

PLANS AND DOCUMENTS
referred to in the PDA
DEVELOPMENT APPROVAL

Approval no: DEV2025/1602

Date: 27 May 2025



Site 18B, 260 Macarthur Avenue, Hamilton

CIVIL ENGINEERING REPORT

(Stormwater Management, Infrastructure & Civil Services)

CLIENT:	Silverstone Developments
SITE ADDRESS:	Site 18B, 260 Macarthur Avenue, Hamilton
MCE No:	24125
DATE:	March 2025



DOCUMENT CONTROL

DOCUMENT TITLE:

Civil Engineering Report (CER)

Incorporating:

- Engineering Services Report (ESR) &
- Site Based Stormwater Management Plan (SBSMP)

MELIORA JOB No:

24125

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GLOSSARY

GENERAL

- BCC – Brisbane City Council
- CER – Civil Engineering Report
- BYDA – Before You Dig Australia
- ESR – Engineering Services Report
- NCC - National Construction Code
- AS/NZS - Australian Standards/New Zealand Standards
- QUDM - Queensland Urban Drainage Manual
- WSAA - Water Services Association of Australia
- SBSMP – Site Based Stormwater Management Plan
- SPP - The State Planning Policy (Queensland)
- CMP – Construction Management Plan
- ha - Hectare (10,000m²)
- kL - kilolitre (1,000L) or (1m³)

EARTHWORKS & ESC

- ASS – Acid Sulfate Soil
- ASSIR – Acid Sulfate Soil Investigation Report
- GWI - Ground Water Inflow
- E&SC – Erosion and Sediment Control

DRAINAGE

- AEP - Annual Exceedance Probability
- ARI - Average Recurrence Interval
- Hydrology – The movement (and impact) of water run-off in relation to the site and surrounds
- OSD – On-Site Detention (Detention Storage System)
- Bioretention system - A system that collects and infiltrates urban stormwater through a prescribed filter media covered with vegetation to improve discharge quality
- GPT - Gross Pollutant Trap – Collects gross pollutants from a catchment to improve stormwater quality
- t_c – ‘Time of Concentration’ for a drainage catchment
- MUSIC - Water quality modelling software; Acronym stands for ‘Model for Urban Stormwater Improvement Conceptualisation’
- Nitrogen - An important nutrient found in high concentrations in recycled waters, originating from human and domestic wastes. A useful plant nutrient that can also cause off-site problems of eutrophication in lakes, rivers and estuaries.
- Phosphorus - An important nutrient found in high concentrations in recycled waters, originating principally from detergents but also from other domestic wastes.
- WSUD – Acronym stands for ‘Water Sensitive Urban Design’. WSUD Provides a strategy for the conservation and management of water resources through better management of stormwater.

SEWER & WATER

- DF - Design Flow
- EP - Equivalent Persons
- IIF - Inflow & Infiltration Flow
- PDWF - Peak Dry Weather Flow
- PWWF - Peak Wet Weather Flow
- ADWF - Average Dry Weather Flow
- SF - Sanitary Flow



TABLE OF CONTENTS

DOCUMENT CONTROL	2
GLOSSARY.....	2
TABLE OF CONTENTS.....	3
1 EXECUTIVE SUMMARY	1
2 INTRODUCTION & BACKGROUND.....	3
2.1 BACKGROUND.....	3
3 SITE CHARACTERISTICS.....	4
3.1 LOCATION & TITLES/EASEMENTS	4
3.2 EXISTING FEATURES & TOPOGRAPHY	4
3.3 GEOTECHNICAL FEATURES.....	5
3.4 FLOODING IMPACT	6
3.5 LOCAL GOVERNMENT INFRASTRUCTURE PLAN (LGIP)	6
4 PROPOSED CIVIL ENGINEERING WORKS.....	7
4.1 DESCRIPTION OF WORKS	7
4.2 FILLING AND EXCAVATION	7
4.3 ACCESS & ROADWORKS.....	7
4.4 SITE-BASED STORMWATER DRAINAGE MANAGEMENT - QUANTITY	8
4.5 SITE BASED STORMWATER DRAINAGE MANAGEMENT - QUALITY	12
4.6 STORMWATER DRAINAGE INFRASTRUCTURE MAINTENANCE.....	15
4.7 SEDIMENT & EROSION CONTROL	15
4.8 SEWERAGE RETICULATION	16
4.9 WATER RETICULATION.....	17
4.10 ELECTRICITY, COMMUNICATIONS & GAS	17
5 SUMMARY & CONCLUSIONS.....	19
5.1 WORKS SUMMARY AND ENGINEERING RECOMMENDATION.....	19
5.2 COUNCIL CODE RESPONSES	20
5.3 LIMITATIONS	20
6 APPENDIX	21
6.1 Appendix A – Architectural Drawings	21
6.2 Appendix B – Schematic Civil Drawings	22
6.3 Appendix C – Survey Plan.....	23
6.4 Appendix D – BYDA Results.....	24
6.5 Appendix E – Floodwise Report	25
6.6 Appendix F – Code Response Tables.....	26
6.7 Appendix G – BCC E&SC EHA Form	27
6.8 Appendix H – Ocean Protect Device Information.....	28



6.9	Appendix J – Ocean Protect Maintenance Manuals	29
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1 EXECUTIVE SUMMARY

Meliora Engineering has been engaged by Silverstone Developments to prepare a Civil Engineering Report suitable for submission to Brisbane City Council in support of a Development Application for a site located at Site 18B, 260 Macarthur Avenue, Hamilton. The Application proposes a MCU (Multi-tower residential project).

The purpose of this Engineering Report is to provide advice on the development proposal as detailed in the Carr Architecture architectural drawings, a selection of which is shown within Appendix A – Architectural Drawings. Commentary and relevant calculations cover works required to service the proposed development including earthworks, roadworks, stormwater drainage management (quantity and quality), sewerage and water reticulation, electricity, communications and gas.

The assessment has been carried out in accordance with Brisbane City Council Planning Scheme Policies and the proposed works described herein will be subject to the Conditions attached to the Development Approval to be provided by Council and any nominated referral agencies.

Meliora Engineering civil schematic sketches addressing Stormwater, Infrastructure & Services are shown within Appendix B – Schematic Civil Drawings.

A summary of civil engineering advice is as follows:

- A review of the potential for the Site to be inundated and the requisite minimum development levels has indicated that the proposed development will have a level of immunity well in excess of that nominally required to satisfy both the requirements of the LGA planning scheme and the higher immunity currently being adopted by EDQ with regard to the design of the road system within the PDA. Refer to Flood Study by WEP for further advice on flooding.
- The application proposes earthwork (mostly cutting) with associated shoring to reflect architectural design intent for basement and ground level layout. The site falls to the west on Barcham Road corridor.
- The development will require 2 x new commercial crossovers along Barcham Road. All existing vehicle crossovers are to be made redundant, demolished and removed offsite as part of the construction works, with kerbs to be reinstated to Council standards.
- The development will require in-ground pit & pipe drainage works to capture roof and surface water from developed areas and discharge flows to two different locations on Karakul Road & Macarthur Ave via existing drainage stubs.
- The development proposes to discharge to the existing infrastructure within the Macarthur Avenue and Karakul Road, which is found to have sufficient hydraulic capacity to cater for developed site flows from each catchment. Hence, no detention is required nor proposed.
- The proposal triggers the SPP's Post-Development Stormwater Management (Water Quality) Design Objectives and therefore permanent tertiary treatment solutions/devices will be proposed within each catchment. This will feature OceanGuards (trash baskets) and StormFilter treatment cartridges within underground off-line tanks, prior to off-site discharge. This arrangement will also satisfy ESD findings and will deliver a stormwater management system delivering the principles of WSUD, and will be a far superior outcome for the receiving environment compared with the existing condition.
- The site appears to be adequately serviced by reticulated water, sewerage, gas, telecommunications, and electricity. These services will need to be connected via the associated authority works process during the development.



Information discussed in this report is inferred from several sources including BYDA records, site survey, design documents received from the client.

All relevant standards and guidelines are addressed in this report including criteria from:

- [BCC Planning Scheme Policy](#)
- [Australian Rainfall and Runoff Guideline \(ARR\)](#)
- [Queensland Urban Drainage Manual \(QUDM\) 2013](#)
- [Plumbing and Drainage Code AS3500.3](#)
- [State Planning Policy \(SPP\)](#)
- [International Erosion Control Association of Australasia \(IECA\)](#)

This report has demonstrated that the proposed development does not present any civil related engineering issues which would prevent the development from proceeding as proposed.



2 INTRODUCTION & BACKGROUND

Meliora Engineering has been engaged by Silverstone Developments to prepare a Civil Engineering Report suitable for submission to Brisbane City Council in support of a Development Application for a site located at Site 18B, 260 Macarthur Avenue, Hamilton. The proposed development is for a MCU (Multi-tower residential project).

The purpose of this Engineering Report is to provide advice on the development proposal as detailed in the Carr Architecture architectural drawings, a selection of which is shown within Appendix A – Architectural Drawings. Commentary and relevant calculations cover works required to service the proposed development including earthworks, roadworks, stormwater drainage management (quantity and quality), sewerage and water reticulation, electricity, communications and gas.

The assessment has been carried out in accordance with Brisbane City Council Planning Scheme Policies and the proposed works described herein will be subject to the Conditions attached to the Development Approval to be provided by Council and any nominated referral agencies.

2.1 BACKGROUND

Meliora is a civil engineering consultancy which specialises in residential and commercial projects within South East Queensland. We understand the commercial drivers behind projects whilst also having significant experience in compliance and construction of same.

This project presents an opportunity for urban densification in line with the current Council planning scheme, creating more dwellings to service the influx of residents and satisfy the growth of Brisbane.

This Civil Engineering Report has been supervised by a Registered Engineering of Queensland (RPEQ) and address the key civil engineering aspects in relation to the planning requirements relevant to the proposal. Section 4.4 & 4.5 of this Report forms a Site Based Stormwater Management Plan (an SBSMP), which outlines potential on and off-site impacts associated with stormwater for the proposed development. It also identifies a range of conceptual stormwater management strategies and actions for water quality, water quantity and environmental issues.

3 SITE CHARACTERISTICS

3.1 LOCATION & TITLES/EASEMENTS

Refer to below figures and tables for locality plan and specific title information for the property to be developed.



Figure 1 - Site Location (as accessed from Google Maps 11/03/2025)

Table 1 - Property Details

Lot Information	Lot 6 on SP326594
Street Address	Site 18B, 260 Macarthur Avenue, Hamilton
Site Area	4240m ²
Existing Easements	No

3.2 EXISTING FEATURES & TOPOGRAPHY

3.2.1 CONTEXT

The site appears to be adequately serviced by reticulated water, sewerage, gas, telecommunications, and electricity. These services will need to be connected via the associated authority works process during the development. Refer to Town Planning Report by Urban Strategies for further planning related context.

3.2.2 GRADING & CONTRIBUTING CATCHMENTS

The site is relatively flat (no significant grade) and there are no notable upstream contributing catchments which discharge into the developed area.

3.2.3 EXISTING FEATURES

The existing property boundaries, surface levels, site features and the location of the existing infrastructure & structures are identified on the survey plan drawing shown within Appendix C – Survey Plan within this report.

Appendix D – BYDA Results includes information as sourced from BYDA and Council Mapping.

It should be noted that site survey includes underground services ‘plotted from records’ ie from BYDA records. As per commentary within AS5488, BYDA and authority records are often Quality Level ‘D’. BYDA plans only give an approximate indication of the underground conduits that exist and cannot not be relied upon. It is strongly suggested that prior to the start of the detailed/developed design phase, and to avoid damaging buried assets when excavating the subsurface, information relating to the location of existing services must be located to minimum quality Level ‘B’ with the position of any underground cables or services thoroughly checked and marked by a trained service locator.

3.3 GEOTECHNICAL FEATURES

At the time of authoring this report, a Geotechnical Report with associated soil testing had not been received by Meliora Engineering. It is strongly recommended that appropriate Geotechnical Investigation and testing by complete for the site to inform engineering for the proposed development.

3.3.1 POTENTIAL OR ACTUAL ACID SULFATE SOILS

The Brisbane City Council Mapping shows the site as being impacted by ‘potential and actual acid sulfate soils’ overlays. An Acid Sulfate Soils Investigation Report has been prepared by Core Consultants (dated December 24).

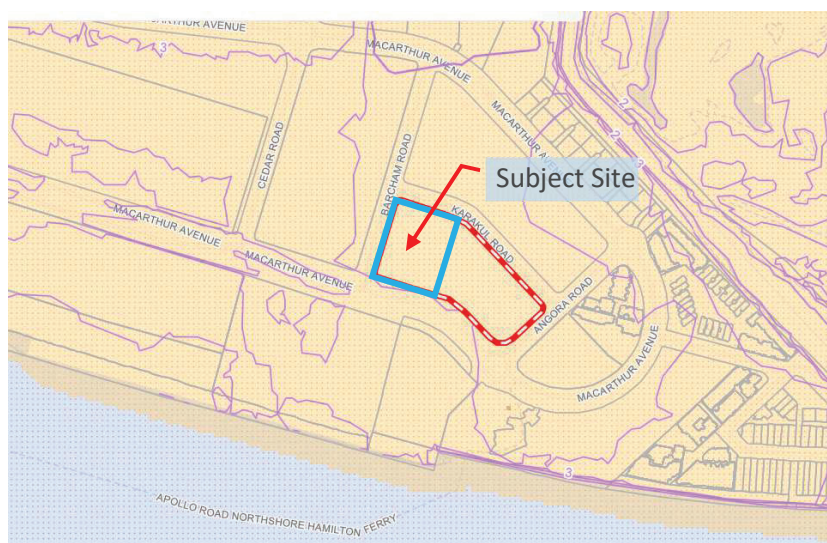


Figure 2 - Acid Sulfate Soil Overlay

3.4 FLOODING IMPACT

An authority Flooding Report has been generated and can be seen within Appendix E – Floodwise Report.

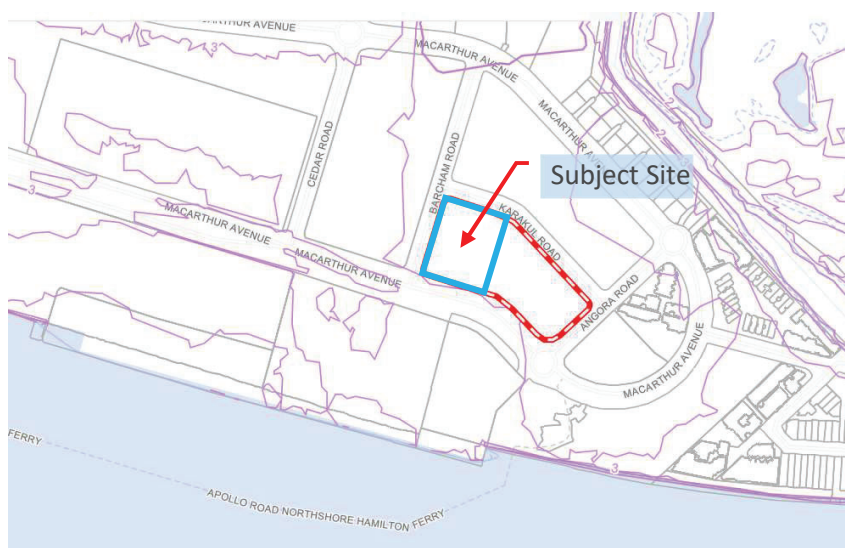


Figure 3 - Flooding Overlays from Council Mapping

A review of the potential for the Site to be inundated and the requisite minimum development levels has indicated that the proposed development will have a level of immunity well in excess of that nominally required to satisfy both the requirements of the LGA planning scheme and the higher immunity currently being adopted by EDQ with regard to the design of the road system within the PDA. Refer to Flood Study by WEP for further advice on flooding.

3.5 LOCAL GOVERNMENT INFRASTRUCTURE PLAN (LGIP)

Review of the Council Priority Infrastructure Plan Maps indicates that no priority infrastructure upgrades are planned within close proximity to the subject site.



4 PROPOSED CIVIL ENGINEERING WORKS

Meliora Engineering accepts no responsibility for the accuracy of information supplied to them by second and third parties, including survey, authority mapping data and geotechnical testing information which may have been relied on to inform the civil engineering opinions and calculations presented within the advice below.

Consider that the assessment addresses the requirements for development of the subject site at the time the study was undertaken. If these conditions are known to change, the results of this assessment should be reviewed and amended as required.

The assessment has been carried out in accordance with the relevant Council Planning Scheme Policies and the proposed works described herein will be subject to the conditions attached to the Development Approval to be provided by Council and any nominated referral agencies.

4.1 DESCRIPTION OF WORKS

The proposed development is for MCU (Multi-tower residential project).

Please refer to Appendix A – Architectural Drawings for select architectural layout plans.

4.2 FILLING AND EXCAVATION

The application proposes earthwork (mostly cutting) with associated shoring to reflect architectural design intent for basement and ground level layout. The site falls to the west on Barcham Road corridor.

Refer to Appendix F – Code Response Tables for the Brisbane City Council Filling and Excavation Code & responses.

4.3 ACCESS & ROADWORKS

The subject site is adjacent to the following roads:

- Macarthur Avenue and Karakul Road – council road, with channel drainage on each side and a two-way crossfall
- Barcham Road – access road, with kerb and channel drainage on both side and a two-way crossfall
- The site is currently accessed via one (1) vehicle crossover along Karakul Road.

The development will require 2 x new commercial crossovers along Barcham Road. All existing vehicle crossovers are to be made redundant, demolished and removed offsite as part of the construction works, with kerbs to be reinstated to Council standards.

Refer to Appendix F – Code Response Tables for the Brisbane City Council Infrastructure Code & responses.

4.4 SITE-BASED STORMWATER DRAINAGE MANAGEMENT - QUANTITY

Refer to Appendix F – Code Response Tables for the Brisbane City Council Stormwater Management Code & responses.

4.4.1 ON-SITE DRAINAGE & RUNOFF QUANTITY TREATMENT OBJECTIVE

The stormwater management objectives that apply to the site have been derived from QUDM, State Planning Policy (2017), BCC Planning Scheme Policy and BCC Land Development Guidelines. The key stormwater parameters and desired outcomes are:

- Minimisation of storm-related nuisance to the public;
- Minimisation of legal disputes between neighbouring landowners and communities;
- Flood control & resilience to flooding in excess of nominated design events;
- Pedestrian and vehicular safety
- Integrate stormwater management infrastructure carefully in the urban and natural landscape, promoting retention of natural drainage system and protection/restoration of environmental values

Subsequently, the objectives of Stormwater Runoff Quantity Management for the subject site are;

1. Provide a stormwater conveyance system for minor (10% AEP) and major (2% AEP) storm events to discharge to the nominated Lawful Point of Discharge
2. Reduce the peak post-development flows discharged from the site to be equal to (or below) the existing condition peak flows for each storm event AEP.
3. Limit flooding of public and private property, both within the catchment and downstream, to acceptable levels.
4. To provide convenience and safety for pedestrians and traffic in frequent stormwater flows by controlling those flows within prescribed velocity/depth limits.

4.4.2 EXISTING DRAINAGE REGIME

A site survey documenting existing services within and surrounding the development site was performed by Landpartners and is shown within Appendix C – Survey Plan. The survey highlights the following existing features related to drainage:

- Two drainage pits are available to the north-west and south-west corners
- The site is extremely flat however sheet flow from existing site generally flowing to the existing pits

Upstream Catchments are described in Section 3.2.2 of this Report.

4.4.2.1 EXISTING LAWFUL POINT OF DISCHARGE

The site features two pits on Karakul Rd & Macarthur Ave – which are the Lawful Points of Discharge (LPODs) for the site.

Further information on existing Council Stormwater Infrastructure in the area of the site was received via a BYDA search and a Council Mapping search. Details are included in Appendix D – BYDA Results.

4.4.3 PROPOSED DRAINAGE REGIME

4.4.3.1 PROPOSED LAWFUL POINT OF DISCHARGE

In the post-developed case, the existing two drainage stubs into the site present themselves as suitable for re-use. All the existing stubs will be maintained and connected into for the development.

4.4.3.2 TAILWATER LEVELS

The tailwater level circumstance considered within the drainage analysis assumes water levels at 150mm below road pavement levels external to the site at the discharge points.

4.4.3.3 PROPOSED DRAINAGE NETWORK

Stormwater generated from the development will be conveyed through a pit and pipe network for minor stormwater events (10% AEP) and a combination of pits and pipes and overland flow swales for major storm events (2% AEP).

All stormwater drainage will be designed in accordance with the requirements of QUDM 2016.

Generally, the development will require in-ground pit & pipe drainage works to capture roof and surface water from developed areas to discharge flows to two different locations on Karakul Rd & Macarthur Ave (catchment 1 & 2) via existing drainage stubs.

4.4.4 CATCHMENT HYDROLOGY

4.4.4.1 FLOW ESTIMATION METHODS & MODELLING

The choice of hydrologic method must be appropriate to the type of catchment and the required degree of accuracy.

As per Section 7.3 of BCC's current Infrastructure PSP, BCC allows flow estimations using Rational method. For this small-scale development Rational method was deemed suitable for use to estimate peak flows for catchments under existing and developed conditions. The Rational Method Calculations are summarised below.

4.4.4.2 RAINFALL DATA

Catchment hydrology has been estimated using rainfall specific for the site at Site 18B, 260 Macarthur Avenue, Hamilton. This is derived from the Bureau of Meteorology (BOM) Design Rainfall Data System (2016) using the following Latitude, Longitude:

- Latitude -27.44301, Longitude 153.08333

4.4.4.3 EXISTING CATCHMENTS DESCRIPTION

The existing catchment EX1 (total existing site discharges to multiple stubs) discharges to both Karakul Rd and Macarthur Avenue. Refer to below figure highlighting the existing discharge locations (stubs built with the subdivision works brought to edge of the lot).

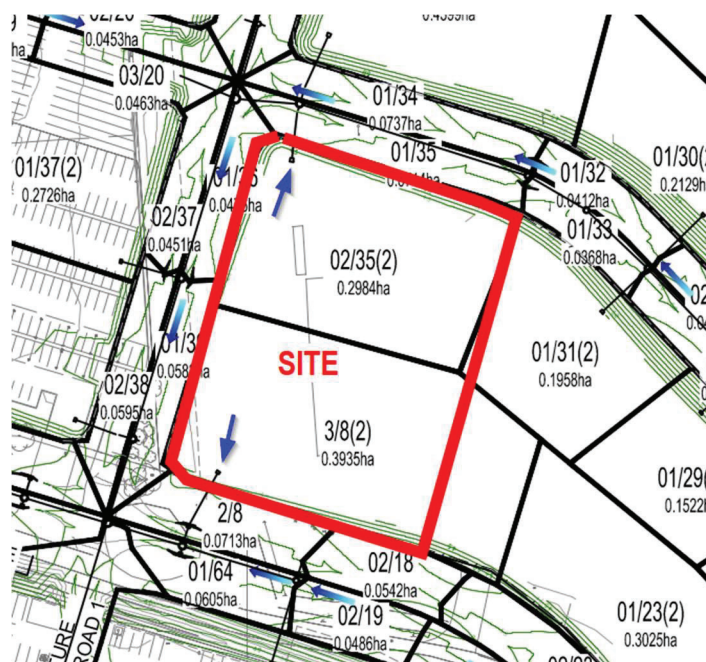


Figure 5 – Existing Catchments

4.4.4.4 PROPOSED CATCHMENTS DESCRIPTION

The proposed Catchments 1 & 2 will discharge to two the existing drainage stubs on Karakul Rd & Macarthur Ave via existing drainage stubs.

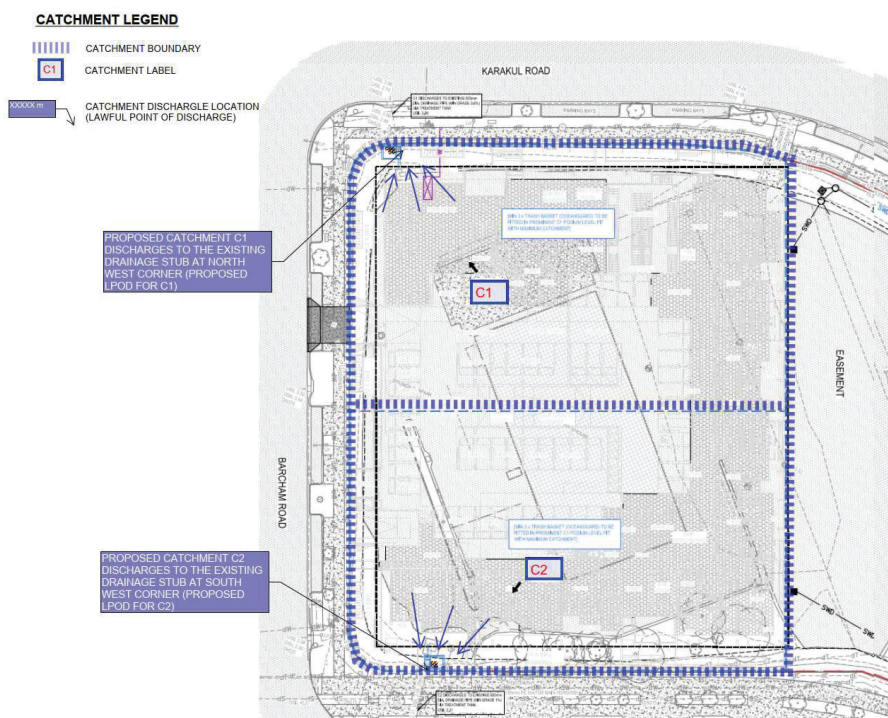


Figure 6 - Proposed Catchments



4.4.4.5 CATCHMENT HYDROLOGY - RATIONAL METHOD CALCULATIONS

EX1 –The existing catchment

CATCHMENT NAME	EX1	Design Storm Event (AEP & ARI)						
RATIONAL METHOD PARAMETERS	(units)	63% (Q1)	38% (Q2)	18% (Q5)	10% (Q10)	5% (Q20)	2% (Q50)	1% (Q100)
Catchment Area	ha				0.664			
Time of Concentration	min				8.0			
Fraction Impervious					0.30			
Runoff Coefficient (Cy)		0.58	0.62	0.69	0.73	0.77	0.84	0.88
Rainfall Intensity (ly)	mm/hr	99.57	127.64	160.94	180.69	207.41	242.71	269.83
Peak Flow	L/s	107.2	146.1	205.8	243.2	293.2	375.8	435.9

C1 – Post-Development

CATCHMENT NAME	C1	Design Storm Event (AEP & ARI)						
RATIONAL METHOD PARAMETERS	(units)	63% (Q1)	38% (Q2)	18% (Q5)	10% (Q10)	5% (Q20)	2% (Q50)	1% (Q100)
Catchment Area	ha				0.333			
Time of Concentration	min				5.0			
Fraction Impervious					0.80			
Runoff Coefficient (Cy)		0.68	0.72	0.81	0.85	0.89	0.98	1.00
Rainfall Intensity (ly)	mm/hr	118.99	152.32	191.54	214.52	245.74	287.11	318.81
Peak Flow	L/s	74.9	101.9	143.2	168.8	203.1	259.8	295.2

C2 – Post-Development

CATCHMENT NAME	C2	Design Storm Event (AEP & ARI)						
RATIONAL METHOD PARAMETERS	(units)	63% (Q1)	38% (Q2)	18% (Q5)	10% (Q10)	5% (Q20)	2% (Q50)	1% (Q100)
Catchment Area	ha				0.331			
Time of Concentration	min				5.0			
Fraction Impervious					0.80			
Runoff Coefficient (Cy)		0.68	0.72	0.81	0.85	0.89	0.98	1.00
Rainfall Intensity (ly)	mm/hr	118.99	152.32	191.54	214.52	245.74	287.11	318.81
Peak Flow	L/s	74.3	101.1	142.0	167.4	201.4	257.7	292.8

4.4.4.6 PRE vs POST DEVELOPMENT (UNMITIGATED) – RESULTS SUMMARY

The existing catchment contributes circa 436L/s to lower of the site as sheet flow.

Post-development, Proposed Catchment C1 & C2 will contribute circa 588L/s (at 1% AEP event) to the surrounding drainage network. So, there are 35% increase in flows due to development.



Total Site Catchment - Unmitigated Discharge Summary				
AEP	Predeveloped Flow	Developed (Unmitigated) Flow	Difference	% Increase in Flow
	(m3/s)	(m3/s)	(m3/s)	
63% (Q1)	0.107	0.149	0.042	39
38% (Q2)	0.146	0.203	0.057	39
18% (Q5)	0.206	0.285	0.079	39
10% (Q10)	0.243	0.336	0.093	38
5% (Q20)	0.293	0.404	0.111	38
2% (Q50)	0.376	0.518	0.142	38
1% (Q100)	0.436	0.588	0.152	35

The above results indicate that the proposed development results in an increase in the quantity of runoff to the lawful point of discharge.

However, as the development proposes to discharge to the existing drainage stubs around the edges of the site which have sufficient hydraulic capacity to cater for the post-development site flows from each catchment, no detention is required nor proposed.

Refer to catchment discharges within this report and on SK17. Also see SK17 for existing pipe stub capacities at existing surveyed grades. You will note the outlet pipes have considerably more capacity than the major flows from each catchment discharging to them.

4.4.5 CONSTRUCTION PHASE DRAINAGE INFRASTRUCTURE

During the construction phase of the development, the stormwater management design objectives for temporary drainage and basin spillways are to reference the Queensland Government State Planning Policy (SPP) 2017 Appendix 2 Table A (Part 1, 2 & 3).

Refer to Section 4.7 for further details on Construction Phase Erosion & Sediment Control details.

4.5 SITE BASED STORMWATER DRAINAGE MANAGEMENT - QUALITY

Refer to Appendix F – Code Response Tables for the Brisbane City Council Stormwater Management Code & responses.

4.5.1 WATER QUALITY TREATMENT OBJECTIVE

Urban stormwater run-off potentially contributes to adverse water quality in waterways, which impact aquatic ecosystems health and limit human water uses. Unless well managed, urban stormwater can release contaminants such as nutrients, sediment and solid waste to waterways. For the post-construction phase, the SPP's stormwater management design objectives require minimum reductions in the mean annual load for key pollutants.

The SPP contains specific assessment benchmarks for the Water quality state interest. The Performance Outcomes (PO) of the SPP apply to the following applications:

- (1) a material change of use for an urban purpose that involves premises 2500m² or greater in size *and*;
 - (a) will result in six or more dwellings; *or*
 - (b) will result in an impervious area greater than 25% of the net developable area; *or*
- (2) reconfiguring a lot for an urban purpose that involves premises 2500m² or greater in size and will result in six or more lots; *or*

The proposal triggers the SPP's Post-Development Stormwater Management (Water Quality) Design Objectives and therefore permanent tertiary treatment solutions/devices will be proposed within each catchment. This will feature OceanGuards (trash baskets) and StormFilter treatment cartridges within underground off-line tanks, prior to off-site discharge. This arrangement will also satisfy ESD findings and will deliver a stormwater management system delivering the principles of WSUD, and will be a far superior outcome for the receiving environment compared with the existing condition

We have identified issues relating to stormwater runoff quality and determined methods of treatment.

The relevant measures proposed for stormwater quality treatment are:

- All runoff from roof areas discharging to treatment via SQIDs
- Runoff from podium and ground level discharging to treatment via SQIDs

4.5.1.1.1 POLLUTANTS OF CONCERN

Nutrients of concern that may contribute to increased occurrence, frequency or intensity of coastal algal blooms (particularly nitrogen, phosphorus, iron and organic matter) may be released during development in coastal areas.

The below table outlines pollutants that are expected form the proposed development.

Pollutants	Main Source	Target Pollutant
Litter	Public use on site	Yes
Oxygen demanding site	Dust accumulating on surfaces, wash off from garden beds, deposition from vehicular traffic	Yes
Nutrient, Phosphorous (P)	Garden bed fertilizer and bird droppings	Yes
Nutrient, Nitrogen (N)	Garden bed fertilizer and bird droppings and atmospheric nitrogen deposited in rainwater	Yes
Hydrocarbons (including oil and grease)	Vehicular traffic	Yes
Heavy metals	Vehicular traffic	Yes
Surfactants	Vehicle wash, and window cleaning	Yes

4.5.1.1.2 EXISTING CONDITION

The existing condition does not feature any SQID's. Development of the site presents and opportunity to provide a superior outcome and cleaner site runoff (than the existing case) through use of properly designed tertiary treatment systems to capture and treat rainfall runoff from the site.

4.5.1.1.3 PROPOSED TREATMENT STRATEGY & MODELLING

The State Planning Policy (2017) (SPP 2017) requires stormwater to meet certain design objectives. Performance Outcome (PO) 8 of the SPP requires:

PO8 -Manage stormwater during operational (post-construction) stages to protect drinking water supply environmental values and facilitate the achievement of water quality objectives for receiving waters.

Acceptable Outcome (AO) for P08 states;

Stormwater run-off generated during operation (postconstruction) demonstrates a minimum reduction in mean annual load from unmitigated development that achieves the following stormwater management design objectives:

- a) 80% reduction in total suspended solids
- b) 60% reduction in total phosphorus
- c) 45% reduction in total nitrogen
- d) 90% reduction in gross pollutants

Compliance with the load reduction targets will typically be demonstrated using an accepted quantitative model (such as MUSIC – Model for Urban Stormwater Improvement Conceptualisation) with all model inputs and outputs provided to the approval authority to enable review and verification of the model results.

Section 4.5 of this Report is proposed to form a complete Stormwater Quality Management Plan (SQMP) to satisfy requirements of the SPP and local authority requirements, and an .sqz file is appended to this report submission reflecting the MUSIC model for the project.

4.5.1.1.4 SOURCE NODES

Catchments and source nodes derived from the civil drainage sketches as per Appendix B.

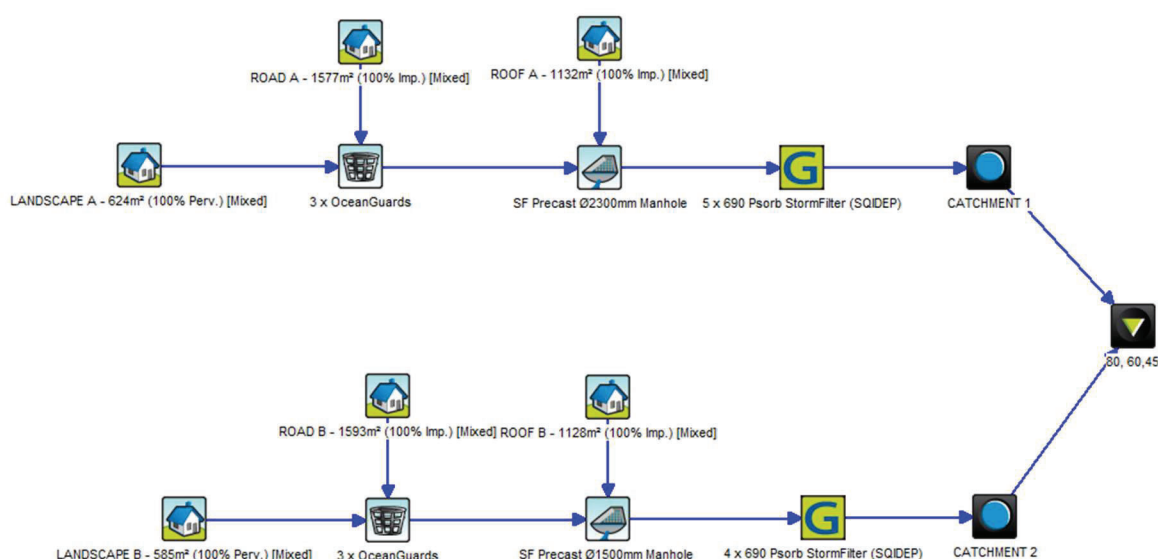


Figure 7 – MUSIC model nodes

4.5.1.1.5 TREATMENT NODES

Treatment nodes are the OceanGuards and StormFilter PSorb units, specifications of which can be seen in Appendix H. These products are accepted on Council register for SQIDs.

