SSDA Infrastructure Management Report

University of Newcastle – Science Technology Engineering Mathematics Medicine (STEMM)

Report No MUON-0102 SD-02
Date 09 July 2019

engineering sustainable environments

REPORT AUTHORISATION

PROJECT: **SSDA INFRASTRUCTURE MANAGEMENT REPORT**
UNIVERSITY OF NEWCASTLE – SCIENCE TECHNOLOGY ENGINEERING MATHEMATICS MEDICINE (STEMM)

REPORT NO: **MUON-0102 SD-02**

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09-07-19	P1	Preliminary Issue	AF/GS/SM/SW	JWG	DKU

Melbourne Office
10 Yarra Street
South Yarra VIC 3141
Australia
Tel: +61 3 9249 0288
Fax: + 61 3 9249 0299
Email: ulmelb@umowlai.com.au
Web: www.umowlai.com.au
ABN: 29 143 564 738

Sydney Office
L7, 657 Pacific Highway
St Leonards NSW 2065
Australia
Tel: +61 2 9431 9431
Fax: +61 2 9437 3120
Email: ulsyd@umowlai.com.au
Web: www.umowlai.com.au
ABN: 99 150 174 782

Brisbane Office
Level 7, 200 Creek Street,
Brisbane QLD 4000
Australia
Tel: +61 7 3917 8888
Fax: +61 7 3917 8887
Email: ulbris@umowlai.com.au
Web: www.umowlai.com.au
ABN: 91 142 668 773

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1.0 INTRODUCTION

This Infrastructure Management Report has been prepared by Umow Lai for TSA and the University of Newcastle in response to the Secretary's Environmental Assessment Requirements (SEARS) for SSDA for the University of Newcastle Science Technology Engineering Mathematics Medicine (STEMM) facility.

1.1 REFERENCE DOCUMENTS

The following documents have been referenced in the preparation of this Infrastructure Management Report:

- Architectural Drawings prepared by Lyons Architects
- The University of Newcastle Design Standards
- The University of Newcastle Design Brief as published and site infrastructure information
- Survey Information and GHD Site Infrastructure Enabling Works documentation.

1.2 EXISTING SERVICES

The proposed site for the STEMM is currently occupied by the McMullin Building, McMullin Theatre and the Drama Building as shown in Figure 1 below.

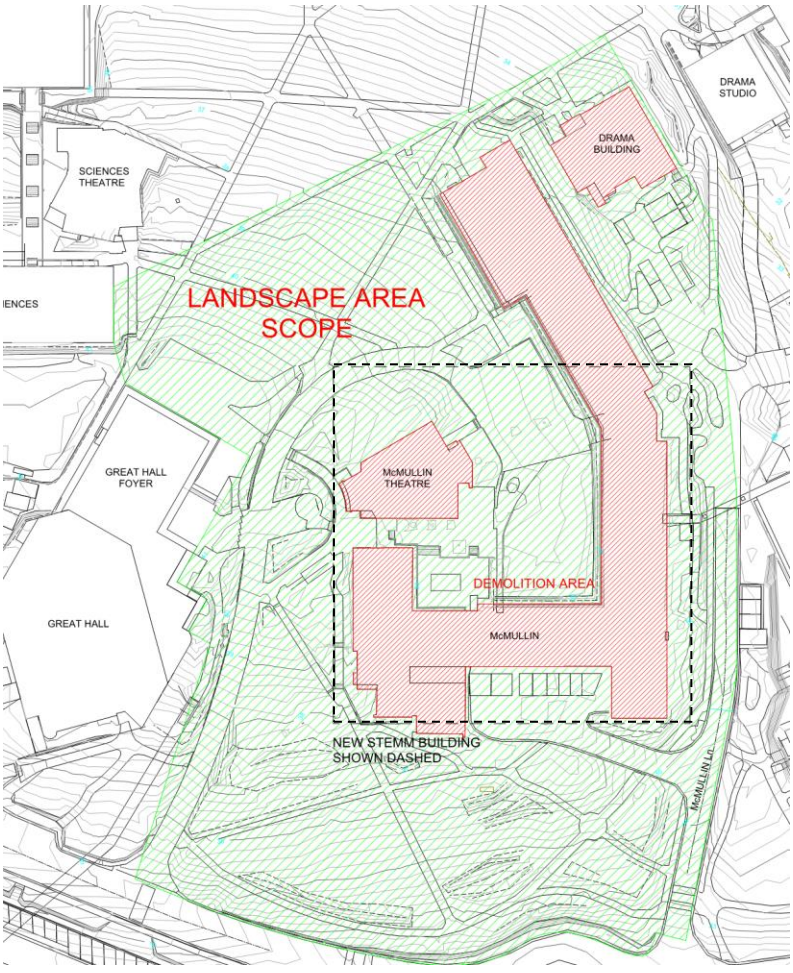

Figure 1 *Site Context*

The 3 buildings currently on the site are to be demolished.

