University of Wollongong
Molecular Life Sciences Building
Services and Infrastructure Report

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Contents

1 Executive Summary

This report has been prepared to describe the implications of the proposed building development on the existing services infrastructure in support of the State Significant Development Assessment requirements for construction of the University of Wollongong Molecular Life Sciences Building.

It addresses the following aspects:

- The extent of the statutory infrastructure in the vicinity of the building;
- The impact the building's footprint will have on the routes of this infrastructure; and
- The implications of the relocation, realignment or augmentation of the affected services.

2 Introduction

This report is written in response to the State Significant Development (SSD) Application Secretary's Environmental Assessment Requirements (SEARs) in relation to the University of Wollongong (UOW) Molecular Life Sciences Building (MLSB).

The following Services and Infrastructure Report has been prepared to address the SEARs including item 9 - Utilities.

- Services Diversion;
- Electrical Connection;
- Cold Water Connection;
- Natural Gas Connection; and
- Sewer Connection.

Design development will be required to verify the assessments made in this report. The stormwater connection strategy is within civil scope and not detailed in this report.
The indicative routing of easements and reticulation routes shall be verified by survey and confirmed as the design is developed.

3 Electrical & Communications Services

A major north-south reticulation zone and HV cable easement runs through the proposed building footprint. It is not proposed to relocate the major north-south backbone infrastructure for electrical and communications cabling, therefore the building footprint and installation shall be coordinated with those installations.

3.1 Electrical Services

3.1.1 Existing Services

A number of existing electrical services are located within Science Precinct, and the proposed MLS building area.

These include existing Substations 6 (located within building 66) and existing Substation 10 located adjacent to Building 42, as indicated on the below site services drawing.

As part of the works it is proposed that the existing substations and their associated cabling would be relocated, and a new substation provided to the MLS.

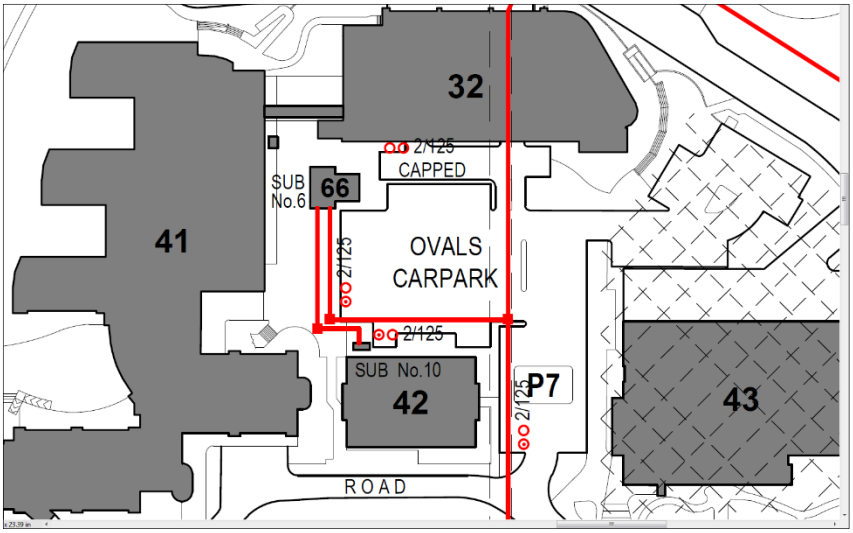

Figure 1: Existing HV Site Services Drawing

3.1.2 HV Supply & Easements

The Science Precinct is served by an Endeavour Energy (EE) 11kV Ring Main power supply from the Mt Ousley zone substation.

The HV feeds, ring mains and substations on campus are owned and managed by EE, and ultimately all modification or augmentation of the electrical HV network must be approved and certified by them. As part of our works coordination is being undertaken with Endeavour Energy.

The HV distribution is subject to EE easements as indicated on the University's existing routing and easements drawing below.

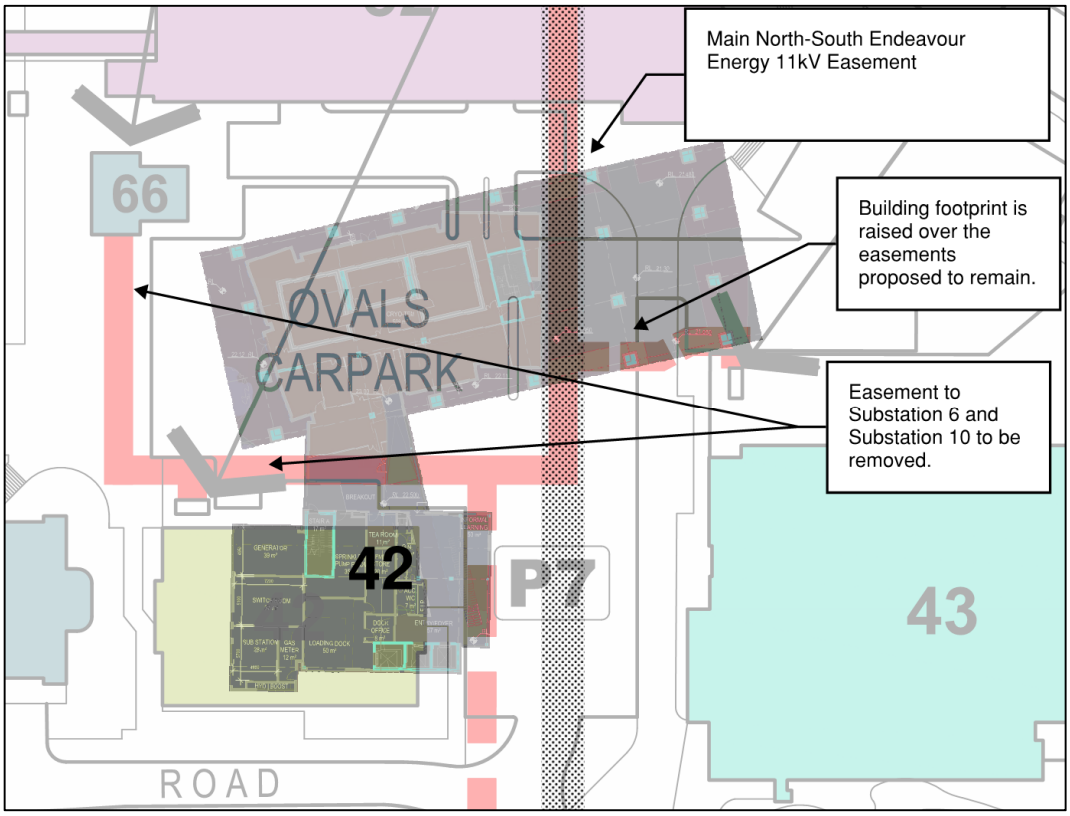

Figure 2: Snapshot from UoW Easement drawing - easement in the vicinity of proposed site

Endeavour Energy 11kV distribution cabling runs within the easements and will be required to be relocated to facilitate the final substation options.

