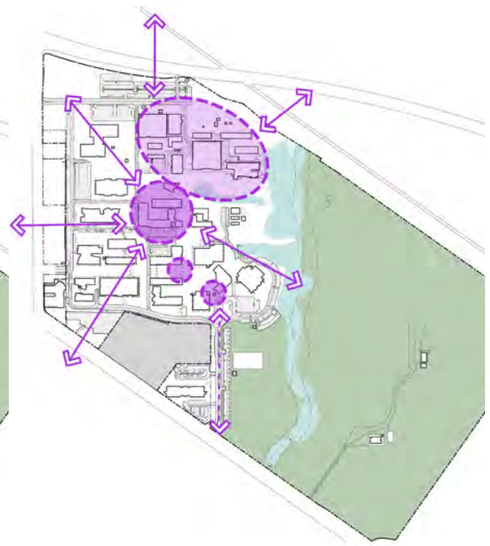
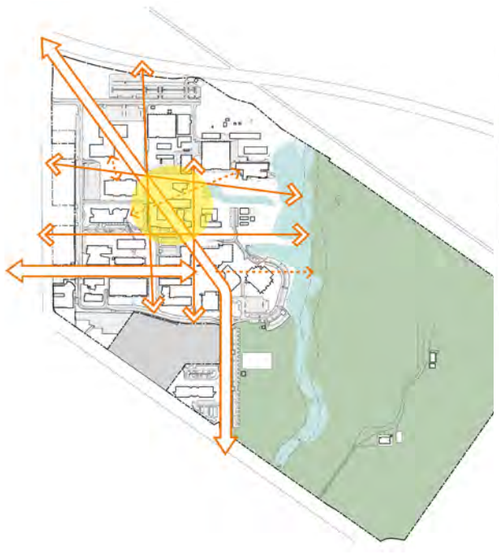




University of South Australia

THE UNIVERSITY OF SOUTH AUSTRALIA

MAWSON LAKES CAMPUS STRATEGIC MASTER PLAN & FII TENANCY PLAN REPORT

PHILLIPS/PILKINGTON ARCHITECTS 19 DECEMBER 2016

Phillips/Pilkington Architects

ASSUMPTIONS & DISCLAIMER

This report has been prepared as a Final Report for UniSA as part of the Mawson Lakes Campus Strategic Master Plan and FII Tenancy Plan. It is confidential and not suitable for distribution.

Phillips / Pilkington Architects
165 MacKinnon Parade
North Adelaide 5006
South Australia

Tel 08 8239 9000

www.phillipspilkington.com.au
admin@phillipspilkington.com.au

Consultant Team:
Jeff Freeman & Associates
BESTEC
Wallbridge & Gilbert
URPS
Aspect Studios
Frank Siow Associates
Rider Levett Bucknall

Revision History

Rev #	Date Issued	Distribution	Prepared by	Approved by
03	19/12/2016	UNISA	AM/SP	SP

CONTENTS

1. OVERVIEW

1 Introduction

Phillips/Pilkington Architects and their consultant team have been commissioned by the University of South Australia's (UniSA) Facilities Management (FM) to prepare the: **Mawson Lakes Campus Strategic Master Plan and FII Tenancy Plan** (Project Number 15-026). This study has been commissioned in two parts, each part comprising two stages.

Part A: FII Space Occupancy Strategy

Review and document the requirements for the consolidation of Institutes for the formation of the Future Industries Institute.

Stage 1: Review and update the 2015 Mawson Lakes Campus Space Audit and DCM Strategic Accommodation Report (2009).

Stage 2: Develop an accommodation schedule and tenancy plans for the Future Industries Institute (FII).

Part B: Mawson Lakes Campus – Site Strategic Master Plan

Review and document a site strategic master plan to optimise use, strengthen strategic partnerships and identify potential use and accommodation efficiencies.

Stage 3: Develop a Strategic Master Plan and an accommodation schedule and tenancy plans for the entire Mawson Lakes Campus to address UniSA's strategic goals.

Stage 4: Develop a preliminary staging plan, identifying individual projects, churn strategy and preliminary cost estimates.

The final report provides an overview of:

- The sites development
- The educational schools located at Mawson Lakes and their associated research centres
- The Future Industries Institute
- Strategic frameworks and master plans previously developed for the site
- Site analysis including:
  - Built form
  - Spatial configurations
  - Development planning framework
  - Services infrastructure
  - Structural review
  - Landscape
  - Traffic and parking
- Consultation summary
- Guiding principles
- Master Plan Proposal
- Accommodation strategy
  - Future Industries Institute
  - Site wide
- Staging strategy
  - Future Industries Institute
  - Site wide
- Building by Building Cost Estimates

1.1 Site Development

The Mawson Lake Campus was initially developed as **The Levels** campus of the South Australian Institute of Technology (SAIT) with 1825 acres (70 hectares) of land purchased in 1967 following assurances that Parafield Aerodrome would not be developed as a jet airport.[1] Jack McConnell of Hassell McConnell and Partners (now Hassell) prepared a Master Plan which was '...rejected because it was too similar to the design for Flinders University.'[2] Rather than engaging another architect, SAIT developed a new plan largely in house, by Dr Eric Mills Assistant Director (Academic) working with executive architect Peter Scrymgour.[3] The campus building program commenced after securing $4,100,000 in funding from the Federal Government with the intention that The Levels would be a self contained campus providing all of the SAIT's diplomas in technology courses with certificate courses being retained in the city.[4] The campus was expected to accommodate a daily population of 6,000 students increasing up to about 9,000 students. Key realised components of the initial master plan include:

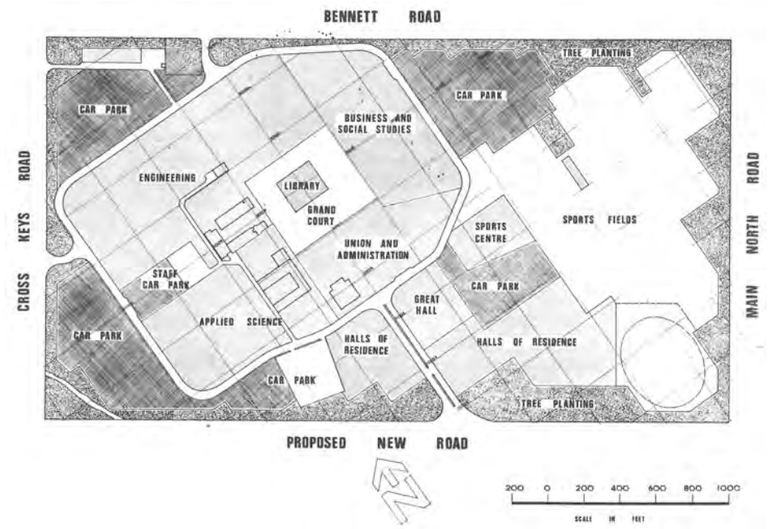
- Building A as an administration building and student union
- Building F envisaged as Applied Science
- Building H and U were not labelled on the early master plan drawing
- Building C library located slightly to the south of the original proposal
- A grand court was proposed in the approximate location of courtyard and gym together with sports fields in their approximate current location[5]

Aspects of the original Master Plan never realised included an extensive series of Halls of Residence located to the east and west of the campuses main entrance from Mawson Lakes Boulevard and University Boulevard.

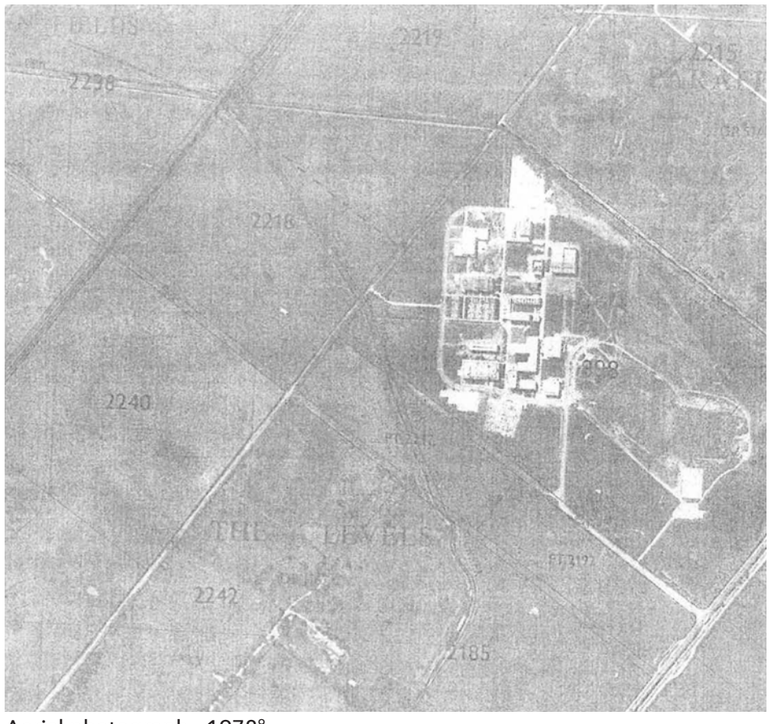
The proximity to Parafield Airport limited building heights to three stories. The first completed buildings were the:

- First Year Science Building
- First Year Engineering Building
- Metallurgy Building
- Union Building (Building A)
- Library (Building C)[7]

These buildings were completed for the 1970 academic year. According to UniSA's asset records the majority of the levels campus buildings were



The Levels Master Plan c. 1960s[8]



Aerial photograph - 1978[9]

completed prior to 1970 as the following table of construction dates indicates.

circa 1967	Buildings A,Q,R, SCT
circa 1969	Buildings D,E,F,J,K,M,PH
circa 1970	Buildings N
circa 1973	Buildings P,Y,Z
circa 1974	Buildings B
circa 1992	Buildings W
circa 1993	Buildings GP
circa 1995	Buildings IW
circa 1996	Buildings OC , X
circa 2004	Buildings MC, G, C (extension)
circa 2009	Buildings V
circa 2011	Buildings MM

Table 1 Approximate construction dates for major buildings at Mawson Lakes – sheds and glass houses not included.[6]

The above table illustrates the extraordinary building program through the late 1960's and early 1970's which came to an abrupt halt with no major building work until the 1990's with the construction of building GP, W, and OC. Building OC a prefabricated building was intended as a temporary stop gap and W was developed as a shared facility. A Master Plan was prepared in 1990 which responded to the development of Technology Park but preceded the creation of the suburb and Town Centre of Mawson Lakes instead proposing an industrial park.

This Master Plan proposed the built form of the campus be extended to the east with the entire campus encircled by a ring road with large open at grade car parks sitting outside this ring road. The following year, the University of South Australia was established from the amalgamation of SAIT and the South Australian College of Advanced Education.

Technology Park and the Mawson Lakes Town Centre grew out of the State Governments controversial proposal for a Multifunction Polis (MFP) proposed in 1987 and abandoned in 1998. DCM were commissioned in the late 1990's to prepare a Master Plan responding to the adjoining Mawson Town Centre and surrounding residential suburbs of Mawson Lakes. The Master Plan is discussed in section 1.3.

The Master Plan guided UniSA's Blueprint 2005 proposals for the Mawson Lakes campus and led to the construction of the Mawson Centre (MC) and Garth Boomer Building (G) together with a major extension to Building C, the Sir Eric Neal Library. Since Blueprint 2005 three major research buildings have been constructed on campus- Building X, constructed as a research institute for CERAR, Building V, built as a research facility for the Mawson Institute and Building MM built for Materials and Mineral Sciences.

The campus is no longer an isolated facility but abuts Technology Park to the south, the Mawson Lakes Town Centre to the west, with extensive playing fields to the east.

Interestingly the concept of engagement with industry dates back to the early years of The Levels campus as recorded in and interview with professor David Lee as part of SAIT's centenary publication The Peoples University:

…we evolved the concept of a technology park next door to the institute… we could see good reasons why education and industry should interact this way, particularly in the advanced technologies so we developed a proposal and took it to a state government which was 'bemused', I think is probably the best way of saying it, it was something before its time … so the then director, Dr Evans and I worked fairly hard with senior officials and state departments and politicians and I think got nowhere … the blueprints were all drawn up, it was precisely the site that it is now occupied by technology park, however, it did not get the essential political support at that stage.[7]

1. The Peoples University South Australia Institute of Technology 1989 p233
2. Ibid p233
3. Ibid p234
4. Ibid p235
5. UniSA Building Construction Details July 2015 pp12-18
6. Project Brief and Consultancy Services Brief Project No. 15-026 University of South Australia 30 October 2015, pg 12-18
7. The Peoples University South Australia Institute of Technology 1989 p242
8. Ibid, p234
9. UniSA Aboriginal Heritage Report for the Mawson Lakes Campus 2003
10. The Peoples University South Australia Institute of Technology 1989 p241

Mawson Lakes aerial photograph - present day

1.2 Mawson Lakes Campus Schools, Research & Community

The Mawson Lakes Campus has evolved from its early days as The Levels Campus with an engineering and computer science focus to a broader technology and research focus with significant community connections.

The following schools with their associated research centres have a significant presence on Campus:

- School of Engineering
- School of Information Technology and Mathematical Sciences
- School of Education
- School of Natural and Built Environments
- School of Pharmacy & Medical Science

with the Division of Information Technology Engineering and the Environment (ITEE) based at Mawson Lakes including the Pro Vice Chancellor's office.

Data Processing Department at The Levels, c.1970[10]

School of Engineering

The School of Engineering (ENE) offers the following undergraduate programs:

- Bachelor of Science (Advanced Materials)
- Bachelor of Aviation (Management)
- Bachelor of Aviation (Pilot)
- Bachelor of Aviation
- Bachelor of Technology (Mechanical and Manufacturing Engineering)
- Bachelor of Engineering (Honours) (Mechatronic)
- Bachelor of Engineering (Honours) (Electrical and Electronic)

The School also offers a range of postgraduate programs including Graduate Diplomas, Masters, and the opportunity to undertake PhD's by research.

The School is home to Research Institutes, Centres and Nodes including:

- Barbara Hardy Institute
- Research Node for Low Carbon Living
- Defence and Systems Institute (DASI)
- Agricultural Machinery Research Design Centre
- Laser Physics and Photonics Devices Laboratory

All these programs and research activities are based at Mawson Lakes with undergraduate teaching primarily in:

- Building SCT
- Building M

located at the northern end of the campus, with Building SCT originally developed for Electrical and Electronic Engineering and Building M for Mechanical Engineering.

The Research Centres and Institutes are located across campus with:

- Defence and Systems Institute (DASI) in Building W
- Barbara Hardy Institute in Building A potentially relocating to Building M or J
- Laser Physics and Photonics Devices Laboratory in Building Q
- Research Node for Low Carbon Living accommodated in Building A as part of the Barbara Hardy Institute
- Agricultural Machinery Research Design Centre has affiliation with the Barbara Hardy Institute with key researchers located in Building J

School of Information Technology and Mathematical Sciences

The School of Information Technology and Mathematical Sciences (ITMS) offers the following undergraduate programs:

- Bachelor of Information Technology (Networking and Cybersecurity)
- Bachelor of Information Technology (Mobile Application Development)
- Bachelor of Information Technology (Software Development)
- Bachelor of Information Technology (Games and Entertainment Design)
- Bachelor of Information Technology
- Bachelor of Mathematical Sciences

The School also offers a range of postgraduate programs including Graduate, Certificates, Diplomas, Masters and the opportunity to undertake PhD's by research.

The school is home to four Research Centres:

- Advanced Computing Research Centre
- Centre for Industrial and Applied Mathematics
- Institute for Telecommunications (ITR)
- Phenomics and Bioinformatics Research Centre

ITMS facilities are dispersed across campus occupying portions of:

- Building D
- Building F
- Building GP
- Building OC (in its entirety)
- Building V
- Building W
- Building R

Research Centres are located in the following buildings:

- Advanced Computing Research Centre in Building D
- Centre for Industrial and Applied Mathematics in Building OC
- Institute for Telecommunications in Building W
- Phenomics and Bioinformatics Research Centre in Building R but relocating to Building M

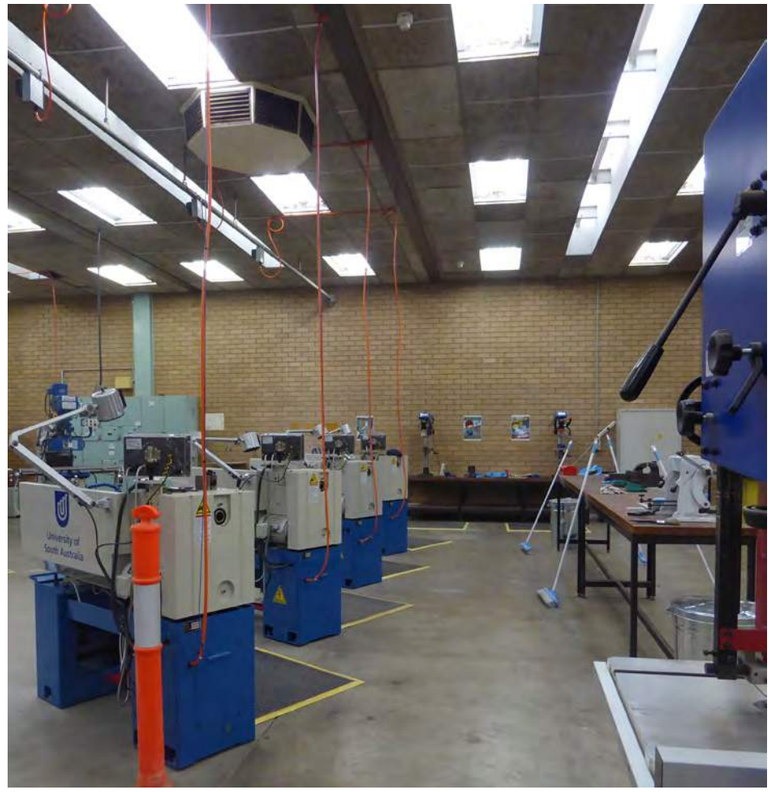
School of Natural and Built Environments

The School of Natural and Built Environments (NBE) offers the following undergraduate programs:

- Bachelor of Built Environments
- Bachelor of Construction Management and Economics (Honours)
- Associate Degree in Built Environment
- Bachelor of Geospatial Science
- Bachelor of Environmental Science
- Bachelor of Engineering

The School also offers a range of post-graduate programs including Graduate Certificates, Diplomas, Masters and the opportunity to undertake PhD's by Research.

The School is home to the Centre for Water Management and Reuse and collaborates with the Barbara Hardy Institute.



Building M

Building L

NBE facilities are located primarily to the north of the campus in a range of Buildings including:

- Building H
- Building P
- Building N
- Building L

The Centre for Water Management and Reuse is based in Building H with significant research infrastructure in Building N.

School of Education

The School of Education offers the following undergraduate programs:

- Bachelor of Education (Early Childhood)
- Bachelor of Education (Primary)
- Bachelor of Education (Primary and Middle)
- Bachelor of Education (Secondary Design and Technology) or (Secondary Food and Textiles Technologies)

The School also offers a range of post graduate programs including:

- Master of Teaching (Early Childhood)
- Master of Teaching (Primary)
- Master of Teaching (Secondary)
- Graduate Certificate in Education (Catholic Education)
- Master of Education
- Master of Education (TESOL)

Students can also undertake research based Masters, PhD's and a Doctorate of Education.

Education programs are shared across the Mawson Lakes and Magill Campuses. Mawson Lakes provides a focus on secondary education, science and technology while Magill focuses on early childhood and primary education together with the Arts.

Education facilities are based in Building GB, the Garth Boomer Building, with extensive utilisation of the EW Mills Sports Centre in Building B for Physical Education, Building K for Physical Movement and Performance and some use of the Mawson Centre (Building MC).

School of Pharmacy and Medical Science

The School of Pharmacy and Medical Science is largely based at City East and in future will also be located in the new Health Innovation Building being constructed at City West. Currently the Mawson Lakes Campus is used for general chemistry teaching which is located in Building R. The decanting of the Reid Building at the City East Campus to enable the construction of the new CBD High School will require additional facilities for pharmacy at the Mawson Lakes Campus, which are likely to be located in Building R.

Research in Nanomedicine and Bio Pharmaceutical Engineering is undertaken in Building Q but will relocate to City West on completion of the Health Innovation Building.

Division of Information Technology, Engineering and Environment

The Division of Information Technology Engineering and Environment (ITEE) is based at Mawson Lakes and is responsible for the following schools:

- School of Engineering
- School of Information Technology and Mathematical Sciences
- School of Natural and Built Environments

The Divisional Office, including the Pro Vice Chancellor is located in the Mawson Centre (Building MC) and also occupies space in Building P and A.

UniSA College

UniSA College which has facilities at Mawson Lakes and City West offers foundation studies and a series of Diplomas to provide alternative pathways to University. The UniSA Connect Workshops run as part of UniSA College engage with secondary school students and their teachers.

UniSA College is based in Building P with offices in Building F and utilises facilities across campus. The College supports the Australian Indigenous Mentoring Experience (AIME).

Administrative Units and Commercialisation

The Mawson Lakes Campus accommodates a number of the Universities Administrative Units including:

- Information Strategy and Technology Services and Library
- Student and Academic Services
- Student Experience Unit
- Research and Innovation Services
- UniSA Ventures
- Facilities Management Unit

Information Strategy and Technology Services (ISTS) and Library

ISTS and Library have recently combined to provide an integrated service for the provision of the University's information needs in both technology and resources.

The Library is located in Building C with ISTS partially co-located in Building C, but primarily in Buildings E and W. Mawson Lakes provides the central service but with accommodation at all of UniSA's campuses.

Student and Academic Services (SAS)

SAS are the central point of contact for all student needs. At Mawson Lakes they are located within the Library Foyer in Building C with administrative support also located in Building C.

Building C Library

Building P- UniSA College Space

Student Engagement Unit (SEU)

SEU offer a range of student services, including Counselling, Health and Wellbeing support to students with diverse cultural and physical needs and career advice. SEU are co-located with SAS on the ground floor of Building C. The Indigenous Student Services are located on the Ground Floor of Building GP.

Research and Innovation Services (RIS)

RIS support the UniSA Research Community to achieve grants, providing support for applications, ethics and integrity issues, together with contracts and grants management. At Mawson Lakes they are based in GP with accommodation also at City West.

UniSA Ventures

UniSA Ventures is the technology commercialisation arm of UniSA, facilitating translation of research into products and services.

UniSA Ventures accommodation is located solely at the Mawson Lakes Campus in Building GP on the ground floor.

Facilities Management

Facilities Management including security are located in Building A. The Power House located in Building PH provides infrastructure services to the majority of the campus including chilled water which is distributed via a large underground tunnel network, running north-south on the eastern side of the Power House. Maintenance on campus is outsourced to Smith Bros who have a base in Building N.

Future Industries Institute

The Future Industries Institute sits under ITEE. The Future Industries Institute (FII) has been created from three former UniSA Research Institutes; Centre for Environment Risk Assessment and Remediation (CERAR), Ian Wark Research Institute (IWRI) and the Mawson Institute (MI) to undertake research that 'will underpin both new discoveries and seed the development of future technologies.'[11]

FII's research concentrates on four strands. These are:

- Minerals and Resources Engineering
- Energy and Advanced Manufacturing
- Environmental Science and Engineering
- Bioengineering and Nanomedicine

FII has partnered with University College London (UCL), with UCL staff to work at Mawson Lakes. FII also supports a significant number of students who sit under the auspices of the Schools on campus.

FII currently occupies the following buildings:

- Building X which provides the Institute's front door
- Building MM
- Building IW
- Building Q
- Building R
- Building V
- Building M

Student Services

There are a range of Student Services in addition to those described under the Administrative Unit, including:

- Prayer Rooms in Building A
- Student Lounge in Building F
- Bookshop in Building A
- Cafes including Main Café in Building A and Aroma Cafés in Buildings MM and MC
- University of South Australia's Student Association (USASA) with offices in Building F
- Bike Parking and Amenities located at the eastern end of Building H
- Computer Barn and Open Study Space in Building F
- Multi Access Suite within the Library in Building C

Shared Student and Community Facilities

The community are able to utilise many facilities on campus in addition to being able to access facilities such as the Cafés, Bookshop and Library.

Facilities that are frequently used by both the community and students include:

- The EW Mills Sports Centre in Building B
- Performance space in Building K
- Planetarium in Building P
- Library and Community Rooms within the Mawson Centre (Building MC)
- Golf Club Rooms in Building Y
- Football and Cricket Club Rooms in Building Z
- Tennis Courts, Golf Course and Playing Fields

Ancillary Facilities

The Mawson Lakes Campus has a number of small lightweight buildings located predominantly in the north east quadrant of the built campus.

The Environmental Precinct includes glasshouses and sheds utilised for research (Buildings EA, EB, EC, ED & EE).

Adjacent to the Power House and north of Building M are a series of sheds (S1, S2, S4, S5, S6), which house plant and equipment.

11.Project Brief and Consultancy Services Brief Project No. 15-026 University of South Australia 30 October 2015, pg 12-18

BBQ Shelter


Book shop in Building A

1.3 EXISTING STRATEGIC FRAMEWORKS & MASTERPLANS

The Strategic Master Plan needs to align with UniSA's 'Crossing the Horizon Action Plan' wherever possible to facilitate the achievement of the Action Plan. Equally the Strategic Master Plan needs to acknowledge and support the State Government Strategy as outlined in 'Building a Stronger South Australia'.

The Strategic Master Plan needs to also acknowledge the thinking that informed previous Master Plans completed for the campus including:

- Mawson Lakes Campus Master Plan 2002-2010 prepared by Denton Corker Marshall (August 2003)
- Master Plans for M^2 and North West Precinct prepared by Denton Corker Marshall (2009)
- Mawson Lakes Campus Landscape Master Plan prepared by Taylor Cullity Lethlean (2006)

1.3.1 Crossing The Horizon Strategic Action Plan 2013-2018

UniSA's Strategic Action Plan has the following vision:

The University of South Australia will contribute to industry and its students as a creative enterprise. Our ambition is to differentiate the University of South Australia as a true University of Enterprise with the following commitment:

1. *Enhanced educational offerings and an outstanding student experience*
2. *Industry and end-user informed research supporting an industry-relevant curriculum*
3. *Increased staffing in the classroom and increased efficiencies beyond*
4. *Transformational infrastructure enriching the fabric of our institutions*
5. *Engagement with society beyond the classroom and campus*
6. *A globally visible University with global reach and leverage*
7. *A move towards a powerful international and external service culture supporting and enabling greater success*

Key actions that pertain to Mawson Lakes include:

ACTION SET 1 Enhanced educational offerings and outstanding student experience

Aspects of this Action include:

- Developing students as industry capable.
- Blended Learning – A blended approach to online and face-to-face learning
- Research Informed Teaching – Research leaders will inspire undergraduates through seminars, lectures and master classes.
- Teaching and Research Alliances – The development of teaching and research alliances with other universities to enable students to learn from other countries in virtual classrooms.
- Equivalence of Infrastructure – Creation of a campus village with a wider range of social and cultural experiences and community spaces.

ACTION SET 2 Industry and end-user informed research supporting an industry-relevant curriculum

Aspects of this Action include:

- UniSA Research Themes – Research themes developed around grand challenges anchored in an entrepreneurial environment.
- Key Disciplines – Continue to build on key disciplines in teaching and research.
- Building Industry Linked Research – Leverage industry connections to target increased participation and research in areas that support research links with industry.

ACTION SET 3 Increased Human Capital in the Classroom and Increased Efficiencies Beyond

Aspects of this Action include:

- Appointment of 100 new academic staff at levels D and E across research themes and key interdisciplinary strengths with a commitment to teaching and research as an embedded and integrated activity.

ACTION SET 4 Transformational Infrastructure enriching the fabric of our Institution

Aspects of this Action include:

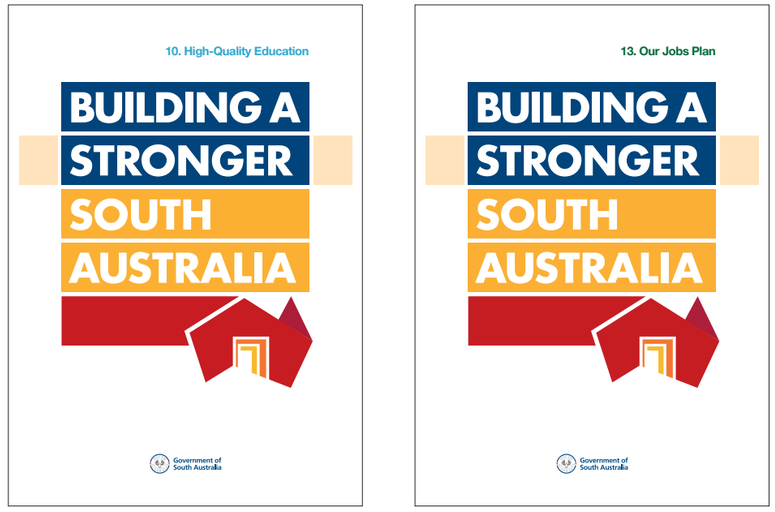
- Deliver new infrastructure that positions the University as an inspiring place to work and study, providing spaces that stimulate and foster creativity and innovation in all fields of operation – spaces that underpin happiness and health and support new models of learning.
- STEM Infrastructure – **Invest in the refurbishment of undergraduate teaching equipment and laboratories for Science, Technology, Engineering and Mathematics (STEM) education at Mawson Lakes**, supporting the redevelopment of approaches to undergraduate teaching in engineering and closer links between teaching and research activities at Mawson Lakes, with flexible access to laboratories for off-campus students and for outreach activities, building connections with regional initiatives, particularly in advanced manufacturing.
- Sports and Culture – Invest in new Sports facilities and clubs.

ACTION SET 5 Engagement with society beyond the classroom and campus.

Aspects of this Action include:

- Mentoring for Success – Advance a University wide strategy for mentoring, including mentoring in secondary schools, the Australian Indigenous Mentoring Experience (AIME), Indigenous Support Services Industry, practitioner mentoring of students and staff, PhD mentoring of undergraduate and 'peer-to-peer' staff mentoring.
- Aboriginal and Torres Strait Islander University of Choice – Strengthen the University's position as University of Choice for the Aboriginal and Torres Strait Islander students. Create environments where Aboriginal and Torres Strait Islander people can learn, grow and define the future in a place that acknowledges, respects and learns from their wisdom and celebrates the pursuit of knowledge in all its guises.

UniSA Crossing the Horizon Strategic Plan 2013-2018



SA Government Strategic Directions

ACTION SET 6 A Globally Visible University with Global Reach and Leverage

Aspects of this Action include:

- International Students – International students will make up 30% of UniSA's total student body, distributed across undergraduate and postgraduate programs.
- Globally Visible and Sustainable Research – Develop a network of international industry-connected joint research centre with partner universities in strategic locations worldwide.

ACTION SET 7 Key Enablers and Supports.

Aspects of this Action include:

- Enhanced End-User Services – Deliver services to the students and staff in a way that is sympathetic and responsive to their needs with a point-of-contact model and matrix management strategy for the delivery of routine services that eliminates duplication of effort, concentrates on the customer and allows service areas to resource routine and complex inquiries more efficiently.

1.3.2 South Australian Government Strategic Directions

The South Australian Government has seven strategic priorities of which three are of particular relevance to the Mawson Lakes Campus including:

- Giving our children every chance to achieve their potential in life
- Growing advanced manufacturing as the way of the future
- Realising the benefits of the mining boom for all

The seven strategic priorities have informed policy initiatives as part of Building a Stronger South Australia with the following pertaining to the Mawson Lakes Campus:

- Future Fund
- High Quality Education
- Our Jobs Plan

The Future Fund is specifically designed to support the three strategic priorities described at the introduction of this section, High Quality Education supports every chance for every child and Realising the Benefit of the Mining Industry, while 'Our Jobs Plan' supports acceleration to advanced manufacturing with a series of Industry Roadmaps, Cluster Development and Precinct Development.

Industry Roadmaps are being developed in the following areas that provide opportunity for the Mawson Lakes Campus:

- Defence Industry technology
- Minerals and/or Petroleum technology
- Medical and assistive technologies
- Industry application of additive and transformative manufacturing technologies

Mawson Lakes Campus is well placed to be the focus of both a Cluster and Precinct Development of interconnected firms, suppliers and associated institutions.

Precincts involve the co-location of firms, researchers and academics in distinct locations often with common user infrastructure.

The State Government will offer a Precinct Integration Package to encourage firms to co-locate into precincts by offering some of the costs of establishment and operation.

The Emerging Technologies Program supports many of the research activities that are currently being pursued at Mawson Lakes including:

- Nanotechnology
- Photonics
- Medical technologies

with funding opportunities for prototyping and development of pilot trials.

1.3.3 Economics and National Priorities

The brief identified alignments between State Economic Priorities and National Priorities with the Future Industries Institute Research Strands:

- Resources, energy and renewable assets (State Economic Priority 1, National Priority 5)
- Environment, soil and water (State Economic Priority 2, National Priorities 2 and 7)
- Health research and devices (State Economic Priority 3, National Priority 5)
- Commercialisation of research and growth through innovation (State Economic Priorities 4 and 6, National Priority 6)

1.3.4 Master Plans

DCM Mawson Lakes Campus Master Plan 2002-2010

The Denton Corker Marshall (DCM) Master Plan was completed in 2003 and was an update of work DCM had undertaken in 1999 which was not endorsed by the University probably due to the rapid evolution of the Mawson Lakes suburb and Town Centre. The key external drivers for the Master Plan were:

- The relocation of programs from the Underdale Campus to Mawson Lakes
- Blueprint 2005 announced in 2000 which led to construction of the Mawson Centre (Building MC), Garth Boomer Building (Building G) and a major extension to the Sir Eric Neale Library (Building C) to accommodate these additional students.
- Development of Mawson Town Centre

Key Directions of the Master Plan were:

- **Change of focus and integration** - To change the nature of the campus from an isolated inwardly focussed institution to one that has outward prospects and connections and is an integral part of a developing community.
- **The Zipper Zone** - To promote a blurred edge between the University and Mawson Central through the creation of a shared use zone where University and town functions intermesh.

DCM Mawson Lakes Campus Master Plan 2002- 2010

- **Pedestrian Network** - To provide clearly defined protected pedestrian linkages at ground level throughout the campus and to enhance the identity of the campus by providing a network of uniting structures across the campus.
- **Traffic and Parking** – To reinforce the new urban context of the campus by reducing the extent of broad acre parking lots in favour of street parking wherever possible.
- **Consolidation and Growth** – To review the development of campus with respect to the opportunities presented by refurbishing current stock before committing to constructing new buildings.
- **Building Typology** – To recognise the nature of the existing built form and use it as the cue for future works.
- **Views and Vistas** – To retain, protect and enhance the series of views and vistas throughout the campus and to define new views and vistas from the campus to adjoining precincts.
- **Landscape** – To enhance the internal and external environments and amenities of the campus through the implementation of unified, site responsive and sustainable hard and soft landscaping.
- **The Meadow and Broader Landscape** – To change the focus of the eastern side of the campus by providing a landscaped outlook as an alternative to the other urban outlooks and to downgrade the eastern sector of the original ring road to that of a small lane (Meadow Lane).
- **Sustainability** – To provide for the inclusion of economically viable or desirable Environmentally Sustainable Development (ESD) principles into all campus projects, including landscaping, civil and building projects, to provide implemented examples of some of the techniques and technologies developed through the University and to demonstrate the University's desire to continue to be a responsible member of the local and global communities.

The DCM Master Plan provides a thoughtful series of observations and development proposals for the Mawson Lakes Campus with all of the principles developed supported into the future. A series of Precinct Plans were developed, with partial implementation of the reinforcement of The Zipper Zone, redevelopment of GP Courtyard as a student hub, the Town Walk and Meadow, but with the majority not implemented.

The direction regarding consolidation and growth based on refurbishing existing building stock prior to construction of new buildings has not been implemented, with little major refurbishment and a significant new build program which in addition to the Mawson Centre has seen the construction of Buildings G, X, MM and V together with a major extension to Building C.

The recommendation to incorporate basement and semi-basement parking in any new buildings has not been implemented presumably due to cost implications. The series of shaded pedestrian networks proposed to sinuously weave their way through the campus has also not been implemented.

Taylor Cullity Lethlean Mawson Lakes Campus Landscape Master Plan

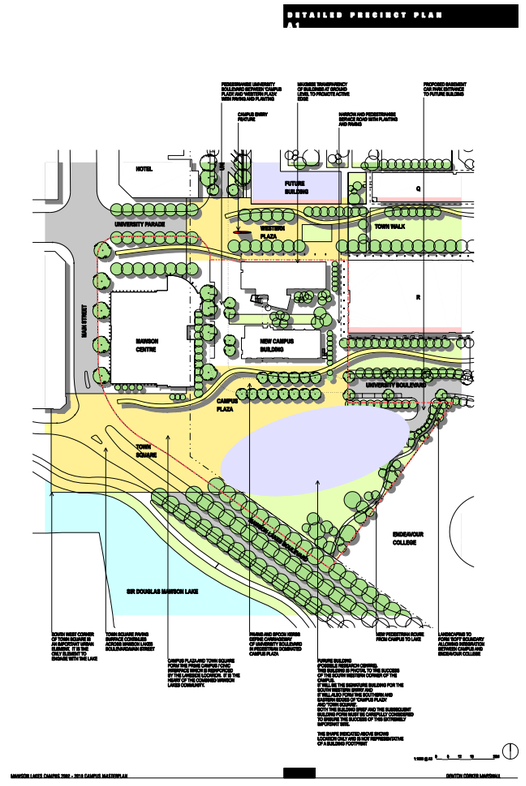
Taylor Cullity Lethlean (TCL) were commissioned by UniSA to prepare a Landscape Master Plan in 2005 which responded to the DCM Master Plan and developed the landscape opportunities for the site. TCL undertook a detailed analysis and prepared a series of design principles as follows:

- **Formal Spaces** – Provide formal landscape spaces that form forecourts to buildings and provide a sense of organised space with a sense of enclosure.
- **Informal Spaces** – Include informal landscape spaces that accommodate general background site uses such as pedestrian circulation and car-parking.
- **Park Lands** – Make a visual connection and utilise informal pathway networks for enjoyment of the wider background landscape.
- **Hierarchy of spaces** – primary & secondary – The circulation spaces of the campus – area with predominance of active pathways, building entries and soft landscape suggest two levels of importance. The primary areas have higher levels of use.
- **Gathering nodes** – Provide a sense of address and orientation as well as an opportunity for informal rest/meeting areas by provision of informal areas adjoining building entrances.
- **Integration with context** – Provide strong visual and pedestrian links towards each adjoining boundary and beyond to adjoining areas so as to integrate the landscape physically and visually with its immediate context.
- **Hierarchy of linkages – vehicles** – Make provision for avenue streetscape to each section of University Boulevard and less formal streetscape on secondary streets that allows access to car parks and delivery points.
- **Hierarchy of linkages – pedestrian** – Provide both formal and informal walkways with high amenity and visual interest imparted through soft and hard landscape, including upgrading of University Walk and Town Walk. Circulation form the bus drop-off through GP courtyard and beyond is also important.
- **Planting canopy** – Retain and augment tree planting that provides shade and a sense of scale, differentiating between deciduous trees for Boulevards and Walks, native trees for general areas and parklands.

TCL developed an overview landscape proposal and a series of Precinct Plans with detailed recommendations regarding planting, paving, lighting, furniture, traffic control and special aspects such as artwork. Significant tree planting, traffic calming and extension of the wetlands was proposed together with more formal pools.

Few of the Master Plan proposals appear to have been realised.

TCL Mawson Lakes Campus Landscape Master Plan 2005



DCM Mawson Lakes Campus Master Plan 2002- 2010

DCM Master Plans for M2 and North West Precincts

DCM were engaged in March 2009 to develop a more detailed Master Plan for the M² and North West Precinct. They developed an envelope for the proposed M² Building and Plasso area with recommendations to activate the Building H frontage to the proposed Plasso. M² (Building MM) and the Plasso have been implemented in accordance with the DCM advice but no work has been done to Building H.

DCM also proposed the creation of a Northern Plaza between Main Street and Building SCT traversing University Boulevard which has not been implemented. This proposal necessitated reconfiguration of the campus entrance at the northwest corner of the site which has also not occurred.

Library Master Plan

MPH and Wilson Architects have been engaged to develop a Master Plan for the Library Building which we understand is still in process. Preliminary proposals indicate significant reduction in the collection size, introduction of collaborative learning spaces and group learning spaces together with an increase in the provision of study rooms. Level 3 is proposed as entirely for staff accommodation.

TIMP

UniSA has prepared a Teaching and Infrastructure Master Plan for Mawson Lakes with specific proposal for Buildings GP, F, MC, MM & P.

Building GP is to be redeveloped on both levels including:

- Lecture theatre upgrade
- Creation of Flexible Tutorial Rooms with three 28 student rooms combining to create a 72 student space
- Video production facility for online content
- Creation of automated Video Conferencing facility

Building F is to be redeveloped as a learning hub with:

- A series of flexible tutorial rooms accommodating between 60-90 students with informal learning spaces developed in the courtyard

Building MC

The existing tutorial rooms as Level 1 of the Mawson Centre are being reconfigured as flexible tutorial spaces with student numbers in each space reducing to 42.

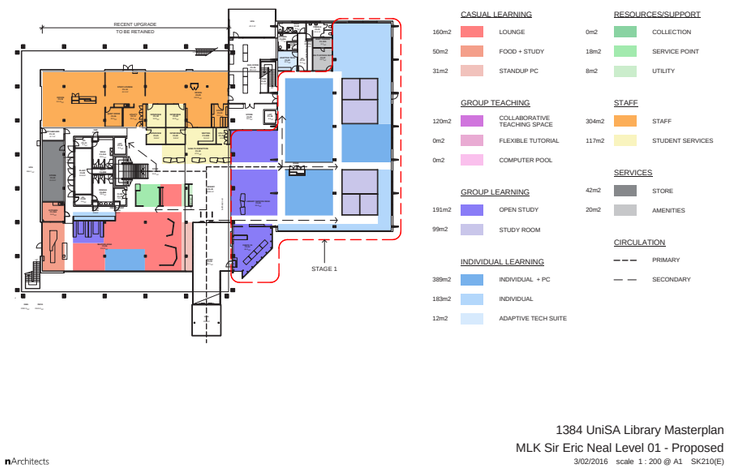
Building P

Teaching spaces in Building P are proposed to be upgraded to a series of flexible tutorial rooms accommodating between 42 and 60 students.

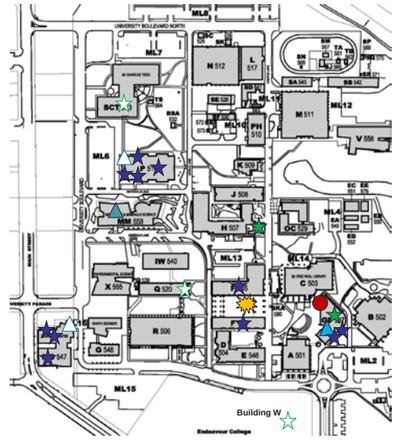
Building MM

A new CTS to CTS Video Conferencing facility is proposed for MM.

Retail Master plan 2016



Library Master plan 2016



Mawson Lakes

- Lecture theatre upgrade
- Lecture theatre repurpose
- Flexible tutorial rooms
- Video production
- New automated VC
- Automated VC (2016 ISTS)
- New CTS to CTS VC
- New learning spaces

University of South Australia

Teaching and Infrastructure Master Plan

Proposed Masterplan Rendered, M² Precinct

DCM Master Plan for M2

1.4 SITE CONTEXT

The Mawson Lakes Campus was founded as **The Levels** Campus of the South Australian Institute of Technology on land that was part of the outwash fan of Dry Creek until flood mitigation and extensive drainage enabled its use for buildings.

This land was in the custodianship of the Kaurna people, the traditional Indigenous owners. Significant Kaurna artefact scatters, mounds and burial sites have been found on land adjoining the campus. The Mawson Lakes campus site would have been intermittently flooded and seasonally waterlogged but at dryer times grasslands attracting kangaroos provided valuable hunting grounds for the Kaurna people.

The area was settled by Europeans from the 1840's originally for grazing but later as a settlement. Kaurna people continued to frequent this locality until the 1890's.

The Institute of Technology purchased 70 hectares of land in 1967 with a major building program largely completed for the 1970 Academic Year which has been described in **Site Development**.

The Campus has two major zones, the built facilities in the western half and playing fields including ovals, tennis courts and a 9 hole golf course in the eastern half of the site. A major wetland bisects the site into these two halves and provides an overflow from the ornamental lake that is a central focus for the suburb of Mawson Lakes.

Since the foundation of **The Levels** the Mawson Lakes Campus has been transformed from an isolated inward looking campus with an engineering and computer science focus to a more outward looking and diverse campus.

Introduction of the School's of Education, Management and Health Sciences have increased student numbers and provided greater gender balance.

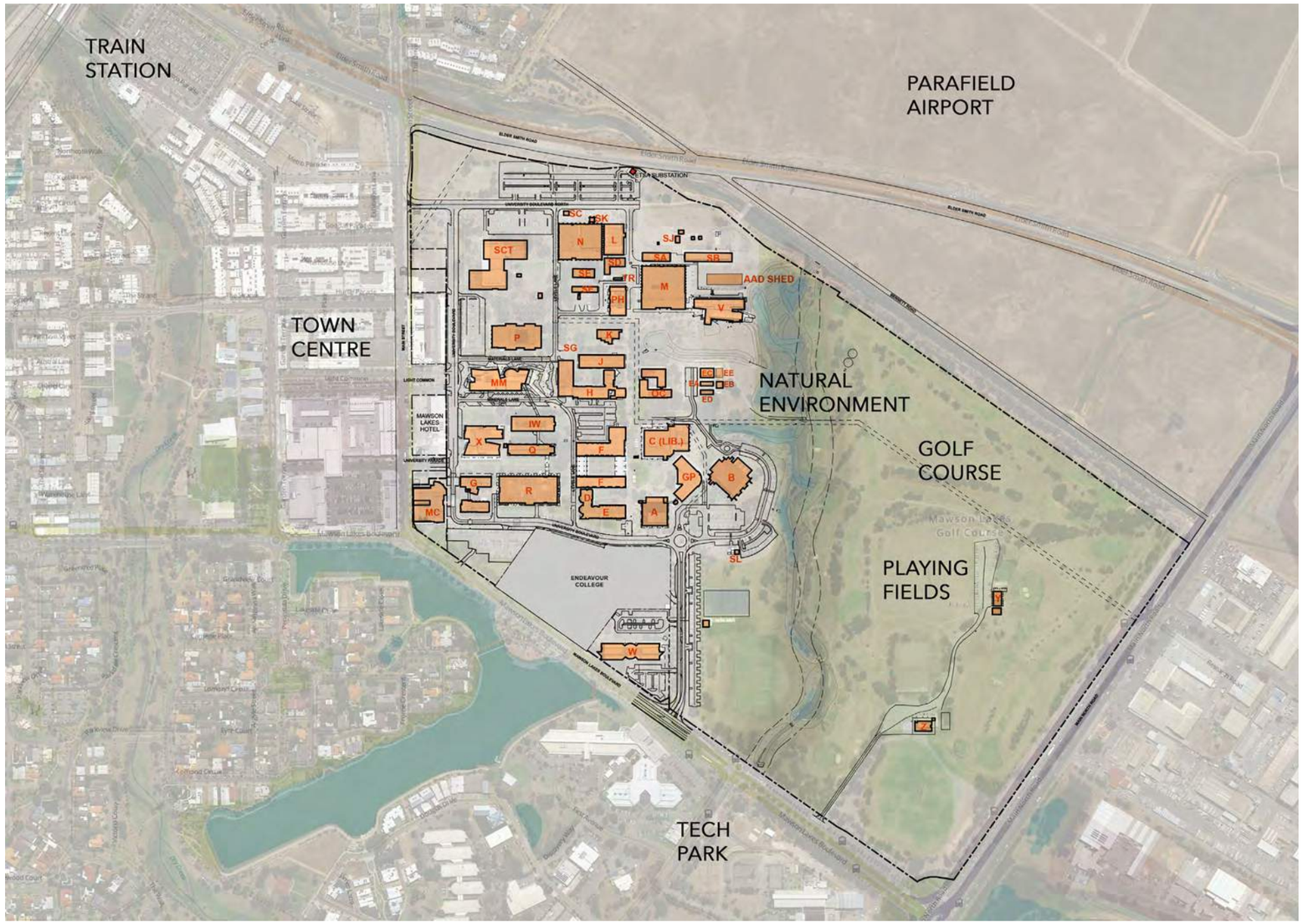
The evolution of Technology Park together with the suburb of Mawson Lakes and Mawson Town Centre have created active frontages to the campus with access to a broad range of facilities and opportunities for industry engagement.

The Campus has greater connectivity both to the Adelaide CBD and Northern Suburbs with the new rail and transit interchange to the North West of the Campus.

The Campus' predominant aesthetic is defined by the large number of late 1960's and early 1970's building which have a consistent palette of off-form concrete, cream and brown bricks with flat roofs. Some of the buildings such as Building R have narrow colonnades and many of the buildings have bridge links connecting upper floors.

The Blueprint 2005 program introduced greater built diversity to the campus with Building MC, GB, and the library extension. Research Buildings MM, X, and V have further added to this diversity.

The early buildings while being predominantly concrete framed have cellular enclosed layouts serviced by long corridors with little open space. They are also inward looking with little visual connection to the exterior. The interiors and exteriors give little clue as to the educational and research programs they contain.



Site context Diagram- Mawson Lakes

The more recent buildings which are predominantly research focused are much more open with opportunities to overview activities. Buildings MM and X enable visitors to witness research in progress.

The wetlands and playing fields have high amenity but do not feel integrated with the campus. Opportunities to improve connectivity between the two halves of the campus if realised will enhance the amenity of the whole campus particularly if supported by landscape and urban vision for all exterior spaces of the campus.

1.5 SPACE UTILISATION

As the Mawson Lakes Campus has evolved with changes to educational and research programs, buildings have developed different uses to their original designed purpose, often creating inefficiencies.

The Campus is home to four large schools:

- School of Engineering (ENE)
- School of Information Technology and Mathematical Sciences (ITMS)
- School of Education
- School of Natural and Built Environments (NBE)

With the exception of Education which has the majority of its facilities in Building GB the schools are split over many buildings with ITMS occupying six buildings. NBE is dispersed across four buildings (excluding sheds) and ENE occupies nine buildings (excluding sheds). The campuses major research facility the Future Industries Building is spread over seven buildings. This dispersal leads to inefficiency and duplication in equipment and materials.

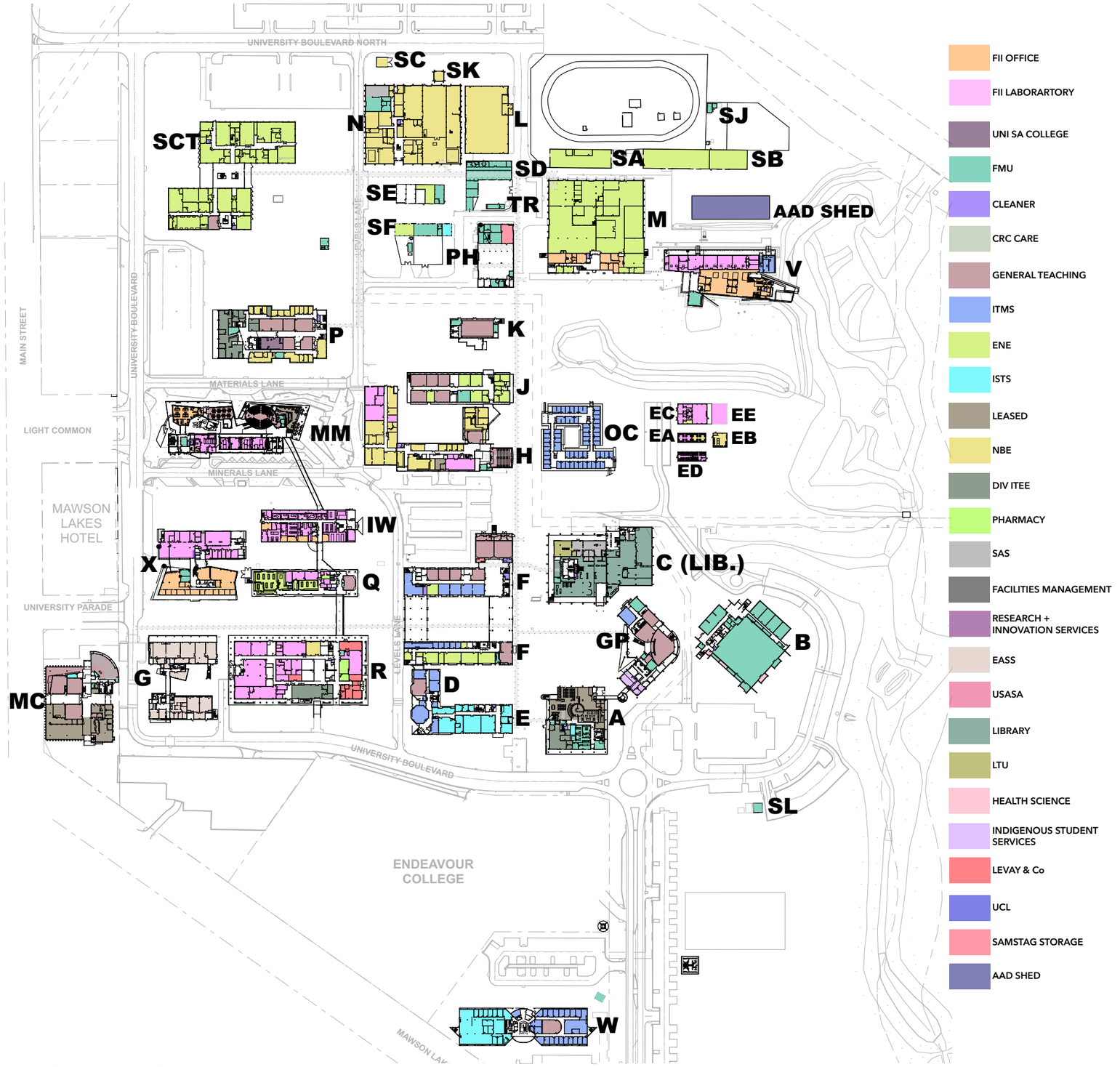
Observational visits suggest significant under utilisation of space across campus particularly in Building R which is predominantly a research facility, Building M and the upper floor of Building F.

UniSA has a target of 75% occupancy for teaching and learning spaces including lecture theatres, tutorial rooms and computer pools. The 2015 Teaching Space Audit Summary suggests that Mawson Lakes teaching and learning facilities were underutilised with approximately 50% usage of Lecture Theatres and Tutorial Rooms, but higher utilisation of Computer Pools which was sitting above 60%.

Opportunities to improve the efficiency of space and its utilisation are considerable. The TIMP proposals promoting more flexible collaborative teaching and learning spaces should enhance efficiency and promote utilisation.

Many of the teaching laboratories are outmoded and if upgraded as flexible facilities could eliminate the need of some older laboratories, which could be decommissioned and repurposed.

Office spaces for academics are predominantly traditional individual offices, which with the desire for more open plan collaborative office layouts will also free up space.



Existing Site Tenancy Plan Ground Floor

2. SITE ANALYSIS

OVERVIEW

This site analysis aims to identify key site challenges and opportunities and forms the basis from which informed decisions can be made regarding the potential to reuse existing building stock and precinct features at the Mawson Lakes Campus. The consultant team has built upon documents and baseline information from The University of South Australia to supplement their own site investigations and research.

The existing site at Mawson Lakes has a land area of approximately 65 hectares. The site is complex, with an array of dispersed buildings built between the 1960s to 2011, with a diversity of uses by various Schools, Institutes, Research Centres, administrative and community uses with a estimated gross floor area of 100,000m2. While the primary site use is a University including offices, teaching and research laboratories, workshops, tutorial rooms, storage and collaborative spaces, there are other uses including research institutes, leased spaces, golf course, playing fields and carparking.

These buildings are predominately serviced from the Power House through a tunnel distribution system.

The following section commences with an overview of each building in chronological order to gain an understanding of the development sequence of the site. This is followed by an overview of planning constraints, services, structure, landscape, traffic and parking analysis.

BUILDING KEY PLAN

- A. BUILDING A
- B. BUILDING B
- C. BUILDING C
- D. BUILDING D
- E. BUILDING E
- EA. BUILDING EA
- EB. BUILDING EB
- EC. BUILDING EC
- EE. BUILDING EE
- F. BUILDING F
- G. BUILDING G
- GP. BUILDING GP
- H. BUILDING H
- IW. BUILDING IW
- J. BUILDING J
- K. BUILDING K
- L. BUILDING L
- M. BUILDING M
- MC. BUILDING MC
- MM. BUILDING MM
- N. BUILDING N
- OC. BUILDING OC
- P. BUILDING P
- PH. BUILDING PH
- Q. BUILDING Q
- SA. BUILDING SA
- SB. BUILDING SB
- SC. BUILDING SC
- SCT. BUILDING SCT
- SD. BUILDING SD
- SE. BUILDING SE
- SF. BUILDING SF
- SG. BUILDING SG
- SJ. BUILDING SJ
- SK. BUILDING SK
- SL. BUILDING SL
- TR. BUILDING TR
- V. BUILDING V
- W. BUILDING W
- X. BUILDING X

Site Location Plan

EXISTING BUILT FORM

Buildings A, Q, R, SCT 1967

Building A was constructed in 1967 and purpose built as an administration building and students union which included squash courts that were later converted to prayer rooms. This building has a vaulted ceiling with a concrete column and beam structure with some insitu loadbearing walls resulting in a large floor plate making the building relatively flexible. This university building currently houses FMU security, bookshop, café, Engineering Experience Studio with balcony along with prayer room facilities and under utilised offices. This building has a strong street presence, high ceilings on the ground floor together with positive links to the GP Courtyard at ground level. The FMU office is the main entrance point for visitors to the campus.

