ENGINEERS FOR BUILDING SERVICES

sydney
melbourne
manila
brisbane

UTS Central
Hydraulic Services
Water Cycle Management Report

sydney office:

tel. (02) 9437 1022 **fax.** (02) 9437 1025

email. general@erbas.com.au

L1, 15 Atchison Street, St. Leonards NSW 2065

P.O. Box 41, St. Leonards NSW 1590

www.erbas.com.au

Rev	Report Reference	Date	Description of Release	Prepared By	Reviewed By	Approved By
0	003	21/12/15	DA Submission	MS	PA	PA
1	003	10/02/16	DA Submission	MS	PA	PA
2	003	21/04/16	DA Submission	MS	SF	GN
3	003	27/04/16	DA Submission	MS	SF	GN

The reader's attention is drawn to the following important information:

Disclaimer:

Energy or resource magnitudes advised are based on theoretical modelling data and may vary from the actual usage for systems.

Exclusive Use:

This report has been prepared for the exclusive use of Erbas Engineers' client to meet their particular objectives and by its nature is limited in scope. The material contained in this report should not be used for any other purpose or by other persons or entities without contacting Erbas Engineers.

Copyright:

Introduction

This report has been prepared to identify an appropriate hydraulic services strategy for the redevelopment and extension of UTS Central Buildings CB01 & CB02 (herein known as UTS Central or, the Project) and as a supporting document to the Development Application and its processes.

It provides commentary to the extent of the statutory infrastructure available to the Project and comments on the potential resultant impact on the surrounding hydraulic infrastructure.

The information herein supports the State Significant Development Application (SSDA) submitted to the Department of Planning and Environment pursuant to Part 4 of the Environmental Planning and Assessment Act 1979 (EP&A Act).

The SSD Application relates to the Concept Plan Approval for the University of Technology Sydney (UTS) City Campus Broadway Precinct, which was approved in December 2009 (MP08_0116).

An educational establishment with a value exceeding $30 miilion is identified as a State Significant Development under the State Environmental Planning Policy (State and Regional Development) 2011, with the Minister for Planning the consent authority for the project.

This report has been prepared having regard to the Secretary's Environmental Assessment Requirements issued for the project on 9 December 2015, Ref; SSD7382.

The information contained within this report is for use in the assessment of impact on hydraulic infrastructure surrounding the University of Technology Sydney (UTS) Campus Buildings CB01 & CB02 upgrade and extension works.

The information used in the compilation of this report is current at the time of issue any future infrastructure and adjoining development plans not available for public information have not been considered in its preparation.

The design has assumed optimal use of available sustainability initiatives to satisfy all the hydraulic services performance requirements in accordance with the Building Code of Australia, relevant Australian Standards and Codes, Green Star initiatives, UTS design guidance and best practice industry guidelines.

The hydraulic services works shall include rationalisation of services trenching in coordination with all other services trades and pre-fabrication of pipework to minimise external disruptions where possible and increase installation efficiency whilst being considerate to the circulation of the surrounding areas.

Design consideration of materials, connection methods and buildability will be discussed and consulted throughout the demolition and construction phases of the project to ensure the reliability of service operation and maintenance beyond the Term.

The storm water strategy herein includes for conceptual sketches, sediment and erosion control plan, services overview, infrastructure report, and Authority correspondences

provided as part of a report submission for consideration in determination of the Development Application.

Overview of Proposed Development

This SSD Application seeks approval for the following components of the development:

- Site preparation works, including demolition and clearance of existing Building 2 down to approximately ground level and associated tree removal;
- Retention and re-use of existing basement Level 1 and Level 2;
- Construction and use of a new podium building fronting Broadway (Building 1 extension and new Building 2);
- Construction and use of new floors above new Building 2 podium;
- Public domain improvements surrounding the site;
- Landscaping works to roof levels;
- Retention of existing vehicle access and parking arrangements; and
- Extension and augmentation of physical infrastructure / utilities as required.

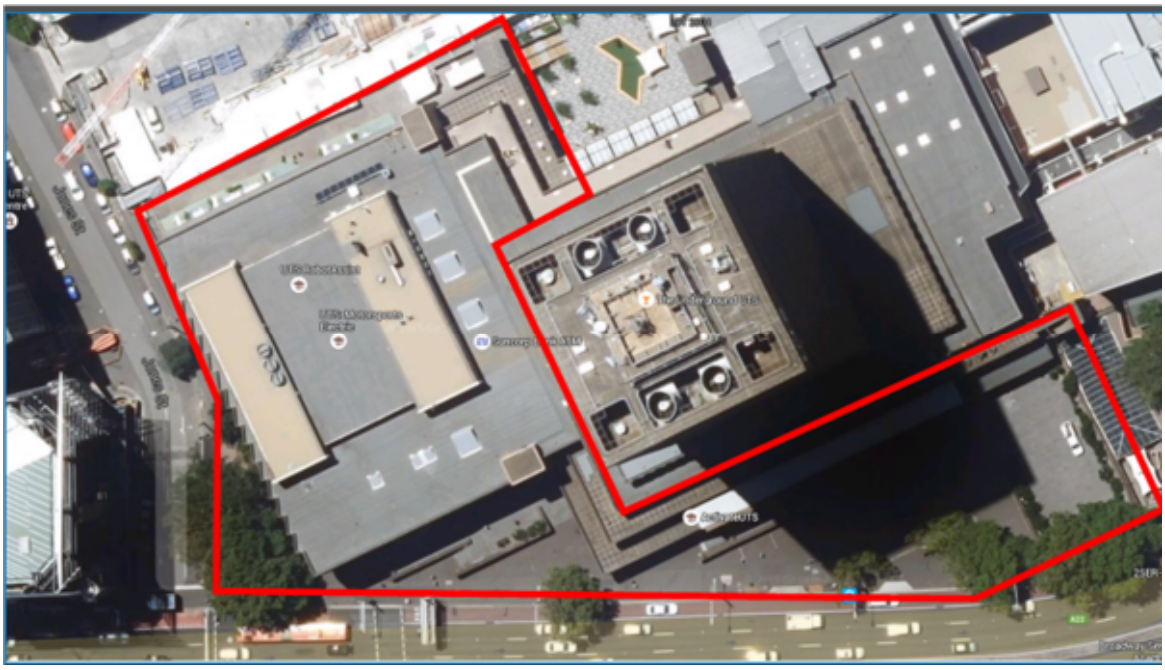
The new floor space will accommodate a range of educational and ancillary educational uses, such as:

- Library
- Research
- Teaching Space
- Informal Learning Space
- Student Centre
- Student Union Spaces
- Food and Beverage Outlets
- Academic (including Faculty space)

The Project Site

The UTS Central Project is located on the southern edges of the central business district and has frontage to Broadway on the eastern side.
Jones Street is a cul-de-sac street with no thoroughfare to Broadway.
The site shares a close proximity to major transport hub of Central Station.

Figure 1- Google Maps image of the site.



Services Executive summary

The detailed impact assessment of the Project had the following focus areas;

- Existing infrastructure capacity and redundancy;
- Existing infrastructure proximity to the extended footprint;
- Services augmentation or diversions that may be required;

Summary Statement;

The Water, Gas, Sewer and Stormwater infrastructure has been reviewed and the result of the investigations and enquiries outlined herein is that there appears to be sufficient capacity in the surrounding infrastructure to support the Project without the need for augmentation or diversion of the surrounding supplies available to the campus.

Various temporary strategies for protection of utility infrastructure will need to be employed during construction. No services have been identified as traversing the site, or documented as encroaching on the property boundaries.

Stormwater service

Storm water overview
The existing site has two street frontages, Broadway to the east and Jones Street to the south.

Jones Street is served by two storm water infrastructure connections;

- To the south-west a 225mm vitrified clay main traverses along Thomas Street flowing southward at a steady grade at 5-10%. This is a Sydney Water owned asset as confirmed with Sydney City's Land Information Officer.
- To the north-east a 300mm concrete main extends under Broadway and falls from the from the north of the site and reticulates to the south passing by the Jones Street intersection with a kerb inlet pit believed to be serving the current site of the CB02 building located at the north-eastern end of Jones Street. This is also a Sydney Water owned asset as confirmed with Sydney City's Land Information Officer.

Alumni Green is located to the south-west of the site and has been recently completed (2011-2012) the works included augmentation of the storm water main in Thomas Street. The completion of these works means that the Alumni Green open space does not burden the Project and will remain separately connected to the Thomas Street infrastructure.

Infrastructure connection
Connection to the existing kerb inlet pit located at the north-eastern end of Jones Street is proposed. Utilisation of this connection is subject to CCTV inspection to assess condition, suitability and integrity and is yet to be undertaken.

As this is a Sydney Water asset the connection and detention requirements are yet to be resolved, and this will take place via the Section 73 application process at the outcome of the Development Application. This process is underway and will be formalised by the outcome of the Development application.

'City of Sydney – Storm water Drainage Connection Information [ref cl;(c)(ii)]; *Requirements for On-Site Detention (OSD)*
- Connection to Sydney Water or Other Public Utility Authority Drainage System
For development sites that connect directly to the Sydney Water or any other public utility authority drainage system, approval is subject to the owner complying with on-site detention conditions imposed by the owner of the drainage system. '

