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CIVIL ENGINEERING REPORT INCORPORATING WATER CYCLE MANAGEMENT STRATEGY (UPDATED FOR RTS)

PROSPECT LOGISTIC ESTATE

SSD 10399

CLUNIES ROSS STREET GREYSTANES NSW

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***Rev*: C**

DOCUMENT VERIFICATION

Project Title	Prospect Logistic Estate SSD 10399 - Clunies Ross Street, Greystanes
Document Title	Civil Engineering Report Incorporating Water Cycle Management Strategy
Project No.	Co13251.06
Description	SSDA report for industrial estate
Client Contact	Mr David Lousick, Aliro

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Prepared by	Mark Wilson & Daniel McCoy	
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Issued by	Mark Wilson	
File Name	13251.06-03c.rpt	

Document History

Date	**Revision**	**Issued to**	**No. Copies**
28 Apr. 2020	DRAFT3	Mr David Lousick, Aliro	PDF
4 June. 2020	A	Mr David Lousick, Aliro	PDF
28 Oct. 2020	DRAFT_B	Mr David Lousick, Aliro	PDF
9 Dec. 2020	B	Mr David Lousick, Aliro	PDF
1 Feb. 2021	C	Mr David Lousick, Aliro	PDF

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1 INTRODUCTION & SCOPE

Costin Roe Consulting Pty Ltd has been commissioned by Aliro Group to prepare a *Civil Engineering Report & Water Cycle Management Strategy* (WCMS) to accompany a State Significant Development Application (SSDA) to the NSW Department of Planning, Industry and Environment (DPIE) for industrial development of the land.

This report presents a civil engineering assessment of a number of properties bounded by The M4 Motorway to the north, Clunies Ross Street and residential properties to the east, existing industrial development to the south and south-west and Girraween Creek and a regional detention basin and wetland on the west and north-west in the suburb of Pemulwuy, NSW. The development will be referred to "*The Prospect Logistics Estate*" (PLE) in this report.

This report provides an assessment of the civil engineering characteristics of the development site and technical considerations of the following aspects:

- Earthworks & geotechnical considerations;
- Services
- Water Cycle Management Strategy (WCMS).

The WCMS comprises several key areas of stormwater and water management which are provided below. These key areas have been established with the aim to reduce impacts from the PLE development on the surrounding environment and neighbouring properties including the adjacent Girraween Creek and associated corridor. The water cycle management strategy identifies the management measures required to meet the targets set. The key water cycle management areas assessed in this report are:

- Storm Water Quantity;
- Storm Water Quality;
- Water Supply and Reuse;
- Flooding; and
- Erosion and Sediment Control

This engineering analysis is based on development for industrial warehouse and logistic facilities consistent with industrial estates in the surrounding area and s and indicative Masterplan provided for Aliro by SBA Architects.

A request for SEAR's has been completed by the proponent. Reference to **Appendix C** should be made for SSD-10399 SEAR's dated 16 December 2019. **Section 10** of this report provides specific responses to civil engineering and water management related items included in the SEAR's.

The site is located within the bounds of two local government areas (LGA's), Blacktown City Council and the recently formed Cumberland Council (within the bounds of the previous LGA of Holroyd City Council). Consideration to the policy of both these councils has been made as part of the proposed development. Further it is noted that at the time of writing, the codes and policies of the previous LGA, Holroyd City Council are still adopted for sites within Cumberland Council and former Holroyd

City Council LGA. Further a precinct specific Development Control Plan (DCP) is relevant for the majority of this site and surrounding developments per *Part Q – Pemulwuy Industrial Controls - Holroyd Development Control Plan 2013*. The stormwater management and engineering requirements as set out in this document have also been considered in the engineering concept and impact assessments included in this report and concept design package.

Revision B of this report has been completed to address agency Response to Submission (RtS) received by the department. In particular the civil engineering items raised by Blacktown City Council in their information request letter dated 18 September 2020 and Cumberland City Council in their information request letter dated 16 September 2020 – refer **Section 10.4**.

Revision C of this report has been completed to incorporate minor updates to the masterplan layout and building arrangement on Warehouse 2. It is noted that the overall civil and stormwater management strategy, and flooding assessments, remain consistent with the **Revision B** submission.

2 SITE DESCRIPTION AND PROPOSED DEVELOPMENT

2.1 Site Description

The development is located on several parcels of land on the west of Clunies Ross Street in the suburb of Pemulway as shown in **Figure 2.1** and aerial image from Nearmap (dated 22 January 2020) in **Figure 2.2**.

The land comprises a combined area of approximately 18.66 Ha.

The current land-use is predominately industrial and commercial with the majority of the site being the current utilised by Austral Masonry Sales and Factory Outlet facility and southern part of the property being previous Boral head office. An aboriginal heritage area is also located on the far south-west of the site and will be excluded from the proposed redevelopment of the property.

The highest elevation on the site is RL 107m AHD at the south-eastern boundary of the site, within the aboriginal heritage area. The lowest level is approximately RL 51m on the north of the site.

Access to the site can be made via Foundation Place on the western side of the site (approx. RL 73.4m AHD), and from Clunies Ross Street to the east.

An existing regional detention basin is present on the north-west of the site. The basin is noted to be a prescribed dam, hence subject to NSW Dam Safety Committee requirements. The basin is owned and managed by Blacktown City Council. The basin storage is noted to currently encroach on the subject land.

A precinct water quality basin/ wetland is also present on the west/ north-west of the property, constructed as part of the precinct Stormwater Management Strategy set out in the *Part Q – Pemulwuy Industrial Controls - Holroyd Development Control Plan 2013*. This system also encroaches the subject land and is managed by Cumberland City Council.

A major WaterNSW Supply Pipeline is located within the north of the property which services Sydney areas from the nearby Prospect Dam.

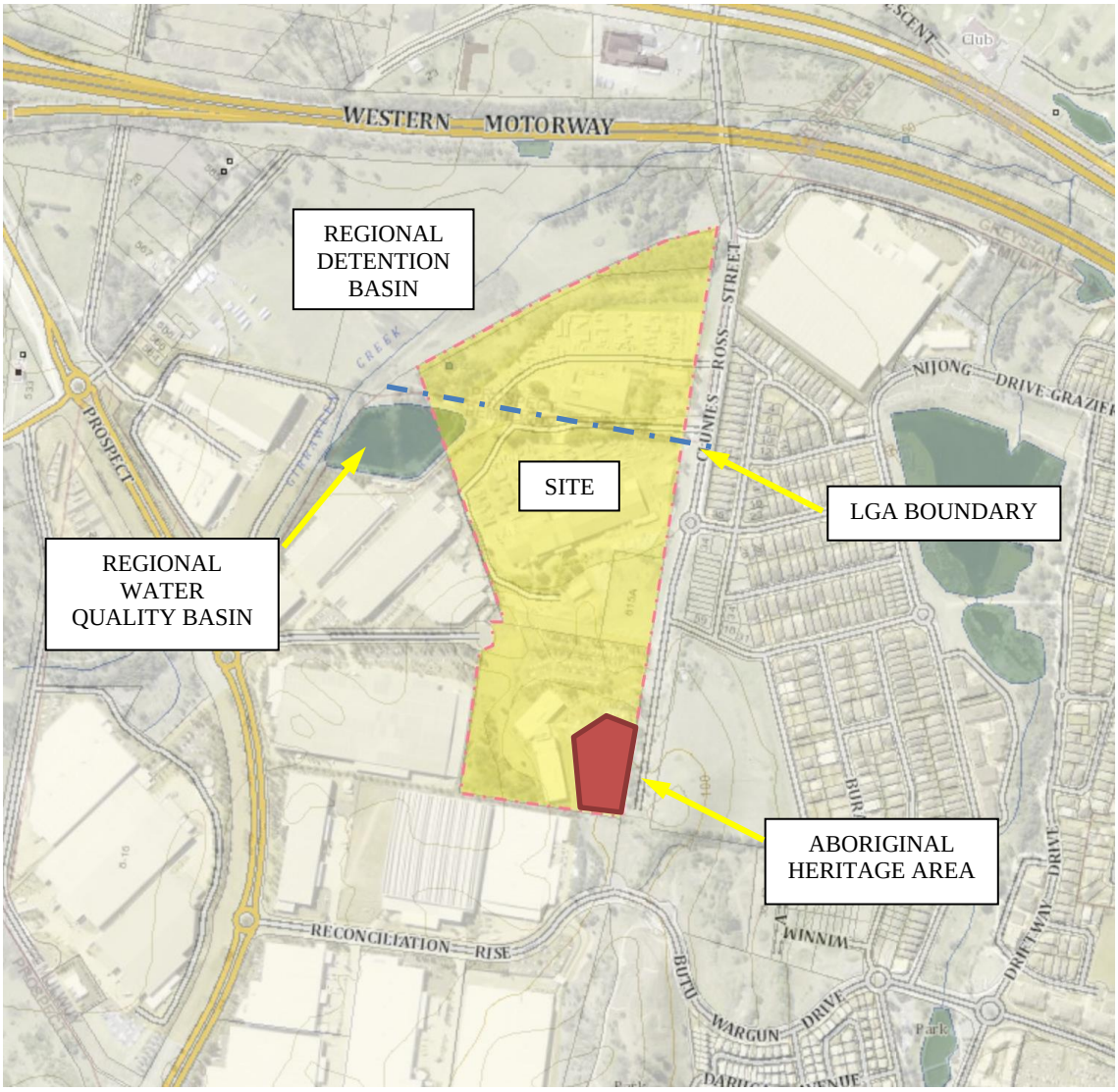


Figure 2.1. Locality Plan

Figure 2.2. Nearmap Image 22 January 2020

2.2 Proposed Development

The proposed development is for an industrial estate, earthworks and infrastructure for future industrial development. The Masterplan Layout has been prepared by SBA Architects and included as **Figures 2.3**.

The proposed development involves construction of seven (7) warehouse buildings with associated office space, car parking, truck circulation areas and truck loading and unloading areas. Access is proposed from Foundation Place and Clunies Ross Street. Consideration to fire access has been made in the design.

Infrastructure works to facilitate the development will include bulk earthworks, provision of services, internal access driveways, stormwater drainage and stormwater management.

Adjustments to the regional detention basin and wetland systems (which currently encroach on the subject property) are also proposed to remove the encroaching storages from the land. These modifications are proposed to maintain the existing water quality and quantity outcomes of both systems and detailed assessments have been included in this report which set out the proposed modification concepts. Further it is noted that consultation with Blacktown City Council has been made as part of the preparation of the SSDA submission in relation to the intended basin modifications. Refer **Section 5.4**, **Section 6** and **Appendix E**.

The preliminary masterplan layout provided shows development buildings approximately 7,000m^2 and 25,000m^2 in size. Siting of the buildings and development pads will require consideration to the existing topography of the land, access and flood planning requirements.

As noted, the aboriginal heritage area (located on the south-west of the site) will be excluded from the redevelopment of the property and maintained its current form.

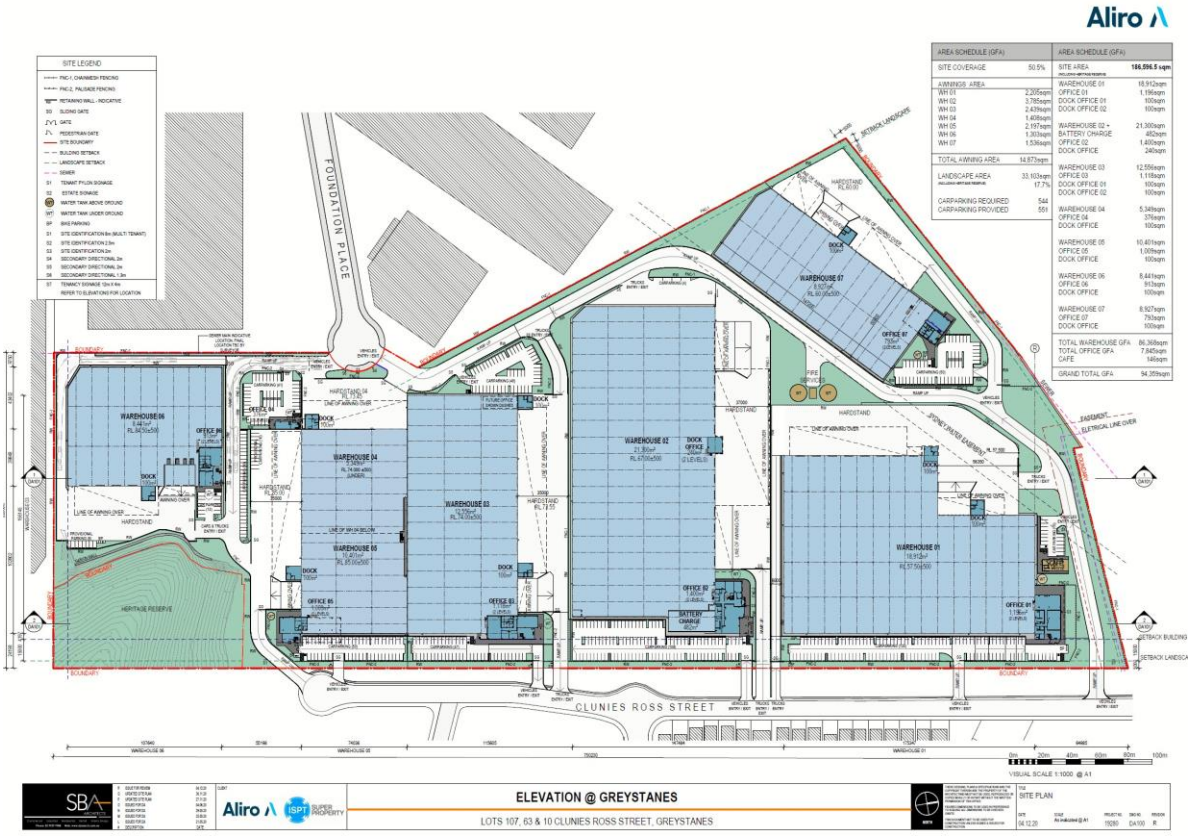


Figure 2.3. Indicative Development Masterplan

3 EARTHWORKS & FOUNDATIONS

3.1 Soil Profile and Geotechnical Considerations

A geotechnical report has been completed by Pells Sullivan Meynink (PSM) dated 11 February 2020. Refer to PSM report for detailed geotechnical information pertaining to the site.

The PSM Geotechnical investigation reference the Penrith 1:100,000 Geological Series Sheet and shows the site to be close to the boundary of the following rock units:

- Prospect Picrite (*Jp*) which typically comprises picrite, dolerite, minor basalt;
- Bringelly Shale of the Wianamatta Group formation (*Rwb*). This group typically comprises shale, carbonaceous claystone, laminate, fine to medium grained lithic sandstone, rare coal and tuff; and
- Qal which typically comprises fine-grained sand, silt and clay.

Engineering properties of the residual clay soils are that they will be moderately reactive, highly plastic subsoils with poor drainage.

Figure 3.1 presents the geological map of the site as included in the PSM report noted above. As noted by PSM, the Dolerite unit (*Jp*) is an intrusion, and it is possible for sills and dykes of this material to be located beyond the boundaries depicted in the figure.

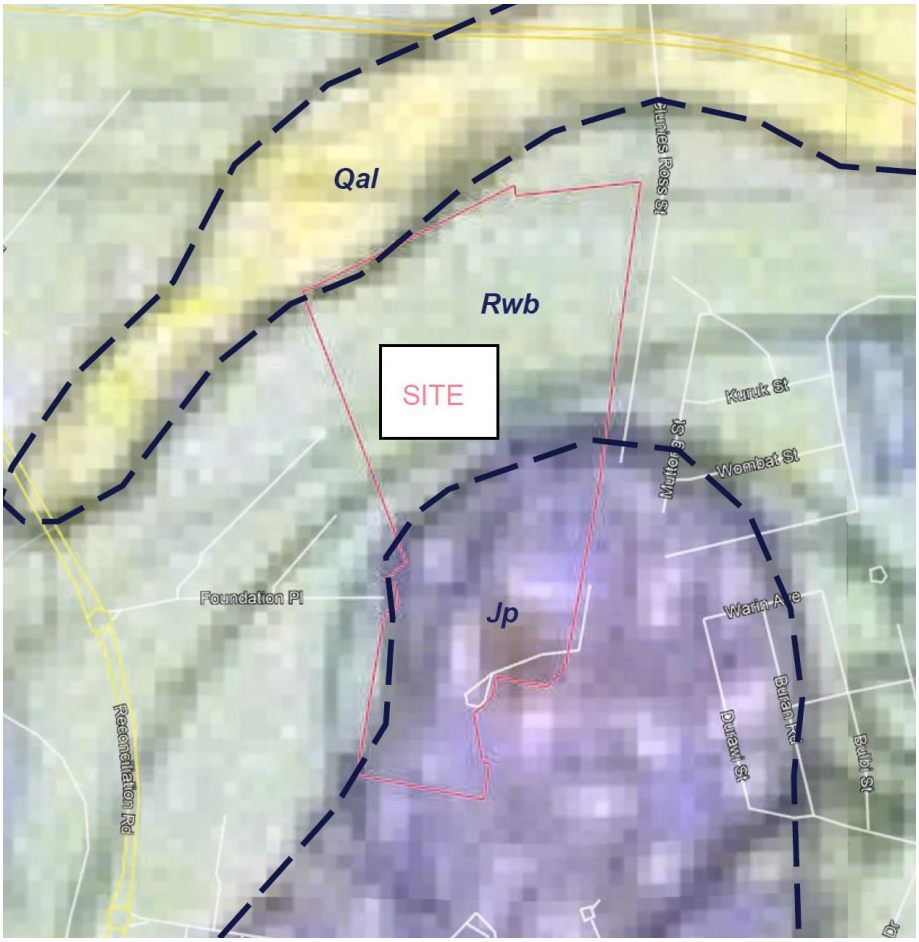


Figure 3.1. Geological Map

3.2 Earthworks

Bulk earthworks will be required to facilitate the development of the estate for industrial use. The earthworks will be undertaken to provide large flat building pads, facilitate site access, to drain the site stormwater via gravity, to minimise off-site export and retaining walls, and to keep building levels above the 1 in 100-year ARI flood level with a minimum freeboard of 500mm.

High level earthworks and volume estimates have been completed and are shown on drawing **Co13251.06-DA30** of **Appendix A**. The earthworks volume estimates are based on a lot layout with flat building pads. The earthworks analysis has been completed to a level of detail to enable general pad levels to be set and to obtain an order of magnitude cut and fill volume estimate.

The earthworks volume estimates are as follows:

Total Cut	- 146, 800 m^3	
Total Fill	+ 268, 300 m^3	
Basin Regrading	- 13, 900 m^3	
RE Wall Backfill	- 75, 800 m^3	
Detailed Excavation (1,500m^3/Ha)	- 26, 400 m^3	
Balance	+ 5, 400 m^3	*(minor import required.)*

The volume estimate is based on a 36,400m^3 (topsoil, deleterious or pavements) strip (200mm over the site area) to be either removed from the site, blended or placed and used within non-developable vegetation zones. Given the large volume and associated cost this would impose to dispose the topsoil, geotechnical advice is recommended to confirm options for borrow pit arrangement or blending non-organic topsoil component with site won fill material, so disposal of topsoil is not required. Consideration to the short- and long-term performance of the blended fill, including effect on settlement, soil modulus, CBR and bearing capacity should be made in any geotechnical advice. If high-bay or other settlement sensitive uses are proposed on the site, then topsoil blending should not be adopted.

Consideration to bulking of cut materials including rock and clay materials should be allowed for in detailed engineering cut to fill designs. Bulking of clay would normally be expected to be 4% of the removed volume and rock bulking can be expected in the range of 8-12%.

Given the variance and detailed assessments required to ensure cut to fill balance is achieved and to minimise offsite export, the final levels of buildings will be subject to a variance of plus/ minus 0.5m from those nominated on engineering and architectural submission drawings.

Soil erosion and sediment control measures including sedimentation basins will also be provided for the development – please refer to the Soil and Water Management Plan in **Section 10** of this report. All Soil and Sediment Control measures will be performed in accordance with the Landcom document *Managing Urban Stormwater, Soils and Construction (1998) – The Blue Book.*

3.3 Embankment Stability

To assist in maintaining embankment stability, permanent batter slopes in clay will be no steeper than 3 horizontal to 1 vertical while temporary batters will be no steeper than 2 horizontal to 1 vertical. This is in accordance with the recommended maximum batter slopes for residual clays and shale which are present in the area.

Steeper slopes may be adopted for dolerite if encountered subject to geotechnical assessments during works.

Permanent batters will also be adequately vegetated or turfed which will assist in maintaining embankment stability.

Stability of batters and reinstatement of vegetation shall be in accordance with the submitted drawings and the Soil and Water Management Plan in **Section 10**.

3.4 Supervision of Earthworks

All geotechnical testing and inspections performed during the earthwork's operations will be undertaken to Level 1 geotechnical control, in accordance with AS3798-1996.

3.5 Groundwater

The initial geotechnical investigations undertaken by PSM Geotechnical did encounter groundwater in two of the twelve boreholes undertaken on the site near to the regional wetland systems. Groundwater has been described as seepage water and noted at depths of 5.5m and 4.0m below ground level in BH09 and BH10 respectively. It could be expected that groundwater may have some seasonal variation and variation associated with periods of high rainfall.

Further groundwater testing has been undertaken by PSM during November & December 2020 (refer PSM Report PSM4010-010L dated 7 December 2020), and specific letter to address RTS items from Cumberland Council and Blacktown Council – refer PSM letter PSM4010-008L, dated 8 December 2020.

Groundwater is noted to be present adjacent to the regional basin at levels between RL 48.2m and RL 51.8m AHD. This part of the site is noted to be in an area of fill (with proposed pad level at RL 59.5m. Consideration to groundwater during construction will be required for retaining wall footings and temporary drainage. The works and designs will be completed during Construction Certificate and detail design stage with consideration to the requirements of the PSM reports noted.

PSM have confirmed there is no observed groundwater within areas of proposed cut. Allowance for general minor seepage which would be expected from shale substrate will be required.

Overall it is not considered the proposed development would have any significant effect on groundwater.

We confirm that the development does not propose to utilise surface or groundwater water sources. An assessment of the impact on these items is not relevant for the warehouse distribution center construction.

Surface water management, including conveyance of surface runoff, management of water quantity (through on-site detention) and water quantity (through on-site and estate wide management systems using WSUD principles and best practice pollution reduction objectives) has been proposed in the design.

In relation to groundwater affectation, this is expected to be minor and would be managed via proposed on-site stormwater systems. The geotechnical investigations undertaken by PSM noted seepage in only two of the twelve boreholes undertaken hence any interaction with existing groundwater or groundwater flow paths would negligible and hence not be impacted.

Refer further information from PSM Geotechnical Engineers:

- Letter PSM4010-008L, dated 8 December 2020; and
- Groundwater Report PSM4010-010L dated 7 December 2020

3.6 Soil Salinity and Aggressivity

An assessment of the potential for salinity and aggressive soils has been requested as part of the SEAR's requirements.

Reference to the *NSW Land & Water Conservation Acid Sulphate Soils Map* shows the subject land clear of any known occurrence of acid sulphate soils.

The PSM Geotechnical report Section 6) confirms that the majority of soils on the site would be considered to be classified as "non-saline" to "slightly saline", with the exception of one sample which would be classified as "moderately saline".

The information in the PSM report showed that the risk of highly saline or aggressive soils would be considered to be low, and that soil salinity could be managed through typical design and normal best practice engineering completed to industry standards.

4 INFRASTRUCTURE SERVICES

An overview of the existing and proposed infrastructure network layouts is outlined in the following sections. The assessment considers the supply and management of the following services and considerations for the development of the site:

- Potable Water (drinking water);
- Wastewater (sewer);
- Power;
- Natural Gas; and
- Telecommunications.

The information provided in this Report is intended to inform the Master Planners of the opportunities and constraints associated with the provision of infrastructure services to the site. Specifically the report provides the following information:

- Layout and capacity of existing service networks;
- Indicative utility demands for the current development proposals where available;
- Current service infrastructure delivery programs from the primary utility suppliers where available; and
- Service infrastructure assets required onsite.

Location and description of services included in this section are based on review of Dial Before You Dig (DBYD) services diagrams obtained via a DBYD search conducted in March 2020. Refer **Appendix F** for authority provided layout drawings and following descriptions of existing services and requirements for servicing.

4.1 Potable Water (drinking water)

Sydney Water is the servicing authority for potable water.

A 150mm uPVC water main is present in Foundation Place. This main traverses along the southern side of Foundation Place and terminates in the cul-de-sac adjacent to the Lot 107 (former Boral House) street frontage.

A 150mm uPVC and DICL main is located on the eastern side of Clunies Ross Street, north of the intersection with Burraga Way.

There are extensive water mains servicing the residential areas east of Clunies Ross Street, however expect these have limited capacity to service further or additional developments.

It is also noted that Sydney Water has a critical 1200mm SCL IBL trunk watermain (Prospect WP159 Main) with associated elements located within the northern portion of the site. Refer Sydney Water DBYD map in **Appendix F** and Landpartners Pipeline Survey (A2-74855SWAPR dated 17 January 2020) in **Appendix D**. It is noted that this pipeline would not be utilised to service the property however consideration to construction will be required to ensure the continued utilisation of the water main

throughout construction and maintaining structural integrity of the watermain following construction.

It is noted that a meeting has been held between Sydney Water, the developer Aliro, Civil Engineers Costin Roe Consulting and Landpartners, the Sydney Water Service Coordinator on 11 March 2020 to begin consultation in regard to the development over and around the asset. This consultation is noted to be ongoing and works (and approval for the works) will be subject to a separate out of scope built over sewer application.

Potable Water Demand

Typical water demand rates for different land uses are provided in **Table 4.1** below.

Land Use	Design Criteria	Units	Potable Water Demand
Single Dwelling Residential (14 - 17 dwelling/net ha)	Max Day Demand	kL/dwelling/day	2.2
Town House (<30 units/net ha)	Max Day Demand	kL/unit/day	1.6
Multi/ high Rise Units	Max Day Demand	kL/N Floor Ha/day	33.5
Light Industrial	Max Day Demand	kL/N Ha/day	40
Medium Industrial	Max Day Demand	kL/N Ha/day	66
Suburban Commercial	Max Day Demand	kL/N Ha/day	40
City Rise Commercial/ shopping Centre	Max Daily Demand	kL/floor Ha/day	63

Table 4.1 Water Demand Unit Rates

Utilising the light industrial rate of 40kL/ N Ha/day over approximately 94,000m^2 GFA of industrial development, a demand for the estate in the order of 376 kL/day is expected. Studies undertaken by Landpartners indicate that areas such as Glendenning, Arndell Park, Huntingwood and Eastern Creek (all developed as warehouse/ logistic centres) utilise a much lower rate of approximately 15 kL/ N Ha/day. Utilising this rate would result in a demand of 141 kL/day for the estate.

Potable Water Strategy

A feasibility application with Sydney Water would provide a definitive answer as they would be able to assess their current water model to determine the capacity available to service the development. Confirmation of the capacity of the existing system will need to be confirmed initially via a feasibility application and ultimately via a Section 73 Application to Sydney Water performed by a Sydney Water qualified Quickcheck agent.

The strategy and design for the required extension of the system will need to be performed by a Sydney Water Service Coordinator. We provide a high-level discussion relating to the extension of the water main in Clunies Ross Street for the purpose of addressing the SEAR's and SSDA assessments.

The following considerations have been made in the strategy:

- Extending the 150mm main in Clunies Ross Street to provide better frontage of the main to the site;
- Connection to the site from the extended main, subject to final site layout and internal site requirements;
- Potentially connecting the 150mm main to the 250mm main in Reconciliation Rise or to the existing 150mm main in Foundation Place. This would provide bi-directional flow in the case of a main break/ shutdown to the 150mm main. This would be subject to Sydney Water requirements, noting potential difficulty in providing construction between Clunies Ross Street and Reconciliation Rise in relation to Aboriginal Heritage; and
- Potentially a need for cross-connection from the extended 150mm main to the 100mm mains in the Pemulwuy residential estate

A qualified Hydraulic Engineer shall design internal water and fire system water supply to service the proposed development sites. This will be investigated as part of the detailed design and assessed as part of future separate building development applications.

Notwithstanding the further investigations and applications required with Sydney Water, it is considered that water supply will be able to be provided to the development site in the required timeframe.

4.2 Wastewater (sewer)

Sydney Water is the servicing authority for sewage disposal in the suburbs of Greystanes and Pemulway.

There are three wastewater mains in the immediate vicinity of the development site as follows:

- a 225mm VC gravity main is located on the western boundary of Lot 107 at a depth of around 2.0-2.5m below natural levels. The main is shown to run parallel to the western boundary in a north-south direction. At the junction of Foundation Place the main traverses in a westerly direction along the southern side of Foundation Place. An existing site connection to Lot 107 is shown adjacent to the Foundation Place cul-de-sac;
- a 375mm VC gravity main is located on the northern site boundary within Lot 216 at a depth of around 3.7m below natural levels. The main is shown to run parallel to the northern boundary in a south-west to north-east direction.
- A 225mm VC gravity main is located on the north-east boundary of Lot 44 adjacent to Clunies Ross Street. This main then joins the 375mm VC described above just north of the development site before traversing east away from the development area.

Wastewater Service Demand

The design criteria used to forecast future sewer loadings are generally taken from the Sydney Water Area Planning Design Criteria Guide and are expressed as an Equivalent Population for a particular land use. The Average Dry Weather Flow (ADWF) per Equivalent Population (EP) is taken as 180 L/day or 0.0021 L/s (ADWF (L/s) = 0.0021 x EP). Alternatively an estimate of the ADWF can be made based on 80% of the expected potable water demand.

Values for typical development types are summarised in **Table 4.3**.

Item	Units	Adopted Value	Source
Single Dwelling Residential	EP/dwelling	3.5	SWC Area Planning Design Criteria Guide
Medium Density Residential (townhouses up to 4 storeys)	EP/dwelling	3.0	SWC Area Planning Design Criteria Guide
High Density Unit Development (up to 200-400 Bedrooms/ Ha)	EP/Bedroom	0.275	SWC Area Planning Design Criteria Guide
Light Industrial	EP/ha	75	SWC Area Planning Design Criteria Guide
Heavy Industrial	EP/ha	150	SWC Area Planning Design Criteria Guide
Commercial	EP/ha	75	SWC Area Planning Design Criteria Guide
High Density Commercial	EP/ha	300 - 800	WSA 02-2002-2.2
Reserves	EP/ha	20	SWC Area Planning Design Criteria Guide

Table 4.3. Sewer Equiv Population Loading Criteria

An equivalent population (EP) of 685 has been estimated and the discharge per EP rate of 180kL/day results in discharge of 123kL/day. The Average Dry Weather Flow (ADWF) for the project has been calculated based on 90% of the expected 123kL demand. An ADWF of 111 kL/day or 1.3 L/s has been estimated for the development.

Note that the design of sewer mains will apply a peaking factor to the ADWF to get the Peak Daily Dry Weather Flow (PDWF), and include the peak (rainfall dependent) inflow and infiltration and the groundwater (non-rainfall) dependent infiltration. The peaking factor will vary depending on the size of the upstream catchment and would normally be within a range of 2 to 5.

Wastewater Capacity

The existing sewer connections at Foundation Place and the north-east corner of the site adjacent to Clunies Ross Street can be used for connecting development wastewater. The receiving 375mm carrier for the area is expected to be able to cater for the expected discharge rate shown above.

Confirmation of the proposed strategy will need to be performed in conjunction with Sydney Water via a Sydney Water qualified Water Service Coordinator during project application stage.

Notwithstanding the further investigations and applications required with Sydney Water, it is considered that wastewater reticulation will be able to be provided to the development site through connection to the existing infrastructure in Greystanes and Pemulway.

4.3 Power

Endeavour Energy is the servicing authority for energy adjacent to the site.

Existing low voltage supply run overhead along Clunies Ross Street past the subject site and servicing the current Austral Masonry operations on the land. DBYD also shows inground conduits and cable on the eastern side of Clunies Ross Street.

Inground conduits and cable are also present on within Foundation Place. Refer **Appendix F**.

An initial enquiry to the service provider regarding the ability of these cables to service the site, suggests that additional infrastructure will be required to service the site. Endeavour Energy advise that the engagement of a Level 3 Service Provider will be required to further assess the capacity of the existing system and the requirements for the infrastructure to service the proposed development.

Notwithstanding the further investigations and applications required with Endeavour Energy, it is considered that power supply will be able to be provided to the development site from surrounding infrastructure for normal light industrial or logistic type facility development.

4.4 Natural Gas

Jemena is the servicing authority for gas supply adjacent to the site.

Existing underground natural gas reticulation exists on Clunies Ross Street. Low pressure gas mains (110mm PE low pressure) mains service residential areas east of the development area.

100mm ST 1050kPa mains are also present on Clunies Ross Street with site connection which is understood to service existing Austral Masonry operations.

It is expected that demand for gas would only be necessary for a user/ tenant with specific uses for gas, and that generally gas would not be required for the development.

Notwithstanding the further investigations and applications required with Jemena, it is considered that gas supply will be able to be provided to the development site if required for a future specific user. We would expect this to be on an as needs basis for individual lots.

4.5 Telecommunications

Existing local telecommunications services are present on site which service the previous Boral House, and current Austral Masonry operations.

NBN conduits are shown to be located in Foundation Place and Clunies Ross Street.

We expect that the existing local cable network would not have the capacity to service the proposed development and that new underground cabling would be required to suit the project requirements. Normally this would be completed on a project by project basis.

Demand and capacity calculations have not been provided for telecommunications as these are not readily quantifiable like the other services provided. The requirements for telecommunications would need to be formalised via a Telstra Smart Community (or similar) registration.

Notwithstanding the further investigations and applications required with Telstra, it is considered that telecommunication infrastructure will be able to be provided to the estate.

5 WATER CYCLE MANAGEMENT STRATEGY & DRAINAGE METHODOLOGY

5.1 Key Areas and Objectives

Water Cycle Management (WCM) is a holistic approach that addresses competing demands placed on a region's water resources, whilst optimising the social and economic benefits of development in addition to enhancing and protecting the environmental values of receiving waters.

Developing a WCMS at the SSD stage of the land development process provides guidance on urban water management issues to be addressed for the estate and development as a whole. This assists urban rezoning and estate infrastructure planning for the industrial development proposed on the land.

This WCMS has been prepared to inform the DPIE, Blacktown City Council and Cumberland Council that the development is able to provide and integrate WCM measures into the stormwater management strategy for estate. It presents guiding principles for WCM across the precinct which includes establishing water management targets and identifying management measures required for future building developments to meet these targets.

Several WCM measures have been included in the WCMS and engineering design, which are set out in this report and the attached drawings. The key WCM elements and targets which have been adopted in the design are included in **Table 5.1** following.

It is noted that the land to the north of the LGA boundary, that is within Blacktown City Council LGA, does not form part of the *Northern Employment Land Precinct* whose controls are governed by the *Part Q – Pemulwuy Industrial Controls - Holroyd Development Control Plan 2013* (refer **Section 5.2**). WCM measures for the land north of the LGA boundary will adopt Blacktown City Council LGA requirements for water quality and quantity as set out in the Blacktown City Council DCP Part J.

Element	Target	Reference
Water Quantity	Ensure that additional stormwater runoff generated by the development does not adversely affect peak flows, velocities and water levels downstream of the site in the full range of flood up to 1 in 100year storm event.	Pemulway Industrial Controls Holroyd DCP Part Q
Water Quality	*Cumberland Council LGA/ Northern Employment Lands* Load-based pollution reduction targets based on an untreated urbanised catchment: Gross Pollutants >5mm 70% Coarse Sediment 80% Fine Sediments 0 % Total Phosphorus 0 % Total Nitrogen 0 % Total Hydrocarbons 90% *Blacktown Council LGA Land* Load-based pollution reduction targets based on an untreated urbanised catchment: Gross Pollutants 90% Total Suspended Solids 85% Total Phosphorus 65% Total Nitrogen 45% Total Hydrocarbons 90%	Source Controls - Section 7.3 and Table 1 of *Pemulway Industrial Controls Holroyd DCP Part Q* Blacktown City Council DCP Part J
Flooding	Buildings and road set 500mm above 1% AEP. No affectation to upstream downstream or adjoining properties as a result of development	Pemulway Industrial Controls Holroyd DCP Part Q Blacktown City Council NSW Floodplain Development Manual. Pemulway Industrial Controls Holroyd DCP Part Q Blacktown City Council DCP Part J
Water Supply	Ensure reduced demand for imported mains water by water conservation measures and re-use of stormwater in accordance with the principles of Water Sensitive Urban Design Reduce non-potable water supply demands by 80%.	Pemulway Industrial Controls Holroyd DCP Part Q Blacktown City Council

Erosion and Sediment Control	Appropriate erosion and sedimentation control measures must be described in the environmental assessment for all stages of construction to mitigate potential impacts downstream waters in accordance with Landcom Blue Book.	Landcom Managing Urban Stormwater: Soils and Construction
Waterway and Stream Health	Maintain pre and post development flows within Girraween (Greystanes) Creek.	Pemulway Industrial Controls Holroyd DCP Part Q

Table 5.1. WCM Targets

A summary of the how each of the WCM objectives will be achieved are described below. Reference to the relevant sections of the report should be made for further and technical details relating to the WCM measures:

- *Stormwater Quantity Management (Refer **Section 6**)*

  The intent of this criterion is to reduce the impact of urban development on existing drainage system by limiting post-development discharge within the receiving waters to the pre-development peak, and to ensure no affectation of upstream, downstream or adjacent properties.

  As discussed in earlier sections of the report, an existing regional basin is located to the north of the site, managed by Blacktown City Council. The existing basin has an active storage of approximately 100,000m^3 during the 1% AEP storm and attenuates a catchment with an area of approximately 173.4Ha including the 84 Ha associated with the Northern Employment Land precinct.

  Attenuation of stormwater runoff from the development will be managed via the regional detention basin. Modification of the existing detention basin is proposed to relocate existing storage which encroaches the site, and to increase the capacity of the basin to include discharge attenuation from the portion of the site which sits within the Blacktown Council LGA and does not form part of the current Northern Employment Lands. The proposed modification to the regional system was discussed with Blacktown City Council in a meeting held on 17 September 2019. During the meeting it was noted that council would accept the adjustment subject to key criteria and technical items being assessed and confirmed. Refer meeting minutes included in **Appendix E**.

  Reference to drawing **Co13251.06-DA47** shows the configuration for the proposed modification to the basin. It is proposed to provide additional storage on the northern side of the basin to provide compensation for lost storage and provide additional storage for the northern portion of the PLE land within Blacktown Council LGA.

  No on-lot detention systems are required or proposed for the PLE.

  Refer to **Section 6** of the document for assessment of the detention system modification.

- *Stormwater Quality Management (Refer **Section 7**)*

  There is a need to target pollutants that are present in stormwater runoff to minimise the adverse impact these pollutants could have on downstream receiving waters.

  The required pollutant reductions are included in **Table 5.1** of this document and MUSIC modelling has been completed to confirm the reduction objectives can be met for the development and precinct overall.

  A series of Stormwater quality improvement devises (SQID's) have been incorporated in the design of the estate. The proposed management strategy will include the following measures:

  - Development sites within the Northern Employment Land Precinct (Holroyd DCP Part Q) will require primary treatment via gross pollutant trap (GPT's) prior to discharge. Development sites within DCP Part Q precinct require primary treatment of litter, gross pollutants, course sediment and hydrocarbons. Tertiary treatment will be made within the wetland area.
  - The development area within Blacktown City Council LGA will require full on lot treatment which meets councils DCP Part J pollution reduction targets (refer **Table 5.1**).

  Refer to stormwater management drawings in **Appendix A** should be made, in particular drawing **Co13251.06-DA40** which provides and overall summary of stormwater management provisions for the development.

  Reference to **Section 7** of this document should be made for detailed Stormwater Quality modelling and confirmation of measures proposed.

- *Flood Management (refer **Section 8**)*

  The proposed development considered flooding and large rainfall events from the adjacent regional basin and Girraween Creek.

  The following measures have been incorporated in the design:

  - All buildings are sited 500mm above the 1% AEP design flood level of the regional detention basin.
  - Development is clear of the 1% AEP flood extents;
  - Requirements of Council DCP have been met regarding works in and around flooding areas;
  - Stormwater detention measures (via regional basin) have been included to manage pre and post development runoff as discussed above and in **Section 6**; and
  - Overland flow paths to manage runoff in large storm events have been made including achieving at least 500mm freeboard to building levels from the flow paths.

- *Water Demand Reduction/ Rainwater Reuse*

  Rainwater reuse measures will be provided as part of future building development designs. Rainwater reuse is proposed to reduce demand on non-potable uses by at least 50%, with a target of 80%. The reduction in demand will target non-potable uses such as toilet flushing and irrigation. **Refer Section 7.4**.

- *Waterway Health*

  The receiving waterway is noted to be Girraween Creek, previously referred to as Greystanes Creek. As required of Pemulway Industrial Controls Holroyd DCP Part Q stream health would be maintained through confirmation of post development peak flows and duration of flow being consistent with pre-development conditions. Refer Section 6 for confirmation of pre and post development flows in and around the regional detention system and Girraween Creek.

5.2 Existing Precinct and Regional Drainage Systems

An existing regional detention basin and water quality system services the Greystanes Northern Employment Lands in which the majority of the proposed development site is located. The regional measures are generally described in *Part Q – Pemulwuy Industrial Controls - Holroyd Development Control Plan 2013*.

The *Part Q DCP* confirms the measures provided for the *Northern Employment Land Precinct*, with the general arrangement as shown in **Figure 5.1** below, and current as constructed systems shown in **Figures 5.2** & **5.3**. *Appendix A* of the *Part Q DCP* describes the measures required for individual development sites and the measures provided at a regional level.

In terms of stormwater quantity management, a regional basin is located to the north of the site in Girraween Creek as shown in **Figure 5.4 & 5.5**. This basin comprises an active storage volume in the range of 100,000m^3 during the 1% AEP event and attenuates stormwater flows from a 173.4 Ha catchment including the 84 Ha Northern Employment Lands Estate and includes the subject development. No additional on-site measures are necessary to achieve compliance with water quantity or on-site detention requirements. Refer to **Appendix G** which includes work as constructed drawings of the basin as provided by Blacktown City Council. The basin is shown to include a downstream control consisting of a weir at RL 57.0m, spillway at RL 56.1m AHD a 1050mm Class 2 RCP outlet culvert, and 4m wide basin drain through the base of the excavated earth detention area.

In terms of water quality, the constructed wetland (refer **Figure 5.1, 5.2** and **5.3**) provides tertiary water quality treatment for the Northern Employment Lands Estate. The wetland targets fine sediments and nutrients which are not treated by lot treatment measures. Individual lots require gross pollutant trap (GPT) which targets coarse sediments, hydrocarbons, oil and grease, and litter.