Building Q is a relatively narrow building slotted in the south western corner of the site, two storeys in height with plant and constructed of reinforced concrete columns. The internal arrangement, apart from the ANFF area, does not allow transparency into spaces. The only lift access is via connecting bridges from Buildings IW & R. The infilled verandah at ground level to the south side has glazed openings providing some activation and was redeveloped as a result of a fire at the western end of the building in the 2000's. The building consists of research laboratories used by ANFF which have been designed to a high standard, photonics laboratories, wet chemistry laboratories used by Pharmacy and smaller general laboratories used by the Future Industries Institute. There is also a lecture theatre on the ground floor along with some offices on the upper floor which are oddly configured as a result of the narrow floor plate. Whilst the structural grid provides flexibility, along with high end ANFF facilities, the building into the future requires significant mechanical upgrades and lacks flexibility for modern laboratory design.

Building R was originally built for use as the Chemical Technology 'south' School and has large structural column grid with concrete column and beam structure. There is a change in column grid at the western end suggesting that this building has been extended previously, with cracking evident at this location. Ventilation is an issue, with strong smells throughout the building. Asbestos stickers were also noted. The building houses a variety of functions including research laboratories used by the Future Industries Institute which are in a range of conditions and leased laboratories on the ground floor. The School of Pharmacy has chemistry laboratories on the upper floor which are in poor condition. This building also houses a large workshop space together with a former workshop space used for storing legacy chemicals that need to be disposed of. Although there are a variety of groups using this building, they appear to be significantly underutilised along with dated finishes throughout and some zones in very poor condition. The building is in a prominent location with good street frontage. The building's large open floor plates, generous ceilings and dock access suggest it may be suitable for reconfiguration in the future.

Building SCT was originally built for Electrical and Electronic Engineering. It is isolated in the far north western corner of the site with a concrete column structure and mansard roof consisting of two levels. The building houses a ranges of spaces used by the School of Engineering including a mix of old and new electrical, digital electronics and mechatronics laboratories together with workshops and research laboratories, post grad offices, tutorial rooms, lecture rooms and cellular staff offices. There is a central foyer which also houses a lift that has been recently upgraded. The building suffers from isolation, some teaching spaces requiring upgrades together with disconnection at street level and asbestos noted in the building. The building currently acts as the western gateway to the campus and has the closest proximity to the train station.

Buildings D, E, F, J, K, M, PH 1969

Building D & E are located at the southern end of the site and interconnected at the first two levels. An extension to Building D added a third floor. Building E is constructed of solid brick with loadbearing walls while Building D has structural column grid (octagonal concrete columns) and a series of small rooms along with complicated circulation limiting flexibility. Building E primarily houses ISTS offices and the Campus Data Centre and is a secure building but with no lift. Building D houses some of the School of Information Technology Mathematical Sciences administration offices, general teaching spaces and a decommissioned lecture theatre. Both of these buildings are prominently located with University Boulevard frontage. They have limited internal flexibility with some servicing in Building D at end of life.

Building F is centrally located onsite and adjacent the GP courtyard, it is a two storey building with an interconnecting bridge to Building D. The solid brick building is constructed with loadbearing brickwork walls. There are movement issues together with long travel distances between each wing on the upper floor. This building is integral to the campus power supply but is significantly dated internally. Multiple schools use these spaces but vacant/ underutilised laboratories were observed on the upper floor. The building has a range of uses including specialised MAC computer pools, dated physics and optics teaching laboratories, research laboratories and many cellular offices. Building F also houses two large lecture theatres that are not DDA compliant along with general purpose computer pools and the USASA office. Although the building has a strong connection to the GP courtyard as a result of its physical form, the building is disconnected from the public realm at street level and its narrow floor plates may limit future flexibility.

Building J is a two storey building to the northern side of the site that houses some of the School of Engineering administration offices and reception along with general purpose tutorial rooms and cellular research offices on the upper floor. The building is constructed with loadbearing brickwork walls limiting future flexibility with typically dated finishes throughout. Heating and cooling is currently through floor consoles making future upgrades challenging along with limitations in access to female toilets across the levels.


Building A 1967


Building Q 1967


Building R 1967


Building SCT 1967


Building D 1969


Building F 1969


Building J 1969


Building K 1969

Building K is small performing arts building located toward the northern side of the site adjacent the wetlands but relatively isolated and hard to find. The building is constructed from loadbearing brickwork and blockwork walls and works well as a flexible performance and meeting space. The School of Education uses this space as overflow when the gymnasium is at capacity. The building is also used by the community for events, predominantly after hours.

Building M was originally built for Mechanical Engineering. It is located at the far north eastern end of the site and is a large two storey plus mezzanine workshop facility constructed with a structural grid and loadbearing walls. This large workshop space is primarily used by the School of Engineering and houses research workshops, teaching workshops, aviation simulator teaching, double height machinery workshops space, high temperature test laboratories and significant new HDR open plan office spaces. Although the building has very deep floor plates, no lift and is remote from the student hub in the GP courtyard, with significant upgrades it has the potential and capacity to become the nucleous of a centralised workshop zone for the University.

Building PH is the central Power House for the campus and is constructed with a structural column grid and loadbearing walls. Due to the Power House servicing many buildings across the site, a proposal to demolish or relocate this building would be challenging. The Power House is at capacity and does not serve the most recent buildings on campus.

Buildings C, H, J, N 1970

Building C, the Sir Eric Neal Library, is located to the northern side of the GP Courtyard with strong visual links to the wetlands. The original section of the building is combination of solid brick construction with concrete floors and frame designed for loads to support a large library collection. The building structure was also designed to have an additional fourth floor which never eventuated. The extension to building C, designed by Thomson Rossi Architects, was completed in 2004 and houses mainly office spaces for library staff while the existing section incorporates the library collections, break out spaces, campus central, SEU offices and meeting rooms. The building frontages are not as active at street level as they could be, in part due to some office locations. The interiors to much of the original section of the building are dated. The large open floor plates along with good northern orientation and a strong presence with the GP Courtyard contribute to this buildings re-use potential.

Building H is centrally located on the site, is three storeys in height with plant on top and is constructed of loadbearing walls. This building predominantly houses the School of Natural & Built Environments research laboratories and has cellular office spaces. On the ground floor, the single level concrete block annexe is in poor condition and houses the Future Industries Institute crushing and grinding facilities for the Minerals Strand. This building was recently handed over to NBE from a former institute, originally configured for research and as a result spaces appear underutilised or vacant. Although this building is the geographic heart of the campus, it has accessibility issues. The structure type limits future flexibility and it has a disconnection with the public realm at street level.

Building N is a large specialised workshop facility at the far northern end of the site and is constructed with a structural column grid and solid brick walls. The building is used by the School of Natural Built Environments and houses a range of facilities including water tunnels, concrete test facilities, temperature and humidity rooms along with offices and teaching spaces. Although this structure has specialist facilities used by both research, industry testing and students, there appear to be issues with the ceiling, flooding in basement and significant upgrades required to meet NBE course accreditation standards.

Building P 1973

Building P is located on the western edge of the site and constructed with a structural column grid, loadbearing walls and a solid brick façade. The building is mainly configured for teaching and houses the School of Natural Built Environments teaching laboratories, tutorial and cellular office spaces. The Planetarium is also located on the upper floor of this building with a insitu domed ceiling along with UniSA College designated workshop space and DIVITEE offices on the ground floor. Although this building is in close proximity to the train station and the planetarium which is a popular attraction with the community, it is isolated from the rest of campus. Interior finishes are dated in some locations with problematic internal configurations making future flexibility challenging.

Building B 1974

Building B, the EW Mills Sports Centre, is located in the far south eastern corner of the site with its main function as the campus gymnasium. The building has two levels constructed with loadbearing walls and consists of two full sized courts, squash courts, fitness centre, tutorial room, storage and mezzanine viewing zone. Although the gymnasium is adjacent the wetlands, golf course and playing fields, the GP Building precludes visual links to the gymnasium. The gymnasium is block booked during the week which significantly limits UniSA Sport and community access.

Building W 1992

Building W is seperated from the rest of the campus located in the far southern corner adjacent Endeavour College. The two storey building is constructed with a steel frame and a suspended concrete slab with precast panel infills. The building houses a range of research and academic office spaces for ISTS, ITMS, DASI, meeting rooms, defence reading rooms along with a lecture theatre and wireless data laboratory. There are satellite connections and electrical engineering associated with this building that could all be relocated, if required, excluding the satellite that would be expensive to relocate.

Building GP 1993

Building GP is located adjacent the GP courtyard and was built as a general purpose building. It is two storeys in height and is a composite structure of steel and concrete columns with suspended concrete floor slabs. The building houses a large lecture theatre, medium size lecture theatre, computer pools and tutorial rooms along with multiple office spaces for Research Innovation Services, UniSA Ventures, Indigenous Student Services space and community bookable rooms. There is one lift which is accessed via a foot bridge to Building A and although the building has inflexible floor plates, due to the shape of the building it is well connected at street level to the GP courtyard and provides a range of spaces suitable for reuse.

Building M 1969

Building PH 1969

Building C 1970

Building H 1970

Building N 1970

Building P 1973

Building B 1974

Building W 1992

Building IW 1995

Building IW was built to house the Ian Wark Institute and is centrally located adjacent Building Q. It is two storeys in height and constructed from a steel frame with concrete floor slabs and concrete block infill. This building houses a variety of laboratory spaces used by the Future Industries Institute with highly specialised equipment located in the smaller rooms on the ground floor and many cellular offices on the upper floor that appear underutilised. The ground floor also includes some PhD offices that appear to have been converted from laboratory preparation spaces with accessibility and WHS issues along with no sightlines into laboratory or offices spaces exacerbating this issue. This building also has a lecture theatre on the upper floor and connecting bridges to Building MM and Q.

Building OC 1996

Building OC is centrally located onsite and designed as a temporary prefabricated steel framed building that is one storey in height. This temporary structure houses many cellular offices for the School of Information Technology & Mathematical Sciences that are in fair condition but the building suffers from air conditioning issues, significant leaks with no stormwater connection and is at its end of life as functional accommodation.

Building MC 2004

Building MC was designed by GMB from Canberra in association with local firm Russell & Yelland. It is located in the far south western corner of the site with strong links to the Mawson Town Centre and is constructed with a steel frame, solid concrete block infill and some lightweight aluminium panels. The Mawson Centre was a joint initiative between UniSA, DECD and Salisbury Council with UniSA having 63%, DECD 18% and Salisbury Council 18% of ownership. The aim of the building was to open the University to the community along with the creation of a civic presence adjacent the Town Centre. The internal spaces include a public library, large lecture theatre, tutorial rooms that are also bookable by the community, open computer pool and the UniSA ITEE Divisional offices on the upper floor. This building is in generally good condition with good access to public transport but is disconnected from the rest of the UniSA Mawson Lakes Campus.

Building GB 2004

Building GB, the Garth Boomer Building, was also designed by Canberra based GMB in association with Russell & Yelland. It is located adjacent The Mawson Centre (Building MC), and comprises a north wing of two storeys, and a south wing of four storeys. The building has varying structural types including steel frame to the northern wing and solid concrete block work to the southern wing. The building solely houses the School of Education secondary teaching students along with staff offices dedicated to this school. There are a number of practice secondary teaching spaces which include workshops spaces and a general purpose science laboratory. A small breakout/ social space for students is adjacent the central courtyard. The southern wing houses the School's administration and academic staff offices which are a cellular individual offices with an inefficient layout.

Building X 2007

Building X was designed by Adelaide architects MPH and is located on the western edge of the campus. It is a designated research facility and the headquarters of the Future Industries Institute. The building is constructed of steel frame with suspended concrete floor slabs, two storeys high with a plant space above. The building was originally designed for CERAR with a range of high quality laboratories that are reasonably flexible and have office space adjacent. Although the building is disconnected from the eastern side of the campus, it has a strong street presence with transparency into the building enabling passers by to observe research activities.

Building V 2009

Building V was also designed by Canberra based GMB in association with Russell & Yelland and is located in the far north eastern corner of the site adjacent the wetlands. It is two storeys in height and constructed with a steel frame and loadbearing walls with a significant cantilever feature. The building was constructed for the former Mawson Institute with specialist cell culture laboratories and generous open plan office spaces. The Future Industries Institute currently occupies the building with one space toward the back of the building used by the School of Information Technology Mathematical Sciences. Although the building is in very good condition, it is disconnected from other Future Industries Institute spaces with limited pedestrian connections.

Building MM 2011

Building MM, designed by John Wardle Architects in association with Adelaide practice Swanbury Penglase, is the newest building onsite and is located along the western edge of the campus adjacent Building X and was designed as a multipurpose research and teaching facility. The structure comprises of a concrete column grid and load bearing walls and is three levels high plus plant, with a peristitial space to the southern side of the building. There are a number of users in the building including ANFF and Future Industries Institute research laboratories, central store and offices together with experimental teaching studios, seminar spaces, meeting rooms, forum and a café opening out onto the Plasso. The building is centrally located on campus with a high level of finish and servicing with good transparency into spaces but the size of laboratories and lack of equipment space appears restrictive to research.

AAD Shed 2016

The Art Architecture and Design Shed has recently been constructed and is located to the north of Building V and will be mainly used for prototype construction. The building will have a gantry and it is important to have sufficient truck access.

Building GP 1993

Building IW 1995

Building OC 1996

Building MC 2004

Building GB 2004

Building X 2007

Building V 2009

Building MM 2011

INTERNAL ENVIRONMENTS

LABORATORIES

The diversity of laboratory-type spaces at the Mawson Lakes Campus reflects the range of activities, organisational entities and historical development of the campus.

The disparate "campus-style" spacing of relatively small buildings while of its time, does not facilitate opportunities for modern collaborative research and teaching, interaction and program integration unless future development is actively planned in a way that helps address these issues.

Modern research (and teaching) facilities are designed for high visibility, serendipitous interactions and ability to move between labs, high technology platforms and offices in an efficient, secure and fluid manner. They are also highly adaptable and allow research and teaching to develop in a manner that is unencumbered by facility inadequacies.

Organisational review of some departmental structures, their scope of activity in both teaching and research is still underway but will present further opportunities for consolidation and modernisation of facilities that must be seized. The nature of competition for research funding, premium staff recruitment and student enrolments are all demanding that excellence in facilities must be pursued in order to remain competitive and viable.

Inward-looking organisational structures (with associated control of real estate) are not tenable in a competitive age.

FII Laboratories

The FII laboratories mirror this same expanse of history and subsequent facility quality but have commenced a journey of organisational regeneration. FII has the benefit of the some more recently-constructed buildings. However, improvement must be pursued and development of building transparency, building mass, activity mass and inter-building pathways are critical to creating a vital, competitive research environment.

Buildings R, IW, and Q all need to be significantly improved or replaced in order to provide viable, cost effective, efficient and attractive research capability. Building X, MM and V, though relatively new, still have building services deficiencies that need to be understood and addressed with infrastructure improvements.

FII Laboratories Summary

Highly varied laboratory configuration, age and condition of laboratory spaces exist across FII.

Key features and observations include:

Building E group including EC (enclosed conventional building)

EC is in a reasonable renovated state and part (possible half) could be adapted for animal house use (refer detail in Chapter 6).

Building EA and ED glass houses (and associated plant – including an emergency generator)

These are somewhat degraded and barely useable. A decision needs to be made regarding their future.

Building H (part)

Materials laboratory. A bespoke space that contains a range of minerals preparation equipment and a pilot plant setup. Busy at times there is work (some of which is contract) but the analytical laboratory (H1-12) contains aged and seeming outdated equipment. A proportion of contract work is undertaken.

Building IW

Aged laboratories - some renovated, that contain a mix of high-end service facilities (e.g. electron microscopy, NMR) through to some newly renovated laboratories in the core of level 2. Engineering service deficiencies affect multiple areas.

Building MM

The newest building with internal visibility featuring strongly but with limited outward aspect from laboratories. Inflexible benching and engineering services are already problematic in managing change. The peristitial service space and at least one fan room appear to be already near-capacity with services and equipment.

The central FII stores are housed on level one.

Building Q (part)

This includes the Photonics Research Centre (not part of FII) on level one and the ANFF on level two along with multiple office spaces to the south on level two. The new areas appear to be well designed. The level two office areas would benefit from an open plan approach.

Building R

Building R is the most likely candidate for redevelopment. It is in most parts highly aged, enclosed and poorly serviced. Teaching laboratories (Pharmacy) are substandard, ventilation overall is poor with the smell of chemicals in many locations. Recently renovated/augmented spaces include a PC2 laboratory and additional fume cupboard provision in the large central laboratories.

Building V

Building V, though remote is a generally well designed facility with a semi-enclosed peristitial space adjacent to the laboratories. The small size of the facility and its remoteness from other FII buildings remains a disadvantage. There are anomalous carpeted areas (currently for microscopy) and a human movement laboratory that could be converted to an 80m2 wet laboratory.

Building X

This building, while already faced with engineering services difficulties has a flexible benching system and a reasonably adaptable laboratory layout with larger open plan labs and adjacent specialised support laboratories.

Non FII laboratories

Within each building there are areas of neglect, recent renovation and higher activity. Most buildings are enclosed, lack a sense of internal orientation, openness and activity.

More recent renovations (eg the electronics teaching laboratory SCT 1-10) are open, vibrant and well-geared to their contemporary purpose but these by necessity have been completed ad-hoc and in seemingly opportunistic rather than strategic locations.

Building MM

Building X

Building V

Building H

Building IW

Building F

Building Q

Building R

Building F

Physics laboratory and a redundant biology laboratory.

Moderately aged facilities and equipment with significant potential for redevelopment of space.

Building GB (teacher training)

Good condition and vital with lots of activity.

Well managed and highly used, but space-constrained design and technology workshops on level one and highly used teaching laboratories and preparation space on level two.

Building H

A building in transition having recently been handed over to NBE.

Unattractive, enclosed circulation and functional spaces.

Building M

A valuable building with high bay capability and further development potential. In transition with further plans for development of teaching spaces in the eastern half.

Building N

Also a valuable building with high bay capability and further development potential.

Specialist structural testing facilities and water management testing.

Building SCT

Lighter, more open in appearance and feel with well conceived renovations (eg SCT1-10 electronics teaching laboratory).

WORKSHOPS

Workshops and associated research support facilities have been traditionally vital to the support of technical facilities but the ability to outsource some services, to consolidate and develop must be considered. The rapid development of advanced manufacturing technologies suggests that undergraduate, postgraduate and research oriented workshop activities might be substantially integrated and centralised so that truly excellent, vital facilities can be developed.

Opportunities in robotics/mechatronics, electronics, photonics, advanced machining, 3D printing, nanotechnology all need to be accessible on-site to serve, excite and challenge the Mawson Lakes community.

Heavy engineering capabilities that service particular facilities should be considered to have ongoing site-specific capabilities.

OFFICES

There is a range of office accommodation across the Mawson Lakes Campus concerning size and quality. Typically the older buildings that have not recently been refurbished house a number of small cellular offices with little visibility into rooms. Examples of these types of offices include Buildings SCT, P, H, J, OC, F, R & IW that are organised on the traditional university model where each academic or researcher had their own office. Newer buildings such as MM, X and V, typically display open plan office environments with opportunities for breakout spaces and meeting spaces. It is worth noting that although Building GB is relatively new, the office layout is a cellular model and Building MC also has a high proportion of individual offices. A series of older buildings have begun to transition into an open plan office arrangement including Building E, W, M & GP upper floor. There are also a series of office spaces across the campus that did not start out life as offices such as repurposed preparation spaces in Building IW and a series of rooms in Building H. There are a range of staff facilities throughout the campus but many staff kitchens are inadequate in size for the number of staff using them and do not facilitate casual interaction. Female toilets are not well dispersed across campus and are often inadequate in size and difficult to access, with Building H as an example.

Any new workspace projects across the University need to consider the UniSA Space Management & Planning Guidelines which stipulate the direction of open plan office work environments as directed by the Vice Chancellor. Many of the existing office arrangements on the Mawson Lakes Campus do not meet the size requirements listed in these guidelines.

TUTORIAL ROOMS

General tutorial spaces across the campus are used by each School and are typically found in the majority of buildings. Most of the tutorial spaces are of a standard arrangement with rows of loose tables, flat floors and a projector or AV screen on the wall and range in quality depending on how recently they were upgraded. Some of these spaces are bookable by the community with The Mawson Centre as an example.

There is a range in lecture theatre size and quality across the campus with Building GP Lecture theatre the largest but with a dated interior. Building F houses two lecture theatres that are well used but have accessibility issues at the entry doors. There are a number of decommissioned lecture theatres across the campus including Building H and Building D, with Building Q rarely used.

COLLABORATIVE SPACE

Building MM includes a range of collaborative teaching spaces which were first developed in this building and rolled out across multiple campuses. These types of spaces include Experiential Teaching Rooms and Experience Studio used by multiple schools. Building A houses a large experience studio but is dedicated to first year engineering students only and is not well utilised.

STORAGE

A variety of storage facilities can be seen across the Mawson Lakes Campus with large shed clusters primarily used for storage by the schools at the northern end of the site. Storage has a significant footprint on site with a number of cellular offices and laboratory preparation spaces that have also been converted into stores. This is evident in Building SCT along with a number of spaces on the upper floor of Building F full of old research projects, equipment and general items.

Building F

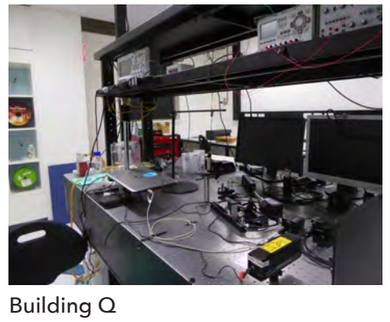
Building G

Building H

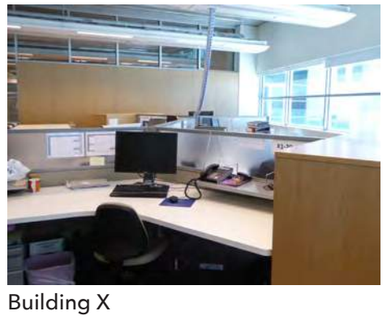
Building M

Building MM

Building N



Building Q



Building X

DEVELOPMENT PLANNING FRAMEWORK

The key existing planning parameters relevant to the preparation of the Master Plan for the Mawson Lakes Campus of the University of SA are considered to be land use, parking, building heights and flooding. These are discussed separately below.

Zoning

The Mawson Lakes Campus is currently located in the Urban Core Zone of the Salisbury Development Plan (Consolidated 7 July 2016). It also sits within both the Mawson Innovation Policy Area 24 and the Runway Public Safety Policy Area 26. The extent of the Zone and associated Policy Areas is shown on Zone and Policy Area Maps Sal/47 and 48 in the Salisbury Development Plan. In simple terms, the main building area associated with the campus is contained within proposed Policy Area 24, while the associated golf course is primarily located within Policy Area 26 adjacent to Main North Road.

The Mawson Centre, which is part owned by the University, is located immediately adjacent to, but outside of, the western boundary of Policy Area 24. It is not located within a Policy Area but is subject to the wider Urban Core Zone policies.

We have made some reference to aspects of the DPA is the planning advice below where we consider it to be most relevant.

Land Use

The Urban Core Zone is a reasonably flexible in terms of land use within the following key provisions:

Objectives

1 A mixed use zone accommodating a mix of employment generating land uses and medium to high density residential development in close proximity to a high frequency public transport corridor.

2 Development within a mixed use environment that is compatible with surrounding development and which does not unreasonably compromise the amenity of the zone or any adjoining residential zone.

Principle of Development Control

1 The following types of development, or combination thereof, are envisaged in the zone:

- affordable housing
- aged persons accommodation
- art gallery
- community centre
- communication dish
- consulting room
- dwelling
- dwelling and office
- educational establishment
- emergency services
- entertainment venue
- hall
- hospital
- library
- licensed premises
- nursing home
- office
- office and dwelling
- parking facility
- petrol filling station
- pre-school
- public transport Interchange
- recreation area
- residential flat building
- retirement village
- shop or group of shops
- supported accommodation
- swimming pool
- telecommunications facility
- theatre
- under croft car parking.

The Mawson Innovation Policy Area 24 of the Urban Core Zone is also reasonably flexible in terms of land use:

Objectives

1 A policy area accommodating a range of advanced technology organisations, in areas such as defence and aerospace, advanced electronics and information communication technology sectors.

2 A high quality innovative and progressive education and business community with organisations that range from small businesses and start-up companies to global organisations.

Principle of Development Control

1 The following forms of development are envisaged in the Policy Area:

- **affordable housing**
- **consulting room**
- **community centre**
- **dwellings located above non-residential land uses**
- **educational establishment**
- **health facility**
- **light industry associated with high technology or research and development related uses**
- **library**
- **office**
- **pre-school**

University Boulevard

Parafield Airport

http://www.parafieldairport.com.au/environment/recycled-water

- **primary school**
- **public administration office**
- **residential flat building**
- **service trade premises**
- **shop with a gross leasable area less than 250 square metres**
- **store**
- **theatre**
- **training facility**
- **warehouse.**

The Runway Public Safety Policy Area 26 of the Urban Core Zone is much more restrictive in terms of land use:

Objective

2 A policy area accommodating a range of integrated and accessible sporting, entertainment, cultural and recreational land uses and activities with associated spectator and administrative facilities.

Principle of Development Control

1 The following forms of development are envisaged in the policy area:

- **car parking**
- **clubroom associated with a sports facility**
- **golf course**
- **lighting for night use of facilities**
- **office associated with community or recreation facility**
- **playground**
- **sports ground and associated facility**
- **special event**
- **spectator and administrative facilities ancillary to recreation development.**

4 Development that is likely to result in the assembly or concentration of large numbers of people in locations where there is a significant risk to public health or safety should not occur within the policy area.

The list of non-complying development (i.e. development that is generally inappropriate), in the in the Urban Core Zone is as follows:

Advertisement and/or advertising hoarding that achieves one or more of the **following:**

(a) it moves, rotates or incorporates flashing lights

(b) it is attached to a building and any part extends above the roof line of the building.

Fuel depot

General industry

Light industry

Public service depot

Road transport terminal

Service trade premises

Special industry

Store

Transport depot

Warehouse

Waste reception, storage, treatment or disposal

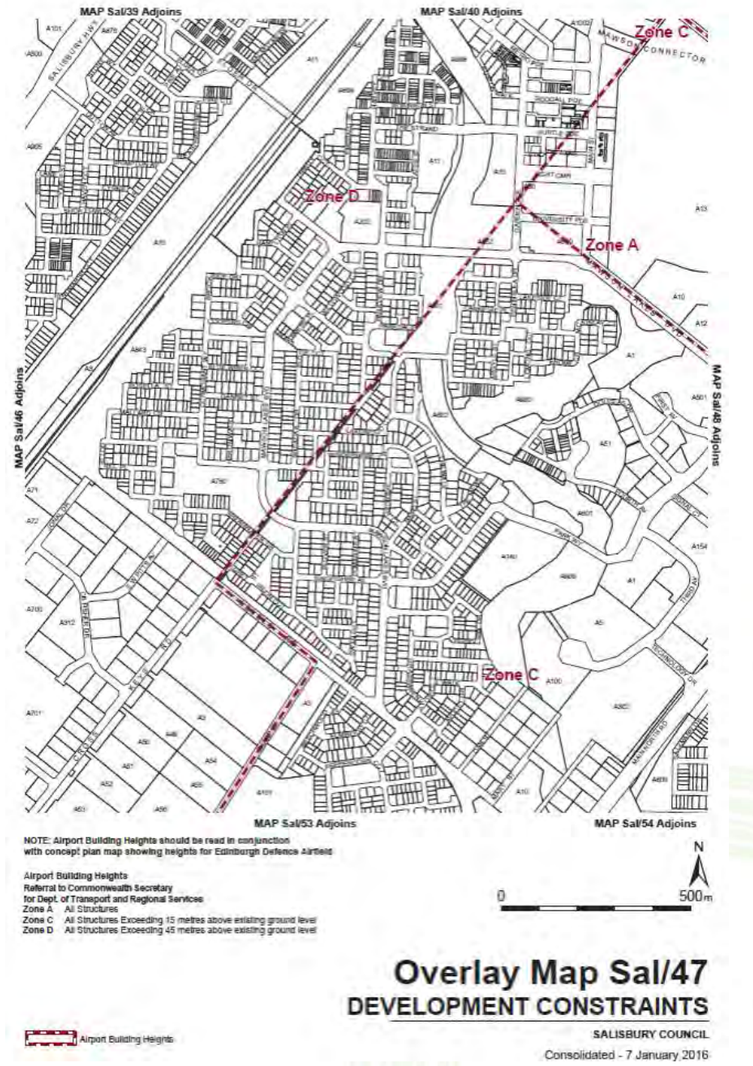
This listing of "light industry" as a non-complying form of development is also incongruent with other provisions for Mawson Innovation Policy Area 24, particularly PDC 1 which lists "light industry associated with high technology or research and development related uses" as an envisaged land use in the Policy Area.

This listing as non-complying may have the unintended consequence of limiting innovative partnerships with businesses to operate/co-locate on the University Campus. If any new activities undertaken by the University in partnership fall outside the definition of "educational establishment" and are considered to be "light industry", for example, then they will be subject to the more complex and uncertain non-complying assessment process.

In preliminary discussions with staff from the City of Salisbury and the Department of Planning Transport and Infrastructure, both support light industry being deleted from the list of non-complying forms of development in Policy Area 24 (covering the University Campus and adjoining Technology Park area) of the Urban Core Zone. This would have the effect of enabling development application for Light Industry associated with high technology or research and development related uses to be considered via the more straight forward on-merit assessment process.

This can be readily achieved through the use of a process under section 29 of the Development Act 1993, which enables the Minister for Planning to amend policies in a Development Plan by a Gazette notice, without going through the usual Development Plan Amendment process. While limited in scope, this process can be used to address inconsistency or error in policy, as is evident in this circumstance. This process is underway and is likely to take 3– 4 months, being reliant on Council and DPTI/the Minister for Planning to progress and finalise.

Staff from the City of Salisbury and DPTI were partially supportive of General Industry being deleted from the non-complying list if it only relates to the University Campus land within Policy Area 24. This matter would need to be further considered by the Elected Members for endorsement. A section 29 process was not considered appropriate to effect this amendment to the Development Plan, but it is possible the amendment could be considered as part of the further deliberations on the Mawson Lakes (Part 2) DPA. This is unlikely to be considered by Council until the end of 2016 and then has to go through the approval process by DPTI/the Minister.



Height Guideline Maps in the Salisbury Development Plan

Off-Street Parking

Principle of Development Control 28 in the Urban Core Zone identifies off-street parking rates as follows:

28 Except where incentives apply, vehicle parking should be provided at the following rates:

Form of development	Minimum number of parking spaces
Residential development	**0.75 per dwelling**
Shops	**3 per 100 square metres of gross leasable floor area**
Tourist accommodation	**1 space for every 4 bedrooms up to 100 bedrooms plus 1 additional parking space for every 5 bedrooms over 100 bedrooms**
All other non-residential development	**3 per 100 square metres of gross leasable floor area at ground floor level plus 1.5 additional parking spaces for every 100 square metres of gross leasable floor area above ground floor level**

Building Heights

Principle of Development Control 2 in the Salisbury Development Plan under "Building Near Airfields" sets the height limits in concert with the Overlay Maps – Development Constraints as follows:

2 Buildings and structures that exceed the airport building heights as shown on Overlay Maps – Development Constraints or Concept Plan Map Sal/1 – Edinburgh Defence Airfield Defence (Area Control) Regulations should not be developed unless a safety analysis determines that the building/ structure does not pose a hazard to aircraft operations. (URPS underlining added)

As we understand it, most of the University of SA Mawson Lakes Campus is located in "Zone A" as shown on the Overlay Maps. Therefore, applications for all buildings have to be referred to the Commonwealth Secretary for the Department of Transport and Regional Services to determine whether they will negatively impact on flight paths in terms of their height.

The Desired Character statement for the Mawson Innovation Policy Area 24 in the Salisbury Development Plan states:

…Development will have regard to the Parafield Airport operational requirements for matters such as building height restrictions, and airplane noise, operational airspace intrusion, wildlife strike management and lighting…"

Principle of Development Control 8 in the Airport Runway Control Area Policy Area 26 states:

8 Development within the Airport Runway Control Area as shown on Policy Area Map Sal/48 should not:

- **(a) contain buildings, unless it is a clubroom or similar building used for sporting and recreational activities, or buildings associated with such activities**
- **(b) result in a significant increase in the number of people working or congregating in that area**
- **(c) involve the use or storage of hazardous materials.**

Adelaide Airports Ltd (AAL) control Parafield Airport. Brett Eaton, the Airside Operations Manager from AAL, has provided plans that show the Obstacle Limitation Surface (OLS) and the Procedures for Air Navigation Services – Aircraft Operations (PANS-OPS) associated with Parafield Airport. These plans are provided in Appendix C.

The lowest height limit on each of these plans is to be relied upon for different parts of the campus. The heights shown are in AHD (Australian Height Datum), which is height above sea level not above ground.

Flooding

The Salisbury Development Plan does not specifically identify the Mawson Lakes Campus as being within a flood hazard area. However, the Development Plan contains a number of provisions that anticipate new development having no negative impact on flood prone areas as follows:

Hazards

Objective 4 Development located and designed to minimise the risks to safety and property from flooding.

Flooding – Principles of Development Control

4 Development should not occur on land where the risk of flooding is likely to be harmful to safety or damage property.

5 Development should not be undertaken in areas liable to inundation by tidal, drainage or flood waters unless the development can achieve all of the following:

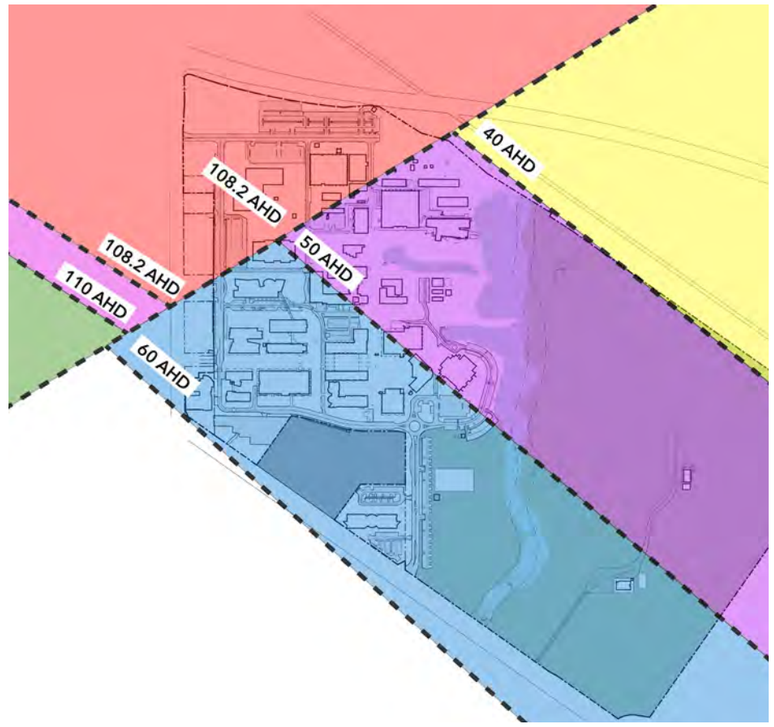
- **(a) it is developed with a public stormwater system capable of catering for a 1-in-100 year average return interval flood event**
- **(b) buildings are designed and constructed to prevent the entry of floodwaters in a 1-in-100 year average return interval flood event.**

6 Development, including earthworks associated with development, should not do any of the following:

- **(a) impede the flow of floodwaters through the land or other surrounding land**
- **(b) increase the potential hazard risk to public safety of persons during a flood event**
- **(c) aggravate the potential for erosion or siltation or lead to the destruction of vegetation during a flood**
- **(d) cause any adverse effect on the floodway function**
- **(e) increase the risk of flooding of other land**
- **(f) obstruct a watercourse.**

Natural Resources - Principle of Development Control

9 Development should include stormwater management systems to protect it from damage during a minimum of a 1-in-100 year average return interval flood.



Development Height Limitations Diagram

Development Height Limitations Diagram

SERVICES ANALYSIS

The existing UniSA Mawson Lakes Campus contains infrastructure of varying ages and condition. There is good potential to reuse some of the existing services regardless of how the site use is resolved, though the campus configuration will need to be reviewed prior to making specific decisions about infrastructure reuse. The likely term of reuse is specific to the ages of the infrastructure in question. This varies across the campus.

The original Campus (formerly known as the South Australian Institute of Technology Levels Campus) was designed to incorporate a centralised services reticulation network, distributed from the Power House (PH) Building via services tunnels to the various buildings located on site. The service tunnel infrastructure has been gradually expanded over time as new buildings were constructed, to provide power, natural gas, and chilled and heating hot water for air conditioning to these buildings. The main buildings not connected to the service tunnel infrastructure are Buildings MM, IW, B and W, which are generally provided with their own local infrastructure.

In general the building services remain functional, are in good to fair condition and are generally well maintained. Particular buildings and their associated building services may have functional inadequacies with increased need of maintenance and eventual replacement.

The laboratory areas within the buildings contain specialist services including lighting, power, air conditioning and laboratory gases that are generally in good working order. However it is important to note that whilst some services are in good condition, they may not be required for future alternative uses.

To meet the campus reliability requirements the infrastructure also include a small degree of backup and inbuilt redundancy in some services so that a failure in any one item of equipment, pipework or electrical distribution system will not be disruptive to a continuing service.

The condition and reuse potential for each of the main site services can be summarised as follows:

MECHANICAL SERVICES

Chilled Water Plant Infrastructure

The main chilled water plant is located in the Power House Building (PH). This consists of 4 water cooled electrically driven chillers of nominal 7,500kW refrigeration capacity in total, with an estimated 2,000kW-3,000kW spare capacity (based on trend log data provided in the Systems Solutions report "SSE2178 Chilled and Heating Water Futures Planning Study"). The chilled water plant supplies cooling for air conditioning equipment in buildings throughout the site via pipework reticulated within the services tunnel.

The chillers are served by 4 induced draft cooling towers located at roof level above the powerhouse. The cooling towers are approximately the same age as the chillers, and are in similarly good condition.

All chillers, pumps and cooling towers range from 5-15 years old, are in good condition and are anticipated to be suitable for reuse in the short to medium term.

The chilled water pipework distribution network serves Buildings A, C, D, E, F, G, GP, H, J, K, M, MC, OC, P, Q, R, SCT, V and X. Buildings B, IW, L, MM, N, PH and W are not connected to the chilled water distribution network, and are provided with standalone air conditioning systems (or are not air conditioned in the case of Building L).

The chilled water pipework distribution network is generally adequately sized to cater for the cooling demands on site, with spare capacity to serve future expansion in the short to medium term. The pipework is therefore sufficiently sized to provide capacity for the short to medium term, but will be limited by its age and condition. The pipework is understood to be of medium grade steel type and of a similar age to many of the buildings (ie. 30-40 years old), and although well maintained and provided with chemical treatment, will nonetheless require staged replacement over the medium term.

Heating Hot Water Plant Infrastructure

The main heating hot water plant is co-located in the Power House Building (PH) with the chilled water plant. This consists of 3 fire-tube type natural gas boilers of nominal 3,600kW capacity in total, with an estimated 1,000kW spare capacity. The heating hot water plant supplies heating for air conditioning equipment in buildings throughout the site via pipework reticulated within the services tunnel (adjacent to the chilled water pipework).

The heating hot water units and pumps are in good condition and are anticipated to be suitable for reuse in the short to medium term.

The heating hot water pipework distribution network is more than adequately sized to cater for the full capacity of all heating hot water units operating simultaneously (approximately 85L/s). Based on current loads the pipework is currently operating at approximately 50L/s, and hence has available approximately 40% spare capacity. The pipework is therefore sufficiently sized to provide capacity for the short to medium term, but similar to the chilled water pipework, will be limited by its age and condition. Hence this pipework will also require staged replacement over the medium term.

Building Management System (BMS) Network Infrastructure

The Building Management System network (BMS) is in good condition and is generally adaptable for potential future uses. Although some buildings are provided with older BMS infrastructure (such as Buildings K, SCT and F), this infrastructure is being progressively replaced and is expected to be completed in the next 1-3 years. All controls and actuators are of modern electric type, with the exception of building OC, which is still provided with older style pneumatic type controls. It is understood that replacement of these controls is difficult due to access issues, and hence these replacement works are not currently scheduled.

Mechanical A/C Plant Infrastructure Diagram


Building PH

Air Conditioning Plant Infrastructure

The air conditioning systems serving buildings across the site generally comprise chilled and heating hot water type air handling units and fan coil units, with some buildings also served with air cooled reverse cycle fixed speed type air conditioning units. There are also a number of smaller air cooled reverse cycle inverter type wall mounted and ceiling cassette type air conditioning units serving individual spaces within various buildings. The Building E server room is served by a number of air cooled computer room air conditioning units (CRAC units), which were not able to be observed at the time of inspection.

With the exception of the newer buildings on site (Buildings MM, X, G, MC and V), the main chilled and heating hot water and fixed speed reverse cycle type air conditioning systems are all generally well beyond their economic service lives and require replacement. It is noted that the fixed speed reverse cycle type air conditioning systems generally operate on refrigerant R22, supplies of which will be heavily restricted from 2016 onwards. Hence these systems will be expensive to maintain should a critical failure (such as compressor replacement) occur.

Laboratory Gases Infrastructure

The reticulated laboratory gases systems are considered to be in a good condition but are unlikely to be required for anything other than laboratory applications. Lab gases are generally not monitored by the BMS for alarms (eg. gas detection, low pressure etc) with the exception of Building MM and some gases within Building X.

ELECTRICAL SERVICES

High Voltage (HV) Infrastructure

The existing high voltage electrical infrastructure is supplied from one SA Power Networks 11 kV feeder to the campus via the existing substation located off Elder Smith Drive. The total peak demand for the campus is in the order of 4 MVA. The total peak demand from the proposed redevelopment program has been assessed as unlikely to require any additional augmentation to meet the future campus peak demand.

From the SA Power Networks substation eight separate university owned 11kV/415V substations one located throughout the campus.

Building MM has its own dedicated substation housed within the building connected to the SA Power Networks 11 kV feeder described above.

Building W has an independent high voltage supply from SA Power Networks and has no connection to the SA Power Networks 11 kV feeder described above.

The redevelopment or demolition of some buildings could result in the need to relocate or replace portions of the electrical infrastructure to maintain supply to current and future buildings.

Low Voltage (LV) Infrastructure

The existing 415 V infrastructure consists of 415 V electrical cables distributed from the relevant university owned substations and connecting to the main electrical switchboard for each building. The condition of the low voltage infrastructure varies depending on building age. A detailed condition survey would be required to determine the adaptability for future use in each instance. It is likely that this infrastructure would need to be replaced within buildings if a complete renovation is undertaken to suit the building use and ensure compliance with current codes.

Due to age and capacity some main switchboards for existing buildings may not be suitable for alternative uses and may require replacement.

As the cable routed for the main switchboards for some building are unknown at this stage subject to the extent of any demolition works, these buildings may need to be re-supplied from alternative sources.

Essential Power Infrastructure

Five diesel fuelled generators are distributed in five locations around the campus in order to supply electrical power for essential services in the event of a complete failure of the SA Power Networks power supplies from the main electrical grid.

The generators vary in age but they are well maintained and regularly tested and in generally good condition and would be suitable for potential future use, as required.

Essential Power Infrastructure Diagram

Telephone Communications Infrastructure

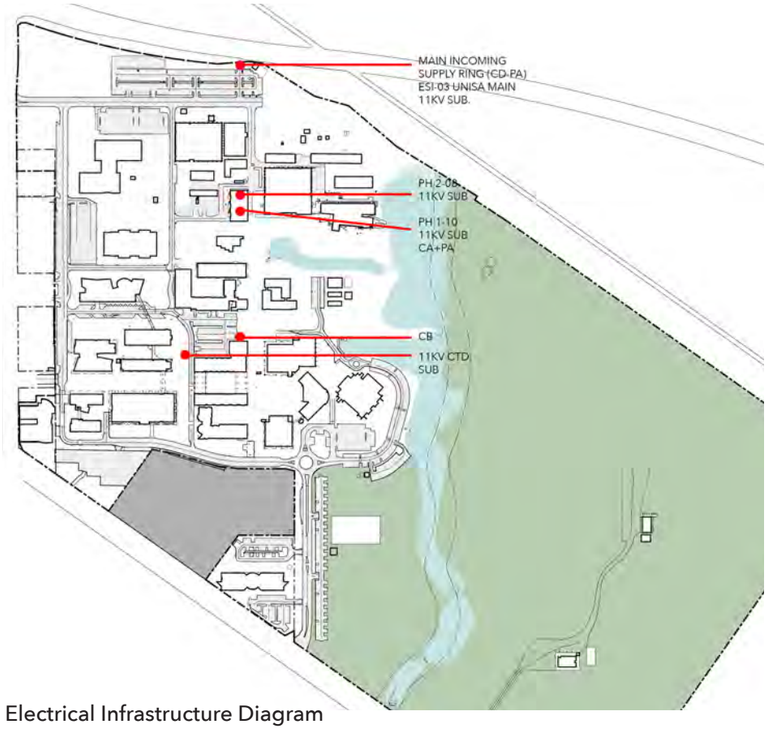
The telephone communications network consists of copper backbone cables entering the campus and connecting the main PABX located in Building A. From this location a network of copper telephone cables distribute the telephone communications to a distributor panel within each building.

The telephone communications network is in reasonable condition and is adaptable to suit the future utilisation of most buildings. As the telephone backbone cables servicing some buildings may traverse through other buildings then, subject to the extent of any demolition works, these building may need to be re-supplied from alternative sources. A detailed survey would be required to determine the cable routes in each instance.

Fibre Optic Network Infrastructure

The existing fibre optic network is located in the existing Building E. From this location individual buildings are connected in a star configuration with individual fibre optic cables radiating from the campus cabinet to the distributor cabinet in each building.

The existing fibre optic network is in good condition and is adaptable to alternative uses. Protection or re-routing of cables and the campus cabinet may be required should redevelopment or demolition work occur in the existing buildings.



Electrical Infrastructure Diagram

Security Infrastructure

Cardax access control system provides electronic access control for individual security points within the relevant buildings within the campus. Local controllers within each building are connected to a central control point located within Building A. Alarms from the Cardax system are registered in the security office located in Building A and also on the Building Management System. The system is in reasonable condition and is functionally adaptive to alternative uses.

The campus CCTV surveillance system provides electronic surveillance and recording of key locations internally and externally within the campus. Signals from the CCTV are aggregated in the ground floor security office located within Building A. The systems and equipment are in reasonable condition and are suitable for adaption to alternative uses.

Alterations and or demolition to any building CCTV cables traverse may require existing cables and perhaps the central control point to be relocated.

HYDRAULIC SERVICES

Sewer Drainage Infrastructure

Sewer drainage enters the site from the South Australian Water Corporation 450mm dimeter vitreous clay sewer main located within Main North Road. The SA Water Sewer main easement extends through the site and exits through Elder Smith Road.

Existing buildings from the precinct are connected via multiple sewer connections to the SA Water external sewer main easement located within the site.

The existing sanitary drainage appears to be in reasonable condition based on non-intrusive surveys and is thought to be adaptable to alternative future uses. CCTV surveys should be undertaken to determine the condition of existing sewers prior to commencing new work. There is a risk associated with presuming reuse of this network until a detailed survey is undertaken.

As the SA Water sewer easement traverses under several buildings then, subject to the extent of any development or demolition works, protection or re-routing may need to be considered. These will need to be retained or alternative arrangements to be put in place.

A detailed existing Site Services Sewer Drainage Drawing can be found in Appendix F.

Trade Waste drainage

Trade Waste drainage systems is provided to numerous buildings within the site. Trade waste treatment locations are lodged by the South Australian Water Corporation Trade Waste branch with the following treatment systems used to treat trade waste drainage for the site:-

- 4 x Grease arrestors
- 12 x Acid Neutralising Pits
- 9 x Sludge Pits
- 1 x Oil Arrestors
- 1 x Cement Silts

The existing trade waste drainage system appears to be in reasonable condition based on non-intrusive surveys and is thought to be adaptable to alternative future uses. CCTV surveys should be undertaken to determine the condition of existing sewers prior to commencing new work. There is a risk associated with presuming reuse of this network until a detailed survey is undertaken.

Mains Water Infrastructure

Domestic cold water is supplied from a 'ring' main system with two metered water connections from the SA Water street mains, one from the water main located within Main North Road and one from the water main located within Bennett Road. Mains water is distributed at street pressure to the site.

Isolation valves are installed downstream of the SA Water Corporation Water meters. Both isolation valves are required to be turned off to isolate the entire mains water supply to the site.

The existing mains water system is assumed to be in reasonable condition and is adaptable to alternative future uses of the precinct. Upgrading or demolition of building in the centre of the precinct may require the mains water serving other building to be protected or re-routed.

Recycled Water Infrastructure

Recycled water to the site is provided via SA Water Corporation metered connection from the main located within Mawson Lakes Boulevard.

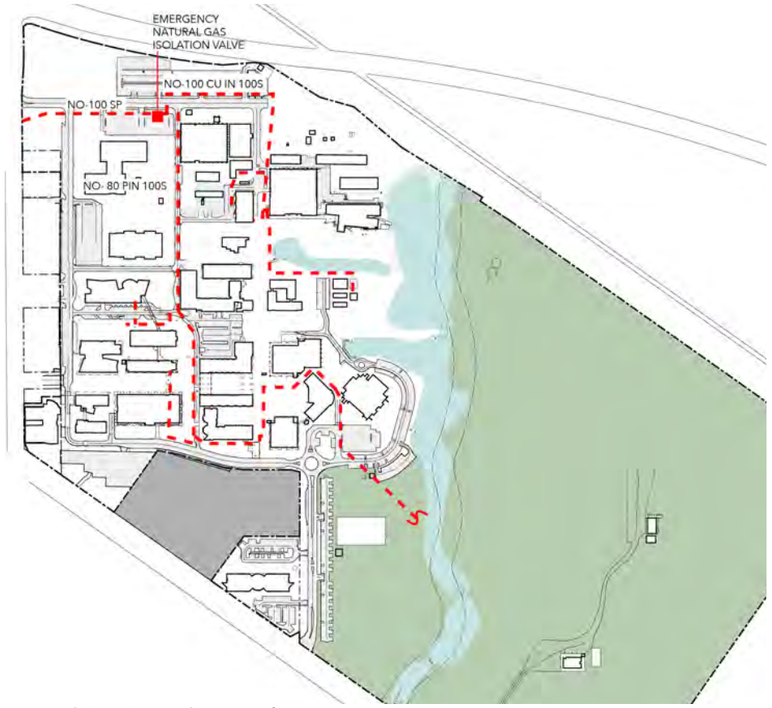
Recycled water is used throughout the site for use of irrigating and toilet flushing purposes.

The existing recycled water system is in considered to be in good condition and is adaptable to alternative future uses of the precinct.

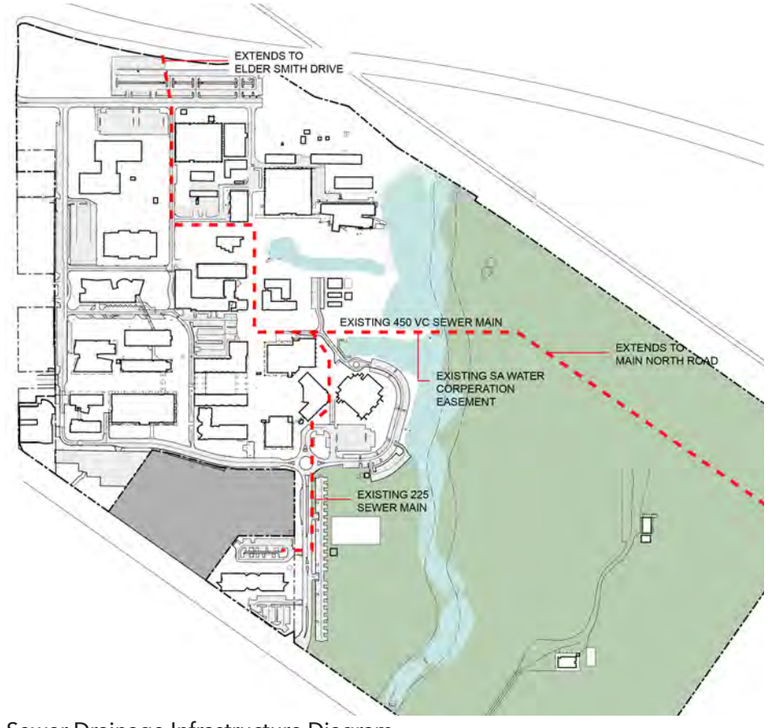
Natural Gas Infrastructure

Natural gas is supplied from the street mains located within in Main Street via a metered connection to the north west corner of the campus. The main use of natural gas is for the mechanical services heating hot water units for air-conditioning located within the power house. Gas supply pipework is also supplied for use of domestic hot water heating and cooking purposes.

The existing natural gas supply system is in good condition and is adaptable to potential future needs.



Natural Gas Reticulation Infrastructure Diagram



Sewer Drainage Infrastructure Diagram

VERTICAL TRANSPORTATION SERVICES

The existing vertical transportation infrastructure consists of a number of lifts spread across the campus, not all buildings have lifts installed with bridge links providing disability access to a number of buildings. The conduction of the lifts varies depending on the building age. A detailed conduction survey would be required to determine the adequacy for future use.

It is likely that this infrastructure would need to be replaced within buildings if a complete renovation is undertaken to suit the building use and ensure compliance with current codes.

FIRE INFRASTRUCTURE

Fire water supply to the campus is provided by a dedicated connection to the 150mm SA Water Corporation main from University Drive with a single SAMFS booster facility located adjacent the ML3 carpark. Fire service pipe work from the SAMFS suction/booster facilities are connected to a ring main pipework system distributing around the precinct to external and internal fire hydrant system, internal fire hose reels systems and automatic fire sprinkler systems where installed.

The overall fire mains system generally complies with current requirements and is considered to be in good working condition and is adaptable to potential future use. The site fire mains will be required to be kept live during redevelopment or demolition works to protect the associated buildings. It is likely that a precinct redevelopment will result in the need to relocated sections of the site ring main arrangement to suit new building and complex uses.

The existing fire detection and control systems within the buildings are considered to be in good working condition and are adaptable to potential future use.

LABORATORY SERVICES ISSUES

The following services issues are prevalent across the campuses research laboratories and are summarised below from the user and laboratory service viewpoint:

- Inconsistent standards of pure water service and pure water service maintenance
- Numerous gas supply issues. Lack of reticulation and alarms to many areas. Lack of coordinated /central reticulation from liquid and auto-change bottle manifolds.
- Lack of monitored freezer alarms to many areas
- Lack of robust emergency and UPS power.
- Difficulty in extending exhaust ventilation and additional cooling to some laboratory areas

Domestic Cold Water Infrastructure Diagram

Building MM

SERVICES MATRIX

The following services matrix describes the mechanical, laboratory, electrical, communications, security, vertical transportation, hydraulic and fire services within each building and provides a high level assessment of the existing conditions.