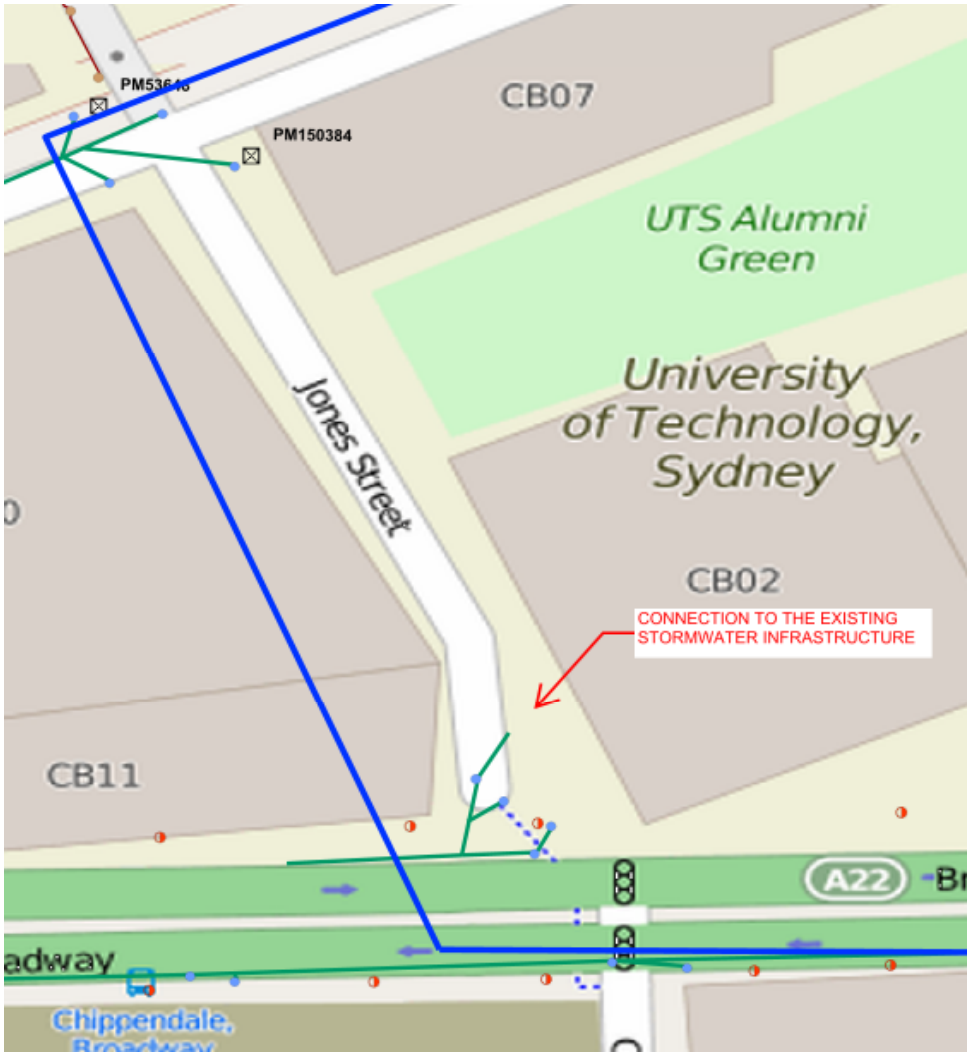


Figure 1 This plan indicates the existing sewer and storm water connections, including sewer infrastructure. This information is based on existing UTS drawings and information provided by Sydney Water. The infrastructure shown above is the property of Sydney Water.

Pre and Post Development Flows
The new form gives way to one utilising extensive green spaces. The increase of green space on the Project development also creates space from which to harvest rainwater. A reuse system that captures, filters and recirculates recycled water to irrigation and toilet facilities will serve the development to align the Project with its Green Star intiatives.

Each of these strategies favours the reduction of post development flows when compared to the pre- development form.

Early feasibility discussions with Sydney Water have indicated that a demonstrated post development flow reduction of 30-35% is possible. This is achieved by a 30-40% increase in impervious areas whilst designing for 50-60% storm water reuse over the multiple terraced gardens and open outdoor spaces.

The resultant reduction in post development flows also considers attenuated flows from rainwater recycling facilities located on Levels 18, 8 and 4.

With the above considerations, the recommendation for no or compensated detention has been requested as part of the Feasibility assessment to be confirmed by Development Engineer review.

Sub Soil drainage
The basement levels are to be retained as part of the Project, as such the existing storm water subsoil and groundwater facility is to remain.

The existing pressure pump out line from the basement will be diverted to the temporary drainage facility during construction to ensure the water entering the basement is appropriately treated prior to discharging to Authority infrastructure. This is further detailed below in '*Temporary Drainage strategy*'.

The existing sub soil and ground water pump out will be reconfigured to discharge into the temporary facility outlined below. Silt arresting and sand bagging of the existing inlet pits is required and will be consistent with the details provided on the storm water management plans.

The existing pump is proposed to be renewed as part of the works and this will take place at a programmed point of the project whereby siltation and sediment damage is considered to be mitigated by the progress of the construction of the upper floors.

Temporary Drainage strategy
The partial demolition of the CB02 building presents unique challenges to capture and treat the rainwater that collects on the site during its demolition and construction phases. The project has recognised the importance of this management strategy and has considered specific treatment processes to ensure the quality of this discharge prior to the authority main.

The storm water management plans indicate a temporary treatment chain. The treatment chain will utilise 3 phases of settlement, filtration and storage prior to discharge and will incorporate storage capacity for construction purposes like dust suppression and truck wash down facilities using the pre-treated water.

The final discharging chamber of the temporary treatment chain will be designed to attenuate the velocity at its discharge point to ensure no localised downstream flooding will occur in significant weather.

The temporary storm water system will be decommissioned prior to occupation and a transition to the compliant treated storm water system, as detailed by Sydney Waters pending requirements, will occur at a coordinated point of time during the project.

A rainwater tank (final volume to be determined based upon final cooling tower loads) is proposed to catch and store the rainwater within the roof plant room and reticulate it to various reuse fixtures around the site.

Discharge quality

The designed system is to address peak stormwater flow, and stormwater runoff pollutant management is to be in operation throughout the Project life cycle including throughout demolition. Design intent is to minimise pollutants from stormwater runoff and prevent waste material from entering the stormwater drainage system.

The DCP [(2012) cl3.7.3(1)(c)]states;

3.7.3 Stormwater quality
(1) Development of a site greater than 1,000sqm must undertake a stormwater quality assessment to demonstrate that the development will achieve the post-development pollutant load standards indicated below:
(a) reduce the baseline annual pollutant load for litter and vegetation larger than 5mm by 90%;
(b) reduce the baseline annual pollutant load for total suspended solids by 85%;
(c) reduce the baseline annual pollutant load for total phosphorous by 65%; and
(d) reduce the baseline annual pollutant load for total nitrogen by 45%.

Reference is to be made to the parallel guidelines provided by 'Green Star *design as built tool',* and the University of Technology Sydney '*Design Guidelines'*. The more stringent of these requirements will be adopted to ensure the minimum standard of storm water treatment objectives are provided for the Project.
Additional reference to the standard guides will also be cross checked, with the design, "Australia Runoff Quality, A Guide to Water Sensitive Urban Design," published in 2006 by Engineers Australia, and with those contained in the CSIRO "Urban Storm water Best Practice Environmental Management Guidelines" (1999) in order to effectively treat any pollutants in the storm water that is released back into the Sydney Water system.

Water supply

The Project has frontage to both small and large bore water reticulation infrastructure located on Broadway, Harris, Jones, Thomas and Wattle Streets, which all border the UTS Central Project.

Existing connections are provided from these mains to the CB01 & CB02 buildings for water, fire hydrant water, and fire sprinkler water from the existing water main on Broadway.

Water supply pressure and flow characteristics have been confirmed and the modelling by Sydney Water shows the main being capable of supporting the required flows for the project. A Section 73 Feasibility Application has been processed by

Sydney Water and the resultant Provisional Notice of Requirements is pending outcome. Consultation with Sydney Water confirms the location and capacity of the surrounding infrastructure. Once the Development Conditions are received a Section 73 application will need to be formally processed and the exact requirements determined.