Figure 8: The constructed wetlands- Pemulwuy North Employment Lands

Figure 5.2. Excerpt: Figure 8 from Part Q DCP2013 – Wetland Location

igure 9: The constructed wetland and riparian corridor Pemulwuy North Employment lands

Figure 5.3. Excerpt: Figure 9 from Part Q DCP2013 – General Arrangement

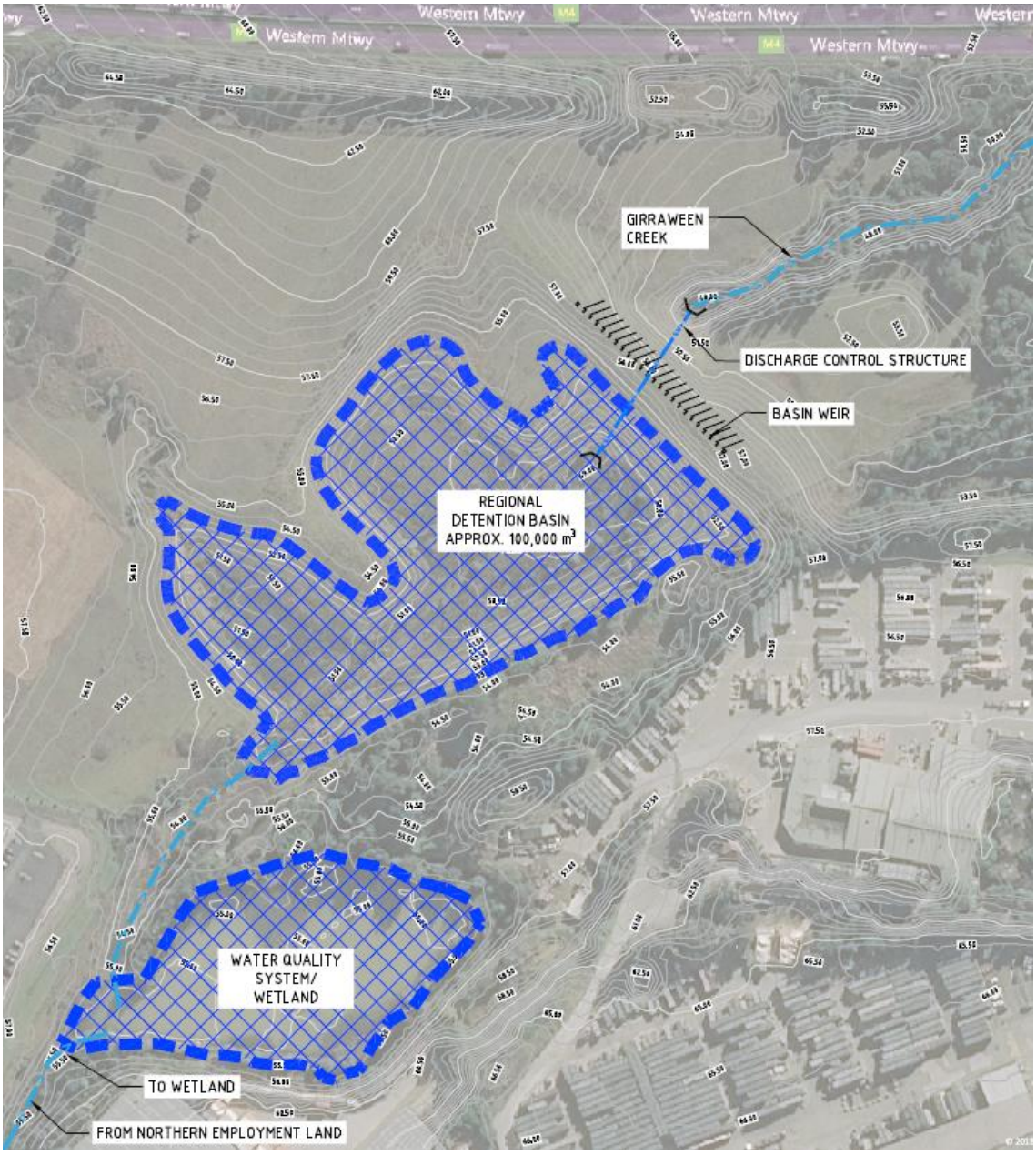


Figure 5.4. As Constructed Stormwater Management Systems

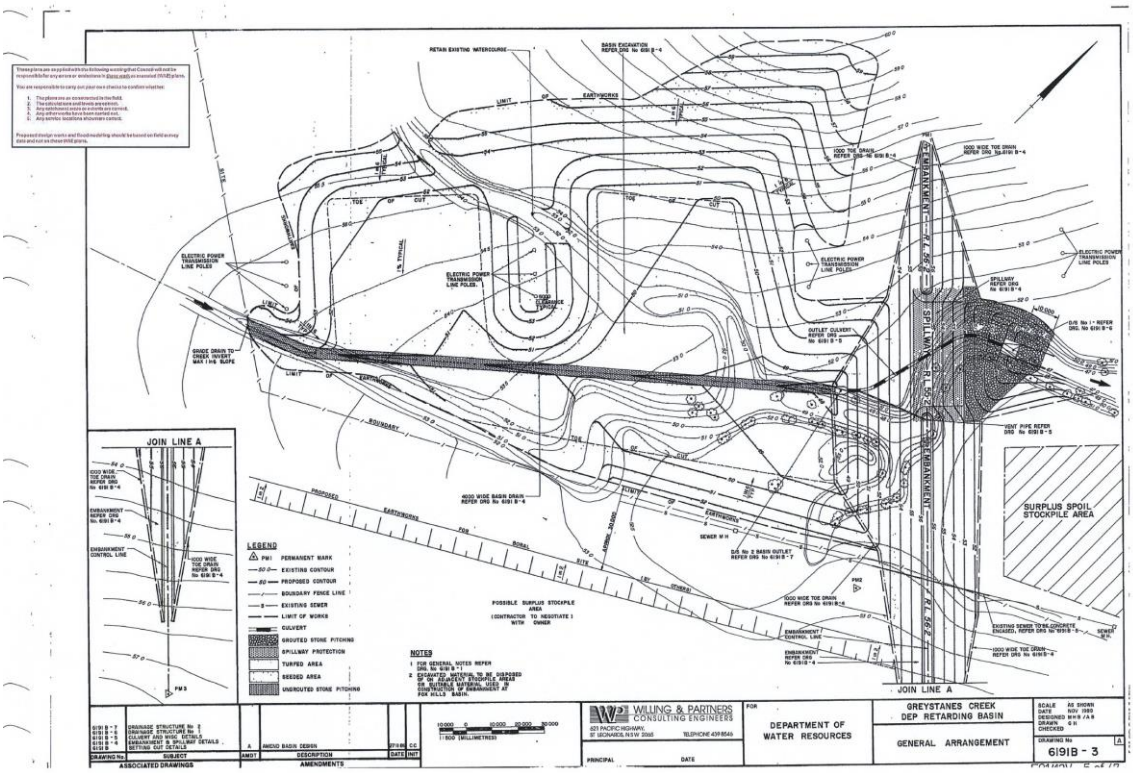


Figure 5.5. Work As Constructed General Layout of Regional Basin

5.3 Proposed Estate Drainage System

As per general engineering practice and relevant council and state guidelines, the proposed stormwater drainage system for the estate development will comprise a minor and major system to safely and efficiently convey collected stormwater run-off from the development to the legal points of discharge.

The minor system will consist of a piped drainage system which is designed to convey runoff from a 1 in 20-year ARI design storm event (Q20). The major system will be designed to cater for storms up to and including the 1 in 100-year ARI storm event (Q100). The major system will employ the use of defined overland flow paths, such as roads and open channels, to safely convey excess run-off from the site to the regional detention basin.

The design of the stormwater system for this site will be based on relevant national design guidelines, Australian Standard Codes of Practice, the Holroyd Council Part Q DCP for areas within the Pemulway Northern Employment Lands and the standards of Blacktown City Council for areas within Blacktown City Council LGA, and accepted engineering practice. Runoff from buildings will generally be designed in accordance with AS 3500.3 National Plumbing and Drainage Code Part 3 – Stormwater Drainage. Overall site runoff and stormwater management will generally be designed in accordance with the Institution of Engineers, Australia publication “Australian Rainfall and Runoff” (1988 Edition), Volumes 1 and 2 (AR&R).

Water quality and re-use are to be considered in the design to ensure that any increase in the detrimental effects of pollution are mitigated, Water Quality Objectives are met and that the demand on potable water resources is reduced.

The legal point of discharge is a point specified by Council where stormwater from a property can be discharged. The legal point of discharge is usually Council's stormwater infrastructure (where available), the street kerb and channel for smaller developments or downstream receiving waters like an existing stream or gully, lake, pond or waterbody, or regional detention system.

Legal discharge for the entire development is via:

- Existing trunk drainage in Foundation Place, or to the wetland on the west/ north-west of the site for areas within the Pemulway Northern Employment Lands: or
- Directly to the regional detention system (for areas within Blacktown City Council LGA).

The design and construction of any new outlet structures will be assessed in accordance with the NSW Office of Water document *Controlled Activities: Guidelines for Outlet Structures.*

The stormwater outlets to the regional basin will need to consist of a reinforced concrete pipe and 'natural' energy dissipater. The outlet is to be aligned with the creek to remove the potential for bank scour and shall include rip rap energy dissipaters constructed in accordance with the Outlet Structures Guidelines as published by the Department of Water & Energy and The Blue Book. The arrangement is shown figuratively below in **Figure 5.4** below.

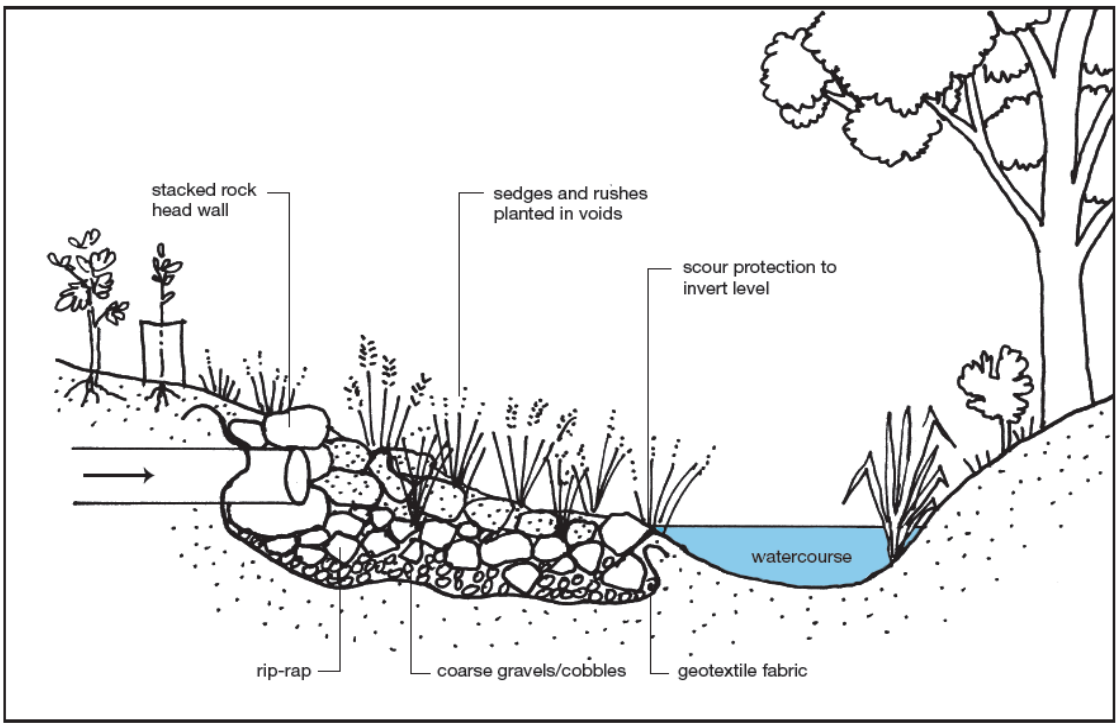


Figure 5.4. Typical Natural Outlet Structure Components

5.4 Proposed Modifications to Precinct Wetland and Regional Detention Systems

As discussed in this report, it is proposed that modifications be undertaken to the existing precinct wetland and regional detention systems described in **Section 5.2** and shown in **Figure 5.2**.

The modifications are proposed to remove the areas of the existing systems which currently encroach on the subject land. The proposed modifications have been shown on drawings **Co13251.06-DA40** and **DA47** as included in **Appendix A**.

The modifications proposed to the existing wetland will maintain the existing wetland pond treatment efficiency. This would be achieved through maintaining the existing surface area and volume by filling a portion of the eastern end of the pond and providing compensatory storage and area on the northern side of the pond. Consideration to maintaining existing discharge and inlet structures, and also maintaining maintenance access points has been made in the proposed concepts included in the drawings noted above. It is noted the existing area of the pond is approximately 9500m^2, with a permanent volume of approximately 11,400m^3 based on a nominal 1.2m depth. The effectiveness of the existing regional system has not been assessed as part of this SSDA.

The modifications to the existing detention system involved filling of the site on the northern boundary of the property and providing compensatory storage to an area on the northern side of the detention system. Additional storage is also proposed to be introduced to the system to enable discharge of the portion of the site within Blacktown City Council LGA to discharge directly to the basin. This additional storage would be provided at a rate of 455m^3/Ha as required of Blacktown City Council LGA.

Detailed assessment of the storage/ discharge for the existing detention system and proposed modified system has been made and included in **Section 6** of this report. The proposed modification to the regional system was discussed with Blacktown City Council in a meeting held on 17 September 2019 at Blacktown City Council offices. During the meeting it was noted that council would support the adjustment subject to key criteria and technical items being assessed and confirmed. Refer meeting minutes included in **Appendix E**.

5.5 Climate Change

In relation to impact on the development from the adjacent regional detention system, as requested in the SEAR's an assessment of the 0.2% AEP and 0.5% AEP was to be included as a proxy for the effect of climate change. Reference to **Section 6 & 8** of the report should be made for an assessment of the detention basin and flooding levels for the noted AEP events. Based on the modelling completed for the 0.2% AEP, the effect from climate change (and considering the proposed modification to the basin) would result in an overall increase of 0.8m from the current 1% AEP. That is an increase in water level from RL 55.2m to 56.0m AHD.

The assessment shows that the proposed stormwater drainage system and stormwater management systems (including the proposed detention system modification) would have sufficient capacity to manage the increased peak flows and water volume with minor increase in hydraulic grade line and peak water level within the basins. We confirm the

increase in rainfall intensities will achieve the required minimum 0.5m freeboard to the proposed building pad levels in relation to local overland flow paths in and around the estate as nominated on the design drawings. There is negligable change to discharge flow rates from the regional basin between the 1% AEP pre-development to the 0.2% AEP post development flows

Overall, flood immunity of the extreme western development sites would not be compromised given a large available freeboard amount much larger than minimum 0.5m values generally adopted.

The site is situated well upstream from any tidally influenced receiving waters including expected potential sea level rise of 0.3m. We confirm the development will not affect or be affected by potential sea level rise.

An assessment on the regional stormwater on-site detention basin confirms that the current basin design has sufficient capacity to cater for a larger rainfall events and increased rainfall intensity represented by the 0.5% and 0.2% AEP events.

6 WATER QUANTITY MANAGEMENT

6.1 General Design Principles & Methodology

Water quantity management, also known as "On-site Detention (OSD)", is required to be considered for this development to ensure the cumulative effect of development and urbanisation does not have a detrimental effect on the existing stormwater infrastructure and watercourses located downstream of the site.

With reference to **Sections 5.2** and **5.4** of this report and drawings in **Appendix A**, the existing regional detention system located to the north of the subject property is proposed to be utilised for the management of water quantity for the future development, and that a modification to the basin will be made to relocate detention storage which currently encroaches the subject property, and increase the storage to account for the portion of the development which falls within Blacktown City Council LGA.

A hydrological analysis of the regional detention system has been undertaken to confirm the effectiveness of the existing and the proposed modified detention system. The existing basin configuration is noted to be based on Work As Executed drawings (refer **Appendix G**) provided by Blacktown City Council, detail survey and lidar survey information.

In order to assess the existing and operational phase peak discharges from the development precinct, a RAFTS model hydrological model was used to estimate peak flows from catchments on the site for various storm durations as follows:

- 5% AEP (1 in 20yr ARI)
- 1% AEP (1 in 100yr ARI)
- 0.5% AEP (1 in 200yr ARI)
- 0.2% AEP (1 in 500yr ARI)
- PMF

RAFTS modelling has been undertaken using the following initial and continual losses in **Table 6.1**, consistent with Blacktown City Council recommended modelling parameters.

Catchment Type	Initial Loss (mm)	Continued Loss (mm/hr)
Pervious	15	2.5
Impervious	5	0

Table 6.1. Initial and Continued Loss for RAFTS Model

The detention system was then modelled in DRAINS to confirm water levels, storage and discharge relationships as noted above. Refer **Appendix I** for RAFTS/ DRAINS model layout.

Further, the assessment has been utilised to confirm flood levels and flood conditions for the development which are further discussed in **Section 8**.

6.2 Catchment & Hydrological Assessment

A review of the existing catchment which drains to the regional detention system has been made. With reference to **Figure 6.1** below, it is estimated that 83.35 Ha from the Pemulway Employment lands, 76.47 Ha upstream of the Pemulway Employment Lands, 6.14 Ha from surrounding landform of the basin and the basin itself, and an area of 7.41 Ha from the Austral land within Blacktown Council LGA area. It is noted that the Austral land bypasses the Pemulway Employment Land wetland, however currently discharges directly to the regional basin.

The total area managed by the detention system is noted to be 173.4 Ha in the pre-development and post development conditions.

Figure 6.1. Regional Detention System Catchment Layout

6.3 Assessment of Existing Detention System

Table 6.1 shows the existing stage storage arrangement for the existing basin used in the assessment. Values have been assessed at 1.0m increments based on existing topography and basin WAE plans in **Appendix G**.

R.L. (m AHD)	Depth (m)	S.A. (m^2)	Volume (m^3)	Cum. Volume (m^3)
47.4	0	0	0	0
48	0.6	80	48	48
49	1.6	160	160	208
50	2.6	3285	3285	3493
51	3.6	9898	9898	13391
52	4.6	17307	17307	30698
53	5.6	22282	22282	52980
54	6.6	29506	29506	82486
55	7.6	43135	43135	125621
56	8.6	71080	71080	196701
56.5	9.1	81501	40751	237452
57	9.6	97169	48585	286036

Table 6.1. Existing Stage Storage Values

Table 6.2 to **6.4** shows the overall hydrology, storage and water levels for the detention systems for the regional basin. Output for the 5% AEP (1 in 20yr ARI), 1% AEP (1 in 100yr ARI), 0.5% AEP (1 in 200yr ARI), 0.2% AEP (1 in 500yr ARI) and PMF events have been included in the table. Flows and storages are provided for the critical peak inflow storm duration of 2 hours and the critical active storage storm which has a duration of 9 hours.

AEP (%)	Flow In (m^3/s)	Flow Out (m^3/s)			Storage Volume (m^3)	Water Level (m AHD)
		Low Flow	High Flow	Total		
5	43.524	5.45	0	5.45	64824	54
1	55.639	5.853	0	5.853	91364	54.8
0.5	63.021	6.016	0	6.016	105276	55
0.2	71.755	6.177	0	6.177	121867	55.4

Table 6.2. Existing Precinct Hydrology, Basin Storage Volume and Water Level (2-Hour)

AEP (%)	Flow In (m^3/s)	Flow Out (m^3/s)			Storage Volume (m^3)	Water Level (m AHD)
		Low Flow	High Flow	Total		
5	21.472	5.633	0	5.633	75662	54.3
1	25.16	6.093	0	6.093	112710	55.2
0.5	27.412	6.287	0	6.287	135232	55.7
0.2	29.859	6.451	0	6.451	158724	56

Table 6.3. Existing Precinct Hydrology, Basin Storage Volume and Water Level (9-Hour)

Duration	Flow In (m^3/s)	Flow Out (m^3/s)			Storage Volume (m^3)	Water Level (m AHD)
		Low Flow	High Flow	Total		
2hr	117.935	6.957	94.50	101.458	258203	57.16
6hr	65.175	6.88	54.879	61.759	239953	57

Table 6.4. Existing Precinct Hydrology, Basin Storage Volume and Water Level for PMF

Low flow values represent flows within the 1050mm RCP culvert and high flow represents flow over the basin spillway. Refer **Appendix G** and **Section 5.2** relating to existing basin configuration.

The modelling has shown that the existing detention system attenuates stormwater from the precinct and surrounding catchments to pre-development values, an active storage of 112710m^3 is achieved in the 1% AEP and that a water level in the 1% AEP is RL 55.20m AHD and in the PMF is 57.16m AHD. It is noted that in the 1% AEP the overflow weir is not activated with the water level being approximately 0.9m below the weir level of RL 56.1m.

6.4 Assessment of Modified Detention System

Table 6.5 shows the modified stage storage arrangement for the proposed basin arrangement used in the assessment. Values have been assessed at 1.0m increments based on proposed geometry in **Appendix A**. Review of the differences in volumes shows that the modified basin is generally consistent with the existing basin storage construction.

R.L. (m AHD)	Depth (m)	S.A. (m^2)	Volume (m^3)	Cum. Volume (m^3)
47.4	0	0	0	0
48	0.6	80	48	48
49	1.6	160	160	208
50	2.6	3285	3285	3493
51	3.6	9898	9898	13391
52	4.6	19595	19595	32986
53	5.6	25020	25020	58006
54	6.6	29506	29506	87512
55	7.6	37533	37533	125045
56	8.6	61355	61355	186400
56.5	9.1	68181	34091	220491
57	9.6	98373	49187	269677

Table 6.5. Modified Stage Storage Values

Table 6.5 shows the overall hydrology, storage and water levels for the proposed modification of the regional detention system. Output for the 5% AEP, 5% AEP (1 in 20yr ARI), 1% AEP (1 in 100yr ARI), 0.5% AEP (1 in 200yr ARI), 0.2% AEP (1 in 500yr ARI) and PMF events have been included in the table. Flows and storages are provided for the critical storm duration of 2 hours.

AEP	Flow In (m^3/s)	Flow Out (m^3/s)			Storage Volume (m^3)	Water Level (m AHD)
		Low Flow	High Flow	Total		
5	43.525	5.372	0	5.372	65599	53.8
1	55.658	5.814	0	5.814	92281	54.7
0.5	63.05	6	0	6	105968	55
0.2	71.853	6.182	0	6.182	122107	55.3

Table 6.6. Proposed Precinct Hydrology, Basin Storage Volume and Water Level (2hr duration)

AEP	Flow In (m^3/s)	Flow Out (m^3/s)			Storage Volume (m^3)	Water Level (m AHD)
		Low Flow	High Flow	Total		
5	21.52	5.573	0	5.573	76810	54.1
1	25.374	6.091	0	6.091	113568	55.2
0.5	27.476	6.307	0	6.307	135554	55.7
0.2	29.712	6.485	0	6.485	158222	56

Table 6.7. Proposed Precinct Hydrology, Basin Storage Volume and Water Level (9hr duration)

Duration	Flow In (m^3/s)	Flow Out (m^3/s)			Storage Volume (m^3)	Water Level (m AHD)
		Low Flow	High Flow	Total		
2hr	118.653	6.958	95.40	102.358	244949	57.16
6hr	65.477	9.884	55.72	65.604	226593	57

Table 6.8. Post Development Precinct Hydrology, Basin Storage Volume and Water Level for PMF

Low flow values represent flows within the 1050mm RCP culvert and high flow represents flow over the basin spillway.

The modelling has shown that the modified detention system attenuates stormwater from the precinct and surround catchments to the pre-development values. An active storage of 92,281m^3 and 113,568m^3 is achieved in the 1% AEP 2-hour and 9-hour storm events with a corresponding water level of RL 54.7m and 55.2m AHD respectively.

In the PMF storm, an active storage of 244,949m^3 and 226,593m^3 is achieved in 2-hour and 6-hour storm events with corresponding water levels of RL 57.16m and 57.0m AHD respectively.

Detention storage is noted to be fully active. It is also noted that, based on the 1% AEP volume of 113,568m^3 and contributing catchment of approximately 173.4 Ha, that a storage rate of 655m^3/Ha is achieved. This is noted to exceed council's current minimum storage rate of 455m^3/Ha by 44% for new detention systems within Blacktown City Council LGA.

6.5 Comparison of Pre and Post Development Detention System

A comparison of pre and post development storages, discharge rates and water levels for the various AEP events, and PMF event has been completed as shown in **Table 6.9**.

It is noted that comparison of the 1% AEP is most relevant for impact assessments, however the 0.5% and 0.2% being considered in the SEAR's as being proxy for climate change have also been included.

Review of differences in PMF have been made with respect to safety and Dam Safety Committee requirements.

AEP	Time	Peak Discharge (m^3/s)			Storage Volume (m^3)			Water Level (m)		
	(hrs)	Pre	Post	Diff.	Pre	Post	Diff.	Pre	Post	Diff.
5	2	5.45	5.372	-0.078	64824	65599	775	54	53.8	-0.20
5	9	5.633	5.573	-0.060	75662	76810	1148	54.3	54.1	-0.20
1	2	5.853	5.814	-0.039	91364	92281	917	54.8	54.7	-0.10
1	9	6.093	6.091	-0.002	112710	113568	858	55.2	55.2	0.00
0.5	2	6.016	6	-0.016	105276	105968	692	55	55	0.00
0.5	9	6.287	6.307	0.020	135232	135554	322	55.7	55.7	0.00
0.2	2	6.178	6.182	0.004	121867	122107	240	55.4	55.3	-0.10
0.2	9	6.451	6.485	0.034	158724	158222	-502	56	56	0.00
PMF	2	101.458	102.358	0.900	258203	244949	-13254	57.16	57.16	0.00
PMF	6	61.759	62.604	0.845	239953	226593	-13360	57	57	0.00

Table 6.9. Pre and Post Development Output and Differences

Review of **Table 6.9** shows that pre and post development discharge, storage volumes and water levels are generally consistent, or a reduction in flow and water level is achieved, between the pre and post development conditions, allowing for the proposed modification to the existing detention basin for all AEP events assessed.

Water levels can be seen to be reduced by 0.1m for the 1% to 0.2% AEP events, and by 0.2m in the 5% AEP. Peak flows are also noted to be slightly lower in all AEP events, however extent of duration of flow for all events is shown to be generally consistent.

Review of change during the PMF event has been made. Although this criteria is not normally required for impact from development, given the basin is a prescribed dam, consideration to operation of the basin for dam break and downstream safety during larger than normally assessed events to the PMF events is necessary to be made. Review of **Table 6.9** shows a minor increase in total flow is noted in the PMF event.

The duration and velocity associated with the minor increase in total flow over the weir during the PMF event has been made. This review of the pre and post development duration of flow over the basin weir shows that a post-development duration of approximately 181 minutes in the 2hr event and 344 minutes in the 9 hour event and a reduction of flow time over the weir of 6.6 minutes and 4.5 minutes respectively (refer **Table 6.10)**. Further the pre and post development velocities of the flow are equal, hence. Given the reduction in overall duration of flow over the weir, and no increased velocity, the minor increase in flow is considered to result in negligible impact due to development and consistent pre and post development operation of the basin during the PMF event.

AEP	Time (hrs)	Velocity (m/s)			Flow Time (mins)		
		Pre	Post	Diff.	Pre	Post	Diff.
PMF	2	1.737	1.728	-0.009	188	181	-6.6
PMF	6	1.559	1.565	0.006	348	344	-4.5

Table 6.10. Pre and Post Development Output and Differences, Spillway Velocity and Flow Time

Table 6.11 shows the velocity and flow time difference over the embankment due to a 2hr PMF storm event.

AEP	Time (hrs)	Velocity (m/s)			Flow Time (mins)		
		Pre	Post	Diff.	Pre	Post	Diff.
PMF	2	0.087	0.090	0.002	73	75	2.7

Table 6.11. Pre and Post Development Output and Differences, Embankment Velocity and Flow Time

Based on the modelling and assessment completed, it can be confirmed that the proposed modification of the basin results in consistent operation of the basin for inflow, outflow, water levels and storage. Thus, the proposed modification is considered to be acceptable and meets councils recommended criteria for the basin modification.

It is further noted that duration of flow within Girraween Creek is also noted to be consistent or less than predevelopment. Stream health and other associated ecological considerations as such would remain consistent, hence not impacted, following the development.

For further discussion relating to flooding and flood planning refer to **Section 8** of this report.

7 STORMWATER QUALITY CONTROLS

7.1 Regional Parameters

There is a need to provide design which incorporates the principles of *Water Sensitive Urban Design (WSUD)* and to target pollutants that are present in the stormwater to minimise the adverse impact these pollutants could have on receiving waters and to also meet the requirements specified by Cumberland (Holroyd) Council and Blacktown City Council.

Reference to **Section 5.1**, **Table 5.1** should be made for water quality criteria achieved for the development, noting differing requirements and strategy employed for areas within Cumberland City Council LGA (subject to Holroyd Council Part Q DCP) and those within Blacktown City Council LGA (subject Blacktown City Council DCP 2015 Part J).

Developed impervious areas of the estate, including roof, hardstand, car parking, roads and other extensive impervious areas are required to be treated by the Stormwater Treatment Measures (STM's). The STM's shall be sized according to the whole catchment area of the development. The STM's for the estate are based on a treatment train approach at the estate level to ensure that all the objectives in **Table 5.1** are met.

7.2 Proposed Stormwater Treatment System – Areas within Cumberland Council LGA

Provision for water quality for areas within Cumberland City Council LGA will be provided in accordance with the requirements for individual development lots set out as "*Source Controls" in* Section 7.3 and Table 1 of *Part Q – Pemulwuy Industrial Controls - Holroyd Development Control Plan 2013*. The components of the treatment train for areas within Cumberland Council LGA are as follows:

- Primary treatment of runoff from the development sites via a vortech style GPT (CDS or equivalent).
- A portion of the future building roofs will also provide a level of treatment via rainwater reuse and settlement within the rainwater tank. Given however that building layouts are subject to change during detail design, allowance for rainwater tank within the MUSIC model has not been made.

The maintenance of the water quality measures (gross pollutant traps) will be made by the estate at no cost or burden to council. Further discussion on maintenance are contained in **Section 7.7** of this document.

7.3 Proposed Stormwater Treatment System – Areas within Blacktown Council LGA

Provision for water quality for areas within Blacktown City Council LGA will be provided in accordance with the requirements for individual development lots set out as DCP 2015 Part J.

Components of the treatment train for areas within Blacktown City Council LGA are as follows:

- Primary treatment of runoff to be treated via pit inserts. These pit inserts will provide treatment for gross pollutants, course sediments, some fine sediments, some nutrients and some hydrocarbons.
- Tertiary treatment of runoff will be provided via proprietary filtration system produced by Ocean Protect. The syfon actuated filtration system will treat fine and course sediments, nutrients and hydrocarbons.
- A portion of the future building roofs will also provide a level of treatment via rainwater reuse and settlement within the rainwater tank.

The maintenance of the water quality measures will be made by the estate at no cost or burden to council. Further discussion on maintenance are contained in **Section 7.7** of this document.

7.4 Stormwater Quality Modelling

7.4.1 Introduction

The MUSIC model was chosen to model water quality. The MUSIC model has been released by the Cooperative Research Centre for Catchment Hydrology (CRCCH) and is a standard industry model for this purpose. MUSIC (the Model for Urban Stormwater Improvement Conceptualisation) is suitable for simulating catchment areas of up to 100 km^2 and utilises a continuous simulation approach to model water quality.

By simulating the performance of stormwater management systems, MUSIC can be used to predict if these proposed systems and changes to land use are appropriate for their catchments and are capable of meeting specified water quality objectives (CRC 2002). The water quality constituents modelled in MUSIC and of relevance to this report include Total Suspended Solids (TSS), Total Phosphorus (TP) and Total Nitrogen (TN).

The pollutant retention criteria set out in **Section 5.1** of this report were used as a basis for assessing the effectiveness of the selected treatment trains.

The MUSIC model "*13251.06 Prospect Logistic Rev 1.sqz*" was set up to examine the effectiveness of the water quality treatment train and to predict if council requirements have been achieved on an estate wide basis and on individual lots respectively.

The layout of the MUSIC model is presented in **Appendix B**.

7.4.2 Rainfall Data

Six-minute pluviographic data was provided by BCC which has been sourced from the Bureau of Meteorology (BOM) as nominated below. Evapo-transpiration data for the period was sourced from the Sydney Monthly Areal PET data set supplied with the MUSIC software.

Input	**Data Used**
Rainfall Station	67035 Liverpool (Whitlam)
Rainfall Period	1 January 1967 – 31 December 1976 (10 years)
Mean Annual Rainfall (mm)	857
Evapotranspiration	Sydney Monthly Areal PET
Model Timestep	6 minutes

7.4.3 Rainfall Runoff Parameters

Parameter	**Value**
Rainfall Threshold	1.40
Soil Storage Capacity (mm)	170
Initial Storage (% capacity)	30
Field Capacity (mm)	70
Infiltration Capacity Coefficient a	210
Infiltration Capacity exponent b	4.7
Initial Depth (mm)	10
Daily Recharge Rate (%)	50
Daily Baseflow Rate (%)	4
Daily Seepage Rate (%)	0

7.4.4 Pollutant Concentrations& Source Nodes

Pollutant concentrations for source nodes are based on the land use parameters defined by the nearby Blacktown City Council and are shown as per the **Table 7.1**:

Flow Type	Surface Type	TSS (log_{10} values)		TP (log_{10} values)		TN (log_{10} values)	
		Mean	Std Dev.	Mean	Std Dev.	Mean	Std Dev.
Baseflow	Roof	*	*	*	*	*	*
	Roads	*	*	*	*	*	*
	Landscaping	1.2	0.17	-0.85	0.19	0.11	0.12
Stormflow	Roof	1.30	0.32	-0.89	0.25	0.30	0.19
	Roads	2.43	0.32	-0.30	0.25	0.34	0.19
	Landscaping	2.15	0.32	-0.6	0.25	0.30	0.19

*Base flows are only generated from pervious areas; therefore these parameters are not relevant to impervious areas.

Table 7.1. Pollutant Concentrations

The MUSIC model has been setup with a treatment train approach based on the pollutant concentrations in **Table 7.1** above and the catchments shown on drawing **Co13251.06-DA40** in **Appendix A**.

7.4.5 Treatment Nodes

GPT, pit insert, filtration and rainwater tank treatment nodes have been used in the modelling of the development.

Modelling parameters as per Blacktown City Council WSUD technical requirements have been adopted for the modelling assessment.

7.4.6 Results

Tables 7.2 and **7.3** show the results of the MUSIC analysis. The reduction rate is expressed as a percentage and compares the post-development pollutant loads without treatment versus post-development loads with treatment.

	Source	Residual Load	% Reduction	% Required
Total Suspended Solids (kg/yr)	24000	7670	68.1	0
Total Phosphorus (kg/yr)	42	29.2	30.3	0
Total Nitrogen (kg/yr)	186	176	5.4	0
Gross Pollutants (kg/yr)	2090	49.9	97.6	80

Table 7.2. MUSIC analysis results – Areas within Cumberland Council LGA

	Source	Residual Load	% Reduction	% Required
Total Suspended Solids (kg/yr)	8700	170	86.5	85
Total Phosphorus (kg/yr)	16.7	5.77	65.5	65
Total Nitrogen (kg/yr)	97.1	53.3	45.1	45
Gross Pollutants (kg/yr)	1120	0	100	90

Table 7.3. MUSIC analysis results – Areas within Blacktown Council LGA

These model results indicate that, through the use of the STM's in the treatment train, pollutant load reductions for Total Suspended Solids, Total Phosphorous, Total Nitrogen and Gross Pollutants will meet the pollution reduction requirements on an overall catchment basis.

7.4.7 Modelling Discussion

MUSIC modelling has been performed to assess the effectiveness of the selected treatment trains.

The MUSIC modelling has shown that the proposed treatment train of STM's will provide stormwater treatment which will meet council requirements in an effective and economical manner.

Hydrocarbon removal cannot easily be modelled with MUSIC software. The proposed distribution/ storage facility would be expected to produce low source loadings of hydrocarbons. Potential sources of hydrocarbons would be limited to leaking engine sumps or for accidental fuel spills/leaks and leaching of bituminous pavements (car parking only). The potential for hydrocarbon pollution is low and published data from the CSIRO indicates that average concentrations from Industrial sites are in the order of 10mg/L and we would expect source loading from this site to be near to or below this concentration. Hydrocarbon pollution would also be limited to surface areas which will be treated via bio-retention swales which are predicted to achieve a 90% reduction of this pollutant.

Given the expected low source loadings of hydrocarbons and removal efficiencies of the treatment devices we consider that the requirements of the Cumberland and Blacktown City Councils have been met.

7.5 Stormwater Harvesting

Stormwater harvesting refers to the collection of stormwater from the developments internal stormwater drainage system for re-use in non-potable applications. Stormwater from the stormwater drainage system can be classified as either rainwater, where the flow is from roof areas only, or stormwater where the flow is from all areas of the development.

Rainwater harvesting will be provided for this development with re-use for non-potable applications as part of future individual building development applications. Internal uses include such applications as toilet flushing while external applications will be used for irrigation. The aim is to reduce the water demand for the development and to satisfy the requirements of BCC DCP Part J.

In general terms the rainwater harvesting system will be an in-line tank for the collection and storage of rainwater. At times when the rainwater storage tank is full rainwater can pass through the tank and continue to be discharged via gravity into the stormwater drainage system. Rainwater from the storage tank will be pumped for distribution throughout the development in a dedicated non-potable water reticulation system.

Rainwater tanks are to be sized with reference to the NSW Department of Environment and Conservation document *Managing Urban Stormwater: Harvesting and Reuse*, using a simple water balance analysis to balance the supply and demand, based on the base water demands.

Rainwater tanks have been designed, using MUSIC software to balance the supply and demand, based on the below base water demands to provide a minimum 50% reduction

in non-potable water demand with a target of 80% as set out in WCM's included in **Table 5.1**.

7.5.1 Internal Base Water Demand

Indoor water demand has been based on Section 7.11 of Blacktown Council DRAFT MUSIC Modelling Guideline 2013 for an industrial/ commercial development. Section 7.11 requires an allowance of 0.1kL/day/ toilet or urinal. No allowance is required for disable toilets.

The above rates result in the following internal non-potable demand:

Warehouse 1	23 Toilets	2.3 kL/day
Warehouse 2	30 Toilets	3.0 kL/day
Warehouse 3	21 Toilets	2.1 kL/day
Warehouse 4	14 Toilets	1.4 kL/day
Warehouse 5	15 Toilets	1.5 kL/day
Warehouse 6	18 Toilets	1.8 kL/day
Warehouse 7	18 Toilets	1.8 kL/day

7.5.2 External Base Water Demand

The external base water demand has also been based on Section 7.11 of Blacktown Council DRAFT MUSIC Modelling Guideline 2013 for an industrial/ commercial development. Section 7.11 requires an allowance of 0.3kL/year/m^2 as PET-Rain for subsurface irrigation.

The above regime for the landscaped area for the site gives the following yearly outdoor water demand:

Irrigated Area (0.3kL/year/m^2)	1.33m^2	0.4 kL/year
TOTAL		**0.4 kL/year**

7.5.3 Rainwater Tank Sizing

The use of rainwater reduces the mains water demand and the amount of stormwater runoff. By collecting the rainwater run-off from roof areas, rainwater tanks provide a valuable water source suitable for flushing toilets and landscape irrigation.

Rainwater tanks have been designed, using MUSIC software to balance the supply and demand, based on the calculated base water demands and proposed roof catchment areas. Allowances in the MUSIC model have been made for high flow bypass which will be managed by a dual high flow (225mm downpipe) and low flow (100mm downpipe) roofwater collection configuration along a portion of the southern elevation of the warehouse. This has been shown on drawing **Co13251.06-DA40**.

Roof Catchment (m^2)	Highflow Bypass (l/s)	Tank Size in MUSIC (kL)	Predicted Demand Reduction (%)	Provided Tank (kL)
1	0	100	81.08	120
2	0	120	81.22	150
3	0	100	78.43	120
4	0	80	79.34	100
5	0	80	78.85	100
6	0	80	76.67	100
7	0	80	76.67	100

Table 7.4. Rainwater Reuse Requirements

The MUSIC model, results summarised in **Table 7.4**, predicts that the reductions in demand of 50% minimum with an 80% target can be met for the development with the provision of rainwater tanks noted.

We note that the final configuration and sizing of the rainwater tanks is subject to detail design considerations and optimum site utilisation.

7.6 Maintenance and Monitoring

It is important that each component of the water quality treatment train is properly operated and maintained. To achieve the design treatment objectives, an indicative maintenance schedule has been prepared (refer to **Table 7.5** below) to assist in the effective operation and maintenance of the various water quality components.

Note that inspection frequency may vary depending on site specific attributes and rainfall patterns in the area. In addition to the below nominated frequency it is recommended that inspections are made following large storm events.**Table 7.5. Indicative Maintenance Schedule**

MAINTENANCE ACTION	FREQUENCY	RESPONSIBILITY	PROCEDURE
SWALES/ LANDSCAPED AREAS			
Check density of vegetation and ensure minimum height of 150mm is maintained. Check for any evidence of weed infestation	Six monthly	Maintenance Contractor	Replant and/or fertilise, weed and water in accordance with landscape consultant specifications
Inspect swale for excessive litter and sediment build up	Six monthly	Maintenance Contractor	Remove sediment and litter and dispose in accordance with local authorities' requirements.
Check for any evidence of channelisation and erosion	Six monthly/ After Major Storm	Maintenance Contractor	Reinstate eroded areas so that original, designed swale profile is maintained
Weed Infestation	Three Monthly	Maintenance Contractor	Remove any weed infestation ensuring all root ball of weed is removed. Replace with vegetation where required.
Inspect swale surface for erosion	Six Monthly	Maintenance Contractor	Replace topsoil in eroded area and cover and secure with biodegradable fabric. Cut hole in fabric and revegetate.

MAINTENANCE ACTION	FREQUENCY	RESPONSIBILITY	PROCEDURE
GROSS POLLUTANT TRAPS			
Per manufacturers Operational & Maintenance Manuel requirements	Per manufacturers Operational & Maintenance Manuel requirements. Six to twelve monthly maximum or after major storm.	Maintenance Contractor	Per manufacturers Operational & Maintenance Manuel requirements
RAINWATER TANK			
Check for any clogging and blockage of the first flush device	Monthly	Maintenance Contractor	First flush device to be cleaned out
Check for any clogging and blockage of the tank inlet - leaf/litter screen	Six monthly	Maintenance Contractor	Leaves and debris to be removed from the inlet leaf/litter screen
Check the level of sediment within the tank	Every two years	Maintenance Contractor	Sediment and debris to be removed from rainwater tank floor if sediment level is greater than the maximum allowable depth as specified by the hydraulic consultant
INLET & JUNCTION PITS			
Inside of pits	Six Monthly	Maintenance Contractor	Remove grate and inspect internal walls and base, repair where required. Remove any collected sediment, debris, litter.
Outside of pits	Four Monthly/ After Major Storm	Maintenance Contractor	Clean grate of collected sediment, debris, litter and vegetation.
STORMWATER SYSTEM			
General Inspection of complete stormwater drainage system	Bi-annually	Maintenance Contractor	Inspect all drainage structures noting any dilapidation in structures and carry out required repairs.

