If a building becomes architecture, then it is art. Clearly, if a building is not functionally and technically in order, then it isn't architecture either – it's just a building.
Arne Jacobsen

Mechanical Engineering
Lighting Design
Sustainable Design
Electrical Engineering

Copenhagen
London
Sydney
Canberra
Hong Kong
New York

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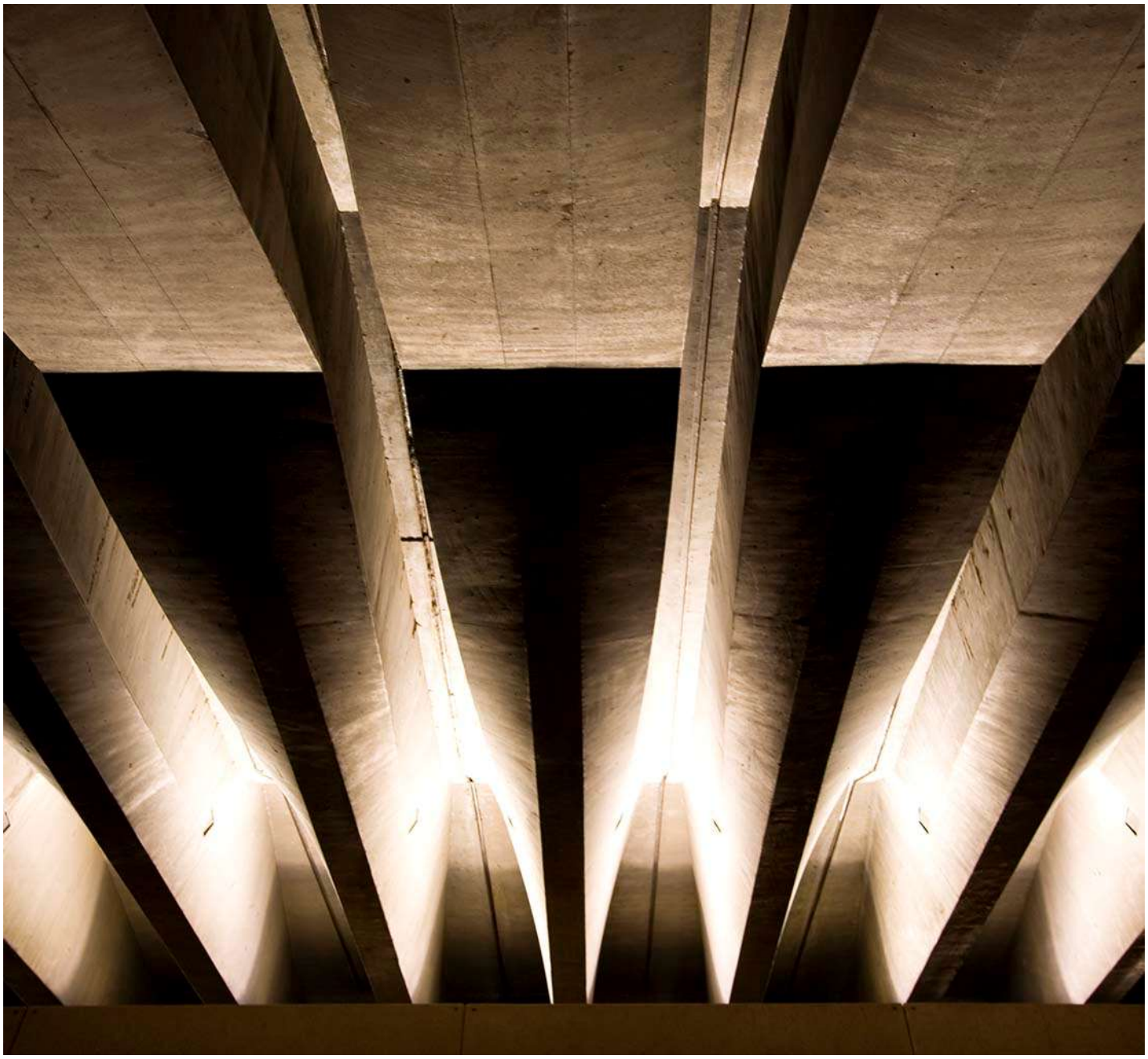
BUILDING SERVICES

STEENSEN VARMING

Barker College
New Aquatic Centre and Recital Hall
Infrastructure Requirements and Utility Assessment



Document Revision and Status

Date	Rev	Issue	Notes	Checked	Approved
17-03-2022	00	Draft	For Comment	IM	BJ
16-08-2022	00	Final		IM	BJ

Sydney March 17th 2022
Ref. No. 217142 E01

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Table of Contents

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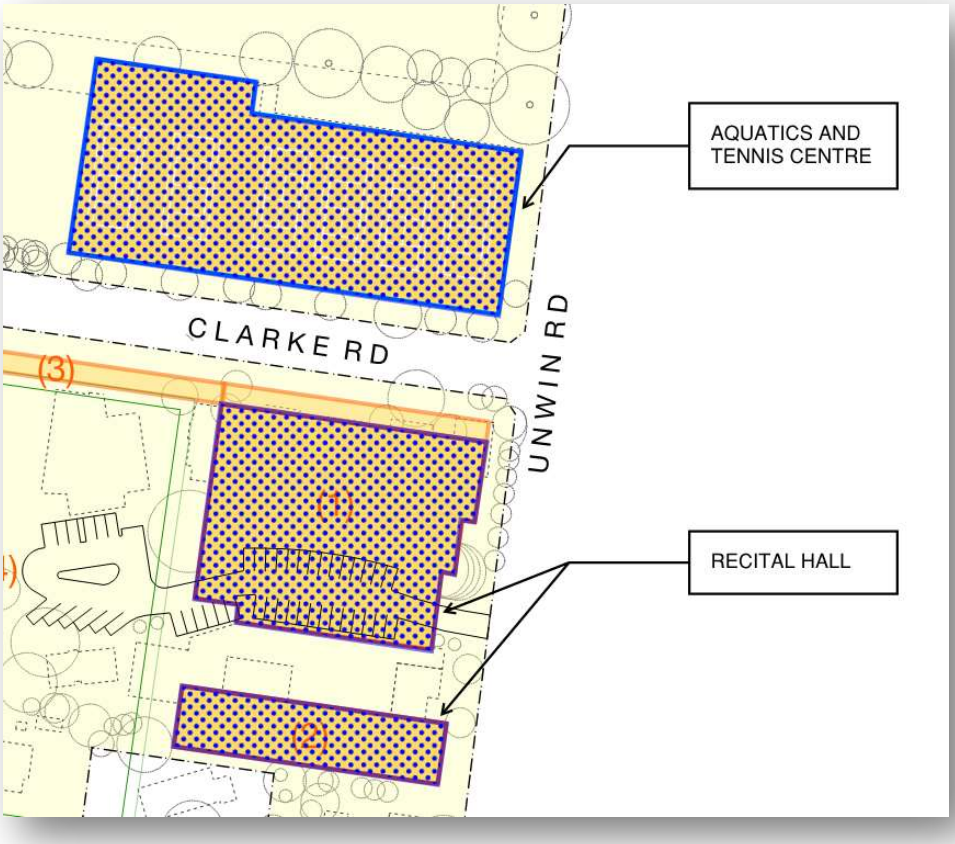
1.0 Introduction

Barker College is in initial stages of a multistage project incorporating the following works:

1. Campus Circulation Works;
2. Recital Hall;
3. Aquatic and Tennis Centre + Performing Arts and Exam Centre as future stages (Future Stages)

The projects are located at the corner of Clarke Road and Unwin Road in Hornsby within the Barker College campus as indicated in the diagram below



The purpose of this report is to identify the electrical and telecommunications infrastructure and connection points in the area to support the two proposed projects.

Warren Smith Consulting Engineers as a sub consultant to Steensen Varming have completed the same for Fire and Hydraulic services, refer to their report within appendix A.

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This is in response to Item 20 of the SEARs Document (see below)

20. Infrastructure Requirements and Utilities

- In consultation with relevant service providers:
  - assess the impacts of the concept development on existing utility infrastructure and service provider assets surrounding the site.
  - identify any infrastructure upgrades required on-site and off-site to facilitate the concept development and any arrangements to ensure that the upgrades will be implemented on time and be maintained.
  - provide an infrastructure delivery and staging plan, including a description of how infrastructure requirements would be co-ordinated, funded and delivered to facilitate the development.
  - identify potential impacts to existing utility infrastructure, as a result of the concept development.

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2.0 Infrastructure Assessment

2.1 Electricity

2.1.1 Maximum Demand

A preliminary maximum demand calculation has been completed for both the Aquatics and Tennis Centre and the Recital Hall to determine the electrical requirements of each building. The calculations provided below indicate the following preliminary maximum demands:

1. Recital Hall – 883kVA (1226A)
2. Aquatic and Tennis Centre – 803kVA (1116A)

Preliminary Electrical Maximum Demand

Project Name: Barker College - Aquatic Centre

Instructions		
1. Enter room name and VA/m² estimate according to AS3000 according to the rooms function 2. Enter the area for each room and the spread sheet will do the rest 3. To enter more rooms simply add more lines within the table and copy down the formula	Job Number	217142
	Date	3/12/2021
	Revison	1
	Author	IM
	Checked	IM

Room Name	VA/m²	Area (m²)	Total kVA
Lower Ground Floor			
Carpark	50	1432	71.6
Plantroom	50	272	13.6
Travel	50	980	49.0
Ground Floor			
Pool areas	80	3700	296.0
Staff facilities	80	60	4.8
User facitilites	80	113	9.0
Store	50	80	4.0
Staff room	80	37	3.0
Rec	80	42	3.4
Café	150	21	3.2
Management	80	20	1.6
Meeting room	80	18	1.4
First aid	80	18	1.4
Life guard	80	20	1.6
Family change room	80	35	2.8
Control room	80	19	1.5
First Floor			
Tennis court lighting allowance			30.0
Second Floor			
Change rooms	80	52	4.2
Travel	50	82	4.1
Staff	80	47	3.8
Seminar	80	67	5.4
Pool Water Treatment Allowance (400A)			287.8
	TOTALS	**7115**	**803.1**
	Current Per Phase (A)		**1116.3**

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Preliminary Electrical Maximum Demand

Project Name: Barker College - Recital Hall

Instructions

1. Enter room name and VA/m² estimate according to AS3000 according to the rooms function
2. Enter the area for each room and the spread sheet will do the rest
3. To enter more rooms simply add more lines within the table and copy down the formula

Job Number	217142
Date	3/12/2021
Revison	1
Author	IM
Checked	IM

Room Name	VA/m²	Area (m²)	Total kVA
Basement			
Storage	50	368	18.4
Lift lobby	80	174	13.9
Car park	50	2803	140.2
Workshop storage / service vehicles	50	1141	57.1
Lower Ground Floor			
Storage	50	520	26.0
Percussion	80	75	6.0
Recording Studio	150	105	15.7
Small prac 3	80	77	6.2
Small prac 4	80	77	6.2
Medium prac 3	80	141	11.3
Large prac	80	330	26.4
Recital Hall	150	743	111.4
WCs	50	39	2.0
Travel and BOH	50	966	48.3
Workshop	150	395	59.3
Print	150	277	41.6
Ground Floor			
Large prac	80	330	26.4
XS x 4	80	50	4.0
Medium prac	80	121	9.7
Staff/meet	80	105	8.4
Small prac 1	80	77	6.2
Small prac 2	80	77	6.2
Medium prac 2	80	132	10.6
BOH	80	67	5.4
Travel	100	1333	133.3
WCs	50	39	2.0
Recital hall control rooms	150	72	10.8
Mezzanine	80	240	19.2
Staff	80	169	13.5
Roof Plant			
Roof plant	50	745	37.2
	TOTALS	**11785**	**882.2**
	Current Per Phase (A)		**1226.3**

2.1.2 Scope of Work

Given the anticipated loads, from an electrical supply perspective it appears that both buildings will require their own dedicated kiosk transformers, in the order of 1000kVA depending on the standard Ausgrid kiosk sizes.

2.1.3 Review of Infrastructure

Steensen Varming has completed a Dial Before You Dig as well as a review Ausgrid services maps to getting an understanding of the services in the area of the works. High voltage infrastructure exists adjacent to both proposed buildings to which the new kiosk transformers could be connected. The image below is an extract from the

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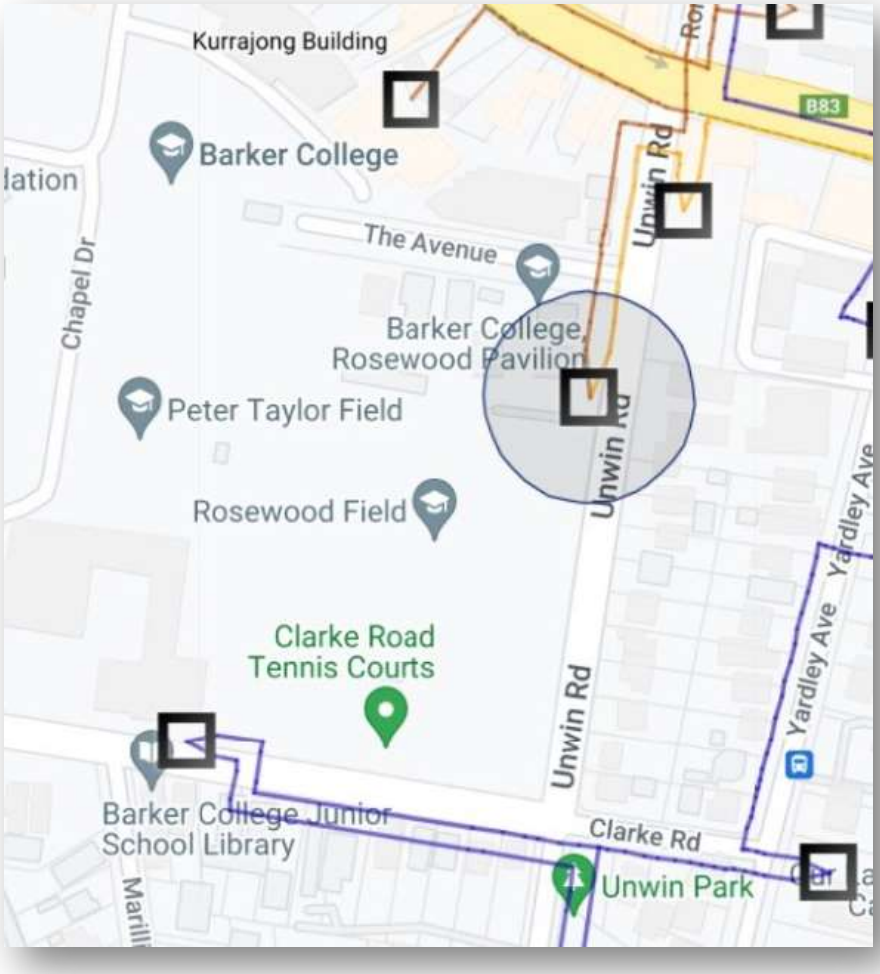
Ausgrid maps which shows there are two seperate feeders in the area, one along Clarke Road in blue and the other along Unwin Road in yellow.