All existing services affected by the construction of the STEMM facility will be:

- Identified, capped, sealed, made safe, and removed if redundant; or
- Identified, isolated and relocated if the services is to be re-used.

All works associated with the diversion, capping, connecting or modification to the existing Utility or University services infrastructure will be coordinated with Campus Infrastructure Services (CIS) or the relevant Authority or Utility prior to any works proceeding.

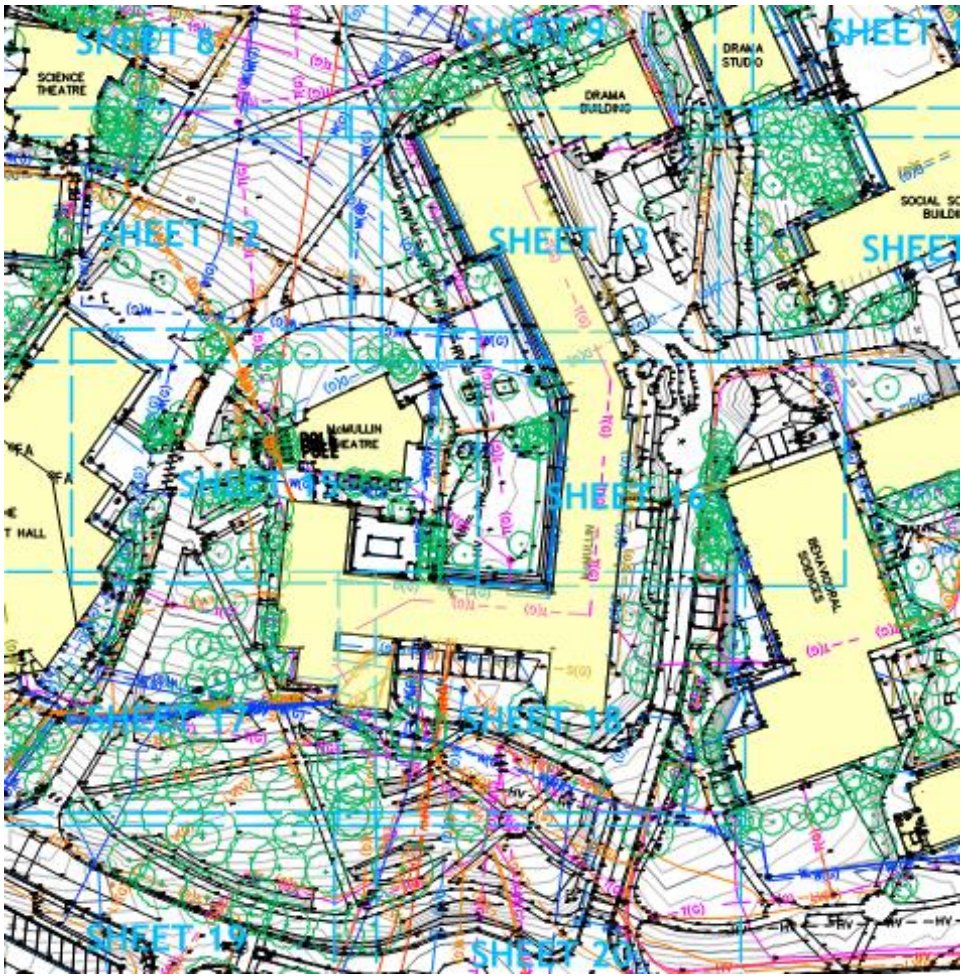

Figure 2 *Existing Site Survey (Provided July 2018 by University of Newcastle)*

Further information regarding the major Utility and Authority routes and their proposed modification and augmentation is detailed in later sections of this report.

2.0 ELECTRICAL

2.1 EXISTING SITE HV INFRASTRUCTURE

The University of Newcastle is a HV (High Voltage) customer that owns and maintains its own High Voltage 11 kV networks on the Callaghan Campus. The network is made up of 20 substations connected by approximately 4km of underground cable over approximately 350 acres. The Network is divided into four separate **distribution ring main** sections, NIER, East Campus, West Campus and accommodation **each with a separate Ausgrid 11 kV supply**. The West Campus section is the one affected by the new STEMM works.