3.1.3 Existing LV Supplies

The existing Substation 6 and Substation 10 LV outputs supply Buildings 41 and 32 respectively.

In addition multiple LV feeders traverse the proposed site layout to supply lighting and CCTV services.

The current LV reticulation is indicated on the Low Voltage drawing, Issue 15-A.

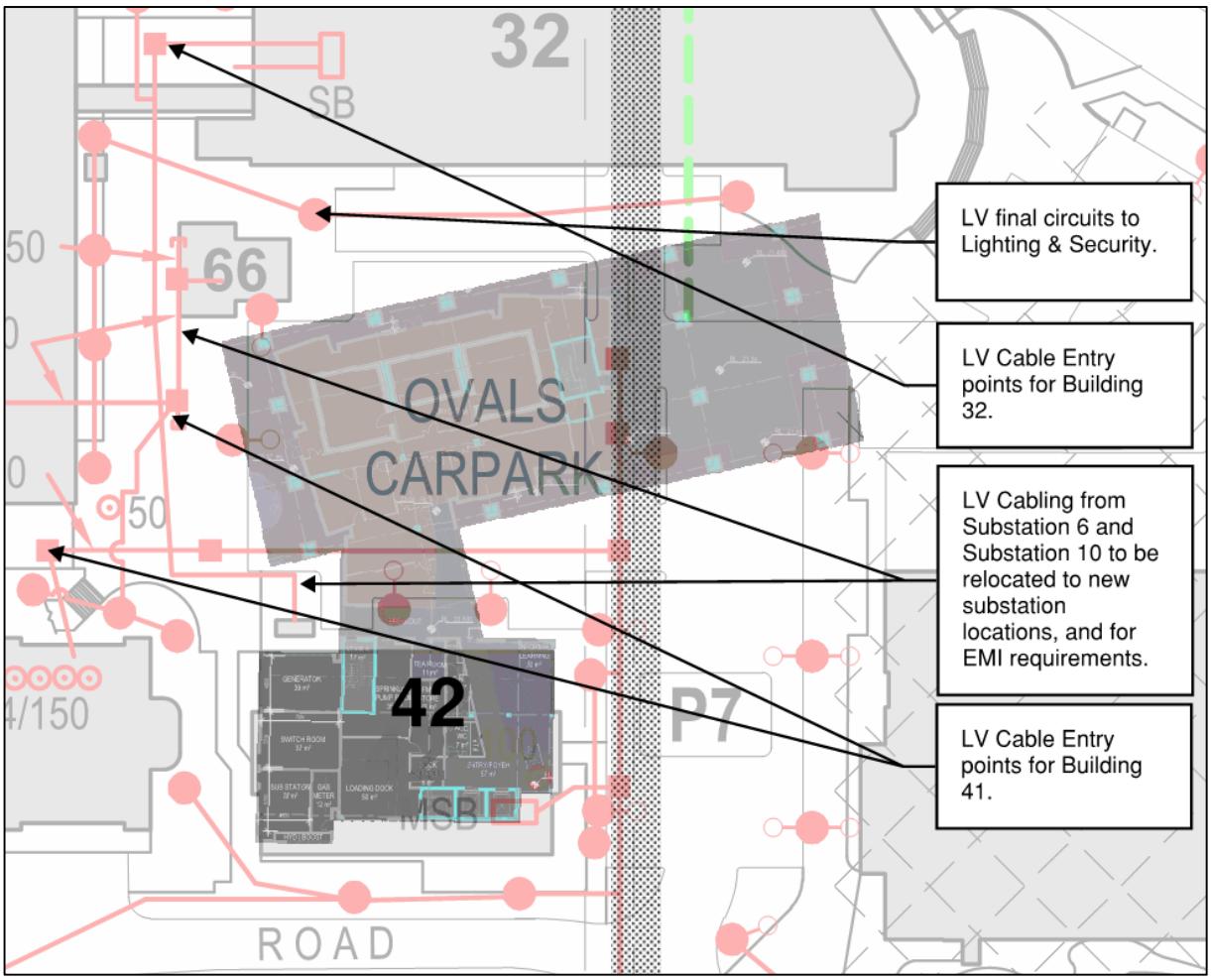

Figure 3: Snapshot from Low Voltage drawing - services in the vicinity of the proposed site

The following supplies are located in the vicinity of the proposed site:

- Substation 10 – located to the north of Building 42, 1,000 kVA capacity, serves Building 32;
- Substation 6 – located within Building 66, 1,000 kVA capacity, serves Building 41.

3.1.4 Proposed Modifications to Existing Infrastructure

The requirements for substation and HV infrastructure modifications are currently under consideration, and a number of options exist which shall be required to be finalised in the design development phase.

The primary drivers for modifications to existing infrastructure are:

Existing substation 10 is located within the proposed site footprint, therefore it must be relocated to allow construction of the MLS building. In considering options for its modified location we have considered available space, adjacency to HV infrastructure, and sensible minimisation of LV cabling.

Existing Substation 6 is located in Building 66, which also houses the LV switchboard associated with the Sub 6 transformer, and a number of laboratory services, specifically gas storage.

There is an EMI requirement to relocate the extensive existing HV and LV cabling to the West of the proposed TEM suites to minimise potential negative EMI influence.

The EMI consultant has advised that the existing Substation 6 must be relocated from its current position to allow the specific EMI requirements for the building to be achieved.

Following extensive review of options we have reached a likely position on the proposed modifications to existing infrastructure. We note that these shall be developed further as further feedback is received from stakeholders.