Uni SA Mawson Lakes Strategic Master Plan and Tenancy Plan
Existing Building Services Summary
Discipline: Mechanical, Laboratories, Electrical, Communications, Security, Vertical Transportation, Hydraulic and Fire Protection Services

BESTEC BRINGING BUILDINGS TO LIFE

MECHANICAL

BUILDING	Year Built	Service Tunnel Access	Thermal Plant - supplied from PH	A/C Systems (CH - chilled water, R - reverse cycle, E - evaporative cooling)	Outside Air (AC - via AC plant, NT - natural ventilation)	AHU and FCU Condition - % requiring replacement within 5 years	AHU and FCU Condition - % requiring replacement within 10 years	Toilet Exhaust	General Exhaust	Fume Cupboards	BMS	Coolroom / Freezer Room	Alarms
A	1967	Y	Y	CH	AC	90	90	Y	Y	N	Y	Y	Y
B	1974	N	N	E	AC	N/A	N/A	Y	N	N	Y	N	N
C	1960 2004	Y	Y	CH	AC	40	50	Y	N	N	Y	N	Y
D	1969	N	Y	CH	AC	70	80	Y	Y	N	Y	N	Y
E	1969	Y	Y	CH	AC	40	40	Y	N	N	Y	N	Y
F	1969	Y	Y	CH	AC	70	80	Y	Y	Y	Y	N	Y
G	2004	N	Y	CH	AC	0	10	Y	Y	N	Y	Y	Y
GP	1993	N	Y	CH	AC	5	30	Y	Y	N	Y	N	Y
H	1970	Y	Y	CH	AC	90	100	Y	Y	Y	Y	Y	Y
IW	1995	N	N	R	AC	50	70	Y	Y	Y	Y	Y	Y
J	1969	Y	Y	CH	AC	100	100	Y	N	N	Y	N	Y
K	1969	N	N	CH	AC	50	80	Y	N	N	Y	N	Y
L	1985	N	N	N/A	NT	N/A	N/A	N	N	N	N	N	N
M	1969	Y	Y	CH	AC	100	100	Y	Y	Y	Y	N	Y
MC	2004	N	Y	CH	AC	0	10	Y	Y	N	Y	N	Y
MM	2011	N	N	CH	AC	0	0	Y	Y	Y	Y	Y	Y
N	1971	Y	N	N/A	NT	N/A	N/A	Y	Y	Y	Y	Y	Y
OC	1996	N	Y	CH	AC	50	70	Y	N	N	Y	N	Y
P	1973	N	Y	CH	AC	80	90	Y	Y	N	Y	N	Y
PH	1969	Y	Y	E	N/A	N/A	N/A	Y	N	N	Y	N	Y
Q	1967	N	Y	CH	AC	100	100	Y	Y	Y	Y	N	Y
R	1967	Y	Y	CH	AC	80	90	Y	Y	Y	Y	Y	Y
SCT L&P	1994	N	Y	CH	AC	100	100	Y	Y	Y	Y	N	Y
SCT LABS	1994	N	Y	CH	AC	100	100	Y	Y	Y	Y	N	Y
V	2010	N	Y	CH	AC	0	0	Y	Y	Y	Y	N	Y
W	1992	N	N	R	AC	N/A	N/A	Y	N	N	Y	N	Y
X	2007	N	Y	CH	AC	0	10	Y	Y	Y	Y	Y	Y

LABORATORY GASES - RETICULATED

BUILDING	Flammable Gases: Hydrogen	Flammable Gases: Acetylene	Non Flammable Gases: Argon	Non Flammable Gases: Nitrogen	Non Flammable Gases: Oxygen	Non Flammable Gases: CO2	Compressed Air	Vacuum / Suction	Contactor Controlled Power Shutdown	Other
A	N	N	N	N	N	N	N	N	N	N
B	N	N	N	N	N	N	N	N	N	N
C	N	N	N	N	N	N	N	N	N	N
D									N	
E	N	N	N	N	N	N	N	N	N	N
F									Y	
G	N	N	N	N	N	N	N	N	Y	N
GP	N	N	N	N	N	N	N	N	N	N
H			Y						Y	
IW				Y					Y	
J	N	N	N	N	N	N	N	N	N	N
K	N	N	N	N	N	N	N	N	N	N
L	N	N	N	N	N	N	N	N	N	N
M			Y	Y			Y		Y	
MC	N	N	N	N	N	N	N	N	N	N
MM	N	N	Y	Y	Y	Y	Y	N	Y	He, NG
N	N	N	N	N	N	N	N	N	N	N
OC	N	N	N	N	N	N	N	N	N	N
P									N	
PH	N	N	N	Y	N	N	Y	N	N	N
Q							Y		Y	
R	Y		Y	Y			Y		Y	He
SCT L&P							Y	Y	N	
SCT LABS									Y	
V	N	N	Y	Y	Y	Y	Y	?	Y	N
W									N	
X	Y	N	Y	Y	Y	Y	Y	Y	y	N

ELECTRICAL

BUILDING	Substation	Transformer - kVA	Supplied from Main Switchboard	Power Supply - Amps	Main Switchboard	Distribution Boards	APFC - kVAr	UPS - kVA	Generator - kVA	Lighting	Exit & Emergency
A	CB	750	CBS CBD	500	Good	Fair	400	N	Y	Good	Good
B	CB	750	CBS CBD	400	Good	Fair	400	N	N	Good	Good
C	CB	750	CBS CBD	630	Good	Fair	400	N	N	Good	Good
D	CB	750	CBS CBD	500	Good	Fair	400	N	N	Fair	Fair
E	CB	750	CBS CBD	500	Good	Fair	400	N	370	Good	Good
F	CB	750	CBS CBD	600	Good	Fair	400	N	N	Fair	Fair
G	PQ	1500	PQD	800	Good	Fair	N	N	N	Good	Fair
GP	CB	750	CBS CBD	600	Good	Fair	400	N	N	Fair	Fair
H	CA	750	CAD	300	Good	Fair	N	N	N	Fair	Fair
IW	CT	750	CTD	300	Good	Fair	N	N	N	Fair	Fair
J	CA	750	CAD	300	Good	Fair	N	N	N	Fair	Fair
K	CA	750	CAD	200	Good	Fair	N	N	N	Fair	Fair
L	CA	750	CAD	100	Good	Fair	N	N	N	Good	Good
M	CA	750	CAD	800	Good	Fair	N	N	N	Fair	Fair
MC	PQ	1500	PQD	630	Good	Good	Y	N	Y	Good	Good
MM	MM	1500	N/A	2400	Good	Good	550	40	120	Good	Good
N	E	1200	ED	800	Good	Good	N	N	N	Fair	Fair
OC	CB	750	CBS CBD	400	Good	Fair	400	N	N	Fair	Fair
P	E	1200	ED	600	Good	Good	N	N	N	Fair	Fair
PH	PA	1500	PAD	500	Good	Fair	Y	N	N	Fair	Fair
Q	CT	750	CTD	300	Good	Fair	N	N	Y	Fair	Fair
R	CT	750	CTD	550	Good	Fair	N	N	N	Good	Good
SCT L&P	E	1200	ED	800	Good	Fair	N	N	N	Good	Good
SCT LABS	E	1200	ED	400	Good	Fair	N	N	N	Fair	Good
V	PA	1500	PAD	630	Good	Good	N	N	160	Good	Good
W	SAPN	1000	N/A	1500	Good	Fair	N	N	N	Good	Good
X	PQ	1500	PQD	800	Good	Good	200	40	160	Good	Good

Fair - denotes low light levels, exit signs not 'running man' or not throughout, DB's require upgrade to RCD CB's

COMMS, SECURITY, VERTICAL TRANSPORTATION

BUILDING	COMMS - Incoming Services: Voice - Cat 3 pairs	COMMS - Incoming Services: Fibre - Core	COMMS: Communications	SECURITY: CARDAX	Passanger Lift	Manufacturer	No. Passengers	Capacity (KG)	Stretcher Capacity	Goods Lift
A	PABX A1-13	12SM	Cat 6	Y	N	N/A	N/A	N/A	N/A	Y
B	30	12SM	Cat 6	Y	N	N/A	N/A	N/A	N/A	N
C	200	12SM	Cat 6	Y	x2	Kone Johns	13 20	1000 1136	N	N
D	50	12SM	Cat 6	Y	Y	?	13	900	N	N
E	2/100	CC 1-16	Cat 6	Y	N	N/A	N/A	N/A	N/A	Y
F	100	12SM	Cat 6	Y	Y	Kone	20	1365	N	N
G	300	12SM	Cat 6	Y	x2	Kone	13	1000	N	N
GP	200	12SM	Cat 6	Y	Y	Otis	13	844	N	N
H	100	12SM	Cat 6	Y	Y	Kone	15	1020	Y	N
IW	200	12SM	Cat 6	Y	N	N/A	N/A	N/A	N/A	N
J	50	12SM	Cat 6	Y	N	N/A	N/A	N/A	N/A	N
K	10	12SM	Cat 6	Y	N	N/A	N/A	N/A	N/A	N
L	50	12SM	Cat 6	Y	N	N/A	N/A	N/A	N/A	N
M	50	12SM	Cat 6	Y	N	N/A	N/A	N/A	N/A	N
MC	200	12SM	Cat 6	Y	Y	Kone	13	1000	N	N
MM	100	24SM	Cat 6	Y	L1 L2	Kone	22 38	1500 2600	Y	Y
N	50	12SM	Cat 6	Y	N	N/A	N/A	N/A	N/A	N
OC	100	12SM	Cat 6	Y	N	N/A	N/A	N/A	N/A	N
P	100	12SM	Cat 6	Y	Y	Otis	15	1050	N	N
PH	30	12SM	Cat 6	Y	N	N/A	N/A	N/A	N/A	N
Q	100	12SM	Cat 6	Y	N	N/A	N/A	N/A	N/A	N
R	200	12SM	Cat 6	Y	Y	Otis	20	1136	N	N
SCT L&P	100	12SM	Cat 6	Y	Y	Otis	20	1350	N	N
SCT LABS	N/A	N/A	N/A	Y	N	N/A	N/A	N/A	N/A	N
V	100	12SM	Cat 6	Y	Y	Kone	8	630	N	N
W	100	12SM	Cat 6	Y	Y					N
X	200	24SM	Cat 6	Y	Y	JPS	26	2000	Y	Y

HYDRAULIC

BUILDING	Sewer Drainage	Trade Waste Drainage	Settling Pit, SL=Sludge, CS=Cement silt	Neutralizing pit	Oil arrester	Grease arrestor	Water Meter	Potable Water	Non-Potable Water reticulation	Domestic hot water plant	Domestic hot water reticulation	Domestic cold water reticulation	Natural gas meter	Natural Gas reticulation	Backflow prevention Device	Specialised Water: Purification	Specialised Water: Reverse Osmosis plant	Specialised Water: Demineralised water plant	Specialised Water: De-ionized
A	Y	Y	N	N	N	Y	N	Y	N	L	Y	Y	N	N	U	N	N	N	N
B	Y	N	N	N	N	N	N	Y	N	C	Y	Y	U	Y	U	N	N	N	N
C	Y	Y	N	N	N	Y	N	Y	N	C	Y	Y	U	Y	U	N	N	N	N
D	Y	N	N	N	N	N	N	Y	N	L	Y	Y	N	N	U	N	N	N	N
E	Y	N	N	N	N	N	N	Y	N	L	Y	Y	N	N	U	N	N	N	N
F	Y	Y	N	Y	N	N	N	Y	N	L	Y	Y	U	Y	U			Y	
G	Y	N	N	N	N	N	N	Y	N	L	Y	Y	N	N	N	N	N	N	N
GP	Y	N	N	N	N	N	N	Y	N	L	Y	Y	N	N	N	N	N	N	N
H	Y	Y	SL	N	N	N	N	Y	N	L	Y	Y	U	Y	Y				
IW	Y	Y	N	Y	N	N	N	Y	Y	L	Y	Y	U	Y	Y			Y	
J	Y	N	N	N	N	N	N	Y	N	L	Y	Y	N	N	N	N	N	N	N
K	Y	N	N	N	N	N	N	Y	N	L	Y	Y	N	N	N	N	N	N	N
L	Y	Y	SL	N	N	N	N	Y	N	N	N	Y	N	N	N	N	N	N	N
M	Y	Y	N	N	Y	N	N	Y	N	L	Y	Y	U	Y	U				
MC	Y	N	N	N	N	N	N	Y	N	L	Y	Y	N	N	N				
MM	Y	Y	N	N	N	Y	N	Y	Y	C	Y	Y	U	Y	Y		Y	Y	
N	Y	Y	CS	N	N	N	N	Y	N	L	Y	Y	N	Y	U				
OC	Y	N	N	N	N	N	N	Y	N	L	Y	Y	N	N	N				
P	Y	Y	N	Y	N	N	N	Y	N	Y	Y	Y	N	N	Y			Y	
PH	Y	Y	SL	N	N	N	N	Y	N	L	Y	Y	Y	Y	U	Y	N	N	N
Q	Y	Y	N	Y	N	N	N	Y	N	L	Y	Y	N	Y	Y	Y		Y	
R	Y	Y	N	Y	N	N	N	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	
SCT L&P	Y	Y	SL	N	N	N	N	Y	N	L	Y	Y	U	Y	Y				
SCT LABS	Y	Y	SL	N	N	N	N	Y	N	L	Y	Y	U	Y	Y				
V	Y	Y	N	Y	N	N	N	Y	Y	L	Y	Y	N	Y	U			Y	Y
W	Y	N	N	N	N	N	Y	Y	N	L	Y	Y	N	N	N	N	N	N	N
X	Y	Y	N	Y	N	N	N	Y	Y	C	Y	Y	U	Y	Y			Y	

L = LOCALISED HOT WATER PLANT
C = CENTRALISED HOT WATER PLANT
U = UNKNOWN

FIRE

BUILDING	Fire Hydrant covergae provided	Fire hydrant system code compliant	Fire Hose Reels provided	fire hosereel system code compliant	Fire Sprinklers Provided	Fire Sprinklers Code Compliant	Fire Extinguishers Provided	Fire Extinguishers Code Compliant	Fire Detection & Alarm System Provided	Fire Detection System Code Compliant	Occupant Warning System Provided	Occupant Warning System Code Compliant	EWIS provided	EWIS Code Compliant
A	Y	N	Y	N	N	N/A	Y	Y	Y	N	N	N/A	Y	Y
B	Y	N	Y	N	N	N/A	Y	N	Y	N	N	N/A	Y	Y
C	Y	N	Y	N	Y	Y	Y	Y	Y	Y	N	N/A	Y	Y
D	Y	N	Y	N	N	N/A	Y	Y	Y	N	N	N/A	Y	Y
E	Y	N	Y	N	N	N/A	Y	Y	Y	N	N	N/A	Y	Y
F	Y	N	Y	N	N	N/A	Y	Y	Y	N	N	N/A	Y	Y
G	Y	Y	N	N	N	N/A	Y	Y	Y	Y	N	N/A	Y	Y
GP	Y	Y	Y	N	Y	Y	Y	Y	N	N/A	N	N/A	Y	Y
H	Y	N	Y	N	N	N/A	Y	Y	Y	N	N	N/A	Y	Y
IW	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	N/A	Y	Y
J	Y	Y	Y	N	N	N/A	Y	Y	Y	N	N	N/A	Y	Y
K	Y	Y	N	N/A	N	N/A	Y	Y	N	N/A	N	N/A	N	N/A
L	Y	Y	Y	Y	N	N/A	Y	Y	Y	Y	N	N/A	Y	Y
M	Y	Y	Y	N	N	N/A	Y	Y	Y	N	N	N/A	Y	Y
MC	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	N/A	Y	Y
MM	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	N/A	Y	Y
N	Y	N	Y	N	N	N/A	Y	Y	Y	Y	N	N/A	Y	Y
OC	Y	Y	Y	Y	N	N/A	Y	Y	Y	N	N	N/A	Y	Y
P	Y	N	Y	Y	N	N/A	Y	Y	Y	N	N	N/A	Y	Y
PH	Y	Y	Y	Y	N	N/A	Y	Y	Y	Y	N	N/A	Y	Y
Q	Y	N	Y	Y	N	N/A	Y	Y	Y	N	N	N/A	Y	Y
R	Y	N	Y	N	N	N/A	Y	Y	Y	N	N	N/A	Y	Y
SCT L&P	Y	Y	Y	N	N	N/A	Y	Y	Y	N	N	N/A	Y	Y
SCT LABS	Y	Y	Y	N	N	N/A	Y	Y	Y	N	N	N/A	Y	Y
V	Y	Y	Y	Y	N	N/A	Y	Y	Y	Y	N	N/A	Y	Y
W	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	N/A	Y	Y
X	Y	Y	N	N	Y	Y	Y	Y	Y	Y	N	N/A	Y	Y

STRUCTURAL ANALYSIS

The adaptive reuse of any facility at the precinct must consider the structural capacity limitations of each building. Whilst some of the building stock at the precinct predates current design codes, the buildings are likely to have historically proven vertical load support for live loads of a minimum of 3.0kPa or 300kg/m2.

To provide some context, the current design live loads in accordance with *AS1170.1-2002 Permanent,* imposed and other actions, for a range of building uses include the following:

- Classrooms, operating theatres, offices 3.0kPa
- Work rooms, light industrial without storage 3.0kPa
- Corridors, stairs, hallways, galleries and exhibition spaces 4.0kPa
- Areas subject to overcrowding 5.0kPa
- Stages in Public Assembly Areas 7.5kPa

In addition to the above, the buildings are also required to resist lateral wind and seismic loads. For taller structures, the governing lateral load condition is expected to be the seismic load case. Again, the construction of the majority of the buildings predates current earthquake design codes but there are instances when an assessment of an existing building is necessary as described by *AS3826: Strengthening Existing Buildings for Earthquake* if any of the following will increase the risk to building occupants:

- An alteration which will reduce the strength or other performance characteristics of the building;
- An addition which will add mass and increase the earthquake response;
- A change of use, which will increase the occupant density in the building; or
- Other changes due to the building in its unaltered condition being considered unsafe.

AS3826 does however recognise that it may be either uneconomical or impractical to impose a requirement to strengthen existing buildings to current standards (or threshold loads) and permits design to reduced threshold loads, typically one third or two thirds. The reduced threshold load approach is aimed at reducing the risk to the safety of building occupants but not necessarily the risk of building damage. Load bearing masonry structures typically do not perform well when subject to seismic loads and some of the older structures at the precinct fit into this category. Items such as gable walls, parapets and chimneys are particularly vulnerable to damage during earthquakes if not adequately restrained to roof and floor systems.

Steel or concrete framed structures with integral stability elements such as reinforced walls, cores or vertical bracing are much more robust. The buildings constructed since the 1960's typically fit into this category.

The expected seismic performance of the buildings to date has been based on a review of the year of construction and on a review of the predominant structural system evident on the structural drawings when these have been available.

The vertical load carrying capacity has been determined from the provided design loads on the structural drawings when these have been available. In the case when structural drawings were not available, it has been assumed that the buildings were designed in accordance with the standards in force at the time, generally assumed to be 300kg/m2.

Seismic Performance Assessment

The buildings on site have been constructed between 1967 and 2009. Over this period, three different Australian Standards have been in force for determining earthquake actions, the earliest buildings were built prior to the first (1979) earthquake code.

The four different time periods for different earthquake design regimes are summarised below.

Time Period	Relevant Code
Prior to 1979	No earthquake code applicable in Australia
1979 - 1993	*AS2112.1 SAA Earthquake Code*
1993 – 2007	*AS1170.4 Earthquake loads*
2007 – Present	*AS1170.4 Earthquake actions in Australia*

A comparison was undertaken to estimate the load increase between the 1979 and 2007 earthquake codes, and also between 1993 and 2007 earthquake codes. Whilst the design methodology has changed, all three standards provide an approach for estimating the earthquake base shear for use in an equivalent static analysis to design the primary bracing elements. Our assessment has been based on the following design parameters, which represent a building structure with similar use, height, bracing philosophy and soil conditions in each standard.

AS2121-1979

Zone Factor, Z = 0.18

Importance Factor, I = 1.0

Ductility Factor, K = 1.0

Soil-Structure Resonance Factors, S = 1.5

AS1170.4-1993

Importance Factor, I=1.0

Earthquake design coefficient, C=0.26

Site Factor, S=1.25

Structural Response Factor, Rf=1.5

AS1170.4-2007

Importance Level = 2

Annual Probability of Exceedance = 1:500

Probability Factor, Kp = 1.0

Building R (circa 1967)

Hazard Factor, Z = 0.10

Sub-Soil Class = De

Ductility Factor, μ = 1.25

Structural Performance Factor, Sp = 0.77

Our assessment has demonstrated that the design base shear force calculated in accordance with the 1993 standard represent between 50% and 90% of the current code requirements. The design base shear forces determined according to the 1979 standard represents between 20% and 45% of the current code requirement. The buildings designed prior to 1979 were not designed to resist earthquake loads. The buildings built since 2007 are expected to have been designed to comply with the current earthquake code.

Based on our previous experience in assessing the capacity of existing buildings to resist earthquake forces, we believe this is not necessarily representative of the true building capacity as it does not take into account inherent reserve capacity in the bracing elements and substructure.

The South Australian Government has produced a number of documents to assist in assessing existing buildings for earthquakes, of particular relevance are the documents titled *'Earthquake Hazard Risk Mitigation in Government Leasing, July 2012'* and *'Strengthening Existing Government Buildings for Earthquake Policy, April 2012'*. These documents provide a guide to government agencies in terms of life safety and business continuity when assessing potential tenancy space, and also provide guidelines for earthquake retrofitting work undertaken on government owned buildings. Refer to Appendix D and E for full copies of these documents.

The document *'Earthquake Hazard Risk Mitigation in Government Leasing'* uses an earthquake star rating scale to rate business continuity impacts for a moderate earthquake. The ratings range from zero stars for buildings designed and constructed prior to 1983 (prior to the first 1979 earthquake code) to six stars for buildings requiring immediate post disaster occupation that have been designed in accordance with the current standard. For each of the buildings covered by this assessment, we have provided a star rating based on the year of construction. Further detailed earthquake analysis on a case by case basis would be required in order to determine the actual building capacity to resist earthquake loading.

Earthquake Assessment Summary Diagram

STRUCTURAL MATRIX

The following matrix describes the structural systems for each building and assesses their performance as a high level overview.

	Building	Included in scope of Structural Review YES/NO	Original Construction (YEAR)	Significant Additions, if any (YEAR/comment)	No. Storeys	Condition Assessment	Form of Construction	Gravity load Capacity	Drawings		Earthquake Assessment			General Comments
						Summary	Summary		Structural (# dwgs.)	Architectural	Applicable EQ Design Code	Business Continuity Impacts for a **moderate** earthquake (DPTI, July 2012).	Star Rating (DPTI, July 2012)	
1	**A**	**YES**	1967	Appears to be new development/canopy to north side of building.	2	good	Reinforced concrete columns, and suspended RC first floor and ROOF. RC walls for core, load bearing masonry.	likely to be 3.0kPa generally.	19		Pre-EQ Code	Damage to building structure and interruption to business is unknown	zero	
2	**B**	**YES**	1974		1	good	large span steel trusses over sports centre.	likely to be 3.0kPa generally.	0	7	Pre-EQ Code	Damage to building structure and interruption to business is unknown	zero	gym
3	**C (Library)**	**YES**	1970	new library building added to east, approximatly 10 years old.	3+plant	good	RC, Precast, RC core.	likely to be 3.0kPa generally. Book storage areas have probably been designed for higher loads, possibly 5kPa.	0		Pre-EQ Code	Damage to building structure and interruption to business is unknown	zero	there should be drawings for new library addition.
4	**D**	**YES**	1969		3	good, some cracking to masonry.	RC, concrete slab at roof level also, precast panels, appears to rely on concrete columns to resist lateral loads.	likely to be 3.0kPa generally.	22		Pre-EQ Code	Damage to building structure and interruption to business is unknown	zero	
5	**E**	**YES**	1969		2	good, some cracking to masonry.	load bearing masonry, RC, off form RC slabs.	likely to be 3.0kPa generally	0		Pre-EQ Code	Damage to building structure and interruption to business is unknown	zero	
6	**EA (Greenhouse)**	**NO**	2007								AS1170.4 - 2007 - Current EQ Code	Building expected to perform very well. Negligible interruption expected to business.	****	
7	**EB (Prop shed)**	**NO**	2007								AS1170.4 - 2007 - Current EQ Code	Building expected to perform very well. Negligible interruption expected to business.	****	
8	**EC (Soils Shed)**	**NO**	2007								AS1170.4 - 2007 - Current EQ Code	Building expected to perform very well. Negligible interruption expected to business.	****	
9	**ED (Greenhouse)**	**NO**									na			
10	**EE (shed)**	**NO**									na			
11	**ETSA substation**	**NO**									na			
12	**F**	**YES**	1969	appears to have been built in stages.	2	good, some minor cracks.	load bearing masonry, RC, off form slabs.	likely to be 3.0kPa generally.	10		Pre-EQ Code	Damage to building structure and interruption to business is unknown	zero	we have dwgs for 1970 extensions, but not the original buildings.
13	**G (Garth Boomer)**	**YES**	2004	appears to have been built in two stages.	2 and 4.	good	steel frame	likely to be 3.0kPa generally.	0		AS1170.4 - 1993 - 2nd EQ Code	Buiilding may suffer moderate non-structural damage, minor structural damage. Moderate interruption to business may occur.	***	should have drawings for this?
14	**GP**	**YES**	1993		2 + lowe level lecture theatre.	good, some hairline cracks to RC beam-column connection.	RC	4kPa ground, 4kPa L1 inc. 1kPa Partition. Plant rooms 3.0 kPa	20		AS1170.4 - 1993 - 2nd EQ Code	Buiilding may suffer moderate non-structural damage, minor structural damage. Moderate interruption to business may occur.	***	CONNELL WAGNER
15	**H**	**YES**	1970	1988 (possibly three stages?)	1 & 3.	good/moderate. Some cracks to RC beams & edge of RC footing spalling.	RC, SF and load bearing masonry.	likely to be 3.0kPa generally.	15		Pre-EQ Code	Damage to building structure and interruption to business is unknown	zero	
16	**IW**	**YES**	1995		2	good	steelframe, precast.	likely to be 3.0kPa generally.	0		AS1170.4 - 1993 - 2nd EQ Code	Buiilding may suffer moderate non-structural damage, minor structural damage. Moderate interruption to business may occur.	***	should have drawings for this?
17	**J**	**YES**	1969		2	good, some minor cracks.	PT, large span steel truss roof. Load bearing masonry.	likely to be 3.0kPa generally.	5		Pre-EQ Code	Damage to building structure and interruption to business is unknown	zero	

18	**K**	**YES**	1969		1	good	RC portal frames, RC roof.	likely to be 3.0kPa generally.	5		Pre-EQ Code	Damage to building structure and interruption to business is unknown	zero	theatre.
19	**L**	**YES**	1985		1	good	steel frame	likely to be 3.0kPa generally.	0		AS2121 - 1st EQ Code	Building may suffer moderate non-structural. Moderate to major inturruption to business may occur.	**	shed.
20	**M**	**YES**	1969		1 & 2	good/moderate. Some saltdamp damage evident at bottom of masonry.	RC portal frames. Load Bearing Masonry.	likely to be 3.0kPa generally.	1		Pre-EQ Code	Damage to building structure and interruption to business is unknown	zero	
21	**MC (Mawson Centre)**	**YES**	2004		2	good	SF	Teaching areas and office 3.0kPa, corridors, balcony 4.0kPa, toilet 2.0kPa, plantroom 4.0kPa.	12		AS1170.4 - 1993 - 2nd EQ Code	Buiilding may suffer moderate non-structural damage, minor structural damage. Moderate interruption to business may occur.	***	KBR
22	**MM**	**YES**	2009		3 plus plant level	good	RC SF	General 3.0kPa, Plant Level 04 10.0kPa, other plant roooms 5.0kPa, Theatre 4.0 kPa, Teaching areas and laboratories 3.0kPa.	ALL		AS1170.4 - 2007 - Current EQ Code	Building expected to perform very well. Negligible interruption expected to business.	****	W&G
23	**N**	**YES**	1971		1 & 2	good	RC portal frame, load bearing masonry.	likely to be 3.0kPa.	0		Pre-EQ Code	Damage to building structure and interruption to business is unknown	zero	similar in construction to M.
24	**OC**	**YES**	1996	appears to be built in two stages.	1	good	SF	likely to be 3.0kPa	9		AS1170.4 - 1993 - 2nd EQ Code	Buiilding may suffer moderate non-structural damage, minor structural damage. Moderate interruption to business may occur.	***	LOW RISK
25	**P**	**YES**	1973		2	good	RC and Load bearing masonry.	likely to be 3.0kPa	0	1	Pre-EQ Code	Damage to building structure and interruption to business is unknown	zero	
26	**PH**	**YES**	1969		2	good	load bearing masonry	likely to be 3.0kPa	0		Pre-EQ Code	Damage to building structure and interruption to business is unknown	zero	
27	**Q**	**YES**	1967	-	2	good	RC and Load bearing masonry. Suspended precast cladding.	likely to be 3.0kPa	16		Pre-EQ Code	Damage to building structure and interruption to business is unknown	zero	
28	**R**	**YES**	1967	2004	2	good, some movement between precast panels.	RC. Large suspended precast panels on edge of cantilevered slab.	likely to be 3.0kPa	36 SHOP DWGS.	12	Pre-EQ Code	Damage to building structure and interruption to business is unknown	zero	
29	**SA (shed)**	**NO**	1989								AS2121 - 1st EQ Code	Building may suffer moderate non-structural. Moderate to major inturruption to business may occur.	**	
30	**SB (shed)**	**NO**	1994								AS1170.4 - 1993 - 2nd EQ Code	Buiilding may suffer moderate non-structural damage, minor structural damage. Moderate interruption to business may occur.	***	
31	**SCT**	**YES**	1967	appers to have been built in stages.	1 & 2	good	SF, large span steel truss roof. Masonry.	likely to be 3.0kPa	36		Pre-EQ Code	Damage to building structure and interruption to business is unknown	zero	
32	**SD (shed)**	**NO**	1980								AS2121 - 1st EQ Code	Building may suffer moderate non-structural. Moderate to major inturruption to business may occur.	**	
33	**SE (shed)**	**NO**	1975								Pre-EQ Code	Damage to building structure and interruption to business is unknown	zero	
34	**SF (shed)**	**NO**	1975								Pre-EQ Code	Damage to building structure and interruption to business is unknown	zero	
35	**V**	**YES**	2008		2	good	SF	general 3.0kPa, plant rooms 5.0kPa, storage rooms 5.0kPa, mezzanine loads 4.0 kPa.	ALL		AS1170.4 - 2007 - Current EQ Code	Building expected to perform very well. Negligible interruption expected to business.	****	W&G
36	**W**	**YES**	1991		2	good	RC	4kPa ground, 4kPa L1 inc. 1kPa Partition. Plant rooms 3.0 kPa	34		AS2121 - 1st EQ Code	Building may suffer moderate non-structural. Moderate to major inturruption to business may occur.	**	CONNELL WAGNER
37	**X**	**YES**	2007		2	good	RC PT	ground floor 4.0kPa, suspended floors 4.0kPa, stairs 4.0kPa plant room 5.0kPa.	36		AS1170.4 - 2007 - Current EQ Code	Building expected to perform very well. Negligible interruption expected to business.	****	CONNELL WAGNER

LANDSCAPE OVERVIEW

VIEWS AND EXISTING CHARACTER

The landscape character of the campus is typically dominated by a series of courtyard and paved zones with an overlay of planting on largely 1970s' style Western Australian mallee gums. This landscape is punctuated by newer and more considered external spaces such as 'the Plasso' which have been developed in line with new buildings through out the campus. The overriding discontinuity of landscape character across the campus is evidenced by the photographic analysis.

Key

Key existing views

1. View looking west along Town Walk. No visual connection to Main Street.

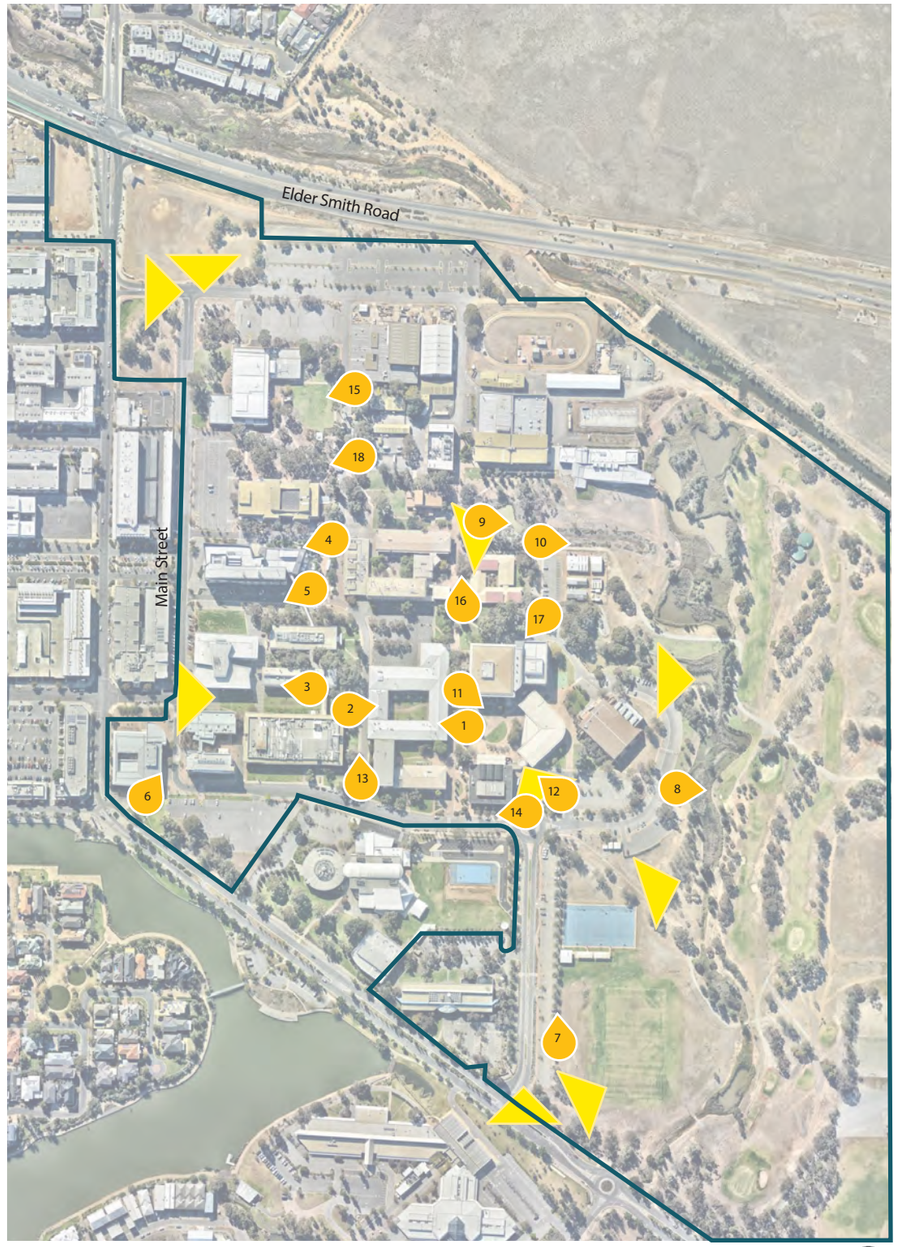
2. Existing sculpture along Town Walk in poor condition.

3. Unprotected walk along Town Walk.

4. Cafe area at the front of MM Building very successful with a defined and well developed planting palette.

5. Successful pedestrian bridge, providing access and shade

6. Looking north from Mawson Central, with little natural shade and landscape character.



Scale: Not to scale

LANDSCAPE CHARACTER ANALYSIS

EXISTING SITE CHARACTER

7. Palm tree avenue between the existing sports facilities and the carpark. Opportunities to build on the landscape character here.

8. A nice view looking east over the existing carpark.

9. An attractive view east over the new wetland, opportunities to create more viewing platforms.

10. Little-to-no planting between the path network and the wetland.

11. Multiple lawn areas, path networks and small amounts of shade through the 'Entry Plaza'.

12. Brutal and unclear entry from the Bus drop off point

13. Shared-use path for service vehicles and pedestrians on Campus.

14. Strong landscape character along the Boulevard interface between the Campus and Endevour College.

15. Large lawn area with ponding issues during large down fall.

16. Wide, paved areas with little shade between campus buildings

17. Pedestrian paths through mulched areas with little signage.

18. Large areas of native vegetation


7

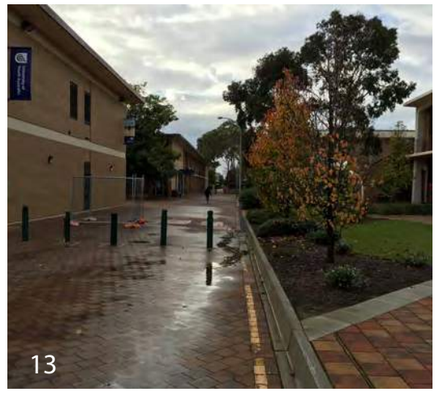

8


9


10

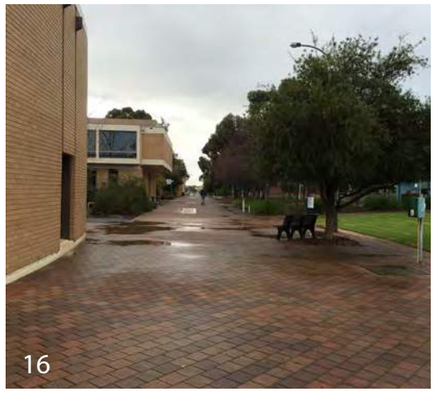
11

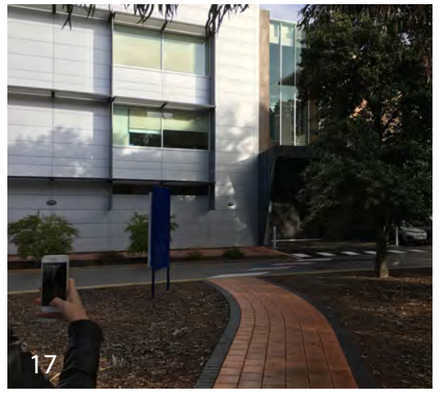

12

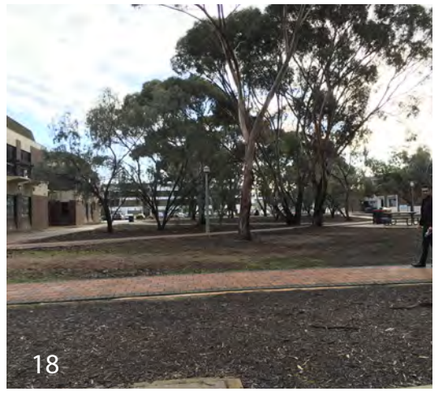

13


14


15


16


17


18

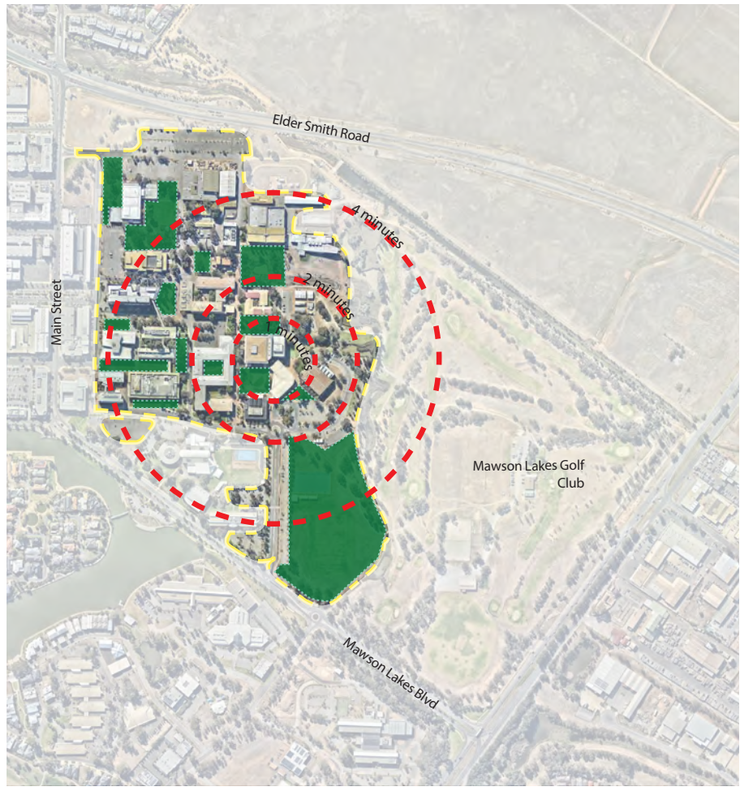
GREEN SPACE COMPARISIONS

A comparison between the Mawson Lakes Campus and other larger Australian campus' reveal the discontinuity of green spaces within the campus, and the distinct lack of any focal greenspaces within the heart of the campus.

Uni SA Mawson Lakes Campus

Campus size: approx. 30 ha

Percentage of green space: 20%



Map based on a person walking 80m per minute

Scale: Not to scale

Monash University, Clayton Campus, Victoria

Campus size: approx. 120 ha

Percentage of green space: 30%

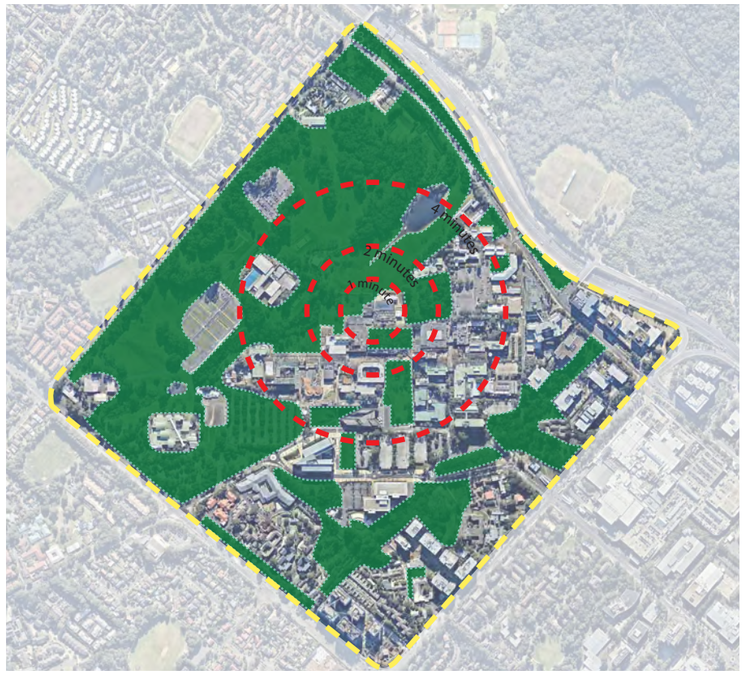
Map based on a person walking 80m per minute

Scale: Not to scale

Macquarie University, New South Wales

Campus size: approx. 125 ha

Percentage of green space: 45%



Map based on a person walking 80m per minute

Scale: Not to scale

CAMPUS LANDSCAPE PRECEDENTS

The following are examples of more clearly defined and legible University Campus landscape areas to aspite to.

Monash University, Clayton Campus, Victoria

1. 'Pedestrian priority space' around building entry
2. Iconic 'Australian Landscape' character.
3. A 'green courtyard' at main building entry, creates places to study or gather in groups.
4. A more 'natural landscape' integrated with a contemporary paved plaza


1


2


3


4

Macquarie University, New South Wales

5. Lawn/gathering area adjacent to 'natural landscape'
6. Tree lined walkways.
7. Contemporary plazas with natural shade
8. Intimate courtyards flooded with planting


5


6


7


8

TRAFFIC SUMMARY

The following section summarises the key findings from the traffic and parking assessment by Frank Siow and Associates.

1.0 DATA FOR MASTER PLAN ANALYSIS (source: Phillips Pilkington Architects)

- Current student enrolment: 4,159
- Current staff enrolment: 1,054
- Student enrolment not envisaged to increase
- Building works mainly associated with building refurbishment and upgrade

2.0 CURRENT PARKING AVAILABILITY

CAR PARK	STAFF	STUDENTS	OTHERS	TOTAL
Bus interchange area	5			5
ML1	21	100		121
ML2	76			76
ML3	69	108		177
ML4	26			26
ML5	33			33
ML6	113			113
ML7	64	51		115
ML8*		250	100	350
ML10*	20		6	26
ML11	9			9
ML12	34			34
ML13	94			94
ML14	8			8
ML15	6	116	20	142
ML 16 University Blvd		122		122
ML18		53		53
ML19	51		3	54
University Blvd North		26		26
Endeavour St		16	4	20
Levels Lane*			9	9
TOTAL (ESTIMATE)	**629**	**842**	**142**	**1613**

ML8* - there is an adjacent unsealed area used for parking with capacity for approx. 100 cars
ML10* - Bus parking area, authorised parking area and permit parking area
Levels Lane – disabled parking and on-street parking (estimated)

There are approximately 1,600 parking spaces spread around the various car parks and private roadways of the campus, including the unsealed area adjacent to ML8 where there is already a high parking demand during peak times.

3.0 CURRENT PARKING DEMAND

Parking counts were carried out at the parking areas listed in Table 1 on Wednesday 3 August 2016. An additional check was made the following week on Thursday 11 August 2016 during the peak parking time identified to compare the results.

Table 2: Parking within the University site

Time	9am	12 noon	4pm
Capacity	1613	1613	1613
Wed 3/8/16	872	**1244**	907
Thu 11/8/16 check		**1213**	

The above Table shows that the peak parking demand was approximately 1,250 vehicles during the noon period. The Wednesday and Thursday counts were fairly consistent.

While there may appear to be a significant parking surplus available within the University site, a more detailed check of where the parking surplus occurs reveals a different picture of the overall availability.

There are a number of reserved or permit areas within the University site, more particularly ML1 (boom gate area), ML2, ML6 (reserved portion), ML7 (reserved portion), ML10, ML11, ML12, ML13 (boom gate area), ML14, ML19 and the bus terminus area.

Table 3: Reserved parking areas

Time	9am	12 noon	4pm	Minimum surplus
Capacity	488	488	488	
Wed 3/8/16	173	**231**	211	257
Thu 11/8/16 check		**237**		251

Reserved parking is an inefficient way of using parking spaces. As can be seen from Table 3, the underutilisation of the reserved parking spaces is very high. A surplus of approximately 250 parking spaces was found on both occasions on the Wednesday and Thursday during the peak times.

Overall, given that the surplus within the reserved parking areas are not able to be utilised by others (eg students and visitors), the peak parking usage would be 1,244+237 ie 1481. The surplus parking that is available is spread over a wide area of the University site. This usage (1,481) would be equivalent to 92% of capacity (1,613). For the purpose of the parking assessment, it can be considered that the University car parks are being used to capacity.

We have also counted parked vehicles in the adjacent Council streets of Light Common and University Parade, between University Boulevard and Main Street, and noted that both streets are parked to capacity over the entire count periods on Wednesday and Thursday. That is, the adjacent Council streets are also used to capacity during University periods.

If some the surplus parking within the reserved car parks could be “freed up” for use by others, this is one way of increasing overall parking availability for the University for students and visitors.

Parking Areas at Mawson Lakes Campus

3. CONSULTATION SUMMARY

There was an extensive consultation program and included the following:

DIVISION

The Division of Information Technology, Engineering and the Environment (ITEE)

The Division of ITEE would ideally like to be collocated in one location and not spread across Buildings MC, P, GP and A. Building MC currently works well as the PVC office but has limited opportunity for expansion which is required if offices are to be consolidated. The Division supports open plan office arrangements as long as privacy can be managed and secure filing maintained. The Division believe there needs to be high quality informal student and lounge spaces onsite, together with spaces that encourage staff to collaborate such as a professional staff centre. The general amenity of teaching laboratories and tutorial spaces is also an issue. It was noted that other Universities are spending money on these teaching spaces such as Flinders University which is a competitive issue locally for ENE, NBE and ITMS.

SCHOOLS

The School of Natural Built Environments

The School of Natural Built Environments is currently located across Building P which is predominantly for teaching and offices, Building H, which was recently handed over from a former Institute and mainly houses research laboratories and offices but is underutilised and Building N, which is a large workshop structure specialising in large scale water tunnels, concrete structures/ testing along with some general teaching spaces.

This school also uses some sheds across the campus for storage and uses glasshouses in the Eco Precinct. NBE have a brand new biology/ chemistry teaching laboratory in P2-28 together with very dated teaching spaces and significant issues in relation to Building N which if not rectified could effect course accreditation.

NBE require a lot of storage space and in the future would like to see the development of flexible breakout spaces adjacent teaching laboratories along with 24/7 student hub type spaces. It was noted that the academics have no desire to have open plan offices and have issues with accommodating visiting academics as there are no available spaces. NBE has close links with the Future Industries Institute through environmental science and consider Swinburne University, Hawthorne Campus as a worthwhile precedent.

The School of Information Technology and Mathematical Sciences

The School of Information Technology and Mathematical Sciences are located across many buildings of the Mawson Lakes Campus as a result of the amalgamation of four previous schools. Many of the spaces occupied such as Building D are old, small and cellular with air conditioning issues. ITMS has large cohort sizes and many of these smaller spaces do not provide sufficient space for the undergraduate programs. ITMS have two research institutes but with low large scale equipment needs. The main requirement for undergraduate programs is for large flexible spaces with a lot of power and good air-conditioning. They would ideally like one large computer pool that suits 100 students and is sub divisible into 25. The current MAC laboratories in Building F are used for virtual classes around the world, but this building suffers from air conditioning issues which compromises the technology in the spaces.

ITMS have a strong preference for consolidation across the campus along with a identifiable 'front door' and have submitted a Business Case to the PVC to support this model which lists Building GP as their preferred of location, vacating Building W & OC. ITMS support open plan office spaces, along with the correct acoustics and allocated break out spaces. ITMS consider the QUT Cube, Deakin MBA on Collins Street and Flinders University spaces as useful precedents.

School of Engineering (ENE)

The School of Engineering are currently spread across multiple buildings including A, EC, F, IW, J, M, MM, Q SA, SB, SCT & W. PhD students are mainly housed in Building F & M with administration located in Building J. There are four research centres that sit within ENE with have a strong industry engagement. ENE support consolidation along with addressing visibility issues as there is no obvious front door for the school or the research centres.

There is a preference for ENE headquarters to be located in Building SCT with the research centre offices to be located in Building M. Teaching facilities range in quality with dated physics labs in Building F and new digital electronics laboratory in Building SCT. Building M has 100% use by the School of Engineering and consists mainly of large workshop spaces, some research laboratories and open plan HDR offices. ENE would like to see WHS issues such as female toilet locations, clear designation of spaces, lack of staff kitchen facilities addressed. ENE consider Flinders at Tonsley an interesting precedent for consideration.

School of Education

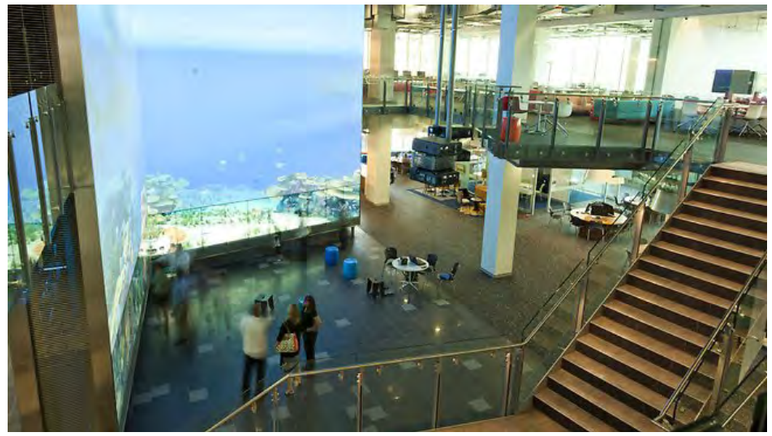
The School of Education is currently located primarily in Building GB with use of the gymnasium which they block book throughout the week, and occasional use of Building K. The school currently has 800 undergraduate student completing practical work at Mawson Lakes with Building GB at capacity. It is likely that the School of Education will relocate to the Magill campus as part of the Magill Education Precinct.

The School of Pharmacy & Medical Sciences

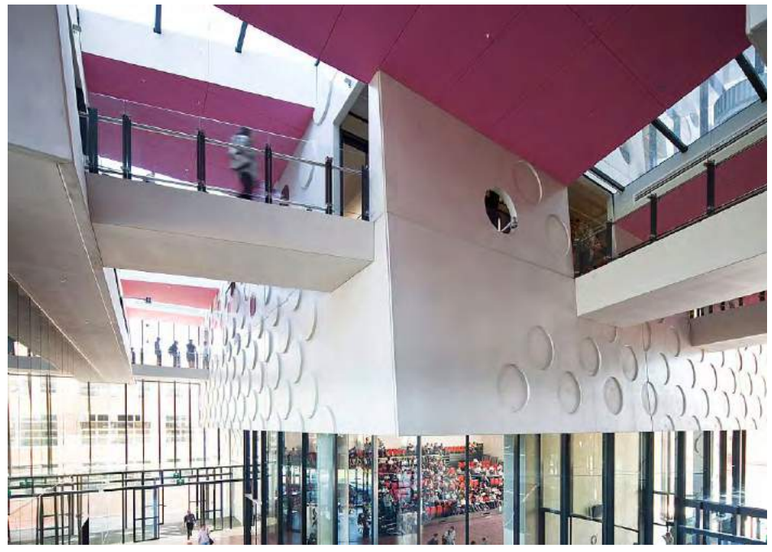
The School of Pharmacy confirmed that all research based work at Mawson Lakes in Building R & Q will relocate into the new Health Innovation Building in 2018. Undergraduate chemistry teaching is located in Building R, in very old teaching laboratories with no air conditioning. Long term teaching at Mawson Lakes will require the equivalent space of R2-01 and R2-21 with no aspiration to expand pharmacy teaching on the Mawson Lakes Campus. The decanting of the Reid Building at City East will necessitate the need for interim use of space at Mawson Lakes.

UniSA College

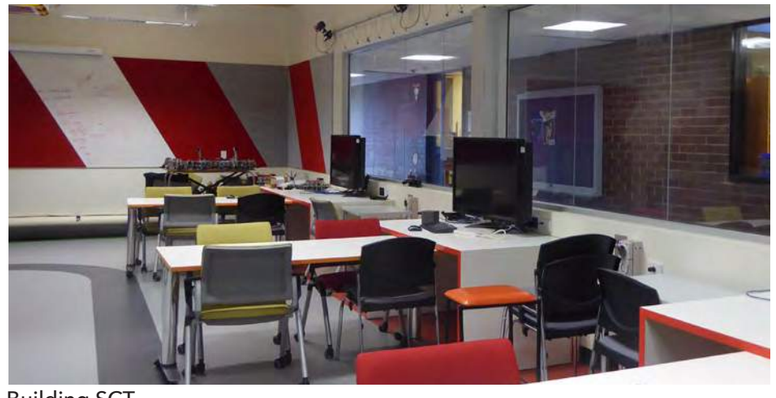
UniSA College lacks an identity and is currently fragmented across the campus usually slotting in the back end of timetabling and as result often restricted to older laboratory teaching spaces. The school is promoting UniSA and pathways into their courses and it is not a positive experience when teaching is scheduled in older spaces when other universities have newer teaching facilities. The College have P1-11 in Building P which is a newly fitted out space but this is at capacity together with office spaces located in Building F. The staff wish to have an identifiable presence of site with connections to the community and a positive student experience.



QUT Cube



Swinburne University of Technology



Building SCT

FUTURE INDUSTRIES INSTITUTE

Future Industries Institute

The Future Industries Institute believe sharing laboratories is positive for research and has a focus on promoting shared spaces and shared equipment opportunities. Where there is duplication, this frees up space for future growth.

FII also believe that integration of Industry has a great benefit for research with a need to attract Industry Partners. These partners may use spaces for short or medium term use (with potential for Industry to have onsite offices), with a need to better communicate with industry. Free parking is seen as a draw card for industry. At present the doors at Mawson Lakes are open but not advertised, 'come use our spaces' is the strong message moving forward.

FII strive for big picture industry engagement where industry is embedded in all teams and labs. The Tenancy Plan needs to respond to Industry Engagement with:

- Facilities for embedded research
- Start up laboratories and incubators
- Facilities to attract businesses through research engagement

UniSA is focused on innovation, transformative industry and the creation of future industries.

FII considers community engagement as essential. Conference type facilities would promote opportunities for community engagement. While Endeavour House in Technology Park is available for use, Mawson Lakes Boulevard is a real barrier.

FII are hoping for greater engagement with ITEE through individual Schools where there are opportunities for FII to supervise Masters and Honours Students. It is not appropriate for FII to be solely aligned with ITEE as work such as Allison Cowin's research has greater synergies with Health.

There is currently nowhere at the Mawson Lakes Campus for effective Industry Engagement. Flexible spaces for meetings of around 35 people suiting a range of meeting types are desirable. This is further described in Section 6: FII Accommodation Strategy.

SUPPORT

Information Strategy and Technology Services

ISTS are predominantly located in Building E, W with a small presence in C. The Information Infrastructure and Help desk teams are located in Building E where a secure environment is important. The Data Centre is also located in Building E and connected to UPS and a large generator would be very expensive to relocate. The IT Help Desk has quite specific technical requirements but preference for this to be collocated with teaching technologies who are in Building C. Transit offices are often used as ISTS have many project continually running and often hire ITMS students to work on development technologies such as apps. City West has a 'Meet-me' Centre for Commercial entities onsite which the Mawson Lakes Campus does not currently have.

Library

The library collection and staff are currently located in Building C with ISTS also sharing the staff areas. Other UniSA campus libraries have collaborative teaching spaces which is not the case at Mawson Lakes. There is a need to update the furniture selections which are currently a mix of ages, colours and design. The study rooms are well utilised but with a significant constraint being the broken blinds within the window glass panes limiting light access into spaces. Additional study and project rooms are desirable.

Communications & Marketing

Communications and Marketing staff are currently located in Building P but do not need to be in this location. CMK conduct tours across the campus and discussed this issue of connectivity between buildings and the importance of having a central meeting point with a student hub atmosphere along with the need to upgrade the old signage. Feedback from tours is the lack of visibility and transparency into the range of spaces with exceptions such as MM displaying its activities well. The campus would benefit from having the following variety of flexible meeting spaces:

- 150- 200 people for whole day seminars
- 30-50 people council rooms, school rooms
- 20 people most meeting rooms onsite

The gymnasium is not suitable for large gatherings with Building MC predominantly used. The campus would benefit from a greeting hall which could be a flexible space and used for other events.

UniSA Ventures

UniSA Ventures are not likely to expand in the future with their current office accommodation size being acceptable. They need a lot of space for storage of records in a compactus and there needs to be consideration for confidentiality with commercial intellectual property. If UniSA Ventures are meeting investors onsite, they meet at their office in Building GP. UniSA Ventures generally believe once start up companies have expanded, they prefer to move off campus as stand alone entities.

Research Innovation Services

Research and Innovation Services are located on the upper floor of Building GP and are expanding to 46 staff with the current/new office fitout able to accommodate this with minor alterations. RIS require a dedicated meeting space (which they do not currently have). Transit offices are also important as they work across all research areas and divisions with a lot of interaction with other campuses. A continuous internal layout of desks is important for staff culture and RIS are very happy with their existing fitout. Any potential colocation needs to be carefully considered as there are issues with confidentiality.

Building X

Building MC

Student Experience Unit

The student experience unit are happy with their existing offices which are reasonably new on the ground floor of Building C. The space designated for the Indigenous Student Services in Building GP is dated and should be collocated with a Student Hub type space, but needs to be at ground floor with potential access to outdoor garden space. This spaces needs to be contained but visible and designated entirely for students.

The gymnasium is currently block booked by the School of Education full time which is very restricting to UniSA Sport. The gym is quite vibrant at night with basketball and badminton popular at Mawson Lakes. SEU believe that vibrancy needs to be redefined at Mawson Lakes as the student numbers are unlikely to grow and worth considering community access to increase population. The student lounge model at City West has been successful and pool tables and gaming are likely to do very well at Mawson Lakes.

STUDENTS

Student Consultation

The student representatives see the GP courtyard as a potential focal point but think the student dedicated spaces around this can be improved. They like the student lounge model at City West along with the variety of project rooms and seating flexibility in the Jeffrey Smart Building. It was noted that Mawson Lakes students commute to the Jeffrey Smart Building to use the flexible project style rooms. The northern end of the site does not have any student designated spaces. Student spaces are not well promoted or known, for example the 1st year Engineering Experience Studio. The 'Hive' lounge adjacent the GP Courtyard is used for the Breakie Bar twice a week but is too small, with not enough tables and the hockey table is broken. Some students prefer to walk to the Mawson Lakes Town Centre as there is more variety of food that is cheaper than buying onsite. Generally the students feel that the campus is quite safe.

A full list of consultations can be seen below with some groups consulted multiple times:

- School of Natural and Built Environment
- School of Information Technology & Mathematical Science
- School of Art Architecture & Design
- School of Engineering
- Library
- Marketing and Communications
- School of Education
- USASA
- UniSA College
- USASA Student Representatives
- School of Pharmacy
- FM Services Infrastructure
- ISTS
- Reasearch Innovation Service
- Human Resources
- UniSA Ventures
- Student Experience Unit
- Student Academic Services
- Pro Vice Chancellor: ITEE
- Vice Chancellor and SMG
- Office of Strategic Programs
- FM Assist
- Campus Operations Group
- ITEE Divisional Executive
- FII Environmental Science & Engineering Strand
- FII Minerals & Resources Engineering Strand
- FII Biomaterials Engineering & Nano Medicine
- FII Manager
- FII Technical Manager
- FII ANFF
- FII Director

UniSA Student Lounge, City West. Photo credit: David Sievers

Building B Weighs Room

4. MASTER PLAN PROPOSAL

VISION & DESCRIPTION

The implementation of the Strategic Master Plan will continue the transition of UniSA's Mawson Lakes Campus from inward looking to outward looking and increasingly engaged locally, nationally and globally.