The main incomer substation for the West Campus is Substation 1. Substation 1 has two Ausgrid feeds for redundancy reasons. The two feeds are paralleled in Substation 1. Both feeds have the capacity to supply the required power so there is effectively N+1 incomer redundancy.

Substation 1 is located on the ground floor of the McMullin Building. The McMullen Building is end of life and scheduled to be demolished to make way for STEMM.

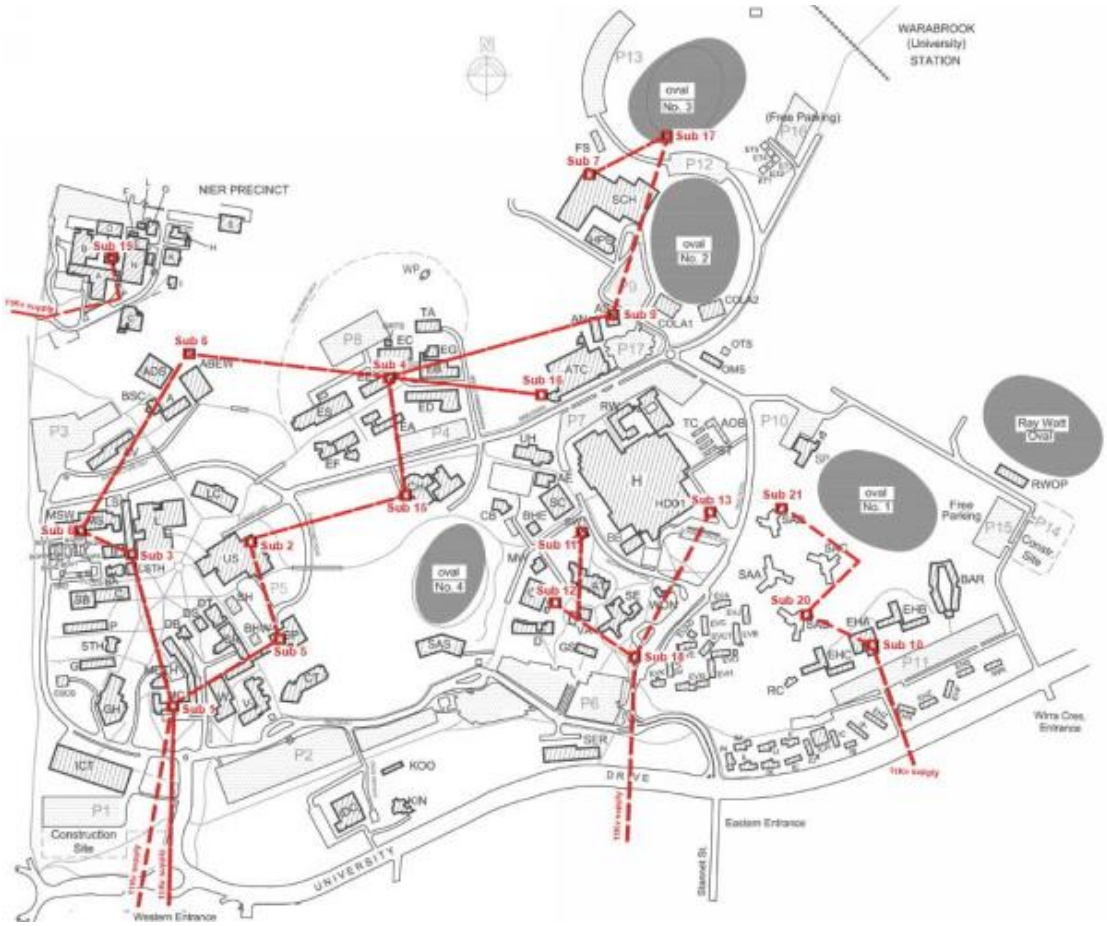

Figure 3 *Existing University of Newcastle HV Network*

2.2 PROPOSED ELECTRICAL INFRASTRUCTURE

As Substation 1 in the McMullin Building will be demolished, a new main incomer substation needs to be constructed to take the Ausgrid feed, provide power to the HV ring and to supply local LV power. For the purpose of design, this substation will be called Substation Zero. It is proposed that Substation 0 will be located south of the South/West corner of the ICT Building as shown in Figure 4.

Figure 4 *Existing and Proposed Ausgrid substations*

To serve the STEMM building one new substation, Substation 22 will be established on the Lower Ground level of the building which will contain two (2) number ONAN type 2.5 MVA transformers and 11 kV ring main units [RMU's].

