3.0___Site review/analysis

3.1 Site description

Lismore Base Hospital (LBH) is the oldest Major Referral Hospital in the Northern NSW LHD. A large proportion of the inpatient wards are in buildings dating from pre-1960, while the more recent 1990's development includes the procedural and diagnostic departments. By today's standards much of Lismore Base Hospital is out-dated and does not facilitate efficient patient care nor does it allow for implementation of contemporary clinical service models required to meet the growth in demand identified in the CSP.

The current LBH campus has developed over a long period, with buildings added to the campus infrastructure from time to time creating a site with a variety of facilities of differing form, structure, condition and clinical suitability.

01_Project context

02_Clinical infrastructure & surrounding development

3.0____Site review/analysis

3.2 Vehicular access

Emergency access

_The entry to the Emergency Department is located on Uralba Street on Level 4, adjacent to the main hospital entry this includes access for emergency vehicles and patient transport vehicles

_There is a separate secure mental health drop-off zone at level 0 underneath the mental health unit

_Ambulance transfers from other hospitals and from the air ambulance arrive through the existing emergency department

Staff and service access

_The Main Loading Dock is accessed from Hunter Street at level 1, rising to level 2 at the delivery point

_There are multiple entry points to the campus buildings from Uralba Street, Hunter Street, Little Uralba Street and Weaver Street. Each entrance relates to a specific building and/or clinical service and reflects the buildings relationship to the adjacent street level

_The Pathology Unit (Block T) is accessed from Uralba Street at a datum approximately half a level above the main entrance. There is a secondary service entry to the Pathology suite accessed from Little Uralba Street at level 3

_The Mortuary (Block U) is accessed from Little Uralba Street at level 3

_Crawford House (Block N) is accessed from Hunter Street via steps/ramp at level 3

_Access for the main medical gas bulk vessel top up is from Weaver Street on level 0

Visitor access

_The main entry to the hospital is located on Uralba Street on Level 4, with a steep vehicular access drive

_The existing site topography combined with 'ad hoc' expansion over many years has created a site with poor permeability and legibility for pedestrians. Access around the site on public footpaths is generally clear however Little Uralba Street lacks a defined footpath and the grades on Hunter Street are very steep, making it hard for people with poor mobility to move between the Hunter Street car park and the main entry on Uralba Street. There is also a little weather protection for visitors around the main drop-off area

_The Cancer Centre is accessed from a drop-off zone at level 1, which also provides a secondary access to the main hospital

_All parts of the Mental Health Unit are also accessed from level 1

3.2

3.3

3.4

3.0____Site review/analysis

3.3 Pedestrian access

Pedestrian access within the site is particularly confusing. There is no clear and legible link from the Hunter Street car park to the North of the site on level 0 through to the main entry on Uralba Street at level 4, and pedestrians are required to travel via a series of poorly connected corridors, lifts and stairs.

Planning for the overall Stage 3 redevelopment of LBH must be mindful of the current LBH physical infrastructure, to ensure that existing hospital assets are best utilised, adapted or decommissioned to maximize the priority health services provided by LBH now and into the future.

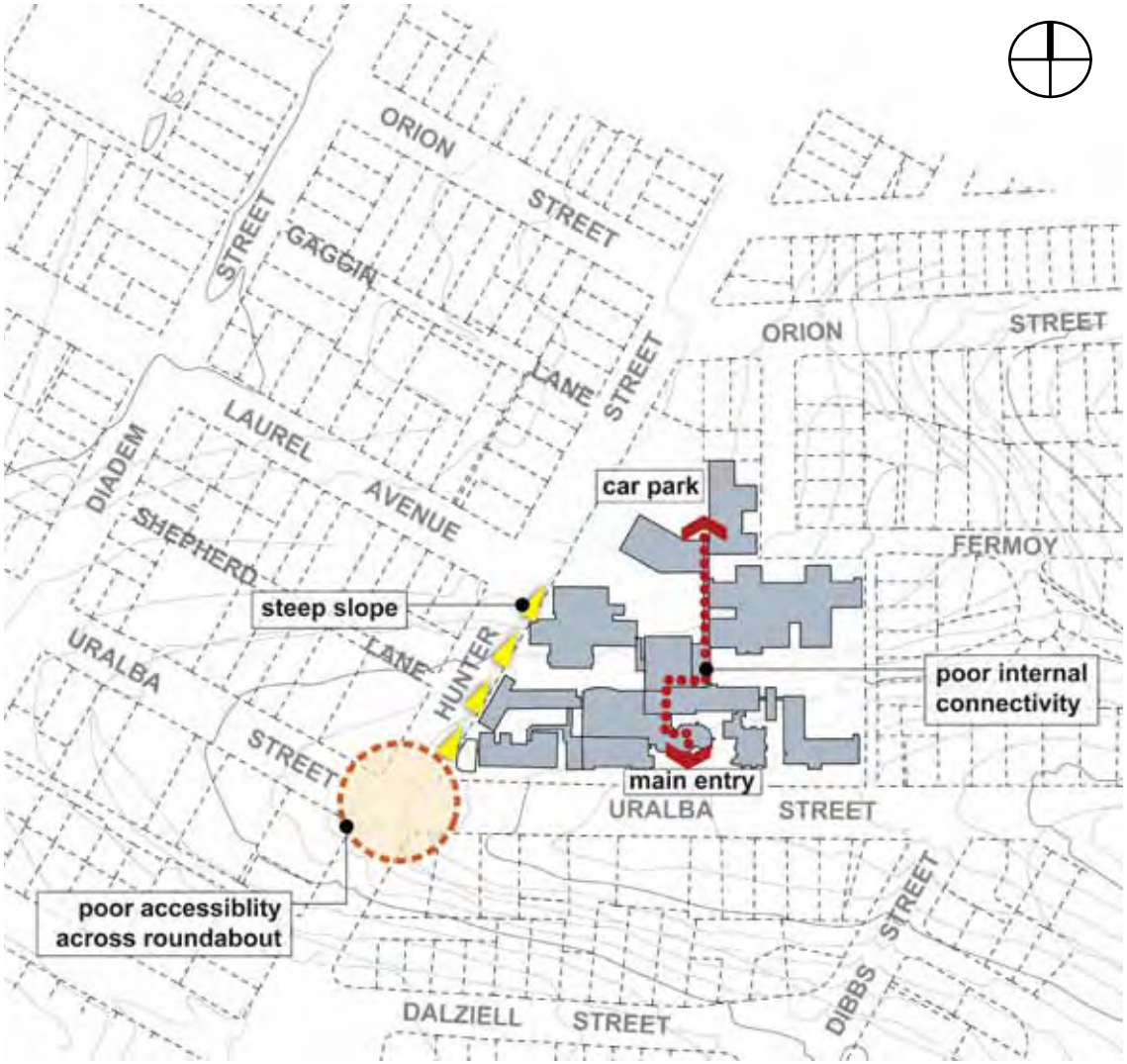
There are several significant challenges to be overcome, and these can be identified as key issues for LBH Stage 3 redevelopment:

_Improvement of ambulance, patient and public access to the Lismore Base Hospital site together with goods loading and hospital delivery facilities

_Resolution within an agreed master plan for improvement of vehicle movement, car parking and pedestrian access within the LBH campus

_Staging and decanting of new and refurbished clinical and non-clinical services to ensure continuity of service at all times

_Overcoming some poor clinical relationships which exist within the existing acute care buildings



01_Pedestrian access

3.0____Site review/analysis

3.4 Features and contours survey

Lismore Base Hospital comprises a number of separate development plots variously owned by Lismore Base Hospital, North Coast Area Health Service and Health Administration Corporation.

As part of the concept design process Newton Denny & Chappell were commissioned to develop a full measured topographical survey of the existing site under the direction of Health Infrastructure. The survey has helped to identify number of issues which will have a critical impact on the stage 3 development:

_The complexity of the existing site levels
_The variety of building levels and entry points
_Details of the services infrastructure, particularly the points at which key services enter the site
_The complexity of the existing drainage system which has been developed in an ad-hoc manner

A full set of survey drawings are included in Appendix A.

01_NDC survey

3.0___Site review/analysis

3.5 Town planning issues

Lismore LEP 2000 is the relevant planning instrument and zones the site No 5 (Special Uses), a zone typically used for community and public purpose land.

There are currently no height or FSR restrictions on the site and none of the site is identified as a local or state heritage item. The far northern part of the site is flood prone (see diagram 02).

'Armstrong House' is a local heritage item located near the Hospital, on the corner of the Uralba Street and Dibbs Street. It is also understood that there are heritage values associated with the dwelling located on the south-eastern corner of Uralba Street and Dibbs Street, opposite the Hospital.