8 FLOODING

8.1 Flooding Introduction

Consideration to flooding is required due to the proximity to the regional detention system and Girraween / Greystanes Creek located to the north of subject property.

As required by the SEAR's, a comprehensive flood assessment is required for the development. As described in previous parts of this report, the existing regional basin will be modified to address existing encroachment of basin storage on the northern boundary of the subject land.

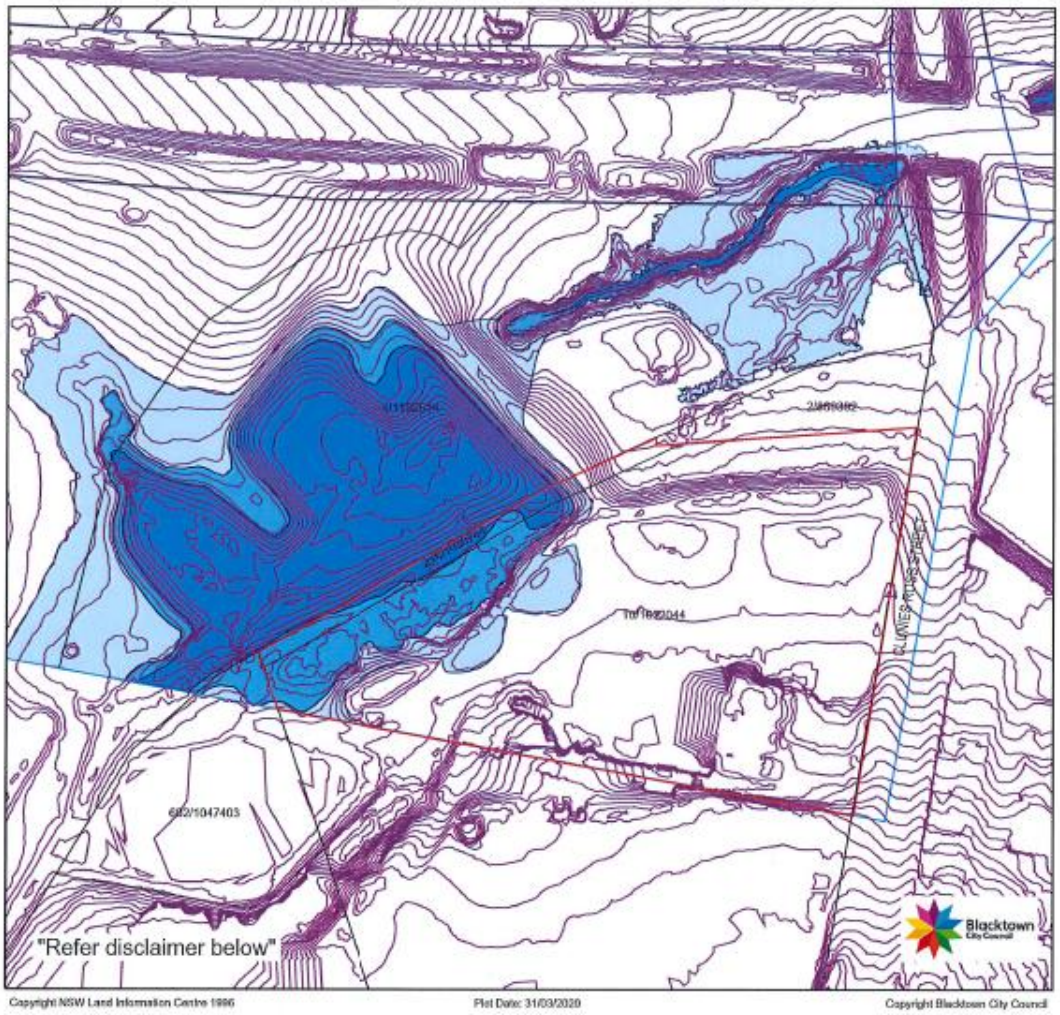
Flood consideration for this site is primarily related to its interaction with the adjoining regional detention system and Girraween Creek. As such, there is significant cross over with the assessments completed for the regional basin which are included in **Section 6** of this document. We have included discussion and confirmation of flood requirements in this section of the report, however they key technical and modelling parameters are included in **Section 6** of the report, and should be read in conjunction with the flooding discussions included following.

8.2 Existing Flooding and Flood Behaviour Affectation

The approximate flood extent, as shown on Blacktown City Council online flood mapping per **Figure 8.1** below.

A formal application to Blacktown Council and Cumberland Council has also been made to confirm council flood levels and to assist with model verification completed by Costin Roe Consulting in relation to the basin modifications. Blacktown Council Flood Advise Letter (325885 337658 dated 9 April 2020) and Cumberland Council Flood Advise letter (EC2020/0849, dated 19 October 2020) are included in **Appendix H & J** respectively. The Cumberland Council flood output is also included in **Figure 8.2**.

As noted above, flooding and flood considerations relate to the regional detention system and wetland which are on the north and north-western portions of the site. As a detention system, flood behaviour will be based on the hydraulic controls of the detention system and behaviour of water within the basin. Flood water in the basin will be slow moving, generally of flat surface level. The detention basin comprises a low flow pipe (1050mm) and earth bund with a rock overflow weir. Refer to **Appendix G** for WAE details of the existing basin. Assessment of the Council information shows that the basin will not overtop the existing bund weir in all storm events other than the PMF.



BLACKTOWN CITY COUNCIL
Flood Risk Map

Figure 8.1. Existing Flood Extent vide Blacktown City Council.

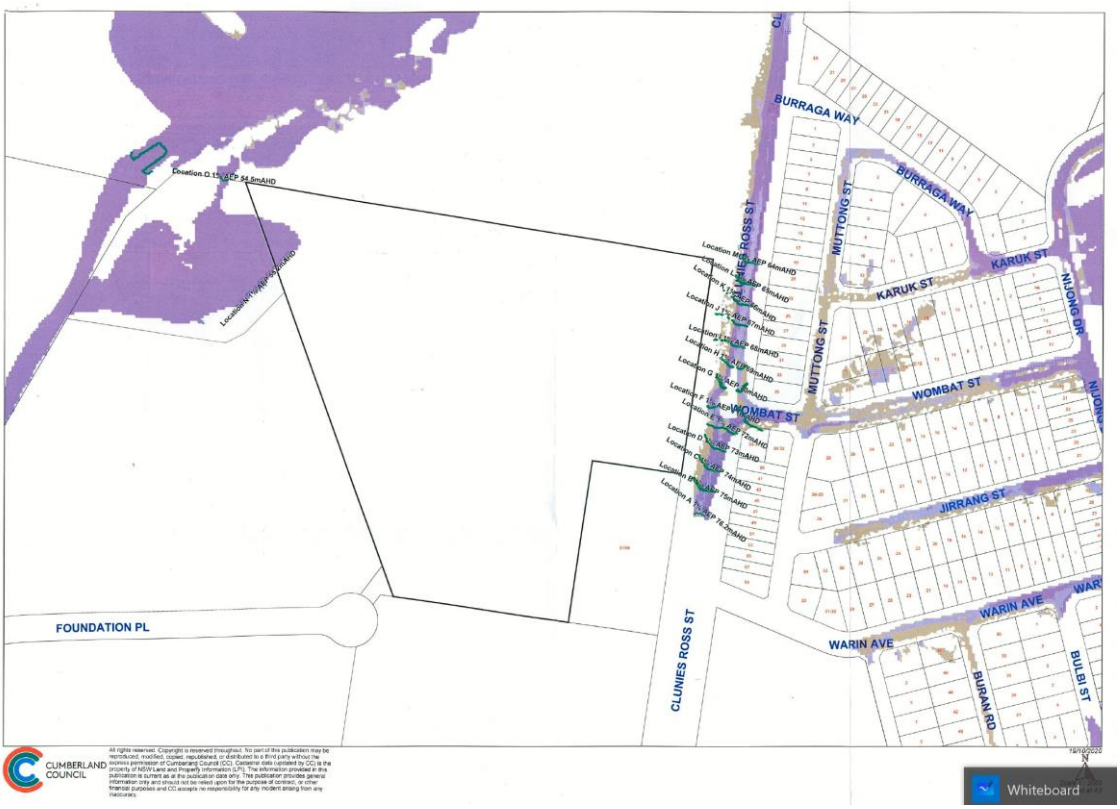


Figure 8.2. Existing Flood Extent vide Cumberland City Council.

Blacktown Council's flood letter shows the existing 1% AEP flood level is RL 55.06m AHD, and the PMF is RL 57.17m AHD within the basin. Cumberland Council's flood letter shows the existing 1% AEP flood level is RL 55.2m AHD within the basin. Cumberland Council do not provide advice on the PMF flood level.

Blacktown Councils flood advise letter (refer **Appendix H**) also shows the flow levels within Girraween Creek are RL 48.3m AHD and RL 50.56m AHD, or lower, for the 1% AEP and PMF events. Given these levels are significantly lower than the site, and per Council maps are shown to be clear of the development footprint, no further modelling of overland flow is considered necessary downstream of the regional basin weir/ bund wall.

The Cumberland Council flood letter also shows overland flow within Clunies Ross Street. Comparison of survey levels with the flood information shows that the flow depths are in the range of 0.15-0.2m in depth in the vicinity of the intersection of Clunies Ross Street with Wombat Street, and 0.3m in the vicinity of Burraga Way. The overland flow shown in the Cumberland Council letter is noted to be gutter flow which is contained within the road carriageway. Generally, levels within the Clunies Ross Street verge are between 0.5-1.0m higher than the top of gutter level, hence there is limited opportunity for flow within the gutter and Clunies Ross Street to enter the site, or to affect the development.

Flood risk associated with the gutter flow in Clunies Ross Street is considered negligible, and the proposed development will not impact flooding within Clunies Ross Street. We do not consider any additional flood assessments relating to gutter flow in

Clunies Ross Street are warranted based on the information contained within the Cumberland Council Flood Advice.

8.3 Flood Modelling Methodology

As assessment of pre and post development flooding and potential impact has been undertaken as part of the submission. The assessment includes comprehensive hydrological and hydraulic modelling of the 5%, 1%, 0.5% and 0.2% AEP events, and the PMF.

Hydrology for the contributing catchment has been undertaken in a RAFTS model using parameters included in **Table 6.1** of **Section 6.1**.

With reference to **Figure 6.1** in **Section 6.2**, the total contributing catchment area managed by the detention system is noted to be 173.4Ha. It is estimated that approximately 48% of the catchment is comprised of the Pemulway Northern Employment lands.

An assessment of the predevelopment and post development basin hydraulics has been completed through a staged storage discharge calculation in DRAINS. Given the nature of the flood behaviour being defined by the regional basin, alternate flood modelling techniques (HEC-RAS, Mike11, TUFLOW) were not considered the most appropriate or accurate flood modelling tools in this instance.

The existing stage storage relationship is based on detail site survey (undertaken on behalf of the proponent) and WAE information from Council – refer **Table 6.1**. Confirmation of suitability of the WAE was confirmed on site by our engineers during the submission assessment phase. Post development modelling is based on the modified basin extent and change in post development flow rates due to the change in impervious surface within the development footprint with the staged storage relationship shown in **Table 6.5**.

Sections 6.3 and **6.4** include detailed storage volumes, inflow and outflow rates and water levels for the noted storms for the designs storms noted above for the pre and post development events. **Section 6.5** includes a comparison of the pre and post development events. **Sections 8.5** to **8.7** summarise the findings of previous sections for completeness.

Validation of modelled predevelopment flood levels has been completed against Blacktown Council flood advise as confirmed in **Section 8.4** below. This ensures that the predevelopment model has been completed to suitable accuracy for post development modelling and comparisons to be undertaken.

As noted in **Section 8.2**, Blacktown Councils flood advise letter (refer **Appendix H**) also shows the flow levels within Girraween Creek are RL 48.3m AHD and RL 50.56m AHD, or lower, for the 1% AEP and PMF events. Given these levels are significantly lower than the site, and per Council maps are shown to be clear of the development footprint, no further modelling of overland flow is considered necessary downstream of the regional basin weir/ bund wall.

Refer **Section 6** for further modelling methodology and detail.

Refer **Section 5.5** relating to climate change considerations.

8.4 Flood Modelling Validation

Validation of the pre-development flood levels in the regional basin for the 1% AEP (1 in 100-year ARI) and PMF events have been made against the advice included in the Blacktown City Council flood advise letter.

Refer **Table 8.1** for comparison.

Event	BCC Flood Level (m)	Costin Roe Consulting Flood Level (m)	Difference (m)
1% AEP	55.06	55.20	0.14
PMF	57.17	57.16	0.01

Table 8.1. Comparison of Costin Roe Consulting Model and Council Advise

Comparison of the Costin Roe Consulting Modelling output shows very good correlation with the council advise. The minor variance is considered consistent with modelling accuracy and tolerances, noting that the Costin Roe Consulting 1% AEP level (being higher than Council) means that the assessment is considered conservative. The modelling is considered suitable for completing pre and post development comparisons, impact assessments and confirming flood planning requirements.

8.5 Predevelopment Flood Extent and Levels

Pre-development modelled extent is included in **Figure 8.2** below and drawing included in **Appendix A**.

The peak water levels and flows for various events are also included in **Table 8.2**. Peak water levels are shown for the 9hr duration storm. It is noted that the 2hr storm generally produced the peak inflow hydrograph however the peak water level, storage and outflow occurs in the 9hr duration event.

AEP/ Event	Duration (hr)	Peak Flow In (m^3/s)	Peak Flow Out (m^3/s)	Flood Level (m)
20%	9	21.472	5.633	54.30
1%	9	25.16	6.093	55.20
0.5%	9	27.412	6.287	55.70
0.2%	9	29.859	6.451	56.00
PMF	2	117.935	79.930	57.16

Table 8.2. Pre-development Flood Levels and Peak Flow

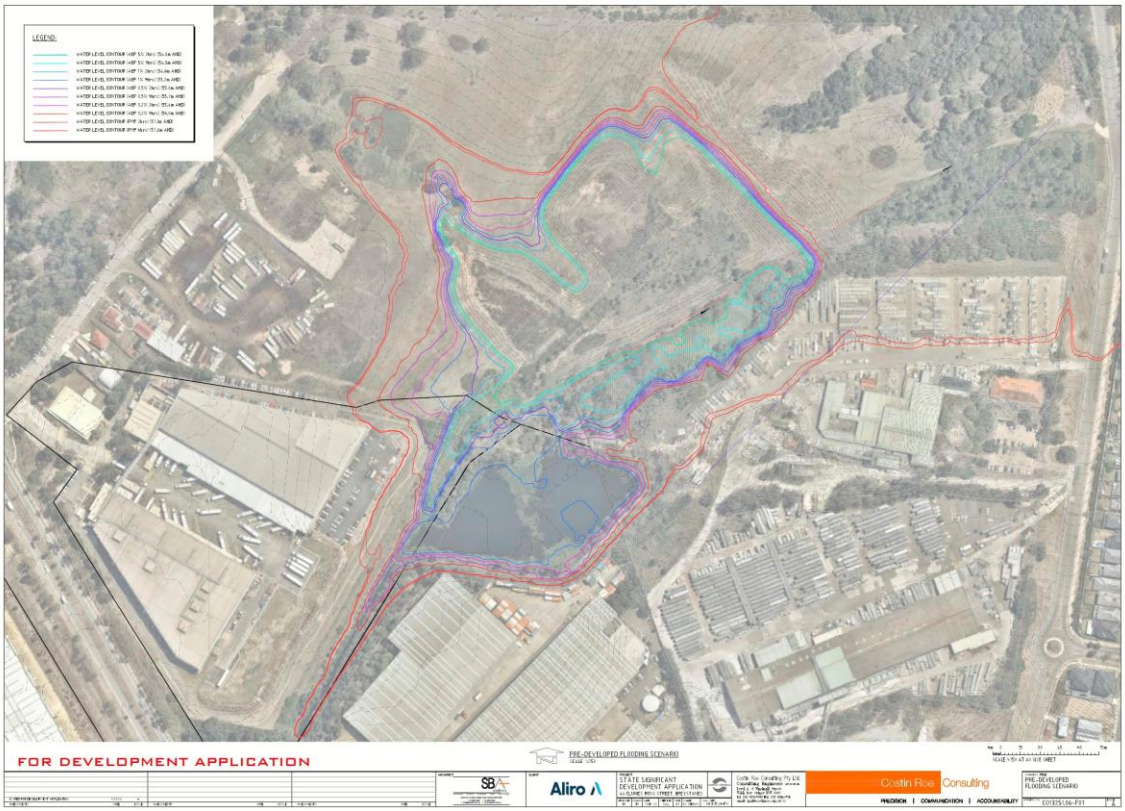


Figure 8.3. Existing/ pre-development Flood Extent

As noted in **Section 8.3**, Blacktown Councils flood advise letter (refer **Appendix H**) also shows the 1% AEP flood levels within Girraween Creek are RL 48.3m AHD (or lower) and that the flow path downstream of the regional basin weir is clear of the development. No further assessment downstream of the basin weir has been undertaken or is required for this development.

8.6 Post Development Flood Extent and Levels

Post-development modelled extent is included in **Figure 8.4** below and drawing included in **Appendix A**.

The peak water levels and flows for various events are also included in **Table 8.3**. Similarly to the predevelopment modelling, the 2hr storm generally produced the peak inflow hydrograph however the peak water level, storage and outflow occurs in the 9hr duration event.

AEP/ Event	Duration (hr)	Peak Flow In (m^3/s)	Peak Flow Out (m^3/s)	Flood Level (m)
20%	9	21.52	5.573	54.1
1%	9	25.3.74	6.091	55.2
0.5%	9	27.476	6.307	55.7
0.2%	9	29.712	6.485	56.0
PMF	2	118.653	80.237	57.16

Table 8.3. Post-development Flood Levels and Peak Flow

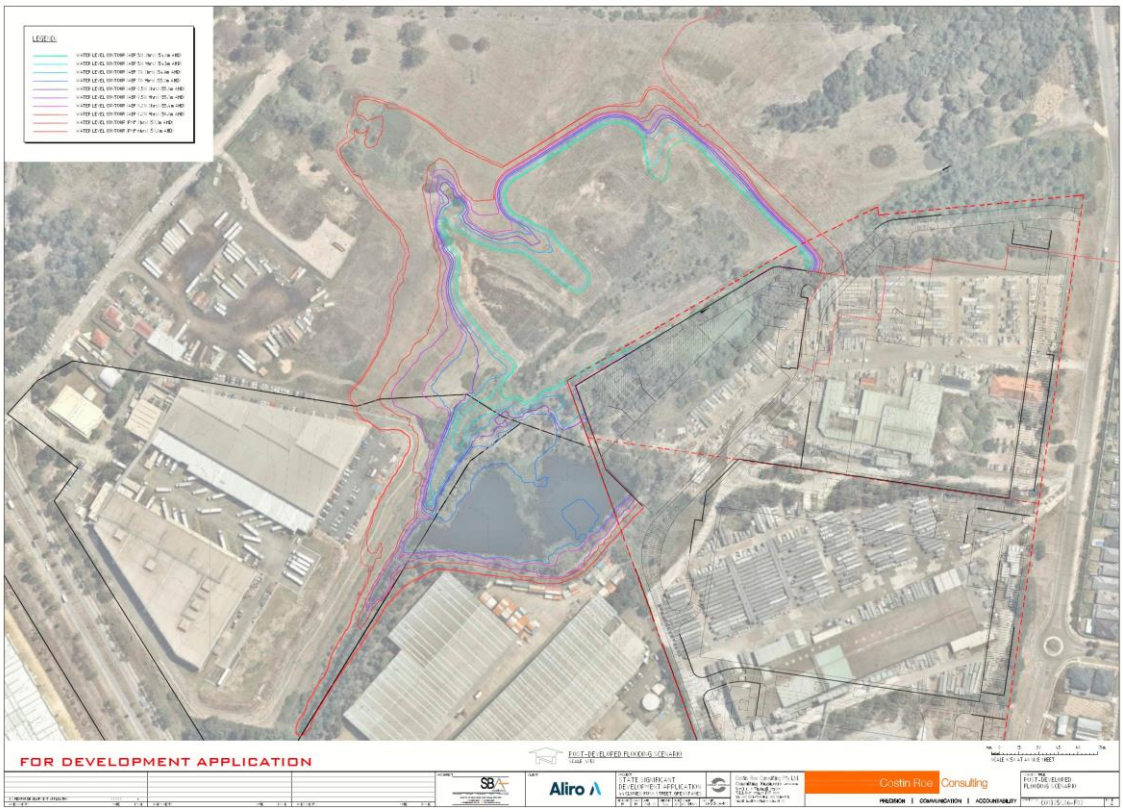


Figure 8.4. Post-development Flood Extent

8.7 Comparison of Pre and Post Development Flooding

Section 6.5 includes a comprehensive comparison of pre and post development flow rates, storage volumes and water levels within the detention system. We reiterate that the water level in the basin is the key consideration relating to flooding and flood assessments for this development site.

Review of **Table 6.9** shows that pre and post development discharge, storage volumes and water levels are generally consistent, or a reduction in flow and water level is achieved, between the pre and post development conditions for all AEP events assessed.

Water levels can be seen to be reduced by 0.1m for the 1% to 0.2% AEP events, and by 0.2m in the 5% AEP. Peak flows are also noted to be slightly lower in all AEP events, however the extent of duration of flow for all events is shown to be generally consistent.

Review of impact of development during the PMF event has been made. Although this criteria is not normally required for impact assessment from development, given the basin is a prescribed dam, consideration to operation of the basin for dam break and downstream safety during larger than normally assessed events to the PMF events is necessary to be made. Review of **Table 6.9** shows a minor increase in total flow is noted in the PMF event.

The duration and velocity associated with the minor increase in total flow over the weir during the PMF event has been made. This review of the pre and post development duration of flow over the basin weir shows that the post-development duration has a reduction of flow time over the weir of 6.6 minutes and 4.5 minutes for the 2hr and 6hr PMF storms respectively (refer **Table 6.10)**. It is further noted that the pre and post development flow velocities are equal, hence given the reduction in overall duration of flow over the weir, and no increased velocity, the minor increase in flow is considered to result in negligible impact due to development and consistent pre and post development operation of the basin during the PMF event.

8.8 Flood Planning Requirements

Allowing for the council required freeboard of 0.5m to the 1% AEP flood level, the corresponding flood planning level (for parts of the development which are upstream of the basin weir wall) is RL 55.7m AHD.

The lowest proposed building level on the site, which could be impacted by flooding from the regional basin (i.e. upstream of the basin bund wall) is RL 60.0m AHD. The proposed minimum building level is noted to be at least 4.3m above the flood planning level, hence meets all flood planning requirements.

Consideration to a potential future flood planning level can be made based on the 0.5% or 0.2% AEP events as proxies for climate change. Based on the 0.2% AEP events (being the larger storm event), the FPL would be RL 56.5m AHD. Refer **Section 5.5** for further discussion on climate change.

It is noted that flood levels and flood extent downstream of the basin weir within Girraween Creek are significantly lower than those within the basin and are clear of the development extent. Hence consideration to overland flow downstream of the basin

weir is not required to be considered from a flood or flood planning perspective. Refer **Section 8.2** and **8.3**, and Blacktown Council flood advise letter in **Appendix G**.

8.9 Flood Safety and Egress

The PMF flood level in the regional basin is estimated to be RL 57.16m. The Blacktown City Council Flood information shows that downstream of the regional basin weir the PMF level is RL 50.56m (refer **Appendix G** and **Figure 8.5**).

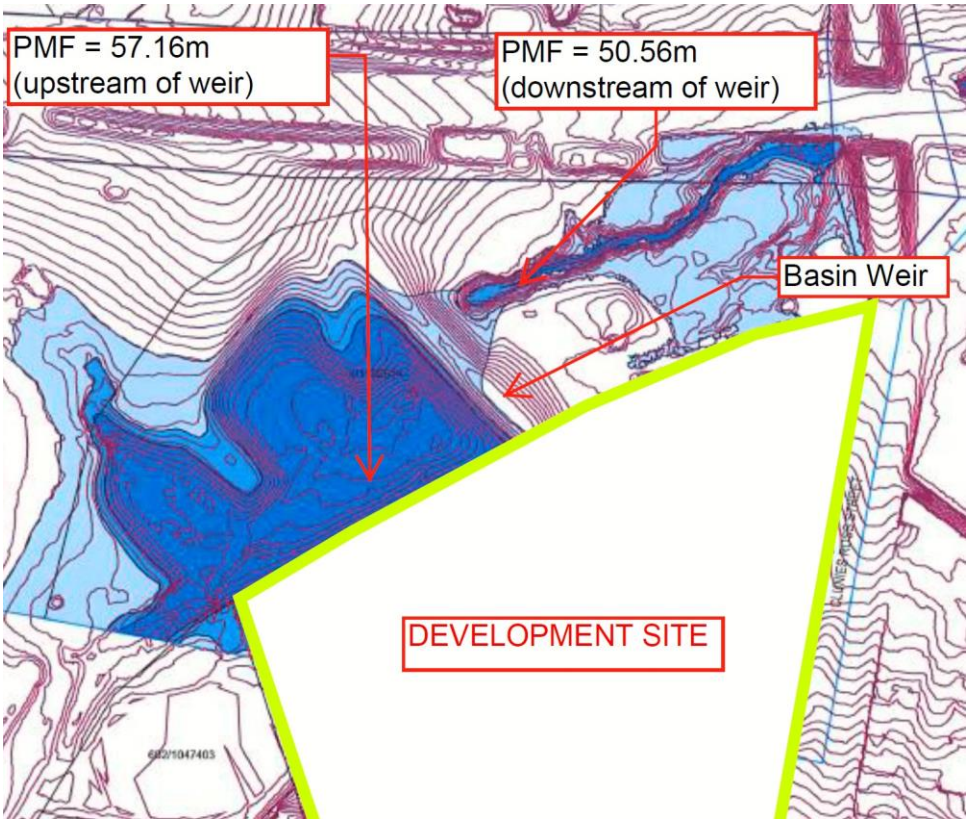


Figure 8.5. PMF Levels

Buildings 2 to 6, are upstream of the regional basin weir and have a minimum floor level of RL 60.0m AHD. These proposed buildings, which need to consider flooding relating to the regional basin are noted to be sited at levels which are higher than the PMF Flood Level and are not and not affected by PMF flooding.

Building 1 is downstream of the regional basin weir and proposed at a level of RL 57.5m. This building is noted to be more than 6.9m higher than the relevant PMF level of 50.56m, and is also above the PMF level upstream of the basin weir.

As no parts of the operational development are affected by any flood events, detailed flood safety management assessments or reporting are not required or proposed for the development.

9 EROSION & SEDIMENT CONTROL PLAN

An erosion and sediment control plan (ESCP) is included in drawings **Co13251.06-DA20, DA21 and DA25**. These plans show the works can proceed without polluting receiving waters. A detailed plan will be prepared after development consent is granted and before works commence.

9.1 General Conditions

1. The ESCP is to be read in conjunction with the engineering plans, and any other plans or written instructions that may be issued by the site manager, council inspector or other authorised representative in relation to development at the subject site.
2. Contractors will ensure that all soil and water management works are undertaken as instructed in this report and constructed following the guidelines stated in Managing Urban Stormwater, Soils and Construction (1998) and Council specifications.
3. All subcontractors will be informed by the site manager of their responsibilities in minimising the potential for sedimentation and soil erosion.

9.2 Land Disturbance

1. Where practicable, the soil erosion hazard on the site will be kept as low as possible and as recommended in **Table 9.1**.

Land Use	Limitation	Comments
Construction areas	Limited to 5 (preferably 2) metres from the edge of any essential construction activity as shown on the engineering plans.	All site workers will clearly recognise these areas that, where appropriate, are identified with barrier fencing (upslope) and sediment fencing (downslope), or similar materials.
Temporary construction access	Limited to a maximum width of 5 metres	The site manager will determine and mark the location of these zones onsite. All site workers will comply with these restrictions.
Remaining lands	Entry prohibited except for essential management works	

Table 9.1. Limitations to access

9.3 Erosion & Sediment Control Conditions

1. Clearly visible barrier fencing shall be installed as shown on drawing **Co13261.06-DA20 & DA25** and elsewhere at the discretion of the site superintendent to ensure traffic control and prohibit unnecessary site disturbance. Vehicular access to the site shall be limited to only those essential for construction work and they shall enter the site only through the stabilised access points.
2. Soil materials will be replaced in the same order they are removed from the ground. It is particularly important that all subsoils are buried and topsoils (landscaped areas only) remain on the surface at the completion of works.
3. The construction program should be scheduled so that the period of time from starting land disturbance to stabilisation is minimised.
4. Notwithstanding this, schedule works so that the duration from the conclusion of land shaping to completion of final stabilisation is less than 20 working days.
5. Land recently established with grass species will be watered regularly until an effective cover has properly established and plants are growing vigorously. Further application of seed might be necessary later in areas of inadequate vegetation establishment.
6. Where practical, foot and vehicular traffic will be kept away from all recently established areas
7. Earth batters shall be constructed in accordance with the Geotechnical Engineers Report or with as law a gradient as practical but not steeper than:
   - 2H:1V where slope length is less than 7 metres
   - 2.5H:1V where slope length is between 7 and 10 metres
   - 3H:1V where slope length is between 10 and 12 metres
   - 4H:1V where slope length is between 12 and 18 metres
   - 5H:1V where slope length is between 18 and 27 metres
   - 6H:1V where slope length is greater than 27 metres
8. All earthworks, including waterways/drains/spillways and their outlets, will be constructed to be stable in at least the design storm event of 1 in 10-year ARI (Q10).
9. During windy weather, large, unprotected areas will be kept moist (not wet) by sprinkling with water to keep dust under control. In the event water is not available in enough quantities, soil binders and/or dust retardants will be used, or the surface will be left in a cloddy state that resists removal by wind.

9.4 Pollution Control Conditions

1. Stockpiles will not be located within 5 metres of hazard areas, including likely areas of high velocity flows such as waterways, paved areas and driveways.
2. Sediment fences will:
   a) Be installed where shown on the drawings, and elsewhere at the discretion of the site superintendent to contain the coarser sediment fraction (including aggregated fines) as near as possible to their source.
   b) Have a catchment area not exceeding 720 square metres, a storage depth (including both settling and settled zones) of at least 0.6 metres, and internal dimensions that provide maximum surface area for settling, and
   c) Provide a return of 1 metre upslope at intervals along the fence where catchment area exceeds 720 square meters, to limit discharge reaching each section to 10 litres/second in a maximum 20-year t_c discharge.
3. Sediment removed from any trapping device will be disposed of in locations where further erosion and consequent pollution to down slope lands and waterways will not occur.
4. Water will be prevented from directly entering the permanent drainage system unless it is relatively sediment free (i.e. the catchment area has been permanently landscaped and/or likely sediment has been treated in an approved device). Nevertheless, stormwater inlets will be protected.
5. Temporary soil and water management structures will be removed only after the lands they are protecting are fully stabilised.

9.5 Waste Management Conditions

Acceptable bind will be provided for any concrete and mortar slurries, paints, acid washings, lightweight waste materials and litter. Clearance services are to be provided by the respective contractors at least weekly.

9.6 Site Inspection and Maintenance

1. A self-auditing program will be established based on a check sheet. A site inspection using the check sheet will be made by the site manager:
   - At least weekly;
   - Immediately before site closure; and
   - Immediately following rainfall events in excess of 5mm in any 24-hour period.

The self-audit will include:

- Recording the condition of every sediment control device;
- Recording maintenance requirements (if any) for each sediment control device;

- Recording the volumes of sediment removed from sediment retention systems, where applicable;
- Recording the site where sediment is disposed; and
- Forwarding a signed duplicate of the completed Check Sheet to the project manager/developer for their recording.

2. In addition, the site manager will be required to oversee the installation and maintenance of all soil and water management works on the site. The person shall be required to provide a short monthly written report to the superintendent. The responsible person will ensure that:
   - The plan is being implemented correctly;
   - Repairs are undertaken as required; and
   - Essential modifications are made to the plan if and when necessary.

The report shall include a certificate that works have been carried out in accordance with the plan.

3. Waste bins will be emptied as necessary. Disposal of waste will be in a manner approved by the Site Superintendent.
4. Proper drainage will be maintained. To this end, drains (including inlet and outlet works) will be checked to ensure that they are operating as intended, especially that:
   - No low points exist that can fill and overtop in a large storm event;
   - Areas of erosion are repaired (e.g. lined with a suitable material) and/or velocity of flow is reduced appropriately through construction of small check dams and installing additional diversion upslope; and
   - Blockages are cleared (these might occur because of sediment pollution, sand/soil/spoil being deposited in or too close to them, breached by vehicle wheels, etc.).
5. Sand/soil/spoil materials placed closer than 2 metres from hazard areas will be removed. Such hazard areas include areas of high velocity water flows (e.g. waterways and gutters), paved areas and driveways.
6. Recently stabilised lands will be checked to ensure that erosion hazard has been effectively reduced. Any repairs will be initiated as appropriate.
7. Excessive vegetation growth will be controlled through mowing or slashing.
8. All sediment detention systems will be kept in good working condition. In particular, attention will be given to:
   a) Recent works to ensure they have not resulted in diversion of sediment laden water away from them;
   b) Degradable products to ensure they are replaced as required; and
   c) Sediment removal, to ensure the design capacity remains in the settling zone.
9. Any pollutants removed from sediment basins or litter traps will be disposed of in areas where further pollution to down slope lands and waterways should not occur.

10. Additional erosion and/or sediment control works will be constructed as necessary to ensure the desired protection is given to down slope lands and waterways, i.e. make ongoing changes to the plan where it proves inadequate in practice or is subjected to changes in conditions at the work site or elsewhere in the catchment.
11. Erosion and sediment control measures will be maintained in a functioning condition until all earthwork activities are completed and the site fully stabilised.
12. Litter, debris and sediment will be removed from the gross pollutant traps and trash racks as required.

10 SEAR's & AGENCY RESPONSE ITEMS

10.1 SEAR's & Agency Response Items Introduction

The following sections of the report covers response to civil engineering and WCM items included in the NSW Department of Planning and Environment SEARS letter dated 16 December 2019, reference SSD_10399 and associated agency response letters from Blacktown City Council (10 September 2018), NSW Department of Primary Industries (DPI) and NSW Office of Environment & Heritage (OEH).

Further reference to the EIS prepared by Aliro should be made for confirmation of how the SEAR's have been addressed for non-civil engineering or WCM related items.

SEAR's responses are included in **Section 10.2** and Agency responses in **Section 10.3**.

RTS Response to items raised by Blacktown City Council in their information request letter dated 18 September 2020 and Cumberland City Council in their information request letter dated 16 September 2020 are included in **Section 10.4**.

10.2 SEAR's Response Items

This section of the report covers items relating to the NSW Department of Planning and Environment SEARS letter dated 16 December 2019.

SEARS – Soil and Water	
Item 1.1	*A description of the water demands and a breakdown of water supplies, including a detailed site water balance* <u>Response</u> Refer to **Section 4.1 & 5.1** which sets out key components relating to water cycle management, water demand and supplies. Further discussion relating to water management, including rainwater reuse requirements are set out in **Section 6** and **7** of the report.
Item 1.2	*A description of the measures to minimise water use* <u>Response</u> Refer to **Section 5.1** which sets out key components relating to water cycle management. Further discussion, including rainwater reuse requirements are set out in **Section 6** and **7** of the report.
Item 1.3	*A description of all wastewater generated on site.* <u>Response</u> Refer **Section 4.2** for discussion on wastewater, noting that for this site this would be confined to sewer.

Item 1.4	*characterisation of the nature and extent of any contamination of the site and a description of proposed measures.* <u>Response</u> Refer EIS and report by environmental consultant for items relating to contamination.
Item 1.5	*A detailed description of any cut and fill works and/ or additional retaining walls required to facilitate the development.* <u>Response</u> A preliminary earthworks assessment has been undertaken for the development to confirm building pad levels and estimate of cut to fill for the development. The objective for the earthworks is to achieve cut to fill balance with minimal import or export from the site, to minimize retaining walls through landscape batter where possible, to provide suitable site access and to drain the site by gravity. Reference to earthworks drawings included in **Appendix A**, and written descriptions relating to earthworks and geotechnical considerations in **Section 3** of this report.
Item 1.6	*A description of the proposed erosion and sediment controls during construction and operational phases of the development.* <u>Response</u> A concept erosion and sediment control plan has been undertaken for the development to confirm minimum erosion and sediment control measures. The erosion and sediment controls have been provided in accordance with the Landcom document *Managing Urban Stormwater: Soils & Construction – 2004, "The Blue Book"*. Reference to erosion and sediment control drawings included in **Appendix A**, and written description of the plan in **Section 9** of this report.
Item 1.7	*A description of the surface and stormwater management system, including on site detention, and measures to treat or re-use water* <u>Response</u> A comprehensive WCMP has been included in this report – refer **Section 5** for key objectives for the development. This includes description of proposed surface water management system, water quantity requirements and water quality included in **Section 7** and **8** respectively.

	Reference to stormwater management and layout drawings included in **Appendix A** should be made pertaining to site layout and confirmation of key management measures and proposals should also be made.
Item 1.8	*An assessment of potential surface and groundwater impacts associated with the development including impacts on bulk water supply infrastructure within the vicinity of the site* <u>Response</u> We confirm that the development does not propose to utilise surface or groundwater water sources. An assessment of the impact on these items is not relevant for the warehouse distribution center construction.
Item 1.9	*A description of the surface and stormwater management including drainage design, on site detention, and measures to treat or re-use water* <u>Response</u> Refer *Item 1.7* response.
Item 1.10	*A flooding assessment* <u>Response</u> An assessment of flooding relating to the regional detention system and Girraween Creek to the north of the development has been included in **Section 8** of this report, in conjunction with the water quantity assessment included in **Section 6**. The assessment has been completed in accordance with the SEAR's and agency response letter, especially the NSW Planning Industry & Environment letter dated 26 November 2020 (refer detailed responses to this letter in **Section 10.3**). The assessment shows that the development will be above and clear of the flood level within the regional basin (meeting flood planning controls), that the development will not impact existing flooding and discharge relationships in the detention basin or downstream of the development site, hence confirming no impact to upstream, downstream or adjacent properties has resulted.
Item 1.11	*A description of erosion and sediment controls* <u>Response</u> A concept erosion and sediment control plan has been undertaken for the development to confirm minimum erosion and sediment control measures. The erosion and sediment controls have been provided in accordance with the Landcom document *Managing Urban Stormwater: Soils & Construction – 2004, "The Blue Book"*.

	Reference to erosion and sediment control drawings included in **Appendix A**, and written description of the plan in **Section 9** of this report.
Item 1.12	*Details of impact mitigation, management and monitoring measures.* Response Details of impact mitigation throughout construction phase are included in the concept erosion and sediment control plan, in accordance with the Landcom document *Managing Urban Stormwater: Soils & Construction – 2004, "The Blue Book"*. Refer to erosion and sediment control drawings included in **Appendix A**, and written description of the plan in **Section 9** of this report.

10.3 SEARS Agency Response Items

This section of the report provides response to civil engineering items included in the SEAR's agency responses from the following agencies :

- Blacktown City Council SSD 10399 File no:F15/1234-02 Dated 4 December 2019;
- NSW Environment Protection Authority DOC19/1014381-2 Dated 25 November 2019;
- NSW Planning Industry and Environment letter DOC 19/1026978 Dated 26 November 2019; and
- Sydney Water letter Dated: 10 February 2020.

Authority Comments	***Response***
Blacktown City Council SSD 10399 File no:F15/1234-02 Dated 4 December 2019	
Planning Comments	
Submission of a cut and fill plan is to be submitted with the EIS.	An earthworks concept has been included in the submission documents. This includes cut to fill depth shading and estimate of earthworks volumes. The project intent is to maintain an overall cut to fill balance, enable access, minimise retaining walls, drain the site by gravity and to meet any flood planning requirements. Refer **Section 3** of this report and earthworks drawings included in **Appendix A**.