The demolition of Substation 1, the construction of Substation 0 and the associated HV cabling works are being undertaken under a separate Enabling Works package. As part of the Enabling Works package conduits will be provided from Substation 0 terminating adjacent to the proposed Substation 22. HV cables will be installed between Substation 0 and Substation 22 as part of the STEMM project.

3.0 COMMUNICATIONS

The existing communications services to the University of Newcastle campus are provided by Telstra and enter the campus from the main entrance near the ICT building. The existing communications service cables are served from University Drive and enter the campus at a main Telstra communications pit along the east side of the entrance road between University Drive and Ring Road. The existing main service consists of three 100-pair copper communications cables and a small number of fibre optic cables.

The external communications services are distributed for internal reticulation from a main communications room within the McMullin Building. The existing communications room houses the existing MDF, PABX, the main FIP, as well as backup battery power and UPSs to support the telecommunications equipment.

With the proposed demolition of the McMullin Building, a new Network Room is proposed in the ICT Building as part of the Enabling Works.

Optic fibre and telephone cabling is primarily reticulated though service conduits and pits being delivered as part of the Enabling Works scope, delivering services originating from the new Network Room.

Two primary communications entry points to the building will provide physical and systematic redundancy in the proposed system.

The actual pathway(s) for reticulation from the STEMM to the existing Campus IT Network Nodes will be determined in liaison with University of Newcastle's IT Department.

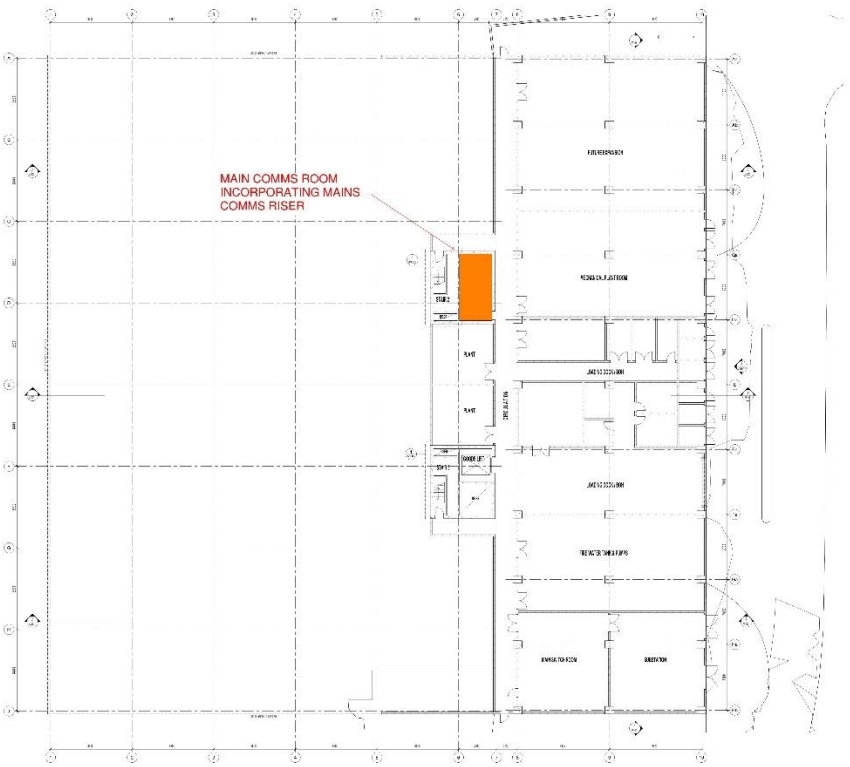

Figure 5 *Proposed Communications Infrastructure*

4.0 WATER, SEWER AND GAS SERVICES

4.1 WATER SERVICE

The main water supply to the University's Western Campus is supplied via dual DN250 connections to the DN600 and DN1,200 Hunter Water Corporation (HWC) water mains located on the Northern side of University Drive. These HWC mains are interconnected yet independently supplied from HWC reservoirs located at Lambton, approximately 1 km to the South/East. Within the Campus the water mains currently provide a combined potable and fire service.

As part of the Enabling Works, the Campus water supply is to be separated into independent potable and fire services supplies that will eventually form ring mains around the Campus.

The Enabling Works consultant GHD has undertaken modelling that indicates the proposed systems will readily accommodate the estimated water and fire service demands for STEMM.

A 200 dia potable water supply and a 250 dia fire service water supply branch from the proposed new ring mains will be provided under the Enabling Works package, as shown in Figure 6 below.