Linkages with the local community are to be strengthened by creating a more permeable campus, which invites community use. Existing facilities such as the gym will be developed as attractors to enable greater community engagement.

Research linkages with Technology Park and wider industry can be strengthened by the development of identifiable research and industry hubs with supporting facilities such as well-equipped meeting rooms and conference facilities. Together with opportunities to support business incubation and colocation of industry, education and research are to be showcased, with the community and industry given visual access to the wide range of educational and research activities that the campus accommodates.

The development of an Industry Connections Hub in the heart of the campus will provide a space for student career development, encourage networking through industry interaction together with pods to support this model. This hub will also provide an iconic first point of contact for meeting with industry onsite for researchers, academics and students and will be strongly linked to the Northern Adelaide region. The campus acknowledges the opportunities between industry connections and student engagement together with collaborations alongside small to medium enterprise groups in the SA economy. This will be developed through the creation of office spaces and start up laboratories across the campus that allow these 'SME's to be visible and immersed on campus. Alongside this will be provisions for pre-existing industries that see the benefits in colocation on campus. Design led developments will be established to attract tenants on campus.

Facilities will be developed to attract businesses through research engagement with Industry embedded within research teams and laboratories spaces across the campus. The University and campus environment will focus on innovation, transformative industry and the creation of future industries to position UniSA as a leader in Industry Engagement in research and teaching.

Existing buildings that are dated and no longer fit for purpose are to be upgraded where economically viable, to create 21st century learning and research environments that showcase UniSA's endeavours. Buildings that are inflexible and no longer fit for purpose should be considered for demolition.

Student life on campus is to be celebrated with a vibrant Student Hub. Access to quality food and beverage options, recreational opportunities, resources and learning spaces will all add to the vibrancy of this important area of the campus.

Connectivity with the Mawson Town Centre is to be promoted through the enhanced amenity of the east-west links and greater activation of the western edge of the campus.

The landscape and urban environment is to be upgraded to improve campus amenity with the development of sheltered pedestrian connections between buildings and a consistent landscape treatment reinforced with more plantings, high quality paving and street furniture elements. Outdoor recreation and a fitness loop will be developed to encourage group activities toegether with staff and students utilising outdoor spaces frequently.

A series of interpretive trails are to be developed showcasing the environmental and technological research that is undertaken on campus. These trails will be supported by high quality interpretive material and potential art installations that engage the university and wider community whilst promoting the research culture of the campus.

A strong identity for the campus will be developed, building on the natural assets of the immediate environment. The wetlands in particular provide an opportunity to extend the environment into the heart of the campus and can transition into more formal water features providing amenity during Adelaide's hot summers.

The rich Kaurna heritage of the site and its continuing importance to the Kaurna people is to be celebrated with the development of the Indigenous gathering and performance space between Buildings V and OC. Interpretive elements will be developed across the site and can be potentially linked to the environmental trail.

A carbon neutral campus aspiration will be adopted to promote best practise construction methods through adaptation and upgrades to existing buildings to leverage existing embedded energy where possible or maximising recycling where buildings are unsuitable for reuse. The implementation of a solar farm and solar panels to all buildings and parking areas, where appropriate will demonstrate leadership in sustainability. The campus will consier opportunities outside of the boundary of the Campus for water management infrastructure and capture and recycle stormwater and rainwater.

Carparking is to be rationalised to limit its visual dominance and ensure it is not a barrier to accessing the campus.

The entrance identity on campus is to be enhanced with the development of major entries between Building A and GP to enable immediate immersion in the heart of the campus. Additionally the community entrance through The Mawson Centre will be reinforced together and a new northern entrance promoting connection with the existing rail and transit hub will be developed.

The existing main entrance on University Boulevard will be enhanced to create a prominent arrival point.

UniSA Jeffrey Smart Building, photo credit: Sam Noonan

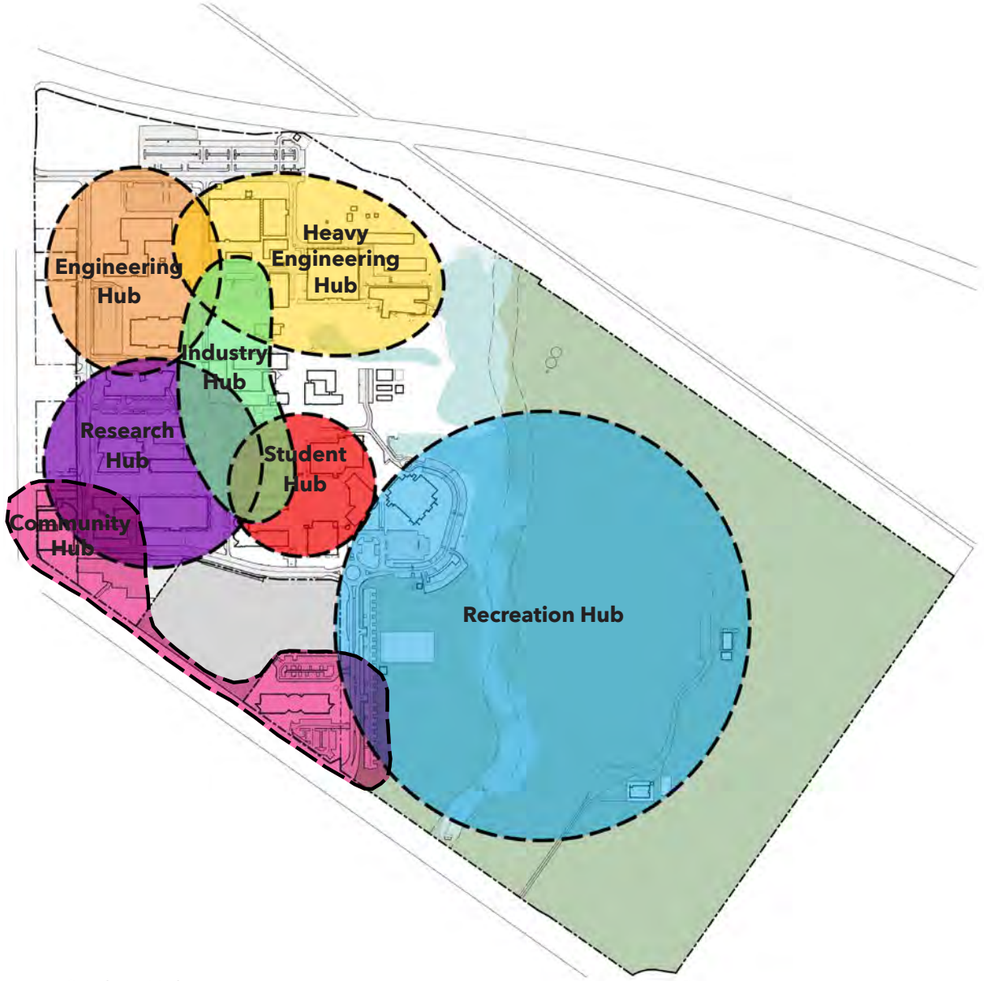
FUTURE 3D RENDER

FUTURE 3D RENDER

GUIDING PRINCIPLES

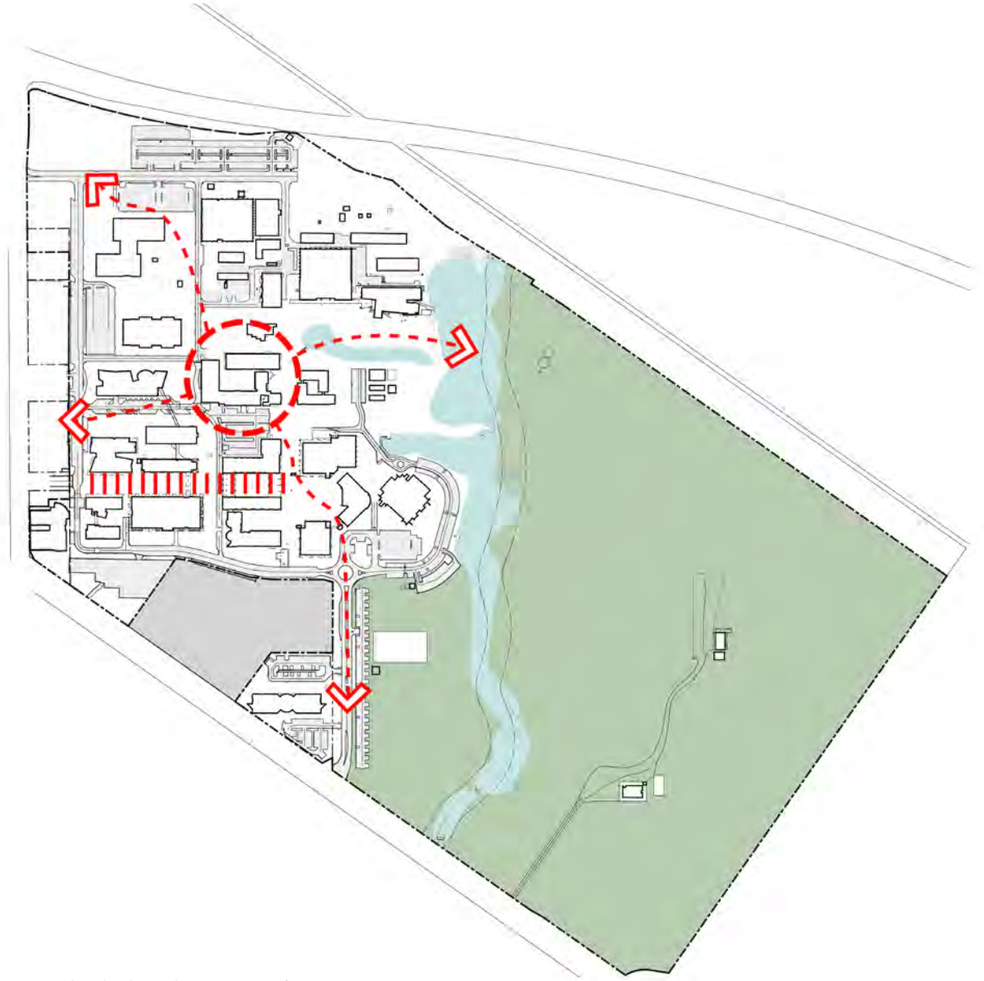
GUIDING PRINCIPLES

HUBS & PRECINCTS



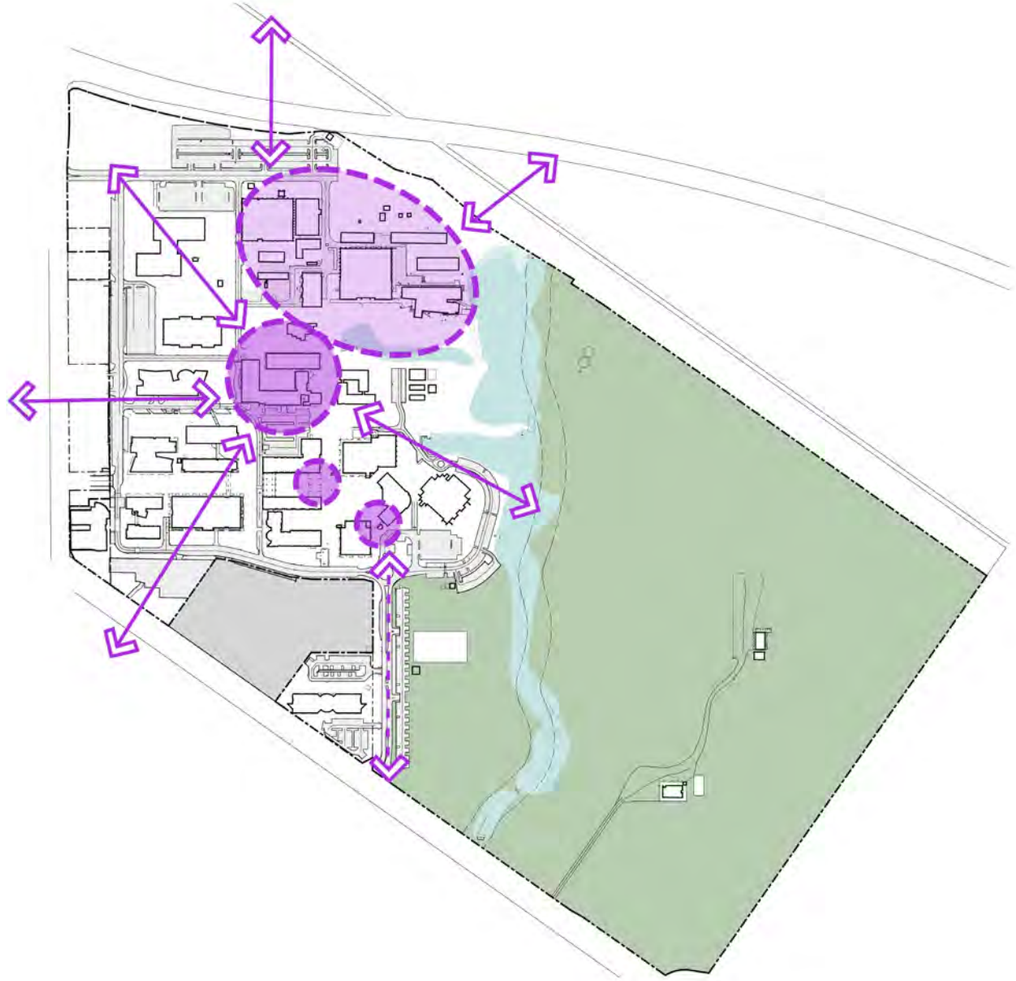
- Student Hub
- Recreation Hub
- Research Hub
- Industry Hub (research and students)
- Heavy Engineering Hub (Engineering/Research/Industry/pilot plant)
- Community Hub
- Strengthen engagement with GP Courtyard
- Vibrancy through consolidation
- Lively campus through public art
- Interlocking research, industry and teaching hubs
- Maximise concentration

CONNECTING THE HUBS



- Shaded pedestrian walkways
- Diagonal Pathways
- Technology Trail
- Environment Trail
- Bike Paths
- Well illuminated pathway systemincorporating CEPTD principles

INDUSTRY & UNIVERSITY PARTNERSHIPS



- Industry Connections Hub
- Design led developments to attract tenants
- Incubation Spaces
- Industry embedded in Research
- Industry workshop/ pilot plant space
- Pre-existing Industry onsite
- Links to Technology Park
- Conference and meeting spaces
- Seminar presentation facilities

STRENGTHEN LINKS BETWEEN FII & SCHOOLS

- Visible Research Practices
- Seminar Opportunities
- Contemporary visions of an integrated research and teaching campus
- Cross discipline boundaries
- Activated atriums and interaction spaces
- Unlocking future opportunities through collaboration
- Leverage opportunities in defence, low carbon economy, innovation, food industry, SME-economy, design, medical technology & allied health

ENVIRONMENT

- Extension and integration of the natural environment
- Building on Salisbury Council water recycling, wetlands model
- Develop Kaurna Landscape and performance spaces
- Celebrate Kaurna Heritage
- Interpret European Heritage
- Utilise Environment and Landscape as Educational tool
- Reinforce Campus identity celebrating environment, heritage and research future

LINKAGES & CONNECTIONS

- Linkage to Town Centre
- Connectivity to Train Station and Northern Expressway
- Technology Park connection
- Community connections and activation on frontages
- Provide clear, defined and safe traffic routes
- Provide clear and defined primary and secondary pedestrian links/ circulation

COHESIVE CONCENTRATION OF SCHOOLS

- Consolidate Schools into appropriate facilities
- Create identity and entry point for each school
- Develop flexible teaching and learning facilities for use by all schools
- Name buildings to reinforce School identity
- Develop landscape precincts that support educational program

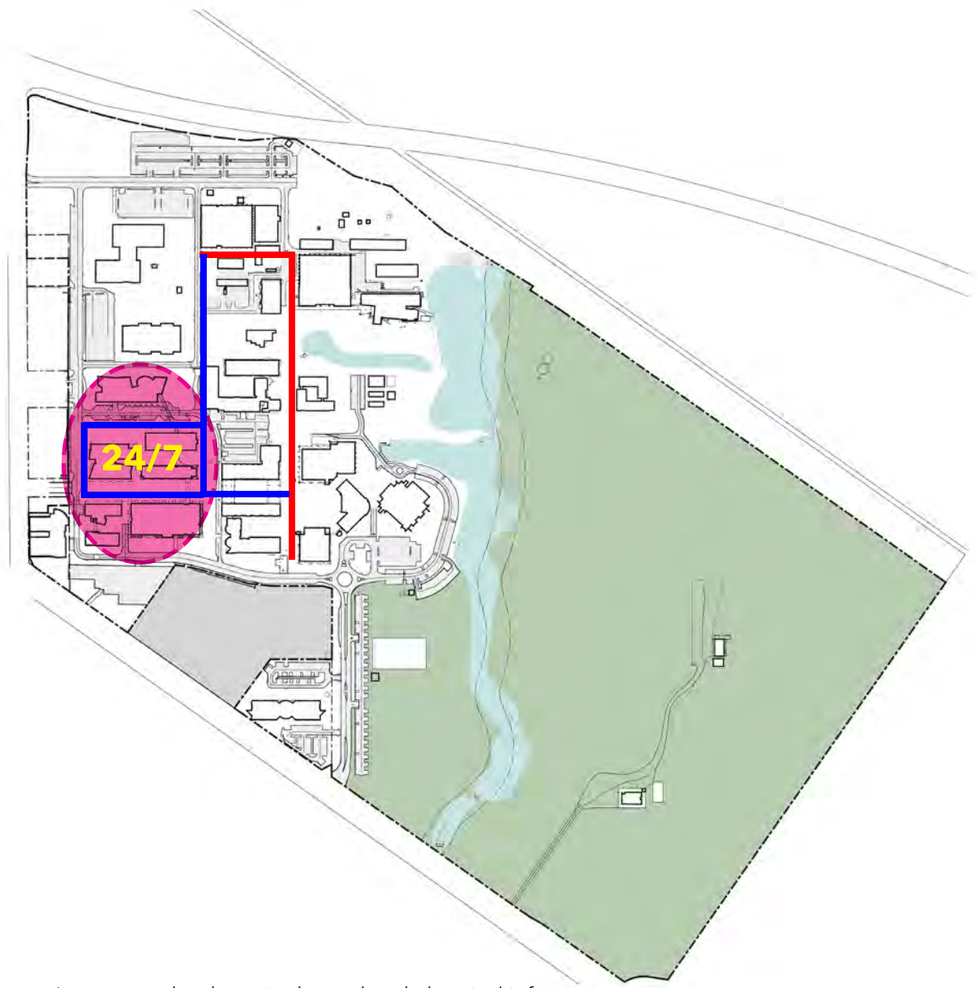
VISABILITY & WAYFINDING

- Provide clear and defined pathways with improved wayfinding
- Multiple front doors
- Research gateway
- Identity
- Transparency
- Permeable edges linking Town Centre and recreational facilities
- Promotion of arts and culture through the public realm
- Demonstrate engagement with the research culture of the campus through furniture, graphics and temporary structures
- Encourage visual connectivity between the inside activities and the general public outside of these spaces

SUSTAINABILITY

- Adapt and upgrade existing buildings to leverage existing embedded energy
- Where buildings are unsuitable for reuse maximise recycling
- Demonstrate leadership in sustainability and utilise building services and landscape as an education
- Carbon Neutral Campus Strategy
- Opportunities outside of the boundary of the Campus for water management infrastructure
- Capture and recycle stormwater and rainwater

SITE SERVICES INFRASTRUCTURE



- Increase redundancy in thermal and electrical infrastructure
- Enable staged replacement of existing chilled water/ heating hot water pipework in tunnels
- Dedicated ring main and PH2 for research intensive and critical operations
- Consolidation of research intensive 27/4 laboratory spaces
- Consolidation of thermal plant in common locations where possible for maintainability
- Stand-alone plant for leased buildings
- Upgrade end of life existing air handling units and fan coil units throughout buildings
- Services Strategy Guidelines for future UniSA research/laboratory intensive buildings

MASTER PLAN PROPOSAL

LEGEND

SCT EXISTING BUILDING NUMBER
Ref REFURBISHED EXISTING BUILDING
1 NEW ENE/NBE INFILL BUILDING
2 INDUSTRY OPPORTUNITY
3 WORKSHOP/GLASSHOUSE PRECINCT
4 NEW AAD WORKSHOP
5 NEW XX EXTENSION TO BUILDING X
6 GREEN HEART COURTYARD
7 INDIGENOUS LANDSCAPE/PERFORMANCE ZONE
8 BUILDING V AS INDUSTRY RESEARCH CENTRE
9 NEW TEACHING & LEARNING BUILDING (MULTI-DISCIPLINARY)
10 UNIVERSITY COLLEGE LINKED TO GB
11 BUILDING R REDEVELOPED AS FII INDUSTRY FOCUS RESEARCH HUB
12 BRIDGE LINK FROM GP TO C
13 INDUSTRY CONNECTIONS HUB
14 GROUND FLOOR ACTIVATION OF C – STUDENT LEARNING/USASA/LIBRARY
15 EXPAND GYMNASIUM – ADD 1 INDOOR COURT
16 NEW ENTRANCE BUILDING DEVELOPED FOR PVC & CMK.
17 GP AS STUDENT LEARNING AND FLEXIBLE TEACHING
18 EXTENDED CAR PARKING
19 EXTENDED STUDENT & VISITOR CAR PARKING
20 FITNESS/RECREATION ACTIVITY AREA
21 FUTURE DEVELOPMENT SITE
22 LEASED AS COMMUNITY CLINICAL BUILDING

MASTER PLAN PRECEDENTS

Industry Connections Hub

Research Hub

Student Lounge

Student Learning

Open Plan Offices

Visability of Research

Sunshading

Facade upgrade

LANDSCAPE VISION & DESCRIPTION

Landscape Vision

The UniSA Mawson Lakes campus is strategically located adjacent to Mawson Central, a major town centre in Adelaide's northern suburbs. The campus is home to the University's computing and information technology, engineering, science, civil aviation, applied science, sports science, e-commerce and environmental studies programs. The campus has state-of-the-art research facilities and houses well known research institutes and centres.

The University grounds are situated between Mawson Central, and include the Golf Club and adjacent water body/green corridor, which serves as an important environmental and flood management function for the greater area.

The campus landscape is in need of a significant upgrade and improved amenity in order to achieve the Universitys' strategic vision to build a strong campus life and identity. The future of the campus' landscape needs to be one of transition and transformation, as the campus creates new contemporary spaces, upgrades existing spaces and protects areas of valued existing landscape.

Main Challenges

Social and technological change in education

The landscape must provide new spaces and elements (eg. wi-fi and outdoor recharge opportunities) to meet technological and social change in education and research, and to support future new learning and social behaviours and environments.

Climate change

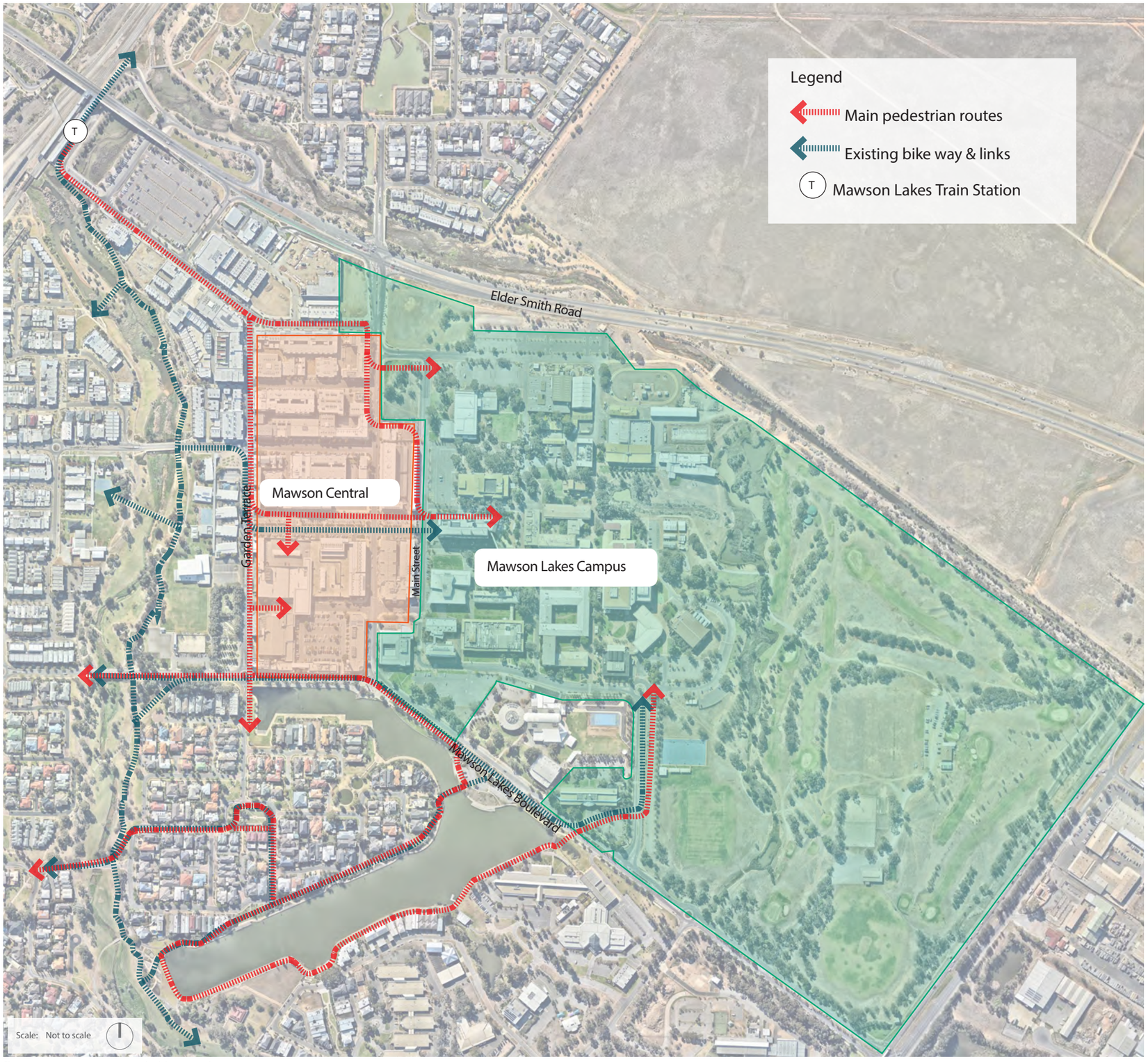
The landscape must contribute to the University's sustainability objectives through water sensitive urban design (WSUD), use of sustainable materials, increased planting of vegetation to reduce the heat island effect, facilitation of sustainable transport options and provision of opportunities for food security.

Ecology

The landscape must evolve to embrace ecological principles such as improving the Indigenous landscape values and promoting biodiversity values.

Identity

The landscape must provide high quality designed spaces and be delivered with a strong approach to improved legibility, walkability and wayfinding across the Campus.



Site context plan and broader pedestrian/bike connections

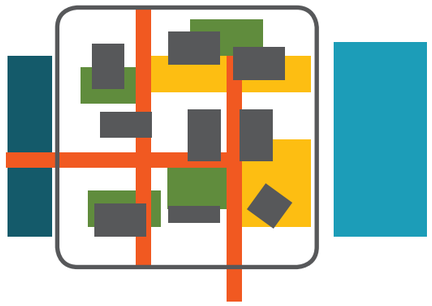
LANDSCAPE PRINCIPLES

Key Spaces and Places

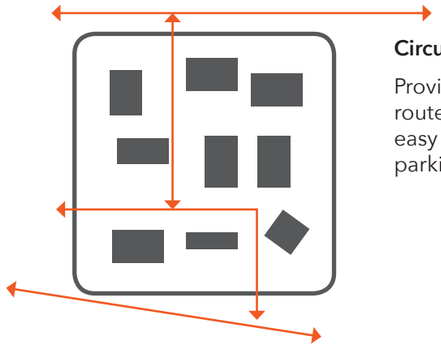
Landscape Principles

The Landscape Masterplan developed by TCL in 2006 recommends that the Mawson Lakes campus aspires for a predominately Australian vegetation palette, while also incorporating global ideas in contemporary design, 'best practice' in water sensitive urban design and ecologically sensitive landscape practice.

Through further analysis and consideration of the current and proposed future site uses anticipated, a series of Landscape Principles have been developed as follows.

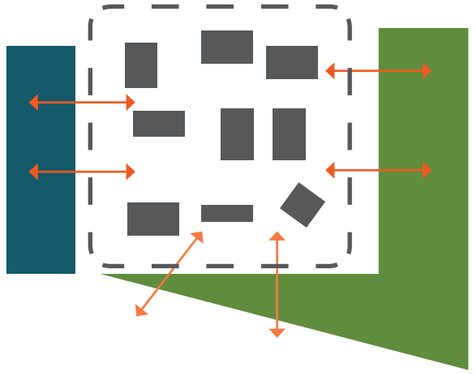


Identity of spaces - Create a hierarchy of connected spaces and define these areas through carefully selected landscape treatments that reinforce the distinct landscape identity of the campus

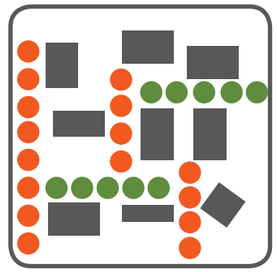


Circulation and Connectivity - Vehicles

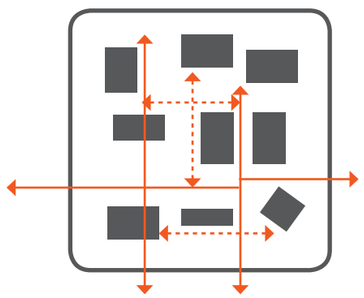
Provide clear, defined and safe traffic routes through out the University with easy access to delivery points and car parking



Integration and connectivity with context - Capture the character and identity of Mawson Lakes and provide strong visual and pedestrian links towards each adjoining boundary

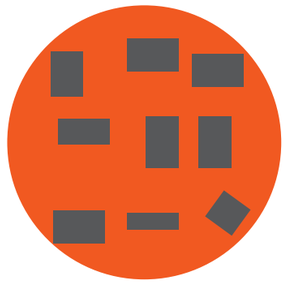


Landscape - Retain the existing planting where it provides shade and scale and use new planting to define streetscapes and spaces based on identification of use



Circulation and Connectivity - Pedestrian

Provide clear and defined primary and secondary pedestrian links/ circulation at ground level with improved wayfinding throughout the campus



People - Provide a comfortable and accessible Campus for all ages and abilities at a human scale with opportunities for formal and informal rest/meeting areas

LANDSCAPE MASTERPLAN

This Campus Landscape Master Plan presents a strategic vision for the future character of the campus with a focus on providing quality spaces that refine the wider site context and which draws on the surrounding landscape character, bringing this into the Campus heart.

1. Town Walk
Consolidate a series of landscape rooms with a high level of legibility and activate edges with potential food and beverage spaces and other 'hole in the wall' retail outlets at ground level

2. Mawson Centre Pedestrian Zone
Create a high quality pedestrian orientated space to better connect the campus and Mawson Centre

3. Covered Links
Improve pedestrian amenity and connectivity across the campus through realising the DCM Masterplan proposal to develop a series of covered link ways through the campus

4. Car Parking
Expand the areas of carparking and look at decking. There are also opportunities for expansive canopies over selected carparks with opportunity for photo-voltaic cells.

5. Main Entry
Upgrade main campus entry to improve legibility and better reflect the Uni SA brand and landscape character of the campus

6. Sports Hub/Fitness Loop
Existing sports precinct with a fitness loop linking through the campus.

7. The Green Heart
Extend the broader natural landscape setting into the heart of the campus and create a significant new multi- purpose green space that attracts student activity and opportunities for gathering.

8. The Green Link
Create a path network through the existing natural environment and then extend this into the University campus.

9. Gateways
Develop significant landscape interventions with hi-tech installations to frame the northern and southern entries to the campus.

Key Spaces and Places

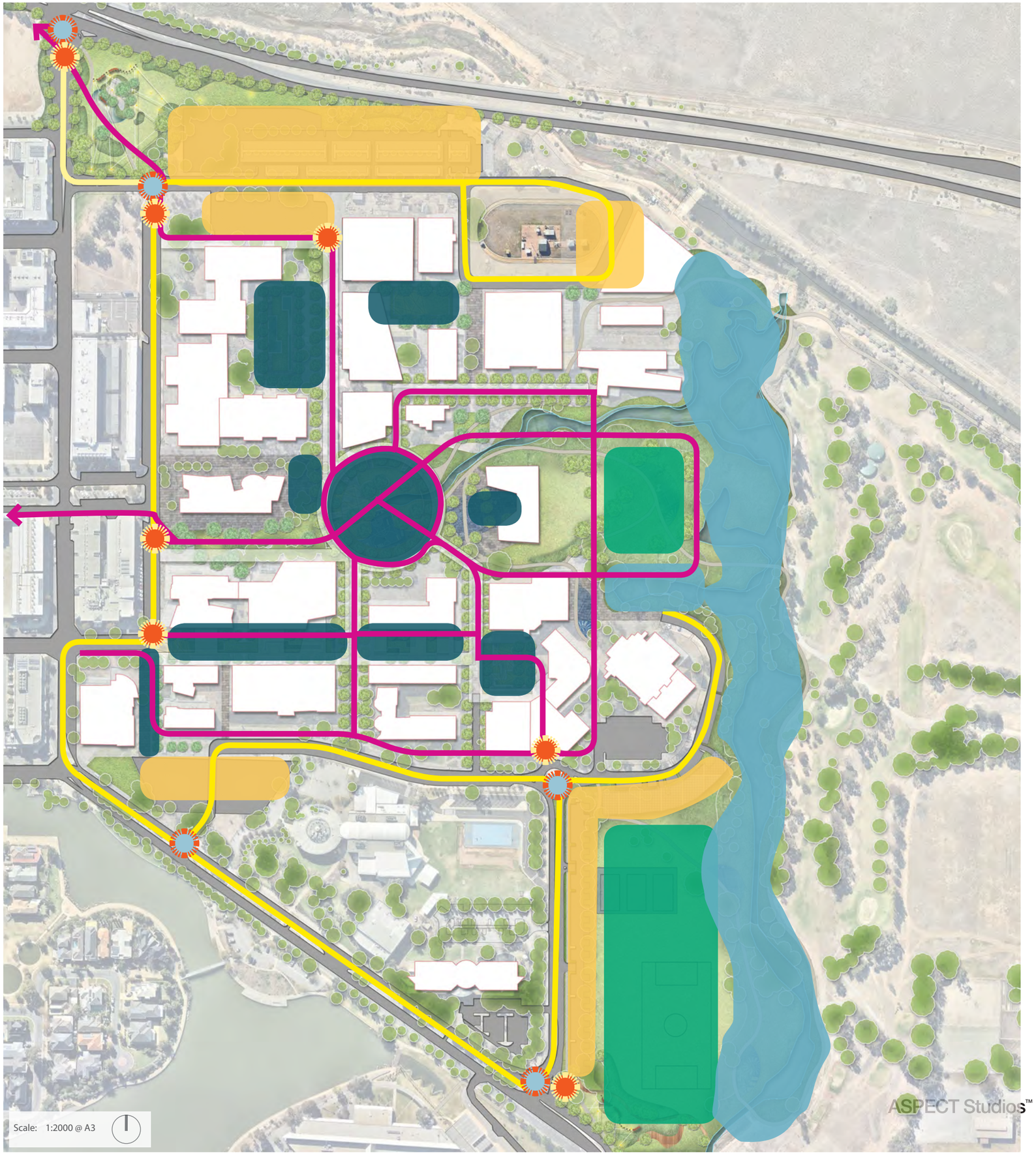
The UniSA Mawson Lakes Campus landscape spaces vary according to function, location and context. The wide range of spaces includes general movement corridors, lawns, courtyards and recreational areas.

Some parts of the campus are more formal in character or others provide a specific function. A spatial hierarchy has been developed to determine how an overarching character can be maintained throughout the campus.

The key spaces and places diagram highlights a basic typology of spaces and major functional requirements.

Key

- Primary Walks
- Primary Vehicle Routes
- Car Parking
- Significant existing landscape
- Courtyards/plaza/squares
- Sports
- Entry gateways (pedestrians and bicycles)
- Entry gateways (vehicles)



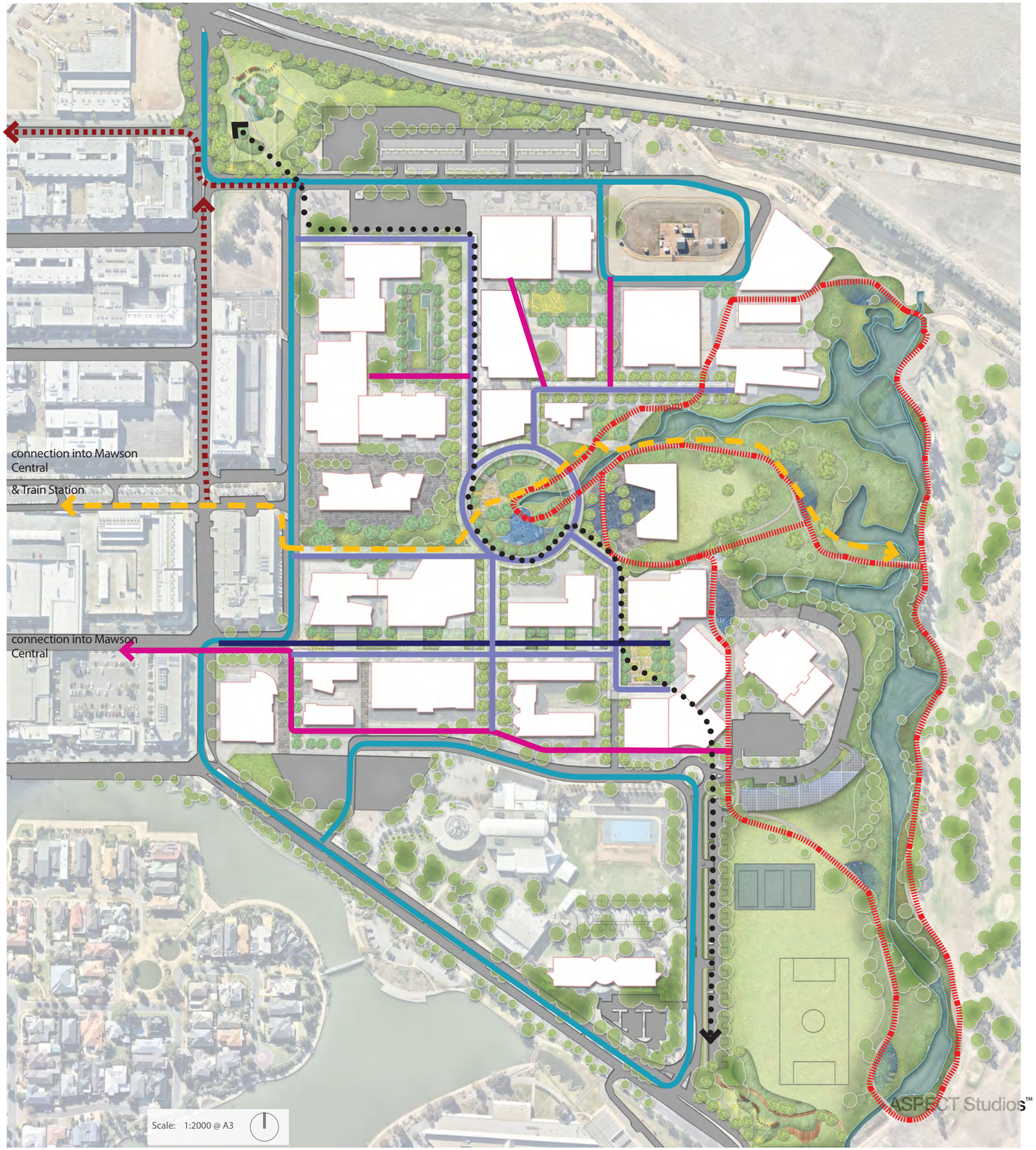
Movement and Connectivity

Primary Walk Network

- Town Walk
- Campus Walk
- Environment Trail
- Technology Walk
- Covered Link
- Fitness Loop
- Connection to Mawson Lakes Train Station

Primary Vehicle Routes

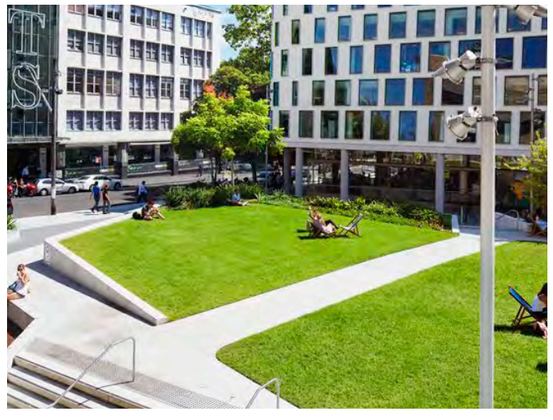
- Uni Loop



Town Walk

Providing a highly legible pedestrian connection between Mawson Central and the Campus Administration Centre is a fundamental component of the previous masterplans and is essential for realising the University's vision of strengthening the identity and presence of the campus within the town centre.

The adjacent images highlight the potentials for a range of spaces that can work together to create a more vibrant link.



Location Diagram

Town Walk

The Town Walk objectives:

- Provide generous pedestrian movement
- Be student and Town Centre focused
- Have its own distinctive tree and plant character with an emphasis on formality
- Space trees at regular intervals to create a strong promenade aesthetic
- Create a visual link through vibrant colour in chosen materials; ie seating.
- Use lighting to improve safety at night
- Have a gateway at the main entrance from University Parade
- Minimise access for service vehicles
- Activate the space with pop-up cafe/potential hole-in-the-wall style shop fronts sleeved onto existing structure

Signature gateway and connection to Mawson Central

Activity nodes

Create covered spaces along Town Walk.
'Hub' type environments with connection points to power/wifi. Places to work outside.

Connect with proposed 'Covered Links'

Create a strong green link with a consistent plant palette.

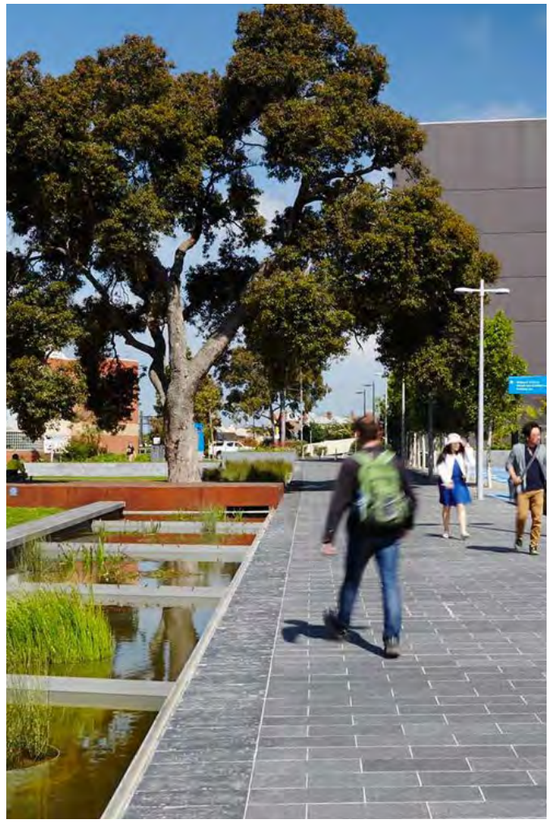
Relate to upgraded 'Entry Plaza'

Scale: 1:1000 @ A3

Mawson Centre Pedestrian Zone

The Mawson Centre is a cultural hub for the residents of Mawson Lakes and surrounding suburbs. It is a space which offers learning based activities as well as a library and cafe. The surrounding landscape needs to work together with the building to promote this and have a strong connection with the University.

The adjacent images depict what the space could be.



Location Diagram

Mawson Centre Pedestrian Zone

The Mawson Centre Pedestrian Zone objectives:

- Provide clear and cohesive wayfinding/signage
- Be pedestrian/bicycle prioritised
- Have its own distinctive tree and plant character
- Use lighting to improve safety at night
- Connect strongly with the Town Walk and provide a gateway to both entries
- Minimise access for service vehicles
- Have a distinctive paving pattern that reinforces the pedestrian nature of the space

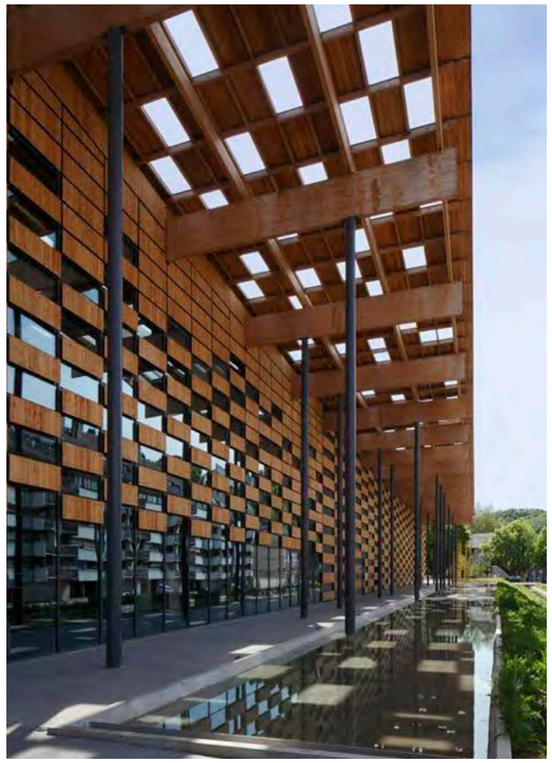
Signature gateway and connection to Mawson Central

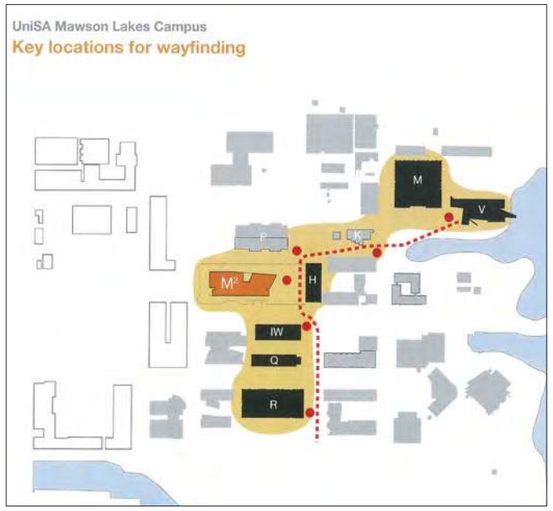
Well lit and signed entrance from adjacent carpark and with pedestrian/cyclist priority entering via Mawson Lakes Boulevard.

Covered Links

The concept of Covered Links are an instrumental part of the masterplan due to the harsh climatic conditions, including extreme summer heat and wind driven rain in winter. The route these covered links have been identified by analysing key pedestrian links connecting the campus.

The adjacent images gives some sense of the aspirational qualities that can be expected from these link.





Location Diagram

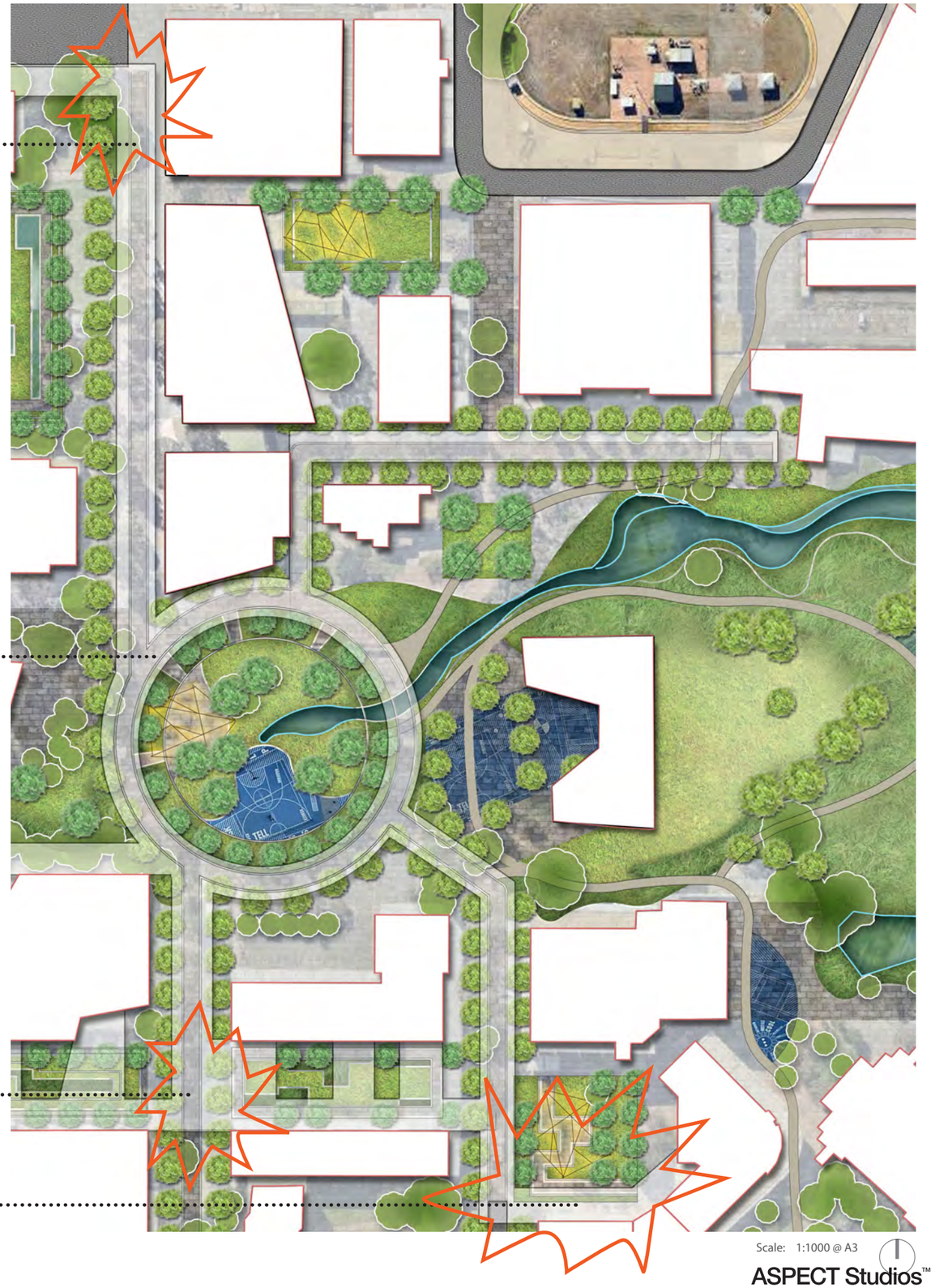
The 'Covered Links' concept was proposed in the 2009 'Site Analysis and Conditions Report' by John Wardle Architects.

The images above show the constructed form on-site and the proposed layout for the links

Covered Links

The Covered Links objectives:

- Provide an aesthetically pleasing and functional covered form over key pedestrian routes
- Assist in wayfinding through the campus
- Have a strong relationship with the furniture items beneath
- Have its own distinctive tree and plant character that runs adjacent/beneath the built form



Scale: 1:1000 @ A3

Car Parking

Parking on the campus is extensive and has the potential to severely detract from the desired future character through expanses of hardstand areas. At the same time, there is an opportunity to use WSUD initiatives and canopies to reduce the heat loads generated by these areas.

The adjacent images depict ways that car parks can be better integrated with the campus character.

Location Diagram

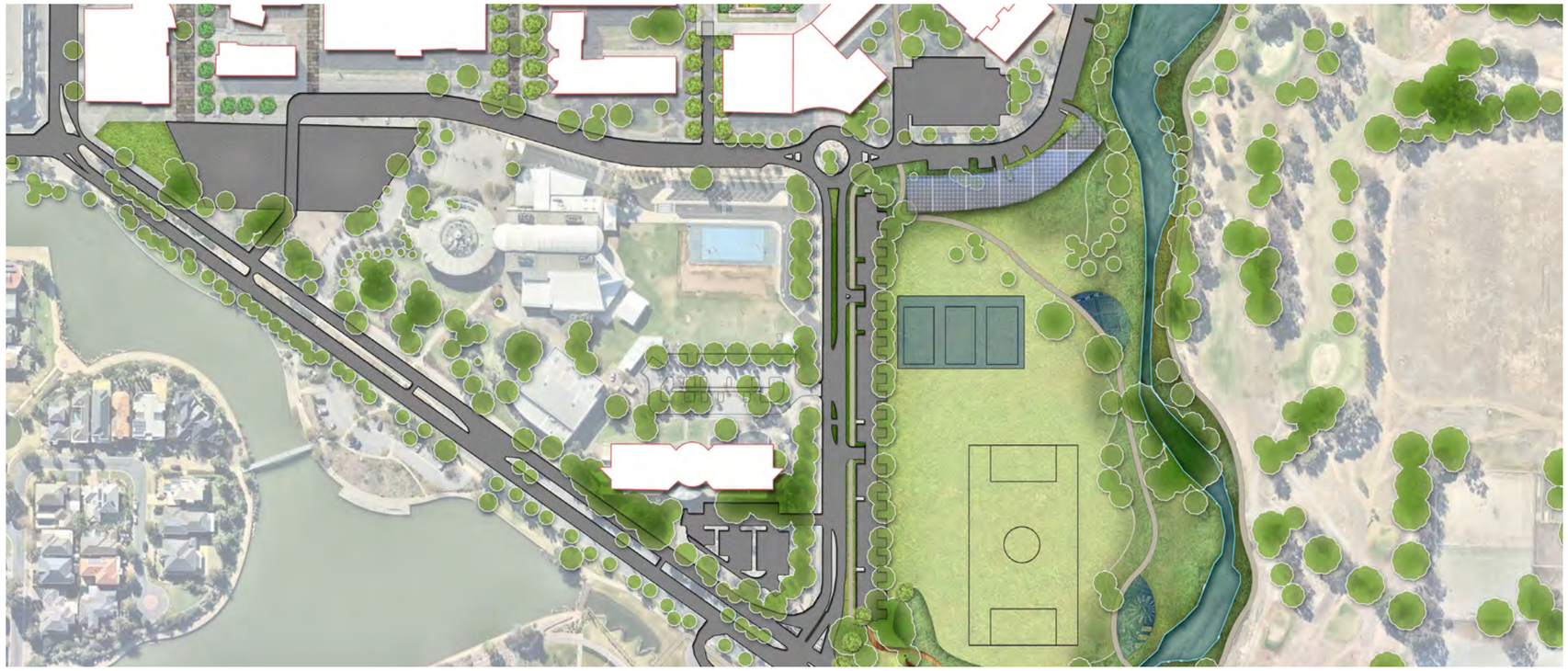
Car Parking

Car Parking objectives:

- Consolidate parking areas to the north of southern main entry precinct
- Explore opportunities for provision of canopies to shade parking areas
- Explore incorporation of photo-voltaic cells into canopies if considered viable as part of the campus sustainability strategy

NORTHERN CARPARK

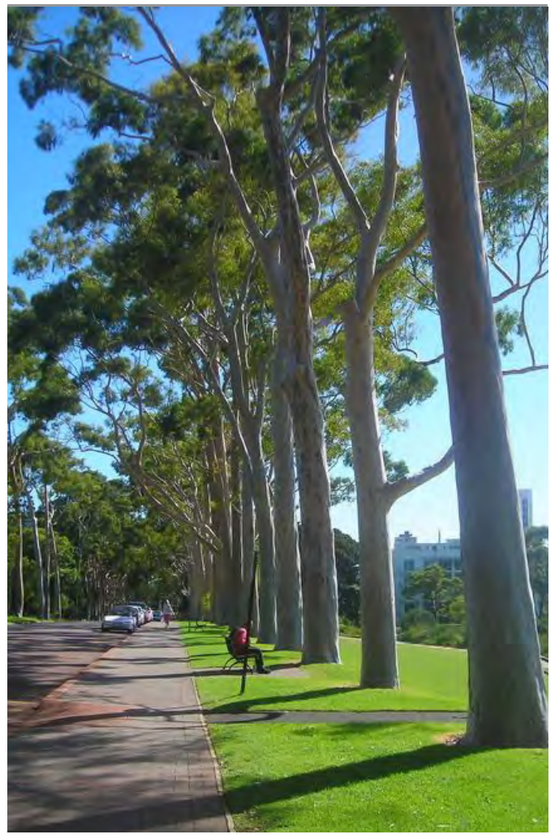
SOUTHERN CARPARKS



Main Entry

The Main Entry could be significantly enhanced to reinforce the identity of the campus and to better facilitate wayfinding for students, staff and visitors. The landscape design needs to have a strong relationship with the adjacent buildings and establish a distinct 'University / Mawson Lakes' character.

The adjacent images highlight examples of more successful campus main entrances.