Authority Comments	***Response***
<u>*Engineering Matters*</u>	
Detail measures to minimise operational water quality impacts on surface waters and groundwater as per area controls (outlined in the documents listed below).	Refer below response.
Stormwater plans detailing the proposed methods of drainage without impacting on downstream properties (including Wamuli Reserve) and providing appropriate management of all anticipated flows. <u>*Relevant Policies and Guidelines:*</u> • *Guidelines for development adjoining land and water managed by DECCW (OEH, 2013)* • *Blacktown City Council Development Control Plan (Current Version) including Part J — Water Sensitive Urban Design and Integrated Water Cycle Management* • *Blacktown City Council's Water Sensitive Urban Design Standard Drawing A(BS)175M* • *Blacktown City Council's Engineering Guide for Development* • *Blacktown City Council's Works Specification — Civil land development.*	Reference to stormwater management and layout drawings included in **Appendix A** should be made pertaining to site layout and confirmation of key management measures and proposals should also be made. A comprehensive WCMP has also been included in this report – refer **Section 5** for key objectives for the development to which stormwater management measures specified in the drawings (**Appendix A)** have been made. The WCMP includes description of proposed surface water management system, water quantity requirements and water quality included in **Section 7** and **8** respectively. Consideration to the relevant policy guidelines noted has been made for areas within *Pemulway Industrial Controls Holroyd DCP Part Q* and Blacktown City Council LGA's.
NSW Environment Protection Authority DOC19/1014381-2 Dated 25 November 2019	
The requirements of State Environmental Planning Policy (SEPP) 55 will need to be satisfied and documented in the EIS. SEPP 55	Refer to EIS and relevant environmental consultant reports in regard to

Authority Comments	***Response***
states that as part of the development process, the following key considerations should be addressed: *o Whether the land is contaminated;* *o If the land is contaminated whether it is suitable in its contaminated state (or will be suitable, after remediation) for all the purposes to which the land will be used; and* *o If the land requires remediation; will be made suitable for any purpose for which the land will be used.*	contamination investigations and requirements.
The EIS should consider the likelihood of the basements encountering groundwater. If groundwater is likely to be intersected by a basement, the EIS should detail measures to collect and manage any seepage groundwater from the basement/underground car parking areas to prevent pollution of waters, particularly as the site is situated in an area of moderate to high salinity potential. Consideration should be given to waterproofing or "Tanking" and basement levels likely to interfere with an aquifer to prevent the need for treatment and discharge of moderate to high salinity potential.	There are no basements proposed or expected as part of any developments. It is noted however that cut to fill earthworks will be completed over the site. The geotechnical investigations completed by PSM show that groundwater has not been observed in any of the historical investigations completed on the site. The expectation is that no significant groundwater will be experienced on site, however if any groundwater is encountered suitable subsoil and surface measures will be employed to control drainage of the groundwater. This most likely to be in the form of subsoil drainage to retaining structures, subsoil drainage around pavement edges or in areas of cut rather than basement tanking or other tanking arrangements.
***NSW Planning Industry and Environment DOC 19/1026978* Dated 26 November 2019**	
<u>Water and Soils – Item 9</u>	
The EIS must map the following features relevant to water and soils including: *a. Acid sulfate soils (Class 1, 2, 3 or 4 on the Acid Sulfate Soil Planning Map)*	Refer geotechnical and ecological studies relating to Items a to c. In relation to Items d & e, as per the geotechnical investigations completed by PSM, groundwater has not been observed in

Authority Comments	***Response***
b. Rivers, streams, wetlands, estuaries (as described in s4. 2 of the Biodiversity Assessment Method) *c. Wetlands as described in s4. 2 of the Biodiversity Assessment Method* *d. Groundwater* *e. Groundwater dependent ecosystems* *f. Proposed intake and discharge locations.*	any of the historical investigations completed on the site. The expectation is that no significant groundwater will be experienced on site and there will negligible impact to groundwater and/ or groundwater dependent ecosystems as a result of the development. In relation to Item f, there are no proposed groundwater intake or discharge locations as part of this development.
Water and Soils – Item 10	
The EIS must describe background conditions for any water resource likely to be affected by the development, including: *a. Existing surface and groundwater.* *b. Hydrology, including volume, frequency and quality of discharges at proposed intake and discharge locations.* *c. Water Quality Objectives (as endorsed by the NSW Government) including groundwater as appropriate that represent the community's uses and values for the receiving waters* *d. Indicators and trigger values/criteria for the environmental values identified at (c) in accordance with the ANZECC (2000) Guidelines for Fresh and Marine Water Quality and/or local objectives, criteria or targets endorsed by the NSW Government* *e. Risk based Framework for Considering Waterway Health Outcomes in Strategic Land-use Planning Decisions http://www. environment. nsw.gov. au/research-and-publications/publications-search/risk-based-framework-for-considering-waterway- health-outcomes-in-strategic-land-use-and planning.*	Detailed drawings showing the proposed surface water and stormwater management systems for the development have been included in **Appendix A**. Requirements for water quantity management, and water quality management have been discussed in **Sections 6** and 7 of this Engineering Report respectively which include volumes, discharge rates. Water quality objectives consistent with local planning requirements and NSW Government have been adopted for the development as set out in **Section 5.1** and confirmed as being met through MUSIC modelling in **Section 7**. The adopted water quality discharge values are consistent with *Pemulway Industrial Controls Holroyd DCP Part Q* and Blacktown City Council DCP 2015 Part J.
Water and Soils – Item 11	

Authority Comments	***Response***
The EIS must assess the impacts of the development on water quality, including *a. The nature and degree of impact on receiving waters for both surface and groundwater, demonstrating how the development protects the Water Quality Objectives where they are currently being achieved, and contributes towards achievement of the Water Quality Objectives over time where they are currently not being achieved. This should include an assessment of the mitigating effects of proposed stormwater and wastewater management during and after construction.* *b. Identification of proposed monitoring of water quality* *c. Consistency with any relevant certified Coastal Management Program (or Coastal Zone Management Plan).*	a. Refer responses for *Item 9* relating to groundwater and *Item 10* relating to water quality. b. There are no requirements for monitoring of water quality for industrial type developments and none are proposed for this site. c. The development is not located within any certified coastal management program or plan.
<u>*Water and Soils – Item 12*</u>	
The EIS must assess the impact of the development on hydrology, including: *a. Water balance including quantity, quality and source.* *b. Effects to downstream rivers, wetlands, estuaries, marine waters and floodplain areas.* *c. Effects to downstream water-dependent fauna and flora including groundwater dependent ecosystems* *d. Impacts to natural processes and functions within rivers, wetlands, estuaries and floodplains that affect river system and landscape health such as nutrient flow, aquatic connectivity and access to habitat for spawning and refuge (e.g. river benches).*	a. We confirm that water usage is consistent with industrial developments typical of the area. Water use will be for toilet flushing, hand washing, employee showers, van washing, tote washing and irrigation with supply being made from Sydney Water. Water demand will be supplemented by rainwater harvesting with proposed reduction in non-potable demands as per the *Pemulway Industrial Controls Holroyd DCP Part Q* and Blacktown City Council DCP 2015 Part J and the NSW Department of Environment and Conservation document *Managing Urban Stormwater: Harvesting and Reuse*, using a simple water balance

Authority Comments	*Response*
e. Changes to environmental water availability, both regulated/licensed and unregulated/rules-based sources of such water. *f. Mitigating effects of proposed stormwater and wastewater management during and after construction on hydrological attributes such as volumes, flow rates; management methods and re-use options.* *g. Identification of proposed monitoring of hydrological attributes.*	analysis to balance the supply and demand. b. Discharge from the site is made directly to an existing precinct wetland and regional detention basin. Confirmation of achieving pre and post discharge rates downstream of the basin, maintaining active basin storage volumes and consistency in the system pre and post have been confirmed in **Section 6** of this report. Based on the assessment completed there will be no negative affect on downstream rivers, estuaries, marine waters and/ or floodplain areas. c. As per *Item b* above, as pre and post development conditions within the wetland and basin, and downstream of these systems, are confirmed to be consistent, there would be no negative effect on water dependant flora or fauna. d. As per *Item b* above, as pre and post development conditions within the wetland and basin, and downstream of these systems, are confirmed to be consistent there would be no impact to current natural processes within the receiving waters. e. No changes to environmental water availability are proposed as part of the project. f. During construction an Erosion and Sediment Control program is proposed to be implemented. An Erosion and Sediment Control Plan has been prepared in accordance with *Managing Urban Stormwater, Soils and Construction "The Blue Book"* (Landcom 1998). Post construction storm water quantity and quality will

Authority Comments	***Response***
	be managed as set out in **Sections 5** to **7** and per drawings in **Appendix A**.
Flooding and Coastal Hazards Item 13	
The EIS must map the following features relevant to flooding as described in the Floodplain Development Manual 2005 (NSW Government 2005) including a. *Flood prone land.* b. *Flood planning area, the area below the flood planning level* c. *Hydraulic categorization (floodways and flood storage areas)* d. *Flood hazard*	Flooding is noted to be related to the regional detention system and Girraween Creek (also known as Greystanes Creek) to the north of the development site. Refer to **Section 8** which confirms flooding considerations including flood extent, flood planning levels and flood hazard in relation to the development. It is noted that the development and all access points are flood free during major flooding events.
Flooding and Coastal Hazards Item 14	
The EIS must describe flood assessment and modelling undertaken in determining the design flood levels for events, including a minimum of the 5% Annual Exceedance Probability (AEP), 1% AEP, flood levels and the probable maximum flood, or an equivalent extreme event.	Refer **Section 6** which confirms hydrology and flow hydrographs for the noted storm events, and **Section 8** which confirms flood descriptions and items included in the requested item.
Flooding and Coastal Hazards Item 15	
The EIS must model the effect of the proposed development (including fill) on the flood behavior under the following scenarios: a. *Current flood behavior for a range of design events as identified in 14 above. This includes the 0.5% and 0.2% AEP year flood events as proxies for assessing sensitivity to an increase in rainfall*	Refer **Section 6** which confirms hydrology and flow hydrographs for the noted storm events, and **Section 8** which confirms flood descriptions and items included in the requested item.

Authority Comments	*Response*
intensity of flood producing rainfall events due to climate change.	
Flooding and Coastal Hazards Item 16	
Modelling in the EIS must consider and document: a. *Existing council flood studies in the area and examine consistency to the flood behavior documented in these studies* b. *The impact on existing flood behavior for a full range of flood events including up to the probable maximum flood, or an equivalent extreme flood* c. *Impacts of the development on flood behavior resulting in detrimental changes in potential flood affection of other developments or land. This may include redirection of flow, flow velocities, flood levels, hazard categories and hydraulic categories* d. *Relevant provisions of the NSW Floodplain Development Manual 2005.*	a. Existing flood information has been obtained from Blacktown City Council. The existing flood information has been utilised to confirm assessment of the detention basin is consistent with modelling completed by council and suitable to utilise in post development scenario assessments. Refer to **Appendix H** for council flood letter and flood levels for the 1% AEP flood event. b. The impact on behaviour for a range of flood events has been completed as per *Item 14* and *15* as included in **Section 6** and **8** of the report. c. Flood behaviour changes have been assessed and included in **Section 6** and **8** of the report. d. Relevant provisions of the NSW *Floodplain Development Manual 2005* have been made including confirmation of flood planning levels and impact from and on development in relation to flooding.
Flooding and Coastal Hazards Item 17	
The EIS must assess the impacts on the proposed development on flood behavior, including	a. The assessment included in **Section 6** and **8** of the report confirm consistency between existing and post development

Authority Comments	*Response*
a. Whether there will be detrimental increases in the potential flood affectation of other properties, assets and infrastructure.	flood behaviour, hence no detrimental impact or potential affectation of other properties would be anticipated as a result of the development.
b. Consistency with Council floodplain risk management plans.	b. As above, given there is negligible change to flood behaviour, consistency with any floodplain risk management plans is achieved.
c. Consistency with any Rural Floodplain Management Plans.	c. Refer Item 17(b) above.
d. Compatibility with the flood hazard of the land.	d. All parts of the site are noted to be flood free hence compatible with flood hazard of the land.
e. Compatibility with the hydraulic functions of flow conveyance in floodways and storage in flood storage areas of the land.	e. A modification to flood storage associated with the regional basin is proposed as set out in **Sections 6** and **8** of the report. The assessment shows no change to flood behaviour and that full storage compensation is achieved.
f. Whether there will be adverse effect to beneficial inundation of the floodplain environment, on, adjacent to or downstream of the site.	f. Refer Item 17(a) response.
g. Whether there will be direct or indirect increase in erosion, siltation, destruction of riparian vegetation or a reduction in the stability of riverbanks or watercourses.	g. Existing and proposed flow regime in downstream waters have been confirmed to be consistent. A detailed water quality management system has been employed for the development which would mitigate any potential sedimentation, it is anticipated that potential for any reduction in stability or banks or watercourses would be negligible.
h. Any impacts the development may have upon existing community emergency management arrangements for flooding. These matters are to be discussed with the NSW SES and Council.	h. There would be no effect on any existing community emergency management arrangements for flooding as a result of the development. Refer **Section 8.4**.
i. Whether the proposal incorporates specific measures to manage risk to life from flood. These matters are to be discussed with the NSW SES and Council.	i. The development site is flood free up to the PMF flood event. There are no specific flood related management arrangements required for the development. Refer **Section 8.4**.
j. Emergency management, evacuation and access, and contingency measures for the development considering the full range or flood risk (based upon the probable maximum flood or an equivalent extreme flood event). These matters are to be discussed with and have the support of Council and the NSW SES.	j. Refer *Item 17(h) & 17(i)* responses.
k. Any impacts the development may have on the social and economic costs to the community as consequence of flooding.	

Authority Comments	*Response*
	k. The assessment included in **Section 6** and **8** of the report confirm consistency between existing and post development flood behaviour, hence no detrimental impact or potential affectation relating to social or economic costs to the community are anticipated as a result of the development l.
Sydney Water Dated: 10 February 2020	
Water Related Infrastructure Requirements Item 1	
The proponent of the development should determine service demands following servicing investigations and demonstrate that satisfactory arrangements for drinking water, wastewater, and if required, recycled water services have been made	Refer to **Section 4.1** and **4.2** regarding anticipated service demands and service investigations relating to water and sewer. It is noted that reduction in demand for non-potable reuse is proposed as set out in **Section 7.4**. It is anticipated that existing services will have sufficient capacity, noting that a Section 73 application to Sydney Water will be required as part of ongoing designs to confirm requirements for water supply and wastewater.
Water Related Infrastructure Requirements Item 2	
The proponent must obtain endorsement and/or approval from Sydney Water to ensure that the proposed development does not adversely impact on any existing water, wastewater or stormwater main, or any other Sydney Water asset, including any easement or property. When determining landscaping options, the proponent should take into account that certain tree species can cause cracking or blockage of Sydney Water pipes and therefore should be avoided	The requirement for endorsement of development by Sydney Water is noted. Future detailed assessment and Build Over Sewer approvals are anticipated to be completed as part of Construction Certificate approval phases of the development. It is noted that consultation with Sydney Water has been completed in this regard with meetings held with the proponent (Aliro), civil engineers (Costin Roe Consulting) and Sydney Water Service Coordinators (Landpartners) held on 11 March 2020.

Authority Comments	***Response***
Water Related Infrastructure Requirements Item 3	
Strict requirements for Sydney Water's stormwater assets (for certain types of development) may apply to this site. The proponent should ensure that satisfactory steps/measures been taken to protect existing stormwater assets, such as avoiding building over and/or adjacent to stormwater assets and building bridges over stormwater assets. The proponent should consider taking measures to minimise or eliminate potential flooding, degradation of water quality, and avoid adverse impacts on any heritage items, and create pipeline easements where required	Consideration to all Sydney Water assets in and around the development area have been considered as part of the development application concept designs. These include construction considerations for the 375mm wastewater carrier on the northern site boundary, the 225mm carrier on the south-west of the site and the 1200mm SCL IBL trunk watermain (Prospect WP159 Main). It is noted that consultation with Sydney Water has been completed in this regard with meetings held with the proponent (Aliro), civil engineers (Costin Roe Consulting) and Sydney Water Service Coordinators (Landpartners) held on 11 March 2020.
Integrated Water Cycle Management Item 4	
The proponent should outline any sustainability initiatives that will minimise/ reduce the demand for drinking water, including any alternative water supply and end uses of drinking and non-drinking water that may be proposed, and demonstrate water sensitive urban design (principles are used), and any water conservation measures that are likely to be proposed. This will allow Sydney Water to determine the impact of the proposed development on our existing services and required system capacity to service the development.	Refer to **Section 4.1** and **4.2** regarding anticipated service demands and service investigations relating to water and sewer. It is noted that reduction in demand for non-potable reuse is proposed as set out in **Section 7.4**. It is anticipated that existing services will have sufficient capacity, noting that a Section 73 application to Sydney Water will be required as part of ongoing designs to confirm requirements for water supply and wastewater.

10.4 RTS Response Items

This section of the report provides response to civil engineering items included in the Blacktown City Council information request letter dated 18 September 2020 and Cumberland City Council information request letter dated 16 September 2020.

No.	Item and Response
Blacktown City Council	
3. Drainage	
	Review of the following documents was undertaken: 1. *Letter from Blacktown City Council to NSW Department of Planning, Industry and Environment reference no. SSD 10399 dated 4 December 2019.* 2. *Civil Engineering Report Incorporating Water Cycle Management Strategy by Costin Roe Consulting, project no. C013251.06, revision A dated 4 June 2020.* 3. *Appendix B to Appendix H of the Civil Engineering Report Incorporating Water Cycle Management Strategy by Costin Roe Consulting, project no. C013251.06, revision A dated 4 June 2020.* 4. *Engineering Plans by Costin Roe Consulting drawing nos. CO13251.06-DA10(D), CO13251.06-DA20(B), CO13251.06-DA25(B), CO13251.06-DA30(C), CO13251.06-DA31(C), CO13251.06-DA35(B) to CO13251.06-DA37(B), CO13251.06-DA40(C) to CO13251.06-DA42(C), CO13251.06-DA44(B), CO13251.06-DA45(C), CO13251.06-DA47(D), CO13251.06-DA48(B), CO13251.06-DA51(C), CO13251.06-DA52(C), CO13251.06-DA55(B), CO13251.06-DA56(B), CO13251.06-F01(B) and CO13251.06-F02(B) dated 3 June 2020.* 5. *Geotechnical Investigation report by PSM reference no. PSM4010-003L dated 11 February 2020.* 6. *Environmental Assessment report by JBS&G reference 58238/130144, revision 0 dated 3 June 2020.* 7. *SEARs Report for Prospect Logistics Estate application no. SSD-10399 dated 16 December 2019.* <u>Response</u> Reviewed documents are noted – no comment required.
Item 1)	*The following items need to be addressed to meet the requirements under Council's DCP Part J 2015 and Council's Engineering Guide for Development 2005:* *General Notes:* *It is acknowledged that the subject site is situated within two separate LGAs (Blacktown City Council and Cumberland Council). The proposed stormwater quality for the overall development is split into catchments to target the water quality requirements for the particular Council. Notwithstanding, the stormwater system from the overall development is proposed to be discharged to the regional detention basin / wetland located and managed by Blacktown City Council. Therefore, the drainage design*

No.	Item and Response
	for the entire development is to be amended to meet Blacktown City Council's guidelines which include (not limited): *i. BCC DCP 2015 including Part J — Water Sensitive Urban Design and Integrated Water Cycle Management;* *ii. DRAFT WSUD developer handbook with MUSIC modelling and design guide.* *iii. BCC WSUD Standard Drawings A(BS)175M;* *iv. BCC Engineering Guide for Development 2015; and* *v. BCC Works Specification 2005 — Civil land development.* <u>Response</u> The requirement for the whole of site to conform to Balcktown City Council stortmwater management policy is not agreed. The parts of the site which are within Cumberland City Council are subject to the Greystanes Northern Employment Lands and within the Holroyd Council Part Q DCP. All sites within the Greystanes Northern Employment land, including the proposed development, are subject to an agreed and approved Stormwater Management Plan. The approved stormwater management plan requires sites to provide gross pollutant traps (GPT's) which target suspended solids, hydrocarbons and litter. Based on the request from Council, the requirement for all sites which drain toward Blacktown City Councils regional system should provide compliance to Blacktown Council DCP2015 Part J. If adopted this requirement could apply to up to 18 existing facilities which can be more than 1kM from the Council LGA border. It is unreasonable to expect this development, being adjacent to the system to have to provide stormwater management measures which differ from any of the other facilities within the Greystanes Northern Employment Area and no change to the submitted management strategy is proposed.
Item 2)	*Clarity is required in relation to the combined area of the site. Section 2.1 of the Civil Engineering Report by Costin Roe (project no. C013251 revision A dated 4 June 2020) has stated the combined area of the site is 18.40 hectares, the architectural plans by SBA Architects (project no. 19280 revision 0 dated 4 June 2020) has stated a site area of approximately 18.66 hectares and the Environmental Assessment report by JBS&G (reference 58238/130144 revision 0 dated 3 June 2020) has stated an area of 18.77 hectares. The correct combined area of the site is to be adopted on all reports, engineering plans and relevant modelling for the Water Cycle Management.* <u>Response</u> We confirm the combined area of the site is 18.66 Ha. This has been updated within the engineering report and catchment plans.

No.	Item and Response
Item 3)	*Geotechnical Investigation report by PSM (dated 11 February) has suggested that Groundwater seepage was encountered at boreholes conducted onsite (boreholes 2020/BH09 and 2020/BH10). Results and recommendations carried out in this report must be considered (i.e. excavation methods, batter slopes and heights above the groundwater table etc) for the civil engineering designs. Since these boreholes were tested at the location of proposed building pads (i.e. Pad 7), further investigation and possibly long-term groundwater monitoring is required to ensure that the proposed development does not impact the groundwater table and groundwater flows.* <u>Response</u> Further groundwater testing has been undertaken by PSM during November & December 2020 (refer PSM Report PSM4010-010L dated 7 December 2020), and specific letter to address this RTS item – refer PSM letter PSM4010-008L, dated 8 December 2020. Groundwater is noted to be present adjacent to the regional basin at levels between RL 48.2m and RL 51.8m AHD. This part of the site is noted to be in an area of fill (with proposed pad level at RL 59.5m. Consideration to groundwater during construction will be required for retaining wall footings and temporary drainage. The works and designs will be completed during Construction Certificate and detail design stage with consideration to the requirements of the PSM reports noted. PSM have confirmed there is no observed groundwater within areas of proposed cut. Allowance for general minor seepage which would be expected from shale substrate will be required. Overall it is not considered the proposed development would have any significant effect on groundwater. Refer further information from PSM Geotechnical Engineers: • Letter PSM4010-008L, dated 8 December 2020; and • Groundwater Report PSM4010-010L dated 7 December 2020.
Item 4)	*Provide electronic copies of the XP-RAFTS, DRAINS, MUSIC and flood model used to assess Water Cycle Management Strategy for the development. Ensure that the correct models are submitted and are consistent with the engineering plans.* <u>Response</u> Modelling has been provided to Blacktown Council Engineers (Mr Arham Soomro and Mr Tony Merrilees) on 10 September 2020 and discussed between Mr Soomro and Mark Wilson from Costin Roe Consulting.

No.	Item and Response
Item 5)	*A dam break assessment of the existing regional detention basin with the proposed modifications is required. The engineer is to assess whether the proposed modifications to the detention basin will have risks to the population should the basin fails. Where there is any population at risk, a comprehensive risk assessment is to be undertaken. The requirements of this risk assessment are to be implemented including any remediation works. Provide details.* <u>Response</u> As a prescribed dam, a detailed assessment of the basin modifications will be required by the NSW Dam Safety Committee. Requirements for assessment, including risk assessment, detailed hydraulic modelling, and potentially a dam break assessment will be required as part of the detail design and approval phase of the development. These would be completed in accordance with the NSW Dam Safety Committee requirements and in consultation with Blacktown City Council. It is agreed that more detailed assessments will be required however these are considered to form part of the post approval phase of the development.
Item 6)	*Any flows that are discharging to Blacktown Council's drainage network including any flows from the area under Cumberland Council control are to meet all Council's water quality targets and be located on land under Blacktown Council control to ensure ongoing monitoring.* <u>Response</u> This is not agreed – refer Item 2 response.
Item 7)	*The WSUD design is to capture a minimum of 90% of the post development average annual load of Hydrocarbons and oils. Council does not accept the proposition in Section 7.4.7 of the Civil Engineering Report by Costin Roe Consulting dated 4 June 2020 which states that the proposed development is expected to produce low source loadings of hydrocarbons. This can be achieved with a number of alternatives.* *i. GPTs can be provided prior to discharge from the site including all areas located in BCC. GPTs are to have an oil baffle able to trap and contain oil or hydrocarbons and sized to treat a minimum 2EY flow considered as 75% of the 1EY flow. The GPTs are to be located in an area that can be easily accessed by truck for maintenance. Or* *ii. a Stormfilter Cartridge system is proposed to manage the water quality, provide an oil baffle within the Stormfilter chamber to trap and contain oil or hydrocarbons. The oil baffle is to be 250 mm upstream of the Stormfilter weir and extend 400 mm below the weir level for a 690 cartridge. The minimum length of the Stormfilter weir (L) is to be increased to provide a maximum velocity of 0.4 mls under the baffle*

No.	Item and Response
	during peak flow (i.e. L > Q20 / (0.4 x 0.25), or L > 10 x Q20) in m, where Q20 is in m3/s). Provide calculations. <u>Response</u> The provided strategy proposed to capture 90% of hydrocarbons. This is proposed for both Blacktown City Council LGA and for the parts of the site which are within Cumberland LGA and the Greystanes Northern Employment Land DCP area. The comment in our report regarding low sources loads is correct, however as confirmed it is proposed to ensure 90% reduction of hydrocarbons have been met.
Music Modelling	
Item 8)	*The Blacktown water quality targets are to apply to all parts of the site that drain to the Blacktown drainage network even where such water originates from the Cumberland Council area. Locate all treatment devices within the Blacktown boundaries.* <u>Response</u> This is not agreed – refer Item 2 response.
Item 9)	*Provide two separate and additional MUSIC models (pre and post) to demonstrate that the Stream Erosion Index (SEI) is less than 3.5. The pre development is to consider a vacant pervious block. Provide all calculations used to determine Qcritical.* <u>Response</u> Flows within from the site all discharge to the regional basin to the north. As per Blacktown City Council Part J DCP, any site which discharges to a regional basin is exempt from an SEI calculation requirements. The receiving waters (i.e. Girraween Creek downstream of the Regional Detention Basin) are noted to be dependant on the hydraulic controls provided by the basin discharge system. It has been confirmed that the pre and post development flows, and duration of flows are consistent, hence there is no change to SEI within the receiving waters. We do not consider the confirmation of SEI via a model is warranted based on the existing catchment and regional control basin, and the requirements of Councils Part J DCP2015.
Item 10)	*The proposed rainwater tanks for the site are to amended to comply with Blacktown City Council guidelines. Ensure that all rainwater tanks provide the minimum 80% non-potable water reuse. Allow for a 10% loss in rainwater tank size volume in MUSIC to that shown on the design plans below the overflow invert to allow for anaerobic zones and mains water top up levels (i.e. where*

No.	Item and Response
	a 100 kL tank is specified on the drainage plan, it is to be modelled as 90 kL in MUSIC). Response Rainwater tanks have been sized based on the noted above. Refer to **Section 7.5** of our report for detailed specification and modelling input.
Item 11)	*For watering landscaped areas only (excluding turf areas) allow 0.4 kL/year/m2 as PET-Rain.* Response Rainwater tanks have been sized based on the noted above. Refer to **Section 7.5** of our report for detailed specification and modelling input.
Item 12)	*For industrial developments allow for internal rainwater reuse of 0.1 KL/day per toilet/urinal. However, where the site is occupied say 5 days per week the daily usage rate is to be reduced by 5 / 7.* Response Rainwater tanks have been sized based on the noted above. The application is proposing up to 7 day use of facilities. All tanks have been sized conservatively based on 7 day occupation. Refer to **Section 7.5** of our report for detailed specification and modelling input.
Item 13)	*Ensure that the areas draining to surface inlet pits with OceanGuards match the engineering plans.* Response Modelling and design which defines areas to specific surface inlet pits with OceanGuards would form part of future Operational Stormwater Management Plans for individual buildings. These would be completed in accordance with council recommendations as necessary.
Item 14)	*Ensure that Blacktown Council's specific MUSIC modes are used for the total development area draining to the devices.* Response Blacktowns specific MUSIC nodes have been utilized in the modelling of the development. Refer Item 2 response in relation to treatment objectives for the development.
Item 15)	*The minimum Stormfilter chamber area is to be No. of Cartridges x 0.177 m2/cartridge excluding the area of the weir.* Response

No.	Item and Response
	Refer to updated drawing **Co13251.06-DA45** which confirms details of the stormfilter chamber and typical details including baffles, weirs, chamber area, false floor and other typical information for the chamber.
Item 16)	*Ocean Protect has advised that the maximum storage permitted below the Stormfilter weir to ensure effective operation of the filter cartridges is limited to an equivalent volume derived from 2.0 mm of rainfall (20 m3/Ha) without losses, falling over the site area that drains to the Stormfilter chamber (ignoring any bypass area).* <u>Response</u> Refer to updated drawing **Co13251.06-DA45** which confirms details of the stormfilter chamber and typical details including baffles, weirs, chamber area, false floor and other typical information for the chamber.
Item 17)	*It is acknowledged that there is no development proposed within the Aboriginal Heritage area located south east of the site and this area has not been included in the provided MUSIC model. However, this area appears to drain directly into the proposed development and affect the proposed stormwater system. The options below are to be considered to ensure this area is managed:* *i. Where levels permit, relocate the proposed retaining walls further away from the Aboriginal Heritage area and provide a catch drain with a series of pits and pipes at the top of the wall just clear 0f the heritage zone to capture the 5% AEP flows and discharge these flows independently to the wetland area.* *ii. Where the retaining walls are not relocated or it is too difficult to discharge an area independently to the wetland, then this area will need to be included in the MUSIC model as a "Forest" node.* <u>Response</u> The aboriginal heritage area falls within Cumberland Council and Greystanes Northern Employment Lands where a specific DCP applies (Refer Item 2 response). Treatment of this catchment will be provided through site GPT's prior to discharge from the site, then further treated within the wetland area. Capture of drainage will remain consistent with existing site runoff collection. No MUSIC modelling is required for this portion of the site.
Item 18)	*Amend the MUSIC model accordingly. Provide an electronic copy of the model with MUSIC Link report that matches the MUSIC model and drainage plans.* <u>Response</u> Refer updated MUSIC model *Co13251.06_BCC_Rev2*. The changes mainly relate to clarification regarding the stormfilter concept design, within the BCC

No.	Item and Response
	LGA. Note, we have included a second MUSIC model for areas within CCC LGA pertaining to rainwater tank sizing only.
Item 19)	*Provide a MUSIC catchment plan that shows both the land use and the areas contributing to each specific device. To make this more understandable it may be easier in many cases to split these into two separate plans.* <u>Response</u> Overall catchments are shown on drawing **Co13251.06-DA40**. A separate MUSIC catchment drawing (**Co13251.06-DA43)** has been prepared for the BCC LGA zone.
Drains Modelling	
Item 20)	*The DRAINS model provided seems to be incorrect. The surface areas of the regional detention basin in the model do not match with Tables 6.1 and 6.5 of the Civil Engineering Report and the engineering plans. Furthermore, the high flow overflow routes levels do not match the levels within the detention basin. Ensure that the correct DRAINS models are provided.* <u>Response</u> We confirm consistency within the DRAINS model for Table 6.1 and 6.5 which pertain to the predevelopment and post development staged surface areas respectively. Minor inconsistencies in levels of overflow routes have been adjusted in the report, noting no changes to the levels within the model have been made. Hence, previously reported results remain consistent. Refer updated plan and report which confirms minor inconsistencies in areas and overflow route levels.
Item 21)	*Council is unable to run the DRAINS models provided. Ensure that the model provided can be opened in a version of DRAINS that does not require the use of Storage Network Routing (i.e. XP-RAFTS).* <u>Response</u> Modelling of hydrology through the run-off routing/ RAFTS module in DRAINS is considered the most suitable hydrological assessment for the catchment. If the DRAINS model were formulated without the RAFTS module this would provide inaccurate modelling output. We understand through previous approvals with Blacktown Council that they have the ability to run the DRAINS model with the RAFTS module and request this option is utilized by them.
Specific Notes	

No.	Item and Response
Item 22)	*Civil Engineering Report Incorporating Water Cycle Management Strategy by Costin Roe Consulting, project no. C013251.06, revision A dated 4 June 2020.* *i. Delete reference to Penrith Council in Section 5.1.* *ii. The Erosion and Sediment Control must be prepared in accordance with Blacktown City Council guidelines and not Penrith City Council as stated in Table 5.1 under the "Reference" column and Section 9.1 of the report.* *iii. Delete reference to "2hr duration" under Table 6.9 title. The table includes 2, 6 and 9 hour durations.* *iv. Insufficient information is provided in relation to the flood assessment. A comprehensive flood assessment is required for the development in conjunction with the BCC guidelines and SEAR's. All information must be provided including which software was used for the assessment, methodology, calibration of the flood model to ensure consistency of the flood behaviour documented by Council, rainfall data, catchments, hazard and flood difference maps, flow velocities, hydraulic categories, assumptions, etc* *v. The flood planning level mentioned in Section 8.4 seems to be incorrect. The minimum FPL should be the 1% AEP flood level with climate change + 0.5 m freeboard. Furthermore, the section suggests that the lowest proposed building level on the site is RL 60.0 m AND when drawing CO13251.06 of the engineering plans shows Warehouse 1 FLL = 57.50 +- 500 mm* *vi. Section 5.1 (Page 23) of the report states that the existing regional detention basin caters for catchment with an area of approximately 167 hectares while Section 6.2 states that the area is 173.55 hectares. Clarity is required.* *vii. Section 6.3 (Assessment of Existing Detention System) — values in the discussion section on Page 36 do not match the tabulated results. For example, the water level stated in the discussion for the existing detention basin is RL 55.01 m AHD in the 1% AEP and RL 56.43 in PMF. Results of the assessment in Tables 6.2 and 6.3 depict RL 55.20 m AHD in the 1% AEP and RL 57.15 in PMF respectively.* *viii. Section 6.4 (Assessment of Modified Detention System) — similar to the above, values in the discussion on Page 39 do not align with the results in Tables 6.6 — 6.9.* *ix. Section 5.5 (Climate Change) — the section states an assessment was undertaken for the effect of climate change on the development with a 10% increase in rainfall intensity for the 1% AEP and reference to Table 6.9 to compare the flows. However, no such results are shown in this table respectively. Also, rainfall intensities for the 1% AEP are to be increased to 15% for a conservative estimate on climate change and to meet Council guidelines.*

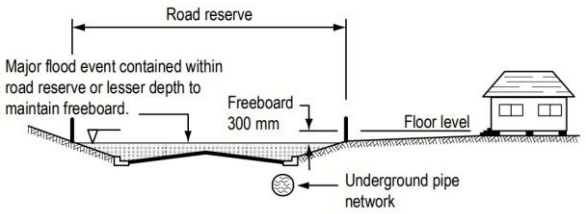
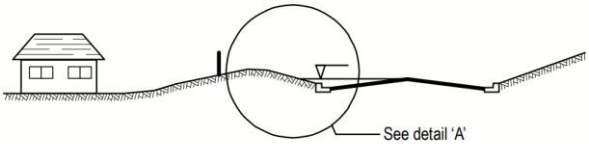
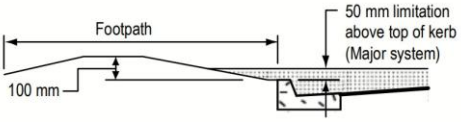
No.	Item and Response
	x. Recheck all results, values and grammar in the report. Ensure consistency in/between the models and the report. <u>Response</u> i. Incorrect reference to Penrith has been removed – refer report Revision B. ii. Incorrect reference to Penrith has been removed – refer report Revision B. iii. Reference to duration has been adjusted – refer report Revision B iv. Flooding has been included in **Section 8** of the report. As discussed in the report, flood behavious is defined by the water level within the regional basin as confirmed through the modelling and assessments completed within **Section 6.** The flood assessment and regional detention system assessment hence have cross over with each other and need to be read in conjunction with each other. We have provided additional flood information within the report **Section 8**, to clarify details of the completed flood assessment and to make the assessment between the two section of the report more approachable. v. Council policy requires flood planning level of the 1% AEP + 0.3m freeboard. The NSW Floodplain Development Manual recommends the 1% AEP + 0.5m freeboard. Neither of the two relevant documents require additional freeboard for climate change. This being said, of climate change were added to the flood planning level noted above, all proposed buildings are noted to be significantly above both the flood planning level and the flood planning level with climate change. It is also confirmed that the minimum floor level reference of RL 60.0m (Building 7) has been adjusted to clarify this is the minimum floor level for parts of the site upstream of the regional basin weir where flooding is required to be considered in detail. The building (Building 1) which is proposed at RL 57.5m is downstream of the regional basin weir, meaning it is not subject to the same flood planning level as Building 7. We note that, per the Blacktown Council Flood Letter, the flood planning level for Building 1 (based on 1% AEP level of 48.33m) is RL 48.83m AHD (so 8.67m below the proposed building level). vi. The existing catchment is confirmed with an area of 173.4Ha, refer updated report/ plans. vii. The 1% AEP and PMF flood levels are confirmed and amended. Refer updated report/ plans. viii. Refer updated report/ plans for confirmed levels. ix. Refer updated report which confirms commentary regarding climate change assessments. Per the SEAR's, modelling of the 0.5% and 0.2% AEP events has been completed as proxies for climate change. It is noted that no tidally or sea level influenced water bodies affect the waterway hence sea level rise is not required to be considered in the assessment.

No.	Item and Response
	x. Refer updated report and modelling which confirms consistency between modelling and reporting.
Item 23)	*Engineering Plans by Costin Roe Consulting dated 3 June 2020:* *i. Considering that the stormwater system for the entire development will be discharged to the regional devices managed Blacktown City Council, the engineering plans for the total development are to be amended to comply with meet Blacktown City Council's guidelines which include (not limited to):* *BCC DCP 2015 including Part J — Water Sensitive Urban Design and Integrated Water Cycle Management* *BCC DRAFT WSUD developer handbook with MUSIC modelling and design guide 2020* *BCC WSUD Standard Drawings A(BS)175M;* *BCC Engineering Guide for Development 2015; and* *BCC Works Specification 2005 — Civil land development.* *ii. The internal pipe network is to be designed in accordance with the Council's Engineering Guide for Development 2005 to carry the 5% AEP (20 year ARI) storm flows.* *iii. The 1% AEP flows from the site are to be directed to the OSD. Demonstrate how the surface flows in excess of the pipe capacity are directed to the OSD basin.* *iv. Consider the tailwater conditions in the regional detention basin when discharging the stormwater system. High backwater levels can reduce the effectiveness of the stormwater system. For example, to reduce impact of tailwater levels, set the false floor level within the Stormfilter Cartridge chamber and also the outlet from the CDS GPT units above the 1 EY water level immediately downstream of the basin.* *v. Provide step irons at 300 cts for pits deeper than 1.2 m.* *vi. Show how the roof water gets to the rainwater tanks. Provide a separate system for roof water and surface drainage. Pits between the roof lines (i.e. charged pipes) are to be sealed.* *vii. Charge line cleanout pits are to be provided at the low point of all charge line systems for the rainwater tanks to facilitate cleaning of the system.* *viii. Provide pit numbers/identifications on all plans.* *ix. Review the pit size as 600 * 600 mm pits are limited to 600 mm maximum depth and 600 * 900 mm pits are limited to 900 mm depth. Pits greater than 900 mm depth are all to be minimum 900 * 900 mm. All pits within the proposed development must comply with these requirements*

No.	Item and Response
	x. On drawing Co13251.0-DA44, show the impervious area in % adopted for each catchment in the hydrology model. *xi. Provide details of the proposed CDS GPT units (where used) including sections, levels, calculations of treatable fiow rates.* *xii. As noted above any flows that are discharging to Blacktown Council's drainage network including any flows from the area under Cumberland Council control are to meet all Council's water quality targets and be located on land under Blacktown Council control to ensure ongoing monitoring.* *xiii. OceanGuards should treat a maximum of 1000 m2 ofnon-roof areas and 1500m2 of roof areas. All OceanGuards are to be clearly notated as "200 micron OceanGuards.* *xiv. OceanGuards treating only surface flows require a minimum clear depth of 500 mm below the grate to any inlet or outlet pipe obvert. OceanGuards treating surface flows and upstream pipe flows require a minimum clear depth of 500 mm from the invert of the upstream pipes to be treated, to the obvert of the outlet pipe. Where these pits are treating upstream pipe flows the inverts of all pipes in and out of the pit are to be shown* *xv. Where OceanGuards (Enviropods) are designed to treat upstream pipe flows, the invert levels on all pipes discharging to and from the pit are to be clearly shown. Provide a minimum clear depth of 500 mm from the invert of the upstream pipes to be treated to the outlet pipe obvert.* *xvi. All proposed Stormfilter Cartridge Systems are to be designed in accordance with BCC guidelines. Provide all details of the proposed Stormfilter Cartridge system including plan view, sectional view, levels, cartridges, calculations etc.* <u>Response</u> i. Not agreed – refer Item 1 response. ii. Preliminary sizing of internal pipework has been shown which is based on a 5% AEP (1 in 20 year ARI) design storm. Final sizing of drainage, based on Council design documents will be completed as part of detail design stage. iii. Refer updated plans which show general flow paths for 1 in 100 year flows. It is noted that all site levels are generally graded toward the regional detention system. iv. The anticipated invert level of the filtration tank is approximately RL 52.92m AHD. The 1EY water level in the basin is noted to be RL 51.97m. This is 0.95m below the filtration unit invert and will have negligible impact on tailwater. Further assessment on tailwater effect will be completed during detail design phase of the development. v. Refer drainage Note 16 on drawing **Co13251.06-DA10** which requires step irons for pits deeper than 1000mm.

No.	Item and Response
	vi. Indicative connection to rainwater tanks has been includes and updated on drawings. vii. Cleanouts to charged lines would be included in detail design drawings. Not relevant for concept drainage layouts. viii. Pit naming not required at concept stage. Naming and pit schedules will be provided in detail design phase. ix. Minimum pit sizes will be provided in accordance with Australian Standards and Council requirements. It is anticipated that most pits will be 900mm square or larger. Pit sizing and schedule would form part of detail design phase. x. % impervious has been added to the drawing – refer updated DA44. xi. Sizing of GPT's has been added to the drawings – refer updated DA41 and DA42. xii. Not agreed – refer Item 2 responses. xiii. Noted – this would be confirmed during detail design phase for individual buildings (within Blacktown Council LGA only). xiv. Noted – this would be confirmed during detail design phase for individual buildings. xv. Noted – this would be confirmed during detail design phase for individual buildings. xvi. Noted – additional sections and details on the stormfilter system have been included in updated drawings.
Cumberland City Council	
Planning - Excavation – Bulk Earthworks	
Item 1c)	*In accordance with Clause 3.5, Control C12, development shall minimise cut and fill to protect existing drainage patterns and maintain integrity of the groundwater system.* *In this regard, the proposed development is designed to require significant bulk earthworks with cut and fill in the order of 8m and 14m respectively, as identified on Page 11 of the Geotechnical Investigation (GI), which is considered excessive.* <u>Response</u> Further groundwater testing has been undertaken by PSM during November & December 2020 (refer PSM Report PSM4010-010L dated 7 December 2020), and specific letter to address this RTS item – refer PSM letter PSM4010-008L, dated 8 December 2020. Groundwater is noted to be present adjacent to the regional basin at levels between RL 48.2m and RL 51.8m AHD. This part of the site is noted to be in an area of fill (with proposed pad level at RL 59.5m. Consideration to groundwater during construction will be required for retaining wall footings and temporary drainage. The works and designs will be completed during

No.	Item and Response
	Construction Certificate and detail design stage with consideration to the requirements of the PSM reports noted. PSM have confirmed there is no observed groundwater within areas of proposed cut. Allowance for general minor seepage which would be expected from shale substrate will be required. Overall it is not considered the proposed development would have any significant effect on groundwater. Refer further information from PSM Geotechnical Engineers: • Letter PSM4010-008L, dated 8 December 2020; and • Groundwater Report PSM4010-010L dated 7 December 2020.
Engineering	
Flooding	
Item 3)	*The site is located within the Flood Risk precinct. In this regard, a Flood Advice Letter should be obtained from Council.* <u>Response</u> A formal flood advise letter has been obtained from Council and considered in the development assessment. Refer Letter EC2020/0849, dated 19 October 2020 and updated report **Section 8** and **Appendix J**. The flood advise letter shows flood extent and levels to to the north and north west of the property, within the regional detention basin and wetland, consistent with the information previously obtained from Blacktown Council. Blacktown Council's flood letter shows the existing 1% AEP flood level is RL 55.06m AHD, and the PMF is RL 57.17m AHD within the basin. Cumberland Council's flood letter shows the existing 1% AEP flood level is RL 55.2m AHD within the basin. Cumberland Council do not provide advice on the PMF flood level. The Cumberland Council flood letter also shows overland flow within Clunies Ross Street. Comparison of survey levels with the flood information shows that the flow depths are in the range of 0.15-0.2m in depth in the vicinity of the intersection of Clunies Ross Street with Wombat Street, and 0.3m in the vicinity of Burraga Way. The overland flow shown in the Cumberland Council letter is noted to be gutter flow which is contained within the road carriageway. Generally levels within the verge are between 0.5-1.0m higher than the top of gutter level, hence there is limited opportunity for flow within the gutter and Clunies Ross Street to enter the site, or to affect the development. The situation is shown figuratively below, as sourced from QUDM2013.