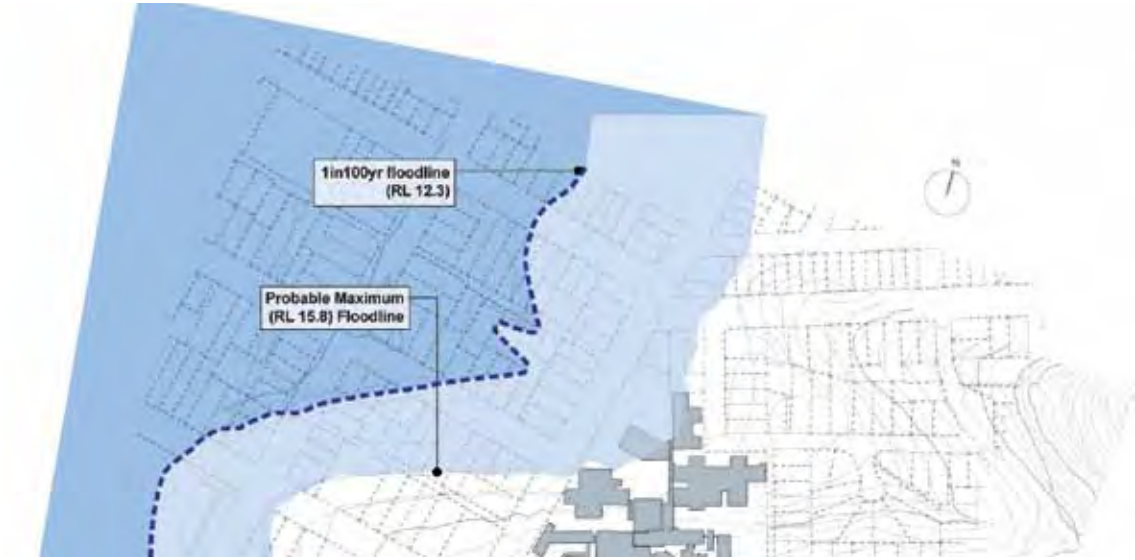
Lismore DCP 2007 provides more detailed planning provisions in regards to parking, building in flood prone lands, Crime Prevention Through Environmental Design and tree preservation orders.

Council recently exhibited the draft Lismore LEP 2011. This planning instrument will retain a similar land use (SP2 Health Services Facility) and will not have any site specific height or FSR limits.

The buildings surrounding the Hospital are generally all of a low scale residential character and any future development in this zone is likely to be restricted to a 9m maximum height limit. It is important that any future development on the hospital site respects the surrounding context.

The majority of the Lismore Base Hospital site is located outside of the Lismore City Council Flood Risk Area identified by the 1m 100yr flood line in the diagram. However, the northeast corner of the site (existing parking lot) is located within the Low Flood Risk Area which is defined as area within the limits of the Probable Maximum Flood (PMF).

01_Height controls



02_Flood zones

3.0___Site review/analysis

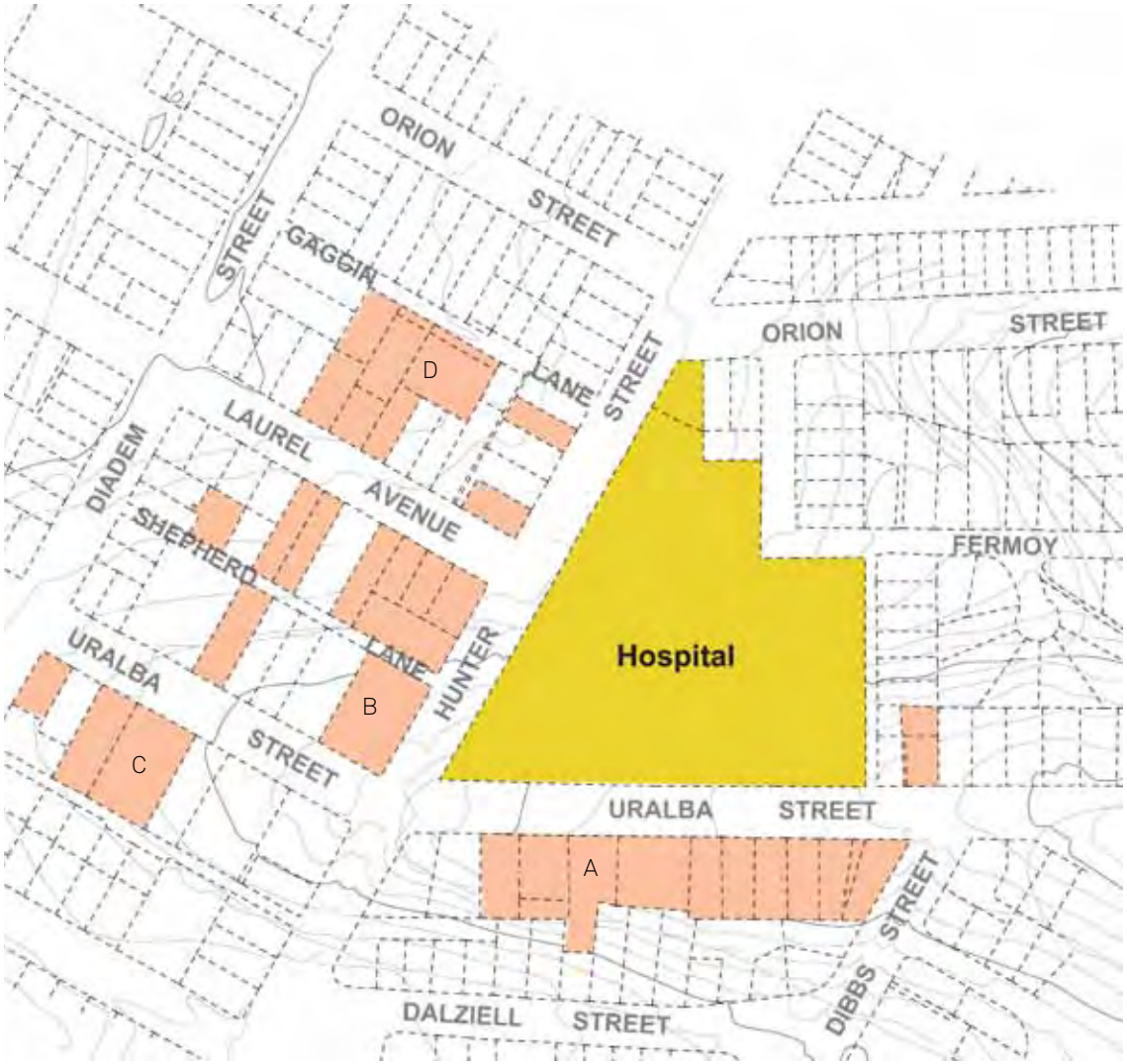
3.6 Urban design issues

The area surrounding the Hospital is in a period of transition from residential to hospital related uses. It is evident that the presence of Lismore Base Hospital has been an attractor for allied health uses as well as services directly associated with the Hospital. This has created a larger 'hospital precinct' which includes numerous health related facilities, as well as privately owned properties by staff.

The areas to the north and east of the site are primarily residential and it will be important than any future development near these boundaries are sensitive and respectful to the residential interfaces. For example, these areas generally have setback requirements of 6m for primary frontages and 4m for secondary frontages.

The diagram highlights the existing hospital and those buildings in close proximity which are used for health related funtions. This also includes the University Centre for Rural Health (A), the Drug and Alcohol Unit (B), Population Health and Planning (C) and LBH maintenance (D).

Lismore City Council offices are currently considering an opportunity to create a 'health precinct' centred around the hospital as part of its local development plan. LCC organised a design charette in November 2012 with the purpose of further refining this strategy. Lismore City Council are currently preparing a report describing the outcomes from this process.



