6. ACCOMMODATION STRATEGY FUTURE INDUSTRIES INSTITUTE

SUMMARY OF CURRENT FACILITIES

FII currently occupies the following buildings with laboratories and offices:

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

The following FII tenancy discussion summarises the current onsite footprint for the Future Industries Institute at Mawson Lakes, existing office and laboratory locations along with staff and HDR numbers that need to be acommodated onsite. Staff numbers are based on information provided by the Future Industires Institute. Onsite footprint calculations are based on Phillips/Pilkington Architects review and update of the 2015 Mawson Lakes Campus Space Audit.

This section also instigates a discussion regarding FII laboratory organisation, opportunities for consolidation and duplication and recommendations for the tenancy plan development and implementation.

This section concludes with a FII site wide consolidation proposal together with building by building Tenancy Plans, Packages and Staging Schedule, and Concept Cost Estimates for each identified package of works.

Building IW

EXISTING LABORATORIES LOCATION SCHEDULE

Lab types	General chem	Microbiology	Tissue culture	Clean room	Molecular biology	Imaging	other Analytical Instr.	Surface deposition / analyisis	Workshop / dirty / processing	Hot lab	CTR
MM	MM3-08, MM2-08, MM2-11, MM 1-14	M1-12	M3-07, 7B	MM3-10		MM1-13, MM1-14	MM3-08	MM1-11, MM1-13, MM1-14			
X	X1-34, X1-44, X2-41	X2-34, X2-30	X2-34	X2-34	X2-31to35		X1-39, X2-46, X2-47, X2-48			X1-41	X1-35, X1-37A, X2-29, X2-37, X2-38
V	V1-07		V1-11areas	V1-11	V1-10	V1-06, V1-07A		V1-09			
R	R1-37, R2-31, R2-47							R1-12A, R2-45	R1-28, R1-32		
H									H1-13, H1-17		
IW	IW1-18, IW2-38			IW1-16		IW1-14,	IW1-02, IW1-07, IW1-17	IW1-04, IW1-05	IW1-21		
Q	Q1-13,		Q2-21A	Q2-30,36		Q1-19		Q1-13, Q2-20			

Note:

- Does not include all spaces
- General equipment and support rooms rooms not listed
- General and special stores not listed
- Underutilised rooms not listed

Building MM

FII STAFF OFFICE EXISTING AND PROPOSED ACCOMMODATION

EXISTING STAFF NUMBERS

FII STAFF NUMBERS	QTY	PROPOSED ACCOMM
Research	91	27x office, workstations
Visiting researcher	14	hotdesks
Visiting Student	30	hotdesks
UCL Students	8	hotdesks
PhD	117	workstations
Admin (incl manager)	9	workstations
Technical Staff	28	workstations
HDR	2	workstations
Adjunct	4	Shared hotdesk
TOTAL	**303**	
Volunteers	14	No space provided

NOTES:

Visiting Acadmic and student numbers together with UCL students are based on revised increased numbers provided on 11/7/16. These numbers are based on current peak demand

EXISTING OFFICE NUMBERS

EXISTING FII OFFICES	QTY
MM	17
X	16
V	11
R	5
IW	21
Q (not incl ANFF)	11
M	2
	83

EXISTING FII WORKSTATIONS	QTY
MM	91
X (not incl CRC)	92
V	22
R	17
IW	21
Q (not incl ANFF)	0
M	18
	261

PROPOSED OFFICE NUMBERS

PROPOSED FII OFFICES	QTY
MM	11
X	15
V	3
R	0
IW	4
Q (not incl ANFF)	0
M	0
	33

PROPOSED FII WORKSTATIONS	QTY
MM	73
X	99
V	51
R	0
IW	10
Q (not incl ANFF)	0
M	0
	233

PROPOSED FII HOT DESKS/ TRANSIT/ IND	QTY
MM	23
X	0
V	5
R	0
IW	35
Q (not incl ANFF)	15
M	0
	78

TOTAL: 344 ACCOMMODATED (X, MM, V, IW & Q)
TOTAL: 280 ACCOMMODATED (X, MM & V)

NOTES:

FII have confirmed that staff that are D, E, Foundation Fellows and Senior Staff require an office.

UniSA Space Management & Planning Guidelines state enclosed offices will represent no more than 10% of work spaces provided.

Some existing workstations in Building MM do not meet the 6m2 area requirement.

PhD accomodated in FII spaces.

Total Staff acommodated figures include the use of 18 desks in Building X2-03 which is currently occupied by CRC Care.

Building X offices

Building MM offices

LABORATORIES

The nature of research laboratory spaces is rapidly evolving from manual processes towards sophisticated machine-dependent processes. Laboratories must therefore be able to adapt to these trends by providing spaces and engineering services that are highly flexible and adaptable.

Organisation

At the organisational level, research is oriented around research leaders and their associated groups that may vary in size and over time from a few, to many and back to a few. Collaborations with other groups, internal or external, may be frequent or infrequent.

The most effective way to accommodate these requirements is for larger, general laboratories to be provided where people, equipment and processes are co-housed to allow the ebb and flow of group sizes and the ebb and flow of equipment and processes that do not require special environments.

Adjacent rooms, which can usually be generic or modular in size can then house equipment and processes that require more specialised environmental conditions (e.g. temperature, humidity, noise isolation, darkness, pressure control, cleanliness).

In addition, advanced platforms that require the most specialised facilities and specialised technical support can be accommodated in a manner that is accessible to multiple laboratory areas.

Offices should be located to provide good visual connection and access to research areas. Visibility throughout should be an aspiration.

In addition, the following should be provided:

- Incubator spaces for industry collaborations or newly establishing groups
- Interaction spaces, cafes spaces and amenity areas that encourage both planned and serendipitous interaction
- Support and material logistics facilities (e.g. stores, waste) can be shared between floors / buildings. Minimum local supply storage for day-to-day provision with all materials kept as far up the supply chain as reasonably possible. The number of facilities for receipt, storage and distribution of goods should be minimised but adequate to supply the geographically diverse campus
- Some activites have distinct spatial or environmental needs and these need to be seperately accommodated

Consolidation & Duplication

The Institute is of a size where consolidated facilities that service multiple groups should be encouraged and developed. These have the advantage of concentrating technical skills, experience, safe working practices and where space and equipment resources can be consolidated, achieve high utilisation. Technical staff typically perform key roles in maintaining their operational quality but support of a research leader with interest in that facility is often vital. Examples include radiation, microbiology, cell line tissue culture, imaging (all modalities) and specialised analytical services. These need to be structured in a way that facilitates the rapid training and integration of new users from across the Institute.

The Future Industries Laboratory Schedule on page 117 summaries the large range of laboratory types used by the Future Industries Institute.

Building R

Building R appears significantly under utilised in many areas. On the ground floor underutilised spaces include: biology laboratories (superseded by the Building X laboratories), leased laboratories along with large workshop spaces that have the capacity to be potentially consolidated into a campus workshop precinct (pending the External Workshop Review). Advanced Manufacturing Laboratories at the eastern end are well utilised and at capacity. The upper floor has a number of underutilised chemistry laboratories however both R2-31 & R2-35 that are well utilised. These have the potential to be consolidated into underutilised laboratory spaces in Building IW. There are also dated research and teaching Pharmacy Laboratories on this floor.

Building IW

On the ground floor of IW are a number of highly specialised analytical equipment pieces used by multiple groups and industry together with a shared Clean Laboratory. A large Synthetic Chemistry Laboratory is located on Level 2 that is relatively new with apparent spare capacity. There appear to be two underutilised Instrument Rooms in Building IW along with a dated Chemistry Laboratory.

Building MM

The majority of Building MM laboratories are well utilised with some at capacity. There is the opportunity on Levels 2 and 3 to reconfigure the Design Suite and Viewing Room into Instrument Rooms to free up laboratory bench space in adjacent spaces. A number of moves and consolidations are currently being planned in Building MM.

Building Q

When the Health Innovation Building is completed in 2018, Pharmacy will be moving out of Building Q freeing up some laboratory space. ANFF(SA) would like to develop these laboratories into Class 10,000 laboratories along with the relocation of the Building MM Design Suite into spare office space on Level 2 of Building Q.

Building H

The Majority of Building H was vacated by a previous Institute and handed to the School of Natural Built Environment. There remain crushing and grinding facilities used by FII on the ground floor, which in the long term have the potential to be co-located in a workshop precinct.

Building V

Building V has specialist cell culture facilities along with microscopy laboratories in rooms not designed for this function. The laboratories appear at capacity but are in good condition. There is the potential to consider an additional wet laboratory where there is currently an ITMS 3D Visualisation Studio space providing an alternative location can be found.

Building X

Building X displays a mixture of laboratory types with some spaces shared across groups and appears to be effectively functioning as a Future Industries Resource. Two new research groups have recently moved into this building with some alterations underway to accommodate their requirements. Building X houses the administration for FII and is the main public interface for FII.

Dangerous goods

Dedicated central gas reticulation stores are absent except in Buildings X, V, MM and Building X which already has significant space limitations. Distributed bottles and small reticulation circuits give rise to significant bottle rental costs, manual handling risks and other safety concerns associated with indoor placement of bottles.

Clear policies for gas bottle and liquefied gas management, gas detection requirements and development of central, compliant reticulation points would be advantageous.

Chemical storage cabinet sizes and locations do not meet code requirements in many locations.

The legacy chemical project has attempted to remove chemicals not in use from working areas but in itself has created a significant disposal and management problem in Building R.

Building R & Q

Laboratory stores

The MM stores are intended to service all FII areas which facilitates stock control. Building V has its own store due to its remote location. The MM store appears to be at capacity and is likely to need augmentation with bulk storage in adjacent areas.

Controlled temperature rooms

These serve a number of purposes from warm rooms (usually bacterial work) through to “cool” rooms (4 degrees C) or freezer rooms (-20 degrees C).

Where -20 degrees C rooms are provided, they are best deployed with a 4 degrees C anteroom (to better control temperature and condensation in the -20 degrees C room) and prevent WHS issues.

The freezer room in Building X (X1-37A), though adjacent to a 4C room (X1-35) is not accessed through that room and suffers from regular ice build-up on the floor.

Cool rooms and freezer rooms usually contain material that cannot tolerate sustained exposure to uncontrolled temperatures and therefore should normally be provided with full redundancy (emergency power, dual chillers / heaters) to prevent loss of valuable experimental work.

As shared facilities, they also require strong management regimes to maintain order and prevent accumulation of redundant material. Multiple discreet freezers and fridges can often provide equivalent amenity, however cool rooms have the added advantage of being able to be used for experimental work (by inclusion of a work bench and sometimes a sink).

Versatile laboratory buildings should contain wherever possible at least one 4C room (with storage and a work bench) and in some cases an adjoining -20C room.

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

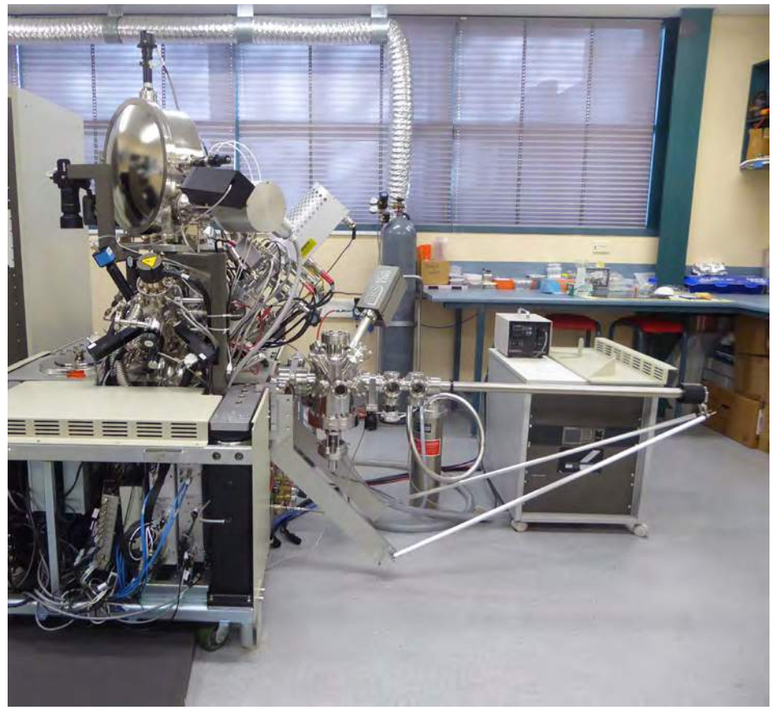
- Inconsistent standards of pure water service and pure water service maintenance
- Numerous gas supply issues. Lack of reticulation and alarms to many areas.
- Lack of coordinated /central reticulation from liquid and autochange bottle manifolds.
- Lack of monitored freezer alarms to many areas
- Lack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

Future facilities and major refurbishments should be developed with a view to:

- Careful planning of space and reticulated services so that laboratories are maximally able to respond to new uses and changing technology. Space planning should discourage “silo-ing” of groups and facilities into spaces that are inflexible as groups expand and contract
- Laboratory planning must allow a malleable mix of allocated and shared spaces (Building X provides a good example but Building MM which is more recent has less flexibility)
- Water, drainage, gas services, chilled water and ventilation must be provided in a highly coordinated manner that enable future provision and ready adaptation of spaces to new technologies
- Easy reticulation of new services within laboratories is also an essential part of laboratory planning
- Furniture systems must be highly flexible. Benches should not be fixed unless there are specific reasons for doing so such as vibration control
- Promoting visibility of activity into and across research and office spaces
- Availability of outdoor aspect and public (and student) visibility of activity inside wherever possible
- Provision of interaction hubs / kitchens and cafes with meeting tables together with individual workspaces

Development of Institutes such as FII need to be clearly imbued with an Institute vision, aims and governance structures that enable and facilitate:

- Communication between groups
- Efficient, Institute-focused space allocation, co-location and development
- Strategic development of facilities – always geared for delivery of the Institute’s aims.
- Development of central high technology platforms. These can be vital enablers of research and serve multiple other purposes
- Adoption and maintenance of the latest technologies
- Skill development and training the latest technologies
- A facilitator of productive collaborations with other public and private research entities
- Attractants for new staff/collaborations/grants/equipment
- Development of other core facilities that encourage collaboration and cooperation, equipment consolidation, space consolidation, training quality and WHS practice
- Efficient and centralised purchasing, stores and logistics (including dangerous goods management)
- Adequate scientific technical facility
- Support that serves to enable efficient research outcomes
- Space and management systems that enable fruitful industry collaborations, but only those that contribute to the Institutes overall mission

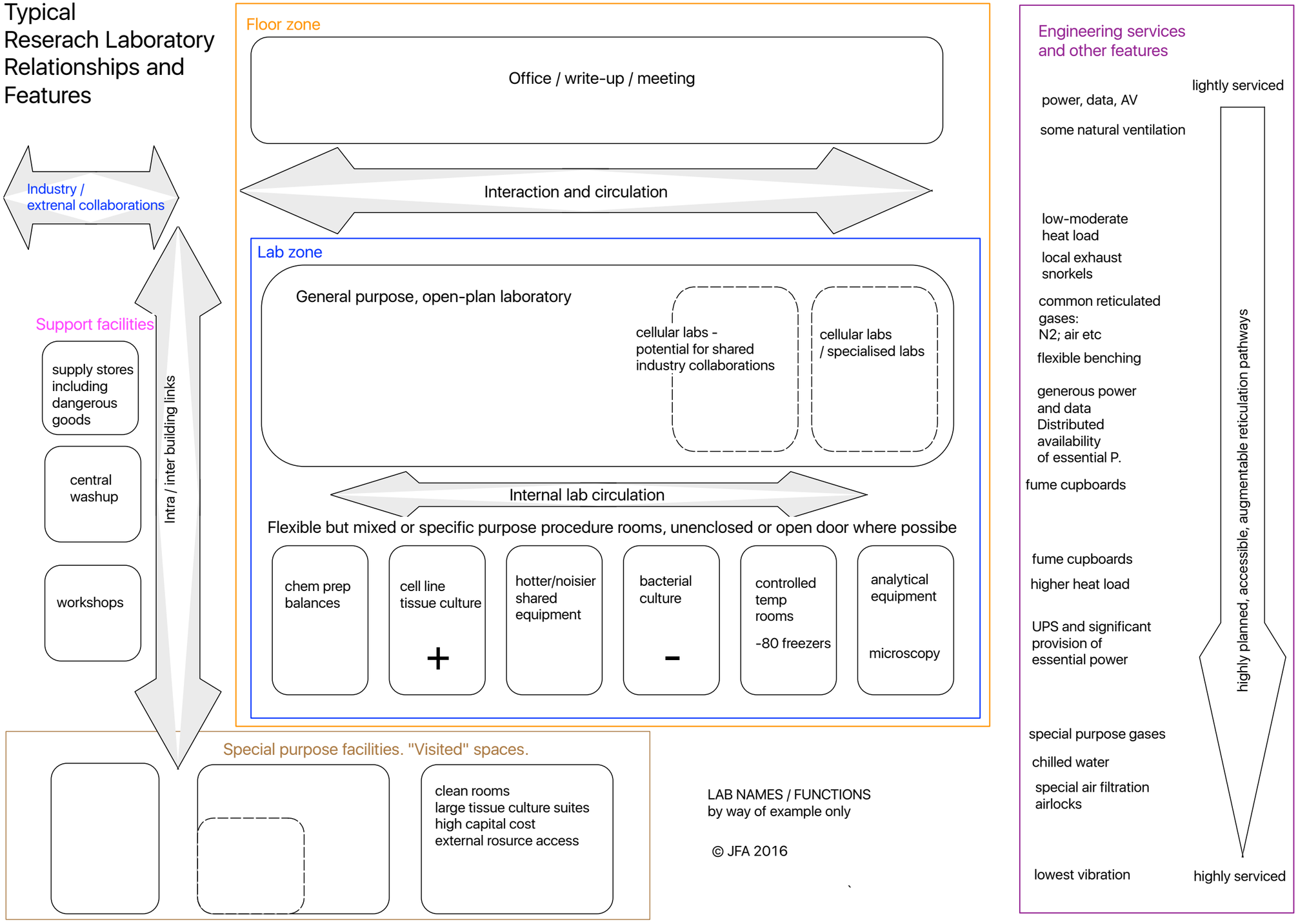


Building IW

Building X

LABORATORY ORGANISATIONAL MODEL EXAMPLE

Typical Reserach Laboratory Relationships and Features



FII REFERENCE GROUP SUMMARY

A FII Reference Group was established to review, refine and enhance the outputs of the Master Planning process together with making the FII Master Planning effort relevant to Institute aims and ambitions. The intention was that participants focus on what is best for the Institute rather than individual needs. Some common themes emerged from the reference group workshops and follow up correspondence.

The FII community

There was considerable discussion around what contributes to an Institute as a strong and dynamic entity. This was particularly relevant because of the relatively recent formation of the Institute and its convergence from previously disparate groups.

A number of points raised included:

- The need for more interaction at all levels from students through to senior academics and across all strands. Discussion ranged from social functions to formal seminars and "TED" style short talks. There was concern about the lack of an adequate venue for the variety of activities that might nurture positive outcomes for the Institute
- The need to accommodate PhD's in reasonable proximity to research work areas and to facilitate contact and supervision by group leaders
- The lack of staff common rooms to promote interaction between groups and across academic research disciplines
- The need for a user-friendly space booking system which would promote organisational efficiency
- Groups were asked to submit completed relationships matrices that addressed the degree to which collaborations occurred between groups which are illustrated on pages 124-125

Promotion of community was generally agreed to be facilitated by visibility of laboratory spaces and office areas. This was noted as particularly problematic in the older buildings.

Industry and Public Interaction

There was particular emphasis placed upon the visibility of capabilities to Industry, visiting academics and the public as well as the concentration of relevant research so that these activities can be reasonably "showcased". Level 1 of Building MM works well at showcasing research to industry, academics students and the public. However much of the high end capability equipment remains behind closed doors where it is unobservable. Level One of Building IW is one such example where impressive equipment and research activities are hidden from view with lost opportunities to promote industry and research collaborations.

Scientific facilities

There was considerable discussion around the kind of facilities that would allow FII to address a number of the issues that were seen as limiting to the work of the Institute. This was particularly relevant to the opportunities that a re-developed Building R might afford in the mid term.

- Open plan laboratories with adjacent support rooms (as in Building X) were not seen to be relevant to all types of work because of the differing environments and compatibilities but the success of the level two Building X open plan laboratory area in flexibly accommodating a variety of groups was acknowledged
- Service corridors were seen as important to some facilities and kinds of work
- Overall there was agreement that new facilities should be highly flexible, adaptable in terms of both space use and services, and have all environmental requirements met (e.g. electromagnetic noise dampening, humidity, vibration control)
- Reliable and flexible engineering services were seen as being vital to the efficient work of the Institute (e.g. pure water, gases, HVAC, power, alarms)

Research "Precincts"

The proposal to develop precincts fostered considerable positive discussion. The aggregation of technical capabilities and provision of high quality management and technical support would promote internal efficiency, capabilities and industry interaction.

Possible precincts discussed included:

- Manufacturing (coatings, ANFF, minerals)
- Analytical Science (mass spec, chemical spectroscopy)
- High-end Spectroscopy and imaging (SEM, TEM, ToF-SIMS, XPS)
- 2 x cell culture (in Building V and potentially in MM)
- Interfacial Science (surface tension, zeta potential, particle sizing, wettability, AFM)
- Minerals processing

It was noted however that some technologies (e.g. some AFM and surface work) were not in themselves service-type facilities but were core tools within groups used to research modifications to enhance and adapt them for improved research outcomes and new research fields, in which case it is not beneficial to aggregate them all and needs to be assessed on a case by case basis.

Particular "Strand" features

Minerals processing was seen to have some activities that were heavier, dirtier and wetter than typical laboratory processes and required some heavy transport access requirements that may not be compatible with other research activities. The existing Mineral Processing research in Building R may not sit comfortably within its proposed redevelopment. However Mineral Processing also includes ultra-high end analytical equipment which has compatibility with research areas outside the strand. Some elements in common with NBE were noted (as in Building H now). Ideally, it would make sense to have Minerals processing that is currently across Building H, R and IW located in one building. Expansion space in Building H into the future would be useful or Building R could be used in the mid term with the major refurbishment project proposal with possible long term purpose built facilities created.

Manufacturing groups were particularly concerned with how facilities presented to Industry, the public and other Institutions together with supporting Precincts as a technology focus. Future expansion space for this group in the near future was noted as important.

Biology areas were concerned with adequate separation of micro and molecular processes. The need for ongoing access to animals was acknowledged to have to continue off campus with the soon to be opened HIB Building, likely to become the focus for animal work.

Interfacial science was noted as being spread over various locations. There used to be a focus in IW1-16 but currently equipment is dispersed across laboratories. Any surface studies were noted as requiring clean surfaces and no contamination.

A number of groups had interests in maintaining clean rooms of different standards for quite differing processes such as:

- Surface chemistry
- Tissue culture
- ANFF fabrication

Feedback on the Short Term Proposals:

Building X:

- The change of entry location into the freezer on the ground floor works well but also requires expansion of freezer space
- Microbiology needs to be closed off in Building X from the Molecular Ecology work in the same space. Partition off laboratory X2-33 with bio cabinets for Microbiology work is fine as a solution. Partition not required for Molecular Ecology PC2 laboratory
- The Clean room X2-34 is not well utilised
- X2-42 Wash Facility is not well utilised and could be converted for alternate uses
- X2-32 could become a store for Molecular Ecology (consumables) as they will not be able to store items in the Laboratory if using it as a PC2 space
- X2-35 to house PCR equipment and potential new robot
- X2-47 Instrumentation Room overcrowded with servicing issues

Building MM:

- Shared Microscopy and Spectroscopy facility on the ground floor of Building MM supported in MM1-12. Users do not want equipment in MM1-13 relocated but see MM1-12 as an expansion of this space. Spaces on the ground floor of Building MM should be Industry facing as highly visible. These types of equipment are vibration sensitive therefore ground floor location works well
- The possibility of Haolin Xu group to be colocated into MM2-11 was discussed but later confirmed not possible

- A communal Tissue Culture suite not required in the short term but FII would like to investigate the use of the existing cell therapy suite on the upper floor of Building MM which is currently leased out. This is a high end facility somewhat over-specified for most tissue culture activities and may not be viable depending on other activities to be conducted there. Mid term this could be worthwhile having an entire floor dedicated to Cell Culture focused work

Building V:

Users noted that there are changes currently occurring in Building V. Advice received after the workshop included:

- Dark room still required but good to remove door to Store
- OK for confocal and AFM to be relocated to the consolidated MM Imaging Precinct
- V1-12B could be converted into a General Purpose Laboratory and could house the plasma reactors (from V1-09) which are currently expanding. This would then allow V1-09 to be used for Histology and Sample Preparation together with V1-09, V1-10 and V1-11 becoming a full PC2 suite of laboratories
- V1-06 could be converted into a light microscopy room which is currently set up in the reception space. These microscopes are specific to the work in Building V and need to stay in this building
- A coolroom facility in Building V would be beneficial

Building H

- Logical co-location for the Minerals group would include the hydrofloat facility from Building R and Small crushing facilities from Building IW into Building H. This would need to be discussed with the School of Natural Built Environments as it requires an expansion into their spaces

Building IW

This building's layout suits placement of high end equipment quite well as there are many discreet rooms as well as equipment that requires its own controlled space. Vibration control and ground floor facilities are very important for these core technology platforms. It was noted that:

- The relocation of thermal analysis equipment from Building R would be beneficial
- Not all high end equipment needs its own room with controlled room temperature in this building very important
- If there were to be office space on the ground floor of IW (not strongly supported due to all of the existing offices on the upper floor), it would be better located in IW1-03
- IW2-38 is set up as a Synthetic Chemistry Laboratory and was recently refurbished with nine fume hoods. There is a research group using this laboratory but not for synthetic chemistry work
- It would be good to open up sections of wall in IW with glass partitions as the building is hard to navigate
- Soft surface (MM1-14) and hard surface laboratories (IW2-38) to be co-located on the ground floor of IW in a refurbished IW1-21 as long as it is renovated to a high standard with temperature and vibration control. It makes sense for this research to be adjacent the Clean Room facilities IW1-16 and would result in the consolidation and colocation of interfacial sciences in one building rather than being dispersed across many buildings
- The upper floor offices of Building IW on the northern side were identified as a potential laboratory expansion space as they can be easily serviced sitting above the peristitial space on level one

Building Q

- Proposal for ANFF (SA) heavy equipment to be located in the defunct lecture theatre with a potential front door for ANFF supported on the ground floor
- The ground floor FII laboratories that are currently isolated from other FII activities are used for synthetic chemistry. This group could potentially be located in IW2-38 but this would mean the group currently using this laboratory would need to be relocated
- The upper floor proposal for the expansion of clean room facilities and general purpose laboratory was supported together with the internal refurbishment of ANFF(SA) offices. It was noted additional store space important and that the PhD offices not required in this building as no PhD students associated with ANFF(SA)

Building H

Building V

FII GROUPING & COLLABORATIONS SCHEDULE

Group leader (TBC)		former affiliation	minerals and resources engineering	energy and advanced manufacturing	environmental science and engineering	biomaterials engineering and nanomedicine	comments	IW	Q	M2	X	H	V	R	Group size (total FTE)	# PhD Students	Surface coating	Imaging	Imaging modalities (?)	Tissue culture	Clean rooms	Molecular biology	Microbiology	Analytical chemistry instrumentation	Radiation	General chemistry	Animal use	CTR	Processing
			Prof David Giles	Prof. Peter Murphy	Prof Enzo Lombi	Pro. Nico Voelcker																							
Emily Hilder	Director						Polymer chemistry				X1-39,X1-40, X2-29, X2-30, X2-31, X2-32, X2-33, X2-35, X2-37, X2-38, X2-41, X2-42, X2-43, X2-44, X2-45, X2-46, X2-47, X2-48					5+						X2-31, X2-32, X2-33, X2-35,	X2-30	X1-39, X1-40, X2-44, X2-45, X2-46, X2-47, X2-48		X2-41, X2-43		X2-29, X2-37,X2-38,	
Prof. David Giles	Strand leader	IW					Interface Analysis and Synchrotron Science, surface science, minerals processing	IW1-21, IW1-06	Q2-12			H1-12, H1-13, H1-17		R1-37, R1-38		5+5		IW1-06									Q2-12, **R1-37**			H1-12, H1-13, H1-17, **R1-38, IW1-21,**
Prof. Peter Murphy	Strand leader	Mawson					engineering of surfaces, application of thin film coatings,	IW1-07, IW1-19, IW1-20						R1-12		3	R1-12, **IW1-19,** **IW1-20**							X1-39, X1-40, X2-44, X2-45, X2-46, X2-47, X2-48						
Prof Enzo Lombi	Strand leader	CERAR					contaminant risk assessment, biogeochemistry, ecotoxicology and waste management				X1-39,X1-40, X2-29, X2-30, X2-31, X2-32, X2-33, X2-35, X2-37, X2-38, X2-41, X2-42, X2-43, X2-44, X2-45, X2-46, X2-47, X2-48					2+4						X2-31, X2-32, X2-33, X2-35,	X2-30	X1-39, X1-40, X2-44, X2-45, X2-46, X2-47, X2-48		X2-41, X2-43		X2-29, X2-37,X2-38,	
Pro. Nico Voelcker	Strand leader	Mawson					bio- and nanomaterials			MM1-12, MM3-06,MM3-07, MM3-08, MM3-10				R2-35, R2-45, R2-29, R2-31		9+?	R2-45?			MM3-07	MM3-10		MM1-12	MM3-08, **R2-31**		R2-35, R2-29			
AsPr Albert Juhasz	Research Leader						biocontainment / bio-availability				X2-30, X2-31, X2-32, X2-33, X2-34, X2-35, X2-37,, X2-38, X2-41, X2-43, X2-44, X2-45, X2-46, X2-47, X2-48					3				X2-34	X2-34	X2-31, X2-32, X2-33, X2-34, X2-35,	X2-30	X2-44, X2-45, X2-46, X2-47, X2-48		X2-41, X2-43		X2-29, X2-37,X2-38,	
AsPr Benjamin Thierry	Research Leader	IW					NanoBioEngineering group, biodiagnostic and prognostic technologies			MM2-09					2+7	7				MM2-09		MM2-09					MM2-08			
AsPr David Beattie	Research Leader	IW					Co-leader Surface interface and soft matter group	IW1-23, IW2-38		MM1-14						3									IW1-23,			MM1-14, **IW2-38**			
AsPr Drew Evans	Research Leader	Mawson					Co-leader Thin film coatings group; Conducting Polymers, Advanced Manufacturing, Industry projects (SMR, HeliostatSA, MAI, Sentek)	IW1-07, IW1-19, IW1-20		MM1-11				R1-12	25-30	4+?	R1-12, IW1-19, IW1-20, MM1-11													
AsPr Erica Donner	Research Leader	CERAR					environmental biogeochemistry, soil and water/wastewater chemistry				X1-41, X1-42, X2-30, X2-31, X2-32, X2-33, X2-35					4							X2-32, X2-33, X2-35,	X2-30		IW1-23,	X1-41, X1-42				
AsPr Max Zanin	Research Leader	W					Mineral Processing and Engineering	IW1-21, IW1-06, IW2-31	Q2-12			H1-12, H1-13, H1-17				2+		IW1-06									Q2-12, **R1-37**			H1-12, H1-13, H1-17, **R1-38, IW1-21,**
Prof Ajayan Vinu	Research Leader						Nano-materials / microporous materials				X1-34, X1-37,X1-38,X1-44					8											X1-34, ,X1-38, X1-44?		X1-37	
Prof Allison Cowin	Research Leader	Mawson					wound healing and regenerative biology					V1-08, V1-10, V1-11, V1-11CT, V1-02, M1			15 FTE	1+5		V1-07A		V1-11, V1-11CT	V1-11CT	V1-10,							
Prof Hans Griesser	Research Leader	Mawson		?			High end imaging; plasma coating			MM1-12	X2-30, X2-31, X2-32, X2-33, X2-34, X2-35		V1-09	R2-45, R2-29, R2-35, R2-31		4	V1-09	V1-09		X2-34	X2-34	X2-34	X2-30, MM1-12	X2-31			R2-35, R2-45, R2-29			
Prof Mats Andersson	Research Leader	Wark					solar cells	IW2-38								4											IW2-38			
Prof Peter Majewski	Research Leader	Wark			?	?	nanotechnology, and surface engineering									2														
Dr Angela Ivask	Foundation Fellow					?	nanoeco(toxicological studies, Environmental Toxicology																								
Dr Chia-Chi Chien	Foundation Fellow	W					biomedical engineering																							
Dr Craig Priest	Foundation Fellow						Micro/nanofluidics, materials/interfacial chemistry, analytical science, lab on a chip technology	IW1-18 Clean room	ANFF-SA facilities Q2-10, Q2-30,Q2-35, Q2-36	MM 2-11; 12-10; 2:01 offices					Research Group: 8 to 12 FTE ------ ANFF-SA Team: 5 FTE	2 (5 in 2017)	MM1-13				Q2-30, Q2-36				Q2-35?			MM2-11, **Q2-10,**			
Dr Craig Priest (with techniques copied per return) Q-A4																			yes; ANFF-SA; IW1-18	via collaboration only		yes; ICP, mass spec, UV-vis spectroscopy, raman, etc	etching, sample cleaning, chemical surface modification, solution preparation, including using		microfabrication	than 200 users with many external to the university, including industry users. It will be important that the future of ANFF-SA			
Dr Daria Arrua	Foundation Fellow						polymer monoliths and nano/micro particles								yes; metal, oxide, polymer coatings in vacuum, spin coating, etc	yes; SEM, confocal, XPS, ToF-SIMS, X-ray tomography, surface profiling													
Dr Gary Owens	Foundation Fellow	CERAR, Mawson				?	environmental chemistry, contaminant dynamics in terrestrial environments				X2-41, X2-43, X2-44, X2-45, X2-46, X2-47, X2-48			R2-37		4											R2-37			
Dr Haolan Xu	Foundation Fellow	Wark					Colloids, chemical sciences, materials science		Q1-10, Q1-13							2?											Q1-10, Q1-13			
Dr Ivan Kempson	Foundation Fellow	Wark					bio-inorganic chemistry and surface science									1														
Dr Kamil Zuber	Foundation Fellow	Mawson					conductive polymers, thin film coatings, nanocomposites, siloxanes, atmospheric plasma, vacuum technology																								
Dr Marta Krasowska	Foundation Fellow	W					Co-leader Surface interface and soft matter group	IW1-16, IW1-18, IW2-38		MM1-14						3		MM1-14				W1-16					IW1-18, IW2-38			
Dr Rick Fabretto	Foundation Fellow	IW					conducting and electroactive polymers																							
Dr Roey Elnathan	Foundation Fellow						nanomaterial fabrication and characterisation																							
Dr Zlatko Kopecki	Foundation Fellow						wound healing, scar formation and fragile skin syndromes																							

	Emily Hilder	David Giles	Peter Murphy	Enzo Lombi	Bill Skinner	Nico Voelcker	Albert Juhasz	Fran Harding	Benjamin Thierry	David Beattie	Drew Evans	Erica Donner	Max Zanin	Ajayan Vinu	Allison Cowin	Hans Griesser	Mats Andersson	Peter Majewski	Angela Ivask	Chia-Chi Chien	Criag Priest	Dario Arrua	Gary Owens	Haolan Xu	Ivan Kempson	Kamil Zuber	Marta Krasowska	Rick Fabretto	Roey Einathan	Ziatko Kopecki	Magus Nyden	Beatriz Pietro Simon	Colin Hall
Emily Hilder	x																																
David Giles		x																															
Peter Murphy			x																														
Enzo Lombi				x																													
Bill Skinne					x																												
Nico Voelcker						x																											
Albert Juhasz							x																										
Fran Harding								x																									
Benjamin Thierry									x																								
David Beattie										x																							
Drew Evans											x																						
Erica Donner												x																					
Max Zanin													x																				
Ajayan Vinu														x																			
Allison Cowin															x																		
Hans Griesser																x																	
Mats Andersson																	x																
Peter Majewski																		x															
Angela Ivask																			x														
Chia-Chi Chien																				x													
Criag Priest																					x												
Dario Arrua																						x											
Gary Owens																							x										
Haolan Xu																								x									
Ivan Kempson																									x								
Kamil Zuber																										x							
Marta Krasowska																											x						
Rick Fabretto																												x					
Roey Einathan																													x				
Ziatko Kopecki																														x			
Magus Nyden																															x		
Beatriz Pietro Simon																																x	
Colin Hall																																	x

high levels of collaboration / joint projects
moderate levels of collaboration / joint projects
some degree of collaboration / cooperation

FII TENANCY PROPOSAL DISCUSSION

The aim of the Future Industries Institute tenancy plan is to minimise the physical distribution of research groups across the campus together with promoting a feeling of belonging, interconnectivity and wellbeing. The Future Industries Institute offices and research laboratories are to be consolidated in Building X the headquarter building, 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 which also applies to Building H for Minerals Processing. The tenancy proposal also proposes some new open plan office space on the upper floor of Building IW so that students can be directly adjacent their research projects in the laboratories of this building. ANFF(SA) facilities will remain in Building Q in the short term with the creation of some Industry offices/ hot desking. A consolidated area of research laboratories for Advanced Manufacturing will remain in Building R in the short term with the majority of Building R to be mothballed for a major future refurbishment project. 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 leverage existing plant life expectancy. 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. In the older buildings such as Building IW and Q, corridors are to be opened with glass partitions to improve the overall amenity and transparency of the building where this does not conflict with research activities.

The future redevelopment of Building R proposes the creation of a large workshop environment for Advanced Manufacturing, ANFF(SA) and potentially Minerals Precinct together with high end core technology platforms relocated from Building IW, contemporary open plan laboratories, the creation of internal void and open plan offices. The redevelopment of Building R as a mid term project would facilitate the relocation of Building V users into Building MM with the creation of a centralised tissue culture suite together with the opportunity to lease Building V to Industry.

Long term, the demolition of Building Q and IW is proposed as a site for Building X2 and possible future Power House to support the highly intensive service requirements of FII, with the existing Power House retained.

This section is followed by the Precincts Diagram, Tenancy Proposals for offices and laboratories, Services Strategy Guidelines and costing of individual projects.

ANALYTICAL INSTRUMENTS (CHARACTERISATION)

BIO/ NANO

MANUFACTURING/ MINERALS

ANALYTICAL MOLECULAR BIOLOGY

ENVIRONMENTAL &
ANALYTICAL CHEMISTRY

INTERFACIAL SCIENCE

HIGH END CORE PLATFORMS

Precincts Legend

Precinct Discussion

The Precincts have been established to help align big picture consolidation opportunities and to be used as a tool to inform the short term tenancy proposal locations for offices and laboratories. Currently there is a mix of research across the campus leading to inefficiencies and duplication in resources. The Following precincts have been identified:

- Analytical Instruments (Characterisation)
- High End Core Technology Platforms
- Bio/Nano
- Manufacturing/ Minerals
- Analytical Molecular Ecology
- Environmental & Analytical Chemistry
- Interfacial Science

The Relationships Diagram on page 128 together with Collaborations Schedule on page 125 have also been used as a tool to help align future short term proposals.

Office Tenancy Discussion

The Future Industries Institute office tenancy plan priorities concentration of professional staff, researchers and associated groups across Building X, MM and V. There is a range of office, workstation and hotdesk positions together with breakout spaces in line with the UniSA Space Management and Planning Guidelines. HDR and PhD students are to be colocated with their associated research groups which will be located as close as possible to laboratory spaces.

The current tenancy plan for Building X, MM and V allows for all of the researchers, HDR students, professional staff and technical staff to be located within these buildings with a series of minor fitout projects proposed to accommodate this. Each of the buildings also have allocated locations for hot desking for visiting researchers and students. As these visiting numbers fluctuate throughout the year, Building IW and Q are allocated for future expansion of office space which allows for these fluctuations in numbers. Building MM specifically has a zone of Level 2 and Level 3 dedicated to visiting researchers and students to allow colocation with research groups in this building who have regular visitors and to also allow these groups to sit together in a supportive environment. Breakout spaces and meeting rooms have been distributed across the office spaces to allow for confidential conversations and dedicated quite zones.

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. Where possible, existing offices will be renovated to open plan and designed to suit the minimum space requirements per staff member.

Examples of research group clusters based on the current research groups and predominant laboratory locations include:

Building X:

Lombi

Hilder

Vinu

Owens

Professional Staff

Building MM:

Murphy

Priest

Thierry

Voelcker

Ginic-Markovic

Building V:

Cowin

Griesser

Building Q:

ANFF (SA)

Industry offices, hot desking

If Building IW is required due to future expansion, the following groups would be well aligned:

Xu

Beattie/ Krasowska

Industry offices, hot desking

Building V

Short Term Building By Building Laboratory Proposals

Below is a summary of the short term laboratory projects identified which are further described in the **Packages and Staging Schedule** on page 154. This schedule also identifies building wide upgrades required to achieve these options for services and structure. Laboratories moving forward are to be technique based rather than belonging to a particular research group to leverage collaboration opportunities and consolidation of facilities.

Building X (Environmental & Analytical Chemistry focus)

Building X Level One proposes:

- Freezer expansion and door relocation

Building X Level Two proposes:

- The relocation of microbiology work into underutilised X2-33 laboratory. A new partition wall is required for separation from Molecular Ecology Laboratory
- Minor refurbishment of existing laboratory for shared high end ddPCR equipment and robot
- Conversion of the Wash Room into Analytical Chemistry Instrumentation Room to allow decant of overcrowded X2-47
- Improvement to services for heat sensitive equipment in X2-47

Building MM (Bio Materials & Sciences, Analytical Instruments Characterisation focus)

Building MM Level One proposes:

- Creation of a shared Microscopy, Spectroscopy and Imaging Facility for consolidation of shared equipment in a vibration sensitive environment

Building MM Level Two proposes:

- Conversion of Design Suite into a Shared Instrument Room to allow decanting of equipment on benches in adjacent laboratories. This stage of works cannot occur until a Design Suite has been created in Building Q

Building MM Level Three proposes:

- Conversion of Viewing Area into a Shared Instrument Room to allow decanting of equipment on benches in adjacent laboratories

Building V (Regenerative Biology focus)

Building V Level One proposes:

- Conversion of the Movement Laboratory into a general Wet Chemistry Laboratory for the plasma reactors
- Conversion of V1-09 into Histology and Sample Preparation Laboratory so the three interconnected laboratories can be used as a PC2 capability suite. No works required to achieve this option
- Remove V1-07A Darkroom door into Store together with relocation of AFM and Confocal into Building MM shared facility
- V1-06 change of use to a light microscopy room (currently sitting in reception space)
- Conversion of V1-12 Office into Coolroom

Building IW (High End Core Technology Platforms, Interfacial Sciences Instrumentation focus)

Building IW Level One proposes:

- Refurbishment of IW1-06 for relocation of shared thermal analysis instrumentation currently located in Building R
- Refurbishment IW1-03 for future short term expansion of high end core technology platforms
- Expansion of the shared Interfacial Science Instrumentation Clean Laboratory for equipment consolidation together with refurbishment of adjacent laboratory for sample preparation for surface analysis
- Refurbishment of existing Minerals Processing Laboratory into Surface Interfaces Laboratory to allow consolidation adjacent the clean room. This stage of works could not occur until the relocation of the Minerals Processing Laboratory into Building H.

Building IW Level Two proposes:

- Relocation of Synthetic Chemistry users into existing laboratory. This stage cannot occur until the creation of a Surface Interface Laboratory has been created or alternate ground floor location identified
- Future laboratory expansion opportunity identified above the existing peristitial zone

Building Q (ANFF (SA), future expansion focus)

Building Q Level One proposes:

- Creation of ANFF Equipment Platform in the existing lecture theatre together with upgrades to foyer for new ANFF (SA) front door
- Future expansion Wet Chemistry Laboratory location identified in Q1-12 zone

Building Q Level Two proposes:

- Refurbishment of existing laboratory into a Class 10,000 Clean Laboratory in Q2-21
- Refurbishment of existing laboratory into a general Wet Chemistry Laboratory in Q2-11, 12, 19 & 20
- Creation of ANFF (SA) Design Suite and Stores for Clean Rooms to the southern wing of the floor

Building R (Advanced Manufacturing focus)

Building R Level One proposes:

- Nominated future expansion zone for Advanced Manufacturing until the mid term major refurbishment project of Building R
- Decant of Building R Level One and Two for future major refurbishment project

Building H (Minerals focus)

Building H Level One proposes:

- Consolidation of Minerals Processing facilities to include relocation of small scale Crushing and Grinding Facilities from IW1-21 and relocation of Leaching Columns and hydro float in R1-37 adjacent the existing Minerals Processing Laboratory in Building H.

Mid Term Laboratory Proposals

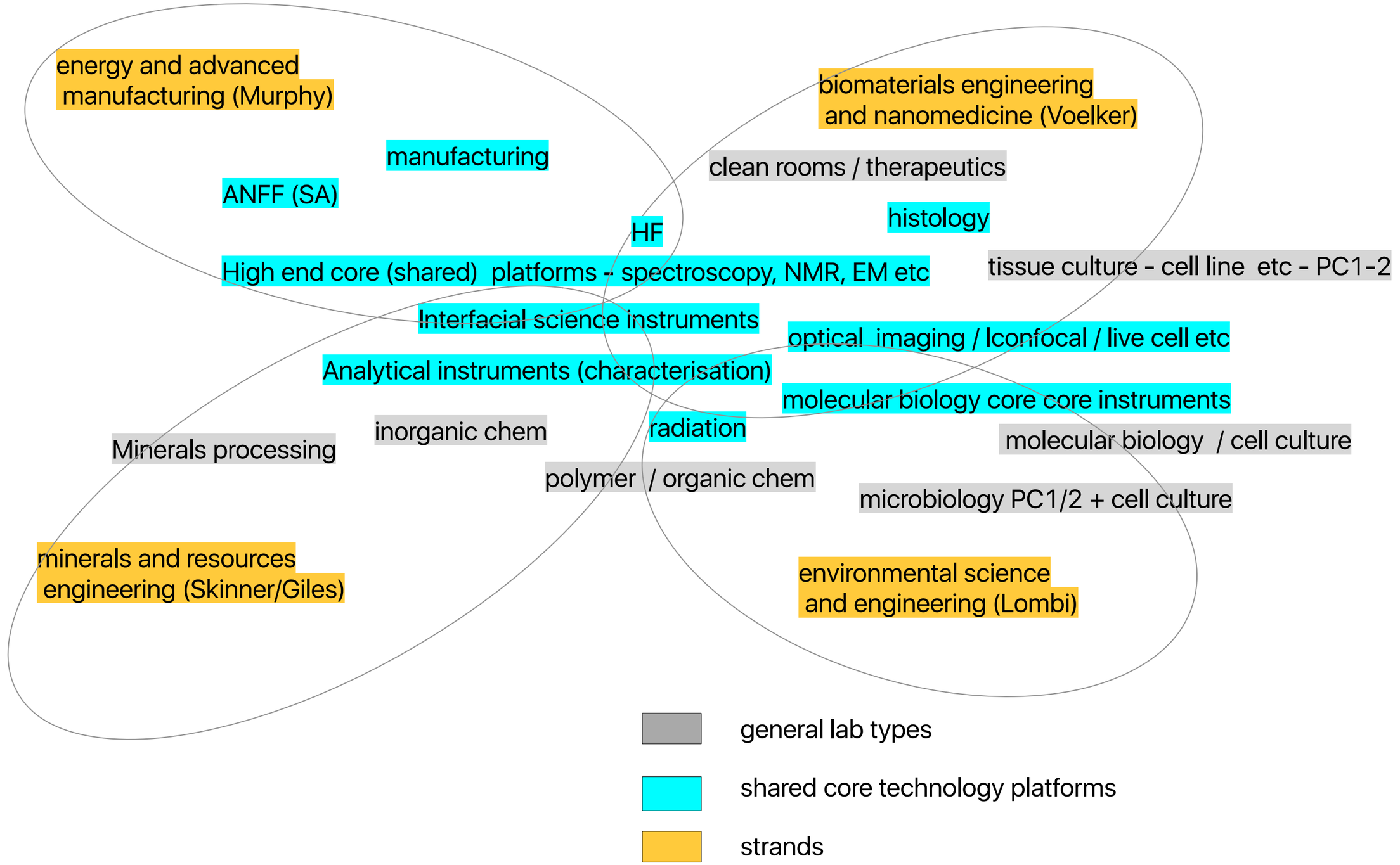
Building R

- Major refurbishment project to Level One and Two of Building R

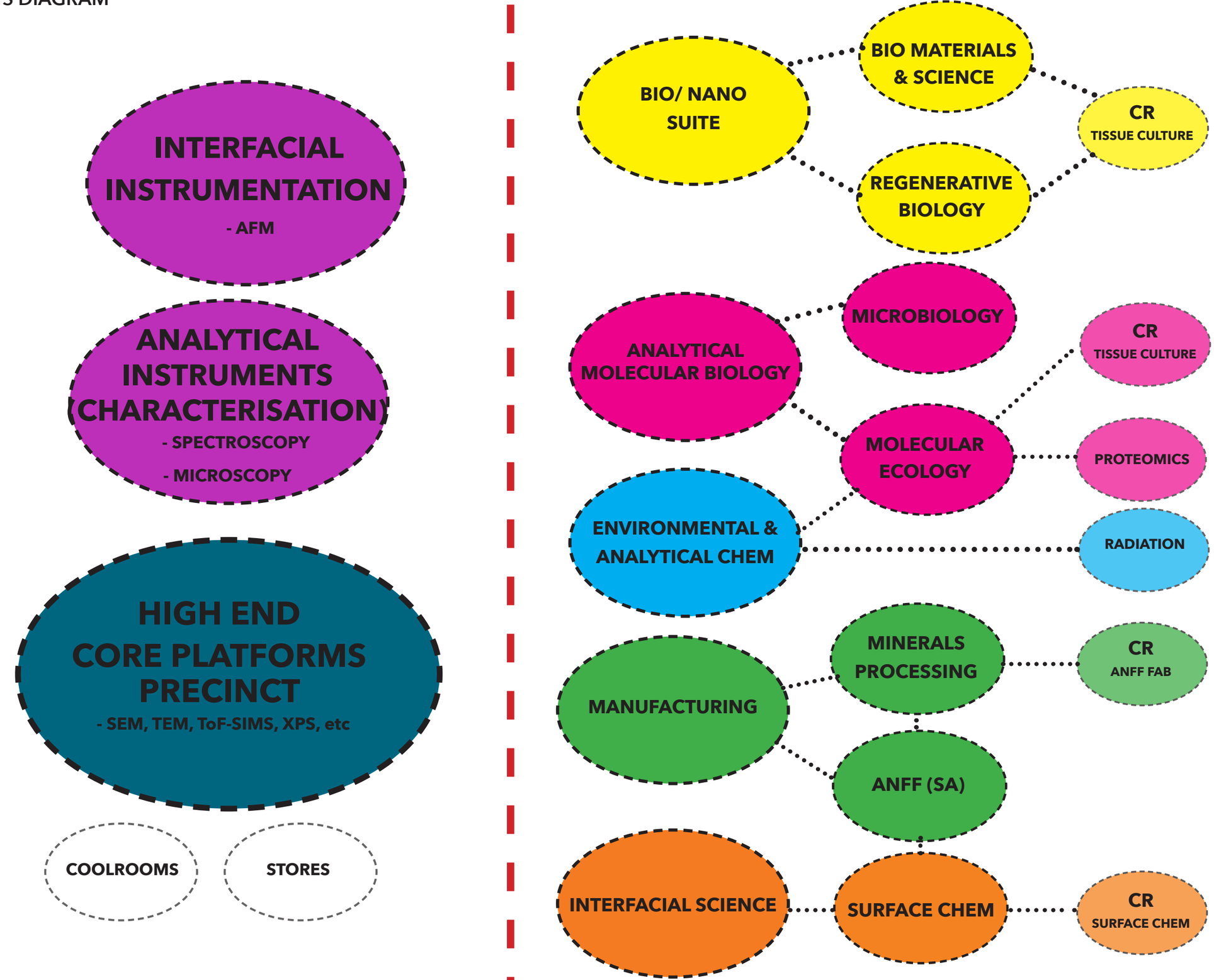
Building MM

- Minor refurbishment projects to Level Two and Three existing laboratories for consolidation of tissue culture work