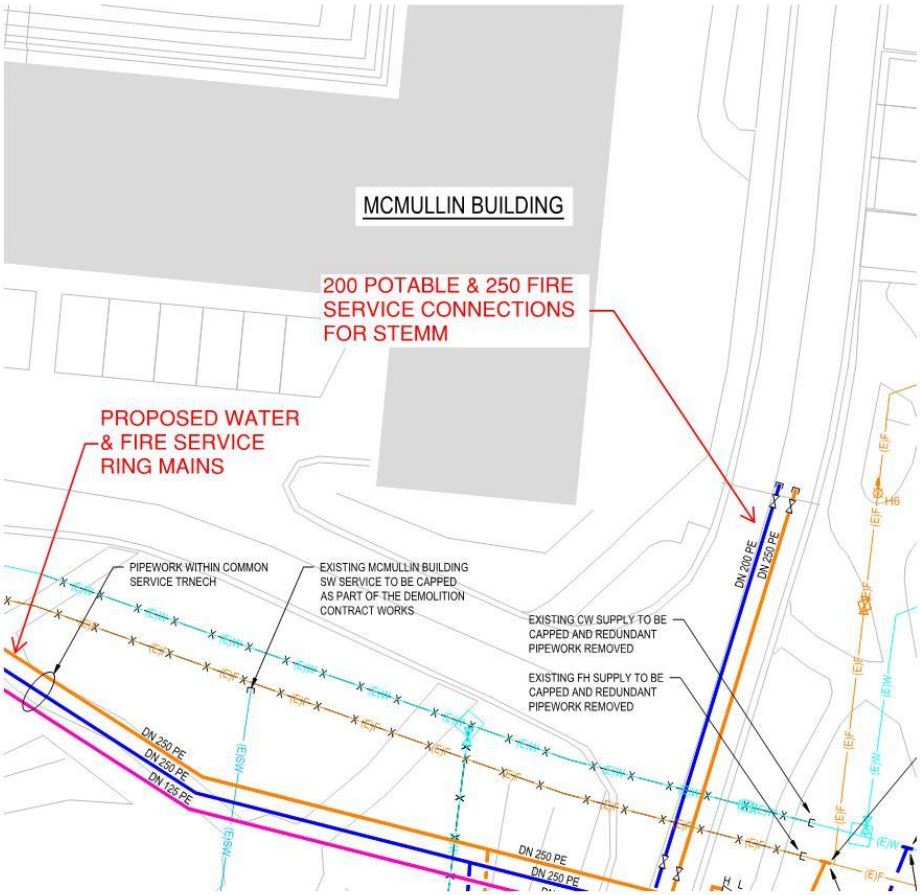

Figure 6 *Proposed STEMM Water Main Connections*

4.2 SEWER DRAINAGE

Buildings on the Western Campus drain via multiple gravity drainage pipelines to a University owned sewer pumpstation, located approximately 70 metres to the northeast of the Auchmuty Library, on the northern side of the Ring Road.

Wastewater collected by the pumpstation is pumped to the west to Hunter Water's sewer network via a 200 mm CICL rising main. Previous studies, confirmed by the Enabling Works consultant GHD indicate that the existing pumpstation has adequate capacity to service the anticipated load from STEMM.

An existing 150 sewer main currently serving the McMullin Building will be capped off for future connection to the STEMM Building as part of the Enabling Works package.