4.5.1.1.6 MUSIC MODELLING RESULTS

Results from the MUSIC model (.sqz is appended to this report submission) are presented as follows, showing the treatment train effectiveness at the downstream receiving node (Brisbane River).

	Sources	Residual Load	% Reduction
Flow (ML/yr)	6.15	6.15	0
Total Suspended Solids (kg/yr)	1490	153	89.7
Total Phosphorus (kg/yr)	2.73	1.06	61.1
Total Nitrogen (kg/yr)	12.8	6.86	46.4
Gross Pollutants (kg/yr)	136	0	100

Figure 8 – MUSIC model results

The above results surpass the per cent reduction water quality objectives identified by the current State Planning Policy (SPP) 2017 and Healthy Waterways guidelines and if the proposed treatment measures are adopted for the developed site, they will represent a major improvement to the existing site's run-off quality.

4.5.1.1.7 SQID MAINTENANCE

Refer attached Operations and Maintenance Manuals (Appendix J).

4.5.2 CONSTRUCTION PHASE STORMWATER QUALITY

During the construction phase of the development, the stormwater management design objectives for temporary water quality & ESC devices, including sediment basins, are to reference the Queensland Government State Planning Policy (SPP) 2017 Appendix 2 Table A (Part 1, 2 & 3).

Refer to Section 4.7 for further details on Construction Phase Erosion & Sediment Control details.

4.6 STORMWATER DRAINAGE INFRASTRUCTURE MAINTENANCE

The landowner is responsible for the ongoing operation and maintenance of all privately-owned stormwater management assets & devices to ensure the drainage facility continues to meet its design performance and are maintained for the life of the approved development and may be liable for damages as a result of drainage system malfunction caused by lack of proper maintenance.

Roof-water drainage systems are classified as private drains with the responsibility for maintenance lying with the property owners.

4.7 SEDIMENT & EROSION CONTROL

Healthy Waterways have identified that the large and increasing amount of sediment entering our waterways is one of the major issues affecting waterway health across south-east Queensland. Sediment is a contaminant that can seriously degrade water quality and starve marine life of oxygen, leading to fish kills and damage to aquatic ecosystems.

During the construction phase of the development, the stormwater management design objectives for temporary water quality & ESC devices, including sediment basins, are to reference the Queensland Government State Planning Policy (SPP) 2017 Appendix 2 Table A (Part 1, 2 & 3).



IECA 2008 Best Practice Erosion and Sediment Control (as amended) is to be referenced for details on the application of the Construction Phase requirements.

For the construction phase, the SPP's stormwater management design objectives require that developments apply best practice erosion and sediment control. These objectives are derived from International Erosion Control Association of Australasia (IECA) 2008 Best Practice Erosion and Sediment Control.

All sediment and erosion controls will be designed in the detailed design phase to meet the relevant design objectives.

The erosion risk for the proposed development has been assessed against the BCC Erosion hazard guidelines and found that the site is classified MEDIUM risk for Erosion and Sediment Control Hazard.

Refer to Appendix G – BCC E&SC EHA Form for Certified & complete BCC E&SC EHA Form.

4.8 SEWERAGE RETICULATION

4.8.1 EXISTING SEWER INFRASTRUCTURE

There is a DN160mm PE sewer reticulation main which enters the site from south-western corner.

Refer to the UU Asset Plan provided within Appendix D – BYDA Results for further information.

4.8.2 PROPOSED SEWER WORKS

It is proposed that existing sewer property connection to be reused (or upgraded if required) for the post development.

The details of the sewer connection, including an analysis of the existing infrastructure capacity to cater for the proposed development sewer discharge will be subject to authority assessment via a future UU Water Approval Application (Non-standard connection). It is assumed that the surrounding network built with the subdivision was designed to cater for the proposed loading by the development, however, in order to assist EDQ checks to verify consistency with the demand allocated to the land as part of our infrastructure planning, the sewer flow estimate calculation is shown below.

Sewer Flow Estimate				
Development Type	EPs	ADWF (kL/day)	PDWF (kL/day)	PWWF (kL/day)
Residential	442.75	79.70	276.4143594	435.8043594
		ADWF (L/sec)	PDWF (L/sec)	PWWF (kL/sec)
		0.92	3.20	5.04

Refer to Appendix F – Code Response Tables for the Brisbane City Council Infrastructure Code & responses.

4.9 WATER RETICULATION

4.9.1 EXISTING WATER INFRASTRUCTURE

Mapping suggests the site is currently serviced by multiple existing water services from the existing DN180mm uPVC water main in Macarthur Avenue, however on-site investigation has failed to find the meters and services.

Refer to the UU Asset Plan provided within Appendix D – BYDA Results for further information.

4.9.2 PROPOSED WATER WORKS

It is proposed to provide a new large diameter water service and meter assembly (fire and domestic) from the existing water main in the Karakul Road. The meter assembly will be located within the basement with remote reading (AMR) technology.

The details of this connection, including an analysis of the existing infrastructure capacity to cater for the proposed development sewer discharge will be subject to authority assessment via a future UU Water Approval Application (Non-standard connection). It is assumed that the surrounding network built with the subdivision was designed to cater for the proposed loading by the development, however, in order to assist EDQ checks to verify consistency with the demand allocated to the land as part of our infrastructure planning, the water demand estimate calculation is shown below.

Water Demand Estimate					
Development Type	EP	AD (L/s)	MDMM (L/s)	PD (L/s)	PH (L/s)
Residential	442.75	1.18	1.77	2.36	4.13

Refer to Appendix F – Code Response Tables for the Brisbane City Council Infrastructure Code & responses.

4.10 ELECTRICITY, COMMUNICATIONS & GAS

4.10.1 ELECTRICTY INFRASTRUCTURE

Survey and BYDA suggest that the frontage road corridors at the site feature underground electrical infrastructure.

Refer to the Energex Asset Plans (obtained from the ‘Before You Dig Australia’ service) within Appendix D – BYDA Results for further details.

Electricity services required for the proposed development will be designed by the electrical engineer and will be assessed by Energex during the detailed design phase of the development.

Refer to Appendix F – Code Response Tables for the Brisbane City Council Infrastructure Code & responses.

4.10.2 COMMUNICATIONS INFRASTRUCTURE

Telstra BYDA map suggest that the frontage road corridor at the site features existing telecommunications infrastructure that connects directly to the site.

Refer to the Telstra, Optus and NBN Asset Plans within Appendix D – BYDA Results for details.



All works required to provide communication services to the proposed development will be undertaken with the appropriate server's approval and coordination.

Refer to Appendix F – Code Response Tables for the Brisbane City Council Infrastructure Code & responses.

4.10.3 GAS INFRASTRUCTURE

APA Group suggests that the site features existing underground gas infrastructure.

Refer to the APA Group within Appendix D – BYDA Results for details.

All works required to provide gas services to the proposed development will be undertaken by the appropriate consultant with APA Group's approval and coordination.

Refer to Appendix F – Code Response Tables for the Brisbane City Council Infrastructure Code & responses.

5 SUMMARY & CONCLUSIONS

5.1 WORKS SUMMARY AND ENGINEERING RECOMMENDATION

The purpose of this Civil Engineering Report is to provide engineering advice in support of the development proposal as detailed in the Carr Architecture architectural drawings, a selection of which is shown within Appendix A – Architectural Drawings. Commentary and relevant calculations cover civil works required to service the proposed development including earthworks, roadworks, stormwater drainage management (quantity and quality), sewerage and water reticulation, electricity, communications and gas.

This Report relating to the Development Application proposing a MCU (Multi-tower residential project) has shown the following in relation to the civil engineering elements:

- A review of the potential for the Site to be inundated and the requisite minimum development levels has indicated that the proposed development will have a level of immunity well in excess of that nominally required to satisfy both the requirements of the LGA planning scheme and the higher immunity currently being adopted by EDQ with regard to the design of the road system within the PDA. Refer to Flood Study by WEP for further advice on flooding.
- The application proposes earthwork (mostly cutting) with associated shoring to reflect architectural design intent for basement and ground level layout. The site falls to the west on Barcham Road corridor.
- The development will require 2 x new commercial crossovers along Barcham Road. All existing vehicle crossovers are to be made redundant, demolished and removed offsite as part of the construction works, with kerbs to be reinstated to Council standards.
- The development will require in-ground pit & pipe drainage works to capture roof and surface water from developed areas and discharge flows to two different locations on Karakul Road & Macarthur Ave via existing drainage stubs.
- The development proposes to discharge to the existing infrastructure within the Macarthur Avenue and Karakul Road, which is found to have sufficient hydraulic capacity to cater for developed site flows from each catchment. Hence, no detention is required nor proposed.
- The proposal triggers the SPP's Post-Development Stormwater Management (Water Quality) Design Objectives and therefore permanent tertiary treatment solutions/devices will be proposed within each catchment. This will feature OceanGuards (trash baskets) and StormFilter treatment cartridges within underground off-line tanks, prior to off-site discharge. This arrangement will also satisfy ESD findings and will deliver a stormwater management system delivering the principles of WSUD, and will be a far superior outcome for the receiving environment compared with the existing condition.
- The site appears to be adequately serviced by reticulated water, sewerage, gas, telecommunications, and electricity. These services will need to be connected via the associated authority works process during the development.

Information discussed in this report is inferred from several sources including BYDA records, site survey, design documents received from the client.

Meliora Engineering civil schematic sketches addressing Stormwater and Services are shown within Appendix B – Schematic Civil Drawings.

The assessment has been carried out in accordance with the relevant Council Planning Scheme Policies and the proposed works described herein will be subject to the conditions attached to the Development Approval to be provided by Council and any nominated referral agencies.

This report has demonstrated that the proposed development does not present any civil related engineering issues which would prevent the development from proceeding as proposed.

5.2 COUNCIL CODE RESPONSES

The proposed development will trigger design & construction that will need to be assessed against the following Council Codes:

- [Acid Sulfate Soils Overlay Code](#)
- [Filling and Excavation Code](#)
- [Stormwater Code](#)
- [Infrastructure Design Code](#)

To aid in Council's Decision, Meliora Engineering has provided an RPEQ certified response to the engineering aspects of the above codes. The codes with associated responses can be found attached in Appendix F – Code Response Tables.

5.3 LIMITATIONS

Meliora Engineering accept no responsibility for the accuracy of information supplied to them by second and third parties, including survey, authority mapping data and geotechnical testing information which may have been relied on to inform the civil engineering opinions and calculations presented within this report.

We consider that the study addresses the requirements for development of the subject site at the time the study was undertaken. If these conditions are known to change, the results of this study should be reviewed.

This Civil Engineering Report has been prepared under the direct supervision of a Registered Professional Engineer of Queensland generally in accordance relevant guidelines and standards.



6 APPENDIX

6.1 APPENDIX A – ARCHITECTURAL DRAWINGS

SITE 18B. NORTHSHORE HAMILTON, QUEENSLAND

MULTI-RESIDENTIAL DEVELOPMENT



DRAWING LIST

TP3-0000	PROJECT INFORMATION
TP3-0001	DRAWING REGISTER
TP3-0002	DEVELOPMENT SUMMARY
TP3-0003	COMPLIANCE WITH PLANNING REQUIREMENTS
TP3-0004	COMPLIANCE WITH PLANNING REQUIREMENTS - LANDSCAPE AREAS
TP3-0005	COMPLIANCE WITH PLANNING REQUIREMENTS - LANDSCAPE AREAS
TP3-0006	COMPLIANCE WITH PLANNING REQUIREMENTS - COMMUNAL OPEN SPACES
TP3-0007	AREA SUMMARY - TYPICAL LEVEL
TP3-0100	SITE PLANS
TP3-0101	LOCATION PLAN
TP3-0102	SURVEY PLAN
TP3-0103	PROPOSED SITE PLAN
TP3-0300	GFA PLANS
TP3-0301	GFA PLANS
TP3-0302	GFA PLANS
TP3-0400	UNIVERSAL APARTMENTS
TP3-0401	UNIVERSAL APARTMENTS - GA PLANS
TP3-0402	UNIVERSAL APARTMENTS - APT PLANS
TP3-0403	UNIVERSAL APARTMENTS - APT PLANS
TP3-1000	GENERAL ARRANGEMENT PLANS
TP3-1001	BASEMENT 01
TP3-1002	GROUND LEVEL
TP3-1003	LEVEL 1 - PODIUM
TP3-1004	LEVEL 2 - PODIUM
TP3-1013	LEVELS 3-12 - TYPICAL
TP3-1014	LEVELS 13-16 - TYPICAL
TP3-1015	ROOF LEVEL
TP3-2000	BUILDING ELEVATIONS
TP3-2001	ELEVATION - NORTH
TP3-2002	ELEVATION - EAST
TP3-2003	ELEVATION - SOUTH
TP3-2004	ELEVATION - WEST
TP3-3000	BUILDING SECTIONS
TP3-3001	BUILDING SECTIONS
TP3-3002	BUILDING SECTIONS
TP3-3003	BUILDING SECTIONS
TP3-3004	BUILDING SECTIONS
TP3-4000	MATERIAL PALETTE
TP3-4001	MATERIAL PALETTE
TP3-5000	SHADOW STUDIES
TP3-5001	SHADOW DIAGRAMS - JUNE 21 - 9AM + 12PM
TP3-5002	SHADOW DIAGRAMS - JUNE 21 - 3PM
TP3-5003	SHADOW DIAGRAMS - DECEMBER 22 - 9AM + 12PM
TP3-5004	SHADOW DIAGRAMS - DECEMBER 22 - 3PM

These drawings are prepared by the Architect for the Client's use only. They are not to be used for any other purpose without the written consent of the Architect. The Client is responsible for ensuring that the drawings are used in accordance with the relevant laws and regulations. The Architect is not responsible for any errors or omissions in the drawings or for any consequences arising from the use of the drawings. The Client is responsible for obtaining all necessary permits and approvals for the development. The Architect is not responsible for any delays or costs incurred by the Client in obtaining such permits and approvals. The Client is responsible for ensuring that the drawings are used in accordance with the relevant laws and regulations. The Architect is not responsible for any errors or omissions in the drawings or for any consequences arising from the use of the drawings. The Client is responsible for obtaining all necessary permits and approvals for the development. The Architect is not responsible for any delays or costs incurred by the Client in obtaining such permits and approvals.

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GENERAL NOTES

TP1	11/03/2020	DA ISSUE
Rev	Date	Chd Reason for Issue
Based on Drawings Received		

TOWN PLANNING ISSUE

NOT FOR CONSTRUCTION

Level 4

31 Riverside Lane
Sydney NSW 2000
Australia

+61 3 9609 2200

info@carr.arch.au
carr.arch.au

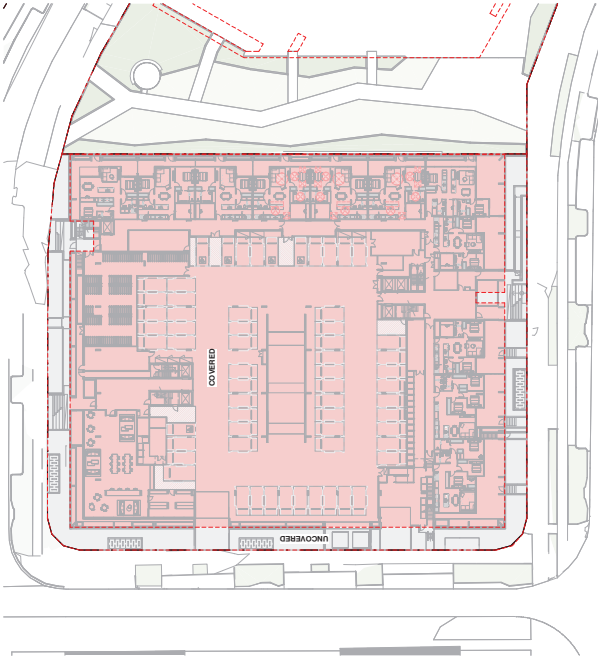
carr

Project	NORTHSHORE HAMILTON			
	SITE 18B			
Title	DRAWING REGISTER			
Date	11/03/2025	Project No	24047	
Scale @ A1		Draw No	TP3-000	
Drawn By	ME	Chkd	KW	Rev
				TP1

Notes: 1. Coverage and area of permeability are calculated based on the current design. Coverage is shown as a percentage of the total site area. All calculations are based on the current design. Any discrepancies between the current design and the previous design shall be the responsibility of the client. The client shall be responsible for ensuring that the current design is accurate and that the previous design is not used for any other purpose. The client shall be responsible for ensuring that the current design is accurate and that the previous design is not used for any other purpose. The client shall be responsible for ensuring that the current design is accurate and that the previous design is not used for any other purpose.

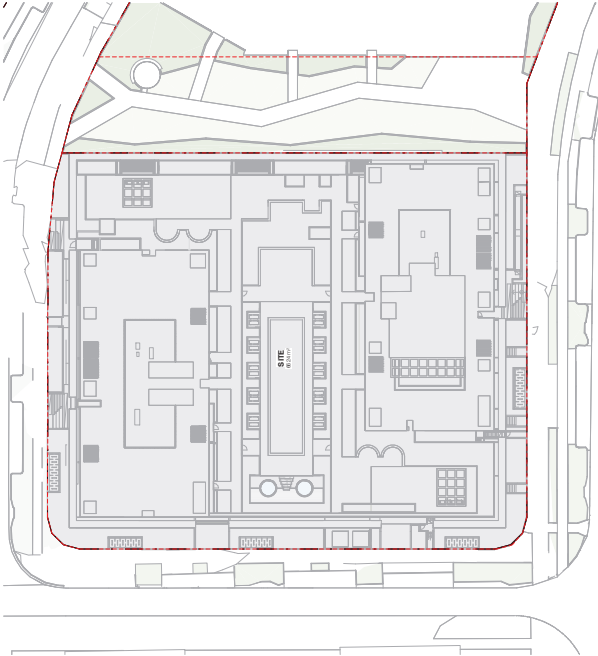
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15 Carr Place
ABN 56 126 212 075

GENERAL NOTES



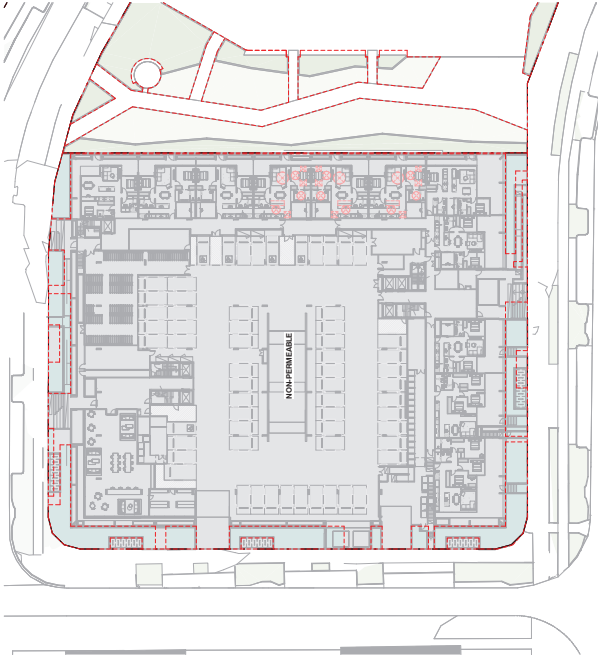
SITE COVERAGE		
COVERED	6544 m²	85%
UNCOVERED	980 m²	15%
6624 m²		

2 SITE COVERAGE
SCALE 1:500



SITE AREA		
SITE	6624 m²	100%
6624 m²		

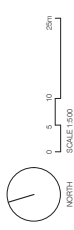
1 SITE AREA
SCALE 1:500



SITE PERMEABILITY		
PERMEABILITY HAS BEEN CALCULATED INCLUDING PERMEABLE PAVING AND PATIOS		
PERMEABLE	645 m²	10%
NON-PERMEABLE	5979 m²	90%
6624 m²		

3 SITE PERMEABILITY
SCALE 1:500

TP1 11/03/2025 DA ISSUE
Rev Date Chd Reason for Issue
Based on Drawings Received



TOWN PLANNING ISSUE
NOT FOR CONSTRUCTION

Level 4
31 Riverside Lane
Sydney NSW 1585
3000 Australia
+61 3 9606 2200
info@carr.arch.au
carr.arch.au

Project NCPR18-036 HAMILTON
SITE 108
Title COMPLIANCE WITH PLANNING REQUIREMENTS
Date 11/03/2025 Project No 24047
Scale @ A1 1:500 Draw No
Drawn By OCAME Chd KWF Rev TP3-0003
TP1

Notes: - Contractors shall verify all dimensions before any construction commences. Dimensions shown on drawings are approximate. If any discrepancies arise, the contractor shall be responsible for rectifying them. All dimensions shall be in accordance with the Australian Standard AS/NZS 1100:2005. Any discrepancies shall be the responsibility of the contractor. All dimensions shall be in accordance with the Australian Standard AS/NZS 1100:2005. Any discrepancies shall be the responsibility of the contractor. All dimensions shall be in accordance with the Australian Standard AS/NZS 1100:2005. Any discrepancies shall be the responsibility of the contractor.

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GENERAL NOTES

TP1 11/03/2025 D:\ISSUE
Rev Date Chd Reason for issue
Based on Drawings Reviewed

0 2 4 10m
NORTH
SCALE 1:200

TOWN PLANNING ISSUE

NOT FOR CONSTRUCTION

Level 4
317 Pines Lane
Bentley, WA 6107
3007 Australia
+61 8 9466 2300
info@carr.arch.au
carr.arch.au

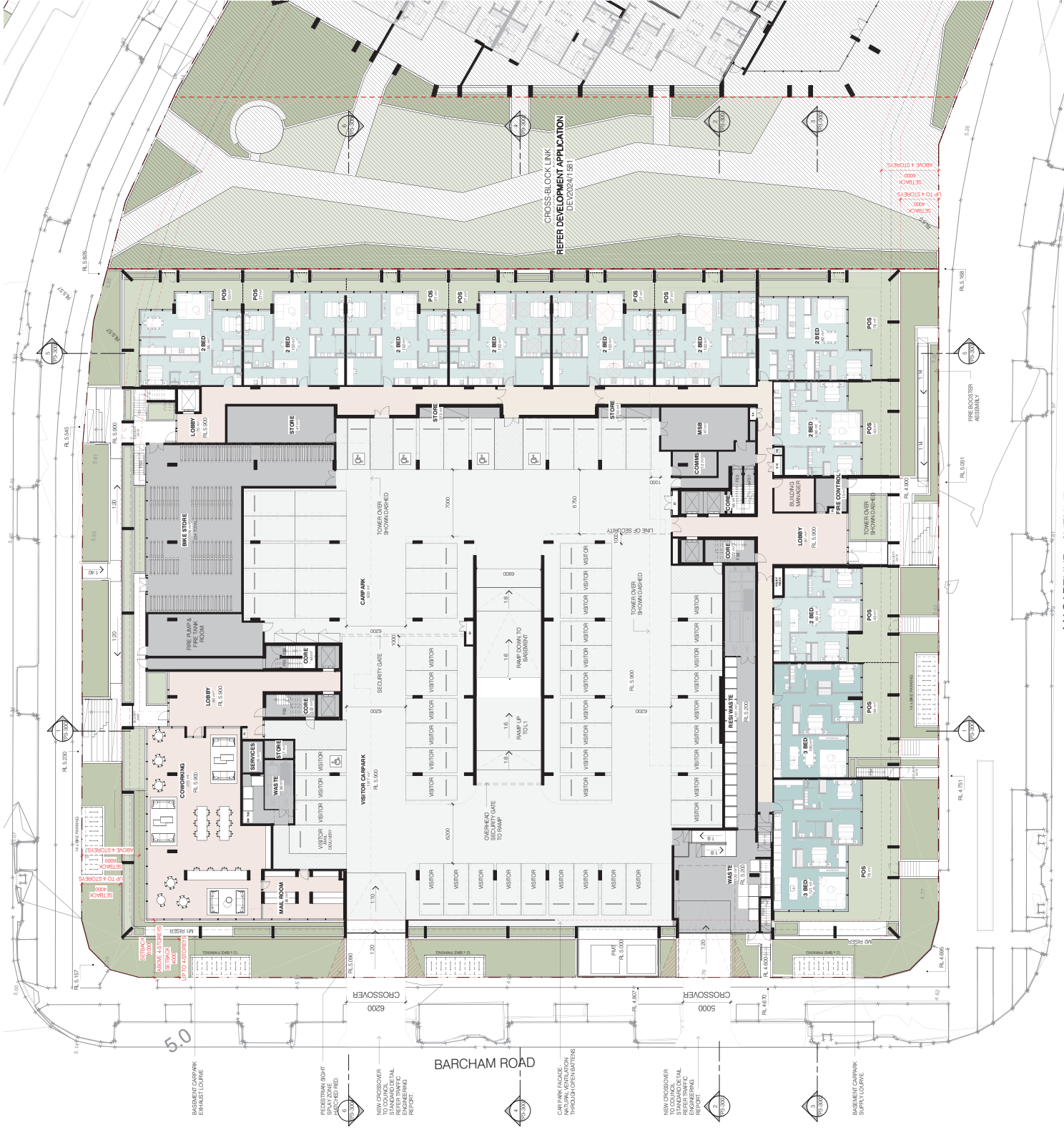
Project NCPI-ROSCHE HAMILTON
Site 108
GROUND LEVEL

Date 11/03/2025 Project No 24047
Scale @ A1 1:200 Drawn By CE Chd KWF Rev
TP3-1002
TP1

KARAKUL ROAD

BARCHAM ROAD

MACARTHUR AVENUE



Notes: Contractors shall verify all dimensions before any work commences. Dimensions shown are approximate. If any dimensions are found to be incorrect, the contractor shall be responsible for any variations. All dimensions shall be taken from the finished floor level unless otherwise stated. All dimensions shall be taken from the finished floor level unless otherwise stated. All dimensions shall be taken from the finished floor level unless otherwise stated.

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Rev	Date	Chd	Reason for issue
Based on Drawings Reviewed			

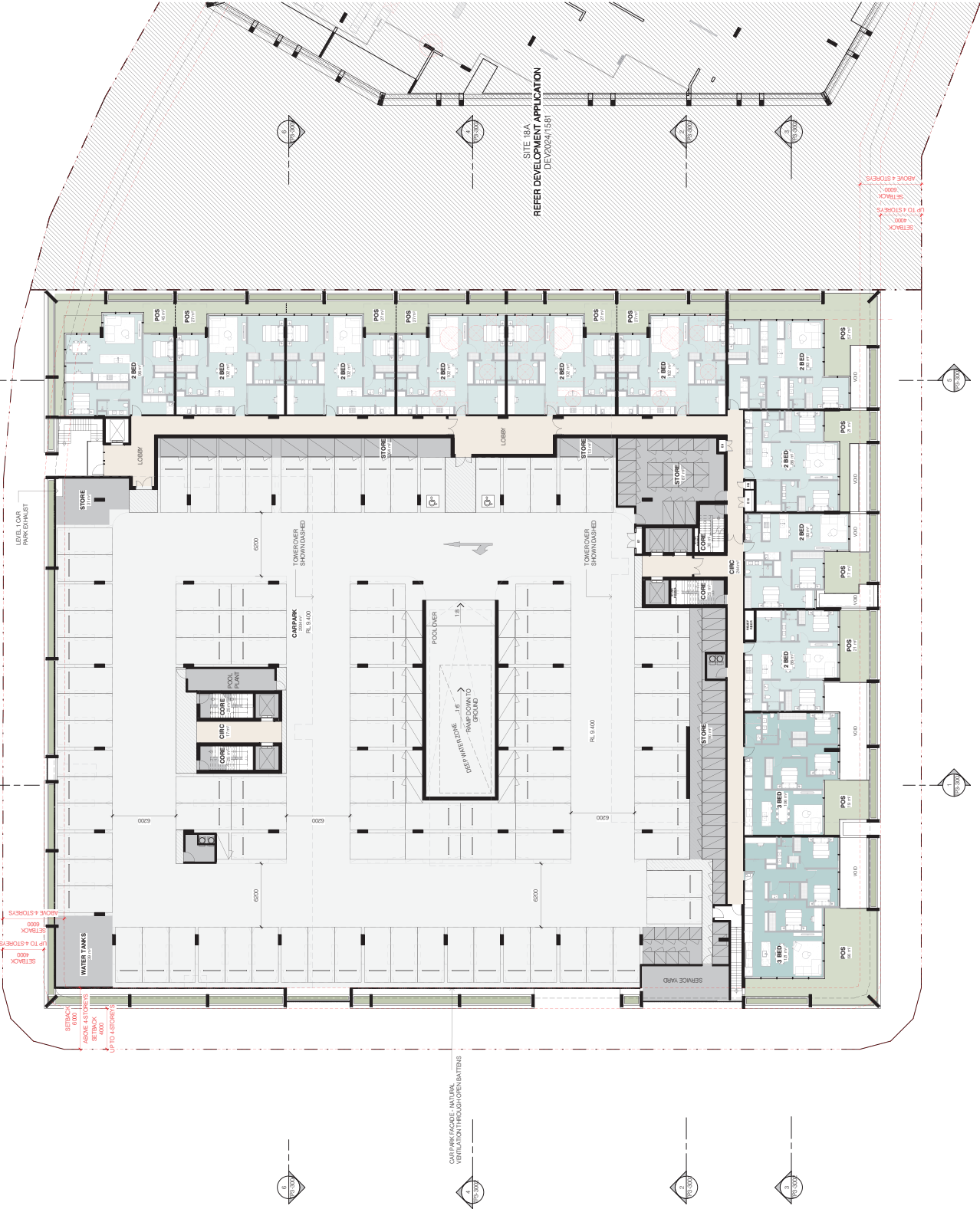


TOWN PLANNING ISSUE
NOT FOR CONSTRUCTION

Level 4
31 Princes Lane
Sydney NSW 2000
3000 Australia
+61 3 9666 2200
info@carr.arch.au
carr.arch.au

Project	NCPT-RICHIE HAMILTON
Site	SITE 108
Level	LEVEL 1 - PODIUM
Date	11/03/2025
Scale @ A1	1:200
Drawn By	CE/ARK Chd KWR
Rev	TP1

Project No. 24047
Drawing No. TP3-1003



GENERAL NOTES

TP1	11/03/2025	DATE	REASON FOR ISSUE
Rev	Date	Chd	Reason for issue
Based on Drawings Reviewed			



TOWN PLANNING ISSUE
NOT FOR CONSTRUCTION

Level 4
31 Princes Lane
Sydney NSW 2000
3000 Australia
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info@carr.arch.au
carr.arch.au

Project	NCPT-RICHIE HAMILTON
Site	SITE 108
Level	LEVEL 1 - PODIUM
Date	11/03/2025
Scale @ A1	1:200
Drawn By	CE/ARK Chd KWR
Rev	TP1

Project No. 24047
Drawing No. TP3-1003

GENERAL NOTES



NORTH

0 2 4 10m

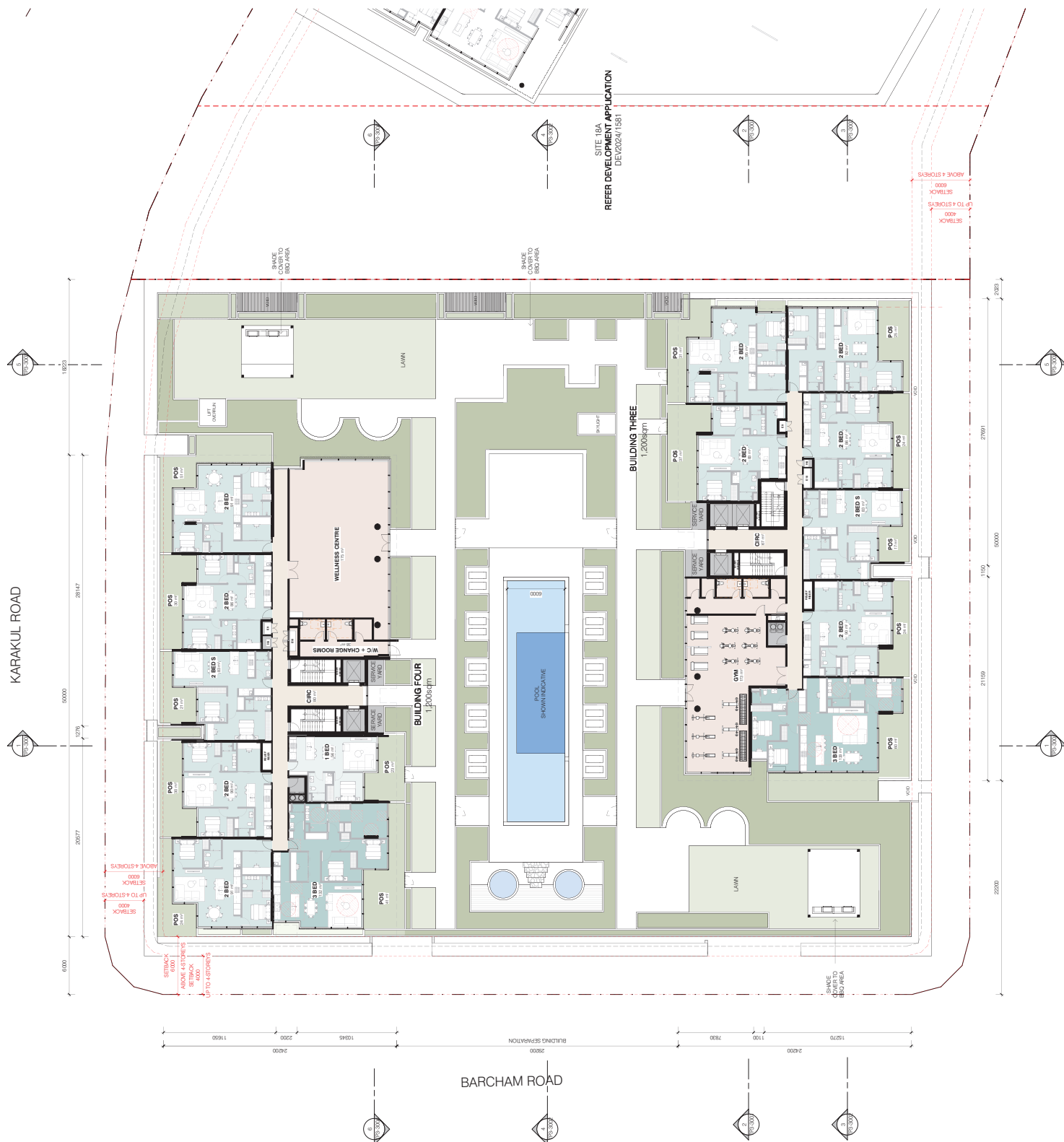
SCALE 1:200

NOT FOR CONSTRUCTION

61 3 9665 2300
info@car.net.au
car.net.au

Scale @ A1 1 : 200

TP3-1004



GENERAL NOTES

Project	NORTHSHORE HAMILTON			
	SITE 18B			
Title	LEVELS 3-12 - TYPICAL			
Date	11/03/2025	Project No	24047	
Scale @ A1	1:200	Dwg No	TP3-101	
Drawn By	CE/AR	Chd	KW	TP1