01_Health sites

3.0___Site review/analysis

3.7 Local context

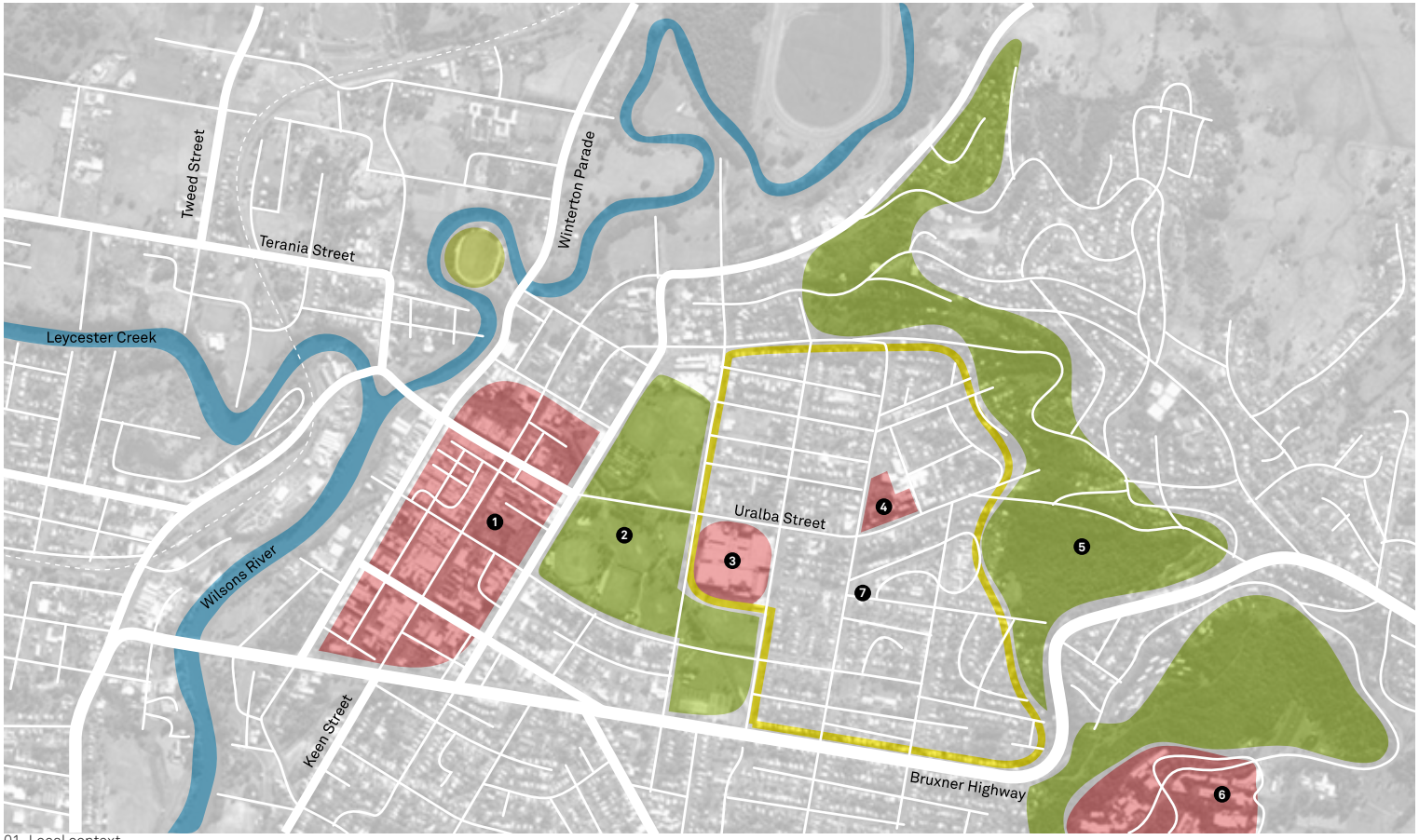
The Hospital is located within the valley to the east of the Town Centre on a slight ridgeline to the north of Ballina Road, the primary east-west arterial road through Lismore. The height and location of the Hospital ensures it is a prominent feature from all view points, as well as offering expansive views from the upper levels of the main acute buildings.

The site is has a high degree of connectivity to the Town Centre and Ballina Road through the surrounding street system:

_Uralba Street, which provides an east-west link between the Town Centre and eastern part of Ballina Road

_Hunter Street, which links provides the main southern approach

_Orion Street, Weaver Street and Little Uralba Street are smaller residential streets



01_Local context

1. Town Centre frame
2. Lismore Park
3. Lismore Square
4. Base Hospital
5. Rotary Park Rainforest Reserve
6. Southern Cross University
7. Residential frame

3.0____Site review/analysis

3.8 Planning approval pathways

3.8.1 Pathways

The Environmental Planning and Assessment Act 1979 (EP&A Act) provides a number of pathways to assess and approve hospital related development, these are summarised on the adjacent diagram.

Discussion with Health Infrastructure has indicated that Stage 3A and 3B will be undertaken as a State Significant Development. The application will seek approval for a concept proposal of Stage 3A and 3B (stage DA) and a full DA for Stage 3A.

3.8.2 Statutory planning approach

(Refer Appendix L – Volume 2)
Work to include planning approval for:

_Enabling works
_Stage 3a new works
_Land use permissibility of 'hospital or 'car parking' uses on adjacent sites.

The process will require:

_Part 5 REF approval process for the proposed enabling works
_State Significant Development (SSD) approval with a staged Construction Certificate is the most appropriate for the Lismore Base Hospital Redevelopment for Stage 3a
_Hospital and car park uses are permissible on the adjacent sites through the provisions of SEPP (Infrastructure) 2007.

SSD Planning process

The SDD Approval Process generally takes 12 months from completion of the architectural drawings. The process and timing are shown in table 2.

Sub consultant inputs

Actual sub consultant inputs will be determined by the DGRs. However the following are likely to be required:

_Architectural plans- to DA standard
_Landscape Plans and Public Domain Plans
_Site survey
_Operational Management
_Hazard Management
_Waste Management Plan
_Traffic and Parking Assessment
_Civil Report (including stormwater strategy, erosion and sediment control)
_Infrastructure and services review
_Arborist assessment of trees likely to be impacted by works (including demolition)
_Geotechnical and structural report

Scale of proposed hospital development	Indicative criteria	Process
Minor	Does not increase the number of patients or staff by more than 10%	Part 5 Review of Environmental Factors (REF)
Moderate	Development up to $29m	Part 4 lodged to Council
Major ($30m+)	Capital Investment Value of $30m+	State Significant Development (SSD) lodged to DPI

Table 1

3.0____Site review/analysis

Phase	Tasks	Timeframe
SSD declaration and Director General's Requirements (DGRs)	_Determine the project concept _Prepare preliminary assessment of concept and a request to Minister to declare the project as SSD and issue DGRs _Receive declaration and DGRs	1-2 months
Draft Environmental Impact Statement (EIS) Report	_Advise sub consultants and planning/design requirements (as outlined in DGRs) _Refine development concept _Liaise with key agencies (as required) _Prepare draft EIS including proposed mitigation measures _Finalise EIS	3-4 months
Lodgement of EIS	_Lodge EIS with Department _Department checks if EIS meets DGRs- if not Department may request additional information (similar to former Test of Adequacy)	1 month
Exhibition & response to submissions	_Department exhibits EIS for a minimum 30 days and provides submissions to applicant for review _Review of submissions and prepare response as required	4 months
Assessment & determination	_Department finalises assessment of DA and consults applicant regarding draft conditions. _Determination of DA.	Up to 1 month

_Table 2

3.0____Site review/analysis

3.9 Traffic engineering and car-parking

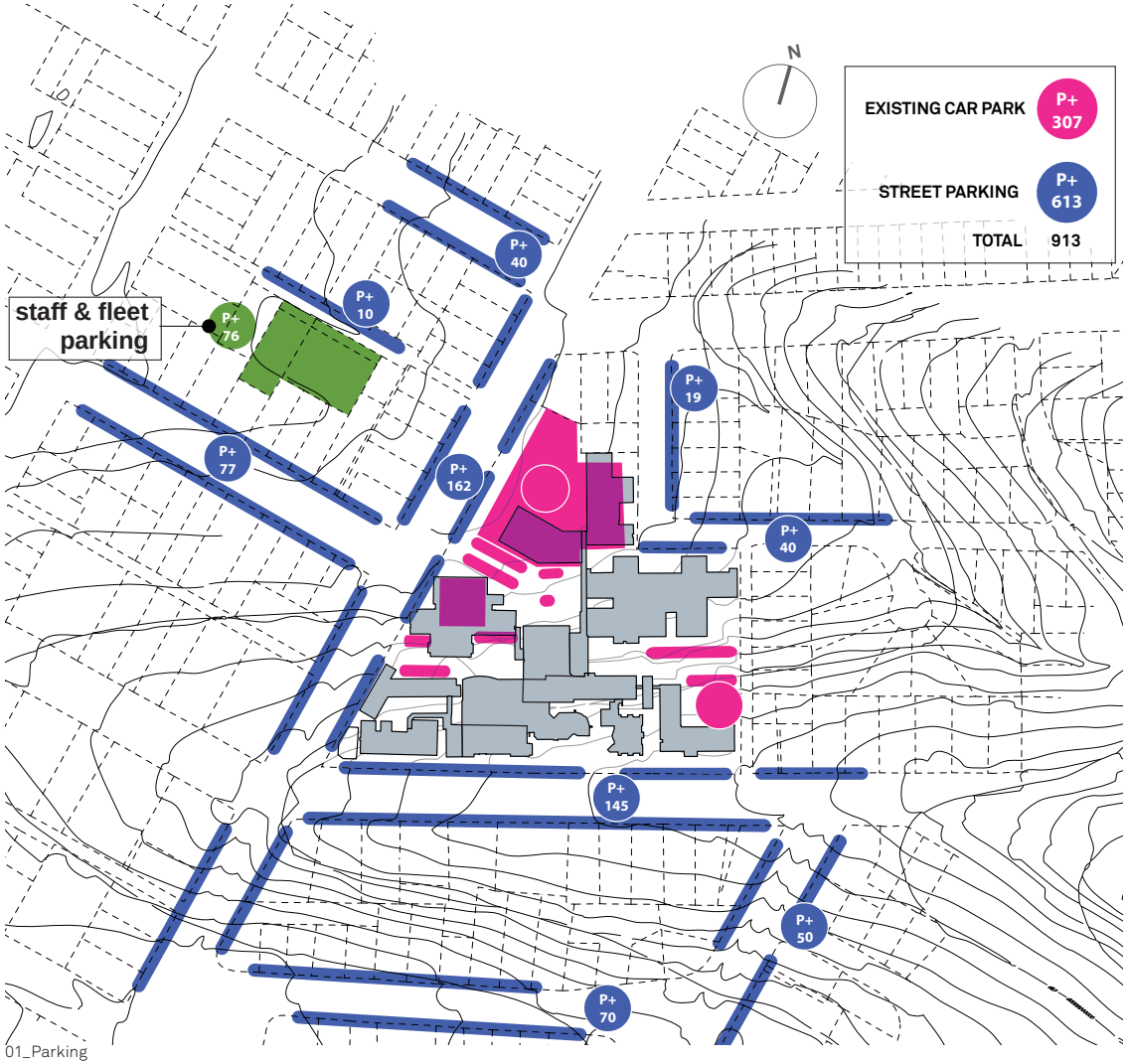
Currently, a total of some 300 parking spaces are available within the Hospital Campus with a further 100 spaces outside the campus accommodating for fleet cars and doctors' accommodations. Over 650 on street parking spaces also are available in the vicinity of the Hospital. Most on street parking spaces are unrestricted whilst Uralba Street provides some short term parking along its length including pay parking.