The following summarises the proposed works

- Demolish existing substation 6 and provide new kiosk substation to south of Building 41
- Temporary supply to building 41 required during cutover
- Possibility to re-route LV cabling to enter the former LV entry point to 41, and reticulate internal to the building to the two main switchboards. This solution will be driven by the EMI constraints of running in existing conduits, but is considered likely.
- Relocate existing substation 10 to the north south of Building 32
- Temporary supply to building 32 required during cutover
- Provide either a kiosk or chamber substation to supply the new MLS building (current Architectural preference is for Chamber substation but that shall be required to be confirmed).
- Low voltage feeds to various locations in the car park (generally security and lighting feeds) will need to be removed as part of the enabling works.

3.1.5 Modifications to the HV Cabling Infrastructure

A number of modifications to the existing HV cabling are proposed, to achieve the EMI requirements, and to rearrange supplies to the various substations impacted by the works.

We note that all amendments to the HV infrastructure shall be required to be approved by Endeavour Energy and certified under a Level 3 design process. Therefore while the below nominates the currently preferred engineering solution, modifications may be required.

The primary HV ring main will need to be reconfigured to allow the removal / relocation of the existing Substation 6 and Substation 10 supplies, and to provide a new feeder for the MLS building. This shall require the positions of certain substations on the ring to be amended.

In order to achieve EMI requirements it shall be necessary to relocate the existing HV cabling at the West of the MLS site (serving substations 6 and 10). It is proposed that the supply to the relocated Substation 10 would run in the North Ring Road, and the supply to new Substation 6 would run along Sciences Road.

It is proposed that the supply to the new substation for MLS would run along Sciences Road forming part of the same Ring Main routing as the Substation 6 supply.

The proposed modifications to the HV ring are outlined in drawing E-8006 (extract below)

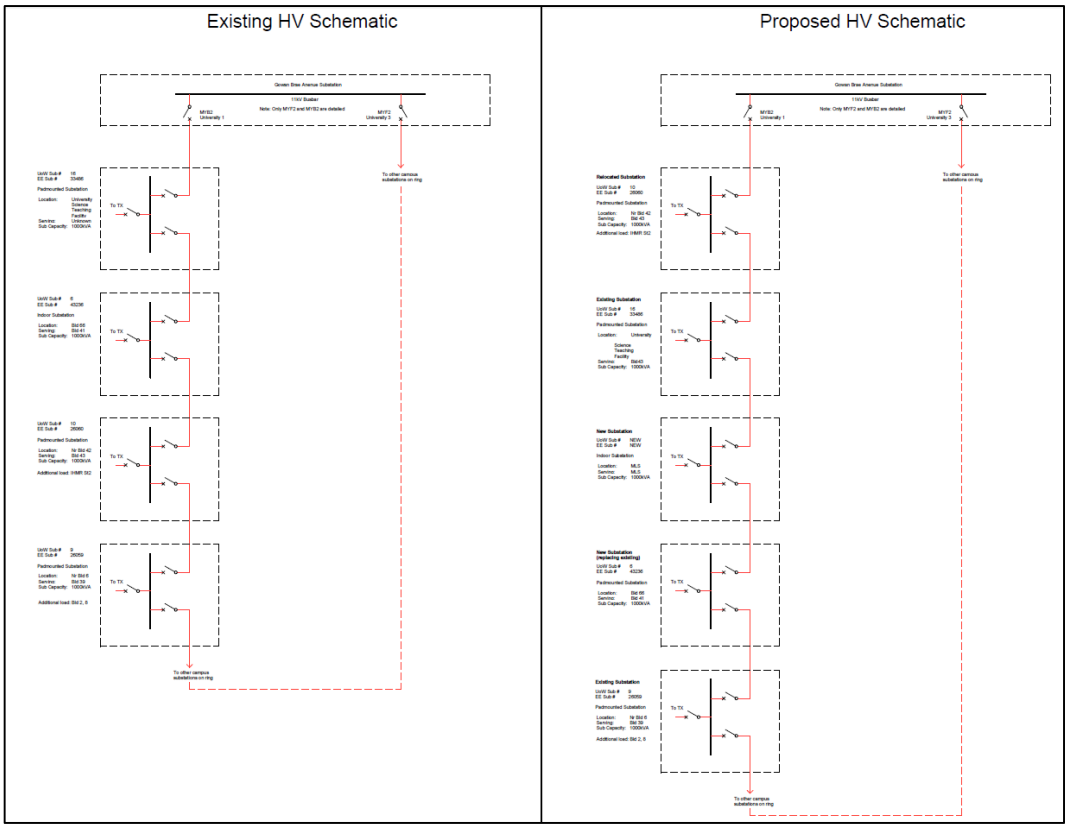

Figure 4: HV Modifications Schematic

3.1.6 Final Substation Configuration Supplies

The final substation configuration are still under development, however at this stage the following is considered the preferred option.

Existing kiosk substation 10 to be relocated to North of IMHRI (along Ring Road).

Existing substation 6 to be demolished and replaced with kiosk substation at the South of Building 41.

MLS building supplied from dedicated chamber substation.

The proposed modifications to the site plan are outlined in drawing E-1000 (extract below).

