occupant warning system as part of the smoke control (stair pressurisation system) which hold similar performance requirements.

The University generally requires a sound system and intercom system for emergency purposes in buildings of this nature

Currently both buildings are provided with a sound system and intercom system for emergency purposes, however the spacing and location of loud speakers are insufficient to satisfy the required sound levels throughout and the warden intercommunication point handsets many some areas do not comply with the current requirements.

CONSIDERED NON-COMPLYING

Recommendation

To satisfy the sound level requirements throughout the building additional speakers are required with every room.

To satisfy the requirements for the warden intercommunication point handsets the white handsets should be replaced with new red handsets.
3. **RECOMMENDATIONS AND ESTIMATES**

3.1 **RECOMMENDATIONS**

In summary the existing building’s fire and life safety systems require upgrade to satisfy the current requirements of BCA 2016. The items identified have been assessed and attributed an order of priority of either High, Medium or Low to enable the required works to be planned. The following table is arranged in high to low priority and provides an indicative breakdown of costs for undertaking the works.

3.2 **BUDGET ESTIMATES**

In order to determine whether sufficient funds are available to complete the works indicated above, the following table provides an indicative breakdown of costs for undertaking the works:-

<table>
<thead>
<tr>
<th>Item</th>
<th>Importance</th>
<th>Estimated Budget Cost</th>
<th>Comment</th>
<th>Current RLB Cost Plan</th>
<th>Allowance</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Prepare fire engineering report for:-</td>
<td>High</td>
<td>$15,000.00</td>
<td></td>
<td></td>
<td>Nil</td>
</tr>
<tr>
<td>- Rationalise Fire Ratings</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Extended egress distances</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Proximity of Booster to building</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Hydrant coverage short falls</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Fire indicator panel serving MSS located with MSN</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Fire rate and provide alternative exit pathway for MSS east fire stair discharge at ground floor.</td>
<td>High</td>
<td>$100,000.00</td>
<td>RLB to review scope and advise estimate.</td>
<td></td>
<td>Nil</td>
</tr>
<tr>
<td>3. Re-swing MSS ground floor south-east exit door to open outwards.</td>
<td>High</td>
<td>$5,000.00</td>
<td></td>
<td></td>
<td>Nil</td>
</tr>
<tr>
<td>4. Provide egress path from MSS Levels 1 and 4 to MSN via link bridge.</td>
<td>High</td>
<td>$10,000.00</td>
<td></td>
<td></td>
<td>Nil</td>
</tr>
<tr>
<td>5. Upgrade exit signage/lighting throughout MSS and MSN.</td>
<td>High</td>
<td>$75,000.00</td>
<td></td>
<td>$22,640.00</td>
<td></td>
</tr>
<tr>
<td>6. Upgrade emergency lighting throughout MSS and MSN.</td>
<td>High</td>
<td>$130,000.00</td>
<td></td>
<td>$28,300.00</td>
<td></td>
</tr>
<tr>
<td>7. Upgrade occupant warning speakers throughout all areas of both MSN and MSS.</td>
<td>High</td>
<td>$250,000.00</td>
<td>Assumes works occur with detection upgrades for economy</td>
<td>$350,000.00</td>
<td></td>
</tr>
<tr>
<td>8. Provide addressable smoke detection throughout the un-protected areas of MSN for stair pressurisation control.</td>
<td>High</td>
<td>$75,000.00</td>
<td></td>
<td>$37,940.00</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Description</td>
<td>Risk</td>
<td>Cost</td>
<td>Savings</td>
<td>Notes</td>
</tr>
<tr>
<td>---</td>
<td>-----------------------------------------------------------------------------</td>
<td>------</td>
<td>------</td>
<td>---------</td>
<td>-------</td>
</tr>
<tr>
<td>9</td>
<td>Replace existing conventional thermal detection with new addressable smoke detection throughout MSS.</td>
<td>High</td>
<td>$250,000.00</td>
<td>$1,680.00</td>
<td>Option to retain existing conventional zone based system - $150,000 saving</td>
</tr>
<tr>
<td>10</td>
<td>Undertake functional testing of existing smoke control systems</td>
<td>High</td>
<td>$10,000.00</td>
<td>Nil</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Install smoke dampers to each take-off from the central air conditioning ductwork risers within MSN.</td>
<td>Medium</td>
<td>$150,000.00</td>
<td>Nil</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Replace existing conventional thermal detection with new addressable smoke detection throughout MSN.</td>
<td>Medium</td>
<td>$45,000.00</td>
<td>Nil</td>
<td>Assumes works occur with other detection upgrades for economy</td>
</tr>
<tr>
<td>13</td>
<td>Provide new fire hydrant risers within both MSN fire isolated stairs.</td>
<td>Medium</td>
<td>$40,000.00</td>
<td>Nil</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>Interlink MSN and MSS hydrant systems to use MSN pump and tanks with MSS booster.</td>
<td>Medium</td>
<td>$25,000.00</td>
<td>Nil</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>Upgrade Warden Intercommunication point handsets within MSN.</td>
<td>Medium</td>
<td>$10,000.00</td>
<td>Nil</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>Provide window wetting sprinklers to:</td>
<td>Medium</td>
<td>$50,000.00</td>
<td>$40,000.00</td>
<td>RLB cost plan allowance is under MSS</td>
</tr>
<tr>
<td></td>
<td>- MSS ground floor north and south façade adjacent egress paths.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- MSS Level 2 and 3 North façade.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- MSS ground floor adjacent booster.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>Rectify the fire compartmentation at the ground floor sliding fire door between MSN and MSS.</td>
<td>Low</td>
<td>$10,000.00</td>
<td>Nil</td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>Provide sprinkler protection throughout MSN.</td>
<td>Low</td>
<td>$650,000.00</td>
<td>Nil</td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>Upgrade fire water infrastructure to duty/standby and capacity to serve combined sprinkler and hydrants.</td>
<td>Low</td>
<td>$300,000.00</td>
<td>$300,000.00</td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>Incorporate nominal zone smoke control/pressurisation system to MSS.</td>
<td>Low</td>
<td>$500,000.00</td>
<td>Nil</td>
<td></td>
</tr>
<tr>
<td>21</td>
<td>Other.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Fire Hose Reels</td>
<td></td>
<td></td>
<td>Included within RLB Cost Plan $20,000.00</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Compartmentation rectification</td>
<td></td>
<td></td>
<td>$200,000.00</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td>$2,700,000.00</td>
<td>$1,000,560.00</td>
<td></td>
</tr>
</tbody>
</table>
Costs above are exclusive of:

- GST.
- Consultancy design, certification and managing contractor fees.
- Latent conditions such as asbestos and the like.

### 3.3 FIRE AND LIFE SAFETY UPGRADE TIMEFRAME

Whilst we believe that all items outlined in this report should be undertaken in the shortest amount of time possible, we understand that there may be budgetary constraints involved in undertaking these upgrades and benefits in incorporating the works within any planned works in areas. As such we have categorised the above items into different priority groups to establish what items cause a higher level of risk than others.

We recommend that all of the above works are undertaken within a 7-year period in order of priority. The recommended scope and associated capital expenditure for each financial year is as follows:

<table>
<thead>
<tr>
<th>Financial Years</th>
<th>Items to be Rectified</th>
<th>Budget Estimated Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>2017/2018</td>
<td></td>
<td>$........................000.00</td>
</tr>
<tr>
<td>2018/2019</td>
<td></td>
<td>$........................000.00</td>
</tr>
<tr>
<td>2019/2020</td>
<td></td>
<td>$........................000.00</td>
</tr>
<tr>
<td>2020/2021</td>
<td></td>
<td>$........................000.00</td>
</tr>
<tr>
<td>2021/2022</td>
<td></td>
<td>$........................000.00</td>
</tr>
<tr>
<td>2022/2023</td>
<td></td>
<td>$........................000.00</td>
</tr>
</tbody>
</table>
8 Appendix D - Site Survey

Refer to attached site survey produced by Alexander Symonds.
9 Appendix E – Planning Approval Documents

Refer to attached drawings issued for planning approval.
10 Appendix F – 30% Documentation Drawings

Refer to attached drawings issued for 30% documentation milestone.
REFURBISHED COMMS ROOM

BASEMENT AREAS
GFA = 2,214m²
AREA UNDER REFURBISHMENT = 10m²
NEW SWITCHROOM
NEW KITCHENETTE FOR ALL STAFF
NEW PAVING TO ALFRESCO AREA
REFURBISHED DDA COMPLIANT FACILITIES
REFURBISHED OFFICE SPACE FOR STUDENT SERVICES
REFURBISHED MEETING ROOM
REFURBISHED RECEPTION SPACE FOR MICROSCOPY
REFURBISHED CIRCULATION SPACE. NEW FLOOR COVERING
REFURBISHED TUTORIAL SPACES FOR MICROSCOPY
NEW MULTI-MODAL TEACHING MUSEUM. REFER TO PREVIOUSLY SUBMITTED EARLY WORKS PACKAGED A/0172/2017
NEW LOADING DOCK AND STORAGE SPACE
NEW STORAGE AND SPECIMEN PREPARATION AREA FOR MULTI-MODAL TEACHING MUSEUM
SCHOOL LEGEND
ANATOMY/PATHOLOGY
CIRCULATION
DDA FACILITIES
DELIVERIES & STORAGE
HEALTH SCIENCE FACULTY
MEDICINE
MICROSCOPY
OUT OF SCOPE
PLANT
STUDENT HUB