There are no existing Ausgrid assets in the area of the two projects and thus neither project will impact of existing infrastructure in the area.

In order to provide a supply to the proposed buildings, if capacity permits they could both be connected to the blue high voltage feeder on Clarke Road or have the yellow feeder extended down Unwin road to connect the Aquatic and Tennis Centre to the network.



An application for connection for both projects will need to be submitted to Ausgrid to obtain a design information package to confirm the exact scope of works required and confirm that there is sufficient capacity in the area.

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2.2 Telecommunications

2.2.1 Scope

The telecommunications requirements of both buildings can be served in one of two methods:

1. Connected directly to the authority network as a new service
2. Linked back to the existing Barker College ICT network through the installation of a backbone fibre cable

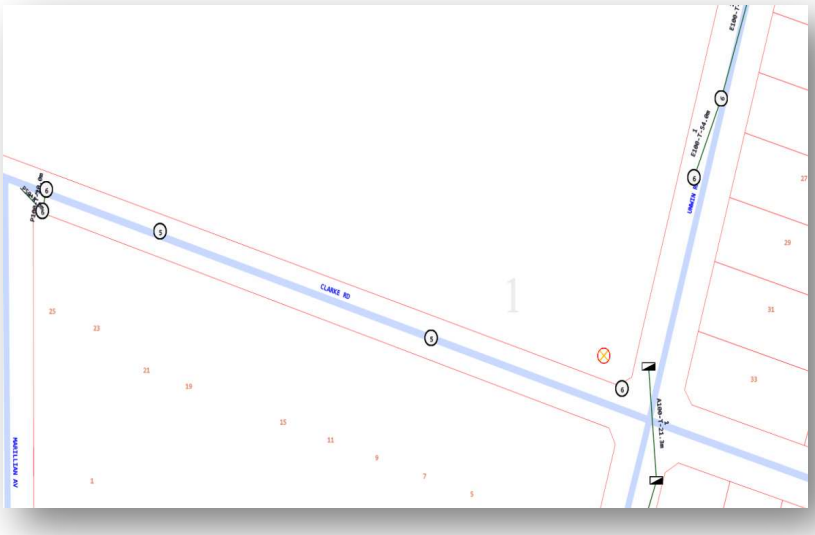
2.2.2 Review of Infrastructure

Steensen Varming has completed a Dial Before You Dig and reviewed the provided services maps. There are three telecommunications authorities in the vicinity of the two projects, namely NBN, Telstra and Optus.

If option 1 noted in section 2.2.1 is progressed with an application will need to be made to the preferred authority to obtain an incoming connection however based on our review, we see no issues in obtaining a new connection to either building.

2.2.2.1 NBN

Based on the Dial Before You Dig survey, NBN has existing services within Clarke Road and Unwin Road. There are no services within the proposed site of either project therefore the existing authority services should not be impacted upon. There is a pillar located at the corner of Clarke Road and Unwin Road on proposed aquatic and tennis centre side, but this appears to be outside the boundary of the school.



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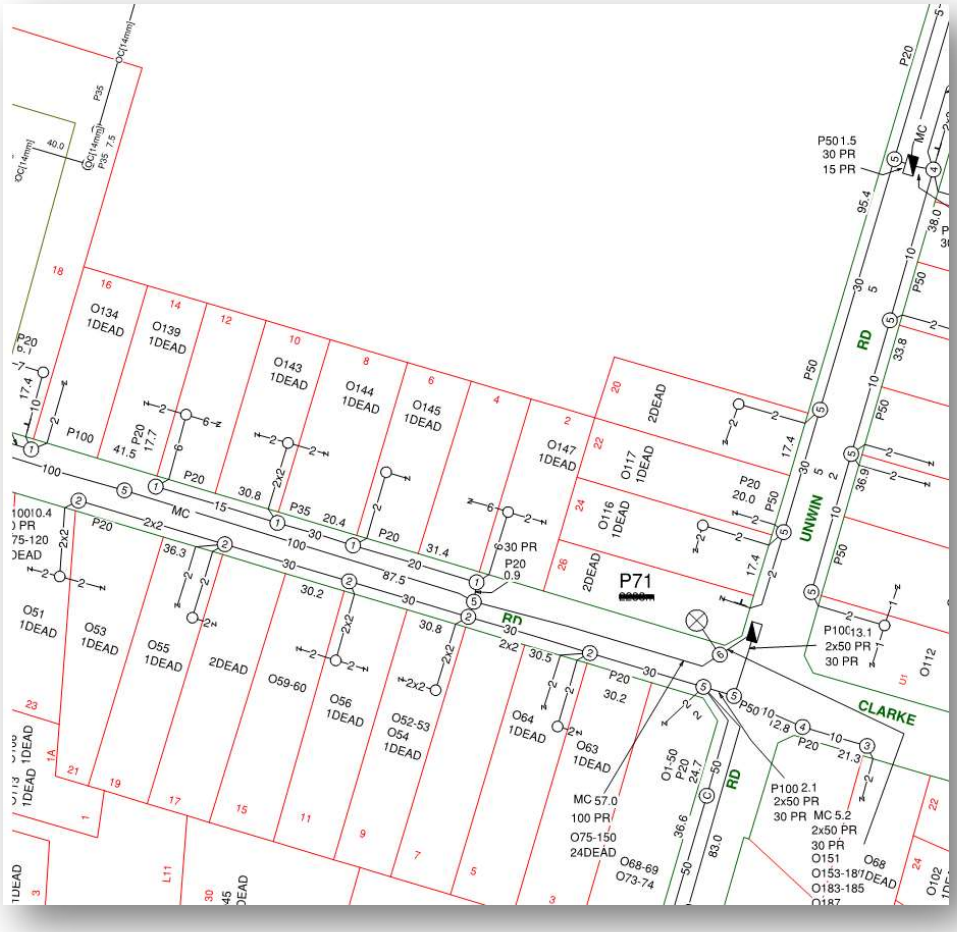
2.2.2.2 Telstra

Based on the Dial Before You Dig survey, Telstra has existing services within Clarke Road and Unwin Road. Based on the plans provided there are services indicated to the proposed project areas however they are noted as being dead services. There is a pillar located at the corner of Clarke Road and Unwin Road on proposed aquatic and tennis centre side, but this appears to be outside the boundary of the school. This is the same pillar as indicated on the NBN maps.



2.2.2.3 Optus / Uecomm

Based on the Dial Before You Dig survey, Optus / Uecomm have existing services within Clarke Road and Unwin Road. Based on the plans provided there are no existing services running within either of the project sites and therefore no Optus / Uecomm services should be impacted upon by the works.

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3.0 Appendix A – Fire and Hydraulic Services

16 March 2022

BARKER COLLEGE AQUATIC CENTRE AND RECITAL HALL

INFRASTRUCTURE UTILITIES ASSESSMENT REQUIREMENTS REPORT

REVISIONS

Rev #	Date	Description of Change
01	16 March 2022	Infrastructure Assessment & Requirements Report

APPROVALS

Rev #	Author	Status	Reviewer
01	F. Pinto & R. Bozic	Current	T. Wise

PREPARED BY:

WARREN SMITH CONSULTING ENGINEERS

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Hydraulic Services Fire Protection Civil Engineering Sydney Water Accredited Water Servicing Co-ordinator - Design Project Management - Building Plan Approvals

EXECUTIVE SUMMARY

Warren Smith Consulting Engineers (WSCE) has been engaged by Steensen Varming to prepare an Infrastructure Assessment Requirements Report for the proposed Aquatic Centre and Recital Hall at Barker College.

The below are the services discussed in this report:

- Sanitary drainage
- Potable water services
- Fire services water supplies

Aquatic Centre

The proposed development is a multi-use building which includes but not limited to:

- Pools
- Carpark
- Tennis courts
- Amenity facilities

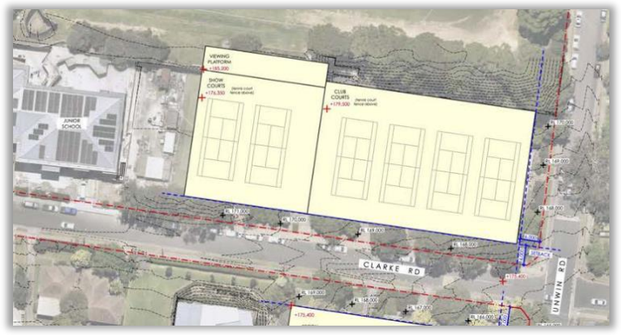


Figure 1.1 – Aquatic Centre

Recital Hall

The proposed development is a multi-use building which includes but not limited to:

- Workshops
- Carpark
- Recording studio
- Practical rooms
- Amenity facilities

Figure 1.2 – Recital Hall

Key Items to Clarify:

There are still a few items that require further clarification and additional input is needed to finalise the system methodology and approach to suit the functions and needs to the building:

- Survey of existing sewer drainage within the site (both private and authority).
- Extent of easements on the site.
- Lodgement of building plan approvals with Sydney Water through accredited Sydney Water Coordinators to allow the authority to assess new building impacts on the authority infrastructure (this is especially urgent for the sewer infrastructure that is within the footprint of the Recital Hall).
- Pressure and flows available from the existing college infrastructure to support the fire services supply to the aquatic centre.
- Pressure and flows available to the authority mains surrounding the proposed buildings for potable water supplies.
- Population numbers provided by a BCA consultant.
- Final fixtures nominated on architectural drawings.

1.0 CONTENTS

1.0 INTRODUCTION

Warren Smith Consulting Engineers (WSCE) has been engaged by Steensen Varming to prepare an Infrastructure Utility Requirements Report in relation to the proposed Barker College Aquatic Centre and Recital Hall.

The Barker College Aquatic Centre and Recital Hall ("the site") are located;

- Adjacent to Clarke Road and Unwin Road, Hornsby NSW

Figure 2.1 - Site Location

1.1 OBJECTIVES OF THIS REPORT

The preparation of this report has been undertaken to assist with the following objectives in relation to the proposed Barker College aquatic centre and recital hall for potable water supply, fire services water supply and sanitary drainage services:

- Identification of the current status of adjacent utility infrastructure services
- Outline potential diversions / augmentations required;
- Arrange a point of contact within each authority for liaison;

1.2 LIMITATIONS OF REPORT

This document is based on preliminary information provided by the architects, design team, survey drawings and information communicated during design team meetings and as such is considered conceptual and not to be relied upon for the purposes of tendering or construction.

WSCE have based this document on the assumption that the information provided can be taken at face value and the design requiring design development in a future design phase.

WSCE have not received an engagement for Sydney Water servicing coordinator services at this stage. This report is limited to general assessments of the sanitary drainage and water loadings, information received from Dial before you dig site searches and the concept architectural drawings.

WSCE does not accept any liability regarding the accuracy of the reference design documentation.

1.3 PROJECT TEAM

SERVICE	COMPANY
Project Manager	Steensen Varming
Electrical, ICT and Security	Steensen Varming
Mechanical	Steensen Varming
Hydraulic & Fire	Warren Smith Consulting Engineers
Architect	Neeson Murcutt + Neille

1.4 ABBREVIATIONS

AHU	Air Handling Unit (provided by Mechanical Trade)
BAU	Business as usual
Co-gen	Co-generation plant
CRAC	Computer Room Air Conditioning
DTS	Deemed to Satisfy
ESD	Environmentally Sustainable Design
FCU	Fan Coil Unit (provided by Mechanical Trade)
FU	Fixture unit – *A unit of measure, based on the rate of discharge, time of operation and frequency of use of a fixture, that expresses the hydraulic load imposed by that fixture on the sanitary plumbing installation.*
GMP	Gross maximum price
IL	Invert level
L/sec	Litres per second
m/sec	Metres per second
MJ/hr	Megajoules per hour
kPa	Kilo Pascals
NoR	Notice of requirements
OSD	On-Site Detention relating to stormwater
PSD	Probable Simultaneous Demand *The probable maximum flow rate for pipework supplying multiple fixtures based on the usage patterns in specific building installations.*
RPZD / RPZ	Reduced Pressure Zone Device
Shell	An area with the building fabric that is not fitted out with internal walls, ceilings and fixtures
SMH	Sewer Maintenance Hole
TV	Tempering Valve
UV	Ultraviolet
VC	Vitreous Clay
WSC	Water Servicing Coordinator

The Use of Must, Shall & Should:

In accordance with the international Organization for Standardization (ISO) Directives, the word “shall” is used to state that a requirement is strictly to be followed in order to conform to a Performance Requirement. Consequently, there can be no deviation from that requirement, other than a specific tolerance.

It is noted that in legislation and specifications it is common to use the work “must” to express a requirement. The word “shall” in this document should be considered as equivalent to “must” in the legislation.

The word “should” introduces a suggestion or recommendation that is not a requirement. It is not necessary that such recommendations or suggestions be followed in order to comply with the Performance Requirement.