GENERAL NOTES

NOT FOR CONSTRUCTION

+61 3 9665 2300
melb@car.net.au
car.net.au

SITE 18B

Scale @ A1 1 : 200

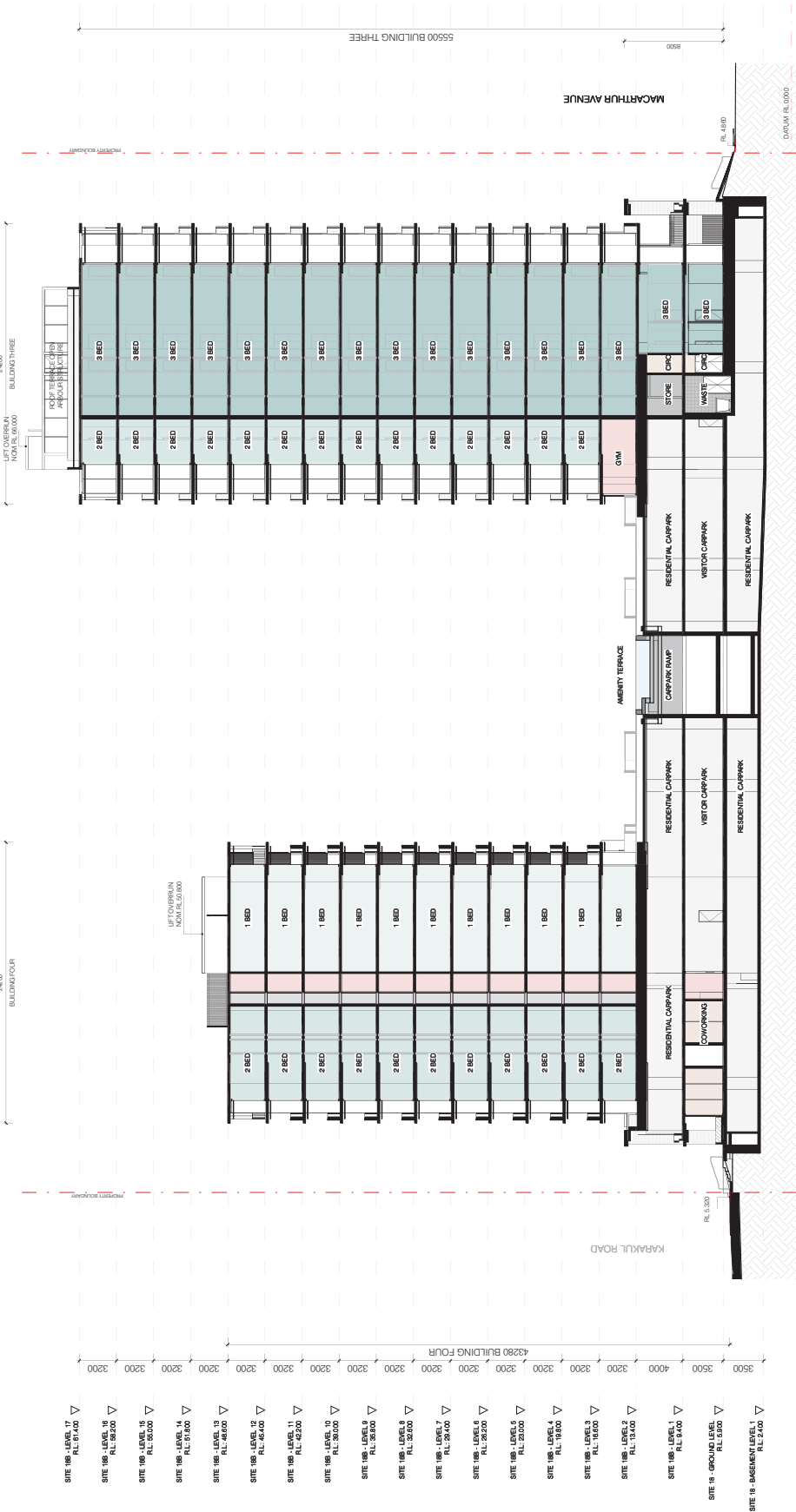
MACARTHUR AVENUE



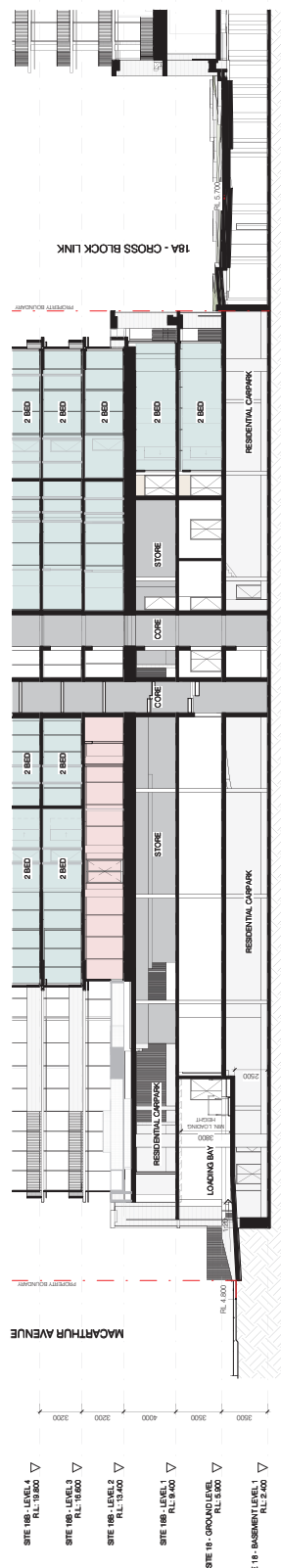
Notes: - Contractors shall verify all dimensions before any construction commences. Dimensions shown are approximate. If any dimensions are found to be incorrect, the contractor shall be responsible for any variations. Dimensions shown are approximate. If any dimensions are found to be incorrect, the contractor shall be responsible for any variations. Dimensions shown are approximate. If any dimensions are found to be incorrect, the contractor shall be responsible for any variations.

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GENERAL NOTES



TP3 SECTION 01
SCALE 1:200



TP3 SECTION 02
SCALE 1:200

TP1	11/03/2025	DATE	11/03/2025
Rev	Date	Chd	Reason for issue
Based on Drawings Received			

0 2 4 10m
SCALE 1:200

TOWN PLANNING ISSUE

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Level 4
31 Princes Lane
Sydney NSW 2007 Australia
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info@carr.arch.au
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Project: NCPT18-SCHE HAMILTON

SITE 188

Building Sections

Date: 11/03/2025 Project No: 24047

Scale @ A1: 1:200 Drawing: TP3-3001

Drawn By: AMCE Chd: KWR Rev: TP1

GENERAL NOTES

Based on Drawings Received:

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carr

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31 Finders Lane
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mel@carr.net.au
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SITE 18B

100

Drawn By	AK/OE	Chkd KW	Rev	TP1
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NOT FOR CONSTRUCTION

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carr.net.au

SITE 18B

100

Drawn By	AK/OE	Chkd KW	Rev	TP1
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6.2 APPENDIX B – SCHEMATIC CIVIL DRAWINGS

KARAKIL ROAD

- ## LEVELS NOTES

1. NETWORKS LEVELS ARE SHOWN AS FINISHED SURFACE LEVELS (FSL) INCLUSIVE OF TOPSOIL LAYER / PAVEMENT DEPTHS IF RELEVANT.
2. FLOOD IMMUNITY - REFER TO FLOOD REPORT BY OTHERS FOR DETAILS.
3. ALL RETAINING WALL HEIGHT LABELS ARE CALCULATED TO FINISHED SURFACE LEVELS INCLUDING TOPSOIL (AND TO NEAREST 200mm HEIGHT); FINAL RETAINING WALL DESIGNS AND DETAILED STEPPING IS SUBJECT TO STRUCTURAL DESIGN BY OTHERS.
4. REFER TO ARCHITECTURAL DRAWINGS FOR BUILDING DETAILS

[illegible]

- FOLLOW ADEQUATE PROVISIONAL AMOUNTS FOR OR CONTINGENCIES FOR THE FOLLOWING UNKNOWN EARTHWORKS/GEOTECH PARAMETERS
- SMELTING COMPACT FACTORS - UNKNOWN
- SUBGRADE CBR - UNKNOWN
- SUBGRADE SUITABLE FOR FILLING/PAVEMENT - UNKNOWN
- CUT FROM SITE CAN BE USED FOR FILLING (STRUCTURAL OR OTHERWISE) - UNKNOWN
- ON SITE ARE DISPENSING/HEAVILY REACTIVE - UNKNOWN

UNSTRIPPED EXISTING SURFACE TO FINISHED SURFACE	
CUT	12236m ³
FILL	0m ³
BALANCE (CUT)	12236m ³

NOTE: THE ABOVE VOLUMES ARE INDICATIVE ONLY AND SUBJECT TO DETAILED DESIGN

REFER TO REQUIREMENTS OF THE FOLLOWING MANDATORY REFERENCE DOCUMENTS (IN ORDER OF PRECEDENCE), REQUEST IF NOT RECEIVED DURING TENDER: CONTRACTOR WILL BE LIABLE FOR NON-COMPLIANT CONSTRUCTION. RAISE DISCREPANCIES WITH SUPERINTENDENT PRIOR TO CONSTRUCTION.

1. AUTHORITY APPROVED PLANDOCUMENTS
2. AUTHORITY APPROVED PLANS
3. RECOMMENDATIONS WITHIN REQUEST REPORTS INCLUDING GEOLOGICAL REPORTS
4. AUTHORITY STANDARDS, GUIDELINES AND POLICY
5. DESIGN STANDARD & GUIDELINES (AS 3706 AS 1289)
6. PROJECT DRAWINGS, NOTES AND DETAILS (INCLUDING EXPLANATIONS)
7. ENGINEERING SPECIFICATIONS (IF APPLICABLE)

FOR EARTHWORKS SECTIONS REFER DWG NO SK12

PROPOSED RETAINING WALL (TYPE _____)

FINISHED LEVELS

EXISTING LEVELS

DESIGN/FINISHED SURFACE CONTOUR

NOTE: FOR CONTOURS, BOUNDARIES



NOTE
ALL PLANS TO BE READ IN CONJUNCTION WITH INFORMATION AND NOTES ON DRG. No. SK10 AND ALL RELEVANT SPECIFICATIONS



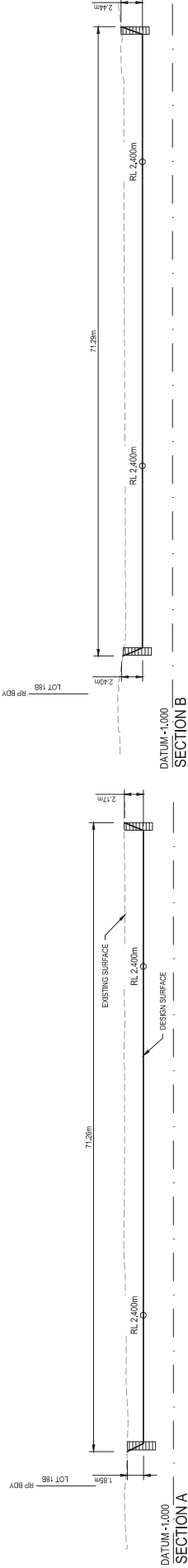
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LEGEND - SECTIONS

DESIGN FINISHED SURFACE

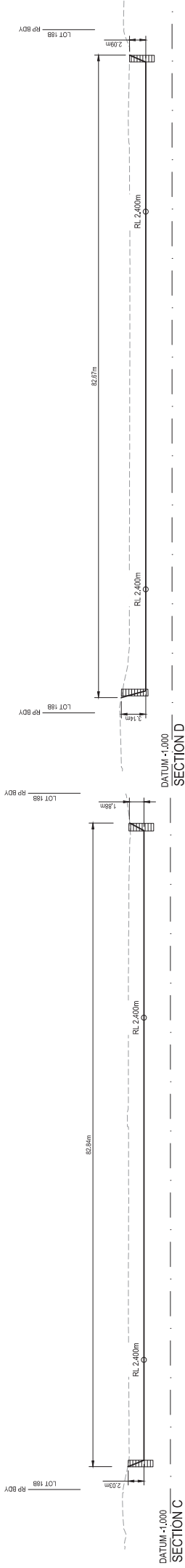
EXISTING (UNSTRIPPED) SURFACE

INDICATIVE SHORING



SECTION A
SCALE 1:250
SK01

SECTION B
SCALE 1:250
SK01



SECTION C
SCALE 1:250
SK01

SECTION D
SCALE 1:250
SK01

LAYOUT & NOTES REFERENCE
FOR EARTHWORKS LAYOUT PLAN REFER DWG No SK11.

REFERENCE PRECEDENCE

REFER TO REQUIREMENTS OF THE FOLLOWING MANDATORY
INSTRUMENTS AND STANDARDS IN THE ORDER LISTED
IF NOT REFERRED DURING TENDER, CONTRACTOR WILL BE LIABLE
FOR NON-COMPLIANT CONSTRUCTION. RAISE DISCREPANCIES
WITH SUPERINTENDENT PRIOR TO CONSTRUCTION.

1. AUTHORITY APPROVED PLANS/DRAWINGS
2. AUTHORITY APPROVAL CONDITIONS
3. AUTHORITY APPROVED EARTHWORKS REPORTS
INCLUDING GEOTECHNICAL REPORTS
4. AUTHORITY STANDARDS, GUIDELINES AND POLICY
5. DESIGN STANDARD & GUIDELINES (AS 1289)
6. ALL MELBORA CIVIL DRAWINGS (INCLUDING
ALL MELBORA CIVIL DRAWINGS)
7. ENGINEERING SPECIFICATIONS (IF PUBLISHED)



Zero Damage - Zero Harm

NOTE
ALL PLANS TO BE READ IN CONJUNCTION WITH INFORMATION AND
NOTES ON DRG. No. SK10 AND ALL RELEVANT SPECIFICATIONS

REV		DESCRIPTION		DATE	APPR.	NORTH POINT		SCALE (MARS)		DRAWN		JANUARY 2025		DESIGNED		JANUARY 2025		APPROVED		MITCHELL BLYTH		RPMO SIGNATURE		DATE: 18/01/2025		RPMO No. 212598		SILVERSTONE DEVELOPMENTS PTY LTD 100/1000 MOUNTAIN VIEW DRIVE, HAMILTON VIC 3170		SILVERSTONE DEVELOPMENTS PTY LTD 100/1000 MOUNTAIN VIEW DRIVE, HAMILTON VIC 3170		SILVERSTONE DEVELOPMENTS PTY LTD 100/1000 MOUNTAIN VIEW DRIVE, HAMILTON VIC 3170		SILVERSTONE DEVELOPMENTS PTY LTD 100/1000 MOUNTAIN VIEW DRIVE, HAMILTON VIC 3170		SILVERSTONE DEVELOPMENTS PTY LTD 100/1000 MOUNTAIN VIEW DRIVE, HAMILTON VIC 3170		SILVERSTONE DEVELOPMENTS PTY LTD 100/1000 MOUNTAIN VIEW DRIVE, HAMILTON VIC 3170		SILVERSTONE DEVELOPMENTS PTY LTD 100/1000 MOUNTAIN VIEW DRIVE, HAMILTON VIC 3170		SILVERSTONE DEVELOPMENTS PTY LTD 100/1000 MOUNTAIN VIEW DRIVE, HAMILTON VIC 3170		SILVERSTONE DEVELOPMENTS PTY LTD 100/1000 MOUNTAIN VIEW DRIVE, HAMILTON VIC 3170		SILVERSTONE DEVELOPMENTS PTY LTD 100/1000 MOUNTAIN VIEW DRIVE, HAMILTON VIC 3170		SILVERSTONE DEVELOPMENTS PTY 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LEGEND

PROPOSED RETAINING WALL (TYPE B/C)
PROPOSED DRAINAGE PIPE
PROPOSED SEWER MAIN CONNECTIONS
AND METERS
PROPOSED FIELD INLET PIT

PROPOSED CONCRETE ROAD/CROSSOVER

PROPOSED BUILDINGS

PROPOSED TURF OR LANDSCAPING AREA

EXISTING EXTERNAL ROAD PAVEMENT

NOTE FOR CONTOURS, BOUNDARIES & EXISTING FEATURES: LEGEND REFER TO DRG. NO. SK00

PRELIMINARY ROADWORKS AND DRAINAGE NOTES

1. ALL WORKS SHALL BE UNDERTAKEN IN ACCORDANCE WITH CURRENT COUNCIL STANDARD SPECIFICATIONS AND DRAWINGS, UNLESS NOTED OTHERWISE.
2. CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY CONSENTS AND APPROVALS FROM ALL RELEVANT AUTHORITIES PRIOR TO COMMENCEMENT OF ANY WORKS.
3. CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY CONSENTS AND APPROVALS FROM ALL RELEVANT AUTHORITIES PRIOR TO COMMENCEMENT OF ANY WORKS.
4. ALL WORKS TO BE UNDERTAKEN IN ACCORDANCE WITH COUNCIL'S EROSION AND SEDIMENT CONTROL GUIDELINES.
5. ALL TRENCH EXCAVATION AND CONSTRUCTION SHALL COMPLY WITH THE REQUIREMENTS OF THE EROSION AND SEDIMENT CONTROL GUIDELINES.
6. CONTRACTOR TO REINSTATE DAMAGE TO ANY EXISTING INFRASTRUCTURE (KERB AND CHANNEL ASPHALT, FOOTPATH, VERGE ETC) TO COUNCIL SATISFACTION.
7. CONTRACTOR TO ENSURE ADJOINING PROPERTIES AND ROADS ARE PROTECTED FROM ANY DAMAGE OR INTERFERENCE FROM STORMWATER RUNOFF AS A RESULT OF THE PROPOSED WORKS.
8. CONTRACTOR TO REMOVE ANY REDUNDANT DRAINAGE OUTLETS FROM THE KERB AND CHANNEL INCLUDING ANY ASSOCIATED PPEWORK ACROSS THE FOOTWAY AND REINSTATE THE KERB AND CHANNEL AND THE FOOTWAY AREA IN ACCORDANCE WITH COUNCIL STANDARD SPECIFICATIONS AND DRAWINGS, UNLESS NOTED OTHERWISE.

PRELIMINARY GENERAL CIVIL WORKS NOTES

1. ALL WORKS SHALL BE UNDERTAKEN IN ACCORDANCE WITH CURRENT COUNCIL STANDARD SPECIFICATIONS AND DRAWINGS, UNLESS NOTED OTHERWISE.
2. CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY CONSENTS AND APPROVALS FROM ALL RELEVANT AUTHORITIES PRIOR TO COMMENCEMENT OF ANY WORKS.
3. CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY CONSENTS AND APPROVALS FROM ALL RELEVANT AUTHORITIES PRIOR TO COMMENCEMENT OF ANY WORKS.
4. SERVICES AUTHORITIES INCLUDING ELECTRICITY, COMMUNICATIONS (GAS, NBN) CONNECTION APPLICATIONS TO BE FACILITATED BY OTHERS WITH CONDUIT/PIPELAYS TO BE INSTALLED PRIOR TO COMMENCEMENT OF ANY WORKS.
5. ENSURE SEWER AND WATER WORKS APPROVAL IS GRANTED BY THE RELEVANT WATER AUTHORITY PRIOR TO COMMENCING CONSTRUCTION OF CIVIL WORKS.
6. NEW WORK MUST NOT DAMAGE OR COMPROMISE THE WORKING ABILITY OF EXISTING INFRASTRUCTURE. PROTECT EXISTING INFRASTRUCTURE AT ALL TIMES DURING CONSTRUCTION.

KARAKUL ROAD

KARAKUL ROAD

EM'D
SP338461

EASEMENT

BARCHAM ROAD

MACARTHUR AVENUE

NOTE
ALL PLANS TO BE READ IN CONJUNCTION WITH INFORMATION AND
NOTES ON DRG. NO. SK10 AND ALL RELEVANT SPECIFICATIONS



REV	DESCRIPTION	DATE	DRAWN	MB	APPR
01	ISSUE FOR INFORMATION	11.03.25	SD	MB	APPR

SCALE (METERS)

NORTH POINT

0 1 2 3 4 5 6 7 8 9 10

SCALE: 1:200 @ A1

DESIGNED: JANUARY 2025
APPROVED: WITCHELL BLYTH
REGD No. 21259
DATE: 10/01/2025

MELOKA ENGINEERING
INFORMATION@MELOKA.COM
08 9471 1111

CLIENT/DEVELOPER
SILVERSTONE DEVELOPMENTS
CLIENT/DEVELOPER LOGO
SILVERSTONE

PROJECT
SITE 18B, 260 MACARTHUR AVE,
HAMILTON

ARCHITECT
BUILDER

PRELIMINARY
DRAWING TITLE
PRELIMINARY CIVIL SERVICES LAYOUT PLAN

MELOKA JOB No.
24125

SK15
DWG No.

01
REVISION

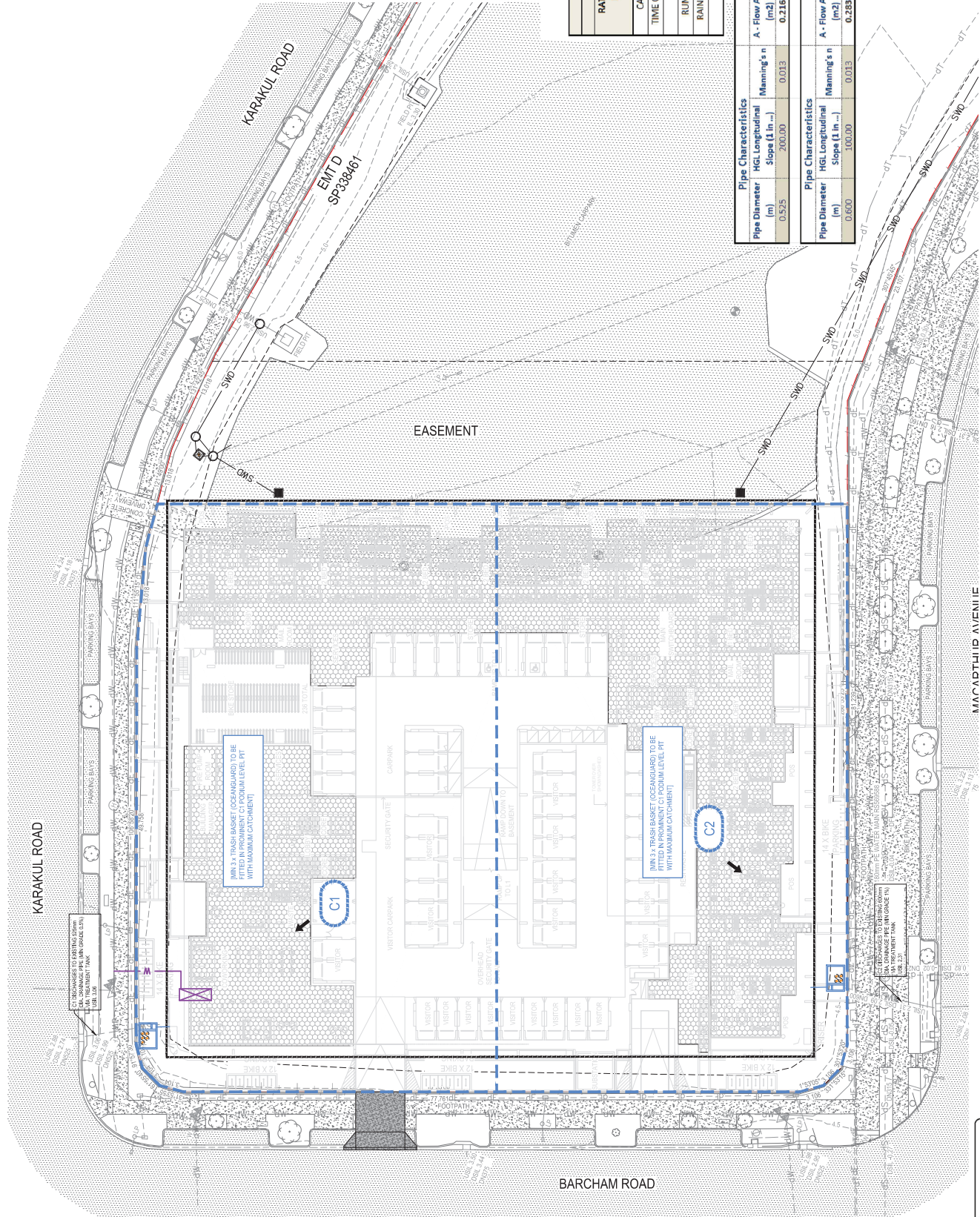
JRS, E
SK10

PRE DEV

MINOR EVENT		10	MAJOR EVENT		50
RATIONAL METHOD CATCHMENT NAME			C1		
PARAMETERS		Units	Design Storm (yrs)		Design Storm (yrs)
CATCHMENT AREA		ha	10	50	10
TIME OF CONCENTRATION		min	0.333		0.333
RUNOFF COEFFICIENT			5.0		5.0
RAINFALL INTENSITY (iv)		mm/hr	0.85	0.98	0.85
PEAK FLOW		l/s	214.52	287.11	214.52
			168.8	259.8	167.4

Pipe Characteristics			Hydraulic Characteristics				
Pipe Diameter (m)	HGL Longitudinal Slope (1 in...)	Manning's n	A - Flow Area (m ²)	P - Wetted Perimeter (m)	R - Hydraulic Radius (m)	V - Flow Velocity (m ² /s)	Q (l/s)
0.525	200.00	0.013	0.216	1.449	0.131	1.405	304.1

Pipe Characteristics			Hydraulic Characteristics				
Pipe Diameter (m)	HGL Longitudinal Slope (1 in...)	Manning's n	A - Flow Area (m ²)	P - Wetted Perimeter (m)	R - Hydraulic Radius (m)	V - Flow Velocity (m ² /s)	Q (l/s)
0.600	100.00	0.013	0.283	1.385	0.150	2.172	614.0



NOTE
ALL PLANS TO BE READ IN CONJUNCTION WITH INFORMATION AND NOTES ON DRG. No. SK10 AND ALL RELEVANT SPECIFICATIONS



PRELIMINARY

PROJECT: SITE 18B, 260 MACARTHUR AVE,
HAMILTON

DRAWING TITLE: PRELIMINARY CIVIL
DRAINAGE CATCHMENT PLAN

CLIENT/DEVELOPER:
SILVERSTONE DEVELOPMENTS
CLIENT/DEVELOPER LOGO:
SILVERSTONE

MELIORA ENGINEERING
INFO@MELIORACE.COM
AMEN 46 151 772 813



DRAWN:
JANUARY 2025

DESIGNED:
JANUARY 2025

APPROVED:
MITCHELL BLYTH
RPEQ No. 21258
DATE: MAR/CH 2025

RPEQ SIGNATURE




01	ISSUE FOR INFORMATION	11.03.25	SD	MB

12, 2025 - 12:16am



6.3 APPENDIX C – SURVEY PLAN

CLIENT

SILVERSTONE
DEVELOPMENTS

PROJECT

DETAIL SURVEY
OF
LOT 6 ON SP326594
(MACARTHUR AVE, HAMILTON)

NOTES

- (i) The title boundaries shown hereon were marked at the time of survey.
- (ii) Survey data inside the subject lot fencing is taken from previous LandPartners plan BRMM7695-000-245-1, surveyed on 6/10/2022
- (iii) Services shown hereon have been located where possible by field survey. If not able to be so located, services have been plotted from the records of relevant authorities where available and have been noted accordingly on the plan.
- (iv) Prior to any demolition, excavation or construction on the site, the surveyor shall be made aware of the position of any existing or further underground services and detailed locations of all services.

REV	DATE	DRAWN	CHECKED	APPROVED	SURVEY DATE
1	6/09/2024	AG	AG	MJM	4/09/2024



Brisbane Office
PO Box 1399
Milton
QLD 4064
P: (07) 3842 1000
E: info@landpartners.com.au
W: www.landpartners.com.au

LEVEL DATUM	LOCAL AUTHORITY
AHD	BRISBANE C.C.
LEVEL ORIGIN	CONTOUR INTERVAL
PSM186779 FL 4.325m	0.5 Metre
MGA	CO-ORD SYSTEM
	LOCAL ARBITRARY
UDN	

SHEET 1 OF 3
BRMM8547-000-3-1

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SILVERSTONE
DEVELOPMENTS

DETAIL SURVEY
OF
LOT 6 ON SP326594
(MACARTHUR AVE, HAMILTON)

- (i) The title boundaries shown herein were marked at the time of survey.
- (ii) Survey data inside the subject lot fencing is taken from previous Land Services plan BRMM/7650-000-245-1, surveyed on 01/02/2022.
- (iii) Services shown herein were located where possible by field survey. If not able to be located, services have been plotted from the records of relevant authorities where available and have been noted accordingly on the plan.
- (iv) Prior to any demolition, excavation or construction on the site, the relevant authority should be contacted for possible location of further underground services and detailed locations of all services.

1	6/09/2024	A/J	A/J	MLM	4/09/2024
REV	DATE	DRAWN	CHECKED	APPROVED	SURVEY DATE



LEVEL DATUM	LOCAL AUTHORITY
AHD	BRISBANE C.C.

MERIDIAN	CO-ORD SYSTEM
MGA	LOCAL ARBITRARY

UDN SHEET 2 OF 3



SCALE 1:500 (A3)

SILVERSTONE DEVELOPMENTS

PROJECT

DETAIL SURVEY OF LOT 6 ON SP326594 (MACARTHUR AVE, HAMILTON)

NOTES

- (i) The title boundaries shown hereon were marked at the time of survey.
- (ii) Survey data inside the subject of fencing is taken from previous LandPartners plan BRMM7695-000-245-1, surveyed on 6/10/2022
- (iii) Services shown hereon have been located where possible by field survey. If not able to be so located, services have been plotted from the records of relevant authorities where available and have been noted accordingly on the plan.
- (iv) Prior to any demolition, excavation or construction on the site, the client is advised to obtain all necessary permits and to further underground services and detailed locations of all services.



LANDPARTNERS
 surveyors and planners



REGISTERED PROFESSIONAL ENGINEER
 CIVIL
 No. 1001
 2014-2024
 10/01/2024

Brisbane Office
 Level 11, 171 St. Johns Street
 Milton QLD 4064



CARTRIDGE LOCATOR
 p: (07) 3842 1000
 f: (07) 3842 1001
 e: info@landpartners.com.au
 w: www.landpartners.com.au

Level Datum
 AHD
 Level Origin
 PSM1186719 RL 4.325m
 Meridian
 MGA
 Local Authority
 BRISBANE C.C.

PO Box 1399
 QLD 4064
 CONTOUR INTERVAL
 0.5 Metre
 CO-ORD SYSTEM
 LOCAL ARBITRARY

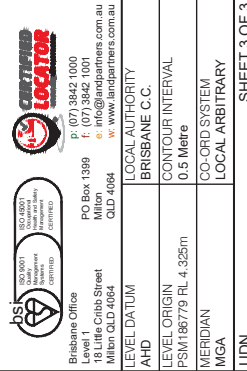
REV	DATE	DRAWN	CHECKED	APPROVED	SURVEY/DATA DATE
1	6/09/2024	AG	AG	MLM	4/09/2024

DEVELOPMENT IS	PROJECT	DETAIL SURVEY OF LOT 6 ON SP326594 (MACARTHUR AVE., HAMILTON)
NOTES i) The title boundaries shown hereon were marked at the time of the survey. ii) Survey data inside the subject lot, fencing is taken from previous LandPartners plan BRMM7895-000-245-1, surveyed on 6/10/2022 iii) Services shown hereon have been located where possible by field observation and are not intended to be relied upon without confirmation from the records of relevant authorities where available and have been noted accordingly on the plan. iv) Prior to any demolition, excavation or construction on the site, the relevant authority should be contacted for possible location of further underground services and detailed locations of all services.		

PROJECT	DETAIL SURVEY OF LOT 6 ON SP326594 (MACARTHUR AVE, HAMILTON)
NOTES	(i) The title boundaries shown hereon were marked at the time of survey. (ii) Survey data inside the subject lot fencing is taken from previous Land Partners plan BRN417955-005-245-1, surveyed on 8/10/2022 (iii) Services shown hereon have been located where possible by field survey. If not able to be so located, services have been plotted from the records of relevant authorities where available and have been noted accordingly on the plan. (iv) Prior to any demolition, excavation or construction on the site, the relevant authority should be contacted for possible location of further underground services and detailed locations of all services.