CB02 is proposed to be connected via a new connection to the Jones Street 150mm water main. This connection would form the primary water services for the extended tower section of the works.

CB01 water supply is to remain. The existing cold water supply entering CB01 appears to have an acceptable expected life span and is not in need of upgrade or replacement.

The new connection to Jones Street will have sufficient capacity for the proposed redevelopment, extension, based upon the potable water demand being 11,500 litres based on a population density of 1 person/20m2 and a 20 l/person daily consumption (CIBSE Guide).

Potable water supply requirements will be reduced due to rainwater reuse systems for the CB01 & CB02 buildings. This recycled water system will be used to supply irrigation, toilet flushing, and process make-up water.

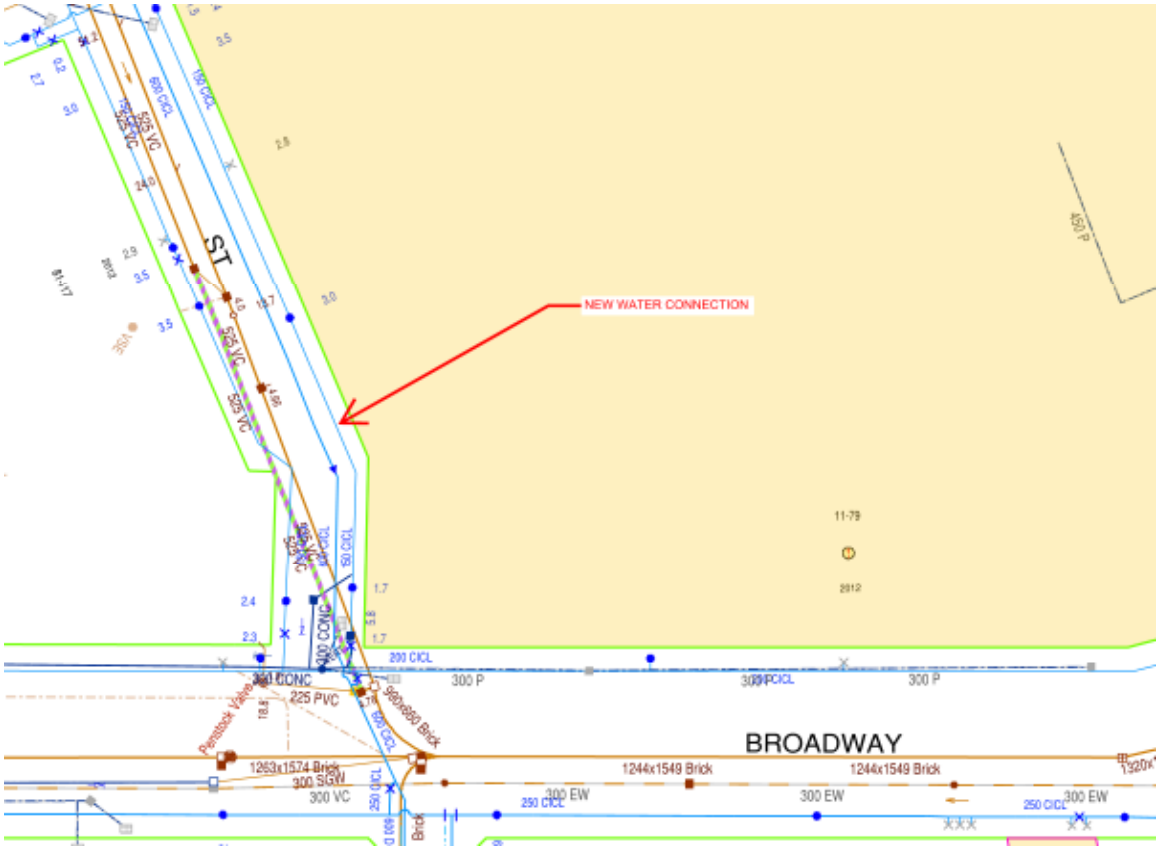


Figure 2 This plan indicates the existing sewer and storm water connections, including sewer infrastructure. This information is based on existing UTS drawings and information provided by Sydney Water. The infrastructure shown above is the property of Sydney Water.

Sewer service

There is existing sewer infrastructure on Jones Street and Broadway that is sufficient to serve the development.

A Section 73 Feasibility Application has been processed by Sydney Water and the resultant Provisional Notice of Requirements is pending. Once the Development Conditions are received a renewed Section 73 application will need to be processed as application will need to be formally processed and the exact requirements determined.

The existing 300mm vitrified clay sewer main that comes off Jones Street will be the connection point for the project.

A services protection report for the services surrounding the development is underway to ensure that the Project works will not adversely affect the surrounding utility infrastructure. The protection report will place a definitive location of the surrounding drainage services that can be visibly marked and recorded prior to construction proceeding.