1.5 REFERENCE DOCUMENTS

The brief is based on the following reference documents;

COMPANY	DOCUMENTS
Neeson Murcutt + Neille	Architectural Drawings issued 27/10/2021
Neeson Murcutt + Neille	Functional Brief dated 09/09/2021
Neeson Murcutt + Neille	SDRP Presentation dated 27/10/2021
Dial before you dig	Site Search

1.6 SOURCES OF INFORMATION

The following table lists the sources of information that were received, the document numbers and the dates of when a dial before you dig information was received:

OWNER	DOCUMENT	DATE	COMMENT
DBYD	30889857	03/12/2021	Enquiries summary cover sheet
TPG	205189619	03/12/2021	DBYD return response
NBN	065842599989	03/12/2021	DBYD return response
Telstra	205189621	03/12/2021	DBYD return response
Optus	205189624	03/12/2021	DBYD return response
Jemena	30889857_205189623	03/12/2021	DBYD return response
Sydney Water	20518962530889857	03/12/2021	DBYD return response
Ausgrid	N_205189622_GMLA0	03/12/2021	DBYD return response
Ausgrid	TR_N_205189622	03/12/2021	DBYD return response

Table 1.2 *– Sources of information*

1.7 AUTHORITY CONTACT INFORMATION

The below table shows the relevant surrounding authorities and provides a contact number.

AUTHORITY NAME	CONTACT NUMBER
Ausgrid	(02) 4951 0899
Jemena Gas North	1300 880 906
NBN Co NSWACT	1800 687 626
Optus and or Uecomm NSW	1800 505 777
Sydney Water	13 20 92
Telstra NSW Central	1800 653 935
TPG Telecom (NSW)	1800 786 306

Table 1.3 *– Authority Contact Information*

1.8 SCOPE

The hydraulic services scope has considered the following services:

- Sanitary plumbing and drainage
- Domestic hot, cold and warm water
- Fire services water supply

1.9 SCOPE EXCLUSIONS

This report has excluded the following services:

- Civil stormwater
- Natural gas (not considered at this stage)

1.10 AUTHORITY APPLICATION PROCESS – SYDNEY WATER

The initial first step with Sydney Water would be to engage an accredited Sydney Water coordinator to carry out a building plan approval. Where Sydney Water assess that their assets are affected by building footprints, they will deem the building plan to be referred for a non-standard process which then involves protecting or potentially diverting their assets. It is already noted that Sydney Water assets are within the footprint of the proposed aquatic centre so it would be expedient to begin the process to divert the affected sanitary drainage assets.

Each development proposed on the site that requires a development application will in turn require a Section 73 lodgement, that will be independently assessed on its own merits as part of the SSDA conditions. In order to lodge a section 73 with Sydney Water a copy of the signed development consent is required along with development/subdivision plans as approved under the development consent.

Sydney Water then processes the application and issues a notice of requirements (NOR) based on an assessment of the development and its impact on Sydney Water's local assets.

The section 73 NOR will specify any minor / major works required to be undertaken to ensure each development / lot has a frontage to a water main and a connection point to the sewer main and any other minor / major works such as amplification, extension or adjustment of the system or building over sewer protection.

Once these works are completed satisfactorily, they are taken over as part of the Sydney Water system. The Section 73 Development Application will only take into consideration the development works associated with the proposal. The works associated with Sydney Water applications are subject to the authority timeframes and can take more than 6 months for completion.

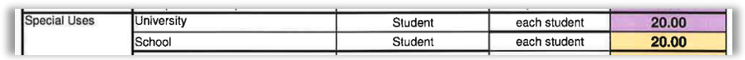
The Anticipated Requirements Application would be for information purposes only, this is a non-enforceable document and a separate application fee would apply.

2.0 SYDNEY WATER INFRASTRUCTURE ASSESSMENT

2.1 SANITARY DRAINAGE & POTABLE WATER PEAK DEMANDS

The architectural drawings available at this stage do not show all of the hydraulic fixtures within each of the proposed buildings. Some amenity areas required the fixtures estimated. The probable simultaneous potable water demands have been calculated using the provisions in AS/NZS 3500.1:2018 deemed to satisfy requirements and fixtures estimated. The breakup of the estimated fixtures have been shown in Appendix B.

To determine the total water usage for each of the building the average daily water usage of different property types document from Sydney Water has been used which nominates 20 litres of water per student.



Special Uses	University	Student	each student	20.00
	School	Student	each student	20.00

Figure 2.1 – Excerpt from Sydney Water daily usage (20 litres per student per day)

Population numbers are not available from the BCA consultant so an estimate of population numbers has been made based on areas and density population data nominated in NCC 2016 - Table D1.13. These population estimates will need to be validated against future BCA reports and final population numbers and usage patterns once the design is finalised. The estimated area sizes is included in appendix B.

BUILDING	DEVELOPMENT DETAILS	SEWER PEAK DEMAND	WATER PEAK DEMAND
Aquatic Centre	*Estimated population 2,696	4.675 L/s (45.9 kl/day)	5.5 L/s (54 kl/day)
Recital Hall	*Estimated population 1,623	3.75 L/s (28.05 kL/day)	4.41 L/s (33 kL/day)

Table 2.1 *- Peak Sydney Water demands breakdown*

*Population estimates based on area and density estimates and are to be confirmed by BCA consultant.

2.2 BAU PROPOSED SANITARY DRAINAGE CONNECTIONS FOR EACH BUILDING

The table below with cost estimates are based on a standard business as usual (BAU) connection case and subject to a Sydney Water assessment and approval under the Section 73 process. Should Sydney Water assess the connections as non-standard requiring minor or major works these cost estimates will change based on the complexity of the works. The estimates below are based on a BAU connection at least one metre inside the site boundary to an adjacent authority sewer. Each connection is sized to accommodate the loading from the proposed building and located to enable maximum gravity drainage for the building.

BUILDING	CONNECTION DETAILS	BAU SANITARY DRAINAGE CONNECTION OPINION OF COSTS
Aquatic Centre	*150mm (at a depth of less than 2m basement to be pumped)	**$150,000
***Recital Hall	*150mm (at a depth of less than 2m basement to be pumped)	**$150,000

*All sizing to be validated and basement drainage strategy to be confirmed and validated in detailed design.

** All opinion of costs based on 2022 pricing feedback and to be validated at the time of construction

*** Estimate does not include any diversion works

2.3 BAU PROPOSED POTABLE WATER CONNECTIONS FOR EACH BUILDING

The table below with cost estimates are based on a standard business as usual (BAU) connection case and subject to a Sydney Water assessment and approval under the Section 73 process. Should Sydney Water assess the connections as non-standard these estimates will change based on the complexity of the works.

BUILDING	CONNECTION DETAILS	BAU POTABLE WATER CONNECTION OPINION OF COSTS
Aquatic Centre	*100 mm	** $ 120,000
Recital Hall	*100 mm	** $ 120,000

*All sizing to be validated and basement drainage strategy to be confirmed and validated in detailed design.

** All opinion of costs based on 2022 pricing feedback and to be validated at the time of construction

2.4 BAU PROPOSED FIRE SERVICES WATER CONNECTIONS FOR EACH BUILDING

The table below with cost estimates are based on a standard business as usual (BAU) connection case and subject to the Sydney Water assessment and approval under the Section 73 process for the recital hall. The estimate for the aquatic centre fire services is based on a standard connection and has not considered any ancillary upgrades to the existing fire services infrastructure. Should Sydney Water assess the connections as non-standard these estimates will change based on the complexity of the works.

BUILDING	CONNECTION DETAILS	BAU FIRE SERVICES WATER CONNECTION OPINION OF COSTS
Aquatic Centre	Proposed to be connected to existing adjacent college infrastructure. 150mm line 40m run in ground.	*** $ 60,000
Recital Hall	*100 mm	** $ 120,000

*All sizing to validated in detailed design.

** All opinion of costs based on 2022 pricing feedback and to be validated at the time of construction

*** Does not include any upgrades to pump sets or ancillary upgrades to school infrastructure

3.0 SANITARY DRAINAGE

3.1 SANITARY DRAINAGE MAINS (UTILITY)

A water servicing coordinator is not yet assigned and the section 73 application process has not been commenced. The notice of requirements once received from Sydney Water will inform which sanitary drainage asset can have connections made to it.

3.2 SANITARY DRAINAGE MAIN AVAILABLE CAPACITY

A Sydney Water Notice of anticipated requirements is not yet available and the authority will assess the loading on their infrastructure through this process.

The below image shows the relationship of the proposed buildings and adjacent Sydney Water infrastructure.

It is through the section 73 process that Sydney Water will perform their own capacity checks for the proposed development.

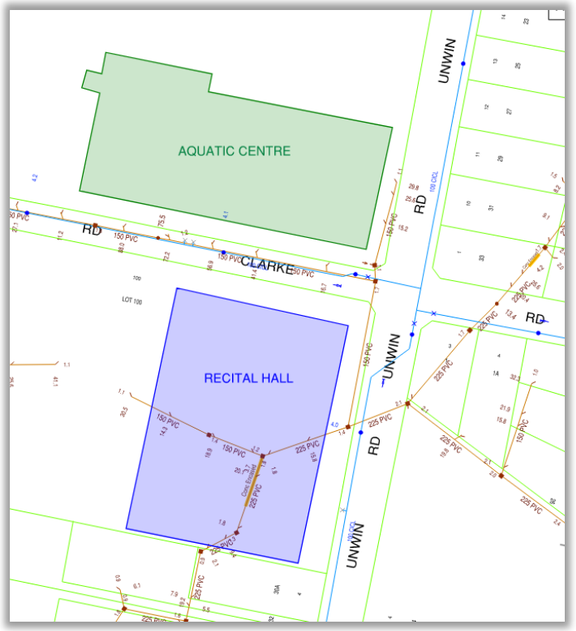


Figure 3.8 – Site building footprints and relationship with adjacent Sydney Water infrastructure

3.3 PROPOSED SEWER MAIN CONNECTION POINT

3.3.1 AQUATIC CENTRE

Subject to authority acceptance the below red shaded zones are potential sanitary drainage connection locations. The sewer levels appear acceptable for connection for fixtures on the Show Court level (RL 176.350) and above as the sewer depth is approximately 1.1m below the ground level with an approximate IL: 166.900.

Any fixtures below the sanitary drainage main would not be feasible for a gravity connection and require pumping.

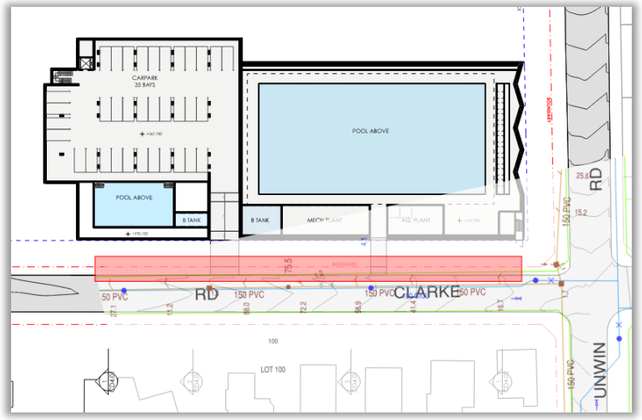


Figure 3.3.1 – Aquatic centre sewer connection options

3.3.2 RECITAL HALL

Subject to authority acceptance through a Section 73 process a possible connection location is shown below. This location is subjective to possible diversion works and would be required to be validated in the Section 73 process with the authority. This connection location appears acceptable for connection of fixtures on the ground level (RL 169.000) as the sewer shown on the current dial before you dig document is approximately 1.3m below the ground and has an approximate IL 167.700. Any fixtures below the sanitary drainage main would not be feasible for a gravity connection and require pumping.

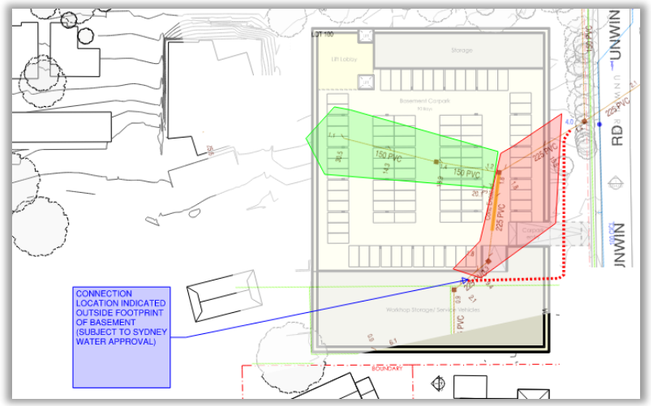


Figure 3.3.2 – Recital Hall sewer connection option

3.4 EXISTING PRIVATE SANITARY DRAINAGE

The extent of the existing private sewer drainage is required to be fully surveyed. Where redundant the private sanitary drainage services would be removed and capped off in accordance with code and authority requirements as encountered. Private sewer is not shown on Sydney Water infrastructure plans and would be removed and made redundant as surveyed and encountered during main works.

3.5 EXISTING AUTHORITY SANITARY DRAINAGE DIVERSIONS

3.5.1 AQUATIC CENTRE

Existing sanitary drainage infrastructure is indicated on the authority service diagrams and appears unaffected by the aquatic centre footprint. The level surrounding the Aquatic centre is at AHD 169.000 (Approximate surface level Clarke Road 5m east of intersection with Unwin Road). The basement is proposed to be excavated to an RL of 167.750. The total depth of excavation proposed is approximately 2.25m. The excavation depth would have to be evaluated against Sydney Water's assets in the building plan approval process. Levels are indicative only and subject to validation by detailed surveys.

3.5.2 RECITAL HALL

The level surrounding the Aquatic centre is at AHD 167.000. The basement is proposed to be excavated to an RL of 158.300. The total depth of excavation proposed is 8.7m (Approximate surface level Unwin Road 5m south of intersection with Clarke Road). The excavation depth would have to be evaluated against Sydney Water's assets in the building plan approval process. Levels are indicative only and subject to validation by detailed surveys.

The figure below shows a services overlay, of the Sydney Water assets and the footprint of the Recital Hall. The exact route of the sewer infrastructure would require detailed surveying to confirm extent and exact routes and depths.