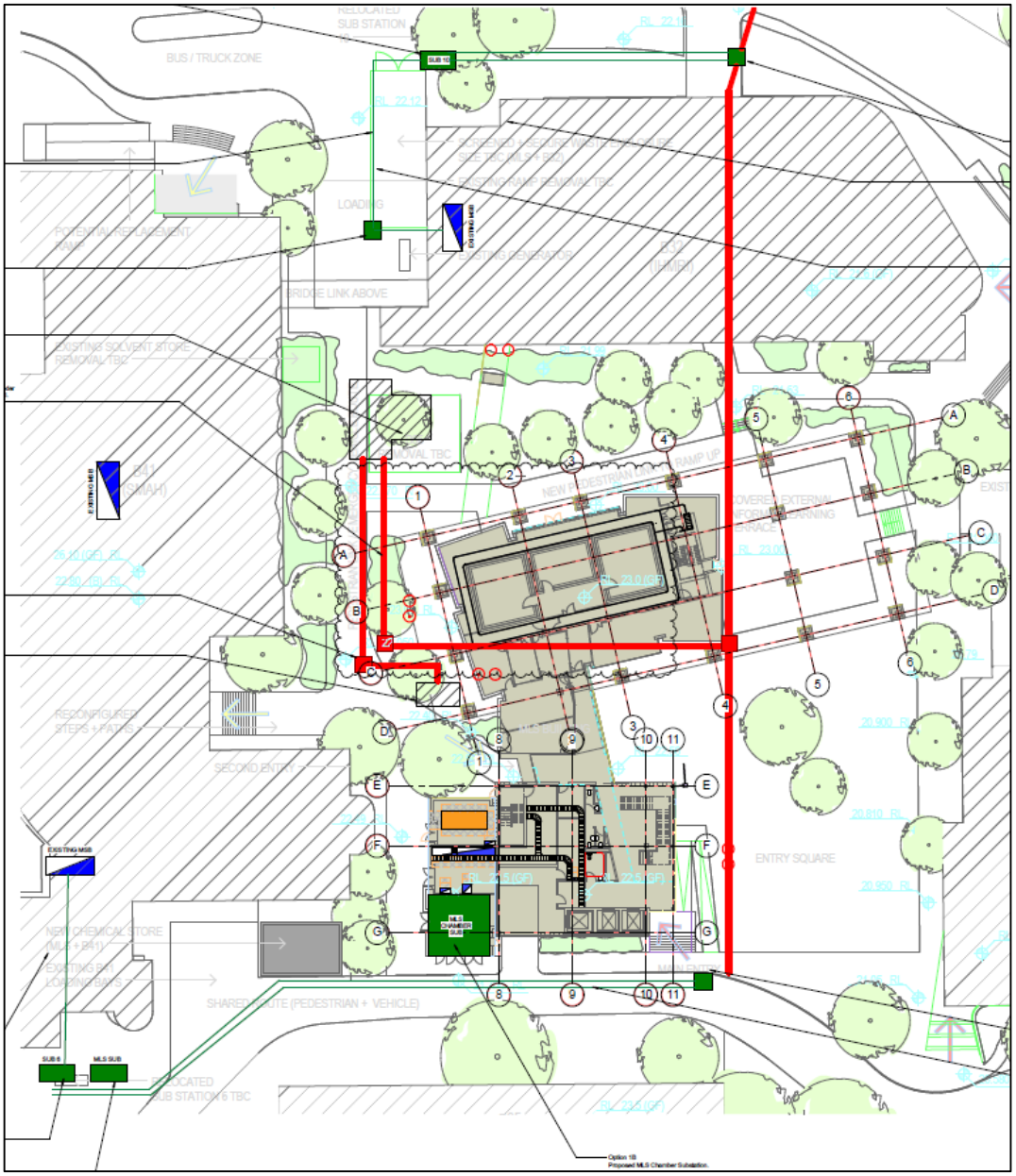

Figure 5: Proposed HV and LV Services Diversions Diagram

3.2 Communications Infrastructure

3.2.1 Existing Communications Infrastructure

The campus IT network is provided as a major north-south fibre backbone, ducted in below ground conduit. Indicative routing details are shown on the drawing ITS Cabling, Issue 15-A. The exact routes shall be confirmed by survey.

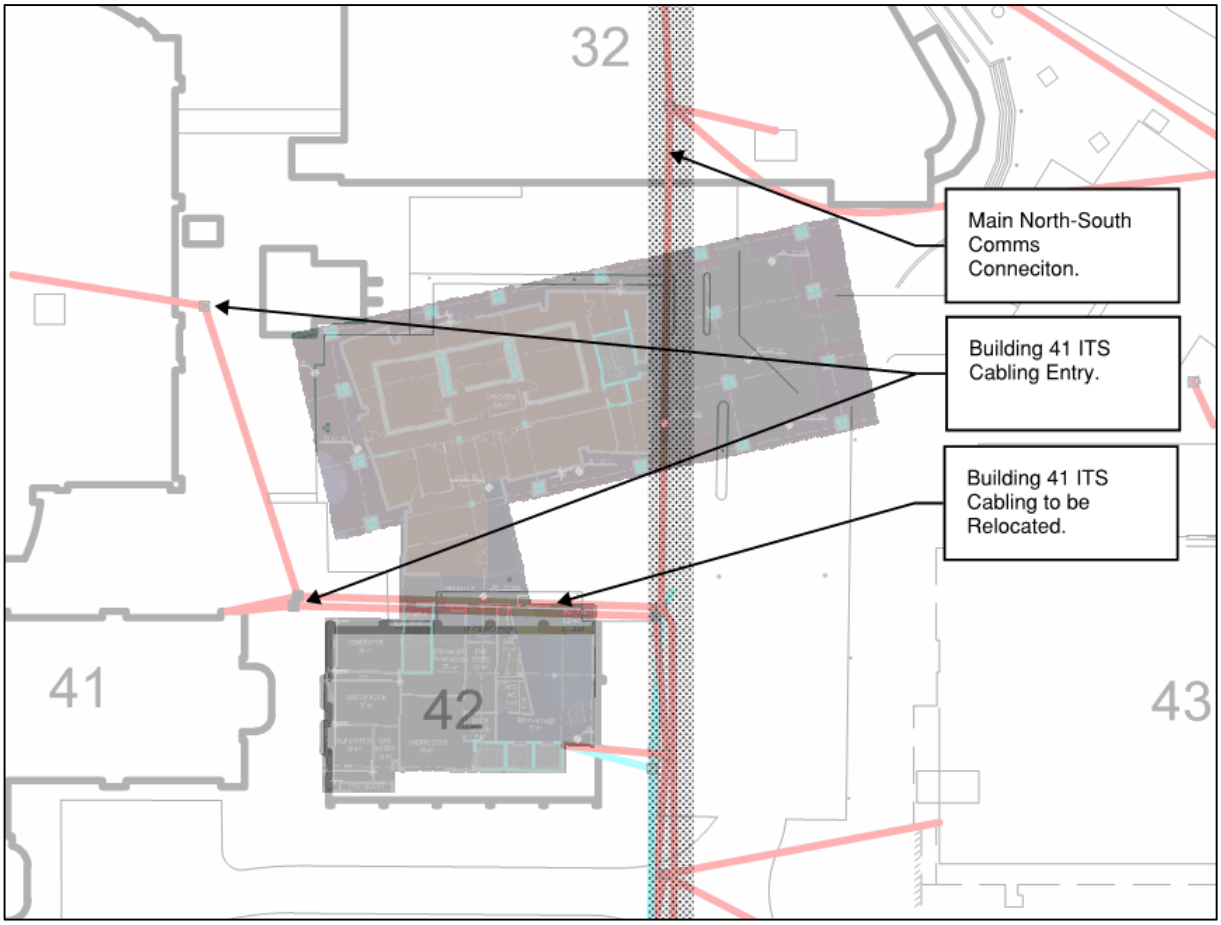

Figure 6: Snapshot from ITS drawing - services in the vicinity of the proposed site

This drawing shows conduit running north – south through the proposed site within the HV easement. There are branch connections to Buildings 41 and 42.