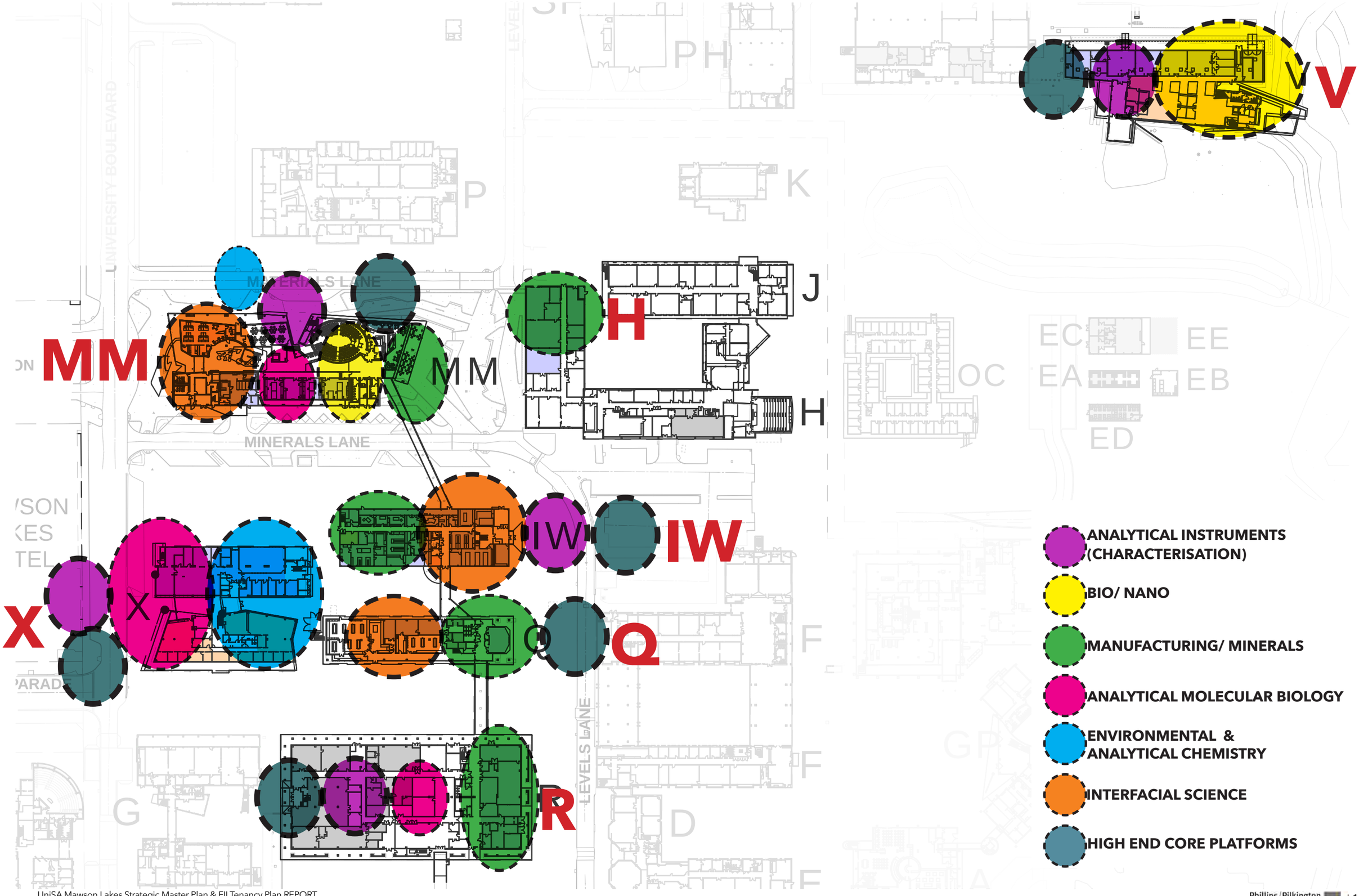
RELATIONSHIPS DIAGRAM



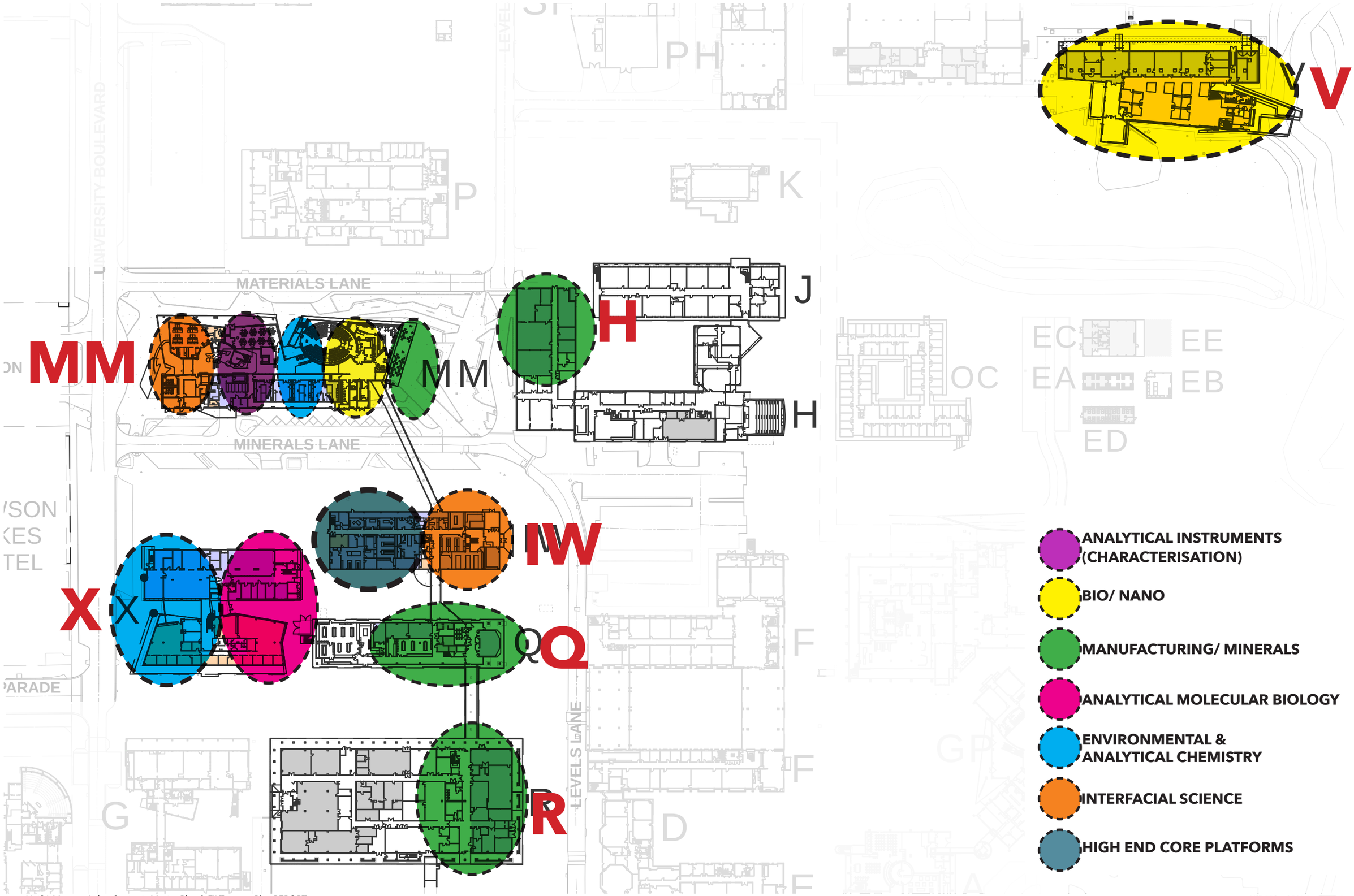
PRECINCTS DIAGRAM



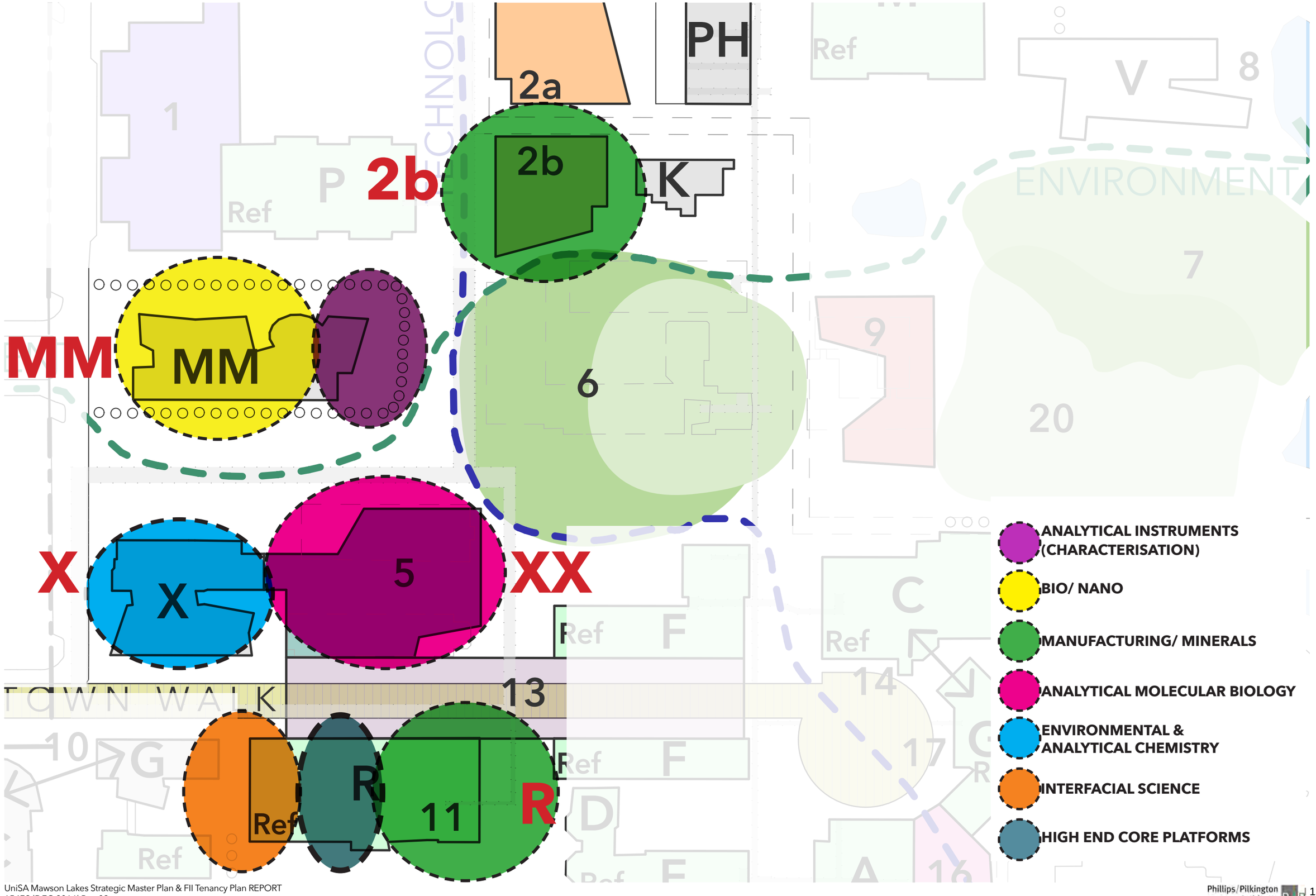
EXISTING PRECINCTS PLAN



PROPOSED SHORT TERM PRECINCTS PLAN



PROPOSED LONG TERM PRECINCTS PLAN



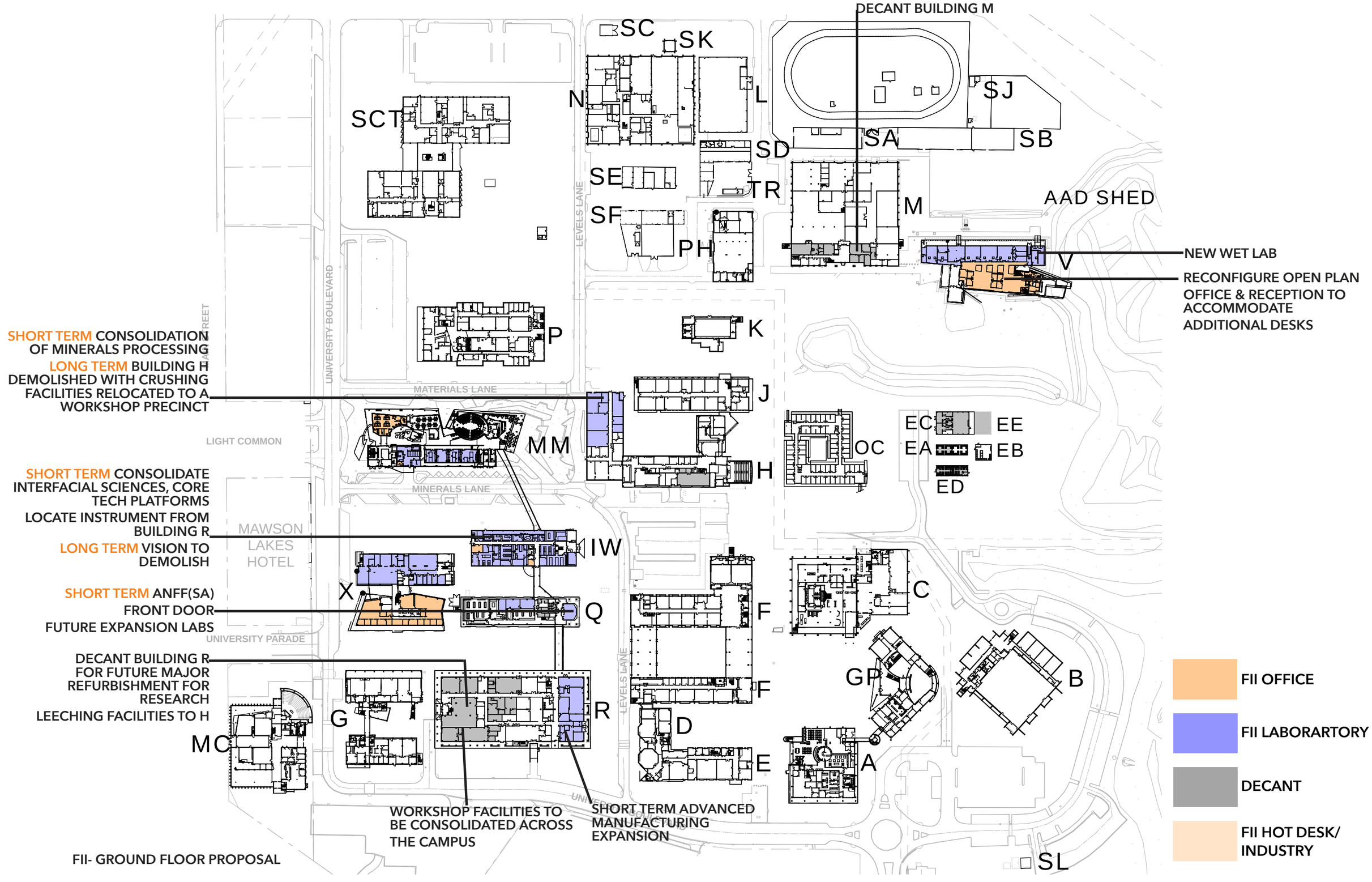
PRECINCTS SHORT TERM LOCATION SUMMARY

[Technology] Precincts	Features / comment	Where
Areas of shared access - internal and external collaborations.		
Manufacturing (coatings, ANFF, minerals)	Low vibration / high servicing / clean rooms / specialist rooms and prep labs.	IW / Q / MM then Building R rebuild
Minerals processing area (to accommodate heavy / dirty processing, some radiactive)	Some heavier / dirtier. Truck access / Gantry crane. Radioactive ores	H, IW then building R rebuild or new Building in Workshops Precinct
Analytical Science (mass spec, chemical spectroscopy, …) - "characterisation"	High servicing.	MM, X
Analytical chemistry	ICPMS - GC - HPLC. High servicing	X
High-end Spectroscopy (SEM, TEM, ToF-SIMS, XPS, etc)	Low vibration / high servicing.	IW / Q then Building R rebuild
Interfacial Science (surface tension, zeta potential, particle sizing, wettability, AFM…etc)	High grade environment- needs to be clean surfaces	MM, IW
HF	Wet bench, scurbbed fume cbds	MM - Level 3
Microscopy / Imaging	Confocal / AFM's / SEM	MM (some AFM to remain in IW)
Core molecular biology	Servicing all biology. PCR and prep	X
Microbiology	Adjacent to core molecular biology	X
Tissue culture (non micro)	Shared clean facilities.	V, MM
Radiation	Existing	X Level 1

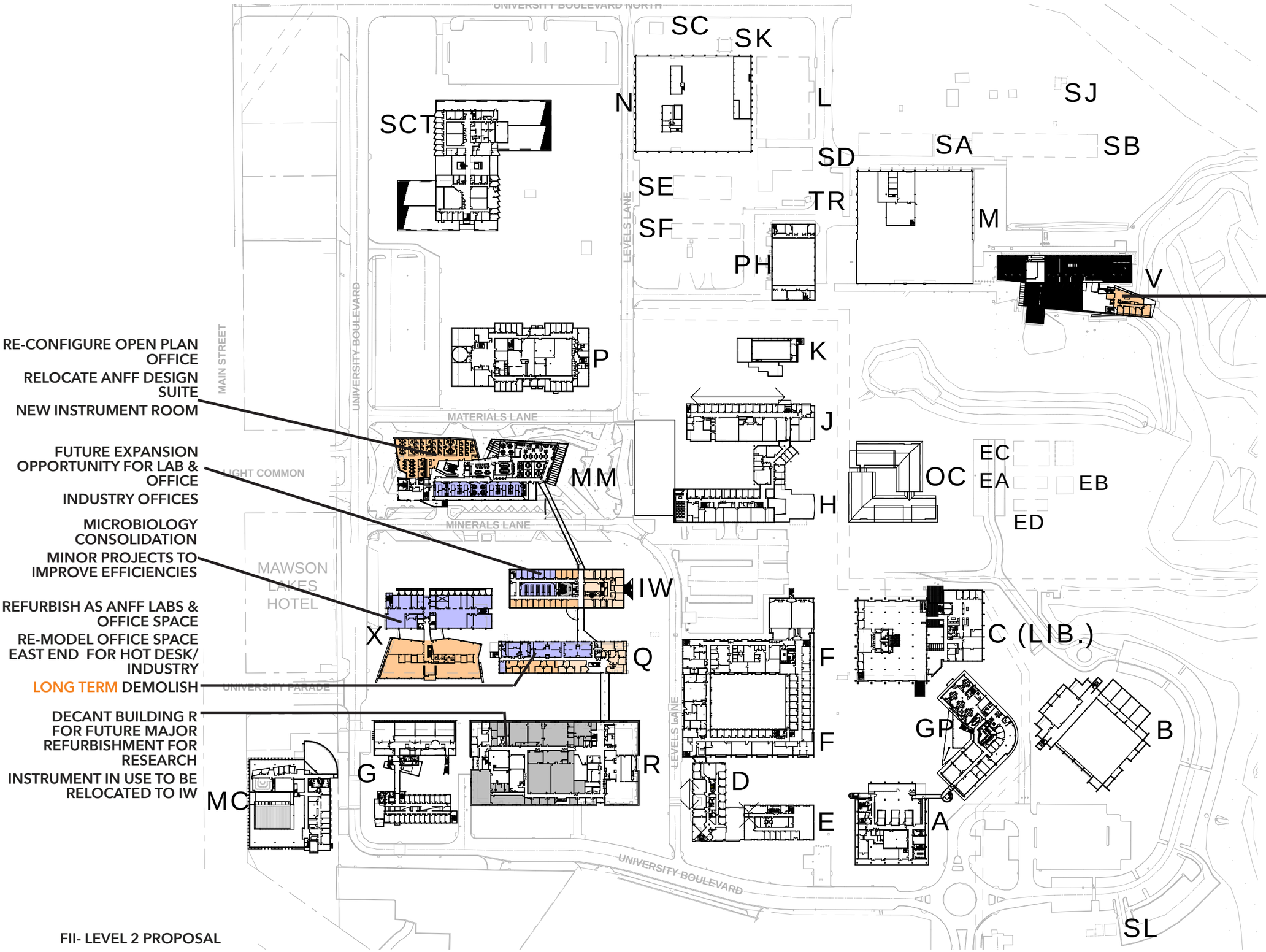
Building MM

Building X

FII SITE WIDE SHORT TERM TENANCY CONCEPT

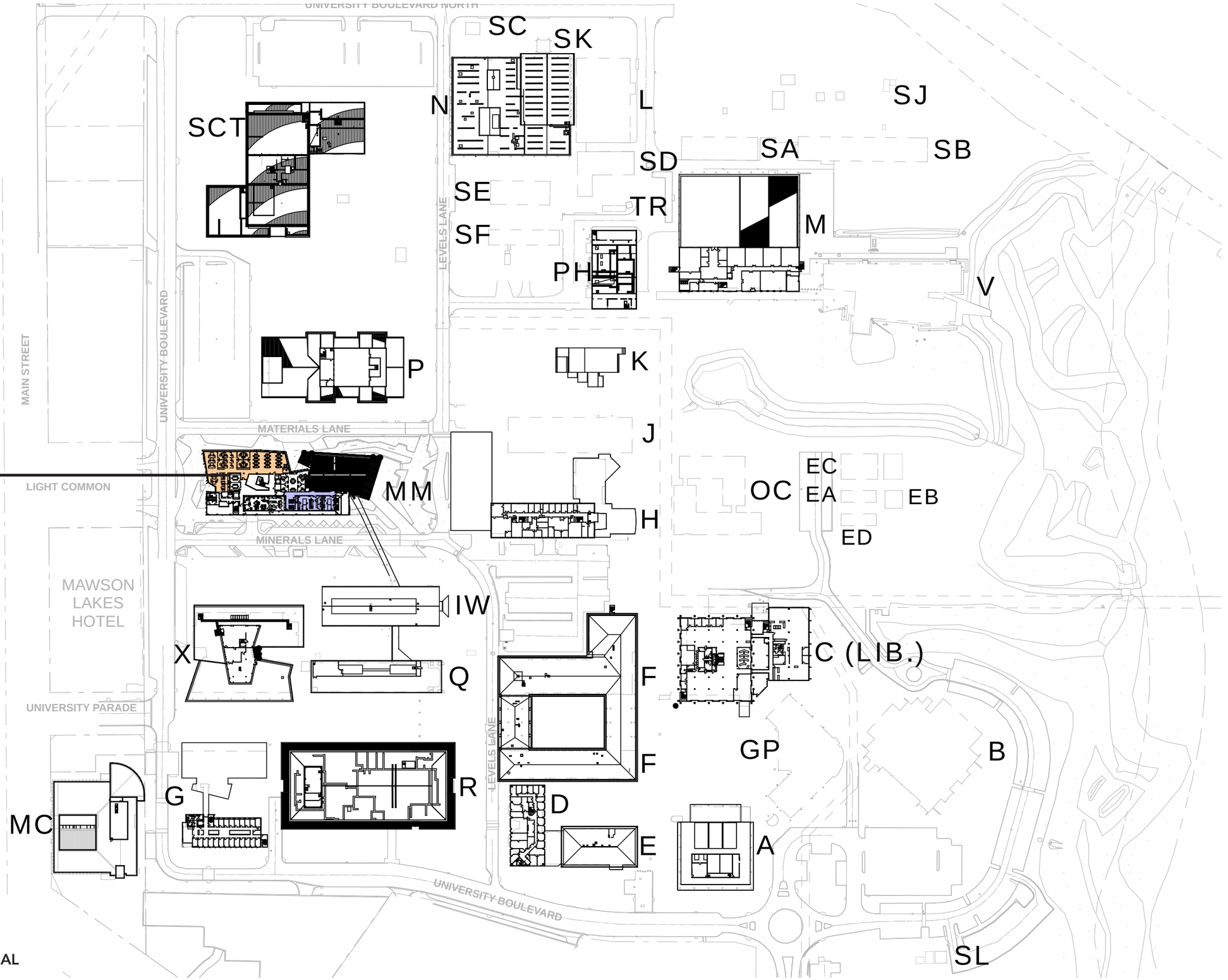


FII- GROUND FLOOR PROPOSAL



FII- LEVEL 2 PROPOSAL

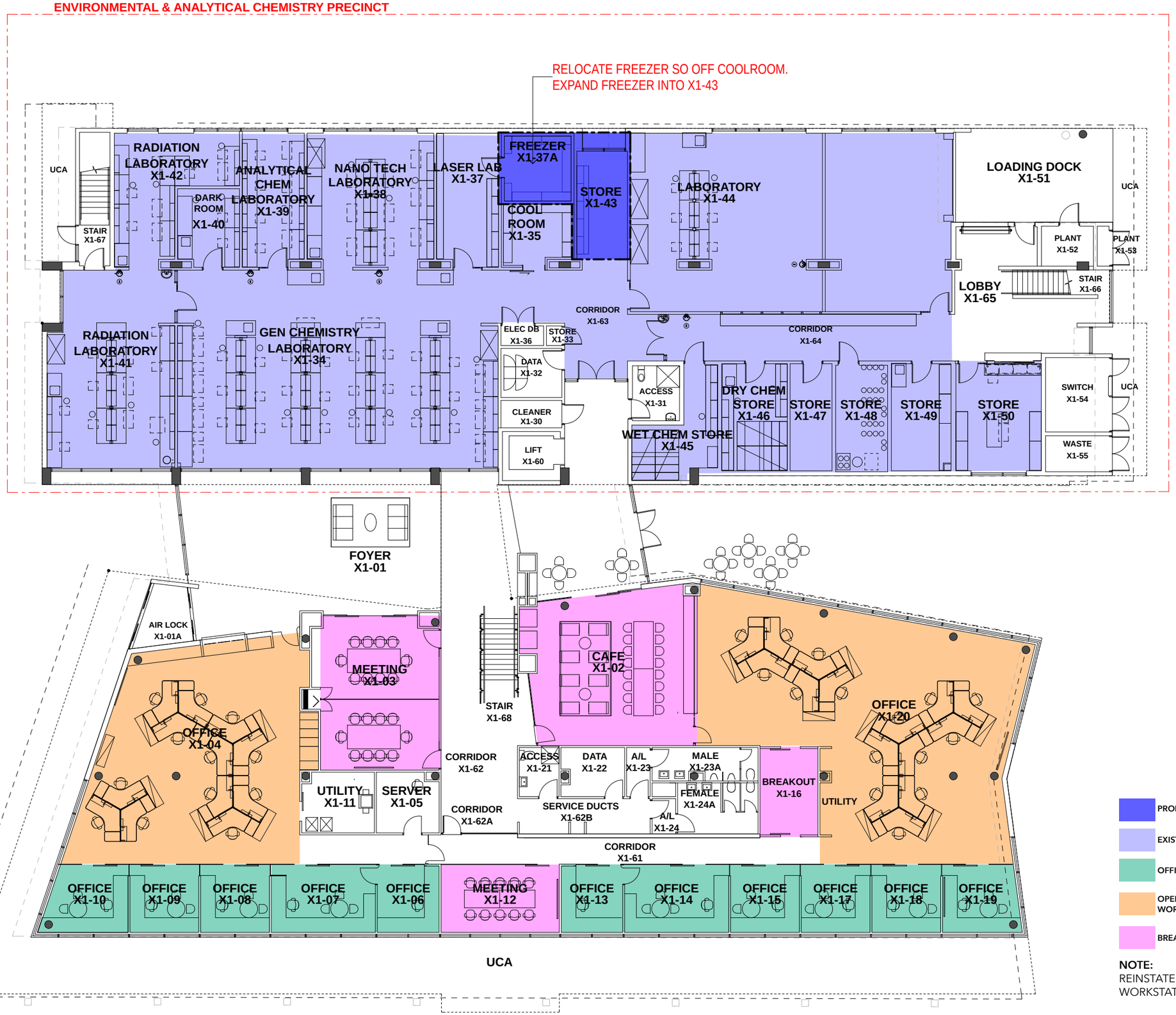
RE-CONFIGURE OPEN PLAN OFFICE
RE-CONFIGURE TEACHING OBSERVATION AREA INTO INSTUMENT ROOM



FII- LEVEL 3 PROPOSAL

FII SHORT TERM BUILDING BY BUILDING TENANCY PLANS

ENVIRONMENTAL & ANALYTICAL CHEMISTRY PRECINCT



PROPOSED LABORATORY CHANGES

EXISTING LABORATORY

OFFICE = 11

OPEN PLAN OFFICE WORKSTATIONS = 27

BREAKOUT/MEETING SPACE

NOTE:
REINSTATE BACK TO ORIGINAL WORKSTATION NUMBERS

Phillips/Pilkington Architects

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

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

BUILDING X LEVEL 01 - PROPOSED FII TENANCY PLAN

Scale 1:100 @ A1
Scale 1:200 @ A3

Drawing By: AM
Checked By: SP
Date: 14/12/2016
PRELIMINARY ONLY
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Revision: P2

Plot Date: 14/12/2016 /Volumes/PPA Data/JOB FILES/15479 UniSA Mawson Lakes Master Plan/15479 Drawings/CAD Files/Model/SITE MASTER PLAN- FII/15479 UniSA Master Plan_SITE CONCEPT.pln

ENVIRONMENTAL & ANALYTICAL CHEMISTRY PRECINCT

MICROBIOLOGY CONSOLIDATION
NEW PARTITION WALL FOR SEPARATION
FROM MOLECULAR ECOLOGY, REQUIRES
NEGATIVE PRESSURE

CONVERT INTO STORE
FOR CONSUMABLES

FUTURE EXPANSION OPPORTUNITY
ANALYTICAL CHEM INSTRUMENTATION

SERVICE IMPROVEMENTS

COVERT TO SHARED
PCR/ ddPCR
LABORATORY FACILITY

PC2 CAPABILITES

DEMOLISH PARTITION WALL

STAIR X2-56
LABORATORY X2-35
MICROBIOLOGY X2-33
STORE X2-32
PROTEOMICS X2-31
SERVICE X2-36
CTR X2-38
CTR X2-37
LABORATORY X2-42
GEN CHEMISTRY LAB X2-43
BALANCE ROOM X2-44
LABORATORY X2-45
ANALYTICAL CHEM INSTUMENTATION X2-47
ROOF ACCESS X2-56A
STORE X2-55A
CORRIDOR X2-55
STAIR X2-57
GEN WET CHEM LABORATORY X2-41
MOLECULAR ECOLOGY LABORATORY X2-30
AIR LOCK X2-34
CTR X2-29
ELEC DB X2-39
PLANT X2-40
PLANT X2-26
ANALYTICAL CHEM LABORATORY X2-46
ANALYTICAL CHEM INSTRUMENTATION X2-48
PLANT X2-27
ROOF ACCESS X2-26A
CLEAN ROOM X2-34A
ACCESS X2-25
FOYER X2-01
OFFICE X2-03
OFFICE X2-02
CORRIDOR X2-54
UTILITY X2-12
OFFICE X2-11
OFFICE X2-13
MEETING X2-04
STAIR X2-58
CLEANER X2-14
ACCESS X2-15
A/L X2-16
MALE X2-16A
FEMALE X2-17A
KITCHENETTE X2-54A
SERVICE DUCTS X2-54B
A/L X2-17
OFFICE X2-10
OFFICE X2-07
BREAKOUT X2-09
UTILITY X2-08
OFFICE X2-05
LIBRARY X2-18
OFFICE X2-06
BALCONY X2-18A

PROPOSED LABORATORY CHANGES
EXISTING LABORATORY
OFFICE = 4
OPEN PLAN OFFICE WORKSTATIONS = 72
BREAKOUT/MEETING SPACE

NOTE:
REINSTATE BACK TO ORIGINAL
WORKSTATION NUMBERS

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BUILDING X LEVEL 02 - PROPOSED FII TENANCY PLAN

Scale 1:100 @ A1
Scale 1:200 @ A3

Drawing By: AM
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Date: 14/12/2016
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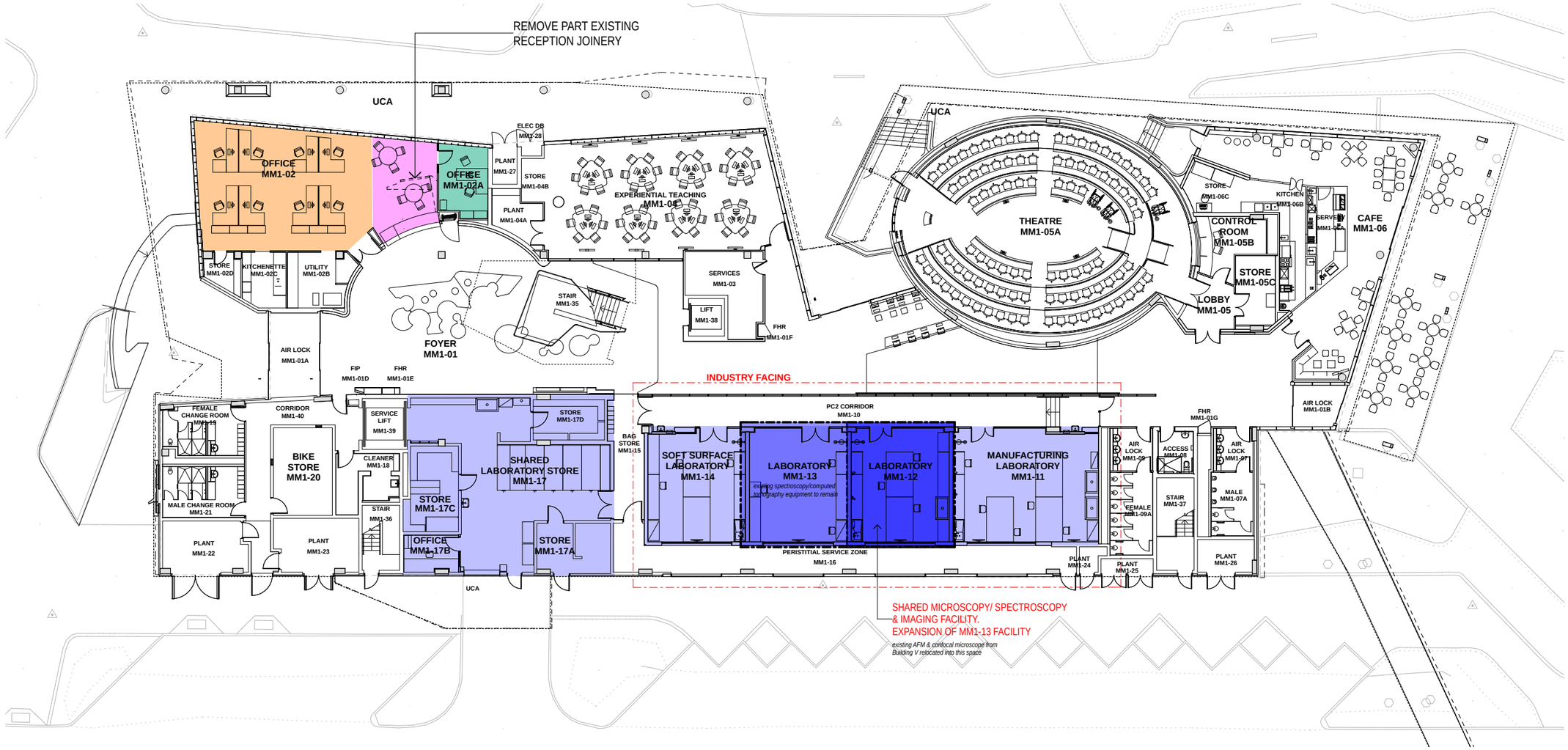
Project No/Drawing No.: 15479 - SK002
Revision: P3

Plot Date: 14/12/2016 /Volumes/PPA Data/JOB FILES/15479 UniSA Mawson Lakes Master Plan/15479 Drawings/CAD Files/Model/SITE MASTER PLAN- FII/15479 UniSA Master Plan_SITE CONCEPT.pln



PROPOSED LABORATORY CHANGES

EXISTING LABORATORY

OFFICE = 1

OPEN PLAN OFFICE
WORKSTATIONS = 8

BREAKOUT/MEETING SPACE

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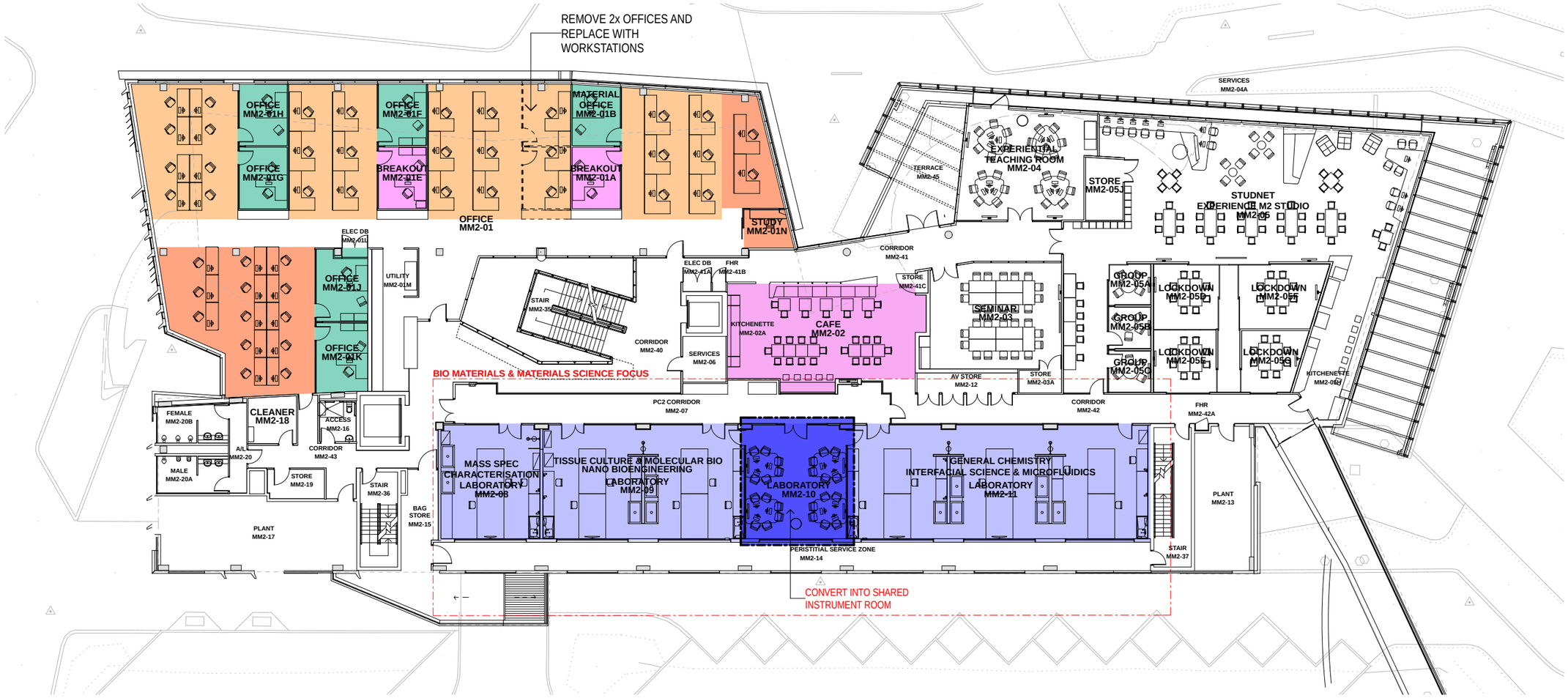
Mawson Lakes, South Australia

MM LEVEL 01 - PROPOSED FII TENANCY PLAN

Scale 1:150 @ A1
Scale 1:300 @ A3

Drawing By: AM
Checked By: SP
Date: 14/12/2016
PRELIMINARY ONLY
Project No/Drawing No.: 15479 - SK003
Revision: P2

Plot Date: 14/12/2016 /Volumes/PPA Data/JOB FILES/15479 UniSA Mawson Lakes Master Plan/15479 Drawings/CAD Files/Model/SITE MASTER PLAN- FII/15479 UniSA Master Plan_SITE CONCEPT.pln



NOTE:
SOME EXISTING WORKSTATIONS DO NOT MEET CURRENT 6M^2 UNISA SPACE GUIDELINES

- PROPOSED LABORATORY CHANGES
- EXISTING LABORATORY
- OFFICE = 6
- OPEN PLAN OFFICE WORKSTATIONS = 29
- HOT DESK/TRANSIT WORKSTATIONS = 16
- BREAKOUT/MEETING SPACE

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

MM LEVEL 02 - PROPOSED FII TENANCY PLAN
Scale 1:150 @ A1
Scale 1:300 @ A3

Drawing By: AM
Checked By: SP
Date: 14/12/2016
PRELIMINARY ONLY
Project No/Drawing No.: 15479 - SK004
Revision: P2

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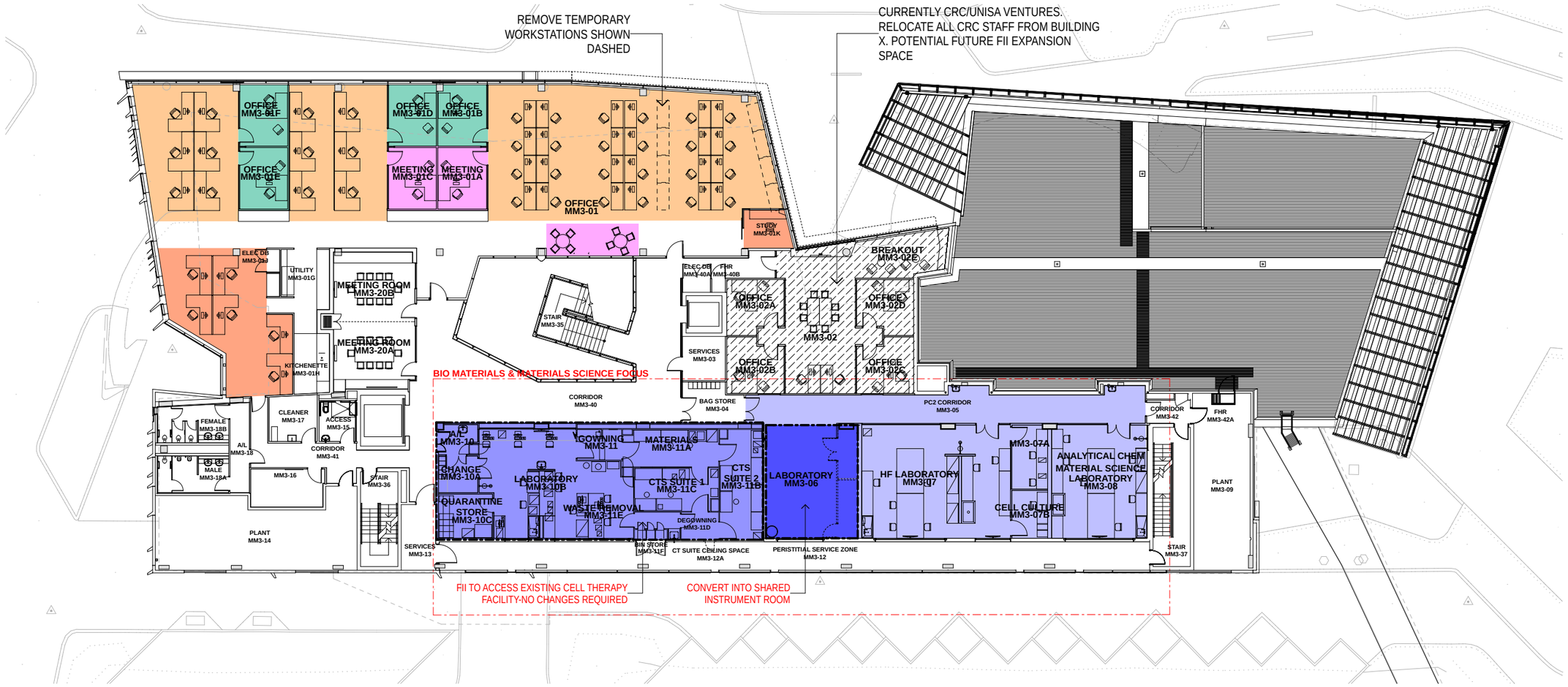

NOTE:
SOME EXISTING WORKSTATIONS DO NOT MEET CURRENT 6M^2 UNISA SPACE GUIDELINES

- PROPOSED LABORATORY CHANGES
- EXISTING LABORATORY
- OFFICE = 4
- OPEN PLAN OFFICE WORKSTATIONS = 36
- HOT DESK/TRANSIT WORKSTATIONS = 7
- BREAKOUT/MEETING SPACE

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

MM LEVEL 03 - PROPOSED FII TENANCY PLAN

Scale 1:150 @ A1
Scale 1:300 @ A3

Drawing By: AM
Checked By: SP
Date: 14/12/2016
PRELIMINARY ONLY
Project No/Drawing No.: 15479 - SK005
Revision: P2

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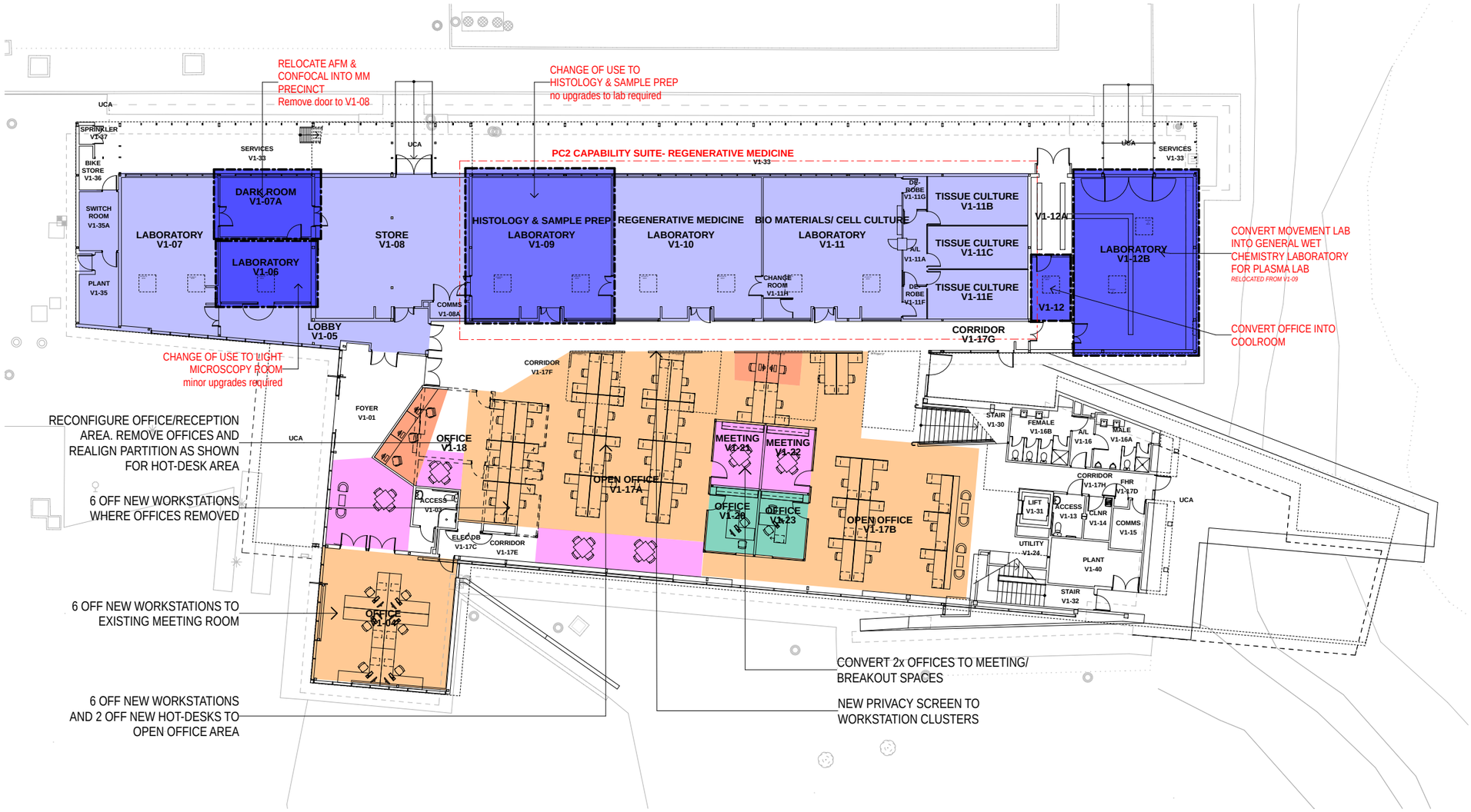

PROPOSED LABORATORY CHANGES

EXISTING LABORATORY

OFFICE = 2

OPEN PLAN OFFICE WORKSTATIONS = 41

HOT DESK/TRANSIT WORKSTATIONS = 5

BREAKOUT/MEETING SPACE

NOTE:
SOME EXISTING WORKSTATIONS DO NOT MEET CURRENT 6M^2 UNISA SPACE GUIDELINES

Phillips/Pilkington Architects

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

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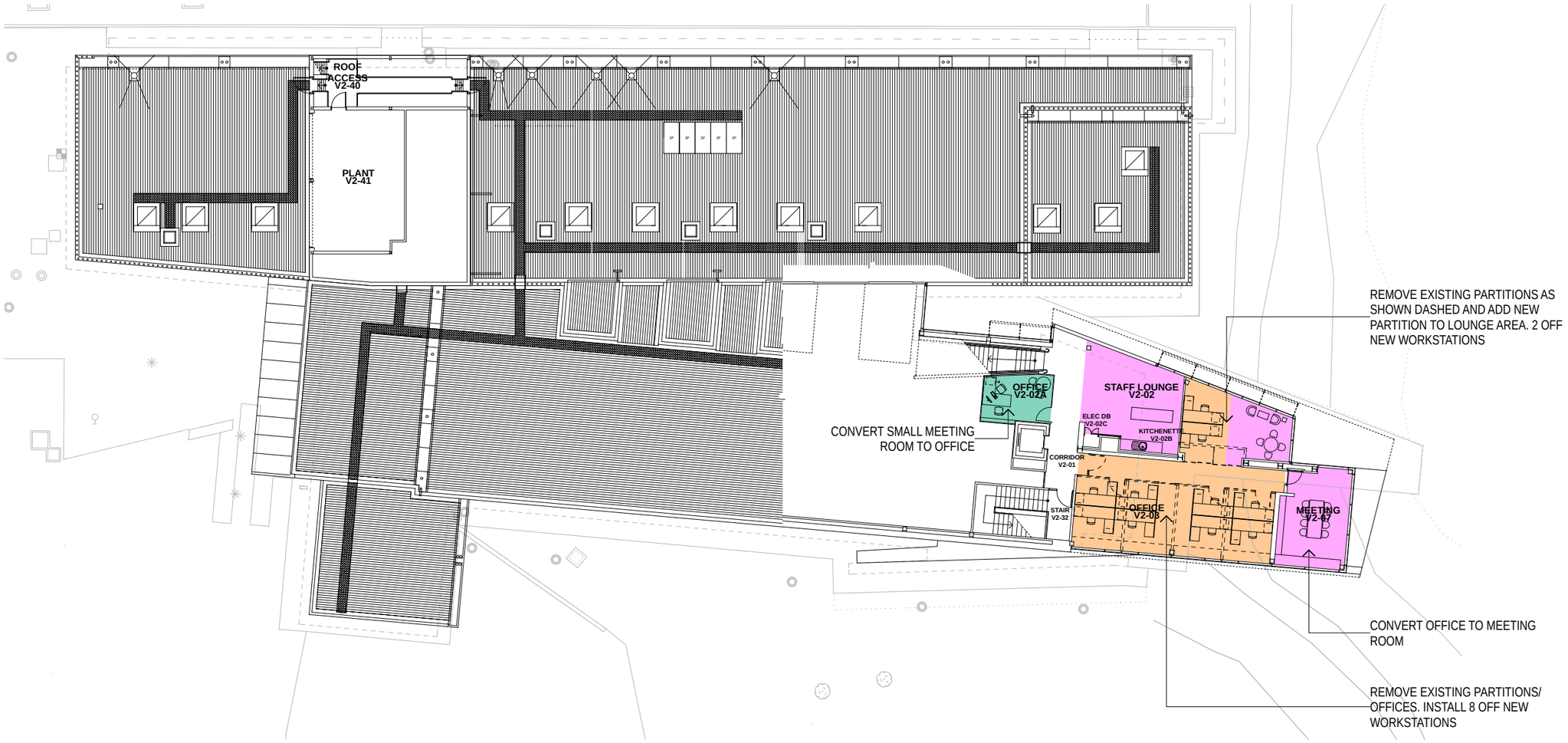
BUILDING V LEVEL 01 - PROPOSED FII TENANCY PLAN

Scale 1:150 @ A1
Scale 1:300 @ A3

Drawing By: AM
Checked By: SP
Date: 14/12/2016
PRELIMINARY ONLY
Project No/Drawing No.: 15479 - SK006
Revision: P2

Plot Date: 14/12/2016 /Volumes/PPA Data/JOB FILES/15479 UniSA Mawson Lakes Master Plan/15479 Drawings/CAD Files/Model/SITE MASTER PLAN- FII/15479 UniSA Master Plan_SITE CONCEPT.pln



OFFICE = 1

OPEN PLAN OFFICE WORKSTATIONS = 10

BREAKOUT/MEETING SPACE

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BUILDING V LEVEL 02 - PROPOSED FII TENANCY PLAN

Scale 1:150 @ A1

Scale 1:300 @ A3

Drawing By: AM

Checked By: SP

Date: 14/12/2016

PRELIMINARY ONLY

Project No/Drawing No.: 15479 - SK007

Revision: P1

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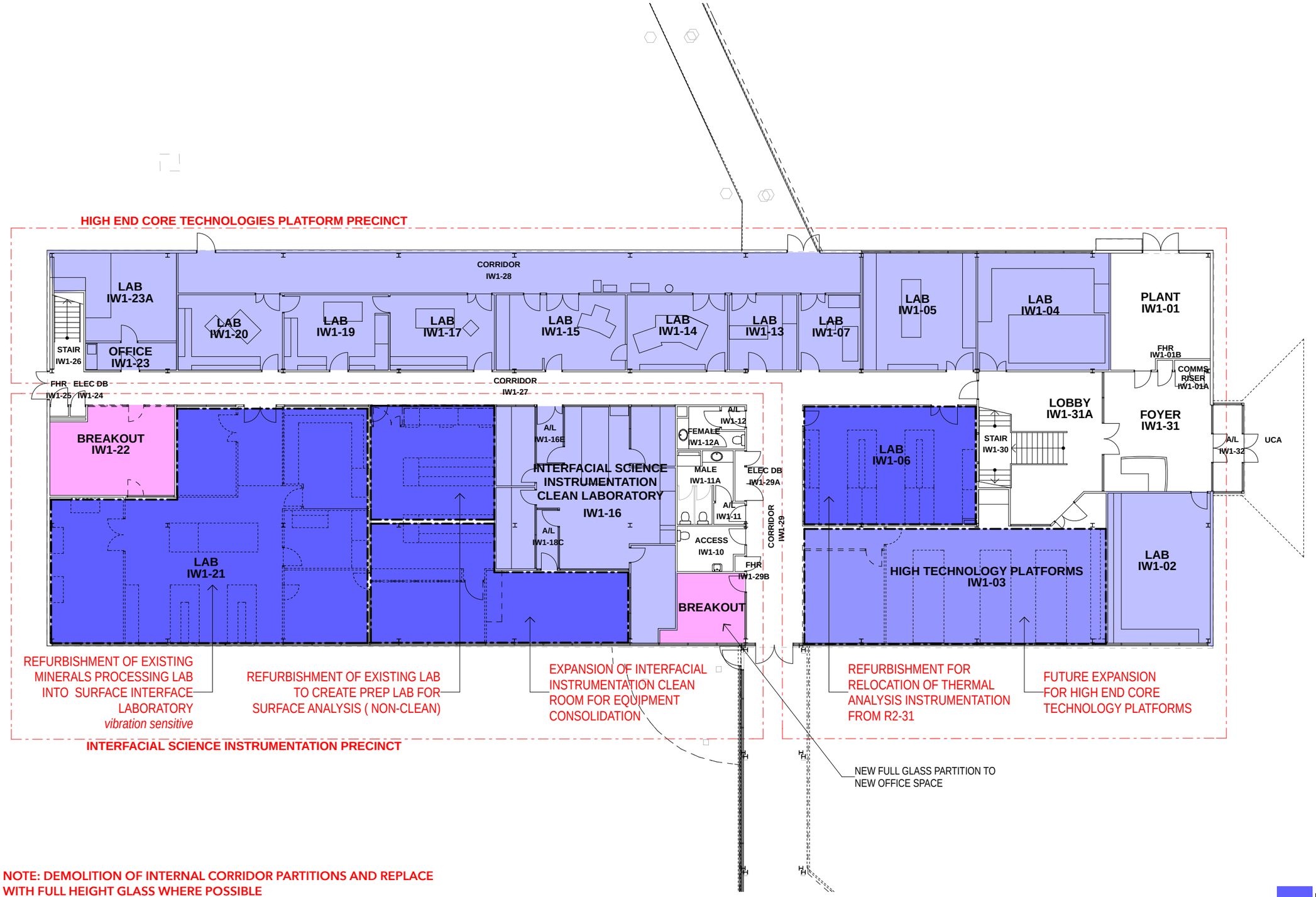

NOTE: DEMOLITION OF INTERNAL CORRIDOR PARTITIONS AND REPLACE WITH FULL HEIGHT GLASS WHERE POSSIBLE
UPGRADES TO INTERNAL CORRIDOR FINISHES & ACCESS

PROPOSED LABORATORY CHANGES
EXISTING LABORATORY
BREAKOUT/MEETING SPACE

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IW LEVEL 01 - PROPOSED FII TENANCY PLAN

Scale 1:100 @ A1
Scale 1:200 @ A3

Drawing By: AM
Checked By: SP
Project No/Drawing No.: 15479 - SK008
Date: 14/12/2016
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Revision: P2