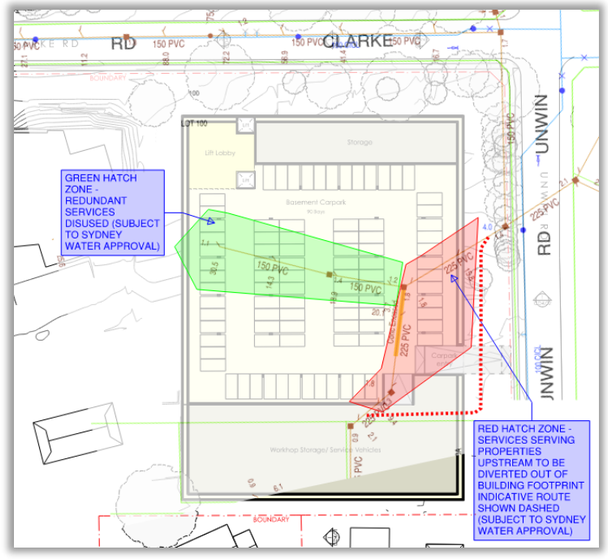


Figure 3.5.2 – Aquatic centre sewer connection options

As we understand that lead times can be excessive it is recommended to engage an accredited Sydney Water Coordinator to carry out diversion investigations as soon as possible for the proposed aquatic centre. The footprint of works appears likely to require major works and require live diversions as there are properties upstream that drain through the area of works. These construction works may also carry long lead times.

Subject to Sydney Water assessment the authority mains appear to be required to be diverted out of the building footprint (indicative locations shown in red hatch zone and red dashed line in figure above). The diversion works may also require the construction of a manhole and are likely to be treated as Sydney Water as major works. Subject to Sydney Water acceptance redundant portions of the pipework shown on Sydney Water's infrastructure plan may be removed (indicated in green). The relocation works may also need to consider temporary diversions as there are properties upstream served this sanitary drainage main.

4.0 POTABLE WATER SERVICES

4.1 WATER MAIN AVAILABLE CAPACITY

There are several water mains available adjacent to the proposed properties which may be available for connection. The table below summarises the water mains available but any future connectiosn are subject to Section 73 applications:

Main size (mm)	Asset ID	Location	Materials
100mm	2514080	Clarke Road	CICL
100mm	2514244	Unwin Road	CICL

Table 4.1 – Summary of adjacent water mains

The below figure shows information available on the water main on Clarke Road.

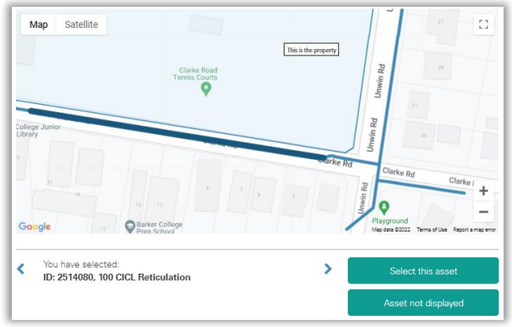


Figure 3.11.1 –Water main Clarke Road

The below figure shows information available on the water main on Unwin Road.

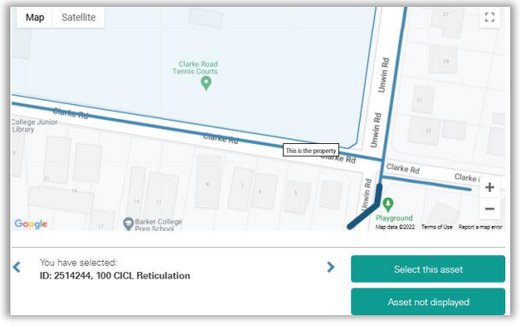


Figure 3.11.1 –Water main Unwin Road

4.2 POTABLE WATER MAIN CONTINGENCY

Water main contingency plans for the potable supply have not been evaluated at this stage. Any future water contingency measures may include:

- Storage tanks for maintaining short-term supply for essential services or processes
- Developing a water contingency action plan for what to do if water supply is disrupted.

4.3 PRESSURE AND FLOW

Pressure and flows applications have been made for both mains and will be included once available from the authority.

4.4 PROPOSED WATER MAIN CONNECTION POINTS

4.4.1 AQUATIC CENTRE POTABLE WATER CONNECTION

Should a standalone potable connection to the authority main for the aquatic centre not be preferable the existing college site infrastructure would require testing of available flows and pressures with the additional load to serve the aquatic centre allowed for. Should the pressure and flows not be sufficient the existing main connection and meter may require upgrading again subjective to section 73 applications.

Subject to authority applications requests to connect to the 100mm Clarke Road main may be possible in the zones shaded in red in the figure below.

Figure 6.6.1 – Aquatic centre - water main adjacent to building Clarke Road

4.4.2 RECITAL HALL POTABLE WATER CONNECTION

Subject to authority applications a tap in request for connection may be made for the 100mm Unwin Road water main with possible connection locations shaded in red in the figure below.

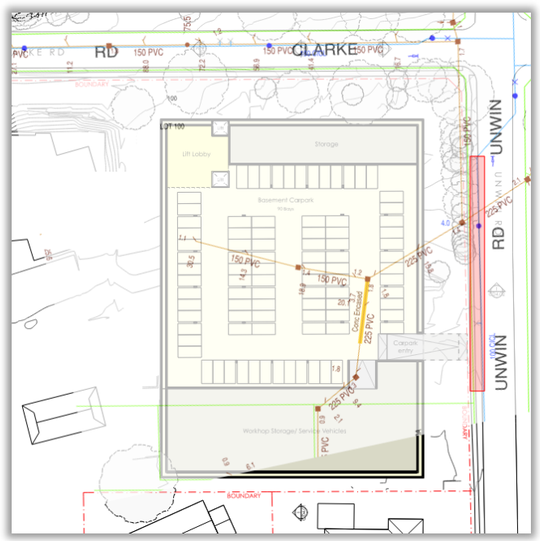


Figure 6.6.2 – Recital Hall – water main adjacent to building Unwin Road

5.0 FIRE WATER SERVICES

5.1 FIRE SPRINKLER RECITAL HALL

The recital hall is required to be protected by a fire sprinkler system.

5.1.1.1 FIRE SPRINKLER DEMAND LOADS (DESIGN CRITERIA)

Occupancy	Hazard Class	Minimum Flow per Head	Number of Heads
General Areas	Light Hazard	67 L/Min	6 heads
Plant	OH1	60 L/Min	6 heads
*Storage Areas	OH3	60 L/Min	18 heads
Office, administration	Light Hazard	67 L/Min	6 heads

Table 5.1.1.1 – Fire Hydrant Design Criteria

*NOTE: Storage Areas – Ordinary Hazard 3 (Storage area limitations shall apply)

NOTE: All ceiling voids greater than 200mm in depth will be sprinkler protected.

5.2 FIRE HYDRANT SUPPLY AQUATIC AND RECITAL HALLS

A Fire Hydrant System as part of the Combined Fire Sprinkler/Hydrant system shall be provided in accordance with AS 2419.1 – 2005 and E1.3 of the BCA.

A fire hydrant service shall be provided to the new building with hydrants provided externally and internally as required to satisfy hydrant coverage to all internal floor areas. Hydrants will be located within fire stairs with on-floor access, and on floor adjacent to fire compartments with fire hose reels as required.

Temporary Fire Hydrants shall be provided during construction and staged to suit the construction sequence.

All new fire hydrants to feature locking wheel covers.

5.2.1.1 MAXIMUM FIRE HYDRANT DEMAND LOADS (DESIGN CRITERIA)

Fire hydrant services shall be sized with adequate capacity to supply a minimum of 10 L/sec to each fire hydrant location. It is noted that the performance of the fire hydrant system is to be able to cater for the larger fire scenario.

Fire Compartment Floor Area	< 5,000 m2
Building Classification	All classes
No. off hydrants to operate simultaneously	2
Minimum flow rate	20 L/s total at the two most hydraulically disadvantaged hydrants (10 L/s each)
Minimum outlet pressure each hydrant non-boosted	700 kPa @ 10 L/s for each hydrant
Minimum outlet pressure when boosted	700 kPa
Maximum outlet pressure when boosted	1200 kPa

Table 5.2.1.1 – Fire Hydrant Design Criteria

5.3 AQUATIC CENTRE FIRE SERVICES WATER CONNECTION

The fire services for the Aquatic Centre is proposed to be supplied from the adjacent school campus and existing booster. The fire services supply feeds from the existing school are required to be tested for flows and pressures with supplementation works for upgrades, flows and pressures to be completed to bring up to code compliance as required with no additional fire water service connections for this building.

5.4 RECITAL HALL FIRE SERVICES WATER CONNECTION

The fire water services for the Recital Hall are proposed to be connected to the same main as the potable water supply. The hydrant is proposed to be mains fed with the sprinkler system supplemented by a tank supply. Both of these supply feeds are subject to pressure and flow enquiries.

The fire services are proposed to have a mains feed connection for the hydrant supply and a tank supplementation for flow for the sprinklers.

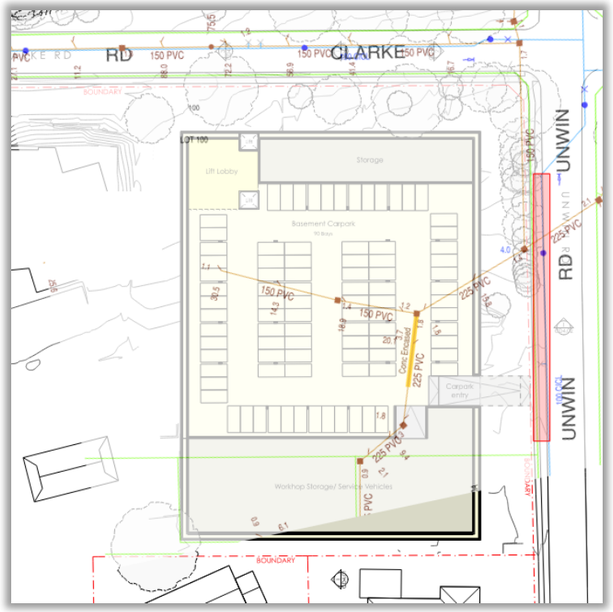


Figure 6.6.2 – Recital Hall – potable water mains adjacent to building

APPENDIX A - DIAL BEFORE YOU DIG RETURNED DOCUMENTS

Job No 30889857

Phone: 1100
www.1100.com.au

Caller Details

Contact:	Fernando Pinto	**Caller Id:**	3066679	**Phone:**	0488 110 110
Company:	Not supplied				
Address:	233 Castlereagh Street Sydney NSW 2000	**Email:**	fpinto@warrensmith.com.au		

Dig Site and Enquiry Details

WARNING: The map below only displays the location of the proposed dig site and does not display any asset owners' pipe or cables. The area highlighted has been used only to identify the participating asset owners, who will send information to you directly.

User Reference: Barker

Working on Behalf of: Private

Enquiry Date:	**Start Date:**	**End Date:**
12/11/2021	21/11/2021	03/12/2021

Address:

1x Clarke Road
Waitara NSW 2077

Job Purpose:	**Onsite Activities:**
Excavation	Mechanical Excavation
Location of Workplace:	**Location in Road:**
Both	Road, Nature Strip, Footpath

- Check that the location of the dig site is correct. If not you must submit a new enquiry.
- Should the scope of works change, or plan validity dates expire, you must submit a new enquiry.
- Do NOT dig without plans. Safe excavation is your responsibility. If you do not understand the plans or how to proceed safely, please contact the relevant asset owners.

Notes/Description of Works:

Not supplied

Your Responsibilities and Duty of Care

- The lodgement of an enquiry does not authorise the project to commence. You must obtain all necessary information from any and all likely impacted asset owners prior to excavation.
- If plans are not received within 2 working days, contact the asset owners directly & quote their Sequence No.
- ALWAYS perform an onsite inspection for the presence of assets. Should you require an onsite location, contact the asset owners directly. Please remember, plans do not detail the exact location of assets.
- Pothole to establish the exact location of all underground assets using a hand shovel, before using heavy machinery.
- Ensure you adhere to any State legislative requirements regarding Duty of Care and safe digging requirements.
- If you damage an underground asset you MUST advise the asset owner immediately.
- By using this service, you agree to Privacy Policy and the terms and disclaimers set out at **www.1100.com.au**
- **For more information on safe excavation practices, visit www.1100.com.au**

Asset Owner Details

The assets owners listed below have been requested to contact you with information about their asset locations within 2 working days.
Additional time should be allowed for information issued by post. It is **your responsibility** to identify the presence of any underground assets in and around your proposed dig site. Please be aware, that not all asset owners are registered with the Dial Before You Dig service, so it is **your responsibility** to identify and contact any asset owners not listed here directly.
** Asset owners highlighted by asterisks ** require that you visit their offices to collect plans.
# Asset owners highlighted with a hash # require that you call them to discuss your enquiry or to obtain plans.

Seq. No.	Authority Name	Phone	Status
205189622	Ausgrid	(02) 4951 0899	NOTIFIED
205189623	Jemena Gas North	1300 880 906	NOTIFIED
205189620	NBN Co NswAct	1800 687 626	NOTIFIED
205189624	Optus and or Uecomm Nsw	1800 505 777	NOTIFIED
205189625	Sydney Water	13 20 92	NOTIFIED
205189621	Telstra NSW Central	1800 653 935	NOTIFIED
205189619	TPG Telecom (NSW)	1800 786 306	NOTIFIED

END OF UTILITIES LIST

TPG Corporation Limited
ABN 46 093 058 069
PO Box 1844 Macquarie Centre
North Ryde NSW 2113
Phone: **1800 786 306** (24hrs)

Date: 12/11/2021

Enquirer Name: Fernando Pinto
Enquirer Address: 233 Castlereagh Street
Email: fpinto@warrensmith.com.au
Phone: +61488110110

Dear Fernando Pinto

The following is our response on behalf of each of the TPG carriers (listed below) to your Dial Before You Dig enquiry – Sequence 205189619 .
It is provided to you on a confidential basis under the following conditions and must be shredded or securely disposed of after use.

Assets Affected:

Carriers (each a "TPG carrier") and assets affected:

PIPE Networks

Location: 1x Clarke Road

According to our records, the underground assets in the vicinity of the location stated in your enquiry are **AFFECTED**. Please read the below information and disclaimers in addition to the any attached plans provided prior to any construction activities.