An observation of parking activities showed a high utility of over 90% occupancy rate of parking spaces within the campus and on street. The existing parking demand for the site would be in order of 820 spaces. This is based on 90% car use among hospital's patrons (based on survey questionnaire; July 2012) and an average stay of 2 hours for outpatients and 1 hour for visitors during a peak hour. In addition to the above some 50-70 additional spaces would be required for fleet cars and special uses.

For Stage 3A the demand for additional parking will require 110 new spaces associated with additional staff and patient activity along with 62 spaces which will be provided following the loss of some of the existing spaces on site (although 67 spaces are gained through rearrangements at Gaggin Lane and improved line marking on Hunter and Walba Streets).

The 110 additional spaces required for Stage 3A will be provided by either:

1. A new multi-deck car-park located between Uralba Street and Dalziel Street
2. A minimum enhancement land acquisition on Little Uralba Street which would accommodate up to 60 cars
3. The expanded use of the existing road network, possibly through new line-marking
4. The decision on which option to progress will be dependent on funding and the potential for land purchase.



01_Parking

3.0____Site review/analysis

3.10 Existing buildings

The physical fabric and internal layouts of the majority of the existing buildings does not facilitate efficient patient care, and limits the capacity of hospital staff to implement the contemporary care models required to effectively address growing demands and the increasing complexity of clinical needs within the catchment communities.

The existing buildings comprise approximately 32,000sqm of clinical and support accommodation within 10 separate buildings over 9 levels. An overview of the key clinical functions by building and level is included in the diagram opposite.

The last major upgrade of the acute services buildings occurred in 1990 and involves the construction of the new C block.

Following this a master plan for the LBH site was completed in 2003, and a Service Procurement Plan was completed in 2006. Stage 1 of the master plan was the Mental Health facility completed in 2008 which incorporates 48 specialist Mental Health beds, Community Mental Health and Mental Health administration and research.

Stage 2 was the Integrated Cancer Care Centre (the Lismore Campus of the North Coast Cancer Institute) which was completed in 2010 and includes medical oncology and radiation therapy. It was initially commissioned with one Linear Accelerator and in 2011 a second Linear Accelerator was installed. A new Cardiac Catheterisation Laboratory was also completed in 2010 on level 6 of “C” Block above the existing main entrance.

Recently a Positron Emission Tomography (PET) Suite and MRI scanner was installed in an extension of the existing medical imaging department on level 4.

The new departments were opened for patients in November 2012.

During the next 12 months the LHD will also be constructing a new Endoscopy site adjacent to the operating theatres on level 5, above the new PET/MRI, creating space for an Emergency Medical Unit on level 4.

The current project which is the subject of this report, is Stage 3A of the redevelopment of the LBH site.

As new buildings have developed on the LBH campus over time they have by necessity responded to the existing floor levels established by Block A which was built circa 1960. These existing buildings were constructed with a floor to floor height of approximately 3.6m. Current design guidance and good practice suggests that it is not appropriate to restrict the floor to floor heights of the proposed building to match the existing levels particularly as the proposed development includes some of the most technically complex and highly serviced clinical departments. The scheme design process will include a more detailed assessment of the most appropriate floor to floor height.

In June 2012 NDY undertook an Audit of the existing lifts to assist in the consideration of the master planning strategy for the redevelopment project. A copy of the Lift Services Audit Report is included in Appendix V.

The report highlights where the existing lifts are noncompliant with current standards and makes some summary recommendations for future upgrades which include general compliance upgrades to all lifts but significant upgrades to the lifts in Crawford House and Block C (note that the lifts in Block A are currently being upgraded).

Externally the existing buildings include a variety of material finishes including brickwork of varying colours and textures, exposed concrete, terracotta tiles and pre-finished metal cladding While a comprehensive inspection of the building fabric has not been carried out, the external materials appear to be in reasonable condition.

The Structural Engineering report provides a summary of the results of document reviews, noting which buildings have available structural documentation and comments as a result of visual inspections that have been carried out. We note that any visual inspections are limited due to access and covering of the structure with finishes/ceilings etc.

At this stage no detailed or destructive structural investigation have been carried out.

In general the primary structure of the existing buildings appears sound. There is evidence of some deterioration of facade elements including some local concrete spalling, particularly on the older buildings N (Crawford House) and Blocks A and B.

In July 2012, Blackett, Maguire and Goldsmith undertook a site audit at the existing buildings to assess potential non-compliance issues against the fire safety provisions of Sections C, D (D1 & D2) and E of the Building Code of Australia 2012 and the access requirements of Part D3 of the BCA.

The report identifies existing compliance issues within the subject building in its current state and does not propose design solutions to rectify existing non-compliances. The non-compliances identified are of a nature that would be considered to impact on the life safety on the building occupants in the event of an emergency.

3.0____Site review/analysis

Existing building uses and gross internal areas (including travel and engineering)

Level	Mental Health	Cancer Centre	Block J	Block B	Block A	Block C	Block T	Block U	Block N	Block P	Acute Pain
8					Paediatric Ward	Surgical Ward					
7					Medical Ward	Medical Ward			O/N Accommodation		
6					Renal Services	Cardiac Cath Lab			Admin		
					Transit Lounge	Orthopaedic Ward					
5				Intensive Care	Day Surgery	Theatres	Pathology		Admin		
4			Maternity Beds	Birthing Unit Special Care Nursery	Maternity ward	Main Entrance	Pathology	Mortuary	Admin	Library Outpatient	
						Pharmacy dispensing					
						Endoscopy					
						Emergency Medical Imaging					
3				Allied Health	Allied Health	Physiotherapy Occupational Therapy		Mortuary	Admin	Outpatient	
						Sterile Processing Medical Records					
2		Day Infusion Offices		Cafe	Kitchen	Loading Dock Stores			Admin		
1	Ambulatory Care CAMHS Ward Adult Ward	Radiotherapy Consulting Suites		Engineering Services IT							
0											Pain management needle exchange

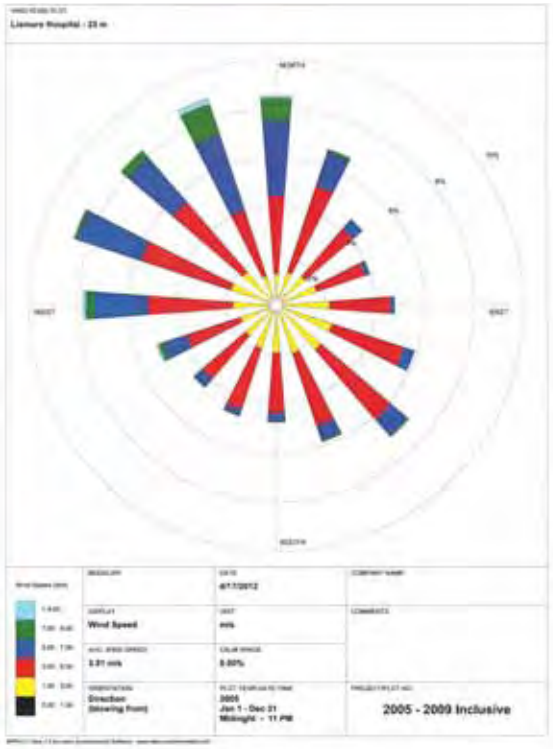
8					780.0	960.0					
7					740.0	960.0			620.0		
6					740.0	1390.0			620.0		
5				480.0	1050.0	1290.0	840.0		620.0		
4			470.0	480.0	1070.0	2350.0	273.0	110.0	620.0	730.0	
3				470.0	1030.0	1900.0		110.0	620.0	310.0	
2		1350.0		580.0	840.0	900.0			630.0		
1	5100.0	1500.0		70.0							
0											No information
	5100.0	**2850.0**	**470.0**	**2080.0**	**6250.0**	**9750.0**	**1113.0**	**220.0**	**3730.0**	**1040.0**	available

3.0___Site review/analysis

3.11 Environmental assessment

Lismore is located within a valley surrounded by ridgelines. The town is subject to a specific microclimate which leads to higher than typical temperatures - as compared to the rest of the region, and severe fog.