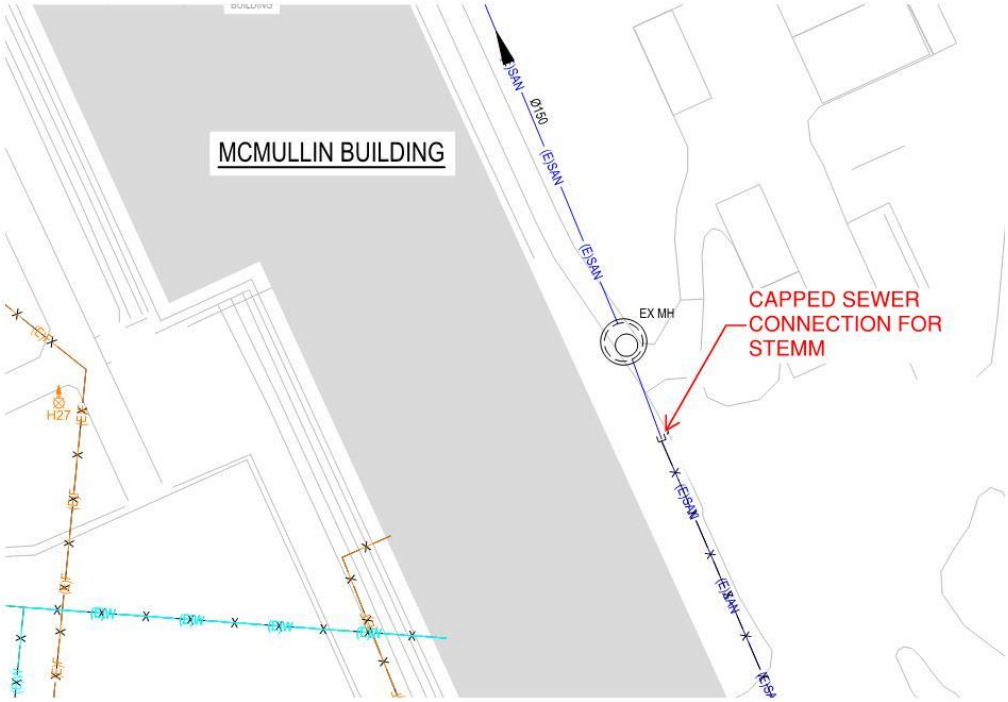

Figure 7 *Location of Existing Sewer Infrastructure*

4.3 NATURAL GAS

Natural gas will be extended from a capped branch provided in the Enabling Works package, as shown in Figure 8.

The incoming supply will incorporate a gas meter assembly and regulator system to control gas pressures. Isolation valves will be installed to all main lines and branches for maintenance purposes prior to any appliance.