GROUNDS AREAS
GFA = 3,073m²
AREA UNDER REFURBISHMENT = 1,230m²
REFURBISHED DDA COMPLIANT FACILITIES

REFURBISHED MEETING ROOM

REFURBISHED OFFICE SPACE FOR SCHOOL OF MEDICINE

REFURBISHED OFFICE SPACE FOR SCHOOL OF MEDICINE

REFURBISHED OFFICE SPACE FOR SCHOOL OF MEDICINE

NEW COMMS ROOM

REFURBISHED SHARED FACILITIES FOR SCHOOL OF MEDICINE

REFURBISHED OFFICE SPACE FOR SCHOOL OF MEDICINE

REFURBISHED CIRCULATION SPACE. NEW FLOOR COVERING

MSS LEVEL 2 NOT IN SCOPE

LEVEL 1 AREAS
GFA = 3,000sf
AREA UNDER REFURBISHMENT = 853 sf

HMSIS2
PROPOSED LEVEL 1 FLOOR PLAN
REFURBISHED DDA COMPLIANT FACILITIES

REFURBISHED MEETING ROOM

REFURBISHED OFFICE SPACE FOR SCHOOL OF MEDICINE

REFURBISHED OFFICE SPACE FOR SCHOOL OF MEDICINE

NEW COMMUN Room

REFURBISHED OFFICE SPACE FOR SCHOOL OF MEDICINE

REFURBISHED OFFICE SPACE FOR SCHOOL OF MEDICINE

REFURBISHED SHARE FACILITIES FOR SCHOOL OF MEDICINE

REFURBISHED STORE ROOM FACILITIES FOR SCHOOL OF MEDICINE

REFURBISHED CIRCULATION SPACE

EXISTING LABORATORY DIVIDED INTO TWO SEPARATE LABORATORIES

NEW CELL CULTURE LABORATORY

LEVEL 2 AREAS

GFA = 2,627m²

AREA UNDER REFURBISHMENT = 1,423m²
MSN LEVEL 4 NOT OCCUPIED
EXISTING OFFICES
REFURBISHED MEETINGROOMS
REFURBISHED LABORATORY SPACE
EXISTING OFFICE SPACE TO BE REFURBISHED AS LAB SPACE
REFURBISHED LABORATORY SPACE
REFURBISHED LABORATORY SPACE
REFURBISHED OFFICE SPACE FOR SCHOOL OF MEDICINE
REFURBISHED MEETING ROOMS

LEVEL 4 AREAS
GFA = 2,625 m²
AREA UNDER REFURBISHMENT = 960 m²

HMSIS2
PROPOSED LEVEL 4 FLOOR PLAN
HMSIS2
PROPOSED LEVEL 5 FLOOR PLAN

LEVEL 5 AREAS
GFA = 2,025 m²
AREA UNDER REFURBISHMENT = 1,273 m²
HMSIS2
PROPOSED LEVEL 6 FLOOR PLAN

MSN LEVEL 6 NOT OCCUPIED

MSS LEVEL 6 OUT OF SCOPE

LEVEL 6 AREAS
GFA = 2,625 m²
AREA UNDER REFURBISHMENT = 0 m²

FOR APPROVAL

DWG SK-2308 - P1
SCALE 1 : 200 @ A1
DATE 03/28/17
HMSIS2
MSN - L06 - DEMO PLAN
LEVEL 5 NOT OCCUPIED
LEVEL 6 NOT OCCUPIED
BASEMENT LEVEL NOT IN SCOPE
<table>
<thead>
<tr>
<th>ROOM NO</th>
<th>ROOM NAME</th>
<th>DEPARTMENT</th>
<th>OCCUPANCY</th>
<th>AREA</th>
</tr>
</thead>
<tbody>
<tr>
<td>SG1</td>
<td>ENTRANCE</td>
<td>CIRCULATION</td>
<td>6</td>
<td>m²</td>
</tr>
<tr>
<td>SG2b</td>
<td>LIFT FOYER</td>
<td>CIRCULATION</td>
<td>23</td>
<td>m²</td>
</tr>
<tr>
<td>SG7</td>
<td>AIRLOCK</td>
<td>CIRCULATION</td>
<td>3</td>
<td>m²</td>
</tr>
<tr>
<td>SG19</td>
<td>MUSEUM ENTRY</td>
<td>CIRCULATION</td>
<td>8</td>
<td>m²</td>
</tr>
<tr>
<td>SG8</td>
<td>AIRLOCK</td>
<td>DDA FACILITIES</td>
<td>3</td>
<td>m²</td>
</tr>
<tr>
<td>SG8a</td>
<td>FEMALE WC</td>
<td>DDA FACILITIES</td>
<td>20</td>
<td>m²</td>
</tr>
<tr>
<td>SG9</td>
<td>AIRLOCK</td>
<td>DDA FACILITIES</td>
<td>4</td>
<td>m²</td>
</tr>
<tr>
<td>SG10</td>
<td>AIRLOCK</td>
<td>DDA FACILITIES</td>
<td>5</td>
<td>m²</td>
</tr>
<tr>
<td>SG10a</td>
<td>MALE WC</td>
<td>DDA FACILITIES</td>
<td>26</td>
<td>m²</td>
</tr>
<tr>
<td>SG10b</td>
<td>MALE WC</td>
<td>DDA FACILITIES</td>
<td>17</td>
<td>m²</td>
</tr>
<tr>
<td>S23b</td>
<td>STORE - WASTE</td>
<td>DELIVERIES &amp; STORAGE</td>
<td>35</td>
<td>m²</td>
</tr>
<tr>
<td>SG21</td>
<td>NITROGEN D EWER</td>
<td>DELIVERIES &amp; STORAGE</td>
<td>11</td>
<td>m²</td>
</tr>
<tr>
<td>SG21a</td>
<td>STORE - CLEAN BINS</td>
<td>DELIVERIES &amp; STORAGE</td>
<td>29</td>
<td>m²</td>
</tr>
<tr>
<td>SG21b</td>
<td>STORE - RETAIL</td>
<td>DELIVERIES &amp; STORAGE</td>
<td>29</td>
<td>m²</td>
</tr>
<tr>
<td>SG21c</td>
<td>STORE - GENERAL</td>
<td>DELIVERIES &amp; STORAGE</td>
<td>21</td>
<td>m²</td>
</tr>
<tr>
<td>SG21d</td>
<td>SORTING &amp; DISTRIBUTION</td>
<td>DELIVERIES &amp; STORAGE</td>
<td>19</td>
<td>m²</td>
</tr>
<tr>
<td>SG22</td>
<td>GOODS DELIVERY</td>
<td>DELIVERIES &amp; STORAGE</td>
<td>32</td>
<td>m²</td>
</tr>
<tr>
<td>SG23</td>
<td>ANIMAL HOUSE FOOD STORE</td>
<td>DELIVERIES &amp; STORAGE</td>
<td>48</td>
<td>m²</td>
</tr>
</tbody>
</table>