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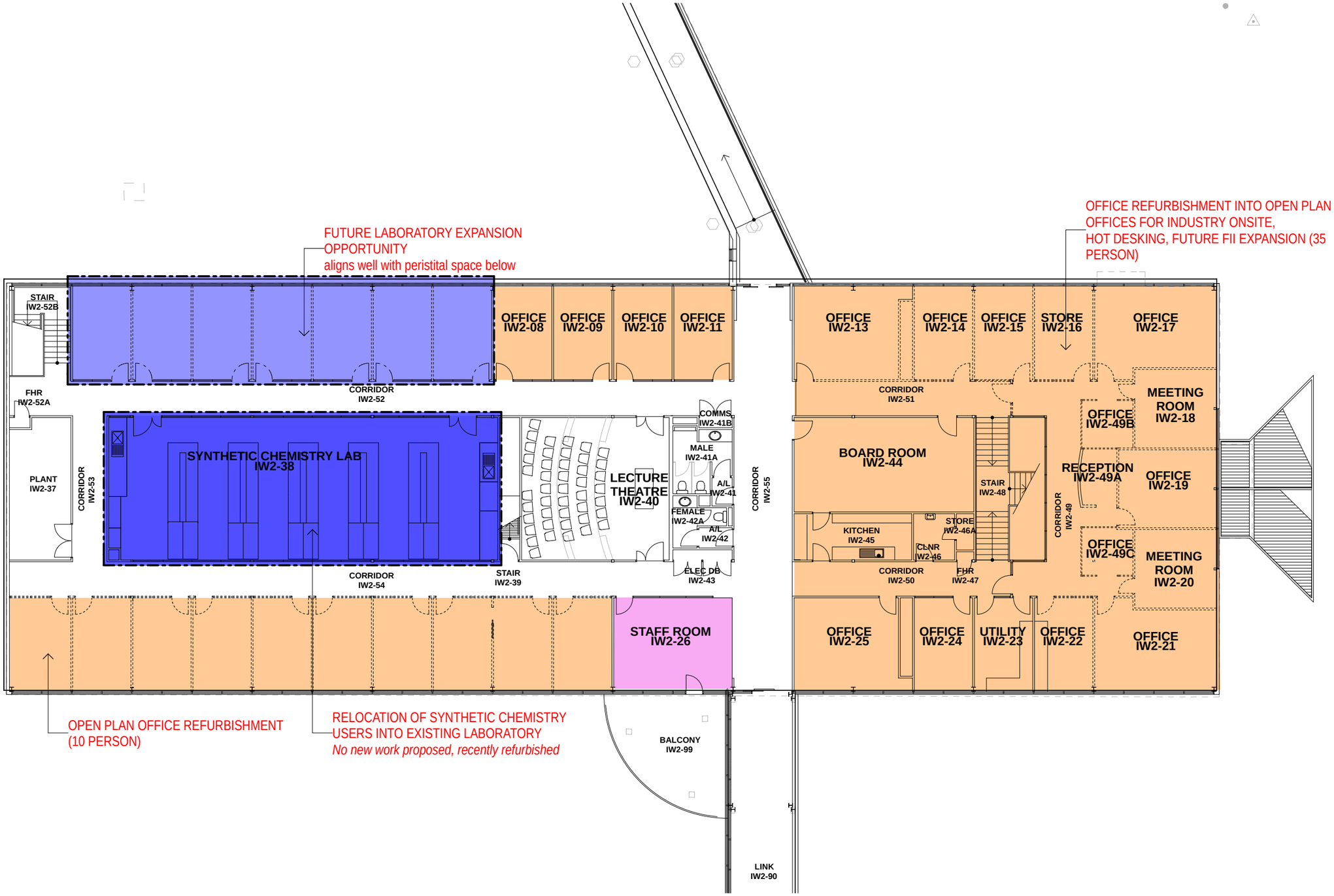

NOTE: DEMOLITION OF INTERNAL CORRIDOR PARTITIONS AND REPLACE WITH FULL HEIGHT GLASS WHERE POSSIBLE
UPGRADES TO INTERNAL CORRIDOR FINISHES & ACCESS

- PROPOSED LABORATORY CHANGES
- EXISTING LABORATORY
- BREAKOUT/MEETING SPACE
- OFFICES = 14

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tel: 08 8239 9000 fax 08 8239 9099
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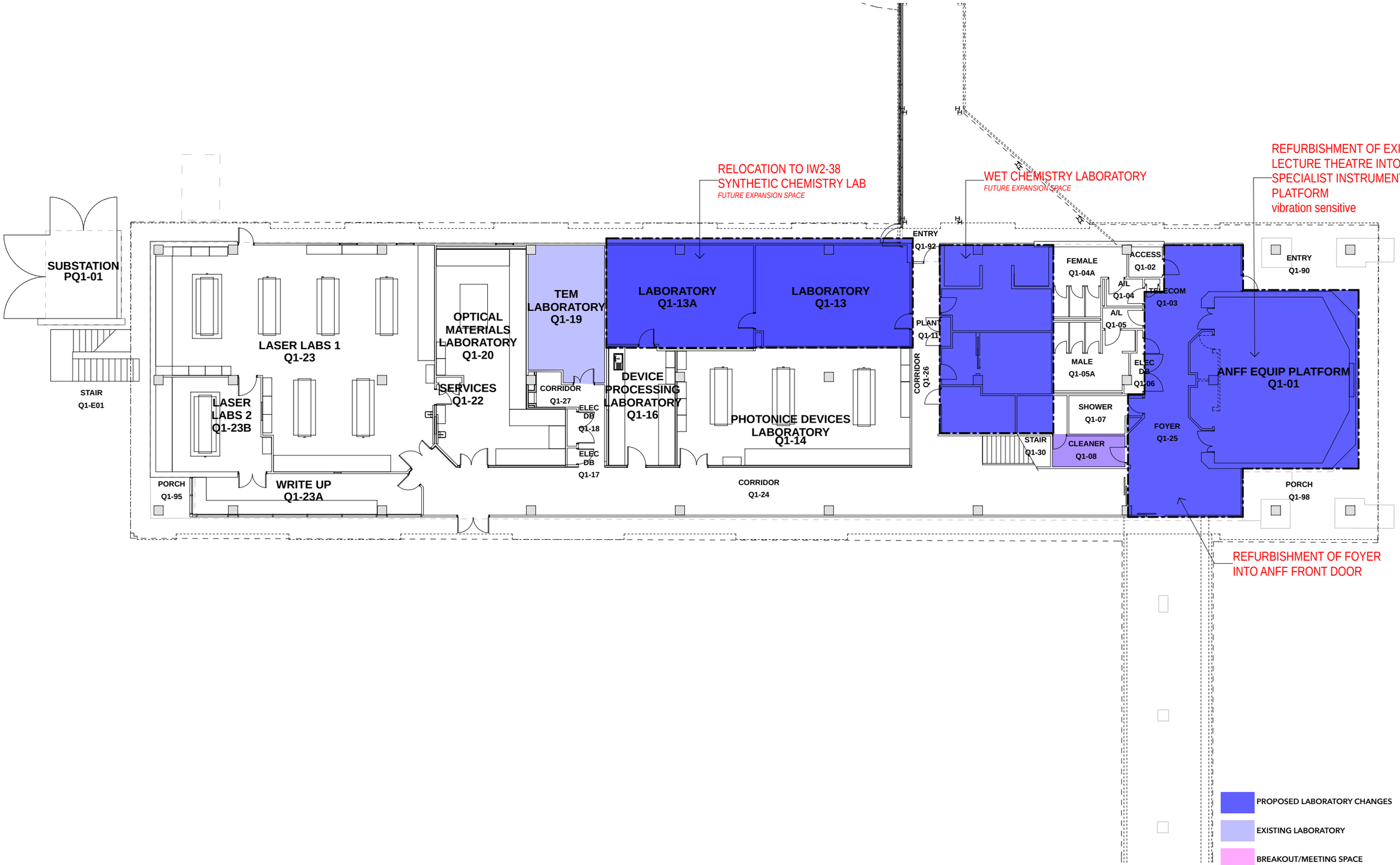
IW LEVEL 02- PROPOSED FII TENANCY PLAN

Scale 1:100 @ A1
Scale 1:200 @ A3

Drawing By: AM
Checked By: SP
Date: 14/12/2016
PRELIMINARY ONLY
Project No/Drawing No.: 15479 - SK009
Revision: P2

Plot Date: 14/12/2016 /Volumes/PPA Data/JOB FILES/15479 UniSA Mawson Lakes Master Plan/15479 Drawings/CAD Files/Model/SITE MASTER PLAN- FII/15479 UniSA Master Plan_SITE CONCEPT.pln



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Q LEVEL 01- PROPOSED FII TENANCY PLAN

Scale 1:100 @ A1
Scale 1:200 @ A3

Drawing By: AM
Checked By: SP
Date: 14/12/2016
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Project No/Drawing No.: 15479 - SK010
Revision: P2

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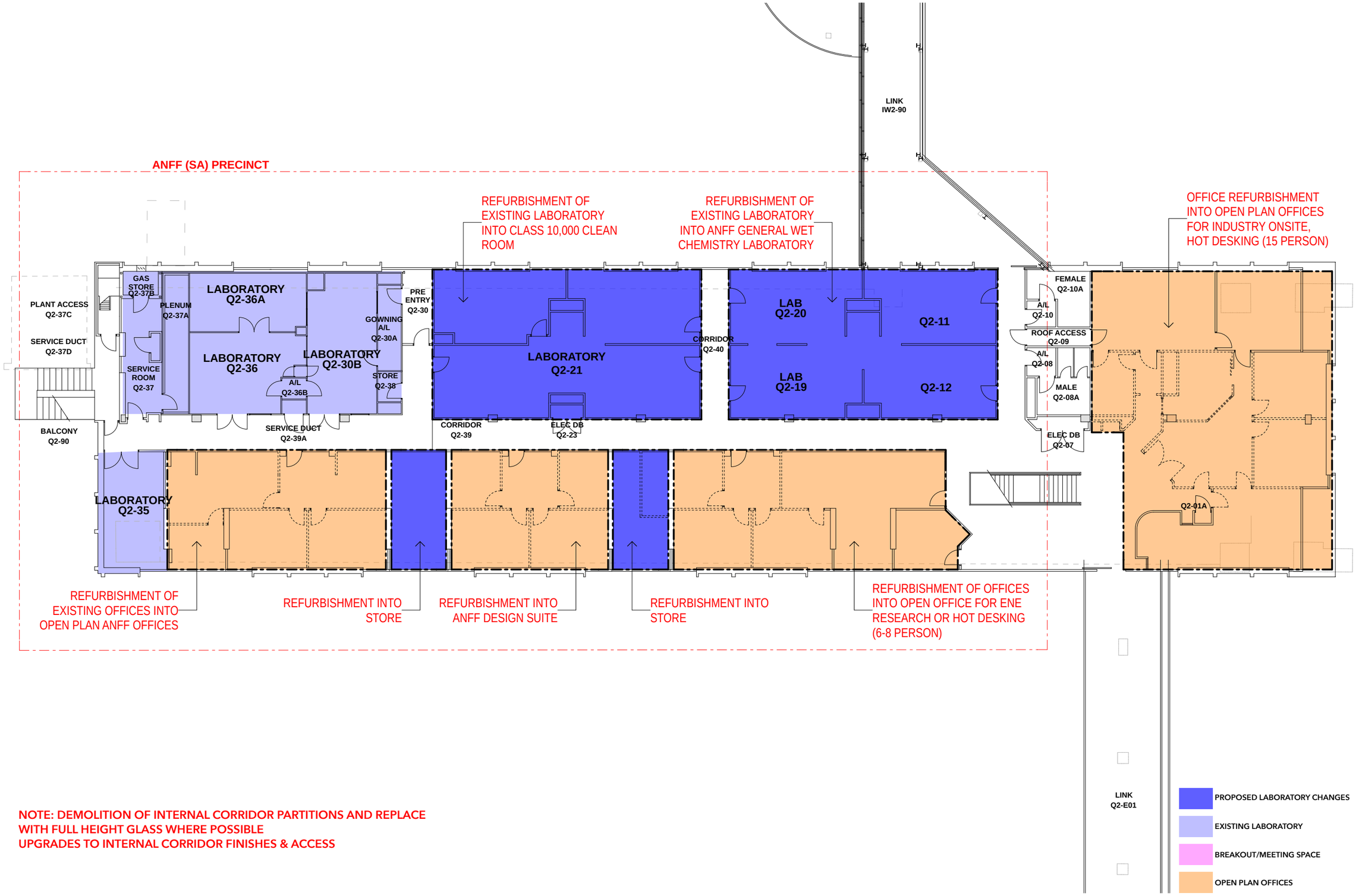

NOTE: DEMOLITION OF INTERNAL CORRIDOR PARTITIONS AND REPLACE WITH FULL HEIGHT GLASS WHERE POSSIBLE
UPGRADES TO INTERNAL CORRIDOR FINISHES & ACCESS

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Q LEVEL 02- PROPOSED FII TENANCY PLAN

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Scale 1:200 @ A3

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Date: 14/12/2016
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Project No/Drawing No.: 15479 - SK011
Revision: P2

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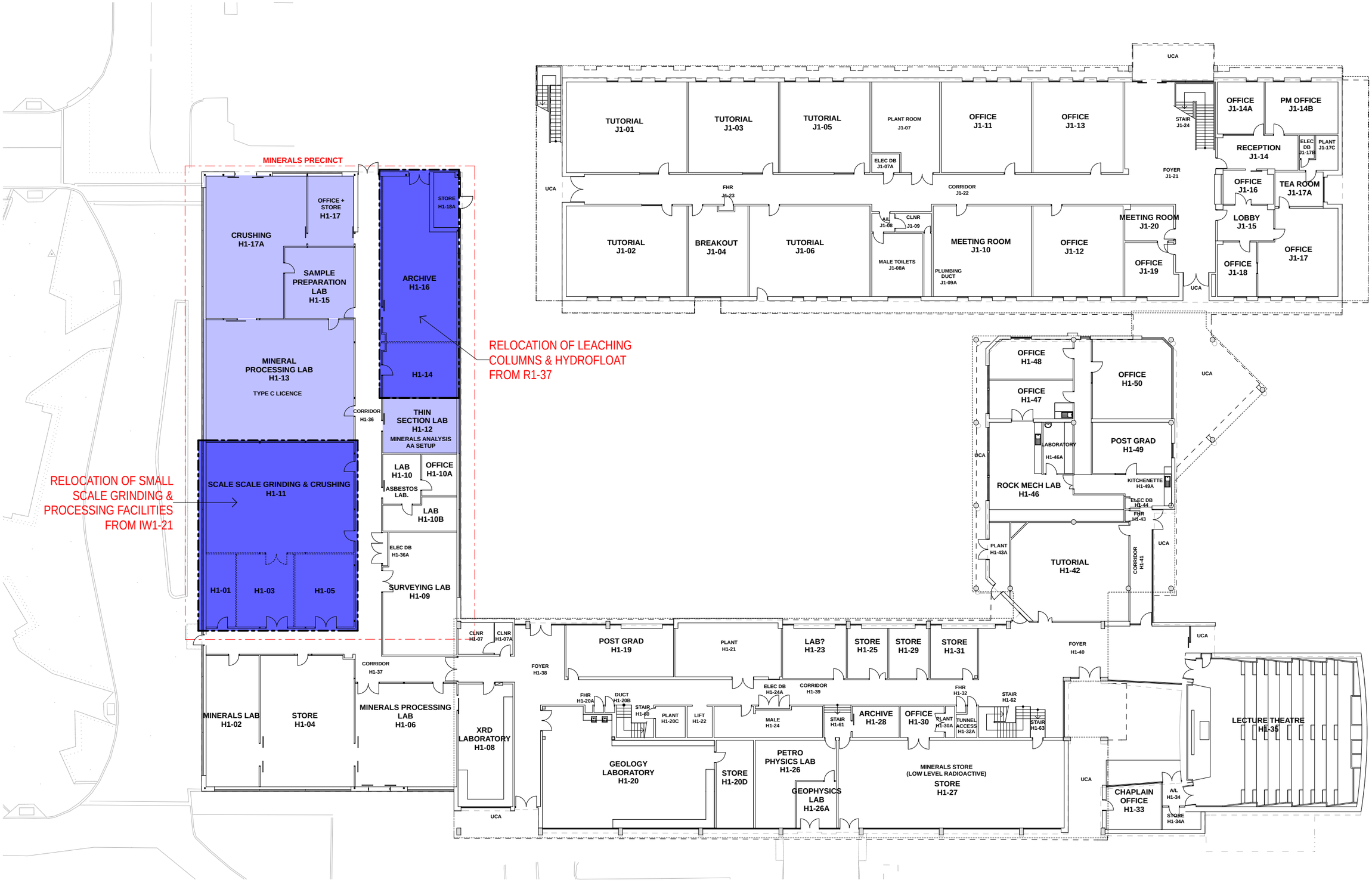

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H LEVEL 01- PROPOSED FII TENANCY PLAN

Scale 1:150 @ A1

Scale 1:300 @ A3

Drawing By: AM

Checked By: SP

Date: 14/12/2016

PRELIMINARY ONLY

Project No/Drawing No.: 15479 - SK013

Revision: P2

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DECANT OF BUILDING R LEVEL 01 AND 02 FOR MAJOR REFURBISHMENT PROJECT

ADVANCED MANUFACTURING

FUTURE EXPANSION SPACE FOR ADVANCED MANUFACTURING LABORATORY

LAB R1-37
MINERALS PROCESSING LAB.
POST GRAD LAB R1-38
MINERALS PROCESSING LAB.
CRUSHER R1-55
PLANT R1-39
CONSTANT TEMP R1-41D
CONSTANT TEMP R1-41C
CONSTANT TEMP R1-41B
INSTRUMENT LAB R1-41A
MICRO LAB R1-41
A/C PLANT R1-56
OFFICE R1-45
A/C PLANT R1-57
LAB R1-47
PLANT R1-16A
STAIR R1-51
LIFT R1-16
DUCT R1-41E
DUCT R1-41F
ELEC DB R1-43
CORRIDOR R1-70
ELEC DB R1-32B
STORE R1-36A
FOYER R1-54
STAIR R1-65
SERV R1-64
TRANSFER OPERATIONS LAB. (HIGH INTENSITY MAGNETIC SEPARATION FOR MINERALS EQUIP.)
STORE R1-36
SOLVENT STORE R1-35
WORKSHOP/ STORE R1-34
OFFICE R1-33
PLANT R1-40A
MICRO INSTRUMENT R1-40
MICRO PREP R1-42
MICRO PREP R1-42A
MICRO PREP R1-44
LABORATORY R1-46
MICRO STORE R1-42B
MICRO OFFICE R1-44A
OFFICE R1-48
FOYER R1-52
(FOR WORKSHOP R1-28) STORE R1-27
STORE R1-25
ELEC DB R1-24
PLANT R1-24A
DUCT R1-23
CORRIDOR R1-73
STORE R1-29
STORE R1-30
OFFICE R1-31
PLANT R1-26
STORE R1-22
LARGE LEGACY CHEMICAL STORE
STORE OFFICE R1-21
SOLVENT STORE R1-22A
ACID STORE R1-22B
STORE R1-61
STAIR R1-62
UCA
WORKSHOP R1-32
SPRAY BOOTH R1-28B
A/L R1-28A
WORKSHOP R1-28
ELEC DB R1-49
CLNR R1-50
A/L R1-17
MALE R1-17A
FEMALE R1-19A
CORRIDOR R1-71
HOIST R1-09
STAFF SHWR R1-18
ACCESS R1-20
A/L R1-19
SERV R1-63
ADVANCED MANUFACTURING LAB R1-15
FIP R1-14
PLANT R1-15A
STORE R1-13
LOBBY R1-12
ADVANCED MANUFACTURING LAB R1-12A
PETER MURPHY LAB
R1-11
COMMS R1-02A
ELEC DB R1-02
DUCT R1-01A
BASEMENT ACCESS R1-01
PLANT R1-58
PLANT R1-59
PLANT R1-60

PROPOSED LABORATORY CHANGES

EXISTING LABORATORY

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R LEVEL 01- PROPOSED FII TENANCY PLAN

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Drawing By: AM
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Revision: P2

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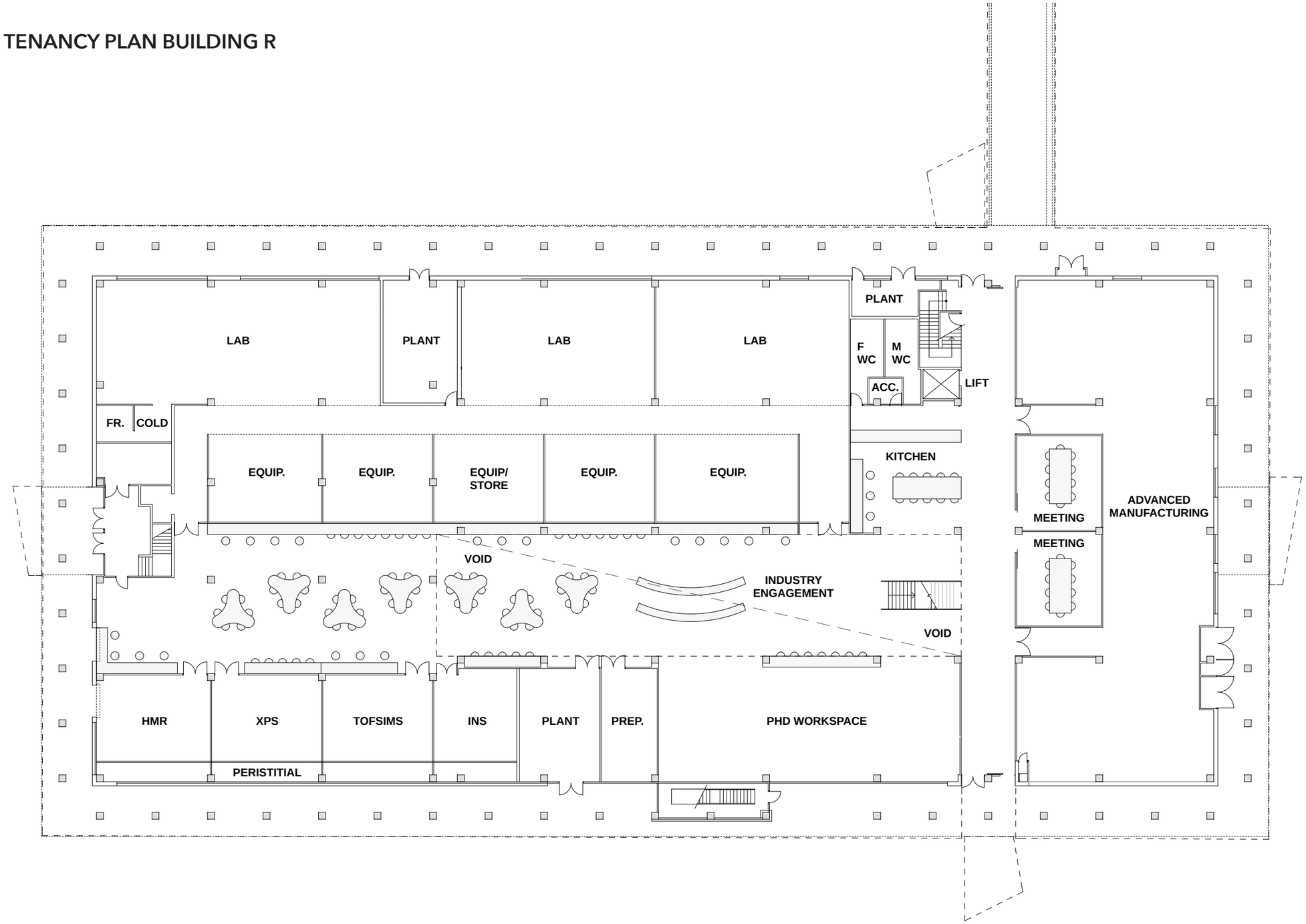
FII MID TERM TENANCY PLAN BUILDING R



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BUILDING R CONCEPT PROPOSAL RESEARCH INDUSTRY HUB LEVEL 01

Scale 1:150 @ A1
Scale 1:300 @ A3

Drawing By: AM
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Date: 14/12/2016
PRELIMINARY ONLY
Project No/Drawing No.:
Revision:

15479 - SK014

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BUILDING R CONCEPT PROPOSAL
RESEARCH INDUSTRY HUB LEVEL 02

Scale 1:150 @ A1
Scale 1:300 @ A3

Drawing By: AM
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Date: 14/12/2016
PRELIMINARY ONLY
Project No/Drawing No.:
Revision:

15479 - SK015

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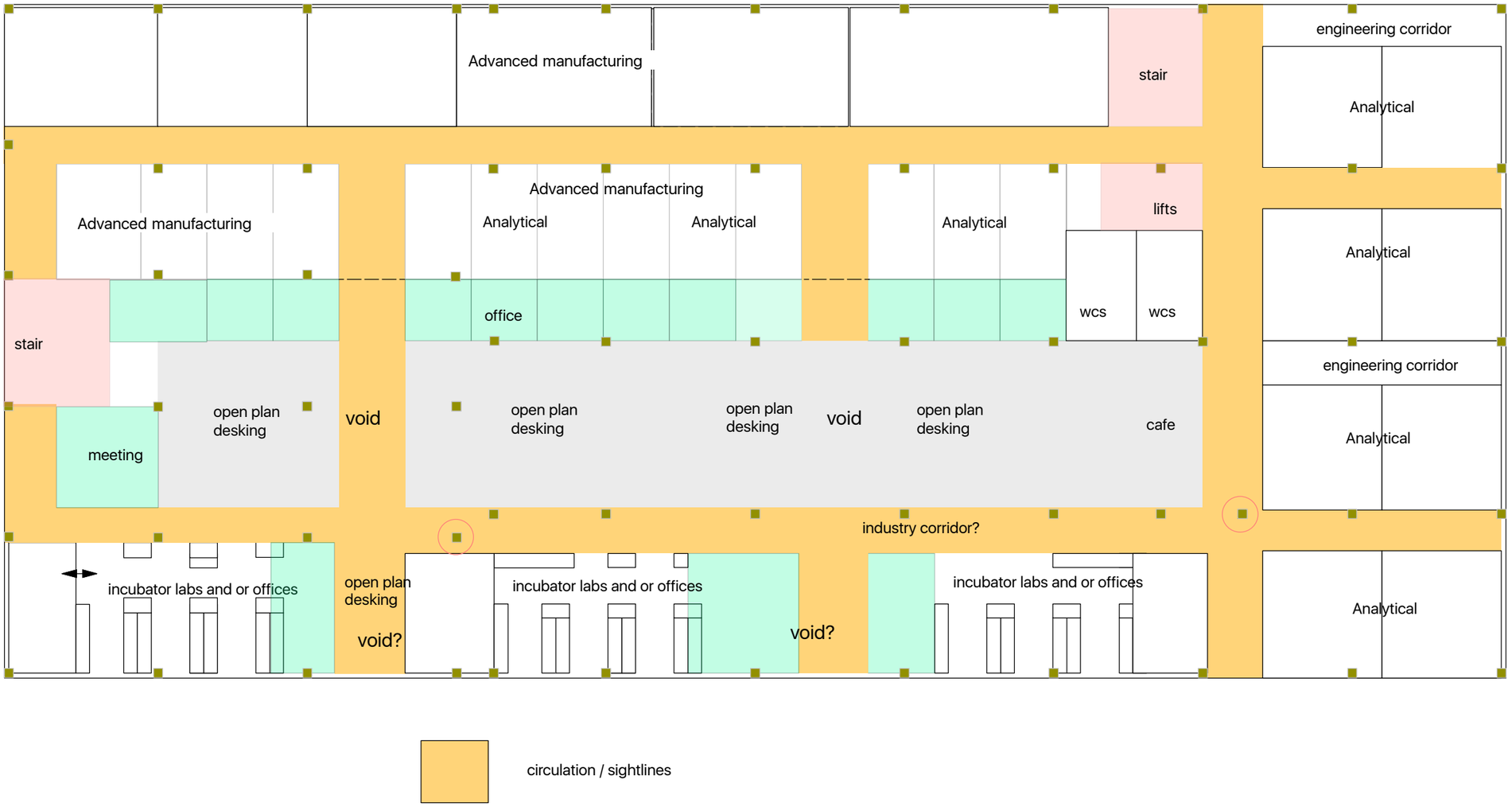
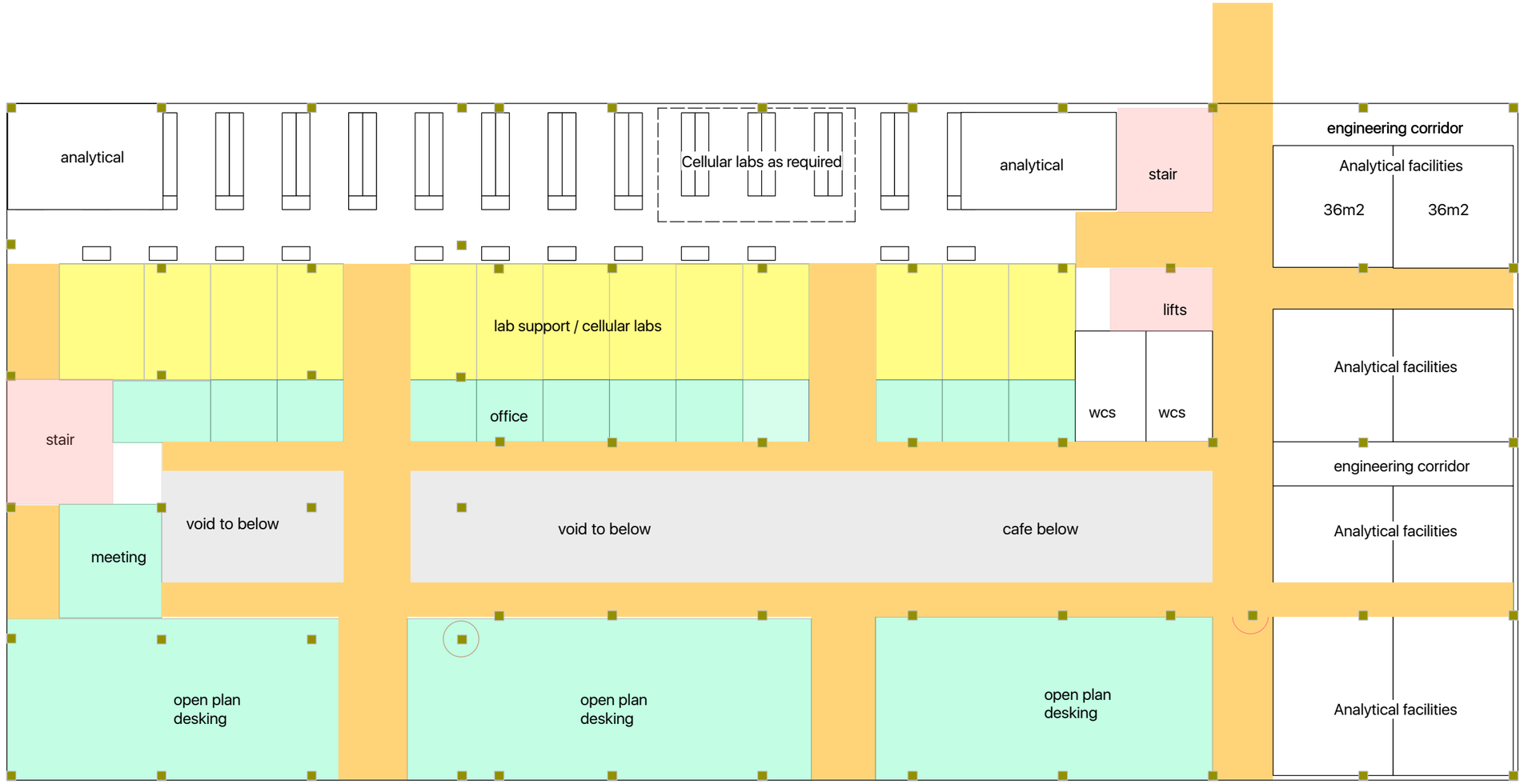
LABORATORY MODULES APPLIED TO BUILDING R



Level 1



Level 2

circulation / sightlines

FII PACKAGES & STAGING SCHEDULE (LABORATORIES)

PACKAGE	FII LABORATORY TENANCY	LEVEL	UPGRADE HIGH END/ MEDIUM/ LOW	DECANT REQUIRED	0	1	2	3	4	5	6	7	8	9	10	Summary of works required	Mechanical works required	Electrical works required	Hydraulic Works Required	Fire Services Works Required	Structural Works required
	SHORT TERM PROJECTS																				
A	**BUILDING X**																				
	Freezer expansion and door relocation	LEVEL 01	MID	N/A												Relocate entry door into freezer so off Coolroom and expand freezer into store zone	Assumed that refrigeration plant supply and installation by specialist contractor	N/A	Generally, pipework, plant and equipment will require to be refurbished and modified to suit new fixture locations. New drainage will be required to service condensate drainage from coolroom FDC.	Replacement of aged smoke and thermal detectors.	N/A
	Mircobiology Laboratory	LEVEL 02	MID	N/A												Relocation of microbiology work into underutilised X2-33 laboratory. New partition wall required for separation from Molecular Ecology Laboratory. Space needs to be negatively pressured. Allow for relocation of small equipment items	New chilled water / heating hot water air handling unit required in order to provide suitable pressurisation between spaces. Ventilation system upgrade and controls system modification required. Further investigation required if specialist exhaust or fume cupboards are required and for new plant location.	NewRCD protected general and specialised power throughout. Emergency power shutdown facilities. Standby and UPS power requirements to be determined.New communications horizontal cabling RJ45 outlet.New energy efficient LED lighting throughout. New exit and emergency lighting throughout.	Generally, pipework, plant and equipment will require to be refurbished and modified to suit new fixture locations.	Replacement of aged smoke and thermal detectors.	N/A
	PCR/ dd PCR Laboratory	LEVEL 02	LOW	N/A												Minor refurbishment of existing laboratory for shared high end $$$ ddPCR equipment and robot	Potential Air balancing modification required. Further investigation required if specialist exhaust or specific air handling requirement	NewRCD protected general and specialised power throughout. Emergency power shutdown facilities. Standby and UPS power requirements to be determined.New communications horizontal cabling RJ45 outlet.New energy efficient LED lighting throughout. New exit and emergency lighting throughout.	Generally, pipework, plant and equipment will require to be refurbished and modified to suit new fixture locations.	Replacement of aged smoke and thermal detectors.	N/A
	Store	LEVEL 02	LOW	N/A												Minor refurbishment project to convert laboratory into consumable Store	N/A	N/A	N/A	Replacement of aged smoke and thermal detectors.	N/A
	Analytical Chem Instrumentation Expansion	LEVEL 02	MID	N/A												Convert wash room into Analytical Chemistry Instrumentation Room to allow decant of overcrowded X2-47. New internal fitout required	New chilled water / heating hot water air handling unit required. Ventilation system upgrade and controls system modification required. Further investigation required if specialist exhaust or fume cupboards are required and for new plant location.	NewRCD protected general and specialised power throughout. Emergency power shutdown facilities. Standby and UPS power requirements to be determined.New communications horizontal cabling RJ45 outlet.New energy efficient LED lighting throughout. New exit and emergency lighting throughout.	Generally, pipework, plant and equipment will require to be refurbished and modified to suit new fixture locations. New fixtures and assoicated plumbing drainage and reticulation will be required.	Replacement of aged smoke and thermal detectors.	N/A
	Analytical Chem Instrumentation Service Improvements	LEVEL 02	MID	N/A												Improvement to services for heat sensitive equipment with space 24/7. A/C balancing issues, heat generation issues, individual chillers and pumps need to be removed/ relocated from room	New chilled water / heating hot water air handling unit may be required. Ventilation system upgrade and controls system modification required. Further investigation required for new plant location.	N/A	N/A	Replacement of aged smoke and thermal detectors.	N/A
	Building wide infrastructure upgrades required to achieve this															No Freezer alarms, No gas warning system. Plant at capacity.	BMS interface for laboratory gas monitoring. Chilled water / heating hot water air handling unit plant currently at capacity. Limited ability to accommodate additional specialist exhaust systems such as fume cupboards.	N/A	New trade waste interceptors may be required to serve additional trade waste drainage. Building sewer, water and gas will need to be expanded to suit the new refurbishments.	No Major upgrades will be required	N/A
B	**BUILDING MM**																				
	Analytical Instruments Characterisation Facility	LEVEL 01	LOW	N/A												Conversion of existing microbiology lab into a shared Microscopy/ Spectroscopy/ Imaging Facility which expands on MM1-13. Vibration sensitive equipment requiring ground floor location. Allow to decommission some microbiology equipment in this space. Section of space to be created as a dark room for confocal microscope	Air balancing modification required.	NewRCD protected general and specialised power throughout. Emergency power shutdown facilities. Standby and UPS power requirements to be determined.New communications horizontal cabling RJ45 outlet.New energy efficient LED lighting throughout. New exit and emergency lighting throughout. Standby and UPS power requirements to be determined.	Generally, pipework, plant and equipment will require to be refurbished and modified to suit new fixture locations.	Relocation of existing sprinklers and smoke detectors to suit the revised architectural arrangement.	The structural drawings indicate that the ground level slab is a raft slab, i.e. the slab is 'on ground'.
	Instrument Room	LEVEL 02	LOW	yes												Design Suite relocated to Building Q with ANFF to create Instrument Room for shared smaller equipment items used in Building MM that currently sit on laboratory benches	Air balancing modification required. Laboratory gas pipework reticulation	Emergency power shutdown facilities. Standby and UPS power requirements to be determined.New communications horizontal cabling RJ45 outlet. New exit and emergency lighting throughout.	Generally, pipework, plant and equipment will require to be refurbished and modified to suit new fixture locations.	Relocation of existing sprinklers and smoke detectors to suit the revised architectural arrangement.	N/A
	Instrument Room	LEVEL 03	LOW	N/A												create Instrument Room for shared smaller equipment items used in Building MM that currently sit on laboratory benches.	Air balancing modification required. Laboratory gas pipework reticulation	Emergency power shutdown facilities. Standby and UPS power requirements to be determined.New communications horizontal cabling RJ45 outlet. New exit and emergency lighting throughout.	Generally, pipework, plant and equipment will require to be refurbished and modified to suit new fixture locations.	Relocation of existing sprinklers and smoke detectors to suit the revised architectural arrangement.	N/A
	Building wide infrastructure upgrades required to achieve this															Plant at capacity	No additional fume cupboards able to be accommodated unless space is located directly below existing fume cupboard exhaust fan plant room on level 03. Existing air handling systems able to be reconfigured for minor modification works only. No major change in use able to be accommodated.	N/A	No major upgrades required as part of fitout works.	No Major upgrades will be required	N/A
C	**Building V**																				
	Creation of General Wet Chemistry Laboratory	LEVEL 01	MID	yes												Convert ITMS Movement Laboratory into General Wet Chemistry Laboratory. This involves the relocation of large high end plasma reactors from V1-09.	New chilled water / heating hot water air handling units required. New ventilation systems required. Plant space to be further investigated to determine spatial limitations.	NewRCD protected general and specialised power throughout. Emergency power shutdown facilities. Standby and UPS power requirements to be determined.New communications horizontal cabling RJ45 outlet.New energy efficient LED lighting throughout. New exit and emergency lighting throughout. Standby and UPS power requirements to be determined.	Generally, pipework, plant and equipment will require to be referbished and modified to suit new fixture locations.	Replacement of aged smoke and thermal detectors.	N/A
	Coolroom	LEVEL 01	MID	yes												Convert existing office into Coolroom	Assumed that refrigeration plant supply and installation by specialist contractor.	N/A	New drainage will be required to service condensate drainage from coolroom FDC.	Replacement of aged smoke and thermal detectors.	N/A
	Histology & Sample Prep Laboratory	LEVEL 01	LOW	yes												Minor allowance only for change of use for existing plasma laboratory into Histology & Sample Prep Laboratory. All existing services are set up to accommodate this. Power and data, benches and a fume cupboard required which already exist	No major upgrade required provided that fume cupboard is already in use within this room (ie not to be relocated from another location).	Emergency power shutdown facilities. Standby and UPS power requirements to be determined.	N/A	Replacement of aged smoke and thermal detectors.	N/A
	Light Microscopy Room	LEVEL 01	LOW	no												Relocation of small equipment items to Building MM Characterisation Space. Allow for minor fitout as space originally designed as an office. Upgrade acoustics in room.	Air balancing modification required.	NewRCD protected general and specialised power throughout. Emergency power shutdown facilities. Standby and UPS power requirements to be determined.New communications horizontal cabling RJ45 outlet.New energy efficient LED lighting throughout. New exit and emergency lighting throughout.	N/A	Replacement of aged smoke and thermal detectors.	N/A
	Dark Room	LEVEL 01	LOW	no												Remove door to Store Room and upgrade locking	Air balancing modification required.	N/A	N/A	Replacement of aged smoke and thermal detectors.	N/A
	Building wide infrastructure upgrades required to achieve this															No warning system that gas running out, No RO water, Freezer alarms lacking, Limited distribution of essential power outlets (extension cords in use), good external Peristitial space	BMS interface for laboratory gas monitoring.	No Major upgrades will be required	No Major upgrades will be required. RO Water Reticulation	No Major upgrades will be required	N/A
D	**Building IW**																				
	Thermal Analysis Instrumentation Room	LEVEL 01	MID	no												Refurbishment of old existing wet laboratory into Thermal Analysis Instrumentation Room (desk mounted equipment to be relocated from R2-31). Book equipment to use. reticulated gas, oxygen, helium, nitrogen required. Partitions to corridor to be glazed and highly visible	Air balancing modification required. Laboratory gas pipework reticulation.	NewRCD protected general and specialised power throughout. Emergency power shutdown facilities. Standby and UPS power requirements to be determined.New communications horizontal cabling RJ45 outlet.New energy efficient LED lighting throughout. New exit and emergency lighting throughout.	Generally, pipework, plant and equipment will require to be refurbished and modified to suit new fixture locations.	Relocation of existing sprinklers and smoke detectors to suit the revised architectural arrangement.	N/A
	Interfacial Science Instrumentation Clean Laboratory Expansion	LEVEL 01	HIGH	yes												Expansion of existing clean room facility into existing office space. High end AFM's, wetting equipment, pristine surfaces, low air charge rate required, vibration control for equipment very important. Highly serviced lab	Existing air handling unit plant will require replacement to accommodate larger area of clean room. Spatial availabilliity still to be determined. Expansion of laboratory gas reticulation	NewRCD protected general and specialised power throughout. Emergency power shutdown facilities. Standby and UPS power requirements to be determined.New communications horizontal cabling RJ45 outlet.New energy efficient LED lighting throughout. New exit and emergency lighting throughout.	Generally, pipework, plant and equipment will require to be refurbished and modified to suit new fixture locations.	Relocation of existing sprinklers and smoke detectors to suit the revised architectural arrangement.	N/A
	Surface Analysis Sample Preparation Laboratory	LEVEL 01	HIGH	yes												Refurbishment of existing old wet chemistry laboratory into Surface Analysis Sample Preparation Laboratory which works in conjunction with the adjacent clean room facility. Fumehoods and oven already exist in this space. Internal refurbishment of lab required as old	Air balancing modification required. Expansion of laboratory gas reticulation	NewRCD protected general and specialised power throughout. Emergency power shutdown facilities. Standby and UPS power requirements to be determined.New communications horizontal cabling RJ45 outlet.New energy efficient LED lighting throughout. New exit and emergency lighting throughout.	Generally, pipework, plant and equipment will require to be refurbished and modified to suit new fixture locations. New fixtures including drainage, water or gas supply pipework may also be required to suit new architectural layout.	Relocation of existing sprinklers and smoke detectors to suit the revised architectural arrangement.	N/A
	Surface Interface Laboratory	LEVEL 01	HIGH	yes												Major refurbishment of existing Mineral Processing Laboratory into Surface Interface Laboratory. Working with soft and hard particles which requires controlled clean environment with temp control, vibration sensitive equipment, stabile environment, 2x fume hoods required, glass partitions to corridor to increase visibility. Highly serviced lab	New chilled water / heating hot water air handling units required. New ventilation systems required. Fume cupboard exhaust ductwork reticulation routes still to be investigated. Plant space to be further investigated to determine spatial limitations.	NewRCD protected general and specialised power throughout. Emergency power shutdown facilities. Standby and UPS power requirements to be determined.New communications horizontal cabling RJ45 outlet.New energy efficient LED lighting throughout. New exit and emergency lighting throughout.	Generally, pipework, plant and equipment will require to be refurbished and modified to suit new fixture locations.	Relocation of existing sprinklers and smoke detectors to suit the revised architectural arrangement.	review walls proposed to be removed, new steel beams and columnsn may be required to transfer load. Additional steel bracing frames may be required in strategic locations.

	High end core technologies Laboratory	LEVEL 01	HIGH	no													Refurbishment of existing old wet chemistry laboratory into High End Technologies Laboratory for one off $$$ equipment that can be colocated in one room. Highly serviced lab	New chilled water / heating hot water air handling units required. New ventilation systems required. Laboratory gas pipework reticulation.	NewRCD protected general and specialised power throughout. Emergency power shutdown facilities. Standby and UPS power requirements to be determined.New communications horizontal cabling RJ45 outlet.New energy efficient LED lighting throughout. New exit and emergency lighting throughout.	Generally, pipework, plant and equipment will require to be refurbished and modified to suit new fixture locations. New fixtures including drainage, water or gas supply pipework may also be required to suit new architectural layout.	Relocation of existing sprinklers and smoke detectors to suit the revised architectural arrangement.	N/A
	Synthetic Chemistry Laboratory	LEVEL 02	LOW	yes													Relocation of Synthetic Chemistry users from Building Q. Newly refurbished laboratory so minor allowance only for relocation of equipment	N/A	N/A	N/A	N/A	N/A
	General Wet Chemistry Laboratory Expansion	LEVEL 02	MID	no													Creation of Wet Chemistry Laboratory in location of existing offices for future expansion. Aligns well under the existing peristitial space.	New chilled water / heating hot water air handling units required. New ventilation systems required. Laboratory gas pipework reticulation.	NewRCD protected general and specialised power throughout. Emergency power shutdown facilities. Standby and UPS power requirements to be determined.New communications horizontal cabling RJ45 outlet.New energy efficient LED lighting throughout. New exit and emergency lighting throughout.	Generally, pipework, plant and equipment will require to be refurbished and modified to suit new fixture locations. New fixtures including drainage, water or gas supply pipework may also be required to suit new architectural layout.	Relocation of existing sprinklers and smoke detectors to suit the revised architectural arrangement.	N/A
	Building wide infrastructure upgrades required to achieve this																Airconditioning issues throughout. Unable to maintain constant temp in clean room labs on the ground floor. Access issue control into the building . Electrical interference issues on the ground floor eastern end of building. Lack of gas reticulation in building (lots of gas bottles). Lack of control of UPS in single-phase fail situations, ad hoc deployment of UPS (which is a large issue as very high end equipment kept in this building) units. Wet area upgrades generally. Glazed partitions to corridors, general upgrades to corridors	Upgrade to existing chilled water / heating hot water air handling units required to clean room areas. Laboratory gas pipework reticulation.	Upgrade of electrical switchbooards (ie DB's) will be required to refurbished areas to comply with current AS3000 standards. Laboratory areas will require emergency power shutdown facilites to be installed with tnew switchboards. Generally new switchboards will replace existing switchboards within existing riser cupboards. We note some areas may have had their distribution boards upgrade as part of the RCD replacement program whilst others may not. Communications services will need to expanded to suit the proposed refurbished areas. This will include but not limited too communications cabinets, patch panels, wire minders, cable pathways and associated electrical power requirements	New trade waste interceptors may be required to serve additional trade waste drainage. Building sewer, water and gas will need to be expanded to suit the new refurbishments.	No Major upgrades will be required	Query: fire rating of exposed steel columns in labs?
E	**Building Q**																				
	ANFF Heavy Equipment Platform	LEVEL 01	MID	yes													Refurbishment of existing lecture theatre into ANFF Heavy Equipment/ Instrument Room requiring a ground floor location. Existing stepped floor is lightweight. Creation of opening in façade for window. Equipment is vibration sensitive and requires good a/c. Minor refurbishment of existing foyer space adjacent lecture theatre	New chilled water / heating hot water air handling units required. New ventilation systems required. Laboratory gas pipework reticulation.	NewRCD protected general and specialised power throughout. Emergency power shutdown facilities. Standby and UPS power requirements to be determined.New communications horizontal cabling RJ45 outlet.New energy efficient LED lighting throughout. New exit and emergency lighting throughout.	Generally, pipework, plant and equipment will require to be refurbished and modified to suit new fixture locations. New fixtures including drainage, water or gas supply pipework may also be required to suit new architectural layout.	Replacement of aged smoke and thermal detectors.	N/A
	General Wet Chemistry Laboratory	LEVEL 01	MID	no													Refurbishment of existing stores and old pressure vessel laboratory into wet chemistry laboratory as a future expansion opportunity. Demolition of some internal walls to achieve	New chilled water / heating hot water air handling units required. New ventilation systems required. Laboratory gas pipework reticulation.	NewRCD protected general and specialised power throughout. Emergency power shutdown facilities. Standby and UPS power requirements to be determined.New communications horizontal cabling RJ45 outlet.New energy efficient LED lighting throughout. New exit and emergency lighting throughout.	Generally, pipework, plant and equipment will require to be refurbished and modified to suit new fixture locations. New fixtures including drainage, water or gas supply pipework may also be required to suit new architectural layout.	Replacement of aged smoke and thermal detectors.	N/A
	ANFF Clean Room Expansion	LEVEL 02	HIGH	yes													Creation of a Class 10,000 Clean Room in existing laboratory space. Allowance to relocate some high end equipment	New chilled water / heating hot water air handling units required. New ventilation systems required. Laboratory gas pipework reticulation. Clean room type plant and equipment required including HEPA filtration and room pressure monitoring.	NewRCD protected general and specialised power throughout. Emergency power shutdown facilities. Standby and UPS power requirements to be determined.New communications horizontal cabling RJ45 outlet.New energy efficient LED lighting throughout. New exit and emergency lighting throughout.	Generally, pipework, plant and equipment will require to be refurbished and modified to suit new fixture locations. New fixtures including drainage, water or gas supply pipework may also be required to suit new architectural layout.	Replacement of aged smoke and thermal detectors.	N/A
	ANFF General Laboratory	LEVEL 02	MID	yes													Upgrade of existing old laboratory into general wet chemistry laboratory	Air balancing modification required.	NewRCD protected general and specialised power throughout. Emergency power shutdown facilities. Standby and UPS power requirements to be determined.New communications horizontal cabling RJ45 outlet.New energy efficient LED lighting throughout. New exit and emergency lighting throughout.	Generally, pipework, plant and equipment will require to be refurbished and modified to suit new fixture locations. New fixtures including drainage, water or gas supply pipework may also be required to suit new architectural layout.	Replacement of aged smoke and thermal detectors.	N/A
	Building wide infrastructure upgrades required to achieve this																Demolition of internal corridor partitions where possible and replace with glass to increase visibility. General upgrades to corridor circulation spaces. Wet area upgrades generally. Service issues: No building wide UPS or generator back up (no reserve backup). No reticulated gases. There is a current project to improve quality of chilled water between Building R and Q this year.	The existing air conditioning plant will require replacement due to age and unsuitability for reuse. Laboratory gas pipework reticulation.	Review of electrical supply capacity. Upgrade of electrical switchboards (ie DB's) will be required to refurbished areas to comply with current AS3000 standards. Laboratory areas will require emergency power shutdown facilites to be installed with tnew switchboards. Generally new switchboards will replace existing switchboards within existing riser cupboards. We note some areas may have had their distribution boards upgrade as part of the RCD replacement program whilst others may not.	Upgrade or additional trade waste treatment may be required.	Upgrade of existing fire hydrant and hose reel systems. Inclusive of decommissioning non-compliant internal fire hydrants, provision of new external fire hydrants and relocation of existing fire hose reels.	Structural limiations on upper floor for heavy equipment. Refer separate W&G Report prepared for UniSA & ANFF
F	**Building R**																				
	Advanced Manufacturing Laboratory Expansion	LEVEL 01	MID	yes													Expansion of existing Advanced Manufacturing Laboratory into existing leased laboratory space if expansion required in the short term. Requires the demolition of some existing internal lightweight partitions and removal of old chemical stores	Potential chilled water / heating hot water fan coil unit upgrade. Laboratory gas pipework reticulation. New ventilation system	NewRCD protected general and specialised power throughout. Emergency power shutdown facilities. Standby and UPS power requirements to be determined.New communications horizontal cabling RJ45 outlet.New energy efficient LED lighting throughout. New exit and emergency lighting throughout.	Upgrade of existing sewer, water and natural gas supplies will be required. New domestic hot water and pre treatment plant will be proposed. Refeurbishment and modification of exisintg sanitaryware and tapware will need to be made.	Replacement of aged smoke and thermal detectors.	review walls proposed to be removed, new steel beams and columnsn may be required to transfer load. Additional steel bracing frames may be required in strategic locations.
G	**Building H**																				
	Small Grinding/ Processing Facility	LEVEL 01	MID	yes													Relocation of existing IW1-21 small scale dirty grinding and processing facilities for the Mineral Strand, Special Type C and Quarantine Lab, Floatation Lab, Trenches for washing of samples, fume hood that is ducted for cyanide use	New chilled water / heating hot water air handling units required. New ventilation systems required. Laboratory gas pipework reticulation.	NewRCD protected general and specialised power throughout. Emergency power shutdown facilities. Standby and UPS power requirements to be determined.New communications horizontal cabling RJ45 outlet.New energy efficient LED lighting throughout. New exit and emergency lighting throughout.	Generally, pipework, plant and equipment will require to be refurbished and modified to suit new fixture locations. New fixtures including drainage, water or gas supply pipework may also be required to suit new architectural layout.	Replacement of aged smoke and thermal detectors.	N/A
	Leaching Columns an Hydrofloat Facility	LEVEL 01	MID	yes													Relocation of existing R1-37 Leaching Columns & Hydrofloat facility into Building H used by the Minerals Group. Acid Leaching HydroFloat system, fume hood, furnace, dock access important, high bay dirty workshop type environment	New chilled water / heating hot water air handling units required. New ventilation systems required. New fume cupboard and exhaust ductwork. Laboratory gas pipework reticulation.	NewRCD protected general and specialised power throughout. Emergency power shutdown facilities. Standby and UPS power requirements to be determined.New communications horizontal cabling RJ45 outlet.New energy efficient LED lighting throughout. New exit and emergency lighting throughout.	Generally, pipework, plant and equipment will require to be refurbished and modified to suit new fixture locations. New fixtures including drainage, water or gas supply pipework may also be required to suit new architectural layout.	Replacement of aged smoke and thermal detectors.	N/A
	MID TERM PROJECTS																				
H	**Building R**																				
	Building R Refurbishment Project	LEVEL 01 & 02	HIGH	yes													Major refurbishment project for Level 01 and 02 of Building R. Major decant project before including the Legacy Chemical Store and Transfer Opps Room. Creation of large workshop environment for Advanced Manufacturing, ANFF and Minerals Precinct, High End core technology platforms relocated from IW ($$$), contemporary open plan laboratories, creation of internal void, open plan offices (70% lab/ 30% office)	N/A	N/A	N/A	N/A	N/A
J	**Building MM**																				
	Cell Culture Suite	LEVEL 03	HIGH	yes													Creation of shared cell culture suite (wound/ healing) across all laboratory spaces on Level 3 of Building MM. Relocation of Building V uses into Building MM	Existing air handling systems able to be reconfigured for minor modification works only. No major change in use able to be accommodated.	Emergency power shutdown facilities. Standby and UPS power requirements to be determined.New communications horizontal cabling RJ45 outlet. New exit and emergency lighting throughout.	Generally, pipework, plant and equipment will require to be refurbished and modified to suit new fixture locations. New fixtures including drainage, water or gas supply pipework may also be required to suit new architectural layout.	Relocation of existing sprinklers and smoke detectors to suit the revised architectural arrangement.	N/A
	Tissue Culture Suite	LEVEL 02	LOW	yes													Creation of shared tissue culture facility in existing laboratories. Minor modifications to laboratories only including reticulation of carbon dioxide. Experimental tissue culture work (150m2)	Existing air handling systems able to be reconfigured for minor modification works only. Laboratory gas pipework reticulation	Emergency power shutdown facilities. Standby and UPS power requirements to be determined.New communications horizontal cabling RJ45 outlet. New exit and emergency lighting throughout.	Generally, pipework, plant and equipment will require to be refurbished and modified to suit new fixture locations. New fixtures including drainage, water or gas supply pipework may also be required to suit new architectural layout.	Relocation of existing sprinklers and smoke detectors to suit the revised architectural arrangement.	N/A

FII PACKAGES & STAGING SCHEDULE (OFFICE)

PACKAGE	FII OFFICE TENANCY	LEVEL	DECANT REQUIRED	0	1	2	3	4	5	6	7	8	9	10	Summary of works required	Mechanical works required	Electrical works required	Hydraulic Works Required	Fire Services Works Required	Structural Works Required
	SHORT TERM PROJECTS																			
A	**BUILDING X**																			
	Removal of new partition wall on upper floor and re-instatement of workstations	LEVEL 02													Removal of new partition wall on upper floor and re-instatement of workstations	General re-balance and re-commissioning of existing system. No new mechanical services systems anticipated.	no major implications to the electrical , communications and security services base building and fitout works	No major Hydraulic services implications to the fitout works.	Relocation of existing sprinklers and smoke detectors to suit the revised architectural arrangement.	N/A
B	**BUILDING MM**																			
	Minor internal fitout works to all floors in open plan office (no decant required if completed in the Christmas break)	LEVEL 01, 02 & 03	no												Minor internal fitout works to all floors in open plan office (no decant required if completed in the Christmas break)	May involve relocation passive chilled beams to suit new layout. General re-balance and re-commissioning of existing system. No new mechanical services systems anticipated.	no major implications to the electrical , communications and security services base building and fitout works	No major Hydraulic services implications to the fitout works.	Relocation of existing sprinklers and smoke detectors to suit the revised architectural arrangement.	N/A
C	**Building V**																			
	Refurbishment and addition of workstations to ground and upper floor of V together with new privacy screens	LEVEL 01	yes												Refurbishment and addition of workstations to ground and upper floor of V together with new privacy screens	May 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.	no major implications to the electrical , communications and security services base building and fitout works	No major Hydraulic services implications to the fitout works.	Relocation of existing sprinklers and smoke detectors to suit the revised architectural arrangement.	N/A
	AC group relocate from Building M	LEVEL 01	no																	
D	**Building IW**																			
	Breakout Spaces	LEVEL 01	no												Minor refurbishment of existing offices into Breakout/ Meeting Rooms for Industry Engagement.	May 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	NewRCD protected general and specialised power throughout.New communications horizontal cabling RJ45 outlet.New energy efficient LED lighting throughout. New exit and emergency lighting throughout.	Minor referbishment of plumbing drainage and reticulation.	Relocation of existing sprinklers and smoke detectors to suit the revised architectural arrangement.	N/A
	Office Refurbishment	LEVEL 02	no												Office refurbishment to existing offices to create open plan offices. Moderate office refurbishment to eastern end of upper floor into open plan offices for future use and expansion	Air balancing modification required.	NewRCD protected general and specialised power throughout.New communications horizontal cabling RJ45 outlet.New energy efficient LED lighting throughout. New exit and emergency lighting throughout.	N/A	Relocation of existing sprinklers and smoke detectors to suit the revised architectural arrangement.	review walls proposed to be removed, new steel beams and columnsn may be required to transfer load. Additional steel bracing frames may be required in strategic locations.
E	**Building Q**																			
	ANFF Office Refurbishment	LEVEL 02	yes												Refurbishment of existing old cellular offices into open plan offices and store space. Floor levelling required where old balconies used to be.	Air balancing modification required.	NewRCD protected general and specialised power throughout.New communications horizontal cabling RJ45 outlet.New energy efficient LED lighting throughout. New exit and emergency lighting throughout.	N/A	Replacement of aged smoke and thermal detectors.	review walls proposed to be removed, new steel beams and columnsn may be required to transfer load. Additional steel bracing frames may be required in strategic locations.
	Industry Office Refurbishment (eastern end)	LEVEL 02	no												Refurbishment of existing old cellular offices into open plan offices for Industry/ hot desking	Air balancing modification required.	NewRCD protected general and specialised power throughout.New communications horizontal cabling RJ45 outlet.New energy efficient LED lighting throughout. New exit and emergency lighting throughout.	N/A	Replacement of aged smoke and thermal detectors.	review walls proposed to be removed, new steel beams and columnsn may be required to transfer load. Additional steel bracing frames may be required in strategic locations.