It is a subtropical climate and experiences mild to warm temperatures ranging from an average annual maximum temperature of 25.4 degrees Celsius and minimum of 13.4 degrees Celsius.



01_Wind rose

01_Sun/Wind

3.0____Site review/analysis

3.12 Hazardous materials (building fabric)

A desktop study was undertaken in 2012 by Noel Arnold and Associates with the purpose of summarising the findings from hazardous material surveys undertaken between 2004 and 2007. The findings identified that many of the existing buildings contain both friable and non-friable asbestos, and that it is unknown whether the buildings contain other hazardous materials such as synthetic mineral fibre, lead paint and polychlorinated biphenyl (PCB). Refer Appendix.

The study recommends that further investigative works be undertaken in any existing buildings prior to refurbishment or demolition.

3.13 Geotechnical survey

A desktop review of available data and previous reports has been carried out by Coffey Geotechnics. A copy of this report is attached within the Structural Engineering Appendix.

The site is underlain by the Lismore Basalt Foundation. This generally comprises significant thickness of basalt flows, potentially separated by weaker soil or sedimentary deposits.

A summary of typical conditions is set out below.

_A surface profile disturbed by the current building developments, including significant cuts and retention structures. Fill is expected behind retaining walls and in gardens

_A variable depth soil profile, generally of medium to high plasticity clay. Typically the soil depth varies from 1m at the south east side of the site, to 7m towards the north west areas of Blocks N and D (Crawford House/Cancer Care). Soils are stiff to very stiff and highly reactive

_An underlying rock material consisting of two basalt layers separated by a soil layer. The upper layer is typically up to 12m thick, and is distinctly weathered, fractured and variable in strength. A 4m-7m deep soil layer lies beneath the upper basalt layer, which will be of low (soil) strength, and will have significant effect on bearing capacities for foundations. The lower basalt layer is high to very high strength, and significantly less weathered

_Foundations are expected to be either pads/strip footings within the upper basalt layer, or piled foundations to the lower, stronger basalt. Pad footings would have an allowable bearing capacity of 500 kPa, with piles up to 5,000 kPa if founded in the lower basalt layer. Some rock coring is expected to reach the higher strength basalt

_Shallow excavations may be battered back, with permanent slopes of 2.5H to 1V for soils and 2H to 1V in upper basalt

_Deep excavations will be subject to slope movements along the fracture zones of the upper basalt layer. In this case retaining walls, or more likely soil nailed walls will be required. Soil nails were used on the shotcrete wall behind mental health, and in this case will need to ensure the nails are fully contained within the site

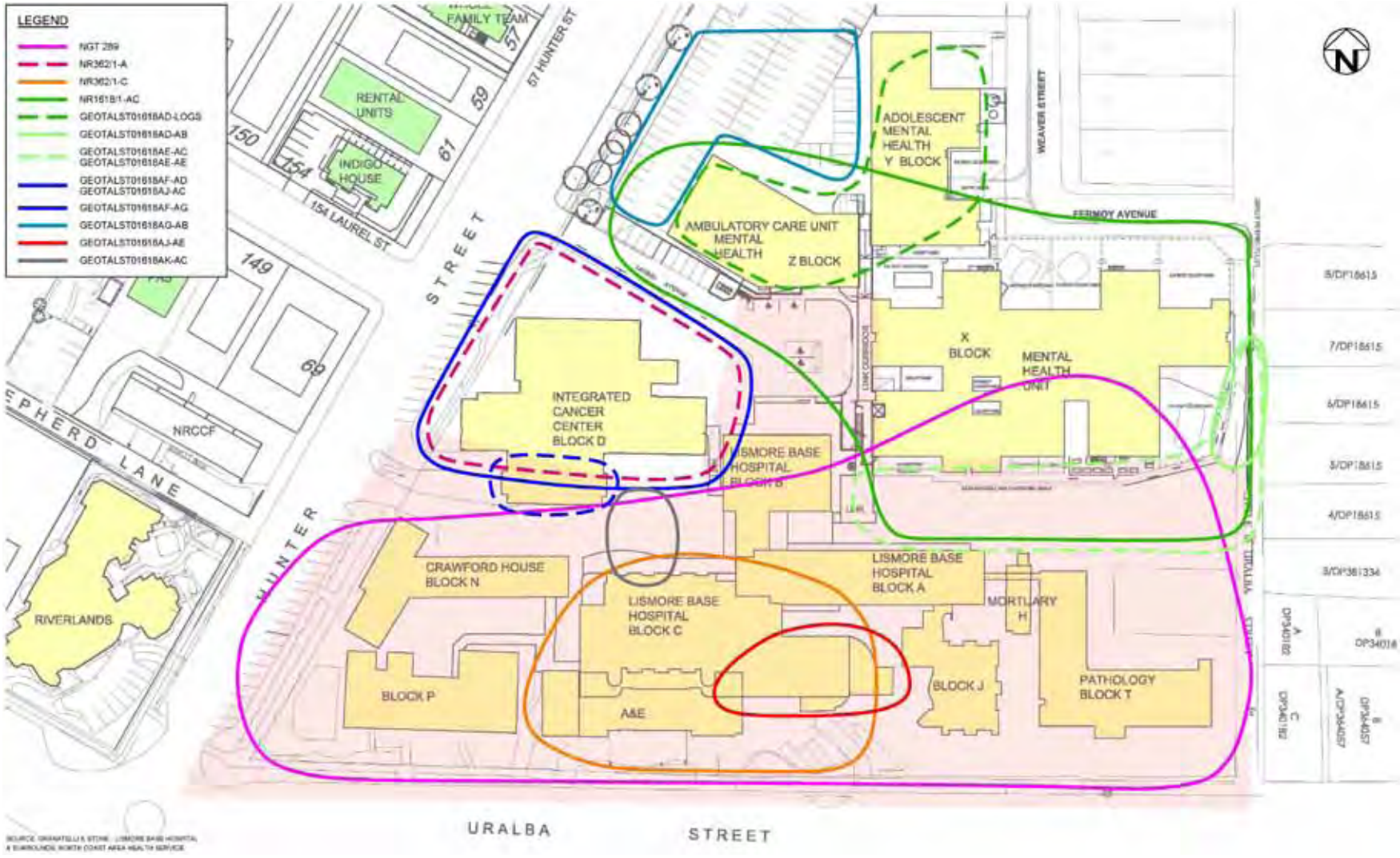
_Groundwater monitoring will be required for deep excavation areas

A detailed geotechnical investigation has been commissioned, to verify the ground conditions. The results of these investigations should be available in February 2013.

It is possible that the previous usage on the site will have contaminated the ground, particularly in the fill areas and where previous buildings have contained contaminants, or been demolished.

Coffey Geotechnics are currently undertaking some ground contamination investigation works including testing of fill in conjunction with the geotechnical investigation. Results from this investigation should be available in February 2013.

3.0____Site review/analysis



01_Zones identifying geotechnical surveys

3.0____Site review/analysis

3.14 Site services

A detailed review of the existing services connections, capacity and distribution has been undertaken by the design team including an assessment of the recent engineering services condition report by MDA. Details of the analysis are included in the various appendices, however a summary of the existing conditions in the following sections.

3.15 Electrical and ICT services

The existing site is supplied via three points of attachment from the Essential Energy Electricity Network. These include:

_2 x 1000kVA oil filled transformers located within a chamber substation, located within B block (installed circa 1989)

_1 x 1000kVA external kiosk transformer, located outside the Cancer Care building on Laurel Avenue (installed circa 2005)

_Three phase overhead low voltage (LV) service from the Essential Energy 300kVA transformer located on Hunter Street

The existing chamber substation is supplied by two 11kV underground feeders. Both 11kV feeders enter the site off Hunter street and run along opposing sides of Laurel Avenue. The kiosk transformer is also supplied via one of these 11kV feeders.

Three 1000kVA transformers each supply a separate bus section on the main switch board (MSB) located within the B block level 2 switch room. Based on assessment of the existing there is limited spare capacity for significant future load growth. The existing main switch board was installed in 2005 as part of the upgrade project to install a second standby diesel generator. This MSB is rated at 35kA for 1s and is of Form 2 construction. Each of the three LV bus sections are provided with a dedicated 277kVar power factor correction unit. The main switch board is consider to be of an acceptable condition.

Standby power is supplied via 2 existing diesel generators, rated at 1100kVA and 1200kVA. These sets are installed within B block with a local 1000L day tank.

An external 12 hour bulk fuel tank is installed in Laurel Avenue. Each generator, via a generator output switchboard which feeds the existing MSB via an automatic transfer switch.

The standby power capacity should be around 30% of the overall demand for the hospital, as prescribed by TS-11. Based on this the existing standby generators are oversized for the existing hospital requirements.