IMPORTANT INFORMATION

- The information provided is valid for 30 days from the date of this response. If your work site area changes or your construction activity is beyond 30 days please contact Dial Before You Dig on 1100 or www.1100.com.au to re-submit a new enquiry.
- Due to the nature of underground assets and the age of some assets and records, our plans are indicative of the general location only and may not show all assets in the location. You should not solely rely on these plans when undertaking construction works. It is also inaccurate to assume depth or that underground network conduit and cables follow straight lines, and careful on-site investigations are essential to locate an asset's exact position prior to excavation. It is your responsibility to locate and confirm the exact location of our infrastructure using non-destructive techniques. We make no warranty or guarantee that our plans are complete, current or error free, and to the maximum extent permitted by law we exclude all liability to you, your employees, agents and contractors for any loss, damage or claim arising out of or in connection with using our plans.
- Please note that some of our conduits carry electrical cables and gas pipes. Please exercise extreme care when working within the vicinity of these conduit and take into account the minimum clearance distances under Duty Of Care below.
- You (and your employee and contractors) must not open, move, interfere, alter or relocate any of our assets without our prior approval.
- **Note** It is a criminal offence under the *Criminal Code Act 1995 (Cth)* to tamper or interfere with communication facilities owned by a carrier. Heavy penalties may apply for breach of this prohibition, and any damages suffered, or costs incurred by us as a result of such unauthorised works may be claimed against you.

DAMAGE

- You must report immediately any damage to our network on **1800 786 306** (24hrs). We will hold you liable and seek compensation for any loss or damage to our network, our property and our customers that is caused by or arises out of your activities.

DUTY OF CARE

You have a duty of care to carefully locate, validate and protect our assets when carrying out works near our infrastructure. For construction activities that may impact on or interfere with our network, you will need to call us on **1800 786 306** to discuss a suitable engineering solution, lead time and cost involved. The below precautions must be taken when working in the vicinity of our network:

- Contact us on **1800 786 306** to discuss and obtain relevant information and plans on our infrastructure in a particular location if the information provided in this response is insufficient.
- Physically locate and mark on-site our network infrastructure using non-destructive techniques i.e. pot holing or hand digging every 5 metres prior to commencing any construction activities. Assets located must be marked to AS5488 standard. **NO CONSTRUCTION WORK IS ALLOWED UNTIL THIS STEP IS COMPLETED**. You must use an approved telecommunications accredited locator, or we can provide a locator for you at your expense. If we provide you with a locator, and this locator attended the site and is proven to be grossly negligent in physically locating and marking our infrastructure, then to the extent any TPG carrier is liable for this locator's negligence, acts and omissions, the total liability aggregated for all TPG carriers is limited, at our option, to attend the site and re-mark the infrastructure or to pay for a third party to re-mark the infrastructure.
- If you require us to locate or monitor our infrastructure, please allow five business days' notice for us to respond.
- Ensure all information, including our network requirements and any associated plans provided by us are kept confidential and remain on-site throughout your construction works.

- Use suitably qualified and supervised professionals, particularly if you are working near assets that contain electricity cables or gas pipes.

- Ensure the below minimum clearance distances between the construction activities and the actual location of our assets are met. If you need clearance distances for our above ground assets, or if the below distances cannot be met, call **1800 786 306** to discuss.

  Minimum assets clearance distances.

  - 300mm when laying asset inline, horizontal or vertical.
  - 1000mm when operating vibrating equipment. Eg: vibrating plates. No vibrating equipment on top of asset.
  - 1000mm when operating mechanical excavators or jackhammers/pneumatic breakers.
  - 2000mm when performing directional bore in-line, horizontal and vertical.
  - No heavy vehicle over 3 tonnes to be driven over asset with less than 600mm of cover.

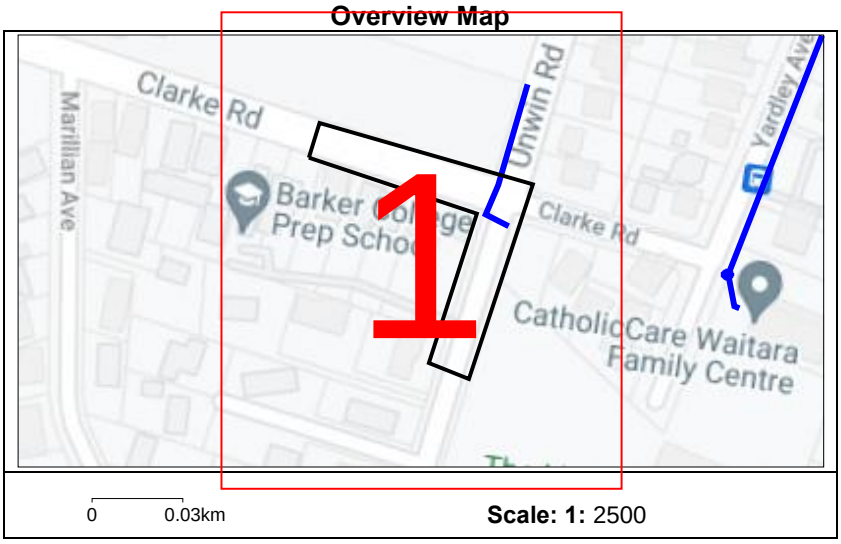
- Reinstate exposed TPG network infrastructure back to original state.

PRIVACY & CONFIDENTIALITY

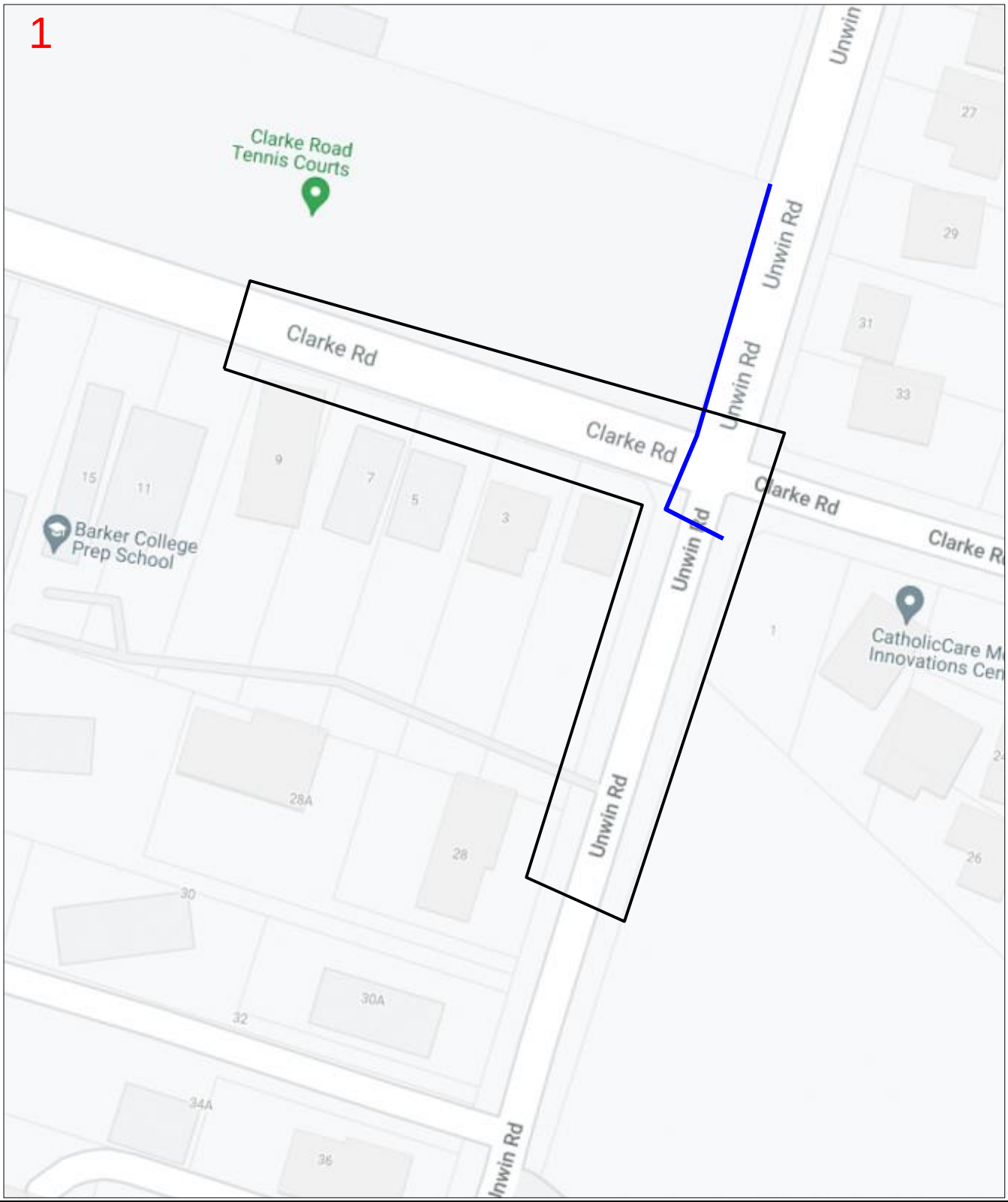
- Privacy Notice – Your information has been provided to us by Dial Before You Dig to respond to your Dial Before You Dig enquiry. We will keep your personal information in accordance with TPG's privacy policy, see www.tpg.com.au/about/privacy.

- Confidentiality – The information we have provided to you is confidential and is to be used only for planning and designing purposes in connection with your Dial Before You Dig enquiry. Please dispose of the information by shredding or other secure disposal method after use. We retain all intellectual property rights (including copyrights) in all our documents and plans.

Overview Map



TPG Corporation Limited



Enquiry Number: 205189619

Map Sheet: 1

Scale: 1: 750

N

0 0.008km

LEGEND

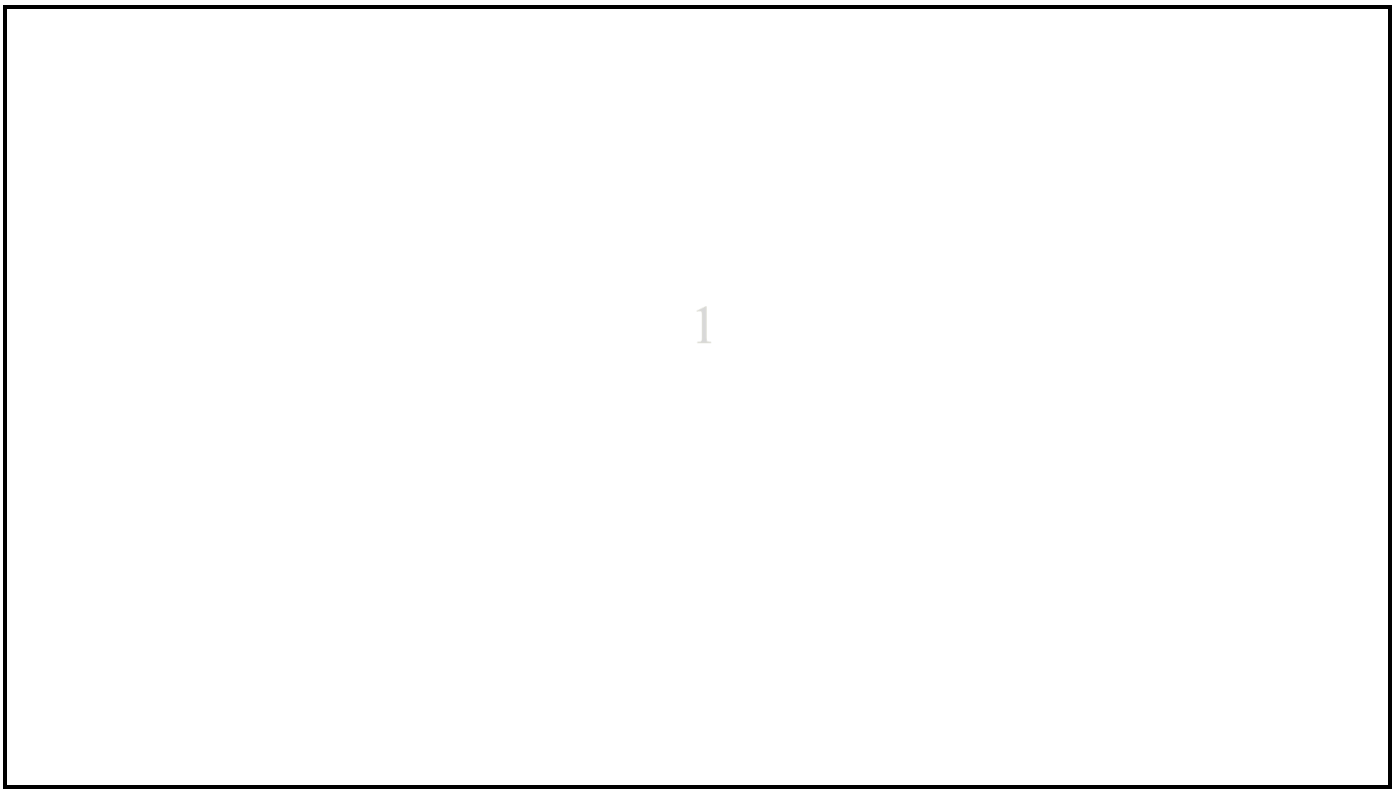
DBYD Work Area

AAPT/PowerTel Pit	TransACT Pit
AAPT/PowerTel Duct	TransACT Duct
DDA Pit	SOUL Pattinson Telecoms Pit
DDA Duct	SOUL Pattinson Telecoms Duct
Agile/Adam Pit	PIPE Networks Pit
Agile/Adam Duct	PIPE Networks Duct

To:	Fernando Pinto
Phone:	Not Supplied
Fax:	Not Supplied
Email:	fpinto@warrensmith.com.au