REV	DATE	DRAWN	CHECKED	APPROVED	MLM	4/30/2024
1	6/09/2024	AUG				

REV	DATE	DRAWN	CHECKED	APPROVED	DATE
1	6/09/2024	ANG	ANG	MLM	4/10/2024

[illegible]

Brisbane Office
Level 1
18 Little Cribb Street
Milton QLD 4064

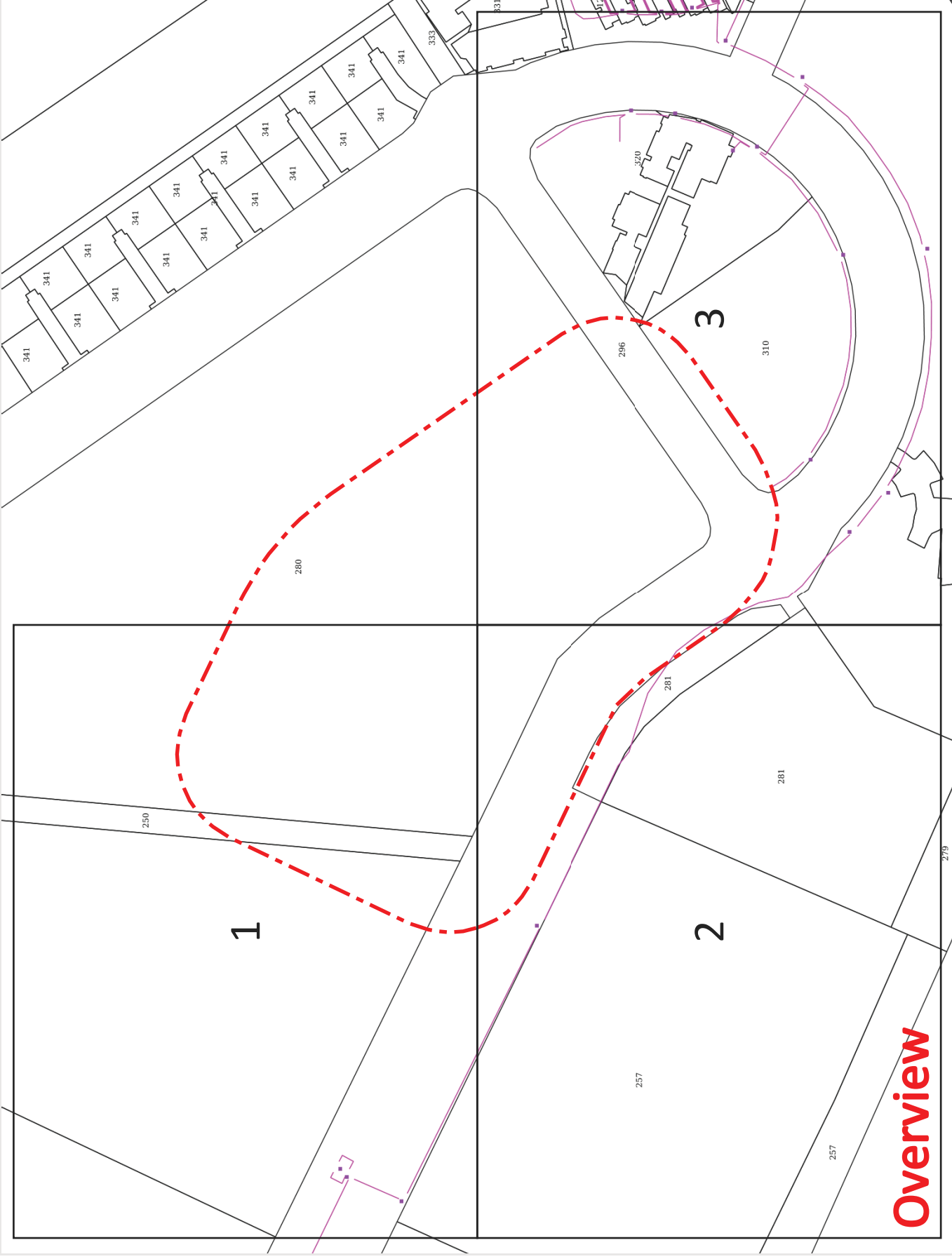
PO Box 1399
Milton
QLD 4064

p: (07) 3842 1000
f: (07) 3842 1001
e: info@landpartners.com.au
w: www.landpartners.com.au

LEVEL DATUM	LOCAL AUTHORITY
AHD	BRISBANE C.C.
LEVEL ORIGIN	CONTOUR INTERVAL
PSM1 186779 RL 4.325m	0.5 Metre
MERIDIAN	CO-ORD SYSTEM
MGA	LOCAL ARBITRARY
UDN	



6.4 APPENDIX D – BYDA RESULTS



Legend

- Pipes
- Pits



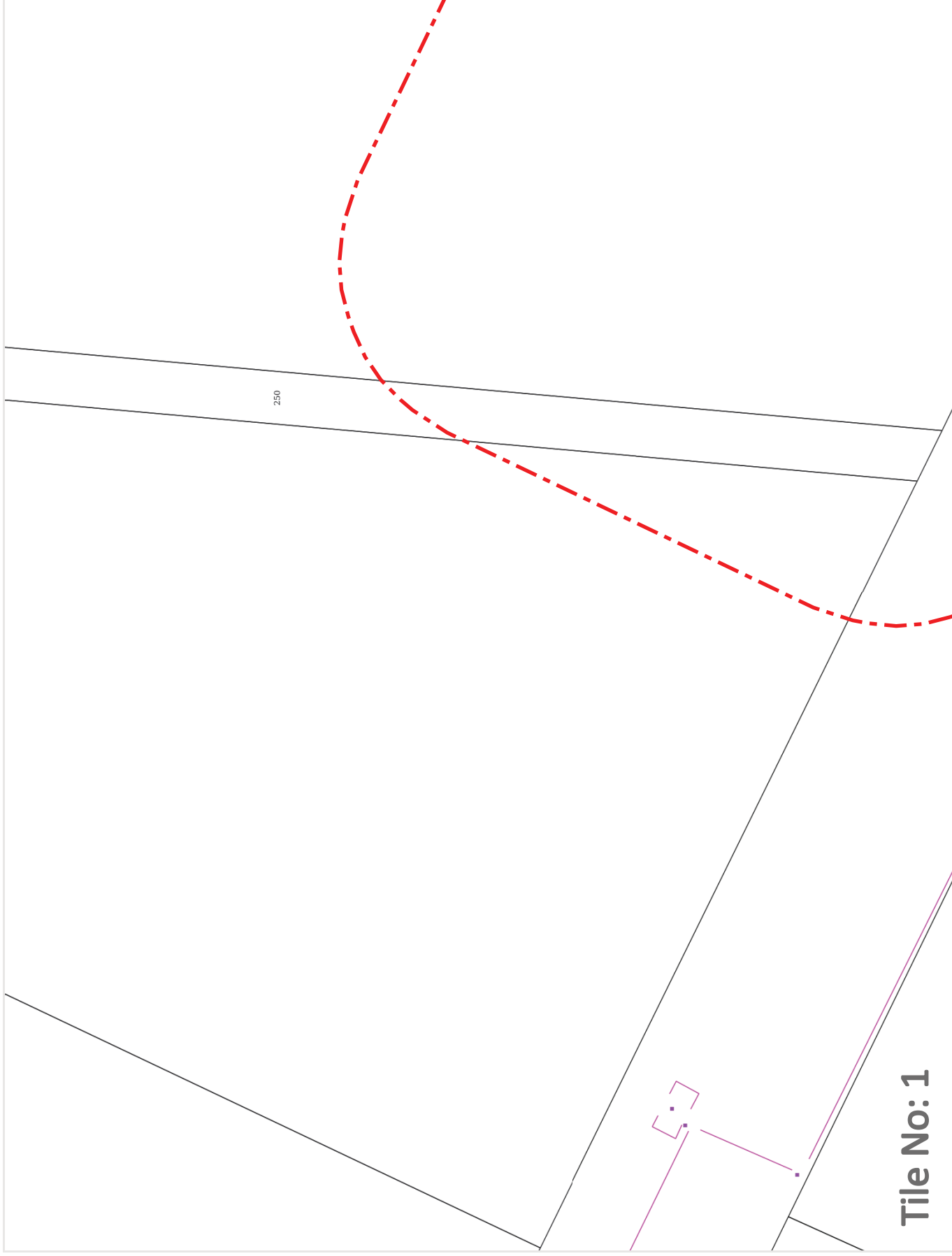
Scale: 1:2050
Expires: 07 Jan 2025

DISCLAIMER: While reasonable measures have been taken to ensure the accuracy of the information contained in this plan response, neither OptiComm nor PelicanCorp shall have any liability whatsoever in relation to any loss, damage, cost or expense arising from the use of this plan response or the information contained in it or the completeness or accuracy of such information. Use of such information is subject to and constitutes acceptance of these terms.



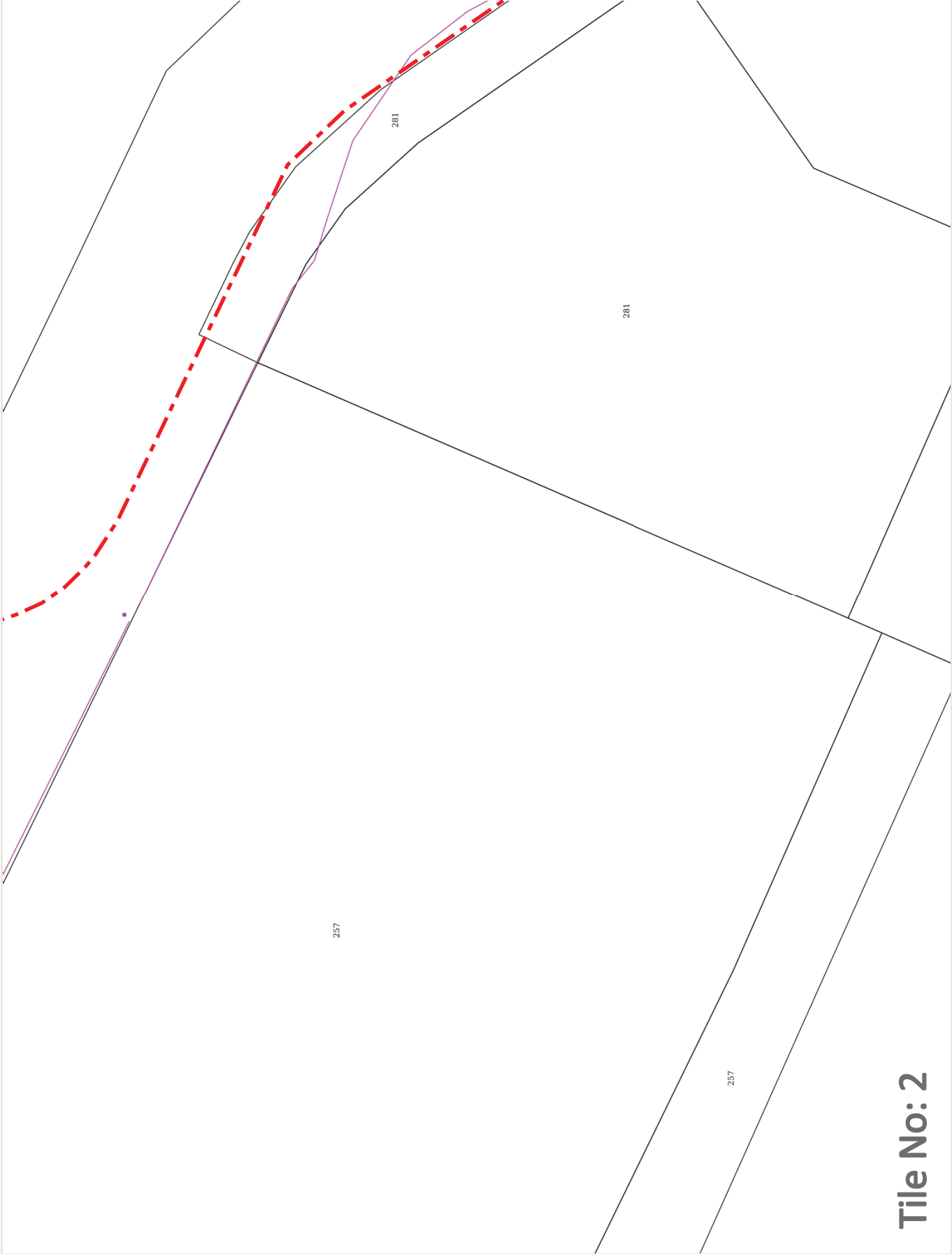
260 Macarthur Av, Hamilton, QLD 4007

Pipes
Pits

 z

DISCLAIMER: While reasonable measures have been taken to ensure the accuracy of the information contained in this plan response, neither OptiComm nor PelicanCorp shall have any liability whatsoever in relation to any loss, damage, cost or expense arising from the use of this plan response or the information contained in it or the completeness or accuracy of such information. Use of such information is subject to and constitutes acceptance of these terms.

Plans generated 10 Dec 2024 by PelicanCorp TicketAccess Software | www.pelicancorp.com



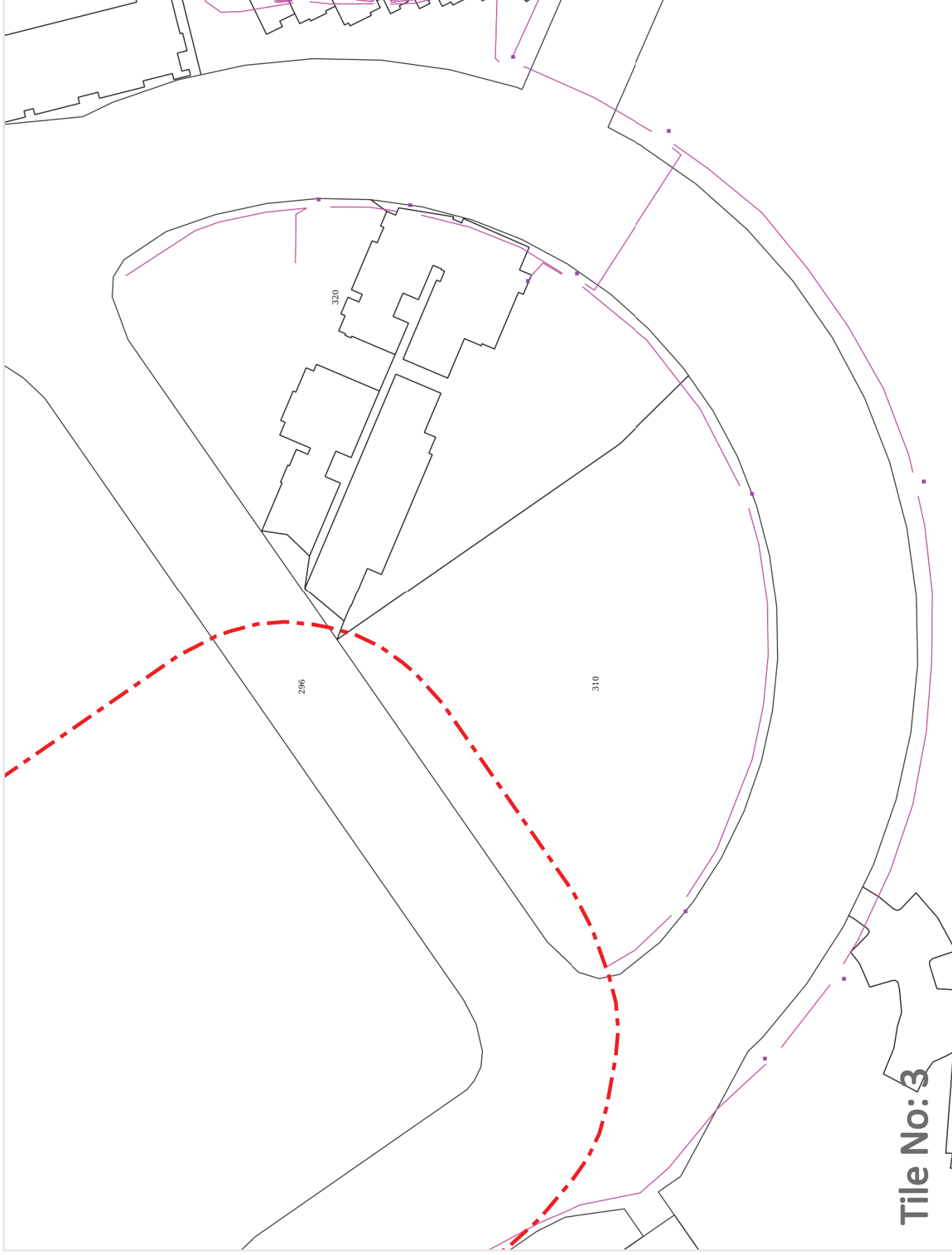
Legend

- Pipes
- Pits



Scale: 1:1000
Expires: 07 Jan 2025

DISCLAIMER: While reasonable measures have been taken to ensure the accuracy of the information contained in this plan response, neither OptiComm nor PelicanCorp shall have any liability whatsoever in relation to any loss, damage, cost or expense arising from the use of this plan response or the information contained in it or the completeness or accuracy of such information. Use of such information is subject to and constitutes acceptance of these terms.



Legend

- Pipes
- Pits



Scale: 1:1000
Expires: 07 Jan 2025

DISCLAIMER: While reasonable measures have been taken to ensure the accuracy of the information contained in this plan response, neither OptiComm nor PelicanCorp shall have any liability whatsoever in relation to any loss, damage, cost or expense arising from the use of this plan response or the information contained in it or the completeness or accuracy of such information. Use of such information is subject to and constitutes acceptance of these terms.

Tile No: 3

Before You Dig Australia

Classification: Networks

Enquiry Date: 10/12/2024
Sequence Number: 248615419
Work Site Address: 260 Macarthur Av
Hamilton
QLD 4007





For your immediate information **THERE IS A
GAS PIPELINE OR INFRASTRUCTURE (Gas
Assets) located in close vicinity to your works.**

Enquiry Date: 10/12/2024
Enquirer: Kousik De

Sequence Number: 248615419
Worksite Address: 260 Macarthur Av
Hamilton
QLD 4007

Thank you for your Before You Dig enquiry regarding the location of gas assets.

We confirm there are Gas Assets located in close vicinity of the above location. Damage to gas assets may result in explosion, fire and personal injury.

Please ensure you read all the relevant information contained in this response to your BYDA enquiry including reviewing the **APA Guidelines for Works Near Existing Gas Assets** and clearly understand and comply with all requirements relating to your scope of work.

If you have any queries relating to this information, contact the APA Before You Dig Officer for clarification. Refer to contact points listed on the following pages.

Before You Dig Checklist



1. Plan

- Review maps provided with this BYDA response and confirm the location of your work site is correct.
- Review the **APA Guidelines for Works Near Existing Gas Assets** and clearly understand requirements relating to my scope of work.



2. Prepare

- Electronically locate gas assets and mark locations.
- Note: Enquirers should still look for visible evidence of gas assets at the worksite not shown on plans.



3. Pothole

- Physically confirm ('prove') the location of gas assets by potholing by hand excavation or non- destructive vacuum excavation methods in accordance with **APA Guidelines for Works Near Existing Gas Assets**.
- Road authorities, councils, utilities and their authorised contractors and agents are responsible to pothole or use other suitable methods to verify the location and depth of all gas assets, including gas (inlet) services, prior to commencing any works.



4. Protect

- Protect gas assets by maintaining clearances whilst excavating and following conditions provided by APA.
- Where required by APA, only conducting work in proximity to gas assets while Site Watch is on site.
- Where applicable, APA Authority To Work permit conditions are clearly understood and complied with.
- Strap and support exposed mains and inlet services. Cover exposed mains to prevent damage until the excavation can be restored permanently.



5. Proceed

- Only proceed with your work once you have completed all the planning, preparation, potholing and protection requirements.
- APA BYDA response (including maps) are on site for reference at all times, and less than 30 days old.

Site Address 260 Macarthur Av
Hamilton
QLD 4007

Sequence No 248615419



Scale 1: 6000

Map Sources: Esri, Garmin, HERE, FAO, NOAA, USGS,
© OpenStreetMap contributors, and the GIS User Community



Enquiry Area

Map Key Area





1



Scale 1: 700 map

Map Sources: Esri, Garmin, HERE, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community

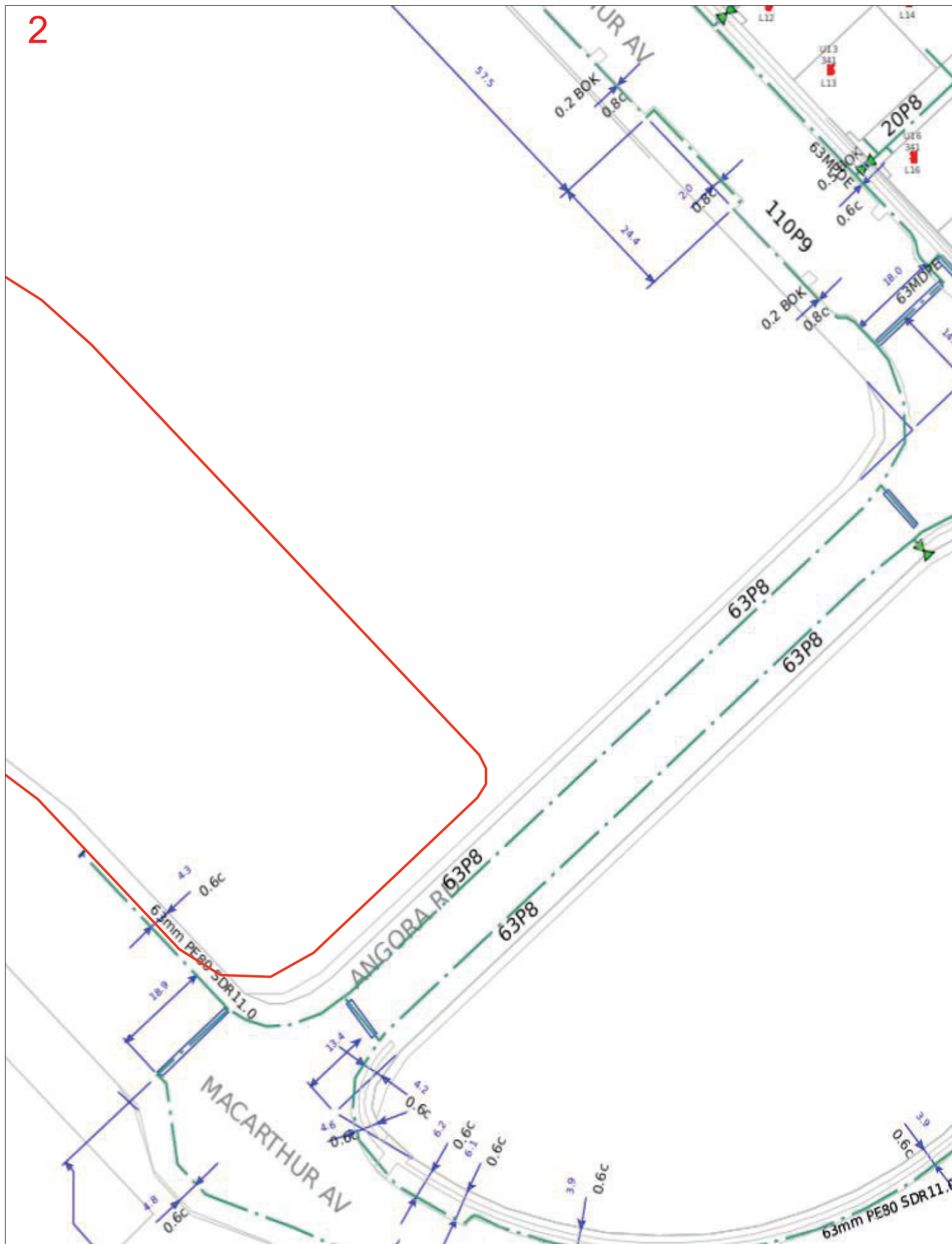


Enquiry Area

Map Key Area



2



Scale 1: 700 map

Map Sources: Esri, Garmin, HERE, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community



Enquiry Area

Map Key Area



Map Symbolology

Pipe	Pipe code and material	Object
Low pressure	C* (for example, C2) Cast iron	Valve
Medium pressure	CU Copper	Buried valve
High pressure	N2 Nylon	Regulator
Transmission pressure	P* Polyethylene (PE)	Gas supplied = yes
Critical main (behind pipe)	P6, P7, P9–P12 Medium density PE	CP rectifier terminal
Proposed (pressure by colour)	P2, P4, P8 High density PE	CP test station
LPG (pressure by colour)	S* Steel	CP anode
Abandoned	W2 Wrought galv iron	CP bond wire
Idle/inactive	W3 PE coat wrought galv iron	Syphon
Sleeve		Trace wire point
Casing (behind pipe)		
Area	Abbreviation	
BYDA area of interest	BoK Back of kerb	FoK Front of kerb
	C Depth of cover	Galv Galvanized
	CP Cathodic protection	NTI Not tied in

Example

Pipe	Pipe code	This map was created in colour and should be printed in colour
40P6 in 80C2	Pipe diameter in millimetres is shown before pipe code. 40P6 = 40 mm nominal diameter	
63S8		

Site Watch

Site Watch is where an APA field officer attends your work site to monitor and ensure controls are in place to protect critical gas assets from damage during work.

The following rates apply for this service (1 hour minimum charge):

Item	Rate (excl. gst)
Site Watch - Business Hours	\$143.42 per hour
Site Watch - After Hours	\$175.06 per hour
Cancellation Fee Fee applies where cancellations received after 12pm (midday) 1 business day prior to the booking	\$286.84

- Contact APA - Before You Dig officer for state specific hours of business.

Contacts

Contacts APA Group	
Enquiry	Contact Numbers
General enquiries or feedback regarding this information or gas assets.	APA - Before You Dig Officer Phone: 1800 085 628 Email: BYDA_APA@apa.com.au
Gas Emergencies	Phone: 1800 GAS LEAK (1800 427 532)

Important Information

- Refer to requirements relating to construction, excavation and other work activities in the APA **Guidelines for Works Near Existing Gas Assets** document with this BYDA response.
- BYDA enquiries are valid for 30 days. If your works commence after 30 days from the date of this response a new enquiry is required to validate location information.
- For some BYDA enquiries, you may receive two (2) responses from APA. Please read both responses carefully as they relate to different assets.
- Gas (inlet) services connecting Gas Assets in the street to the gas meter on the property are not marked on the map. South Australia Only - if a meter box is installed on the property, a sketch of the gas service location may be found inside the gas meter box. APA does not guarantee the accuracy or completeness of these sketches.

Disclaimer and legal details

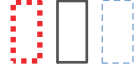
- This information is valid for 30 days from the date of this response.
- This information has been generated by an automated system based on the area highlighted in your BYDA request and has not been independently verified.
- Map location information is provided as AS5488-2022 Quality Level D, as such supplied location information is indicative only.
- Whilst APA has taken reasonable steps to ensure that the information supplied is accurate, the information is provided strictly on the condition that no assurance, representation, warranty or guarantee (express or implied) is given by APA in relation to the information (including without limitation quality, accuracy, reliability, completeness, currency, sustainability, or suitability for any particular purpose) except that the information has been disclosed in good faith.
- Any party who undertakes activities in the vicinity of APA operated assets has a legal duty of care that must be observed. This legal obligation requires all parties to adhere to a standard of reasonable care while performing any acts that could foreseeably harm these assets.

The background consists of several large, overlapping geometric shapes in red and white. A large red shape occupies the top right and bottom right areas. A white shape, resembling a stylized 'A' or a mountain peak, is positioned in the center-left. Another white shape is at the bottom left. The overall composition is minimalist and modern.

apa



Legend



BYDA Enquiry
Detailed map page
No dig site assets

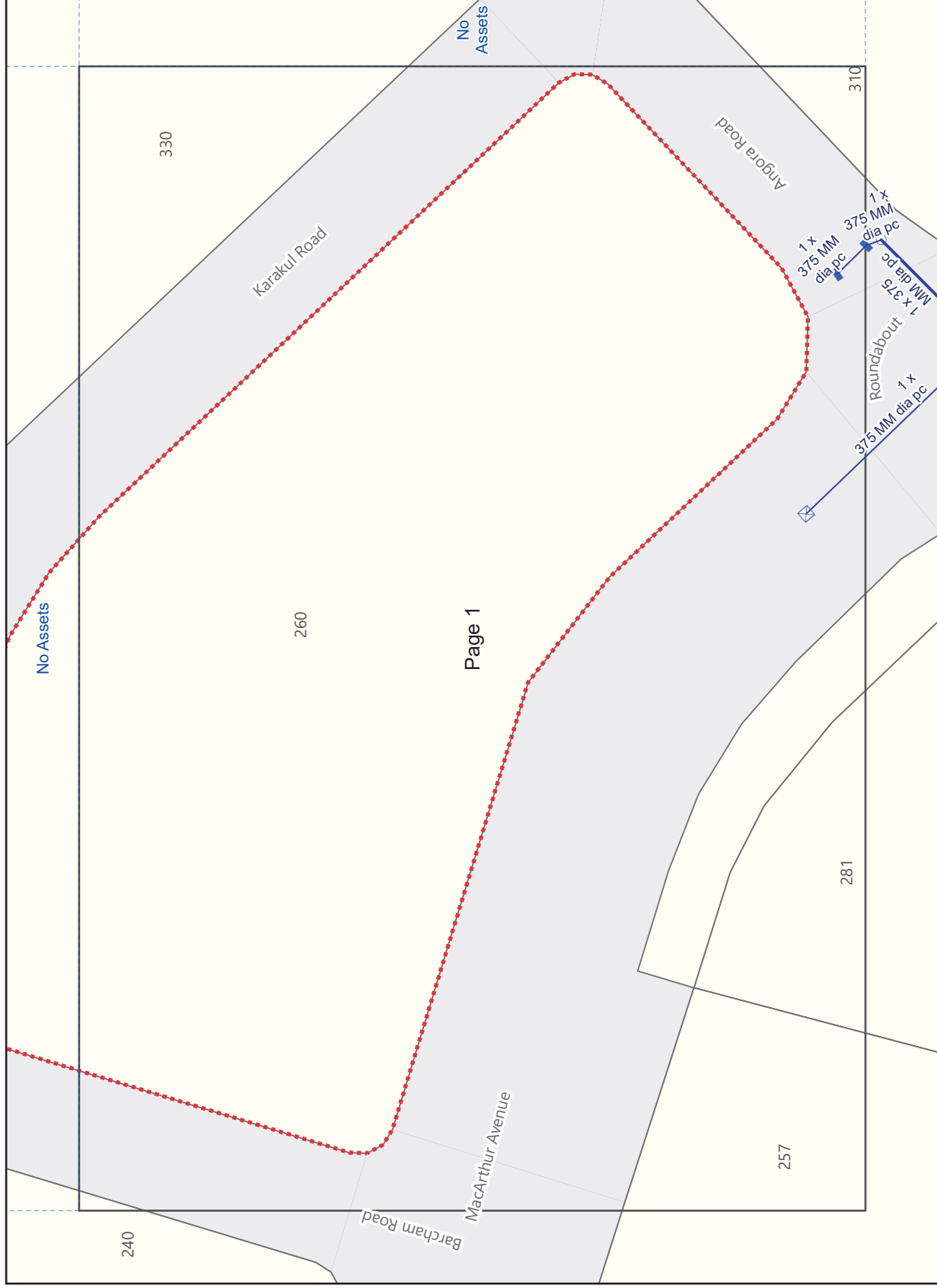
Disclaimer:

© Brisbane City Council [2020]
In consideration of Council, and the copyright owners listed below, permitting the use of this data, you acknowledge and agree that Council, and the copyright owners, give no warranty in relation to the data (including accuracy, reliability, completeness, currency or suitability) and accept no liability (including without limitation, liability in negligence) for any loss, damage or costs (including consequential damage), relating to any use of this data.
Data must not be used for direct marketing or be used in breach of the privacy laws.

Copyright of data is as follows:

Cadastral and Street Names © 2020 State of Queensland (Department of Natural Resources, Mines and Energy)

Caution: This map may contain the locations of abandoned underground asbestos pipes. Council gives no warranty to the completeness or accuracy of these records. Appropriate care needs to be taken in all cases.



Legend

 BYDA Enquiry

Stormwater Network

 Stormwater Drain

 Stormwater Gully /

 Roofwater Connection

 Stormwater Maintenance

 Hole

 Stormwater Gully Pit

 Stormwater Field Inlet

Disclaimer:

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Data must not be used for direct marketing or be used in breach of the privacy laws.

Copyright of data is as follows:

Cadastral and Street Names © 2020 State of Queensland (Department of Natural Resources, Mines and Energy)

Caution: This map may contain the locations of abandoned underground asbestos pipes. Council gives no warranty to the completeness or accuracy of these records. Appropriate care needs to be taken in all cases.



BYDA

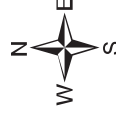
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Date: 10/12/2024
Scale: 1:1025
Title No: **OVERVIEW**

**CAUTION - HIGH
VOLTAGE**

LEGEND

- | | |
|---|--------------------------|
|  | Substation |
|  | Cable Marker |
|  | Pit |
|  | Pole |
|  | Pillar |
|  | LV Cable (up to 1kV) |
|  | HV Cable (1kV - <33kV) |
|  | HV Cable (33kV and over) |
|  | Pit Boundary |
|  | Planned Work Area |

AS5488 Category "D" Plan



DISCLAIMER: While reasonable measures have been taken to ensure the accuracy of the information contained in this plan response, neither Energex nor Pelican Corp shall have any liability whatsoever in relation to any loss, damage, cost or expense arising from the use of this plan response or the information contained in it or the completeness or accuracy of such information. Use of such information is subject to and constitutes acceptance of these terms.

This output provides details of the ENERGEX electrical network. As variations may exist no responsibility is incurred by ENERGEX for the accuracy or completeness of the information provided. Exact positions of cables and electrical connectivity should be confirmed on site.