No.	Item and Response
	 **Building above top of kerb and channel**  **Building below top of kerb and channel**  **Detail 'A'** Flood risk associated with the gutter flow in Clunies Ross Street is considered negligible, and the proposed development will not impact flooding within Clunies Ross Street. We do not consider any additional flood assessments are warranted based on the information contained within the Cumberland Council Flood Advice.
Item 4)	*The subject development shall comply with the Flood Advice Letter, and should be designed in accordance with Part A, Section 8.0 - Stormwater Management of the HDCP.* <u>Response</u> A formal flood advise letter has been obtained from Council and considered in the development assessment. Refer Letter EC2020/0849, dated 19 October 2020 and updated report **Section 8** and **Appendix J**. Refer **Item 2** response and noted sections of the report.
Stormwater	
Item 5)	*Stormwater runoff from Catchment 3 does not discharge to the regional detention basin. In this regard, On-site Stormwater Detention (OSD) should be provided for Catchment 3.*

No.	Item and Response
	Response *Catchment 3* (shown on drawing **Co13251.06-DA40**) is noted to drain to Council trunk drainage within Foundation Place. The Foundation Place drainage is noted to be conveyed to Girraween Creek to the north of the subject land. Girraween Creek then drains to the wetland and then into the regional basin. Although *Catchment 3* does not have a direct drainage connection to the regional wetland basin from within the site, it does so via existing drainage infrastructure within the precinct. The catchment is noted to form part of the regional systems, and the Greystanes Northern Employment Lands catchment and stormwater management system. We have figuratively shown the layout of the trunk drainage which leads to the regional system on the plan to confirm the above arrangement. Given it is confirmed that *Catchment 3* does drain into the wetland via trunk drainage, no additional detention or water quality is required or proposed for *Catchment 3*. This is consistent with all sites within the Greystanes Northern Employment Land Precinct.
Item 6)	*Stormwater runoff from the street / footpath should not enter development site. In this regard, the architectural and stormwater design should be reviewed in conjunction with Council approved Boundary Line Levels.* Response This is noted and considered. Council approved boundary line levels would normally form part of detail design phase assessments and can be conditioned as such.
Sediment and Erosion Control	
Item 38)	*A Sediment and Erosion Control Plan should be developed and implemented for the entirety of construction works on site. The Sediment and Erosion Control Plan should be designed to prevent the offsite migration of sediment from the proposed development.* Response Erosion and Sediment Control Plans have been included in the assessment submission. Refer to drawings **Co13251.06-DA20** and **DA25**. Refer also **Section 9** of the engineering report which includes a detailed draft stormwater management plan designed in accordance with Landcom Blue Book and Council Policy.

11 CONCLUSION

This Civil Engineering Report has been prepared to accompany and EIS for the development of the Prospect Logistic Park at Pemulway, NSW.

An overview of Cumberland City Council and Blacktown City Council requirements, in conjunction with DPIE, for earthworks, stormwater management and erosion and sediment controls has been provided as part of SSDA submission. Specific mention has been made to on-site detention and water quality requirements as required as part of the *Water Cycle Management Plan* for the estate. These are provided for both specific on-lot requirements and broader regional and precinct systems including the existing precinct wetland and detention basin on the north and north-west of the property.

The development is located in the vicinity of, however clear of the predicted 1% AEP flood extent from the regional basin and Girraween Creek. The floor levels of proposed buildings will be set as a minimum to the 1% AEP flood level plus 500mm freeboard in accordance with the requirements of Council and the *NSW Floodplain Development Manual*.

We consider the civil engineering and stormwater management measures included in this report and associated drawings (**Appendix A**) address anticipated impacts and the requirements of the SSD 10399 SEAR's, and associated agency requirements.

We recommend the management measures referenced in this report are adopted as part the approval consent, and further in the detail design process and future development construction.

Updates to the report, in **Revision B** and **C**, have been made to address Agency RtS and minor adjustments to the masterplan layout respectively.

12 REFERENCES

Managing Urban Stormwater: Harvesting and Reuse – 2006 (NSW DEC);

Managing Urban Stormwater: Source Control – 1998 (NSW EPA);

Managing Urban Stormwater: Treatment Techniques – 1997 (NSW EPA);

Managing Urban Stormwater: Soils & Construction – 2004(LANDCOM) – "The Blue Book";

Engineering Guide for Development (2005), Blacktown City Council

Part J, Development Control Plan (2015), Blacktown City Council

Water Sensitive Urban Design – "Technical Guidelines for Western Sydney" by URS Australia Pty Ltd, May 2004

Appendix A
Costin Roe Consulting Pty Ltd
SSDA Drawings

PROSPECT LOGISTICS ESTATE - SSDA 10399

44 CLUNIES ROSS STREET, GREYSTANES, NSW

STATE SIGNIFICANT DEVELOPMENT APPLICATION

DRAWING LIST

DRAWING NO.	DRAWING TITLE
C013251.06-DA10	DRAWING LIST & GENERAL NOTES
C013251.06-DA20	EROSION & SEDIMENT CONTROL PLAN
C013251.06-DA25	EROSION & SEDIMENT CONTROL DETAILS
C013251.06-DA30	BULK EARTHWORKS LEVELS PLAN
C013251.06-DA31	BULK EARTHWORKS CUT/FILL PLAN
C013251.06-DA35	BULK EARTHWORKS SECTIONS - SHEET 1
C013251.06-DA36	BULK EARTHWORKS SECTIONS - SHEET 2
C013251.06-DA37	BULK EARTHWORKS SECTIONS - SHEET 3
C013251.06-DA40	CONCEPT STORMWATER MANAGEMENT PLAN
C013251.06-DA41	CONCEPT STORMWATER DRAINAGE PLAN - SHEET 1
C013251.06-DA42	CONCEPT STORMWATER DRAINAGE PLAN - SHEET 2
C013251.06-DA43	MUSIC CATCHMENT PLAN
C013251.06-DA44	REGIONAL CATCHMENT PLAN
C013251.06-DA45	CONCEPT STORMWATER DRAINAGE DETAILS
C013251.06-DA47	BASIN WORKS PLAN
C013251.06-DA48	BASIN SECTIONS
C013251.06-DA51	FINISHED LEVELS PLAN - SHEET 1
C013251.06-DA52	FINISHED LEVELS PLAN - SHEET 2
C013251.06-DA55	TYPICAL SECTIONS - SHEET 1
C013251.06-DA56	TYPICAL SECTIONS - SHEET 2

SITE PREPARATION NOTES:

1. ALL EARTHWORKS SHALL BE COMPLETED GENERALLY IN ACCORDANCE WITH THE GUIDELINES SPECIFIED BY THE GEOTECHNICAL REPORT.
2. EXISTING LEVELS ARE BASED ON THE SURVEY INFORMATION PROVIDED.
3. STRIP ANY TOP SOIL OR DELETERIOUS MATERIAL AND DISPOSE OF FROM SITE OR STORE AS DIRECTED.
4. COMPLETE CUT TO FILL EARTHWORKS TO ACHIEVE THE REQUIRED LEVELS AS INDICATED ON THE DRAWINGS WITHIN A TOLERANCE OF +0mm/-10mm THROUGH BUILDING PADS/PAVEMENTS AND +0mm/-20mm ELSEWHERE.
5. PREPARE STEEP BATTERS TO RECEIVE FILL BY CONSTRUCTING BENCHING TO FACILITATE FILL PLACEMENT AND COMPACTION.
6. AREAS TO RECEIVE FILL (THAT ARE NOT ON BENCHED BATTERS) AND AREAS IN CUT SHALL BE PROOF ROLLED TO IDENTIFY ANY SOFT HEAVING MATERIAL. SOFT MATERIAL SHALL BE BOXED OUT AND REMOVED PRIOR TO FILL PLACEMENT. PROOF ROLLING TO BE INSPECTED BY A GEOTECHNICAL ENGINEER OR THE EARTHWORKS DESIGNER.
7. SITE WON FILL SHALL BE COMPACTED IN MAXIMUM 300mm LAYERS AND TO DRY OR HILF DENSITY RATIOS (STANDARD COMPACTION) OF BETWEEN 98% AND 103%. THE PLACEMENT MOISTURE VARIATION OR HILF MOISTURE VARIATION SHALL BE CONTROLLED TO BE BETWEEN 2% DRY AND 2% WET.
8. IMPORTED FILL SHALL BE COMPACTED IN MAXIMUM 300mm LAYERS AND TO DRY OR HILF DENSITY RATIOS (STANDARD COMPACTION) OF BETWEEN 98% AND 103%. THE PLACEMENT MOISTURE VARIATION OR HILF MOISTURE VARIATION SHALL BE CONTROLLED TO BE BETWEEN 2% DRY AND 2% WET.
9. ALL ENGINEERED FILL PARTICLES SHALL BE ABLE TO BE INCORPORATED WITHIN A SINGLE LAYER. FURTHER, LESS THAN 30% OF PARTICLES SHALL BE RETAINED ON THE 37.5 mm SIEVE. ENGINEERED FILL SHALL BE ABLE TO BE TESTED IN ACCORDANCE WITH THE STANDARD COMPACTION METHOD (AS1289.5.4.1) OR HILF TEST METHOD (AS1289.5.7.1). THESE METHODS REQUIRE LESS THAN 20% RETAINED ON THE 37.5 mm SIEVE. WHERE BETWEEN 20% AND 30% OF PARTICLES ARE RETAINED ON THE 37.5 mm SIEVE THE ABOVE TEST METHODS SHALL STILL BE ADOPTED AND TEST REPORTS ANNOTATED APPROPRIATELY. THESE REQUIREMENTS SHOULD BE MET BY THE MATERIAL AFTER PLACEMENT AND COMPACTION
10. ALL THE EARTHWORKS UNDERTAKEN AND THE SUBGRADE CONDITION IN THE CUT AREAS [IN THE STATED PERIOD] ARE DOCUMENTED IN THE REPORTS AND HAVE BEEN UNDERTAKEN IN ACCORDANCE WITH THE SPECIFICATION (EG. COSTIN ROE SITE PREPARATION NOTES IN DWG C013003.01-EWC10)
11. PRIOR TO ANY EARTHWORKS, EROSION CONTROL AS OUTLINED IN THE EROSION AND SEDIMENTATION CONTROL PLAN SHALL BE COMPLETED.
12. EXISTING ROCK, IF ANY, SHALL BE REMOVED BY HEAVY ROCK BREAKING OR RIPPING.
13. MATCH EXISTING LEVELS AT BATTER INTERFACE.
14. CONTRACTOR TO MATCH EXISTING LEVELS AT THE INTERFACE OF EARTHWORKS AND EXISTING SURFACE AT BATTER LOCATIONS OR WHERE NO RETAINING WALLS ARE PRESENT. ANY DISCREPANCY BETWEEN DESIGN AND EXISTING LEVELS TO BE REFERRED TO THE ENGINEER FOR DIRECTION OR ADJUSTMENTS TO DESIGN LEVELS.

ELECTRONIC INFORMATION NOTES:

1. THE ISSUED DRAWINGS IN HARD COPY OR PDF FORMAT TAKE PRECEDENCE OVER ANY ELECTRONICALLY ISSUED INFORMATION, LAYOUTS OR DESIGN MODELS.
2. THE CONTRACTOR'S DIRECT AMENDMENT OR MANIPULATION OF THE DATA OR INFORMATION THAT MIGHT BE CONTAINED WITHIN AN ENGINEER-SUPPLIED DIGITAL TERRAIN MODEL AND ITS SUBSEQUENT USE TO UNDERTAKE THE WORKS WILL BE SOLELY AT THE DISCRETION OF AND THE RISK OF THE CONTRACTOR.
3. THE CONTRACTOR IS REQUIRED TO HIGHLIGHT ANY DISCREPANCIES BETWEEN THE DIGITAL TERRAIN MODEL AND INFORMATION PROVIDED IN THE CONTRACT AND/OR DRAWINGS AND IS REQUIRED TO SEEK CLARIFICATION FROM THE SUPERINTENDENT.
4. THE ENGINEER WILL NOT BE LIABLE OR RESPONSIBLE FOR THE POSSIBLE ON-GOING NEED TO UPDATE THE DIGITAL TERRAIN MODEL, SHOULD THERE BE ANY AMENDMENTS OR CHANGES TO THE DRAWINGS OR CONTRACT INITIATED BY THE CONTRACTOR.

GENERAL NOTES:

1. THESE DRAWINGS SHALL BE READ IN CONJUNCTION WITH ALL ARCHITECTURAL AND OTHER CONSULTANT'S DRAWINGS AND SPECIFICATIONS AND WITH SUCH OTHER WRITTEN INSTRUCTIONS AS MAY BE ISSUED DURING THE COURSE OF THE CONTRACT. ANY DISCREPANCY SHALL BE REFERRED TO THE ENGINEER BEFORE PROCEEDING WITH THE WORK.
2. ALL MATERIALS AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE RELEVANT AND CURRENT STANDARDS AUSTRALIA CODES AND WITH THE BY-LAWS AND ORDINANCES OF THE RELEVANT BUILDING AUTHORITIES EXCEPT WHERE VARIED BY THE PROJECT SPECIFICATION.
3. ALL DIMENSIONS SHOWN SHALL BE VERIFIED BY THE BUILDER ON SITE. ENGINEER'S DRAWINGS SHALL NOT BE SCALED FOR DIMENSIONS. ENGINEER'S DRAWINGS ISSUED IN ANY ELECTRONIC FORMAT MUST NOT BE USED FOR DIMENSIONAL SETOUT. REFER TO THE ARCHITECT'S DRAWINGS FOR ALL DIMENSIONAL SETOUT INFORMATION.
4. DURING CONSTRUCTION THE STRUCTURE SHALL BE MAINTAINED IN A STABLE CONDITION AND NO PART SHALL BE OVERSTRESSED. TEMPORARY BRACING SHALL BE PROVIDED BY THE BUILDER TO KEEP THE WORKS AND EXCAVATIONS STABLE AT ALL TIMES.
5. UNLESS NOTED OTHERWISE ALL LEVELS ARE IN METRES AND ALL DIMENSIONS ARE IN MILLIMETRES.
6. ALL WORKS SHALL BE UNDERTAKEN IN ACCORDANCE WITH ACCEPTABLE SAFETY STANDARDS & APPROPRIATE SAFETY SIGNS SHALL BE INSTALLED AT ALL TIMES DURING THE PROGRESS OF THE JOB.

EROSION CONTROL NOTES:

ALL CONTROL WORK INCLUDING DIVERSION BANKS AND CATCH DRAINS, V-DRAINS AND SILT FENCES SHALL BE COMPLETED DIRECTLY FOLLOWING THE COMPLETION OF THE EARTHWORKS.

1. SILT FENCES AND SILT FENCE RETURNS SHALL BE ERECTED CONVEX TO THE CONTOUR TO POND WATER.
2. HAY BALE BARRIERS AND GEOFABRIC FENCES ARE TO BE CONSTRUCTED TO TOE OF BATTER, PRIOR TO COMMENCEMENT OF EARTHWORKS, IMMEDIATELY AFTER CLEARING OF VEGETATION AND BEFORE REMOVAL OF TOP SOIL.
3. ALL TEMPORARY EARTH BERMS, DIVERSION AND SILT DAM EMBANKMENTS ARE TO BE MACHINE COMPACTED, SEEDED AND MULCHED FOR TEMPORARY VEGETATION COVER AS SOON AS THEY HAVE BEEN FORMED.
4. CLEAR WATER IS TO BE DIVERTED AWAY FROM DISTURBED GROUND AND INTO THE DRAINAGE SYSTEM.
5. THE CONTRACTOR IS RESPONSIBLE FOR MAINTAINING AND PROVIDING ON GOING ADJUSTMENT TO EROSION CONTROL MEASURES AS REQUIRED DURING CONSTRUCTION.
6. ALL SEDIMENT TRAPPING STRUCTURES AND DEVICES ARE TO BE INSPECTED AFTER STORMS FOR STRUCTURAL DAMAGE OR CLOGGING, TRAPPED MATERIAL IS TO BE REMOVED TO A SAFE, APPROVED LOCATION.
7. ALL FINAL EROSION PREVENTION MEASURES INCLUDING THE ESTABLISHMENT OF GRASSING ARE TO BE MAINTAINED UNTIL THE END OF THE DEFECTS LIABILITY PERIOD.
8. ALL EARTHWORKS AREAS SHALL BE ROLLED ON A REGULAR BASIS TO SEAL THE EARTHWORKS.
9. ALL FILL AREAS ARE TO BE LEFT WITH A BUND AT THE TOP OF THE SLOPE AT THE END OF EACH DAYS EARTHWORKS. THE HEIGHT OF THE BUND SHALL BE A MINIMUM OF 200mm.
10. ALL CUT AND FILL SLOPES ARE TO BE SEEDED AND HYDROMULCHED WITHIN 10 DAYS OF COMPLETION OF FORMATION.
11. AFTER REVEGETATION OF THE SITE IS COMPLETE AND THE SITE IS STABLE IN THE OPINION OF A SUITABLY QUALIFIED PERSON ALL TEMPORARY WORK SUCH AS SILT FENCE, DIVERSION DRAINS ETC SHALL BE REMOVED.
12. ALL TOPSOIL STOCKPILES ARE TO BE SUITABLY COVERED TO THE SATISFACTION OF THE SITE MANAGER TO PREVENT WIND AND WATER EROSION.
13. ANY AREA THAT IS NOT APPROVED BY THE CONTRACT ADMINISTRATOR FOR CLEARING OR DISTURBANCE BY THE CONTRACTOR'S ACTIVITIES SHALL BE CLEARLY MARKED AND SIGN POSTED, FENCED OFF OR OTHERWISE APPROPRIATELY PROTECTED AGAINST ANY SUCH DISTURBANCE.
14. ALL STOCKPILE SITES SHALL BE SITUATED IN AREAS APPROVED FOR SUCH USE BY THE SITE MANAGER. A 6m BUFFER ZONE SHALL EXIST BETWEEN STOCKPILE SITES AND ANY STREAM OR FLOW PATH. ALL STOCKPILES SHALL BE ADEQUATELY PROTECTED FROM EROSION AND CONTAMINATION OF THE SURROUNDING AREA BY USE OF THE MEASURES APPROVED IN THE EROSION AND SEDIMENTATION CONTROL PLAN.
15. ACCESS AND EXIT AREAS SHALL INCLUDE SHAKE-DOWN OR OTHER METHODS APPROVED BY THE SITE MANAGER FOR THE REMOVAL OF SOIL MATERIALS FORM MOTOR VEHICLES.
16. THE CONTRACTOR IS TO ENSURE RUNOFF FROM ALL AREAS WHERE THE NATURAL SURFACE IS DISTURBED BY CONSTRUCTION, INCLUDING ACCESS ROADS, DEPOT AND STOCKPILE SITES, SHALL BE FREE OF POLLUTANTS BEFORE IT IS EITHER DISPERSED TO STABLE AREAS OR DIRECTED TO NATURAL WATERCOURSES.
17. THE CONTRACTOR SHALL PROVIDE AND MAINTAIN SLOPES, CROWNS AND DRAINS ON ALL EXCAVATIONS AND EMBANKMENTS TO ENSURE SATISFACTORY DRAINAGE AT ALL TIMES WATER SHALL NOT BE ALLOWED TO POND ON THE WORKS UNLESS SUCH PONDING IS PART OF AN APPROVED ESCP / SWMP.

FINISHED LEVELS PLAN NOTES:

1. LEVELS DATUM IS A.H.D.
2. ALL CONTOUR LINES & SPOT LEVELS INDICATE FINISHED PAVEMENT LEVELS U.N.O. ON PLAN.
3. THE MAJOR CONTOUR INTERVAL IS 0.5m
4. THE MINOR CONTOUR INTERVAL IS 0.1m.
5. MINIMUM PAVEMENT GRADE IS TO BE 1:100 (1%).
6. MAXIMUM PAVEMENT GRADE IS TO BE 1:20 (5%) IN CARPARKING AREAS AND 1:25 (4%) ELSEWHERE.
7. MAXIMUM RAMP GRADES ARE TO BE 1:12 (8.3%) U.N.O. ON PLAN
8. PROVIDE MINIMUM 3.0m LONG TRANSITION WHERE CHANGES GRADE EXCEDE 1:20 (5%).
9. PERMANENT BATTER SLOPES ARE TO HAVE A MAXIMUM GRADE OF 1V:3H.
10. ALL BATTER SLOPES WITH GRADES AT OR EXCEDING 1V:6H ARE TO BE TURFED IMMEDIATELY, OR APPROPRIATE EROSION CONTROL IS TO BE PROVIDED TO THE SATISFACTION OF THE ENGINEER.
11. THE ACCESS ROAD TO THE HARDSTAND AREA IS TO HAVE A CROSSFALL OF 2% AS INDICATED ON PLAN.
12. ALL FOOTPATHS ARE TO FALL AWAY FROM THE BUILDING AT 2.5% NOMINAL GRADE.
13. ALL PAVEMENTS ARE TO BE SET AT 50mm BELOW THE FINISHED FLOOR LEVEL OF THE WAREHOUSE AND OFFICE AREAS.

STORMWATER DRAINAGE NOTES:

1. ALL STORMWATER WORKS TO BE COMPLETED IN ACCORDANCE WITH AUSTRALIAN STANDARD AS3500.3:2003 PLUMBING AND DRAINAGE, PART 3: STORMWATER DRAINAGE.
2. THE MINOR (PIPED) SYSTEM HAS BEEN DESIGNED FOR THE 1 IN 20 YEAR ARI STORM EVENT AND THE MAJOR (OVERLAND) SYSTEM HAS BEEN DESIGNED FOR THE 1 IN 100 YEAR ARI STORM EVENT.
3. ALL FINISHED PAVEMENT LEVELS SHALL BE AS INDICATED ON FINISHED LEVELS PLANS DA51 & DA52.
4. PIT SIZES SHALL BE AS INDICATED IN THE SCHEDULE WHILE PIPE SIZES AND DETAILS ARE PROVIDED ON PLAN.
5. EXISTING STORMWATER PIT LOCATIONS AND INVERT LEVELS TO BE CONFIRMED BY SURVEY PRIOR TO COMMENCING WORKS ON SITE.
6. ALL STORMWATER PIPES Ø375 OR GREATER SHALL BE CLASS 2 (WITH HS2 SUPPORT) REINFORCED CONCRETE WITH RUBBER RING JOINTS UNLESS NOTED OTHERWISE.
7. ALL PIPES UP TO AND INCLUDING Ø300 TO BE uPVC GRADE SN8 UNO.
8. PIPE CLASS NOMINATED ARE FOR IN-SERVICE LOADING CONDITIONS ONLY. CONTRACTOR IS TO MAKE ANY NECESSARY ADJUSTMENTS REQUIRED FOR CONSTRUCTION CONDITIONS.
9. ALL CONCRETE PITS GREATER THAN 1000mm DEEP SHALL BE REINFORCED USING N12-200 EACH WAY CENTERED IN WALL AND BASE. LAP MINIMUM 300mm WHERE REQUIRED. ALL CONCRETE FOR PITS SHALL BE F'c=25 MPa. PRECAST PITS MAY BE USED WITH THE APPROVAL OF THE ENGINEER.
10. IN ADDITION TO ITEM 6 ABOVE, ALL CONCRETE PITS GREATER THAN 3000mm DEEP SHALL HAVE WALLS AND BASE THICKNESS INCREASED TO 200mm.
11. PIPES SHALL BE LAID AS PER PIPE LAYING DETAILS. PARTICULAR CARE SHALL BE TAKEN TO ENSURE THAT THE PIPE IS FULLY AND EVENLY SUPPORTED. RAM AND PACK FILLING AROUND AND UNDER BACK OF PIPES AND PIPE FAUCETS, WITH NARROW EDGED RAMMERS OR OTHER SUITABLE TAMPING DETAILS.
12. CONCRETE PIPES UNDER, OR WITHIN THE ZONE OF INFLUENCE OF PAVED AREAS SHALL BE LAID USING HS2 TYPE SUPPORT, AS A MINIMUM, IN ACCORDANCE WITH AS 3725. AGGREGATE BACKFILL SHALL NOT BE USED FOR PIPE BEDDING AND OR HAUNCH/SIDE SUPPORT.
13. WHERE PIPE LINES ENTER PITS, PROVIDE 2m LENGTH OF STOCKING WRAPPED SLOTTED Ø100 uPVC TO EACH SIDE OF PIPE.
14. ALL SUBSOIL DRAINAGE LINES SHALL BE Ø100 SLOTTED uPVC WITH APPROVED FILTER WRAP LAID IN 300mm WIDE GRANULAR FILTER UNLESS NOTED OTHERWISE. LAY SUBSOIL LINES TO MATCH FALLS OF LAND AND/OR 1 IN 200 MINIMUM. PROVIDE CAPPED CLEANING EYE (RODDING POINT) AT UPSTREAM END OF LINE AND AT 30m MAX. CTS. PROVIDE SUBSOIL LINES TO ALL PAVEMENT/ LANDSCAPED INTERFACES, TO REAR OF RETAINING WALLS (AS NOMINATED BY STRUCTURAL ENGINEER) AND AS SHOWN ON PLAN.
15. ALL PIPE GRADES 1 IN 200 MINIMUM UNO.
16. PROVIDE STEP IRONS IN PITS DEEPER THAN 1000mm.
17. MIN. 600 COVER TO PIPE OBVERT BENEATH ROADS & MIN. 400 COVER BENEATH LANDSCAPED AND PEDESTRIAN AREAS.
18. PIT COVERS IN TRAFFICABLE PAVEMENT SHALL BE CLASS D 'HEAVY DUTY', THOSE LOCATED IN NON-TRAFFICABLE AREAS SHALL BE CLASS B 'MEDIUM DUTY' U.N.O.
19. PROVIDE CLEANING EYES (RODDING POINTS) TO PIPES AT ALL CORNERS AND T-JUNCTIONS WHERE NO PITS ARE PRESENT.
20. DOWN PIPES (DP) TO BE AS PER HYDRAULIC ENGINEERS DETAILS WITH CONNECTOR TO MATCH DP SIZE U.N.O. ON PLAN. PROVIDE CLEANING EYE AT GROUND LEVEL.
21. PIPE LENGTHS NOMINATED ON PLAN OR LONGSECTIONS ARE MEASURED FROM CENTER OF PITS TO THE NEAREST 0.5m AND DO NOT REPRESENT ACTUAL LENGTH. THE CONTRACTOR IS TO ALLOW FOR THIS.

LOCALITY PLAN
NTS

FOR DEVELOPMENT APPLICATION

AMENDMENTS	DATE	ISSUE
ISSUED FOR DEVELOPMENT APPLICATION	09.12.20	E
ISSUED FOR DEVELOPMENT APPLICATION	03.06.20	D
ISSUED FOR INFORMATION	22.04.20	C
ISSUED FOR INFORMATION	19.03.20	B
ISSUED FOR INFORMATION	12.03.20	A

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CLIENT: Aliro

PROJECT: STATE SIGNIFICANT DEVELOPMENT APPLICATION
44 CLUNIES ROSS STREET, GREYSTANES

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
IO	IO	MAR '20	M.W.	A0	AS SHOWN	C013251.06-DA10

Costin Roe Consulting Pty Ltd.
Consulting Engineers ACN 003 696 446
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Costin Roe Consulting
PRECISION | COMMUNICATION | ACCOUNTABILITY

DRAWING TITLE: DRAWING LIST & GENERAL NOTES
DRAWING No: C013251.06-DA10
ISSUE: E

LEGEND:

LEVELS DATUM IS AHD.

EXISTING SITE LEVELS AND DETAILS BASED ON SURVEY INFORMATION PROVIDED.

- SILT FENCE
- SILT FENCE WITH CATCH DRAIN
- DIVERSION DRAIN
- EXISTING SYDNEY WATER MAIN
- EXISTING SEWER MAIN
- DIRECTION OF OVERLAND FLOW
- DENOTES CATCHMENT 1
- DENOTES CATCHMENT 2
- DENOTES CATCHMENT 3

SEDIMENTATION BASIN NOTE:

FOR SEDIMENT & EROSION CONTROL DETAILS REFER TO DRAWING C013251.06-DA25.
SEDIMENTATION BASIN SIZING BASED ON RECOMMENDATIONS OF 'SOILS AND CONSTRUCTION, MANAGING URBAN STORMWATER-THE BLUE BOOK'.
CAPACITY BASED UPON 5 DAY RAINFALL DEPTH AT 85th PERCENTILE INTENSITY (32.2mm).

APPROXIMATE AREA OF DISTURBED SITE = 17.8 ha

SEDIMENT BASIN 1:
CATCHMENT AREA = 6.44 ha
REQUIRED BASIN VOLUME = 1,555m³
BASE DIMENSIONS (L X W) = 20m x 38m
TOP DIMENSIONS (L X W) = 29m x 47m
MAX SIDE SLOPE = 1V:3H
DEPTH = 1.5m
PROVIDED BASIN VOLUME = 1,570m³

SEDIMENT BASIN 2:
CATCHMENT AREA = 6.18 ha
REQUIRED BASIN VOLUME = 1,492m³
BASE DIMENSIONS (L X W) = 19m x 38m
TOP DIMENSIONS (L X W) = 28m x 47m
MAX SIDE SLOPE = 1V:3H
DEPTH = 1.5m
PROVIDED BASIN VOLUME = 1,506m³

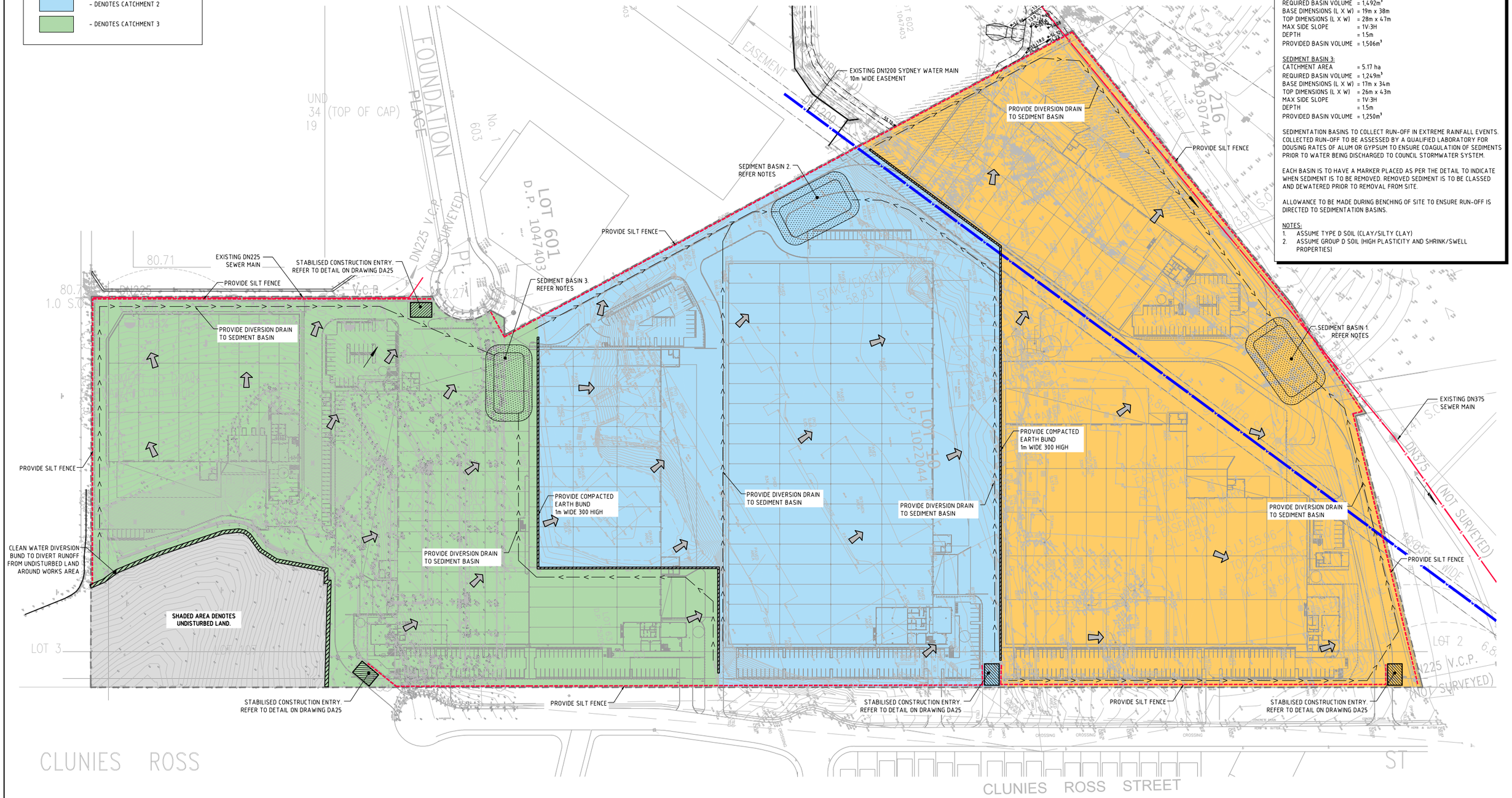
SEDIMENT BASIN 3:
CATCHMENT AREA = 5.17 ha
REQUIRED BASIN VOLUME = 1,249m³
BASE DIMENSIONS (L X W) = 17m x 34m
TOP DIMENSIONS (L X W) = 26m x 43m
MAX SIDE SLOPE = 1V:3H
DEPTH = 1.5m
PROVIDED BASIN VOLUME = 1,250m³

SEDIMENTATION BASINS TO COLLECT RUN-OFF IN EXTREME RAINFALL EVENTS. COLLECTED RUN-OFF TO BE ASSESSED BY A QUALIFIED LABORATORY FOR DOUSING RATES OF ALUM OR GYPSUM TO ENSURE COAGULATION OF SEDIMENTS PRIOR TO WATER BEING DISCHARGED TO COUNCIL STORMWATER SYSTEM.

EACH BASIN IS TO HAVE A MARKER PLACED AS PER THE DETAIL TO INDICATE WHEN SEDIMENT IS TO BE REMOVED. REMOVED SEDIMENT IS TO BE CLASSED AND DEWATERED PRIOR TO REMOVAL FROM SITE.

ALLOWANCE TO BE MADE DURING BENCHING OF SITE TO ENSURE RUN-OFF IS DIRECTED TO SEDIMENTATION BASINS.

NOTES:
1. ASSUME TYPE D SOIL (CLAY/SILTY CLAY)
2. ASSUME GROUP D SOIL (HIGH PLASTICITY AND SHRINK/SWELL PROPERTIES)



EROSION SEDIMENT CONTROL PLAN
SCALE 1:750

6m 0 15 30 45 60 75m
SCALE 1:750 AT A0 SIZE SHEET

FOR DEVELOPMENT APPLICATION

AMENDMENTS	DATE	ISSUE
ISSUED FOR DEVELOPMENT APPLICATION	03.06.20	B
ISSUED FOR INFORMATION	19.03.20	A

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CLIENT: Aliro

PROJECT: STATE SIGNIFICANT DEVELOPMENT APPLICATION
44 CLUNIES ROSS STREET, GREYSTANES

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
IO	IO	MAR '20	M.W.	A0	AS SHOWN	C013251.06-DA20

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Costin Roe Consulting
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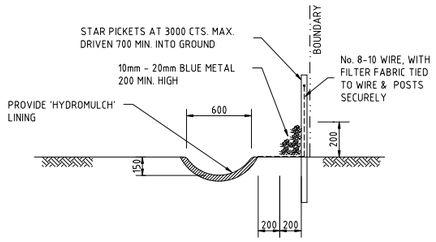
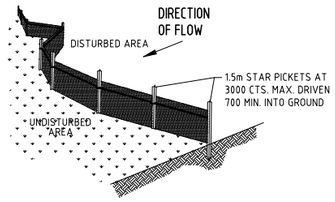
DRAWING TITLE: EROSION SEDIMENT CONTROL PLAN
DRAWING No: C013251.06-DA20
ISSUE: B



TYPICAL OPEN DRAIN & SILT FENCE

SCALE 1 : 20

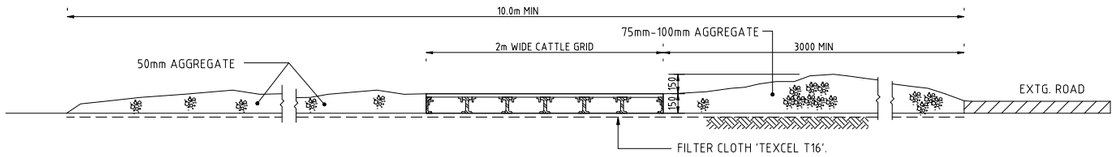


TYPICAL SILT FENCE DETAIL

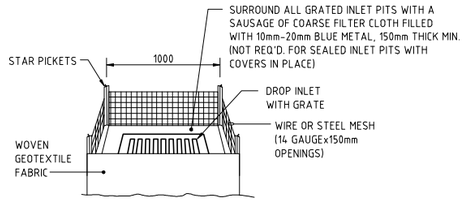
N.T.S.

PROVIDE 1m RETURNS AT 30m INTERVALS.

TYPICAL



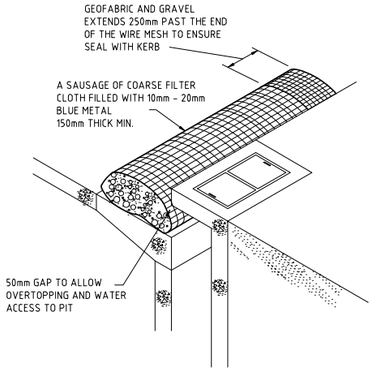
SECTION 1:20 1 C20 : STABILISED CONSTRUCTION ENTRANCE 'TRUCK SHAKER'



GRATED INLET PIT FILTER DETAIL

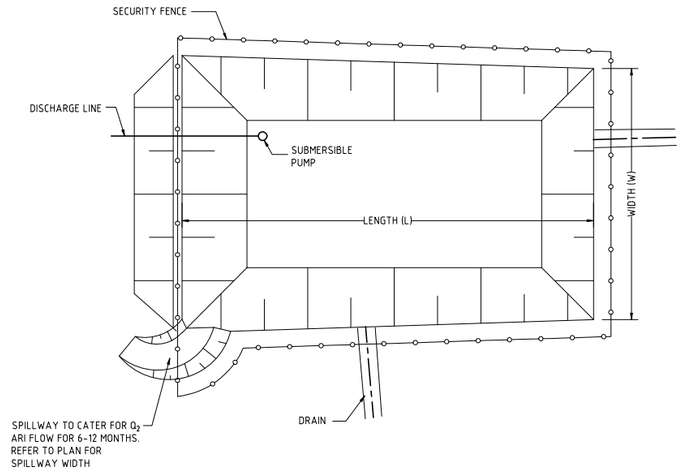
OPTION 1

N.T.S



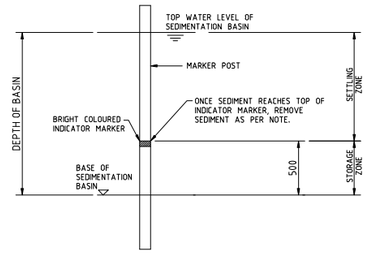
KERB INLET CONTROL

NTS



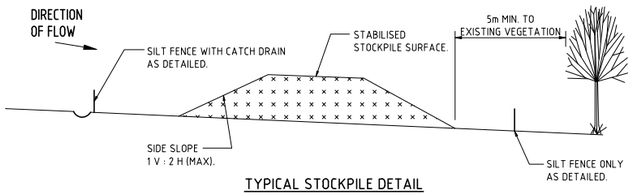
TYPICAL SEDIMENT CONTROL POND PLAN

SCALE 1:250



SEDIMENT STORAGE MARKER

SCALE 1:20

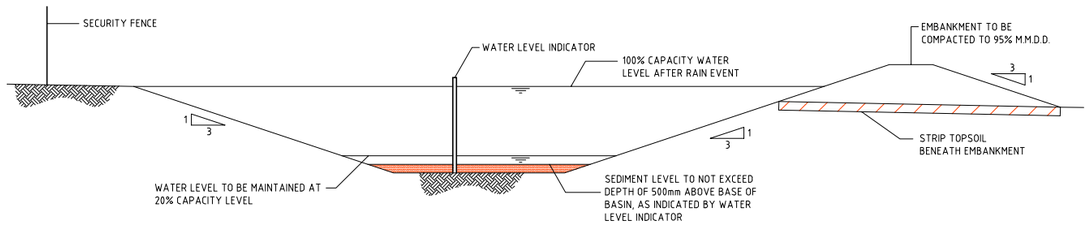


TYPICAL STOCKPILE DETAIL

N.T.S.

STOCKPILE NOTES

1. PLACE ALL STOCKPILES IN LOCATIONS MORE THAN 5m FROM EXISTING VEGETATION, ROADS & HAZARD AREAS.
2. CONSTRUCT ON THE CONTOUR AS LOW, FLAT ELONGATED MOUNDS. SIDE SLOPE TO BE 1 V: 2 H MAX.
3. WHERE THERE IS SUFFICIENT AREA, TOPSOIL STOCKPILES SHALL BE LESS THAN 2m IN HEIGHT.
4. WHERE STOCKPILES ARE TO BE IN PLACE FOR MORE THAN 10 DAYS, STABILISE USING WOOD CHIP MULCH - 16 TONNE/Ha.
5. CONSTRUCT SILT FENCE WITH CATCH DRAIN ON UPSLOPE SIDE TO DIVERT WATER AROUND STOCKPILES & SILT FENCE ONLY 1 TO 2m DOWNSLOPE AS SHOWN.



TYPICAL SEDIMENT CONTROL BASIN SECTION

SCALE 1:50

NOTES:

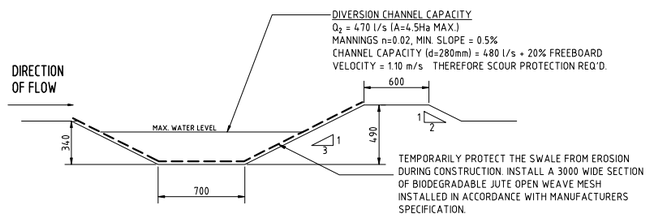
ALL EROSION & SEDIMENT CONTROL MEASURES TO BE INSPECTED & MAINTAINED DAILY BY SITE MANAGER.

MINIMISE DISTURBED AREAS.

ROADS & FOOTPATHS TO BE SWEPT DAILY.

1.2m TURF TO BE PLACED BEHIND KERBS.

DUST MINIMISATION CONTROL BY WATERING TO BE IMPLEMENTED BY SITE MANAGER AS REQUIRED OR AS DIRECTED BY THE EPA.