The existing campus is serviced by via multiple ICT lead ins off the following street frontages:

_Uralba Street
_Laurel Avenue
_Hunter Street
_Orion Street
_Weaver Street

The major fibre optic cable leading originate off Laurel Avenue and Uralba Street. The remaining lead ins are legacy voice grade copper lines for telephony. It is likely the majority of these services are now redundant due to the site wide PABX.

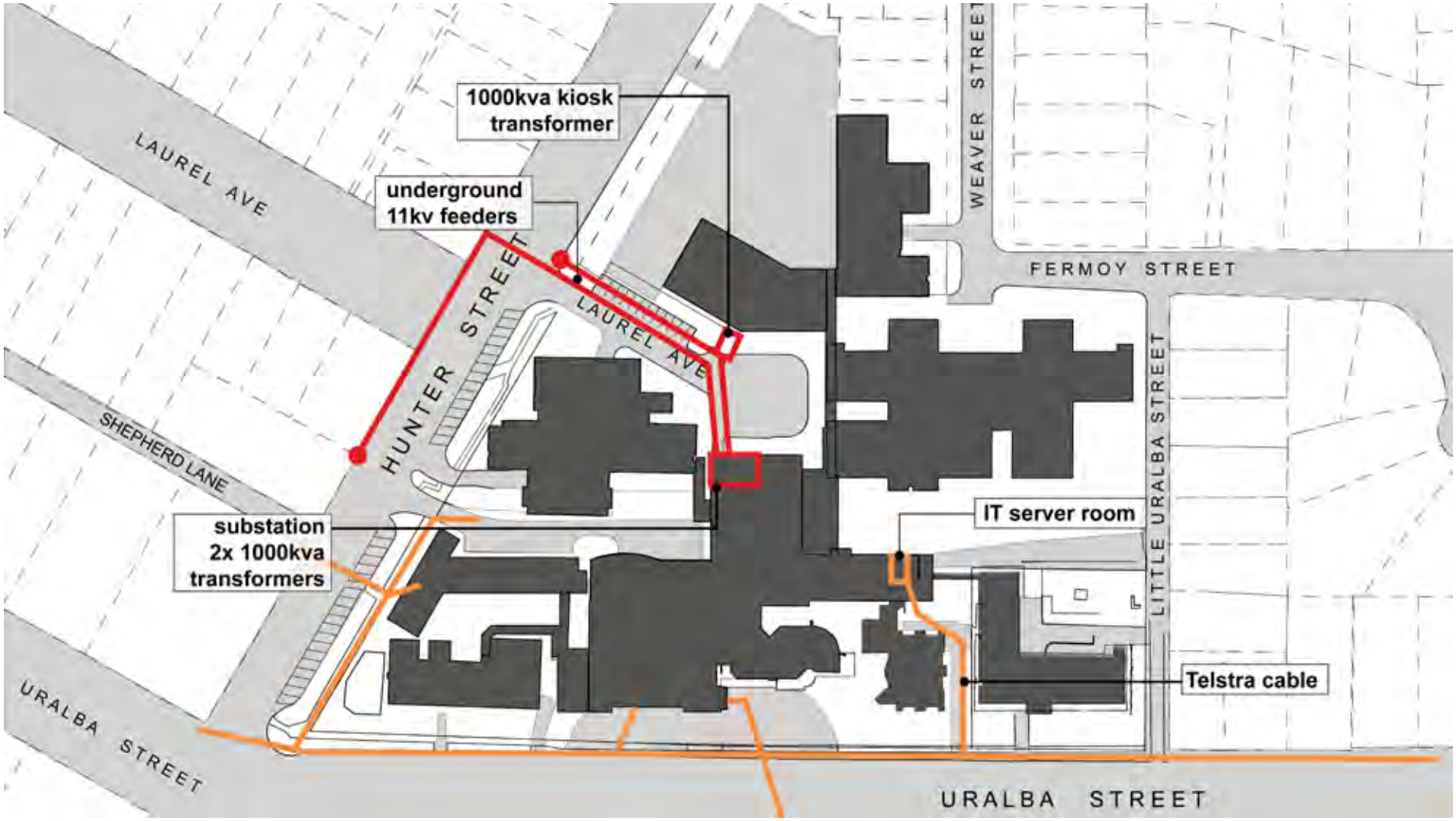
There is a significant quantity of private fibre optic cables originating within the Lismore Base Hospital (LBH) campus and crossing Uralba or Hunter street to remote premises.

The existing Server Room is located within B block. It currently houses 13 racks within the room and 2 racks are currently installed outside the room. There is currently limited spare capacity with room for 1 additional rack to be installed.

A significant concern with the existing server room is the lack of fire separation from the remainder of block C and from the adjacent UPS room.

It is not current practice to co-locate the UPS within the primary server room, due to inherent risks in the event of a fire. The Server room is currently provided with point type smoke detection, no sprinklers or gas suppression systems have been provided.

3.0____Site review/analysis



01_Existing electrical and ICT infrastructure

3.0____Site review/analysis

3.16 Mechanical services

The campus has minimal centralised infrastructure, with major plant generally located in and provided for dedicated building systems.

The existing chilled water plant was installed as part of the development of C Block. It was originally designed and installed to serve C block air handling units and has since also been extended to serve part of block A air handling units. All remaining buildings on site are served via dedicated DX systems.

The chillers are in reasonable condition for their age, though it should be noted that they are approaching the end of life. Furthermore they are utilising refrigerant that has now been outlawed by the Montreal Protocol and is not commercially available.

The existing chiller arrangement does not provide an N+1 level of redundancy. The cooling towers are in reasonable condition for their age, though are showing signs of corrosion and degradation.

There is no spare capacity for any future load growth with the system currently under performing and under sized for the current connected demand in A and C Blocks. In the context of the current project, this plant is not considered expandable or able to be connected to.

The MDA Engineering Services Condition Report (Rev B) does not provide any information on the existing Boiler plant but from our site visits it has been ascertained that two units, at 800kW per unit, are currently installed and are 23 years old.

Anecdotal information obtained on site suggests the units are running at low capacity as the original demand load has significantly decreased. The units are not run in duty/standby but simultaneously due to the age and lack of sophistication of the controls.

Due to the age of the Boiler system it is not recommended that the spare capacity be used for the new development as the units are close to the end of the their design life expectancy and in line with current best design practice for hospital facilities.

The air conditioning plant for Blocks A, B & C are at the end of their design life expectancy and require replacement.

As the air handling plant serves only the existing areas of the hospital and cannot be utilised for the new development, it is recommended that any areas which are not being refurbished should be upgraded as part of separate works.

Generally the older buildings are provided with packaged roof top and split DX systems, while the more recent buildings have been provided with VRF plant.

In the context of this project, these systems shall remain in place. In general the new development will consider the use of chilled water air handling plant.

The existing buildings do not appear to have been provided with smoke hazard management systems which would be likely due to the age of the buildings. Of particular note is the lack of smoke management for the large open stairwell that is shared by Block A, B and C. Refer also to the BCA and Fire Safety reports.

Building C was provided with a BMS system as part of its development. As part of an energy performance improvement program several components of the BMS system were updated in 2001 with new modules and a new head end system installed. The new system however is not able to communicate with the existing detained BMS field device and hence the two head ends are maintained and operate independently.

All alarm monitoring is passed to the original system and is not provided with any dial out or remote monitoring capability.