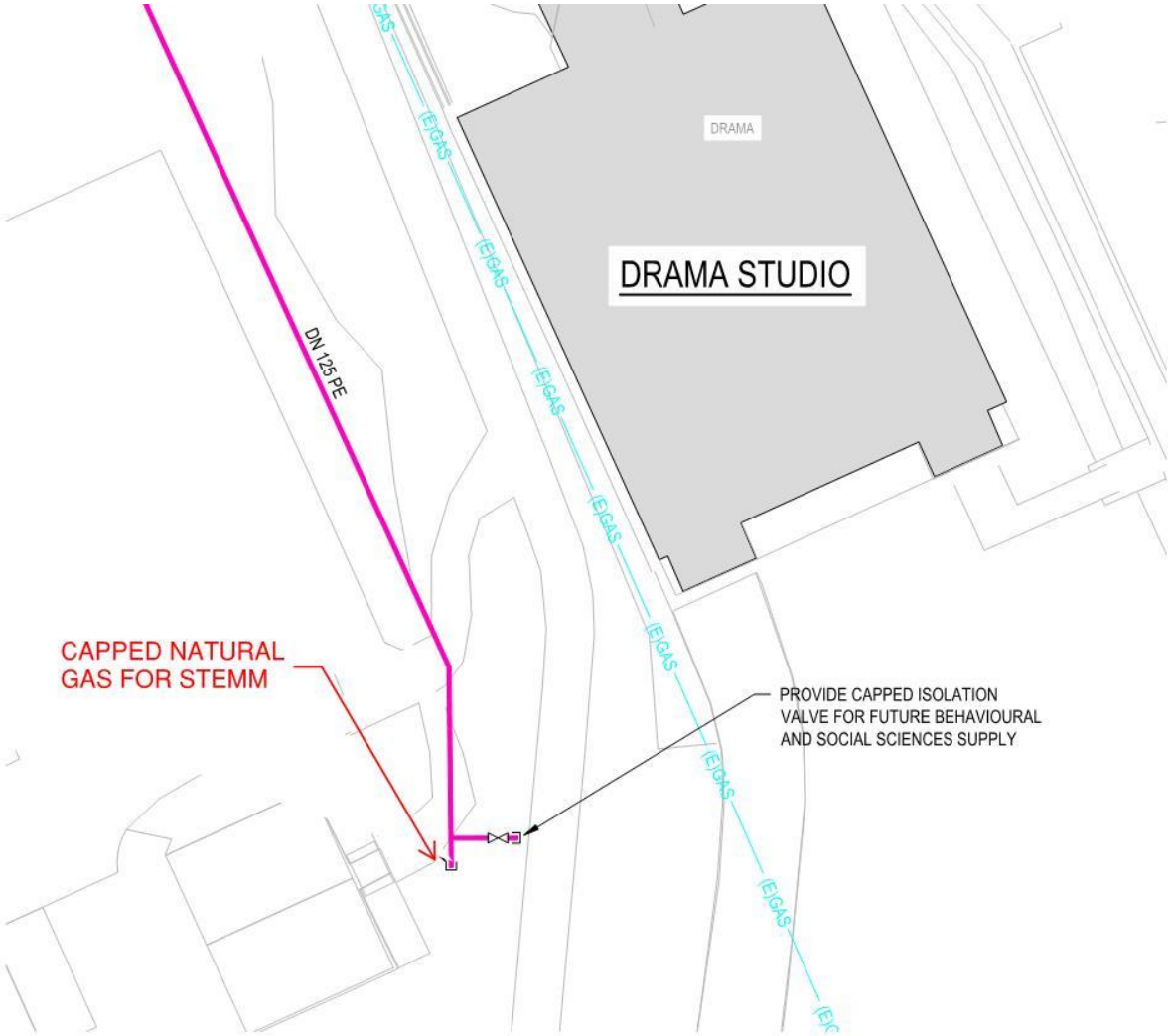

Figure 8 *Natural Gas Connection*

APPENDIX A REPORT CONDITIONS

Exclusive Use

This report has been prepared by Umow Lai, at the request of the University of Newcastle and TSA ("the Client") exclusively for the benefit and reliance of the Client.

This report is an engineering report prepared in accordance with the Client's directions, having due regard to the assumptions that Umow Lai may be reasonably expected to make in accordance with sound engineering practice and exercising the obligations and the level of skill, care and attention required of it under the terms of the engagement.

The following section contains important information about this report. This report, in whole or in part, may only be reproduced, or distributed with the prior written permission of Umow Lai or the Client, and this permission must accompany every copy of this report.

Umow Lai's engagement by the Client is on the basis that Umow Lai's liability, whether under the law of contract, tort, statue, equity or otherwise, is limited as set out in the terms of the engagement.

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This report is prepared exclusively in accordance with instructions given by or on behalf of our Client. Umow Lai therefore excludes any responsibility for the use of, or reliance on, the report by any third party and the use of, or reliance on, the report by any third party is at the risk of that party. Any third party wishing to act upon any material contained in this report should first contact Umow Lai for detailed advice which will take into account that party's particular requirements.

It is not possible to make a proper assessment of this report without a clear understanding of the terms of engagement under which the report has been prepared, including the scope and directions given to, and the assumptions made by, Umow Lai in the preparation of this report.

This report is provided strictly on the basis that the information that has been provided can be relied on is accurate, complete and adequate. However, we accept no liability for the accuracy or otherwise of this information, except where Umow Lai expressly indicates in the report that it has verified the information to its satisfaction.

Nothing in this report shall be read or applied so as to purport to exclude, restrict or modify, or have the effect of excluding, restricting or modifying the application of all or any of the provisions of the Trade Practices Act 1974 or any other legislation which by law cannot be excluded, restricted or modified.

Hazardous Materials

Umow Lai expressly excludes investigation or advice in relation to the actual or potential presence of pollution, contamination or asbestos, or the actual or potential risk of any incident affecting the safety of operation. Umow Lai recommends that the services of a registered occupational hygienist be commissioned to carry out investigations and prepare the necessary report in respect of the presence of asbestos or other hazardous building materials.

Limits on Cost Estimates

Umow Lai has no control over the cost of labour, materials, equipment or services furnished by others, contractors' methods of determining prices, or competitive bidding or market conditions. Any cost estimates provided in this report represent our best judgement as an experienced and qualified professional consultant, familiar with the relevant industry. Umow Lai cannot guarantee that proposals, bids or actual construction costs will not vary from the cost estimates provided.

Commercial Feasibility

Nothing in this engineering report should be construed as an opinion concerning the commercial feasibility of the property or asset.

Compliance with Current Building Codes, Regulations and Standards

Building Codes, Regulations and Standards (Regulations), particularly with respect to fire safety systems, may have changed since the original construction. Buildings constructed in accordance with the Regulations in force at the time, may not now comply with current Regulations.

The report may identify areas of non-compliance with current Regulations but it does not purport to provide a comprehensive analysis of compliance with current Regulations. Accordingly Umow Lai recommends that the Client should seek specialist regulatory/building code advice to confirm any non-conformances.