SERVICES STRATEGY GUIDELINES

The following overview of the services strategy guidelines prepared by BESTEC for future UniSA research/laboratory intensive buildings is provided to drive further discussion and consultation with the University user group.

MECHANICAL SERVICES

Air Conditioning

Air conditioning is recommended to consist of chilled water / heating hot water (CHW/HHW) served from thermal plant, which could be located either remotely in a dedicated plant room (powerhouse type arrangement) or integral to the building plantroom.

Main air conditioning to the laboratory and office spaces is recommended to comprise of Chilled Water / Heating Hot Water type Air Handling Units (AHUs) located in a dedicated plant room and delivering air via dedicated sheet-metal and/or fabric ductwork (to non laboratory spaces only) to each space via sheet-metal ductwork risers. A minimum of 6 off dedicated zones are required for grouping of different thermal zones/areas.

Depending on the floor plate size and building height, on-floor plant rooms may be used to accommodate local AHU's to avoid excessive duct runs and provide increased flexibility.

Air conditioning could be supplemented by in-slab chilled and heating coils, or chilled beams in order to reduce the size of air distribution ductwork and to increase energy efficiency.

Dedicated chilled and heating hot water plant for laboratory equipment is recommended to be serviced by means of plant and equipment located within a building plant room or where warranted, dedicated on floor plantrooms.

Building Plant Room

The building plant room is ideally located at ground level to enable optimal access for service and maintenance and most importantly for the installation of new or replacement of large and heavy equipment without the need for cranage. Alternatively a roof level plant room could be developed and should factor in ease of roof removal or a dedicated lifting and moving area for crane access.

Roof plant areas should be serviced by a goods lift capable of carrying essential maintenance personnel, equipment and replacement components. Roof top plant is advantageous in relation to co-location of exhaust ventilation equipment.

The building plant room would typically be required to be the overall floor area footprint of a building of this nature.

The building plant room height is recommended to be 5.0m to 5.5m clear height to enable ductwork and pipework reticulation and to accommodate AHUs, chillers and the like. In the case of thermal plant being located as part of the building plant room, this height would need to be revisited more closely in the case of cooling towers, which may require a higher roof clearance or open atmosphere plant enclosure.

Louvred walls with integrated filter banks are recommended along the length of the plant room to provide fresh air to the AHUs and other equipment.

Goods lift access is highly recommended to enable plant removal and/or installation and safe access of service personnel and their equipment.

Exhaust Ventilation

Laboratory buildings should be serviced by single pass HVAC systems. The lab exhaust system can be used to service snorkel type apparatus, heat exhaust and other defined exhausts that can be safely mixed (and quickly diluted) in a general lab exhaust. Dedicated fume cupboard exhaust can be provided (singly or manifolded) where determined by risk assessment eg. scrubbed for HF work. Heat recovery can be employed on fume and general lab exhaust and redundancy of critical system should be provided for.

Room Layouts

Laboratories requiring fume cupboards are recommended to be located at the upper level where possible to minimise fume cupboard exhaust ductwork reticulation lengths. Horizontal ductwork for fume cupboards should be avoided where possible due to the need for angled ductwork to allow drainage back to the fume cupboard. As such, where these rooms are not able to be sited to enable direct vertical ducting, dedicated risers should be factored in close proximity to all rooms.

Cleanrooms should be located at upper levels without exception to enable minimal ductwork between room and AHU and other equipment, otherwise they should employ dedicated adjacent plant spaces.

Physical Containment (PC1 to PC4) laboratories should be located at upper levels without exception to enable minimal ductwork between room and AHU and other equipment.

All labs should be at least PC capable.

Laboratories in general are grouped together in common locations throughout the building (common floor or common wing of building).

Laboratory rooms are recommended to be a minimum of 4m - 4.5m floor-to-floor and be provided with easily removable ceilings or without ceilings (exposed concrete slab).

Physical containment labs PC1-2 will generally require ceilings for reasons of flexibility and cleanliness.

Services Reticulation

Gas bottles should be located within a dedicated store room, at ground level and preferably within the building or within close proximity to the building.

Specialised gases are recommended to be installed/reticulated to be adjacent to all laboratories to enable ease of fitout churn and future requirements.

Laboratory equipment exhaust is recommended to be installed/reticulated adjacent to all laboratories to enable ease of fitout churn and future requirements. Separate exhaust is recommended to accommodate; Corrosive Storage Cabinets (CSCs), Flammable Liquids Storage Cabinets (FLSCs), general laboratory equipment exhaust and general room exhaust.

Service Space

A dedicated services corridor or mezzanine plant space directly connected to the laboratories is highly recommended particularly for specialised laboratories.

This services corridor should be a minimum of 2.2 - 2.5m wide, be fire isolated from the remainder of the building and include openings in the floor with removable/trafficable sections to enable ease of modification to existing as well as installation of additional services.

Service risers for pipework and ductwork are recommended to be installed with walk-in maintenance access provisions and with removable/trafficable sections to enable ease of modification to existing as well as installation of additional services.

ELECTRICAL SERVICES

Services Reticulation

Electrical distribution boards should be located within dedicated service corridors adjacent the laboratories on each floor of the building.

Communications cabinets should be located within a dedicated room serving each floor of the building.

Electrical reticulation and communications cabling are recommended to be installed/reticulated to all laboratories to enable ease of fitout and future requirements.

Laboratory areas should be installed with emergency power shutdown facilites.

HYDRAULIC SERVICES

Domestic Cold Water

Potable water is to service kitchens, emergency showers, emergency eyewash, lab handwash facilities, AS3500 compliant isolation is required for PC2 labs sinks and further separation (e.g. RPZ) for some elements with PC3.

Domestic cold water supply to new developments should be designed to ensure pressure requirements do not fall below 150kPa and do not exceed 500kpa to the fixture outlet.

An operating range of 250 to 400kPa should be adopted where possible. Pumps and or pressure limiting valves and the like are to be installed to ensure the flow and water pressures satisfy the function and operation of the fixtures and or appliances.

Domestic cold water reticulation pipework should be designed to ensure pipe runs are reticulated in a practice and costly manner.

Isolation valves are to be situated along domestic cold water reticulation pipework runs to ensure the flow from all rooms within the new developments can be controlled.

Domestic Hot Water

Centralised domestic hot water plant located either on ground floor or plant deck level should be provided to supply domestic hot water to new developments.

Peak flow rates, the duration of those peak periods and the heated water usage patterns should be considered before sizing the plant to ensure hot water is readily available at all times of the day and night.

Natural gas continuous flow manifold systems with storage tank connections to buffer peak hot water demands should be the primary energy source for domestic hot water heating.

Solar boosted hot water system should be considered at an early concept development stage. Detailed payback period data should be developed and produced for the University of South Australia and will assist decisions on use subject to budget and design approval energy saving requirements.

Domestic hot water flow and return circuit should be incorporated into the design to ensure draw of times to fixtures are kept to a minimum.

Water temperature through domestic hot water flow and return pipework should be designed to ensure temperatures do not fall below 60 degrees, so as to inhibit the growth of legionella bacteria.

Domestic hot water reticulation pipework should be designed to ensure pipe runs are reticulated in a practice and costly manner.

Isolation valves should be situated along domestic hot water reticulation pipework runs to ensure the flow from all rooms within the new developments can be controlled.

Tempered water must be considered for emergency showers and eyewash.

Rainwater Harvesting

Rainwater re-use systems should be incorporated into future develops for the sole purpose of supplying rainwater for uses of toilet flushing and irrigation purposes. Storage tank sizes are to be determined from the available roof catchment area and average rainfall intensity in Mawson Lakes.

Energy monitoring and metering systems should be considered in the initial design phase for research facilities and teaching aids for the campus.

Recycled Water Re-use

Recycled water reticulation should be considered for uses for toilet flushing and irrigation purposes throughout the new developments.

Backflow prevention devices should be incorporated into the design to prevent the occurrence of cross-contamination between non-potable and potable cold water supplies.

Treated Water

Treated water plants such as Reverse osmosis, softened water and demineralised water plants should be located in a centralised, practical position to supply treated water to specialised research and laboratory equipment.

Reticulated pure water systems should be to a minimum of type II standard (resistivity>5Mohm.cm) and have no dead legs, be continuously filtered and UV treated by a recirculation system. Local type water systems will be connected to this where required.

Backflow prevention devices must be incorporated into the design to prevent the occurrence of cross-contamination between non-potable and potable cold water supplies.

Treated water reticulation pipework should be designed to ensure pipe runs are reticulated in a practical and costly manner.

Isolation valves are to be situated along domestic hot water reticulation pipework runs to ensure the flow from all rooms within the new developments can be controlled.

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.

Building X

7. IMPLEMENTATION & STAGING

DECANTING & STAGING STRATEGY

The following section discusses the proposed site wide decanting and staging schedule. It acknowledges the emerging Mawson Lakes priorities which were identified during consultations as:

- ITMS Consolidation
- Future Industries Institute Consolidation
- Industry Connections Hub
- Student Hub
- Engineering Teaching Infrastructure

The decanting and staging strategy works toward the long term vision for the campus as illustrated on the Master Plan proposal on page 47.

The decant and staging strategy prioritises a series of packages that result in consolidation of user groups, minimising the need for multiple decants of the users. It also promotes where possible, whole building or floor by floor refurbishment projects to maximise efficiencies in building project cost. Building OC and W together with H and J in the future are proposed as buildings to be used for office and teaching decant spaces whilst construction works are underway.

The redevelopment of the Mawson Lakes Campus will involve a staged approach when funds are available and provide a framework for decision making on future capital funding priorities. This staged approach can be developed to provide on-going activity across a variety of student, teaching and research spaces together with limiting smaller un planned minor work projects that often result in redundant expenditure and the need for multiple decants.

There are a number of easy 'moves' that do not directly relate to the emerging priorities but through completion at the start of the staging program, free up spaces that allow some of the major refurbishment projects to occur. Examples of this include the refurbishment and consolidation of the upper floor of Building C for Division ITEE, Library and ISTS offices, which automatically frees up a number of spaces across the campus that enable the staging of future projects. UniSA College can then relocate to Building MC offices which vacates the upper floor of Building F allowing the redevelopment of this floor for ITMS.

Also, the office refurbishment of Building V allows the Future Industries Institute to vacate the Building M offices for use by ENE research teams which in turn makes Building W largely available as a decant space.

The Building F redevelopment proposes the full refurbishment of the upper floor for ITMS teaching, offices and research which in turn frees up the ground floor of Building F for refurbishment and results in the majority of ITMS staff not having to decant spaces twice. Some ITMS staff from Building D can relocate into this refurbished space in preparation for the Building D redevelopment that also houses ITMS.

The ground floor refurbishment project for Building F sees the refurbishment of flexible teaching spaces along with the Industries Connections Hub at the heart of the GP courtyard promoting vibrancy on the ground plane.

Following the major refurbishments to ITMS Building D and F spaces, Buildings OC and W are fully available to used as decant spaces for other projects with Building OC available for demolition when no longer required. At this stage, UniSA could potentially lease part of Building W.

The Building N projects are proposed to be staged in line with the NBE commissioned Master Plan in 2015.

There are a number of student dedicated spaces such as flexible learning, social learning, student lounge spaces around the GP courtyard that are progressively staged to promote vibrancy for the student hub which will make visible the ongoing commitment to enhancing the student experience.

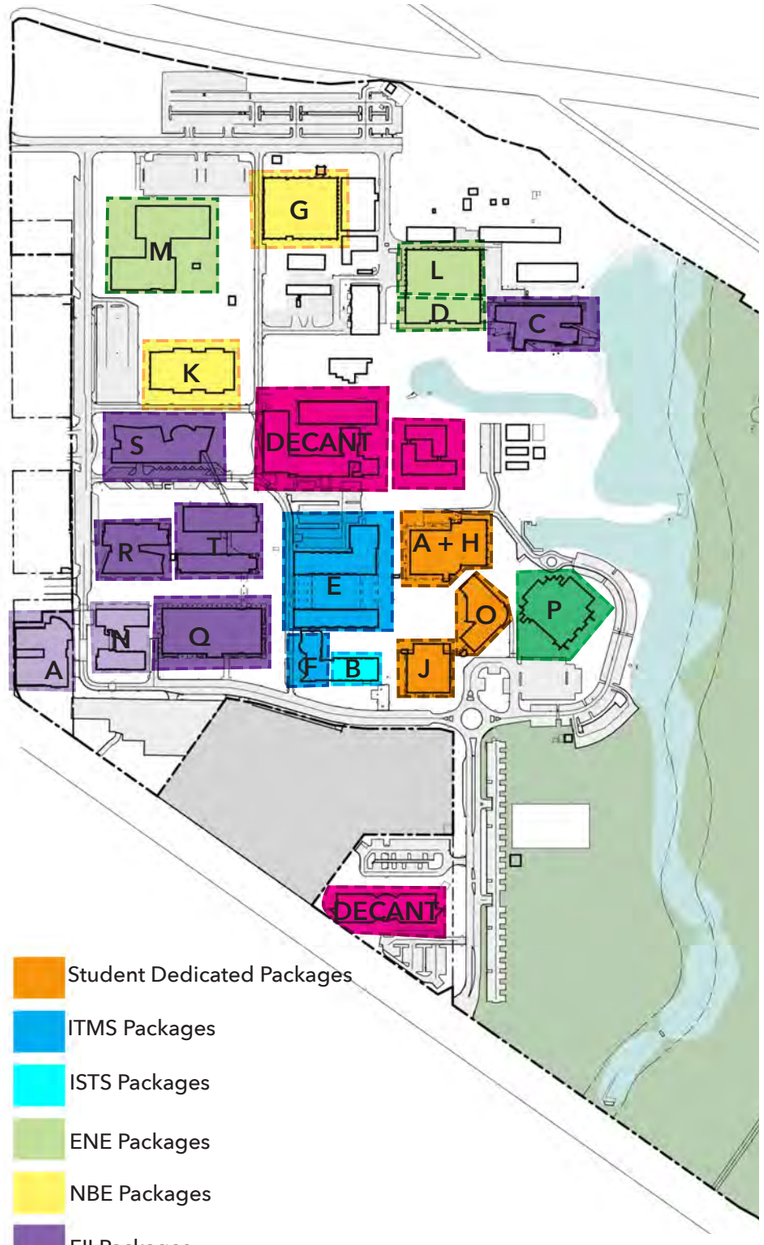
Building P works for NBE teaching, office and research along with Buildings SCT and M for ENE, are staged to maximise the decant potential of Buildings H and J. The ground floor of Building SCT teaching spaces can be progressively staged as a series of minor capital works project without much disruption to the uses of the space whereas Building P proposes a major refurbishment project. Once these works are complete, Building H and J are available for demolition and Building W fully available to be leased or repurposed for community engagement.

Building GB's minor works projects to house the UniSA College teaching spaces, RIS and UniSA Ventures offices together with a Conference Centre are proposed at the 5 year mark when the School of Education are anticipated to relocate to the Magill Campus. If the Building GP refurbishment follows this, it will result in RIS and UniSA Ventures only having to relocate offices once. If UniSA wishes to redevelop Building GP prior to Education relocating to the Magill Campus, RIS and UniSA Ventures could potentially decant as an interim measure to the upper floor of Building IW.

The Future Industries Institute packages of work for Buildings X, MM, V, IW and Q are extensively detailed in Section 6: FII Accommodation Strategy which can occur independently to the staging and decanting discussed above (excluding Building M offices).

The Landscape Priorities Plan on page 193 highlights a series of projects which are coordinated with the proposed building project staging to minimise re-work to the new landscape works. The GP courtyard and entry statements are examples of landscape projects that can occur at an early stage of the Master Plan implementation whereas the green heart project cannot be commenced until the demolition of Buildings H & J.

The schedule of staged relocations on the following page outlines this strategy and is followed by the landscape package priorities plan.



Packages Strategy Diagram

SCHEDULE OF STAGED RELOCATIONS

PACKAGE	LOCATION	OFFICE DECANT SPACE REQUIRED					DECANT TEACHING REQUIRED	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	NOTES
		OC	W	IW	J	H																				
A	**Building C Top Floor Refurbishment**																									
	Library decant top floor of Building C						N/A																			
	DivITEE to relocate into Level 3						N/A																			
	Library & ISTS to relocate into Level 3						N/A																			
	UniSA College offices to decant F and relocate to MC						N/A																			
B	**Building E Minor Internal Fitout**																									
	Creation of ISTS open plan offices		Y				N/A																			
C	**Building V Fitout Office**																									
	Building V Internal Renovations for FII			Y			N/A																			Once complete: Building M offices available for ENE and DASI decanted from Building W
D	**Building M Minor Works**																									
	Relocation of ENE research and industry from Bullding W & J to ground floor refurbished offices						N/A																			
E	**Building F Major Refurbishment**																									
	Building F Upper Floor Refurbishment for ITMS offices, teaching and research		Y				N/A																			Once complete, Building OC now available as a decant space
	Building F Ground Floor Refurbishment Flexible Teaching Spaces						N/A																			ITMS teaching spaces upstairs need to be completed for this to occur
	Industry Connections Canopy						N/A																			
F	**Building D Refurbishment**																									
	Full refurbishment of building D for ITMS offices	Y	Y				N/A																			Note: Building F to occur before Building D so ITMS staff do not need to decant twice. Once complete, **Building OC available for demolition**
G	**Building N Refurbishment**																									
	Staged NBE Facilities Upgrade						N/A																			Staged upgrade of teaching and research facilities to minimise decant space required for workshop facilities
H	**Building C Redevelopment Ground & Middle Floor**																									
	Full refurbishment of Building C to middle floor						N/A																			Library collection temporarily on ground floor
	Refurbishment of Building C to ground Floor						N/A																			Campus Central reception temporarily relocate to GP Foyer
J	**Building A Refurbishment**																									
	Refurbishment of northern section of ground floor into F&B and Student Lounge						N/A																			Bookstore/ café temporary setup in ground floor of Building F south wing
	Minor refurbishment of upper floor of Building A into student learning spaces						N/A																			
K	**Building P Major Refurbishment**																									
	Full refurbishment of ground floor spaces into open plan offices for NBE headquarters		Y				Yes																			UniSA College to use upper floor of Building A until GB available
	Relocation of planetarium to Building MC						N/A																			**Building W now fully available to be leased**
	Full refurbishment of upper floor spaces into NBE teaching and research spaces						Yes																			Building H to be used for temporary specialist teaching
	Third floor extension for NBE research spaces						N/A																			**Building H now fully vacated**
L	**Building M Major Refurbishment workshop and teaching**																									
	Upgrade to ENE teaching and research research facilities ground floor						Yes																			Staged upgrade of teaching and research facilities to minimise decant space required for workshop facilities. Refer ENE Master Plan 2016 for detail
	Upgrade to ENE teaching and research research facilities upper floor						N/A																			
M	**Building SCT Refurbishment**																									
	Staged minor works to refurbishment of ground floor ENE specialist teaching spaces and workshops						Yes																			Staged upgrade of teaching and research facilities to minimise decant space required for specialist facilities. Refer ENE Master Plan 2016 for detail
	Staged minor works to refurbishment of ground floor ENE research spaces				Y		N/A																			
	Open plan refurbishment of upper floor for ENE headquarters				Y	Y	N/A																			**Building J now fully vacated. Building J & H available for demolition**
N	**Building GB Fitout (5 year)**																									
	UniSA College Teaching Spaces Minor Fitout						N/A																			
	New front door office for School of Education in MC						N/A																			
	Refurbishment of ground floor space (south wing) into Conference						N/A																			
	RIS office relocation						N/A																			
	UniSA Ventures Office relocation						N/A																			**Building GP now fully vacated**
	Refurbishment of office spaces for Industry						N/A																			
O	**Building GP refurbishment**																									
	Refurbishment of GP ground and upper floors into flexible tutorials and student spaces						N/A																			RIS and UniSA Ventures need to have vacated the spaces
	Refurbishment of lecture theatres						Yes																			
	New Connection link from Building C to GP						N/A																			
P	**Gymnasium Refurbishment**																									
	Gymnasium refurbishment and extension						Yes																			
Q	**Building R Decant**																									
	Decant designated zones for mothballing			Y			N/A																			

NOTE: For all Future Industries Insitute Packges, refer Chapter 6: FII Accommodation Strategy

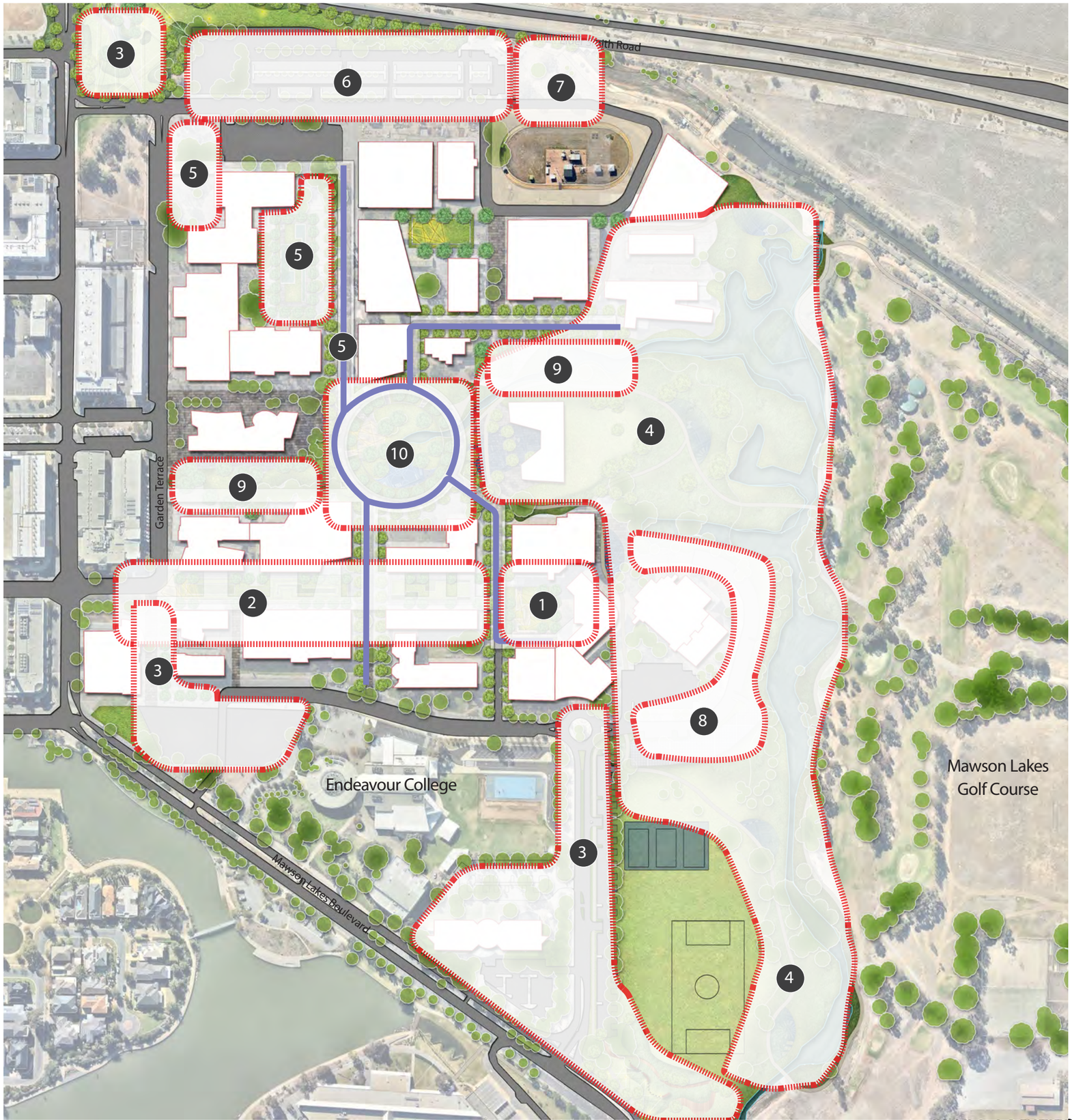
LEGEND:

- not available as decant space
- available for decant space
- Y required as decant space

LANDSCAPE PRIORITIES PLAN

The Landscape Master Plan has packaged the key spaces into the following proposed Staging Plan:

1. Student Hub
2.Town Walk
3. Main Entries & Gateways
4. Sports Hub / Fitness Loop
5. Covered Links and Courtyards
6. Northern Car Parking
7. Eastern Car Parking
8. Main Car Parking
9. The Green Link
10. The Green Heart



Scale: 1:2000 @ A3

RISK ANALYSIS

A preliminary risk register has been prepared as a starting point to assess and manage the potential precinct risks. This risk register can be expanded and developed as the mater plan progresses. The following table rates risk in accordance with the Project Risk Rating matrix adjacent.

Type	Title	Description	Likelihood	Consequence	Risk Rating
Environmental	Site Contamination	Contamination suspected - asbestos etc. Expense of remediation. Further research needed	Almost Certain	Major	**Very High**
	Campus Identity celebrating Environment	Extension and intregration with the natural landscape not intregrated in implementation of Landscape master plan	Possible	Moderate	**Medium**
	Site Flooding	History of flooding on site.	Possible	Moderate	**Medium**
	Carbon Neutral Campus	Lack of integration of solar strategy, lack of upgrades to existing buildings to leverage embedded energy and not meeting carbon neutral campus targets	Possible	Moderate	**Medium**
	Off-grid Water	Lack of consideration of water management infrastructure opportunitites ouside of the boundary of the Campus	Possible	Moderate	**Medium**
	Educational Tool	Lack of integration of environment and landscape as an educational tool diminishing student and community engagement/ awareness	Possible	Low	**Low**
	Archaeological - Aboriginal	Aboriginal site history compromised, burial site protection compromised, local indigenous significance compromised	Possible	Moderate	**Medium**
Servicing	Electrical Redundancy	Risk associated with equipment failures causing site distruptions, many buildings being without power in a major event	Likely	Severe	**Very High**
	Thermal Redundancy	Risk to campus due to consolidation of all thermal plan and electrical infrastructure in one location	Likely	Severe	**Very High**
	Research Intensive Operation	Disruption to the delivery of electrical and thermal energy for process or space conditioning is research critical and could result in substantial time and financial losses	Possible	Major	**High**
	Implementation of Thermal Plant recommendation	Heating and cooling needs for research and industry not accommodated, plant inefficiencies, lack of redundancy and future expansion opportunities, maintainability issues	Possible	Major	**High**
	Sewer Drainage Pipework	In excess of 30 years old and at risk of damage to pipe collapse and root intrusion	Possible	Moderate	**Medium**
	Natural Gas Redundancy	Risk to campus due to one supply entry point	Possible	Moderate	**Medium**
	Implementation of Services Strategy Guidelines	Lack of implamentation resulting in disruption to research projects, frustration by users, maintainability issues	Possible	Moderate	**Medium**
	Dangerous Goods Compliance	Consequences can be highly varied from reputational, property loss (eg fire) injury or worse	Possible	Major	**High**
	Maintainability		Possible	Moderate	**Medium**

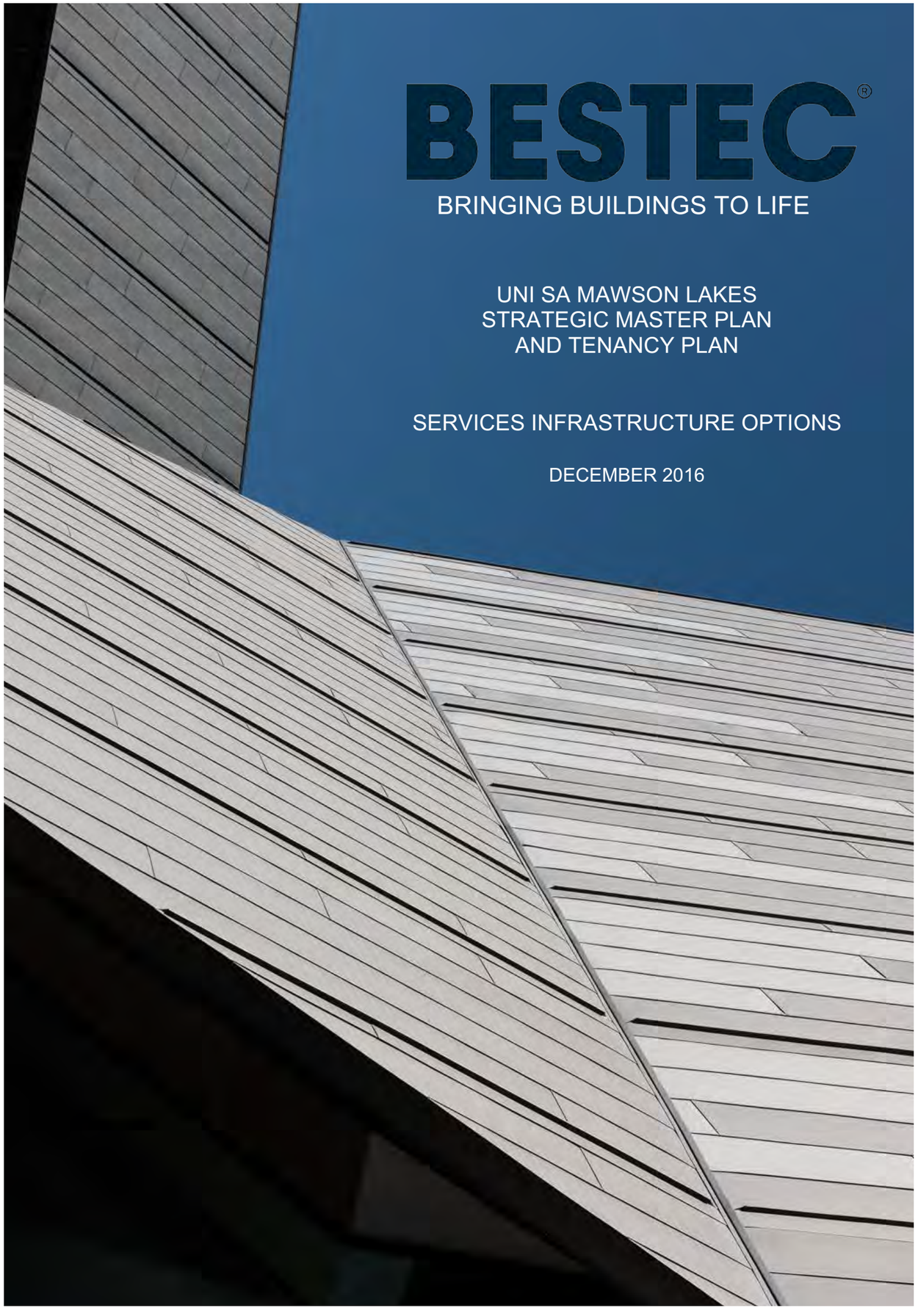
PROJECT RISK RATING MATRIX		RISK CONSEQUENCE				
		Insignificant	Minor	Moderate	Major	Severe
RISK LIKELIHOOD	Almost Certain	Medium	Medium	High	Very High	Very High
	Likely	Low	Medium	High	High	Very High
	Possible	Low	Medium	Medium	High	High
	Unlikely	Low	Low	Medium	Medium	Medium
	Rare	Low	Low	Low	Low	Medium

Economic	Lack of funding leading to inaction	Full potential of campus not achieved, project vision and principles not achieved, loss of students and research groups to other Universities	Possible	Major	**High**
	Life cycle costs	Tenancies not consolidated, on-going costs to maintain plant infrastructure which are close to end of life	Possible	Major	**High**
Structural	Earthquake upgrades	Retained buildings may need a higher level of earthquake upgrades than currently assumed based on the limited access to existing structural documents	Possible	Moderate	**Medium**
	Structural inadequacy	Retained buildings may need to be structurally upgraded above the level currently assumed based on the limited access to existing structural documents	Possible	Moderate	**Medium**
Project	Project Principles not adhered to	Development doesn't maximise potential, poor quality outcomes, lack of building connection to surrounds, ongoing future of site compromised, vibrancy of site compromised	Possible	Major	**High**
	Tenancy Consolidation	Vibrancy through consolidation and maximised concentration not achieved, no creation of entry point and identity for each school	Possible	Major	**High**
	Industry Engagement	Strengthening of strategic partnerships compromised, Industry Connections Hub not proceeding	Possible	Moderate	**Medium**
	Implementation of the priorites and packages	Development doesn't maximise potential, ongoing future of site compromised, vibrancy of site compromised, lack of implementation of associated master plans, loss of students and staff to other Universities	Possible	Major	**High**
	Decanting Strategy	Decanting strategy not followed during implementation of priorities creating disruption for tenants onsite, in abillity to mothball buildings for future development opportunities	Possible	Major	**High**
	Implementation of the Landscape packages	Negative campus experience for staff, students and community, with compromises to linkages, signage and wayfinding. Disregard for landscape master plan principles with ineffective implementation and maintenance	Possible	Moderate	**Medium**
	Connections between research, industry and teaching	Activation of ground floor spaces not achieved, Industry Connections Hub not implemented	Possible	Moderate	**Medium**
	Strengethening links between FII and Schools	Research practices not made visible, lack of engagement between Schools and FII	Possible	Moderate	**Medium**
	Development plan amendments	Delays and complications with changes to Development Plan wording limiting Industry opportunities on site	Possible	Moderate	**Low**
	Road closure adjacent Building MC	Impact on access for the school and bus route, issues with seeking approval from DPTI/Council for the new access connection to Mawson Lakes Boulevard.	Possible	Moderate	**Medium**
	Poor design outcomes	Development doesn't meet full potential	Possible	Major	**High**

PROJECT RISK RATING MATRIX		RISK CONSEQUENCE				
		Insignificant	Minor	Moderate	Major	Severe
RISK LIKELIHOOD	Almost Certain	Medium	Medium	High	Very High	Very High
	Likely	Low	Medium	High	High	Very High
	Possible	Low	Medium	Medium	High	High
	Unlikely	Low	Low	Medium	Medium	Medium
	Rare	Low	Low	Low	Low	Medium

APPENDIX B

SERVICES INFRASTRUCTURE OPTIONS DOCUMENT



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BRINGING BUILDINGS TO LIFE

UNI SA MAWSON LAKES STRATEGIC MASTER PLAN AND TENANCY PLAN

SERVICES INFRASTRUCTURE OPTIONS

DECEMBER 2016

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REPORT ISSUE REGISTER

REVISION	DATE	REVISION DESCRIPTION
01	29.07.16	Final Issue
02	23.08.16	Mechanical and Electrical Services Updated
03	29.11.16	Mechanical and Electrical Services Updated
04	29.11.16	Mechanical and Electrical Services Updated

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CONTENTS

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Mechanical Services

Existing System Description

The existing main chilled water plant located in the powerhouse (PH) building, consists of 4 water cooled electrically driven chillers of nominal 7,500kW refrigeration capacity in total and 3 off gas-fired heating hot water generators of nominal capacity of 3,560kW.

Trend log data obtained from the existing BMS controls contractor on 11 July 2016 indicates a peak maximum cooling demand of 5,370kW and a maximum heating demand of approximately 2,800kW. This indicates a current spare capacity of 2,130kW cooling and 760kW heating.

From the central chilled water and heating hot water generation plant in the powerhouse building, chilled and heating hot water is distributed around the site to various buildings by means of medium grade, Schedule 40 steel pipework within an underground service tunnel network. Tertiary water distribution pumps then deliver the chilled and heating hot water to the air handling units, fan coil units and other terminal devices within each building.

This thermal plant options report is compiled on the basis of the campus being re-configured as per the above layout, with future development also taking this philosophy in to consideration. Any deviation from this approach would require re-evaluation of the thermal plant solution.

The key issues identified as part of the Interim Report 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 later in the report 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).

Uni SA Mawson Lakes
Strategic Master Plan and Tenancy Plan
Services Infrastructure Options
Mechanical, Electrical, Hydraulic
and Fire Protection Services

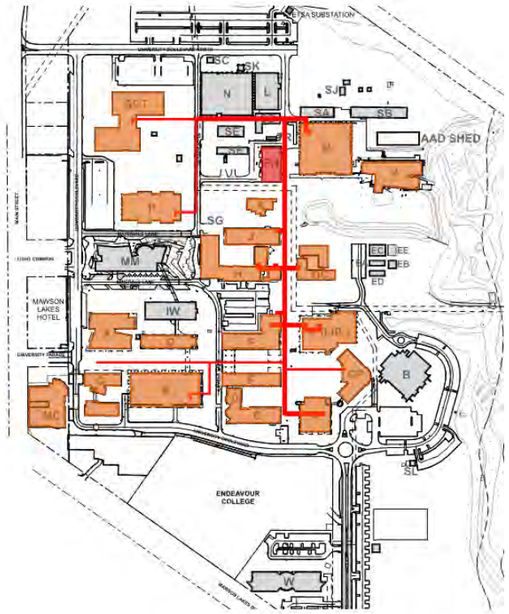

Figure 2: Service tunnel and buildings served from central plant in PH building

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, a 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 hence 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.

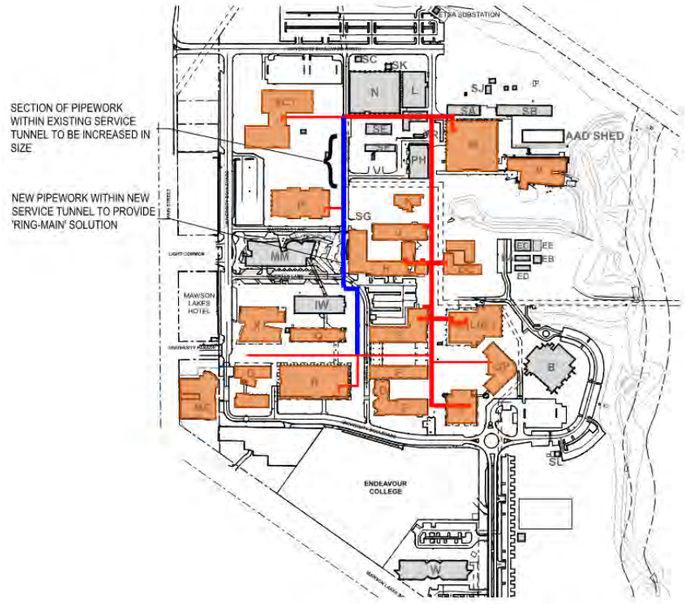

Figure 3: Proposed new service tunnel Stage 1 works to create 'ring-main' network

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.

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.

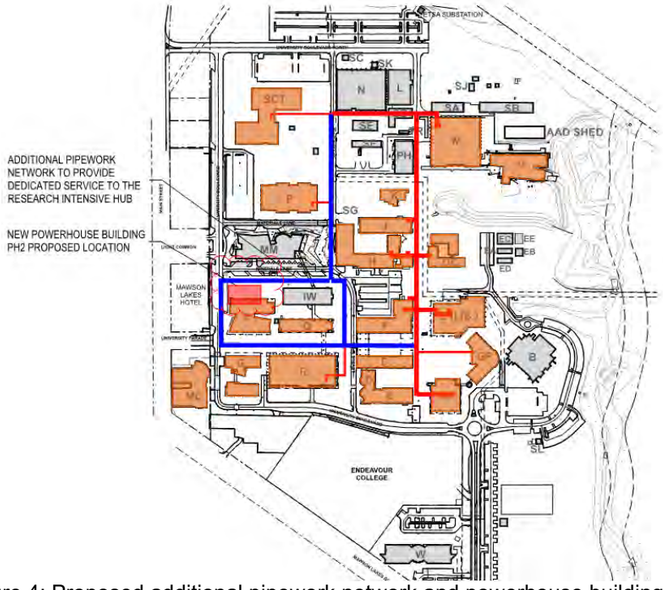

Figure 4: Proposed additional pipework network and powerhouse building PH2

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 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.

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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

Key Issue 4 (Cont.)

- 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.

Uni SA Mawson Lakes
Strategic Master Plan and Tenancy Plan
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and Fire Protection Services

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 A 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.

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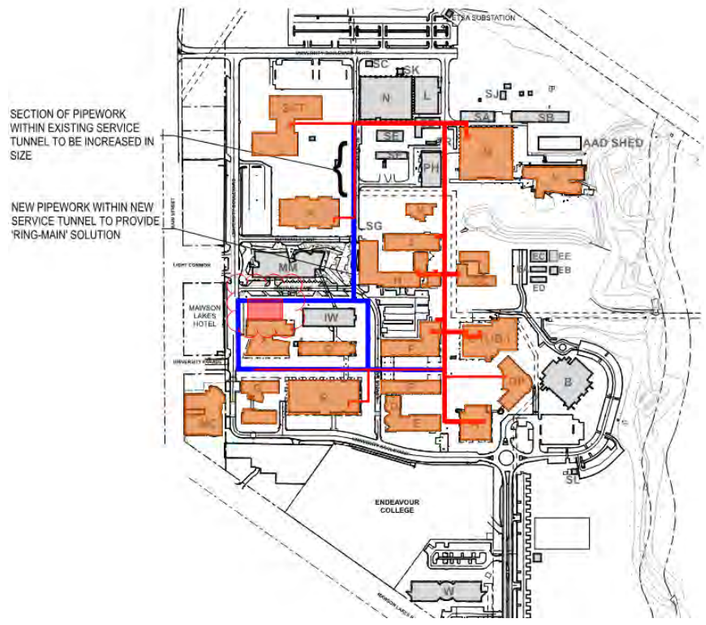
The suggested location for the second Power House building is shown below:-



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.

Mechanical Services

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 G
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.

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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 4 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.

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 at south west 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.

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Electrical Services

Introduction

We present the following overview of the electrical infrastructure options under consideration for the UniSA Mawson Lakes Strategic Master Plan. This is provided in order to drive further discussion and consultation with the University user group.

The existing high voltage electrical infrastructure is supplied from one single 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.

From the SA Power Networks substation eight separate university owned 11kV/415V substations are located throughout the campus, including the Power House (PH) Building.

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.

Disadvantages (Cont.):-

- 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.

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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.

We also recommend Option 1 be raised 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.

We 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

Introduction

We present the following overview of the Hydraulic infrastructure options under consideration for the UniSA Mawson Lakes Strategic Master Plan. This is provided in order to drive further discussion and consultation with the University user group.

Sewer Drainage Infrastructure

Sewer drainage enters the site from the South Australian Water Corporation 450mm diameter vitrified clay sewer main located within Main North Road. The SA Water Sewer main within, 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 Corporation sewer, reticulating throughout.

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

Domestic cold water is supplied from a 'ring' main system with two metered water connections from the 2 off SA Water Corporation 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 various buildings throughout the site.

Isolation valves and backflow prevention devices 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.

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.

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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 within 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

Introduction

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

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.

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APPENDIX A

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BESTEC

APPENDIX B

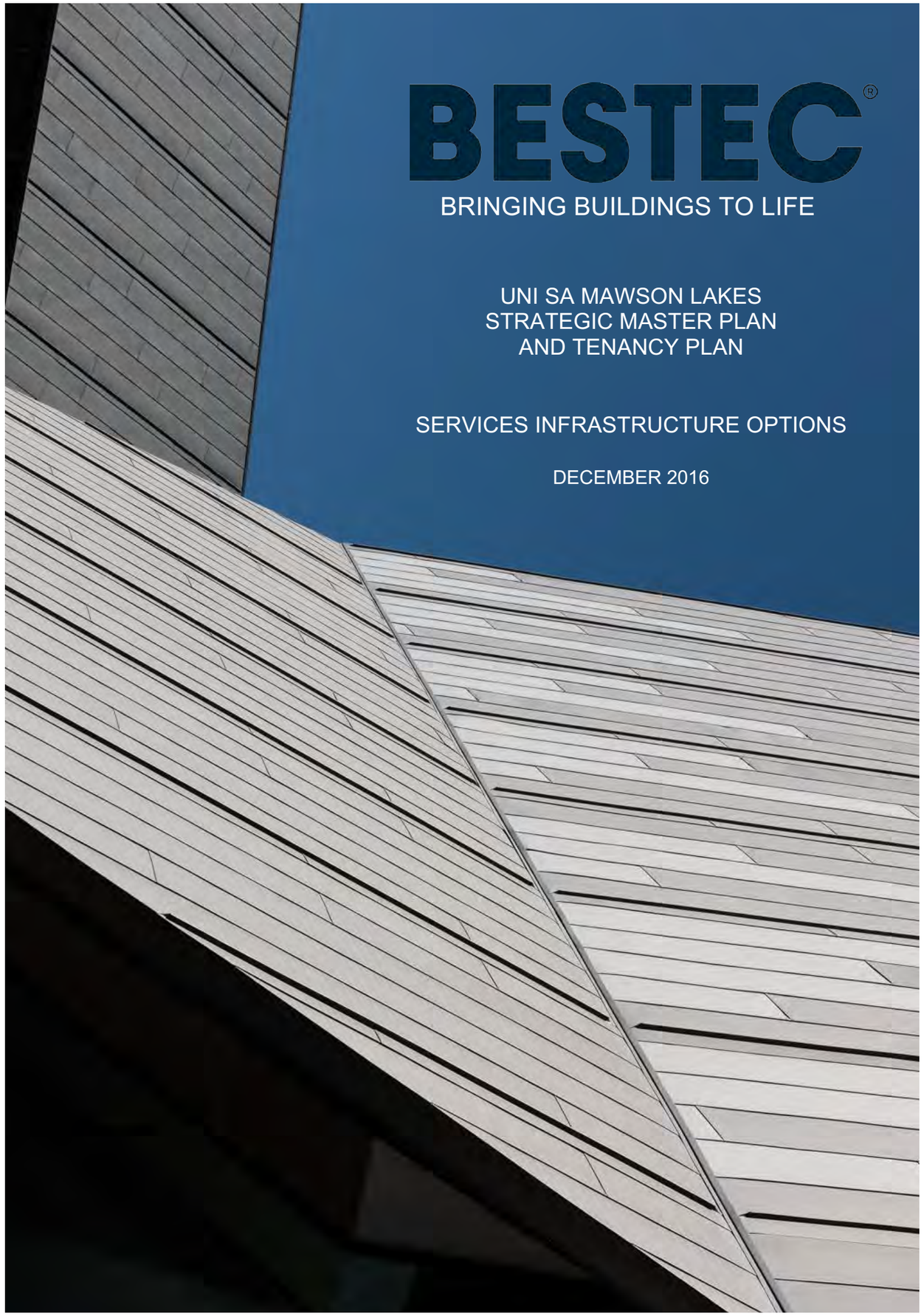
BESTEC

MECHANICAL SERVICES ESTIMATE - PLANT AND EQUIPMENT

BUDGET ESTIMATES	**Project:**	55100
	Engineer:	DP
UniSA Mawson Lakes Master Plan	**Sheet:**	
	Date:	27-Jul-16
		SUMMARY PAGE

Item	Unit	Qty	RATE	TOTAL
Option 1				$ 4,488,852.50
550kW chiller	No	1	$ 135,000.00	$ 135,000.00
2,500kW chillers	No	3	$ 350,000.00	$ 1,050,000.00
3,500kW cooling tower	No	3	$ 180,000.00	$ 540,000.00
CHWP	No	3	$ 8,000.00	$ 24,000.00
CWP	No	3	$ 8,000.00	$ 24,000.00
1,500kW boiler	No	3	$ 105,000.00	$ 315,000.00
HHWP	No	3	$ 6,000.00	$ 18,000.00
Plant room upgrade	No	1	$ 150,000.00	$ 150,000.00
Labour - 5 men x 12 hours per day x 70 days	Hrs	4200	$ 90.00	$ 378,000.00
Pipework - 250mm	m	200	$ 750.00	$ 150,000.00
Pipework - 150mm	m	200	$ 450.00	$ 90,000.00
Pipework - 100mm	m	150	$ 350.00	$ 52,500.00
Pipework - 65mm	m	100	$ 280.00	$ 28,000.00
Valves - isolation - 250mm	No	20	$ 2,500.00	$ 50,000.00
Valves - isolation - 150mm	No	20	$ 1,750.00	$ 35,000.00
Valves - throttling - 150mm	No	20	$ 5,000.00	$ 100,000.00
Valves - isolation - 100mm	No	10	$ 4,000.00	$ 40,000.00
Strainers - 250mm	No	15	$ 2,000.00	$ 30,000.00
Strainers - 150mm	No	15	$ 1,600.00	$ 24,000.00
Crane hire	Hrs	60	$ 1,500.00	$ 90,000.00
BMS works	Hrs	1500	$ 150.00	$ 225,000.00
Margin - 15%				$ 532,275.00
Contingency - 10%				$ 408,077.50
Option 2				$ 4,246,605.00
550kW chiller	No	1	$ 135,000.00	$ 135,000.00
1,800kW chillers	No	3	$ 320,000.00	$ 960,000.00
2,500kW cooling tower	No	3	$ 150,000.00	$ 450,000.00
CHWP	No	3	$ 8,000.00	$ 24,000.00
CWP	No	3	$ 8,000.00	$ 24,000.00
1,500kW boiler	No	3	$ 105,000.00	$ 315,000.00
HHWP	No	3	$ 6,000.00	$ 18,000.00
New 400m² Power House Building	No	1	$ 100,000.00	$ 100,000.00
Labour - 5 men x 12 hours per day x 70 days	Hrs	5000	$ 90.00	$ 450,000.00
Pipework - 250mm	m	200	$ 750.00	$ 150,000.00
Pipework - 150mm	m	200	$ 450.00	$ 90,000.00
Pipework - 100mm	m	150	$ 350.00	$ 52,500.00
Pipework - 65mm	m	100	$ 280.00	$ 28,000.00
Valves - isolation - 250mm	No	10	$ 2,500.00	$ 25,000.00
Valves - isolation - 150mm	No	10	$ 1,750.00	$ 17,500.00
Valves - throttling - 150mm	No	15	$ 5,000.00	$ 75,000.00
Valves - isolation - 100mm	No	10	$ 4,000.00	$ 40,000.00
Strainers - 250mm	No	10	$ 2,000.00	$ 20,000.00
Strainers - 150mm	No	5	$ 1,600.00	$ 8,000.00
Crane hire	Hrs	100	$ 1,500.00	$ 150,000.00
BMS works	Hrs	1500	$ 150.00	$ 225,000.00

Margin - 15%				$ 503,550.00
Contingency - 10%				$ 386,055.00
Option 3				$ 6,709,243.75
650kW chiller (ENE/NBE)	No	2	$ 160,000.00	$ 320,000.00
900kW chiller (XX)	No	2	$ 190,000.00	$ 380,000.00
700kW chiller (Industry Opportunity)	No	2	$ 160,000.00	$ 320,000.00
1000kW chiller (Teaching & Learning)	No	2	$ 200,000.00	$ 400,000.00
900kW cooling tower (ENE/NBE)	No	2	$ 100,000.00	$ 200,000.00
1250kW cooling tower (XX)	No	2	$ 120,000.00	$ 240,000.00
900kW cooling tower (Industry Opportunity)	No	2	$ 100,000.00	$ 200,000.00
1450kW cooling tower (Teaching & Learning)	No	2	$ 130,000.00	$ 260,000.00
CHWP	No	8	$ 5,000.00	$ 40,000.00
CWP	No	8	$ 5,000.00	$ 40,000.00
750kW boiler	No	8	$ 65,000.00	$ 520,000.00
HHWP	No	8	$ 3,000.00	$ 24,000.00
Labour - 5 men x 12 hours per day x days	Hrs	9600	$ 90.00	$ 864,000.00
Pipework - 250mm	m	300	$ 750.00	$ 225,000.00
Pipework - 150mm	m	300	$ 450.00	$ 135,000.00
Pipework - 100mm	m	150	$ 350.00	$ 52,500.00
Pipework - 65mm	m	100	$ 280.00	$ 28,000.00
Valves - isolation - 250mm	No	20	$ 2,500.00	$ 50,000.00
Valves - isolation - 150mm	No	15	$ 1,750.00	$ 26,250.00
Valves - throttling - 150mm	No	10	$ 5,000.00	$ 50,000.00
Valves - isolation - 100mm	No	10	$ 4,000.00	$ 40,000.00
Strainers - 250mm	No	20	$ 2,000.00	$ 40,000.00
Strainers - 150mm	No	15	$ 1,600.00	$ 24,000.00
Crane hire	Hrs	300	$ 1,500.00	$ 450,000.00
BMS works	Hrs	2500	$ 150.00	$ 375,000.00
Margin - 15%				$ 795,562.50
Contingency - 10%				$ 609,931.25



APPENDIX C

ONSITE PARKING RATES IN THE SALISBURY DEVELOPMENT PLAN

Attachment A

Table Sal/2 - Off Street Vehicle Parking Requirements

The following vehicle parking requirements do not apply to the Mixed Use (Bulky Goods, Entertainment, Leisure) Zone except where the form of development is Light Industry whereby the rates for *Industry, warehouse, stores* are applicable.