3.2.2 Enabling Works and Construction Stage Considerations

The preferred building option does not required diversion of the main north – south ITS cabling. However, the following enabling works will be required:

1 – Extend new fibre optic cables from nearest cable junction/termination in Building 41 incoming communications room.

2 – Clear the site by demolishing redundant cabling serving Buildings 41 and 42.

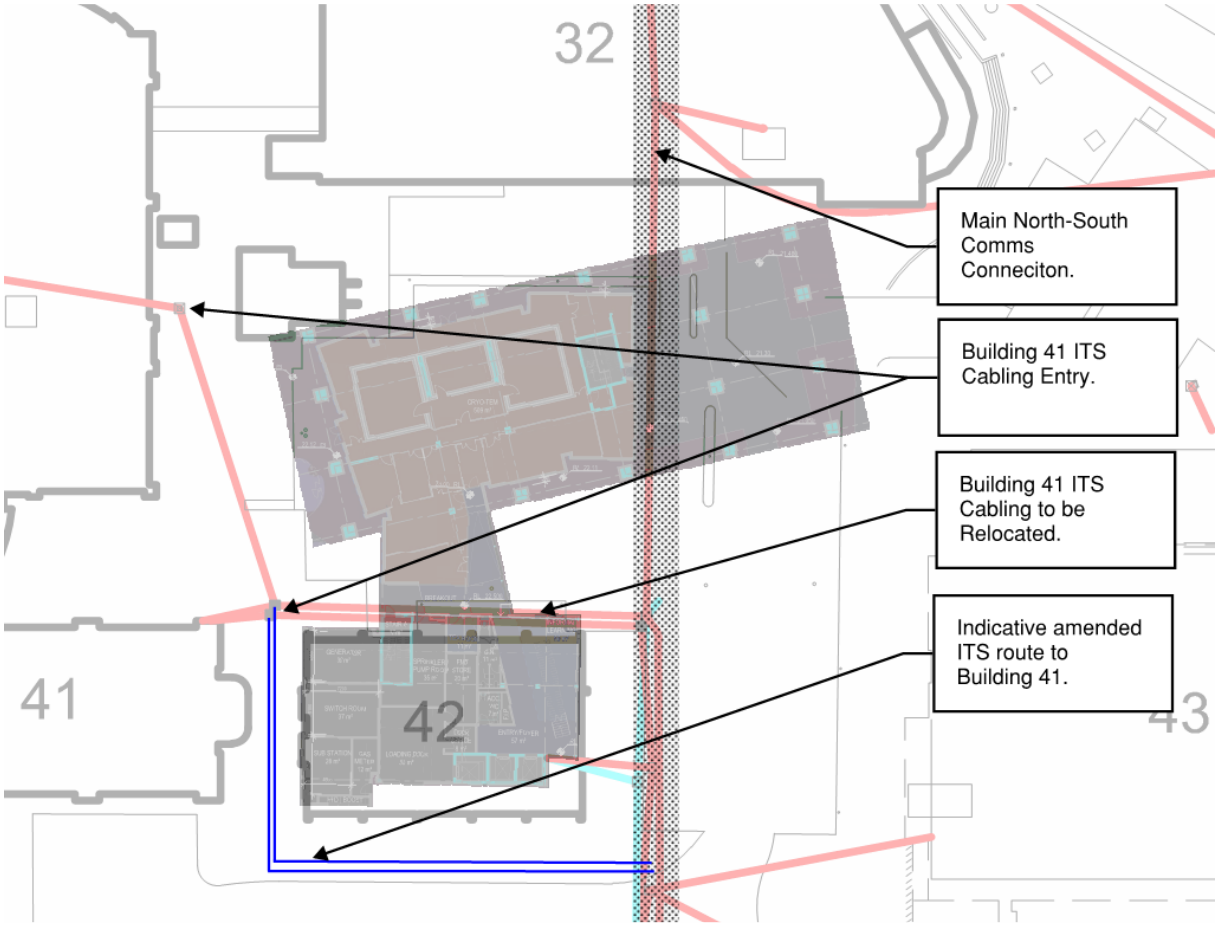

Figure 7: Proposed ITS Services Diversions Diagram

4 Hydraulic and Fire Services

4.1 Existing Services

Existing UOW private services including but not limited to the existing DIA100 water main and DIA110 natural gas main are located within the MLSB footprint, in the existing north-south easement. A DIA225 sewer line is located in close proximity to the MLSB, along with various other DIA150 sewer lines serving surrounding buildings. A stormwater network of various sizes is also located within and adjacent to the MLSB site. Pipe sizes are to be confirmed during detailed design, pending survey detail.

The UOW campus is served by utility mains at the campus perimeter, with distribution through the campus to individual buildings via the UOW private below ground pipe network (as detailed in UOW Facilities Management Division site service drawings, issue 15-A). The public water, gas and sewer mains are not affected by the proposed development.

Based on the initial infrastructure review, the proposed MLSB will be served from new connections to the existing UOW private infrastructure without requiring any upgrade in capacity to the private or public mains (pending available pressure and flow advice from UOW). Various water, gas, sewer and stormwater lines currently serving surrounding buildings will require relocation around the MLSB footprint, as detailed below. Pipework serving building 42 (to be demolished) will be capped off and removed from within the construction footprint for the MLSB.

4.2 Domestic Water and Water for Fire Services

The domestic cold water (DCW) service will be supplied from the private UOW infrastructure via a new water connection, meter and reduced pressure zone device (RPZD). A new 100mm copper water supply from the DIA100 concrete lined cast iron main distribution line (located in the north-south easement) will replace the existing supply branch to building 41, and the DCW supply to the proposed MLSB will branch from this line.