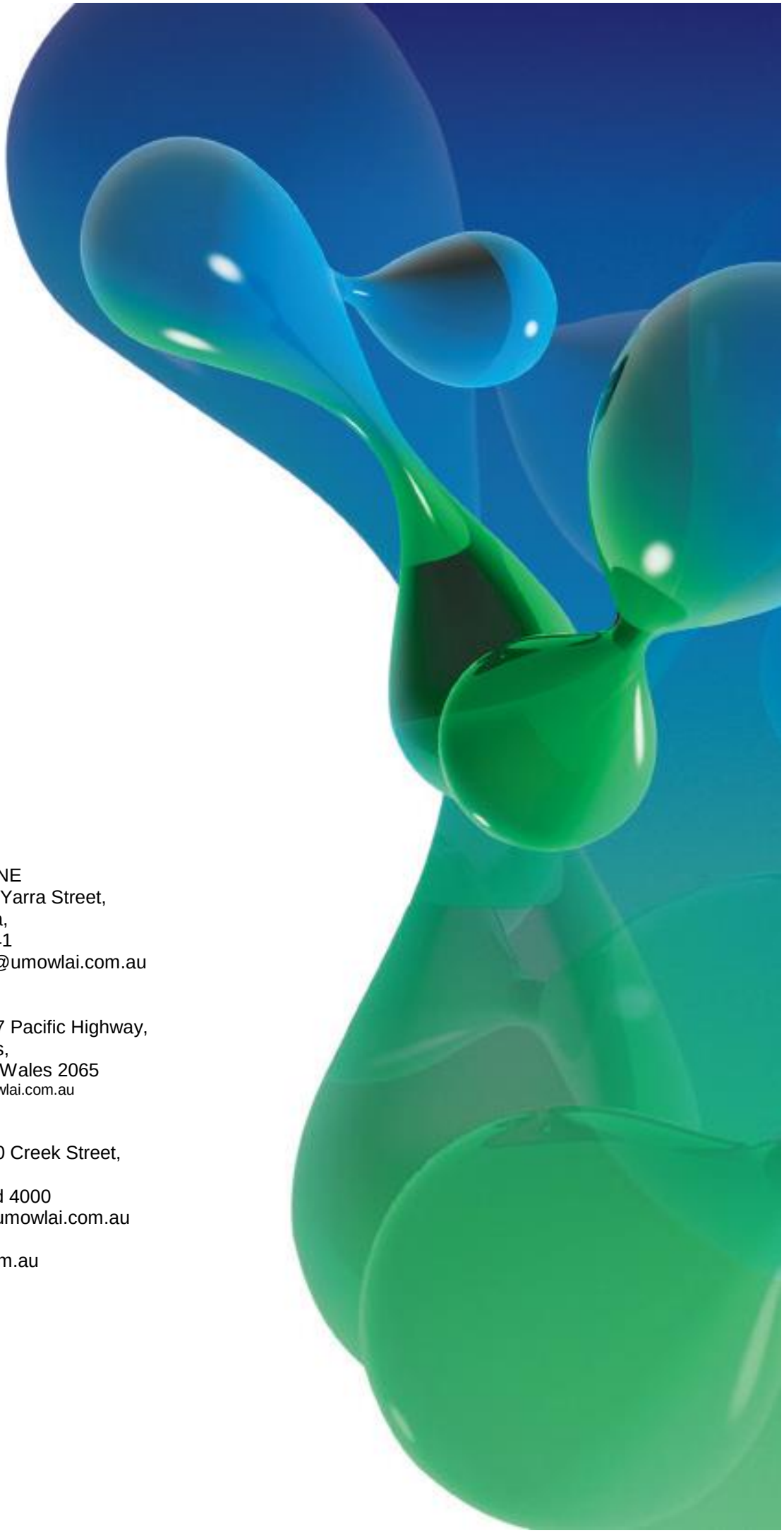
Accuracy

If the reader should become aware of any inaccuracy in or change to any of the facts, findings or assumptions made in this report, the reader is requested to inform Umow Lai so that we may assess its significance and review the report's comments and recommendations.

Exclusions

The following specialist consultancies are outside the scope of this report and it is therefore recommended that specific advice be sought.

- Structural Engineering
- Civil Engineering
- Fire Safety Engineering
- Acoustic Consultancy
- DDA Advice
- OH & S Measures
- Safety in Design Consultancy
- Building Regulations Advice
- Traffic Consultancy
- Architectural Advice
- Hazardous Materials & Dangerous Goods Advice



MELBOURNE
Level 4, 10 Yarra Street,
South Yarra,
Victoria 3141
melbourne@umowlai.com.au

SYDNEY
Level 7, 657 Pacific Highway,
St Leonards,
New South Wales 2065
sydney@umowlai.com.au

BRISBANE
Level 7, 200 Creek Street,
Brisbane,
Queensland 4000
brisbane@umowlai.com.au

umowlai.com.au