Form of Development	Number of Required Car Parking Spaces
Accommodation	
Aged Care / retirement home	1 space per unit
Serviced apartment	1 space per unit plus 1 space per employee
Motel	1 space per unit
Commercial	
Bulky goods outlet	3 spaces per 100 square metres of gross leasable floor area
Cinema	1 space per 4 cinema seats
Hotel Public bar	1 space per 2 square meters of floor area available to the public
Lounge or beer garden	1 space per 6 square metres of floor area available to the public
Gaming room	1 space per 2 machines
Office	1 space per 25 square metres, with a minimum of 4 spaces per office
Restaurant	Greater of 1 space for every 3 seats or 1 space for every 15 square metres of dining area
Service trade premises	3 spaces per 100 square metres
Shop	7 spaces per 100 square metres of gross leasable area for shops outside of centre zones 5 spaces per 100 square metres of gross leasable area for shops within centre zones
Community/civic	
Child care centre	1 space per 4 children
Community centre	10 spaces per 100 square metres of total floor area
Library	4 spaces per 100 square metres
Place of worship	Greater of 1 space for every 3 seats or every 3 attendees
Dwellings	
Detached dwelling Semi Detached Dwelling Row Dwelling	2 spaces per dwelling, one of which is to be covered

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Form of Development	Number of Required Car Parking Spaces
Residential flat building Multiple dwelling Group dwelling	1 space per dwelling, plus 0.5 on-site visitor car parking spaces per dwelling
Industry, warehouses, stores	
Office component	1 space per 30 square metres
Plus	Plus
Non-office component	
Up to 200 square metres Plus 200-2000 square metres Plus greater than 2000 square metres	1 space per 50 square metres 1 additional space for every 75 square metres 1 additional space for every 150 square metres
Or	Or
For labour intensive industries, inclusive of office component (whichever ever is greater)	0.75 car parking spaces per employee
Medical	
Consulting room	10 per 100 square metres of total floor area, with a minimum of 3 spaces per tenancy
Hospital	2.5 spaces per bed
Nursing home	1 space for every 4 beds

The following vehicle parking requirements apply to development specifically within the **Mixed Use (Bulky Goods, Entertainment and Leisure) Zone:**

Form of Development	Minimum number of required vehicle parking spaces
All forms of development (except Light Industry)	3 spaces per 100 square metres of gross leasable floor area

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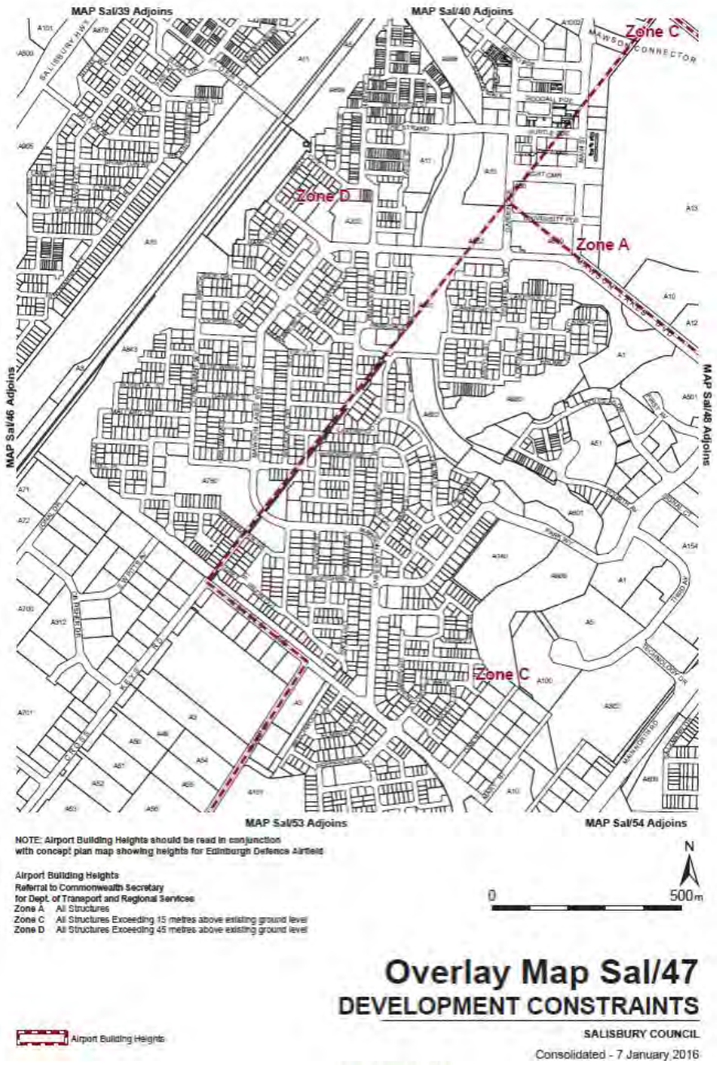
HEIGHT GUIDELINE MAPS IN THE SALISBURY DEVELOPMENT PLAN

Attachment B



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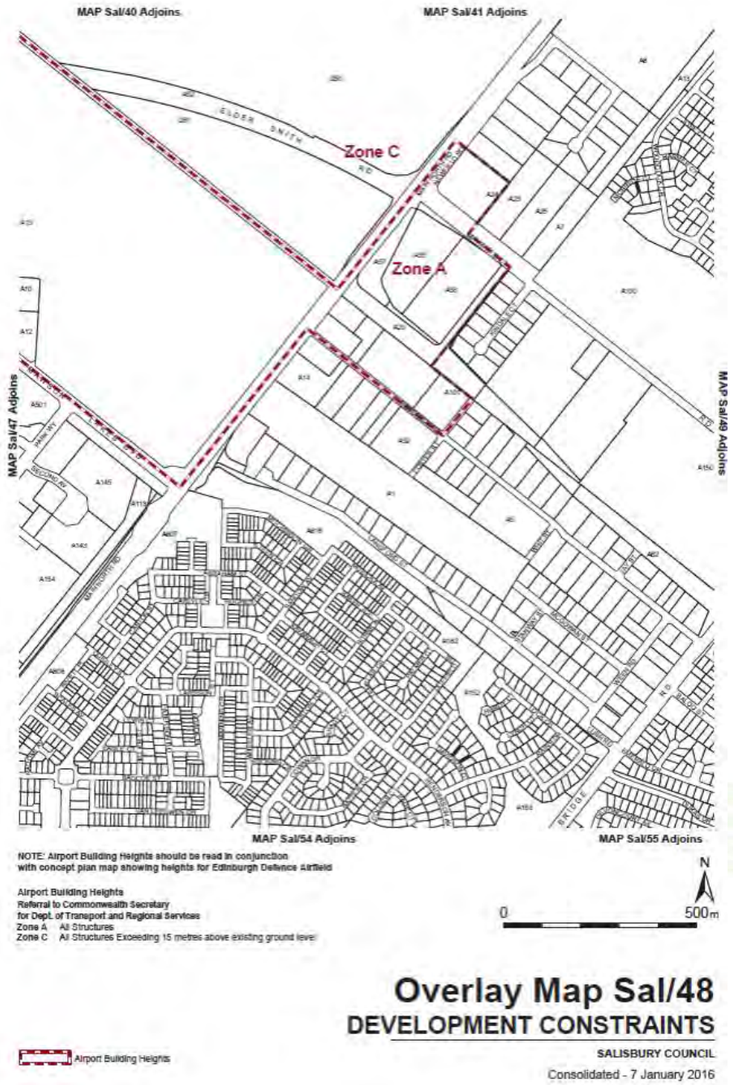

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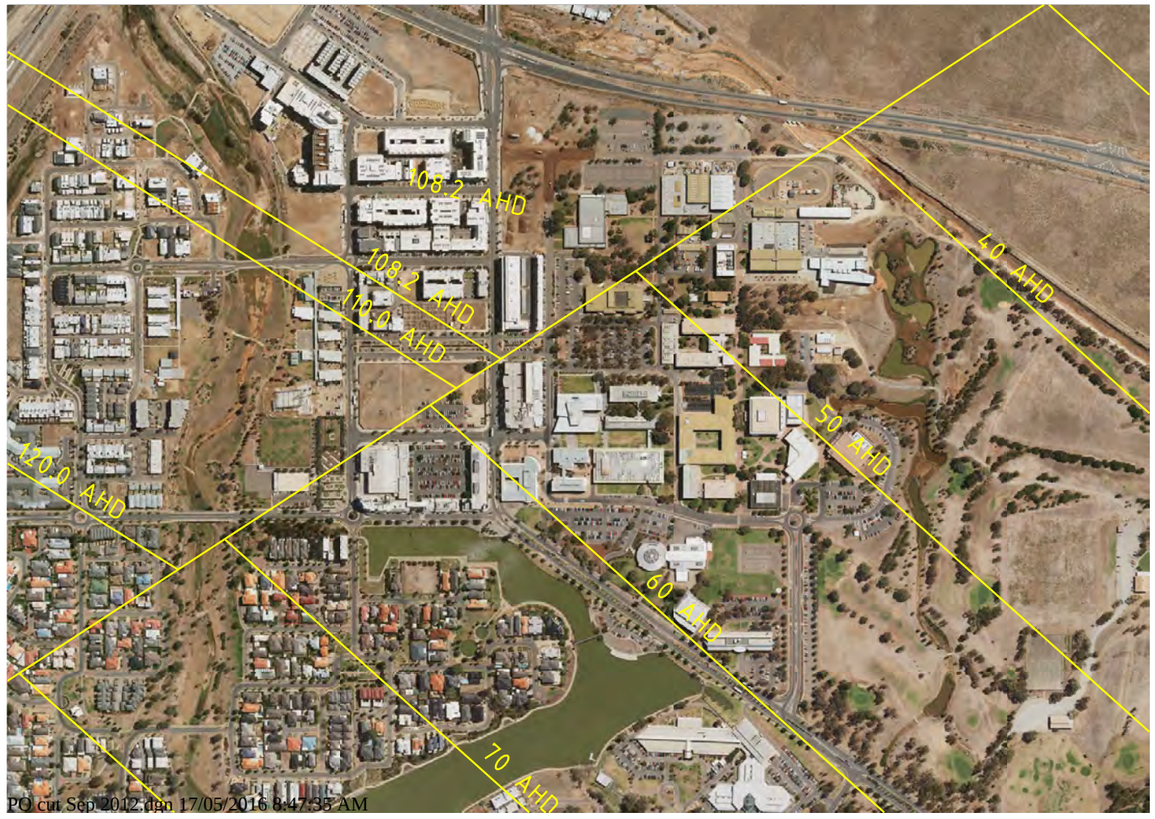
HEIGHT RESTRICTION DIAGRAMS FROM ADELAIDE AIRPORTS LTD



APPENDIX D

DPTI REQUIREMENTS FOR STRENGTHENING EXISTING BUILDINGS FOR EARTHQUAKE

building management

Strengthening Existing Government Buildings for Earthquake Policy

April 2012

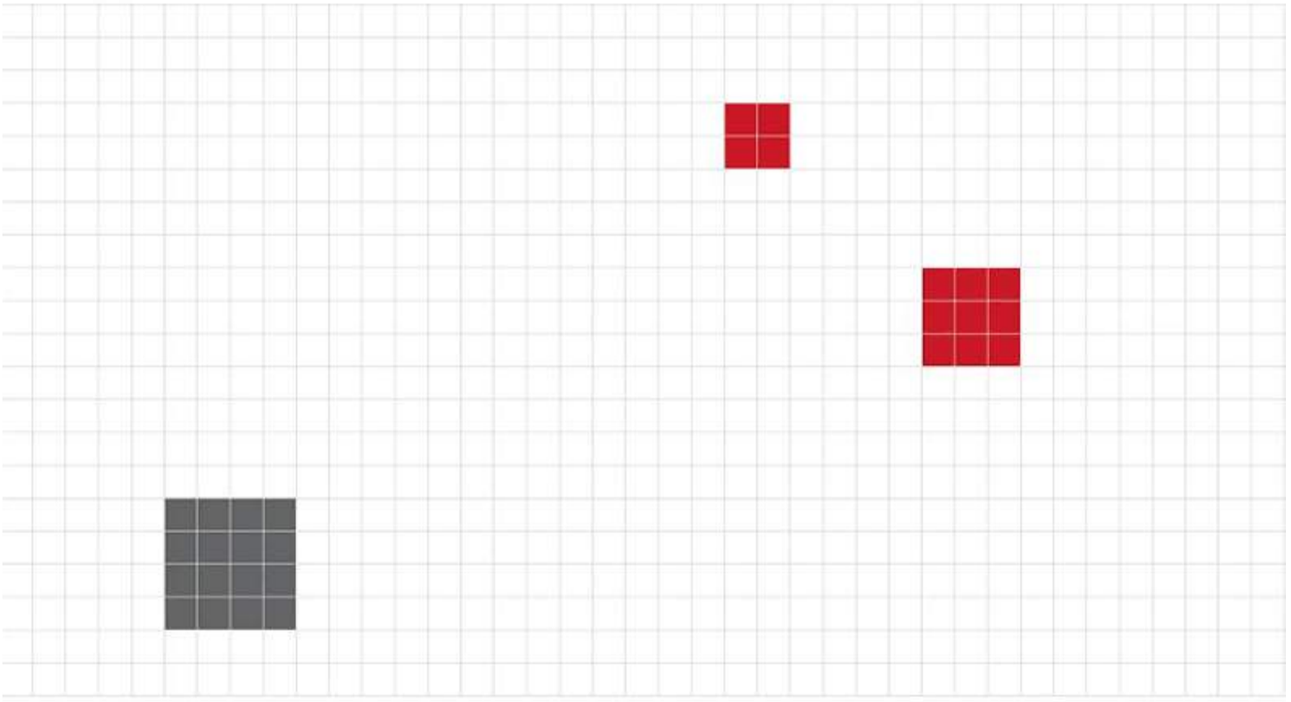


Table of Contents

Government of South Australia
Department of Planning, Transport and Infrastructure

1 Background

The requirements to undertake strengthening of existing government buildings for earthquake are two fold:

- those required by the *Development Act 1993*; and
- those required by this policy.

The *Development Act 1993* states that:

"*If an application for a provisional building rules consent relates to building work in the nature of an alteration to a building constructed before 15 January 1994 and the building is, in the opinion of the relevant authority, unsafe, structurally unsound or in an unhealthy condition, the relevant authority may require, as a condition of consent, that building work be carried out to the extent reasonably necessary to ensure the building is safe and conforms to proper structural and health standards*."

Certifiers typically require a building be assessed for stability under earthquake loading when:

- a building is undergoing a change of use;
- alterations are proposed to a building as part of a renovation which reduce the stability of the building under earthquake, e.g. removal of structural shear walls; or
- substantial renovations are occurring to significant buildings.

The Department of Planning, Transport and Infrastructure (DPTI) policy is a requirement above and beyond the *Development Act 1993* and is not assessed by the Private Certifier unless specifically asked to do so.

This policy requires seismic assessment and, if necessary, earthquake mitigation works be included in any significant alteration proposed to an existing government asset.

The principles of the DPTI policy 'Strengthening Existing Government Buildings for Earthquake' have been approved by State Cabinet and the Department of Treasury and Finance.

2 The Earthquake Hazard

Despite Australia's seemingly low seismic risk, being in the middle of one of the earth's larger tectonic plates, we have been subjected to 17 earthquakes registering 6 or more on the Richter Scale in the last 80 years.

The most well known earthquake in Australia is the Newcastle earthquake of December 1989 which measured 5.6 on the Richter Scale. The Newcastle earthquake claimed 13 lives, caused 150 injuries and damaged 70,000 buildings. The estimated total damage caused by the Newcastle earthquake was $4.5 Billion (1997 values).

Four major earthquakes have also been recorded in South Australia including:

- 1897 - Beachport (M6.5);
- 1902 - Warooka (M6.0);
- 1954 - Adelaide (Darlington) (M5.5); and
- 1986 - Marryat Creek (M6.0).

3 Scope of Policy

This policy applies to all government building projects from August 2010. It supersedes the previous policy dated August 2006 and takes into account the issue of the revised Australian Standard AS 1170.4—2007 Structural design actions Part 4: Earthquake actions in Australia.

Existing government buildings undergoing significant alterations shall be upgraded in accordance with:

- this policy;
- Australian Standard AS 3826—1998 Strengthening existing buildings for earthquake; and
- Australian Standard AS 1170.4—2007 Structural design actions Part 4: Earthquake actions in Australia.

The aim of work undertaken in accordance with this policy is the minimisation of hazard to life during an earthquake by ensuring that building structures, including architectural components, walls, ceilings, mechanical and electrical components, have a low probability of collapse.

In recognition of the practicalities and sometimes prohibitive costs associated with upgrading existing buildings for earthquake this policy, in line with Australian Standard AS 3826—1998 Strengthening existing buildings for earthquake, permits the strengthening of structures to less than current full code compliance.

The owners of some buildings, such as heritage buildings, may elect to go further and aim to protect the whole building from significant damage.

The decision to strengthen an existing building shall be taken in consultation with the owner (lead agency in a construction project), DPTI and the design team considering:

- the cost of remedial work;
- the reduction of risk; and
- the acceptability of any residual risk.

4 Methodology

The steps to determine the requirements for strengthening buildings for earthquake are as follows.

4.1 Establish the Annual Probability of Exceedance (Previously Threshold Load)

Hold Point: In conjunction with the lead agency, DPTI and where appropriate the Building Certifier, establish an agreed Annual Probability of Exceedance (previously Threshold Load) for analysis using this policy.

Table 1: Annual Probability of Exceedance

Importance Level of Building in accordance with BCA	Annual Probability of Exceedance	Probability Factor (AS1170.4—2007 Table 3.1)	Description
4	Consult DPTI	Consult DPTI	Buildings and facilities designated as essential facilities. Buildings and facilities with special disaster functions. Medical emergency or surgery facilities. Emergency services facilities: fire, rescue, police station and emergency vehicle garages. Utilities required as backup for buildings and facilities of Importance Level 4. Designated emergency shelters. Designated emergency centres and ancillary facilities. Buildings and facilities containing hazardous materials capable of causing hazardous conditions that extend beyond property boundaries.
3	1/250	0.75 (previously 2/3 threshold)	Buildings and facilities where more than 300 people can congregate in one area. Buildings and facilities with primary school, secondary school or day care facilities with a capacity greater than 250. Buildings and facilities with a capacity greater than 500 for colleges or adult education facilities. Health care facilities with a capacity of 50 or more residents but not having surgery or emergency treatment facilities. Jails and detention facilities. Any occupancy with an occupant load greater than 5000. Power generating facilities, water treatment and waste water treatment facilities, any other public utilities not included in Importance Level 4. Buildings and facilities not included in Importance Level 4 containing hazardous materials capable of causing hazardous conditions that do not extend beyond property boundaries.
2	1/50	0.35 (previously 1/3 threshold)	Buildings or structures not included in Importance Levels 1, 3 and 4. Low rise residential construction and buildings and facilities below the limits set for Importance Level 3.

4.2 Documentation Review

Review documentation available for the building. For heritage listed buildings review Conservation Management Plans and Dilapidation Surveys that may have been prepared. Identify vertical and lateral load resisting systems and areas of vulnerability in the building.

4.3 Site Inspection

Site inspections shall be carried out by practising Structural Engineers experienced in the assessment and strengthening of existing structures to resist earthquakes.

Inspect the building to assess:

- that the as-built details generally conform to the documents available;
- whether there are significant undocumented alterations to the building;
- the condition of the building structure, materials and connections;
- the integrity of load resisting elements; and
- the non-structural parts and components and their existing anchorage and bracing.

Refer to Australian Standard AS 1170.4—2007 Structural design actions, SECTION 8 DESIGN OF PARTS AND COMPONENTS for an indicative list of relevant non-structural parts and components. If significant undocumented alterations exist, contact DPTI for further advice.

4.4 Engineering Risk Assessment – Building Structure

Carry out an earthquake assessment of the structure using Australian Standard AS 1170.4—2007 Structural design actions to determine the elastic demand on the structural elements for the chosen Annual Probability of Exceedance (previously Threshold Load). Determine the capacity of lateral load resisting structural elements using relevant material codes. Report the seismic load demand against the actual capacity. Where a lateral load resisting system is discontinuous, such as an offset in plan location of a shear wall or frame, demonstrate that the columns below the discontinuity can support either:

- the calculated earthquake forces for the chosen Annual Probability of Exceedance (previously Threshold Load);
- the capacity of other elements of the structure to transfer such loads to the column.

Assess risks associated with any ‘gap’ between the actual structure capacity and the demand calculated for the chosen Annual Probability of Exceedance (previously Threshold Load).

Table 2: Building Structure Risk Matrix

Building Structure Risk Matrix					
Likelihood (AEP)	**Consequences**				
	1. Low Amount of Damage	**2. Minor Damage**	**3. Moderate Damage**	**4. Major Damage**	**5. Catastrophic Damage**
< 3 yrs	Medium	Medium	High	Extreme	Extreme
3-30 yrs	Low	Medium	High	High	Extreme
31-300 yrs	Low	Low	Medium	High	High
301-3000 yrs	Low	Low	Medium	Medium	High

Building Structure Risk Matrix					
Likelihood (AEP)	**Consequences**				
	1. Low Amount of Damage	**2. Minor Damage**	**3. Moderate Damage**	**4. Major Damage**	**5. Catastrophic Damage**
> 3000 yrs	Low	Low	Low	Medium	Medium

Table 3: Building Structure Element Summary

Building Structure Element Summary			
Element	**Code Demand of Element** (at agreed AEP)	**Actual Element Capacity**	**Ratio: Capacity/Demand**
Column type A			
West shear wall			

Table 4: Building Structure Seismic Risk Register

Building Structure Seismic Risk Register							
Risk ID e.g. (Year, Level, Number)	**Building Element**	**Earthquake Impact on Element** (at agreed AEP)	**Likelihood**	**Consequence**	**Risk Rating**	**Retrofit Option**	**Residual Risk Rating**
10.01.01							
10.01.02							

If the structure does not comply with the agreed benchmark, propose cost effective retrofit options/risk treatments which will relieve the overstressed elements of the structure. Provide a written report with recommendations to DPTI for any upgrading, including consideration of options where required, costings and residual risk after treatment.

4.5 Engineering Risk Assessment – Non-structural Parts and Components

Evaluate and summarise the seismic vulnerability of the building's major non-structural parts and components using engineering judgement and the following tables.

Table 5: Non-structural Parts Seismic Damage Consequence

Non-structural Parts Seismic Damage Consequence	
Rating	**Damage Consequence**
1	There is minimal risk of the non-structural part or component being damaged or causing damage.
2	Sliding or toppling of the non-structural part or component impairing the function of that non-structural part or component such that repairs are required to restore its function.
3	Sliding, toppling or other movement could result in the non-structural part or component causing either: • the loss of function of a life safety system; and/or • damage that results in release of flammable or toxic materials.
4	There is a risk that falling or toppling of the non-structural part or component could pose a hazard to life safety.

Table 6: Non-structural Parts and Components Seismic Risk Matrix

Non-structural Parts and Components Seismic Risk Matrix				
Anchorage or Bracing	**1**	**2**	**3**	**4**
Unanchored or unbraced	Low	Moderate	High	Extreme
Marginally anchored and/or braced	Low	Moderate	Moderate	High
Well anchored and/or braced	Low	Low	Low	Moderate

Table 7: Non-structural Parts and Components Seismic Risk Register

Non-structural Parts and Components Seismic Risk Register					
System Element (examples)	**Damage Rating** (Table 5)	**Anchorage Rating**	**Seismic Risk Level** (Table 6)	**Retrofit** (Risk Treatment)	**Residual Seismic Risk Level**
Front street parapet					
Suspended ceiling					
Chimney					

Provide a written report with recommendations to DPTI for any required upgrade including consideration of options, costings and residual risk after upgrade. An example of the report is provided in Attachment 1.

4.6 Documentation

Hold Point: In conjunction with the client agency and DPTI, agree on the proposed upgrading works for the building structure and non-structural parts and components before beginning detailed design and documentation. Provide cost estimates for proposed upgrading works. In the case of heritage listed buildings the proposed upgrade works shall take account of heritage concerns.

Document the upgrade works required to improve the performance of the building structure and non-structural parts and components for seismic forces.

Document the works associated with installing the seismic upgrade which might include:

- roof sheeting removal and replacement;
- flashings and sealing of new roof penetrations;
- ceiling removal and replacement;
- wall lining repairs;
- floor covering removal and reinstatement;
- floor board removal and reinstatement; and
- chimney decommissioning.

Hold Point: Prior to tender submit tender documents to DPTI for review of the earthquake upgrade works. Respond to queries raised by DPTI following review of the documents and make alterations where agreed.

4.7 Certification

If appropriate advise the Building Certifier of the adopted earthquake annual probability of exceedance (previously threshold load) and that certification of the project is required against that annual probability of exceedance.

5 Contact

For further information contact:

Shane Turner
Principal Engineer – Structural

Phone: 08 8226 5223
Email: shane.turner@sa.gov.au

6 Confidentiality

A written report should be prepared with recommendations for any required upgrade including consideration of options, costings and residual risk after upgrade.

When complete it must be submitted to Building Management Project Services, Department of Planning, Transport and Infrastructure, Level 2, 211 Victoria Square, Adelaide SA 5000.

Seismic Assessment and Upgrade Report

1 Executive Summary

Write a summary of key findings and outcomes of the seismic assessment and upgrade project.

2 Introduction

Outline the background to the project, its scope, briefing information provided, established Annual Probability of Exceedance, required outcomes etc.

3 Building Description

Describe the building in terms of size, layout, height, storeys, site etc. List the drawings reviewed.

4 Building Structure/Conformance with the 'Deemed to Comply Provisions' of Australian Standard AS 3826—1998

Describe the type of construction, structural grid spacing and if applying the 'Deemed to Comply Provisions' of Australian Standard AS 3826—1998 Strengthening existing buildings for earthquake how the building complies with the requirements of Section 2 of that code. Describe non-structural components of significance. List the drawings reviewed.

5 Lateral Load Resisting Structural System/Load Paths

Describe the lateral load path including diaphragms, vertical lateral-force resisting system, foundations and connections between these elements.

6 Inspection

Describe the structural condition of the building and any deterioration that has occurred in the building structure and building fabric.

7 Earthquake Compliance and Loading

Provide an outline of the agreed Annual Probability of Exceedance, probability factor, site sub-soil class, earthquake design category, hazard factor, etc.

8 Seismic Risk Analysis and Assessment of the Building Structure

Report on the capacity of building elements. Report on the deflection/storey drift that occurs in the building structure and whether it is likely to cause pounding on adjacent structures or damage/failure of the building façade. Report on the seismic risk to the building in its current condition and if an upgrade was undertaken. Where multiple annual probabilities of exceedance are considered, report on the results for each.

9 Retrofit Options for the Building Structure

Describe the proposed retrofit strengthening options which will relieve the overstressed elements of the structure if required. Describe the proposed works to overcome any pounding problem.

10 Retrofit Options for Non-Structural Parts and Components

Propose risk treatments to non-structural parts and components where necessary and report on the residual risk after treatment.

11 Appendix A – Photographs

Provide photos of general elevations, non-structural components of concern and damage/deterioration that has been found during the inspection.

12 Appendix B - Geotechnical Investigation

Provide a copy of a report or recommendation from a Professional Geotechnical Engineer which establishes the Site Sub-Soil Class for the building under review in accordance with Australian Standard AS 1170.4—2007 Structural design actions Part 4: Earthquake actions in Australia.

13 Appendix C – Seismic Retrofit Sketches

Provide A3 or A4 sized plans with markups of proposed retrofit options.

14 Appendix D - Costing of Seismic Retrofit Options

Provide costings on the basis of the scope of work outlined in the report. Advise the contingency amount allowed, assumptions and exclusions made in providing the costing.

APPENDIX E

EARTHQUAKE HAZARD RISK MITIGATION IN GOVERNMENT LEASING

Earthquake Hazard Risk Mitigation in Government Leasing

Scope

The aims of this guide note are to reduce risks related to:

- **life safety** – the minimisation of hazard to life by ensuring that the structure of buildings leased by government have a low probability of collapse in an earthquake; and
- **business continuity** – the reduction in risk of an earthquake interrupting the function of government by causing damage to agency tenancies.

Some agencies may elect to go further and request tenancies in buildings designed to higher standards than the minimums set out in this guide note.

The Earthquake Hazard

Despite our seemingly low seismic hazard, being in the middle of one of the earth's larger tectonic plates, Australia has been subjected to 17 earthquakes registering 6 or more on the Richter Scale in the last 80 years.

Adelaide has the highest earthquake hazard of any Australian capital city. It has experienced more damaging earthquakes in the past 150 years than any other capital. Several fault zones have been located in the Adelaide region that are likley to be associated with the higher seismic activity. Due to the shallow depth of most Australian earthquakes, even small magnitude earthquakes are often felt and heard and moderate earthquakes can cause damage.

Five major earthquakes that have been recorded in South Australia are:

- Beachport – M6.5 (1897)
- Warooka – M6.0 (1902)
- Adelaide (Darlington) – M5.5 (1954)
- Marryat Creek – M6.0 (1986)
- Ernabella – M5.4 (2012).

The most well known earthquake in Australia is the Newcastle earthquake of December 1989 which measured 5.6 on the Richter Scale. The Newcastle earthquake claimed 13 lives, caused 150 injuries and damaged 70,000 buildings. The estimated total damage caused by the Newcastle earthquake was $4.5 billion (1997 values).

Earthquake Design Code History

The first Australian Standard for the design of earthquake resistant buildings was AS 2121-1979 The design of earthquake-resistant buildings (known as the SAA Earthquake Code). This standard was referenced in the South Australian Building Regulations in 1983.

The second Australian Standard dealing with earthquake design was AS 1170.4-1993 Minimum design loads on structures (Part 4: Earthquake Loads) and referenced in the Building Code of Australia Amendment of 1 January 1995.

The latest version of AS 1170.4-2007 Structural design actions (Part 4: Earthquake actions in Australia) was referenced in the Building Code of Australia Amendment of 1 May 2008. The

latest Building Code increased earthquake design loads for large office type buildings over the previous version.

Life Safety Standard

In recognition of the age and mix of commercial properties in Adelaide and the sometimes prohibitive cost associated with uprading existing buildings for earthquake or relocating agencies and their fitouts, this guide note factors in less than full compliance with the current standard. This is consistent with Australian Standard AS 3826-1998 Strengthening existing buildings for earthquake.

This guide note requires that the structural strength of an existing buildings proposed to house a government agency shall be at least 35% of that required by the current AS 1170.4-2007 Structural design actions (Part 4: Earthquake actions in Australia).

It is accepted that buildings constructed in South Australia during or after 1985 will meet this requirement. Buildings constructed prior to 1985 may however not have been designed and constructed to resist earthquake forces. Buildings of multistorey loadbearing masonry construction are of particular concern as they have been shown to present a hazard to life in numerous earthquake events around the world.

Engineering Risk Assessment

For buildings completed prior to 1985, a engineering risk assessment is required when the lease term is 5 years or greater. Buildings completed during or after 1985 do not require a engineering risk assessment of their capacity to resist earthquake loads except where they are to contain a function critical to post disaster recovery or where the client wishes to know the capacity of a building against the star rating criteria given in the business continuity recommendations in this guide note.

Functions critical to post disaster recovery include the following:

- hospitals and GP Plus Centres
- State control centres of emergency services
- State control centres of support agencies to emergency services
- stores containing essential supplies, e.g. medicines, rescue equipment
- buildings housing emergency services response equipment, e.g. ambulance stations, State Emergency Services depots, Country Fire Services depots.

An engineering risk assessment shall comprise a report from a professional structural engineer prequalified with Building Management. A a list of prequalified structural engineers can be found at http://www.bpims.sa.gov.au/bpims/login/cc_search_start.jsp.

The report shall include:

- a review of drawings and other documents to determine the vertical and lateral load resisting structural systems of the building;
- comments on any evidence of design for earthquake loads;
- checks for any changes that have been made to the original building design and notes as to the effects such changes will have made to the buildings structural strength;
- comments on the general building condition and quality of construction;

- comments on any particular vulnerabilities, e.g. soft floor, irregular shapes, discontinuous shear walls, unrestrained parapets, cantilever canopies, certain types of facades. In a destructive earthquake, the occupants must be able to escape the building safely. This includes the area immediately in front of the building and any emergency exit paths;
- calculations undertaken and a report of the earthquake resistance of the building as a percentage of current code requirements (related to AS 3826-1998 Strengthening existing buildings for earthquake thresholds).

For information on more detailed engineering assessments, refer to the policy Strengthening Existing Buildings for Earthquakes (PO45) which can be downloaded from the Building Project Information Management System (BPIMS) Project Library.

Business Continuity Recommendations

Individual agencies should assess their own business continuity requirements. The following table is provided as a guide.

For the purpose of this table, a moderate earthquake is described as causing most people to be frightened with many finding it difficult to stand, especially on upper floors of buildings. Furniture is shifted and top heavy furniture is overturned. Objects fall from shelves in large numbers. This description is as per the Modified Mercalli (MM) Earthquake Intensity Scale of VII.

Building Description	**Earthquake Star Rating** (All buildings with a star rating meet minimum life safety requirement)	**Business Continuity Impacts for a moderate earthquake**
Buildings designed and constructed in compliance with AS 1170.4-2007 where a 'special study' has been undertaken for immediate post disaster occupation.	******	Building expected to be available for immediate use.
Buildings designed and constructed in compliance with AS 1170.4-2007.	*****	Building expected to perform very well. Negligible interruption expected to business.
Buildings with a structural system and non-structural components which have been determined by an approved engineering assessment to have a capacity of approximately 75% of that required by AS 1170.4-2007.	****	Building expected to perform well, may suffer minor non-structural damage. Minor interruption to business may occur.
Buildings with a structural system and non-structural components which have been determined by an approved engineering assessment to have a capacity of approximately 50% of that required by AS 1170.4-2007.	***	Building may suffer moderate non-structural damage, minor structural damage. Moderate interruption to business may occur.
Buildings with a structural system and non-structural components which have been determined by an approved engineering assessment to have a capacity of at least 35% of that required by AS 1170.4-2007.	**	Building may suffer moderate non-structural and structural damage. Moderate to major interruption to business may occur.

Building Description	**Earthquake Star Rating** (All buildings with a star rating meet minimum life safety requirement)	**Business Continuity Impacts for a moderate earthquake**
Buildings designed and constructed after 1985 where an approved engineering assessment has not been undertaken.	*	Building may suffer moderate to heavy non-structural and structural damage. Major interruption expected to business.
Buildings designed and constructed before 1985 where an approved engineering assessment has not been undertaken.	–	Damage to building structure and interruption to business is unknown.

Contact

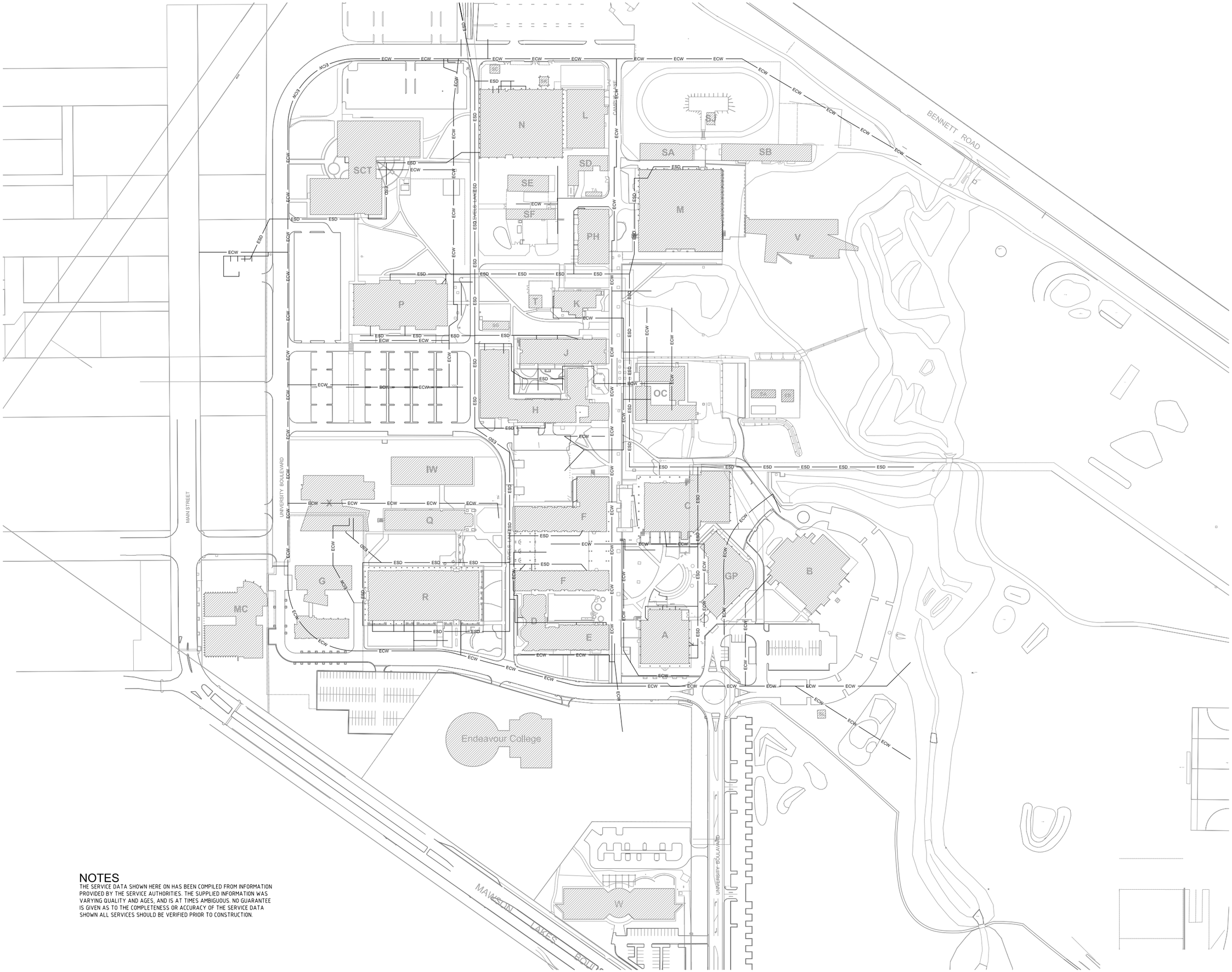
For further information contact:

Shane Turner
Principal Engineer, Structural

Phone: 08 8226 5223
Email: shane.turner@.sa.gov.au

APPENDIX F

HYDRAULIC EXISTING SITE SERVICES DRAWING



NOTES

THE SERVICE DATA SHOWN HERE ON HAS BEEN COMPILED FROM INFORMATION PROVIDED BY THE SERVICE AUTHORITIES. THE SUPPLIED INFORMATION WAS VARYING QUALITY AND AGES, AND IS AT TIMES AMBIGUOUS. NO GUARANTEE IS GIVEN AS TO THE COMPLETENESS OR ACCURACY OF THE SERVICE DATA SHOWN ALL SERVICES SHOULD BE VERIFIED PRIOR TO CONSTRUCTION.

Issue	Amendments	Date

BESTEC
DOCUMENT ISSUE
Date
19 SEPT 2016

BESTEC
ABN 43 909 272 047
BUILDING ENGINEERING
SERVICES TECHNOLOGIES
CONSULTING ENGINEERS

Architects/Client

UniSA

BESTEC

Bestec
ABN 43 909 272 047
Building Engineering
Services Technologies
Consulting Engineers
144 Gawler Place
Adelaide 5000
South Australia
G.P.O. Box 818
Adelaide 5001
Telephone (08) 8232 4442
Facsimile (08) 8232 4244
Email: consulting@bestec.com.au

North

Project
UNIVERSITY OF SOUTH AUSTRALIA
MAWSON LAKES

Title
HYDRAULIC SERVICES
SITE SERVICES
EXISTING SEWER MAINS

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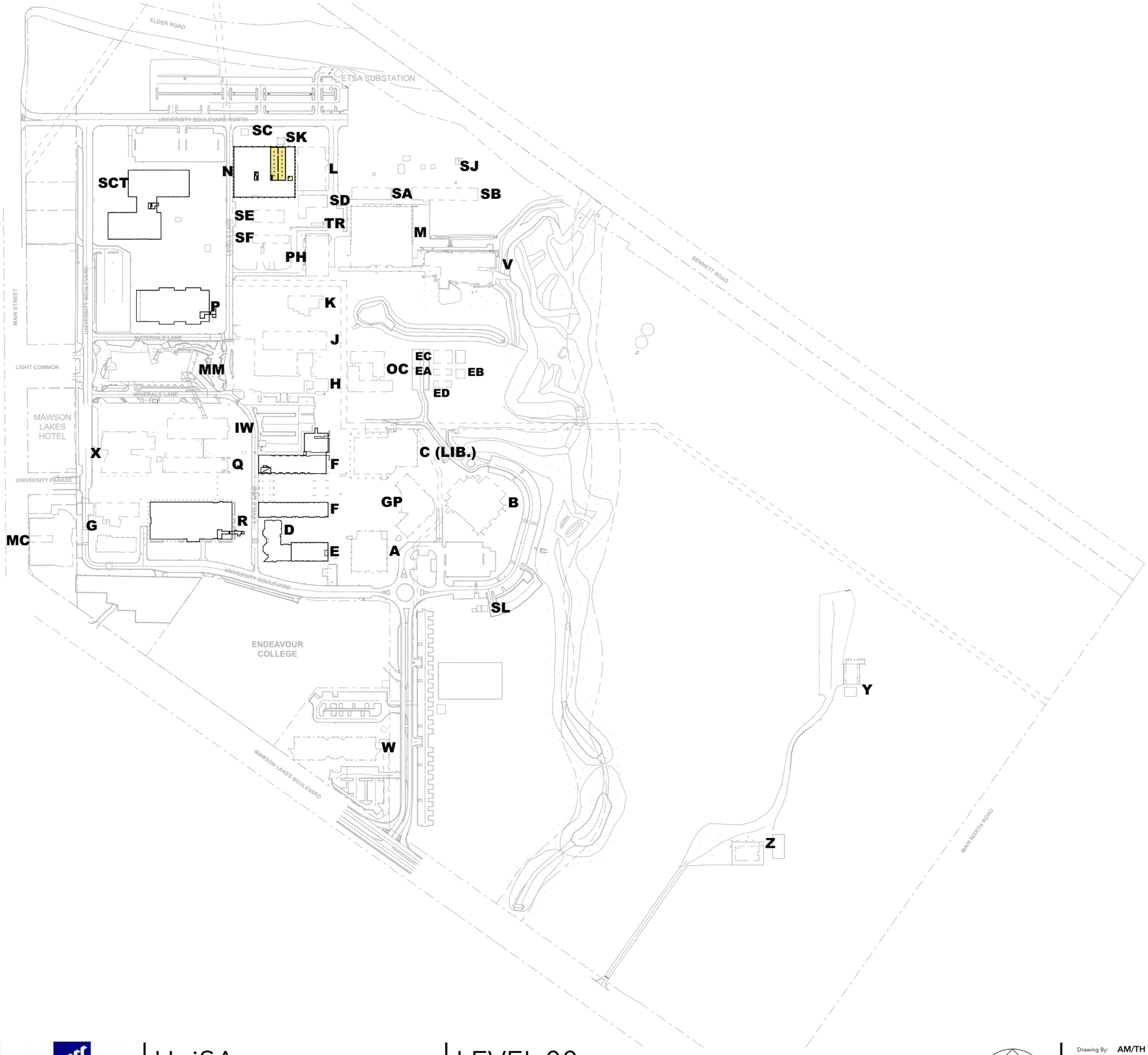
APPENDIX G

UNISA MAWSON LAKES SPACE AUDIT



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- GENERAL TEACHING
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- ISTS
- LEASED
- NBE
- DIV ITEE
- PHARMACY
- SAS
- FACILITIES MANAGEMENT
- RESEARCH + INNOVATION SERVICES
- EASS
- USASA
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- UCL
- SAMSTAG STORAGE
- CLIVE PRESTIGE PMB/FII
- AAD SHED

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

LEVEL 00

Scale 1:2000 @ A1

Drawing By: AM/TH
Checked By: SP
Date: 6/09/2016
PRELIMINARY

Project No/Drawing No.: 15479 - A002
Revision: P4

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

University of South Australia

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Mawson Lakes FII & Campus Master Plan

Mawson Lakes, South Australia

LEVEL 1 [GROUND]

Scale 1:2000 @ A1

Drawing By: AM/TH
Checked By: SP
Date: 6/09/2016
PRELIMINARY

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Revision: P4

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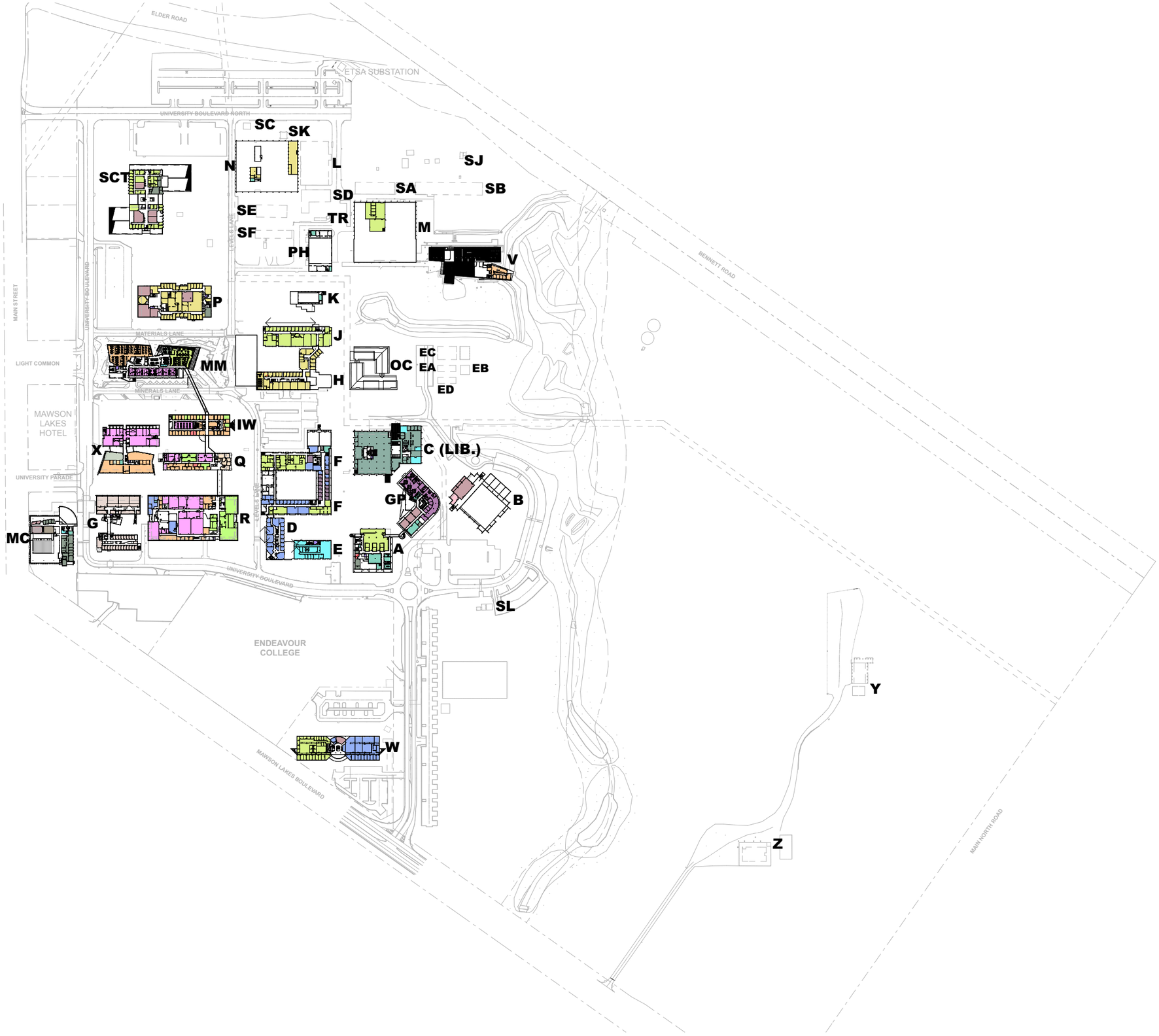

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165 MacKinnon Parade, North Adelaide SA 5006
tel: 08 8239 9000 fax 08 8239 9099

University of South Australia

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Mawson Lakes FII & Campus Master Plan

Mawson Lakes, South Australia

LEVEL 2

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Revision: P4

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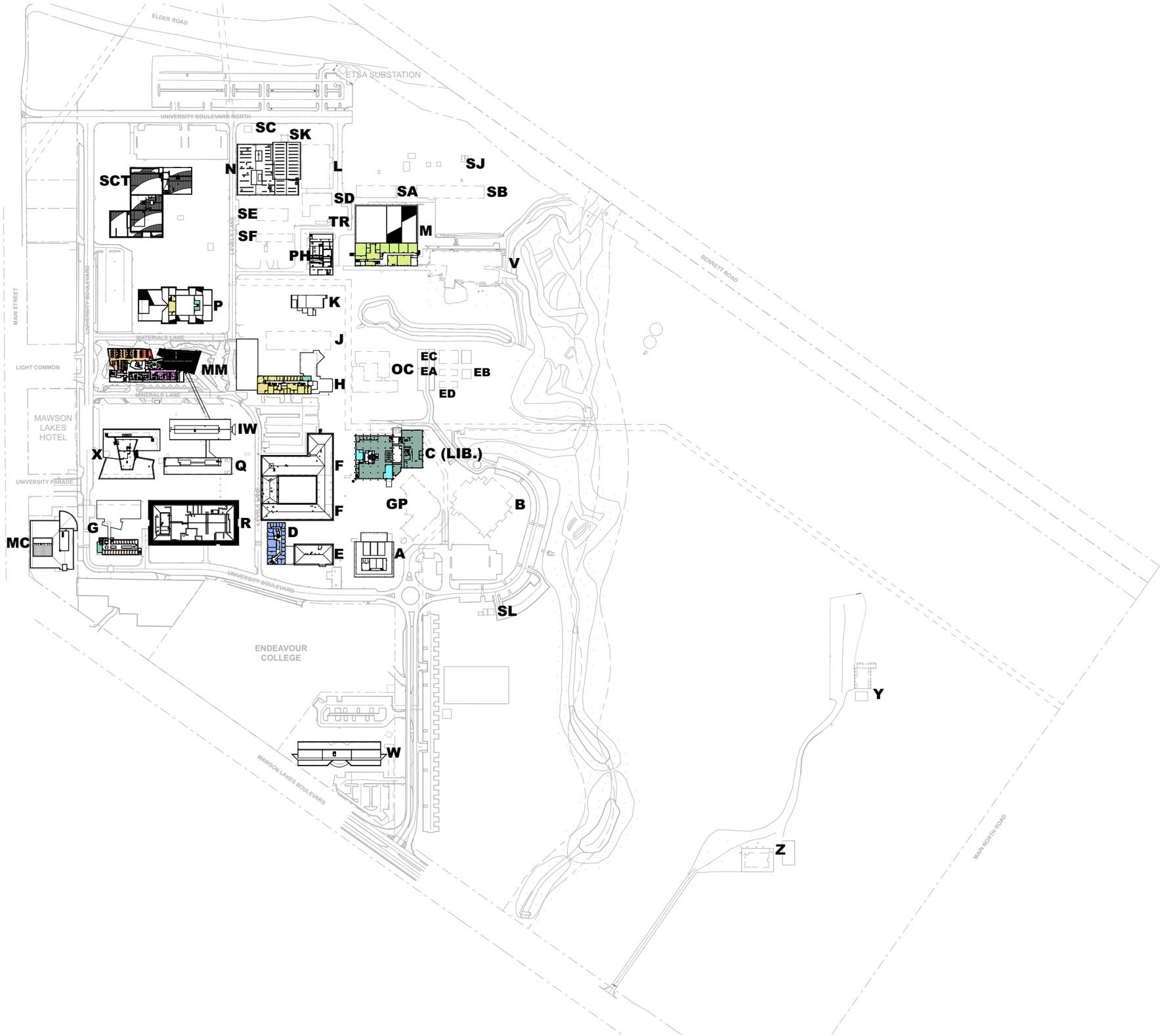

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Mawson Lakes FII & Campus Master Plan