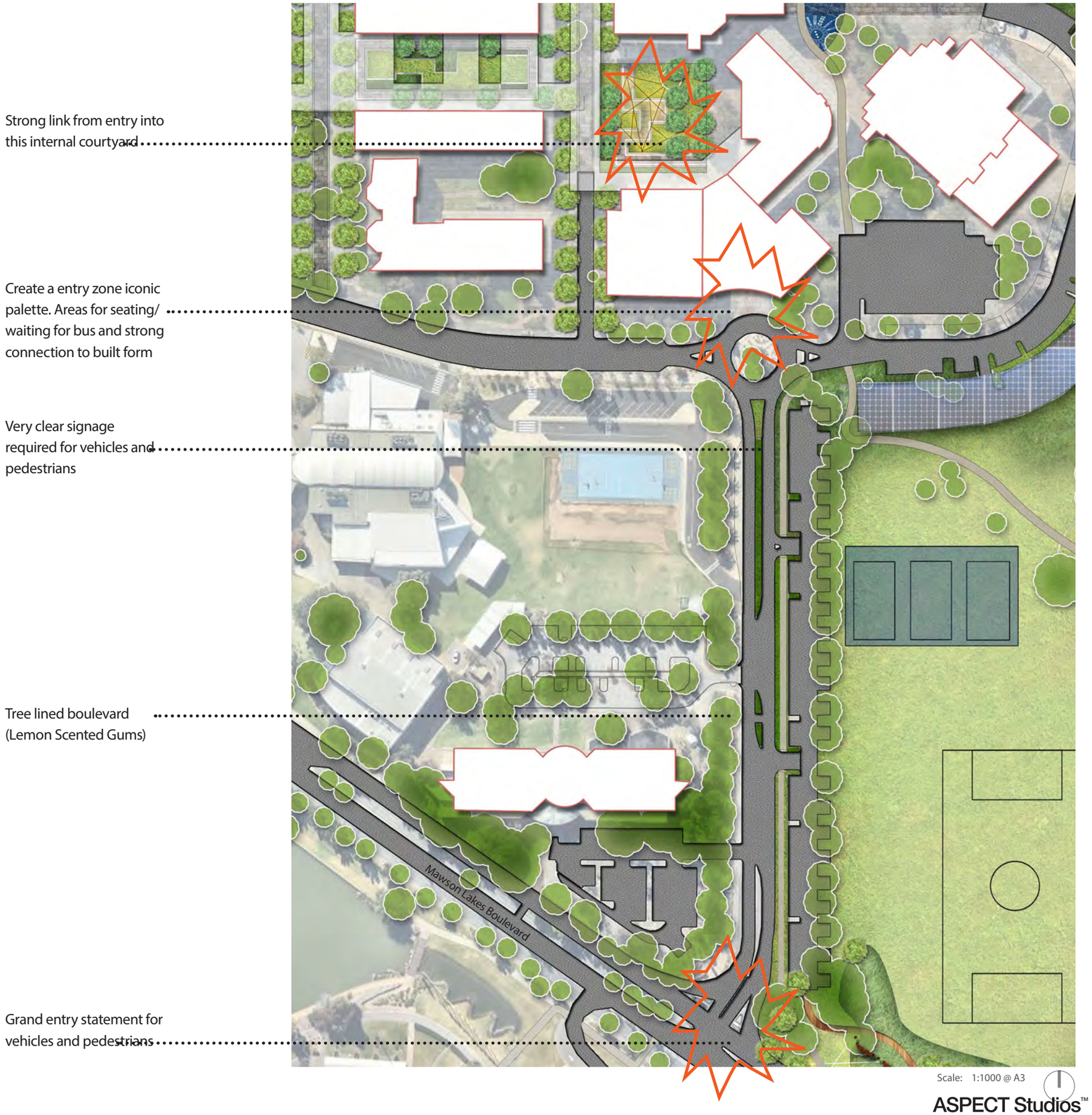


Location Diagram

Main Entry

Main Entry objectives:

- Provide a better access for pedestrians and vehicles
- Establish a distinctive 'University / Maswon Lakes' landscape character
- Be pedestrian, bicycle as well as vehicle focussed
- Adopt a distinctive tree and plant character
- Space trees at regular intervals to create an avenue character
- Use lighting to improve safety at night
- Incorporate a gateway statement at the main entrance from Mawson Lakes Boulevard
- Provide clear signage/wayfinding for vehicles, pedestrians and cyclists



Scale: 1:1000 @ A3

Sports Hub/Fitness Loop

The existing Sports Hub could be enhanced with more multipurpose type landscape green spaces which can facilitate group activity and which encourage students and staff to utilise outdoor spaces more frequently.

These spaces need to be pedestrian focused with a dynamic landscape character.

The adjacent images highlight examples of successful multifunctional spaces that contribute to a more active campus.

There is also an opportunity to improve existing tracks and trails to create a continuous jogging / fitness loop along the eastern parks of the campus.

Location Diagram

Sports Hub/Fitness Loop

The Sports Hub/Fitness Loop objectives:

- Bring group activity and green spaces into the campus
- Promote a healthy and active campus
- Create a 3m loop shared path which is pedestrian/ cycle focused
- Have a strong relationship to the adjacent spaces; including built forms, the Green Walk and Green Heart
- Have its own distinctive tree and plant character
- Use lighting to improve safety at night

Integrate multifunctional activity space into the main courtyard

Promote the fitness loop and connection up into campus

Enhance the existing sportsfields to include seating areas

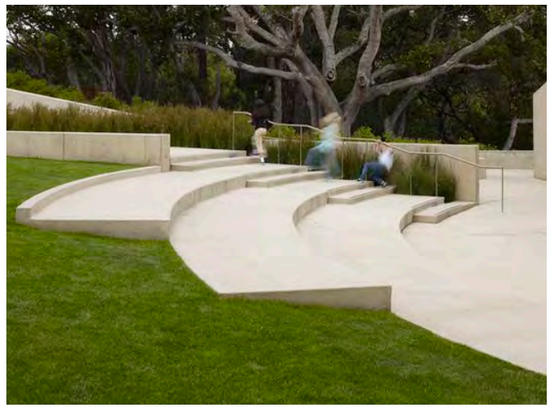
Scale: 1:1000 @ A3

Green Heart

The Green Heart shall extend the broader natural landscape setting into the heart of the campus and create a significant new multi- purpose green space that attracts student activity and opportunities for gathering.

The adjacent images provide aspirational examples of how the Green heart could transform the centre of the campus.

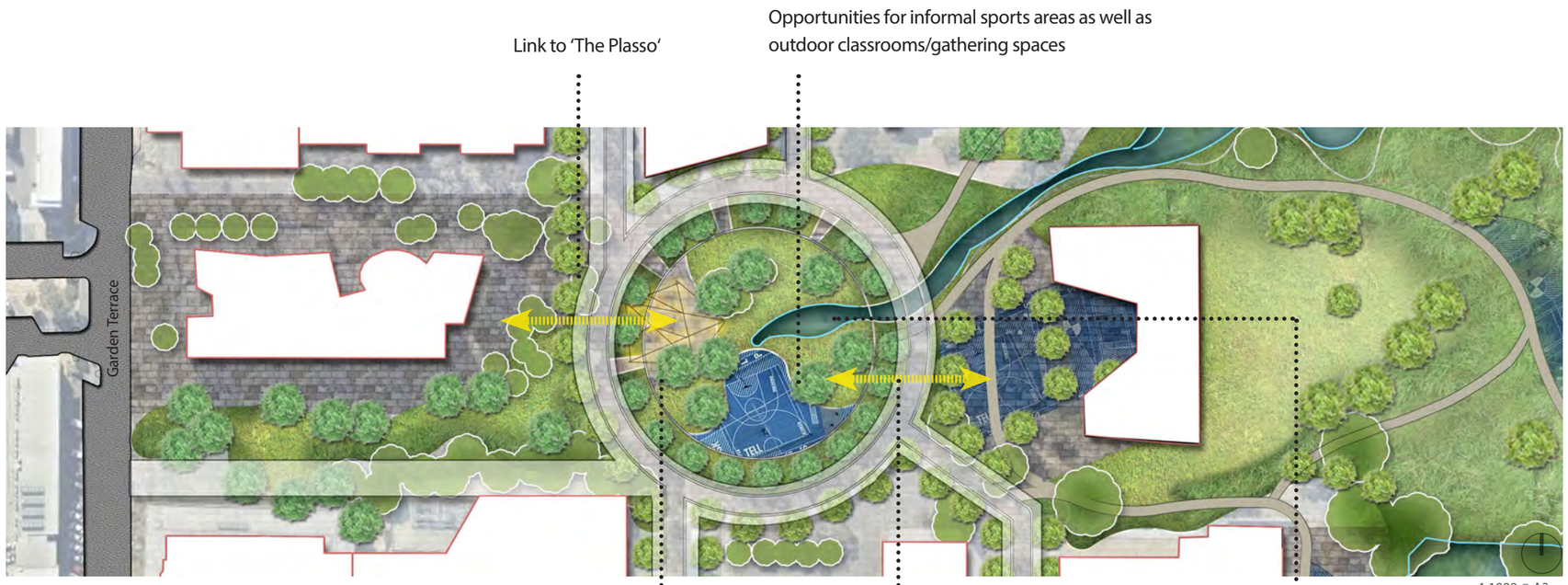
Location Diagram



Green Heart

The Green Heart objectives:

- Design a central green space where students/staff can gather in groups or individually
- Create a landscape character that incorporates the work 'studied' at the University, ie; geology/science and environmental studies
- Bring water into the space in a sustainable way
- Play with the elevation of the site to create an amphitheatre setting for the adjacent sports field
- Provide a generosity of movement space
- Be pedestrian/student focused
- Showcase WSUD principles

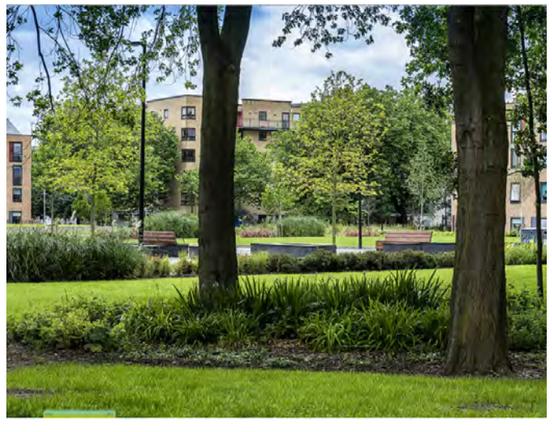


1:1000 @ A3

The Green Link

The Green Link or Environmental Walk running east-west through the heart of the campus has the potential to create a strong link between the green corridor to the east of the campus, through the campus and Mawson Centre, to the dry creek corridor.

The adjacent images provide examples of how the Green Link could appear.



Location Diagram

The Green Link

The Green Link objectives:

- Bring water into the space in a sustainable way
- Provide a clear of legible pedestrian and bike connections east/west through the site
- Be pedestrian/student focused
- Showcase WSUD principles
- Have its own distinctive tree and plant character
- Use lighting to improve safety at night
- Have a gateway at the main entrance from Garden Terrace

Strong link/sense of arrival at Garden Terrace

A ‘green space’ for students to gather

Extend the water body and ‘natural vegetation’ right into the Green Heart

Gateways

At the northern and southern entrances to the campus, generous parcels of undeveloped land prorite an opportunity to create signature interventions heart speark to the hitech focus of the campus, providing a dynamic new gateway experiance for the campus

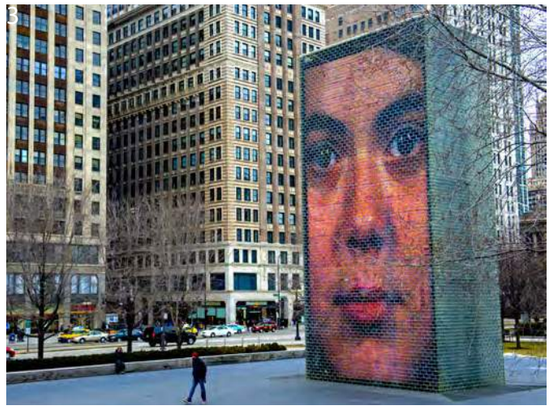
1. A,A, M.D. Anderson Library , Jim Sanborn
2. Lighted tribute, US, WA3
3. Video Walls, Chicago's Millennium Park, The Barnycz Group
4. Ray, amigo & amigo, S1T2 and Wildwon
5. New Interactive illuminated sculpture, PALO ALTO, Joe O'Connell and Blessing Hancock
6. City Gateway Illuminated Sculptures, Wolverhampton, Julia Rowley
7. LED light towers, Milan, Daniel Libeskind and Immersive's

Location Diagram

1

2

3



4

5

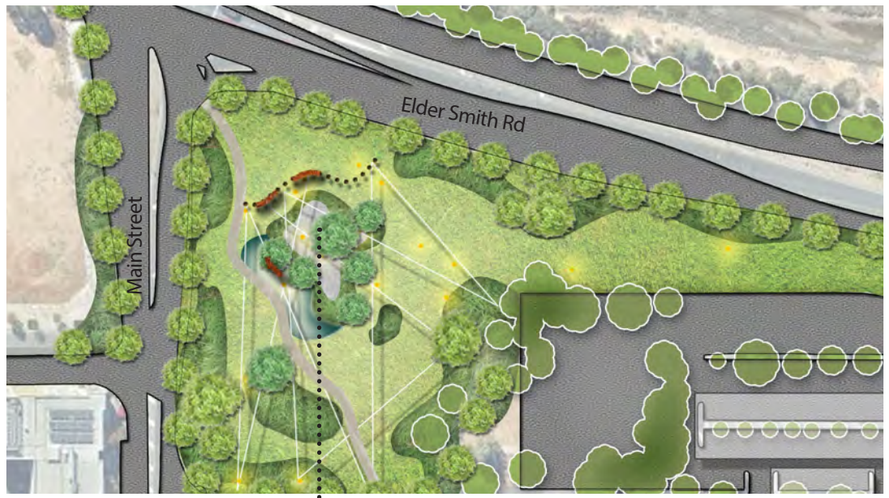
6

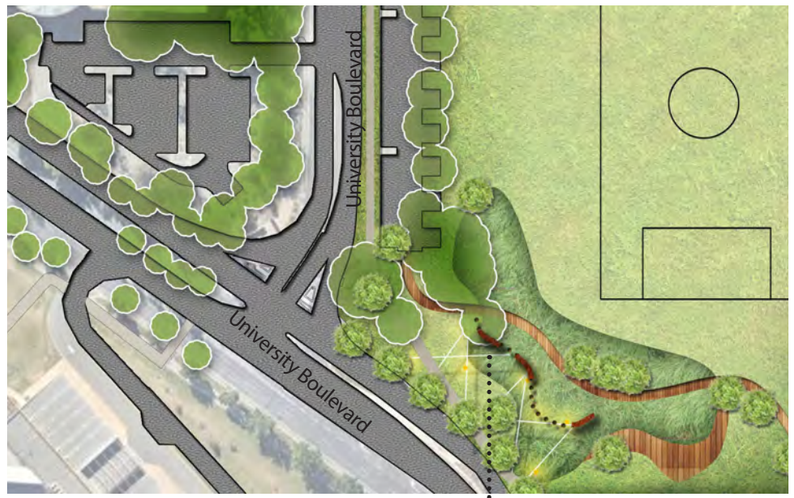
7

Gateways

The Gateway objectives:

- Strengthen the presence and Identity of the Uni SA Mawson Lakes campus as a progressive technology focused learning hub
- Integrate art, science and landscape into a unifying of site specific urban intervention
- Provide generous and legible pedestrian and bike connections through the space



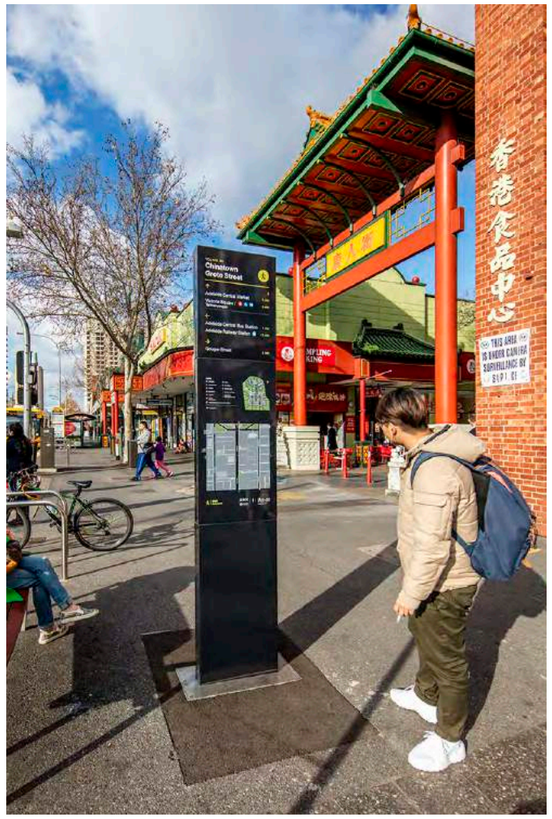


Signature Uni SA Mawson Lakes gateway landscape and art with hitech themes.

Signage and Wayfinding

Signage and wayfinding objectives:

- Improve wayfinding for drivers and encourages drivers to use carparks adjacent to the primary vehicle entry points
- Rationalise vehicle directional signage by consolidating and developing a coordinated suite of signs that complement existing wayfinding signage and addresses campus' requirements and needs
- Improve connectivity between the campus' carparks, public transport, active transport and main destinations by proving consolidated information nodes at key vehicular, cyclist and pedestrian arrival points
- Create a consistent approach to pedestrian wayfinding within the campus, predicated on key circulation routes and future infrastructure provisions like covered walkways
- Develop a hierarchy of signs for use across the campus that improves campus legibility and journey planning for users – include campus maps, key routes, key facilities and destinations, services and building identification
- Provide a digital component to wayfinding – consider the provision of touch displays, interactive digital wayfinding kiosks or campus app for mobile devices



SERVICES STRATEGY & INFRASTRUCTURE OPTIONS

MECHANICAL SERVICES

Thermal plant options have been compiled on the basis of the campus being re-configured in accordance with the master plan proposal illustrated on page 47, with future development also taking this philosophy into consideration. Any deviation from this approach would require re-evaluation of the thermal plant solution.

The key issues identified on site and in conjunction with a review of the previous reports prepared by Cundall (February 2010) and System Solutions (June 2013) are summarised as follows:

1. Requirement for staged replacement of the existing chilled water / heating hot water pipework distribution system.
2. Limited redundancy of the thermal plant and electrical infrastructure within the existing Powerhouse (PH) building.
3. Impact of the development of a Research and Industry Hub and associated FII tenancy relocations on the capacity, distribution and energy efficiency of the thermal plant.
4. Plant capacity to accommodate future expansion.
5. Capital cost.
6. Operating cost.
7. Maintainability.

Item 1 is addressed below with a proposal for a 'ring-main' solution. Items 2 to 7 are evaluated by means of a weighted decision analysis.

KEY ISSUE 1:

Existing pipework distribution network

The existing chilled water and heating hot water infrastructure comprises 4 off water-cooled chillers and 3 off gas-fired heating hot water generators located within the powerhouse (PH) building. Chilled and heating hot water is then distributed around the site to various buildings by means of medium grade, Schedule 40 steel pipework within an underground service tunnel network. The figure below depicts the service tunnel layout and associated distribution pipework (shown in red) with buildings served from the PH central plant (shown in orange).

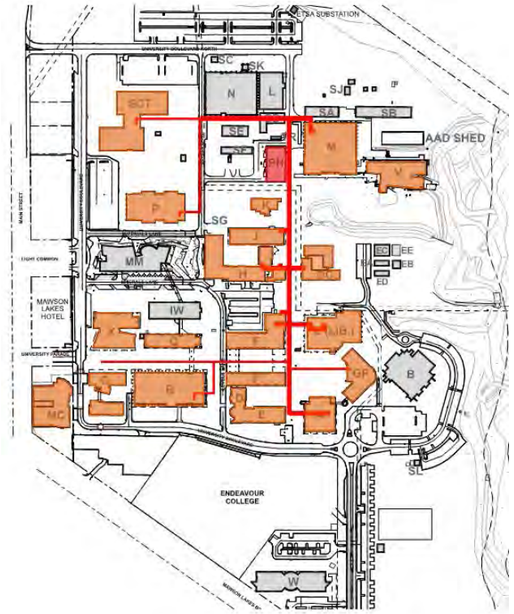


Figure 2: Service tunnel and buildings served from central plant in Building PH

One of the major risks associated with the current configuration is that the existing chilled water and heating hot water pipework (despite being in reasonable condition given its age of approximately 50 years) will eventually require replacement and this is not currently possible without major impact to university operation. This is due to an inability to provide heating and cooling to the buildings affected by works on the pipework within the service tunnels as they are replaced/upgraded over time. There is no available space within the service tunnels to reticulate replacement pipework alongside existing.

Similarly, the current arrangement leaves the university vulnerable to significant downtime if a pipework failure was to occur within the main pipework route. Any building downstream of the point of unforeseen failure or planned repair work necessitating system isolation would be without either cooling or heating depending on the service that failed or is isolated. Should this occur close to the powerhouse, the greater the number of buildings that would be affected for the duration it would take to rectify the failure, and hence severely affect the daily operations of the campus as a result.

Access to pipework installed within the tunnel is restricted due to the geometry of the tunnel and the piping configuration. It is likely that piping in service would have to be isolated and removed in order to gain access to the failed pipe, further increasing the amount of work required to effect repairs.

While the current maintenance and monitoring regimes in place are prudent and diligently monitored to identify any issues and provide the earliest possible warning of piping weaknesses and possible failure points, the potential for unforeseen failure increases with the advancing age of the piping system.

A solution to overcome the above issues is for the extension of the service tunnels to enable a 'ring-main' system to be employed for the chilled water and heating hot water distribution pipework. This would provide the following advantages:

- Provides increased redundancy to overcome pipework failure as buildings can be fed from either direction within the ring-main.
- Provides the ability to replace existing pipework as required in the near future as well as in the long term for any other future pipework replacement and upgrade works. It would be proposed to segment the ring-main with isolation valves in order to control flow within the system for general operation and any works on the system when 'live'.
- Enables connection of additional central plant (powerhouse (PH 2) as discussed later in this report).

Stage 1

Works in Stage 1 would involve the installation of a new service tunnel from P building to R building as shown in blue in the figure below, which would complete the circuit in a 'ring-main' arrangement.

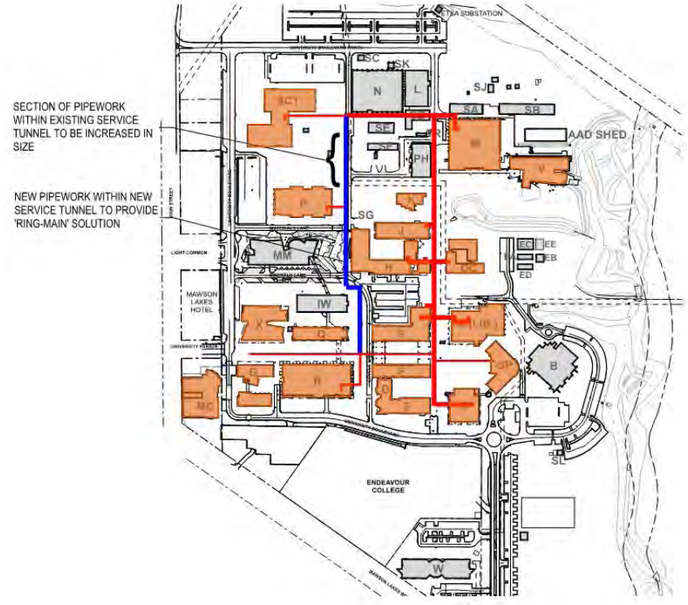


Figure 3: Proposed new service tunnel Stage 1 works to create 'ring-main' network

Mechanical services cost for these works are estimated to be in the order of $935,000 exclusive of GST and excluding excavation and other costs associated with the construction of the service tunnel. A further $850,000 exc. GST is estimated for the replacement of the existing pipework and installation of isolation valves to enable future redundancy.

Also refer Appendix A Concept Estimates for further detail.

Stage 2

Works in Stage 2 would involve the installation of a new powerhouse building and the extension of the ring-main to provide a dedicated network for the research intensive hub proposed for the south west corner of the campus. This is described in further detail later in this report.

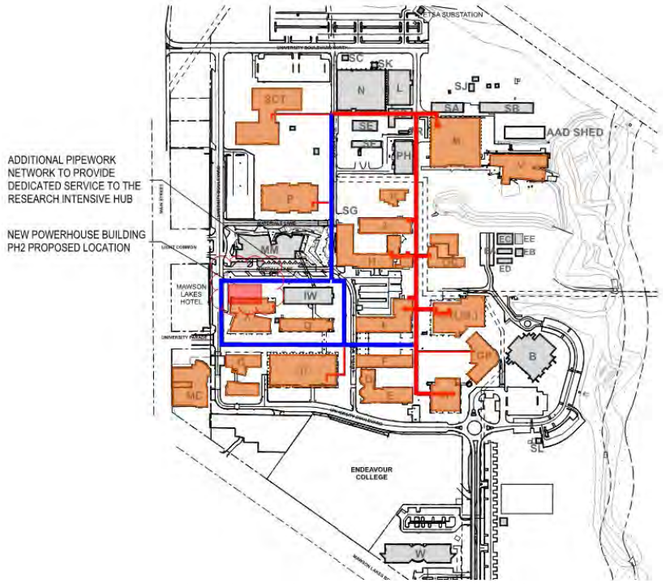


Figure 4: Proposed additional pipework network and powerhouse PH2

Mechanical services cost for the Stage 2 works are estimated to be in the order of $750,000 exclusive of GST and excluding excavation and other costs associated with the construction of the service tunnel.

KEY ISSUES 2 TO 7:

The remaining key issues identified within the previous reports reviewed to date as well as the Mawson Lakes Campus Strategic Master Plan & FII Tenancy Plan Interim Report are grouped together for analysis with the intention for a strategic direction to be provided by means of a weighted decision analysis.

The following thermal plant upgrade options have been considered:

Option 1 - Single Power House

Option 2 - Dual Power Houses

Option 3 - Stand-alone thermal plant

OPTION 1 - SINGLE POWER HOUSE

This approach would involve thermal plant for the site located within a single location in existing building PH. The building would need to be extended and upgraded to accommodate future capacity of the site.

OPTION 2 - DUAL POWER HOUSES

This approach would involve the construction of a second thermal plant building (PH-2) in a remote location to the existing Power House with the potential to connect the chilled water and heating hot water pipework system to the existing network for the purposes of load sharing and redundancy. This option would also provide the opportunity to install thermal plant suited to accommodate the different operating requirements of laboratory and research work including 24/7 operation.

OPTION 3 - STAND-ALONE THERMAL PLANT

This approach would involve the installation of thermal plant as part of the building structure or in a dedicated enclosure adjacent each building. This would further involve new plant being installed for all new buildings constructed as well as the installation of thermal plant to existing buildings over time to enable the decommissioning and removal or upgrade of the centralised plant and associated chilled water and heating hot water pipework within the service tunnels.

Each of the options above have been evaluated in relation to the key issues under consideration. Ratings - between 1 (lowest) and 3 (highest) - are provided for each option under each key issue for the purpose of a decision analysis.

KEY ISSUE 2:

Redundancy

It has been identified that there is significant risk to the university campus due to the consolidation of all of the thermal plant and electrical infrastructure in the one location. In the event of a fire, earthquake or other catastrophic event, all of the twenty buildings connected to the Power House building would run the risk of being left with no heating or cooling.

Option	Advantages / Disadvantages ✓ ×	Key Issue Rating
Option 1 - Single Power House	× Zero redundancy	1
Option 2 - Dual Power Houses	✓ Increased redundancy on a campus-wide basis dependent upon severity and location of damage / plant failure ✓ Potential to serve multiple buildings from one location, resulting in more of the campus remaining 'live' × Potential for entire campus to still be affected dependent upon severity and location of damage / plant failure	2
Option 3 - Stand-alone thermal plant	✓ Maximum redundancy provided on a building-by-building basis × Inability to serve other parts of the campus	3

KEY ISSUE 3:

Research intensive and 24/7 operation

Review of the previous thermal plant options reports and consultation with University user groups has identified the recurring and consistently held view that where disruption to the delivery of thermal energy for process or space conditioning is research critical and could result in substantial time and financial losses, the plant delivering this thermal energy should be located adjacent to the place of research and maintained under the user group's control.

Similarly, the nature of the thermal energy requirements for these research type spaces is such that they require small total heating and cooling loads (in comparison to site wide loads) and generally require 24 hour operation.

The Coefficient of Performance (COP) and Energy Efficiency Ratio (EER) of thermal plant is an indication of the amount of energy required to be input for a certain amount of mechanical/thermal output. Most chillers (thermal plant to produce chilled water for building air conditioning) have an optimal efficiency "sweet spot" from 50-percent to 90-percent loading, where the energy consumption of the plant is actually less than that at full load. This difference in energy consumption at full load compared to 50% part load in some chillers can be nearly double. Other factors also come in to play, such as the energy input to pumping and other equipment such as cooling towers and therefore, optimising chiller operation to match building load is critical in order to keep energy efficiency high and operating costs low.

Energy efficiency has been compared on the basis of theoretical comparisons for the different thermal plant options. This would require further analysis through a desktop energy simulation to further define the actual operating efficiency of the thermal plant. BESTEC has the capability to undertake this analysis utilising Carrier Hourly Analysis Program (HAP) version 4.9 software if required.

It is understood that whilst the predominant requirement for 24/7 operation is driven by the research intensive buildings/spaces, there is still an after-hours load on the thermal plant in the remainder of the network, which is driven by areas such as computer pools. The existing 4 off chillers located in the existing powerhouse building PH are poorly sized to accommodate the small thermal loads of these spaces and currently operate with very poor efficiency. As such, it is recommended to install a smaller 'low-load' chiller within the existing powerhouse to effectively match the current (and future) non research intensive 24/7 operation.

Option	Advantages / Disadvantages ✓ ×	Key Issue Rating
Option 1 - Single Power House	× Poor efficiency-to-load optimisation opportunity × Poor location relevant to research critical loads	1
Option 2 - Dual Power Houses	✓ Increased efficiency-to-load optimisation opportunity ✓ Good location relevant to research critical loads	2
Option 3 - Stand-alone thermal plant	✓ Best efficiency-to-load optimisation opportunity ✓ Good location relevant to research critical loads	3

KEY ISSUE 4:

Future expansion

The existing main chilled water plant located in the Power House (PH) building, consists of 4 water cooled electrically driven chillers of nominal 7,500kW refrigeration capacity in total. Trend log data provided in the Systems Solutions report "SSE2178 Chilled and Heating Water Futures Planning Study" indicates an estimated current peak cooling demand of 5,370kW. Data obtained from the existing BMS controls contractor on 11 July 2016 also indicates a maximum heating demand of approximately 2,800kW.

Proposed future expansion is described above in the interim and long term site wide master plan diagrams and is summarised below (as per advice provided by Phillips/Pilkington Architects):

New building construction in long term plan:

- ENE/NBE infill building: 7,100m²
- Industry Opportunity building: 7,700m²
- X² building: 9,600m²
- New Teaching and Learning building: 5,400m²

Research Intensive areas in short term plan:

- Building IW: 850m²
- Building MM: 1,200m² (current to remain)
- Building Q: 800m²
- Building R: 600m²
- Building V: 600m²
- Building X: 1,200m² (current to remain)

Research Intensive areas in long term plan:

- Building MM: 1,200m² (current to remain)
- Building R: 2,000m²
- Building X: 1,200m² (current to remain)
- Building XX: 1,800m²
- Building V: 600m² (likely leased to industry user)

BESTEC has estimated an anticipated increased demand of approximately 200% at the end of the long term works as outlined in the table below.

Year	Action	Estimated cooling load addition	Estimated heating load addition	Cumulative site wide cooling load	Cumulative site wide heating load
		(kW)	(kW)	(kW)	(kW)
2016	No works (existing demand)	-	-	5,370	2,800
2017	Building R upgrade	50	30	5,420	2,830
2018	Building Q and IW upgrade	120	75	5,540	2,905
2019		-	-	5,540	2,905
2020	ENE/NBE building	1,280	805	6,820	3,710
2021		-	-	6,820	3,710
2022		-	-	6,820	3,710
2023		-	-	6,820	3,710
2024		-	-	6,820	3,710
2025	XX building	1,800	1,135	8,620	4,845
2026		-	-	8,620	4,845
2027		-	-	8,620	4,845
2028		-	-	8,620	4,845
2029		-	-	8,620	4,845
2030	Industry Opp. building	1,390	875	10,010	5,720
2031		-	-	10,010	5,720
2032		-	-	10,010	5,720
2033		-	-	10,010	5,720
2034		-	-	10,010	5,720
2035	Teaching and Learning	980	650	10,990	6,370

The suitability of each option under consideration has been compared and summarised as follows:

Option	Advantages / Disadvantages	Key Issue Rating
Option 1 - Single Power House	× Insufficient physical space to allow future expansion to accommodate predicted capacity	1
Option 2 - Dual Power Houses	✓ Adequate physical space to allow future expansion - additional Power House of similar size to existing	2
Option 3 - Stand-alone thermal plant	✓ Adequate physical space to allow unlimited future expansion	3

KEY ISSUE 5:

Capital cost

Capital cost estimates have been prepared on the basis of thermal plant upgrades to accommodate the reconfiguration and expansion as per the short term and long term site wide plans and predicted future capacity requirements.

Plant and infrastructure upgrades have been provisioned for each option and are presented in Appendix B of this report for reference. This is summarised below:-

Option	Capital Cost	Key Issue Rating
Option 1 - Single Power House	$4,490,000.00	2
Option 2 - Dual Power Houses	$4,250,000.00	3
Option 3 - Stand-alone thermal plant	$6,710,000.00	1

KEY ISSUE 6:

Maintainability

There is significant benefit in consolidating thermal plant in to the one common location, as this provides optimal simplicity in terms of ease of access for maintenance staff. This also restricts the requirement for contractors and other maintenance personnel to need to gain entry to other buildings, which may be beneficial from a privacy and security perspective.

Option	Advantages / Disadvantages	Key Issue Rating
Option 1 - Single Power House	✓ Single maintenance location	3
Option 2 - Dual Power Houses	✓ Minimal multiple maintenance locations	2
Option 3 - Stand-alone thermal plant	× Multiple maintenance locations	1

Summary

The thermal plant options report has been prepared to support the rationale behind the Mawson Lakes Campus Strategic and Tenancy Master Plan. The short term and long term strategic plans for the campus have been considered and three different options for thermal plant development has been evaluated against a number of different key issues.

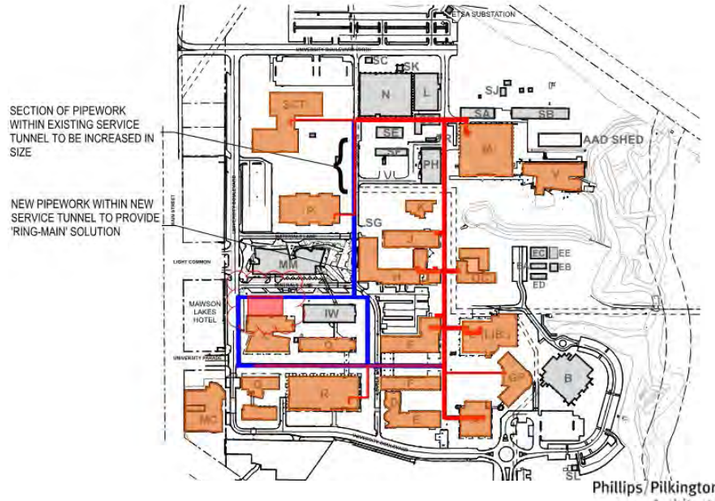
The rating for each option is summarised as follows:

Option	Key Issue Rating
Option 1 - Single Power House	8
Option 2 - Dual Power Houses	11
Option 3 - Stand-alone thermal plant	11

On this basis, the preferred thermal plant direction would be a combination of options 2 and 3. The proposed methodology for this approach would be:

- Construct an additional Power House building (PH-2) to accommodate the heating and cooling needs of the Research and Innovation Hub centred around buildings MM, X, IW, Q and R.
- Remove building V from the existing PH thermal plant and provide stand-alone plant to serve this building.
- Provide stand-alone thermal plant to serve the Industry Opportunity building.
- Provide central thermal plant (served either from PH or PH-2) to serve the ENE/NBE building and the Teaching and Learning building.

The suggested location for the second Power House building is shown below:-



MECHANICAL BUILDING BY BUILDING ANALYSIS

The following outlines the current building services infrastructure including a review of the condition of plant and equipment and the suitability of this infrastructure to support future use. A breakdown of all services within each building is provided in Appendix B of this report.

Building A

Building A contains 2 off Air Handling Units (AHUs), which were installed in 1968. These units would be recommended for replacement within the next 5 years.

There is also a Fan Coil Unit (FCU), which was installed in 2001. This unit is in reasonable condition and would be anticipated to not require replacement for around 10 years.

Building C

Building C contains 6 off AHUs located in the original plantroom, which were installed in 1969. These units would be recommended for replacement within the next 5 years.

There are also 4 off additional AHUs located on the roof and 7 off FCUs located within the ceiling space throughout the building, all of which were installed in 2003. These units are in reasonable condition and would be anticipated to not require replacement for around 10 years.

Building D

Building D contains 2 off AHUs, which were installed in 1974 and 1977 respectively. These units would be recommended for replacement within the next 5 years.

There are 10 off FCUs, all of which were installed in 1977. These units would be recommended for replacement within the next 5 years. An additional 5 off FCUs, which were installed in 1988 would also be recommended for replacement within the next 5 to 10 years.

Building E

Building E contains 4 off AHUs, which were installed in 1974. These units would be recommended for replacement within the next 5 years.

There are 3 off Floor Console units, which were installed in 1974 and which would be recommended for replacement / removal as part of immediate upgrade works.

There are also 13 off FCUs, all of which were installed in 2011. These units are in reasonable condition and would be anticipated to not require replacement for around 15 to 20 years.

Building F

Building F contains 28 off AHUs, which were installed in 1968 and 1970 and which would all be recommended for replacement as part of immediate upgrade works.

There are also 37 off FCUs, which were installed in 1968 and which would be recommended for replacement as part of immediate upgrade works.

There are an additional 4 off ducted type fan coil units serving computer pools, which were installed in 2001. These units are in reasonable condition and would be anticipated to not require replacement for around 10 to 15 years. There are also 6 off ceiling type fan coil units, which were installed in 2007 and which would be anticipated to not require replacement for around 15 years.

Building GB

Building G consists of 8 off AHUs and 15 off FCUs as well as a series of induction units, all installed in 2004. The plant and equipment within Building G would be anticipated to not require replacement for around 15 years.

Building GP

Building GP consists of 10 off AHUs, which were installed in 1994. These units would be recommended for replacement within the next 5 to 10 years.

There is an additional FCU, which was installed in 2006 and which would be anticipated to not require replacement for around 15 years.

Building H

Building H contains 2 off central AHUs, which were installed in 1968 and which would be recommended for replacement as part of immediate upgrade works.

There are also 20 off FCUs, which were installed in 1968 and which would be recommended for replacement as part of immediate upgrade works.

An additional 4 off FCUs, which were installed in 1988 would be recommended for replacement within the next 5 to 10 years.

Building J

Building J contains 1 off central AHU, which was installed in 1967 and which would be recommended for replacement as part of immediate upgrade works.

There are also 20 off FCUs, which were installed in 1967 and which would be recommended for replacement as part of immediate upgrade works.

Building M

Building M contains 1 off central AHU / conditioner, which was installed in 1970 and which would be recommended for replacement as part of immediate upgrade works.

There are also 7 off FCUs, which were installed in 1970 and which would be recommended for replacement as part of immediate upgrade works.

Building MC

Building MC consists of 4 off AHUs, which were installed in 2006. These units would be anticipated to not require replacement for around 15 to 20 years.

There are an additional 14 off FCUs, which was installed in 2006 and which would be anticipated to not require replacement for around 15 years.

Building MM

Building MM consists of 2 off air-cooled chillers, 2 off heating hot water units and associated chilled water and heating hot water circulating pumps, tanks and heat exchangers, installed in 2011. There are 17 off AHU's located at level 4. Building MM was designed and constructed to operate independently of the central thermal plant.

Generally all equipment is in excellent condition, however due to physical space restrictions in the plant and perestitial spaces, the building is currently operating at capacity.

Building OC

Building OC consists of 79 off FCUs, which was installed in 199, which would be recommended for replacement within the next 10 years.

Building P

Building P contains 4 off AHUs, which was installed in 1970 and which would be recommended for replacement as part of immediate upgrade works.

There are also 62 off FCUs, which were installed in 1970 and which would be recommended for replacement as part of immediate upgrade works.

An additional 1 off FCU installed in 1993 would be recommended for replacement within the next 5 to 10 years.

An additional 7 off FCUs installed in 2001 to serve the computer pools would be anticipated to not require replacement for around 10 years.

Building Q

Building Q contains 4 off AHUs, which were installed in 1967 and which would be recommended for replacement as part of immediate upgrade works.

Building R

Building R contains 10 off AHUs, which were installed in 1971 and which would be recommended for replacement as part of immediate upgrade works.

There are also 8 off FCUs, which were installed in 1971 and which would be recommended for replacement as part of immediate upgrade works.

More recently, the 2 off AHUs installed in 2006 would be anticipated to not require replacement for around 15 to 20 years.

Building SCT

Building SCT contains 2 off AHUs, which were installed in 1973 and which would be recommended for replacement as part of immediate upgrade works.

Building V

Building V consists of 17 off AHUs, which were installed in 2011. These units would be anticipated to not require replacement for around 20 to 25 years.

There is an additional 1 off FCU and a series of induction units, which would also be anticipated to not require replacement for around 20 years.

Building X

Building X consists of 22 off AHUs and a series of induction units which were installed in 2008. These units would be anticipated to not require replacement for around 20 to 25 years.

Generally all equipment is in excellent condition, however due to physical space restrictions in the plant rooms and due to the services intensity of the building with respect to reticulation paths, the building is currently operating at capacity.

Mechanical Summary and final recommendations

The final recommendations can be summarised as follows:-

- Extend the existing service tunnel network to incorporate a 'ring-main' layout, in order to provide increased redundancy and to enable staged replacement of the existing chilled and heating hot water pipework within the existing underground service tunnel.
- Provide a second powerhouse (PH2) to deliver thermal energy to the research and critical operations hub. The second powerhouse is proposed to be located in south west section of the campus.
- Provide a new 'low-load' chiller within the existing powerhouse (PH) to accommodate the current and future after hours operation of the non research intensive spaces.
- Upgrade existing Air Handling Units (AHUs) and Fan Coil Units (FCUs) throughout buildings - refer building-by-building analysis for further detailed information.

ELECTRICAL SERVICES

The following overview of the electrical infrastructure options under consideration for the UniSA Mawson Lakes Strategic Master Planis presented to assist UniSA develop appropriate Electrical Services Strategy for the future.

The key issues identified with the existing electrical infrastructure upgrade include:

- Redundancy of the existing single SA Power Networks 11kV feeder.
- Redundancy for the electrical infrastructure i.e. transformers within the existing Powerhouse (PH) building in the event of major failure / catastrophe.

The options under consideration for the electrical infrastructure are detailed below with each being considered in relation to the above key issues, as well as general advantages and disadvantages.

The current arrangement leaves the University vulnerable to significant downtime if the single 11kV feeder should fail. All buildings on the campus would be without electricity excluding the small number that have standby generators. It should be noted the generators are of minimal capacity and generally not capable of supplying whole buildings.

While current maintenance and monitoring regimes in place are prudent and diligently monitored to identify any issues to the University's privately owned infrastructure the potential for unseen failure of the SA Power Networks 11 kV feeder is not, the potential for unforseen failure increases with the advanced aging of the infrastructure.

Description of Proposed Options

Option 1 - New Second SA Power Networks 11kv Feeder

This approach involves the installation of a second SA Power Networks 11kV feeder to the existing substation located off Elder Smith Drive.

Capital cost for the new feeder is estimated to be in order of $1.2M.

The advantages and disadvantages of a new 11kV feeder are as follows:-

Advantages:

- No requirement for additional building.
- Lowest capital cost of all options considered.
- Redundancy of supply from SA Power Networks.

Disadvantages:

- High risk associated with equipment failures causing significant site disruptions. A major event within the existing Power House (such as a fire) would result in many buildings within the Mawson Lakes campus being without electricity.
- High carbon emissions.

Option 2 - Dual Power House

This approach involves the construction of a second Power House building (PH-2) in a remote location to the existing Power House with the potential to connect the electrical infrastructure to the existing network for the purposes of load sharing and redundancy.

Capital cost for new Power House building is estimated to be in the order of $5M.

The advantages and disadvantages of a dual power house are as follows:-

Advantages:

- Increased redundancy with equipment failures causing minimal site disruptions.
- Provides the campus with a significant level of ongoing flexibility.
- Allows the equipment within the existing Power House to be progressively unloaded (in terms of electrical capacity), which will prolong plant life and enable replacement of existing infrastructure as required.

Disadvantages:

- Requirement for additional building and infrastructure.

Option 3 - Solar Power

This approach involves the installation of a large solar power system, located on or in close proximity to the campus to supply the campus with electricity.

D Squared Consulting have prepared a detailed feasibility report for the University which we believe is currently under review.

Capital cost for the solar power system is estimated to be in the order of $20M.

This approach enables load sharing and redundancy of the existing electrical infrastructure.

The advantages and disadvantages of a solar power system are as follows:-

Advantages:

- Redundancy of electrical infrastructure.
- Provides the campus with a significant level of electrical capacity and reduces the reliance on SA Power Networks.
- Carbon neutral approach.
- Ability to supply electricity back to the grid in times of low electricity consumption.

Disadvantages:

- Highest capital cost of all options considered.
- Additional space required to accommodate the solar power system.

Electrical recommendation

Given the above and subject to the University's desire to be a carbon neutral campus, it is recommended that option 1 and 3 be implemented. This approach involves the installation of a second SA Power Networks 11kV feeder to the existing substation and the installation of a large solar power system. These options provide a good balance between capital cost, redundancy and energy efficiency.

BESTEC recommend Option 1 be considered for more immediate investigation.

Further Investigation

In determining the optimal location for the solar power system, consideration should be given to the following:

- Availability of land.
- Location to existing services and infrastructure.

BESTEC advise that the above information is provided for preliminary planning purposes only and will require further input and discussion with the other key stakeholders.

HYDRAULIC SERVICES

The following overview of the Hydraulic infrastructure options under consideration for the UniSA Mawson Lakes Strategic Master Plan to assist UniSA develop appropriate Hydraulic Services Strategy for the future.

Sewer Drainage Infrastructure

The Key issues identified with the existing sewer infrastructure include:

- Existing sewer drainage pipework is in parts, vitrified clay in material and as such in excess of 30 years old. Risk of damage due to pipe collapse or root intrusion is significant.
- Existing sewer drainage pipework located beneath new proposed developments requiring the re-direction or replacement of pipework sections.

Mains Water Infrastructure

Key advantages of the existing mains water infrastructure include:

- 2 off mains water connections to the existing SA Water corporation infrastructure and a designated private mains water ring main allows for redundancy within the mains water system in the event of a planned or unplanned disruption to the authority supply.

Recycled Water Infrastructure

Recycled water sourced from the Bolivar waste water treatment plant and stormwater harvested at Salisbury is delivered to the site via SA Water Corporation metered connection from the main located within Mawson Lakes Boulevard.

Recycled water is used throughout the site for irrigating and toilet flushing purposes.

Option 1 - Addition Recycled Water Infrastructure to Future Developments

Involves the extension and augmentation of the existing recycled water network to enable connection to existing buildings. Presently not served by recycled water and to serve new buildings developed as part of the Strategic Masterplan.

Capital cost for the recycled water system is estimated to be in the order of $200,000.

Advantages:

- Reduce impact on potable supply.

Disadvantages:

- High capital cost.
- Requirement for additional infrastructure works.
- Potential risk and additional re-current maintenance costs associated with preventing backflow and cross connection.

Natural Gas Infrastructure

Natural gas is supplied from the street mains located in Main Street via a metered connection to the North West corner of the campus. Natural gas is primarily used for Mechanical Services heating, domestic hot water heating, specialised laboratory functions and commercial cooking purposes.

The key issues identified with the existing natural gas infrastructure include:

- The site wide natural gas network is supplied from a single entry point to the site from the authority main.

Option 1 - New Natural Gas Meter

This approach involves the installation of a second APA Group owned natural gas meter which is supplied from a different external authority main to the existing meter, thus providing supply redundancy. Whilst it is not permissible to interconnect gas mains from differing supply networks it is possible to provide dual feeds to the site.

Capital cost for the new natural gas meter and associated pipework is estimated to be in the order of $250,000.

The advantages and disadvantages of a new natural gas meter are as follows:-

Advantages:

- Assisting in sharing the gas load between buildings and providing redundancy to sections of the campus in the event of supply interruptions.
- Provides additional flexibility in regards to future development and expansion of the campus.

Disadvantages:

- High capital cost.
- Requirement for additional infrastructure works.
- Requirement to manage additional billing from natural gas retailer.

FIRE SERVICES

The overall fire mains system complies with current code and SAMFS requirements and is considered to be in good working condition and is adaptable to potential future use. No upgrades to this system are necessary or proposed.

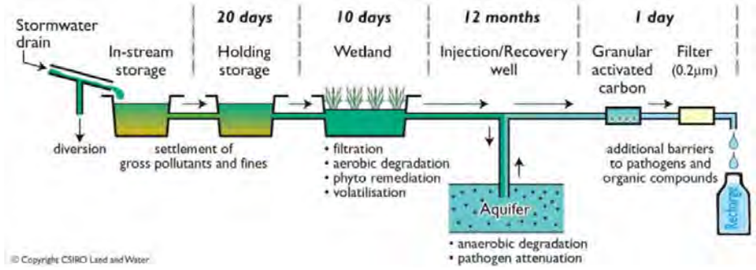
CIVIL STRATEGY

There is currently an extensive network of underground stormwater drains within the Mawson Lakes Campus. These drains collect stormwater runoff from building, paved areas, car parking spaces, internal roads and landscaping areas. Any modifications to the existing built form will need to allow for this existing network. The continued use of the existing network should be encouraged to minimise the financial impact of constructed considerable lengths of new drainage pipes.

Where modifications to local areas result in an increase in the extent of impermeable area (ie the removal of "soft" landscaping and it's replacement with hard surfaces / buildings), there is potential for the existing stormwater network to be unable to cater for the increased flow rates. In order to limit the extent of stormwater drainage upgrades, it is likely that localised stormwater detention storage will be required to limit the peak flow rates to the pre-development (current) rates. This storage could take the form of aboveground rainwater tanks (especially where new buildings are proposed) or underground storages (for new paved / sealed areas).

Where modifications to local areas result in a decrease in the extent of impermeable area (ie the increase in soft landscaping), no upgrades to the existing stormwater networks is envisaged.

The utilisation of water sensitive urban design (WSUD) elements should be strongly encouraged with the potential for rain gardens and bio-filtration swales in paved areas to be considered.



Parafield Airport ASTR – Potable Water supply schematic

Parafield Airport ASTR Example

ESD STRATEGY

D Squared Consulting were engaged on behalf of the University to provide a high level review of the opportunities for a carbon neutral campus and off-grid water campus at Mawson Lakes. Below is the summary by D Squared on opportunities for consideration:

Carbon Neutral Campus

- The Master Plan considers the consolidation of Schools into more defined locations, and the demolition and removal of a number of buildings. The installation of solar PV panels to building roofs should therefore be planned cognisant of the anticipated life of the building.
- The Master Plan considers the effective useful maintenance life of the existing building engineering services systems, and in some cases the short term replacement of the systems is recommended which also triggers a roof replacement. The installation of solar PV panels to building roofs should therefore be planned cognisant of the anticipated life of the roofing material, and consideration given to the coordinated integration of PV systems into the roofing at the time of replacement.
- The Master Plan considers the re-organisation and consolidation of car parking. The installation of solar PV panels as Car Park shading devices should therefore be co-ordinated with this consolidation.
- The Master Plan considers the creation of a new covered student hub space, walkways and potentially a new boulevard to connect to the Mawson Lakes retail centre. This new space creates new opportunities for roof integrated solar systems.
- The introduction of solar PV into the Campus environment should be considered in the context of the overall Master Plan, and planned and designed in to the master plan to avoid simply the basic "adding on" of solar panels to building roofs in a manner which might otherwise appear ad-hoc.
- With land available in the Parafield Airport precinct, and the development of large scale infrastructure options associated with the adjacent proposed Northern Adelaide Food Park currently under way, there is general recognition that the Master Plan (and specifically planning related to energy supply) should consider opportunities outside of the boundary of the Campus itself.

D2 conclude that it is practically and financially viable for UniSA to incorporate technologies which provide a carbon neutral outcome for the Mawson Lakes Campus energy supply, through a combination of renewable and embedded technologies and grid export offsets.

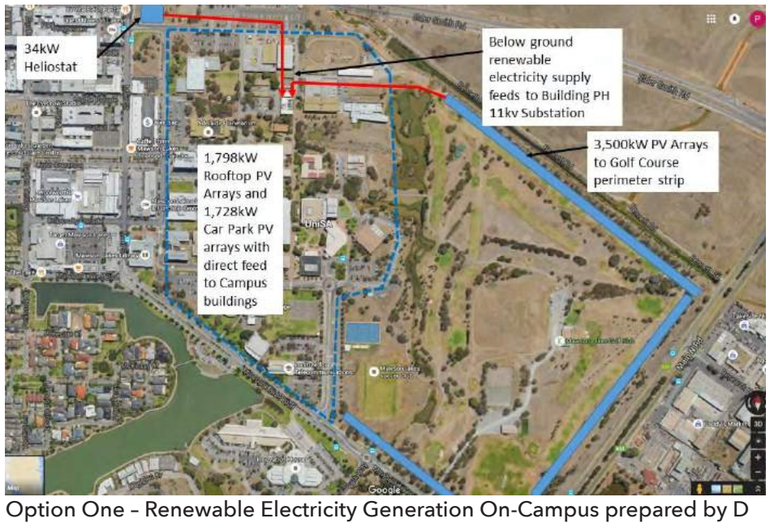
In all cases, a connection to the SA Power Networks grid should be maintained to provide an emergency back-up power supply in the event of a technology failure. SA Power Networks approval will be required as all options require the installation of significant embedded electricity generation systems with significant grid export capabilities.

D2 recommend that before making any financial commitments a detailed feasibility study is commissioned.

Off-grid Water

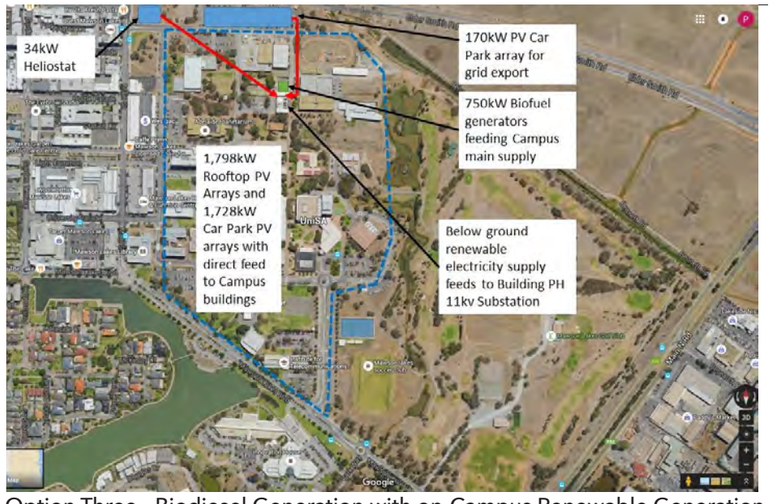
- The Master Plan considers the expansion and re-development of the existing stormwater catchment area. This should be considered further if it is to be used as part of an ASTR scheme.
- The Master Plan content describing the water supply services to the Campus should be reviewed to include more detail on the current water supply provisions and to include all current water supplies connected (e.g. the City of Salisbury recycled water supply to the Golf Course).
- The Master Plan should consider the implications of including rainwater storage and re-use to the existing buildings, particularly those undergoing re-development and roof replacements, and also whether the capture and re-use of rainwater should be integrated into any new buildings in the future.
- The Master Plan should consider the capture and re-use of stormwater, and whether this is to be included in any form (either as direct storage, retention or detention, or as part of an ASTR scheme).
- Given the proximity of similar water management infrastructure already in place, and the fact that very similar discussions and reviews are currently under way for the proposed adjacent Northern Adelaide Food Park, The University should consider opportunities outside of the boundary of the Campus itself

D2 concluded that it is technically possible for the Mawson Lakes Campus to be self-sufficient for water.



Option One – Renewable Electricity Generation On-Campus prepared by D Squared

Option Two – Renewable Electricity Generation with Solar Farm prepared by D Squared



Option Three - Biodiesel Generation with on-Campus Renewable Generation prepared by D Squared

TRAFFIC STRATEGY

There are 3 scenarios where additional parking would be required:

1. If there is a significant increase in student enrolment at the University
2. If there are new buildings and other land uses proposed within the University site
3. If the Master Plan removes some car parking areas for other purposes

We have been advised that student enrolment is not likely to be increased, therefore this scenario (1) would be unlikely to occur.

Currently, the Master Plan envisages refurbishment and upgrade works to many of the current buildings on the site. These types of works are not likely to increase parking demands for the University. However, if new buildings and new land uses are proposed (for example additional office buildings), additional parking would need to be provided to accommodate the new parking demands in accordance with the Council's Development Plan requirements. In scenario (2), the additional floor areas proposed would need to be supported by additional parking at a rate of say 3 to 4 spaces per 100m2 floor area, if offices are proposed.

In scenario (3), we have given consideration to the potential removal of some car parks to achieve other outcomes relating to landscaping, new pedestrian and cyclist paths, planning considerations etc as part of the Master Plan.

In the absence of advice of any new buildings that may be proposed, we have focussed our parking analysis on scenario (3).

One of the concepts identified for the overall area is the enhancement of green space, pedestrian and cyclist linkages and shown on the master plan proposal.

For the purpose of the assessment, we have assessed the implications of the master plan proposal on parking.

Assuming that following car parks are lost: ML4, ML5, ML13 and ML14; the parking loss would be approximately 160 spaces.

We have identified a number of areas where additional parking could be gained to replace the parking loss or and to provide for additional parking that could be used to support future developments (see Section 6.0).

PARKING RATES FOR ASSESSING FUTURE DEVELOPMENTS

- The Salisbury Council's Development Plan does not have a specific parking rate for a Tertiary Education land use. In the absence of this parking data, it is not uncommon to reference other parking standards.
- The Parking Spaces for Urban Places: Car Parking Study Guidelines for Greater Adelaide has a parking rate of 0.8 space per student (maximum number of students at any one time on the site) with a possible maximum 60% discount for proximity to public transport and bicycle facilities and public parking etc. Assuming say a 50% discount, the equivalent rate would be 0.4 per student.
- Note: the above estimates do not include the "non-tertiary" land uses on the site, eg offices associated with external businesses that are located within the campus. The parking requirements of these land uses would need to be added to the requirement.
- The Planning Bulletin – Parking provisions for selected land uses (Suburban metropolitan Adelaide) refers to a parking rate of 0.6 space per full time student and 0.2 space per part-time student. If the mix of students is equally split, the equivalent overall parking rate would be 0.4 space per student, which would be similar to (2) above. If not equally split, there is still the argument that some discounting to the parking requirement should be considered, particularly proximity to the Mawson Lakes transport interchange.