**TOTAL: 499 m²**
### Room Schedule

<table>
<thead>
<tr>
<th>Room No</th>
<th>Room Name</th>
<th>Department</th>
<th>Occupancy</th>
<th>Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>S303</td>
<td>OFFICE</td>
<td>MEDICINE</td>
<td>SHARED SPACE</td>
<td>28 m²</td>
</tr>
<tr>
<td>S303b</td>
<td>OFFICE</td>
<td>MEDICINE</td>
<td>PHARMACOLOGY</td>
<td>10 m²</td>
</tr>
<tr>
<td>S303c</td>
<td>OFFICE</td>
<td>MEDICINE</td>
<td>PHARMACOLOGY</td>
<td>10 m²</td>
</tr>
<tr>
<td>S304</td>
<td>MEETING ROOM</td>
<td>MEDICINE</td>
<td>SHARED SPACE</td>
<td>11 m²</td>
</tr>
<tr>
<td>S304d</td>
<td>OFFICE</td>
<td>MEDICINE</td>
<td>PHARMACOLOGY</td>
<td>15 m²</td>
</tr>
<tr>
<td>S330a</td>
<td>OFFICE</td>
<td>MEDICINE</td>
<td>DENTISTRY</td>
<td>13 m²</td>
</tr>
<tr>
<td>S330b</td>
<td>OFFICE</td>
<td>MEDICINE</td>
<td>DENTISTRY</td>
<td>13 m²</td>
</tr>
<tr>
<td>S330c</td>
<td>OFFICE</td>
<td>MEDICINE</td>
<td>DENTISTRY</td>
<td>13 m²</td>
</tr>
<tr>
<td>S330m</td>
<td>OPEN PLAN OFFICE</td>
<td>MEDICINE</td>
<td>SHARED SPACE</td>
<td>120 m²</td>
</tr>
</tbody>
</table>

### Laboratory Schedule

<table>
<thead>
<tr>
<th>Room No</th>
<th>Room Name</th>
<th>Department</th>
<th>Occupancy</th>
<th>Labs</th>
<th>Bench</th>
<th>Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>S307</td>
<td>LABORATORY (IMMUNOLOGY)</td>
<td>SHARED RESEARCH LABS</td>
<td>23.0 l/m</td>
<td>59 m²</td>
<td></td>
<td></td>
</tr>
<tr>
<td>S307a</td>
<td>HOT ROOM</td>
<td>SHARED RESEARCH LABS</td>
<td>8 m²</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>S307b</td>
<td>CHEMOSTAT</td>
<td>DENTISTRY</td>
<td>5.2 l/m</td>
<td>18 m²</td>
<td></td>
<td></td>
</tr>
<tr>
<td>S307c</td>
<td>BIOFILM</td>
<td>SHARED RESEARCH LABS</td>
<td>5.4 l/m</td>
<td>11 m²</td>
<td></td>
<td></td>
</tr>
<tr>
<td>S307d</td>
<td>CORRIDOR</td>
<td>SHARED RESEARCH LABS</td>
<td>8 m²</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>S313</td>
<td>CELL CULTURE</td>
<td>SHARED RESEARCH LABS</td>
<td>11 m²</td>
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<td></td>
</tr>
<tr>
<td>S314</td>
<td>LABORATORY (PROTEOMICS)</td>
<td>SHARED RESEARCH LABS</td>
<td>15.0 l/m</td>
<td>51 m²</td>
<td></td>
<td></td>
</tr>
<tr>
<td>S314a</td>
<td>OFFICE</td>
<td>SHARED RESEARCH LABS</td>
<td>7 m²</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>S315</td>
<td>MASS SPECTROMETER</td>
<td>SHARED RESEARCH LABS</td>
<td>14 m²</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>S316</td>
<td>LABORATORY (C' CLASS)</td>
<td>SHARED RESEARCH LABS</td>
<td>12.9 l/m</td>
<td>37 m²</td>
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</tr>
<tr>
<td>S316a</td>
<td>LABORATORY</td>
<td>SHARED RESEARCH LABS</td>
<td>10 m²</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>S319</td>
<td>LABORATORY (FORENSIC)</td>
<td>DENTISTRY</td>
<td>51 m²</td>
<td></td>
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</tr>
<tr>
<td>S320</td>
<td>OFFICE / MEETING</td>
<td>DENTISTRY</td>
<td>14 m²</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>S321</td>
<td>LABORATORY</td>
<td>SHARED RESEARCH LABS</td>
<td>13.2 l/m</td>
<td>35 m²</td>
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<tr>
<td>S321a</td>
<td>LABORATORY</td>
<td>SHARED RESEARCH LABS</td>
<td>5.5 l/m</td>
<td>20 m²</td>
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<tr>
<td>S322a</td>
<td>STORE ROOM</td>
<td>SHARED RESEARCH LABS</td>
<td>6 m²</td>
<td></td>
<td></td>
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<tr>
<td>S322b</td>
<td>COLD STORE</td>
<td>SHARED RESEARCH LABS</td>
<td>9 m²</td>
<td></td>
<td></td>
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<tr>
<td>S323</td>
<td>STORE ROOM</td>
<td>SHARED RESEARCH LABS</td>
<td>7 m²</td>
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<td></td>
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<tr>
<td>S325</td>
<td>LABORATORY (CARNIOFACIAL BIOLOGY DRY)</td>
<td>DENTISTRY</td>
<td>26.8 l/m</td>
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<td>S327</td>
<td>STORE ROOM</td>
<td>SHARED RESEARCH LABS</td>
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<td>S327a</td>
<td>COLD ROOM</td>
<td>SHARED RESEARCH LABS</td>
<td>6 m²</td>
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<td></td>
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<tr>
<td>S328</td>
<td>FREEZER ROOM</td>
<td>SHARED RESEARCH LABS</td>
<td>14.0 l/m</td>
<td>26 m²</td>
<td></td>
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</tr>
<tr>
<td>S334</td>
<td>LABORATORY (CORE FACULTY)</td>
<td>SHARED RESEARCH LABS</td>
<td>24.7 l/m</td>
<td>74 m²</td>
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<td>S334a</td>
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<td>SHARED RESEARCH LABS</td>
<td>11 m²</td>
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<tr>
<td>S337</td>
<td>FREEZER ROOM</td>
<td>SHARED RESEARCH LABS</td>
<td>2.6 l/m</td>
<td>38 m²</td>
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<td>S355</td>
<td>LABORATORY</td>
<td>SHARED RESEARCH LABS</td>
<td>31 m²</td>
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</tr>
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</table>