Plans generated 10 Dec 2024 by PelicanCorp TicketAccess Software | www.pelicancorp.com



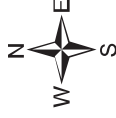
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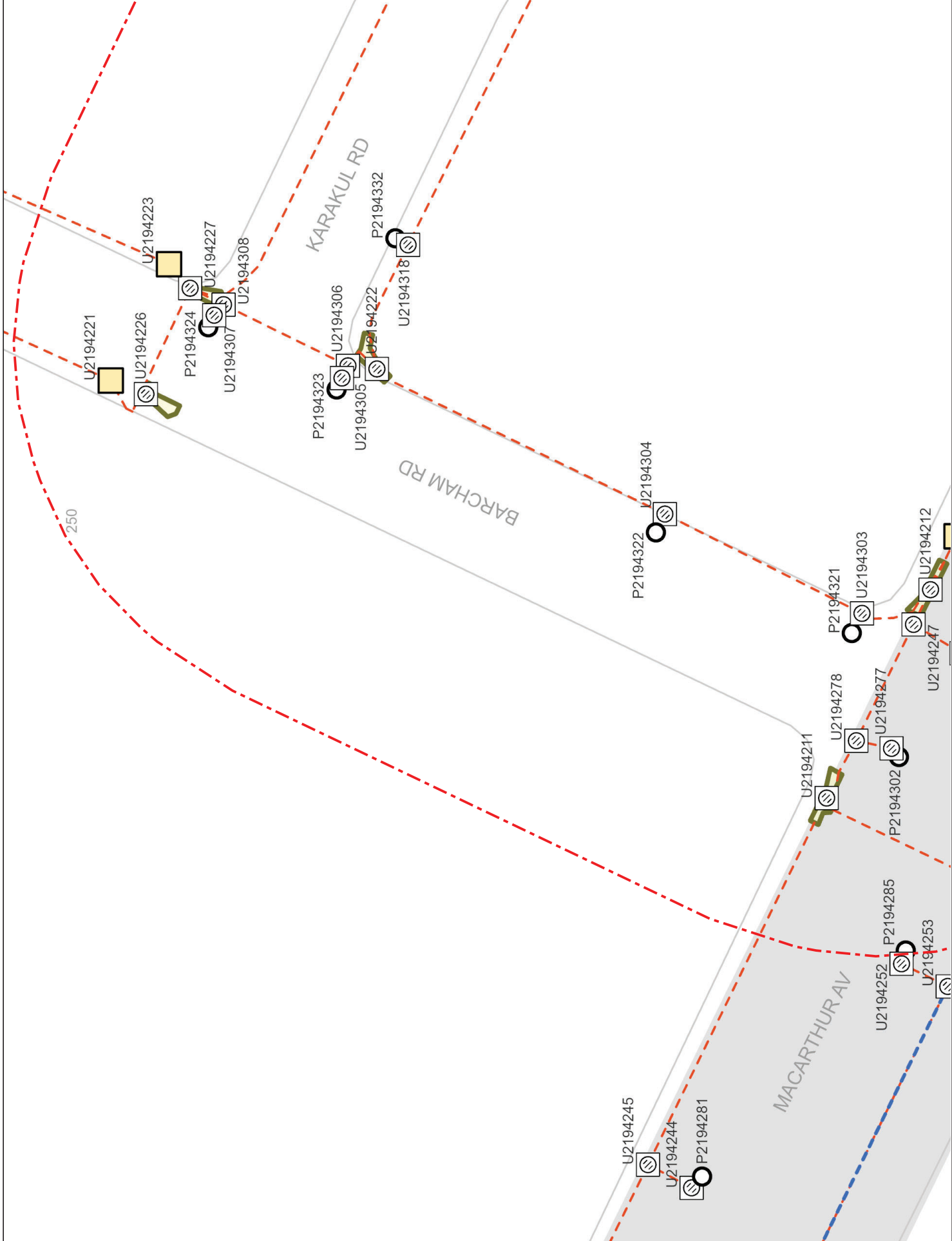
**CAUTION - HIGH
VOLTAGE**

- LEGEND
- Substation
 - Cable Marker
 - Pit
 - Pole
 - Pillar
 - LV Cable (up to 1kV)
 - HV Cable (1kV - <33kV)
 - HV Cable (33kV and over)
 - Pit Boundary
 - Planned Work Area

AS5488 Category 'D' Plan



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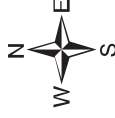
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Scale: 1:500
Title No: 2

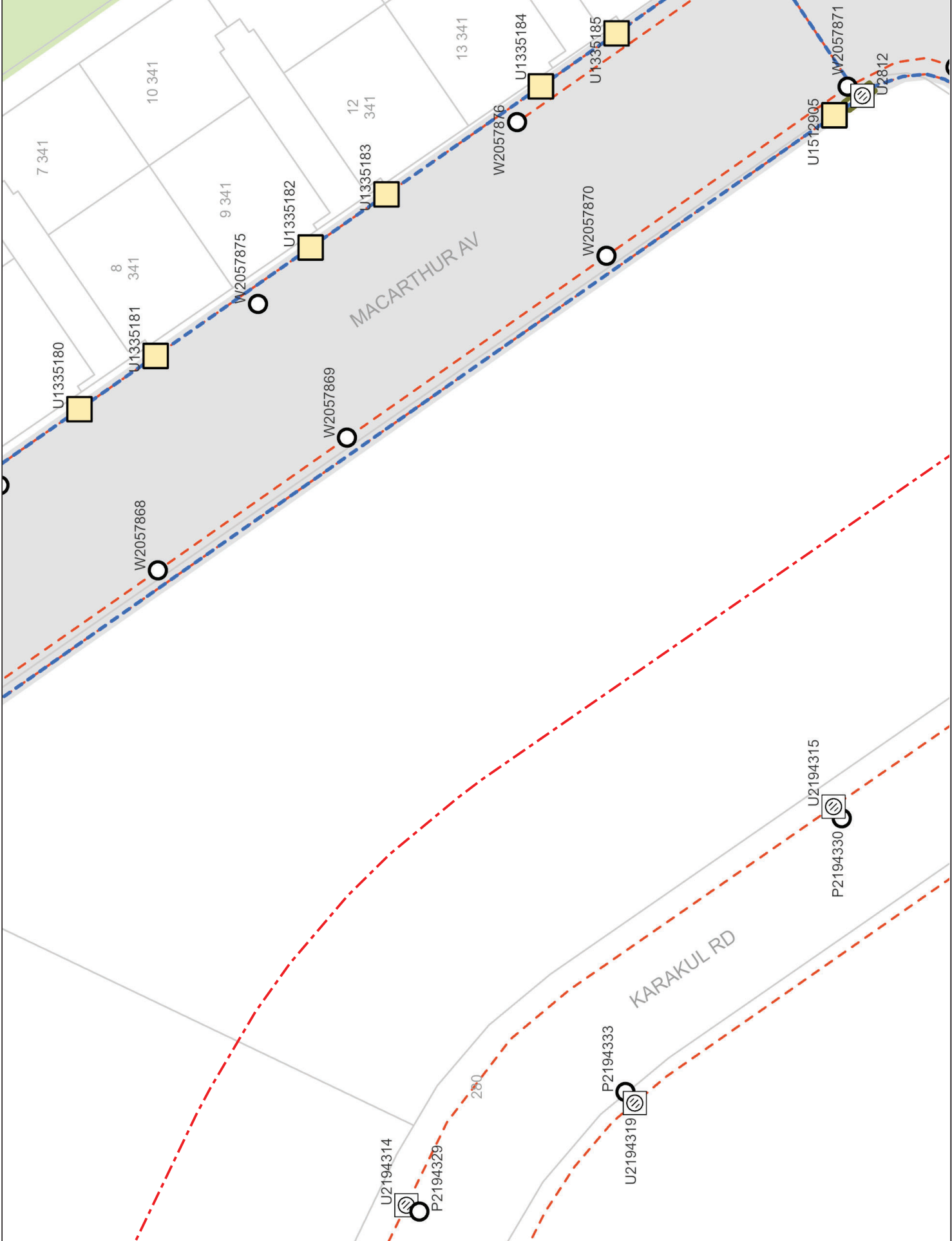
**CAUTION - HIGH
VOLTAGE**

- LEGEND
- Substation
 - Cable Marker
 - Pit
 - Pole
 - Pillar
 - LV Cable (up to 1kV)
 - HV Cable (1kV - <33kV)
 - HV Cable (33kV and over)
 - Pit Boundary
 - Planned Work Area

AS5488 Category 'D' Plan



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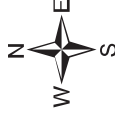
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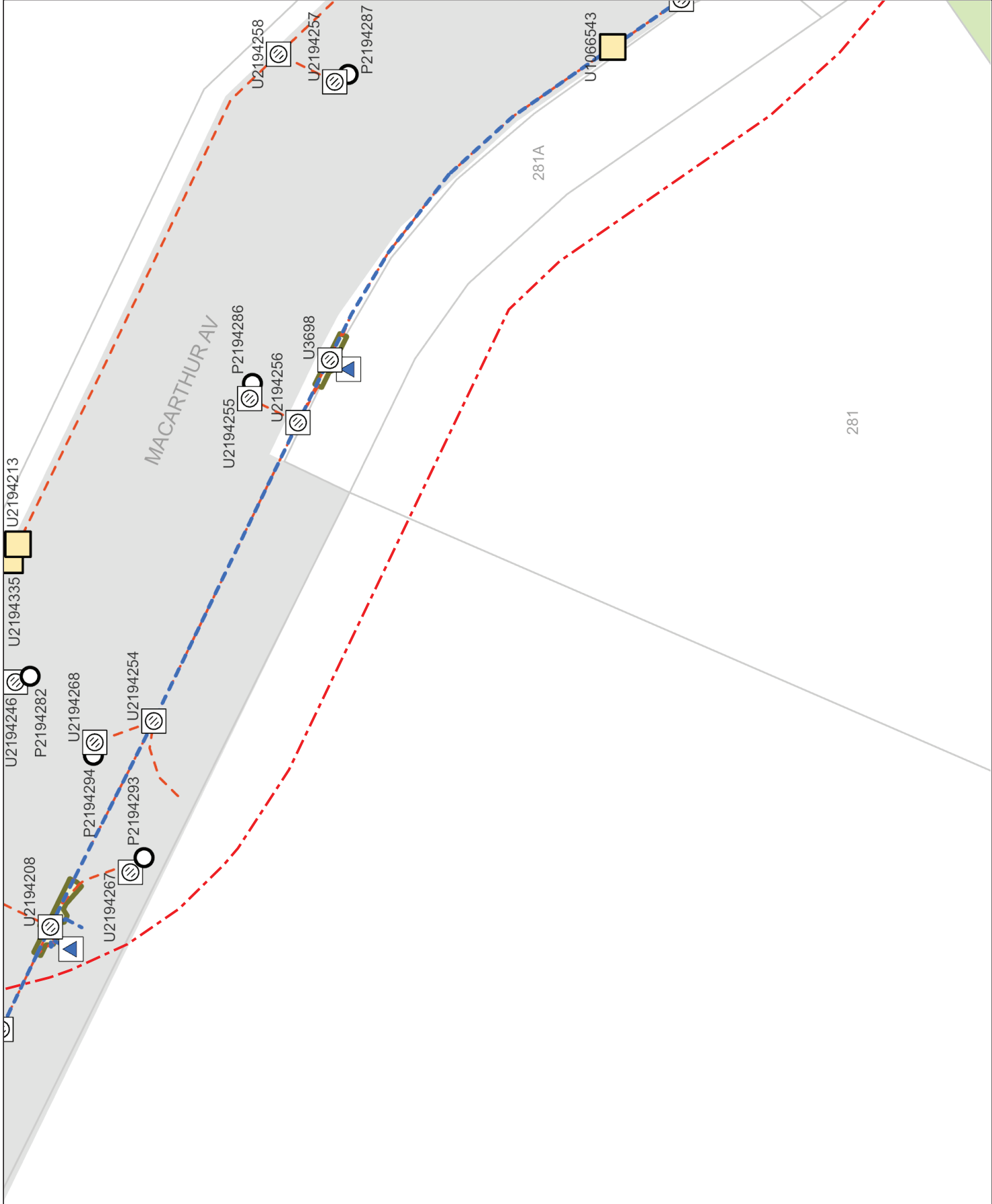
CAUTION - HIGH
VOLTAGE

- LEGEND
- Substation
 - Cable Marker
 - Pit
 - Pole
 - Pillar
 - LV Cable (up to 1kV)
 - HV Cable (1kV - <33kV)
 - HV Cable (33kV and over)
 - Pit Boundary
 - Planned Work Area

AS5488 Category "D" Plan



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BYDA

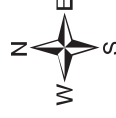
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Date: 10/12/2024
Scale: 1:500
Title No: 4

CAUTION - HIGH VOLTAGE

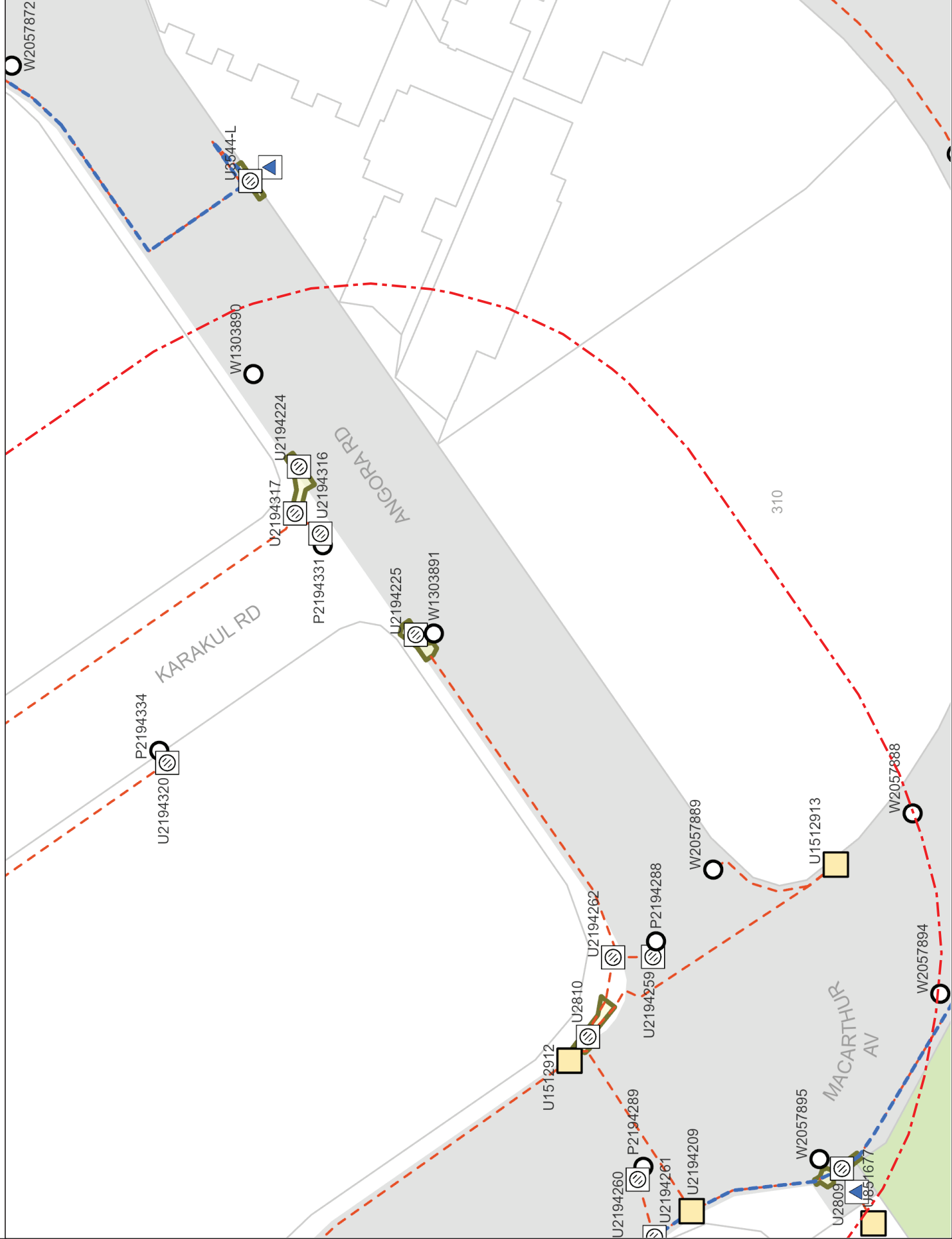
LEGEND

	Substation
	Cable Marker
	Pit
	Pole
	Pillar
	LV Cable (up to 1kV)
	HV Cable (1kV - <33kV)
	HV Cable (33kV and over)
	Pit Boundary
	Planned Work Area

AS5488 Category "D" Plan



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[illegible]

Sequence Number: 248615422

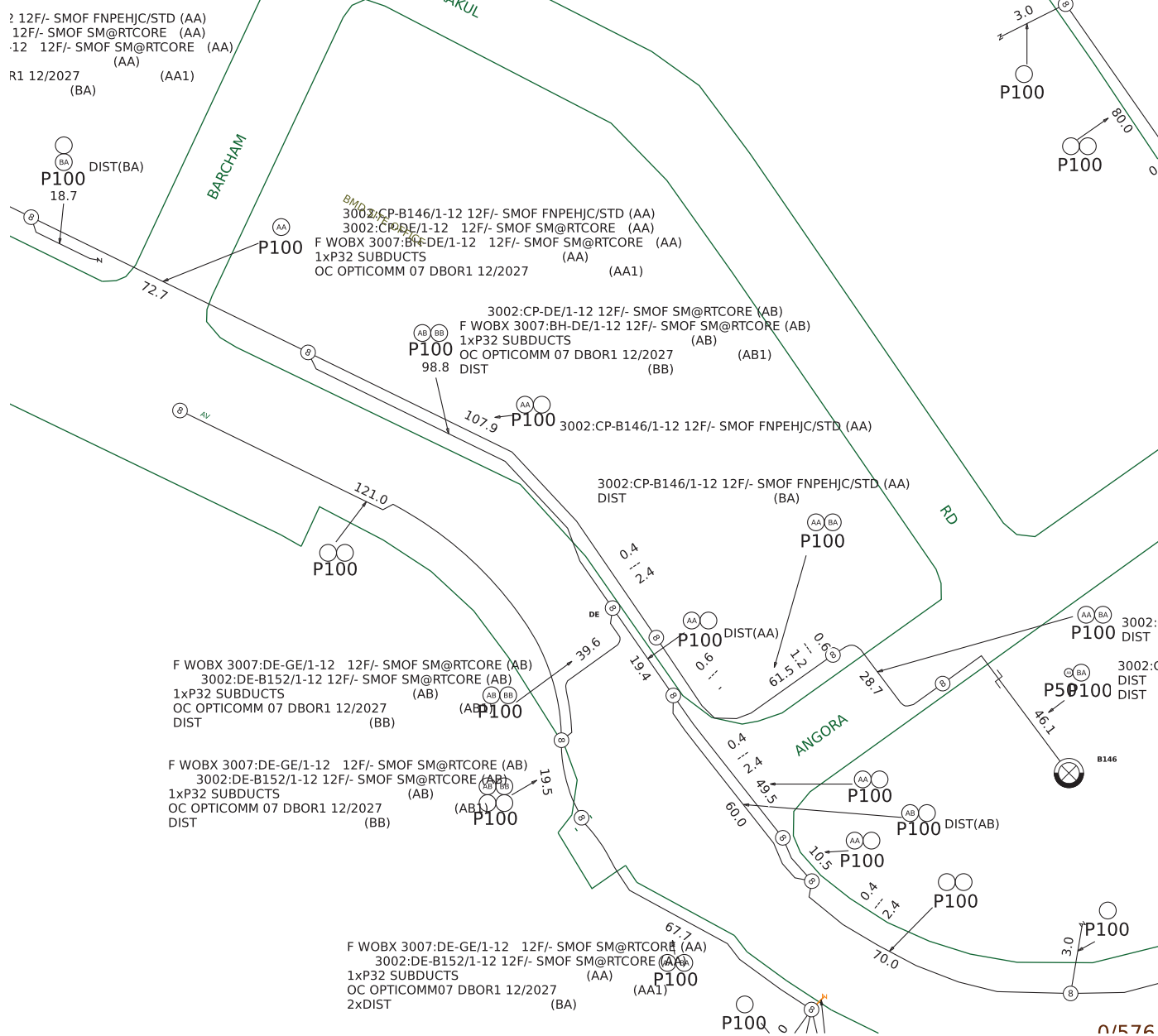
CAUTION: Fibre optic and/ or major network present in plot area. Please read the Duty of Care and contact Telstra Plan Services should you require any assistance.

Generated On 11/12/2024 06:17:56

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

Telstra plans and location information conform to Quality Level "D" of the Australian Standard AS 5488-Classification of Subsurface Utility Information. As such, Telstra supplied location information is indicative only. Spatial accuracy is not applicable to Quality Level D. Refer to AS 5488 for further details. The exact position of Telstra assets can only be validated by physically exposing it. Telstra does not warrant or hold out that its plans are accurate and accepts no responsibility for any inaccuracy. Further on site investigation is required to validate the exact location of Telstra plant prior to commencing construction work. A Certified Locating Organisation is an essential part of the process to validate the exact location of Telstra assets and to ensure the asset is protected during construction works.

See the Steps- Telstra Duty of Care that was provided in the email response.



Sequence Number: 248615422

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.

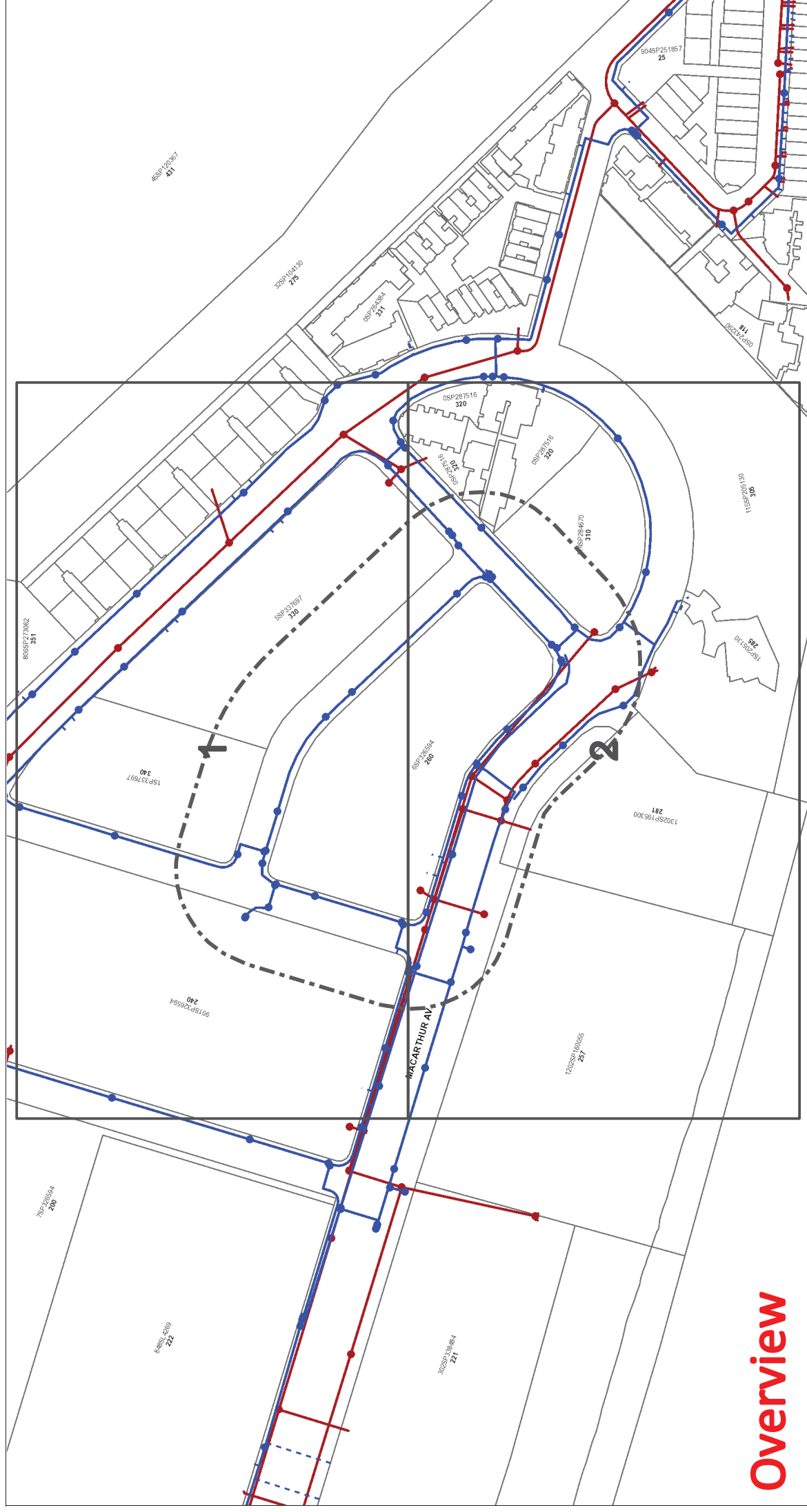
Generated On 11/12/2024 06:17:59

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

WARNING
Telstra plans and location information conform to Quality Level "D" of the Australian Standard AS 5488-Classification of Subsurface Utility Information. As such, Telstra supplied location information is indicative only. Spatial accuracy is not applicable to Quality Level D. Refer to AS 5488 for further details. The exact position of Telstra assets can only be validated by physically exposing it. Telstra does not warrant or hold out that its plans are accurate and accepts no responsibility for any inaccuracy. Further on site investigation is required to validate the exact location of Telstra plant prior to commencing construction work. A Certified Locating Organisation is an essential part of the process to validate the exact location of Telstra assets and to ensure the asset is protected during construction works.

See the Steps- Telstra Duty of Care that was provided in the email response.

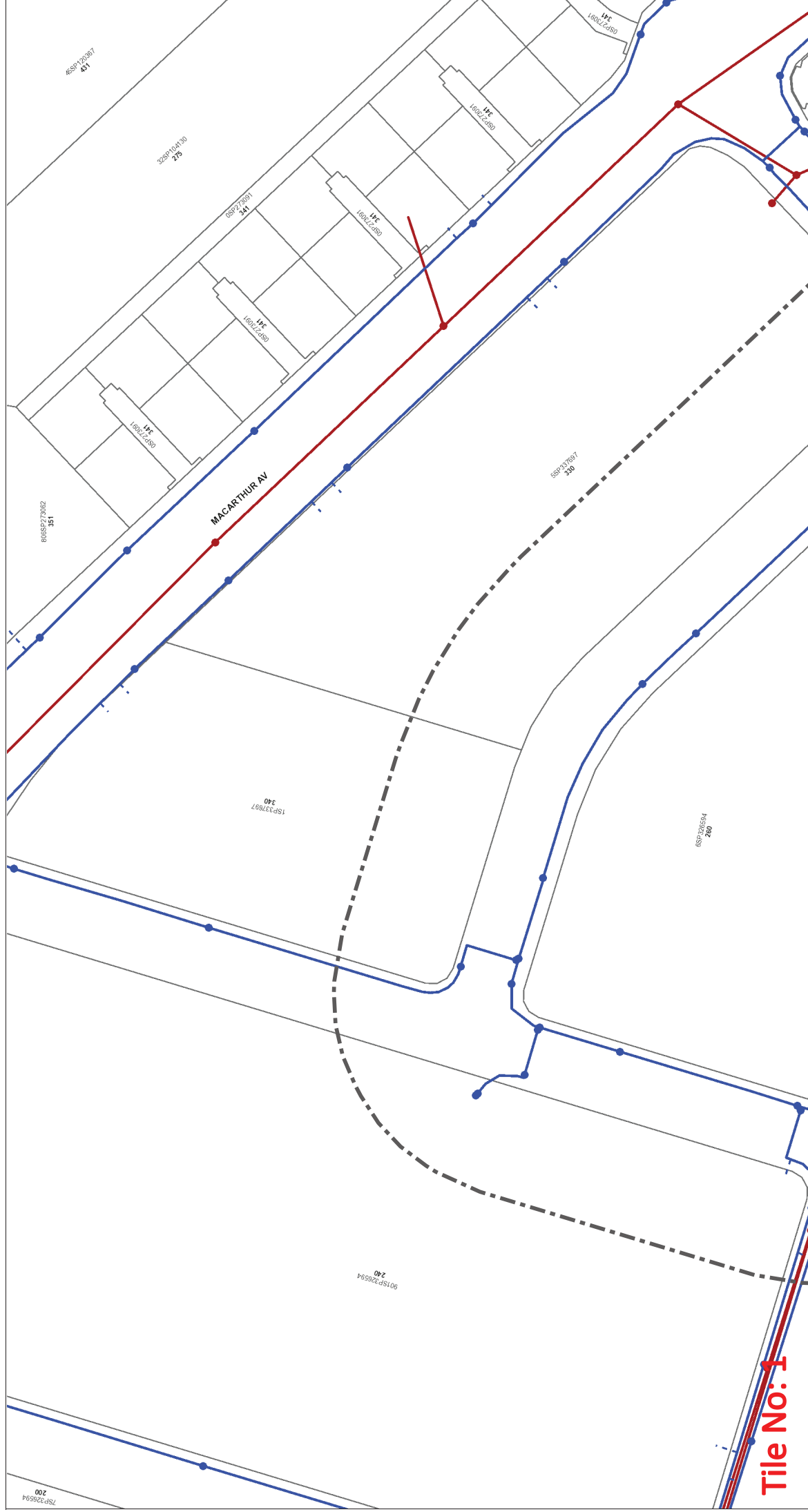
Urban Utilities - Water, Recycled Water and Sewer Infrastructure



Overview

[illegible]

Urban Utilities - Water, Recycled Water and Sewer Infrastructure



Before You Dig Australia- Urban Utilities Water, Recycled Water and Sewer Infrastructure

BYDA Reference No: 248615423

Date BYDA Ref Received: 10/12/2024

Date BYDA Job to Commence: 13/12/2024

Date BYDA Map Produced: 10/12/2024

This Map is valid for 30 days



UrbanUtilities



Map Scale
1:1000

Sewer	Water	Recycled Water
Infrastructure	Infrastructure	Infrastructure
Major Infrastructure	Major Infrastructure	Major Infrastructure
Network Pipelines	Network Pipelines	Network Pipelines
Network Structures	Network Structures	Network Structures
	Water Service (Indicative only)	

While reasonable measures have been taken to ensure the accuracy of the information contained in this plan response, neither Urban Utilities nor Pelican Group or its subsidiaries or any of its employees or agents warrant the accuracy or completeness of the information contained in it or the completeness or accuracy of such information. Use of such information is subject to and constitutes acceptance of these terms. The plans are indicative and approximate only and without warranties of any kind, express or implied including in relation to accuracy, completeness, correctness, currency or fitness for purpose.

Urban Utilities takes no responsibility and accepts no liability for any loss, damage, costs or liability that may be incurred by any person acting in reliance on the information provided on the plans.

This plan should be used as a guide only. Any dimension should be confirmed on site by the relevant authority based on or contained data provided by the State of Queensland (Department of Natural Resources and Mines) [2020]. In consideration of the State permitting the use of this plan, you acknowledge and agree that the State gives no warranty in relation to the data included (including liability in negligence) for any loss, damage or costs (including consequential damages) relating to any use of the data. Data must not be used for direct marketing or be used in breach of the privacy laws. © State of Queensland Department of Natural Resources and Mines [2020]

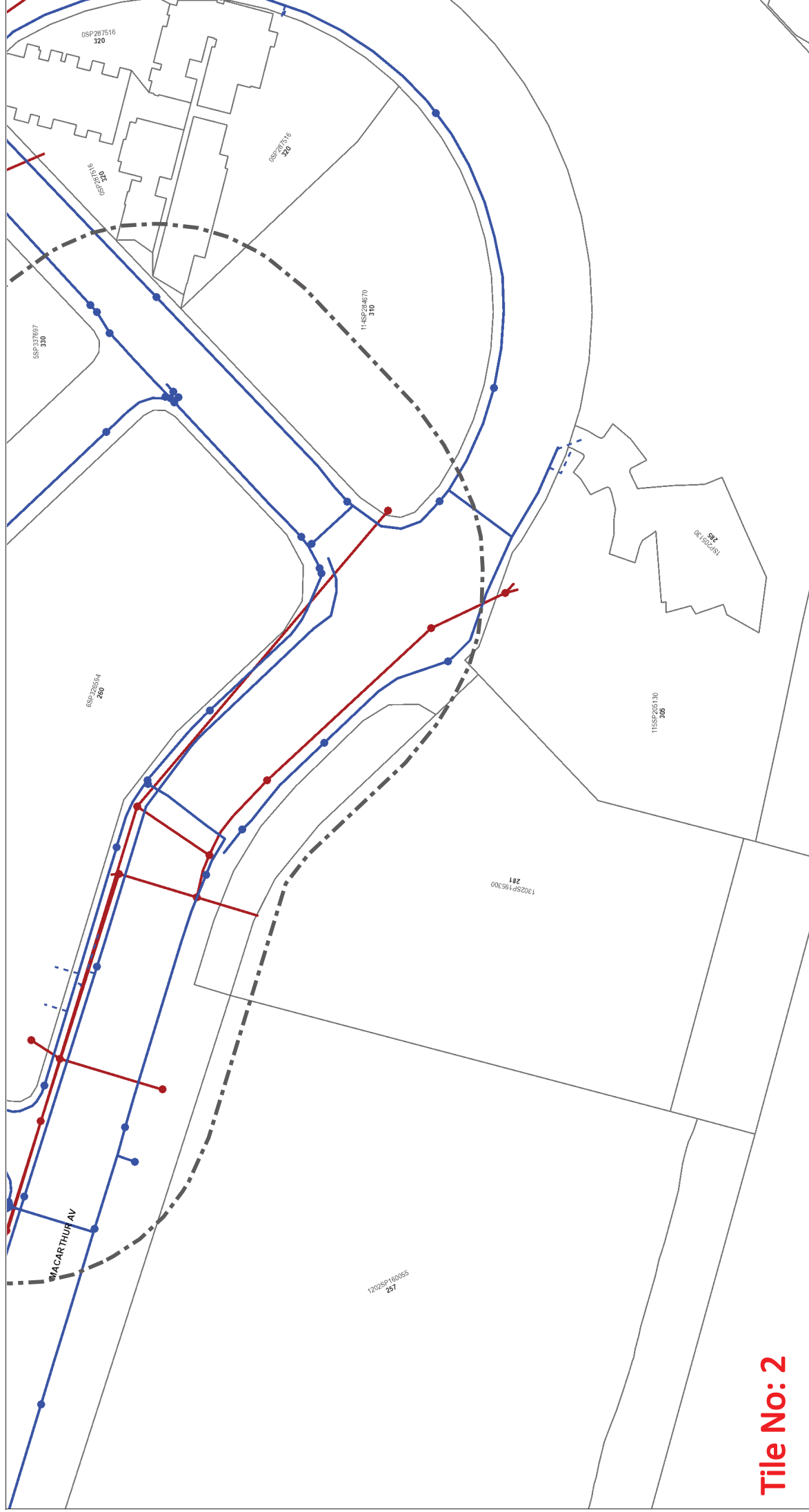
For further information, please call Urban Utilities on 13 26 57 (8 am-6pm weekdays). Faults and emergencies 13 23 66 (24/7).

www.urbanutilities.com.au

ASN 86 673 835 011

Urban Utilities - Water, Recycled Water and Sewer Infrastructure

Tile No: 2

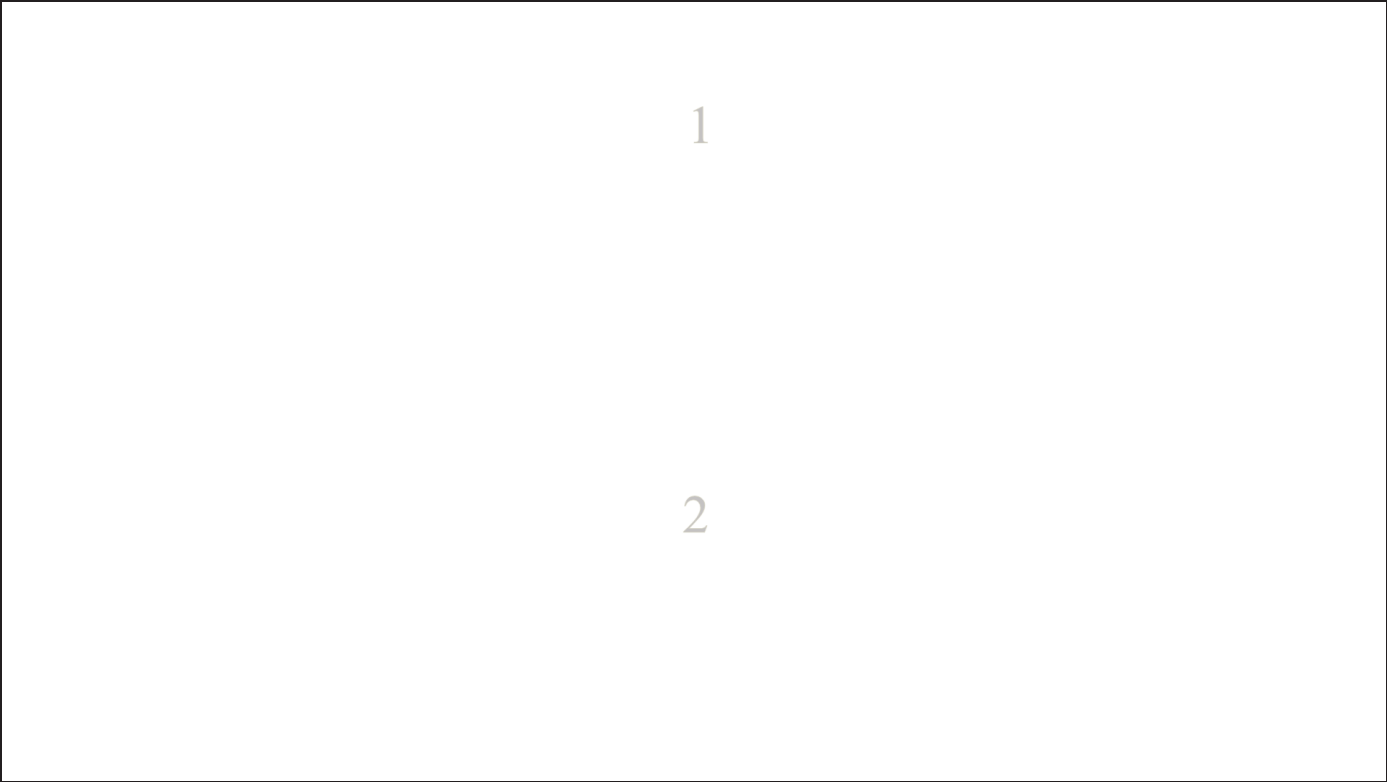


 UrbanUtilities Before You Dig Australia- Urban Utilities Water, Recycled Water and Sewer Infrastructure BYDA Reference No: 248615423 Date BYDA Ref Received: 10/12/2024 Date BYDA Job to Commence: 13/12/2024 Date BYDA Map Produced: 10/12/2024 This Map is valid for 30 days Produced By: Urban Utilities	 Sewer  Water  Recycled Water ● Infrastructure ◆ Major Infrastructure — Network Pipelines  Network Structures ● Infrastructure ◆ Major Infrastructure — Network Pipelines  Network Structures ● Infrastructure ◆ Major Infrastructure — Network Pipelines  Network Structures --- Water Service (indicative only)	While reasonable measures have been taken to ensure the accuracy of the information contained in this plan, Urban Utilities neither warrants nor represents that the information is complete, correct or accurate. The information is provided for your information only and should not be used for any purpose other than that for which it was provided. Urban Utilities does not accept any liability for any loss, damage, costs or liability that may be incurred by any person acting in reliance on the information provided on the plans. This plan should be used as a guide only. Any dimensions should be confirmed on site by the relevant authority. Based on or contains data provided by the State of Queensland (Department of Natural Resources and Mines) [2020]. In consideration of the State permitting the use of this data you acknowledge and agree that the State gives no warranty in relation to the data (including accuracy, liability in negligence) for any loss, damage or costs (including consequential damages) relating to any use of the data. Data must not be used for direct marketing or be used in breach of the privacy laws. © State of Queensland (Department of Natural Resources and Mines) [2020] For further information, please call Urban Utilities on 13 25 57 (8am-6pm weekdays). Faults and emergencies 13 25 66 (24/7). www.urbanutilities.com.au ABN 86 673 835 011
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To: Kousik De
Phone: Not Supplied
Fax: Not Supplied
Email: admin@meliorace.com