Mawson Lakes, South Australia

LEVEL 3

Scale 1:2000 @ A1

Drawing By: AM/TH

Checked By: SP

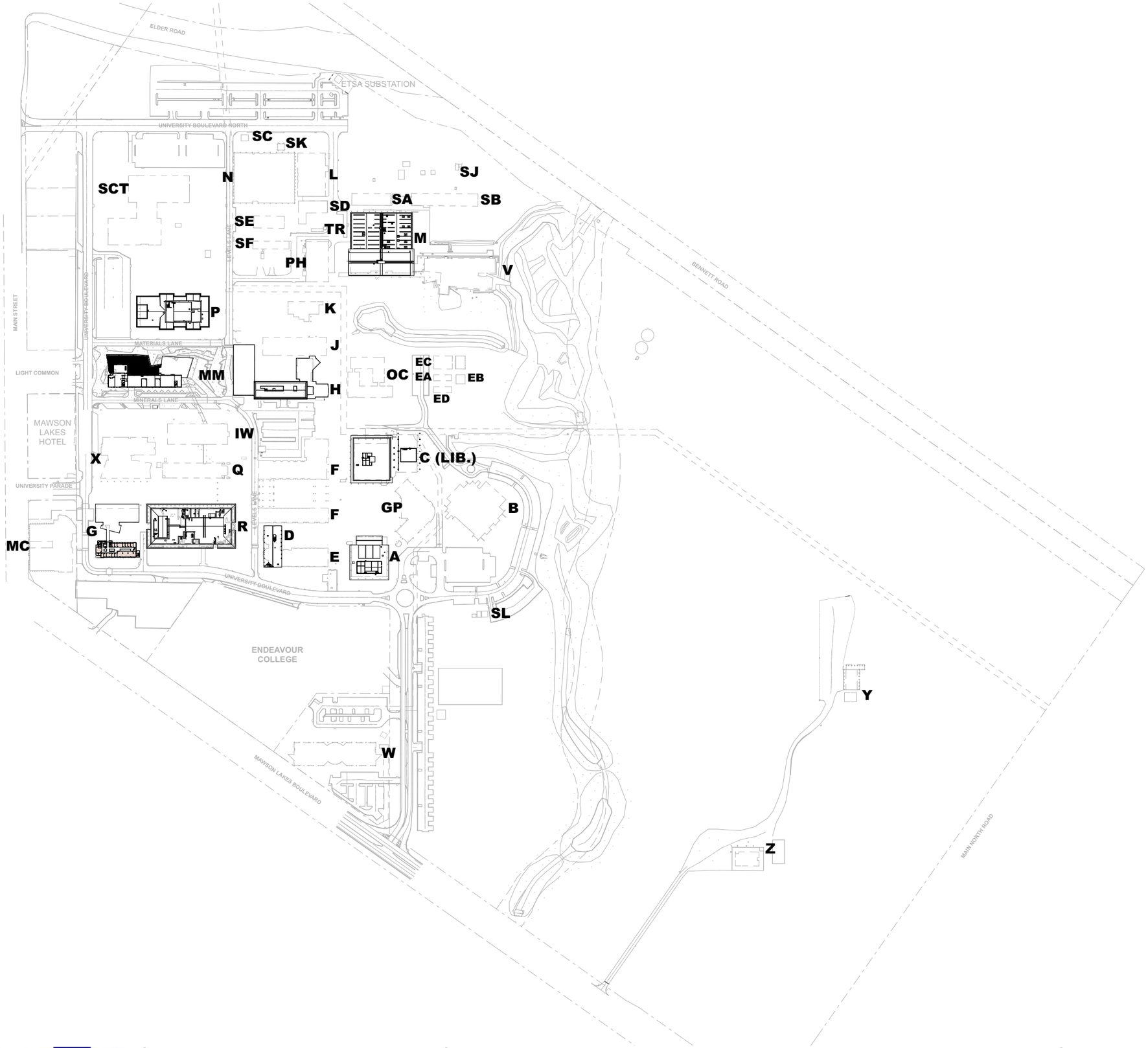
Date: 6/09/2016

PRELIMINARY

Project No/Drawing No.: 15479 - A005

Revision: P4

Plot Date: 6/09/2016 /Volumes/PPA Data/JOB FILES/15479 UniSA Mawson Lakes Master Plan/15479 Drawings/CAD Files/Model/2016 Current Space Audit/15479 UniSA Master Plan Current Space Audit 2016 AUGUST.pln



- FII OFFICE
- FII LABORARTORY
- UNI SA COLLEGE
- FMU
- CLEANER
- CRC CARE
- GENERAL TEACHING
- ITMS
- ENE
- ISTS
- LEASED
- NBE
- DIV ITEE
- PHARMACY
- SAS
- FACILITIES MANAGEMENT
- RESEARCH + INNOVATION SERVICES
- EASS
- USASA
- LIBRARY
- LTU
- HEALTH SCIENCE
- INDIGENOUS STUDENT SERVICES
- LEVAY & Co
- UCL
- SAMSTAG STORAGE
- AAD SHED

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LEVEL 4

Scale 1:2000 @ A1

Drawing By: AM/TH
Checked By: SP
Date: 6/09/2016
PRELIMINARY

Project No/Drawing No.: 15479 - A006
Revision: P4

Plot Date: 6/09/2016 /Volumes/PPA Data/JOB FILES/15479 UniSA Mawson Lakes Master Plan/15479 Drawings/CAD Files/Model/2016 Current Space Audit/15479 UniSA Master Plan Current Space Audit 2016 AUGUST.pln

- FII OFFICE
- FII LABORARTORY
- UNI SA COLLEGE
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- CLEANER
- CRC CARE
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- LEASED
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- RESEARCH + INNOVATION SERVICES
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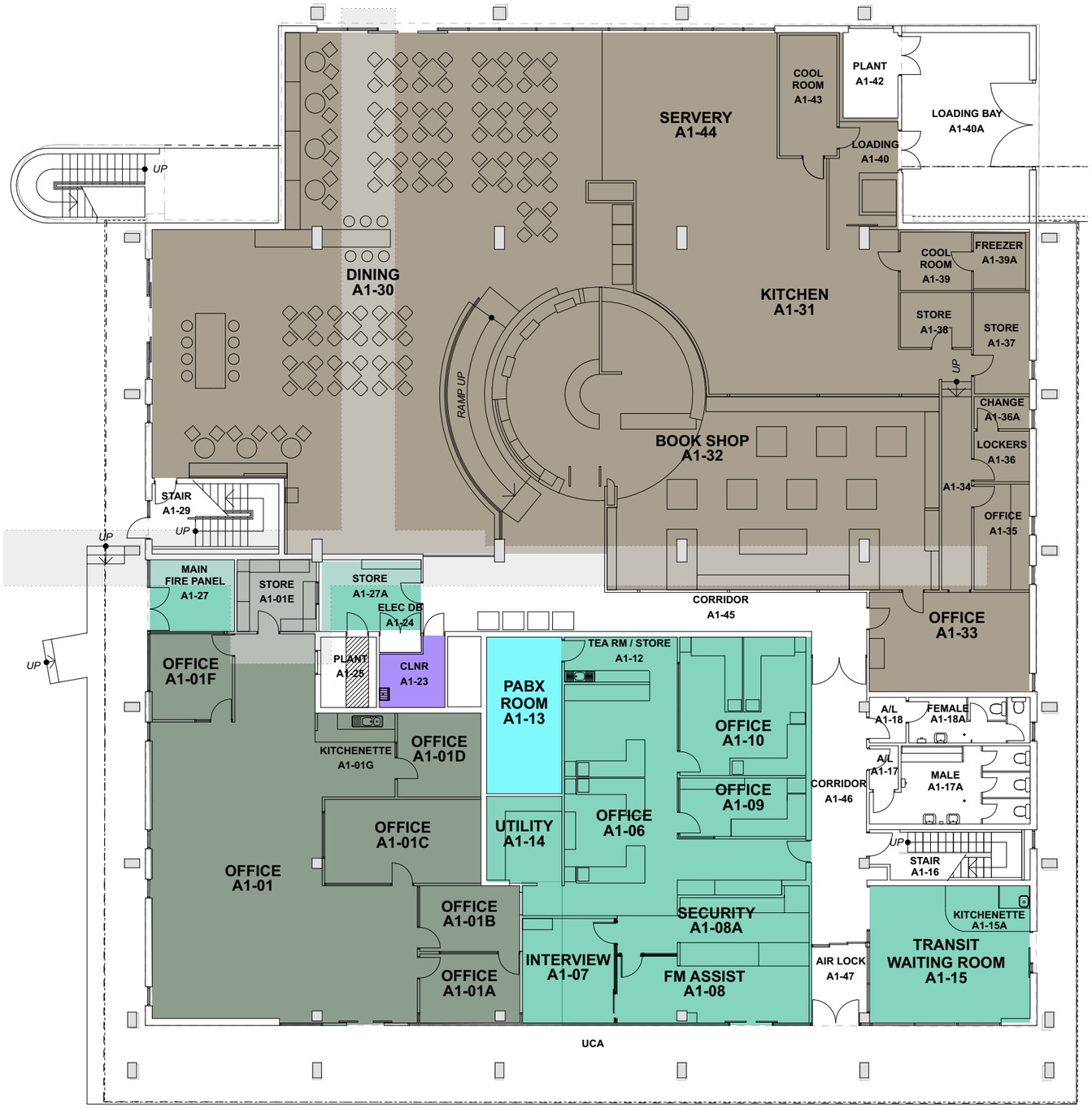
LEVEL 5

Scale 1:2000 @ A1

Drawing By: AM/TH
Checked By: SP
Date: 6/09/2016
PRELIMINARY
Project No/Drawing No.: 15479 - A007
Revision: P4

Plot Date: 6/09/2016 /Volumes/PPA Data/JOB FILES/15479 UniSA Mawson Lakes Master Plan/15479 Drawings/CAD Files/Model/2016 Current Space Audit/15479 UniSA Master Plan Current Space Audit 2016 AUGUST.pln



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BUILDING A LEVEL 1

Scale 1:100 @ A1

Drawing By: AM/TH

Date: 6/09/2016

Checked By: SP

PRELIMINARY

Project No/Drawing No.: 15479 - A008

Revision: P4

Plot Date: 6/09/2016 /Volumes/PPA Data/JOB FILES/15479 UniSA Mawson Lakes Master Plan/15479 Drawings/CAD Files/Model/2016 Current Space Audit/15479 UniSA Master Plan Current Space Audit 2016 AUGUST.pln

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BUILDING A LEVEL 2

Scale 1:100 @ A1

Drawing By: AM/TH

Checked By: SP

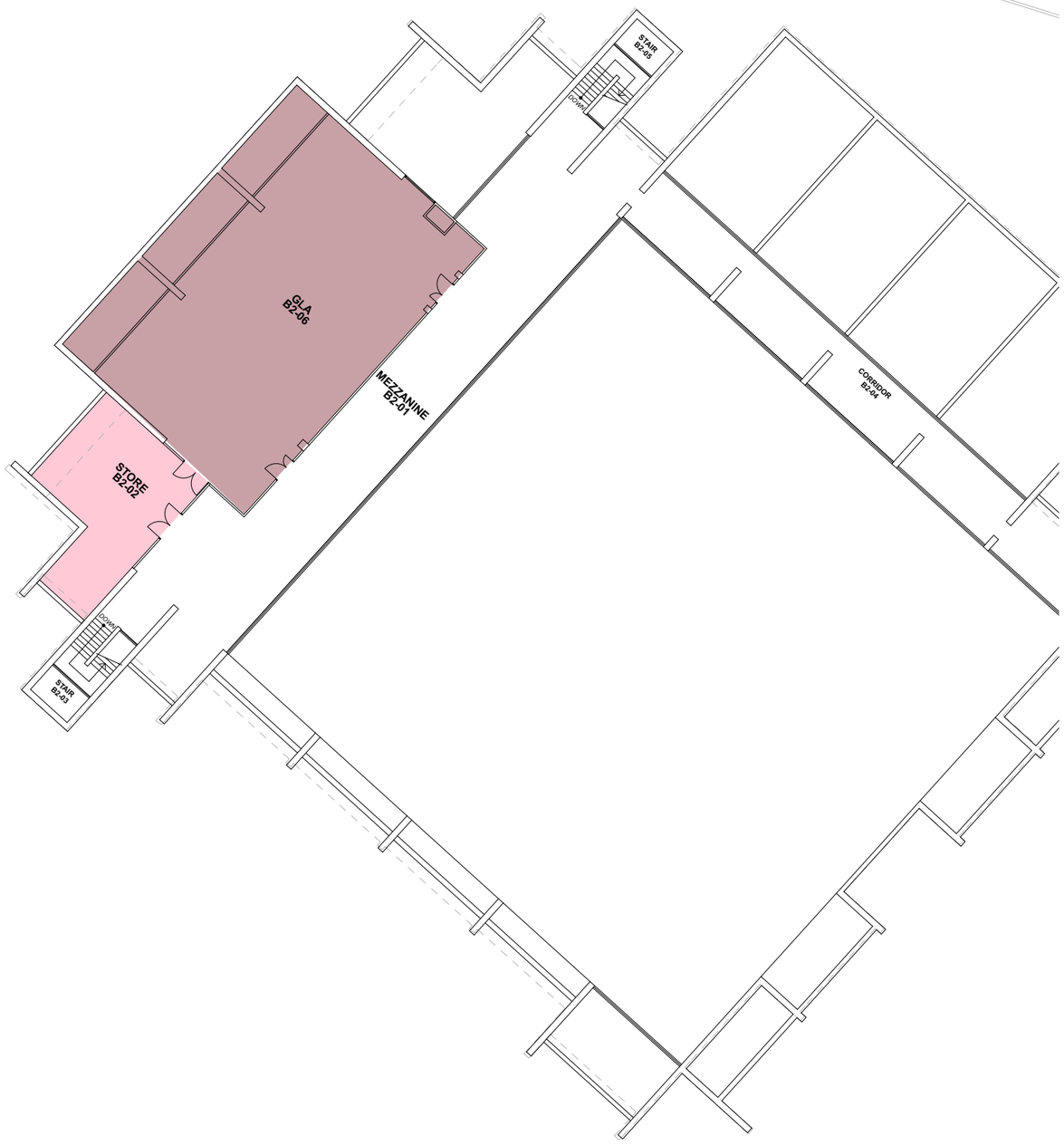
Date: 6/09/2016

PRELIMINARY

Project No/Drawing No.: 15479 - A009

Revision: P4

Plot Date: 6/09/2016 /Volumes/PPA Data/JOB FILES/15479 UniSA Mawson Lakes Master Plan/15479 Drawings/CAD Files/Model/2016 Current Space Audit/15479 UniSA Master Plan Current Space Audit 2016 AUGUST.pln



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BUILDING B LEVEL 1

Scale 1:150 @ A1

Drawing By: AM/TH

Checked By: SP

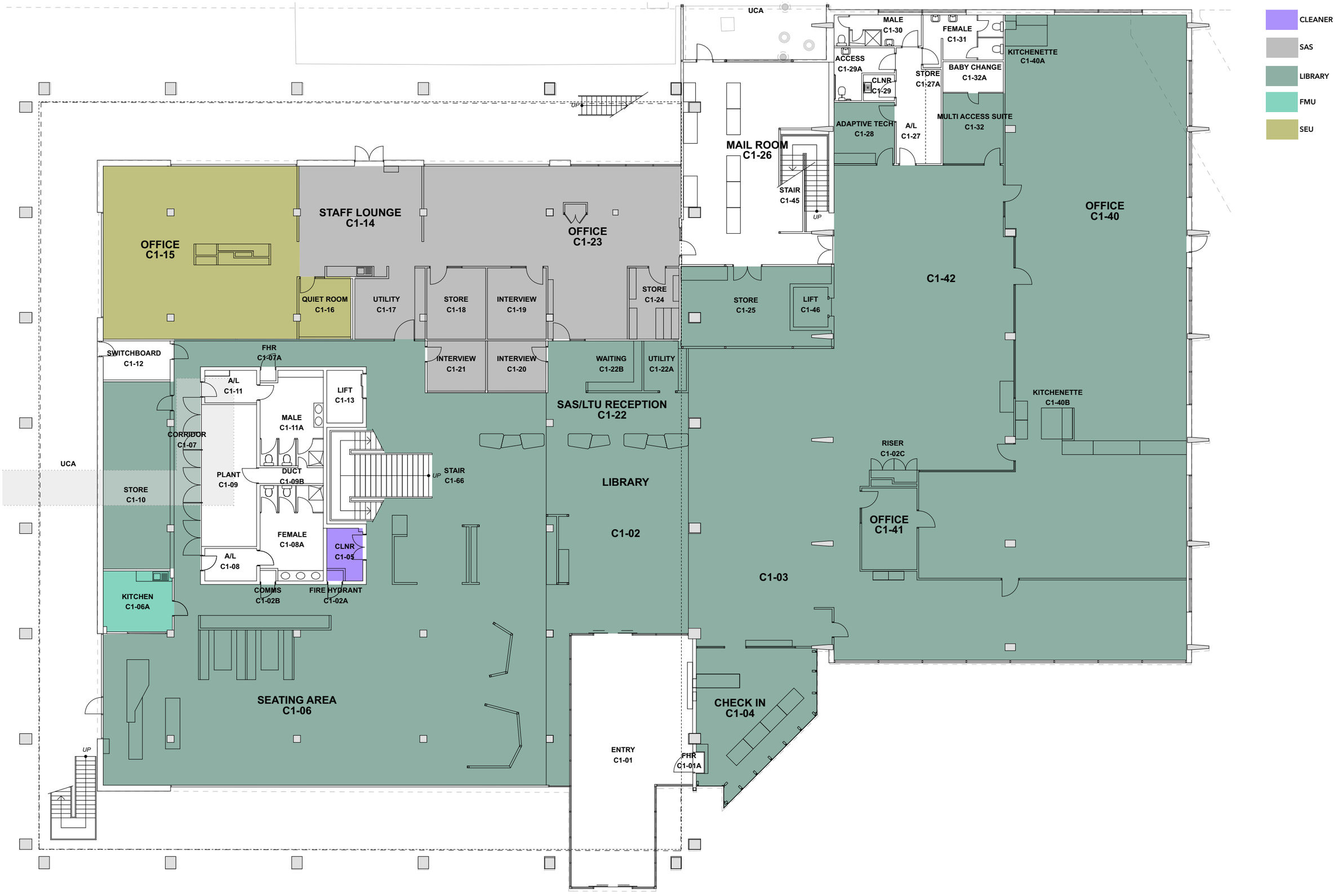
Date: 6/09/2016

PRELIMINARY

Project No/Drawing No.: 15479 - A010

Revision: P4

Plot Date: 6/09/2016 /Volumes/PPA Data/JOB FILES/15479 UniSA Mawson Lakes Master Plan/15479 Drawings/CAD Files/Model/2016 Current Space Audit/15479 UniSA Master Plan Current Space Audit 2016 AUGUST.pln



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BUILDNG C LEVEL 1

Scale 1:100 @ A1

Drawing By: AM/TH
Checked By: SP
Date: 6/09/2016
PRELIMINARY
Project No/Drawing No.: 15479 - A011
Revision: P4

Plot Date: 6/09/2016 /Volumes/PPA Data/JOB FILES/15479 UniSA Mawson Lakes Master Plan/15479 Drawings/CAD Files/Model/2016 Current Space Audit/15479 UniSA Master Plan Current Space Audit 2016 AUGUST.pln

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BUILDING C LEVEL 2

Scale 1:100 @ A1

Drawing By: AM/TH
Checked By: SP
Date: 6/09/2016
PRELIMINARY
Project No/Drawing No.: 15479 - A012
Revision: P4

Plot Date: 6/09/2016 /Volumes/PPA Data/JOB FILES/15479 UniSA Mawson Lakes Master Plan/15479 Drawings/CAD Files/Model/2016 Current Space Audit/15479 UniSA Master Plan Current Space Audit 2016 AUGUST.pln

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BUILDING C LEVEL 3

Scale 1:100 @ A1

Drawing By: AM/TH
Checked By: SP
Date: 6/09/2016
PRELIMINARY
Project No/Drawing No.: 15479 - A013
Revision: P4

Plot Date: 6/09/2016 /Volumes/PPA Data/JOB FILES/15479 UniSA Mawson Lakes Master Plan/15479 Drawings/CAD Files/Model/2016 Current Space Audit/15479 UniSA Master Plan Current Space Audit 2016 AUGUST.pln

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BUILDING D LEVEL 1, 2, & 3

Scale 1:100 @ A1

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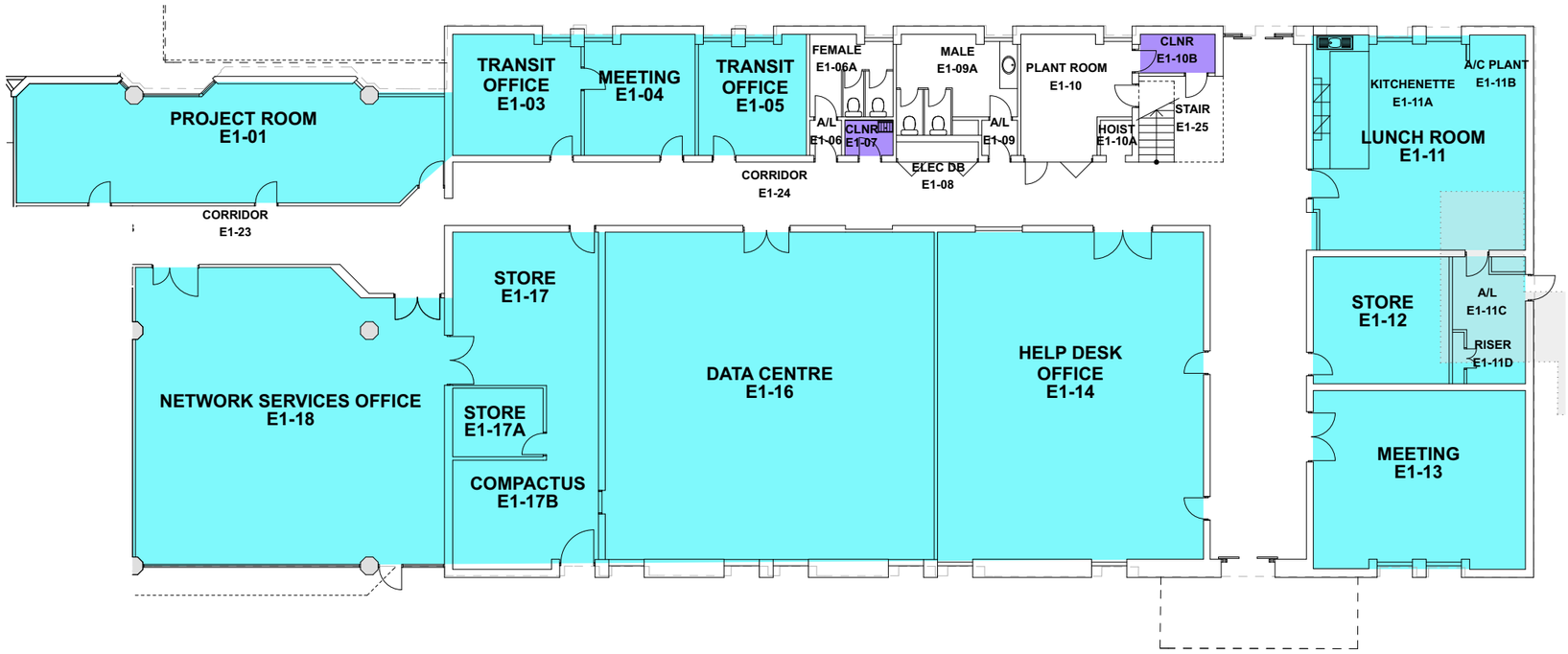
Date: 6/09/2016
PRELIMINARY
Project No/Drawing No.: 15479 - A014
Revision: P4

Plot Date: 6/09/2016 /Volumes/PPA Data/JOB FILES/15479 UniSA Mawson Lakes Master Plan/15479 Drawings/CAD Files/Model/2016 Current Space Audit/15479 UniSA Master Plan Current Space Audit 2016 AUGUST.pln



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BUILDING E LEVEL 1

Scale 1:100 @ A1

Drawing By: AM/TH

Checked By: SP

Date: 6/09/2016

PRELIMINARY

Project No/Drawing No.: 15479 - A015

Revision: P4

Plot Date: 6/09/2016 /Volumes/PPA Data/JOB FILES/15479 UniSA Mawson Lakes Master Plan/15479 Drawings/CAD Files/Model/2016 Current Space Audit/15479 UniSA Master Plan Current Space Audit 2016 AUGUST.pln

CLEANER

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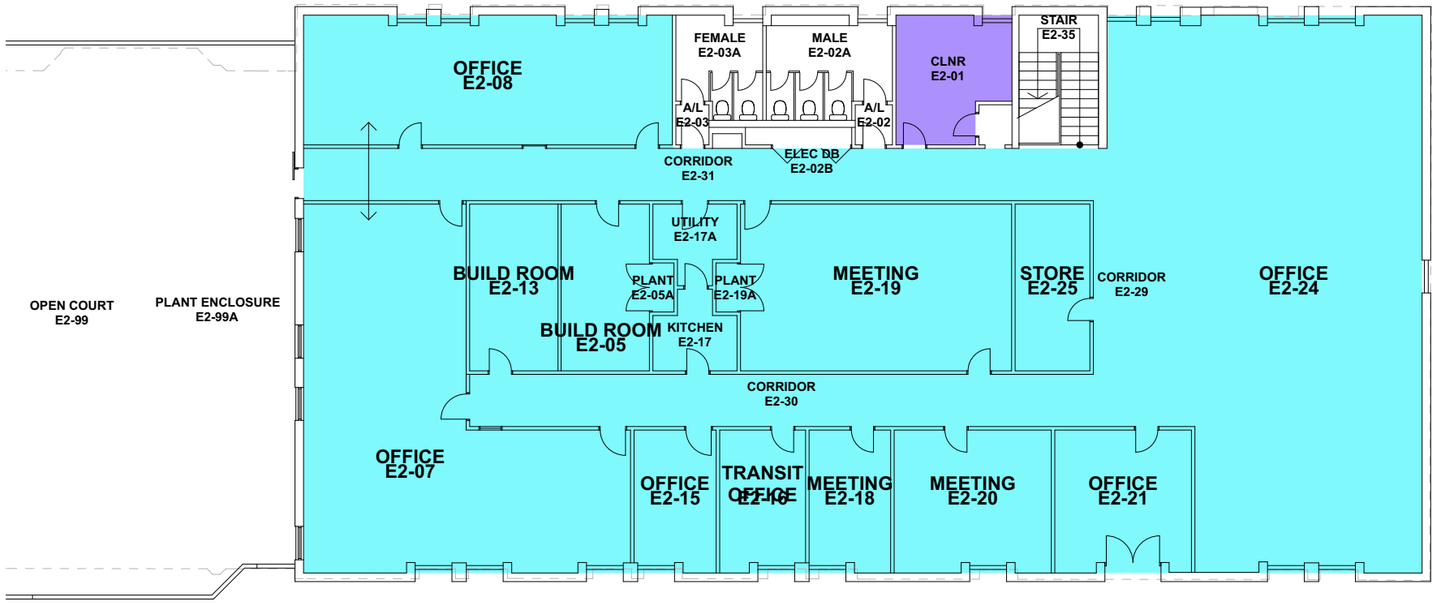

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BUILDING E LEVEL 2

Scale 1:100 @ A1

Drawing By: AM/TH

Checked By: SP

Date: 6/09/2016

PRELIMINARY

Project No/Drawing No.: 15479 - A016

Revision: P4

Plot Date: 6/09/2016 /Volumes/PPA Data/JOB FILES/15479 UniSA Mawson Lakes Master Plan/15479 Drawings/CAD Files/Model/2016 Current Space Audit/15479 UniSA Master Plan Current Space Audit 2016 AUGUST.pln

FII LABORARTORY

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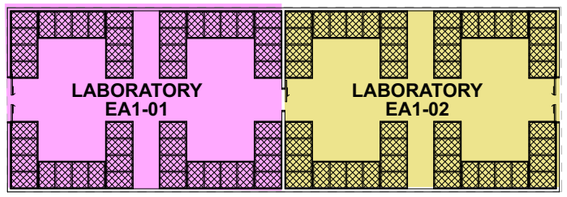

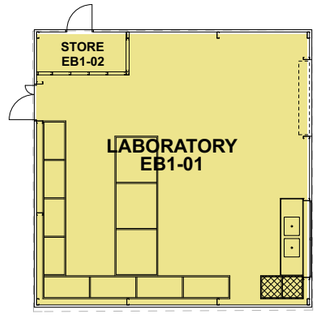

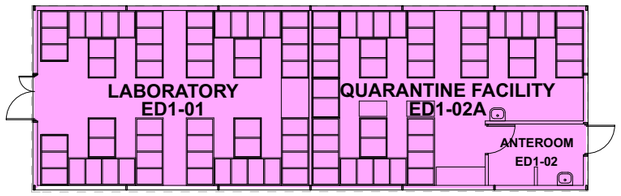

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BUILDING E'S LEVEL 1

Scale 1:100 @ A1

Drawing By: AM/TH

Checked By: SP

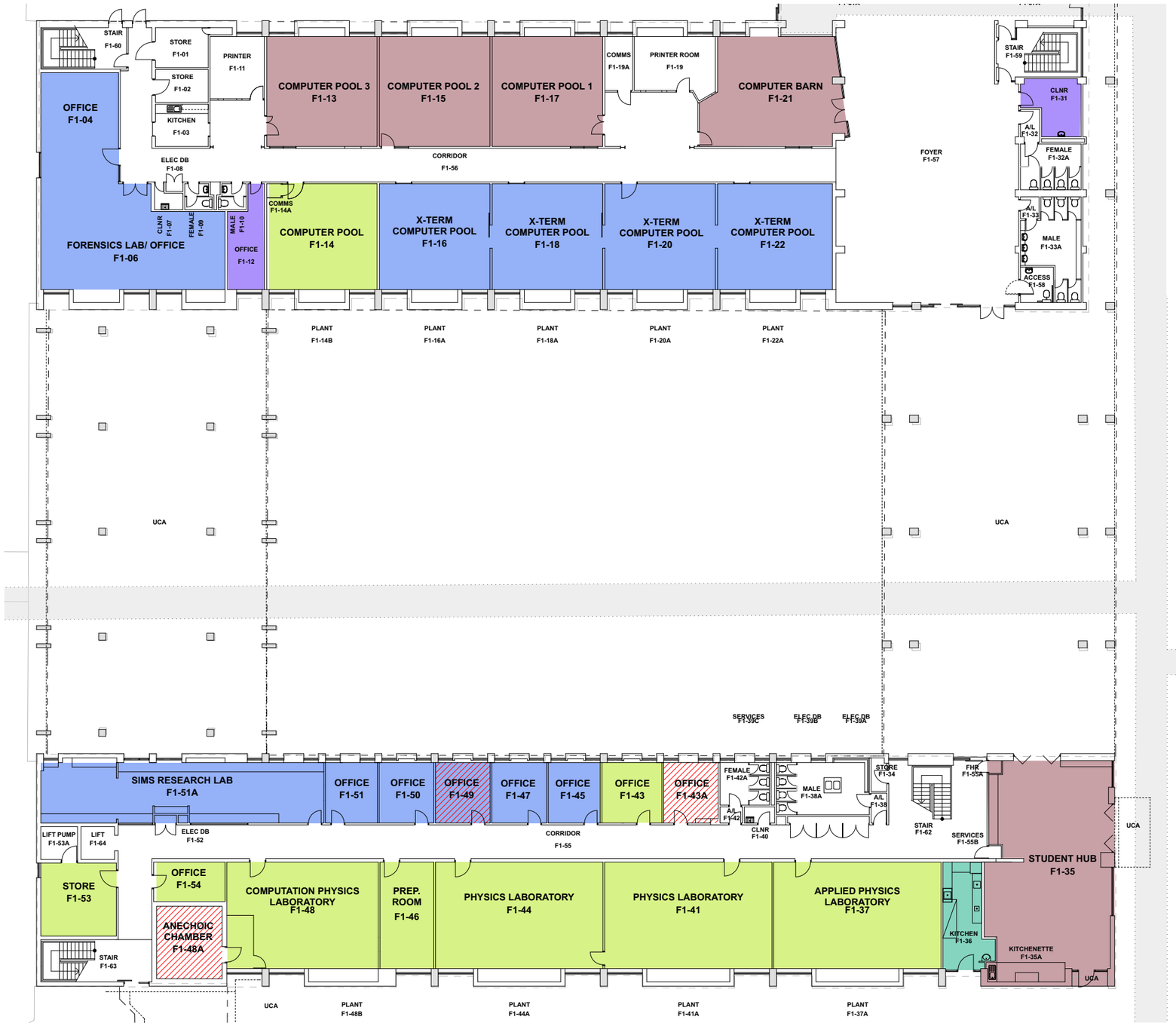
Date: 6/09/2016

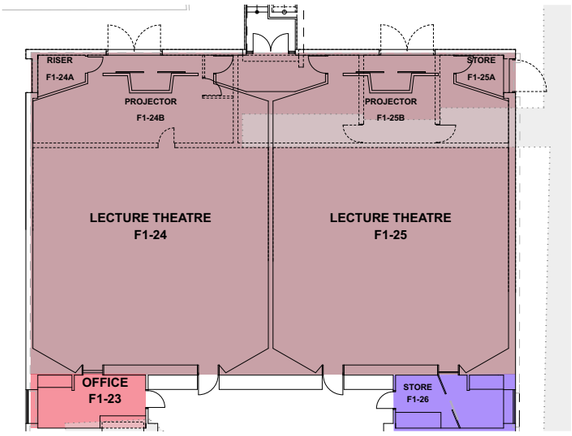
PRELIMINARY

Project No/Drawing No.: 15479 - A017

Revision: P4

Plot Date: 6/09/2016 /Volumes/PPA Data/JOB FILES/15479 UniSA Mawson Lakes Master Plan/15479 Drawings/CAD Files/Model/2016 Current Space Audit/15479 UniSA Master Plan Current Space Audit 2016 AUGUST.pln





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Mawson Lakes FII & Campus Master Plan

Mawson Lakes, South Australia

BUILDING F LEVEL 1

Scale 1:150 @ A1

Drawing By: AM/TH
Checked By: SP
Date: 6/09/2016
PRELIMINARY

Project No/Drawing No.: 15479 - A018

Revision: P4

Plot Date: 6/09/2016 /Volumes/PPA Data/JOB FILES/15479 UniSA Mawson Lakes Master Plan/15479 Drawings/CAD Files/Model/2016 Current Space Audit/15479 UniSA Master Plan Current Space Audit 2016 AUGUST.pln

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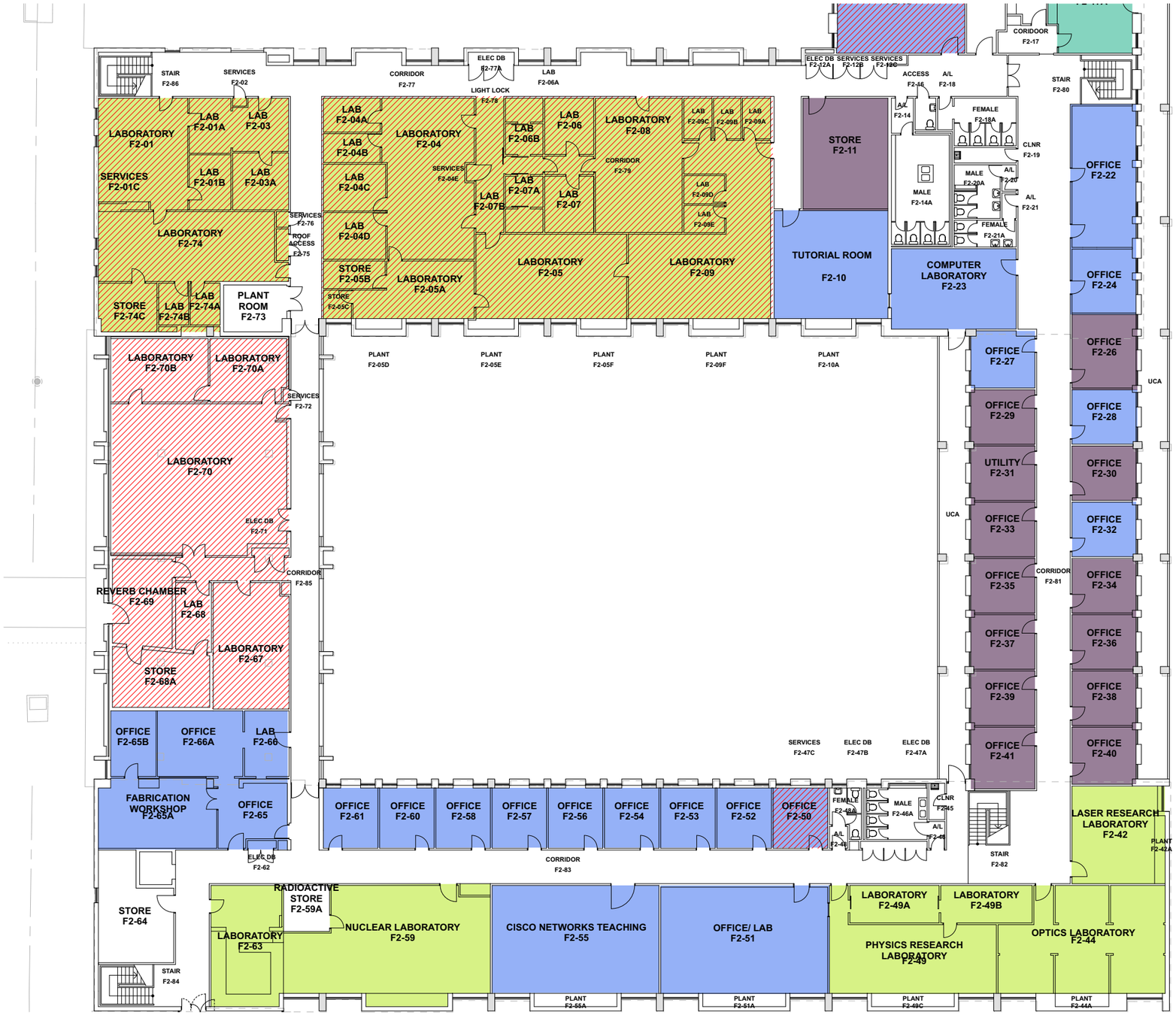

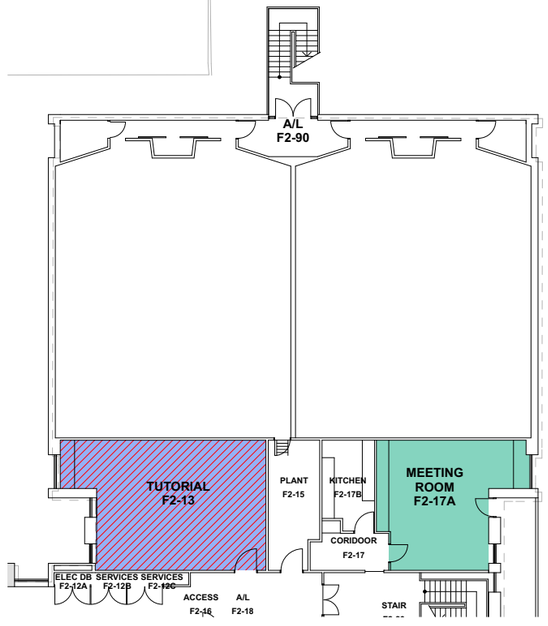

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BUILDING F LEVEL 2

Scale 1:150 @ A1

Drawing By: AM/TH
Checked By: SP
Date: 6/09/2016
PRELIMINARY
Project No/Drawing No.: 15479 - A019
Revision: P4

Plot Date: 6/09/2016 /Volumes/PPA Data/JOB FILES/15479 UniSA Mawson Lakes Master Plan/15479 Drawings/CAD Files/Model/2016 Current Space Audit/15479 UniSA Master Plan Current Space Audit 2016 AUGUST.pln

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BUILDING G LEVEL 1

Scale 1:100 @ A1

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Date: 6/09/2016
PRELIMINARY
Project No/Drawing No.: 15479 - A020
Revision: P4

Plot Date: 6/09/2016 /Volumes/PPA Data/JOB FILES/15479 UniSA Mawson Lakes Master Plan/15479 Drawings/CAD Files/Model/2016 Current Space Audit/15479 UniSA Master Plan Current Space Audit 2016 AUGUST.pln

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BUILDING G LEVEL 2

Scale 1:100 @ A1

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Date: 6/09/2016

PRELIMINARY

Project No/Drawing No.: 15479 - A021

Revision: P4

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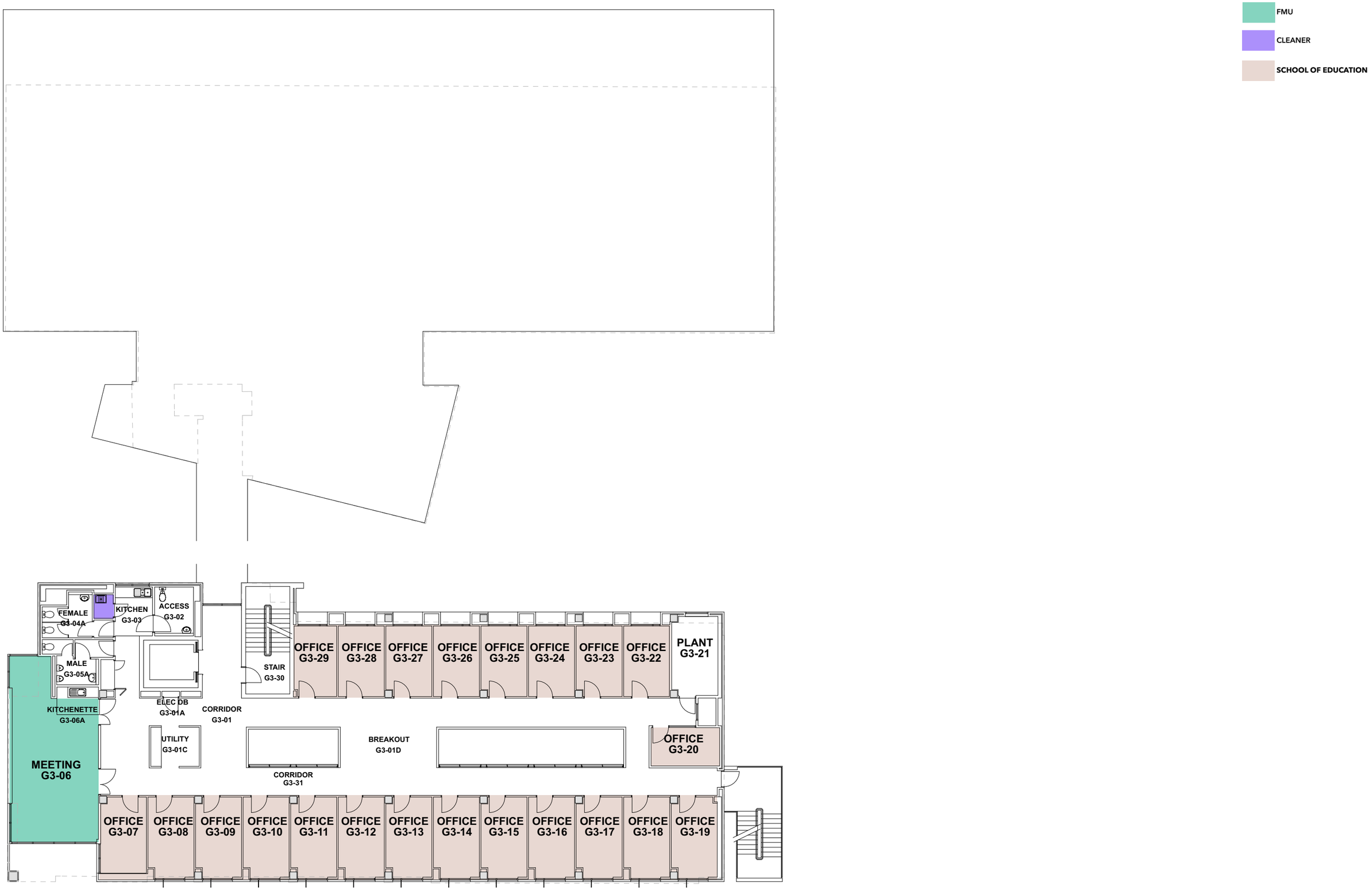

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BUILDING G LEVEL 3

Scale 1:100 @ A1

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Date: 6/09/2016
PRELIMINARY

Project No/Drawing No.: 15479 - A022

Revision: P4

Plot Date: 6/09/2016 /Volumes/PPA Data/JOB FILES/15479 UniSA Mawson Lakes Master Plan/15479 Drawings/CAD Files/Model/2016 Current Space Audit/15479 UniSA Master Plan Current Space Audit 2016 AUGUST.pln

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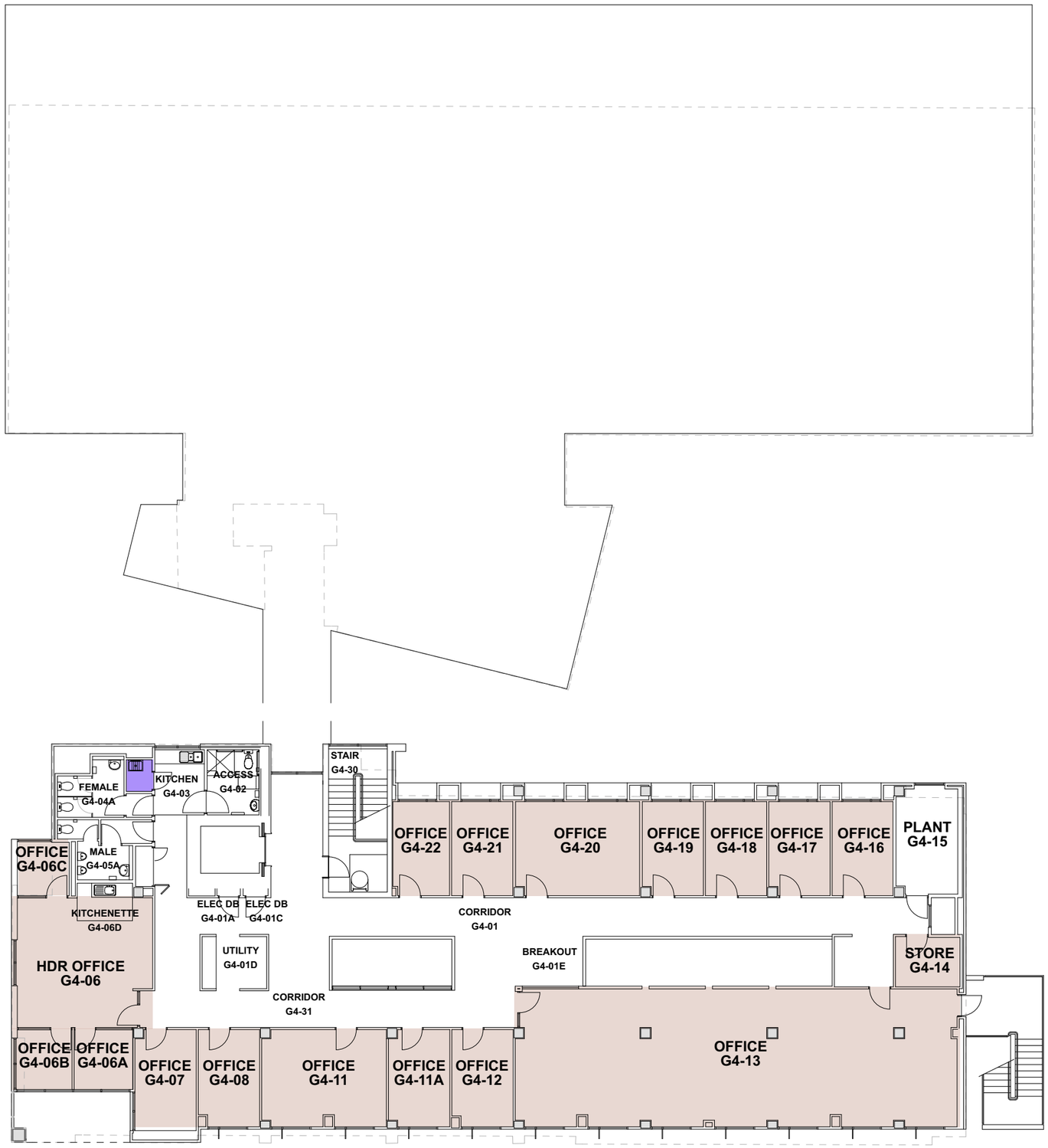

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BULDING G LEVEL 4

Scale 1:100 @ A1

Drawing By: AM/TH

Checked By: SP

Date: 6/09/2016

PRELIMINARY

Project No/Drawing No.: 15479 - A023

Revision: P4

Plot Date: 6/09/2016 /Volumes/PPA Data/JOB FILES/15479 UniSA Mawson Lakes Master Plan/15479 Drawings/CAD Files/Model/2016 Current Space Audit/15479 UniSA Master Plan Current Space Audit 2016 AUGUST.pln

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Mawson Lakes FII & Campus Master Plan

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BUILDING GP LEVEL 1 & 2

Scale 1:150 @ A1

Drawing By: AM/TH
Checked By: SP
Date: 6/09/2016
PRELIMINARY
Project No/Drawing No.: 15479 - A024
Revision: P4

Plot Date: 6/09/2016 /Volumes/PPA Data/JOB FILES/15479 UniSA Mawson Lakes Master Plan/15479 Drawings/CAD Files/Model/2016 Current Space Audit/15479 UniSA Master Plan Current Space Audit 2016 AUGUST.pln

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BUILDING H LEVEL 1

Scale 1:150 @ A1

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Date: 6/09/2016
PRELIMINARY
Project No/Drawing No.: 15479 - A025
Revision: P4

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BUILDING H LEVEL 2

Scale 1:150 @ A1

Drawing By: AM/TH

Checked By: SP

Date: 6/09/2016

PRELIMINARY

Project No/Drawing No.: 15479 - A026

Revision: P4

Plot Date: 6/09/2016 /Volumes/PPA Data/JOB FILES/15479 UniSA Mawson Lakes Master Plan/15479 Drawings/CAD Files/Model/2016 Current Space Audit/15479 UniSA Master Plan Current Space Audit 2016 AUGUST.pln

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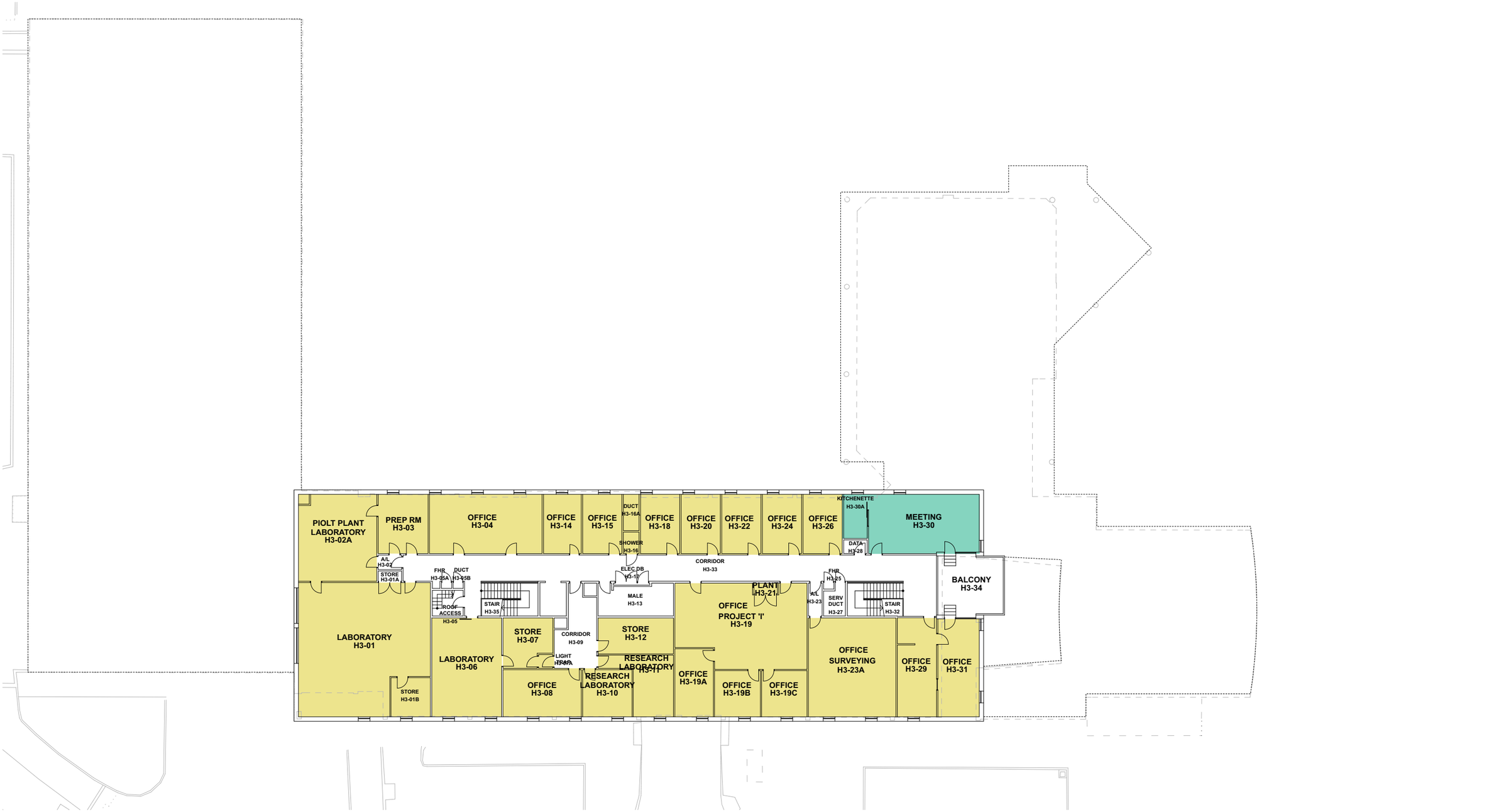

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BUILDING H LEVEL 3

Scale 1:150 @ A1

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Date: 6/09/2016

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Project No/Drawing No.: 15479 - A027

Revision: P4

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FII OFFICE

FII LABORARTORY

VACANT

LAB IW1-23A
DB LAB OPTICAL BENCH
STAIR IW1-26
OFFICE IW1-23
FHR IW1-25
ELEC DB IW1-24
PETER MURPHY STORAGE
CORRIDOR IW1-28
LAB IW1-20 PETER MURPHY
LAB IW1-19 PETER MURPHY
LAB IW1-17 XRD
LAB IW1-15 SAMPLE PREP QEM SCAN
LAB IW1-14 QEM SCAN
LAB IW1-13 SAMPLE PREP
LAB IW1-07
CORRIDOR IW1-27
PETER MURPHY INTRUMENTATION LAB.
LAB IW1-05 XPS SHARED
LAB IW1-04 TOFSIMS MINERAL LAB
PLANT IW1-01
FHR IW1-01B
COMMS RISER IW1-01A
LOBBY IW1-31A
FOYER IW1-31
A/L IW1-32
UCA
STAIR IW1-30
MINERALS LAB. (SHARED) LAB IW1-06
NMR LAB (SHARED) LAB IW1-02
LAB IW1-03 INTRUMENTATION LAB. (SHARED)
OFFICE IW1-08
OFFICE IW1-22
1
STORE IW1-21E
LAB IW1-21A
GEN CHEM LAB.
LAB IW1-18
A/L IW1-16E
LAB IW1-16A
LAB IW1-16C
CLEAN LAB (NOT CLASS 100) AFM + WETTING EQUIP.
A/L IW1-12
FEMALE IW1-12A
MALE IW1-11A
ELEC DB IW1-29A
A/L IW1-11
LAB IW1-16B
LAB IW1-16
A/L IW1-18C
ACCESS IW1-10
FHR IW1-29B
CORRIDOR IW1-29
SPECIAL TYPE C + QUARRUNTINE LAB.
LAB IW1-21D
LAB IW1-21
LAB IW1-21B
OFFICE IW1-21C
OFFICE IW1-18A
OFFICE/ TEA ROOM IW1-18B
3
AFM LAB IW1-16D
OFFICE IW1-09
1