Principle of Development Control 28 in the Urban Core Zone (relevant to the Mawson Lakes Campus of the University of SA) identifies off-street parking rates as follows:

All other non-residential development	***Minimum number of parking spaces*** *3 per 100 square metres of gross leasable floor area at ground floor level plus 1.5 additional parking spaces for every 100 square metres of gross leasable floor area above ground floor level*

- The parking rate for office developments, based on Principle of Development Control 28 in the Urban Core Zone, is 3 per 100 square metres of gross leasable floor area at ground floor level plus 1.5 additional parking spaces for every 100 square metres of gross leasable floor area above ground floor level. Generally, the rate of 3 per 100 square metres of gross leasable floor area would be applicable to all floor levels and not the discounted rate of 1.5 above ground level specified for the Urban Core Zone. Future multi-level office developments within the Mawson Lakes Campus would therefore have a lower parking requirement than if the development were to be located in other zones.

OPPORTUNITIES TO INCREASE CAR PARKING

OPTION 1: ML8 car park expansion opportunities

Vacant land to the north and west of ML8 are already being used by students. The parking surface conditions are quite poor. Sealing of the car park would be beneficial for users. Additional spaces can be gained if extended beyond the current utilised area to the west. An additional say 200 parking spaces could be gained. (NET GAIN SAY 200 SPACES)

Vacant land to the east of ML8 – potentially 30-40 additional spaces (NET GAIN SAY 40 SPACES)

University Boulevard North – Currently parallel parking is permitted on both sides. The northern side could be converted to right angled parking being a private car park roadway. The road width of 12.5m would allow right angled spaces to be provided on the north side and 7.0m of roadway for two-way traffic flow. The current parallel parking capacity is 26 spaces. The conversion would result in approximately 70 spaces. The gain of approximately 44 spaces could be achieved without requiring kerb alterations or major works. It is assumed that the northern roadway is a private road and not a Council road (for a public road the right angled arrangement would not be possible as the spatial requirements are greater than for a private road or private car park) (NET GAIN SAY 40 SPACES)

OPTION 2: South of ML3 car park expansion opportunity

Vacant land to the south of ML3 – potentially 160 additional spaces (NET GAIN SAY 160 SPACES)

Better utilisation of surplus reserved spaces

As indicated earlier, the reserved parking areas are very inefficiently used at the present time with up to say 250 surplus parking spaces available. If the number of reserved spaces were to be reduced, there would be up to 200 additional surplus parking spaces that could be added to the overall parking availability.

Overall, the potential net gain in the new parking areas would be 280 spaces (northern areas) and 160 spaces (southern area), ie total of 440 spaces. Another 200 spaces could be made available through removal of the surplus reserved spaces, giving a total potential gain of 640 spaces.

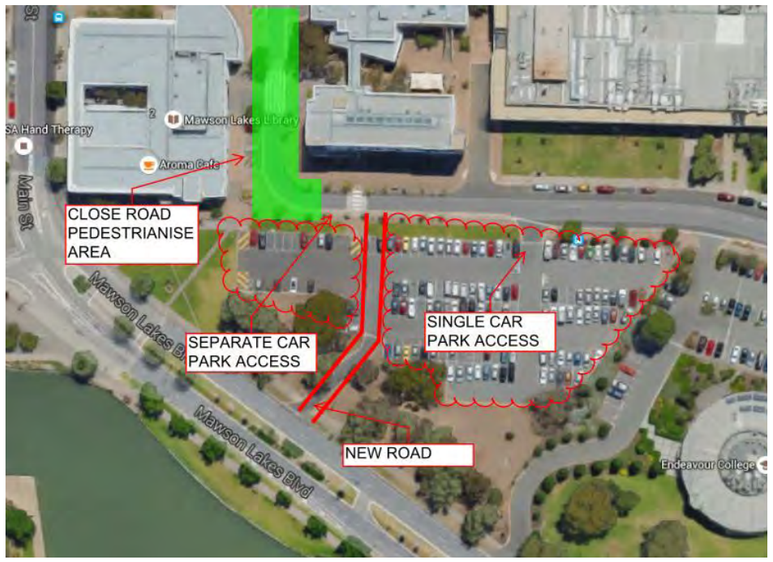
This would more than compensate for the potential loss of 160 spaces from the Master Plan outcomes and the remaining surplus could be used to support future developments on the University site.

- **POTENTIAL GAIN FROM NEW AREAS: 440 SPACES**
- **POTENTIAL GAIN FROM RESERVED CAR PARKS: SAY 200 SPACES**
- **POTENTIAL LOSS FROM MASTER PLAN OUTCOMES: 160 SPACES**

ROAD CLOSURE OF ENDEAVOUR STREET WESTERN END

Assuming that the Endeavour Street is a private road, the Master Plan envisages that the "bend" at the western end is closed and pedestrianised. A separate traffic impact assessment would need to be undertaken to show how much traffic displacement would occur. However, a new road can be connected using the current car park aisleway to Mawson Lakes Boulevard with left in left movements only, to minimise this traffic impact issue. A right turn lane in Mawson Lakes Boulevard nearby would allow a driver to u-turn back to the town centre (see attached diagram).

ML 16 would be split into two separate car parks. The eastern car park would use the current single access point. A new access point should be provided to the western car park between the road closure and the new roadway.



SERVICE VEHICLE REQUIREMENTS

Our parking surveys showed two areas where service vehicles were observed to be regularly parked: northern end of Levels Lane adjacent to Building N; and within the bus bay and bus compound south of Building N. We observed up to 4 vehicles parking on Levels Lane north near the workshop building (N) entrance.

The above two areas are serviced from University Boulevard North and via Main Street to the adjacent main roads. The Master Plan concept would maintain this main service route by modifying the access to Building N and using the laneway to the east in lieu of Levels Lane.

While a number of internal roadways would also be removed to enhance the pedestrian linkages around the campus, the Master Plan envisages that shared paved pedestrian zones would be provided that could be used by service vehicles to access the loading docks of various buildings around the campus. This would ensure that servicing of the buildings around the campus and other facilities together with ambulant access is maintained.

For example, the infrequent service vehicles would be able to circulate around Building MM from University Boulevard as shown in the Master Plan Concept.

In summary, the Master Plan proposals would ensure that servicing impacts around the campus would be minimised and that adequate and convenient access would continue to be provided for servicing of the buildings around the campus.

TRAFFIC IMPACT

At this stage, there are no new developments that would cause a significant change to the existing traffic patterns or traffic generation, based on the advice that student enrolment is not likely to increase in future and the building works are likely to involve refurbishment and upgrade of existing buildings.

Where car parking areas may be affected by the Master Plan proposals, the potential parking expansion opportunity would generally replace the parking area that is lost around the same general area. Therefore, current access to these parking areas should be relatively unchanged and traffic patterns would therefore not likely to be significantly different to the existing situation.

The bus terminus area is not proposed to be changed, as it provides an important and convenient mode of transport for students, staff and visitors. There appears to be a bus route which uses Endeavour Street, University Boulevard, University Parade and Main Street which would be affected by the proposed closure discussed in the road closure of Endeavor Street Western End. Further assessment work would be required to consider options for re-routing of the bus service.

Proposed main car parking zones

Proposed serviced vehicle access for loading docks/shared pedestrian zone

5. ACCOMMODATION STRATEGY SITE WIDE

ACCOMMODATION SCHEDULE PROPOSALS

The accommodation strategy site wide prioritises **consolidation** of all tenancies across the campus, aims to foster the connection between research, industry and teaching whilst considering a **dynamic** on campus experience for the students.

The site wide accommodation strategy works toward the long term vision for the campus as illustrated on the Master Plan proposal on page 47.

Throughout the consultation process, it became evident that many groups are spread across various buildings leading to duplication in space allowances for teaching, research and office together with inefficiencies in building performance and equipment.

The current buildings do not generally support contemporary visions of an **integrated research and teaching campus**. These feature high visibility, highly activated teaching and interaction spaces at ground level. These ground plane facilities should cross discipline boundaries and involve diverse student demographics wherever possible. More specialised teaching spaces (permanent set-ups) can be at higher levels but still with high visibility across and between activated atrium and other interaction spaces. They also begin to integrate with research spaces that invite student and **public visibility** and **engagement**. Together with visible research and teaching practices, the office spaces should be designed to be adjacent these zones with HDR students included in this space.

Any new workspace projects across the University need to consider the UniSA Space Management & Planning Guidelines which stipulate the direction of open plan office work environments as directed by the Vice Chancellor. Many of the existing office arrangements on the Mawson Lakes Campus do not meet the size requirements listed in these guidelines and internal fitout modifications will be required to achieve this.

This accommodation schedule proposes to consolidate student dedicated spaces around the GP courtyard (**Student Hub**) to increase vibrancy, cross collaboration and enhance the student experience. The types of spaces proposed are flexible teaching spaces available to all groups across the campus to the ground floor of Building F which is directly connected to the Industry Connections Hub. Building C student spaces are developed in line with the Library Master Plan, Building A is to house the Student Lounge, food and beverages together with Building GP having a range of flexible teaching, student project rooms, social and individual learning type spaces. Active student spaces are programmed to the lower floors of buildings to activate the ground plane and make visible the exciting learning opportunities. All administration services are proposed for upper levels in this precinct or within the fringes of the campus. Specialist teaching spaces dedicated to individual schools will be located back in the Schools 'headquarter' building and where possible, adjacent and visible to teaching staff and research groups.

The School of Information Technology Mathematical Sciences is consolidated on the upper floor of Building F and the entirety of Building D in the heart of the campus which are both major refurbishment projects. The upper floor of Building F will house a mix of open plan office, research dedicated spaces, ITMS dedicated teaching spaces, being closely aligned with the Industry Connections Hub directly below. Building D will mainly house offices for researchers and academics. There is the potential in the future to construct cantilevered structures over the Industry Connections Hub from the central void that house project room pods and new entry front door into ITMS from the Industry Connections Hub.

The accommodation plan proposes the School of Engineering and School of Natural Built Environments to be collocated in the Engineering and Heavy Engineering Hubs. **The School of Natural Built Environments** is consolidated into Building P with a large refurbishment project to all floors including Level 3 within the Engineering Hub, and Building N within the Heavy Engineering Hub. The accommodation strategy proposes the consolidation of staff in an open plan office arrangement on the ground floor of Building P and teaching facilities on the second floor as some of these spaces already exist. The planetarium is relocated to Building MC, to be at the face of community engagement which also makes available a large area on the second floor of Building P to collocate research laboratories with offices and teaching space. The small cellular rooms are removed from the façade to allow light to penetrate deep into the floor plate.

Building N and L are proposed to be developed in line with the NBE Master plan document commissioned seperately in 2015 but also include the proposal for a potential crushing workshop facility and NBE Camp Store to the rear of Building N with the Smith Brothers offices relocated to Building PH.

The School of Engineering which was previously across multiple buildings is proposed to be consolidated in Building SCT as the headquarters for ENE which sits within the Engineering Hub, and Building M which sits within the workshop zone. Both of these buldings have a combination of specialist teaching spaces, open plan offices and research laboratories. Building M also includes a large workshop zone and Industry engagement space. The specialist teaching spaces for ENE are proposed to the ground floor of SCT as largely intact with internal upgrades only required together with open plan staff workstations on the upper floor which requires a major refurbishment to achieve. Building M is also proposed to house the consolidated workshop facilities precinct for the campus to enable sharing of equipment and avoid duplication of facilities. The ENE Master Plan commissioned in 2016 for Building M and SCT details this further. ENE photonics research group also have a presence in Building Q with newly fitted out laboratories.

The School of Education is to remain in Building GB for 5 years until the relocation to Magill Campus. After this has occurred, a conference centre, **UniSA College** teaching spaces and offices for **Research Innovation Service** and **UniSA Ventures** is proposed for this building.

The upper floor of Building C is to house and consolidate the **Division of ITEE, Library and ISTS** in open plan offices with shared kitchen and breakout zones. ISTS to will continue a presence in Building E adjacent the Data Centre and IT Help desk with minor internal fitout to create an open plan work environment.

UniSA College offices are proposed in Building MC to encourage direct contact with the community sharing this building.

The School of Pharmacy and Medical Sciences will retain their teaching spaces within the eastern end of Building R with research laboratories located temporarily in Building Q until their relocation to the Health Innovation Building at City West.

Facilities Management retain their presence in Building A for office administration together with prayer rooms.

During the consultations, a number of stakeholders have communicated the fluctuations in visiting academics/ researchers and issue with available desk space. The accommodation schedule whilst allowing enough desk space per staff member identified in the staff accommodation areas schedule, also proposes a **hot desk zone** in an existing workstation area on the ground floor of Building C adjacent SEU and SAS staff. This space could be bookable by Schools and groups to meet short term desk requirements rather than having a number of vacant desks within School headquarters for the potential demand required that are expensive to maintain and inefficient.

There is the opportunity to **engage with Industry** onsite and create a front door on campus for these companies or start ups. A number of office locations have been identified if Industry wish to be collocated on the Mawson Lakes Campus in the Research and Community Hubs. These locations include the upper floor of Building Q with good relationship to the Town Walk, Future Industries Institute and ANFF (SA) spaces, the upper floor of Building IW adjacent specialist FII equipment together with Building W being available to lease after interim use as a decant space.

Workshop consolidation across the Mawson Lakes Campus is proposed as discussed above, culminating around Building M and N in the **Heavy Engineering Precinct.** Opportunities in robotics/mechatronics, electronics, photonics, advanced machining, 3D printing, nanotechnology all need to be accessible *on-site* to serve, excite and challenge the Mawson Lakes community. Smaller student workshops that require a technician, for example Electrical Workshop in Building SCT will remain in their current location next to electrical teaching facilities as it is important for technicians and teaching spaces to be adjacent.

Storage and sheds are to be rationalised and cleared out across the campus with future developments proposing the consolidation and demolition of smaller shed structures.

The Future Industries Institute offices and research laboratories are to be consolidated in Building X as the headquarters, Building MM and Building V. In the short term, some facilities will remain in Building IW as there is large expensive equipment that should only ever be relocated once. The accommodation schedule also proposes some new open plan office space on the upper floor so that students and researchers can be adjacent their research projects in the laboratories. ANFF (SA) facilities will remain in Building Q. A small amount of research laboratory will remain in Building R in the short term with the majority of Building R to be mothballed for future redevelopment. The majority of the research intensive 27/4 laboratory spaces are programmed in the south western corner of the campus to improve energy efficiency, reduce operating costs and maintain plant life expectancy. In the long term, Building V will be vacated by FII and leased to Industry. Open plan office spaces are to be made available adjacent research laboratories with these research spaces to be programmed where possible, to be visible to the general public. The Future Industries Institute Tenancy is further discussed in Section 6.

Long term, the demolition of Building Q and IW is proposed as a site for Building X2 and future power house2.

Buildings OC, W, H and J are to be used as **decant spaces** with OC, H and J to be demolished once the decanting and relocations are complete.

The following Schedule summarises all of the proposed tenancy locations across the site together with the staff numbers anticipated. A summary of works involved to achieve each project is then followed by tenancy concepts across the campus.

SITE WIDE ACCOMMODATION SCHEDULE

	Building A		Building B		Building C			Building D			Building E		Building F		Building GB				Building GP	
	1	2	1	2	1	2	3	1	2	3	1	2	1	2	1	2	3	4	1	2
SCHOOL OF ITMS																				
SPECIALIST TEACHING													678.7							
RESEARCH													574.7							
OFFICE								403.9	442	525.5			782.7							
SCHOOL OF NBE																				
SPECIALIST TEACHING																				
WORKSHOP																				
RESEARCH																				
OFFICE																				
SCHOOL OF ENGINEERING																				
SPECIALIST TEACHING																				
WORKSHOP																				
RESEARCH																				
INDUSTRY																				
OFFICE																				
SCHOOL OF EDUCATION																				
SPECIALIST TEACHING															760.9	567.1				
OFFICE															209	380.3	304.3	313.4		
SCHOOL OF PHARMACY & MEDICAL SCIENCE																				
SPECIALIST TEACHING																				
RESEARCH																				
OFFICE																				
UNISA COLLEGE																				
SPECIALIST TEACHING	230																			
OFFICE																				
ISTS																				
OFFICE + BUILD SPACE							685.2				588.5	465								
SANDPIT						131														
DATA CENTRE											124									
LIBRARY																				
OFFICE							685.2													
DIVISION ITEE																				
OFFICE							555													
PROFESSIONAL STAFF HUB					75															
SHARED STUDENT FACILITIES																				
FLEXIBLE TEACHING	392												1413						580	947
GENERAL TUTORIALS			210																	
LECTURE THEATRES													335.3						298	
STUDENT LEARNING & LOUNGE (INCL LIB IN BLD C)	410				1333	1882													175	
LEASED																				
INDUSTRY/ CLINICAL OFFICES, MEETING	195																			
FOOD & BEVERAGE	214																			
DECANT																				
DECANT SPACES																				
MOTHBALL																				
FACILITIES MANAGEMENT																				
CAMPUS MEETING	15.5															44				
OFFICE	181.5																			
GYM/FITNESS			1749	260																
PRAYER ROOMS		146.9																		
PLANETARIUM																				
HOT DESKING					105															
AUDITORIUM																				
CAMPUS CENTRAL/ SEU																				
OFFICE					241															
SCHOOL OF ART, ARCHITECTURE & DESIGN																				
WORKSHOP																				
INDIGENOUS STUDENT SERVICES																				
					92															
USASA																				
USASA													104							
FUTURE INDUSTRIES INSTITUTE																				
RESEARCH LABORATORIES																				
OFFICES																				
WORKSHOP																				
CENTRAL LABORATORY STORES																				
CRC OFFICE																				
CRC LAB																				
TOTALS																				
Total existing UFA	1016	768.9	1749	470	1846	2013	1921	403.9	442	525.5	712.5	465	1852	2036	969.9	947.4	348.3	313.4	1053	947
5% open area gained (minor renovation)		38.45			92.3	100.7	96.07				35.63	23.25								
10% open area gained (signifcant renovation)								40.39	44.2	52.55			185.2	203.6					105.3	94.7
proposed UFA m2	1016	807.3	1749	470	1938	2114	2017	444.3	486.2	578.1	748.1	488.3	2038	2240	969.9	947.4	348.3	313.4	1158	1041.7

	Building H			Building IW		Building J		Building K	Building L	Building M			Building MC		Building MM			Building N		Building OC
	1	2	3	1	2	1	2	1	1	1	mezz	2	1	2	1	2	3	1	2	1
SCHOOL OF ITMS																				
SPECIALIST TEACHING																				
RESEARCH																				
OFFICE																				
SCHOOL OF NBE																				
SPECIALIST TEACHING																				
WORKSHOP																		2669	339.1	
RESEARCH									1133											
OFFICE																				
SCHOOL OF ENGINEERING																				
SPECIALIST TEACHING										717.4		100								
WORKSHOP										1715										
RESEARCH										112.9		485								
INDUSTRY										328.1										
OFFICE										95.8		961.6								
SCHOOL OF EDUCATION																				
SPECIALIST TEACHING																				
OFFICE																				
SCHOOL OF PHARMACY & MEDICAL SCIENCE																				
SPECIALIST TEACHING																				
RESEARCH																				
OFFICE																				
UNISA COLLEGE																				
SPECIALIST TEACHING													140							
OFFICE													297							
ISTS																				
OFFICE + BUILD SPACE																				
SANDPIT																				
DATA CENTRE																				
LIBRARY																				
OFFICE																				
DIVISION ITEE																				
OFFICE																				
PROFESSIONAL STAFF HUB																				
SHARED STUDENT FACILITIES																				
FLEXIBLE TEACHING															120	435.4				
GENERAL TUTORIALS													302.6	140						
LECTURE THEATRES															210.7					
STUDENT LEARNING & LOUNGE (INCL LIB IN BLD C)																89.5				
LEASED																				
INDUSTRY/ CLINICAL OFFICES, MEETING				306.4																
FOOD & BEVERAGE													14.1		135.2					
DECANT																				
DECANT SPACES																				
MOTHBALL																				
FACILITIES MANAGEMENT																				
CAMPUS MEETING																				
OFFICE															63	50.5				
GYM/FITNESS																				
PRAYER ROOMS																				
PLANETARIUM													200							
HOT DESKING														53						
AUDITORIUM								245												
CAMPUS CENTRAL/ SEU																				
OFFICE																				
SCHOOL OF ART, ARCHITECTURE & DESIGN																				
WORKSHOP																				
INDIGENOUS STUDENT SERVICES																				
USASA																				
USASA																				
FUTURE INDUSTRIES INSTITUTE																				
RESEARCH LABORATORIES				714	232.2										219	350.2	177.5			
OFFICES				190.1	263.4										166.1	613.6	556.6			
WORKSHOP			575.2																	
CENTRAL LABORATORY STORES															147.1					
CRC OFFICE																120				
CRC LAB																166				
TOTALS																				
Total existing UFA	575.2			904.1	802			245	1133	2969	485	1062	516.7	630	998.1	1552	1071	2669	339.1	
5% open area gained (minor renovation)				45.21	40.1					148.5		53.08								
10% open area gained (signifcant renovation)																				
proposed UFA m2	575.2			949.3	842.1			245	1133	3118	485	1115	516.7	630	998.1	1552	1071	2669	339.1	

	Building P			Building PH		Building Q		Building R		Building SCT		Building V		Building W		Building X		Building AAD	
	1	2	3	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	
SCHOOL OF ITMS																			
SPECIALIST TEACHING																			
RESEARCH																			
OFFICE																			
SCHOOL OF NBE																			
SPECIALIST TEACHING	1180																		
WORKSHOP																			
RESEARCH	280	200																	
OFFICE	1340	170	250																
SCHOOL OF ENGINEERING																			
SPECIALIST TEACHING										1604	202.5								
WORKSHOP										378.1									
RESEARCH						400				242.3	34.3								
INDUSTRY																			
OFFICE							80			25	942.9								
SCHOOL OF EDUCATION																			
SPECIALIST TEACHING																			
OFFICE																			
SCHOOL OF PHARMACY & MEDICAL SCIENCE																			
SPECIALIST TEACHING								635.6											
RESEARCH																			
OFFICE								108											
UNISA COLLEGE																			
SPECIALIST TEACHING																			
OFFICE																			
ISTS																			
OFFICE + BUILD SPACE																			
SANDPIT																			
DATA CENTRE																			
LIBRARY																			
OFFICE																			
DIVISION ITEE																			
OFFICE																			
PROFESSIONAL STAFF HUB																			
SHARED STUDENT FACILITIES																			
FLEXIBLE TEACHING																			
GENERAL TUTORIALS																			
LECTURE THEATRES																			
STUDENT LEARNING & LOUNGE (INCL LIB IN BLD C)																			
LEASED																			
INDUSTRY/ CLINICAL OFFICES, MEETING							152.6							1257	1402				
FOOD & BEVERAGE																			
DECANT																			
DECANT SPACES																			
MOTHBALL								1627	2040										
FACILITIES MANAGEMENT																			
CAMPUS MEETING																			
OFFICE				190													50		
GYM/FITNESS																			
PRAYER ROOMS																			
PLANETARIUM																			
HOT DESKING																			
AUDITORIUM																			
CAMPUS CENTRAL/ SEU																			
OFFICE																			
SCHOOL OF ART, ARCHITECTURE & DESIGN																			
WORKSHOP																		750	
INDIGENOUS STUDENT SERVICES																			
USASA																			
USASA																			
FUTURE INDUSTRIES INSTITUTE																			
RESEARCH LABORATORIES						224	327	487.6				524.8				455.1	660.1		
OFFICES							185					627.6	199.4			867.4	805.8		
WORKSHOP																			
CENTRAL LABORATORY STORES												82.7				82			
CRC OFFICE																			
CRC LAB																			
TOTALS																			
Total existing UFA	1340	1630	450	190		624	744.6	2115	2784	2249	1179.7	1235	199.4	1257	1407	1405	1516	750	
5% open area gained (minor renovation)						31.2	37.23			112.5		61.76	9.97						
10% open area gained (signifcant renovation)	134	163	45								117.97								
proposed UFA m2	1474	1793	495	190		655.2	781.8	2115	2784	2361	1297.67	1297	209.4	1257	1407	1405	1516	750	

WHEN GB VACATED	1	2	3	4
RIS OFFICE			348	156.5
UNISA VENTURES OFFICE				156.5
UNISA COLLEGE TEACHING	761	567.1		
CONFERENCE CENTRE	209			
INDUSTRY OFFICES		380.3		
Total existing UFA	970	947.4	348	313
5% open plan gained (minor renovation)	48.5	47.37		
10% open plan gained (signifcant renovation)			34.8	31.3
proposed UFA m2	1019	994.7	382.8	344.3

NOTES:

GENERAL OFFICE STORAGE INCORPORATED INTO FIGURES ABOVE

UNISA VENTURES AND RIS ONLY NEED TO RELOCATE IN THE SHORT TERM TO BUILDING IW IF BUILDING GB IS NOT AVAILABLE WHEN BUILDING GP WORKS COMMENCE

STAFF ACCOMMODATION AND AREAS SCHEDULE

	Staff (FTE)	HDR	Hot desks	m2 - staff	m2 - HDR	m2 - hot desk	STAFF ACCOM. TOTAL	TOTAL m2	PROPOSED TOTAL m2	Notes
ITMS	103	117	32	927	1053	134.4	2114	**2114.4**	**2154.4**	
NBE	60	76	15	540	684	63	1287	**1287**	**1760**	
ENE	85	86	23	765	774	96.6	1636	**1635.6**	**2105.7**	Reflects the 2016 ENE Master Plan
ISTS	138	0	10	1242	0	42	1284	**1284**	**1739**	20 are project based, additional allowance required for build spaces
LIBRARY	66	0	0	594	0	0	594	**594**	**685**	
EDUCATION	60	0	0	540	0	0	540	**540**	**1206**	Remain in same location until relocation to Magill
DIV ITEE	41	0	2	369	0	8.4	377	**377.4**	**551**	This total does not include staff training hub
SEU	5	0	0	45	0	0	45	**45**	**120**	Remain in same location
UNISA COLLEGE	16	0	0	144	0	0	144	**144**	**297**	
RIS	46	0	0	414	0	0	414	**414**	**500**	
UNISA VENTURES	12	0	0	108	0	0	108	**108**	**195**	
PHARMACY	9	0	0	81	0	0	81	**81**	**81**	8 moving to HIB
SAS	7	0	0	63	0	0	63	**63**	**120**	Remain in same location
FMU	16	0	0	144	0	0	144	**144**	**372**	
FII	128	119	56	1152	1071	235.2	2458	**2458.2**	**4474.9**	Reflects the 2016 FII Tenancy Plan
TOTAL	**792**	**398**	**138**	**7128**	**3582**	**579.6**	**11290**	**11290**	**16361**	

Office/ desk spaces calculated below are based on the following:

Workstation= 6m2 personal desk space + 1m2 circulation + 2m2 breakout space contribution= 9m2 per person.

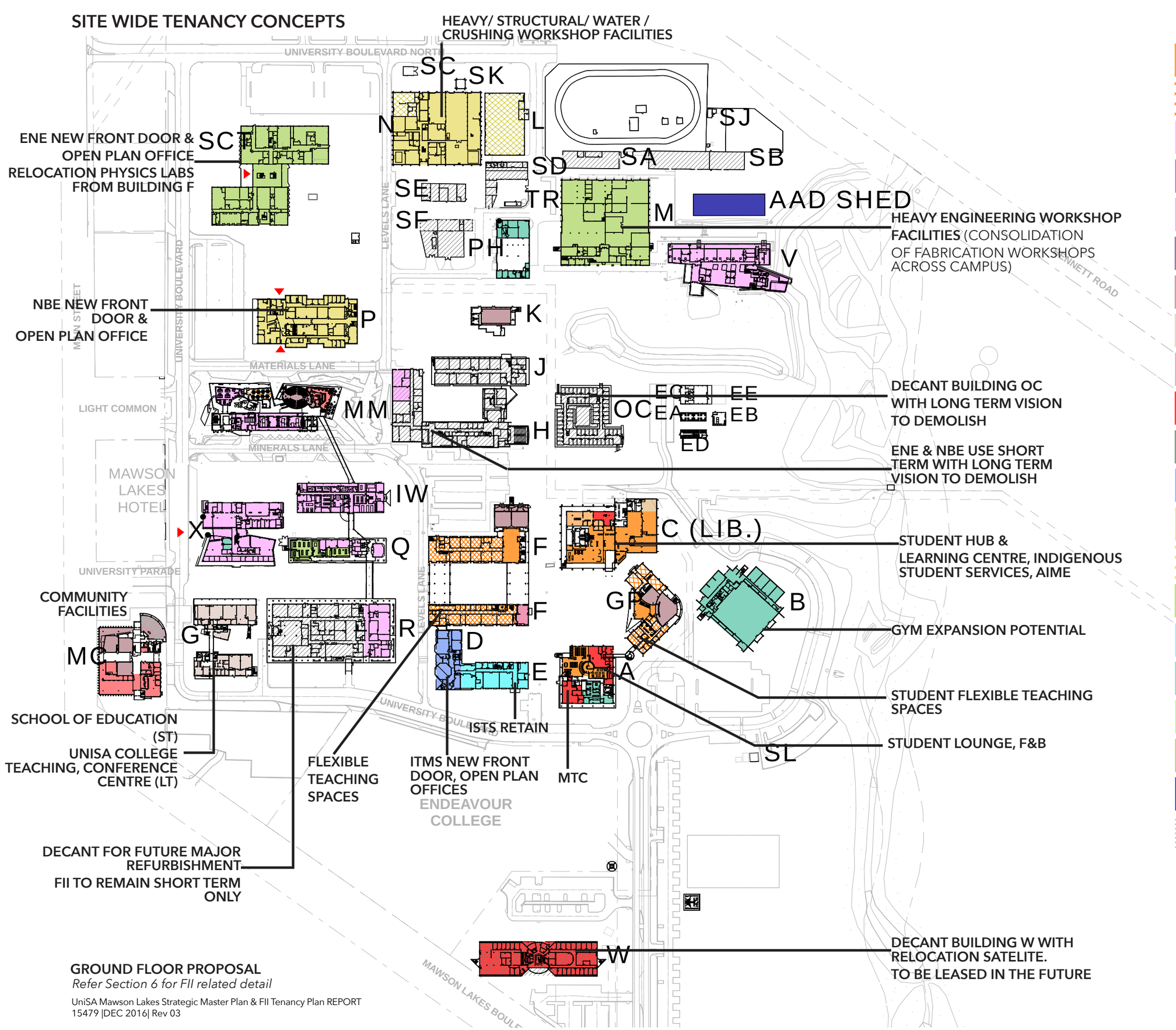
Hot desk= 3m2 personal desk space + 1.2m2 circulation = 4.2m2 per person.

Specialist teaching and research areas based on existing UFA of buildings

Areas exclude dedicated storage zones

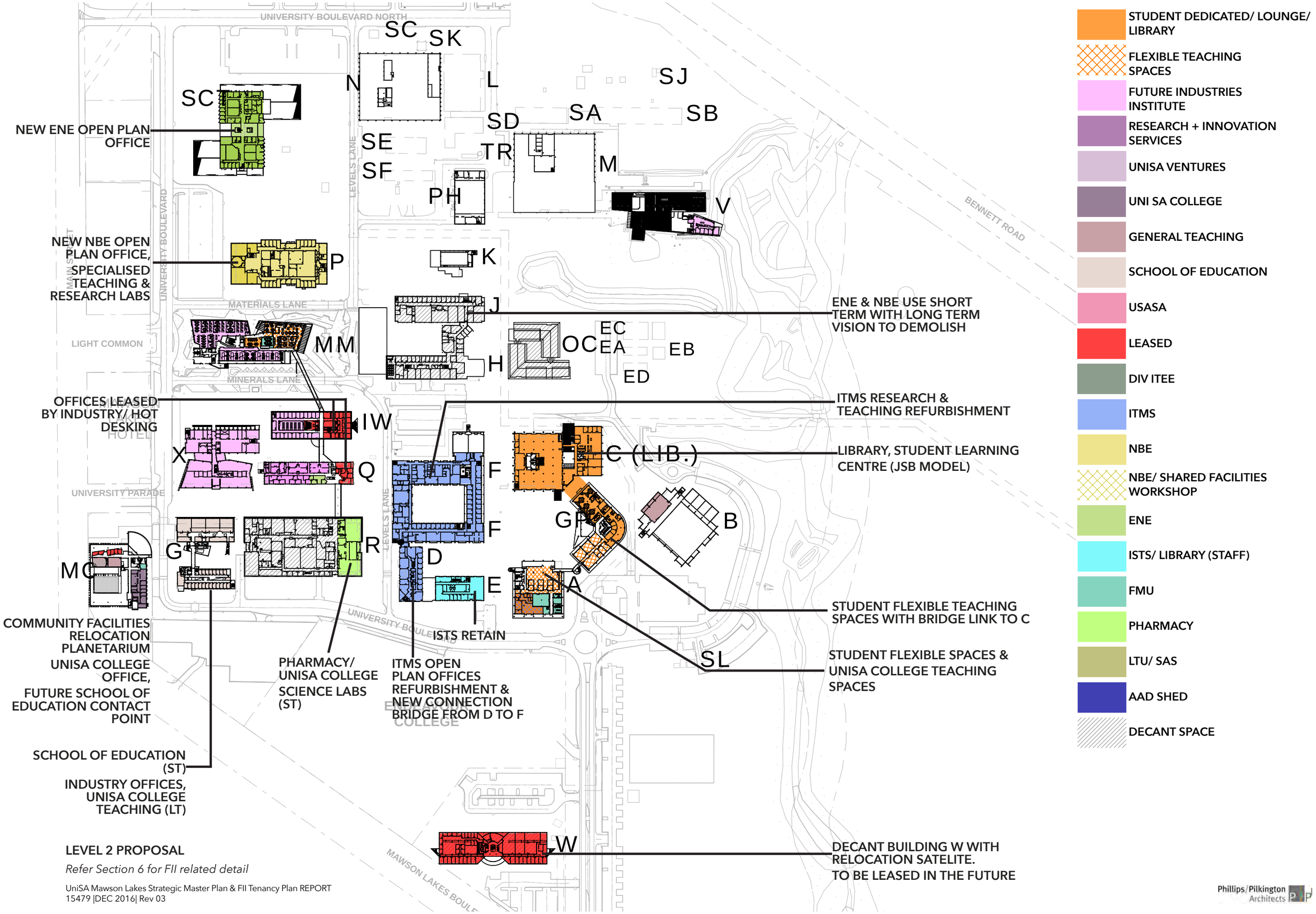
Proposed areas are based on existing UFA.

SITE WIDE TENANCY CONCEPTS



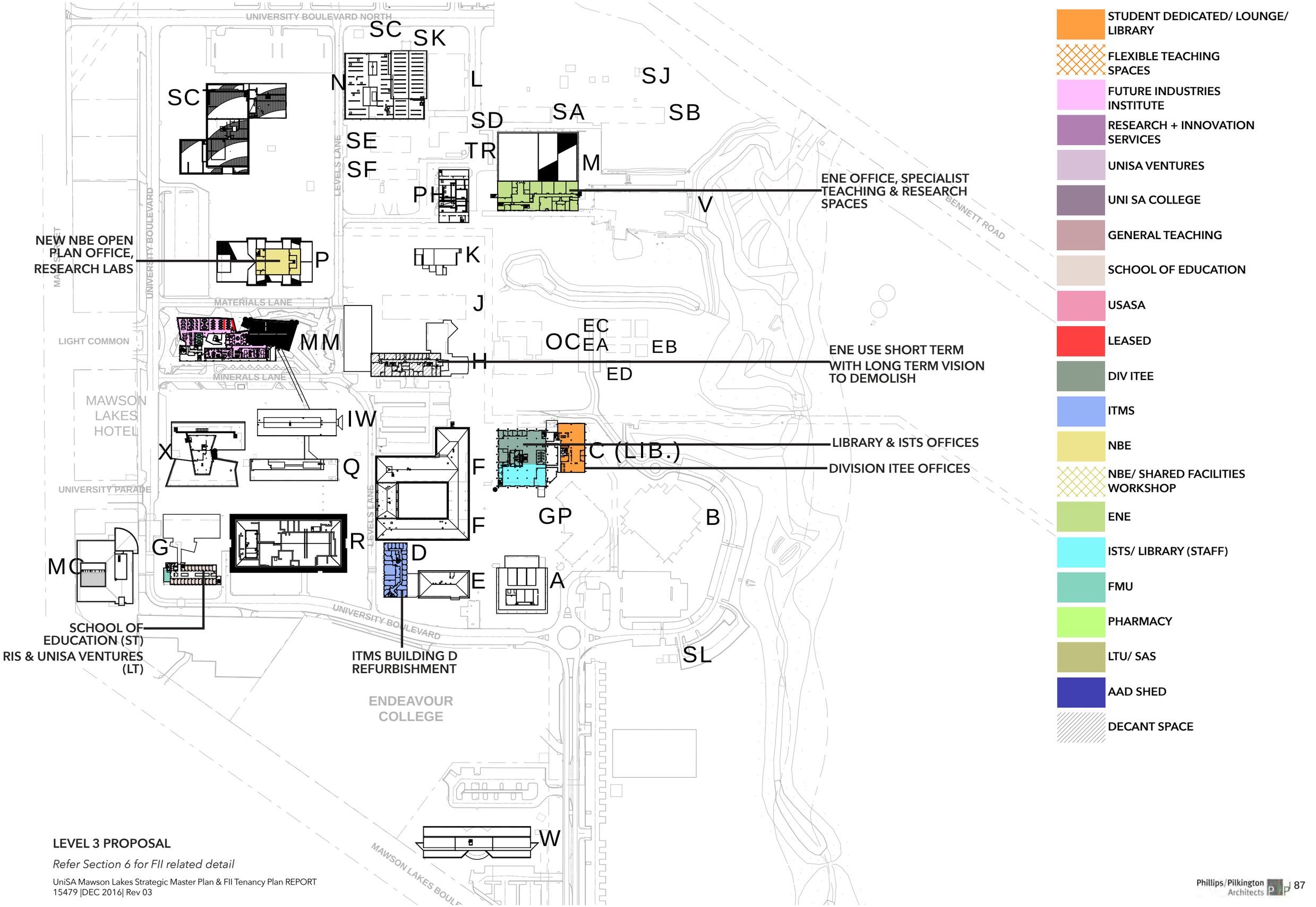
GROUND FLOOR PROPOSAL

Refer Section 6 for FII related detail



LEVEL 2 PROPOSAL

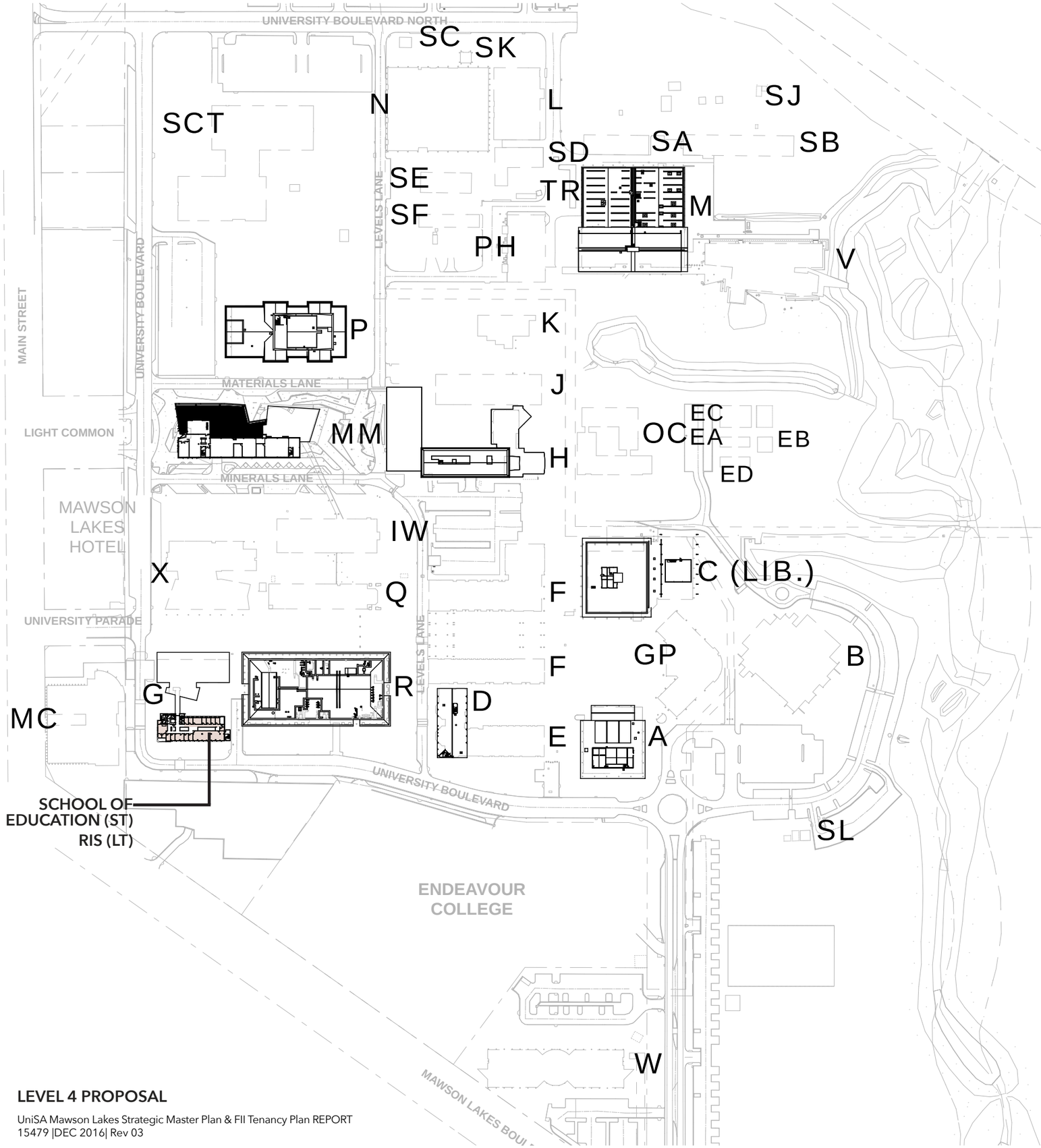
Refer Section 6 for FII related detail



STUDENT DEDICATED/ LOUNGE/ LIBRARY
FLEXIBLE TEACHING SPACES
FUTURE INDUSTRIES INSTITUTE
RESEARCH + INNOVATION SERVICES
UNISA VENTURES
UNI SA COLLEGE
GENERAL TEACHING
SCHOOL OF EDUCATION
USASA
LEASED
DIV ITEE
ITMS
NBE
NBE/ SHARED FACILITIES WORKSHOP
ENE
ISTS/ LIBRARY (STAFF)
FMU
PHARMACY
LTU/ SAS
AAD SHED
DECANT SPACE

LEVEL 3 PROPOSAL

Refer Section 6 for FII related detail



STUDENT DEDICATED/ LOUNGE/ LIBRARY

FLEXIBLE TEACHING SPACES

FUTURE INDUSTRIES INSTITUTE

RESEARCH + INNOVATION SERVICES

UNISA VENTURES

UNI SA COLLEGE

GENERAL TEACHING

SCHOOL OF EDUCATION

USASA

LEASED

DIV ITEE

ITMS

NBE

NBE/ SHARED FACILITIES WORKSHOP

ENE

ISTS/ LIBRARY (STAFF)

FMU

PHARMACY

LTU/ SAS

AAD SHED

DECANT SPACE

LEVEL 4 PROPOSAL

SUMMARY OF WORKS INVOLVED

General site wide observations

Generally electrical switchboards will require to be upgraded to suit the proposed new layouts together with additional communications services cupboards will be also be required.

The chilled and heating hot water pipework infrastructure will be of sufficient capacity to serve the proposed building fitout works (overall cooling and heating load intensities will be similar) but the majority of air handling units will need replacement as they are at end of life.

Upgrade/replacement of existing toilet exhaust systems will be required to suit the proposed building fitout works.

Earthquake strengthening will need to be assessed for each of the building works projects.

Note: minimal structural drawings available and observations below are high level only.

Building A

Building A becomes a major student focus with the follow proposed:

- Minor refurbishment to ground floor offices for MTC.
- Refurbishment of F&B on ground floor.
- Refurbishment of Student Lounge (City West model) on ground floor.
- Small section refurbishment on upper floor from offices to student teaching space.
- New shade canopies to northern side of building.
- Upgrade/replacement of existing sanitaryware and tapware will be required to suit the proposed building fitout works.
- Upgrade and extension of the domestic hot and cold water supply will be required.
- Modification and extension of the existing sanitary plumbing drainage will be required to serve new fixture locations.
- Grease arrestor sizing will require to be reviewed to ensure new installation is in accordance with SA Water Corporation Trade Waste Department current standards and codes and does not increase load of current system.
- Upgrade/replacement of existing power, communications, security and lighting will be required to suit the proposed fitout works
- Existing electrical switchboards and communications services should not require upgrade.
- Upgrade of central air handling plant and equipment due to age and serviceability.
- Modification to Student Lounge Facilities to involve upgrade of supply air diffusion and relocation to suit new layout. General re-balance and re-commissioning of existing system. No new mechanical services systems anticipated.
- Upgraded food and beverage facilities may require upgrade to kitchen exhaust and make-up air dependent on extent of changes.
- Modification to Offices to involve upgrade of supply air diffusion and relocation to suit new layout. General re-balance and re-commissioning of existing system. No new mechanical services systems anticipated.
- Modification to Toilets to involve installation of new exhaust air fan. Existing ductwork and air diffusion to be re-used.
- New Teaching Tutorial General Purpose to involve upgrade of supply air diffusion and relocation to suit new layout. General re-balance and re-commissioning of existing system. No new mechanical services systems anticipated.
- Pre EQ code - damage to building structure and interruption to business unknown (impact for a moderate earthquake).
- Minimal changes to structure proposed – additional bracing may be required, refer to sketch of GP building (allow for similar bracing in 4 locations.)
- Roof replacement and facade upgrade together with solar panels

Building B

The gymnasium capacity is increased with the following proposed:

- Expansion of one playing indoor court.
- Upgrades to internal fitout typically.

Building C

Building C is developed as a learning resources centre, technology hub with staff offices on the upper floor, with the following proposed:

- Refurbishment of majority of ground floor into student group and individual learning. Incorporation of the Indigenous Student Services space. No changes to offices.
- Significant refurbishment of middle floor into student group and individual learning, library collection and project rooms.
- Significant refurbishment of top (third floor) into ISTS and library open plan workstations along with DivITEE offices.
- Rectification of broken venetian blinds in external glass.
- Upgrade/replacement of existing sanitaryware and tapware will be required to suit the proposed building fitout works.
- Upgrade of the existing domestic hot water system will be required as part of building upgrade.
- Upgrade/replacement of existing power, communications, security and lighting will be required to suit the proposed fitout works.
- Existing electrical switchboards and communications services will require upgrade.
- Upgrade of central air handling plant and equipment due to age and serviceability. It would be feasible to relocate the mechanical services plant serving the upper floor without impacting the other levels. However, this would require the following: *A new reticulation path for the chilled water and heating hot water, which currently rises up the building within the plant rooms: New penetrations in the level 3 slab to accommodate supply and return air ductwork (estimated to be approximately 2 off penetrations of 1.6m² area each). This could be separated in to s number of smaller penetrations if necessary: In-fill of the floor within the existing plant rooms, which is currently a large opening with a metal grate*
- Acoustic treatment of plant and equipment to meet current design criteria.
- Modification of Library and Office areas to Individual Learning areas to involve relocation of supply air diffusers and fan coil units / VAV boxes to suit new layout. General re-balance and re-commissioning of existing system. No new mechanical services systems anticipated.
- Modification of Library areas to Office areas on top floor to involve relocation of supply air diffusers and fan coil units / VAV boxes to suit new layout. General re-balance and re-commissioning of existing system. No new mechanical services systems anticipated.
- Installation of new exhaust air grilles to suit refurbished wet areas.
- Pre EQ code - damage to building structure and interruption to business unknown (impact for a moderate earthquake).
- Minimal changes to structure proposed – additional bracing may be required, refer to sketch of GP building (allow for similar bracing in 4 locations)
- Roof replacement together with solar panels

Building D

Building D with Building F becomes an ITMS focus with the following proposed:

- Significant refurbishment of all three floors into open plan office space for ITMS.
- Refurbishment of roof terrace.
- Refurbishment of façade.
- Upgrade/replacement of existing sanitaryware and tapware will be required to suit the proposed building fitout works.
- The existing air conditioning plant will require replacement due to age and unsuitability for reuse.
- Upgrade and extension of the domestic hot and cold water supply will be required to provide supply to top floor.
- Modification and extension of the existing sanitary plumbing drainage will be required to serve new fixture locations.
- Upgrade of existing domestic hot water unit will be required to ensure capability of new building domestic hot water requirements.
- Internal masonry walls do not appear be load bearing and can therefore be removed without effecting the load carrying capacity of the slab. Refer strcutural markup on page 10.
- Earthquake strengthening, should this be required, should be relatively straightforward and could be achieved by building additional in-situ reinforced concrete shear walls at strategic locations. i.e. paired shear walls at each end of the building in both directions.
- Roof replacement and facade upgrade together with solar panels

Building E

Building E is retained for ISTS with the following proposed:

- Internal fitout works only.
- Minor refurbishment to ground floor and upper floor offices to create open plan zones (central loadbearing walls retained)
- No changes to Data Centre or IT Help offices.
- Modification of existing ground and upper floor offices to open plan workstations areas to involve relocation of supply air diffusers and fan coil units / VAV boxes to suit new layout. General re-balance and re-commissioning of existing system.
- No new mechanical services systems anticipated.
- From an electrical and communications perspective all looks generally OK.
- No major implications to the electrical , communications and security services base building and fitout works.
- Upgrade of electrical switchboards will be required to suit the

proposed new layouts.

- Upgrade of the existing domestic hot water system will be required as part of building upgrade.
- Upgrade/replacement of existing sanitaryware and tapware will be required to suit the proposed building fitout works.
- No structural drawings have been made available for building E. Allow for possible new lintels or steel mullions where internal walls are to be removed.

Building F

Building F with Building D is a focus for ITMS and a student learning hub with potential Industry Connections Hub created in the ground level courtyard space. The following interventions are proposed:

- Significant refurbishment project to ground floor for new flexible teaching spaces and lecture theatre upgrade.
- Significant refurbishment project to entire upper floor for ITMS teaching, research and staff offices.
- Research laboratories and dedicated ITMS teaching require good power/data and airconditioning.
- Refurbishment of façade.
- *Infill roof structure at ground floor to be similar style to Adelaide Uni Hughes Plaza with plug in type pods*
- Upgrade/replacement of existing sanitaryware and tapware will be required to suit the proposed building fitout works.
- Modification and extension of the existing sanitary plumbing drainage will be required to serve new fixture locations.
- Upgrade of existing domestic hot water unit required as part of building upgrade.
- Modification and extension of existing stormwater drainage as required to suit new Infill roof structure.
- The existing air conditioning plant will require replacement due to age and unsuitability for reuse.
- Aim to keep existing reinforced concrete walls.
- Earthquake strengthening, should this be required, should be relatively straightforward and could be achieved by building additional in-situ reinforced concrete shear walls at strategic locations. i.e. paired shear walls at each end of the building in both directions.
- Opening up of the ground floor structure requires careful consideration.
- Note: no existing structural drawings available for two main wings however it seems likely, based on a review of the architectural drawings that the internal masonry walls are load bearing (or contain steel columns).
- Roof replacement and facade upgrade together with solar panels

Building GB

No new works proposed in the short term with GB redeveloped once education moves to Magill.

Building GP

Building GP is proposed as a student learning hub with the following proposed:

- Refurbishment of ground floor rooms into flexible teaching spaces, breakout zones and refurbishment of existing lecture theatre spaces.
- Refurbishment of ground floor façade and entry foyer to open to courtyard.
- Refurbishment of existing tutorial rooms on the upper floor into flexible teaching spaces and creation of student social learning spaces.
- New connection bridge to Building C with social learning and Project Room spaces and ramp section.
- The existing air conditioning plant will require replacement due to age and unsuitability for reuse.
- No major Hydraulic services implications to the fitout works.
- Upgrade/replacement of existing power, communications, security and lighting will be required to suit the proposed fitout works.
- Existing electrical switchboards and communications services should not require upgrade.
- Modification of Training Room to Tutorial Room to involve relocation of supply air diffusers to suit new layout. General re-balance and re-commissioning of existing system. No new mechanical services systems anticipated.
- Modification of Games Workshop Room to Tutorial Room to involve relocation of supply air diffusers to suit new layout. General re-balance and re-commissioning of existing system. Increase in outside air rates may be required – unlikely to trigger major mechanical services unit upgrades.
- Modification of Computer Pool Room to Tutorial Room to involve relocation of supply air diffusers to suit new layout. General re-balance and re-commissioning of existing system. Increase in outside air rates may be required – unlikely to trigger major mechanical services unit upgrades.
- Modification of individual office type areas on ground floor to Flexible Teaching areas to involve relocation of supply air diffusers and mechanical services fan coil units / VAV units to suit new layout. General re-balance and re-commissioning of existing system. No new mechanical services systems anticipated.
- Modification of individual office type areas on top floor to Tutorial Rooms to involve relocation of supply air diffusers and mechanical services fan coil units / VAV units to suit new layout. General re-balance and re-commissioning of existing system. Outside air pre-conditioning unit and additional 2 off new fan coil units required.
- 2nd EQ code – Building may suffer moderate non-structural damage, minor structural damage, moderate interruption to business may occur (impact for a moderate earthquake). Refer to attached Sketch for Bracing Concept Design.

Building H

Building H is proposed as decant space in the short term (minor upgrades may be required to achieve this) with future demolition to create a central landscape space. FII will use ground floor spaces in this building in the short term. Refer Section 6 FII Accommodation Strategy for detail.

Building IW

Refurbishment of existing offices on the top floor for Industry into open plan arrangement and meeting spaces together with continued use by FII. Refer Section 6 FII Accommodation Strategy for detail.

Building J

Building J is proposed as decant space in the short term (minor upgrades may be required to achieve this) with future demolition to create a central landscape space.

Building K & L

No new works proposed.

Building MM

Building MM is retained in the Research Hub. Refer Section 6 FII Accommodation Strategy for detail.

Building M

Building M is retained as a workshop and learning hub for ENE with the following proposed:

- Consolidation of workshop facilities.
- Refurbishment of teaching design and build spaces
- Internal fitout upgrades typically (ie. ceiling falling down in sections)
- Refurbishment of offices on ground floor for ENE research groups and Industry Engagement.
- Structural upgrades required to building.
- New bridge link on upper floor to mezzanine.
- Expansion of offices on the upper floor.
- New lift
- Modification of existing areas to offices, workshops and teaching spaces to involve relocation of supply air diffusers and fan coil units / VAV boxes to suit new layout. General re-balance and re-commissioning of existing system. No new mechanical services systems anticipated.
- Upgrade of central air handling plant and equipment due to age and serviceability.
- Acoustic treatment of plant and equipment to meet current design criteria.
- From an electrical and communications perspective all looks generally OK.
- Upgrade of electrical switchboards will be required to suit the proposed new layouts.
- Additional communications services cupboards will be also be required.
- Upgrade of the existing domestic hot water system will be required as part of building upgrade.
- Upgrade/replacement of existing sanitaryware and tapware will be required to suit the proposed building fitout works.
- Roof replacement together with solar panels

Building MC

Building MC is retained as a community hub with minimal refurbishment required for UniSA College offices on the upper floor. Relocation of planetarium to ground floor from Building P. Modification of existing mechanical areas to accommodate the planetarium will be required.

Building N

Building N is retained as a NBE workshop hub with the following proposed:

- Refurbishment of spaces in line with NBE Masterplan document.
- Consolidation for heavy crushing workshop type facilities to rear section of building.
- Modification of existing areas to offices and workshop areas to involve relocation of supply air diffusers and fan coil units / VAV boxes to suit new layout. General re-balance and re-commissioning of existing system.
- New mechanical services systems anticipated.
- Upgrade of central air handling plant and equipment due to age and serviceability.
- Acoustic treatment of plant and equipment to meet current design criteria.
- From an electrical and communications perspective all looks generally OK.
- No major implications to the electrical , communications and security services base building and fitout works.
- Upgrade of electrical switchboards will be required to suit the proposed new layouts.
- Additional communications services cupboards will be also be required.

Building OC

Potential decant space prior to future demolition.

Building P

Building P is proposed as the NBE hub with the following proposed:

- Significant refurbishment to ground floor for new NBE open plan offices.
- Significant refurbishment to upper floor for specialist teaching and research laboratory spaces.
- Significant refurbishment and enclosure of Level 3 into research laboratoires and open plan office.
- Modification of existing ground and upper floor areas to open plan workstations, laboratories and teaching spaces to involve relocation of supply air diffusers and fan coil units / VAV boxes to suit new layout. General re-balance and re-commissioning of existing system.
- New mechanical services systems anticipated.
- New laboratory specialist exhaust required
- Upgrade of central air handling plant and equipment due to age and serviceability.
- Acoustic treatment of plant and equipment to meet current design criteria.
- From an electrical and communications perspective all looks generally OK.
- No major implications to the electrical , communications and security services base building and fitout works.
- Upgrade of electrical switchboards will be required to suit the proposed new layouts.
- Additional communications services cupboards will be also be required
- New lift to third floor.
- Note: no existing structural drawings available for this building. Large loadbearing walls need to be considered.
- Proposed works may trigger earthquake upgrade.
- If earthquake upgrade is required allow for 4x 250UC braced frames for the full height of the building plus new pad footings to accommodate new bracing system.
- Also allow for additional steelwork for mullion restraint at new wall openings or lintels.
- New structural steel for enclosure to 3rd floor deck.
- Roof replacement and facade upgrade together with solar panels

Building PH

The powerhouse is to be retained with the following proposed:

- Allow minor upgrade of office space on Ground Floor for Smith Brothers relocation- 180m2 and SAS gown store relocation.