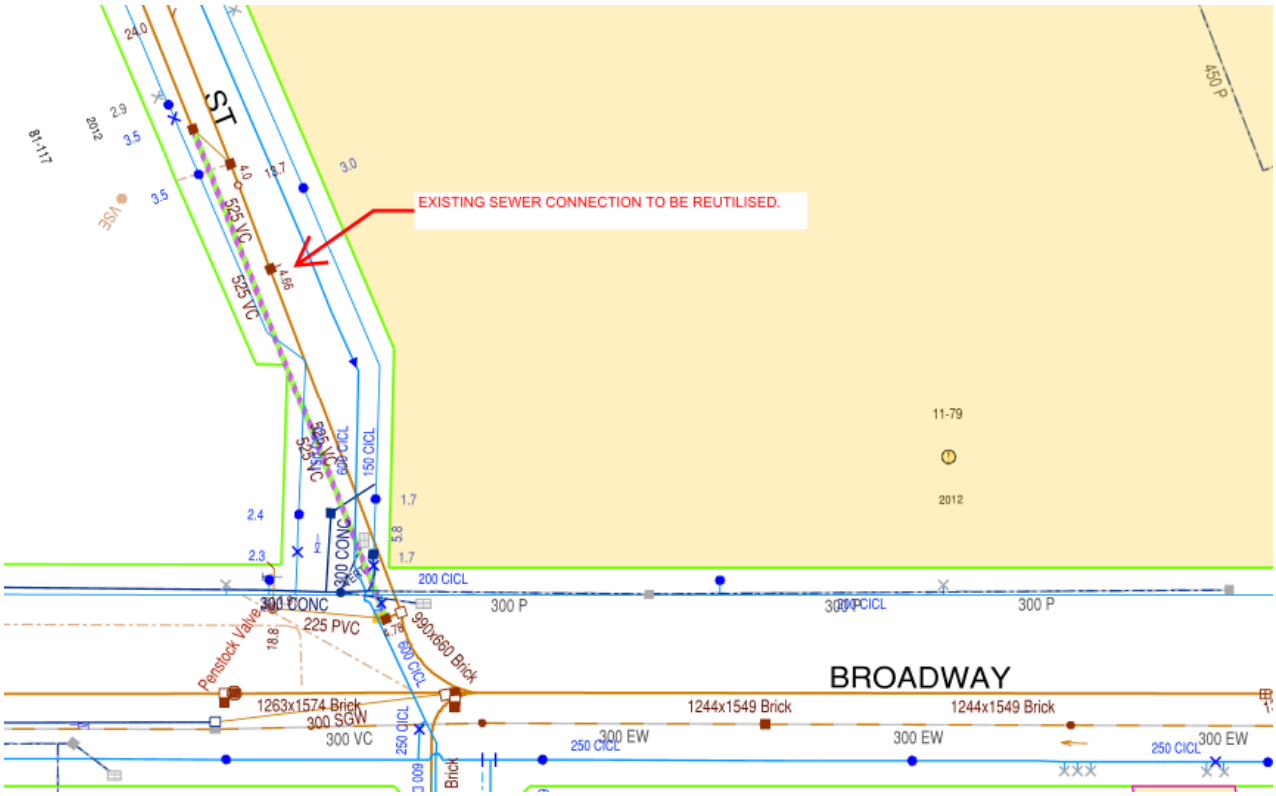


Figure 3 This plan indicates the existing sewer and storm water connections, including sewer infrastructure. This information is based on existing UTS drawings and information provided by Sydney Water. The infrastructure shown above is the property of Sydney Water.

Gas service

There is an existing high-pressure natural gas supply main running from Broadway along Jones Street. A high pressure gas main in Jones Street runs into Building 1 at the rear of Building 2 within a void space. The current gas meter room for Building 1 is located on Level 1 in Building 1, and feeds gas to Building 1, 2, 4 and Building 11.

The current Authority regulator is proposed to be relocated as part of the works to the project. Preliminary discussions with Neale Hilton (Jemena) are that the movement of this 1050kPa main facility may not be feasible or required as part of the works. This is ongoing.

We have requested further identification of the networks be done on site by Jemena and this has been requested through Elena Ioane (Jemena administration).

The extent of reticulated gas supply for the project is primarily provisional and no significant increase in demand is proposed or expected.

The current capacity of the main is sufficient for the demand of the Project.

.