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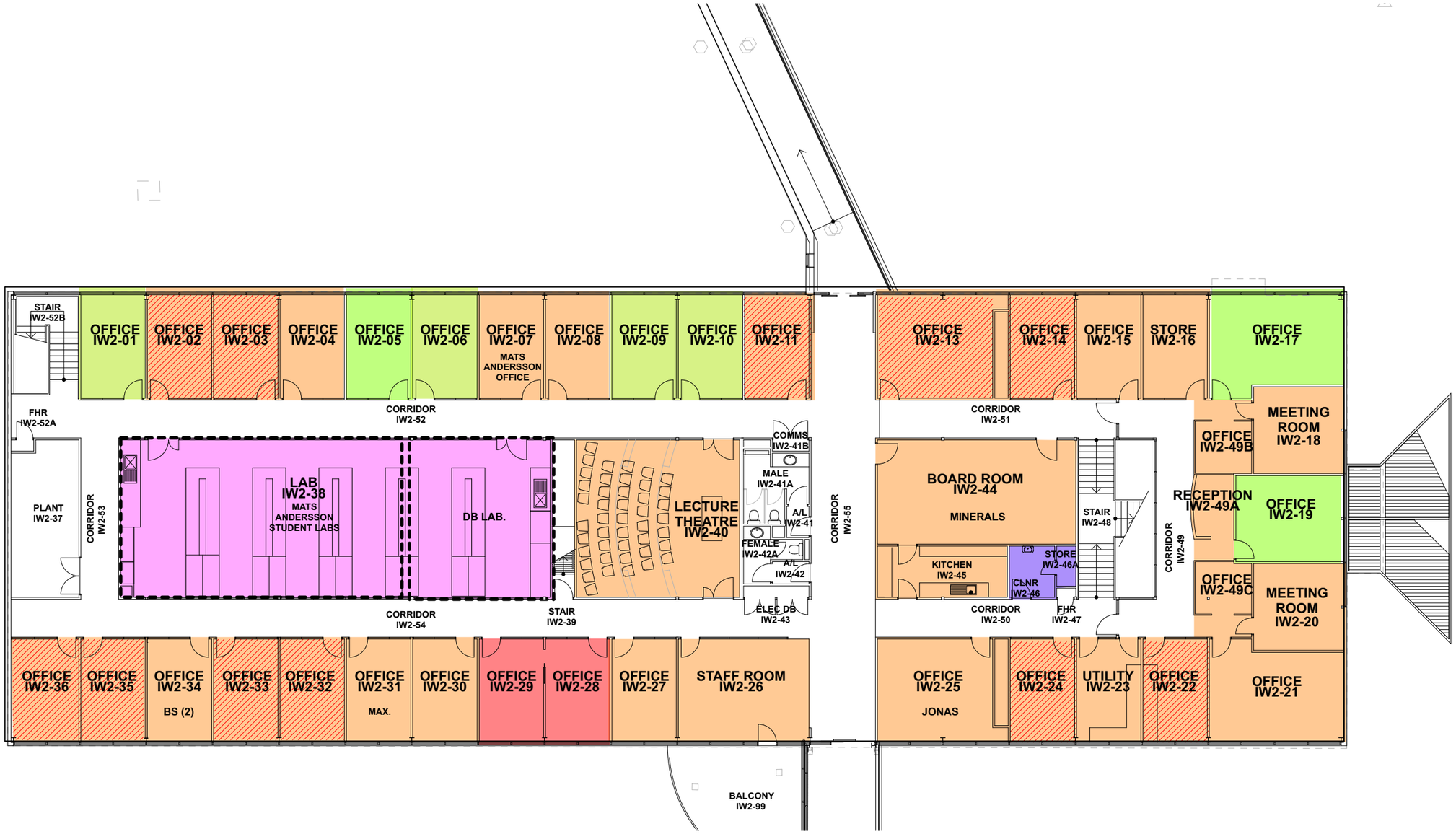
BUILDING IW LEVEL 1

Scale 1:100 @ A1

Drawing By: AM/TH
Checked By: SP
Date: 6/09/2016
PRELIMINARY
Project No/Drawing No.: 15479 - A028
Revision: P4

Plot Date: 6/09/2016 /Volumes/PPA Data/JOB FILES/15479 UniSA Mawson Lakes Master Plan/15479 Drawings/CAD Files/Model/2016 Current Space Audit/15479 UniSA Master Plan Current Space Audit 2016 AUGUST.pln



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BUILDING IW LEVEL 2

Scale 1:100 @ A1

Drawing By: AM/TH
Checked By: SP
Date: 6/09/2016
PRELIMINARY
Project No/Drawing No.: 15479 - A029
Revision: P4

Plot Date: 6/09/2016 /Volumes/PPA Data/JOB FILES/15479 UniSA Mawson Lakes Master Plan/15479 Drawings/CAD Files/Model/2016 Current Space Audit/15479 UniSA Master Plan Current Space Audit 2016 AUGUST.pln

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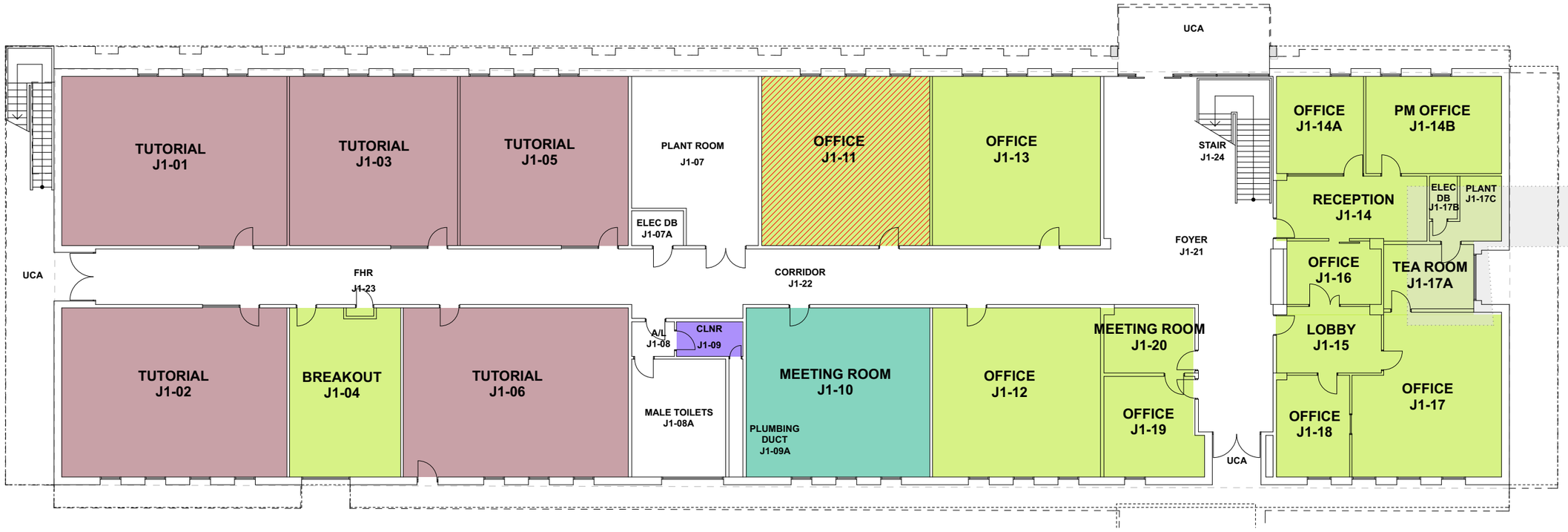

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BUILDING J LEVEL 1

Scale 1:100 @ A1

Drawing By: AM/TH
Checked By: SP
Date: 6/09/2016
PRELIMINARY
Project No/Drawing No.: 15479 - A030
Revision: P4

Plot Date: 6/09/2016 /Volumes/PPA Data/JOB FILES/15479 UniSA Mawson Lakes Master Plan/15479 Drawings/CAD Files/Model/2016 Current Space Audit/15479 UniSA Master Plan Current Space Audit 2016 AUGUST.pln

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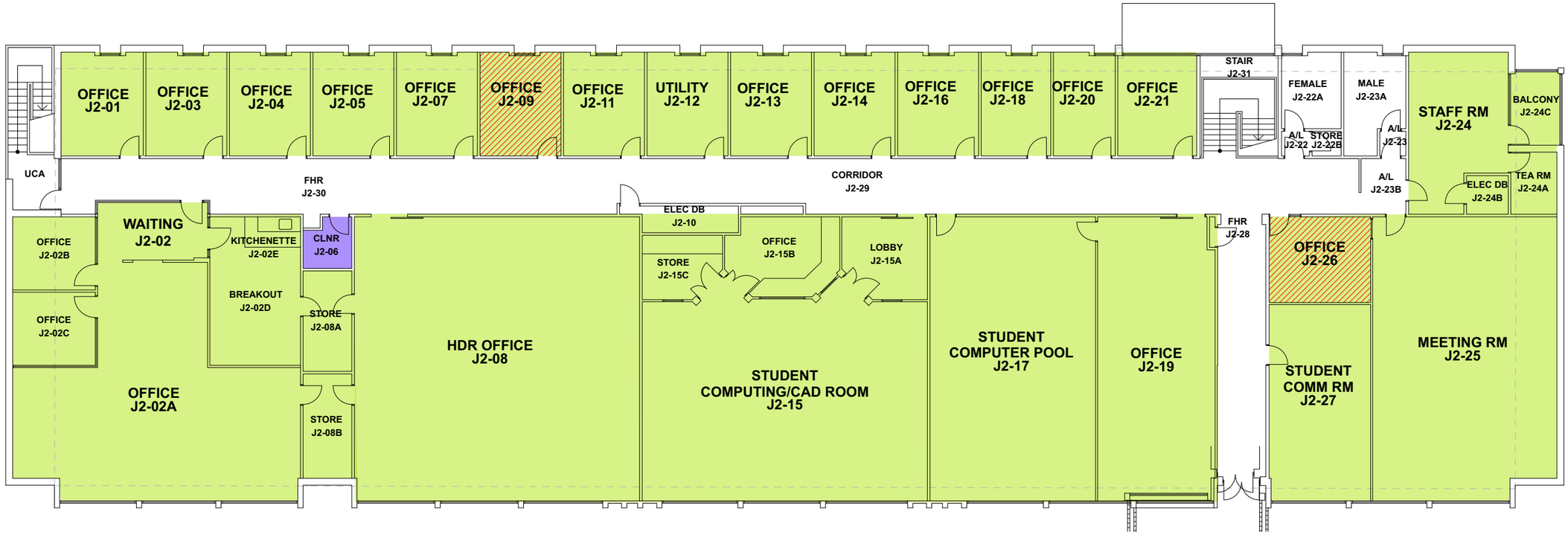

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BUILDING J LEVEL 2

Scale 1:100 @ A1

Drawing By: AM/TH

Checked By: SP

Date: 6/09/2016

PRELIMINARY

Project No/Drawing No.: 15479 - A031

Revision: P4

Plot Date: 6/09/2016 /Volumes/PPA Data/JOB FILES/15479 UniSA Mawson Lakes Master Plan/15479 Drawings/CAD Files/Model/2016 Current Space Audit/15479 UniSA Master Plan Current Space Audit 2016 AUGUST.pln

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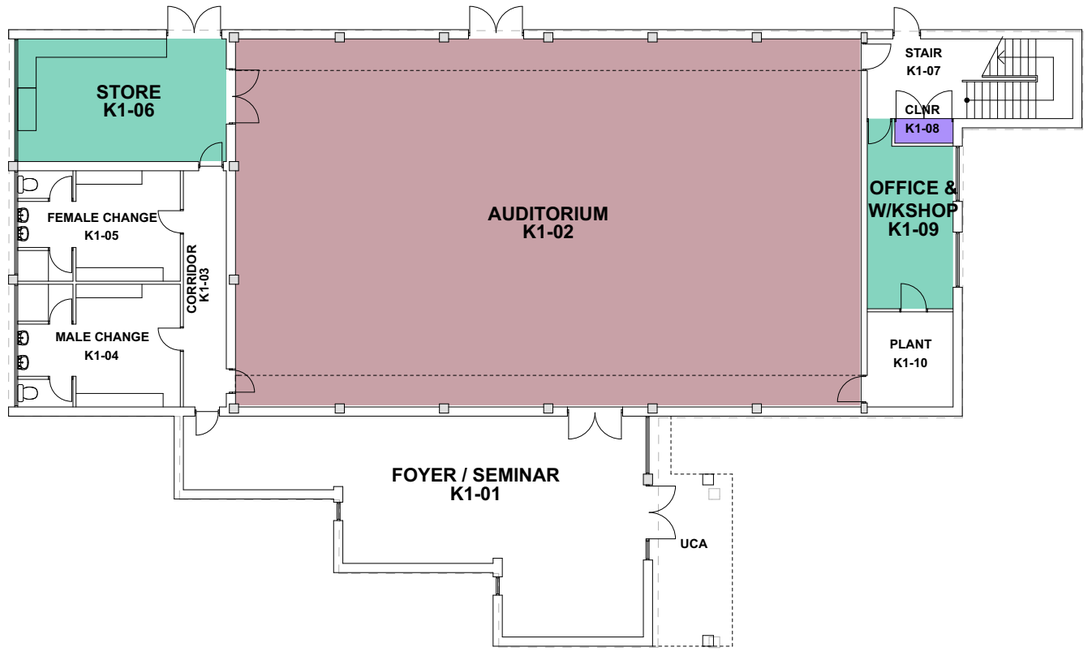

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BUILDING K LEVEL 1

Scale 1:100 @ A1

Drawing By: AM/TH

Checked By: SP

Date: 6/09/2016

PRELIMINARY

Project No/Drawing No.: 15479 - A032

Revision: P4

Plot Date: 6/09/2016 /Volumes/PPA Data/JOB FILES/15479 UniSA Mawson Lakes Master Plan/15479 Drawings/CAD Files/Model/2016 Current Space Audit/15479 UniSA Master Plan Current Space Audit 2016 AUGUST.pln

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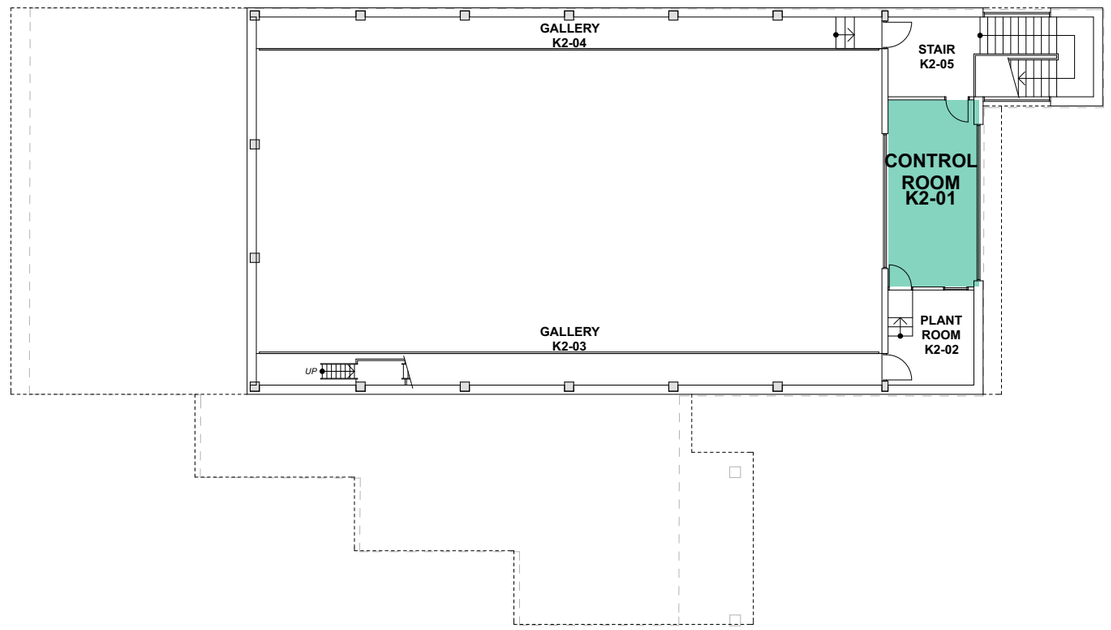

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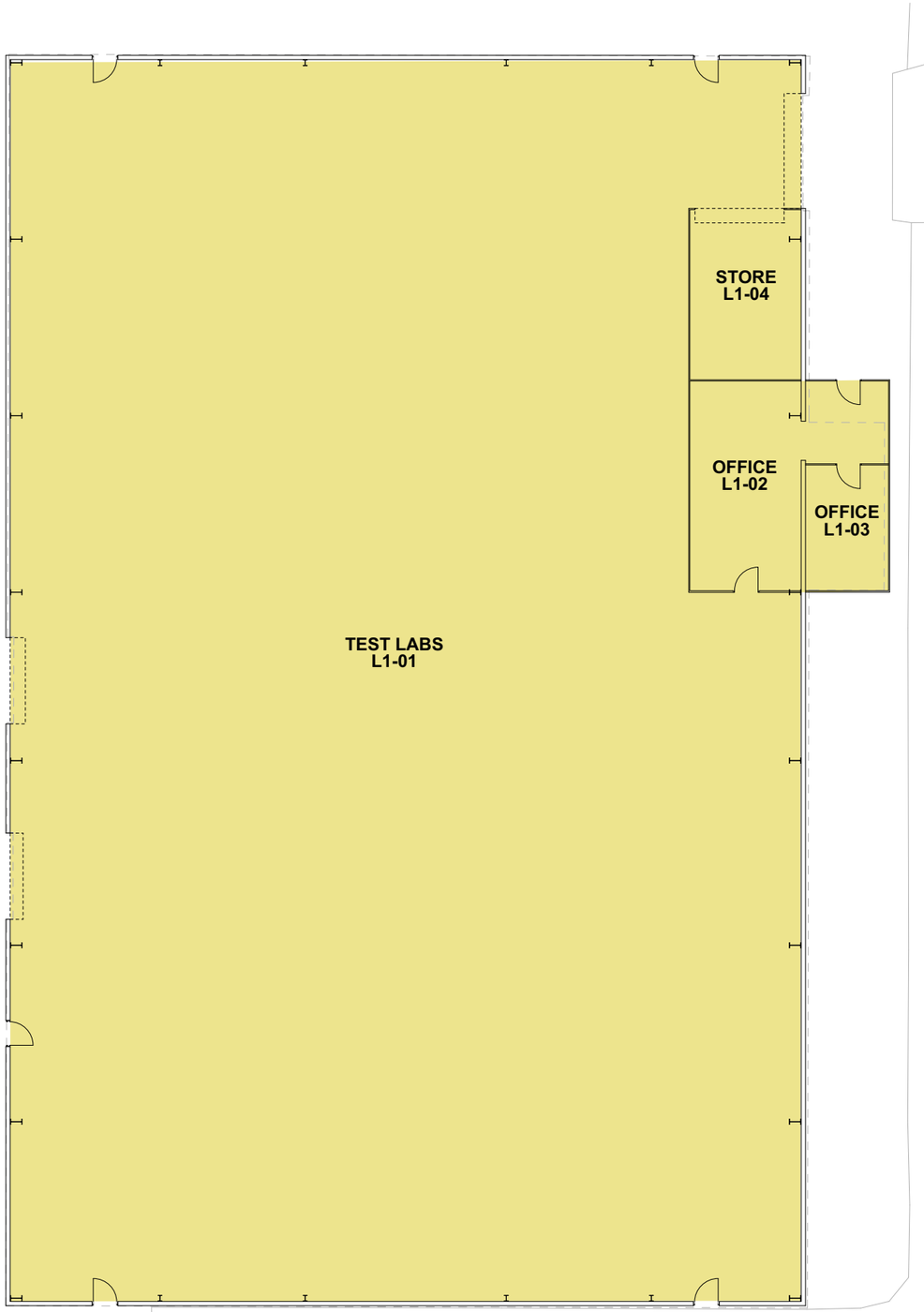
BUILDING K LEVEL 2

Scale 1:100 @ A1

Drawing By: AM/TH
Checked By: SP
Date: 6/09/2016
PRELIMINARY

Project No/Drawing No.: 15479 - A033
Revision: P4

Plot Date: 6/09/2016 /Volumes/PPA Data/JOB FILES/15479 UniSA Mawson Lakes Master Plan/15479 Drawings/CAD Files/Model/2016 Current Space Audit/15479 UniSA Master Plan Current Space Audit 2016 AUGUST.pln



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BUILDING L LEVEL 1

Scale 1:100 @ A1

Drawing By: AM/TH
Checked By: SP
Date: 6/09/2016
PRELIMINARY

Project No/Drawing No.: 15479 - A034

Revision: P4

Plot Date: 6/09/2016 /Volumes/PPA Data/JOB FILES/15479 UniSA Mawson Lakes Master Plan/15479 Drawings/CAD Files/Model/2016 Current Space Audit/15479 UniSA Master Plan Current Space Audit 2016 AUGUST.pln

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BUILDING M LEVEL 1

Scale 1:150 @ A1

Drawing By: AM/TH
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Date: 6/09/2016
PRELIMINARY

Project No/Drawing No.: 15479 - A035

Revision: P4

Plot Date: 6/09/2016 /Volumes/PPA Data/JOB FILES/15479 UniSA Mawson Lakes Master Plan/15479 Drawings/CAD Files/Model/2016 Current Space Audit/15479 UniSA Master Plan Current Space Audit 2016 AUGUST.pln

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Scale 1:150 @ A1

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Date: 6/09/2016
PRELIMINARY
Project No/Drawing No.: 15479 - A036
Revision: P4

Plot Date: 6/09/2016 /Volumes/PPA Data/JOB FILES/15479 UniSA Mawson Lakes Master Plan/15479 Drawings/CAD Files/Model/2016 Current Space Audit/15479 UniSA Master Plan Current Space Audit 2016 AUGUST.pln

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BUILDING M LEVEL 2

Scale 1:150 @ A1

Drawing By: AM/TH

Checked By: SP

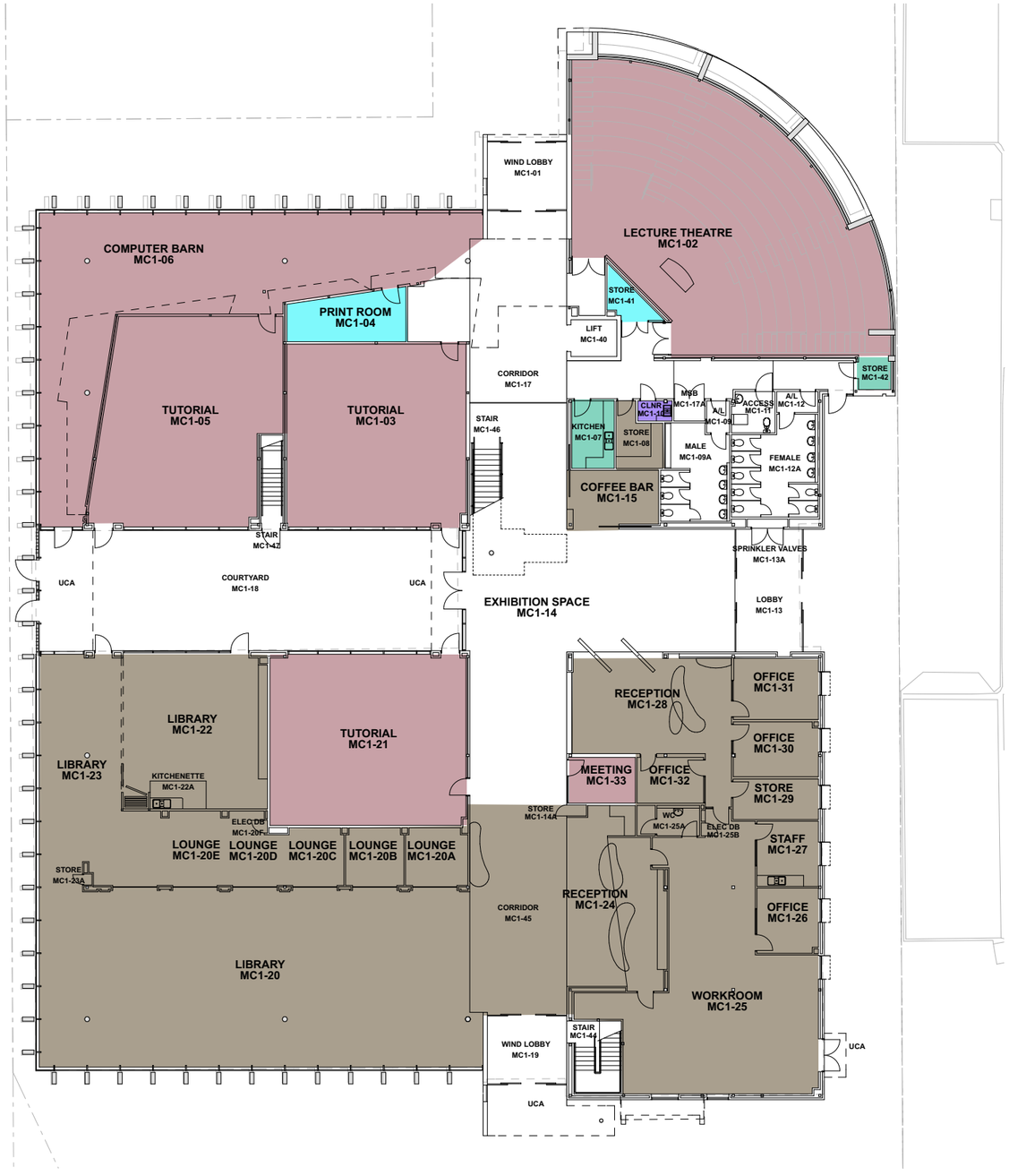
Date: 6/09/2016

PRELIMINARY

Project No/Drawing No.: 15479 - A037

Revision: P4

Plot Date: 6/09/2016 /Volumes/PPA Data/JOB FILES/15479 UniSA Mawson Lakes Master Plan/15479 Drawings/CAD Files/Model/2016 Current Space Audit/15479 UniSA Master Plan Current Space Audit 2016 AUGUST.pln



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BUILDING MC LEVEL 1

Scale 1:150 @ A1

Drawing By: AM/TH

Checked By: SP

Date: 6/09/2016

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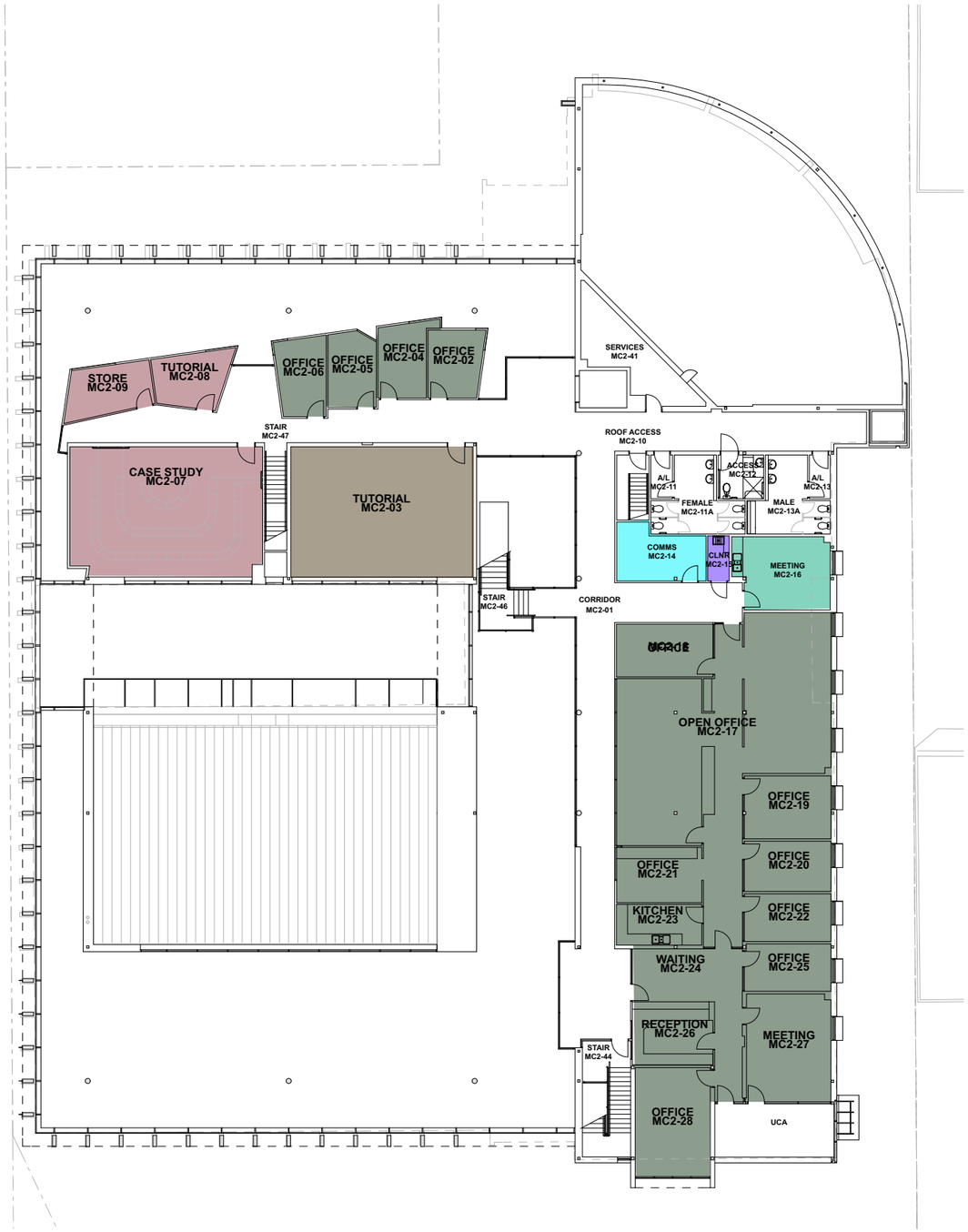
Project No/Drawing No.: 15479 - A038

Revision: P4

Plot Date: 6/09/2016 /Volumes/PPA Data/JOB FILES/15479 UniSA Mawson Lakes Master Plan/15479 Drawings/CAD Files/Model/2016 Current Space Audit/15479 UniSA Master Plan Current Space Audit 2016 AUGUST.pln



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BUILDING MC LEVEL 2

Scale 1:150 @ A1

Drawing By: AM/TH

Checked By: SP

Date: 6/09/2016

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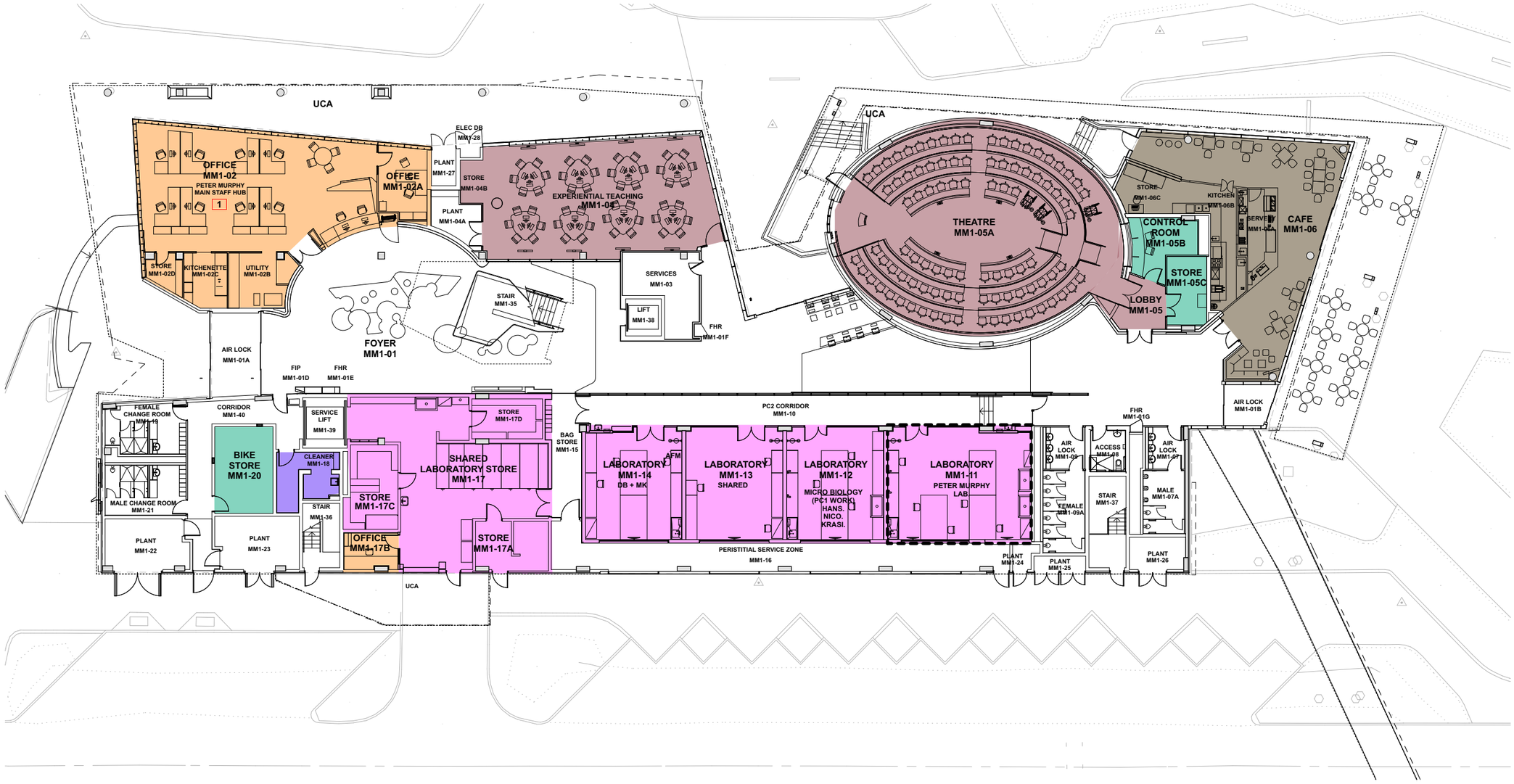
Project No/Drawing No.: 15479 - A039

Revision: P4

Plot Date: 6/09/2016 /Volumes/PPA Data/JOB FILES/15479 UniSA Mawson Lakes Master Plan/15479 Drawings/CAD Files/Model/2016 Current Space Audit/15479 UniSA Master Plan Current Space Audit 2016 AUGUST.pln



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FII LABORARTORY
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BUILDING MM LEVEL 1

Scale 1:150 @ A1

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Date: 6/09/2016
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Project No/Drawing No.: 15479 - A040
Revision: P4

Plot Date: 6/09/2016 /Volumes/PPA Data/JOB FILES/15479 UniSA Mawson Lakes Master Plan/15479 Drawings/CAD Files/Model/2016 Current Space Audit/15479 UniSA Master Plan Current Space Audit 2016 AUGUST.pln

FII OFFICE
FII LABORARTORY
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OFFICE MM2-01H
OFFICE MM2-01G
OFFICE MM2-01F
OFFICE MM2-01E
OFFICE MM2-01D
MATERIAL OFFICE MM2-01B
DP.
MATERIAL OFFICE MM2-01C
CRAIG PRIEST
MATERIAL OFFICE MM2-01A
MK.
OFFICE MM2-01
7
STUDY MM2-01N
ELEC DB MM2-01L
OFFICE MM2-01J
UTILITY MM2-01M
OFFICE MM2-01K
STAIR MM2-35
ELEC DB MM2-41A
FHR MM2-41B
KITCHENETTE MM2-02A
CAFE MM2-02
CORRIDOR MM2-40
SERVICES MM2-06
PC2 CORRIDOR MM2-07
CORRIDOR MM2-41
STORE MM2-41C
SEMINAR MM2-03
AV STORE MM2-12
STORE MM2-03A
SERVICES MM2-04A
TERRACE MM2-45
EXPERIENTIAL TEACHING ROOM MM2-04
STORE MM2-05J
STUDNET EXPERIENCE M2 STUDIO MM2-05
GROUP MM2-05A
LOCKDOWN MM2-05D
LOCKDOWN MM2-05F
GROUP MM2-05B
LOCKDOWN MM2-05E
LOCKDOWN MM2-05G
GROUP MM2-05C
KITCHENETTE MM2-05H
CORRIDOR MM2-42
FHR MM2-42A
FEMALE MM2-20B
CLEANER MM2-18
ACCESS MM2-16
A/L MM2-20
CORRIDOR MM2-43
MALE MM2-20A
STORE MM2-19
PLANT MM2-17
STAIR MM2-36
BAG STORE MM2-15
LABORATORY MM2-08
LABORATORY MM2-09
LABORATORY MM2-10
CRAIG PRIEST
LABORATORY MM2-11
HF
MATERIALS LAB.
PERISTITIAL SERVICE ZONE MM2-14
PLANT MM2-13
STAIR MM2-37
LINK MM2-90
MINERALS LANE

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BUILDING MM LEVEL 2

Scale 1:150 @ A1

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Checked By: SP
Date: 6/09/2016
PRELIMINARY
Project No/Drawing No.: 15479 - A041
Revision: P4

Plot Date: 6/09/2016 /Volumes/PPA Data/JOB FILES/15479 UniSA Mawson Lakes Master Plan/15479 Drawings/CAD Files/Model/2016 Current Space Audit/15479 UniSA Master Plan Current Space Audit 2016 AUGUST.pln

FII OFFICE
FII LABORARTORY
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CRC/ CTM
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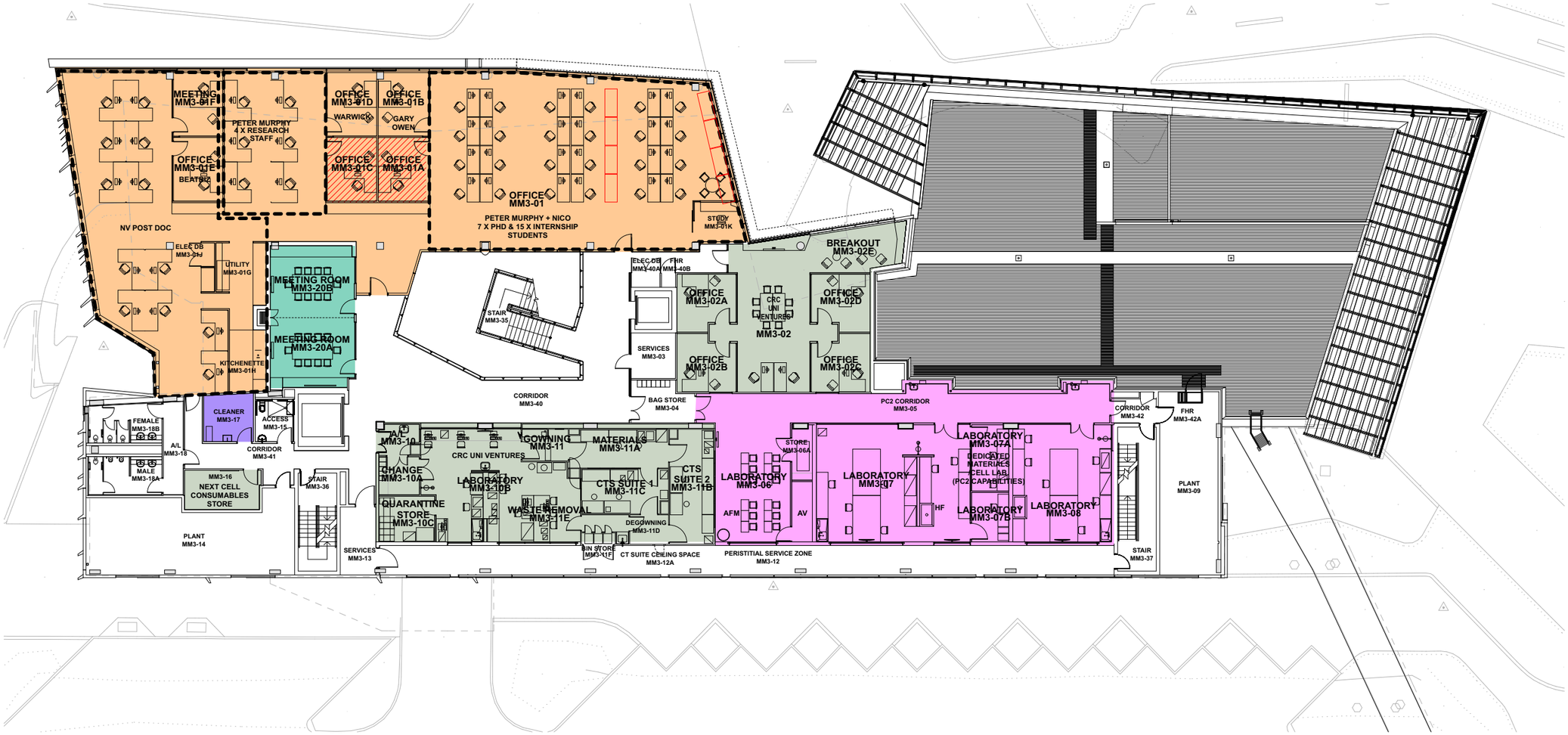

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Scale 1:150 @ A1

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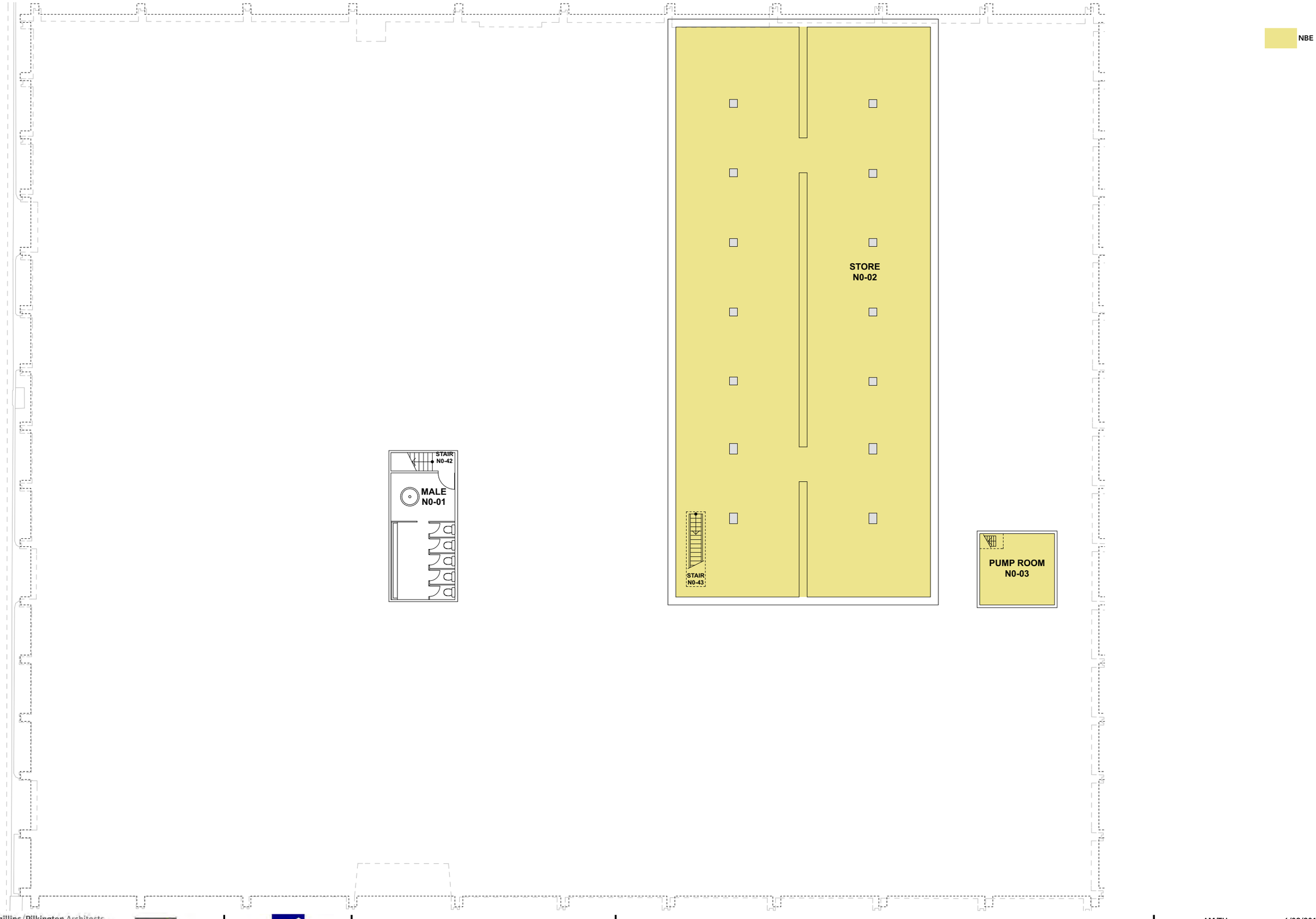
Date: 6/09/2016
PRELIMINARY

Project No/Drawing No.: 15479 - A042
Revision: P4

Plot Date: 6/09/2016 /Volumes/PPA Data/JOB FILES/15479 UniSA Mawson Lakes Master Plan/15479 Drawings/CAD Files/Model/2016 Current Space Audit/15479 UniSA Master Plan Current Space Audit 2016 AUGUST.pln



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BUILDING N LEVEL 0

Scale 1:100 @ A1

Drawing By: AM/TH
Checked By: SP
Date: 6/09/2016
PRELIMINARY

Project No/Drawing No.: 15479 - A043

Revision: P4

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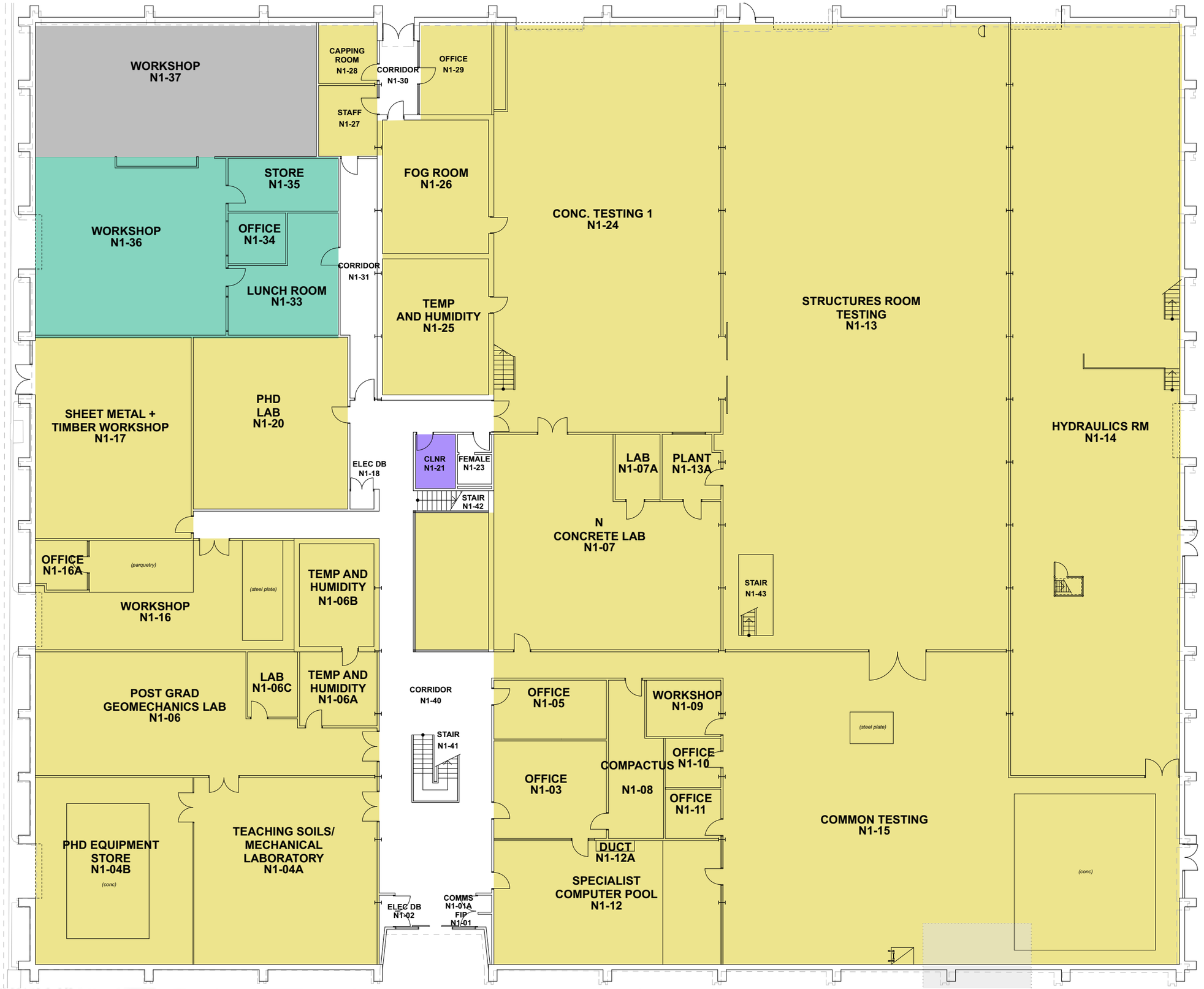

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BUILDING N LEVEL 1

Scale 1:100 @ A1

Drawing By: AM/TH
Checked By: SP
Date: 6/09/2016
PRELIMINARY

Project No/Drawing No.: 15479 - A044

Revision: P4

Plot Date: 6/09/2016 /Volumes/PPA Data/JOB FILES/15479 UniSA Mawson Lakes Master Plan/15479 Drawings/CAD Files/Model/2016 Current Space Audit/15479 UniSA Master Plan Current Space Audit 2016 AUGUST.pln

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BUILDING N LEVEL 2

Scale 1:100 @ A1

Drawing By: AM/TH
Checked By: SP
Date: 6/09/2016
PRELIMINARY

Project No/Drawing No.: 15479 - A045

Revision: P4

Plot Date: 6/09/2016 /Volumes/PPA Data/JOB FILES/15479 UniSA Mawson Lakes Master Plan/15479 Drawings/CAD Files/Model/2016 Current Space Audit/15479 UniSA Master Plan Current Space Audit 2016 AUGUST.pln

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BUILDING OC LEVEL 1

Scale 1:100 @ A1

Drawing By: AM/TH
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Date: 6/09/2016
PRELIMINARY
Project No/Drawing No.: 15479 - A046
Revision: P4

Plot Date: 6/09/2016 /Volumes/PPA Data/JOB FILES/15479 UniSA Mawson Lakes Master Plan/15479 Drawings/CAD Files/Model/2016 Current Space Audit/15479 UniSA Master Plan Current Space Audit 2016 AUGUST.pln

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BUILDING P LEVEL 1

Scale 1:100 @ A1

Drawing By: AM/TH
Checked By: SP
Date: 6/09/2016
PRELIMINARY
Project No/Drawing No.: 15479 - A047
Revision: P4

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GENERAL TEACHING
NBE
DIV ITEE

TUTORIAL P2-51
CONTROL P2-51A
ADJUNCT SHARED OFFICE P2-50
STORE P2-49
OFFICE P2-48
OFFICE P2-47
OFFICE P2-46
OFFICE P2-44
OFFICE P2-42A
OFFICE P2-42
OFFICE P2-40
OFFICE P2-39
OFFICE P2-38
OFFICE P2-37
OFFICE P2-36
OFFICE P2-35
CORRIDOR P2-61
CORRIDOR P2-62
FHR P2-32A
STAFF ROOM P2-34
DUCT P2-32
CLNR P2-33
MALE P2-31A
A/L P2-31
ELEC DB P2-30
OFFICE P2-29
STAIR P2-80
CORRIDOR P2-63
DUCT P2-26
FEMALE P2-23
REST RM P2-23A
DUCT P2-25
DUCT P2-24
FHR P2-24A
OFFICE P2-22
UTILITY P2-21
PROJECT OFFICE P2-53
STAIR P2-45
MEETING P2-43
TEACHING P2-41
NBE LAB BIO/CHEM TEACHING P2-28
PLANT P2-52
STAIR P2-81
PLANETARIUM P2-01
PLANT P2-02
PLANETARIUM FOYER P2-59
SESSIONAL STAFF COMMON ROOM P2-54
PROJECT BASED LEARNING P2-43C
PROJECT ROOM P2-43A
COMMS P2-43B
SERVICES P2-43E
COMPUTER ROOM P2-28A
HONOURS P2-28B
FHR P2-05A
CLNR P2-05
ELEC DB P2-55
MALE P2-56A
A/L P2-56
ACCESS P2-57
FEMALE P2-58A
A/L P2-58
PROJECT BASED LEARNING P2-43D
TUTORIAL P2-04
TUTORIAL P2-06
UTILITY P2-07
CORRIDOR P2-65
CORRIDOR P2-64
OFFICE P2-08
OFFICE P2-09
OFFICE P2-10
OFFICE P2-11
OFFICE P2-12
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OFFICE P2-15
OFFICE P2-16
OFFICE P2-17
OFFICE P2-18
OFFICE P2-19
OFFICE P2-20

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BUILDING P LEVEL 2

Scale 1:100 @ A1

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Date: 6/09/2016
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Project No/Drawing No.: 15479 - A048
Revision: P4

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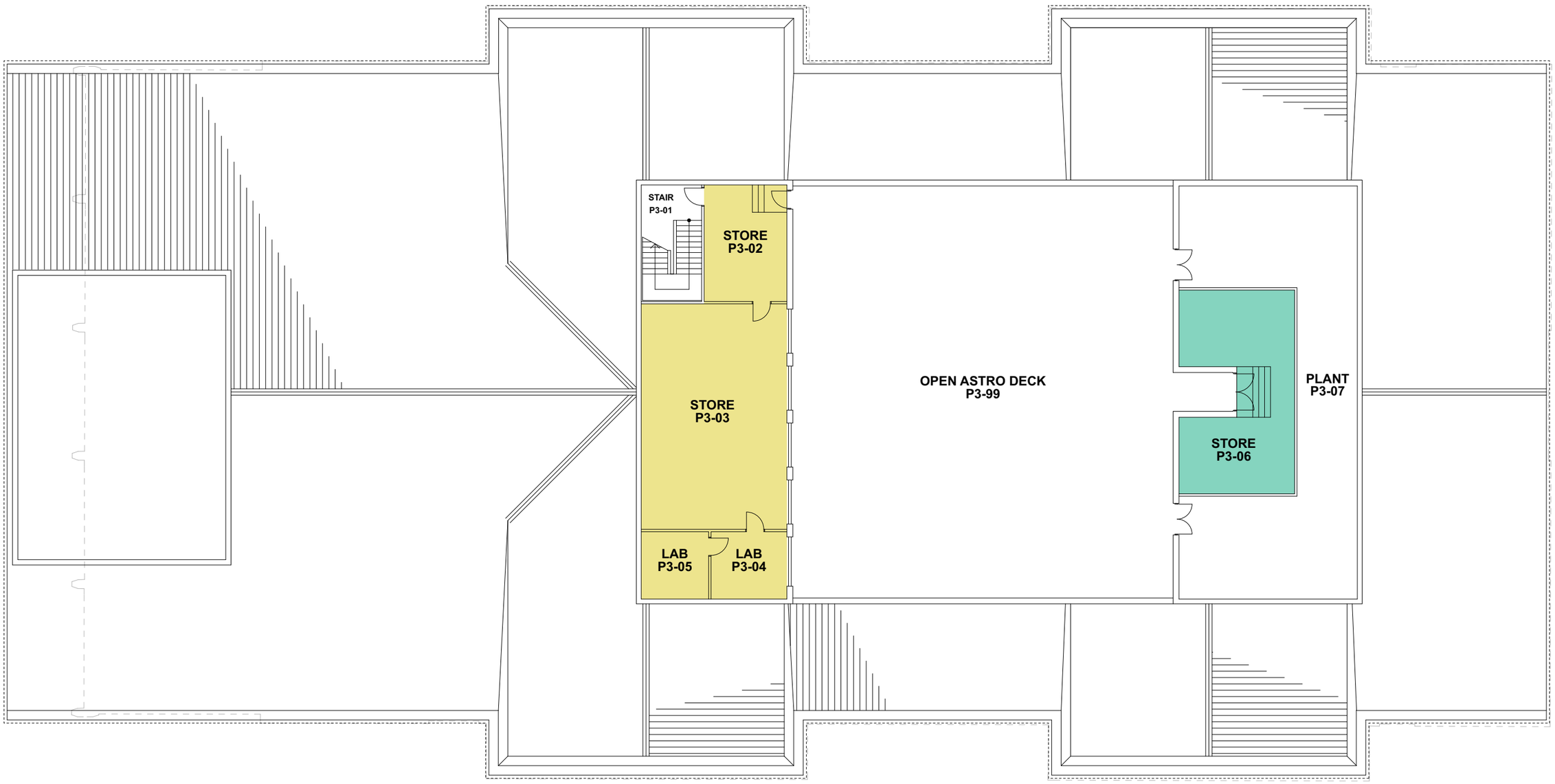