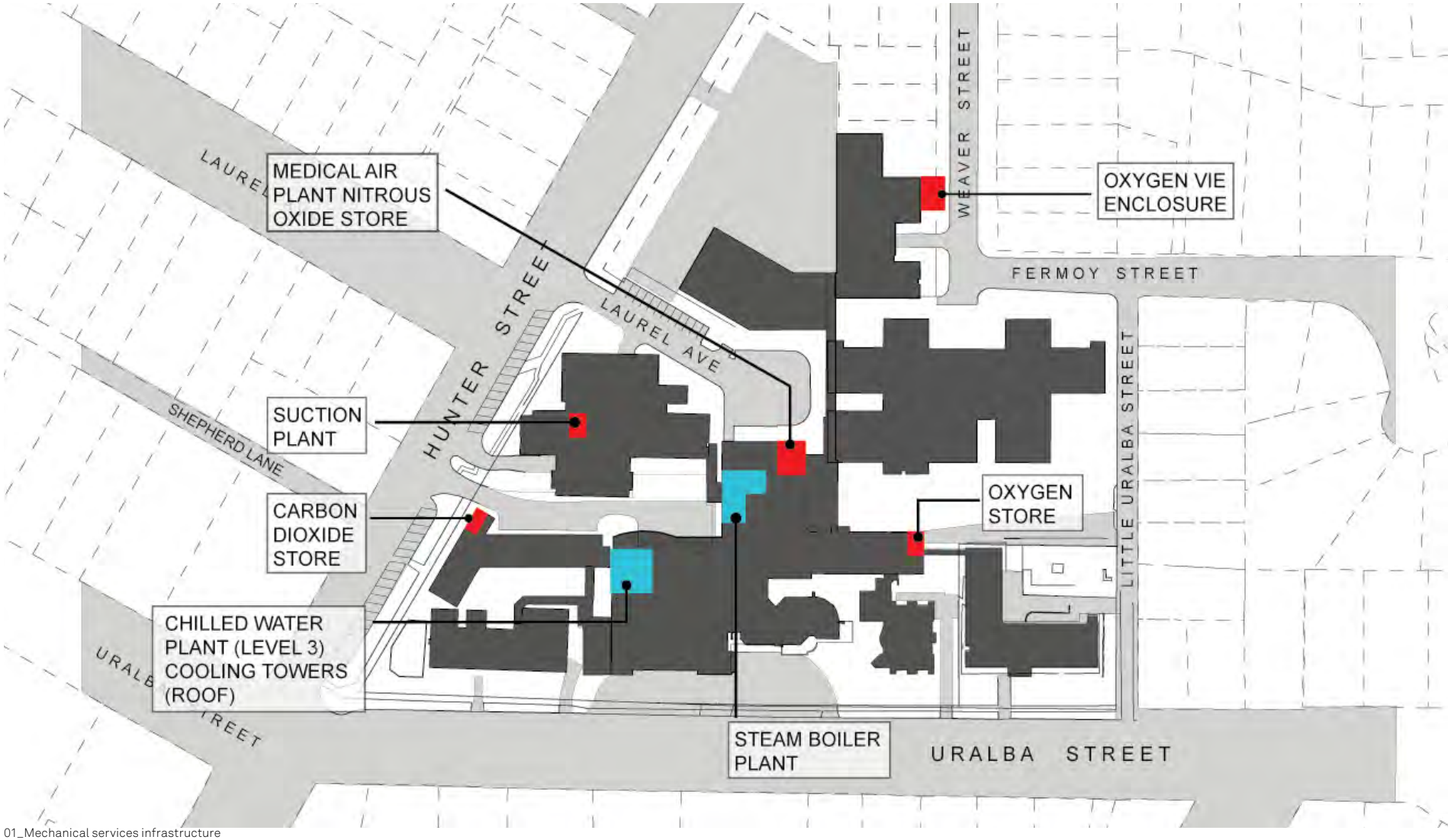
The system does not have capability for expansion and is of superseded technology. In the context of this project, upgrading and expanding the system to serve the new building will not be feasible. It is anticipated that a new modern open protocol BMS system be established for the new development, and this system can then be expanded for future developments. This would also allow the potential for expanding into existing areas of the hospital as a separate BMS grade project.

The VRF DX systems are not connected to the existing BMS and are controlled from their own proprietary controls.

There is no pneumatic tube system currently installed at Lismore Base Hospital. Suction is achieved via a ventir system as part of the med air system.
There is not central vacuum system currently installed at Lismore Base Hospital.
The existing hospital is supplied with several medical gases to meet the needs of the hospital including, Oxygen, Medical Air, Nitrous Oxide, Tool Air, Suction and Carbon Dioxide.

The Oxygen, Medical Air and Suction are distributed site wide with Nitrous Oxide and Tool Air being supplied to Blocks A, B & C via a localised bottle Store in Block B.

3.0____Site review/analysis



01_Mechanical services infrastructure

3.0___Site review/analysis

3.17 Hydraulic and fire services

There are several existing cold water supplies to the site, connected to two main street water mains in Uralba Street and Hunter Street.

Tank supplies are provided for Blocks A, B and C and two mains supplies are provided for Block D. Block A + B is a gravity feed system with Block C being pressurised by pumpsets. The remainder of the Blocks are supplied by mains pressure.

Water supplies within Blocks A+B+C are aged and are/will require ongoing maintenance. Systems for Blocks T, D and X+Y+Z are independent and are in reasonable condition apart from X+Y+Z which contains, Aquatherm pipework which has not been installed to manufacturer's requirements and is fracturing.

The main potential for extension exists with a 150mm incoming supply main near Block J. The intention is to maintain this existing connection and extend to service Stage 3 works.

Hot water is supplied from individual hot water systems throughout the development. The systems are in varying condition related to their age. The most critical being the system serving Block A+B which is generated via a heat exchanger connected to a steam boiler and circulated via natural convection. The other hot water systems are more conventional and can (and are) being replaced as they reach the end of their life.

There is some potential for increasing hot water supply in Block C, however the pipework is exhibiting internal corrosion and connection to this system could lead to the need to replace sections of pipework to support the new works.

There are known issues with the existing hot water supply system where the copper pipework is corroding. The intention is to minimize the connections to the existing system.

Sanitary pluming and drainage discharges via gravity to the authorities sewer mains in Hunter Street.

According to hospital staff, the existing sanitary plumbing and drainage system throughout the hospital is in reasonable condition. There has been need for repairs within Blocks A+B and some in Block C, which is consistent with the age of the installations. There is also a continuing blockage at the discharge from Block P which is likely caused by tree roots.

The existing system has capacity for accepting discharge from the future works. There may be a need for local upgrade and/or replacement in some areas and detailed investigation of the most appropriate drainage route is to be undertaken.

Liquefied Petroleum Gas is supplied to site via reticulated piped system from the Elgas depot in Lismore. Based on preliminary discussions with Elgas, the existing supply has adequate capacity to support the future development.

Fire services to buildings on the site are supplied from several connections and cover multiple buildings which results in some difficulty for fire fighters to quickly determine the relevant system to operate in case of a fire.

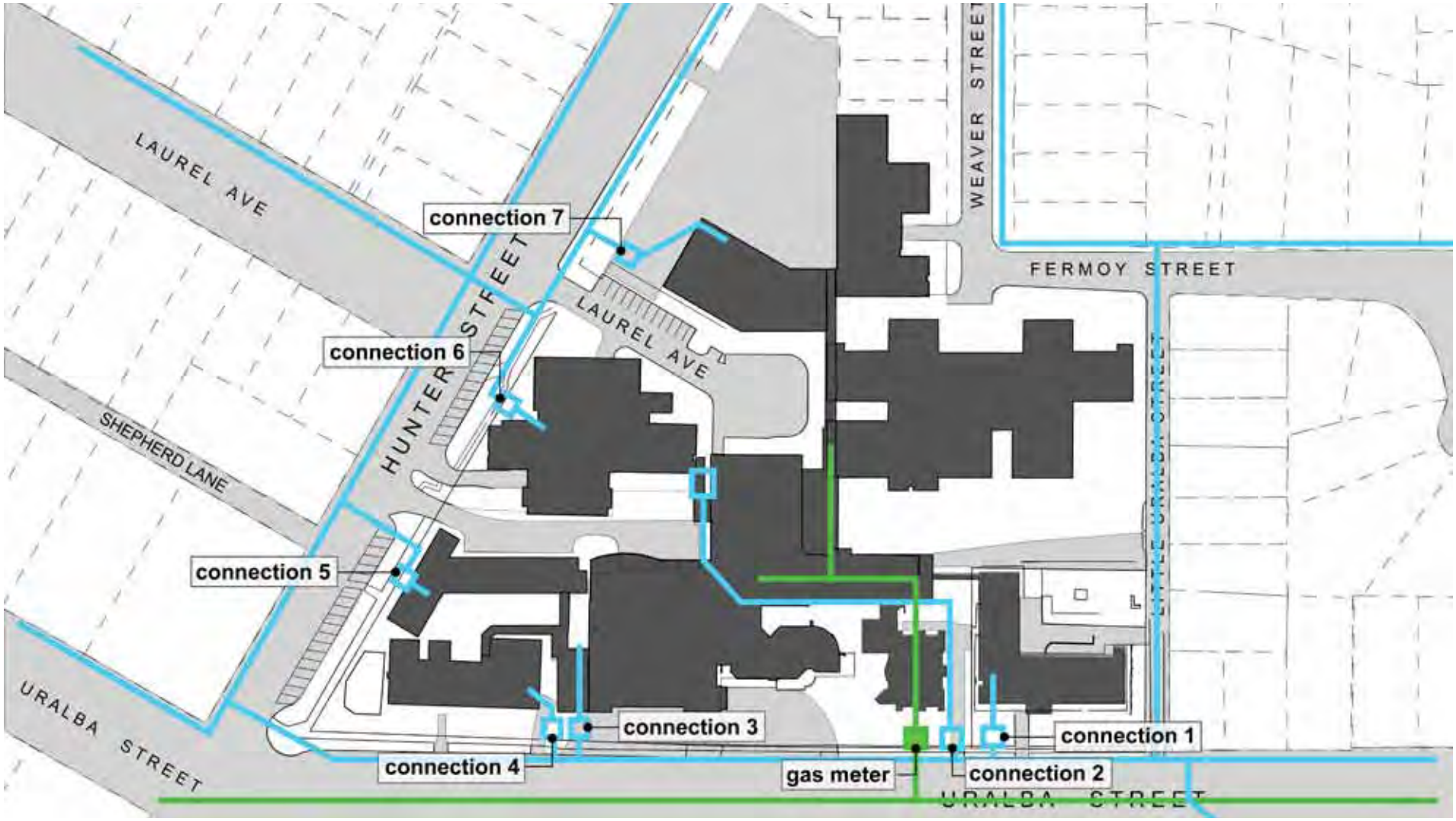
The hospital is currently producing fire system block plans and installing a central Fire Control Centre near Block C entrance to assist the fire brigade in understanding the systems on site.