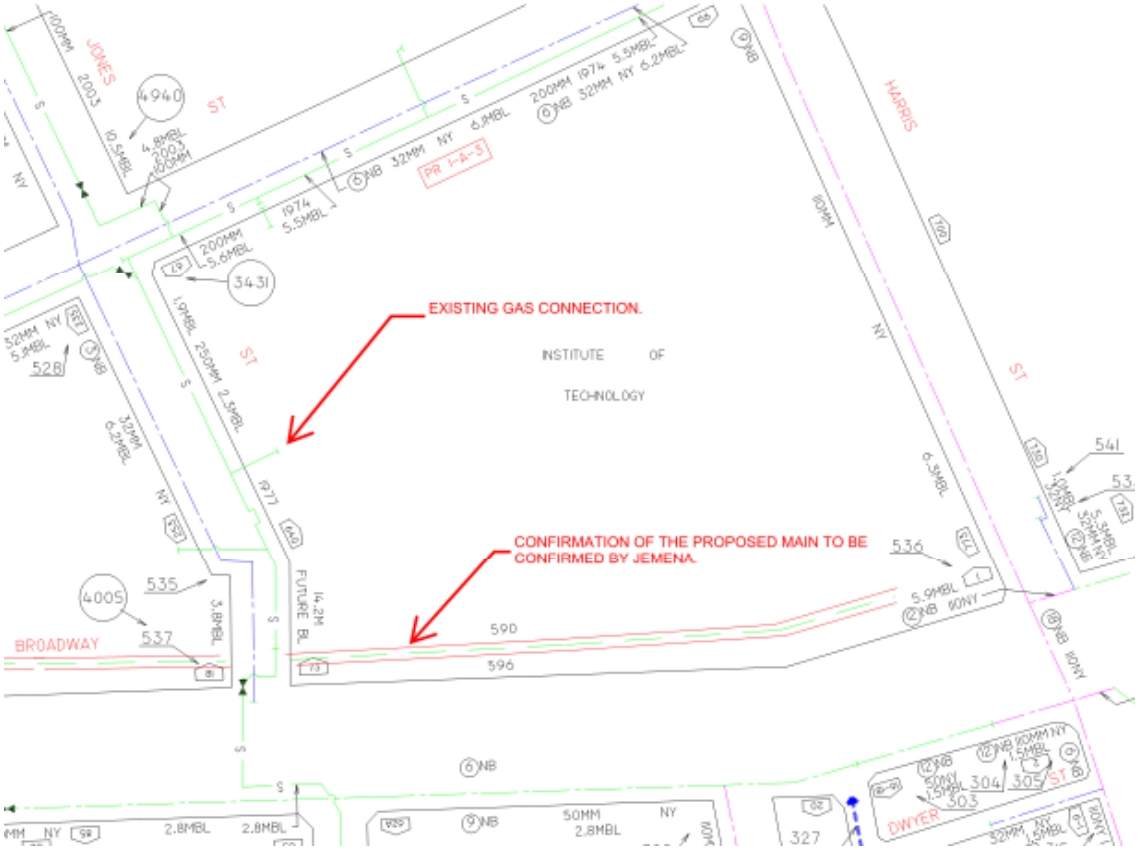
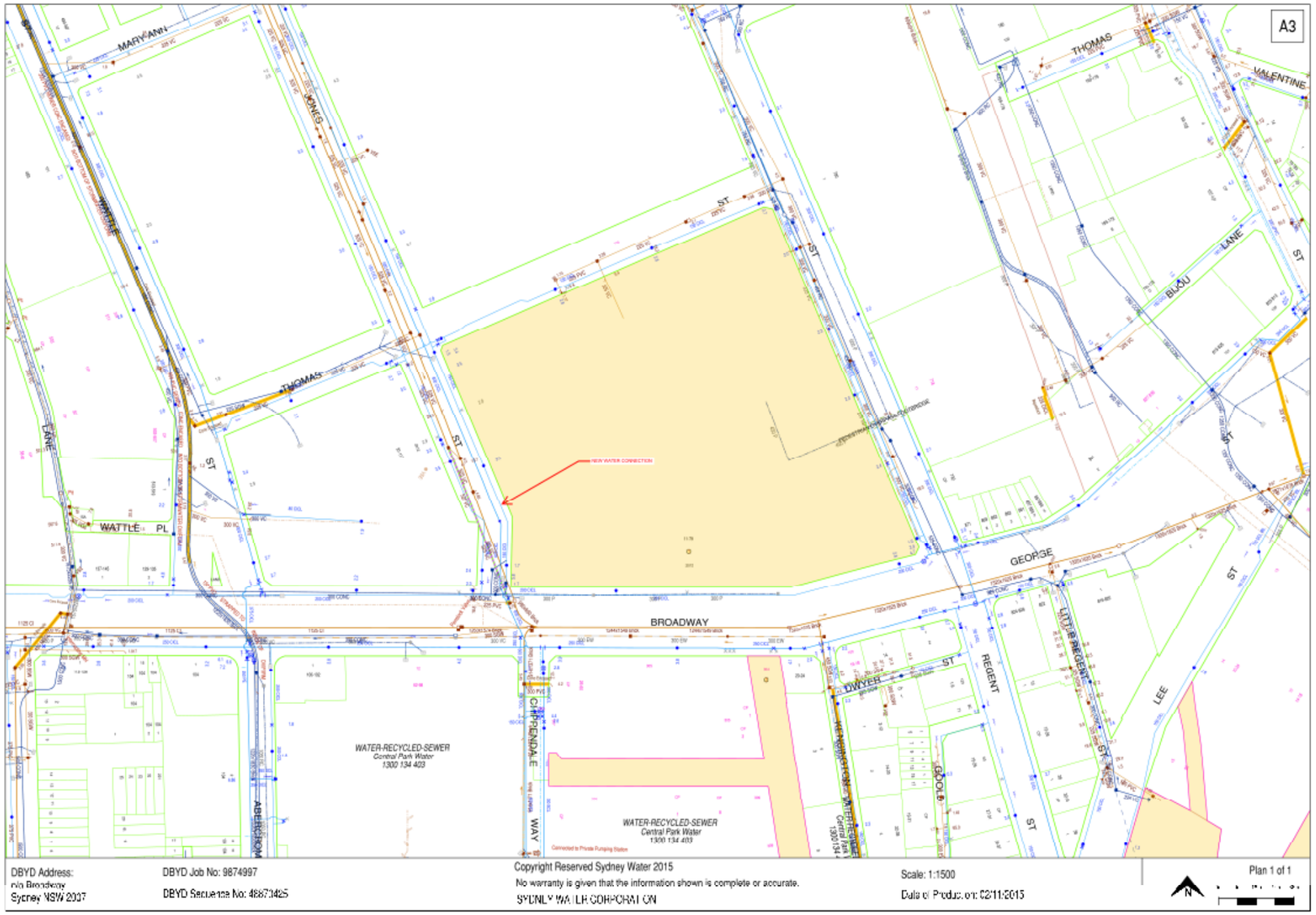