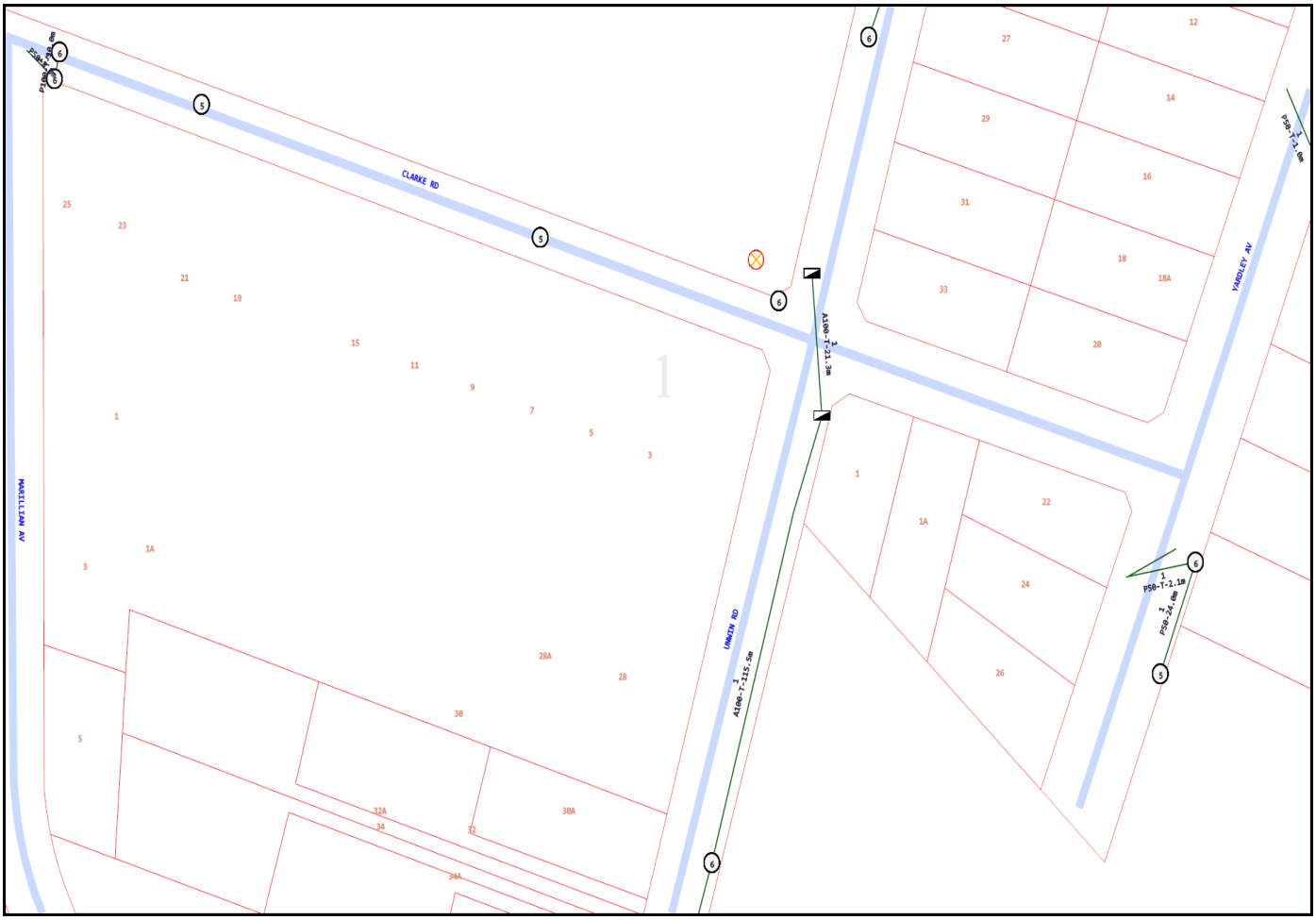
Dial before you dig Job #:	30889857
Sequence #	205189620
Issue Date:	12/11/2021
Location:	1x Clarke Road , Waitara , NSW , 2077

Indicative Plans



LEGEND

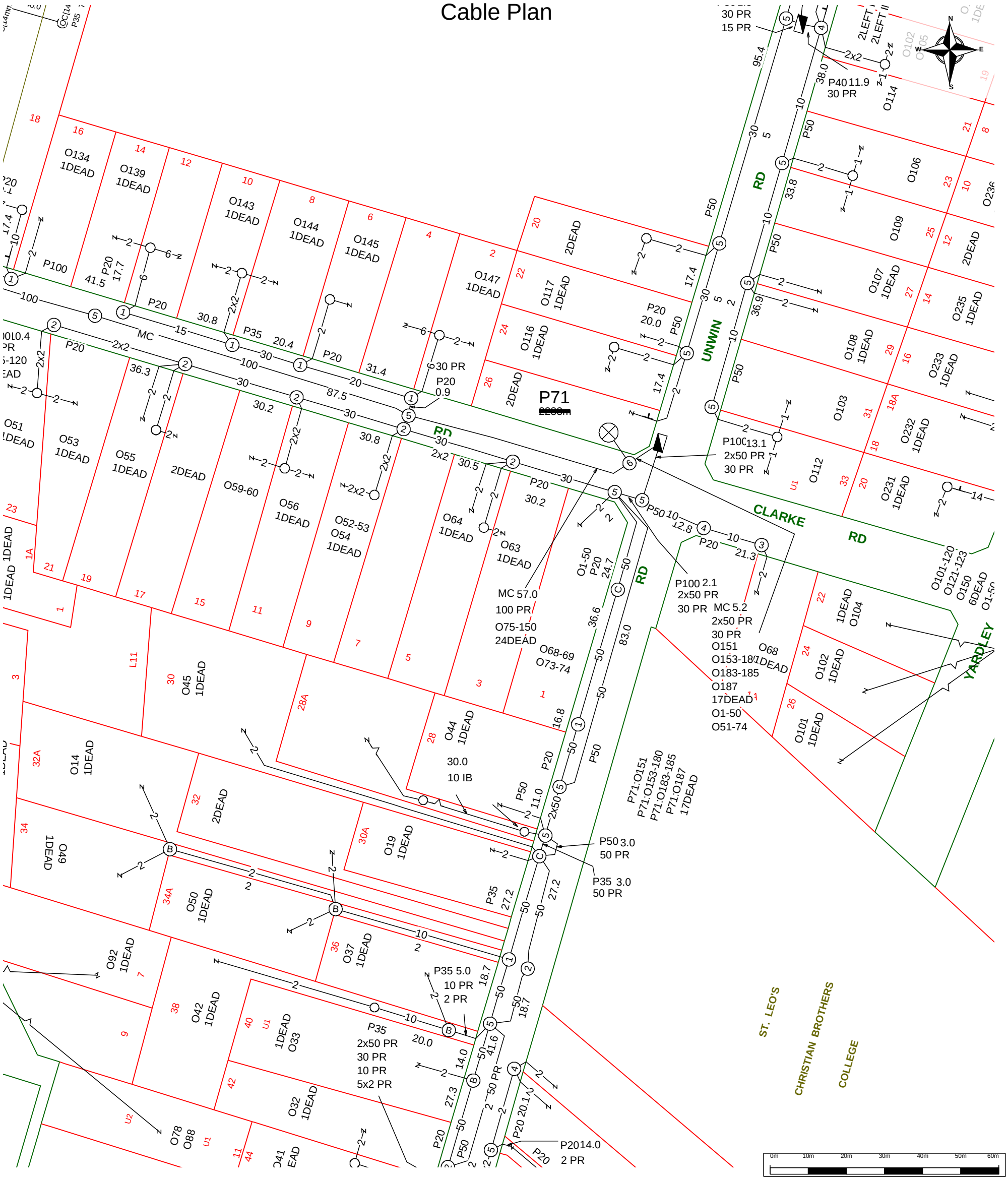
34	Parcel and the location
5	Pit with size "5"
2E	Power Pit with size "2E". Valid PIT Size: e.g. 2E, 5E, 6E, 8E, 9E, E, null.
	Manhole
	Pillar
2 PO – T- 25.0m P40 – 20.0m 5 9	Cable count of trench is 2. One "Other size" PVC conduit (PO) owned by Telstra (-T-), between pits of sizes, "5" and "9" are 25.0m apart. One 40mm PVC conduit (P40) owned by NBN, between pits of sizes, "5" and "9" are 20.0m apart.
2 10.0m 5 9	2 Direct buried cables between pits of sizes ,"5" and "9" are 10.0m apart.
5 9	Trench containing any INSERVICE/CONSTRUCTED (Copper/RF/Fibre) cables.
5 9	Trench containing only DESIGNED/PLANNED (Copper/RF/Fibre/Power) cables.
5 9	Trench containing any INSERVICE/CONSTRUCTED (Power) cables.
BROADWAY ST	Road and the street name "Broadway ST"
Scale	0 20 40 60 Meters 1:2000 1 cm equals 20 m



Emergency Contacts

You must immediately report any damage to the **nbn™** network that you are/become aware of. Notification may be by telephone - 1800 626 329.

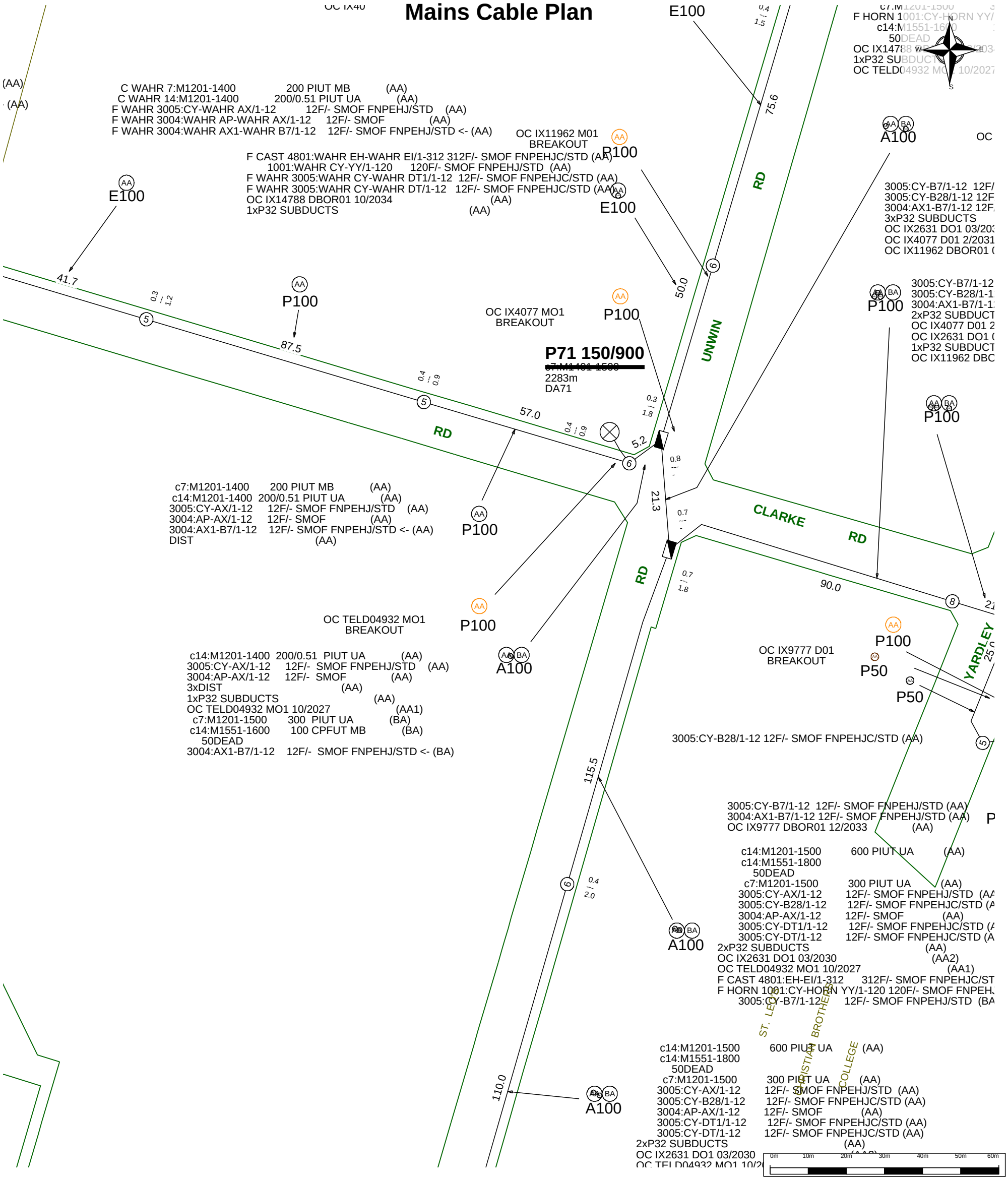
Cable Plan



For all Telstra DBYD plan enquiries - email - Telstra.Plans@team.telstra.com For urgent onsite contact only - ph 1800 653 935 (bus hrs)	Sequence Number: 205189621
TELSTRA CORPORATION LIMITED A.C.N. 051 775 556	CAUTION: Fibre optic and/ or major network present in plot area. Please read the Duty of Care and contact Telstra Plan Services should you require any assistance.
Generated On 12/11/2021 17:07:30	

The above plan must be viewed in conjunction with the Mains Cable Plan on the following page

Mains Cable Plan



For all Telstra DBYD plan enquiries -
email - Telstra.Plans@team.telstra.com
For urgent onsite contact only - ph 1800 653 935 (bus hrs)