The MLSB will be designed to incorporate potable and non- potable reticulation throughout (via RPZDs) but will not include DCW storage tanks. The pipework material will be provided in accordance with the UOW Hydraulic Services Design Standards.

UOW Facilities Management Division (FMD) is to confirm that the cold water main has adequate capacity (pressure and flow) to serve the new MLSB.

Additional pipework located within the MLSB footprint will be relocated and/or removed, as shown in *Figure 8: Proposed Water Services Diagram* below.

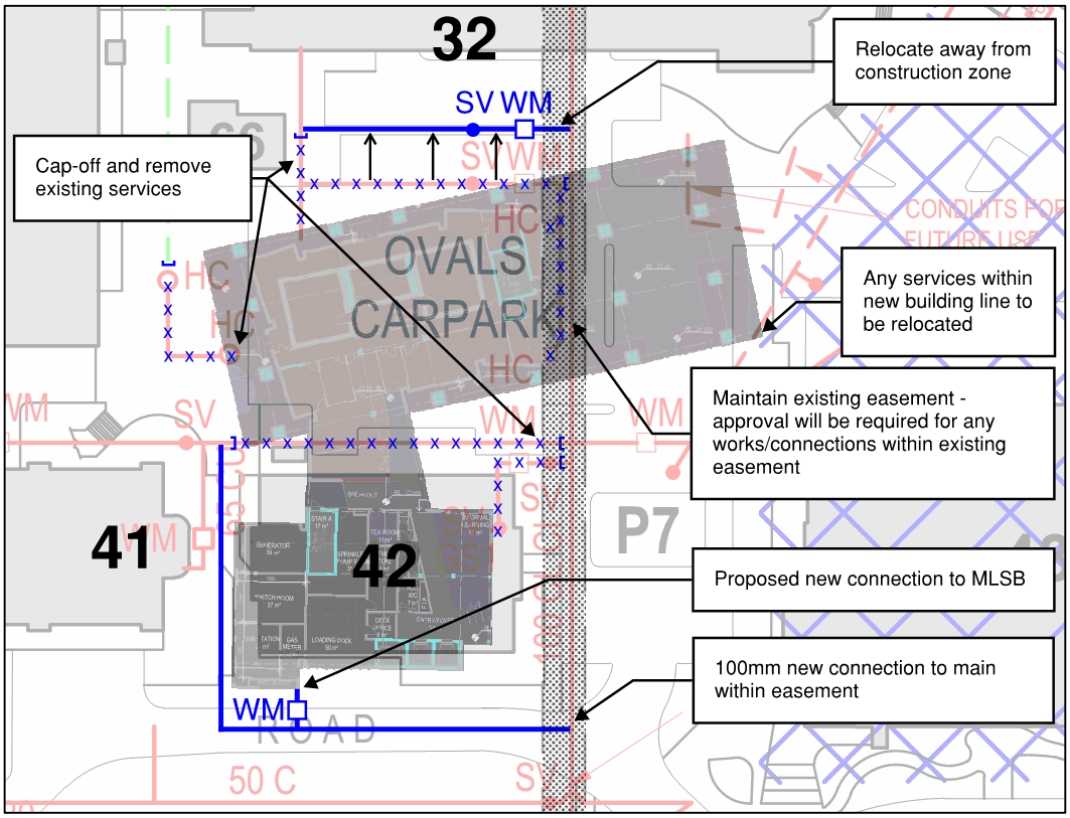

Figure 8: Proposed Water Services Diagram

Similarly, the water for fire service will be supplied from the private UOW fire service supply network DIA100 concrete lined cast iron main, running within the north-south easement. Two new 100mm connections to the main will be installed to serve hydrant and sprinkler services for the MLSB. Fire services storage tanks within the MLSB are not required.

The two existing branch lines crossing the MLSB site serving building 41 will be relocated, as shown in *Figure 9: Proposed Water for Fire Services* Diagram.

An existing masterplan to upgrade the fire service supply network to meet future needs of the campus has been developed, and should be reviewed and updated following final design of the MLSB.