### Work Areas

- **Work Area 01**
  - 3x Single Office
  - 24 Workstations
  - 1 Casual Meeting Room

- **Work Area 02**
  - 2x Single Office
  - 4 Workstations
  - 1 Casual Meeting Room
  - 5P Meeting Room
  - Print Bay
LEVEL 6 NOT IN SCOPE
11 Appendix G – Safety in Design Risk Register

Refer to attached Safety in Design Risk Register.
### 1. HAZARD IDENTIFICATION

<table>
<thead>
<tr>
<th>ID</th>
<th>Phase (or Impact)</th>
<th>Source (in Hazard)</th>
<th>Event/Risk - Including Consequence(s)</th>
<th>Possible Cause(s)</th>
<th>Risk Owner</th>
<th>Possible Mitigation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Construction</td>
<td>Electrical Safety</td>
<td>Cutting of electrical installation during construction</td>
<td>Unearthed cables</td>
<td>Head Contractor</td>
<td>Isolate Power prior to digging, Dial Before You Dig</td>
</tr>
<tr>
<td>2</td>
<td>Construction</td>
<td>Electrical Safety</td>
<td>Location of underground and overhead power cables</td>
<td>Existing known cables</td>
<td>Head Contractor</td>
<td>Mark out locations of known cables prior to digging, Isolate Power prior to digging</td>
</tr>
<tr>
<td>3</td>
<td>Fire &amp; Emergencies</td>
<td>Fire Risks</td>
<td>Fire services out of order during construction period</td>
<td>No Fire Hydrant Leaks</td>
<td>LUCID/ Certifier</td>
<td>Compliance with Statutory Requirements</td>
</tr>
<tr>
<td>4</td>
<td>Fire &amp; Emergencies</td>
<td>Fire detection &amp; Fire fighting</td>
<td>Fire services out of order during construction period</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Ongoing Operation</td>
<td>Movement of people and materials</td>
<td>Safe access and egress, including people with disabilities</td>
<td>Narrow corridors, inadequate turning circles, inadequate latch side clearance</td>
<td>DesignInc/ Certifier</td>
<td>Providing panoramic layout in accordance with AD1428.1 with review for certification</td>
</tr>
<tr>
<td>6</td>
<td>Ongoing Operation</td>
<td>Movement of people and materials</td>
<td>Traffic Management</td>
<td>G2F Students near construction zone</td>
<td>Head Contractor</td>
<td>Contractor to supply Safety Plan for Traffic Management, Site Movement, Deliveries, etc.</td>
</tr>
<tr>
<td>7</td>
<td>Ongoing Operation</td>
<td>Movement of people and materials</td>
<td>Security</td>
<td>G2F Students near construction zone</td>
<td>Head Contractor</td>
<td>Contractor to provide Hoarding to delineate and segregate construction site from University activities</td>
</tr>
<tr>
<td>8</td>
<td>Ongoing Operation</td>
<td>Movement of people and materials</td>
<td>Security</td>
<td>G2F Students in Public near construction zone</td>
<td>Head Contractor</td>
<td>Contractor to provide plan for site security, access, etc.</td>
</tr>
<tr>
<td>9</td>
<td>Ongoing Operation</td>
<td>Movement of people and materials</td>
<td>Security</td>
<td>G2F Students in Public near construction zone</td>
<td>Head Contractor</td>
<td>Contractor to provide plan for site security, access, etc.</td>
</tr>
<tr>
<td>10</td>
<td>Ongoing Operation</td>
<td>Working Environment</td>
<td>Lighting including that of plant</td>
<td>Insufficient lighting levels to work areas due to the installation of new plant or services</td>
<td>設計Inc</td>
<td>LUCID to design to Australian Standards and best practice</td>
</tr>
<tr>
<td>11</td>
<td>Ongoing Operation</td>
<td>Working Environment</td>
<td>Acoustic properties and noise control - uncomfortable work environment</td>
<td>Transfer of construction noise and vibration through structures to other occupants</td>
<td>LUCID/ Resonate/ DesignInc</td>
<td>Provide appropriate acoustic treatment to affected areas. Response to be confirmed.</td>
</tr>
<tr>
<td>12</td>
<td>Ongoing Operation</td>
<td>Working Environment</td>
<td>Floor surfaces to prevent slips and trips - tripping and falls</td>
<td>Uneven surface between differing floor finishes</td>
<td>DesignInc/ Certifier</td>
<td>Designate to specific floor treatments that comply with RDA slip resistance compliance and best practice for each intended usage</td>
</tr>
<tr>
<td>13</td>
<td>Plant</td>
<td>Plant</td>
<td>Mobile crane loads on existing infrastructure</td>
<td>Poor contractor systems in place</td>
<td></td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>Plant</td>
<td>Plant</td>
<td>All installed in a building or structure</td>
<td>Existing conditions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>Plant</td>
<td>Plant</td>
<td>Materials handling plant and equipment - injury or access problems</td>
<td>Large equipment items not easily manoeuvred into work area</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>Plant</td>
<td>Plant</td>
<td>Maintenance access to plant and equipment - injury or access problems</td>
<td>Access difficult to reach</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### 2. RISK ANALYSIS, EVALUATION & TREATMENT