TELSTRA CORPORATION LIMITED A.C.N. 051 775 556

Generated On 12/11/2021 17:07:32

Sequence Number: 205189621

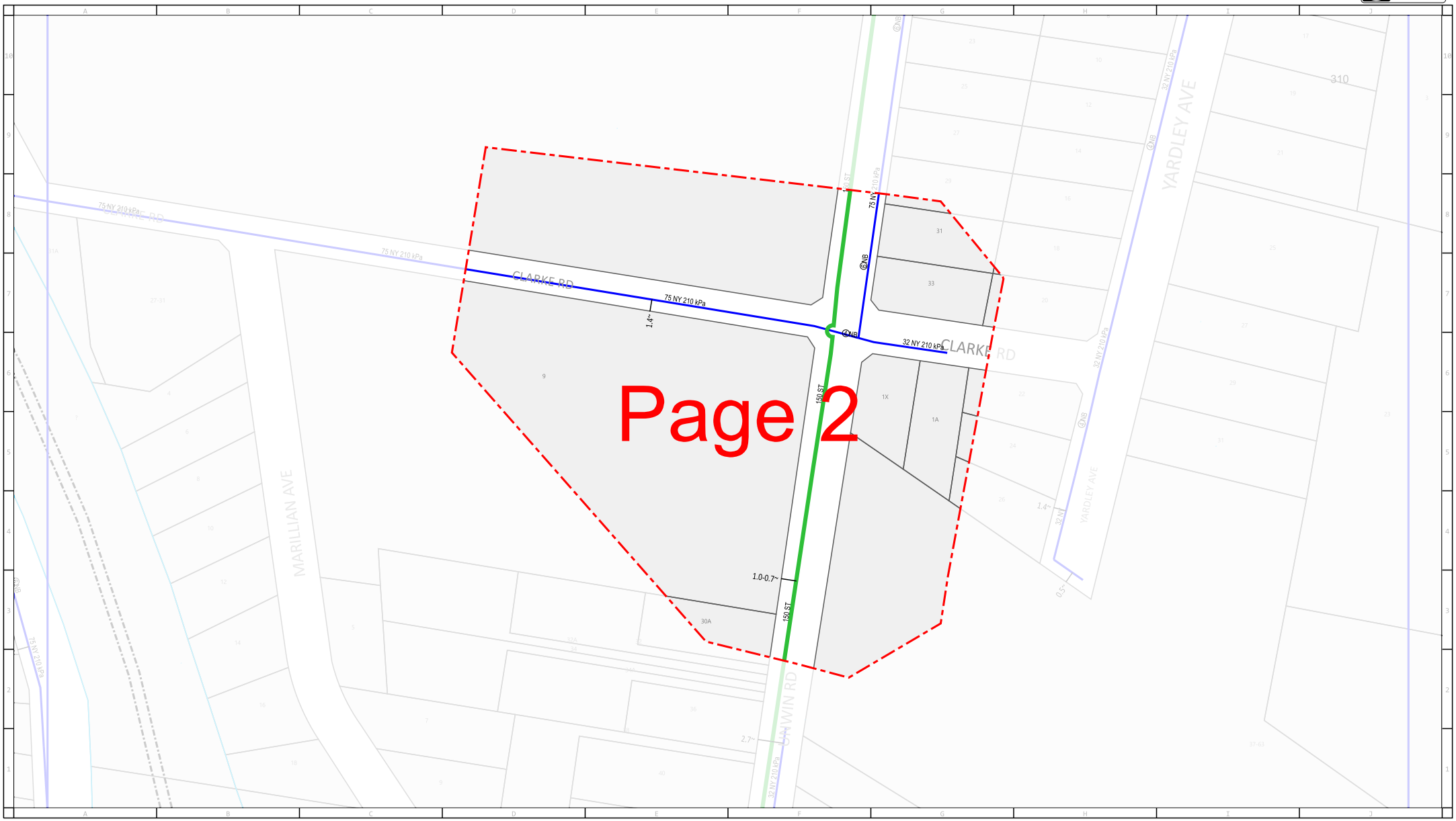
CAUTION: Fibre optic and/ or major network present in plot area. Please read the Duty of Care and contact Telstra Plan Services should you require any assistance.

Sequence Number: 205189624

Date Generated: 12 Nov 2021

For all Optus DBYD plan enquiries –
Email: Fibre.Locations@optus.net.au
For urgent onsite assistance contact 1800 505 777
Optus Limited ACN 052 833 208

DBYD Authority: Jemena Gas Networks (NSW) **DBYD Location:** 1x Clarke Road Waitara NSW, 2077



Jemena
ABN 87 003 004 322

For legend details, please refer to the Coversheet attachment provided as part of this DBYD response.

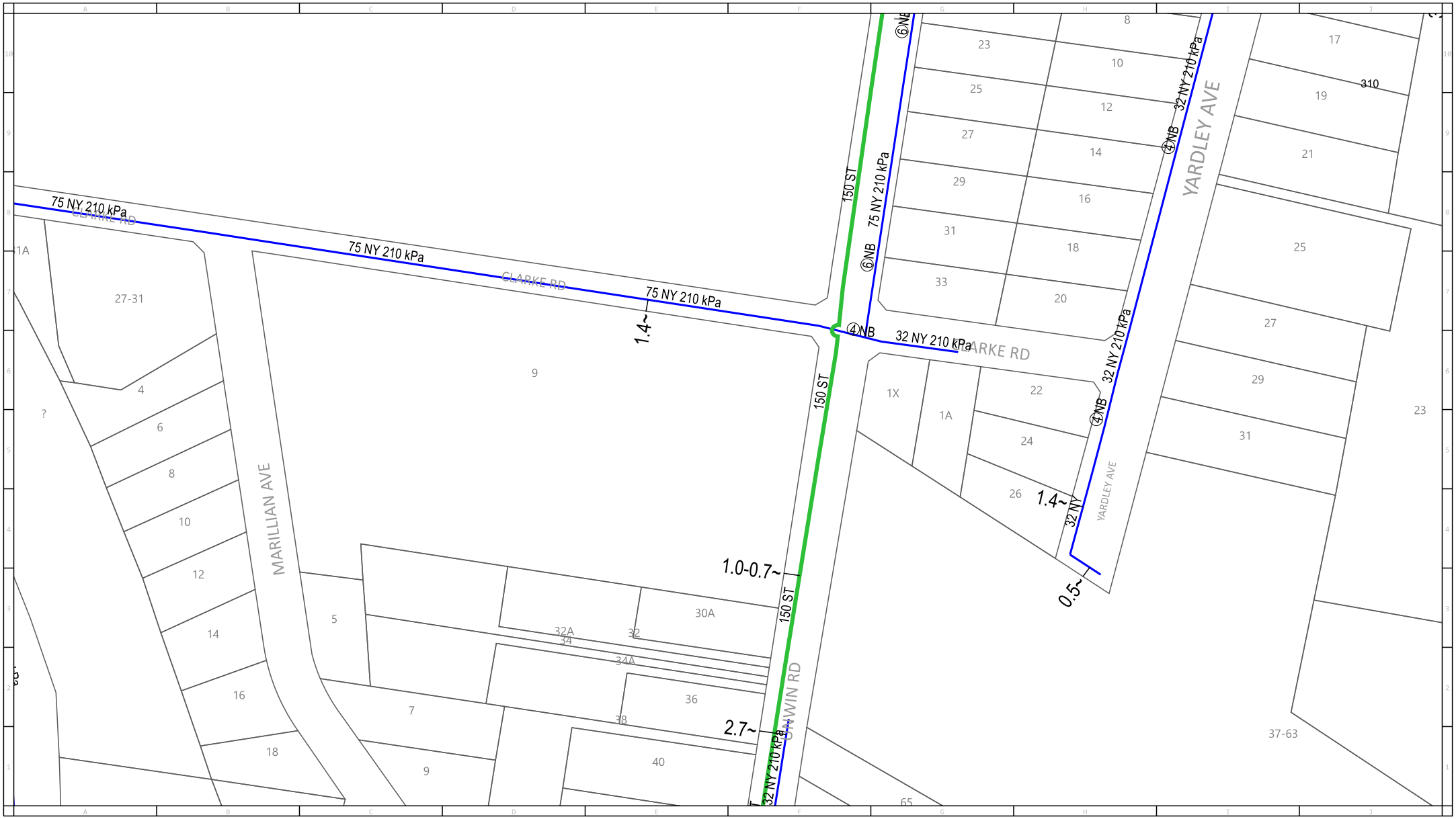
N W E S

Scale: 1:2101

Issue Date: 12/11/2021
DBYD Seq No: 205189623
DBYD Job No: 30889857
Overview Page:

WARNING: This is a representation of Jemena Gas Networks underground assets only and may not indicate all assets in the area. It must not be used for the purpose of exact asset location in order to undertake any type of excavation. Please read all conditions and information on the attached information sheet. This extract is subject to those conditions. The information contained on this plan is only valid for 28 days from the date of issue.

DBYD Authority: Jemena Gas Networks (NSW) **DBYD Location:** 1x Clarke Road Waitara NSW, 2077



Jemena
ABN 87 003 004 322

For legend details, please refer to the Coversheet attachment provided as part of this DBYD response.

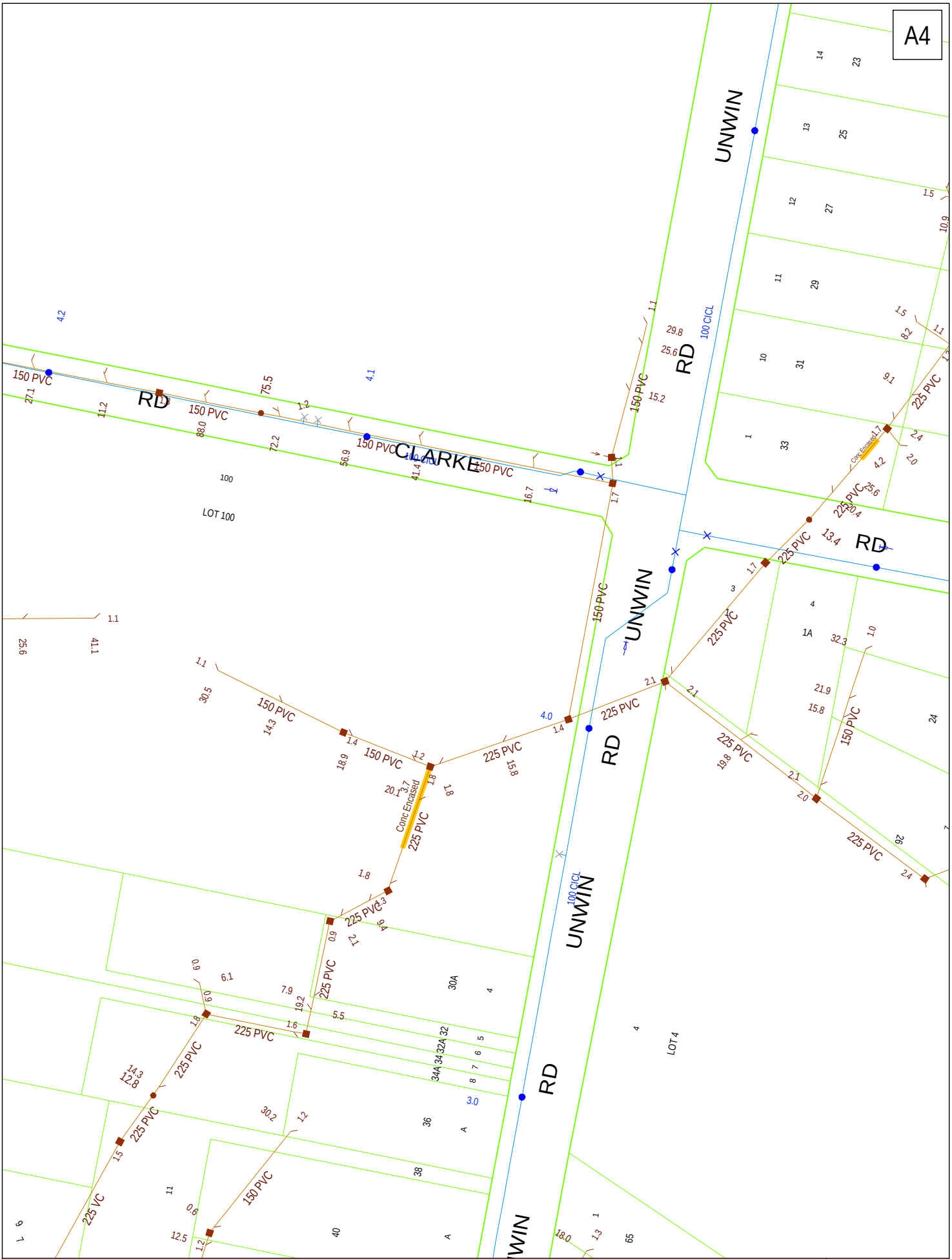
N W E S

Scale: 1:2000

Issue Date: 12/11/2021
DBYD Seq No: 205189623
DBYD Job No: 30889857

0m 10m 20m 30m 40m 50m 60m 70m 80m

WARNING: This is a representation of Jemena Gas Networks underground assets only and may not indicate all assets in the area. It must not be used for the purpose of exact asset location in order to undertake any type of excavation. This plan is diagramatic only, and distances scaled from this plan may not be accurate. Please read all conditions and information on the attached information sheet. This extract is subject to those conditions. The information contained on this plan is only valid for 28 days from the date of issue.



DBYD Address:
1x Clarke Road
Waitara NSW 2077

DBYD Job No: 30889857
DBYD Sequence No: 205189625

SYDNEY WATER CORPORATION

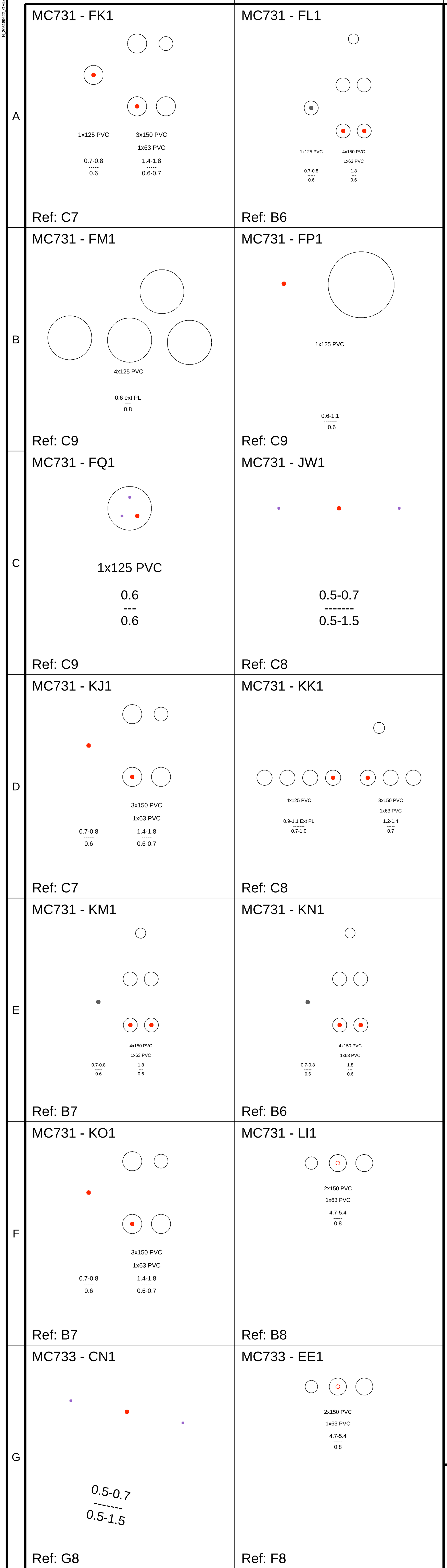
Scale: 1:1000

Date of Production: 12/11/2021

Plan 1 of 1

N

0m 5m 10m 15m 20m



JOINT DETAIL REPORT

No.	Bk-Pg	Pl/Cvr	Joint Location
Map: MC731			
48	1349-1	0.60/0.60	36.0 W OF UNWIN RD WPL
49	1566-15	1.00/0.60	18.8 E OF UNWIN RD WPL
277	UN11-0260+...	1.70/0.70	11.2 W OF 3 CLARKE RD E BDY
278	UN11-0259+...	0.30/0.80	19.9 W OF 1A CLARKE RD W BDY
279			
282	UN11-0259	0.20/0.80	19.7 W OF 1A CLARKE RD W BDY
283			

WARNING

Ausgrid's plans show the position of assets at the time of installation and may not account for subsequent changes to road alignments, fences or buildings. The plans show no more than the presence or absence of Ausgrid assets in the street.