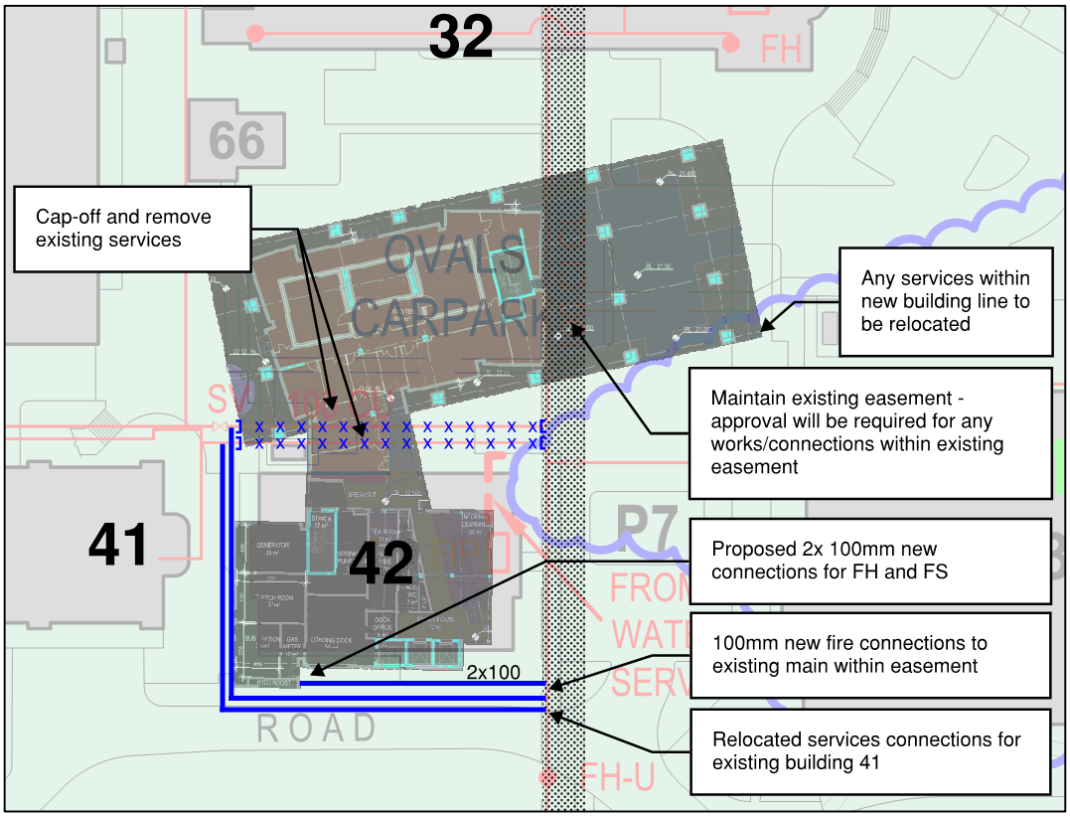

Figure 9: Proposed Water for Fire Services Diagram

4.3 Natural Gas Services

A natural gas supply will be delivered to the building for mechanical plant, hot water heating and laboratory use and will be connected to the UOW infrastructure DIA110 gas main located in the north-south easement. The existing metered supply to building 41 will be relocated via a new 100mm connection to the main, and existing pipework within the MLSB footprint removed. A new metered connection to the MLSB will branch from the new 100mm line, as shown in *Figure 10: Proposed Natural Gas Services Diagram*.

The MLSB will incorporate a gas meter and regulator located on Ground floor. Property isolating valves will be utilised before and after the meter along with filters and regulators. The meter will be fixed in the gas meter room.

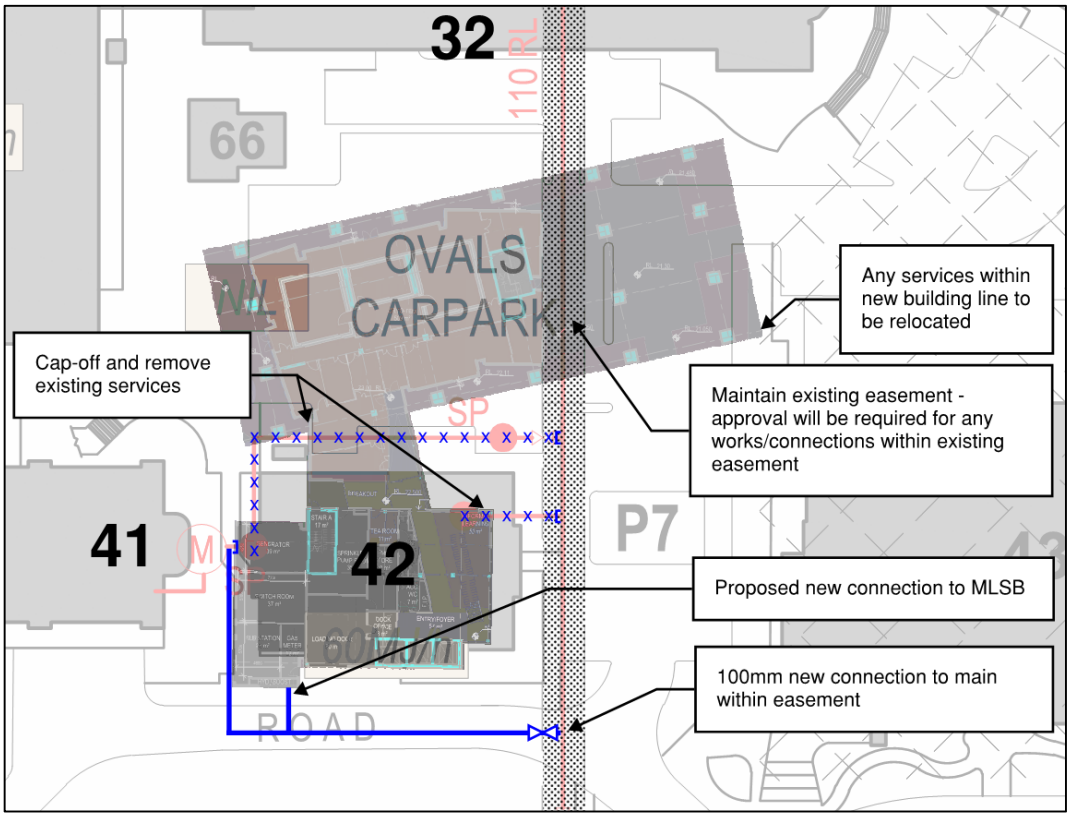

Figure 10: Proposed Natural Gas Services Diagram

4.4 Sewer and Sanitary Plumbing System

Sewer services within the construction footprint of the MLSB will be removed, and the sewer pipework and pit in close proximity serving building 41 will be protected during construction works. If in use, the sewer pit and line between buildings 66 and 32 will be protected during construction works, or relocated. If abandoned, this pit and line shall be removed.

New connections to the UOW sewer network for the MLSB are proposed to the south-east of the building footprint. These shall include a sanitary connections for amenities, and discharge point from a new in-ground dilution pit external to the MLSB but within the site footprint for laboratory waste drainage, as shown in *Figure 11: Proposed Sewer Service Diagram*.