DIVERSION DRAIN SECTION

SCALE 1:20

200mm 0 500 1000 1500 2000mm

SCALE 1:20 AT A0 SIZE SHEET

FOR DEVELOPMENT APPLICATION

AMENDMENTS	DATE	ISSUE	AMENDMENTS	DATE	ISSUE	AMENDMENTS	DATE	ISSUE
ISSUED FOR DEVELOPMENT APPLICATION	03.06.20	B						
ISSUED FOR INFORMATION	19.03.20	A						

ARCHITECT: SBA ARCHITECTS

CLIENT: Aliro

PROJECT: STATE SIGNIFICANT DEVELOPMENT APPLICATION
44 CLUNIES ROSS STREET, GREYSTANES

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF.
ID	ID	MAR '20	M.W.	A0	AS SHOWN	C013251.06-DA25

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PRECISION | COMMUNICATION | ACCOUNTABILITY

DRAWING TITLE: EROSION & SEDIMENT CONTROL DETAILS

DRAWING No: C013251.06-DA25

ISSUE: B

EARTHWORKS VOLUMES

VOLUMES (APPROXIMATE ONLY):

STAGE 1

CUT	= - 100 900 m³
FILL	= + 57 400 m³
DETAILED EXCAVATION (1,500m³/Ha over 4.97Ha)	= - 7 500 m³
REINFORCED EARTH WALL BACKFILL	= - 37 600 m³
BALANCE	= - 88 600 m³ (EXPORT)

STAGE 2

CUT	= - 45 900 m³
FILL	= + 210 900 m³
WETLAND REGRADING	= ± 0 m³ (CUT/FILL BALANCE)
DETENTION BASIN REGRADING	= - 13 900 m³
DETAILED EXCAVATION (1,500m³/Ha over 12.62Ha)	= - 18 900 m³
REINFORCED EARTH WALL BACKFILL	= - 38 200 m³
BALANCE	= + 94 000 m³ (IMPORT)

OVERALL

STAGE 1 BULK EARTHWORKS	= - 88 600m³
STAGE 2 BULK EARTHWORKS	= + 94 000 m³
BALANCE	= + 5 400 m³ (IMPORT)

EARTHWORK VOLUMES ARE PRELIMINARY ONLY AND HAVE BEEN BASED ON A TOPSOIL STRIP/SLAB TRIM OF 200mm OVER THE ENTIRE SITE. THE VOLUMES HAVE ALSO BEEN BASED ON AN OVERALL PAVEMENT STRUCTURAL THICKNESS OF 300mm ACROSS THE SITE. NO ALLOWANCE HAS BEEN MADE IN THE ABOVE VOLUMES FOR EROSION & SEDIMENT CONTROL BACKFILLING, BULKING OR COMPACTION OF FILLED SOILS, THE REMOVAL OF UNCONTROLLED FILL OR CONTAMINATED MATERIAL, TEMPORARY DRAINAGE SWALES WITHIN BUILDING PADS, OR ANY OTHER UNSPECIFIED EXCAVATION RELATED TO FUTURE WAREHOUSE CONSTRUCTION.

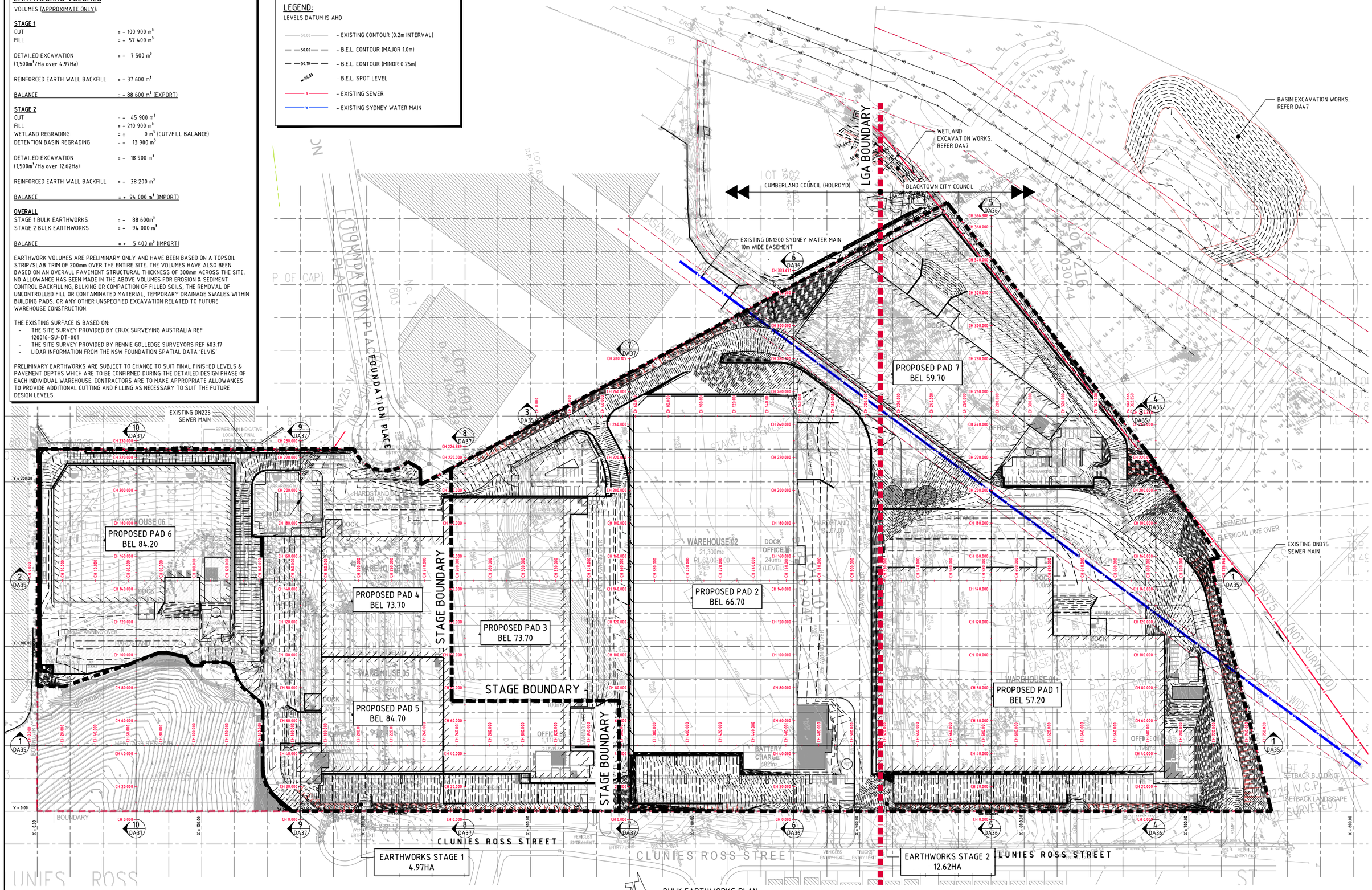
THE EXISTING SURFACE IS BASED ON:
- THE SITE SURVEY PROVIDED BY CRUX SURVEYING AUSTRALIA REF 120016-SU-DT-001
- THE SITE SURVEY PROVIDED BY RENNIE GOLLEDGE SURVEYORS REF 603.17
- LIDAR INFORMATION FROM THE NSW FOUNDATION SPATIAL DATA 'ELVIS'

PRELIMINARY EARTHWORKS ARE SUBJECT TO CHANGE TO SUIT FINAL FINISHED LEVELS & PAVEMENT DEPTHS WHICH ARE TO BE CONFIRMED DURING THE DETAILED DESIGN PHASE OF EACH INDIVIDUAL WAREHOUSE. CONTRACTORS ARE TO MAKE APPROPRIATE ALLOWANCES TO PROVIDE ADDITIONAL CUTTING AND FILLING AS NECESSARY TO SUIT THE FUTURE DESIGN LEVELS.

LEGEND:

LEVELS DATUM IS AHD

- 50.00 – EXISTING CONTOUR (0.2m INTERVAL)
- 50.00 – B.E.L. CONTOUR (MAJOR 1.0m)
- 50.10 – B.E.L. CONTOUR (MINOR 0.25m)
- 58.06 – B.E.L. SPOT LEVEL
- S – EXISTING SEWER
- W – EXISTING SYDNEY WATER MAIN



BULK EARTHWORKS PLAN
SCALE 1:750

6m 0 15 30 45 60 75m
SCALE 1:750 AT A0 SIZE SHEET

FOR DEVELOPMENT APPLICATION

AMENDMENTS	DATE	ISSUE
ISSUED FOR DEVELOPMENT APPLICATION	28.01.21	E
ISSUED FOR DEVELOPMENT APPLICATION	27.01.21	D
ISSUED FOR DEVELOPMENT APPLICATION	03.06.20	C
ISSUED FOR INFORMATION	22.04.20	B
ISSUED FOR INFORMATION	19.03.20	A

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CLIENT: Aliro

PROJECT: STATE SIGNIFICANT DEVELOPMENT APPLICATION
44 CLUNIES ROSS STREET, GREYSTANES

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
IO	IO	MAR '20	M.W.	A0	AS SHOWN	C013251.06-DA30

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DRAWING TITLE: BULK EARTHWORKS PLAN LEVELS PLAN

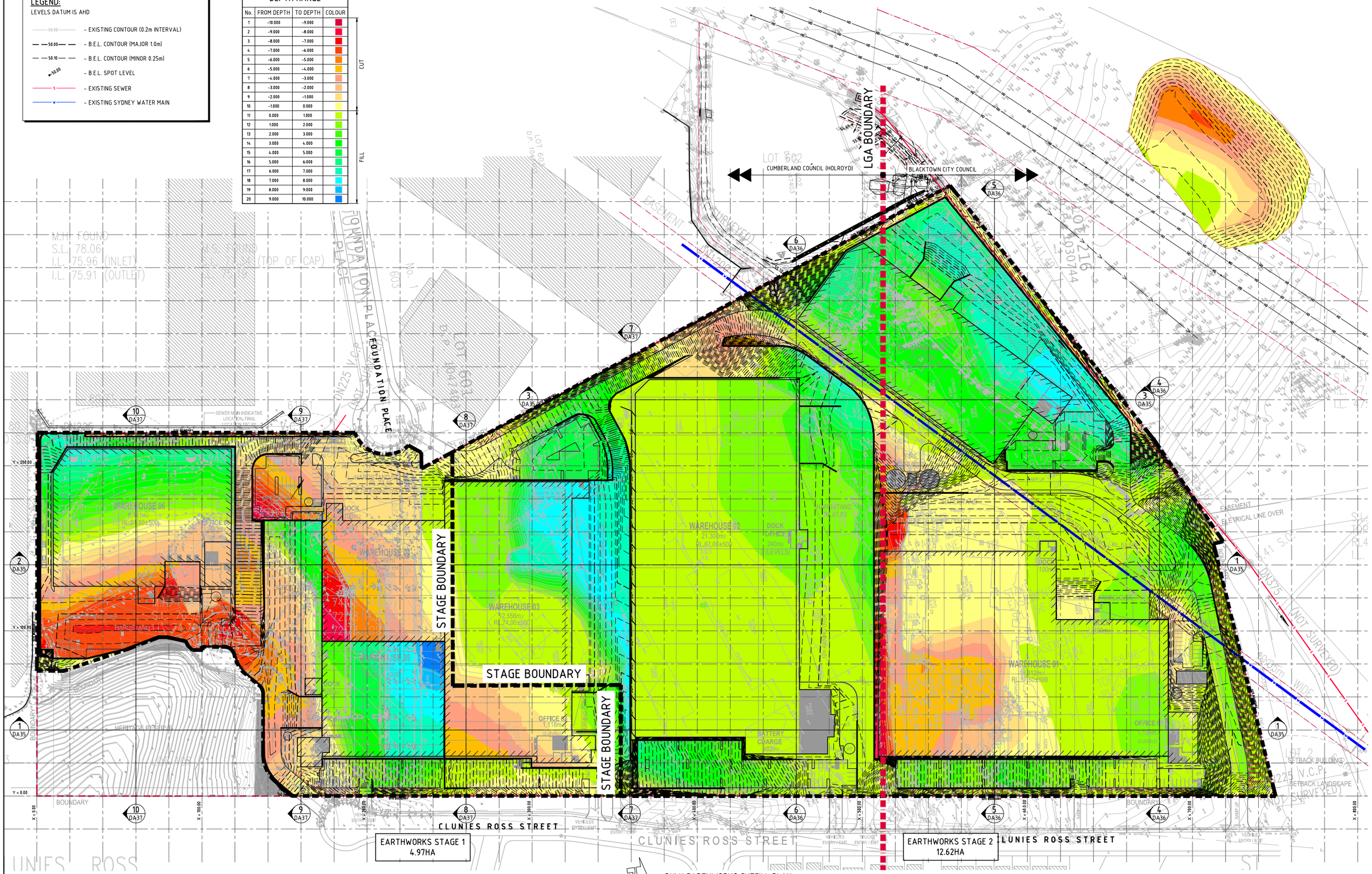
DRAWING No: C013251.06-DA30 ISSUE: E

LEGEND:

LEVELS DATUM IS AHD

- 50.00 - EXISTING CONTOUR (0.2m INTERVAL)
- 50.00 - B.E.L. CONTOUR (MAJOR 1.0m)
- 50.10 - B.E.L. CONTOUR (MINOR 0.25m)
- 50.00 - B.E.L. SPOT LEVEL
- S - EXISTING SEWER
- W - EXISTING SYDNEY WATER MAIN

DEPTH RANGE				
No.	FROM DEPTH	TO DEPTH	COLOUR	
1	-10.000	-9.000		CUT
2	-9.000	-8.000		
3	-8.000	-7.000		
4	-7.000	-6.000		
5	-6.000	-5.000		
6	-5.000	-4.000		
7	-4.000	-3.000		
8	-3.000	-2.000		
9	-2.000	-1.000		
10	-1.000	0.000		
11	0.000	1.000		FILL
12	1.000	2.000		
13	2.000	3.000		
14	3.000	4.000		
15	4.000	5.000		
16	5.000	6.000		
17	6.000	7.000		
18	7.000	8.000		
19	8.000	9.000		
20	9.000	10.000		



BULK EARTHWORKS CUTFILL PLAN

SCALE 1:750

6m 0 15 30 45 60 75m

SCALE 1:750 AT A0 SIZE SHEET

FOR DEVELOPMENT APPLICATION

AMENDMENTS	DATE	ISSUE
ISSUED FOR DEVELOPMENT APPLICATION	28.01.21	E
ISSUED FOR DEVELOPMENT APPLICATION	27.01.21	D
ISSUED FOR DEVELOPMENT APPLICATION	03.06.20	C
ISSUED FOR INFORMATION	22.04.20	B
ISSUED FOR INFORMATION	19.03.20	A

AMENDMENTS DATE ISSUE | AMENDMENTS DATE ISSUE | AMENDMENTS DATE ISSUE

ARCHITECT: SBA ARCHITECTS

CLIENT: Aliro

PROJECT: STATE SIGNIFICANT DEVELOPMENT APPLICATION
44 CLUNIES ROSS STREET, GREYSTANES

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
IO	IO	MAR '20	M.W.	A0	AS SHOWN	C013251.06-DA31

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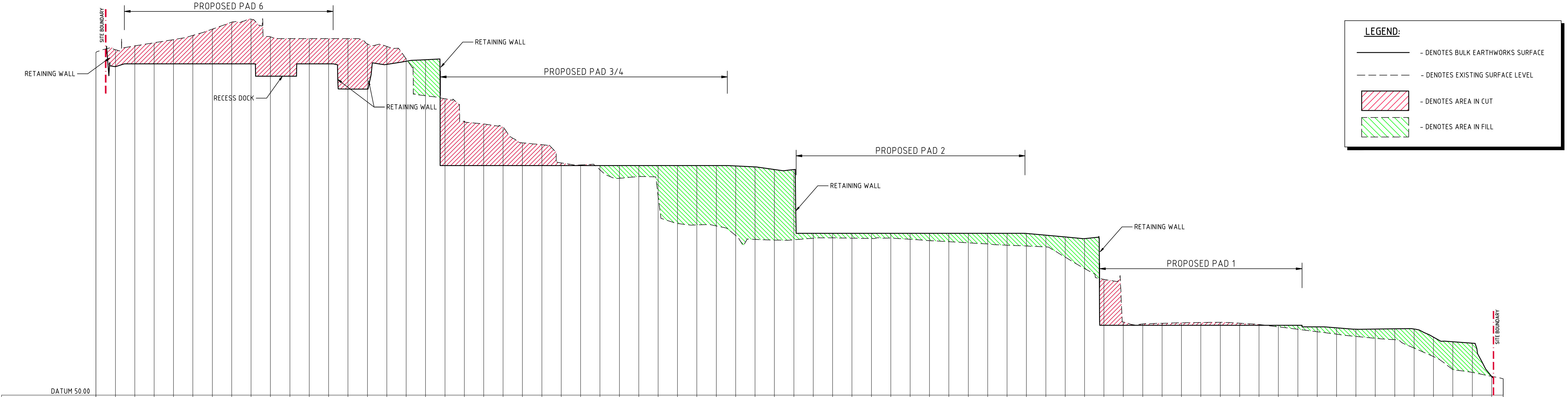
Costin Roe Consulting

PRECISION | COMMUNICATION | ACCOUNTABILITY

DRAWING TITLE: BULK EARTHWORKS CUT/FILL PLAN

DRAWING No: C013251.06-DA31

ISSUE: E

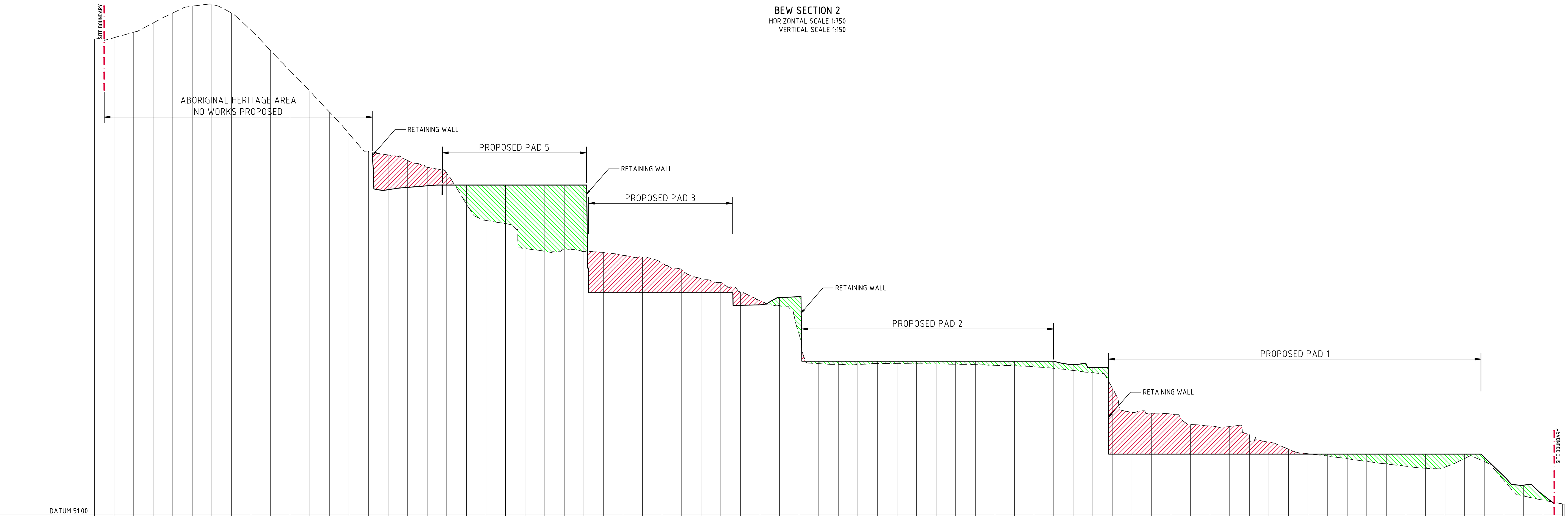


DATUM 50.00

CHAINAGE	EXISTING SURFACE LEVEL	BULK EARTHWORKS LEVEL	CUT/FILL DEPTH
0.000	85.37		
10.000	85.649	83.905	-1.744
20.000	86.048	84.200	-1.848
30.000	86.375	84.200	-2.175
40.000	86.702	84.200	-2.502
50.000	87.136	84.200	-2.936
60.000	87.782	84.200	-3.582
70.000	88.501	84.200	-4.301
80.000	88.811	84.200	-4.611
90.000	86.983	82.913	-4.070
100.000	86.800	82.912	-3.888
110.000	86.800	84.200	-2.600
120.000	86.800	84.200	-2.600
130.000	86.800	81.600	-5.200
140.000	86.264	81.592	-4.671
150.000	85.991	84.137	-1.854
160.000	84.714	84.463	-0.251
170.000	80.900	84.625	3.724
180.000	80.595	73.700	-6.895
190.000	78.277	73.700	-4.577
200.000	77.996	73.700	-4.296
210.000	77.650	73.700	-3.950
220.000	76.042	73.700	-2.342
230.000	75.848	73.700	-2.148
240.000	73.967	73.700	-0.267
250.000	73.766	73.700	-0.066
260.000	73.241	73.700	0.459
270.000	72.380	73.700	1.320
280.000	72.559	73.700	1.141
290.000	70.522	73.700	3.178
300.000	67.713	73.700	5.987
310.000	67.569	73.700	6.131
320.000	67.458	73.700	6.242
330.000	66.476	73.659	7.183
340.000	66.076	73.555	7.479
350.000	66.010	73.282	7.272
360.000	66.033	73.282	7.250
370.000	66.198	66.700	0.502
380.000	66.231	66.700	0.469
390.000	66.202	66.700	0.498
400.000	66.171	66.700	0.529
410.000	66.215	66.700	0.485
420.000	66.085	66.700	0.615
430.000	65.948	66.700	0.752
440.000	65.841	66.700	0.859
450.000	65.721	66.700	0.979
460.000	65.601	66.700	1.099
470.000	65.475	66.700	1.225
480.000	65.394	66.687	1.294
490.000	65.290	66.505	1.216
500.000	64.239	66.323	2.084
510.000	63.061	66.159	3.098
520.000	61.942	57.200	-4.742
530.000	57.544	57.200	-0.344
540.000	57.349	57.200	-0.149
550.000	57.414	57.200	-0.214
560.000	57.467	57.200	-0.267
570.000	57.496	57.200	-0.296
580.000	57.507	57.200	-0.307
590.000	57.416	57.200	-0.216
600.000	57.288	57.200	-0.088
610.000	57.046	57.200	0.154
620.000	56.798	57.200	0.402
630.000	56.544	57.047	0.504
640.000	56.286	56.945	0.659
650.000	56.056	56.803	0.746
660.000	55.864	56.825	0.961
670.000	55.718	56.845	1.127
680.000	54.849	56.820	1.971
690.000	53.972	55.989	2.016
700.000	52.640	55.506	2.866
710.000	52.344	55.354	3.010
720.000	51.937	51.916	-0.021
725.966	51.69		

BEW SECTION 2

HORIZONTAL SCALE 1:750
VERTICAL SCALE 1:150



DATUM 51.00

CHAINAGE	EXISTING SURFACE LEVEL	BULK EARTHWORKS LEVEL	CUT/FILL DEPTH
0.000	99.60		
10.000	99.756		
20.000	100.317		
30.000	101.263		
40.000	102.282		
50.000	102.973		
60.000	103.150		
70.000	102.284		
80.000	100.500		
90.000	98.412		
100.000	96.363		
110.000	94.301		
120.000	92.173		
130.000	89.949		
140.000	88.118		
150.000	87.781	84.222	-3.558
160.000	87.214	84.464	-2.750
170.000	86.482	84.625	-1.857
180.000	85.912	84.700	-1.212
190.000	82.759	84.700	1.941
200.000	81.086	84.700	3.614
210.000	80.748	84.700	3.952
220.000	78.205	84.700	6.495
230.000	77.926	84.700	6.774
240.000	78.080	84.700	6.620
250.000	77.922	84.700	6.778
260.000	77.812	73.700	-4.112
270.000	77.514	73.700	-3.814
280.000	77.336	73.700	-3.636
290.000	76.730	73.700	-3.030
300.000	76.076	73.700	-2.376
310.000	75.127	73.700	-1.427
320.000	74.730	73.700	-1.030
330.000	73.777	72.414	-1.363
340.000	72.896	72.452	-0.444
350.000	72.359	73.201	0.842
360.000	69.479	73.283	3.804
370.000	66.452	66.700	0.248
380.000	66.374	66.700	0.326
390.000	66.355	66.700	0.345
400.000	66.465	66.700	0.235
410.000	66.451	66.700	0.249
420.000	66.437	66.700	0.263
430.000	66.415	66.700	0.285
440.000	66.390	66.700	0.310
450.000	66.348	66.700	0.352
460.000	66.278	66.700	0.422
470.000	66.227	66.700	0.473
480.000	66.136	66.700	0.564
490.000	65.979	66.697	0.718
500.000	65.761	66.363	0.602
510.000	65.518	66.028	0.510
520.000	63.967	57.200	-6.767
530.000	61.472	57.200	-4.272
540.000	61.381	57.200	-4.181
550.000	61.289	57.200	-4.089
560.000	60.233	57.200	-3.033
570.000	60.078	57.200	-2.878
580.000	60.027	57.200	-2.827
590.000	59.206	57.200	-2.006
600.000	58.424	57.200	-1.224
610.000	57.708	57.200	-0.508
620.000	57.249	57.200	-0.049
630.000	57.014	57.200	0.186
640.000	56.730	57.200	0.470
650.000	56.457	57.200	0.743
660.000	56.199	57.200	1.001
670.000	55.962	57.200	1.238
680.000	55.760	57.200	1.440
690.000	55.884	57.200	1.316
700.000	56.759	57.200	0.441
710.000	56.442	56.876	0.433
720.000	54.529	54.946	0.417
730.000	52.939	54.026	1.087
740.000	52.508	53.040	0.532
[illegible]	[illegible]		

BEW SECTION 1

HORIZONTAL SCALE 1:750
VERTICAL SCALE 1:150

6m 0 15 30 45 60 75m
SCALE 1:750 AT A0 SIZE SHEET

2.0m 0 5 10 15m
SCALE 1:150 AT A0 SIZE SHEET

FOR DEVELOPMENT APPLICATION

AMENDMENTS	DATE	ISSUE
ISSUED FOR DEVELOPMENT APPLICATION	03.06.20	B
ISSUED FOR INFORMATION	19.03.20	A

ARCHITECT: SBA ARCHITECTS — Suite 702, 83 Mount Street, North Sydney NSW 2060, T 02 9929 9988, F 02 9929 8899, E info@sbaarch.com.au, W www.sbaarch.com.au

CLIENT: Aliro

PROJECT: STATE SIGNIFICANT DEVELOPMENT APPLICATION
44 CLUNIES ROSS STREET, GREYSTANES

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
IO	IO	MAR '20	M.W.	A0	AS SHOWN	C013251.06-DA35

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Consulting Engineers ACN 003 696 446
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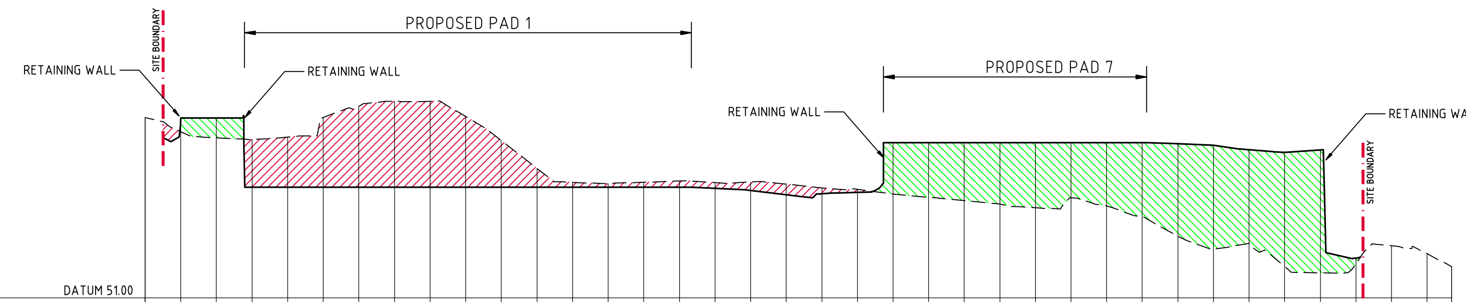
Costin Roe Consulting
PRECISION | COMMUNICATION | ACCOUNTABILITY

DRAWING TITLE: BULK EARTHWORKS SECTIONS SHEET 1
DRAWING No: C013251.06-DA35
ISSUE: B

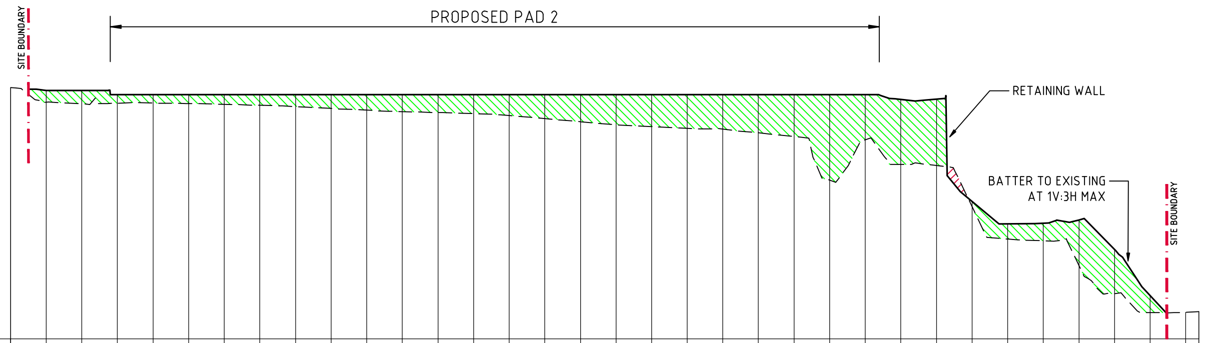
LEGEND:

- DENOTES BULK EARTHWORKS SURFACE (solid line)
- DENOTES EXISTING SURFACE LEVEL (dashed line)
- DENOTES AREA IN CUT
- DENOTES AREA IN FILL



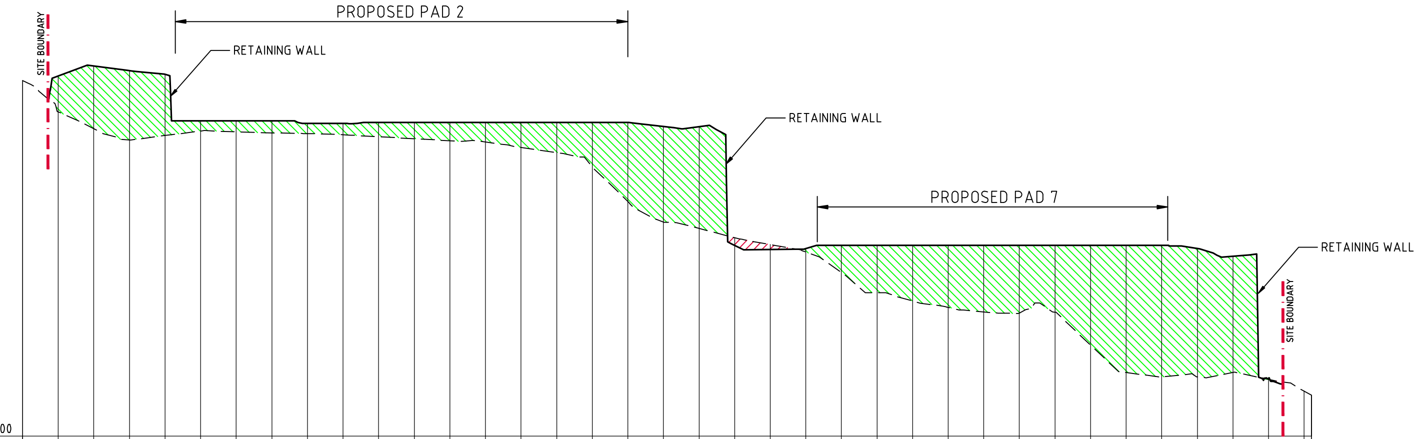
CHAINAGE	CUT/FILL DEPTH	BULK EARTHWORKS LEVEL	EXISTING SURFACE LEVEL
0.000			61.09
10.000	0.762	61.067	60.305
20.000	1.105	61.068	59.963
30.000	-2.671	57.200	59.871
40.000	-2.812	57.200	60.012
50.000	-3.900	57.200	61.100
60.000	-4.547	57.200	61.747
70.000	-4.812	57.200	62.012
80.000	-4.816	57.200	62.016
90.000	-3.959	57.200	61.159
100.000	-2.607	57.200	59.807
110.000	-1.050	57.200	58.250
120.000	-0.267	57.200	57.467
130.000	-0.190	57.200	57.390
140.000	-0.273	57.200	57.473
150.000	-0.339	57.200	57.539
160.000	-0.316	57.134	57.450
170.000	-0.477	57.011	57.489
180.000	-0.596	56.776	57.372
190.000	-0.334	56.825	57.159
200.000	-0.174	56.900	57.074
210.000	2.881	59.700	56.819
220.000	3.071	59.700	56.629
230.000	3.261	59.700	56.439
240.000	3.451	59.700	56.249
250.000	3.656	59.700	56.044
260.000	3.110	59.700	56.590
270.000	3.554	59.700	56.146
280.000	4.165	59.700	55.535
290.000	5.187	59.629	54.442
300.000	5.820	59.546	53.726
310.000	5.257	59.294	54.037
320.000	6.407	59.157	52.750
330.000	6.896	59.289	52.393
340.000	0.319	53.215	52.895
350.000			53.906
360.000			53.456
366.886			52.73

BEW SECTION 5
HORIZONTAL SCALE 1:750
VERTICAL SCALE 1:150



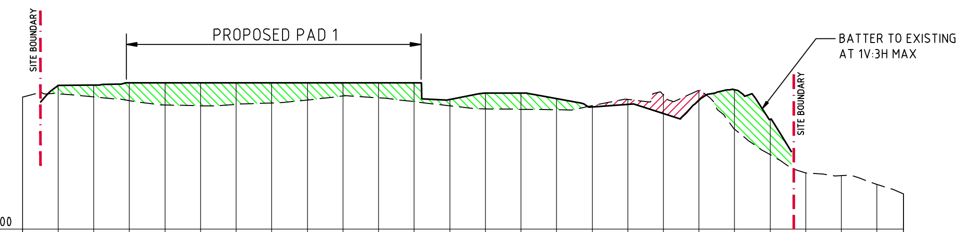
CHAINAGE	CUT/FILL DEPTH	BULK EARTHWORKS LEVEL	EXISTING SURFACE LEVEL
0.000			67.10
10.000	0.662	66.952	66.290
20.000	0.760	66.952	66.192
30.000	0.466	66.700	66.234
40.000	0.463	66.700	66.237
50.000	0.489	66.700	66.211
60.000	0.536	66.700	66.164
70.000	0.587	66.700	66.113
80.000	0.660	66.700	66.040
90.000	0.767	66.700	65.933
100.000	0.865	66.700	65.835
110.000	0.942	66.700	65.758
120.000	0.994	66.700	65.706
130.000	1.055	66.700	65.645
140.000	1.164	66.700	65.536
150.000	1.339	66.700	65.361
160.000	1.514	66.700	65.186
170.000	1.685	66.700	65.015
180.000	1.784	66.700	64.916
190.000	1.882	66.700	64.818
200.000	1.929	66.700	64.771
210.000	2.139	66.700	64.561
220.000	2.341	66.700	64.359
230.000	4.800	66.700	61.900
240.000	2.525	66.700	64.175
250.000	3.646	66.434	62.788
260.000	3.724	66.455	62.730
270.000	0.302	60.706	60.404
280.000	0.846	59.445	58.599
290.000	0.986	59.488	58.502
300.000	2.552	59.667	57.114
310.000	2.489	58.010	55.520
320.000	0.951	55.409	54.458
330.000			54.489
333.621			54.52

BEW SECTION 6
HORIZONTAL SCALE 1:750
VERTICAL SCALE 1:150



CHAINAGE	CUT/FILL DEPTH	BULK EARTHWORKS LEVEL	EXISTING SURFACE LEVEL
0.000			68.96
10.000	2.014	69.220	67.206
20.000	3.527	69.781	66.254
30.000	3.893	69.523	65.631
40.000	3.441	69.315	65.875
50.000	0.572	66.700	66.128
60.000	0.616	66.700	66.084
70.000	0.676	66.700	66.024
80.000	0.569	66.556	65.987
90.000	0.631	66.556	65.925
100.000	0.809	66.618	65.809
110.000	0.923	66.618	65.695
120.000	1.036	66.618	65.582
130.000	1.104	66.618	65.514
140.000	1.422	66.618	65.196
150.000	1.698	66.618	64.920
160.000	2.493	66.618	64.125
170.000	4.443	66.618	62.175
180.000	5.370	66.385	61.015
190.000	5.713	66.371	60.658
200.000	-0.442	59.697	60.138
210.000	-0.285	59.470	59.755
220.000	0.205	59.532	59.327
230.000	1.523	59.700	58.177
240.000	2.650	59.700	57.050
250.000	3.117	59.700	56.583
260.000	3.481	59.700	56.219
270.000	3.730	59.700	55.970
280.000	3.801	59.700	55.899
290.000	3.755	59.700	55.945
300.000	5.595	59.700	54.105
310.000	7.140	59.700	52.560
320.000	7.393	59.700	52.307
330.000	7.208	59.526	52.318
340.000	6.530	59.098	52.567
350.000	0.061	52.234	52.172
360.000			51.524
362.050			51.29

BEW SECTION 3
HORIZONTAL SCALE 1:750
VERTICAL SCALE 1:150



CHAINAGE	CUT/FILL DEPTH	BULK EARTHWORKS LEVEL	EXISTING SURFACE LEVEL
0.000			56.43
10.000	0.474	57.072	56.598
20.000	0.658	57.078	56.419
30.000	0.990	57.200	56.210
40.000	1.242	57.200	55.958
50.000	1.279	57.200	55.921
60.000	1.196	57.200	56.004
70.000	1.118	57.200	56.082
80.000	0.954	57.200	56.246
90.000	0.737	57.200	56.463
100.000	0.835	57.200	56.365
110.000	1.049	57.200	56.151
120.000	0.348	56.264	55.916
130.000	0.900	56.645	55.744
140.000	0.909	56.630	55.720
150.000	0.626	56.322	55.696
160.000	-0.078	55.847	55.925
170.000	-0.281	56.000	56.282
180.000	-1.069	55.483	56.552
190.000	-0.558	56.233	56.792
200.000	2.226	56.829	54.603
210.000	1.987	55.159	53.172
220.000			52.152
230.000			51.999
240.000			51.506
247.388			50.98

BEW SECTION 4
HORIZONTAL SCALE 1:750
VERTICAL SCALE 1:150

6m 0 15 30 45 60 75m
SCALE 1:750 AT A0 SIZE SHEET

2.0m 0 5 10 15m
SCALE 1:150 AT A0 SIZE SHEET

FOR DEVELOPMENT APPLICATION

AMENDMENTS	DATE	ISSUE
ISSUED FOR DEVELOPMENT APPLICATION	03.06.20	B
ISSUED FOR INFORMATION	19.03.20	A

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CLIENT: Aliro

PROJECT: STATE SIGNIFICANT DEVELOPMENT APPLICATION
44 CLUNIES ROSS STREET, GREYSTANES

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
IO	IO	MAR '20	M.W.	A0	AS SHOWN	C013251.06-DA36

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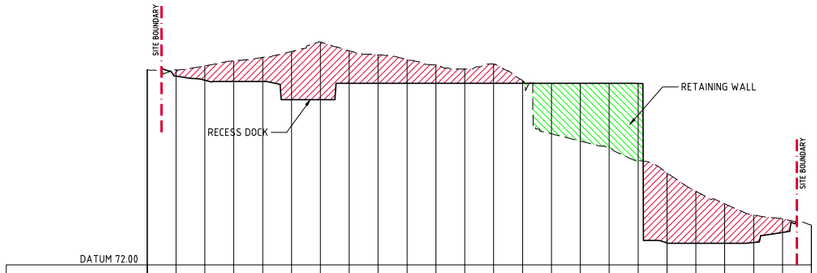
Costin Roe Consulting
PRECISION | COMMUNICATION | ACCOUNTABILITY

DRAWING TITLE: BULK EARTHWORKS SECTIONS SHEET 2
DRAWING No: C013251.06-DA36
ISSUE: B

LEGEND:

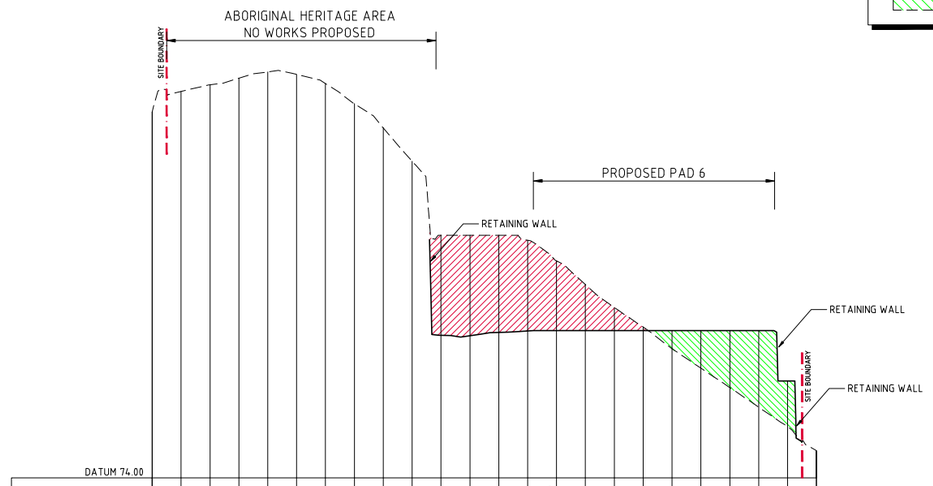
- DENOTES BULK EARTHWORKS SURFACE
- DENOTES EXISTING SURFACE LEVEL
- DENOTES AREA IN CUT
- DENOTES AREA IN FILL



DATUM 72.00

CHAINAGE	CUT/FILL DEPTH	BULK EARTHWORKS LEVEL	EXISTING SURFACE LEVEL
0.000			85.58
10.000	-0.447	85.576	85.523
20.000	-0.995	85.785	85.781
30.000	-1.421	84.785	84.721
40.000	-1.667	84.700	84.367
50.000	-3.330	84.700	84.773
60.000	-3.992	83.643	83.437
70.000	-2.251	83.645	84.822
80.000	-1.961	84.571	86.533
90.000	-1.652	84.571	86.224
100.000	-1.271	84.571	85.843
110.000	-0.981	84.571	85.553
120.000	-1.332	84.571	85.903
130.000	-0.187	84.571	84.758
140.000	3.497	84.571	81.074
150.000	3.997	84.571	80.574
160.000	4.475	84.571	80.097
170.000	5.349	84.565	79.216
180.000	-4.869	73.526	78.395
190.000	-3.603	73.500	77.103
200.000	-2.732	73.500	76.232
210.000	-1.903	73.555	75.457
220.000	-0.953	74.240	75.193
230.000			74.766