#### CURRENT MITIGATION ARRANGEMENT

<table>
<thead>
<tr>
<th>ID</th>
<th>Phase (or Impact)</th>
<th>Source (in Hazard)</th>
<th>Event/Risk - Including Consequence(s)</th>
<th>Possible Cause(s)</th>
<th>Risk Owner</th>
<th>Current Risk Scoring</th>
<th>Future Control Measures (Improvements)</th>
<th>Action Owner(s)</th>
<th>Residual Risk Scoring</th>
<th>Combined Score</th>
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<tbody>
<tr>
<td>1</td>
<td>Construction</td>
<td>Electrical Safety</td>
<td>Cutting of electrical installation during construction</td>
<td>Unearthed cables</td>
<td>Head Contractor</td>
<td>E Low</td>
<td>Isolate Power prior to digging, Dial Before You Dig</td>
<td>Head Contractor</td>
<td>E Low</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Construction</td>
<td>Electrical Safety</td>
<td>Location of underground and overhead power cables</td>
<td>Existing known cables</td>
<td>Head Contractor</td>
<td>E Low</td>
<td>Mark out locations of known cables prior to digging, Isolate Power prior to digging</td>
<td>Head Contractor</td>
<td>E Low</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Fire &amp; Emergencies</td>
<td>Fire Risks</td>
<td>Fire services out of order during construction period</td>
<td>No Fire Hydrant Leaks</td>
<td>LUCID/ Certifier</td>
<td>E High</td>
<td>Compliance with Statutory Requirements</td>
<td>LUCID/ Certifier</td>
<td>E Low</td>
<td>Y</td>
</tr>
<tr>
<td>4</td>
<td>Fire &amp; Emergencies</td>
<td>Fire detection &amp; Fire fighting</td>
<td>Fire services out of order during construction period</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Ongoing Operation</td>
<td>Movement of people and materials</td>
<td>Safe access and egress, including people with disabilities</td>
<td>Narrow corridors, inadequate turning circles, inadequate latch side clearance</td>
<td>DesignInc/ Certifier</td>
<td>D High</td>
<td>Planning panoramic layout in accordance with AD1428.1 with review for certification</td>
<td>DesignInc/ Certifier</td>
<td>D Low</td>
<td>Y</td>
</tr>
<tr>
<td>6</td>
<td>Ongoing Operation</td>
<td>Movement of people and materials</td>
<td>Traffic Management</td>
<td>G2F Students near construction zone</td>
<td>Head Contractor</td>
<td>C High</td>
<td>Contractor to supply Safety Plan for Traffic Management, Site Movement, Deliveries, etc.</td>
<td>Contractor</td>
<td>D Low</td>
<td>Y</td>
</tr>
<tr>
<td>7</td>
<td>Ongoing Operation</td>
<td>Movement of people and materials</td>
<td>Security</td>
<td>G2F Students near construction zone</td>
<td>Head Contractor</td>
<td>C High</td>
<td>Contractor to provide Hoarding to delineate and segregate construction site from University activities</td>
<td>Contractor</td>
<td>D Low</td>
<td>Y</td>
</tr>
<tr>
<td>8</td>
<td>Ongoing Operation</td>
<td>Movement of people and materials</td>
<td>Security</td>
<td>G2F Students in Public near construction zone</td>
<td>Head Contractor</td>
<td>C High</td>
<td>Contractor to provide plan for site security, access, etc.</td>
<td>Contractor</td>
<td>D Low</td>
<td>Y</td>
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<tr>
<td>9</td>
<td>Ongoing Operation</td>
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<td>Security</td>
<td>G2F Students in Public near construction zone</td>
<td>Head Contractor</td>
<td>C High</td>
<td>Contractor to provide plan for site security, access, etc.</td>
<td>Contractor</td>
<td>D Low</td>
<td>Y</td>
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<tr>
<td>10</td>
<td>Ongoing Operation</td>
<td>Working Environment</td>
<td>Lighting including that of plant</td>
<td>Insufficient lighting levels to work areas due to the installation of new plant or services</td>
<td>設計Inc</td>
<td>D Low</td>
<td>LUCID to design to Australian Standards and best practice</td>
<td>LUCID</td>
<td>D Low</td>
<td>Y</td>
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<tr>
<td>11</td>
<td>Ongoing Operation</td>
<td>Working Environment</td>
<td>Acoustic properties and noise control - uncomfortable work environment</td>
<td>Transfer of construction noise and vibration through structures to other occupants</td>
<td>LUCID/ Resonate/ DesignInc</td>
<td>C High</td>
<td>Provide appropriate acoustic treatment to affected areas. Response to be confirmed.</td>
<td>LUCID/ Resonate/ DesignInc</td>
<td>C Low</td>
<td>Y</td>
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<tr>
<td>12</td>
<td>Ongoing Operation</td>
<td>Working Environment</td>
<td>Floor surfaces to prevent slips and trips - tripping and falls</td>
<td>Uneven surface between differing floor finishes</td>
<td>DesignInc/ Certifier</td>
<td>C High</td>
<td>Designate to specific floor treatments that comply with RDA slip resistance compliance and best practice for each intended usage</td>
<td>DesignInc/ Certifier</td>
<td>C Low</td>
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### 3. IMPLEMENTATION OF RISK TREATMENT