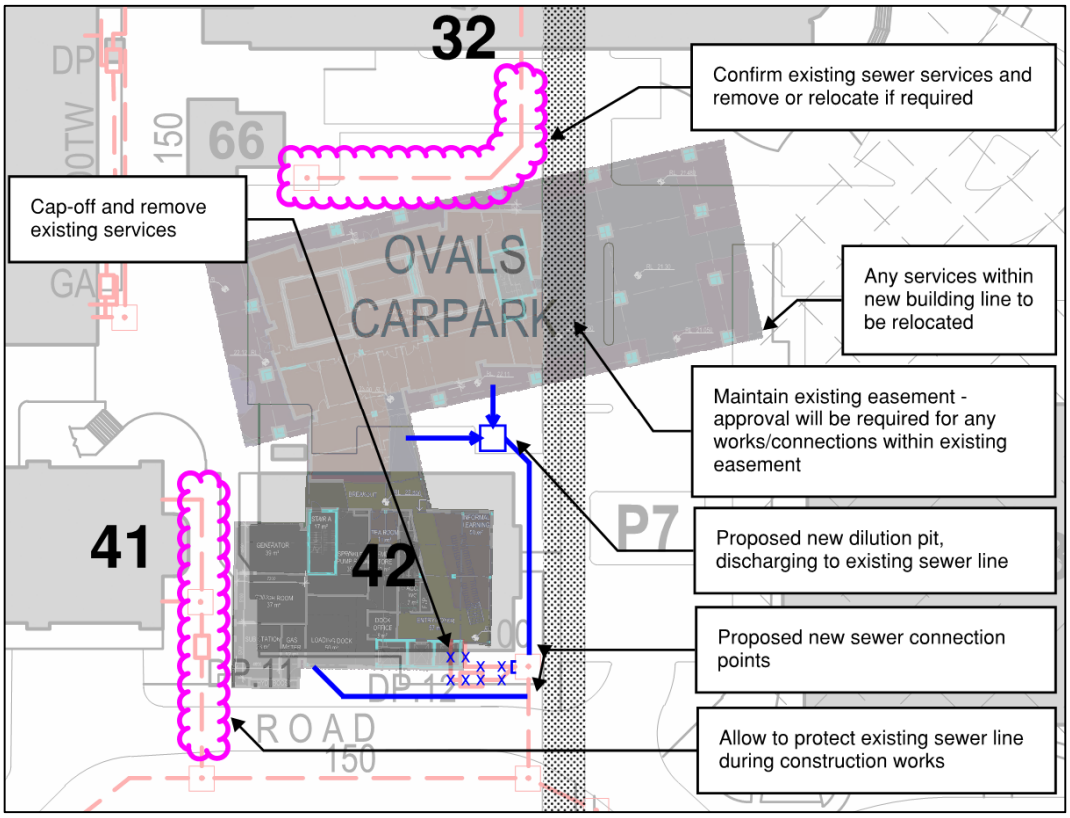

Figure 11: Proposed Sewer Service Diagram

4.5 Stormwater Drainage System

Stormwater drainage required for the MLSB will comprised of roof, green roof, terrace drainage. The stormwater water will be directed to the existing UOW stormwater network. The site-wide stormwater drainage and retention strategy is to be developed by the Civil Engineer.

The stormwater design should be based on rainfall intensities of:

- 265mm/hr for eaves gutters (1 in 20 year ARI with 10% design safety)
- 338mm/hr for downpipes (1 in 100 year ARI with 10% design safety)

Within the MLSB site footprint, a network of underground stormwater pipes pickup building down pipes and stormwater pits. Stormwater infrastructure in this area will need to be diverted to accommodate the MLSB, as shown in *Figure 12: Existing Stormwater Service Diagram*.

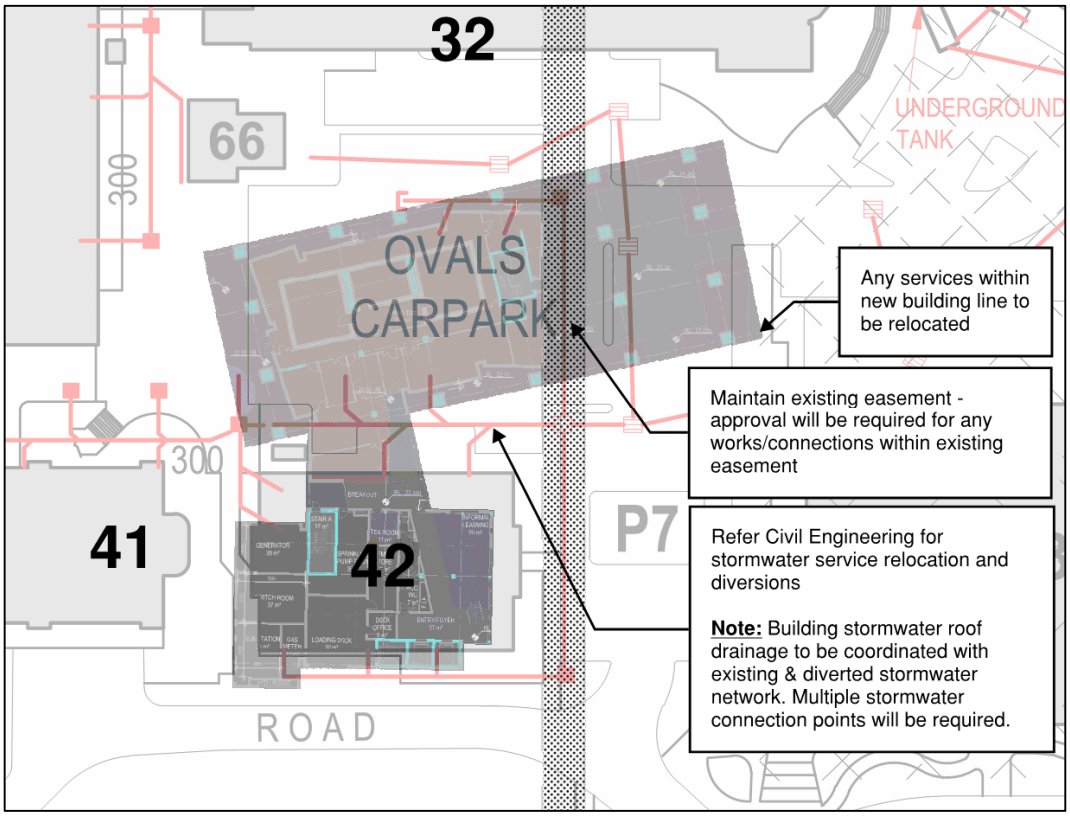

Figure 12: Existing Stormwater Service Diagram

5 Conclusion

The new electrical, hydraulic and fire systems will be supplied from the private UOW infrastructure and do not connect directly to the authority's infrastructure. All connections will be made to the existing UOW network including electricity, potable water, natural gas, sewer and stormwater.

Following preliminary analysis on the building's electrical, hydraulic and fire services requirements, it has been considered that there is sufficient capacity in the UOW existing infrastructure for the new building development.

- Adequate electrical supply has been ideifitied for the new UOW MLSB;
- Adequate potable cold water and fire services supplies have been identified for the new UOW MLSB within the UOW infrastructure;
- Adequate natural gas capacity in the UOW infrastructure has been identified for the proposed loads including mechanical and hot water demand for the new MLSB; and
- Adequate capacity in the UOW sewer line has been identified for the MLSB. Multiple connection points will be provided to UOW sewer infrastructure; and