Dial before you dig Job #:	38250469	
Sequence #	248615417	
Issue Date:	10/12/2024	
Location:	260 Macarthur Av , Hamilton , QLD , 4007	

Indicative Plans are tiled below to demonstrate how to layout and read nbn asset plans

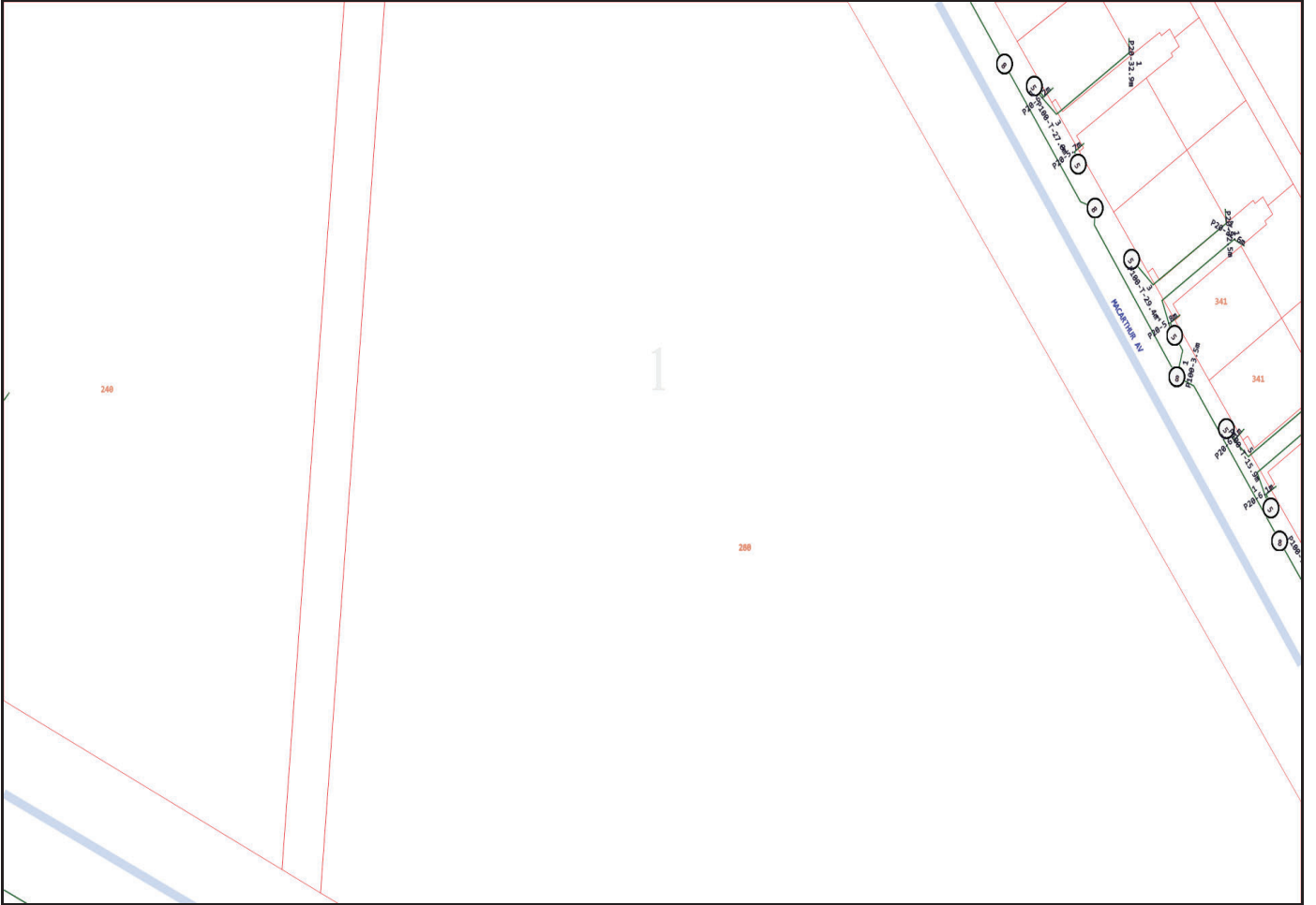


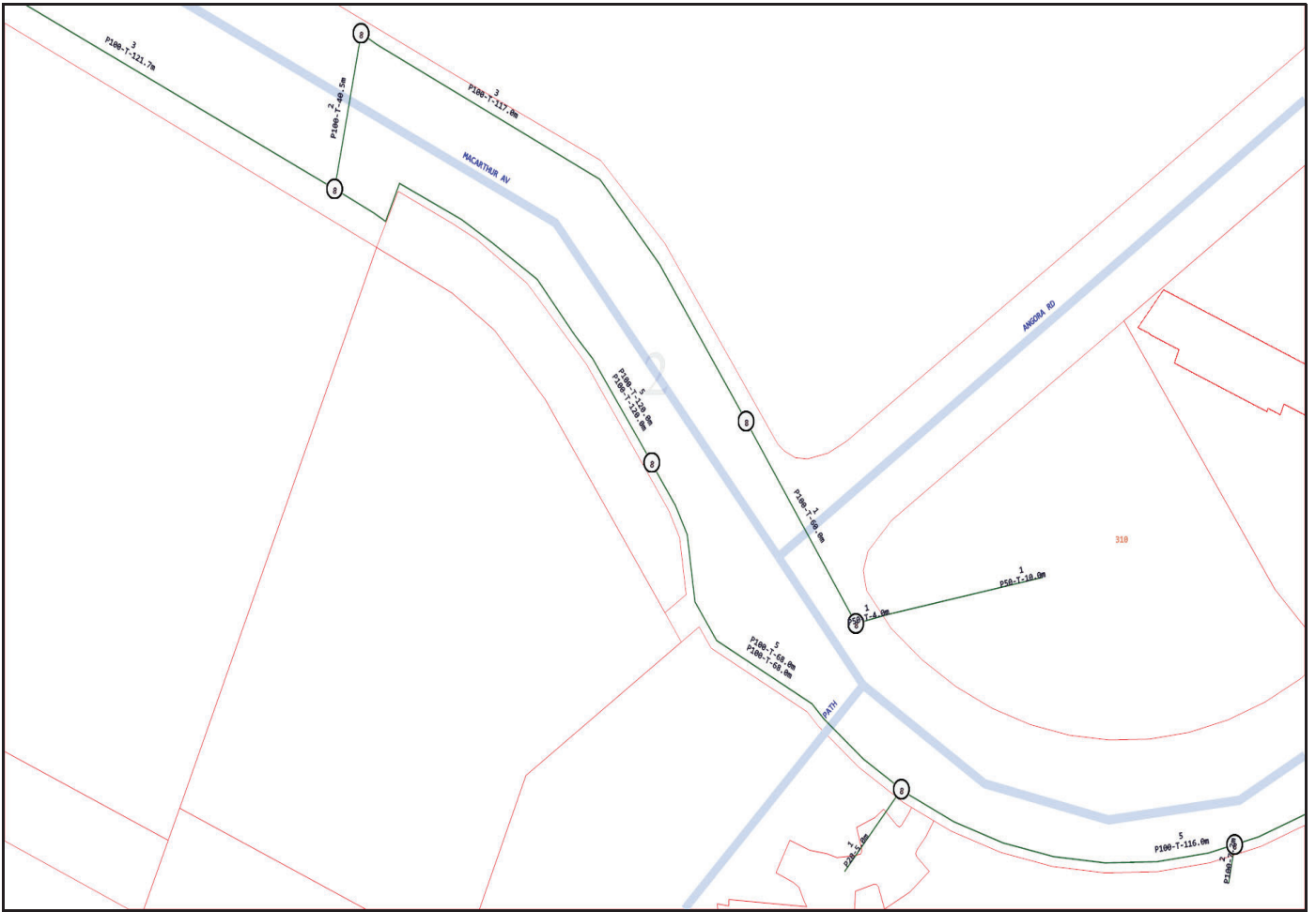


LEGEND



	Parcel and the location
	Pit with size "5"
	Power Pit with size "2E". Valid PIT Size: e.g. 2E, 5E, 6E, 8E, 9E, E, null.
	Manhole
	Pillar
	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 Direct buried cables between pits of sizes, "5" and "9" are 10.0m apart.
	Trench containing any INSERVICE/CONSTRUCTED (Copper/RF/Fibre) cables.
	Trench containing only DESIGNED/PLANNED (Copper/RF/Fibre/Power) cables.
	Trench containing any INSERVICE/CONSTRUCTED (Power) cables.
	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.



6.5 APPENDIX E – FLOODWISE REPORT

FloodWise Property Report

260 MACARTHUR AVE, HAMILTON 4007
Lot 6 on SP326594



Dedicated to a better Brisbane

THE PURPOSE OF THIS REPORT IS FOR BUILDING AND DEVELOPMENT

Brisbane City Council's FloodWise Property Report provides technical flood planning information including estimated flood levels, habitable floor level requirements and more. This report uses the adopted flood planning information in **Brisbane City Plan 2014**, that guides how land in Brisbane is used and developed for the future. Find out more about [planning and building](#). To understand how to be resilient and prepare for floods, visit Council's [Be Prepared](#) webpage. Find more information about [how to read a FloodWise Property Report](#).

This property has no flood levels

Brisbane City Council has not assigned flood level information for this property however it may be affected by one or more flood or property development flags. Please refer to the Flood Planning and Development Information below for details. The property may have 0.2% AEP flood level which will appear on the Flood Planning Information table if applicable. For professional advice or detailed assessment of a property contact a Registered Professional Engineer of Queensland.

Visit the [Be Prepared](#) page to find more information on how to prepare your home or business for potential flooding.

 **Combined** 1% AEP for river, creek and storm tide flood extent (if applicable) from the adopted Brisbane City Plan 2014. Read more about [Brisbane City Plan 2014](#).



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Are you resilient and ready for flood?

- Sign up to the Brisbane Severe Weather Alert at **brisbane.qld.gov.au/beprepared**
- Visit bom.gov.au for the latest weather updates.
- Have an evacuation plan, emergency kit and important phone numbers ready.
- Observe where water flows from and to during heavy rain.
- Consider how flood-resilient building techniques will have you home faster and with less damage.

Life threatening emergencies
000 Police/fire/ambulance
(mobiles **000** and **112**)

State Emergency Service (SES) **132 500**
Energex **13 19 62**
Brisbane City Council **3403 8888**

Technical Summary

This section of the FloodWise Property Report contains more detailed flood information for this property so **surveyors, builders, certifiers, architects, and engineers can plan and build** in accordance with Council's planning scheme.

Find more information about [planning and building](#) in Brisbane or talk to a Development Services Planning Information Officer via Council's Contact Centre on (07) 3403 8888.

Flood Planning and Development Information

This section of the FloodWise Property Report contains information about Council's planning scheme overlays. Overlays identify areas within the planning scheme that reflect distinct themes that may include constrained land and/or areas sensitive to the effects of development.

Flood overlay code

The Flood overlay code of Council's planning scheme uses the following information to provide guidelines when developing properties. The table below summarises the flood planning areas (FPAs) that apply to this property. Development guidelines for the FPAs are explained in [Council's planning scheme](#).

Flood planning areas (FPA)		
River	Creek / waterway	Overland flow
		Not Applicable

To find more information about Council's flood planning areas (FPAs) for Brisbane River and Creek/waterway flooding to guide future building and development in flood prone areas, please review [Council's Flood Planning Provisions](#).

Coastal hazard overlay code

The Coastal hazard overlay code of Council's planning scheme uses the following information to provide guidelines when conducting new developments. The table below summarises the coastal hazard categories that apply to this property. Development guidelines for the following Coastal hazard overlay sub-categories are explained in Council's [planning scheme](#).

Coastal hazard overlay sub-categories
There are currently no Coastal hazard overlay sub-categories that apply to this property.

Note: Where land is identified within one for more flood planning areas on the Flood overlay or is identified within one of the Storm tide inundation area sub-categories on the Coastal hazard overlay, the assessment criteria that provides the highest level of protection from any source of flooding applies.

Property development flags

Large allotment - This property is either a Large Allotment of over 1000 square metres or is located within a Large Allotment. Flood levels may vary significantly across allotments of this size. Further investigations may be warranted in determining the variation in flood levels and the minimum habitable floor level across the site.

For more information or advice, please consult a Registered Professional Engineer of Queensland (RPEQ).

Useful Flood Information Definitions

Australian Height Datum (AHD) - The reference level for defining ground levels in Australia. The level of 0.0m AHD is approximately mean sea level.

Annual Exceedance Probability (AEP) - The probability of a flood event of a given size occurring in any one year, usually expressed as a percentage annual chance.

- **0.2% AEP** - A flood event of this size is considered rare but may still occur. A flood of size or larger has a 1 in 500 chance or a 0.2% probability of occurring in any year.
- **1% AEP** - A flood of this size or larger has a 1 in 100 chance or a 1% probability of occurring in any year.
- **2% AEP** - A flood of this size or larger has a 1 in 50 chance or a 2% probability of occurring in any year.
- **5% AEP** - A flood of this size or larger has a 1 in 20 chance or a 5% probability of occurring in any year.
- **20% AEP** - A flood of this size or larger has a 1 in 5 chance or a 20% probability of occurring in any year.

Data quality

- **Data Quality Code A** - Level data based on recent surveyor report or approved as-constructed drawings.
- **Data Quality Code B** - Level data based on ground-based mobile survey or similar.
- **Data Quality Code C** - Level data derived from Airborne Laser Scanning or LiDAR information.

Defined Flood Level (DFL) - The DFL is used for commercial and industrial development. The Defined flood level (DFL) for Brisbane River flooding is a level of 3.7m AHD at the Brisbane City Gauge based on a flow of 6,800 m/s. DFL is only applicable for non-residential uses affected by Brisbane River flooding.

Flood planning area (FPA) - Council has developed five Flood planning areas (FPAs) as part of Brisbane City Plan 2014 Flood overlay mapping for Brisbane River, Creek/waterway flooding and Overland flow to guide future building and development in flood prone areas. Storm tide flooding is mapped separately. The FPAs are designed to recognise the flood hazard for different flooding types. Flood hazard is a combination of frequency of flooding, the flood depth, and the speed at which the water is travelling. [Find more information here.](#)

Maximum and minimum ground level - Highest and lowest ground levels on the property based on available ground level information. A Registered Surveyor can confirm exact ground levels.

Minimum habitable floor level (dwelling house) - The minimum level in metres AHD at which habitable areas of development (generally including bedrooms, living rooms, kitchen, study, family, and rumpus rooms) must be constructed as required by the Brisbane City Plan 2014.

Indicative existing floor level - The approximate level in metres AHD of the lowest habitable floor in the existing building (excluding apartments). The data is sourced from a range of sources with varying accuracy levels.

Property - A property will contain 1 or more lots. The multiple lot warning is shown if you have selected a property that contains multiple lots.

Residential flood level (RFL) - This flood level for the Brisbane River equates to the 1% annual exceedance probability (AEP) flood level.

To learn more, visit [Brisbane City Council's Flood Information Hub](#)

Brisbane City Council's Online Flood Tools

Council provides several online flood tools:

- to guide planning and development
- to help residents and businesses understand their flood risk and prepare for flooding.

Council's online flood tools for planning and development purposes include:

- **FloodWise Property Report**
- **Flood Overlay Code**

For more information on Council's planning scheme and online flood tools for planning and development:

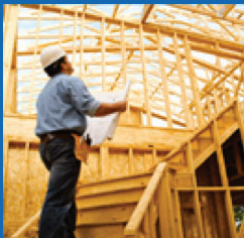
- phone (07) 3403 8888 and ask to talk to a Development Services Planning Information Officer

- visit brisbane.qld.gov.au/planning-building

Council's Planning Scheme - The Brisbane City Plan 2014 (planning scheme) has been prepared in accordance with the Sustainable Planning Act as a framework for managing development in a way that advances the purpose of the Act. In seeking to achieve this purpose, the planning scheme sets out the Council's intention for future development in the planning scheme area, over the next 20 years.

Disclaimer

1. Defined flood levels and residential flood levels, minimum habitable floor levels and indicative existing floor levels are determined from the best available information to Council at the date of issue. These levels, for a particular property, may change if more detailed information becomes available or changes are made in the method of calculating levels.
2. Council makes no warranty or representation regarding the accuracy or completeness of a FloodWise Property Report. Council disclaims any responsibility or liability in relation to the use or reliance by any person on a FloodWise Property Report.



Planning to build or renovate?

For information, guidelines, tools and resources to help you track, plan or apply for your development visit brisbane.qld.gov.au/planning-building

You can also find the Brisbane City Plan 2014 and Neighbourhood Plans as well as other information and training videos to help, with your building and development plans.



6.6 APPENDIX F – CODE RESPONSE TABLES

**BCC Potential and Actual Acid Sulfate Soils Overlay Code – Responses**

Performance outcomes		Acceptable outcomes	Reponses
PO1	Development protects the environmental values and ecological health of receiving waters and does not subject assets to accelerated corrosion.	AO1	Complies with PO1 & AO1
		Development ensures that: (a) no potential or actual acid sulfate soils are disturbed; or Note—This can be demonstrated through the submission of an acid sulfate soil investigation report with reference to the Potential and actual acid sulfate soils planning scheme policy. (b) the disturbance impacts in an area that hosts potential acid sulfate soils are appropriately managed, if less than 500m³ of soil is disturbed and the waterable is not affected; or Note—This can be demonstrated through the submission of an acid sulfate soil investigation report and a preliminary acid sulfate soil management plan, with reference to the Potential and actual acid sulfate soils planning scheme policy. (c) impacts are appropriately managed if 500m³ or more of soil is disturbed or the waterable in an area that hosts potential or actual acid sulfate soils is affected. Note—This can be demonstrated through the submission of an acid sulfate soil investigation report and a full acid sulfate soil management plan, with reference to the Potential and actual acid sulfate soils planning scheme policy using levels of testing commensurate with the level of risk. If the investigation demonstrates that an acid sulfate soil management plan is not required, only an investigation report is required.	An ASS Investigation Report will be developed during Detail Design phase to reference during Construction

**BCC Filling & Excavation Code – Responses**

Performance outcomes	Acceptable outcomes	Responses
PO1 Development for filling or excavation minimises visual impacts from retaining walls and earthworks.	AO1 Development ensures that the total height of any cut and fill, whether or not retained, does not exceed: 2.5m in a zone in the Industry zones category; 1m in all other zones, or if adjoining a sensitive zone.	DOES NOT COMPLY with PO1 & AO1 Earthworks is proposed, with to height of cut retaining >1m – but is in cut and will not impact neighbours. Refer to earthworks plans for details.
PO2 Development of a retaining wall proposed as a result of filling or excavation : is designed and constructed to be fit for purpose; does not impact adversely on significant vegetation; is capable of easy maintenance. Editor's note—A retaining wall also needs to comply with the Building Regulation and embankment gradients will need to comply with the Building Regulation . Note—Guidance on the protection of native vegetation is included in the Biodiversity areas planning scheme policy .	AO2.1 Development of a retaining structure, including footings, surface drainage and subsoil drainage: is wholly contained within the site; if the total height to be retained is greater than 1m, then: the retaining wall at the property boundary is no greater than 1m above the ground level ; all further terracing from the 1m high boundary retaining wall is 1 vertical unit:1 horizontal unit; the distance between each successive retaining wall (back of lower wall to face of higher wall) is no less than 1m horizontally to incorporate planting areas.	DOES NOT COMPLY with PO1 & AO1 Earthworks is proposed, with to height of cut retaining >1m – but is in cut and will not impact neighbours. Refer to earthworks plans for details.
	AO2.2 Development of a retaining wall over 1m in height protects significant vegetation on the site and on adjoining land and is designed and constructed in accordance with the structures standards in the Infrastructure design planning scheme policy and certified by a Registered Professional Engineer Queensland .	NA
	AO2.3 Development provides a retaining wall finish that presents to adjoining land that is maintenance free if the setback is less than 750mm from the boundary.	Complies with PO2 & AO2.3
	AO2.4 Development for filling only uses clean fill that does not include any construction rubble, debris, weed seed or viable parts of plant species listed as an undesirable plant species in the Planting species planning scheme policy .	Complies with PO2 & AO2.4 Refer notes on earthworks plans.
PO3 Development ensures that a rock anchor is designed and constructed to be fit for purpose.	AO3 Development ensures that a rock anchor: is constructed in accordance with the standards in the Infrastructure design planning scheme policy ; where it extends beyond the property boundary, is supported by a letter of consent from the adjoining land and building owners.	NA
PO4 Development protects all services and public utilities.	AO4 Development protects services and public utilities and ensures that any alteration or relocation of services or public utilities meets the standard design specifications of the responsible service authorities.	Complies with PO4 & AO4



PO5 Development provides surface and sub-surface drainage to prevent water seepage, concentration of run-off or ponding of stormwater on adjacent land.	AO5 Development ensures all flows and subsoil drainage are directed to a lawful point of discharge of a surface water diversion drain, including to the top or toe of a retaining wall in accordance with the stormwater drainage section of the Infrastructure design planning scheme policy .	Complies with PO5 & AO5 Retaining Walls will drain to existing drainage infrastructure, or otherwise have seep holes at base
PO6 Development ensures that the design and construction of all open drainage works is undertaken in accordance with natural channel design principles, being the development of a stormwater conveyance system for major flows, by using a vegetated open channel or drain that approximates the features and functions of a natural waterway to enhance or improve riparian values of those stormwater conveyance systems. Editor's note—Guidance on natural channel design principles can be found in the Council's publication Natural channel design guidelines .	AO6 Filling or excavation does not involve the construction of open drainage.	Complies with PO6 & AO6
PO7 Development for filling or excavation : does not degrade water quality or adversely affect environmental values in receiving waters; ensures site sediment and erosion control standards are best practice.	AO7.1 Development for filling or excavation provides water quality treatment that complies with the stormwater drainage section of the Infrastructure design planning scheme policy . AO7.2 Development provides erosion and sediment control standards that are in accordance with the stormwater drainage section of the Infrastructure design planning scheme policy .	Complies with PO7 & AO7.1 Details to be nominated post DA within ESC plans Complies with PO7 & AO7.2 Details to be nominated post DA within ESC plans
PO8 Development for filling or excavation is conducted such that adverse impacts at a sensitive use due to noise and dust are prevented or minimised. Note—A noise and dust impact management plan prepared in accordance with the Management plans planning scheme policy can assist in demonstrating achievement of this performance outcome.	AO8.1 Development ensures that no dust emissions extend beyond the boundary of the site, including dust from construction vehicles entering and leaving the site. AO8.2 Development for filling or excavation activity only occurs between the hours of 6:30am and 6:30pm Monday to Saturday, excluding public holidays.	Complies with PO8 & AO8.1 Details to be nominated post DA within ESC plans Complies with PO8 & AO8.2
PO9 Development ensures that vibration generated by the filling or excavation operation does not exceed the vibration criteria in Table 9.4.3.3.B , Table 9.4.3.3.C , Table 9.4.3.3.D and Table 9.4.3.3.E . Note—A noise management report prepared in accordance with the Noise impact assessment planning scheme policy can assist in demonstrating achievement of this performance outcome.	AO9 Development involving filling or excavation does not cause a ground-borne vibration beyond the boundary of the site.	Complies with PO9 & AO9
PO10 Development ensures that heavy trucks hauling material to and from the site do not affect the amenity of established areas and limits environmental nuisance impact on adjacent land.	AO10 Development ensures that heavy trucks hauling material to and from the site: occur for a maximum of 3 weeks; use a major road to access the site;	Complies with PO10 & AO10



PO11 Development for filling or excavation protects the environment and community health and wellbeing from exposure to contaminated land and contaminated material.	only use a minor road for the shortest-most-direct route that has the least amount of environmental nuisance if there is no major road alternative.	
PO12 Development provides for: landscaping for water conservation purposes; water sensitive urban design measures which are employed within the landscape design to maximise stormwater use and to reduce any adverse impacts on the landscape; stormwater harvesting to be maximised and any adverse impacts of stormwater minimised.	AO11 Development does not involve: excavation on land previously occupied by a notifiable activity or on land listed on the Environmental Management Register or the Contaminated Land Register ; filling with material containing a contaminant.	Complies with PO11 & AO11
PO12 Development provides for: landscaping for water conservation purposes; water sensitive urban design measures which are employed within the landscape design to maximise stormwater use and to reduce any adverse impacts on the landscape; stormwater harvesting to be maximised and any adverse impacts of stormwater minimised.	AO12.1 Development provides landscaping which is designed using the standards in the Landscape design guidelines for water conservation planning scheme policy .	Complies with PO12 & AO12.1
PO12 Development provides for: landscaping for water conservation purposes; water sensitive urban design measures which are employed within the landscape design to maximise stormwater use and to reduce any adverse impacts on the landscape; stormwater harvesting to be maximised and any adverse impacts of stormwater minimised.	AO12.2 Development ensures that the design and requirements for irrigation are in compliance with the standards in the Landscape design guidelines for water conservation planning scheme policy .	Complies with PO12 & AO12.2
PO12 Development provides for: landscaping for water conservation purposes; water sensitive urban design measures which are employed within the landscape design to maximise stormwater use and to reduce any adverse impacts on the landscape; stormwater harvesting to be maximised and any adverse impacts of stormwater minimised.	AO12.3 Development provides areas of pavement, turf and mulched garden beds which are drained. Note— This may be achieved through the provision and/or treatment of swales, spoon drains, field gullies, sub-surface drainage and stormwater connections.	Complies with PO12 & AO12.3
PO13 Development ensures cutting and filling for the development of canals or artificial waterways avoids adverse impacts on coastal resources and processes.	AO13 Development does not involve the creation of canals or artificial waterways.	NA



BCC Infrastructure Design Code – Responses

Performance outcomes	Acceptable outcomes	Response
PO1 Development provides roads, pavement, edging and landscaping which: are designed and constructed in accordance with the road hierarchy; provide for safe travel for pedestrians, cyclists and vehicles; provide access to properties for all modes; provide utilities; provide high levels of aesthetics and amenity, improved liveability and future growth; provide for the amelioration of noise and other pollution; provide a high-quality streetscape; provide a low-maintenance asset with a minimal whole-of-life cost. Note—This can be demonstrated in an engineering report prepared and certified by a Registered Professional Engineer Queensland in accordance with the infrastructure design planning scheme policy .	AO1 Development provides roads and associated pavement, edging and landscaping which are designed and constructed in compliance with the road corridor design standards in the infrastructure design planning scheme policy .	Complies with PO1 & AO1 BCC standard crossovers will be constructed to service proposed development
PO2 Development provides road pavement surfaces which: are well designed and constructed; durable enough to carry the wheel loads of the intended types and numbers of travelling and parked vehicles; ensures the safe passage of vehicles, pedestrians and cyclists, the discharge of stormwater run-off and the preservation of all-weather access; allows for reasonable travel comfort.	AO2 Development provides road pavement surfaces which are designed and constructed in compliance with the road corridor design standards in the infrastructure design planning scheme policy .	Complies with PO2 & AO2
PO3 Development provides a pavement edge which is designed and constructed to: control vehicle movements by delineating the carriageway for all users; provide for people with disabilities by allowing safe passage of wheelchairs and other mobility aids.	AO3 Development provides pavement edges which are designed and constructed in compliance with the road corridor design standards in the infrastructure design planning scheme policy .	Complies with PO3 & AO3
PO4 Development provides verges which are designed and constructed to: provide safe access for pedestrians clear of obstructions and access areas for vehicles onto properties; provide a sufficient area for public utility services; be maintainable by the Council.	AO4 Development provides verges which are designed and constructed in compliance with the road corridor design and streetscape locality advice standards in the infrastructure design planning scheme policy .	Complies with PO4 & AO4
PO5	AO5	NA



Development provides a lane or laneway identified on the Streetscape hierarchy overlay map or in a neighbourhood plan which allows equitable access for all modes; is safe and secure; has 24-hour access; is a low-speed shared zone environment; has a high-quality streetscape.	Development provides a lane or laneway identified on the Streetscape hierarchy overlay map or in a neighbourhood plan which is embellished in compliance with the streetscape locality advice standards in the Infrastructure design planning scheme policy.	
PO6 Development of an existing premises provides at the frontage to the site, if not already provided, the following infrastructure to an appropriate urban standard: - an effective, high-quality paved roadway; - an effective, high-quality roadway kerb and channel; - safe, high-quality vehicle crossings over channels and verges; - safe, accessible, high-quality verges compatible and integrated with the surrounding environment; - safe vehicle access to the site that enables ingress and egress in a forward gear; - provision of and required alterations to public utilities; - effective drainage; - appropriate conduits to facilitate the provision of required street-lighting systems and traffic signals.	AO6 Development of an existing premises provides at the frontage of the site, if not already existing, the following infrastructure to the standard that would have applied if the development involved new premises as stated in the road corridor design standards in the Infrastructure design planning scheme policy: - concrete kerb and channel; - forming and grading to verges; - crossings over channels and verges; - a constructed bikeway; - a constructed verge or reconstruction of any damaged verge; - construction of the carriageway; - payment of costs for required alterations to public utility mains, services or installations; - construction of and required alterations to public utility mains, services or installations; - drainage works; - installation of electrical conduits.	Complies with PO6 & AO6
PO7 Development provides both cycle and walking routes which: - are located, designed and constructed to their network classification (where applicable); - provide safe and attractive travel routes for pedestrians and cyclists for commuter and recreational purposes; - provide safe and comfortable access to properties for pedestrians and cyclists; - incorporate water sensitive urban design into stormwater drainage; - provide for utilities; - provide for a high level of aesthetics and amenity, improved liveability and future growth; - are a low-maintenance asset with a minimal whole-of-life cost; - minimise the clearing of significant native vegetation. Note— This can be demonstrated in an engineering report prepared and certified by a Registered Professional Engineer Queensland in accordance with the Infrastructure design planning scheme policy.	AO7 Development provides cycle and walking routes which are located, designed and constructed in compliance with the road corridor design and off-road pathway design standards in the Infrastructure design planning scheme policy.	NA



PO8 Development provides refuse and recycling collection, separation and storage facilities that are located and managed so that adverse impacts on building occupants, neighbouring properties and the public realm are minimised.	AO8.1 Development provides refuse and recycling collection and storage facilities in accordance with the Refuse planning scheme policy .	Complies with PO8 & AO8.1
	AO8.2 Development ensures that refuse and recycling collection and storage location and design do not have any adverse impact including odour, noise or visual impacts on the amenity of land uses within or adjoining the development. Note—Refer to the Refuse planning scheme policy for further guidance.	Complies with PO8 & AO8.2
PO9 Development ensures that: land used for an urban purpose is serviced adequately with regard to water supply and waste disposal; the water supply meets the stated standard of service for the intended use and fire-fighting purposes.	AO9.1 Development ensures that the reticulated water and sewerage distribution system for all services is in place before the first use is commenced.	Complies with PO9 & AO9.1 <i>Via QUU process</i>
	AO9.2 Development provides the lot with reticulated water supply and sewerage to a standard acceptable to the distributor—retailer.	Complies with PO9 & AO9.2 <i>Via QUU process</i>
PO10 Development provides public utilities and street lighting which are the best current or alternative technology and facilitate accessibility, easy maintenance, minimal whole-of-life costs, and minimal adverse environmental impacts.	AO10.1 Development provides public utilities and street lighting which are located and aligned to: avoid significant native vegetation and areas identified within the Biodiversity areas overlay map ; minimise earthworks; avoid crossing waterways, waterway corridors and wetlands or if a crossing is unavoidable, tunnel-boring techniques are used to minimise disturbance, and a disturbed area is reinstated and restored on completion of the work. Note—Guidance on the restoration of habitat is included in the Biodiversity areas planning scheme policy .	Complies with PO10 & AO10.1 Will comply as required
	AO10.2 Development provides compatible public utility services and street-lighting services which are co-located in common trenching for underground services.	Complies with PO10 & AO10.2 Will comply as required
	AO10.3 Development provides public utilities and street lighting which are designed and constructed in compliance with the public utilities standards in the Infrastructure design planning scheme policy .	Complies with PO10 & AO10.3 Will comply as required
PO11 Development ensures that land used for urban purposes is serviced adequately with telecommunications and energy supply.	AO11 Development provides land with the following services to the standards of the approved supplier: electricity; telecommunications services; gas service where practicable.	Complies with PO11 & AO11 Will comply as required
PO12	AO12 Development provides conduits which are provided in all major Council and government works projects to enable the future provision of fibre optic cabling, if:	NA



Development ensures that major public projects promote the provision of affordable, high-bandwidth telecommunications services throughout the city.	the additional expense is unlikely to be prohibitive; or further major work is unlikely or disruption would be a major concern, such as where there is a limited capacity road; or there is a clear gap in the telecommunications network; or there is a clear gap in the bandwidth available to the area. Editor's note—An accurate, digital 'as built' three-dimensional location plan is to be supplied for all infrastructure provided in a road.	
PO13 Development provides public art identified in a neighbourhood plan or park concept plan which: is provided commensurate with the status and scale of the proposed development; is sited and designed: as an integrated part of the project design; as conceptually relevant to the context of the location; to reflect and respond to the cultural values of the community; to promote local character in a planned and informed manner.	AO13 Development provides public art identified in a neighbourhood plan or park concept plan which is sited and designed in compliance with the public art standards in the Infrastructure design planning scheme policy .	NA
PO14 Development provides signage of buildings and spaces which promote legibility to help users find their way.	AO14 Development provides public signage: at public transport interchanges and stops, key destinations, public spaces, pedestrian linkages and at entries to centre developments; which details the location of the key destinations, public spaces and pedestrian linkages in the vicinity, the services available within the development and where they are located. Editor's note—Signage is to be in accordance with Local Law Number 1 (Control of Advertisements Local Law) .	NA
PO15 Development that provides community facilities which form part of the development is functional, safe, low maintenance, and fit for purpose.	AO15 Development that provides community facilities which form part of the development is designed in compliance with the community facilities standards in the Infrastructure design planning scheme policy .	NA
PO16 Development provides public toilets which: are required as part of a community facility or park; are located, designed and constructed to be: safe; durable; resistant to vandalism; able to service expected demand; fit for purpose.	AO16 Development that provides public toilets is designed and constructed in compliance with the public toilets standards in the Infrastructure design planning scheme policy .	NA
PO17	AO17	NA