It is not uncommon for several systems to be in place on a large site such as this however it is generally Fire and Rescue NSW's (FRNSW) preference to have one combined system for the site.

The extent of upgrade to existing areas is to be determined in conjunction with the BCA Consultant, Fire Engineer and the relevant fire protection authorities. The intention is to develop a strategy for staged upgrade of the services as part of the ongoing redevelopment of the hospital.

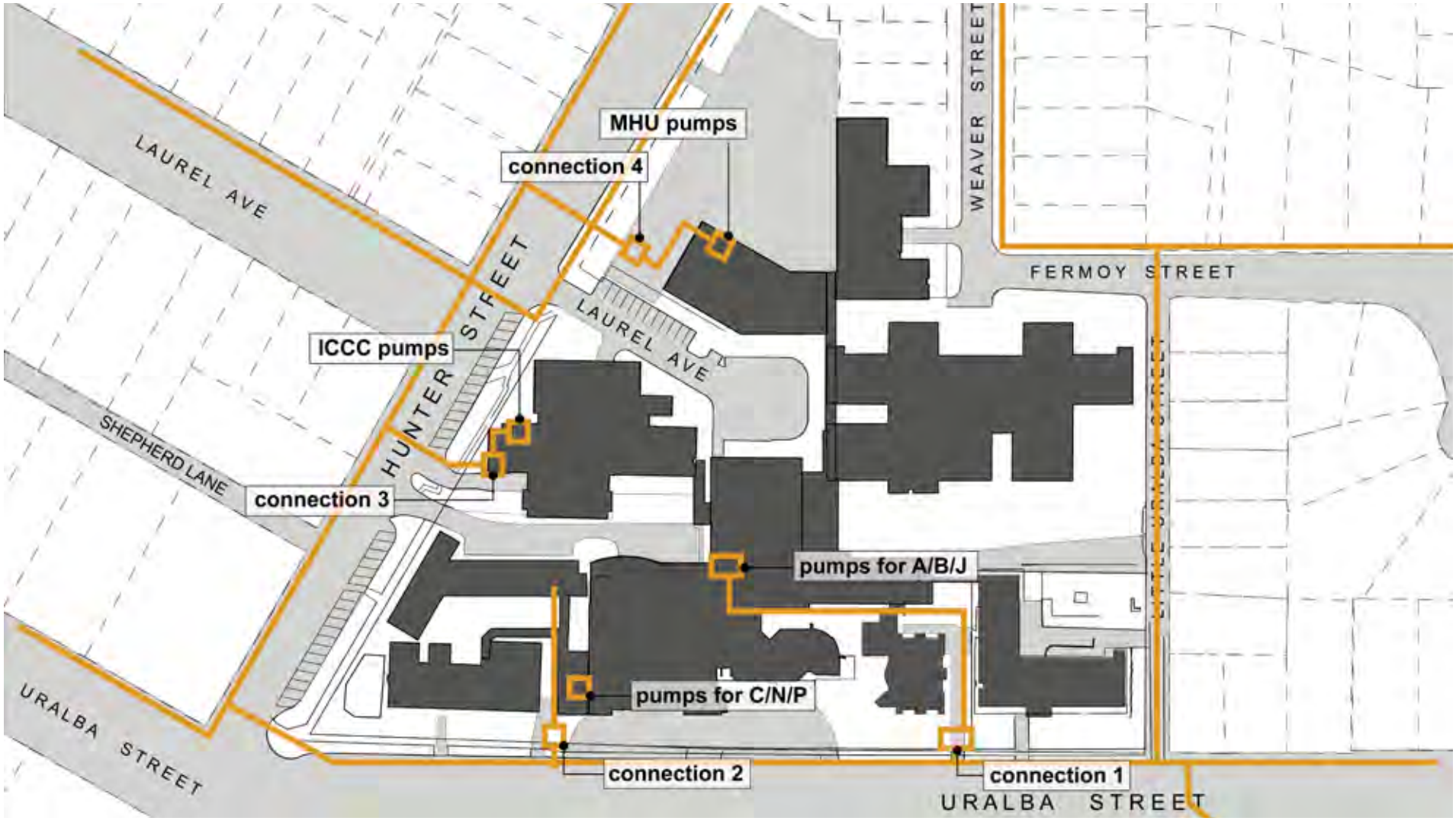
The hospital is currently undertaking an upgrade to the existing dry fire system including the creation of a new central Fire Control Centre. The existing Fire Indicator Boards (FIB's) from the various buildings throughout the site are being connected to a new Main Fire Indicator Board (MFIB) located in Block C.

3.0____Site review/analysis



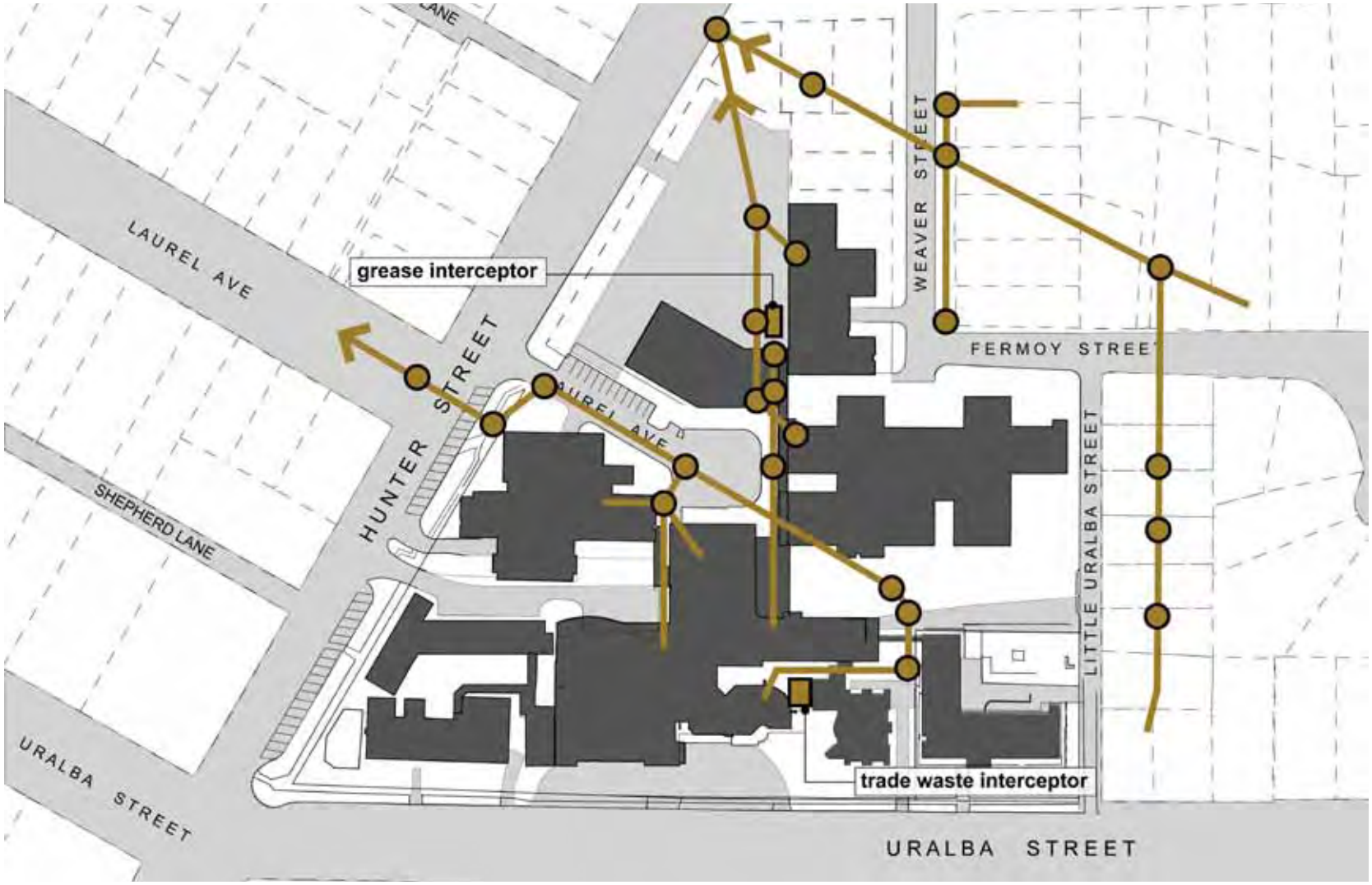
01_Existing water and gas infrastructure

3.0____Site review/analysis



01_Existing fire services infrastructure

3.0____Site review/analysis



02_Existing sewer infrastructure