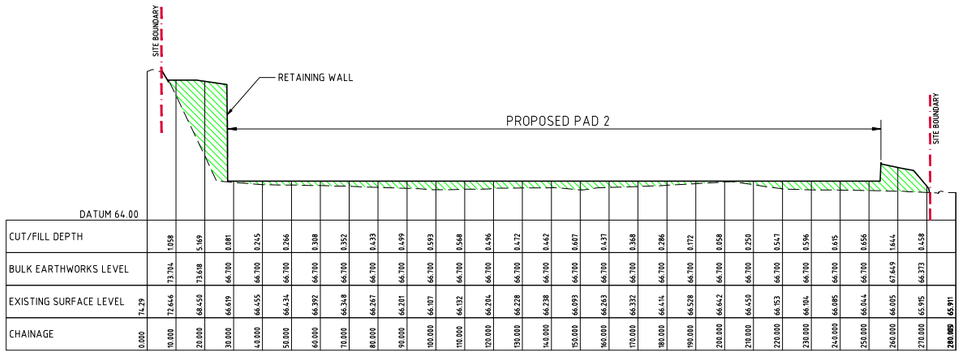
BEW SECTION 9
HORIZONTAL SCALE 1:750
VERTICAL SCALE 1:150



DATUM 74.00

CHAINAGE	CUT/FILL DEPTH	BULK EARTHWORKS LEVEL	EXISTING SURFACE LEVEL
0.000			99.34
10.000			100.752
20.000			101.223
30.000			101.669
40.000			102.187
50.000			101.937
60.000			101.386
70.000			99.907
80.000			98.244
90.000			95.925
100.000	-6.920	93.880	90.880
110.000	-6.956	93.844	90.880
120.000	-6.731	93.869	90.880
130.000	-6.278	94.172	90.450
140.000	-4.822	94.200	89.022
150.000	-3.184	94.200	87.384
160.000	-1.595	94.200	85.795
170.000	-0.239	94.200	84.439
180.000	1.263	94.200	82.937
190.000	2.606	94.200	81.594
200.000	3.948	94.200	80.252
210.000	5.302	94.200	78.898
220.000	3.176	80.715	77.539
230.000			75.08

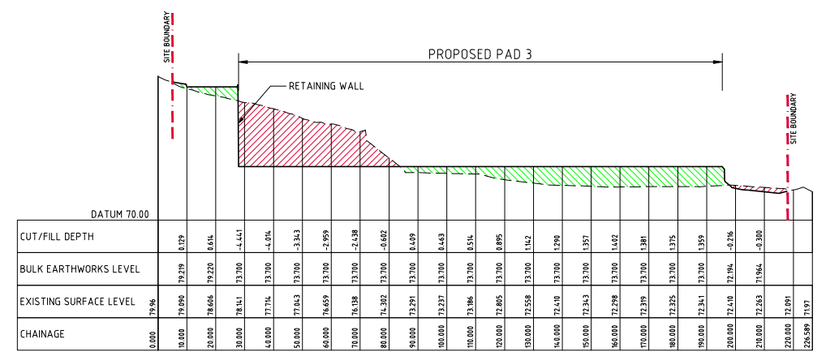
BEW SECTION 10
HORIZONTAL SCALE 1:750
VERTICAL SCALE 1:150



DATUM 64.00

CHAINAGE	CUT/FILL DEPTH	BULK EARTHWORKS LEVEL	EXISTING SURFACE LEVEL
0.000			74.29
10.000	1.958	73.704	72.646
20.000	5.169	73.618	68.450
30.000	0.881	66.700	66.619
40.000	0.245	66.700	66.455
50.000	0.266	66.700	66.434
60.000	0.308	66.700	66.392
70.000	0.352	66.700	66.348
80.000	0.433	66.700	66.267
90.000	0.499	66.700	66.201
100.000	0.593	66.700	66.107
110.000	0.568	66.700	66.132
120.000	0.496	66.700	66.204
130.000	0.472	66.700	66.228
140.000	0.462	66.700	66.238
150.000	0.607	66.700	66.093
160.000	0.637	66.700	66.063
170.000	0.368	66.700	66.332
180.000	0.286	66.700	66.414
190.000	0.172	66.700	66.528
200.000	0.058	66.700	66.642
210.000	0.250	66.700	66.450
220.000	0.247	66.700	66.453
230.000	0.596	66.700	66.104
240.000	0.615	66.700	66.085
250.000	0.656	66.700	66.044
260.000	1.644	67.649	66.005
270.000	0.458	66.373	65.915
280.000			65.911

BEW SECTION 7
HORIZONTAL SCALE 1:750
VERTICAL SCALE 1:150



DATUM 70.00

CHAINAGE	CUT/FILL DEPTH	BULK EARTHWORKS LEVEL	EXISTING SURFACE LEVEL
0.000			79.96
10.000	0.129	79.090	79.219
20.000	0.614	79.220	78.606
30.000	-4.441	73.700	78.141
40.000	-4.094	73.700	77.794
50.000	-3.343	73.700	77.043
60.000	-2.959	73.700	76.659
70.000	-2.438	73.700	76.138
80.000	-0.602	73.700	74.302
90.000	0.409	73.700	73.291
100.000	0.463	73.700	73.237
110.000	0.514	73.700	73.186
120.000	0.895	73.700	72.805
130.000	1.142	73.700	72.558
140.000	1.290	73.700	72.410
150.000	1.357	73.700	72.343
160.000	1.402	73.700	72.298
170.000	1.381	73.700	72.319
180.000	1.375	73.700	72.325
190.000	1.359	73.700	72.341
200.000	-0.216	72.194	72.410
210.000	-0.300	71.964	72.263
220.000	72.091		
226.589	71.97		

BEW SECTION 8
HORIZONTAL SCALE 1:750
VERTICAL SCALE 1:150

6m 0 15 30 45 60 75m
SCALE 1:750 AT A0 SIZE SHEET

2.0m 0 5 10 15m
SCALE 1:150 AT A0 SIZE SHEET

FOR DEVELOPMENT APPLICATION

AMENDMENTS	DATE	ISSUE
ISSUED FOR DEVELOPMENT APPLICATION	03.06.20	B
ISSUED FOR INFORMATION	19.03.20	A

ARCHITECT: SBA ARCHITECTS
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CLIENT: Aliro

PROJECT: STATE SIGNIFICANT DEVELOPMENT APPLICATION
44 CLUNIES ROSS STREET, GREYSTANES

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF.
ID	ID	MAR '20	M.W.	A0	AS SHOWN	C013251.06-DA37

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Costin Roe Consulting
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DRAWING TITLE: BULK EARTHWORKS SECTIONS SHEET 3

DRAWING No: C013251.06-DA37 ISSUE: B

CATCHMENT BREAKDOWN

CATCHMENT	AREA	LGA	DISCHARGE LOCATION	WATER QUALITY REQUIREMENTS	WATER QUALITY REQUIREMENTS
1	6.10Ha	BLACKTOWN CITY COUNCIL	GIRRAWEEN CREEK	PIT INSERTS + STORMWATER QUALITY SYSTEM	REGIONAL DETENTION BASIN
2	8.55Ha	CUMBERLAND COUNCIL	GIRRAWEEN CREEK	ON-LOT GPT + REGIONAL WETLAND	REGIONAL DETENTION BASIN
3	2.94Ha	CUMBERLAND COUNCIL	FOUNDATION PLACE	ON-LOT GPT + REGIONAL WETLAND	REGIONAL DETENTION BASIN

BLACKTOWN CITY COUNCIL LGA

POLLUTANT REDUCTION TARGETS:

POLLUTANT	% POST DEVELOPMENT AVERAGE ANNUAL LOAD REDUCTION
GROSS POLLUTANTS	90
TOTAL SUSPENDED SOILS	85
TOTAL PHOSPHOROUS	65
TOTAL NITROGEN	45
TOTAL HYDROCARBONS	90

CUMBERLAND CITY COUNCIL LGA

POLLUTANT REDUCTION TARGETS:

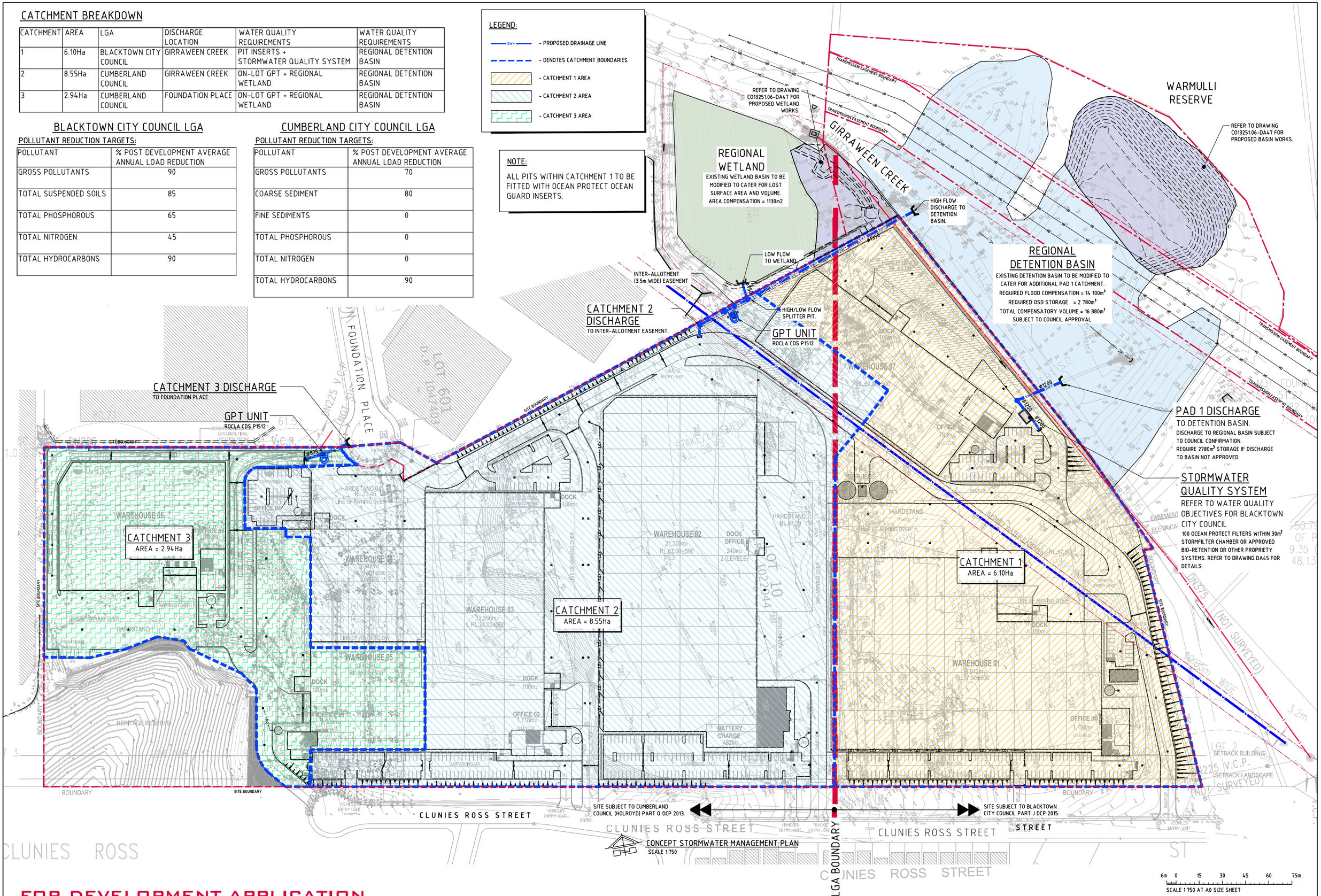
POLLUTANT	% POST DEVELOPMENT AVERAGE ANNUAL LOAD REDUCTION
GROSS POLLUTANTS	70
COARSE SEDIMENT	80
FINE SEDIMENTS	0
TOTAL PHOSPHOROUS	0
TOTAL NITROGEN	0
TOTAL HYDROCARBONS	90

LEGEND:

- SW – PROPOSED DRAINAGE LINE
- DENOTES CATCHMENT BOUNDARIES
- CATCHMENT 1 AREA
- CATCHMENT 2 AREA
- CATCHMENT 3 AREA

NOTE:

ALL PITS WITHIN CATCHMENT 1 TO BE FITTED WITH OCEAN PROTECT OCEAN GUARD INSERTS.



CONCEPT STORMWATER MANAGEMENT PLAN
SCALE 1:750

FOR DEVELOPMENT APPLICATION

AMENDMENTS	DATE	ISSUE
ISSUED FOR DEVELOPMENT APPLICATION	27.01.21	D
ISSUED FOR DEVELOPMENT APPLICATION	03.06.20	C
ISSUED FOR INFORMATION	22.04.20	B
ISSUED FOR INFORMATION	13.03.20	A

ARCHITECT: SBA ARCHITECTS

CLIENT: Aliro

PROJECT: STATE SIGNIFICANT DEVELOPMENT APPLICATION
44 CLUNIES ROSS STREET, GREYSTANES

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
IO	IO	MAR '20	M.W.	A0	AS SHOWN	C013251.06-DA40

Costin Roe Consulting Pty Ltd.
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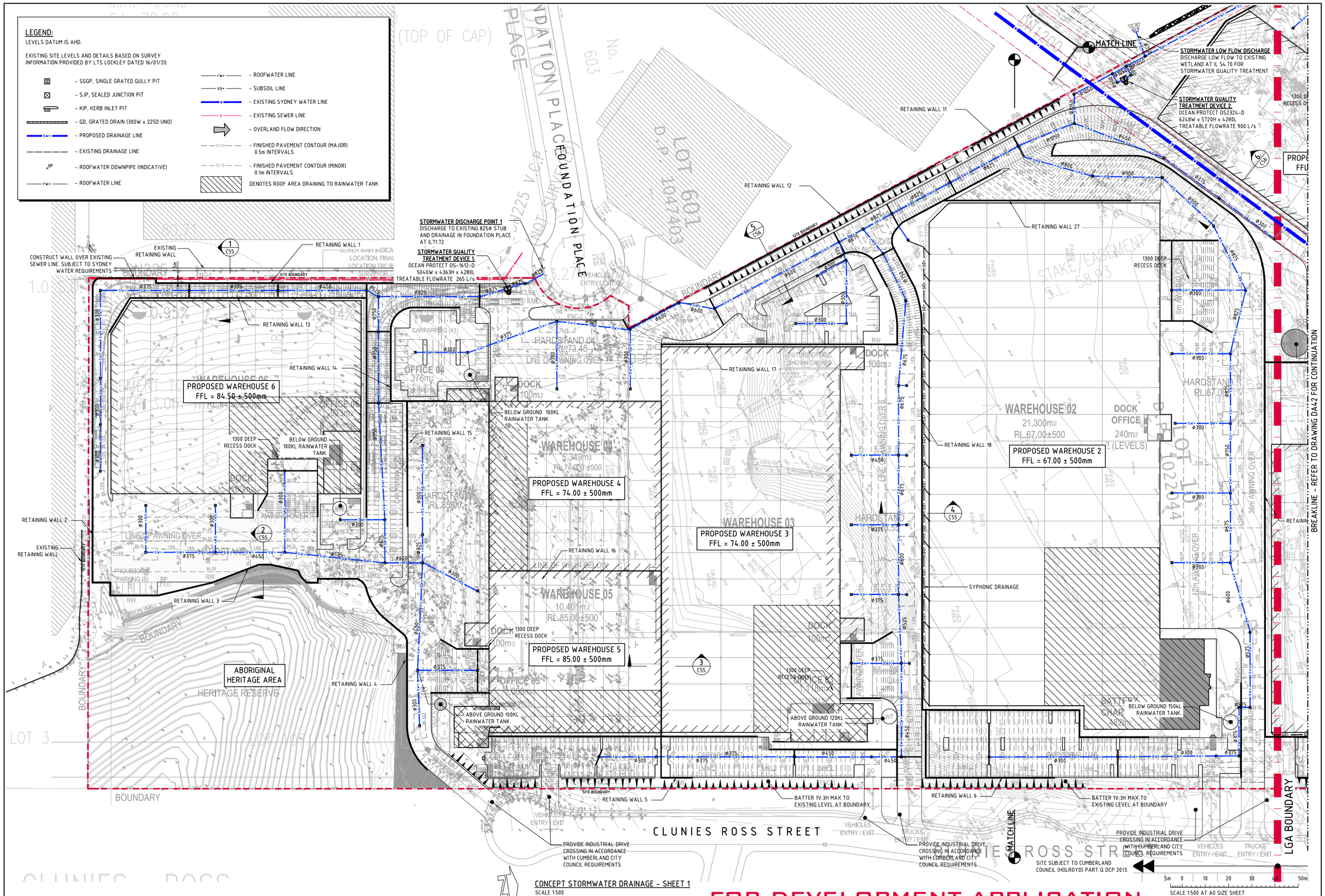
DRAWING TITLE: CONCEPT STORMWATER MANAGEMENT PLAN

DRAWING No: C013251.06-DA40 ISSUE: D



CONCEPT STORMWATER DRAINAGE - SHEET 1
SCALE 1:500

FOR DEVELOPMENT APPLICATION

AMENDMENTS	DATE	ISSUE
ISSUED FOR DEVELOPMENT APPLICATION	28.01.21	F
ISSUED FOR DEVELOPMENT APPLICATION	27.01.21	E
ISSUED FOR DEVELOPMENT APPLICATION	28.10.20	D
ISSUED FOR DEVELOPMENT APPLICATION	03.06.20	C
ISSUED FOR INFORMATION	22.04.20	B
ISSUED FOR INFORMATION	13.03.20	A

ARCHITECT: SBA ARCHITECTS

CLIENT: Aliro

PROJECT: STATE SIGNIFICANT DEVELOPMENT APPLICATION
44 CLUNIES ROSS STREET, GREYSTANES

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
IO	IO	MAR '20	M.W.	A0	AS SHOWN	C013251.06-DA41

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DRAWING TITLE: CONCEPT STORMWATER DRAINAGE PLAN SHEET 1

DRAWING No: C013251.06-DA41

ISSUE: F

BREAKLINE - REFER TO ADJACENT PLAN FOR CONTINUATION

BREAKLINE - REFER TO DRAWING DA41 FOR CONTINUATION

MATCH LINE

STORMWATER LOW FLOW DISCHARGE
DISCHARGE LOW FLOW TO EXISTING WETLAND AT IL 54.70 FOR STORMWATER QUALITY TREATMENT

STORMWATER QUALITY TREATMENT DEVICE 2.
OCEAN PROTECT OS2324-D
6248W x 5720H x 4280L
TREATABLE FLOWRATE 900 L/s

REGIONAL DETENTION BASIN
REFER DA47

RETAINING WALL 10

CLEAR VEGETATION & CLEAN EXISTING CONCRETE CHANNEL UPGRADE TO 1200Ø INGROUND PIPE IF REQUIRED

STORMWATER DISCHARGE POINT 3
1200Ø OUTLET PIPE TO DISCHARGE TO EXISTING CONCRETE LINED CHANNEL AT IL50.40.

STORMWATER QUALITY TREATMENT DEVICE 3.
100 x OCEAN PROTECT ZPG STORMFILTERS WITHIN 30m²
STORMFILTER CHAMBER
REFER TO DRAWING DA45 FOR DETAILS.

1300 DEEP RECESS DOCK

PROPOSED WAREHOUSE 7
FFL = 60.00 ± 500mm

BUILDING FOOTINGS TO BE PIERED AND FOUNDED BELOW Z01 OF SEWER

1200Ø STORMWATER PIPE CROSSES EXISTING SEWER PIPE. 2m CLEARANCE

ABOVE GROUND 100KL RAINWATER TANK.

RETAINING WALL 22

RETAINING WALL 27

PUMP ROOM AND SPRINKLER TANKS

RETAINING WALL 20

RETAINING WALL 19

PROPOSED WAREHOUSE 2
FFL = 67.00 ± 500mm

WAREHOUSE 02
21,300m2
RL 67.00±500

DOCK OFFICE
240m2

PROPOSED WAREHOUSE 1
FFL = 57.50 ± 500mm

BUILDING PRECAST TO RETAIN 2.0m MAX

ABOVE GROUND 120KL RAINWATER TANK.

RETAINING WALL 21

BELOW GROUND 150kL RAINWATER TANK.

SYPHONIC DRAINAGE

RETAINING WALL 7

BATTER 1V:3H MAX TO EXISTING LEVEL AT BOUNDARY

PROVIDE INDUSTRIAL DRIVE CROSSING IN ACCORDANCE WITH CUMBERLAND CITY COUNCIL REQUIREMENTS

PROVIDE INDUSTRIAL DRIVE CROSSING IN ACCORDANCE WITH BLACKTOWN CITY COUNCIL REQUIREMENTS

LGA BOUNDARY

SITE SUBJECT TO CUMBERLAND COUNCIL (HOLROYD) PART Q DCP 2013.

SITE SUBJECT TO BLACKTOWN CITY COUNCIL PART J DCP 2015.

CLUNIES ROSS STREET

CONCEPT STORMWATER DRAINAGE PLAN - SHEET 2
SCALE 1:500

REGIONAL WETLAND
REFER DA47

1050Ø STORMWATER PIPE CROSSES EXISTING SEWER PIPE. 2m CLEARANCE

STORMWATER DISCHARGE POINT 2
DISCHARGE TO EXISTING REGIONAL DETENTION BASIN AT IL53.00

EXISTING D1200 SYDNEY WATER MAIN AND 10m WIDE EASEMENT

BATTER 1V:3H MAX TO EXISTING LEVEL AT BOUNDARY

SETBACK BUILDING

SETBACK LANDSCAPE

LEGEND:

LEVELS DATUM IS AHD.

EXISTING SITE LEVELS AND DETAILS BASED ON SURVEY INFORMATION PROVIDED BY LTS LOCKLEY DATED 16/01/20.

- SGGP, SINGLE GRATED GULLY PIT
- SJP, SEALED JUNCTION PIT
- KIP, KERB INLET PIT
- GD, GRATED DRAIN (300W x 225D UNO)
- PROPOSED DRAINAGE LINE
- EXISTING DRAINAGE LINE
- ROOFWATER DOWNPIPE (INDICATIVE)
- ROOFWATER LINE
- ROOFWATER LINE
- SUBSOIL LINE
- EXISTING SYDNEY WATER LINE
- EXISTING SEWER LINE
- OVERLAND FLOW DIRECTION
- FINISHED PAVEMENT CONTOUR (MAJOR) 0.5m INTERVALS
- FINISHED PAVEMENT CONTOUR (MINOR) 0.1m INTERVALS
- DENOTES ROOF AREA DRAINING TO RAINWATER TANK

SCALE 1:500 AT A0 SIZE SHEET

FOR DEVELOPMENT APPLICATION

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ARCHITECT: SBA ARCHITECTS

CLIENT: Aliro

PROJECT: STATE SIGNIFICANT DEVELOPMENT APPLICATION
44 CLUNIES ROSS STREET, GREYSTANES

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF.
ID	ID	MAR '20	M.W.	A0	AS SHOWN	C013251.06-DA42

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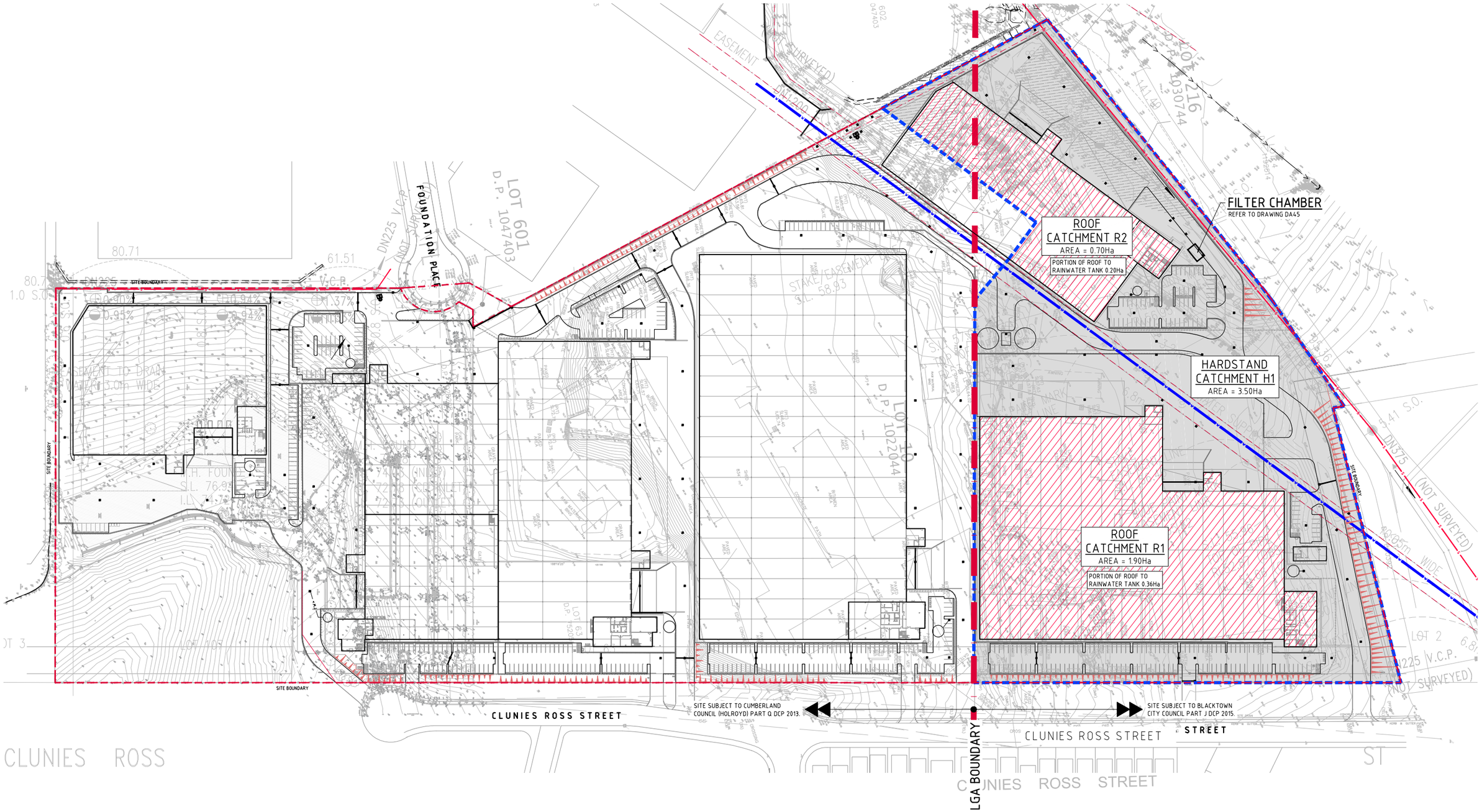
DRAWING TITLE: CONCEPT STORMWATER DRAINAGE PLAN SHEET 2

DRAWING No: C013251.06-DA42 ISSUE: F



MUSIC CATCHMENT PLAN
SCALE 1:750

6m 0 15 30 45 60 75m
SCALE 1:750 AT A0 SIZE SHEET

FOR DEVELOPMENT APPLICATION

ISSUE	DATE	ISSUE	AMENDMENTS	DATE	ISSUE	AMENDMENTS	DATE	ISSUE
ISSUED FOR DEVELOPMENT APPLICATION	28.10.20	A						

ARCHITECT: SBA ARCHITECTS

CLIENT: Aliro

PROJECT: STATE SIGNIFICANT DEVELOPMENT APPLICATION
44 CLUNIES ROSS STREET, GREYSTANES

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF.
ID	ID	MAR '20	M.W.	A0	AS SHOWN	C013251.06-DA43

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DRAWING TITLE: MUSIC CATCHMENT PLAN
BLACKTOWN CITY COUNCIL LGA

DRAWING No: C013251.06-DA43
ISSUE: A

LEGEND:

- 50.00 – EXISTING SURFACE CONTOUR
- CATCHMENT BOUNDARY
- PROPOSED SITE

MODELLING NOTE:
DEVELOPED CATCHMENT ASSUMED 90% IMPERVIOUS.
UNDEVELOPED CATCHMENTS ASSUMED 50% IMPERVIOUS.

REGIONAL CATCHMENT PLAN
SCALE 1:2500

20m 0 50 100 150 200 250m
SCALE 1:2500 AT A0 SIZE SHEET

FOR DEVELOPMENT APPLICATION

AMENDMENTS	DATE	ISSUE
ISSUED FOR DEVELOPMENT APPLICATION	28.10.20	C
ISSUED FOR DEVELOPMENT APPLICATION	03.06.20	B
ISSUED FOR INFORMATION	22.04.20	A

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PROJECT: STATE SIGNIFICANT DEVELOPMENT APPLICATION
44 CLUNIES ROSS STREET, GREYSTANES

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF
ID	ID	MAR '20	M.W.	A0	AS SHOWN	C013251.06-DA20

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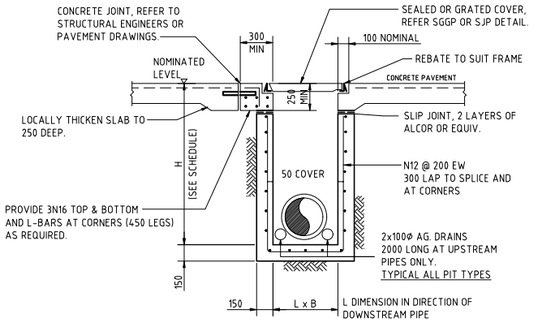
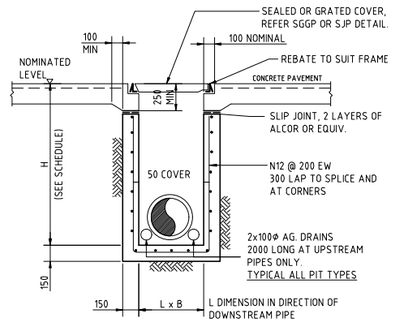
DRAWING TITLE: REGIONAL CATCHMENT PLAN
DRAWING No: C013251.06-DA44
ISSUE: C



SECTION
SCALE 1:20

SJP/CIS & SGGP/CIS (CAST IN SLAB) PIT DETAIL GRATE/COVER SUPPORT CAST-INTO PAVEMENT SLAB

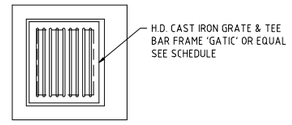
(ADOPT IN CONCRETE PAVEMENT FOR SGGP's & SJP's, WHERE PITS ARE LOCATED IN THE CORNER OF SLAB PANELS OR ADJACENT TO SLAB PANEL JOINTS)



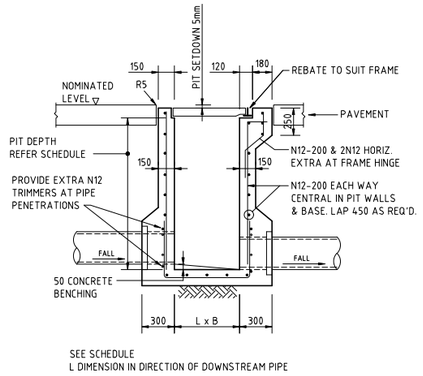
SECTION
SCALE 1:20

SJP/CIS & SGGP/CIS (CAST IN SLAB) PIT DETAIL GRATE/COVER SUPPORT CAST-INTO PAVEMENT SLAB

(ADOPT IN CONCRETE PAVEMENTS FOR SGGP's & SJP's, WHERE JOINTS ARE NOT WITHIN PROXIMITY OF THE GRATE)

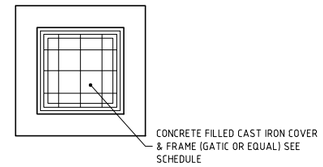


PLAN
SCALE 1:20

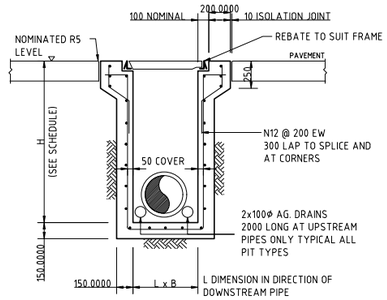


SECTION
SCALE 1:20

SINGLE GRATED GULLY PIT - SGGP

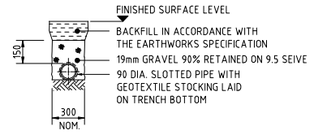


PLAN
1:20



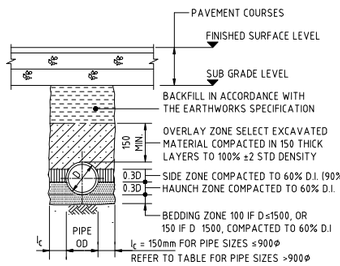
SECTION
SCALE 1:20

SEALED PIT - SJP



SUPPORT TO AGRICULTURAL DRAIN
SCALE 1:20

SIDE ZONE MATERIAL GRADING	
SIEVE SIZE (mm)	WEIGHT PASSING (%)
19.0	100
9.5	100 TO 50
2.6	100 TO 30
0.60	50 TO 15
0.075	25 TO 0

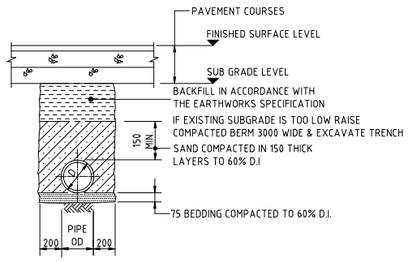


BEDDING & HAUNCH MATERIAL GRADING	
SIEVE SIZE (mm)	WEIGHT PASSING (%)
19.0	100
2.36	100 TO 50
0.60	90 TO 50
0.30	60 TO 10
0.15	25 TO 0
0.075	10 TO 0

SIDE ZONE MATERIAL GRADING	
SIEVE SIZE (mm)	WEIGHT PASSING (%)
75.0	100
9.5	100 TO 50
2.36	100 TO 50
0.60	50 TO 15
0.075	25 TO 0

SELECT FILL MATERIAL IN ACCORDANCE WITH TABLE 1 AS 3725

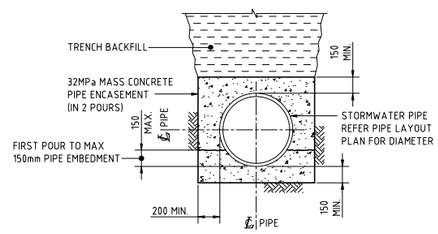
TYPE HS2 SUPPORT TO CONCRETE PIPES UNDER PAVEMENT
SCALE 1:20
D ≤1350, MAX FILL = 4.0m
D >1350, MAX FILL = 3.0m



SUPPORT TO uPVC PIPES
SCALE 1:20

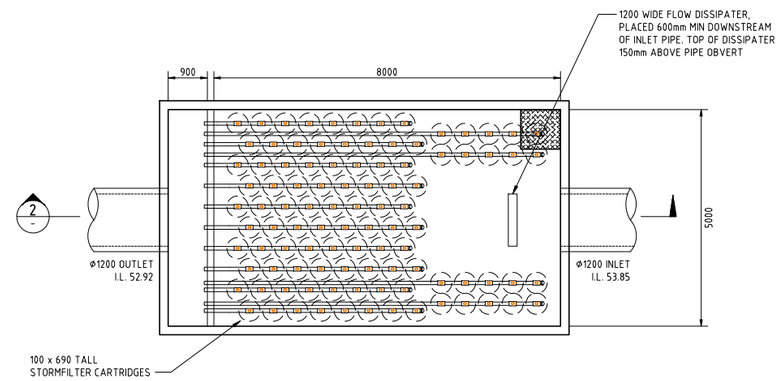
PIPE LAYING DETAILS

SCALE 1:20

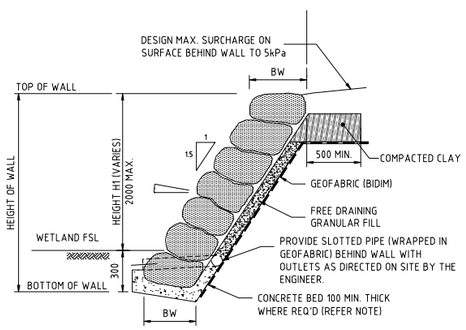


SECTION 1:20 (1) : TYPICAL ACROSS PIPE

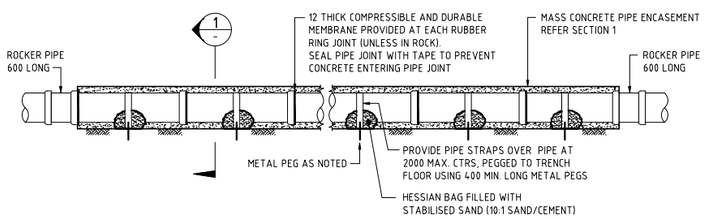
NOTE :
DURING THE ENCASEMENT PROCESS THE CONTRACTOR IS TO PROVIDE SUPPORT TO THE PIPE TO PREVENT PIPE MOVEMENT AND/OR FLOAT. CONCRETE ENCASEMENT TO BE INSTALLED IN 2 POURS.