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<th>ID</th>
<th>Phase (or Impact)</th>
<th>Source (in Hazard)</th>
<th>Event/Risk - Including Consequence(s)</th>
<th>Possible Cause(s)</th>
<th>Risk Owner</th>
<th>CURRENT Mitigation</th>
<th>ALTERNATIVE Mitigation Arrangement</th>
<th>Control to be Implemented - Decided by Risk Owner (Y/N)</th>
<th>Control Implementation Details</th>
<th>Status</th>
<th>Action Completion Date</th>
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<tbody>
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<td>Electrical Safety</td>
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<td>Unearthed cables</td>
<td>Head Contractor</td>
<td>Isolate Power prior to digging, Dial Before You Dig</td>
<td>Head Contractor</td>
<td>Required Action</td>
<td>To be populated</td>
<td>Outstanding</td>
<td>TBA</td>
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<tr>
<td>2</td>
<td>Construction</td>
<td>Electrical Safety</td>
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<td>Required Action</td>
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<td>Outstanding</td>
<td>TBA</td>
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<tr>
<td>3</td>
<td>Fire &amp; Emergencies</td>
<td>Fire Risks</td>
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<td>LUCID/ Certifier</td>
<td>Compliance with Statutory Requirements</td>
<td>LUCID/ Certifier</td>
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<td>Outstanding</td>
<td>TBA</td>
</tr>
<tr>
<td>4</td>
<td>Fire &amp; Emergencies</td>
<td>Fire detection &amp; Fire fighting</td>
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<td>LUCID</td>
<td>Y</td>
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<td>Outstanding</td>
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<tr>
<td>11</td>
<td>Ongoing Operation</td>
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<td>LUCID/ Resonate/ DesignInc</td>
<td>Y</td>
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<td>Outstanding</td>
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<tr>
<td>12</td>
<td>Ongoing Operation</td>
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<td>DesignInc/ Certifier</td>
<td>Y</td>
<td>To be populated</td>
<td>Outstanding</td>
<td>TBA</td>
</tr>
</tbody>
</table>