Building Q

Building Q is to be retained in the short to medium term with refurbishment of existing offices on the upper floor for ENE Photonics research group and Industry partners together with FII ANFF (SA) continued use. Refer Section 6 FII Accommodation Strategy for detail.

- Roof replacement and facade upgrade together with solar panels

Building R

Building R is to be largely mothballed except for FII lab for Advanced Manufacturing together with Pharmacy. Refer Section 6 FII Accommodation Strategy for detail.

Major refurbishment of building proposed in the mid term.

Building SCT

Building SCT is proposed as the ENE hub with the following proposed:

- Internal upgrade only to ENE specialist teaching laboratories and consolidation of physics into this building together with laser laboratory.
- Significant internal refurbishment to upper floor for conversion into ENE open plan offices.
- Internal masonry walls do not appear be load bearing and can therefore be removed without effecting the load carrying capacity of the slab.
- Earthquake strengthening, should this be required, should be relatively straightforward and could be achieved by building additional steel bracing at strategic locations. i.e. paired braces at each end of the building in both directions.
- Modification of existing ground and upper areas to open plan workstations, laboratories and teaching spaces to involve relocation of supply air diffusers and fan coil units / VAV boxes to suit new layout. General re-balance and re-commissioning of existing system.
- New mechanical services systems anticipated.
- New laboratory specialist exhaust required
- Upgrade of central air handling plant and equipment due to age and serviceability.
- Acoustic treatment of plant and equipment to meet current design criteria.
- From an electrical and communications perspective all looks generally OK.
- Upgrade of electrical switchboards will be required to suit the proposed new layouts.
- Additional communications services cupboards will be also be required
- Upgrade of the existing domestic hot water system will be required as part of building upgrade.
- Upgrade/replacement of existing sanitaryware and tapware will be required to suit the proposed building fitout works.
- Roof replacement together with solar panels

Building V

Building V is retained for FII research and offices in the short term with potential leasing to Industry in the mid term. Refer Section 6 FII Accommodation Strategy for detail.

Building W

Used as decant space in the short term (minor upgrades may be required to achieve this).

Future hand over to external group for use as clinical spaces.

Building X

Building X is retained for FII research and offices. Refer Section 6 FII Accommodation Strategy for detail.

FUTURE BUILDINGS

1. ENE/ NBE INFILL BUILDING

3,550m2 x 2 floors. Mix of Engineering dedicated teaching spaces, offices and research laboratories.

2. INDUSTRY BUILDING

3,850m2 x 2 floors. High bay pilot plan spaces, Industry offices and workshops

3. WORKSHOP BUILDING

2,800m2 x 1 floor. Consolidated workshop, high bay large shed structure. Demolition of sheds required.

5. X2 BUILDING

3,200m2 x 3 floors. Extension of Building X type spaces. Demolition of IW & Q.

9. TEACHING & LEARNING BUILDING

1,800m2 x 3 floors. Jeffrey Smart style teaching and learning building.

16. NEW ENTRANCE BUILDING

1,000m2 x 2 floors. Entry hall, seminar spaces and Division office.

INDUSTRY LABORATORY INCUBATOR SPACE DISCUSSION

These types of spaces are potentially proposed in the Industry Connections Hub and summarised for consideration below:

DESK DESIGN

These spaces act as highly flexible, open plan interaction spaces for desk-based "incubator" initiatives. They're not dissimilar to interaction spaces.

They typically include desk areas (sitting and standing) organised in zones that might include lounge space, mobile desk areas, informal meeting tables as well as a number of meeting rooms (usually glazed with blinds) for discreet meetings and presentations. Cafes and recreation areas are sometimes incorporated or nearby.

IP protection is achieved through hot desk / clean desk policy, lockable personal and shared storage cabinets, PIN protected "follow-me" printers as well as secure personal logins on all computing devices.

They do not differ significantly from modern commercial environments as seen in the Macquarie Bank example illustrated.

BENCH SCALE

These are suited to tenanted laboratory bench research and usually required significant access to engineering services and adjacent plant spaces with capacity to be augmented and adapted (peri-stitial spaces for minor plant and reticulations are ideal for this).

The area may be shared / open plan or modular / cellular. The latter might be preferred by some tenants for reasons of IP protection or safety concerns. Bench and services layout should be a 3.3-3.6m wide grid with maximum peninsular bench zone length of 7metres (for distance to a choice of escape routes)

Basic ubiquitous features:

- Generous data and power ("gunshot") including essential power, Service pendants arranged in a modular (descending) grid provide best capability
- Laboratory water (H&C), trade waste drainage points
- handwash stations, safety showers and eyewash, PPE storage areas (potable water)
- Designated dangerous goods storage capable areas
- Lockable storage cabinets and rooms, equipment rooms (for higher heat load, noisy or high end access controlled equipment), access to specialised process rooms (e.g for tissue culture)
- Air conditioning (ideally single pass) with a relatively high heat load capacity (up to 40-50W/m2) and adequate make-up capacity for exhaust ventilation
- Exhaust ventilation (fume cupboards, exhaust snorkels etc). Designed for flexible deployment
- Most laboratories should be at a nominal negative pressure in relation to adjacent areas
- Gases (at minimum compressed air, nitrogen and potentially suction)
- Engineering reticulation systems that readily accommodate addition of other services (especially specialised gases)
- Adjacent plant space for tenant-specific minor plant (gas bottles, cooling units etc)
- Adjacent desk scale research spaces
- Loading dock / delivery area / storage and plant space

Additional features that might be required:

- Metering of services as might be required by the tenancy charging model
- Pure water reticulation (or make tenant responsibility because of risk of contamination
- UPS power (may again be best provide by tenant)
- Negative pressure controlled zones – "PC or physical containment" levels 1 and 2
- Positive pressure controlled zones for clean rooms, tissue culture, GMP areas etc.
- Specialised finishes for clean environments

TECHNICAL BAYS

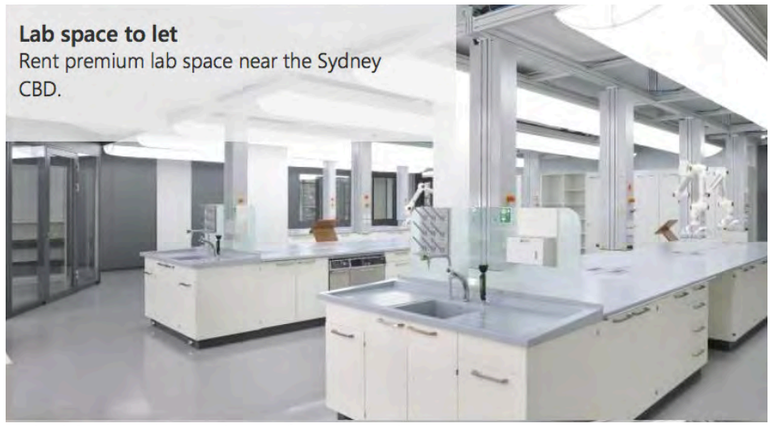
They are medium height / larger scale bays that may be modular or open plan but are of a larger scale than bench scale. They will often be more robustly finished for medium-to-larger scale equipment / pilot plant / research and development. They will, like the labs, have high services access and flexibility together with access loading doors, bench scale labs and desk scale areas.

The images below demonstrate a selection of flexible 'pod-style' laboratory environments:

- Portable clean rooms at Australian BioResources (ABR)
- WOTSO Fleixble Laboratory Spaces for rent
- GSK Harlow Drug Manufactoring Development Space

Portable clean rooms at Australian BioResources (ABR)

Macquarie Bank by Clive Wilkinson Architects Hot Desking Policy

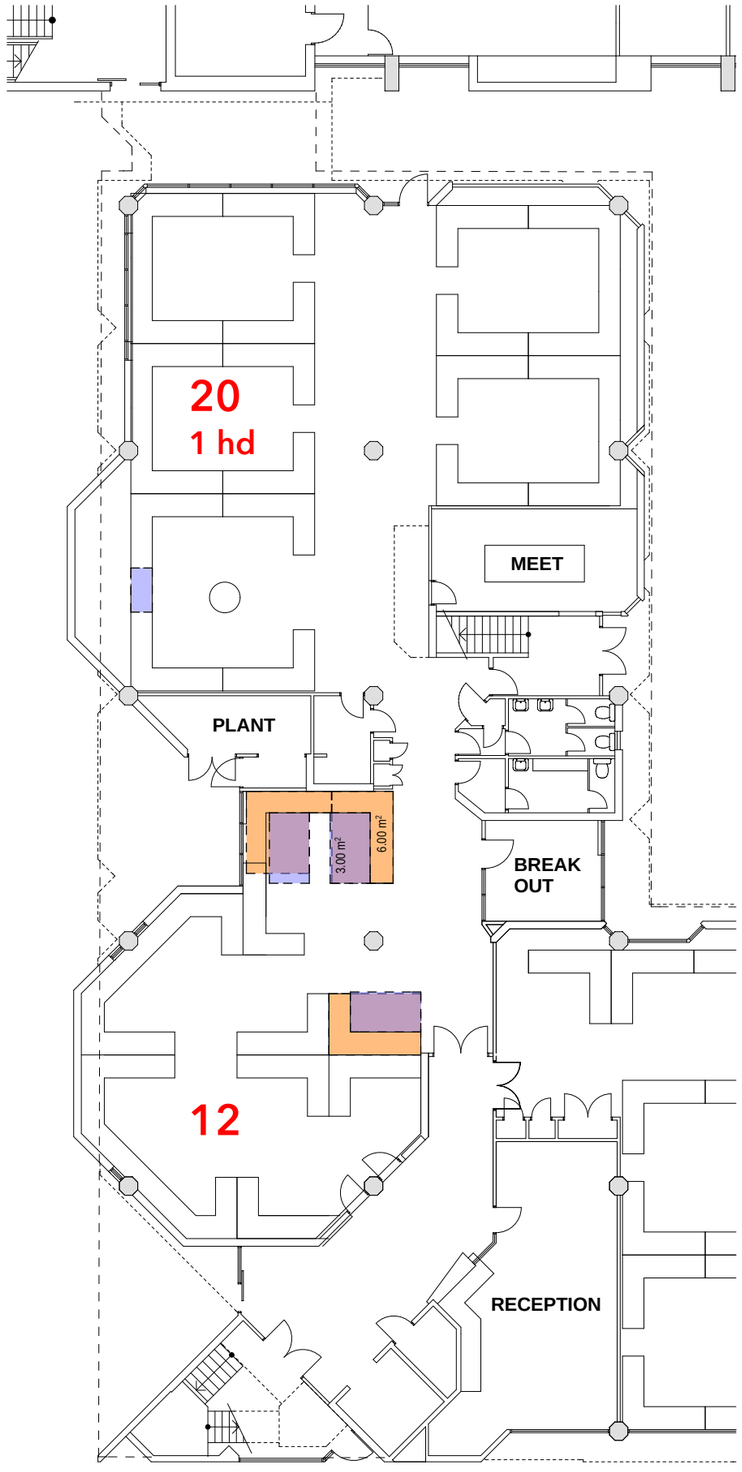


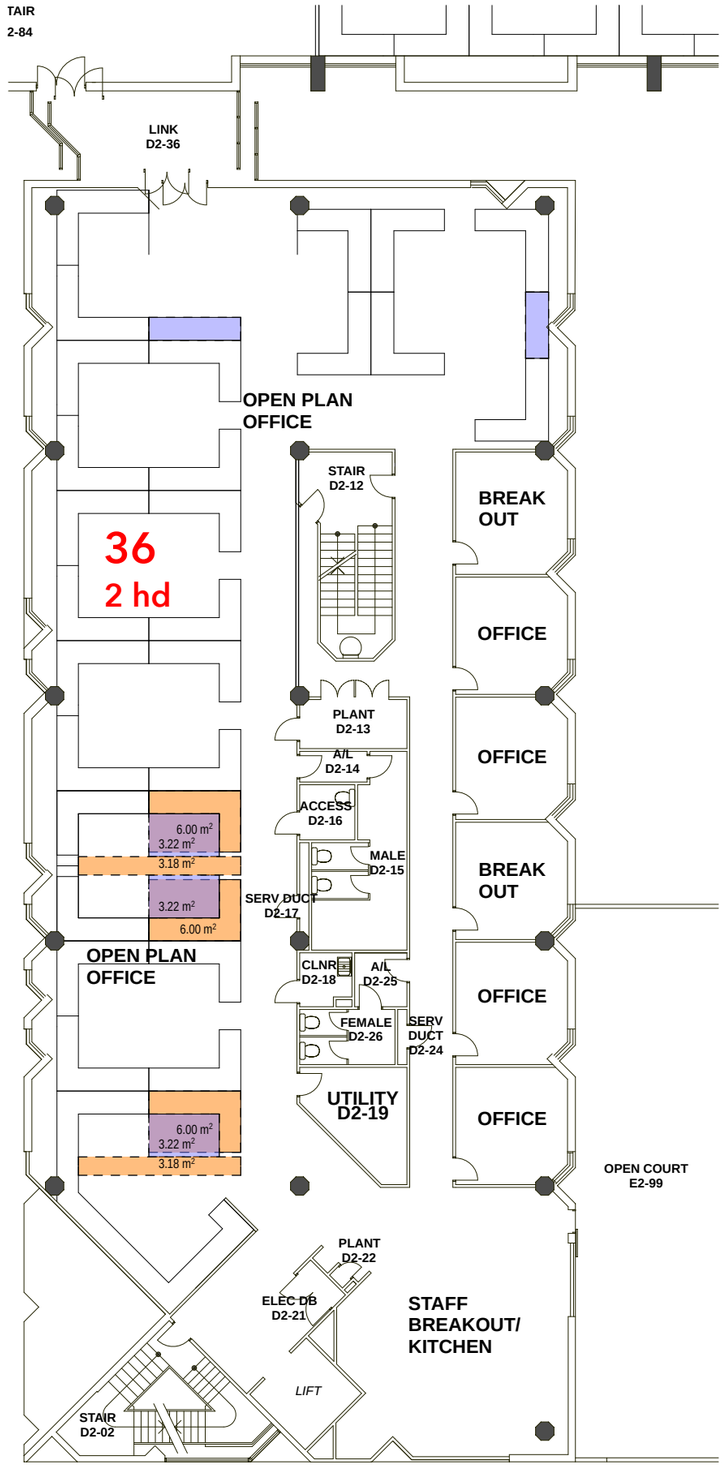
WOTSO Flexible Lab Space for Rent in Sydney

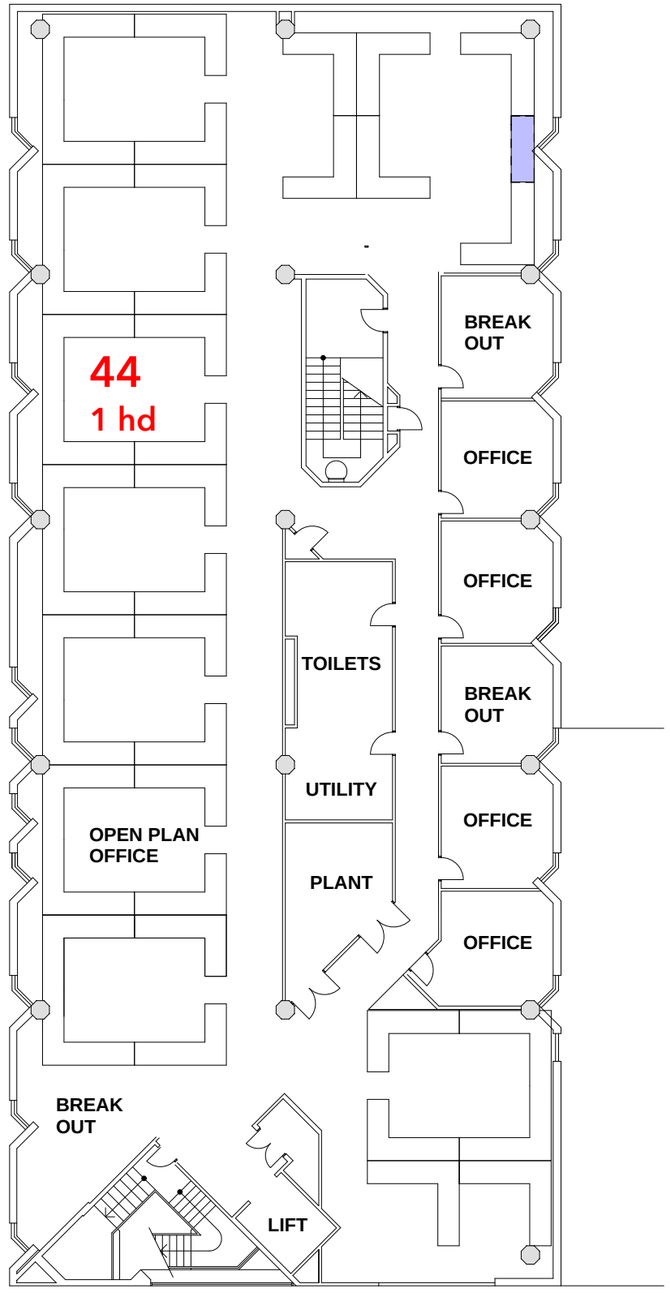
GSK Harlow Drug manufacturing development space – flexible plug in services – no fixed equipment or benches

TENANCY CONCEPTS

ITMS
WORKSPACE & RESEARCH







Phillips/Pilkington Architects

165 MacKinnon Parade, North Adelaide SA 5006
tel: 08 8239 9000 fax 08 8239 9099

University of South Australia

UniSA
Mawson Lakes FII & Campus Master Plan
Mawson Lakes, South Australia

BUILDING D PROPOSAL

Scale 1:100 @ A1

Drawing By: AM/TH
Checked By: SP
Project No/Drawing No.: 15479 - SK010
Date: 19/12/2016
NOT FOR CONSTRUCTION
Revision: P1

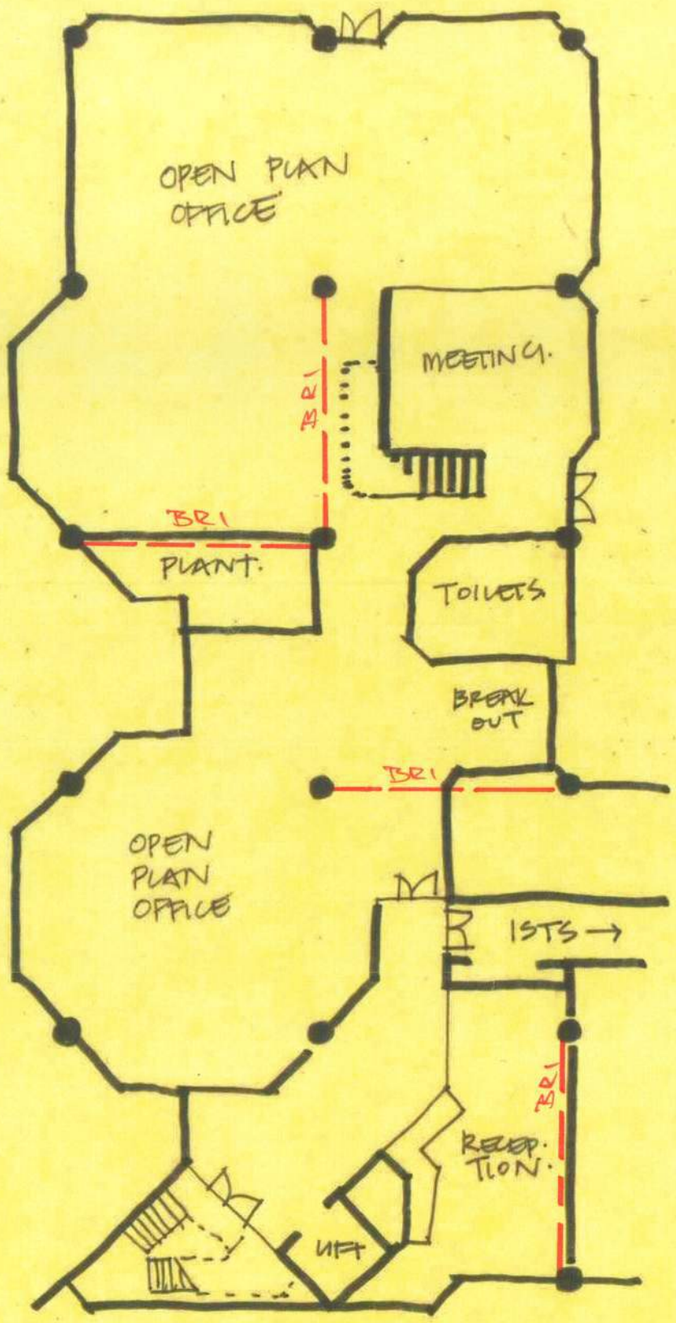
Plot Date: 19/12/2016 /Volumes/PPA Data/JOB FILES/15479 UniSA Mawson Lakes Master Plan/15479 Drawings/CAD Files/Model/ITMS CONCEPT/15479 UniSA Master Plan_ITMS CONCEPT.pln

W&G
WALLBRIDGE & GILBERT
Consulting Engineers
60 Wyatt Street
Adelaide, South Australia 5000
Phone (08) 8223 7433
Facsimile (08) 8232 0967
adelaide@wgeng.com
www.wallbridgeandgilbert.com.au

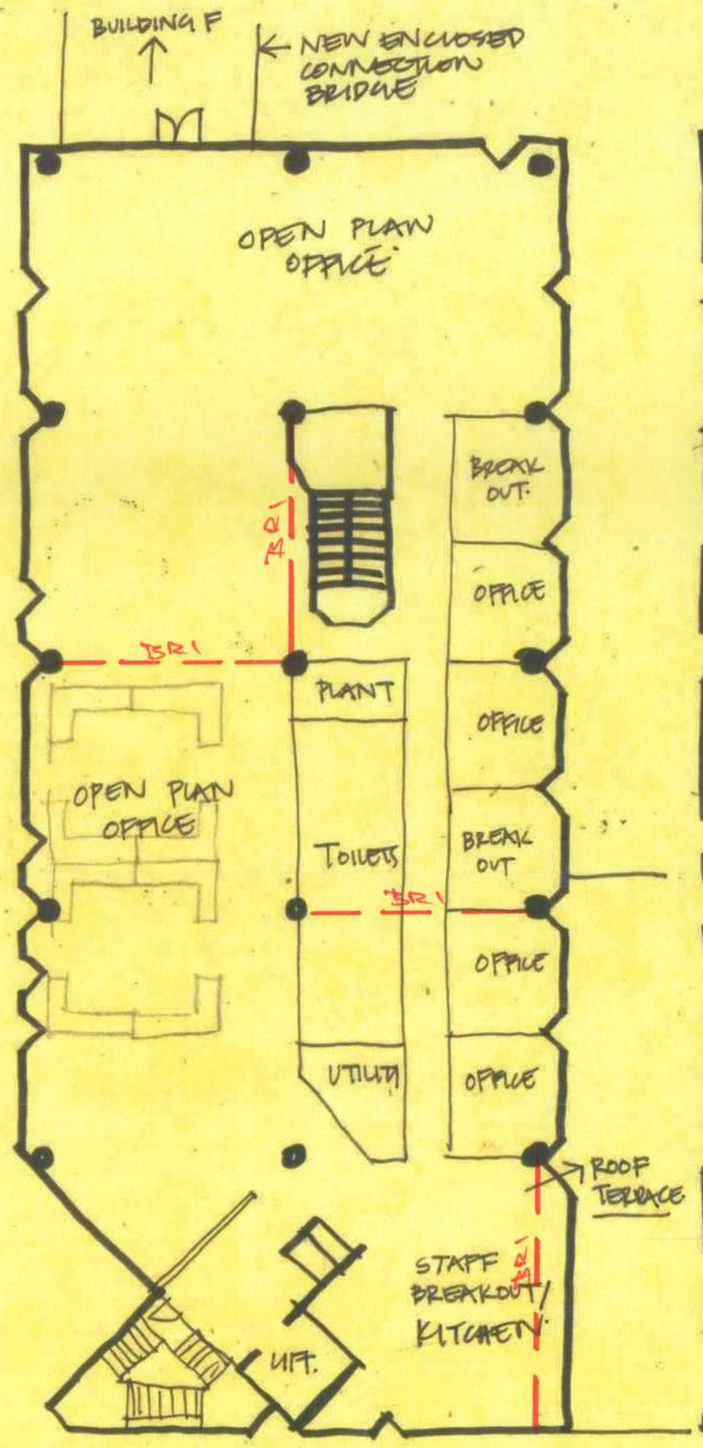
WADIS1446
BMN
29/06/2016
SK-01 A

SCHEDULE

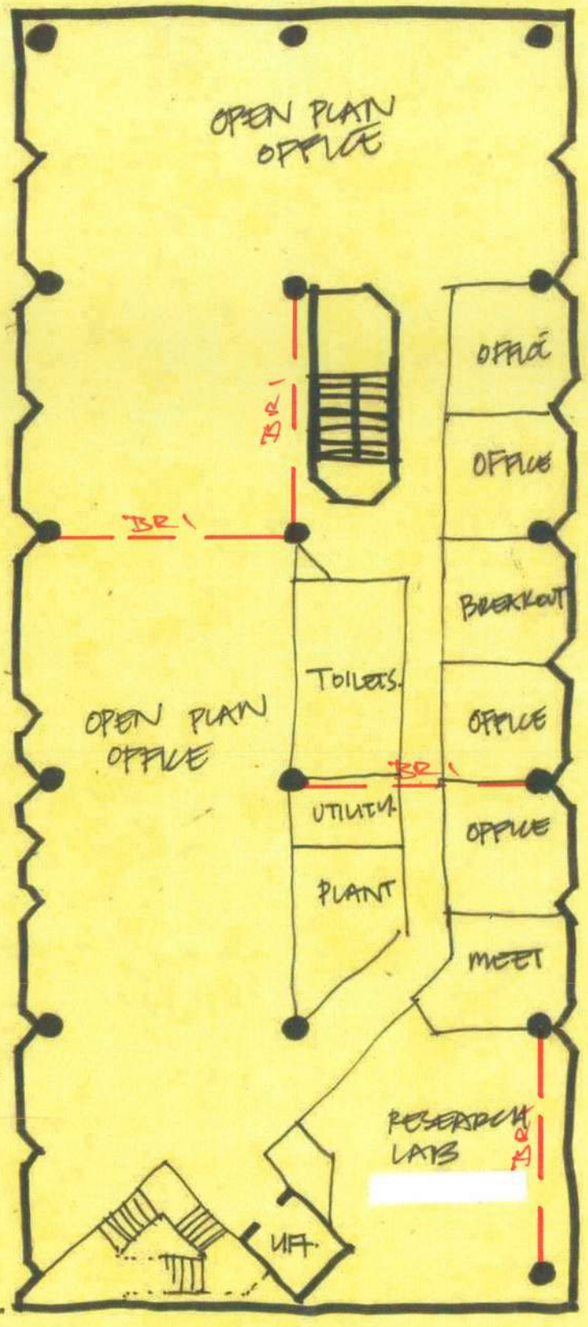
MARK	SIZE
BR1	150 SHS BRACED FRAME TO GROUND



BUILDING D - GROUND
ITMS CONCEPT PROPOSAL.
1:200 @ A3

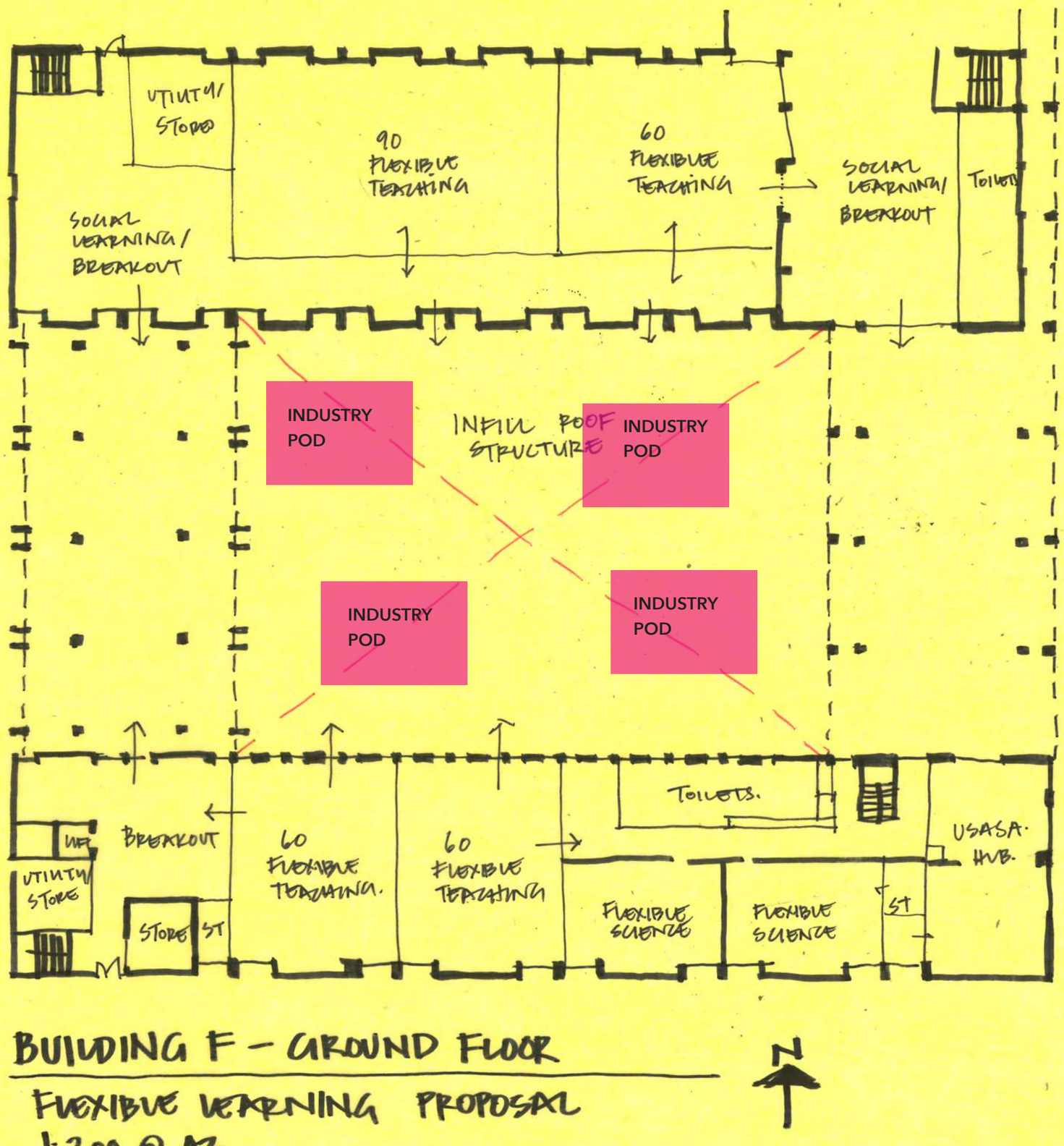


BUILDING D - FIRST. FLOOR
ITMS CONCEPT PROPOSAL
1:200 @ A3



BUILDING D - TOP FLOOR
ITMS CONCEPT PROPOSAL
1:200 @ A3

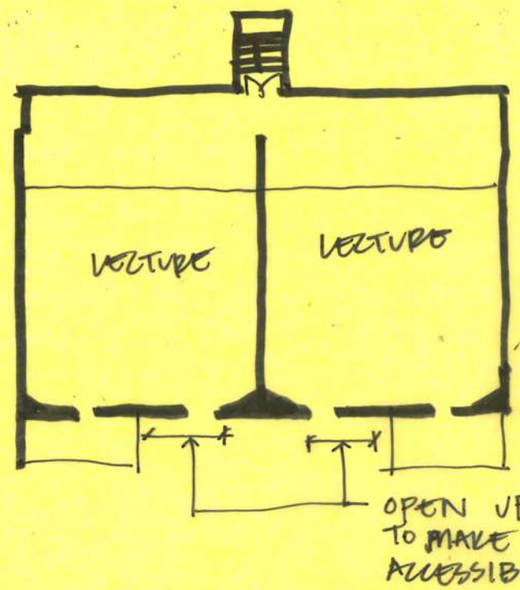
N

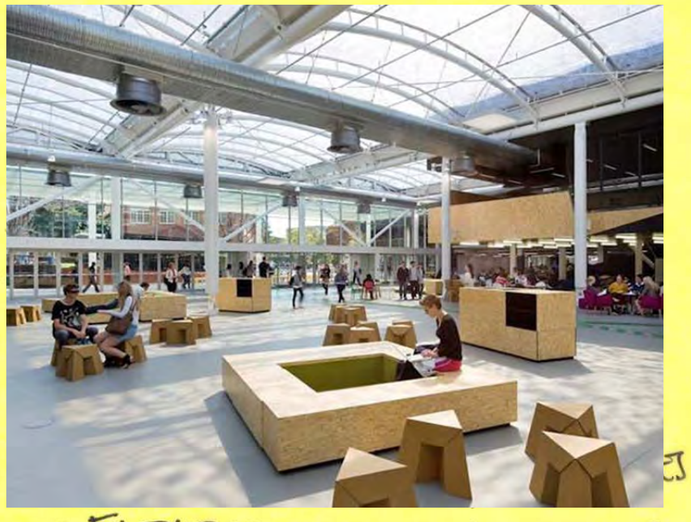


BUILDING F - GROUND FLOOR

FLEXIBLE LEARNING PROPOSAL

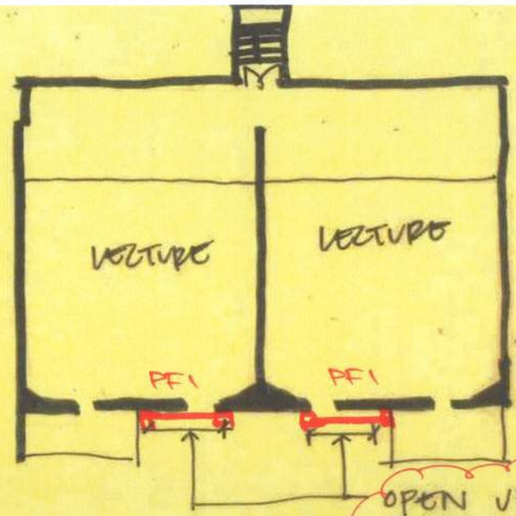
1:300 @ A3

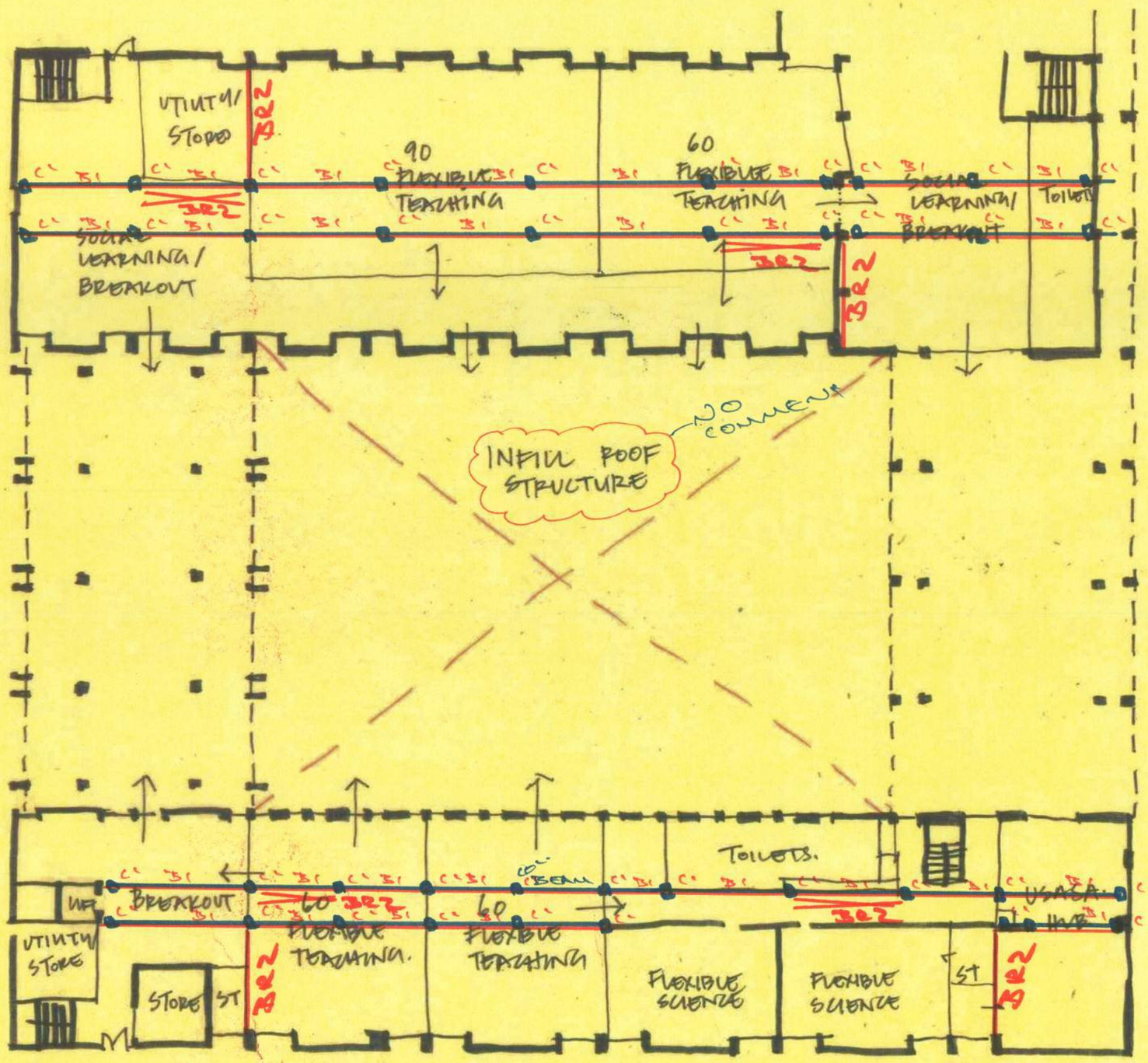




W&G
WALLBRIDGE & GILBERT
Consulting Engineers
60 Wyatt Street
Adelaide, South Australia 5000
Phone (08) 8223 7433
Facsimile (08) 8232 0967
adelaide@wgeng.com
www.wallbridgeandgilbert.com.au

WADI5446
BMN
29/06/2016
SK-02A





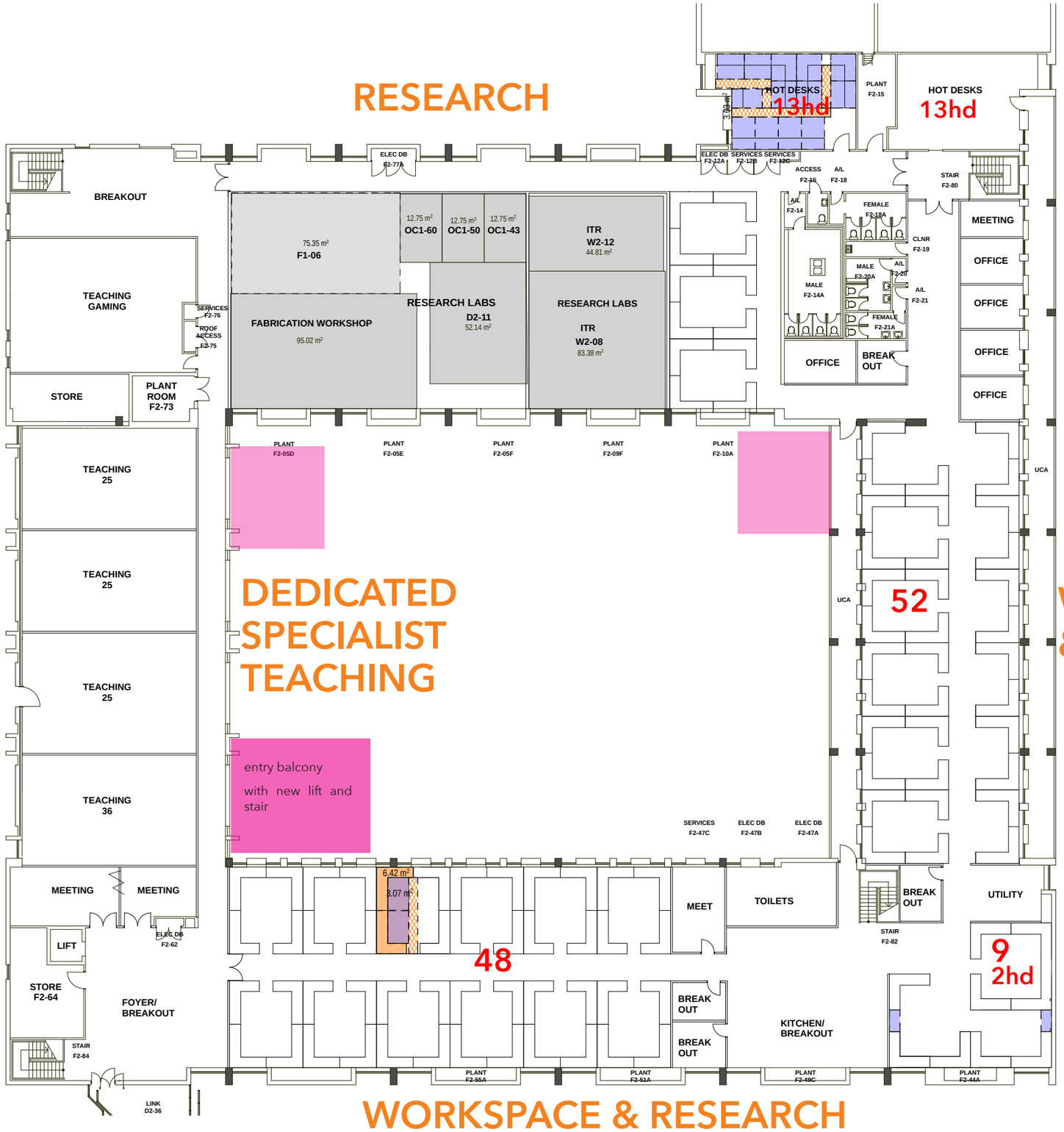
- SERVICES UPGRADE UNDER NEW ROOF STRUCTURE FOR INDUSTRY POD INSTALLATIONS
- OPEN UP FACADE FOR PERMABILITY.
- UPGRADES TO LECTURE THEATRES
- FLEXIBLE TEACHING SPACES

BUILDING F - GROUND FLOOR

FLEXIBLE LEARNING PROPOSAL

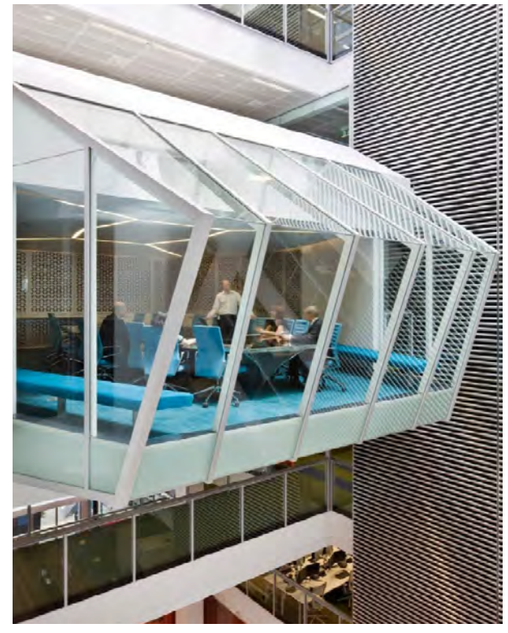
1:300 @ A3

RESEARCH



DEDICATED SPECIALIST TEACHING

WORKSPACE & RESEARCH



WORKSPACE & RESEARCH

Phillips/Pilkington Architects

165 MacKinnon Parade, North Adelaide SA 5006
tel: 08 8239 9000 fax 08 8239 9099

University of South Australia

UniSA
Mawson Lakes FII & Campus Master Plan
Mawson Lakes, South Australia

BUILDING F LEVEL 2 PROPOSAL

Scale 1:150 @ A1

Drawing By: AM/TH
Checked By: SP
Date: 19/12/2016
NOT FOR CONSTRUCTION
Project No/Drawing No.: 15479 - SK011
Revision: P1

Plot Date: 19/12/2016 /Volumes/PPA Data/JOB FILES/15479 UniSA Mawson Lakes Master Plan/15479 Drawings/CAD Files/Model/ITMS CONCEPT/15479 UniSA Master Plan_ITMS CONCEPT.pln

W&G
WALLBRIDGE & GILBERT
Consulting Engineers
60 Wyatt Street
Adelaide, South Australia 5000
Phone (08) 8223 7433
Facsimile (08) 8232 0967
adelaide@wgeng.com
www.wallbridgeandgilbert.com.au

WAD15446
BMN
29/06/2016
SK-03 A

RESEARCH

DEDICATED SPECIALIST TEACHING

WORKSPACE & RESEARCH

WORKSPACE & RESEARCH

Student teaching.
- GP comp pools
- MAZ labs

Research:
- comp labs
- forensics
- ITR labs.
- combined office/labs

SCHEDULE

MARK	SIZE	COMMENT
B1	200UB	BEAM TO REPLACE INTERNAL LOAD BEARING MASONRY.
C1	100 SHS	COLUMN @ 4m CTS NOM.
BR2	100 SHS	WALL BRACE.
PF1	200 UC	COLUMNS & BEAMS, PORTAL FRAME.

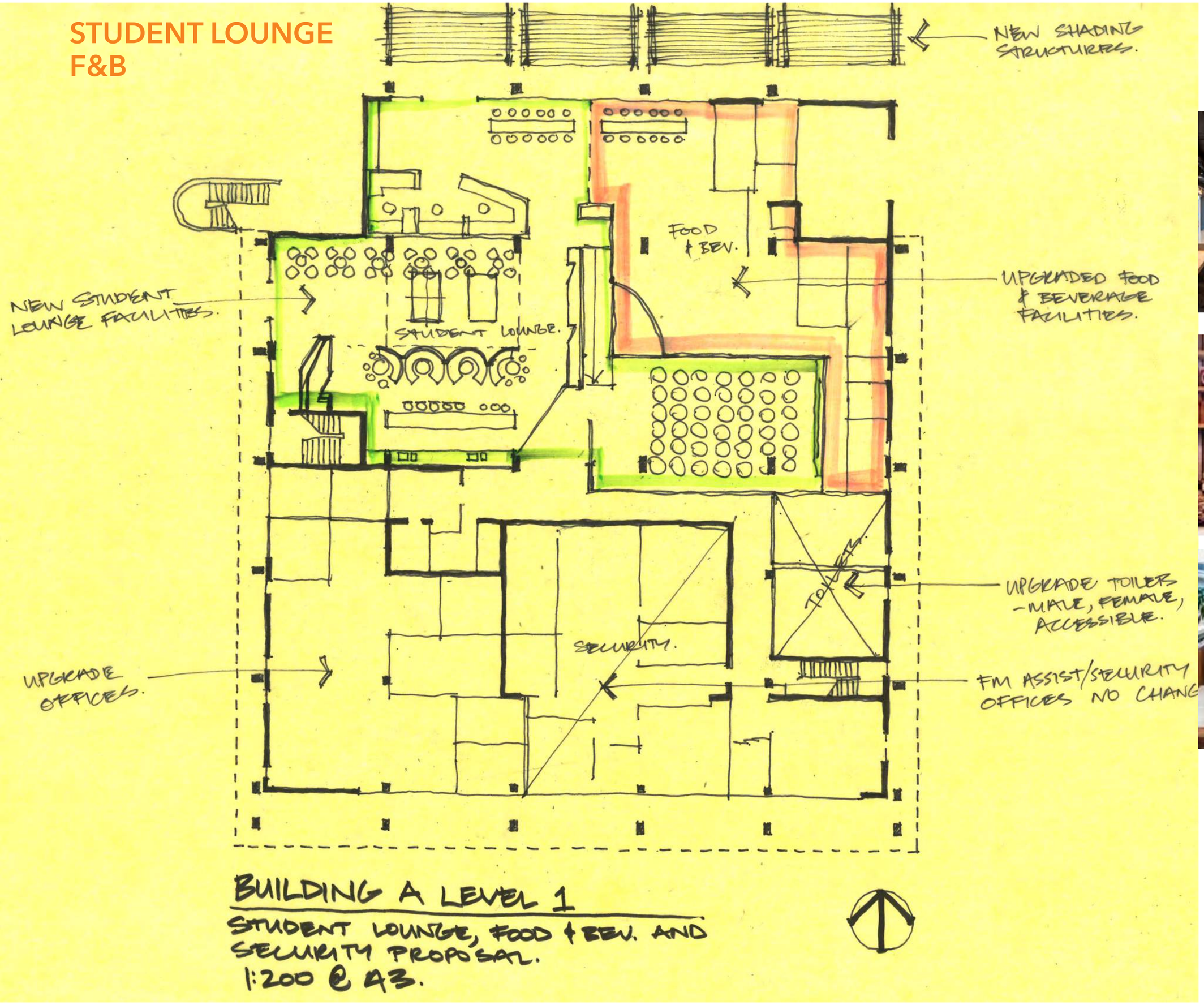
LINK TO BUILDING D.