Development provides bridges, tunnels, elevated structures and water access structures that are designed and constructed using proven methods, materials and technology to provide for: - safe movement of intended users; - an attractive appearance appropriate to the general surroundings and any adjacent structures; - functionality and easy maintenance; - minimal whole-of-life cost; - longevity; - current and future services. Note—All bridges and elevated and associated elements must be designed and certified by a Registered Professional Engineer Queensland in accordance with the Infrastructure design planning scheme policy.	Development that provides bridges, tunnels, elevated structures and water access structures is designed and constructed in compliance with the standards in the Infrastructure design planning scheme policy.	
PO18 Development provides culverts which are designed and constructed using proven methods, materials and technology to provide for: - safety; - an attractive appearance appropriate to the general surroundings; - functionality and easy maintenance; - minimal whole-of-life cost; - longevity; - future widening; - current and future services; - minimal adverse impacts, such as increase in water levels or flow velocities, and significant change of flood patterns. Note—All culverts and associated elements are to be designed and certified by a Registered Professional Engineer Queensland in accordance with the applicable design standards.	AO18 Development that provides culverts is designed and constructed in compliance with the structures standards in the Infrastructure design planning scheme policy.	NA
PO19 Development provides batters, retaining walls, and seawalls and river walls which are designed and constructed using proven methods, materials and technology to provide for: - safety; - an attractive appearance appropriate to the surrounding area; - easy maintenance; - minimal whole-of-life cost; - longevity; - minimal water seepage.	AO19 Development that provides batters, retaining walls, seawalls and river walls is designed and constructed in compliance with the structures standards in the Infrastructure design planning scheme policy.	Complies with PO19 & AO19 Will comply



Note—All retaining walls and associated elements are to be designed and certified by a Registered Professional Engineer Queensland in accordance with the applicable design standards.		
If for development with a gross floor area greater than 1,000m² PO20 Development ensures that construction is managed so that use of public spaces and movement on pedestrian, cyclist and other traffic routes is not unreasonably disrupted and existing landscaping is adequately protected from short- and long-term impacts. Note—The preparation of a construction management plan can assist in demonstrating achievement of this performance outcome. Note—The Transport, access, parking and servicing planning scheme policy provides advice on the management of vehicle parking and deliveries during construction.	AO20 Development ensures that during construction: the ongoing use of adjoining and surrounding parks and public spaces, such as malls and outdoor dining, is not compromised; adjoining and surrounding landscaping is protected from damage; safe, legible, efficient and sufficient pedestrian, cyclist and vehicular accessibility and connectivity to the wider network are maintained.	NA
PO21 Development ensures that construction and demolition activities are guided by measures that prevent or minimise adverse impacts including sleep disturbance at a sensitive use, due to noise and dust, including dust from construction vehicles entering and leaving the site. Note—A noise and dust impact management plan prepared in accordance with the Management plans planning scheme policy can assist in demonstrating achievement of this performance outcome.	AO21.1 Development ensures that demolition and construction: only occur between 6:30am and 6:30pm Monday to Saturday, excluding public holidays; do not occur over periods greater than 6 months. AO21.2 Development including construction and demolition does not release dust emissions beyond the boundary of the site. AO21.3 Development construction and demolition does not involve asbestos-containing materials.	
PO22 Development ensures that: construction and demolition do not result in damage to surrounding property as a result of vibration; vibration levels achieve the vibration criteria in Table 9.4.4.3.B, Table 9.4.4.3.C, Table 9.4.4.3.D and Table 9.4.4.3.E. Note—A vibration impact assessment report prepared in accordance with the Noise impact assessment planning scheme policy can assist in demonstrating achievement of this performance outcome.	AO22 Development ensures that the nature and scale of construction and demolition do not generate noticeable levels of vibration.	
If for a material change of use or reconfiguring a lot in an urban area (as defined in the Regulation) involving premises that is, or will be, accessed by common private title, where involving buildings, either attached or detached, that are not covered by other legislation mandating fire hydrants		na
PO23 Development ensures that fire hydrants are: installed and located to enable fire services to access water safely, effectively and efficiently; suitably identified so that fire services can locate them at all hours.	AO23.1 Above or below ground fire hydrants are provided on residential, commercial and industrial streets and private roads, at not more than 90m intervals, and at each street intersection. Note—On residential streets, above ground fire hydrants may be single outlet. On commercial and industrial streets above ground fire hydrants should have dual valved outlets.	Complies with PO & AO



		AO23.2 Fire hydrants are identified by: raised reflectorised pavement markers (RRPM) on sealed roads; marker posts at the fence line where on an unsealed road, as road (HR) or path (HP) hydrants.	
PO24 Development ensures road widths and construction within the development, are adequate for refuse vehicles and for fire emergency vehicles to gain access to a safe working area close to buildings and near water supplies whether or not on-street parking spaces are occupied.		AO24 Internal private roads have a minimum roadway clearance between obstructions of 3.5m wide and 4.8m high in addition to any width required for on-street parking.	
Development for major electricity infrastructure and bulk water supply infrastructure identified on the State Planning Policy Interactive Mapping System where not in the Utility services zone precinct of the Special purpose zone			NA
PO25 Development avoids or otherwise minimises adverse impacts on surrounding land uses through the use of buffers and setbacks and the appropriate design and location of plant and operational areas within the site.		AO25 No acceptable outcome is prescribed.	
Development potentially impacting on major electricity infrastructure and bulk water supply infrastructure identified on the State Planning Policy Interactive Mapping System where the infrastructure is not in the Utility services zone precinct of the Special purpose zone			NA
PO26 Development is sited and designed to: avoid safety risks to people or property; minimise noise and visual impacts to people and property; ensure the physical integrity and operation, maintenance and expansion of the infrastructure is not compromised.		AO26 No acceptable outcome is prescribed.	

**BCC Stormwater Code - Responses**

Performance outcomes		Acceptable outcomes	Response
Section A—if for a material change of use, reconfiguring a lot, operational work or building work Note—Compliance with the performance outcomes and acceptable outcomes in this section should be demonstrated by the submission of a site-based stormwater management plan for high risk development only.			
PO1 Development provides a stormwater management system which achieves the integrated management of stormwater to: minimise flooding; protect environmental values of receiving waters; maximise the use of water sensitive urban design; minimise safety risk to all persons; maximise the use of natural waterway corridors and natural channel design principles. Editor's note—The stormwater management system to be developed to address PO1 is not intended to require management of stormwater quality.	AO1 Development provides a stormwater management system designed in compliance with the Infrastructure design planning scheme policy .	Complies with PO1 & AO1 Refer stormwater layout within civil services schematics	
PO2 Development ensures that the stormwater management system and site work does not adversely impact flooding or drainage characteristics of premises which are up slope, down slope or adjacent to the site.	AO2.1 Development does not result in an increase in flood level or flood hazard on up slope, down slope or adjacent premises.	Complies with PO2 & AO2.1 Refer stormwater layout within civil services schematics	Complies with PO2 & AO2.2 Refer stormwater layout within civil services schematics
	AO2.2 Development provides a stormwater management system which is designed in compliance with the standards in the Infrastructure design planning scheme policy .		
PO3 Development ensures that the stormwater management system does not direct stormwater run-off through existing or proposed lots and property where it is likely to adversely affect the safety of, or cause nuisance to properties.	AO3.1 Development ensures that the location of the stormwater drainage system is contained within a road reserve, drainage reserve, public pathway, park or waterway corridor.	Complies with PO3 & AO3.1 Refer stormwater layout within civil services schematics. Proposal will not trigger nuisance flows	Complies with PO3 & AO3.2 Refer stormwater layout within civil services schematics Complies with PO3 & AO3.3 Refer stormwater layout within civil services schematics Complies with PO3 & AO3.4 Refer stormwater layout within civil services schematics
	AO3.2 Development provides a stormwater management system which is designed in compliance with the standards in the Infrastructure design planning scheme policy .		
	AO3.3 Development obtains a lawful point of discharge in compliance with the standards in the Infrastructure design planning scheme policy .		
	AO3.4 Where on private land, all underground stormwater infrastructure is secured by a drainage easement.		



P04 Development provides a stormwater management system which has sufficient capacity to safely convey run-off taking into account increased run-off from impervious surfaces and flooding in local catchments.	AO4.1 Development provides a stormwater conveyance system which is designed to safely convey flows in compliance with the standards in the Infrastructure design planning scheme policy.	Complies with PO4 & AO4.1 Refer stormwater layout within civil services schematics
	AO4.2 Development provides sufficient area to convey run-off which will comply with the standards in the Infrastructure design planning scheme policy.	Complies with PO4 & AO4.2 Refer stormwater layout within civil services schematics
P05 Development designs stormwater channels, creek modification works, bridges, culverts and major drains to protect and enhance the value of the waterway corridor or drainage path for fauna movement.	AO5 Development ensures the design of stormwater channels, creek modifications or other infrastructure, permits terrestrial and aquatic fauna movement.	NA
P06 Development ensures that location and design of stormwater detention and water quality treatment: (a) minimises risk to people and property; (b) provides for safe access and maintenance; (c) minimises ecological impacts to creeks and waterways.	AO6.1 Development locates stormwater detention and water quality treatment outside of a waterway corridor; offline to any catchment not contained within the development.	Complies with PO6 & AO6.1 Refer stormwater layout within civil services schematics
	AO6.2 Development providing for stormwater detention and water quality treatment devices are designed in compliance with the standards in the Infrastructure design planning scheme policy.	Complies with PO6 & AO6.2 Refer stormwater layout within civil services schematics
P07 Development is designed, including any car parking areas and channel works to: (a) reduce property damage; (b) provide safe access to the site during the defined flood event.	AO7.1 Development (including any ancillary structures and car parking areas) is located above minimum flood immunity levels in Table 9.4.9.3.B, Table 9.4.9.3.C, Table 9.4.9.3.D, Table 9.4.9.3.E and Table 9.4.9.3.F. Note—Compliance with this acceptable outcome can be demonstrated by the submission of a hydraulic and hydrology report identifying flood levels and development design levels (as part of a site-based stormwater management plan).	Complies with PO3 & AO3.4 Refer stormwater layout within civil services schematics
	AO7.2 Development including the road network provides a stormwater management system that provides safe pedestrian and vehicle access in accordance with the standards in the Infrastructure design planning scheme policy.	Complies with PO7 & AO7.2 Access is safe during storm event
P08 Development designs stormwater channels, creek modification works and the drainage network to protect and enhance the environmental values of the waterway corridor or drainage path.	AO8.1 Development ensures natural waterway corridors and drainage paths are retained.	Complies with PO8 & AO8.1 Refer stormwater layout within civil services schematics
	AO8.2 Development provides the required hydraulic conveyance of the drainage channel and floodway, while maximising its potential to maximise environmental benefits and minimise scour.	Complies with PO8 & AO8.2 Refer stormwater layout within civil services schematics



PO9 Development is designed to manage run-off and peak flows by minimising large areas of impervious material and maximising opportunities for capture and re-use.	Editor's note—Guidance on natural channel design principles can be found in the Council's publication Natural channel design guidelines .	
	AO8.3 Development provides stormwater outlets into waterways, creeks, wetlands and overland flow paths with energy dissipation to minimise scour in compliance with the standards in the Infrastructure design planning scheme policy.	NA
	AO8.4 Development ensures that the design of modifications to the existing design of new stormwater channels, creeks and major drains is in compliance with the standards in the Infrastructure design planning scheme policy.	NA
	AO9 No acceptable outcome is prescribed.	Complies with PO9 & AO9 Refer stormwater layout within civil services schematics. Post-Dev impervious are not considered 'large'.
PO10 Development ensures that there is sufficient site area to accommodate an effective stormwater management system. Note—Compliance with the performance outcome should be demonstrated by the submission of a site-based stormwater management plan for high-risk development only.	AO10 No acceptable outcome is prescribed.	Complies with PO10 & AO10 Refer stormwater layout within civil services schematics
	PO11 Development provides for the orderly development of stormwater infrastructure within a catchment, having regard to the: (a) existing capacity of stormwater infrastructure within and external to the site, and any planned stormwater infrastructure upgrades; (b) safe management of stormwater discharge from existing and future up-slope development; (c) implication for adjacent and down-slope development.	Complies with PO11 & AO11.1 Refer stormwater layout within civil services schematics
PO12 Development provides stormwater infrastructure which: (a) remains fit for purpose for the life of the development and maintains full functionality in the design flood event; (b) can be safely accessed and maintained cost effectively; (c) ensures no structural damage to existing stormwater infrastructure.	AO11.2 Development ensures that existing stormwater infrastructure that is undersized is upgraded in compliance with the Infrastructure design planning scheme policy.	Complies with PO3 & AO3.4 There is no stormwater infrastructure on site
	AO12.1 The stormwater management system is designed in compliance with the Infrastructure design planning scheme policy.	Complies with PO12 & AO12.1 Refer stormwater layout within civil services schematics
	AO12.2 Development provides a clear area with a minimum of 2m radius from the centre of an existing manhole cover and with a minimum height clearance of 2.5m.	Will Complies with PO12 & AO12.2 Refer stormwater layout within civil services schematics
PO13 Development ensures that all reasonable and practicable measures are taken to manage the impacts of erosion, turbidity and sedimentation, both within and external to the development site from construction activities, including vegetation	AO13 No acceptable outcome is prescribed.	Complies with PO13 & AO13 Refer stormwater layout within civil services schematics



clearing, earthworks, civil construction, installation of services, rehabilitation, revegetation and landscaping to protect: (a) the environmental values and water quality objectives of waters; (b) waterway hydrology; the maintenance and serviceability of stormwater infrastructure. Note—The Infrastructure design planning scheme policy outlines the appropriate measures to be taken into account to achieve the performance outcome.			
PO14 Development ensures that: (a) unnecessary disturbance to soil, waterways or drainage channels is avoided; (b) all soil surfaces remain effectively stabilised against erosion in the short and long term.	AO14 No acceptable outcome is prescribed.	Complies with PO14 & AO14 Refer stormwater layout within civil services schematics	
PO15 Development does not increase: (a) the concentration of total suspended solids or other contaminants in stormwater flows during site construction; (b) run-off which causes erosion either on site or off site.	AO15 No acceptable outcome is prescribed.	Complies with PO15 & AO15 Details to be supplied during Detailed Design within ESC plans. Run-off will no cause erosion.	
Section B—Additional performance outcomes and acceptable outcomes which apply to high-risk development, being one or more of the following: (a) a material change of use for an urban purpose which involves greater than 2,500m ² of land that: (i) will result in an impervious area greater than 25% of the net developable area; or (ii) will result in 6 or more dwellings. (b) reconfiguring a lot for an urban purpose that involves greater than 2,500m ² of land and will result in 6 or more lots; (c) operational work for an urban purpose which involves disturbing greater than 2,500m ² of land.			
PO16 Development ensures that the entry and transport of contaminants into stormwater is avoided or minimised to protect receiving water environmental values. Note—Prescribed water contaminants are defined in the Environmental Protection Act 1994 . Note—Compliance with the performance outcome should be demonstrated by the submission of a site-based stormwater management plan for high-risk development only.	AO16 Development provides a stormwater management system which is designed in compliance with the standards in the Infrastructure design planning scheme policy .		
PO17 Development ensures that: (a) the discharge of wastewater to a waterway or external to the site is avoided; or (b) if the discharge cannot practicably be avoided, the development minimises wastewater discharge through re-use, recycling, recovery and treatment. Note—The preparation of a wastewater management plan can assist in demonstrating achievement of this performance outcome.	AO17 No acceptable outcome is prescribed.		



Editor's note—This code does not deal with sewerage which is the subject of the Wastewater code.		
Section C—Additional performance outcomes and acceptable outcomes for assessable development for a material change of use or reconfiguring a lot PO18 Development protects stormwater infrastructure to ensure the following are not compromised: (a) the long term infrastructure for the stormwater network in the Long term infrastructure plans; (b) the existing and planned infrastructure for the stormwater network in the Local government infrastructure plan; (c) the provision of long term, existing and planned infrastructure for the stormwater network which: (i) is required to service the development or an existing and future urban development in the planning scheme area; or (ii) is in the interests of rational development or the efficient and orderly planning of the general area in which the site is situated. Editor's note—A condition which requires a proposed development to keep permanent improvements and structures associated with the approved development clear of the area of long term infrastructure, may be imposed.	AO18 Development protects stormwater infrastructure in compliance with the following: (a) for long term infrastructure for the stormwater network, the Long term infrastructure plans; (b) for existing and planned infrastructure for the stormwater network, the Local government infrastructure plan; (c) the standards for stormwater drainage in the Infrastructure design planning scheme policy.	Complies with PO18 & AO18 Refer stormwater layout within civil services schematics
PO19 Development provides for the payment of extra trunk infrastructure costs for the following: (a) for development completely or partly outside the priority infrastructure area in the Local government infrastructure plan; (b) for development completely inside the priority infrastructure area in the Local government infrastructure plan involving: (i) trunk infrastructure that is to be provided earlier than planned in the Local government infrastructure plan; (ii) long term infrastructure for the stormwater network which is made necessary by development that is not assumed future urban development; (iii) other infrastructure for the stormwater network associated with development that is not assumed future urban development which is made necessary by the development. Editor's note—The payment of extra trunk infrastructure costs for development completely inside the priority infrastructure area in the Local government infrastructure plan is to be worked out in accordance with the Charges Resolution. Editor's note—See section 130 Imposing Development conditions (Conditions for extra trunk infrastructure costs) of the Planning Act 2016.	AO19 No acceptable outcome is prescribed.	NA Site is outside LGIP



6.7 APPENDIX G – BCC E&SC EHA FORM



Erosion Hazard Assessment - June 2014

Brisbane City Council (BCC), *Erosion Hazard Assessment* form must be read in conjunction with the *Erosion Hazard Assessment- Supporting Technical Notes* (June 2014 or later version) for explanatory terms and Certification information.

What is an Erosion Hazard Assessment?

Soil erosion and sediment from urban development, particularly during construction activities, is a significant source of sediment pollution in Brisbane's waterways. The Erosion Hazard Assessment determines whether the risk of soil erosion and sediment pollution to the environment is 'low', 'medium' or 'high'.

When is the EHA required?

An *Erosion Hazard Assessment* form must be completed and lodged with BCC for any Development Application (ie MCU or ROL) that will result in soil disturbance OR Operational Works or Compliance Assessment Application for 'Filling' or Excavation.

Failure to submit this form during lodgement of an application may result in assessment delays or refusal of the application.

Privacy Statement

The personal information collected on this form will be used by Brisbane City Council for the purposes of fulfilling your request and undertaking associated Council functions and services. Your personal information will not be disclosed to any third party without your consent, unless this is required or permitted by law.

Assessment Details

1 Please turn over and complete the erosion hazard assessment.

2 Based on the erosion hazard assessment overleaf, is the site:

☐ A 'low' risk site

Best practice erosion and sediment control (ESC) must be implemented but no erosion and sediment control plans need to be submitted with the development application. Factsheets outlining best practice ESC can be found at <http://www.waterbydesign.com.au/factsheets>

☒ A 'medium' risk site

If the development is approved, the applicant will need to engage a Registered Professional Engineer (RPEQ) or Certified Professional in Erosion and Sediment Control (CPESC) to prepare an ESC Program and Plan and supporting documentation — in accordance with the requirements of the Infrastructure Design Planning Scheme Policy.

☐ A 'high' risk site

If the development is approved, the applicant will need to engage a RPEQ and CPESC to prepare an ESC Program and Plan and supporting documentation — in accordance with the requirements of the Infrastructure Design Planning Scheme Policy. The plans and program will need to be certified by a CPESC.

3 Site Information and Certification

Application number (if known)

Site address

Site 18B, 260 Macarthur Avenue

Hamilton

Postcode 4110

I certify that:

- ☒ I have made all relevant enquiries and am satisfied no matters of significance have been withheld from the assessment manager.
- ☒ I am a person with suitable qualifications and/or experience in erosion and sediment control.
- ☒ The Erosion Hazard Assessment was completed in accordance with the Erosion Hazard Assessment Supporting Technical Notes and the BCC Infrastructure Design Planning Scheme Policy.
- ☒ The Erosion Hazard Assessment accurately reflects the site's overall risk of soil erosion and sediment pollution to the environment.
- ☒ I acknowledge and accept that the BCC, as assessment manager, relies, in good faith, on this certification as part of its development assessment process and the provision of false or misleading information to the BCC constitutes an offence for which BCC may take punitive steps/ action against me/ enforcement action against me.

Certified by *Print name*

MITCH BLYTH

Certifier's signature

Date

31 / 01 / 2025

Table 1: Low Risk Test

		Yes	No
1.1	is the area of land disturbance > 1000 m ²	☒	☐
1.2	does any land disturbance occur in a BCC mapped waterway corridor	☐	☒
1.3	is there any slope on site (longer than three metres in length) before, during or after construction that is steeper than 5%	☐	☒
1.4	does any land disturbance occur below 5 m AHD	☐	☒
1.5	does development involve endorsement of a staging plan	☐	☒
1.6	is there an upstream catchment passing through the site > 1 hectare	☐	☒

Have you answered 'yes' to any of the questions in Table 1?

Yes	No
☒	☐

If 'No' then site is low risk with respect to erosion and sediment control

If 'Yes' then proceed to Table 2

Table 2: Medium Risk Test

		Yes	No
2.1	is the area of land disturbance > 1 hectare	☐	☒

If 'No' then site is medium risk with respect to erosion and sediment control

If 'Yes' then proceed to Table 3

Table 3: High Risk Test

3.1	is there an upstream catchment passing through the site > 1 hectare	☐	☐
3.2	does any land disturbance occurs in a BCC mapped waterway corridor	☐	☐
3.3	is there any slope on site (longer than three metres in length) before, during or after construction that is steeper than 15%	☐	☐

Have you answered 'yes' to any of the questions in Table 3?

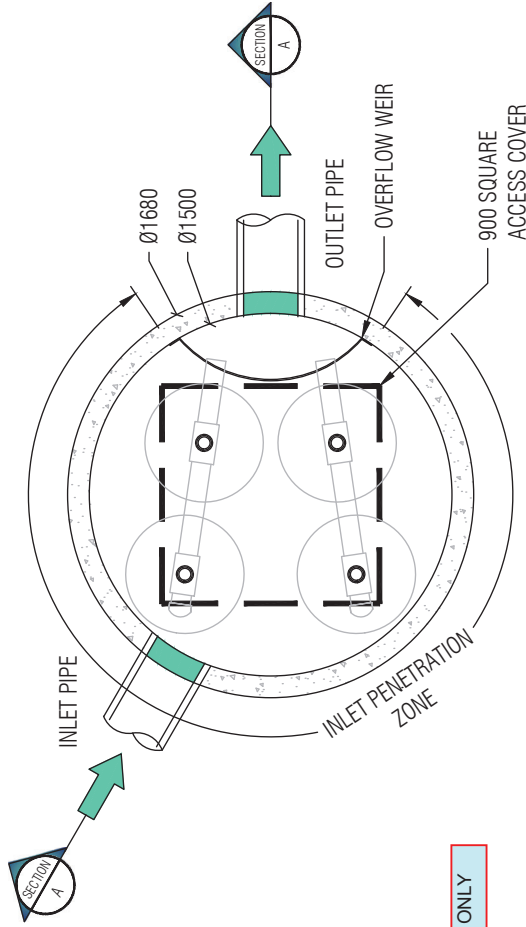
Yes	No
☐	☐

If 'No' then site is medium risk with respect to erosion and sediment control

If 'Yes' then site is high risk with respect to erosion and sediment control



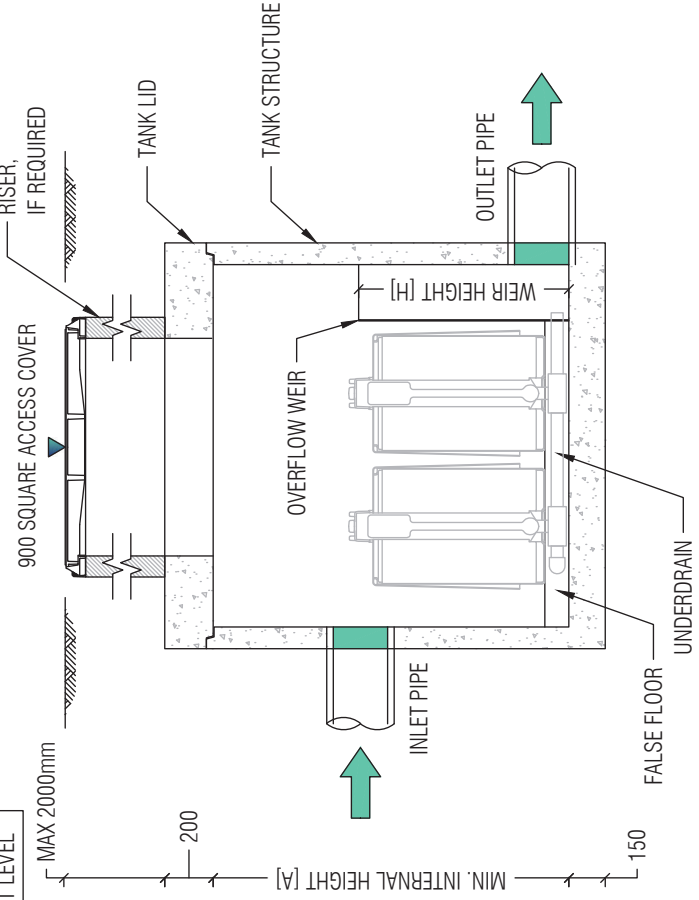
6.8 APPENDIX H – OCEAN PROTECT DEVICE INFORMATION



PLAN LAYOUT

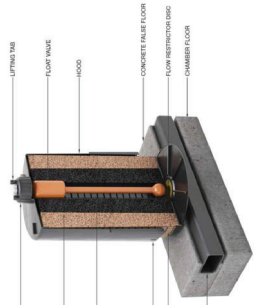
EXAMPLE ONLY

INLET INVERT LEVEL
MINIMUM 100mm ABOVE
OUTLET INVERT LEVEL



SECTION A

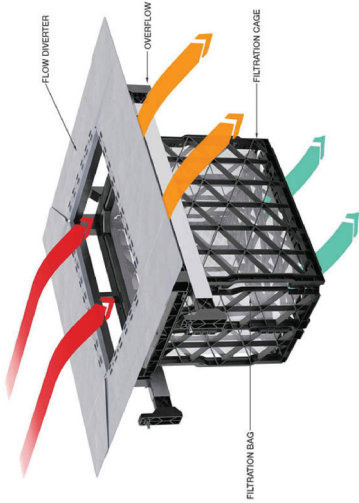
STORMFILTER DESIGN PARAMETERS

	- STORMFILTER TREATMENT CAPACITY VARIES BY NUMBER OF FILTER CARTRIDGES INSTALLED. - THE STANDARD CONFIGURATION IS SHOWN. ACTUAL CONFIGURATION OF THE SPECIFIED STRUCTURE(S) PER CERTIFYING ENGINEER WILL BE SHOWN ON SUBMITTAL DRAWING(S). - FILTER CARTRIDGES SHALL BE MEDIA-FILLED, PASSIVE, SIPHON ACTUATED, RADIAL FLOW, AND SELF-CLEANING. RADIAL MEDIA DEPTH SHALL BE 178mm.	
	NUMBER OF CARTRIDGES	UP TO 4
	HYDRAULIC CAPACITY (L/s)	90
	MAX. COMPONENT WEIGHT (kg)	7000
	TANK LID WEIGHT (kg)	900
*FIGS. VARIABLE		
CARTRIDGE NAME / SIPHON HEIGHT (mm)		690
CARTRIDGE PHYSICAL HEIGHT (mm)		840
TYPICAL WEIR HEIGHT [H] (mm)		920
MINIMUM INTERNAL HEIGHT [A] (mm)		1100
CARTRIDGE FLOW RATE FOR NPSORB MEDIA (L/s)		1.60
CARTRIDGE FLOW RATE FOR PSORB (MCC) MEDIA (L/s)		0.90
CARTRIDGE FLOW RATE FOR PSORB (SQDEP) MEDIA (L/s)		1.26
CARTRIDGE FLOW RATE FOR ZPG MEDIA (L/s)		1.60

- GENERAL NOTES/ STRUCTURAL DESIGN CRITERIA
- PRECAST STRUCTURE SUPPLIED WITH PENETRATIONS TO SUIT OUTER DIAMETER OF NOMINATED PIPE SIZE / MATERIAL.
 - PRECAST STRUCTURE SHALL MEET W80 WHEEL LOAD RATING ASSUMING A MAXIMUM EARTH COVER OF 2.0m AND A GROUND WATER ELEVATION AT, OR BELOW, THE OUTLET PIPE INVERT ELEVATION. CERTIFYING ENGINEER TO CONFIRM ACTUAL GROUNDWATER ELEVATION. PRECAST STRUCTURE SHALL BE IN ACCORDANCE WITH AS3600.
 - PRECAST STRUCTURE SHALL BE PLACED ON A STABLE GROUND WITH A MINIMUM SOIL BEARING CAPACITY OF 125KPa UNDER NORMAL SERVICE CONDITION.
 - IF THE PEAK FLOW RATE, AS DETERMINED BY THE SITE CERTIFYING ENGINEER, EXCEEDS THE PEAK HYDRAULIC CAPACITY OF THE SYSTEM, AN UPSTREAM BYPASS STRUCTURE IS REQUIRED.
 - ALL WATER QUALITY TREATMENT DEVICES REQUIRE PERIODIC MAINTENANCE. REFER TO THE OPERATION AND MAINTENANCE MANUAL FOR GUIDELINES AND ACCESS REQUIREMENTS.
 - SITE-SPECIFIC PRODUCTION DRAWING WILL BE PROVIDED UPON PLACEMENT OF ORDER.
 - DRAWING NOT TO SCALE.
- INSTALLATION NOTES
- ANY SUB-BASE, BACKFILL DEPTH, AND/OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY CERTIFYING ENGINEER.
 - CONTRACTOR TO PROVIDE ALL EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE STORMFILTER STRUCTURE (LIFTING DETAIL PROVIDED SEPARATELY).
 - CONTRACTOR TO APPLY SEALANT TO ALL JOINTS AND TO PROVIDE, INSTALL, AND GROUT INLET AND OUTLET PIPES.

OCEANGUARD

PRODUCT ID	MAX. PIT DIMENSIONS (mm × mm)	MINIMUM DEPTH (mm)	BAG DEPTH (mm)
OG4	450 × 450	350	200
OG6-S	600 × 600	350	200
OG6-D	600 × 600	475	300
OG9-S	600 × 900	400	300
OG9-S	900 × 900	400	300
OG9-D	900 × 900	600	500
OG12-S	1200 × 1200	420	300
OG12-D	1200 × 1200	600	500



GENERAL NOTES

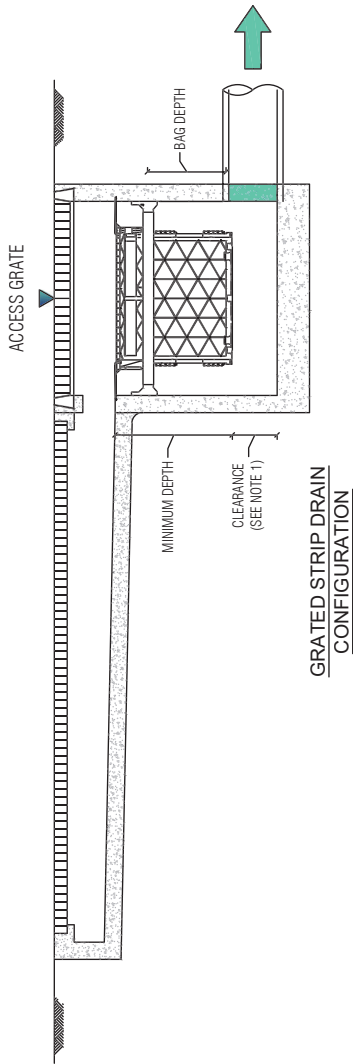
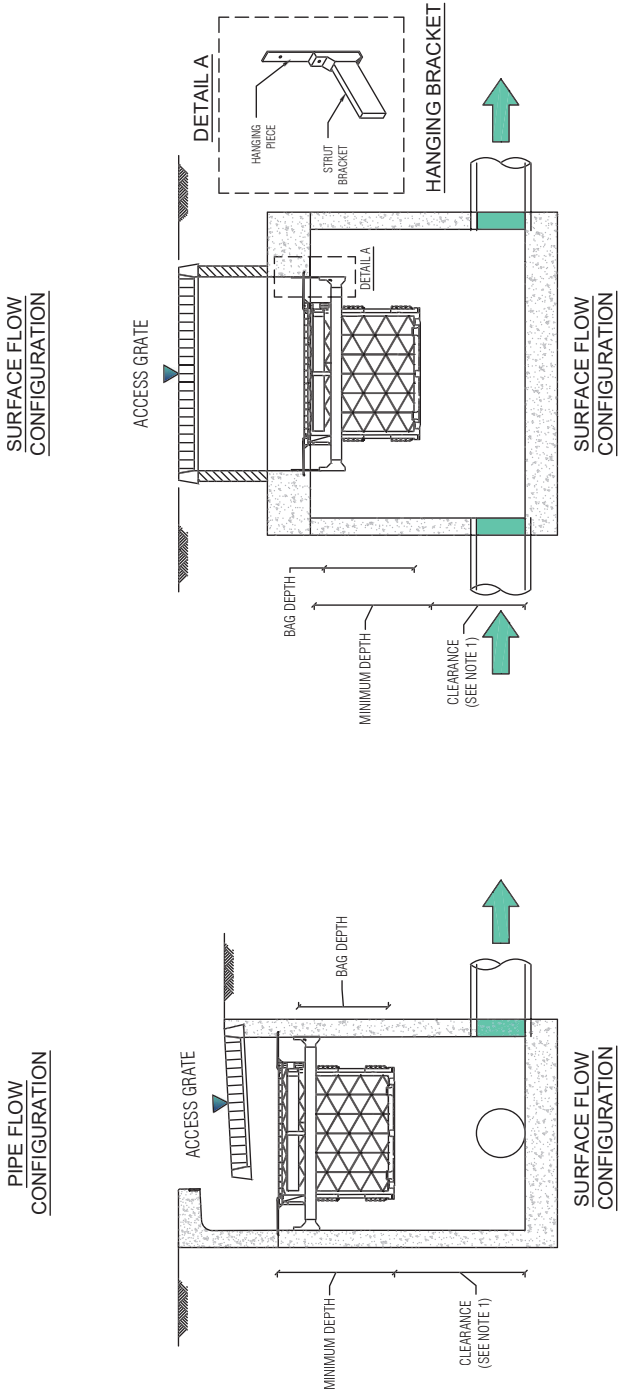
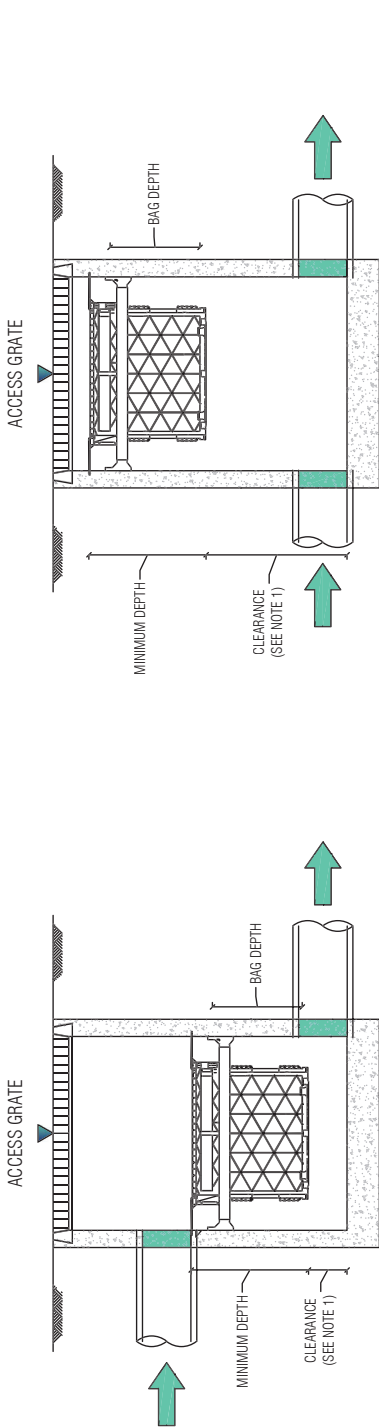
1. CLEARANCE FOR ANY PIT WITHOUT AN INLET PIPE (ONLY USED FOR SURFACE FLOW) CAN BE AS LOW AS 50mm. FOR OTHER PITS, THE RECOMMENDED CLEARANCE SHOULD BE GREATER OR EQUAL TO THE PIPE OBVERT SO AS NOT TO INHIBIT HYDRAULIC CAPACITY.
2. OCEAN PROTECT PROVIDES TWO FILTRATION BAG TYPES:
 - a. 200 MICRON BAGS FOR HIGHER WATER QUALITY FILTERING
 - b. COARSE BAG FOR TARGETING GROSS POLLUTANTS.
3. DRAWINGS NOT TO SCALE.