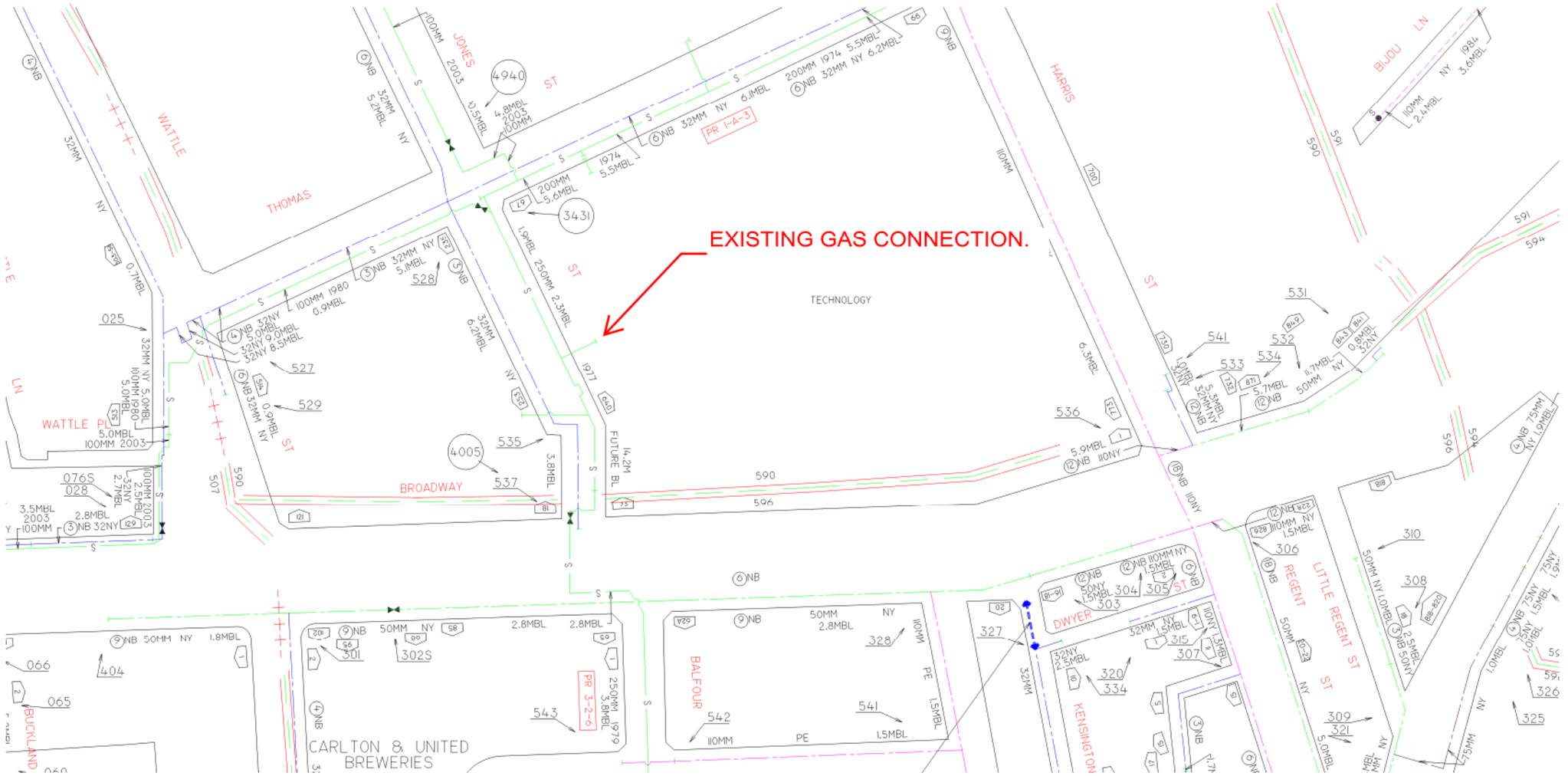
Figure 4 This plan indicates the existing gas connections, including infrastructure. This information is based on existing UTS drawings and information provided by Jemena. The infrastructure shown above is the property of Jemena

Appendices

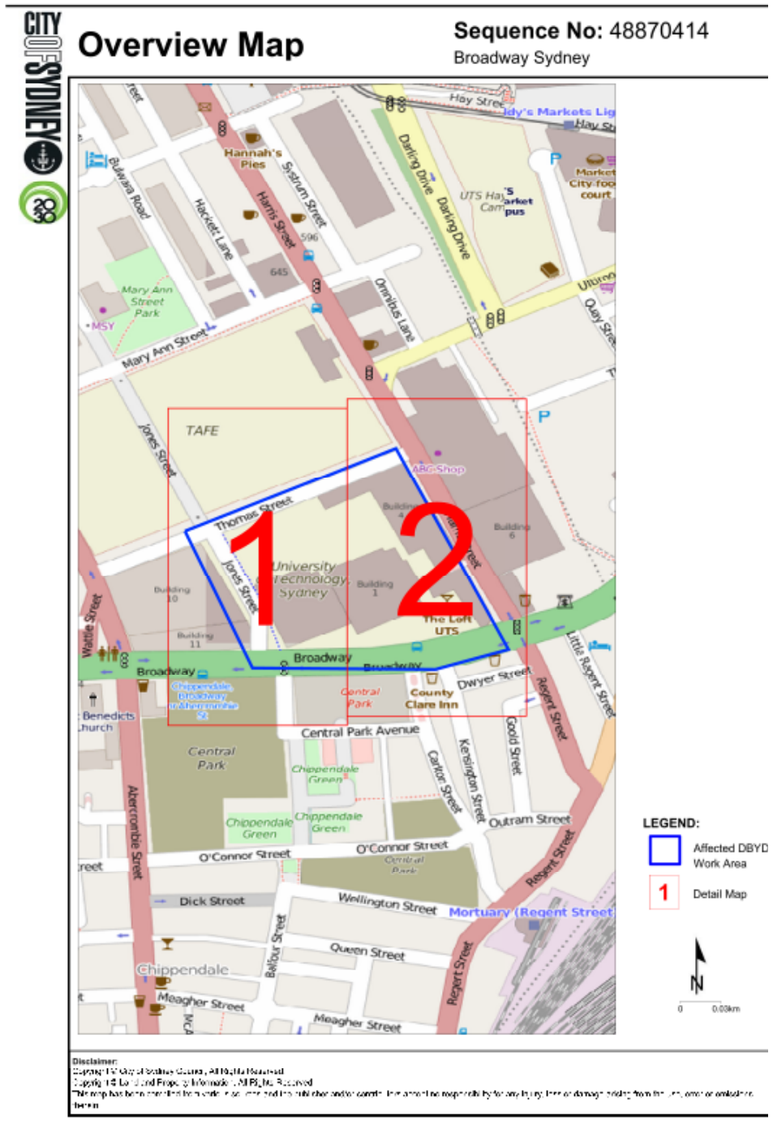
Appendix 1 – Water & Sewer supply diagram