Notes:
- To consider Safe Design during construction, maintenance and ongoing operation / phases. Only a typical design safety issues are considered here. Typical issues to be addressed by standard practices.
<table>
<thead>
<tr>
<th>ID</th>
<th>Phase (for Impact)</th>
<th>Source (ie Hazard)</th>
<th>Event/Risk - Including Consequence(s)</th>
<th>Possible Cause(s)</th>
<th>Risk Owner</th>
<th>CURRENT MITIGATION ARRANGEMENT</th>
<th>ALTERNATIVE MITIGATION ARRANGEMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>18</td>
<td>Construction - Ongoing Operation</td>
<td>Work</td>
<td>The guarding of plant and machinery</td>
<td>Security</td>
<td>Restricted access</td>
<td>Likelihood</td>
<td>Consequence</td>
</tr>
<tr>
<td>19</td>
<td>Operation</td>
<td>Amenities and facilities</td>
<td>Access to first aid rooms, rest rooms, meal and accommodation areas and drinking water</td>
<td>Restricted access</td>
<td>Security</td>
<td>Likelihood</td>
<td>Consequence</td>
</tr>
<tr>
<td>20</td>
<td>Construction</td>
<td>Earthworks</td>
<td>Excavations</td>
<td>Free access</td>
<td>Security</td>
<td>Likelihood</td>
<td>Consequence</td>
</tr>
<tr>
<td>21</td>
<td>Construction</td>
<td>Earthworks</td>
<td>Location of underground services</td>
<td>Free access</td>
<td>Security</td>
<td>Likelihood</td>
<td>Consequence</td>
</tr>
<tr>
<td>22</td>
<td>Construction</td>
<td>Structural Safety</td>
<td>Excavation of shallow or concrete frames - collapse of structure</td>
<td>Large penetration or opening in masonry walls</td>
<td>Security</td>
<td>Likelihood</td>
<td>Consequence</td>
</tr>
<tr>
<td>23</td>
<td>Construction</td>
<td>Structural Safety</td>
<td>Used living requirements</td>
<td>N/A</td>
<td>Security</td>
<td>Likelihood</td>
<td>Consequence</td>
</tr>
<tr>
<td>24</td>
<td>Construction</td>
<td>Structural Safety</td>
<td>Stability and integrity of the structure - collapse of structure</td>
<td>Rotating into the concrete slab</td>
<td>Security</td>
<td>Likelihood</td>
<td>Consequence</td>
</tr>
<tr>
<td>25</td>
<td>Construction - Ongoing Operation</td>
<td>Manual Tasks</td>
<td>Methods of material handling</td>
<td>Injury</td>
<td>N/A</td>
<td>Likelihood</td>
<td>Consequence</td>
</tr>
<tr>
<td>26</td>
<td>Construction - Ongoing Operation</td>
<td>Manual Tasks</td>
<td>Performance space and layout to prevent musculoskeletal disorders - injury</td>
<td>N/A</td>
<td>Security</td>
<td>Likelihood</td>
<td>Consequence</td>
</tr>
<tr>
<td>27</td>
<td>Construction</td>
<td>Substances</td>
<td>Exposure to hazardous substances and materials including insulation and decorative materials</td>
<td>Respiratory issues from inhaling volatile fumes</td>
<td>Security</td>
<td>Likelihood</td>
<td>Consequence</td>
</tr>
<tr>
<td>28</td>
<td>Construction</td>
<td>Substances</td>
<td>Exposure to volatile organic compounds and off-gassing through the use of composite wood products or paints</td>
<td>Respiratory issues from inhaling volatile fumes</td>
<td>Security</td>
<td>Likelihood</td>
<td>Consequence</td>
</tr>
<tr>
<td>29</td>
<td>Construction</td>
<td>Substances</td>
<td>Exposure to irritant dust and fumes</td>
<td>Respiratory issues from inhaling volatile fumes from floor contact adhesives</td>
<td>Security</td>
<td>Likelihood</td>
<td>Consequence</td>
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<tr>
<td>30</td>
<td>Construction - Ongoing Operation</td>
<td>Substances</td>
<td>Storage and use of hazardous chemicals, including cleaning products</td>
<td>Poisoning</td>
<td>Security</td>
<td>Likelihood</td>
<td>Consequence</td>
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<tr>
<td>31</td>
<td>Falls Prevention</td>
<td>Guard rails</td>
<td></td>
<td></td>
<td>Security</td>
<td>Likelihood</td>
<td>Consequence</td>
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<tr>
<td>32</td>
<td>Ongoing Operation</td>
<td>Falls Prevention</td>
<td>Windows heights and glass cleaning</td>
<td>Accessibility to high level fixtures and surfaces for cleaning</td>
<td>Security</td>
<td>Likelihood</td>
<td>Consequence</td>
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<tr>
<td>33</td>
<td>Ongoing Operation</td>
<td>Falls Prevention</td>
<td>Anchorpoints for building maintenance and cleaning</td>
<td>Upgrade existing</td>
<td>Security</td>
<td>Likelihood</td>
<td>Consequence</td>
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<tr>
<td>34</td>
<td>Construction - Ongoing Operation</td>
<td>Falls Prevention</td>
<td>Access to working spaces for construction, cleaning, maintenance and repairs - injury</td>
<td>Accessibility to high level fixtures and surfaces is out of reach</td>
<td>Security</td>
<td>Likelihood</td>
<td>Consequence</td>
</tr>
<tr>
<td>35</td>
<td>Construction</td>
<td>Falls Prevention</td>
<td>Working materials and surface characteristics such as negativity, slip resistance and pitch</td>
<td>N/A</td>
<td>Security</td>
<td>Likelihood</td>
<td>Consequence</td>
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<tr>
<td>36</td>
<td>Construction - Ongoing Operation</td>
<td>Noise Exposure</td>
<td>Exposure to noise from plant or from surrounding area - uncomfortable work environment</td>
<td>Transfer of noisy plant and equipment through Plant Room wall</td>
<td>Security</td>
<td>Likelihood</td>
<td>Consequence</td>
</tr>
<tr>
<td>37</td>
<td>Ongoing Operation</td>
<td>Hydraulics</td>
<td>Bonding - damage to immediate and surrounding work areas</td>
<td>N/A</td>
<td>Security</td>
<td>Likelihood</td>
<td>Consequence</td>
</tr>
</tbody>
</table>