PHONE: 1300 354 722

www.oceanprotect.com.au

OCEAN PROTECT
OCEANGUARD
TYPICAL ARRANGEMENTS
SPECIFICATION DRAWING





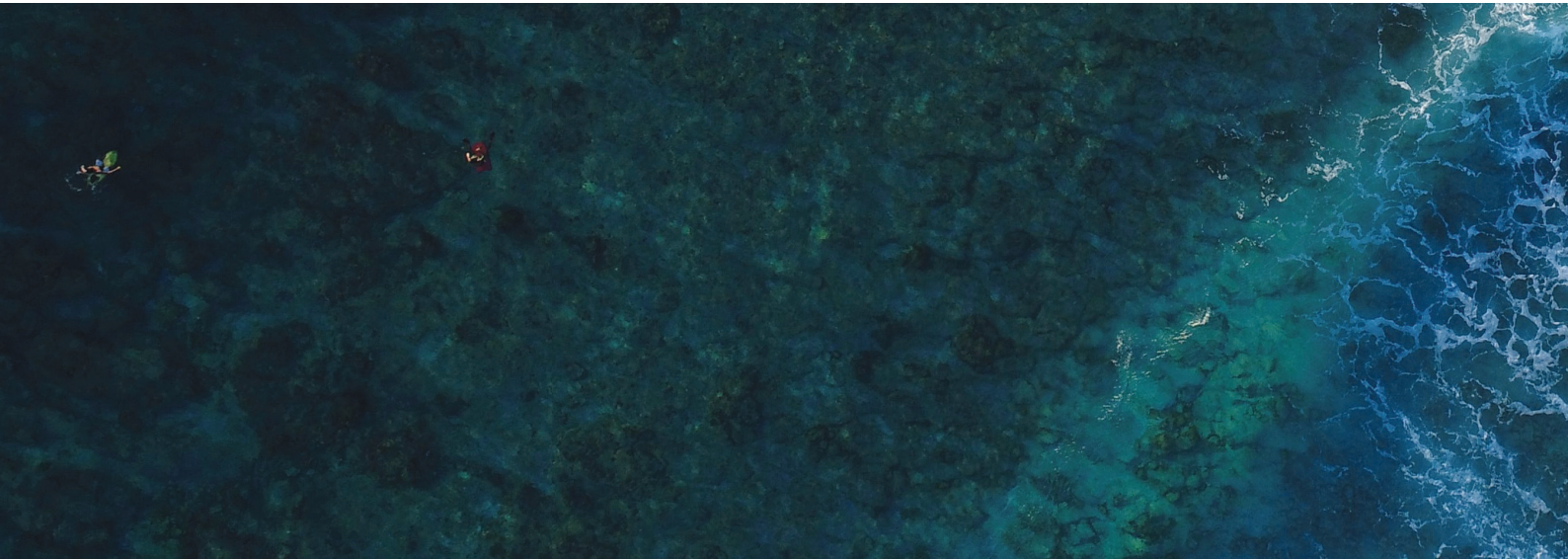
6.9 APPENDIX J – OCEAN PROTECT MAINTENANCE MANUALS

StormFilter®

Operations & Maintenance Manual



Stopping Pollution Entering Waterways



www.oceanprotect.com.au

Introduction	3
Health and Safety	4
How does it work?	5
Maintenance Procedures	6
Maintenance Services	8



Introduction

The primary purpose of stormwater treatment devices is to capture and prevent pollutants from entering waterways, maintenance is a critical component of ensuring the ongoing effectiveness of this process. The specific requirements and frequency for maintenance depends on the treatment device and pollutant load characteristics of each site. This manual has been designed to provide details on the cleaning and maintenance processes for the StormFilter®, as recommended by the manufacturer (Ocean Protect).

The StormFilter® is designed and sized to meet stringent regulatory requirements. It removes the most challenging target pollutants (including fine solids, soluble heavy metals, oil, and soluble nutrients) using a variety of media. For more than two decades, StormFilter® has helped clients meet their regulatory needs and, through ongoing product enhancements, the design continues to be refined for ease of use and improved performance.

Why do I need to perform maintenance?

Adhering to the inspection and maintenance schedule of any stormwater treatment device is essential to ensuring that it functions properly throughout its design life.

During each inspection and clean, details of the mass, volume and type of material that has been collected by the device should be recorded. This data will assist with the revision of future management plans and help determine maintenance interval frequency. It is also essential that qualified and experienced personnel carry out all maintenance (including inspections, recording and reporting) in a systematic manner.

Maintenance of your stormwater management system is essential to ensuring ongoing at-source control of stormwater pollution. Maintenance also helps prevent structural failures (e.g. prevents blocked outlets) and aesthetic failures (e.g. debris build up), but most of all ensures the long term effective operation of the StormFilter®.

Health and Safety

Access to a StormFilter® unit requires removing heavy access covers/grates, and it is necessary to enter a confined space. Pollutants collected by the StormFilter® will vary depending on the nature of your site. There is potential for these materials to be harmful. For example, sediments may contain heavy metals, carcinogenic substances or objects such as broken glass and syringes. For these reasons, all aspects of maintaining and cleaning your StormFilter® require careful adherence to Occupational Health and Safety (OH&S) guidelines.

It is important to note that the same level of care needs to be taken to ensure the safety of non-work personnel. As a result, it may be necessary to employ traffic/pedestrian control measures when the device is situated in, or near areas with high vehicular/pedestrian activity.

Personnel health and safety

Whilst performing maintenance on the StormFilter®, precautions should be taken in order to minimise (or, if possible, prevent) contact with sediment and other captured pollutants by maintenance personnel. The following personal protective equipment (PPE) is subsequently recommended:

- Puncture resistant gloves
- Steel capped safety boots
- Long sleeve clothing, overalls or similar skin protection
- Eye protection
- High visibility clothing or vest

During maintenance activities, it may be necessary to implement traffic control measures. Ocean Protect recommend that a separate site-specific traffic control plan is implemented as required to meet the relevant governing authority guidelines.

Whilst some aspects of StormFilter® maintenance can be performed from surface level, there will be a need to enter the StormFilter® system (confined space) during a major service. It is recommended that all maintenance personnel evaluate their own needs for confined space entry and compliance with relevant industry regulations and guidelines. Ocean Protect maintenance personnel are fully trained and carry certification for confined space entry applications.

How does it work?

Stormwater enters the cartridge chamber, passes through the filtration media and begins filling the cartridge center tube. When water reaches the top of the cartridge the float valve opens and filtered water is allowed to drain at the designed flow rate. Simultaneously, a one-way check valve closes activating a siphon that draws stormwater evenly throughout the filter media and into the center tube. Treated stormwater is then able to discharge out of the system through the underdrain manifold pipework.

As the rain event subsides, the water level outside the cartridge drops and approaches the bottom of the hood, air rushes through the scrubbing regulators releasing the water column and breaking the siphon. The turbulent bubbling action agitates the surface of the cartridge promoting trapped sediment to drop to the chamber floor. After a rain event, the chamber is able to drain dry by way of an imperfect seal at the base of the float valve.

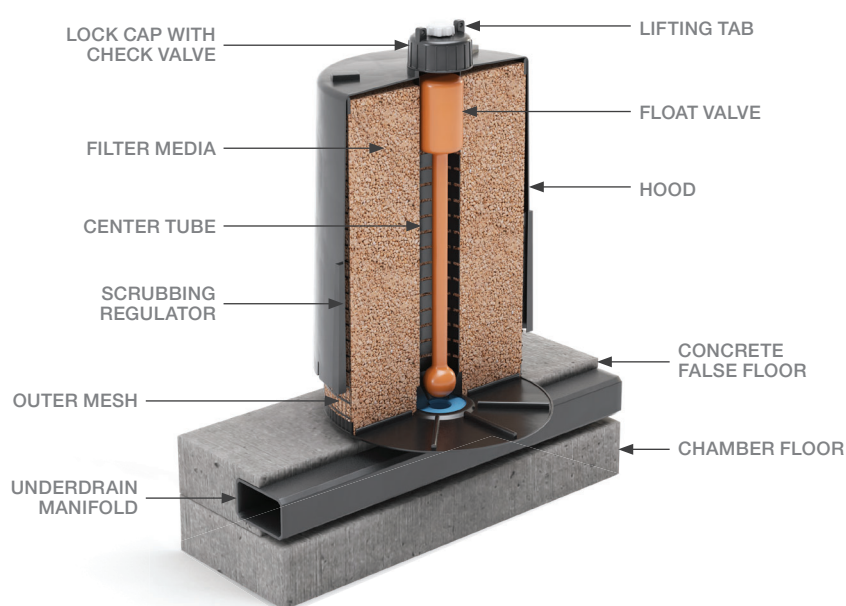


Figure 1: StormFilter® components

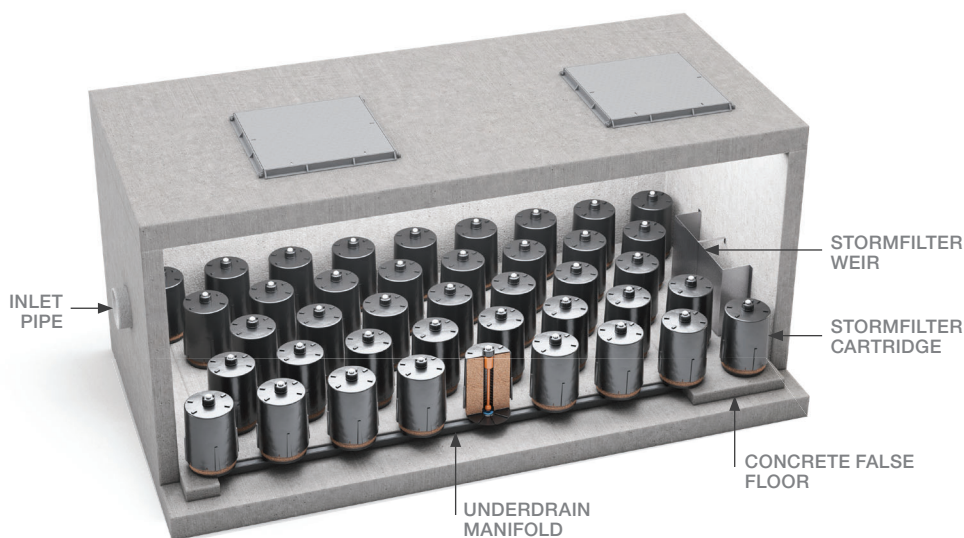


Figure 2: Example conceptual diagram of a StormFilter® system

Maintenance Procedures

To ensure optimal performance, it is advisable that regular maintenance is performed. Typically, the StormFilter® requires an inspection every 6 months with a minor service at 12 months. Additionally, as the StormFilter® cartridges capture pollutants the media will eventually become occluded and require replacement (expected media life is 1-3 years).

Primary types of maintenance

The table below outlines the primary types of maintenance activities that typically take place as part of an ongoing maintenance schedule for the StormFilter®.

Service Type	Description of Typical Activities	Frequency
Inspection	Visual Inspection of cartridges & chamber Remove larger gross pollutants Perform minimal rectification works (if required)	Every 6 Months
Minor Service	Evaluation of cartridges and media Removal of accumulated sediment (if required) Wash-down of StormFilter® chamber (if required)	Every 12 Months
Major Service	Replacement of StormFilter® cartridge media	As required

Maintenance requirements and frequencies are dependent on the pollutant load characteristics of each site. The frequencies provided in this document represent what the manufacturer considers to be best practice to ensure the continuing operation of the device is in line with the original design specification.

Inspection

The purpose of the inspecting the StormFilter® system is to assess the condition of the StormFilter® chamber and cartridges. When inspecting the chamber, particular attention should be taken to ensure all cartridges are firmly connected to the connectors. It is also an optimal opportunity to remove larger gross pollutants and inspect the outlet side of the StormFilter® weir.

Minor Service

This service is designed to ensure the ongoing operational effectiveness of the StormFilter® system, whilst assessing the condition of the cartridge media.

- 1 Establish a safe working area around the access point(s)
- 2 Remove access cover(s)
- 3 Evaluate StormFilter® cartridge media (if exhausted schedule major service within 6 months)
- 4 Measure and record the level of accumulated sediment in the chamber (if sediment depth is less than 100 mm skip to step 9)
- 5 Remove StormFilter® cartridges from the chamber
- 6 Use vacuum unit to removed accumulated sediment and pollutants in the chamber
- 7 Use high pressure water to clean StormFilter® chamber
- 8 Re-install StormFilter® cartridges
- 9 Replace access cover(s)

Major Service (Filter Cartridge Replacement)

For the StormFilter® system a major service is reactionary process based on the outcomes from the minor service, specifically the evaluation of the cartridge media.

Trigger Event	Maintenance Action
Cartridge media is exhausted ^[1]	Replace StormFilter® cartridge media ^[2]

^[1] Multiple assessment methods are available, contact Ocean Protect for assistance

^[2] Replacement filter media and components are available for purchase from Ocean Protect

This service is designed to return the StormFilter® device back to optimal operating performance.

- 1 Establish a safe working area around the access point(s)
- 2 Remove access cover(s)
- 3 By first removing the head cap, remove each individual cartridge hood to allow access to the exhausted media
- 4 Utilise a vacuum unit to remove exhausted media from each cartridge
- 5 Use vacuum unit to remove accumulated sediment and pollutants in the chamber
- 6 Use high pressure water to clean StormFilter® chamber
- 7 Inspect each empty StormFilter® cartridges for any damage, rectify damage as required
- 8 Re-fill each cartridge with media in line with project specifications
- 9 Re-install replenished StormFilter® cartridges
- 10 Replace access cover(s)

Additional Types of Maintenance

Occasionally, events on site can make it necessary to perform additional maintenance to ensure the continuing performance of the device.

Hazardous Material Spill

If there is a spill event on site, the StormFilter® unit should be inspected and cleaned. Specifically, all captured pollutants and liquids from within the unit should be removed and disposed in accordance with any additional requirements that may relate to the type of spill event. Additionally, it will be necessary to inspect the filter cartridges and assess them for contamination – and, depending on the type of spill event, it may be necessary to replace the filtration media.

Blockages

In the unlikely event that flooding occurs upstream of the StormFilter® system, the following steps should be undertaken to assist in diagnosing the issue and determining the appropriate response.

- 1 Inspect the upstream diversion structure (if applicable) ensuring that it is free of debris and pollutants
- 2 Inspect the StormFilter® unit checking the underdrain manifold as well as both the inlet and outlet pipes for obstructions (e.g. pollutant build-up, blockage), which if present, should be removed

Major Storms and Flooding

In addition to the scheduled activities, it is important to inspect the condition of the StormFilter® after a major storm event. The focus is to inspect for damage and abnormally high sediment accumulation that may result from localised erosion. Where necessary damaged components should be replaced and accumulated pollutants should be removed and disposed

Disposal of Waste Materials

The accumulated pollutants found in the StormFilter® must be handled and disposed of in a manner that is in accordance with all applicable waste disposal regulations. When scheduling maintenance, consideration must be made for the disposal of solid and liquid wastes. If the filter media has been contaminated with any unusual substance, there may be additional special handling and disposal methods required to comply with relevant government/authority/industry regulations.

Maintenance Services

With over a decade and a half of maintenance experience, Ocean Protect has developed a systematic approach to inspecting, cleaning and maintaining a wide variety of stormwater treatment devices. Our fully trained and professional staff are familiar with the characteristics of each type of system, and the processes required to ensure its optimal performance.

Ocean Protect has several stormwater maintenance service options available to help ensure that your stormwater device functions properly throughout its design life. In the case of StormFilter®, we offer long term pay-as-you-go contracts, pre-paid once off servicing and replacement media for cartridges.

**For more information please visit
www.oceanprotect.com.au**

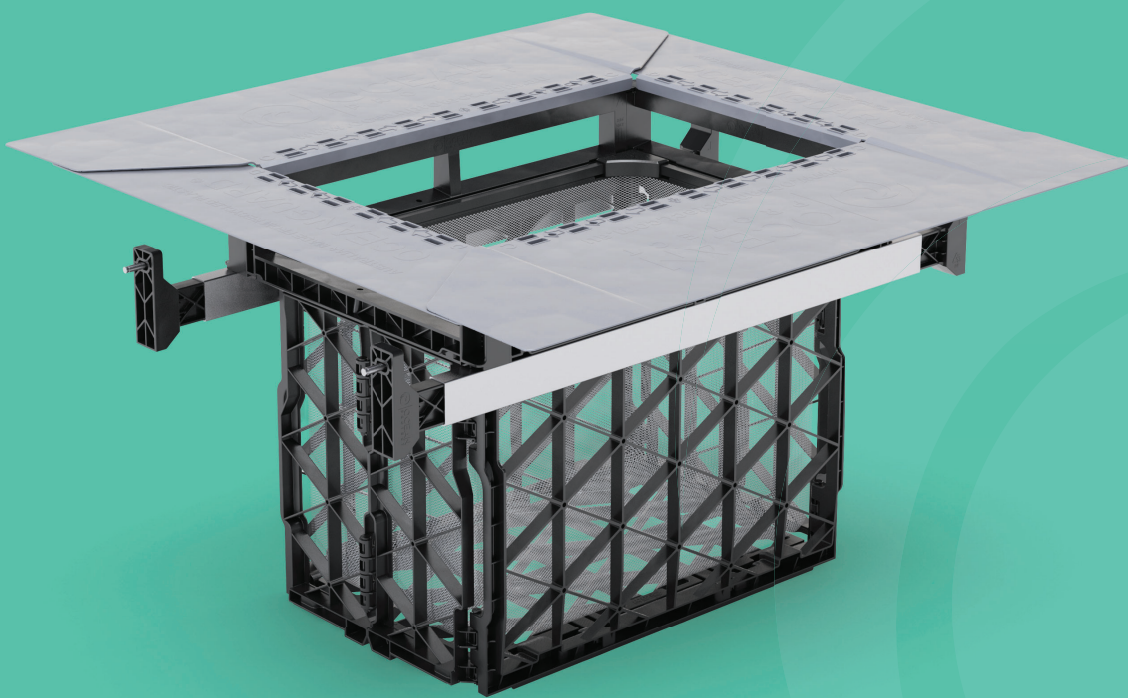
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Ocean Protect supplies and maintains a complete range of filtration, hydrodynamic separation, screening and oil/water separation technologies.

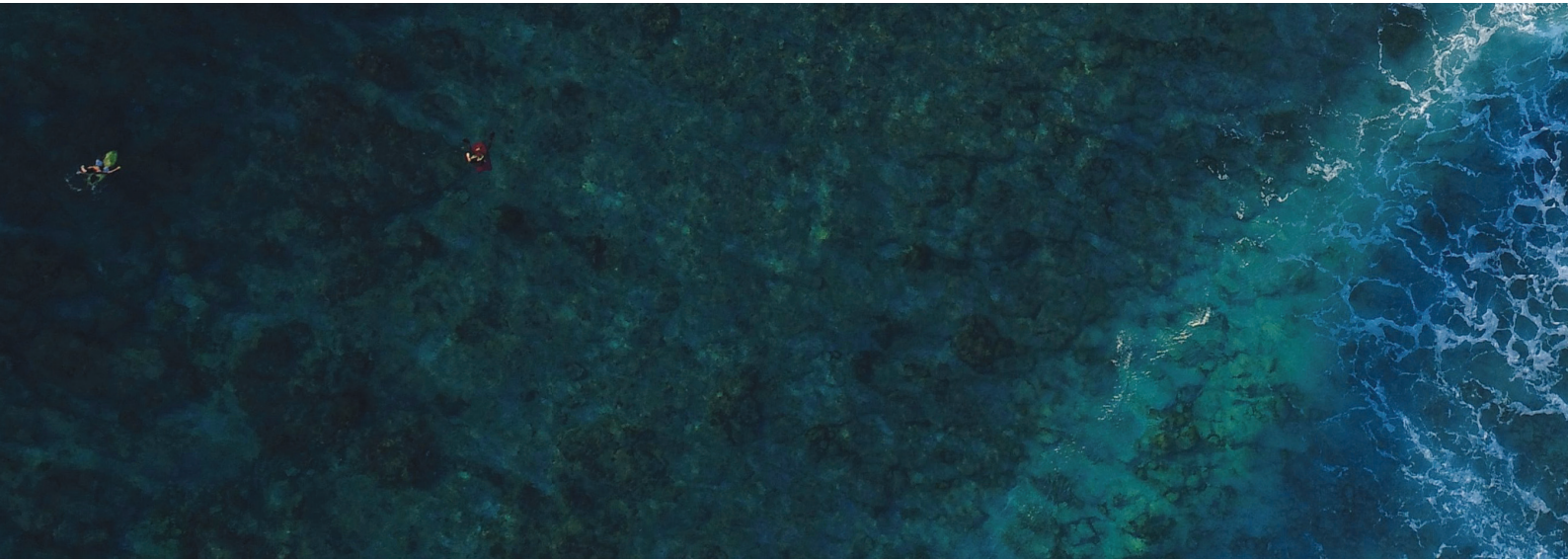
Call 1300 354 722

OceanGuard®

Operations & Maintenance Manual



Stopping Pollution Entering Waterways



www.oceanprotect.com.au

Introduction	3
Health and Safety	4
How does it work?	5
Maintenance Procedures	6
Maintenance Services	7



Introduction

The primary purpose of stormwater treatment devices is to capture and prevent pollutants from entering waterways, maintenance is a critical component of ensuring the ongoing effectiveness of this process. The specific requirements and frequency for maintenance depends on the treatment device and pollutant load characteristics of each site. This manual has been designed to provide details on the cleaning and maintenance processes for the OceanGuard® as recommended by the manufacturer (Ocean Protect).

The OceanGuard® technology is a gully pit basket designed to fit within new and existing gully pits to remove pollution from stormwater runoff. The system has a choice of filtration liners, designed to remove gross pollutants, solids, and other attached pollutants as either a standalone technology or as part of a 'treatment train' (e.g. with StormFilter®, Jellyfish® or biofiltration). OceanGuards are highly effective, easy to install and simple to maintain.

Stormwater professionals should note that Ocean Protect is not permitted to supply OceanGuard® technologies to provide pre-treatment to proprietary stormwater treatment assets that are not provided by Ocean Protect.

Why do I need to perform maintenance?

Adhering to the inspection and maintenance schedule of any stormwater treatment device is essential to ensuring that it functions properly throughout its design life.

During each inspection and clean, details of the mass, volume and type of material that has been collected by the device should be recorded. This data will assist with the revision of future management plans and help determine maintenance interval frequency. It is also essential that qualified and experienced personnel carry out all maintenance (including inspections, recording and reporting) in a systematic manner.

Maintenance of your stormwater management system is essential to ensuring ongoing at-source control of stormwater pollution. Maintenance also helps prevent structural failures (e.g. prevents blocked outlets) and aesthetic failures (e.g. debris build up), but most importantly ensures the long term effective operation of the OceanGuard®.

Health and Safety

Access to pits containing an OceanGuard® typically requires removing (heavy) access covers/grates, but typically it is not necessary to enter into a confined space. Pollutants collected by the OceanGuard® will vary depending on the nature of your site. There is potential for these materials to be harmful. For example, sediments may contain heavy metals, carcinogenic substances or sharp objects such as broken glass and syringes. For these reasons, there should be no primary contact with the waste collect and all aspects of maintaining and cleaning your OceanGuard® require careful adherence to Occupational Health and Safety (OH&S) guidelines.

It is important to note that the same level of care needs to be taken to ensure the safety of non-work personnel, as a result it may be necessary to employ traffic/pedestrian control measures when the device is situated in, or near areas with high vehicular/pedestrian activity.

Personnel health and safety

Whilst performing maintenance on the OceanGuard®, precautions should be taken in order to minimise (or when possible prevent) contact with sediment and other captured pollutants by maintenance personnel. In order to achieve this the following personal protective equipment (PPE) is recommended:

- Puncture resistant gloves
- Steel capped safety boots
- Long sleeve clothing, overalls or similar skin protection
- Eye protection
- High visibility clothing or vest

During maintenance activities it may be necessary to implement traffic control measures. Ocean Protect recommend that a separate site specific traffic control plan is implemented as required to meet the relevant governing authority guidelines.

The OceanGuard® is designed to be maintained from surface level, without the need to enter the pit. However depending on the installation configuration, location and site specific maintenance requirements it may be necessary to enter a confined space occasionally. It is recommended that all maintenance personnel evaluate their own needs for confined space entry and compliance with relevant industry regulations and guidelines. Ocean Protect maintenance personnel are fully trained and carry certification for confined space entry.

How does it work?

OceanGuard® is designed to intercept stormwater as it enters the stormwater pits throughout a site. The OceanGuard® has diversion panels that sit flush with the pit walls, this ensures that as stormwater enters at the top of the pit it is directed to the middle of the insert where the Filtration bag is situated. The filtration bag allows for screening to occur removing 100% of pollutants greater than the opening of the filtration material (200micron, 1600micron bags available).

During larger rain events the large flows overflow slots in the flow diverter of the OceanGuard® ensure that the conveyance of stormwater is not impeded thus eliminating the potential for surface flooding. As the flow subsides, the captured pollutants are held in the OceanGuard® filtration bag. The waste then starts to dry which reduces the magnitude of organic material decomposition transitioning between maintenance intervals.

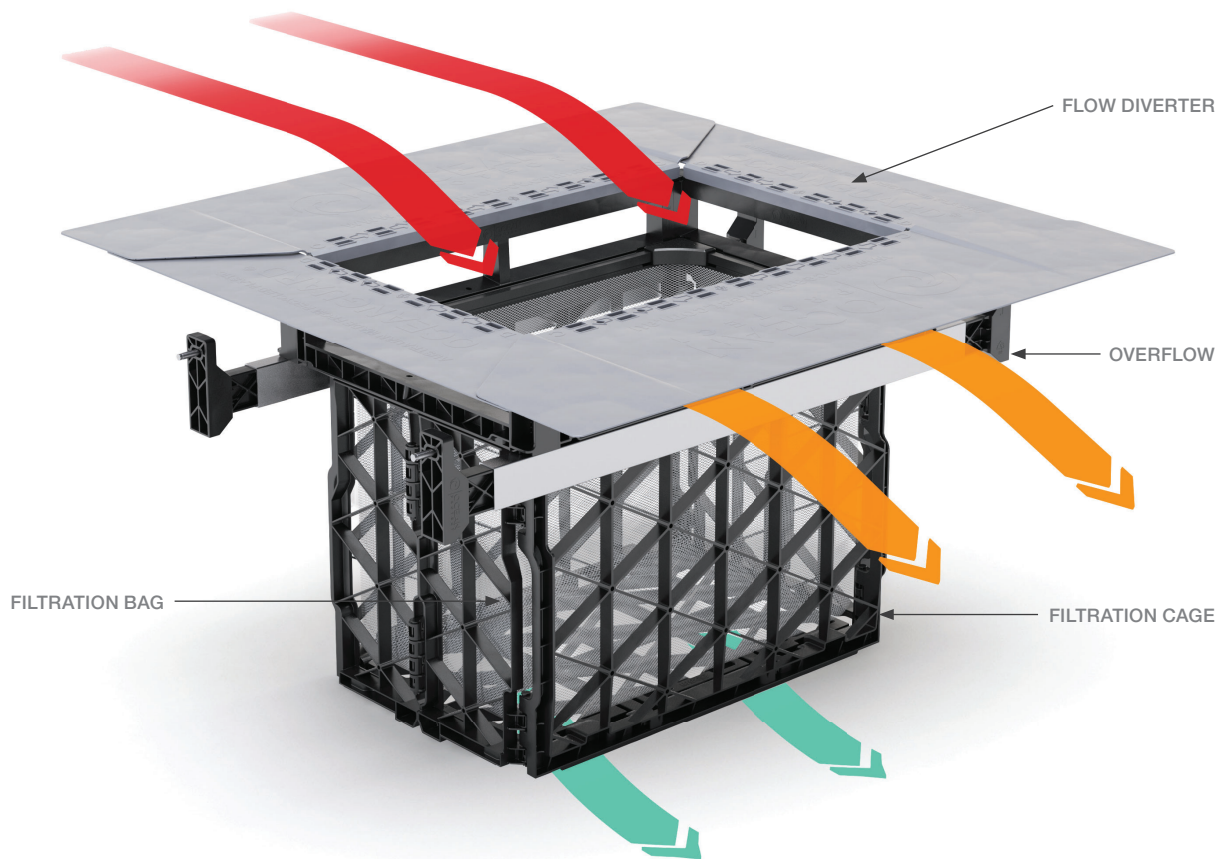


Figure 1: OceanGuard® components

Maintenance Procedures

To ensure that each OceanGuard® achieves optimal performance, it is advisable that regular maintenance is performed. The OceanGuard® requires 1-6 minor services annually (3 to 4 typical). Pending the outcome of these inspections, additional maintenance servicing may be required.

Primary types of maintenance

The table below outlines the primary types of maintenance activities that typically take place as part of an ongoing maintenance schedule for the OceanGuard®.

Service Type	Description of Typical Activities	Frequency
Minor Service	Filter bag inspection and evaluation Removal of capture pollutants Disposal of material	1-6 Times Annually
Major Service	Filter Bag Replacement Support frame rectification	As required

Maintenance requirements and frequencies are dependent on the pollutant load characteristics of each site. The frequencies provided in this document represent what the manufacturer considers to be best practice to ensure the continuing operation of the device is in line with the original design specification.

Minor Service

This service is designed to return the OceanGuard® back to optimal operating performance. This type of service can be undertaken either by hand or with the assistance of a Vacuum unit.

Hand Maintenance

- 1 Establish a safe working area around the OceanGuard®
- 2 Remove access cover/grate
- 3 Use two lifting hooks to remove the filtration bag
- 4 Empty the contents of the filtration bag into a disposal container
- 5 Inspect and evaluate the filtration bag
- 6 Inspect and evaluate remaining OceanGuard® components (i.e. flow diverter, filtration cage and supporting frame)
- 7 Rejuvenate filtration bag by removing pollutant build up with a stiff brush, additionally the filtration bag can be washed using high pressure water
- 8 Re-install filtration bag and replace access cover/grate

Vacuum Maintenance

- 1 Establish a safe working area around the OceanGuard®
- 2 Remove access cover/grate
- 3 Vacuum captured pollutants from the filtration bag
- 4 Remove filtration bag
- 5 Inspect and evaluate the filtration bag
- 6 Inspect and evaluate remaining OceanGuard® components (i.e. flow diverter, filtration cage and supporting frame)
- 7 Rejuvenate filtration bag by removing pollutant build up with a stiff brush, additionally the filtration bag can be washed using high pressure water
- 8 Re-install filtration bag and replace access cover/grate

Major Service (Filter Bag Replacement)

For the OceanGuard®, a major service is a reactionary process based on the outcomes from the minor service.

Trigger Event from Minor Service	Maintenance Action
Filtration bag inspection reveals damage	Replace the filtration bag ^[1]
Component inspection reveals damage	Perform rectification works and if necessary replace components ^[1]

^[1] Replacement filtration bags and components are available for purchase from Ocean Protect

Additional Types of Maintenance

Occasionally, events on site can make it necessary to perform additional maintenance to ensure the continuing performance of the device.

Hazardous Material Spill

If there is a spill event on site, all OceanGuard® pits that potentially received flow should be inspected and cleaned. Specifically, all captured pollutants from within the filtration bag should be removed and disposed in accordance with any additional requirements that may relate to the type of spill event. All filtration bags should be rejuvenated (replaced if required) and re-installed.

Blockages

The OceanGuard's internal high flow bypass functionality is designed to minimise the potential of blockages/flooding and this configuration has been field proven for over twenty years. Flooding caused by an OceanGuard® style of pit basket is extremely rare and in the unlikely event that flooding occurs around the stormwater pit the following steps should be undertaken to assist in diagnosing the issue and implementing the appropriate response.

- 1 Inspect the OceanGuard® flow diverter, ensuring that they are free of debris and pollutants
- 2 Perform a minor service on the OceanGuard®
- 3 Remove the OceanGuard® to access the pit and inspect both the inlet and outlet pipes, ensuring they are free of debris and pollutants

Major Storms and Flooding

In addition to the scheduled activities, it is important to inspect the condition of the OceanGuard® after a major storm event. The inspection should focus on checking for damage and higher than normal sediment accumulation that may result from localised erosion. Where necessary damaged components should be replaced and accumulated pollutants disposed.

Disposal of Waste Materials

The accumulated pollutants found in the OceanGuard® must be handled and disposed of in a manner that is in accordance with all applicable waste disposal regulations. When scheduling maintenance, consideration must be made for the disposal of solid and liquid wastes. If the filtration bag has been contaminated with any unusual substance, there may be additional special handling and disposal methods required to comply with relevant government/authority/industry regulations.

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