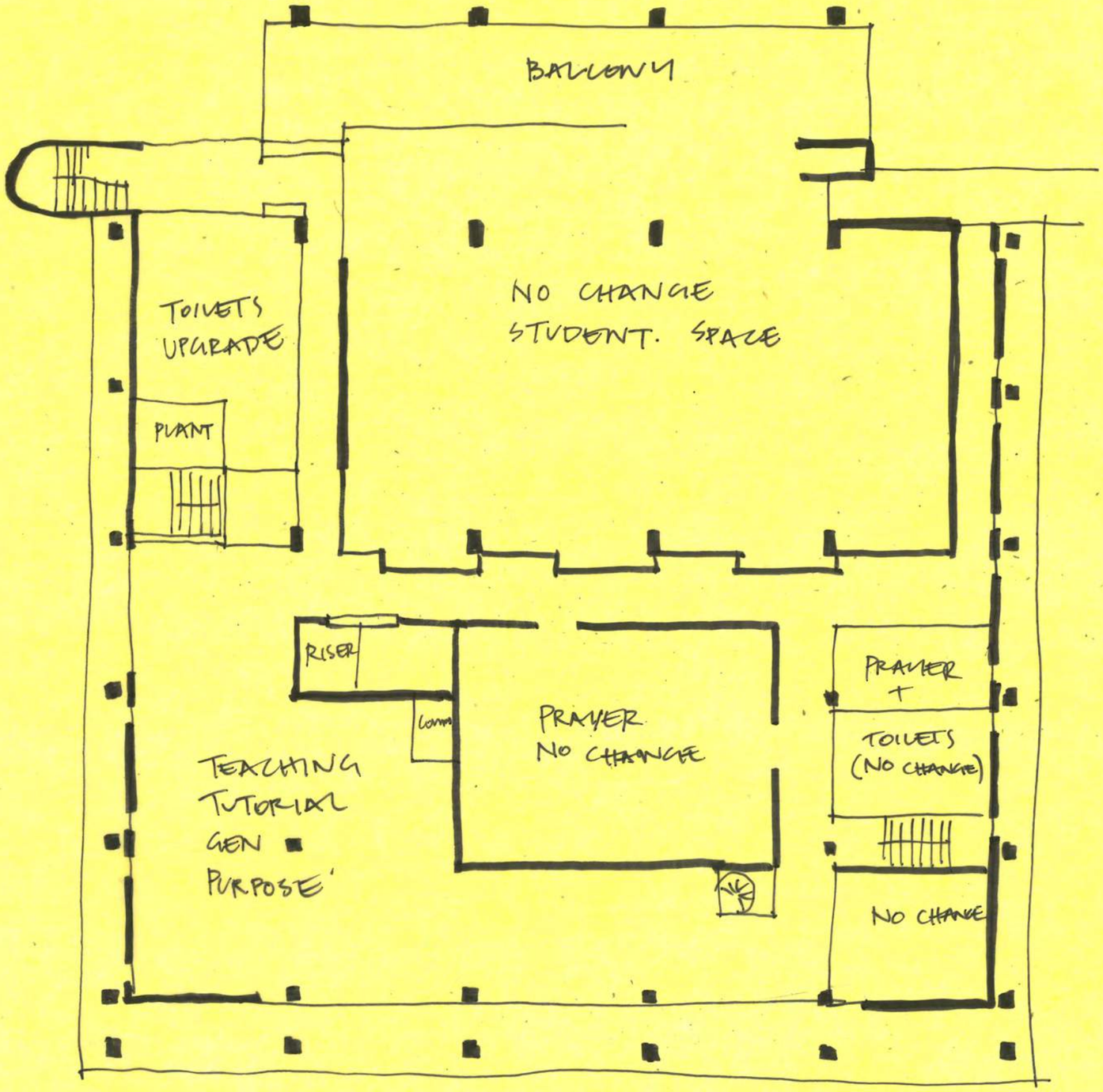
BUILDING F - UPPER FLOOR

ITMS CONCEPT PROPOSAL

N

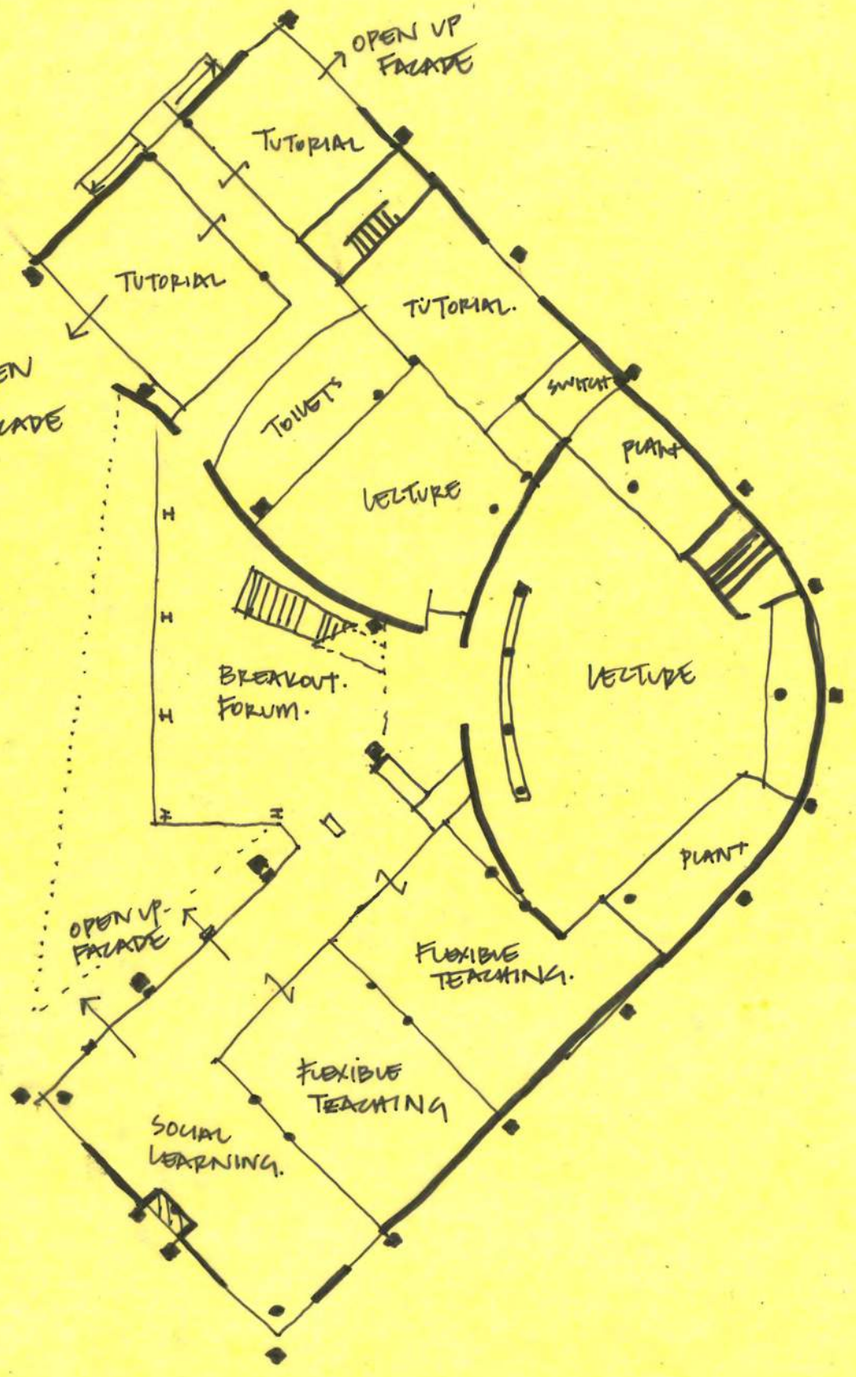
STUDENT LOUNGE F&B



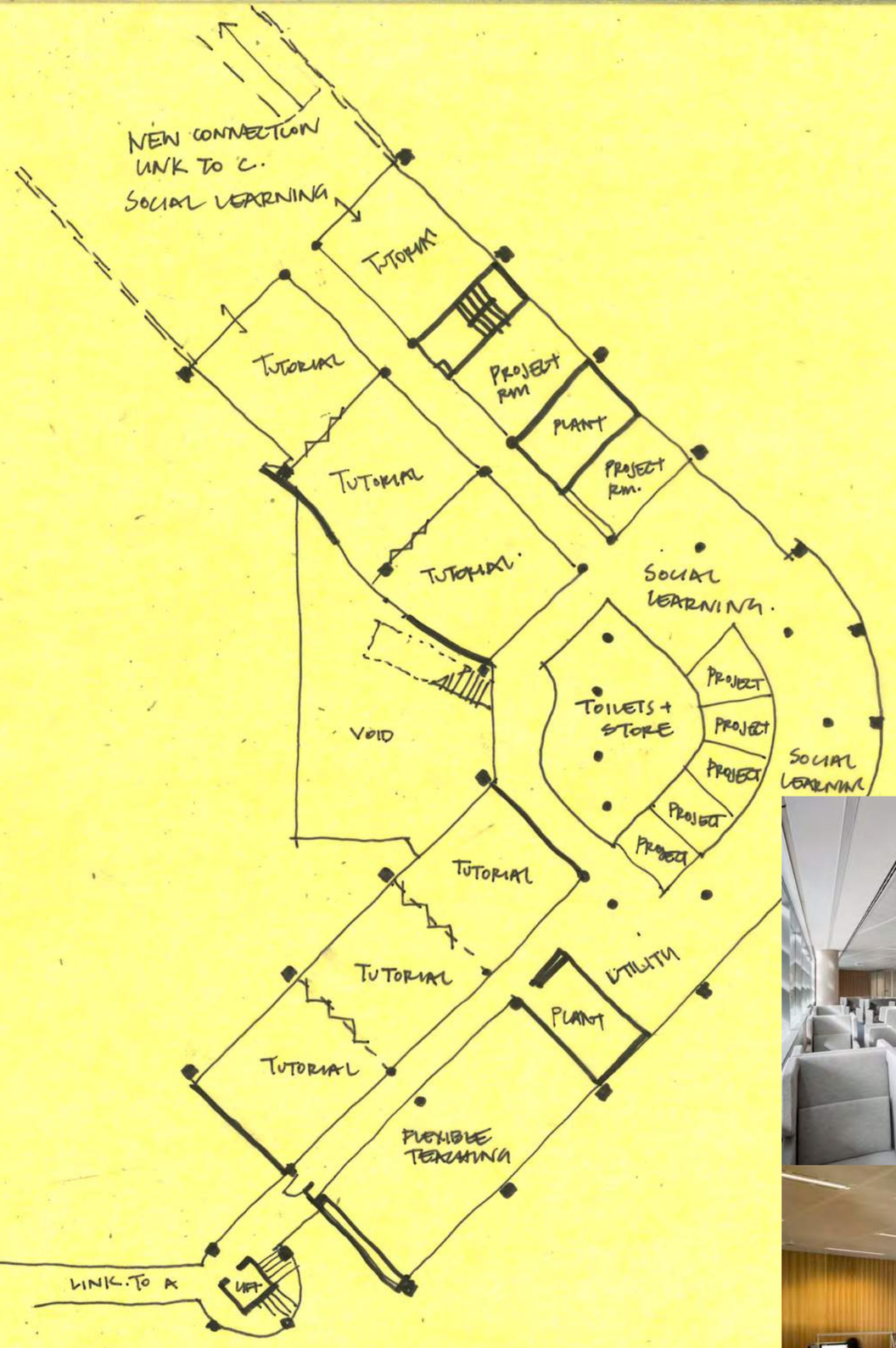


BUILDING A - UPPER FLOOR - STUDENT SPACES

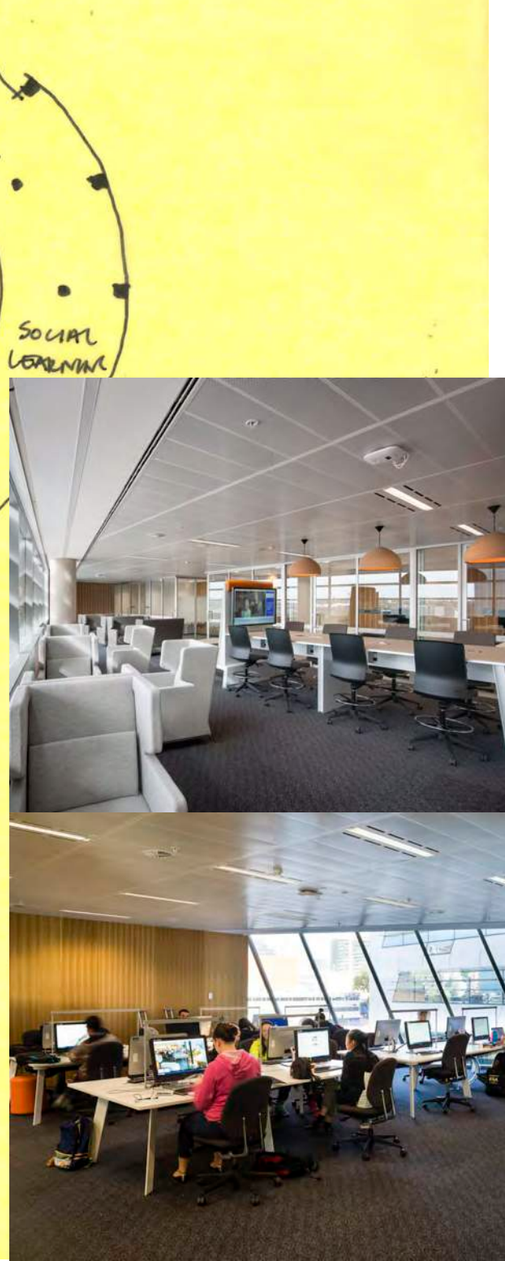
1:200 @ A3



BUILDING GP - GROUND FLOOR
FLEXIBLE TEACHING PROPOSAL
1:300 @ A3

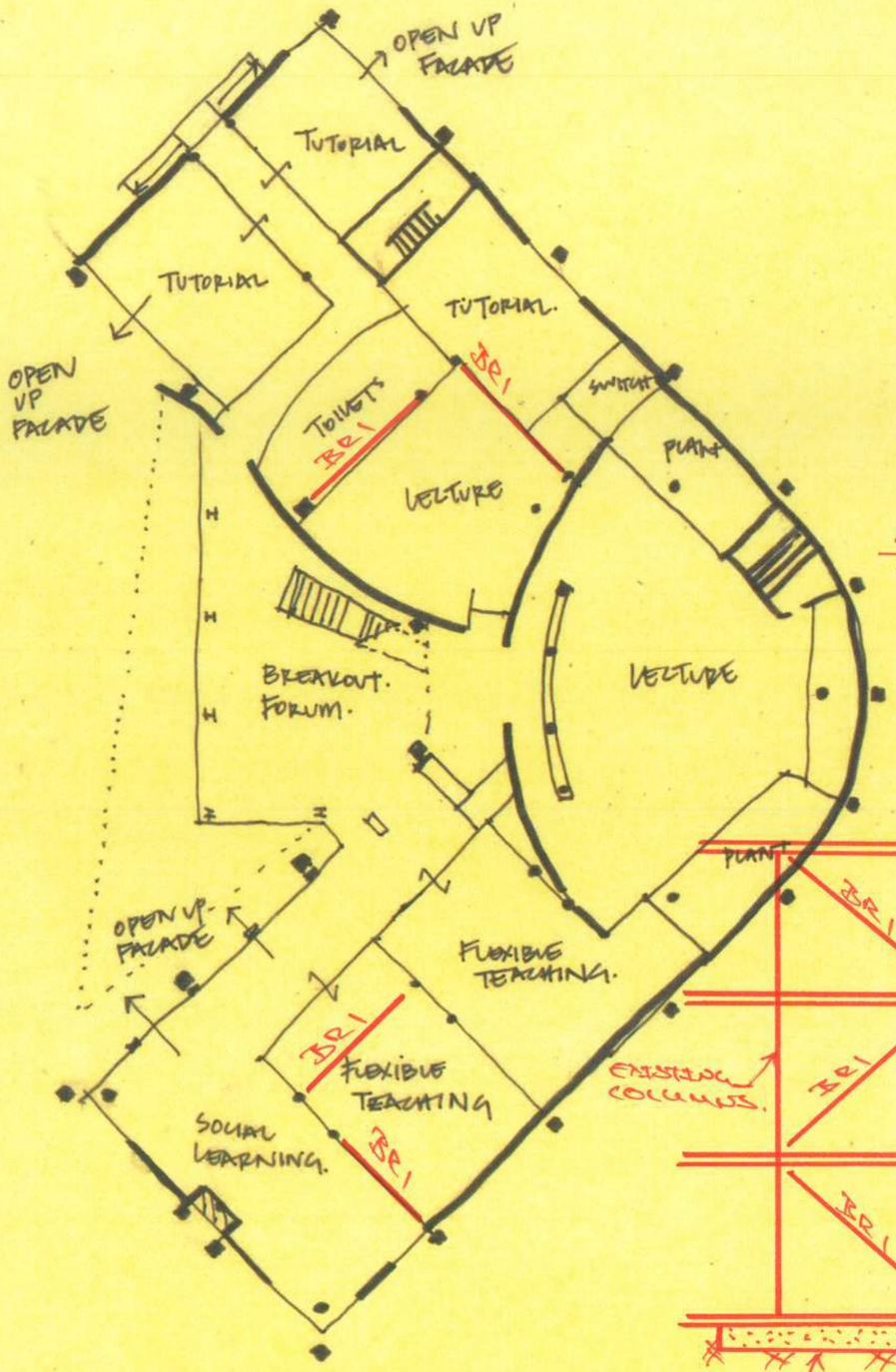


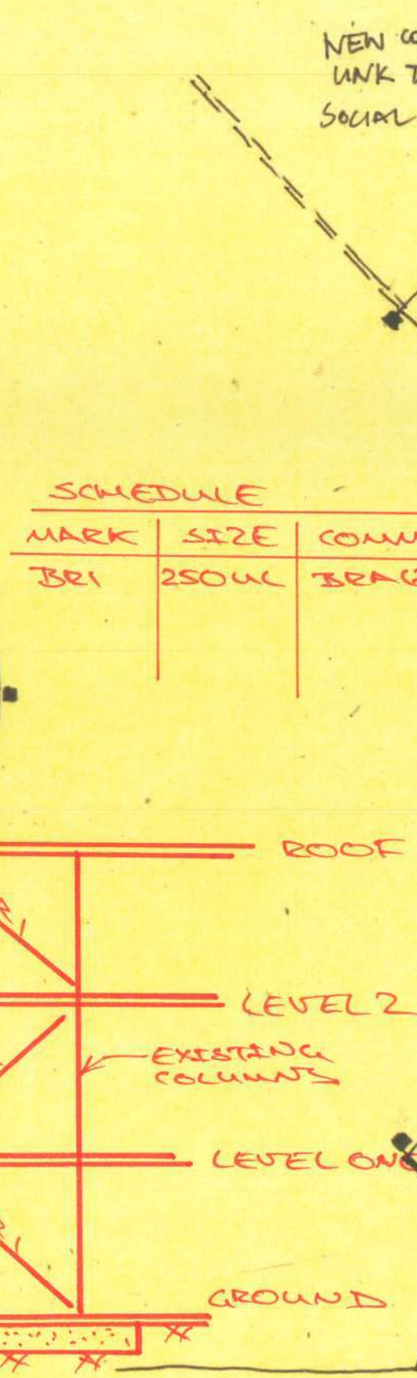
BUILDING GP - UPPER FLOOR
FLEXIBLE TEACHING PROPOSAL
1:300 @ A3



W&G
WALLBRIDGE & GILBERT
Consulting Engineers
60 Wyatt Street
Adelaide, South Australia 5000
Phone (08) 8223 7433
Facsimile (08) 8232 0967
adelaide@wgeng.com
www.wallbridgeandgilbert.com.au

WAD15146
14/07/2016
BMN
SK-04A





SCHEDULE

MARK	SIZE	COMMENT
BR1	250UC	BRACE

TYPICAL BRACING BAY

BUILDING GP - GROUND FLOOR
FLEXIBLE TEACHING PROPOSAL
1:300 @ A3

BUILDING GP - UPPER FLOOR
FLEXIBLE TEACHING PROPOSAL
1:300 @ A3

- UPGRADE LECTURE THEATRES
- REFURBISHMENT TO ALL INTERNAL SPACES
- OPEN UP FACADE AT GROUND LEVEL FOR PERMABILITY. TO COURTYARD.
- FLEXIBLE TEACHING + SOCIAL LEARNING SPACE

OFFICES - NO CHANGE

MAIL ROOM

STORE.

LIFT

RECEPTION.

TOILETS

ADAP. TOIL

MAS

INDIGENOUS STUDENT SERVICES.

INDIVIDUAL + PC STUDY

PROJECT ROOMS

INDIVIDUAL STUDY.

GROUP STUDY

RISER

INDIVIDUAL + PC STUDY.

PROJECT ROOMS.

OPEN UP FACADE TO COURTYARD

GROUP STUDY.

ENTRY.

GROUP STUDY

OPEN UP FACADE TO COURTYARD

KITCHEN

STORE

PLANT

TOILETS

TOILETS

LIFT

UTILITY

BUILDING C - GROUND FLOOR. STUDENT LEARNING

1:200 @ A3.

PROJECT
PROJECT
PROJECT
INDIVIDUAL LEARNING + PC.
LIB COLLECTION
LIFT
PLANT
TOILETS
GROUP STUDY
SOCIAL LEARNING
VOID.
LIFT
PROJECT
PROJECT
PROJECT
PROJECT
ISTS sandpit
SOCIAL LEARNING
GROUP STUDY
UTILITY.
TOILETS
PROJECT
RISER
STORE
COMMS
SILENT WORK ZONE
PROJECT
PROJECT
LIB COLLECTION.
INDIVIDUAL LEARNING + PC.
BREAK OUT.

BUILDING G - MIDDLE FLOOR - STUDENT LEARNING

1:200 @ A3

Phillips/Pilkington Architects

165 MacKinnon Parade, North Adelaide SA 5006
tel: 08 8239 9000 fax 08 8239 9099

University of South Australia

UniSA

Mawson Lakes FII & Campus Master Plan

Mawson Lakes, South Australia

BUILDING C LEVEL 3 PROPOSAL

Scale 1:100 @ A1

Drawing By: AM/TH

Date: 19/12/2016

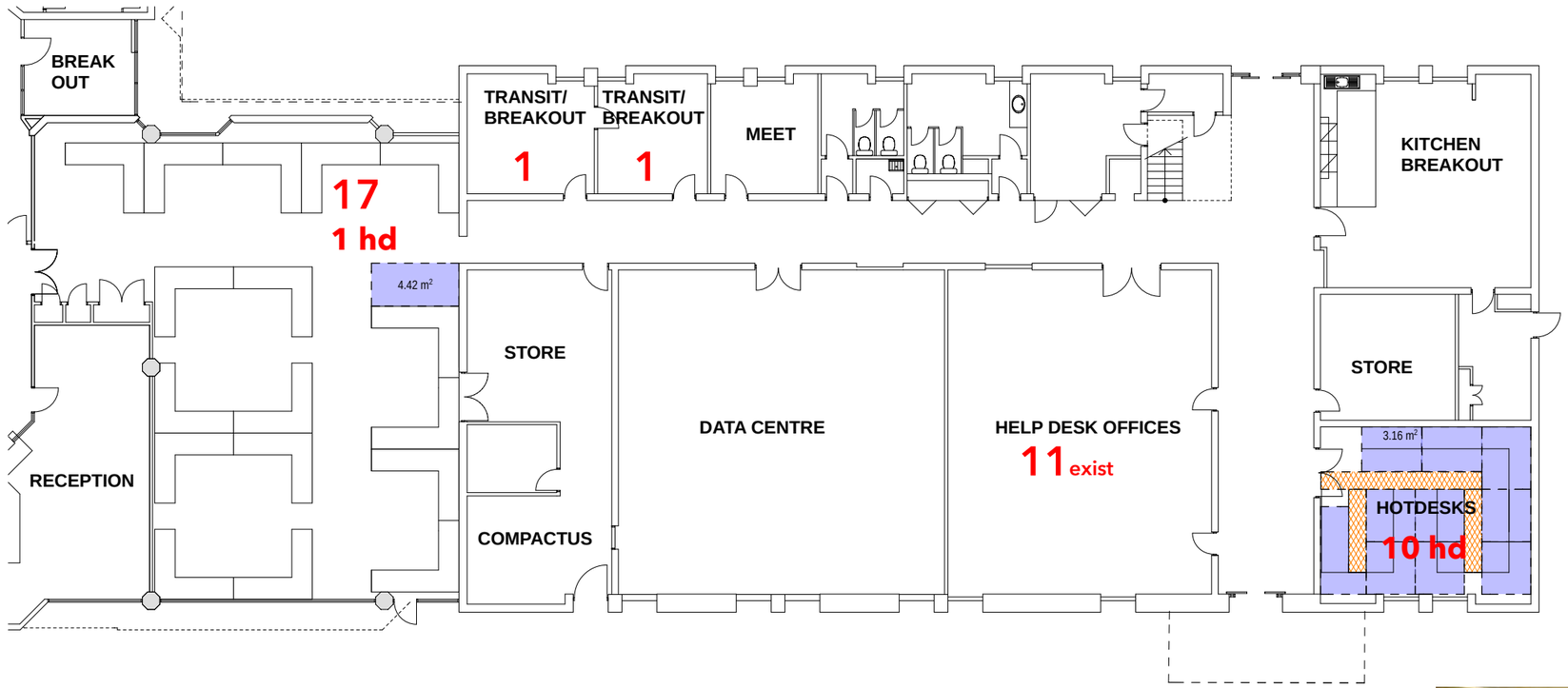
Checked By: SP

NOT FOR CONSTRUCTION

Project No/Drawing No.: 15479 - SK012

Revision: P1

Plot Date: 19/12/2016 /Volumes/PPA Data/JOB FILES/15479 UniSA Mawson Lakes Master Plan/15479 Drawings/CAD Files/Model/ITMS CONCEPT/15479 UniSA Master Plan_ITMS CONCEPT.pln



Phillips/Pilkington Architects

165 MacKinnon Parade, North Adelaide SA 5006
tel: 08 8239 9000 fax 08 8239 9099

University of South Australia

UniSA

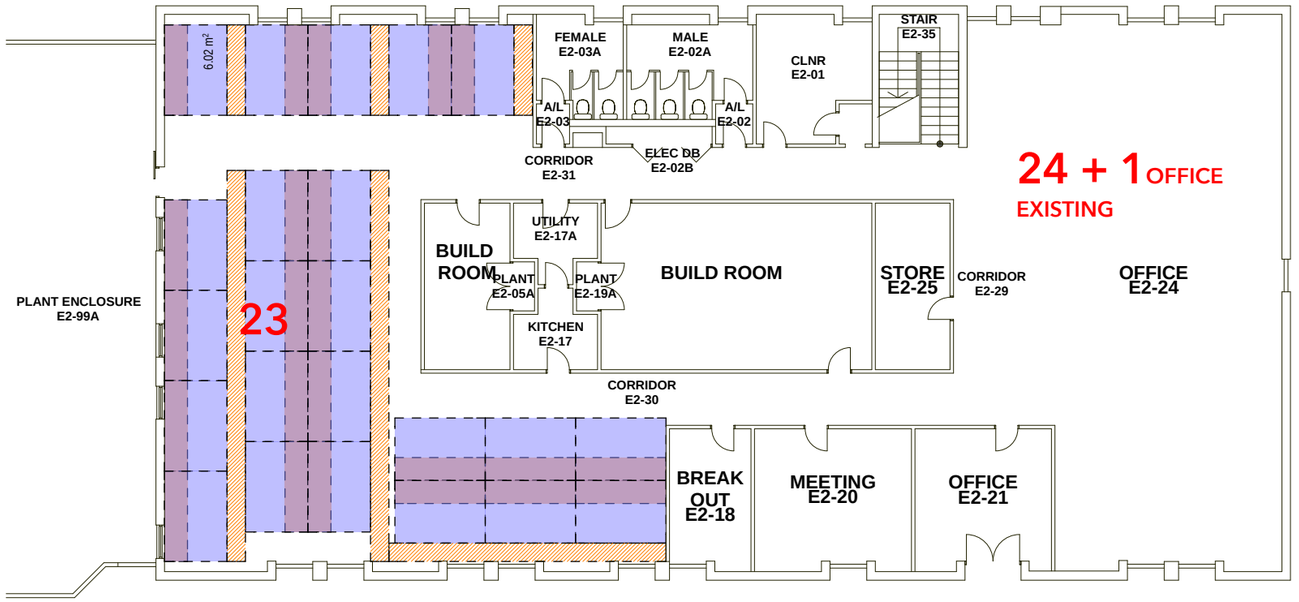
Mawson Lakes FII & Campus Master Plan
Mawson Lakes, South Australia

BUILDING E LEVEL 1 PROPOSAL

Scale 1:100 @ A1

Drawing By: AM/TH
Checked By: SP
Date: 19/12/2016
NOT FOR CONSTRUCTION
Project No/Drawing No.: 15479 - SK013
Revision: P1

Plot Date: 19/12/2016 /Volumes/PPA Data/JOB FILES/15479 UniSA Mawson Lakes Master Plan/15479 Drawings/CAD Files/Model/ITMS CONCEPT/15479 UniSA Master Plan_ITMS CONCEPT.pln



Phillips/Pilkington Architects

165 MacKinnon Parade, North Adelaide SA 5006
tel: 08 8239 9000 fax 08 8239 9099

University of South Australia

UniSA

Mawson Lakes FII & Campus Master Plan

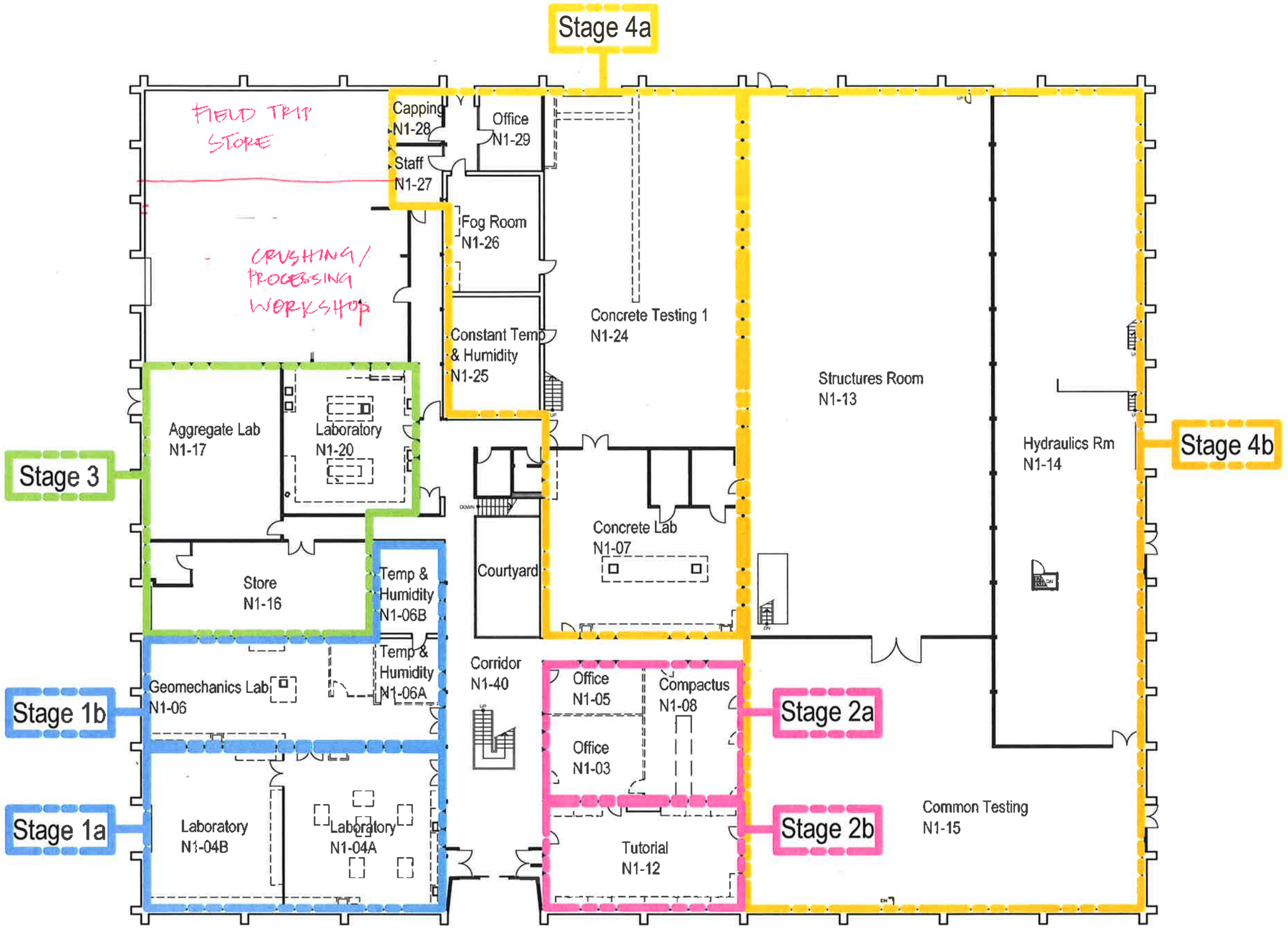
Mawson Lakes, South Australia

BUILDING E LEVEL 2 PROPOSAL

Scale 1:100 @ A1

Drawing By: AM/TH
Checked By: SP
Date: 19/12/2016
NOT FOR CONSTRUCTION
Project No/Drawing No.: 15479 - SK014
Revision: P1

Plot Date: 19/12/2016 /Volumes/PPA Data/JOB FILES/15479 UniSA Mawson Lakes Master Plan/15479 Drawings/CAD Files/Model/ITMS CONCEPT/15479 UniSA Master Plan_ITMS CONCEPT.pln



Staging Proposal for Construction, Building N - Level 1

Scale 1:250 (A3 paper size)

PROPOSED- BUILDING N (IN LINE WITH NBE MP)

University Of South Australia

katanoo

28 Crowther Street
Adelaide SA 5000 AUS

phone 08 8410 8802
fax 08 8410 8803
web katanoo.com.au

Architecture
3D Visualisation
Project Management
4D Construction Management
Master Planning
Contract Administration

project number 15–111

project title

Building N Masterplan
Mawson Lakes

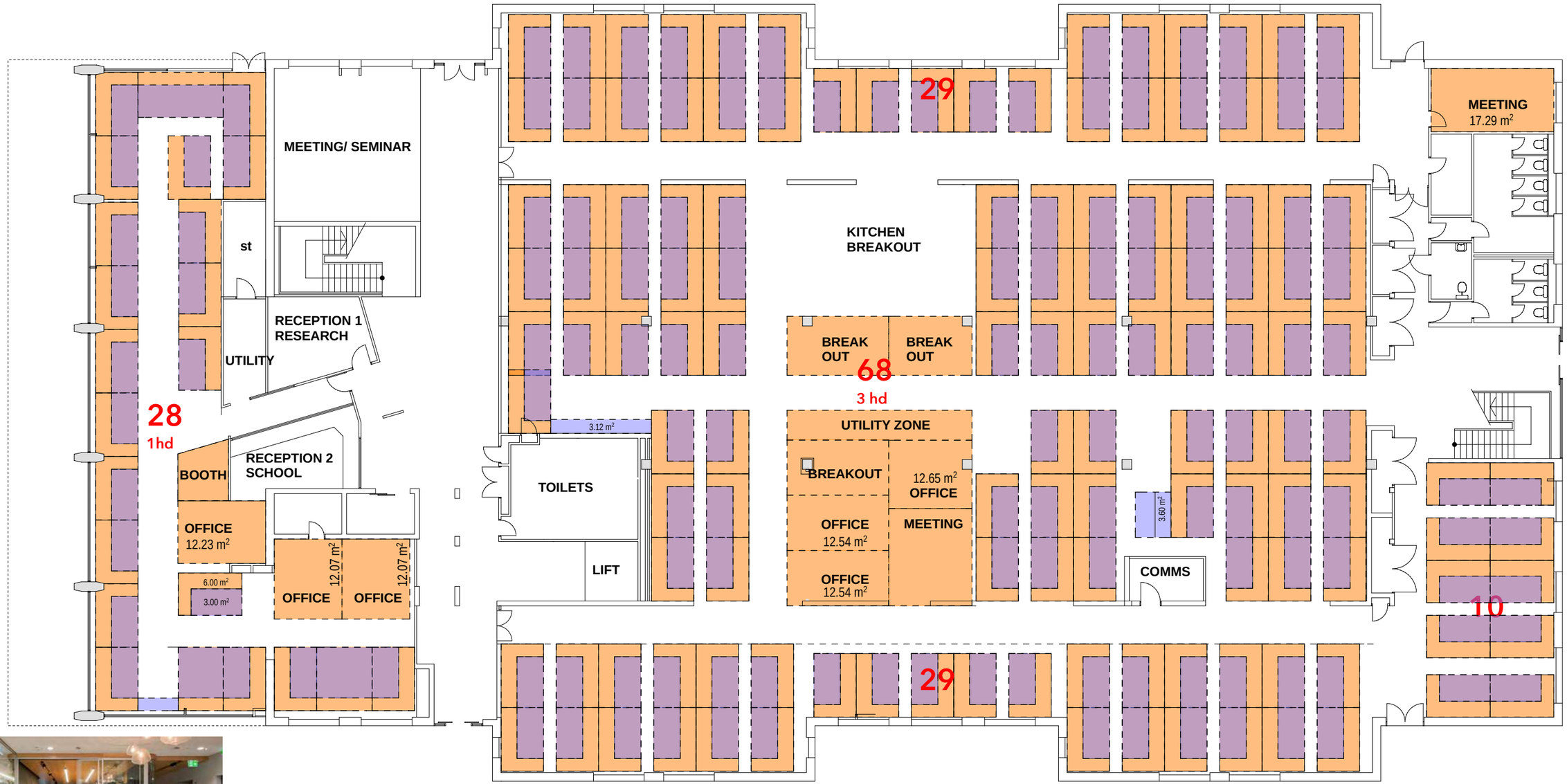
client: UniSA

project architect: J Pienaar

drawing title

Staging Proposal for Construction

scale:	AS SHOWN
date:	August 2015
drawn by:	J Mathews
checked by:	J Pienaar
drawing number	revision
A110	A



Phillips/Pilkington Architects

165 MacKinnon Parade, North Adelaide SA 5006
tel: 08 8239 9000 fax 08 8239 9099

University of South Australia

UniSA

Mawson Lakes FII & Campus Master Plan
Mawson Lakes, South Australia

BUILDING P LEVEL 1 PROPOSAL

Scale 1:100 @ A1

Drawing By: AM/TH
Checked By: SP
Date: 19/12/2016
NOT FOR CONSTRUCTION
Project No/Drawing No.: 15479 - SK015
Revision: P1

Plot Date: 19/12/2016 /Volumes/PPA Data/JOB FILES/15479 UniSA Mawson Lakes Master Plan/15479 Drawings/CAD Files/Model/ITMS CONCEPT/15479 UniSA Master Plan_ITMS CONCEPT.pln

RESEARCH

SPECIALIST TEACHING

6.00 m²

3.00 m²

OPEN PLAN OFFICES

STAIR P2-81

14.35 m²

MEET

WATER RESEARCH LABORATORIES

303.54 m²

BREAKOUT SPACE

FHR P2-05A

CLNR P2-05

FLEXIBLE LEARNING BREAKOUT ZONE

EXISTING P2-53

STAIR P2-45

EXISTING P2-54

SOIL SCIENCE H2-01*

ELEC DB P2-55

TOILETS

A/L P2-56

LIFT

SURVEYING

COMMS P2-43B

SERVICES P2-43E

COMPUTER ROOM

FLEXIBLE LEARNING BREAKOUT ZONE

SPECIALIST TEACHING LAB

PREP ROOM STORAGE

NBE LAB BIO/CHEM TEACHING P2-28

FHR P2-32A

DUCT P2-32

CLNR P2-33

ELEC DB P2-30

A/L P2-31

STRUCTURAL DEMO SPACE

TOILETS

STORE

STAIR P2-80

CORRIDOR P2-63

DUCT P2-26

DUCT P2-25

DUCT P2-24

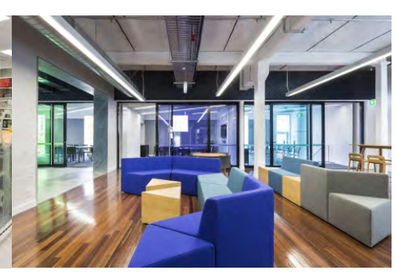
TOILETS

FHR P2-24A

PROJECT BASED LEARNING

FLEXIBLE LEARNING BREAKOUT ZONE

PROJECT BASED LEARNING



Phillips/Pilkington Architects

165 MacKinnon Parade, North Adelaide SA 5006
tel: 08 8239 9000 fax 08 8239 9099

University of South Australia

UniSA

Mawson Lakes FII & Campus Master Plan

Mawson Lakes, South Australia

BUILDING P LEVEL 2 PROPOSAL

Scale 1:100 @ A1

Drawing By: AM/TH

Checked By: SP

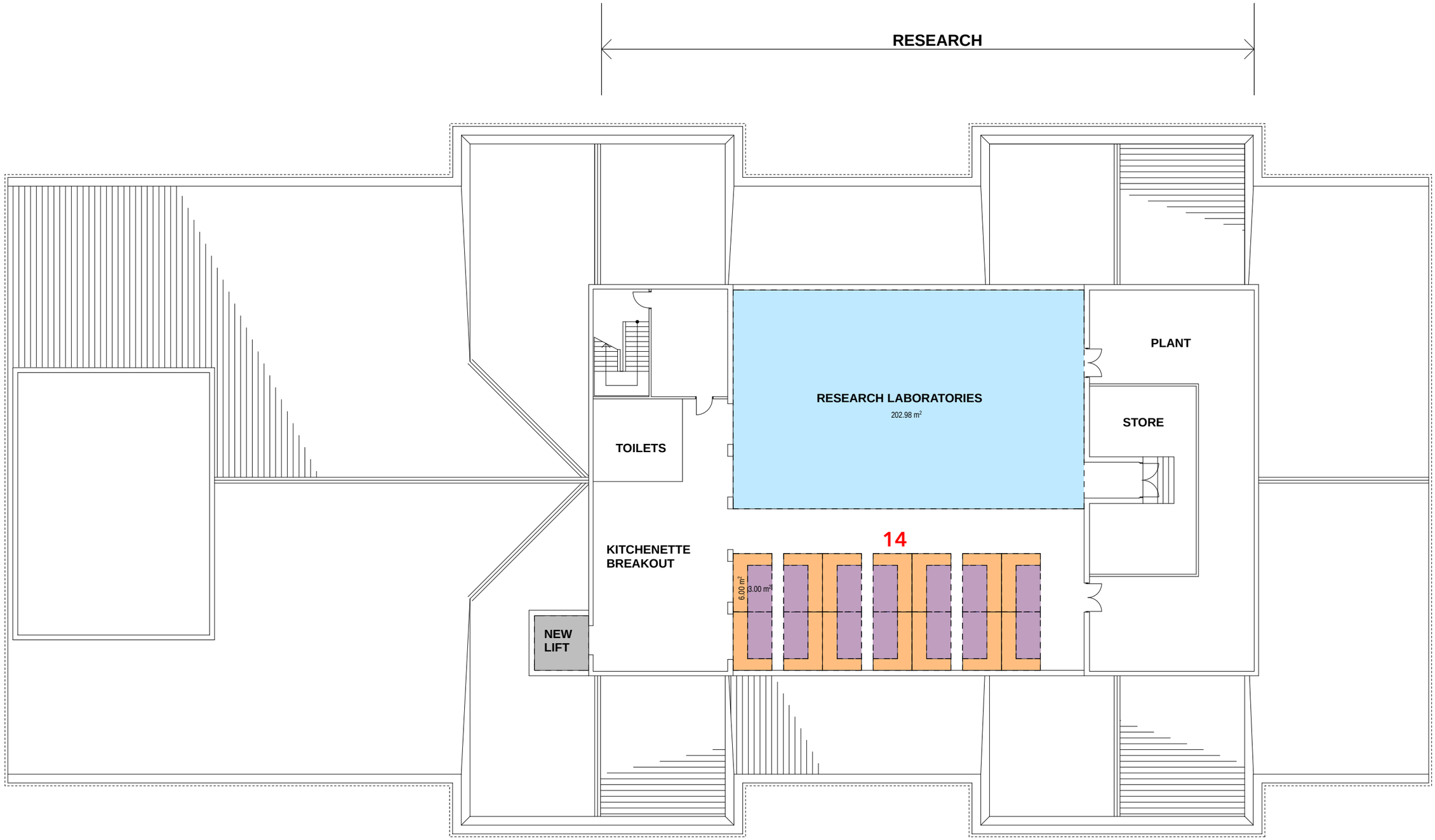
Date: 19/12/2016

NOT FOR CONSTRUCTION

Project No/Drawing No.: 15479 - SK016

Revision: P1

Plot Date: 19/12/2016 /Volumes/PPA Data/JOB FILES/15479 UniSA Mawson Lakes Master Plan/15479 Drawings/CAD Files/Model/ITMS CONCEPT/15479 UniSA Master Plan_ITMS CONCEPT.pln



Phillips/Pilkington Architects
165 MacKinnon Parade, North Adelaide SA 5006
tel: 08 8239 9000 fax 08 8239 9099

University of South Australia

UniSA

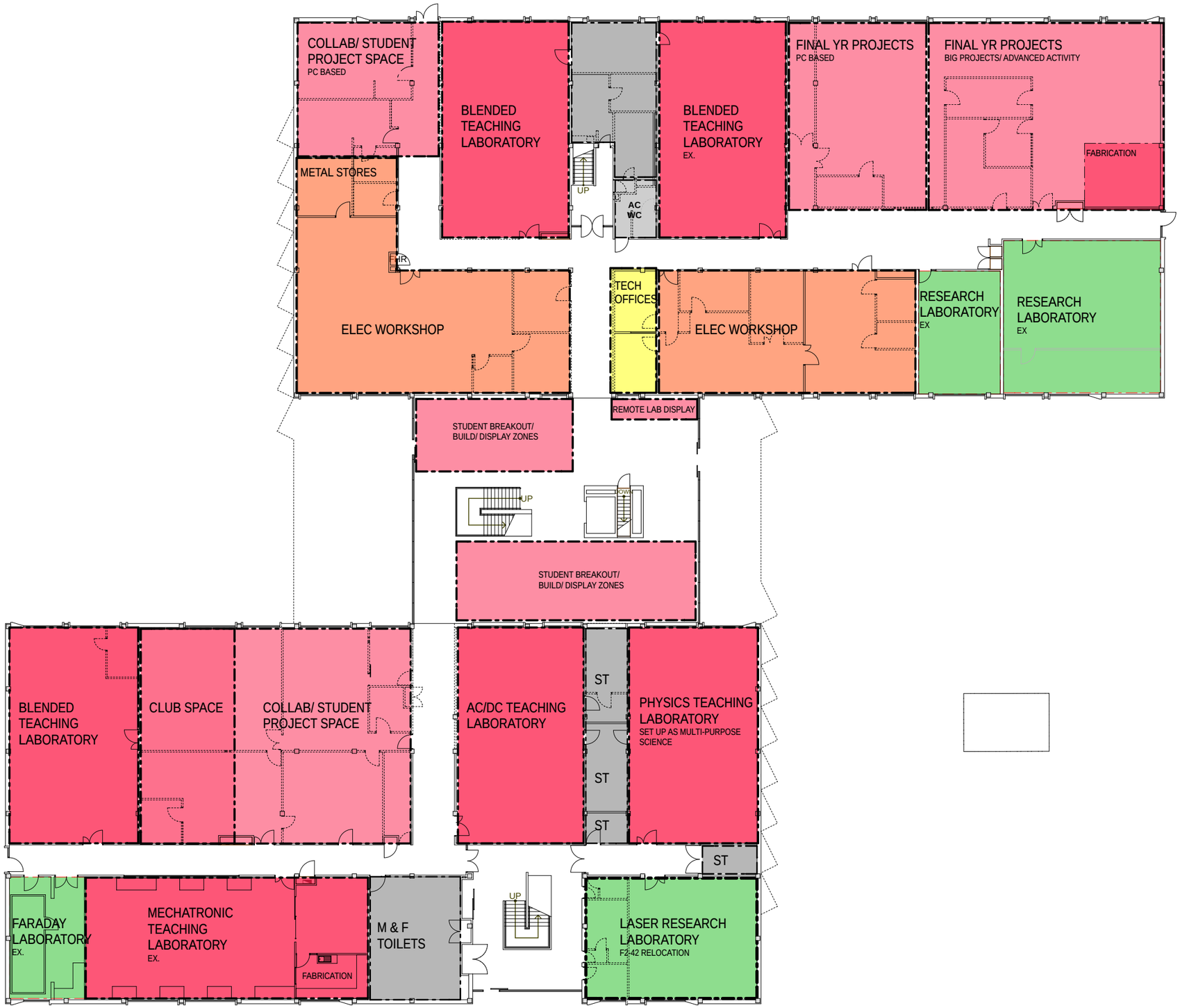
Mawson Lakes FII & Campus Master Plan
Mawson Lakes, South Australia

BUILDING P LEVEL 3 PROPOSAL

Scale 1:100 @ A1

Drawing By: AM/TH
Checked By: SP
Date: 19/12/2016
NOT FOR CONSTRUCTION
Project No/Drawing No.: 15479 - SK017
Revision: P1

Plot Date: 19/12/2016 /Volumes/PPA Data/JOB FILES/15479 UniSA Mawson Lakes Master Plan/15479 Drawings/CAD Files/Model/ITMS CONCEPT/15479 UniSA Master Plan_ITMS CONCEPT.pln



INDUSTRY COLLABORATION SPACE & OFFICES

OFFICES

RESEARCH DEDICATED WORKSHOP

TECHNICIAN DEDICATED WORKSHOP

STUDENT BREAKOUT/PROJECT SPACES

STUDENT TEACHING LABORATORIES

CENTRAL STORES/ AMENITIES

OPENING UP OF FACADE/ INTERNAL WALLS FOR NEW GLAZED WINDOWS & DOORS

NOTES:
NEW PARTITIONS BETWEEN ROOMS TO BE GLASS

Phillips/Pilkington Architects

165 MacKinnon Parade, North Adelaide SA 5006
tel: 08 8239 9000 fax 08 8239 9099

University of South Australia

UniSA

Mawson Lakes ENE Master Plan

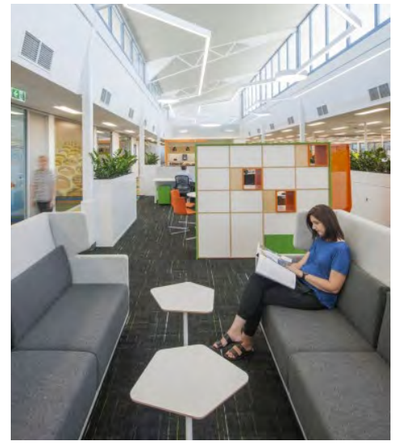
Mawson Lakes, South Australia

SCT LEVEL 01 - PROPOSED PLAN

Scale 1:150 @ A1

Drawing By: AM
Checked By: SP
Date: 1/12/2016
PRELIMINARY
Project No/Drawing No.: 15479 - SK003
Revision: P1

Plot Date: 1/12/2016 /Volumes/PPA Data/JOB FILES/15479 UniSA Mawson Lakes Master Plan/15479 Drawings/CAD Files/Model/BUILDING M & SCT MP/15479 UniSA Master Plan_M & SCT CONCEPT rev 2.pln



- INDUSTRY COLLABORATION SPACE & OFFICES
- OFFICES
- RESEARCH DEDICATED WORKSHOP
- TECHNICIAN DEDICATED WORKSHOP
- STUDENT BREAKOUT/PROJECT SPACES
- STUDENT TEACHING LABORATORIES
- CENTRAL STORES/ AMENITIES
- OPENING UP OF FACADE/ INTERNAL WALLS FOR NEW GLAZED WINDOWS & DOORS

NOTES:
NEW PARTITIONS BETWEEN ROOMS TO BE GLASS

Phillips/Pilkington Architects
165 MacKinnon Parade, North Adelaide SA 5006
tel: 08 8239 9000 fax 08 8239 9099

University of South Australia

UniSA

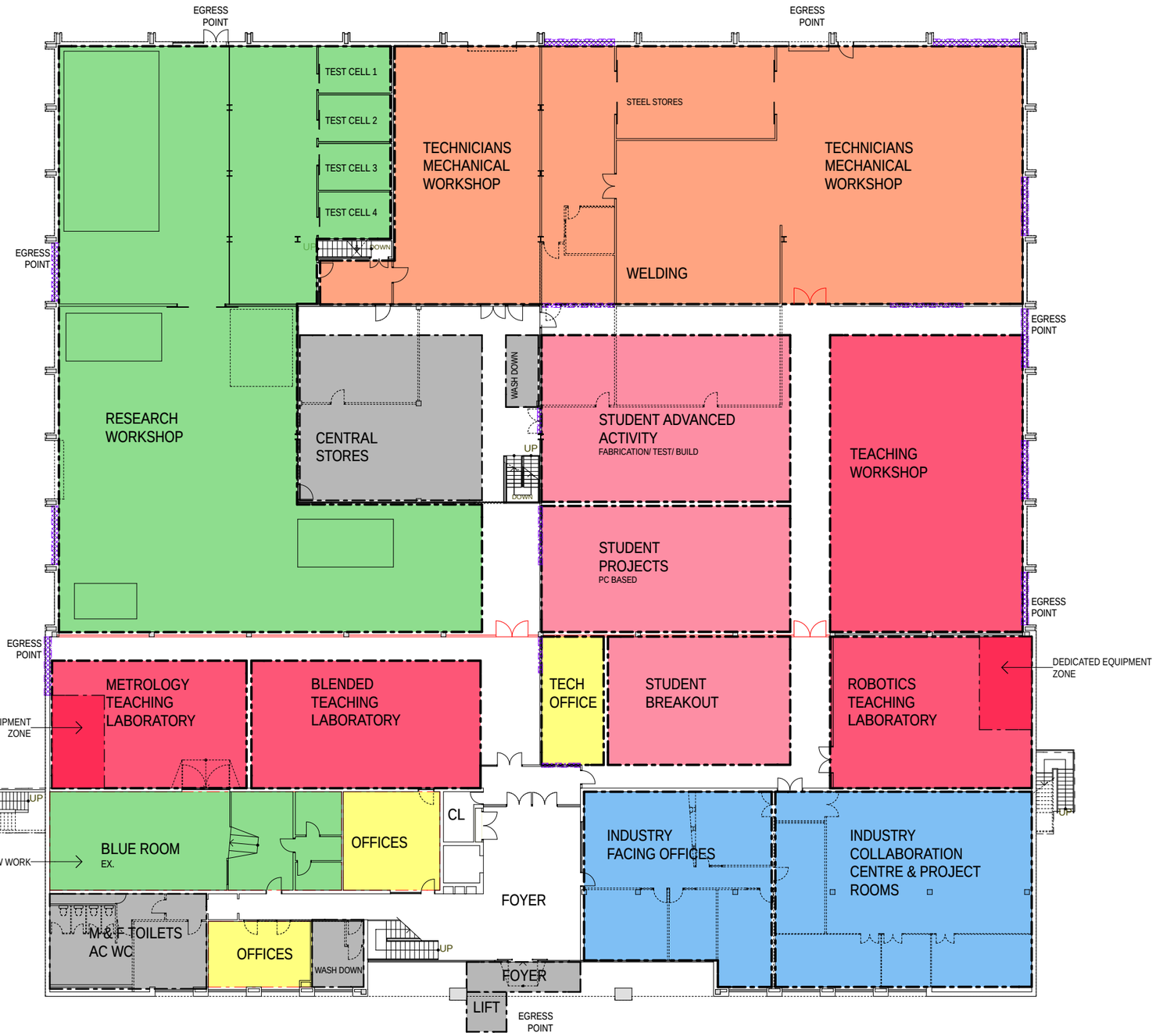
Mawson Lakes ENE Master Plan
Mawson Lakes, South Australia

SCT LEVEL 02 - PROPOSED PLAN

Scale 1:150 @ A1

Drawing By: AM
Checked By: SP
Date: 1/12/2016
PRELIMINARY
Project No/Drawing No.: 15479 - SK004
Revision: P1

Plot Date: 1/12/2016 /Volumes/PPA Data/JOB FILES/15479 UniSA Mawson Lakes Master Plan/15479 Drawings/CAD Files/Model/BUILDING M & SCT MP/15479 UniSA Master Plan_M & SCT CONCEPT rev 2.pln



- INDUSTRY COLLABORATION SPACE & OFFICES
- OFFICES
- RESEARCH DEDICATED WORKSHOP
- TECHNICIAN DEDICATED WORKSHOP
- STUDENT BREAKOUT/PROJECT SPACES
- STUDENT TEACHING LABORATORIES
- CENTRAL STORES/ AMENITIES
- OPENING UP OF FACADE/ INTERNAL WALLS FOR NEW GLAZED WINDOWS & DOORS

NOTES:
NEW PARTITIONS BETWEEN ROOMS TO BE GLASS

Phillips/Pilkington Architects
165 MacKinnon Parade, North Adelaide SA 5006
tel: 08 8239 9000 fax 08 8239 9099

University of South Australia

UniSA

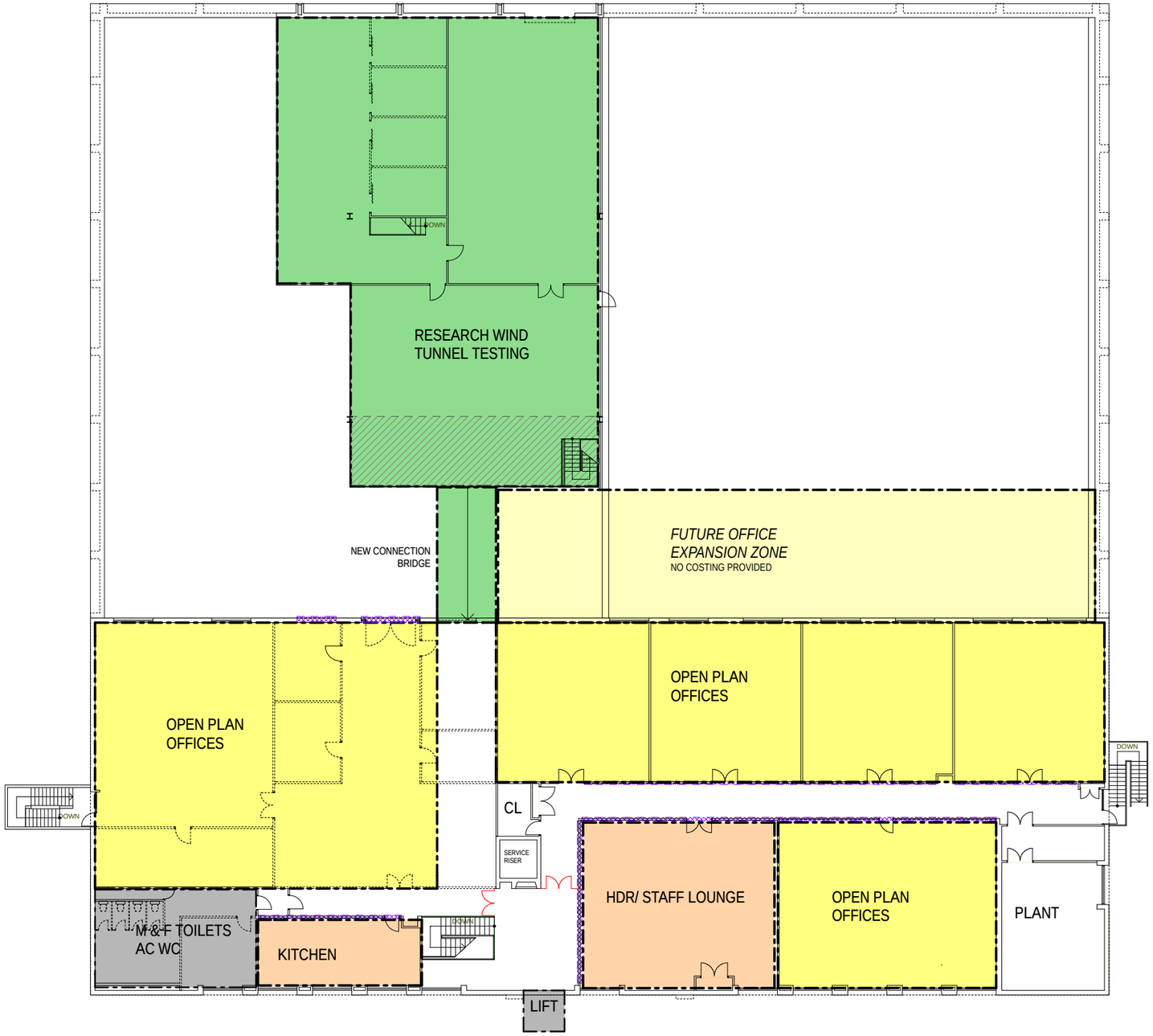
Mawson Lakes ENE Master Plan
Mawson Lakes, South Australia

BUILDING M LEVEL 01 - PROPOSED PLAN

Scale 1:150 @ A1

Drawing By: AM
Checked By: SP
Date: 1/12/2016
PRELIMINARY
Project No/Drawing No.: 15479 - SK001
Revision: P2

Plot Date: 1/12/2016 /Volumes/PPA Data/JOB FILES/15479 UniSA Mawson Lakes Master Plan/15479 Drawings/CAD Files/Model/BUILDING M & SCT MP/15479 UniSA Master Plan_M & SCT CONCEPT rev 2.pln



INDUSTRY COLLABORATION SPACE & OFFICES

OFFICES

RESEARCH DEDICATED WORKSHOP

TECHNICIAN DEDICATED WORKSHOP

STUDENT BREAKOUT/PROJECT SPACES

STUDENT TEACHING LABORATORIES

CENTRAL STORES/ AMENITIES

OPENING UP OF FACADE/ INTERNAL WALLS FOR NEW GLAZED WINDOWS & DOORS

NOTES:
NEW PARTITIONS BETWEEN ROOMS TO BE GLASS

Phillips/Pilkington Architects

165 MacKinnon Parade, North Adelaide SA 5006
tel: 08 8239 9000 fax 08 8239 9099

University of South Australia

UniSA

Mawson Lakes ENE Master Plan

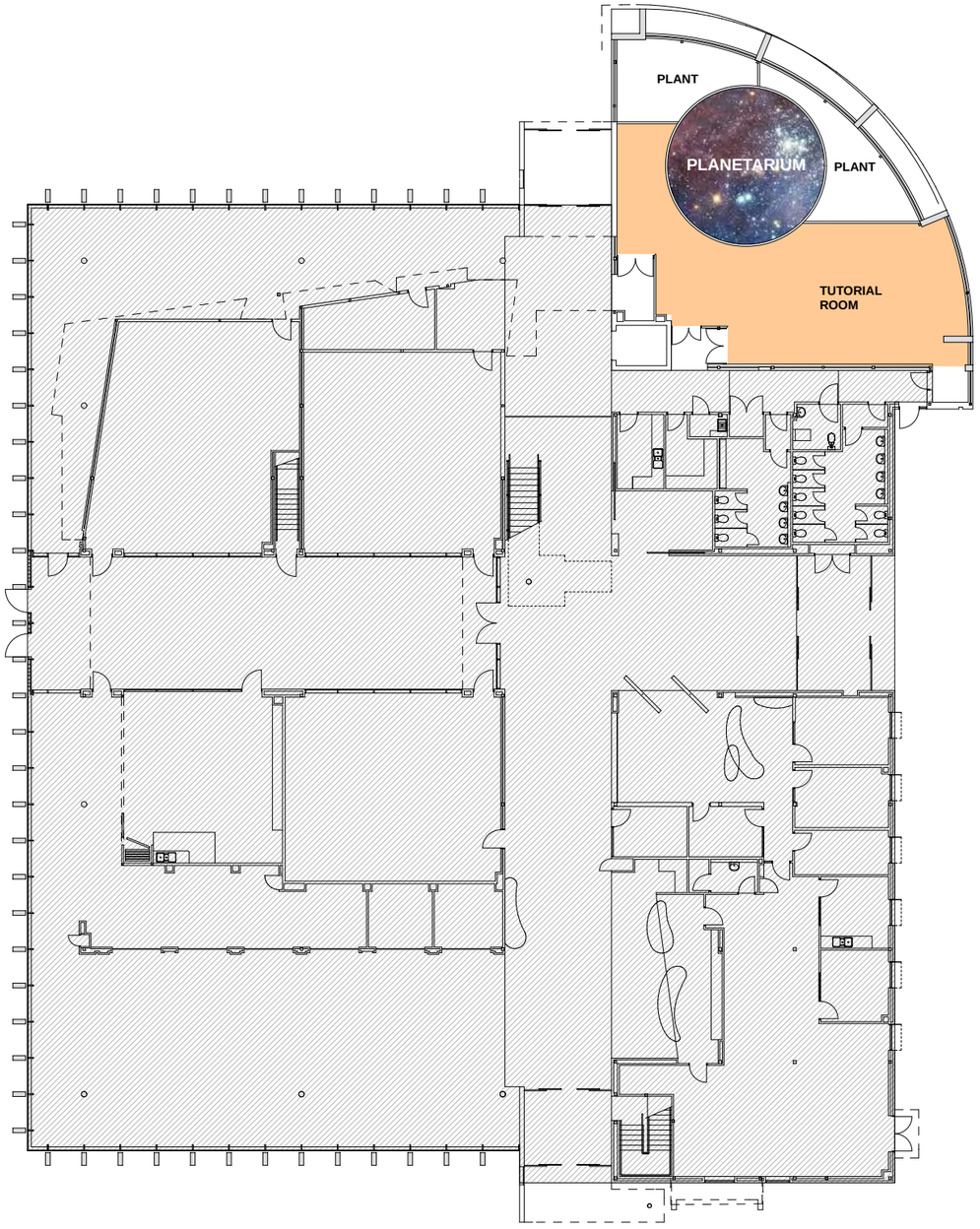
Mawson Lakes, South Australia

BUILDING M LEVEL 02 - PROPOSED PLAN

Scale 1:150 @ A1

Drawing By: AM
Checked By: SP
Date: 1/12/2016
PRELIMINARY
Project No/Drawing No.: 15479 - SK002
Revision: P2

Plot Date: 1/12/2016 /Volumes/PPA Data/JOB FILES/15479 UniSA Mawson Lakes Master Plan/15479 Drawings/CAD Files/Model/BUILDING M & SCT MP/15479 UniSA Master Plan_M & SCT CONCEPT rev 2.pln



Phillips/Pilkington Architects

165 MacKinnon Parade, North Adelaide SA 5006
tel: 08 8239 9000 fax 08 8239 9099

University of South Australia

UniSA

Mawson Lakes FII & Campus Master Plan
Mawson Lakes, South Australia

BUILDING MC LEVEL 1 PROPOSAL

Scale 1:150 @ A1

Drawing By: AM/TH
Checked By: SP
Date: 19/12/2016
NOT FOR CONSTRUCTION
Project No/Drawing No.: 15479 - SK020
Revision: P1

Plot Date: 19/12/2016 /Volumes/PPA Data/JOB FILES/15479 UniSA Mawson Lakes Master Plan/15479 Drawings/CAD Files/Model/ITMS CONCEPT/15479 UniSA Master Plan_ITMS CONCEPT.pln