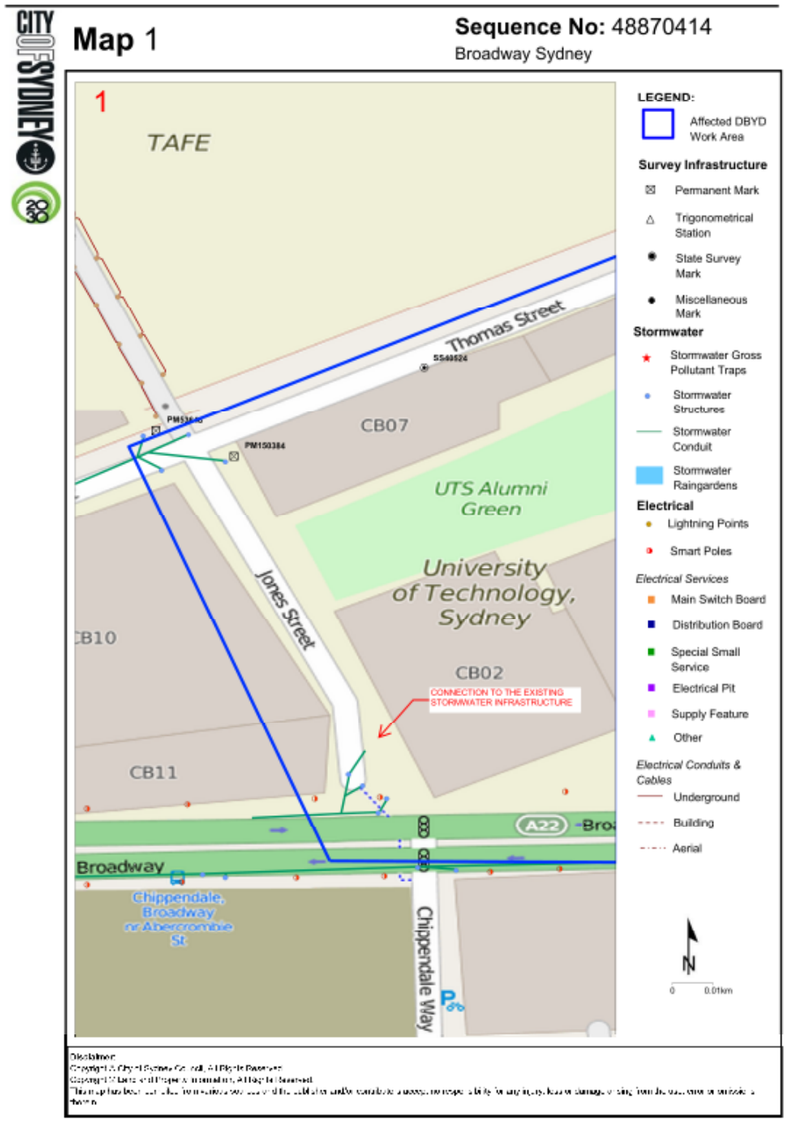


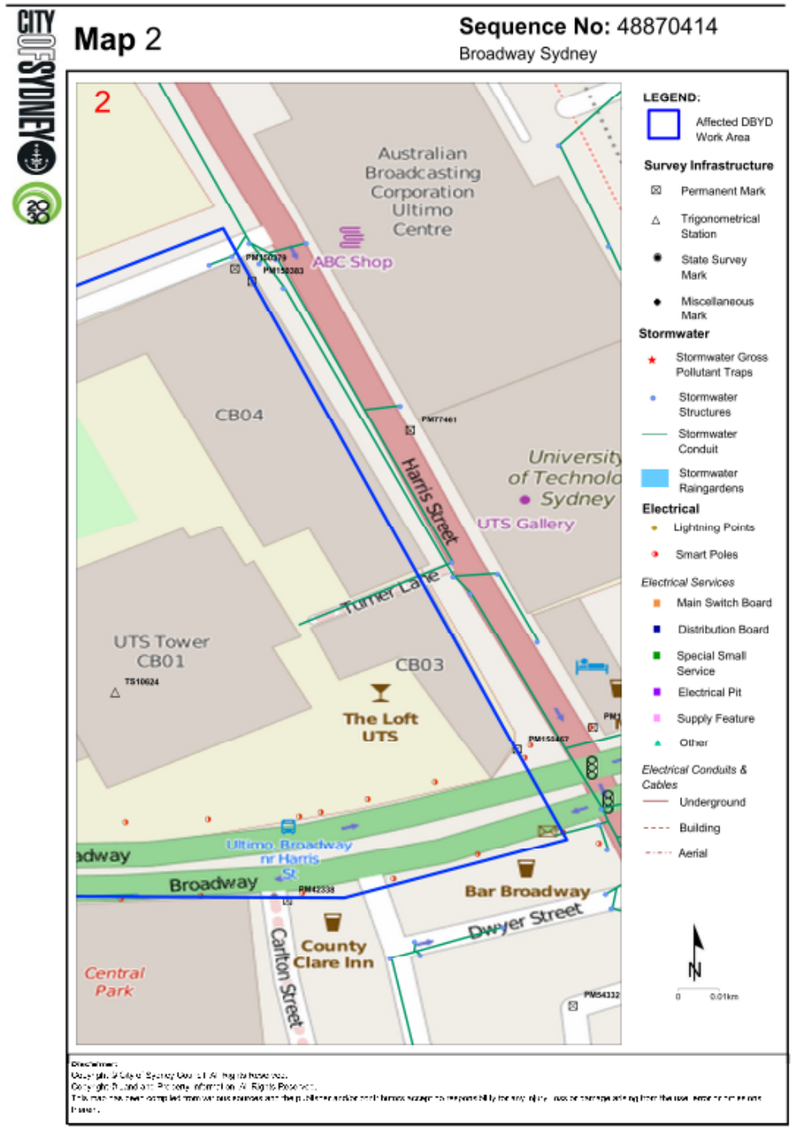
Appendix 2 – Gas supply diagram



Appendix 3 – Stormwater infrastructure diagrams







Appendix 4 – Stormwater reticulation concept schematic