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BUILDING P LEVEL 3

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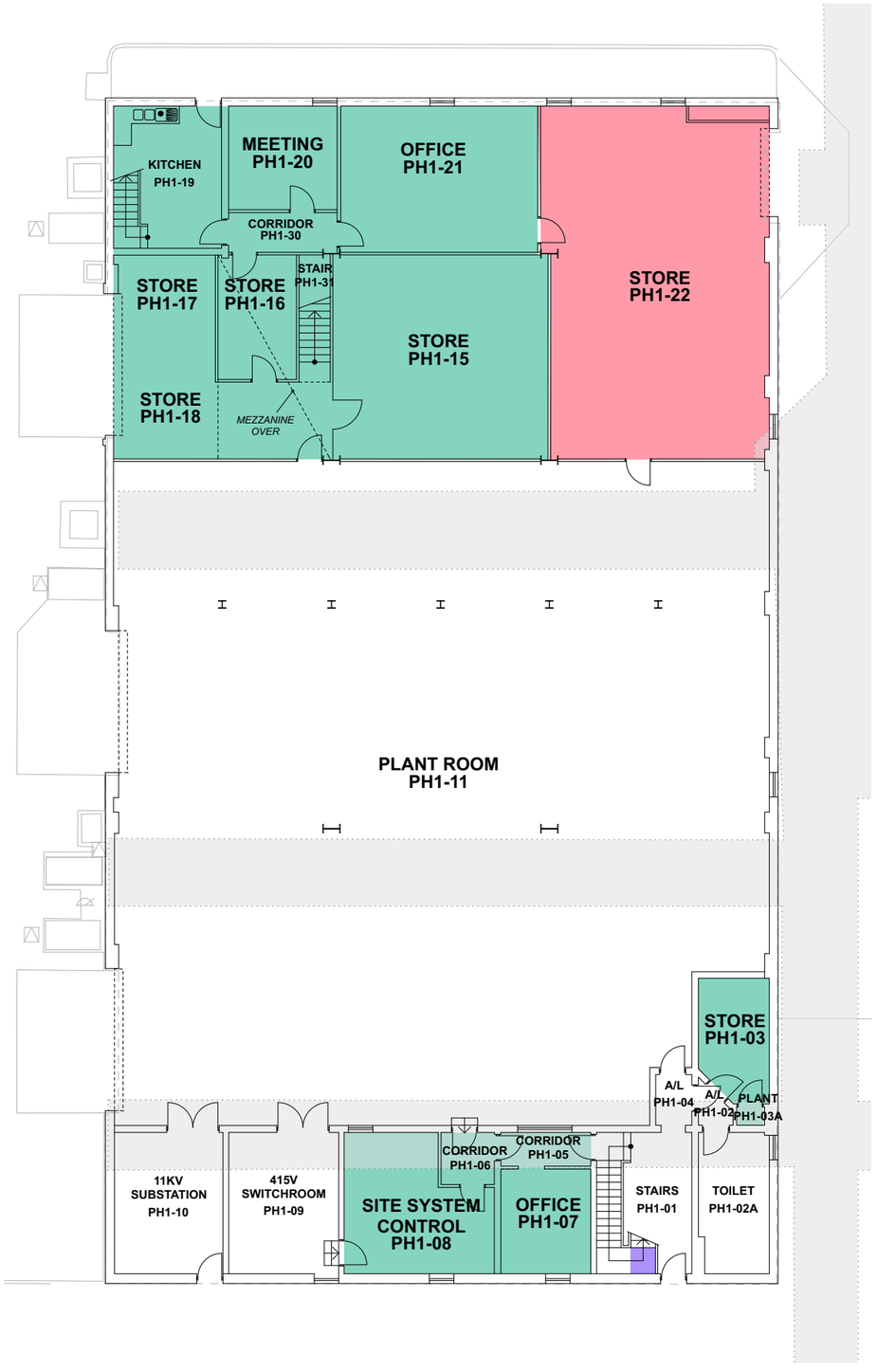

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BUILDING PH LEVEL 1

Scale 1:100 @ A1

Drawing By: AM/TH

Checked By: SP

Date: 6/09/2016

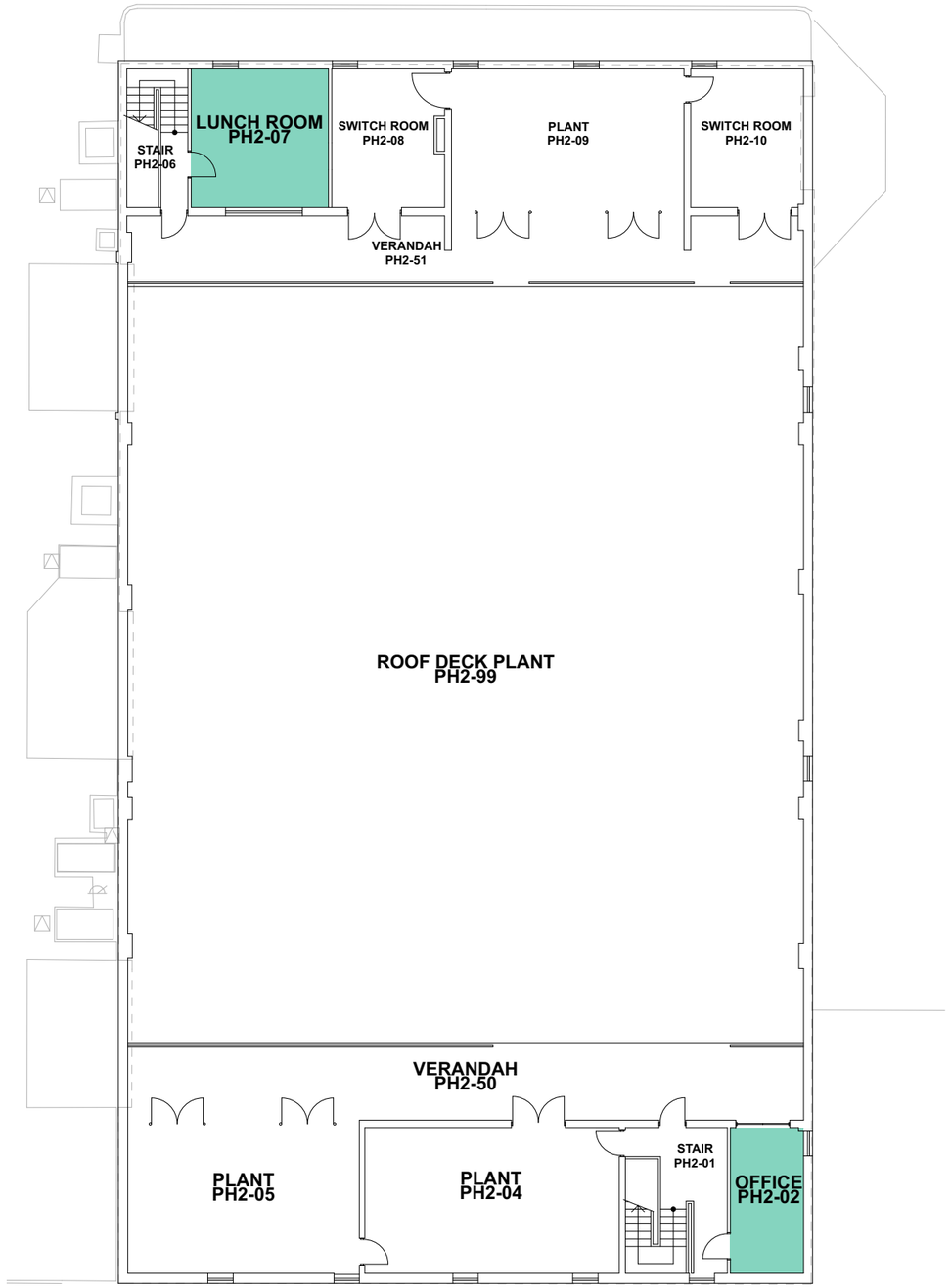
PRELIMINARY

Project No/Drawing No.: 15479 - A050

Revision: P4

Plot Date: 6/09/2016 /Volumes/PPA Data/JOB FILES/15479 UniSA Mawson Lakes Master Plan/15479 Drawings/CAD Files/Model/2016 Current Space Audit/15479 UniSA Master Plan Current Space Audit 2016 AUGUST.pln

FMU



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Mawson Lakes FII & Campus Master Plan

Mawson Lakes, South Australia

BUILDING PH LEVEL 2

Scale 1:100 @ A1

Drawing By: AM/TH
Checked By: SP
Date: 6/09/2016
PRELIMINARY

Project No/Drawing No.: 15479 - A051

Revision: P4

Plot Date: 6/09/2016 /Volumes/PPA Data/JOB FILES/15479 UniSA Mawson Lakes Master Plan/15479 Drawings/CAD Files/Model/2016 Current Space Audit/15479 UniSA Master Plan Current Space Audit 2016 AUGUST.pln

FII LABORARTORY
CLEANER
GENERAL TEACHING
ENE
ISTS
PHARMACY
VACANT

SUBSTATION PQ1-01
STAIR Q1-E01
LASER LABS 1 Q1-23
LASER LABS 2 Q1-23B
WRITE UP Q1-23A
PORCH Q1-95
OPTICAL MATERIALS LABORATORY Q1-20
SERVICES Q1-22
TEM LABORATORY Q1-19
CORRIDOR Q1-27
ELEC DB Q1-18
ELEC DB Q1-17
LABORATORY Q1-13A
LABORATORY Q1-13
DEVICE PROCESSING LABORATORY Q1-16
PHOTONICE DEVICES LABORATORY Q1-14
CORRIDOR Q1-24
ENTRY Q1-92
LABORATORY Q1-12A
JONAS HIGH PRESSURE VESSELS
LABORATORY Q1-12
PLANT Q1-11
A/L Q1-10
LABORATORY Q1-10A
CORRIDOR Q1-26
FLAM LIQUID Q1-09
STORE Q1-08A
STAIR Q1-30
CLEANER Q1-08
FEMALE Q1-04A
MALE Q1-05A
SHOWER Q1-07
ACCESS Q1-02
A/L Q1-04
TELECOM Q1-03
A/L Q1-05
ELEC DB Q1-06
FOYER Q1-25
ENTRY Q1-90
STORE Q1-01B
PROJECTOR Q1-01A
LECTURE THEATRE Q1-01
PORCH Q1-98

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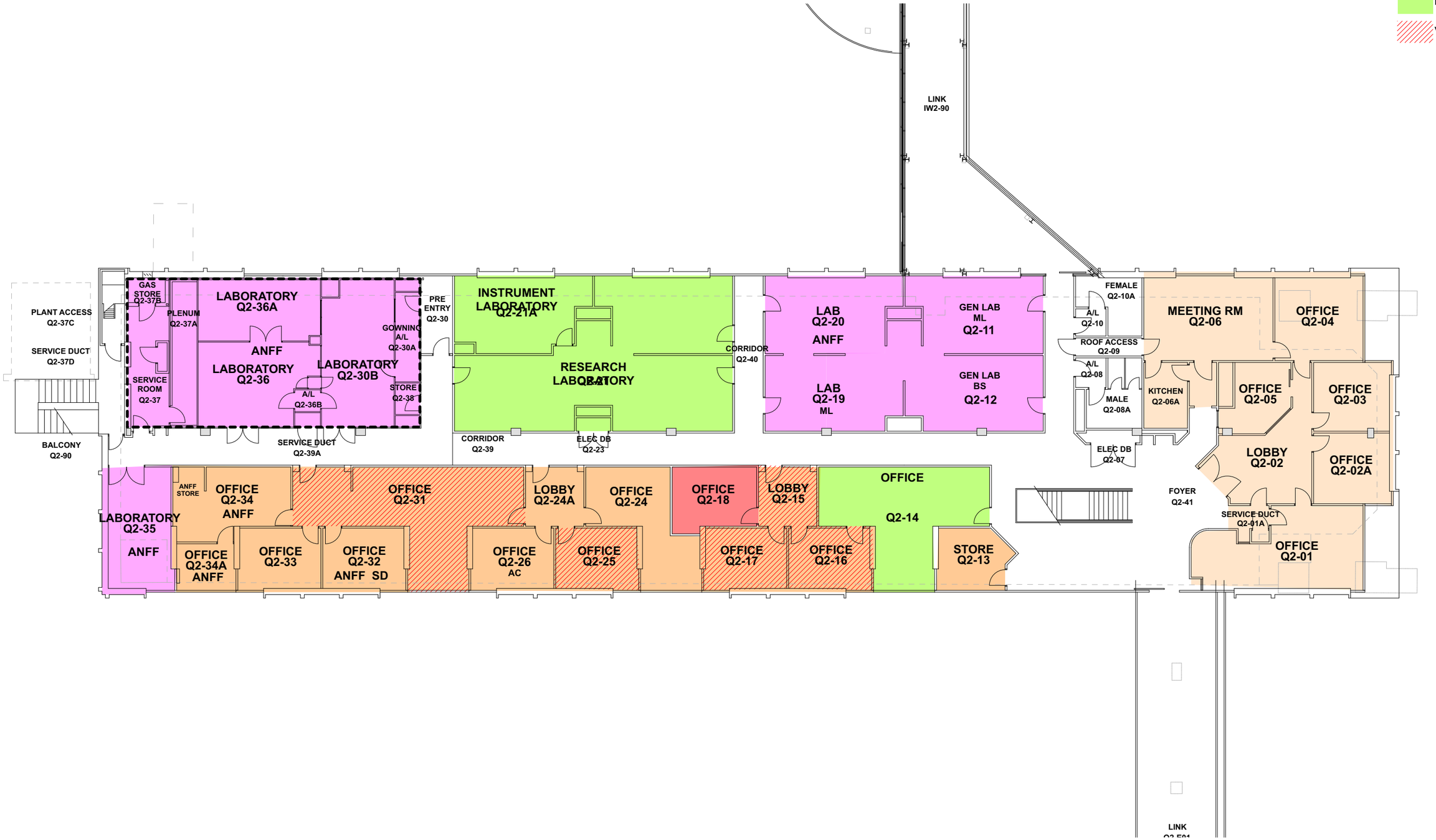
BUILDING Q LEVEL 1

Scale 1:100 @ A1

Drawing By: AM/TH
Checked By: SP
Date: 6/09/2016
PRELIMINARY
Project No/Drawing No.: 15479 - A052
Revision: P4

Plot Date: 6/09/2016 /Volumes/PPA Data/JOB FILES/15479 UniSA Mawson Lakes Master Plan/15479 Drawings/CAD Files/Model/2016 Current Space Audit/15479 UniSA Master Plan Current Space Audit 2016 AUGUST.pln



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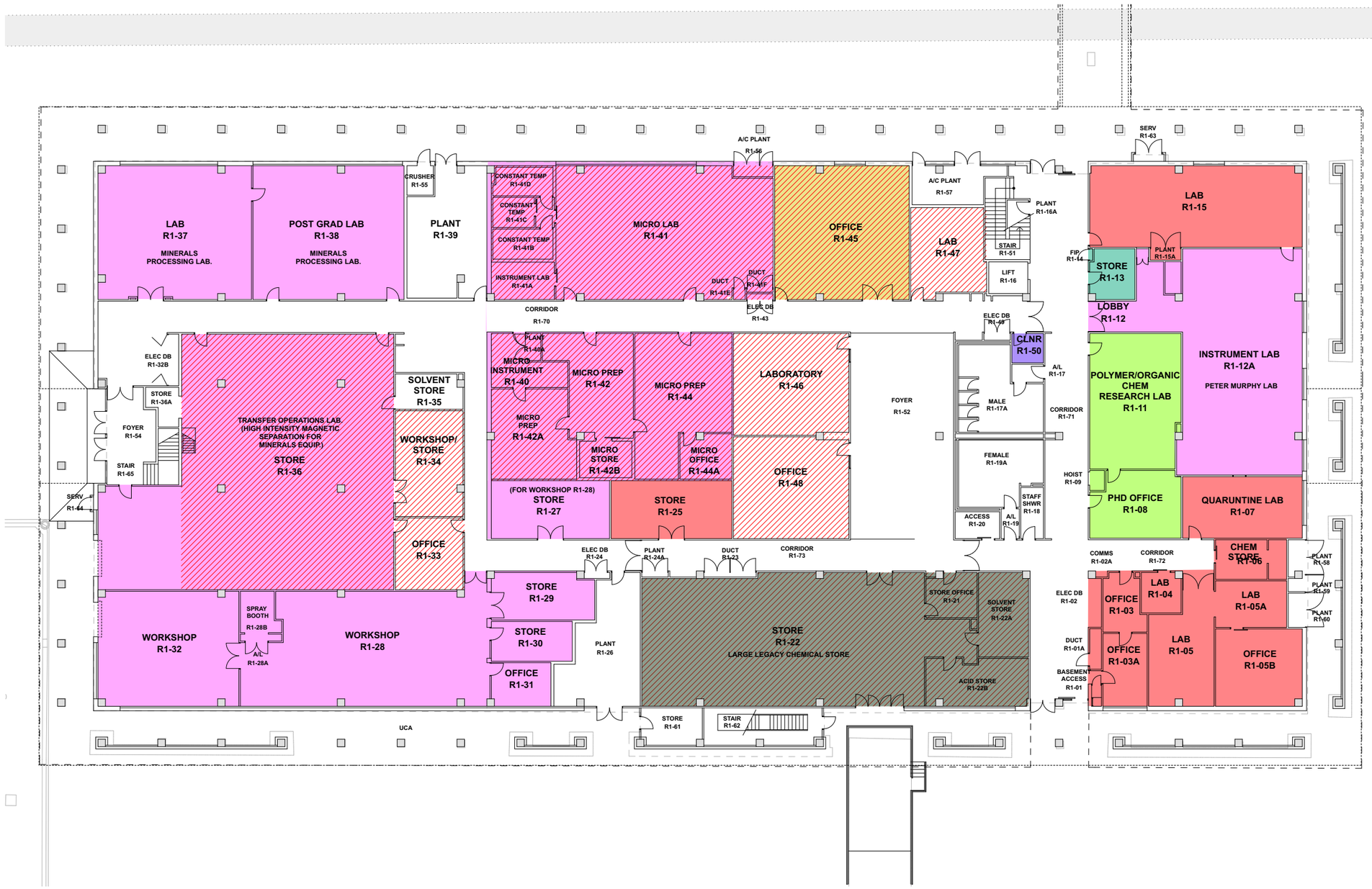
BUILDING Q LEVEL 2

Scale 1:100 @ A1

Drawing By: AM/TH
Checked By: SP
Date: 6/09/2016
PRELIMINARY
Project No/Drawing No.: 15479 - A053
Revision: P4

Plot Date: 6/09/2016 /Volumes/PPA Data/JOB FILES/15479 UniSA Mawson Lakes Master Plan/15479 Drawings/CAD Files/Model/2016 Current Space Audit/15479 UniSA Master Plan Current Space Audit 2016 AUGUST.pln



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Mawson Lakes, South Australia

BUILDING R LEVEL 1

Scale 1:150 @ A1

Drawing By: AM/TH
Checked By: SP
Date: 6/09/2016
PRELIMINARY

Project No/Drawing No.: 15479 - A054
Revision: P4

Plot Date: 6/09/2016 /Volumes/PPA Data/JOB FILES/15479 UniSA Mawson Lakes Master Plan/15479 Drawings/CAD Files/Model/2016 Current Space Audit/15479 UniSA Master Plan Current Space Audit 2016 AUGUST.pln

FII OFFICE
FII LABORARTORY
FMU
CLEANER
ITMS
PHARMACY
VACANT

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BUILDING R LEVEL 2

Scale 1:150 @ A1

Drawing By: AM/TH
Checked By: SP
Date: 6/09/2016
PRELIMINARY
Project No/Drawing No.: 15479 - A055
Revision: P4

Plot Date: 6/09/2016 /Volumes/PPA Data/JOB FILES/15479 UniSA Mawson Lakes Master Plan/15479 Drawings/CAD Files/Model/2016 Current Space Audit/15479 UniSA Master Plan Current Space Audit 2016 AUGUST.pln

ENE

NBE

STORE
SC1-01

COOL ROOM
SA1-03

WORKSHOP
SA1-02

WORKSHOP
SA1-01

WORKSHOP
SB1-01

STORE
SB1-02

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Mawson Lakes FII & Campus Master Plan

Mawson Lakes, South Australia

BUILDING SA, SB, & SC
LEVEL 1

Scale 1:100 @ A1

Drawing By: AM/TH

Checked By: SP

Date: 6/09/2016

PRELIMINARY

Project No/Drawing No.: 15479 - A056

Revision: P4

Plot Date: 6/09/2016 /Volumes/PPA Data/JOB FILES/15479 UniSA Mawson Lakes Master Plan/15479 Drawings/CAD Files/Model/2016 Current Space Audit/15479 UniSA Master Plan Current Space Audit 2016 AUGUST.pln

CLEANER

GENERAL TEACHING

ENE

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BUILDING SCT LEVEL 1

Scale 1:150 @ A1

Drawing By: AM/TH

Checked By: SP

Date: 6/09/2016

PRELIMINARY

Project No/Drawing No.: 15479 - A057

Revision: P4

Plot Date: 6/09/2016 /Volumes/PPA Data/JOB FILES/15479 UniSA Mawson Lakes Master Plan/15479 Drawings/CAD Files/Model/2016 Current Space Audit/15479 UniSA Master Plan Current Space Audit 2016 AUGUST.pln

CLEANER

GENERAL TEACHING

ENE

DIV ITEE

VACANT

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BUILDING SCT LEVEL 2

Scale 1:150 @ A1

Drawing By: AM/TH

Checked By: SP

Date: 6/09/2016

PRELIMINARY

Project No/Drawing No.: 15479 - A058

Revision: P4

Plot Date: 6/09/2016 /Volumes/PPA Data/JOB FILES/15479 UniSA Mawson Lakes Master Plan/15479 Drawings/CAD Files/Model/2016 Current Space Audit/15479 UniSA Master Plan Current Space Audit 2016 AUGUST.pln

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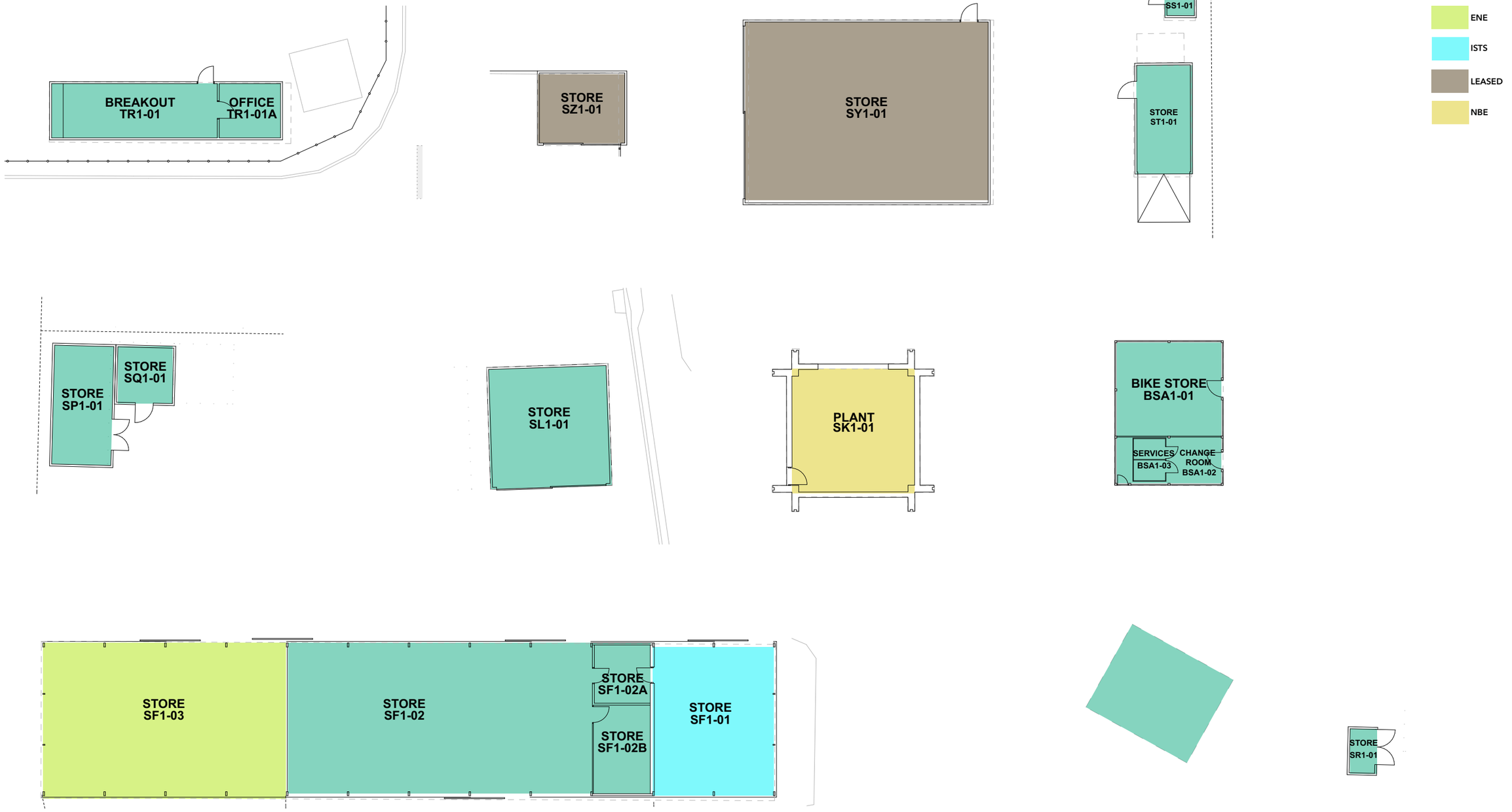
BUILDING SD & SE LEVEL 1

Scale 1:100 @ A1

Drawing By: **AM/TH**
Checked By: **SP**
Date: **6/09/2016**
PRELIMINARY

Project No/Drawing No.: **15479 - A059**
Revision: **P4**

Plot Date: 6/09/2016 /Volumes/PPA Data/JOB FILES/15479 UniSA Mawson Lakes Master Plan/15479 Drawings/CAD Files/Model/2016 Current Space Audit/15479 UniSA Master Plan Current Space Audit 2016 AUGUST.pln



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Mawson Lakes, South Australia

BUILDING S'S, TR, & BSA

LEVEL 1

Scale 1:100 @ A1

Drawing By: AM/TH

Checked By: SP

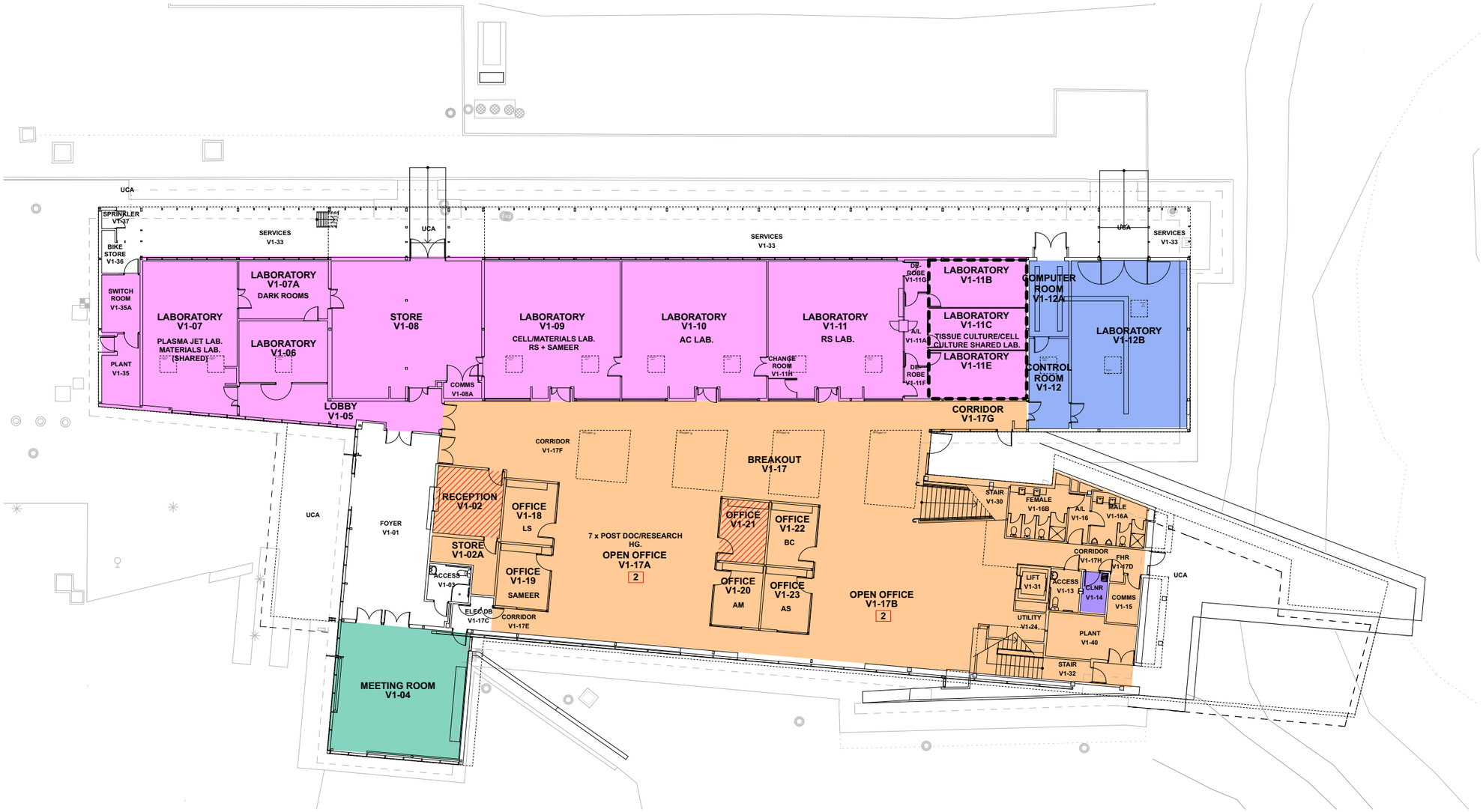
Date: 6/09/2016

PRELIMINARY

Project No/Drawing No.: 15479 - A060

Revision: P4

Plot Date: 6/09/2016 /Volumes/PPA Data/JOB FILES/15479 UniSA Mawson Lakes Master Plan/15479 Drawings/CAD Files/Model/2016 Current Space Audit/15479 UniSA Master Plan Current Space Audit 2016 AUGUST.pln



FII OFFICE

FII LABORARTORY

FMU

CLEANER

ITMS

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Mawson Lakes, South Australia

BUILDING V LEVEL 1

Scale 1:150 @ A1

Drawing By: AM/TH

Checked By: SP

Date: 6/09/2016

PRELIMINARY

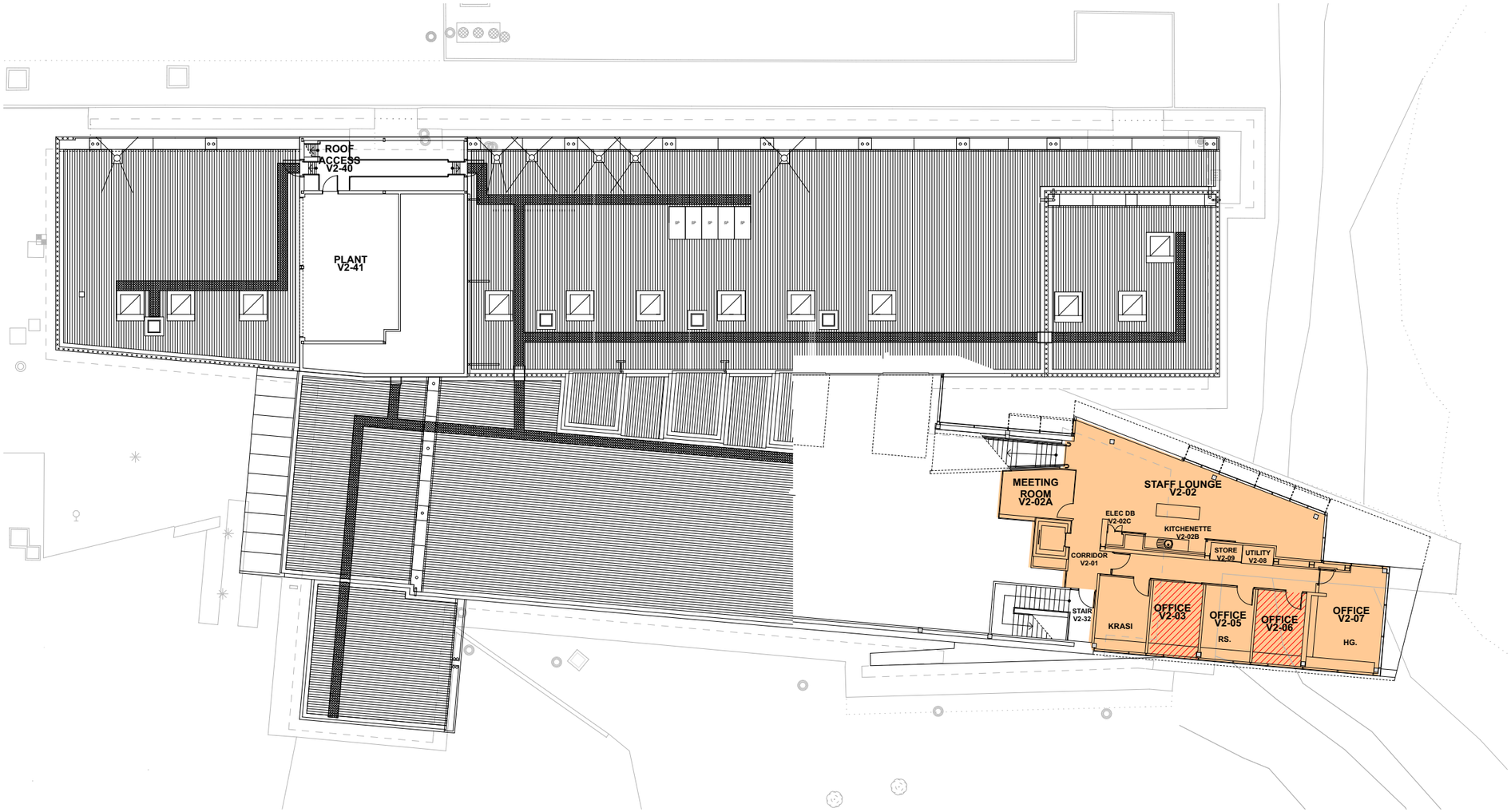
Project No/Drawing No.: 15479 - A061

Revision: P4

Plot Date: 6/09/2016 /Volumes/PPA Data/JOB FILES/15479 UniSA Mawson Lakes Master Plan/15479 Drawings/CAD Files/Model/2016 Current Space Audit/15479 UniSA Master Plan Current Space Audit 2016 AUGUST.pln

FII OFFICE

VACANT



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BUILDING V LEVEL 2

Scale 1:150 @ A1

Drawing By: AM/TH

Checked By: SP

Date: 6/09/2016

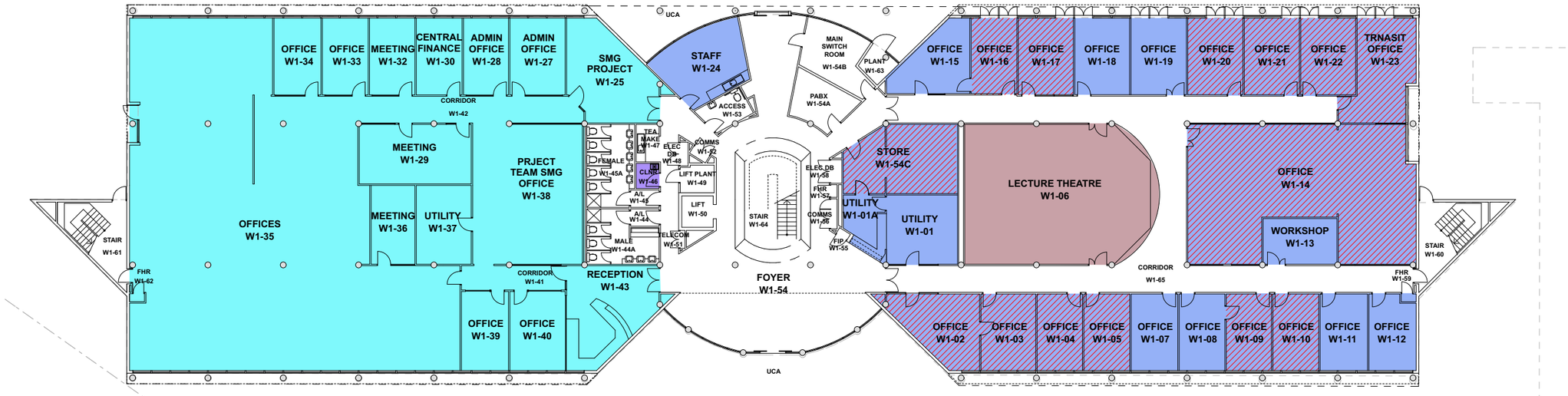
PRELIMINARY

Project No/Drawing No.: 15479 - A062

Revision: P4

Plot Date: 6/09/2016 /Volumes/PPA Data/JOB FILES/15479 UniSA Mawson Lakes Master Plan/15479 Drawings/CAD Files/Model/2016 Current Space Audit/15479 UniSA Master Plan Current Space Audit 2016 AUGUST.pln

GENERAL TEACHING
CLEANER
ITMS
ISTS



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BUILDING W LEVEL 1

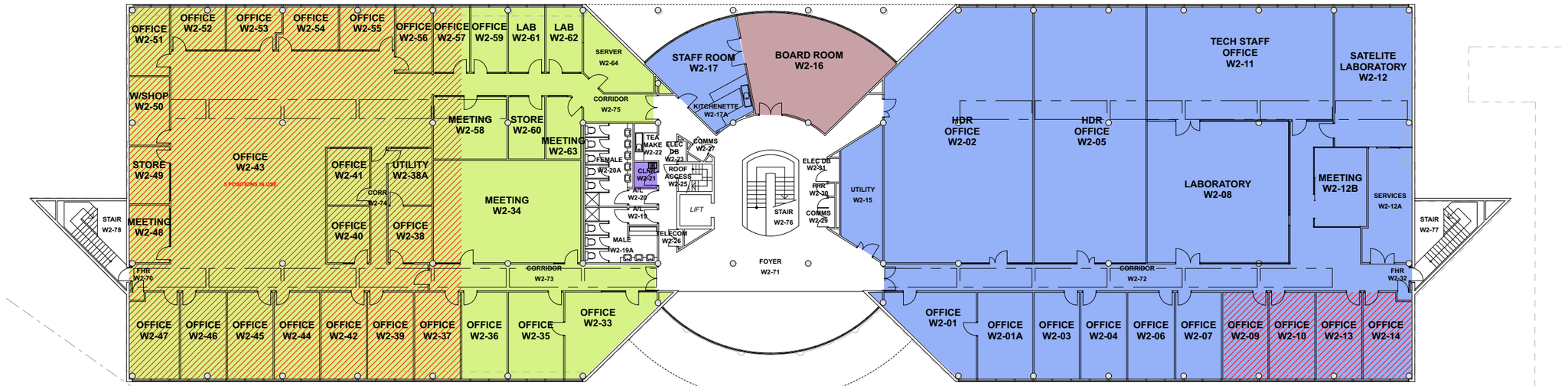
Scale 1:150 @ A1

Drawing By: AM/TH
Checked By: SP
Date: 6/09/2016
PRELIMINARY

Project No/Drawing No.: 15479 - A063

Revision: P4

Plot Date: 6/09/2016 /Volumes/PPA Data/JOB FILES/15479 UniSA Mawson Lakes Master Plan/15479 Drawings/CAD Files/Model/2016 Current Space Audit/15479 UniSA Master Plan Current Space Audit 2016 AUGUST.pln



GENERAL TEACHING

CLEANER

ITMS

ENE

VACANT

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BUILDING W LEVEL 2

Scale 1:150 @ A1

Drawing By: AM/TH

Checked By: SP

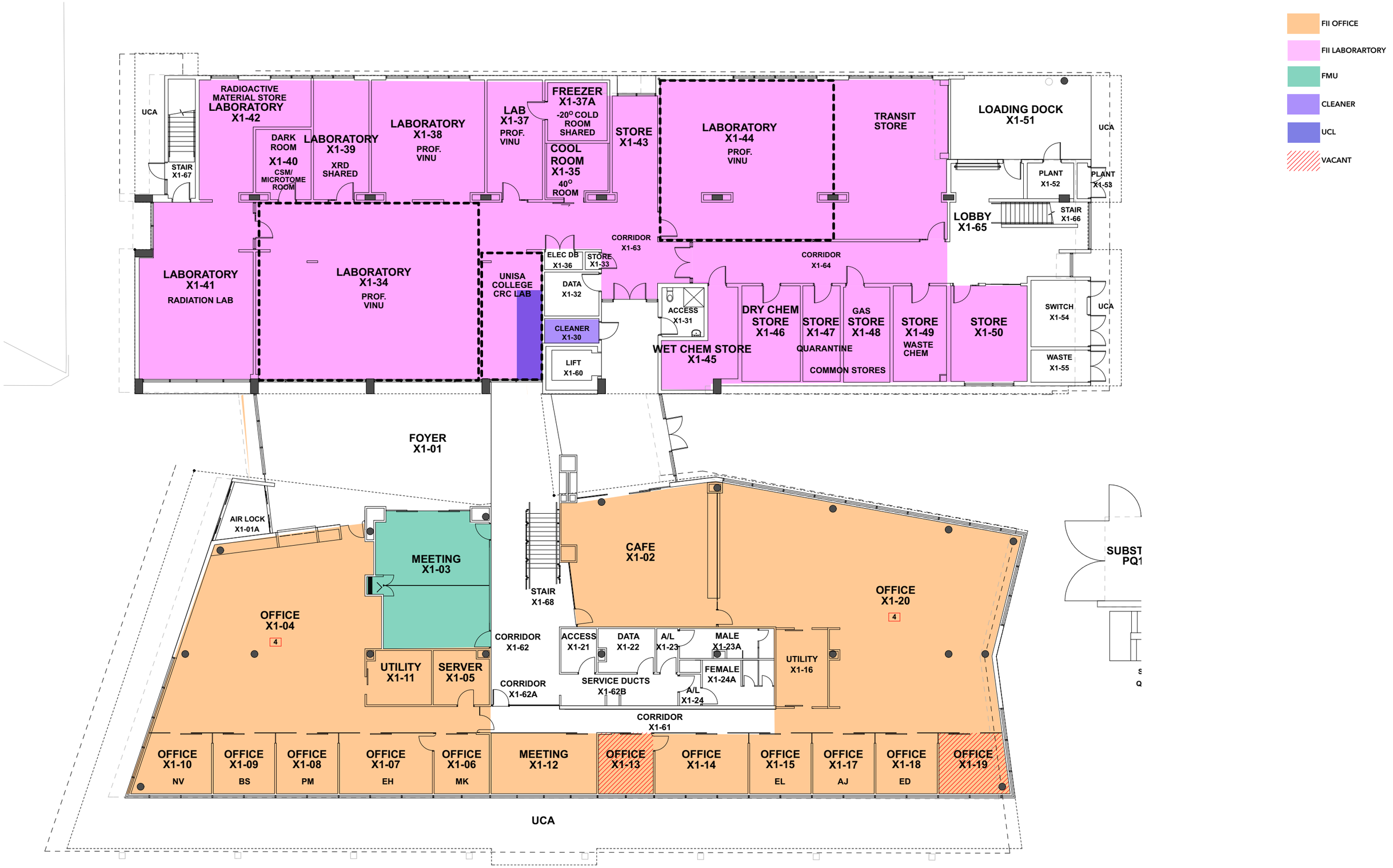
Date: 6/09/2016

PRELIMINARY

Project No/Drawing No.: 15479 - A064

Revision: P4

Plot Date: 6/09/2016 /Volumes/PPA Data/JOB FILES/15479 UniSA Mawson Lakes Master Plan/15479 Drawings/CAD Files/Model/2016 Current Space Audit/15479 UniSA Master Plan Current Space Audit 2016 AUGUST.pln



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Mawson Lakes, South Australia

BUILDING X LEVEL 1

Scale 1:100 @ A1

Drawing By: AM/TH
Checked By: SP
Date: 6/09/2016
PRELIMINARY
Project No/Drawing No.: 15479 - A065
Revision: P4

Plot Date: 6/09/2016 /Volumes/PPA Data/JOB FILES/15479 UniSA Mawson Lakes Master Plan/15479 Drawings/CAD Files/Model/2016 Current Space Audit/15479 UniSA Master Plan Current Space Audit 2016 AUGUST.pln

FII OFFICE
FII LABORARTORY
FMU
CLEANER
CRC CARE
VACANT

STAIR X2-56
ROOF ACCESS X2-56A
LABORATORY X2-35
2 X PCR
LABORATORY X2-33
LABORATORY X2-32
INCUBATION STORE
LABORATORY X2-31
SERVICE X2-36
CTR X2-38 18-20°
CTR X2-37 37°
STORE X2-55A
LABORATORY X2-42
WASH ROOM
LABORATORY X2-43
SHARED
BALANCE ROOM X2-44
BALANCE ROOM
LABORATORY X2-45
LABORATORY X2-47
INSTRUMENT LAB
STAIR X2-57
CORRIDOR X2-55
LABORATORY X2-41
LABORATORY X2-30
MICRO BIOLOGY LAB SHARED + BOOKABLE
AIR LOCK X2-34 18°
CLEAN ROOM X2-34A
PC 2
CTR X2-29
PLANT X2-27
ACCESS X2-25
ROOF ACCESS X2-26A
ELEC DB X2-39
PLANT X2-40
PLANT X2-26
SHARED LABS
EL LABS
EH LABS
GARY OWENS
LABORATORY X2-46
ORGANIC CHEM LAB
LABORATORY X2-48
INSTRUMENT LAB
SHARED LABS SPACE
FOYER X2-01
OFFICE X2-03
OFFICE X2-02
CORRIDOR X2-54
UTILITY X2-12
OFFICE X2-11
OFFICE X2-13
MEETING X2-04
STAIR X2-58
CLEANER X2-14
ACCESS X2-15
A/L X2-16
MALE X2-16A
FEMALE X2-17A
KITCHENETTE X2-54A
SERVICE DUCTS X2-54B
A/L X2-17
OFFICE X2-10
OFFICE X2-07
ES
OFFICE X2-09
AV
UTILITY X2-08
OFFICE X2-05
8
LIBRARY X2-18
OFFICE X2-06
BALCONY X2-18A

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

BUILDING X LEVEL 2

Scale 1:100 @ A1

Drawing By: AM/TH
Checked By: SP
Date: 6/09/2016
PRELIMINARY
Project No/Drawing No.: 15479 - A066
Revision: P4

Plot Date: 6/09/2016 /Volumes/PPA Data/JOB FILES/15479 UniSA Mawson Lakes Master Plan/15479 Drawings/CAD Files/Model/2016 Current Space Audit/15479 UniSA Master Plan Current Space Audit 2016 AUGUST.pln

EXISTING AREA SCHEDULES

DIV ITEE	Bldg A	Bldg MC	Bldg MM	Bldg P	Bldg SCT	TOTAL
Meeting	-	26	-	-	-	26
Office	65	261	-	328	10	664
Shared Staff Spaces	-	10	-	16	74	100
Storage	-	-	-	72	36	108
TOTAL	65	297	0	416	120	898

SPARE=2
HOTDESK=2

SCHOOL OF EDUCATION	Bldg G	TOTAL
General Teaching	528	528
Research Labs	-	0
Teaching Labs	397	397
General Workshop	-	0
Teaching Workshop	163	163
Office	971	971
Shared Staff Spaces	56	56
Storage	245	245
TOTAL	2360	2360

NBE AREAS	Bldg EA	Bldg EB	Bldg H	Bldg L	Bldg N	Bldg P	TOTAL
General Teaching	-	-	-	-	80	319	399
Research Labs	50	78	669	1133	215	-	2145
Teaching Labs	-	-	382	-	97	225	704
General Workshop	-	-	-	-	162	-	162
Teaching Workshop	-	-	-	-	1153	-	1153
Planetarium	-	-	-	-	-	53	53
Office	-	-	780	49.4	149.3	850	1828.7
Shared Staff Spaces	-	-	37.5	-	26.3	85.5	149.3
Storage	-	4	394	23	524	196	1141
TOTAL	50	82	2262.5	1205.4	2406.6	1728.5	7735

ENE AREAS	Bldg A	Bldg EC	Bldg F	Bldg IW	Bldg J	Bldg M	Bldg MM	Bldg Q	Bldg SA	Bldg SB	Bldg SCT	Bldg W	TOTAL
General Teaching	539	-	-	-	314	210	384	-	-	-	315	-	1762
Research Labs	-	15	1236	-	-	1773	-	363	-	-	280	-	3667
Teaching Labs	-	-	-	-	-	-	-	-	-	-	1290	-	1290
General Workshop	-	-	-	-	-	681.4	-	-	465	521	261	11	1939.4
Teaching Workshop	-	-	-	-	-	250	-	-	-	-	-	-	250
Office	-	-	27	54	863	556	-	26	-	-	941	384	2851
Shared Staff Spaces	-	-	-	-	169	56	-	-	-	-	14	-	239
Storage	3	-	23	-	44	191	10	-	17	298	256	29	871
TOTAL	542	15	1286	54	1390	3717.4	394	389	482	819	3357	424	12869.4
Vacant Lab	-	-	1236	-	-	178	-	-	-	-	143	-	1557
Vacant Office	-	-	-	-	88	-	-	-	-	-	237	-	325
													1882

FII AREAS	Bldg EA	Bldg EC	Bldg ED	Bldg H	Bldg IW	Bldg M	Bldg MM	Bldg Q	Bldg R	Bldg V	Bldg X	TOTAL
Research Labs	51	56	94	27	851		1038	423	1702	595	1203	6040
Workshop	-	-	-	239	-		-	-	198	-	-	437
Office	-	-	-	31	470	187.3	1250	-	317	383	1079	3717.3
Shared Staff Space	-	-	-	-	41		20	-	12	90	64	227
Storage	-	126	-	143	28	111.1	120	10	123	102	273	1036.1
TOTAL	51	182	94	440	1390	298.4	2428	433	2352	1170	2619	11457.4
Vacant Laboratory	-	-	-	-	-		-	33	492	-	-	525
Vacant Office	-	-	-	-	172		40	97	160	59	49	577
												1102

FMU AREAS	Bldg A	Bldg B	Bldg F	Bldg G	Bldg GP	Bldg H	Bldg J	Bldg K	Bldg MC	Bldg MM	Bldg N	Bldg P	Bldg PH	Bldg R	Bldg SD	Bldg SE	Bldg S'S, TR + BSA	Bldg V	Bldg X	TOTAL
Meeting/Training	15.4	-	38	43.4	188.2	39.3	60	-	19.5	50.5	-	49.7	13.3	-	-	-	-	69.1	64.2	650.6
Office	154.1	8.3	-	-	14.3	16.4	-	-	-	-	8.3	-	56.9	-	8.2	-	-	-	-	266.5
Workshop	-	8.1	-	-	-	-	-	15.8	-	-	93.6	-	-	-	78.9	-	-	-	-	196.4
Storage	27.1	208.9	-	-	-	5.3	-	27.2	3.2	35.3	29.8	46.5	107.7	10.2	310.4	70.6	238.7	-	-	1120.9
Services	9.7	21.7	-	-	-	-	-	17.1	-	14.7	-	-	21.5	-	-	-	1.8	-	-	86.5
Amenity	97.3	-	19	3.8	8.8	6.3	-	-	8.6	-	29.2	-	39.3	6	41.7	-	9.9	-	-	269.9
Gym/Fitness	-	1402.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1402.4
Prayer	146.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	146.9
TOTAL	450.5	1649.4	57	47.2	211.3	67.3	60	60.1	31.3	100.5	160.9	96.2	238.7	16.2	439.2	70.6	250.4	69.1	64.2	4140.1

GENERAL TEACHING AREAS	Bldg B	Bldg D	Bldg F	Bldg H	Bldg J	Bldg K	Bldg MC	Bldg MM	Bldg P	Bldg Q	Bldg SCT	Bldg W	TOTAL
General Teaching	210	94	642	233	331	244	760	392	814	61	310	151	4242
TOTAL	210	94	642	233	331	244	760	392	814	61	310	151	4242

ITMS AREAS	Bldg D	Bldg F	Bldg OC	Bldg R	Bldg V	Bldg W	TOTAL
Teaching	-	299	-	-	-	-	299
Labs	73	285	12	82	83	125	660
Workshop	-	-	-	-	-	14	14
Office	817	423	722	121	-	842	2925
Shared Staff Space	79	-	12	-	-	53	144
Storage	22	-	-	-	-	58	80
TOTAL	991	1007	746	203	83	1092	4122
Vacant Lab	-	-	-	83	-	-	83
Vacant Office	14	14	109	96	-	159	392
							475

ISTS AREAS	Bldg C	Bldg E	Bldg W	TOTAL
Office	308	815	563	1686
Meeting	-	71	-	71
Shared Staff Spaces	90.5	71.5	55	217
Data Centre	-	124	-	124
Storage	-	110	18	128
TOTAL	398.5	1191.5	636	2226

UniSA COLLEGE AREAS	Bldg F	Bldg P	TOTAL
Labs	-	92	92
Office	184	-	184
Shared Staff Spaces	-	8.5	8.5
Storage	55	6.5	61.5
TOTAL	239	107	346

PHARMACY	Bldg IW	Bldg Q	Bldg R	TOTAL
General Teaching	-	-	-	0
Labs	-	475	605	1080
Office	58	65	105	228
Shared Staff Spaces	-	-	20	20
Storage	-	-	63	63
TOTAL	58	540	793	1391
Vacant Lab	-	-	-	0
Vacant Office	-	-	34	34
				34

LIBRARY AREAS	Bldg C	TOTAL
Collection	3040	3040
Study	591	591
Office	1121	1121
TOTAL	4752	4752

AAD AREAS	New Shed	TOTAL
Workshop	752	752
TOTAL	752	752

SEU/TIU AREAS	Bldg C	TOTAL
Office	124	124
TOTAL	124	124

RIS AREAS	Bldg GP	TOTAL
Office	680	680
TOTAL	680	680

CAMPUS CENTRAL	Bldg C	TOTAL
Office	244.8	244.8
TOTAL	244.8	244.8

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