Persons working near electricity networks must exercise care and will be held responsible for any damage caused.

You must excavate by hand or use vacuum excavation to establish the location of Ausgrid underground cables and associated assets.

Underground: Working near a cable may result in electric shock even if no contact is made. Any work in the vicinity of any cable should only be performed using safe work methods developed in accordance with the recommendations included in Safework NSW Code of Practice for Excavation and Safework NSW Guide for Work Near Underground Assets as well as recommendations of Ausgrid's Network Standard NS156.

Overhead: Do not excavate near poles or towers until the stability of the foundation has been assessed by Ausgrid. Cables or earth conductors may be present close to substations, poles or towers.

Workers must maintain safe approach distances and follow applicable Safework NSW Codes of Practice.

NOTE: 1. You must keep Ausgrid plans on site during excavation works. If the people actually performing the excavation works do not know how to read and interpret Ausgrid's plans, then the work must be directed by a person who knows how to read and interpret the plans. 2. This information includes data from the NSW Digital Cadastral Database by Land and Property Information (c) 2016, used under Creative Commons licence version 4.0.

N

MC73133	MC73134	MC73143	ISG GRID
MC73311	MC73312	MC73321	
MC73313	MC73314	MC73323	

GMLA0

Distribution - 205189622

INFORMATION ON THIS PLAN ONLY VALID FOR 30 DAYS FROM ISSUE DATE

12 Nov 2021

Page 1 of 1

1:235

0 — 14 metres

A0 MOCS_std_plot

You are working near Transmission Cables. You must contact Ausgrid on (02) 4951 9200 at least two weeks before work commences. See Ausgrid Network Standard NS156.

MC731 - FQ1

1x125 PVC

0.6
0.6

Ref: C9

MC731 - JW1

0.5-0.7
0.5-1.5

Ref: C8

MC733 - CN1

0.5-0.7
0.5-1.5

Ref: G8

JOINT DETAIL REPORT

No.	Bk-Pg	Pl/Cvr	Joint Location
Map: MC731			
119	1494-79	0.60/0.60	4.0 S OF CLARKE RD SPL
120	1494-79	0.60/0.60	4.0 S OF CLARKE RD SPL

WARNING

Ausgrid's plans show the position of assets at the time of installation and may not account for subsequent changes to road alignments, fences or buildings. The plans show no more than the presence or absence of Ausgrid assets in the street.
Persons working near electricity networks must exercise care and will be held responsible for any damage caused.
You must excavate by hand or use vacuum excavation to establish the location of Ausgrid underground cables and associated assets.
Underground: Working near a cable may result in electric shock even if no contact is made. Any work in the vicinity of any cable should only be performed using safe work methods developed in accordance with the recommendations included in SafeWork NSW Code of Practice for Excavation and SafeWork NSW Guide for Work Near Underground Assets
as well as recommendations of Ausgrid's Network Standard NS156.
Overhead: Do not excavate near poles or towers until the stability of the foundation has been assessed by Ausgrid. Cables or earth conductors may be present close to substations, poles or towers.
Workers must maintain safe approach distances and follow applicable SafeWork NSW Codes of Practice.
NOTE: 1. You must keep Ausgrid plans on site during excavation works. If the people actually performing the excavation works do not know how to read and interpret Ausgrid's plans, then the work must be directed by a person who knows how to read and interpret the plans. 2. This information includes data from the NSW Digital Cadastral Database by Land and Property Information (c) 2016, used under Creative Commons licence version 4.0.

N

MC73133	MC73134	MC73143
MC73311	MC73312	MC73321
MC73313	MC73314	MC73323

ISG GRID

GMLA0

Transmission - 205189622

INFORMATION ON THIS PLAN ONLY VALID FOR 30 DAYS FROM ISSUE DATE

12 Nov 2021

Page 1 of 1

1:235

0 **14 metres**

Ausgrid

A0 TR_MOCS_std_plot

APPENDIX B - ESTIMATED AREAS, POPULATIONS & FIXTURES

RECITAL HALL

Building	Level	Room	Area		Density	Estimated population
Recital	Lower Ground	Percussion 1	124.5	m2	2	62
Recital	Lower Ground	Recording Studio	100.3	m2	2	50
Recital	Lower Ground	Small Prac 3	75	m2	2	38
Recital	Lower Ground	Small Prac 4	74.1	m2	2	37
Recital	Lower Ground	Medium Prac 3	136.8	m2	2	68
Recital	Lower Ground	Large Prac 2	320.1	m2	2	160
Recital	Lower Ground	WC's	38.3	m2	10	4
Recital	Lower Ground	Recital Hall	726.5	m2	1	727
Recital	Ground Floor	Medium Prac 1	124.5	m2	2	62
Recital	Ground Floor	Staff/Meeting	101.2	m2	10	10
Recital	Ground Floor	Small Prac 1	75	m2	2	38
Recital	Ground Floor	Small Prac 2	74.6	m2	2	37
Recital	Ground Floor	Medium Prac 2	132.9	m2	2	66
Recital	Ground Floor	Back of House	64.3	m2	10	6
Recital	Ground Floor	4x XS	53.9	m2	2	27
Recital	Ground Floor	Large Prac 1	321.8	m2	2	161
Recital	Ground Floor	WC	38.3	m2	10	4
Recital	Ground Floor	Hall Stage	65.8	m2	1	66
					Total:	1623

Project:	**Recital Hall**	**SYD:**	
Engineer:	**F. Pinto**	**Date:**	

	Hot Required	Fixture Qty	FU	Total FU DCW
WC Pan	N	24	2	48
Urinal Cistern	N		1	0
Urinal Auto Flush	N		0.5	0
Basin	Y	18	1	18
Pot sink	Y		7	0
Washdown Taps (20mm)	N	1	8	8
Washdown Taps (15mm)	N		4	0
Shower	Y		5	0
Kitchen Sink	Y	1	3	3
Cleaners sink	N		3	0
Bath	Y		8	0
Dishwasher (Dom)	N		2	0
Dishwasher (Sm Comm)	N		4	0
Dishwasher (Lge Comm)	N		8	0
Washing machine (Dom)	N		2	0
Washing machine (Comm)	N		7	0
			Loading units	**77**
			PSFR	**0.73**

Description of Additional Flows and Constants	L / min	L / sec
Fire Hose Reels (2 x 0.33 L / s)		**0.66**
Emergency Shower and Eye Wash (75.7 L / min)		**0.00**
Irrigation Provision based on ≈25mm @ 1.5m/s		**0.62**
Mech plant top up supplies (allowance on 2 L/s)		**2.00**

AQUATIC CENTRE

Building	Level	Room	Area		Density	Estimated population
Aquatics	Ground Floor	Family Change Roor	34.5	m2	10	3
Aquatics	Ground Floor	Store 1	28.5	m2	2	14
Aquatics	Ground Floor	Control Room	16.3	m2	10	2
Aquatics	Ground Floor	Reception	16.1	m2	10	2
Aquatics	Ground Floor	Café	18.9	m2	1	19
Aquatics	Ground Floor	Manager	19	m2	10	2
Aquatics	Ground Floor	Meeting	15.6	m2	10	2
Aquatics	Ground Floor	First Aid	16.2	m2	10	2
Aquatics	Ground Floor	Life Guard	18.2	m2	10	2
Aquatics	Ground Floor	Store 2	8.5	m2	10	1
Aquatics	Ground Floor	Staff Room	34.1	m2	10	3
Aquatics	Ground Floor	Staff Facilities	68.6	m2	10	7
Aquatics	Ground Floor	User Facilities	109.9	m2	10	11
Aquatics	Ground Floor	Store 3	36.5	m2	10	4
Aquatics	Ground Floor	Main Pool	1256.9	m2	1.5	838
Aquatics	Ground Floor	Learn to Swim	175.7	m2	1.5	117
Aquatics	Ground Floor	Bleachers	447.2	m2	0.5	894
Aquatics	First Floor	Court 1	254.3	m2	10	25
Aquatics	First Floor	Court 2	254.3	m2	10	25
Aquatics	First Floor	Court 3	254.3	m2	10	25
Aquatics	First Floor	Court 4	254.3	m2	10	25
Aquatics	First Floor	Court 5	254.3	m2	10	25
Aquatics	First Floor	Court 6	254.3	m2	10	25
Aquatics	First Floor	Bleachers Centre	154.2	m2	0.5	308
Aquatics	First Floor	Bleachers Left	74.9	m2	0.5	150
Aquatics	First Floor	Bleachers Right	44.3	m2	0.5	89
Aquatics	Second Floor	Change Rooms	49.7	m2	10	5
Aquatics	Second Floor	Staff	47.5	m2	10	5
Aquatics	Second Floor	Seminar	65.1	m2	1	65
					Total:	2696

Project:	**Aquatic centre**	**SYD:**	
Engineer:	**F. Pinto**	**Date:**	

	Hot Required	Fixture Qty	FU	Total FU DCW
WC Pan	N	14	2	28
Urinal Cistern	N		1	0
Urinal Auto Flush	N		0.5	0
Basin	Y	16	1	16
Pot sink	Y		7	0
Washdown Taps (20mm)	N		8	0
Washdown Taps (15mm)	N		4	0
Shower	Y	29	5	145
Kitchen Sink	Y	2	3	6
Cleaners sink	N		3	0
Bath	Y		8	0
Dishwasher (Dom)	N		2	0
Dishwasher (Sm Comm)	N		4	0
Dishwasher (Lge Comm)	N		8	0
Washing machine (Dom)	N		2	0
Washing machine (Comm)	N		7	0
			Loading units	**195**
			PSFR	**1.72**

Description of Additional Flows and Constants	L / min	L / sec
Fire Hose Reels (2 x 0.33 L / s)		**0.66**
Emergency Shower and Eye Wash (75.7 L / min)		**0.00**
Irrigation Provision based on ≈25mm @ 1.5m/s		**0.62**
Mech plant top up supplies (allowance on 2 L/s)		**2.00**

APPENDIX C - SYDNEY WATER AVERAGE DAILY WATER USAGE OF DIFFERENT PROPERTIES

AVERAGE DAILY WATER USAGE OF DIFFERENT PROPERTY TYPE

Water Supply Code of Australia

MWH/PB Flow Study Report

Water Usage Survey

Development Type	Development Sub-Type	Key Metric	Metric Unit	Average Demand (L / Metric Unit / Day)
Residentail	Single Lot Torrens	Dwelling	each dwelling	623.00
	Flats Torrens	Net Floor Area	Square Meter	2.36
	High Rise Units	Net Floor Area	Square Meter	3.34
	Single Lot Community	Dwelling	each dwelling	623.00
Mixed	Residential / Commercial	Combined Floor Area	each dwelling / Square Meter	use separate rates for each componenet
	Commercial / Industrial	Combined Floor Area	Square Meter	use separate rates for each componenet
Commercial	Aged Accom - Self Care	Net Floor Area	square metres	2.50
	Aged Accom - Hostel	Bed	each bed	271.00
	Aged Accom - Full Care	Bed	each bed	271.00
	Childcare	Net Floor Area	Square Meter	3.60
	Hotel / motel / serviced apartments	Room	each room	359.94
	Office	Net Floor Area	Square Meter	2.27
	Shopping Centre	Net Floor Area	Square Meter	3.00
	Laundry / Dry Clearner	Net Floor Area	Square Meter	10.50
	Café / Fast Food / Butcher / Deli	Net Floor Area	Square Meter	2.48
	Retail Units	Net Floor Area	Square Meter	2.48
	Medical / Veterinary	Net Floor Area	Square Meter	2.48
	Mechanical Repair	Net Floor Area	Square Meter	2.48
	Car / Boat Sales	Net Floor Area	Square Meter	2.48
	Car Wash	Net Floor Area	Square Meter	9.40
	Club	Net Floor Area	Square Meter	3.77
Industrial	Heavy Process	As required		
	Chemical Manufacturing	As required		
	Printing Manufacturing	As required		
	Beverage Manufacturing	As required		
	Light Factory Unit	developed floor Area	Square Meter	2.82
	Warehousing	developed floor Area	Square Meter	2.82
	Transport / Bus Depot	Site Area	Square Meter	0.91
Special Uses	University	Student	each student	20.00
	School	Student	each student	20.00
	Hospital	Bed	each bed	271.00
	religious assembles	developed Floor Area	Square Meter	1.30
	Government Depot	Site Area	Square Meter	0.91
	Community Centre / Library	Floor Area	Square Meter	1.84
	Sport Fields With Amenities	As required		
	Park & Reserves	As required		
	Services - Police / Ambulance etc	Floor Area	Square Meter	1.40