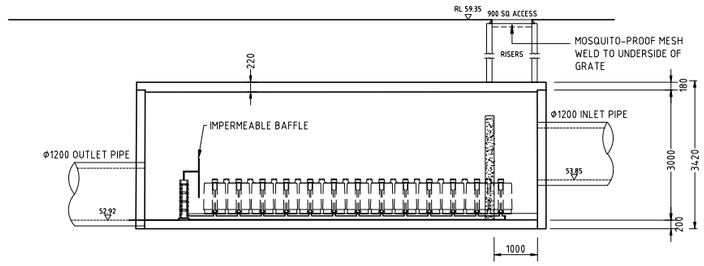
STORMWATER QUALITY DEVICE PLAN
SCALE 1:50



RETAINING WALL
(WETLAND BOULDER RETAINING WALL)
SCALE 1:20



STORMWATER PIPE CONCRETE ENCASEMENT TYPICAL DETAIL
SCALE 1:50



SECTION 2
SCALE 1:50

FOR DEVELOPMENT APPLICATION

AMENDMENTS	DATE	ISSUE
ISSUED FOR DEVELOPMENT APPLICATION	28.10.20	D
ISSUED FOR DEVELOPMENT APPLICATION	03.06.20	C
ISSUED FOR INFORMATION	22.04.20	B
ISSUED FOR INFORMATION	12.03.20	A

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PROJECT: STATE SIGNIFICANT DEVELOPMENT APPLICATION
44 CLUNIES ROSS STREET, GREYSTANES

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IO	IO	MAR '20	M.W.	A0	AS SHOWN	C013251.06-DA45

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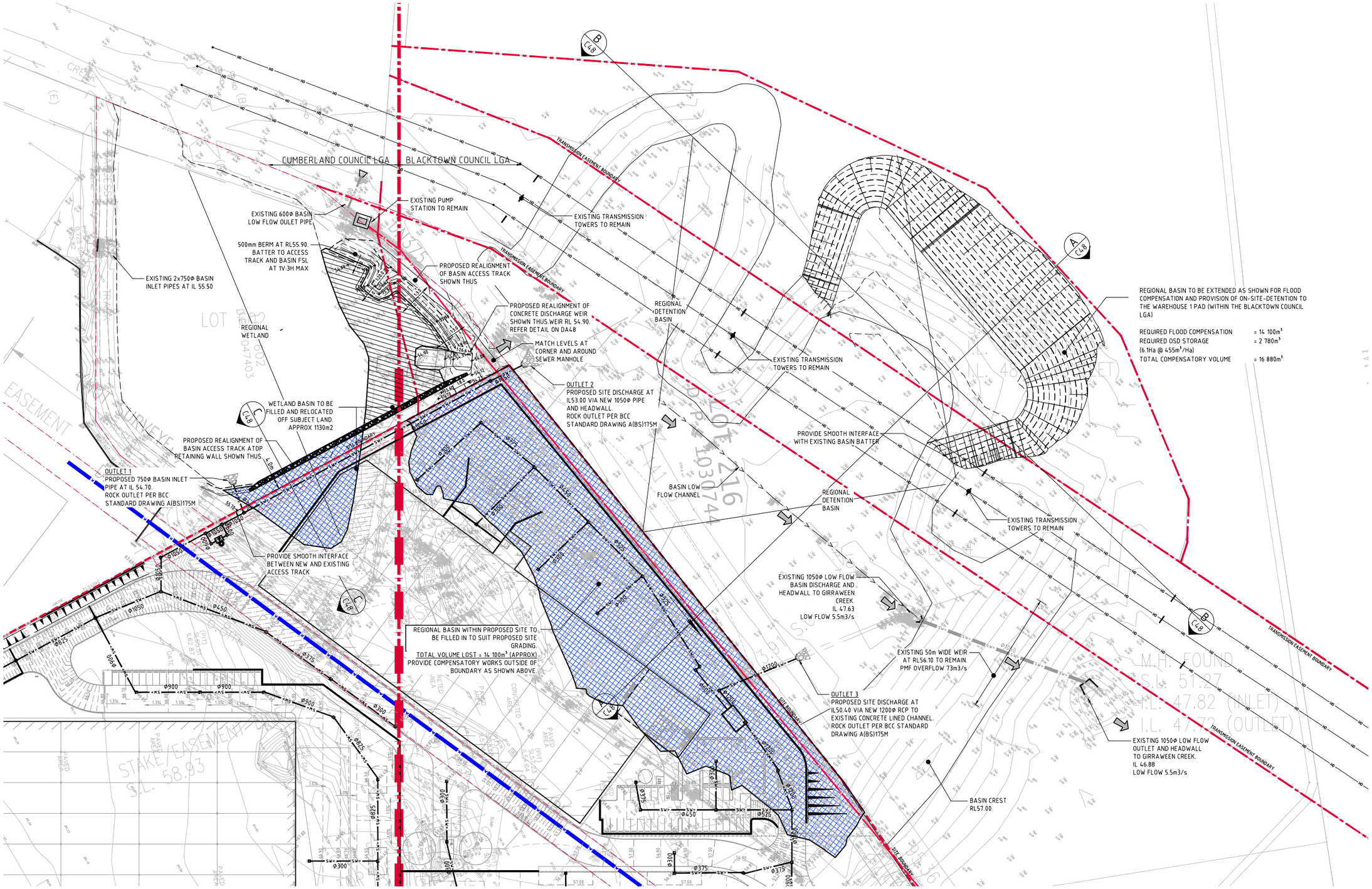
DRAWING TITLE: CONCEPT STORMWATER DRAINAGE DETAILS
DRAWING No: C013251.06-DA45
ISSUE: D



BASIN WORKS PLAN
SCALE 1:500

5m 0 10 20 30 40 50m
SCALE 1:500 AT A0 SIZE SHEET

FOR DEVELOPMENT APPLICATION

AMENDMENTS	DATE	ISSUE
ISSUED FOR DEVELOPMENT APPLICATION	03.06.20	D
ISSUED FOR INFORMATION	24.04.20	C
ISSUED FOR INFORMATION	22.04.20	B
ISSUED FOR INFORMATION	13.03.20	A

AMENDMENTS DATE ISSUE AMENDMENTS DATE ISSUE AMENDMENTS DATE ISSUE

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PROJECT
STATE SIGNIFICANT DEVELOPMENT APPLICATION
44 CLUNIES ROSS STREET, GREYSTANES

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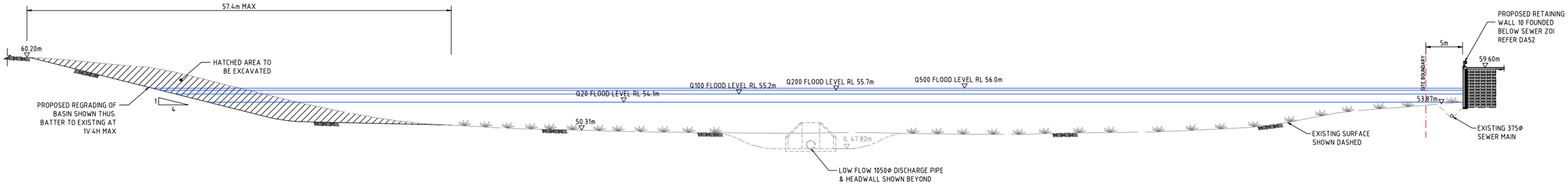
DRAWING TITLE
BASIN WORKS PLAN

DRAWING No C013251.06-DA47
ISSUE D



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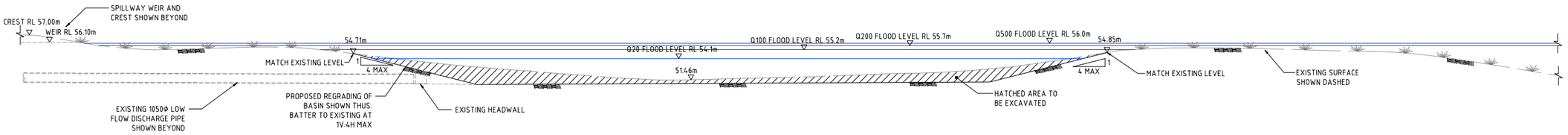

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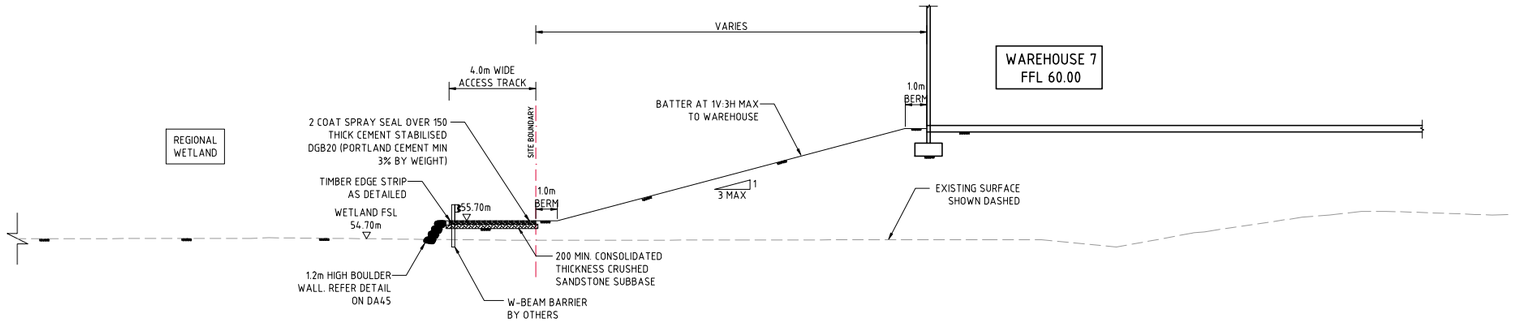

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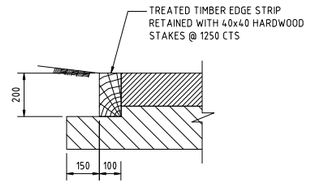
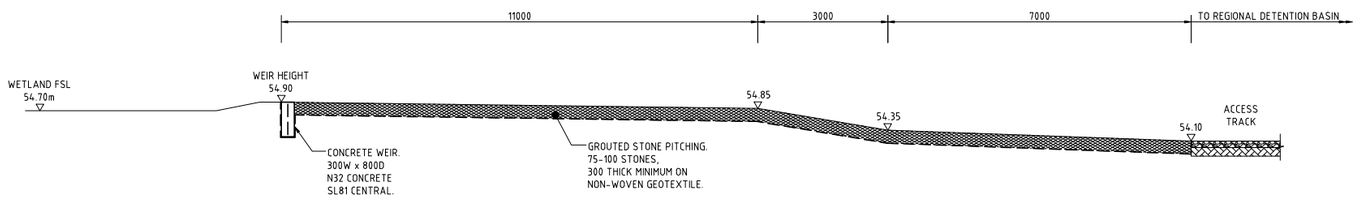


TIMBER EDGE STRIP DETAIL
SCALE 1:10



WETLAND SPILLWAY WEIR DETAIL
SCALE 1:50

1m 0 1 2 3 4 5 6 7 8 9 10m
SCALE 1:100 AT A0 SIZE SHEET

2m 0 5 10 15 20m
SCALE 1:200 AT A0 SIZE SHEET

FOR DEVELOPMENT APPLICATION

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ISSUED FOR INFORMATION	22.04.20	A

AMENDMENTS	DATE	ISSUE	AMENDMENTS	DATE	ISSUE

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PROJECT: STATE SIGNIFICANT DEVELOPMENT APPLICATION
44 CLUNIES ROSS STREET, GREYSTANES

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF.
ID	ID	MAR '20	M.W.	A0	AS SHOWN	C013251.06-DA57

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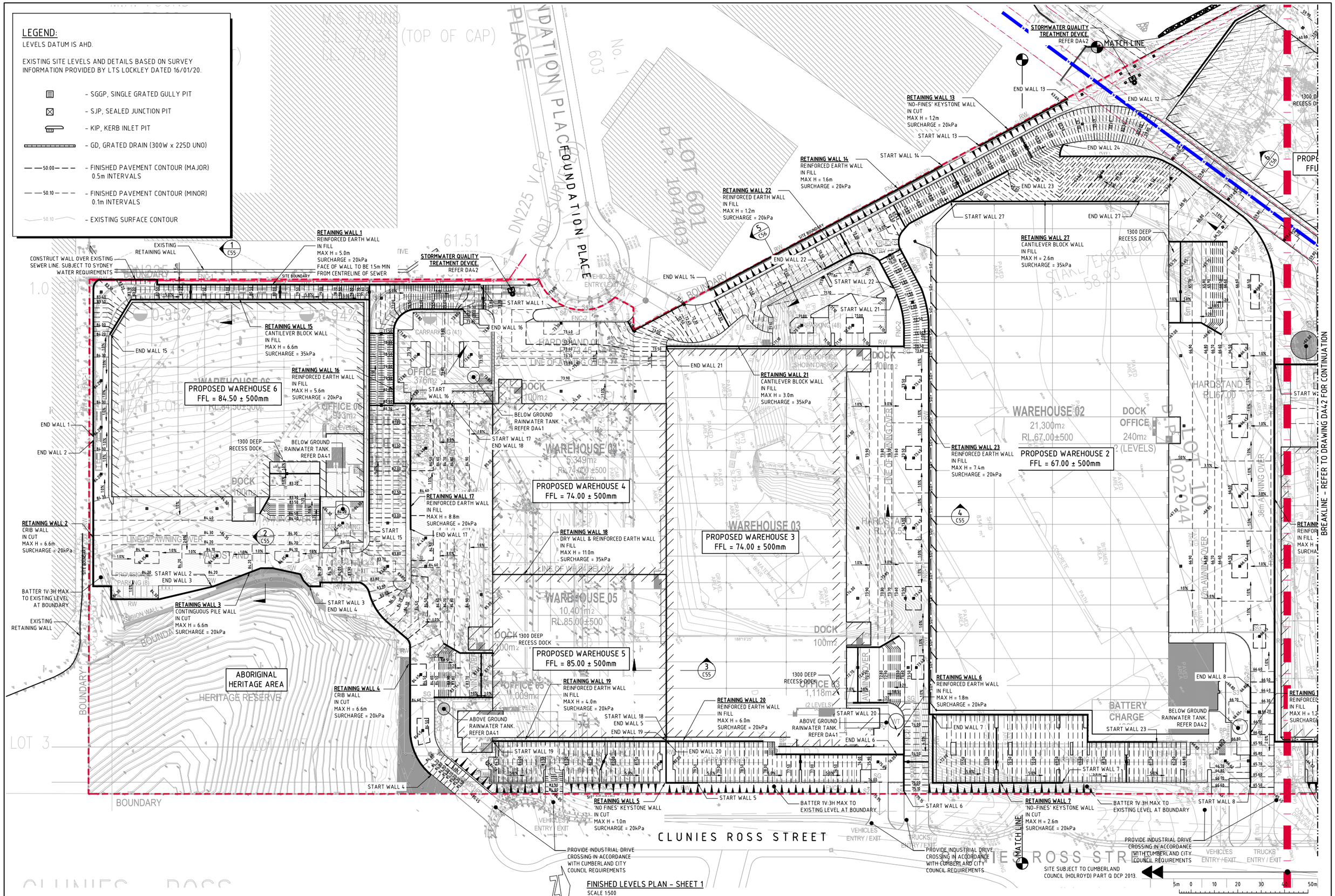
Costin Roe Consulting

PRECISION | COMMUNICATION | ACCOUNTABILITY

DRAWING TITLE: BASIN SECTIONS

DRAWING No: C013251.06-DA48 ISSUE: B



FINISHED LEVELS PLAN - SHEET 1
SCALE 1:500

FOR DEVELOPMENT APPLICATION

AMENDMENTS	DATE	ISSUE
ISSUED FOR DEVELOPMENT APPLICATION	28.01.21	E
ISSUED FOR DEVELOPMENT APPLICATION	27.01.21	D
ISSUED FOR DEVELOPMENT APPLICATION	03.06.20	C
ISSUED FOR INFORMATION	22.04.20	B
ISSUED FOR INFORMATION	13.03.20	A

ARCHITECT: SBA ARCHITECTS

CLIENT: Aliro

PROJECT: STATE SIGNIFICANT DEVELOPMENT APPLICATION
44 CLUNIES ROSS STREET, GREYSTANES

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
IO	IO	MAR '20	M.W.	A0	AS SHOWN	C013251.06-DA51

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Costin Roe Consulting

PRECISION | COMMUNICATION | ACCOUNTABILITY

DRAWING TITLE: FINISHED LEVELS PLAN - SHEET 1

DRAWING No: C013251.06-DA51

ISSUE: E

BREAKLINE - REFER TO ADJACENT PLAN FOR CONTINUATION

BREAKLINE - REFER TO DRAWING DA41 FOR CONTINUATION

STORMWATER QUALITY TREATMENT DEVICE. REFER DA42

MATCH LINE

END WALL 13

END WALL 12

END WALL 24

END WALL 23

END WALL 27

1300 DEEP RECESS DOCK

RETAINING WALL 27
CANTILEVER BLOCK WALL
IN FILL
MAX H = 2.6m
SURCHARGE = 35kPa

PROPOSED WAREHOUSE 7
FFL = 60.00 ± 500mm

RETAINING WALL 12
REINFORCED EARTH WALL
IN FILL
MAX H = 5.6m
SURCHARGE = 20kPa
FACE OF WALL TO BE 1.5m MIN
FROM CENTRELINE OF SEWER

STORMWATER QUALITY TREATMENT DEVICE. REFER DA42

BUILDING FOOTINGS TO BE FOUNDED BELOW ZOI OF SEWER

ABOVE GROUND RAINWATER TANK. REFER DA42

RETAINING WALL 26
REINFORCED EARTH WALL
IN FILL
MAX H = 3.0m
SURCHARGE = 20kPa

END WALL 26

START WALL 12

PUMP ROOM AND SPRINKLER TANKS AT RL 60.00

END WALL 25

START WALL 25

RETAINING WALL 25
REINFORCED EARTH WALL
IN FILL
MAX H = 3.0m
SURCHARGE = 20kPa

END WALL 11

RETAINING WALL 11
REINFORCED EARTH WALL
IN FILL
MAX H = 2.6m
SURCHARGE = 20kPa

START WALL 11

PROPOSED WAREHOUSE 2
FFL = 67.00 ± 500mm

RETAINING WALL 24
REINFORCED EARTH WALL
IN FILL
MAX H = 9.6m
SURCHARGE = 20kPa

1300 DEEP RECESS DOCK

PROPOSED WAREHOUSE 1
FFL = 57.50 ± 500mm

ABOVE GROUND RAINWATER TANK. REFER DA42

END WALL 8

RETAINING WALL 8
REINFORCED EARTH WALL
IN FILL
MAX H = 1.2m
SURCHARGE = 20kPa

BELOW GROUND RAINWATER TANK. REFER DA42

START WALL 23

START WALL 24

BATTER 1V:3H MAX TO EXISTING LEVEL AT BOUNDARY

START WALL 7

RETAINING WALL 7
'NO-FINES' KEYSTONE WALL
IN CUT
MAX H = 2.6m
SURCHARGE = 20kPa

BATTER 1V:3H MAX TO EXISTING LEVEL AT BOUNDARY

START WALL 8

START WALL 9

RETAINING WALL 9
REINFORCED EARTH WALL
IN FILL
MAX H = 1.0m
SURCHARGE = 20kPa

END WALL 9

BATTER 1V:3H MAX TO EXISTING LEVEL AT BOUNDARY

PROVIDE INDUSTRIAL DRIVE CROSSING IN ACCORDANCE WITH BLACKTOWN CITY COUNCIL REQUIREMENTS

PROVIDE INDUSTRIAL DRIVE CROSSING IN ACCORDANCE WITH CUMBERLAND CITY COUNCIL REQUIREMENTS

PROVIDE INDUSTRIAL DRIVE CROSSING IN ACCORDANCE WITH BLACKTOWN CITY COUNCIL REQUIREMENTS

SITE SUBJECT TO CUMBERLAND COUNCIL (HOLROYD) PART Q DCP 2013.

SITE SUBJECT TO BLACKTOWN CITY COUNCIL PART J DCP 2015.

CLUNIES ROSS STREET

LEGEND:

LEVELS DATUM IS AHD.

EXISTING SITE LEVELS AND DETAILS BASED ON SURVEY INFORMATION PROVIDED BY LTS LOCKLEY DATED 16/01/20.

- SGGP, SINGLE GRATED GULLY PIT
- SJP, SEALED JUNCTION PIT
- KIP, KERB INLET PIT
- GD, GRATED DRAIN (300W x 225D UNO)
- 50.00 - FINISHED PAVEMENT CONTOUR (MAJOR) 0.5m INTERVALS
- 50.10 - FINISHED PAVEMENT CONTOUR (MINOR) 0.1m INTERVALS
- 50.10 - EXISTING SURFACE CONTOUR

FINISHED LEVELS PLAN - SHEET 2
SCALE 1:500

5m 0 10 20 30 40 50m
SCALE 1:500 AT A0 SIZE SHEET

FOR DEVELOPMENT APPLICATION

AMENDMENTS	DATE	ISSUE
ISSUED FOR DEVELOPMENT APPLICATION	28.01.21	E
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ARCHITECT: SBA ARCHITECTS

CLIENT: Aliro

PROJECT: STATE SIGNIFICANT DEVELOPMENT APPLICATION
44 CLUNIES ROSS STREET, GREYSTANES

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
IO	IO	MAR '20	M.W.	A0	AS SHOWN	C013251.06-DA52

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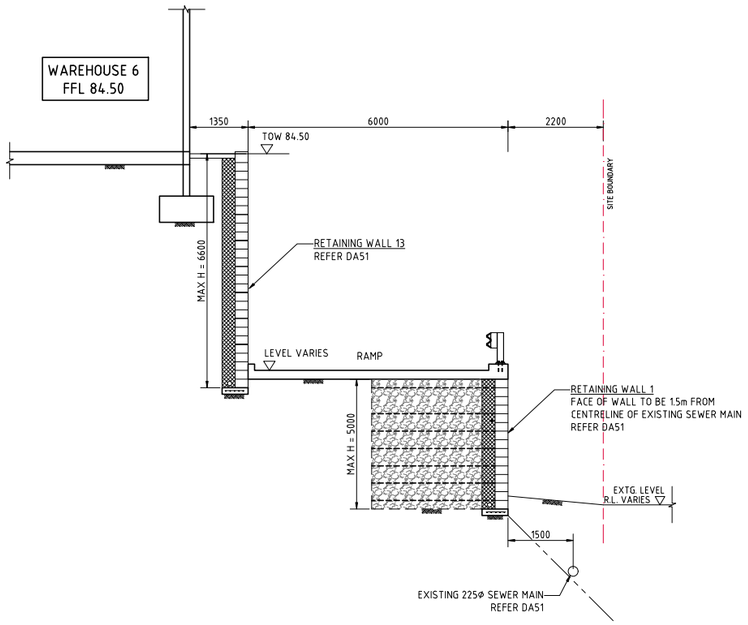
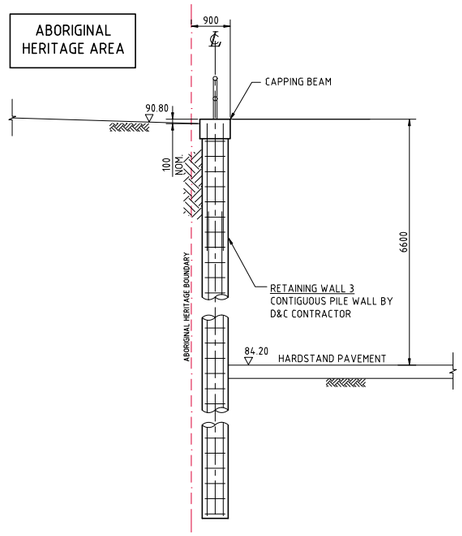
DRAWING TITLE: FINISHED LEVELS PLAN - SHEET 2

DRAWING No: C013251.06-DA52

ISSUE: E



SECTION 1:50 1 DA51



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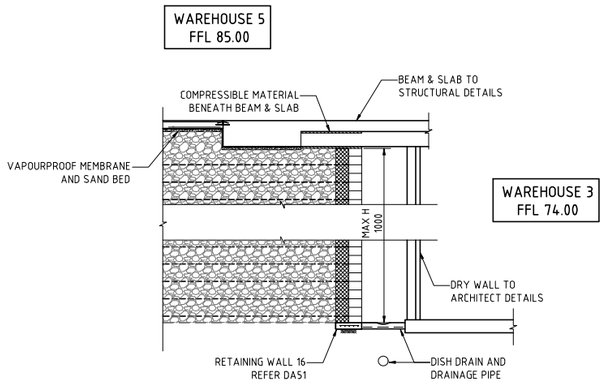

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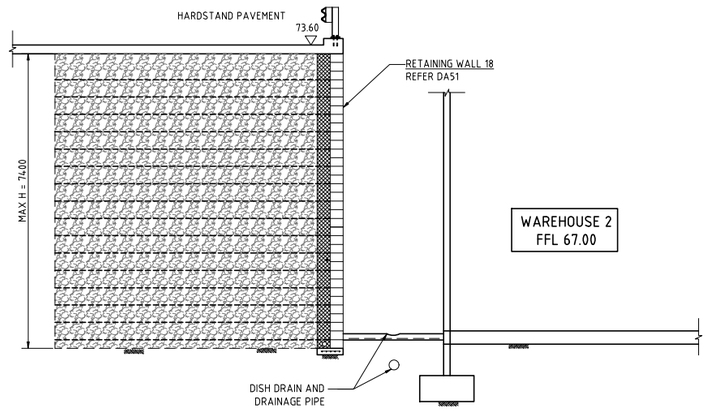

SECTION 1:50 4 DA51

500mm 0 1 2 3 4 5m

SCALE 1:50 AT A0 SIZE SHEET

FOR DEVELOPMENT APPLICATION

AMENDMENTS	DATE	ISSUE
ISSUED FOR DEVELOPMENT APPLICATION	03.06.20	B
ISSUED FOR INFORMATION	13.03.20	A

AMENDMENTS	DATE	ISSUE	AMENDMENTS	DATE	ISSUE

ARCHITECT: SBA ARCHITECTS

CLIENT: Aliro

PROJECT: STATE SIGNIFICANT DEVELOPMENT APPLICATION
44 CLUNIES ROSS STREET, GREYSTANES

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF.
ID	ID	MAR '20	M.W.	A0	AS SHOWN	C013251.06-DA55

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Costin Roe Consulting

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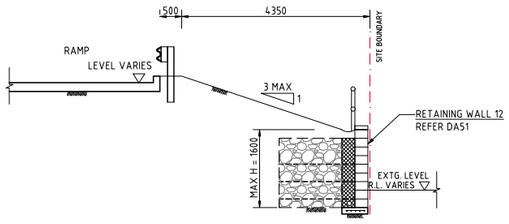
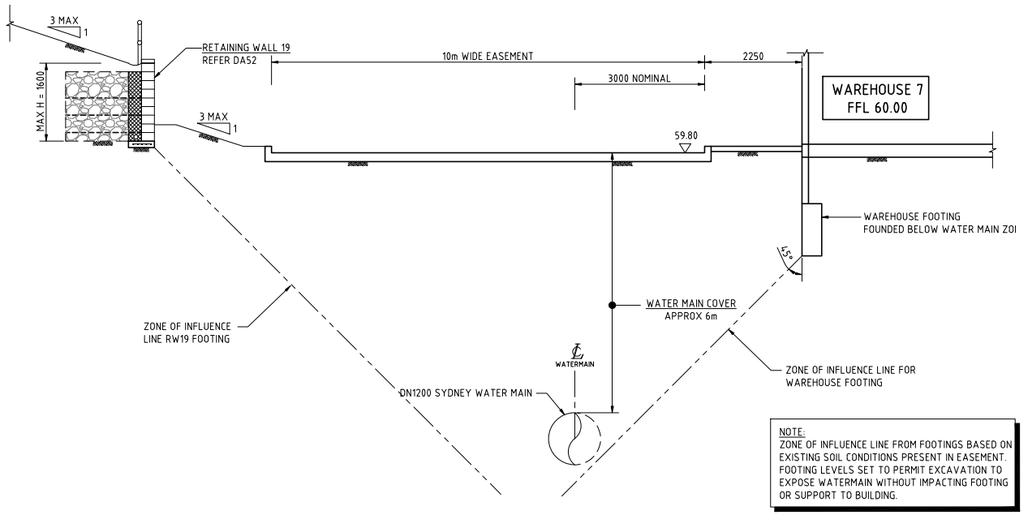
DRAWING TITLE: TYPICAL SECTIONS SHEET 1

DRAWING No: C013251.06-DA55

ISSUE: B

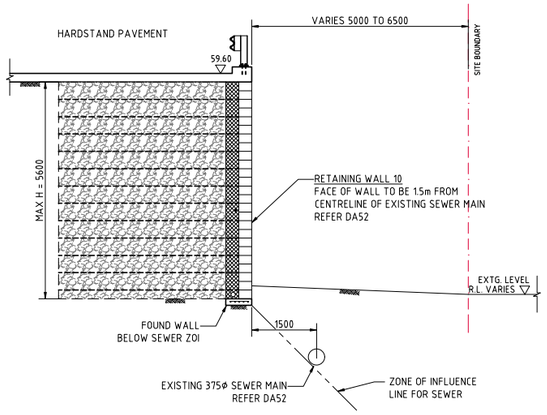


SECTION 1:50 5 DA51



NOTE:
ZONE OF INFLUENCE LINE FROM FOOTINGS BASED ON EXISTING SOIL CONDITIONS PRESENT IN EASEMENT. FOOTING LEVELS SET TO PERMIT EXCAVATION TO EXPOSE WATERMAIN WITHOUT IMPACTING FOOTING OR SUPPORT TO BUILDING.

SECTION 1:50 5 DA52



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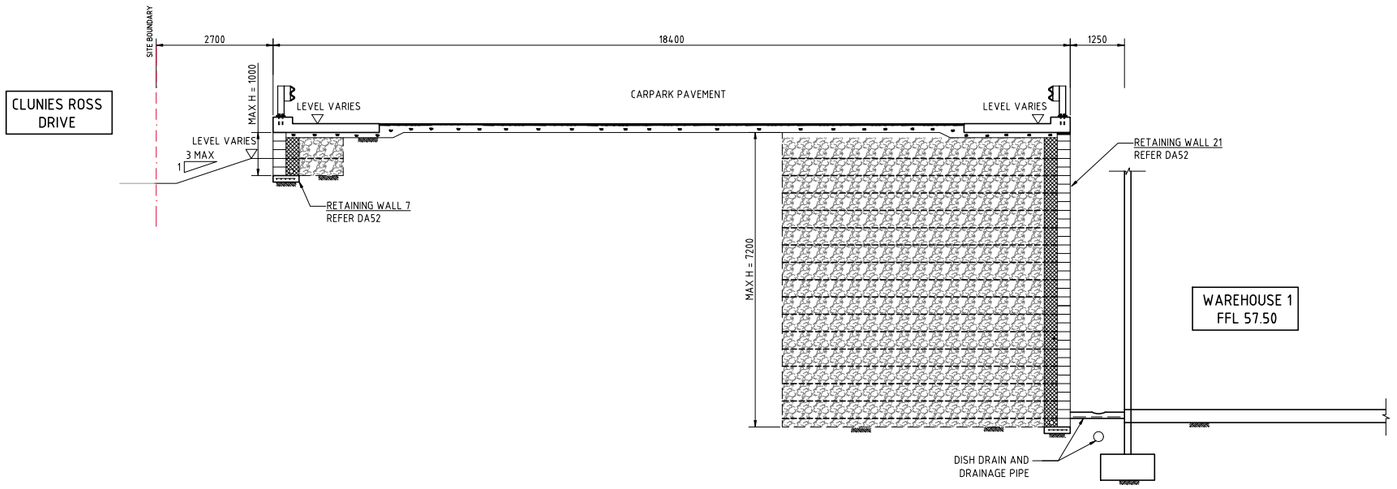

SECTION 1:50 8 DA52

500mm 0 1 2 3 4 5m
SCALE 1:50 AT A0 SIZE SHEET

FOR DEVELOPMENT APPLICATION

AMENDMENTS	DATE	ISSUE
ISSUED FOR DEVELOPMENT APPLICATION	03.06.20	B
ISSUED FOR INFORMATION	13.03.20	A

ARCHITECT: SBA ARCHITECTS
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CLIENT: Aliro

PROJECT: STATE SIGNIFICANT DEVELOPMENT APPLICATION
44 CLUNIES ROSS STREET, GREYSTANES

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF.
ID	ID	MAR '20	M.W.	A0	AS SHOWN	C013251.06-DA56

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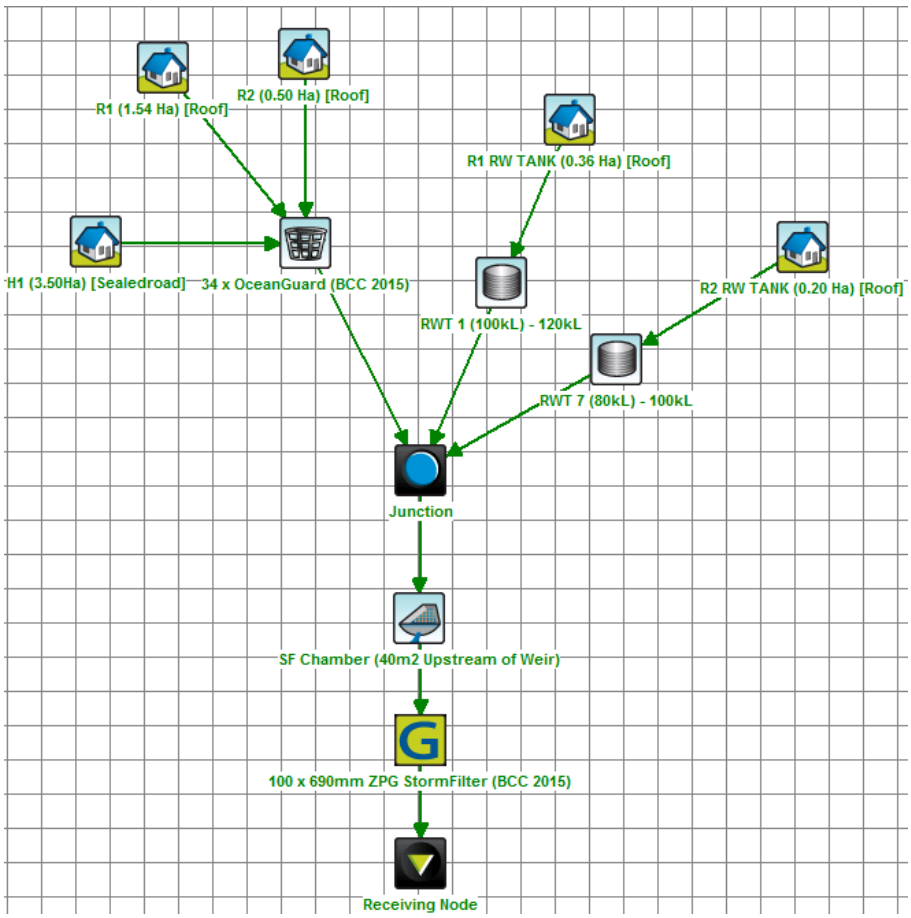
DRAWING TITLE: TYPICAL SECTIONS SHEET 2

DRAWING No: C013251.06-DA56 ISSUE: B

Appendix B
MUSIC Results

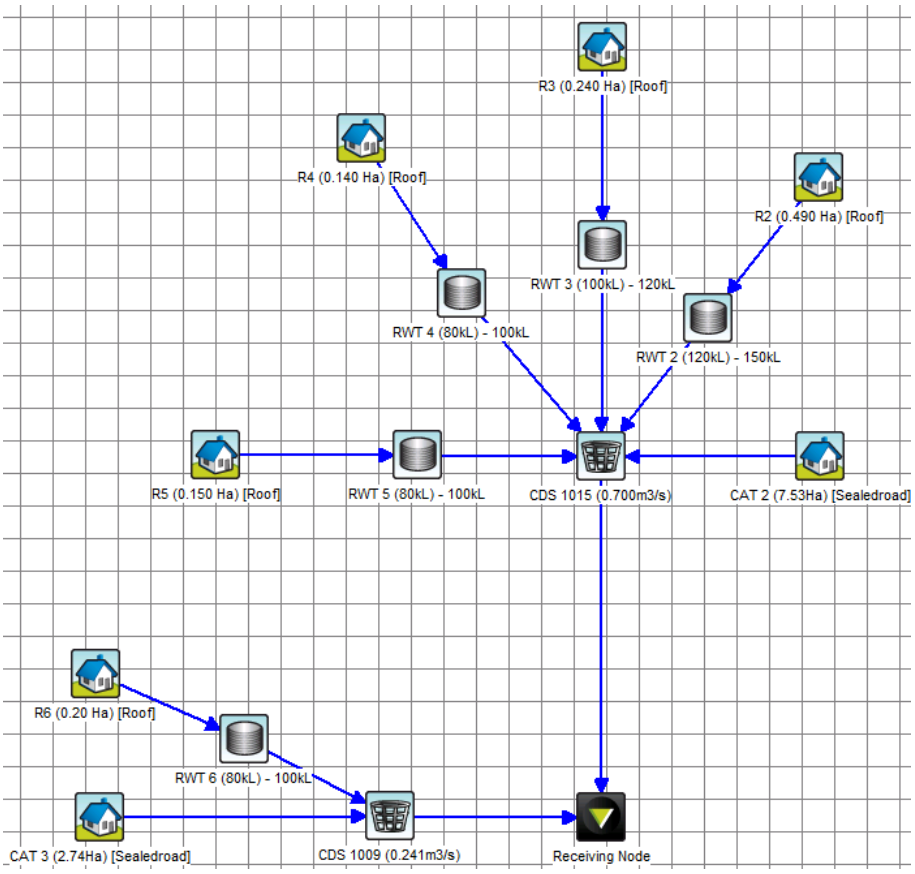
BCC

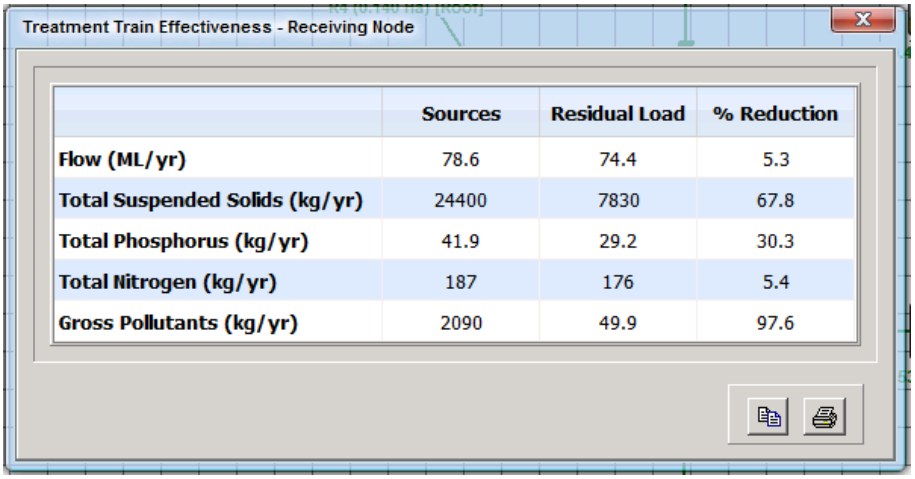


Treatment Train Effectiveness - Receiving Node

	Sources	Residual Load	% Reduction
Flow (ML/yr)	42.5	40.7	4.1
Total Suspended Solids (kg/yr)	8700	1170	86.5
Total Phosphorus (kg/yr)	16.7	5.77	65.5
Total Nitrogen (kg/yr)	97.1	53.3	45.1
Gross Pollutants (kg/yr)	1120	0	100

CCC





Treatment Train Effectiveness - Receiving Node

	Sources	Residual Load	% Reduction
Flow (ML/yr)	78.6	74.4	5.3
Total Suspended Solids (kg/yr)	24400	7830	67.8
Total Phosphorus (kg/yr)	41.9	29.2	30.3
Total Nitrogen (kg/yr)	187	176	5.4
Gross Pollutants (kg/yr)	2090	49.9	97.6

Appendix C
SSD 10399 SEAR's
Dated 16 December 2019

Planning Secretary's Environmental Assessment Requirements

Section 4.12(8) of the *Environmental Planning and Assessment Act 1979*
Schedule 2 of the Environmental Planning and Assessment Regulation 2000

Application Number	SSD-10399
Project Name	Prospect Logistics Estate
Location	Clunies Ross Street, Prospect Lot 10 DP 1022044, Lot 107 DP 1028208, Lot 63 DP 752051, Lot 216 DP1030744, and Lot 601 DP 1047403 within Blacktown and Cumberland Local Government Areas (LGAs)
Applicant	Aliro Management Pty Ltd
Date of Issue	16 December 2019
General Requirements	The Environmental Impact Statement (EIS) for the development must meet the form and content requirements in clauses 6 and 7 of Schedule 2 of the Environmental Planning and Assessment Regulation 2000. In addition, the EIS must include: • a detailed description of the development, including: – the need for the proposed development – justification for the proposed development – likely staging of the development – likely interactions between the development and existing, approved and proposed operations in the vicinity of the site – plans of any proposed building works. • consideration of all relevant environmental planning instruments, including identification and justification of any inconsistencies with these instruments • a risk assessment of the potential environmental impacts of the development, identifying the key issues for further assessment • a detailed assessment of the key issues specified below, and any other significant issues identified in this risk assessment, which includes: – a description of the existing environment, using sufficient baseline data – an assessment of the potential impacts of all stages of the development, including any cumulative impacts, taking into consideration relevant guidelines, policies, plans and statutes – a description of the measures that would be implemented to avoid, minimise, mitigate and if necessary, offset the potential impacts of the development, including proposals for adaptive management and/ or contingency plans to manage significant risks to the environment • a consolidated summary of all the proposed environmental management and monitoring measures, highlighting commitments included in the EIS. The EIS must also be accompanied by a report from a qualified quantity surveyor providing: • a detailed calculation of the capital investment value (CIV) of the development as defined in clause 3 of the Environmental Planning and Assessment Regulation 2000, including details of all components of the CIV • an estimate of the jobs that will be created by the development during the construction and operational phases of the development • certification the information provided is accurate at the date of preparation.

Key issues	The EIS must address the following specific matters: • **Community and Stakeholder Engagement** – including: – a detailed community and stakeholder participation strategy which identifies who in the community has been consulted and a justification for their selection, other stakeholders consulted and the form(s) of consultation, including a justification for this approach – a report on the results of the implementation of the strategy including issues raised by the community and surrounding land owners and occupiers that may be impacted by the proposal – details of how issues raised during community and stakeholder consultation have been addressed and whether they have resulted in changes to the proposal – details of the proposed approach to future community and stakeholder engagement based on the results of consultation. • **Strategic Context** – including: – details of any proposed consolidation or subdivision of land – a demonstration that the proposal is generally consistent with all relevant planning strategies, environmental planning instruments and development control plans (DCPs) and district plans. Outline and justify any inconsistencies with any of these documents. • **Suitability of the Site** – including: – an analysis of site constraints – details of all development consents and approved plans for the existing industrial estate – a detailed justification that the site is suitable for the scale of the proposal, having regard to the site's surrounds and the potential visual impact of the development. • **Urban Design and Visual** – including: – a detailed design analysis of the proposed development with reference to the building form, height, setbacks, bulk and scale in the context of the immediate locality, the wider area and the desired future character of the area, including views, vistas, open space and the public domain – a detailed assessment (including photomontages and perspectives) of the facility (buildings and storage areas) including height, colour, scale, building materials and finishes, signage and lighting, particularly from nearby public receivers and significant or important vantage points of the broader public domain – consideration of the layout and design of the development having regard to the surrounding vehicular, pedestrian and cycling networks – an options analysis for the proposed building materials, architectural treatments, finishes and colour of the buildings, prepared in consultation with nearby sensitive receivers with evidence of consultation provided – a design report that establishes design guidelines and development parameters, and includes diagrams, illustrations and drawings to clarify the design intent of the proposal and which clearly demonstrates how design quality will be achieved in accordance with Clause 31 Design Principles of the State Environmental Planning Policy (Western Sydney Employment Area) 2009 – suitable landscaping incorporating endemic species. • **Heritage** – including: – identification and description of the relevant non-Aboriginal heritage items, including built heritage, landscapes and archaeology, that exist across the development and document in a Statement of Heritage Impact (SOHI). – a description and assessment of potential impacts on non-Aboriginal heritage item(s) such as on Prospect Hill and Mar-Rong Reserve – measures to avoid and/or mitigate the impact on the heritage significance or cultural heritage values of the site and the surrounding heritage item(s)

	– identification and description of the Aboriginal cultural heritage values that exist across the development and document in an Aboriginal Cultural Heritage Assessment Report (ACHAR) – consultation with Aboriginal people must be undertaken and documented in ACHAR – a description and assessment of potential impacts on Aboriginal cultural heritage values such as Prospect Hill and Mar-Rong Reserve • **Traffic and Transport** – including: – a Traffic Impact Assessment detailing all daily and peak traffic and transport movements likely to be generated (vehicle, public transport, pedestrian and cycle trips) during construction and operation of the development, including a description of vehicle access routes and the impacts on nearby intersections – details of access to the site from the road network including intersection location, design and sight distance – an assessment of predicted impacts on road safety and the capacity of the road network to accommodate the development – detailed plans of the proposed site access and parking provision on site in accordance with the relevant Australian Standards – identification of any dangerous goods likely to be transported on arterial and local roads to/ from the site and, if necessary, the preparation of an incident management strategy – details of impact mitigation, management and monitoring measures. • **Soils and Water** – including: – a description of the water demands and a breakdown of water supplies, including a detailed site water balance – a description of the measures to minimise water use – a description of all wastewater generated on site – characterisation of the nature and extent of any contamination of the site and a description of proposed measures – a detailed description of any cut and fill works and/ or additional retaining walls required to facilitate the development – a description of the proposed erosion and sediment controls during construction and operational phases of the development – a description of the surface and stormwater management system, including on site detention, and measures to treat or re-use water – an assessment of potential surface and groundwater impacts associated with the development including impacts on bulk water supply infrastructure within the vicinity of the site – a description of the surface and stormwater management including drainage design, on site detention, and measures to treat or re-use water – a flooding assessment – a description of erosion and sediment controls – details of impact mitigation, management and monitoring measures. • **Noise and Vibration**– including: – a description of all potential noise and vibration sources during the construction and operational phases of the development, including on and off-site traffic noise – a cumulative noise impact assessment of all potential noise sources in accordance with relevant Environment Protection Authority guidelines – details of noise mitigation, management and monitoring measures. • **Air Quality** – including: – an assessment of the air quality impacts at private properties during construction and operation of the development, in accordance with the relevant Environment Protection Authority guidelines – details of any mitigation, management and monitoring measures required to prevent and/ or minimise emissions.

	• **Hazards and Risk** – including: – if the storage of dangerous goods is proposed on site, the Environmental Impact Statement must include a preliminary risk screening completed in accordance with *State Environmental Planning Policy No. 33 – Hazardous and Offensive Development* and *Applying SEPP 33* (DoP, 2011), with a clear indication of class, quantity and location of all dangerous goods and hazardous materials associated with the development. Should preliminary screening indicate that the project is "potentially hazardous" a preliminary hazard analysis (PHA) must be prepared in accordance with Hazardous Industry Planning Advisory Paper No. 6 – Guidelines for Hazard Analysis (DoP, 2011) and Multi-Level Risk Assessment (DoP, 2011). • **Waste** – including: – details of the quantities and classification of all waste streams to be generated on site during construction and operation – details of waste storage, handling and disposal during construction and operation – details of the measures that would be implemented to ensure that the development is consistent with the aims, objectives and guidance in the NSW Waste Avoidance and Resource Recovery Strategy 2014-2021. • **Bushfire and Incident Management.** – assess the level of hazard posed to future development on adjacent land and how the hazards may change as a result of development – address the requirements of Planning for Bush Fire Protection 2006 (RFS), in particular the provision of access (including perimeter roads) and water supply for firefighting purposes. • **Biodiversity** – including: – an assessment of the proposal's biodiversity impacts in accordance with the *Biodiversity Conservation Act 2016*, including the preparation of a Biodiversity Development Assessment Report (BDAR) where required under the Act, except where a waiver for preparation of a BDAR has been granted. • **Greenhouse Gas and Energy Efficiency** – including: – an assessment of the energy use on-site, and demonstrate the measures proposed to ensure the development is energy efficient. • **Socio-economic** – including: – an analysis of the economic and social impacts of the development, particularly any benefits to the community. • **Ecologically Sustainable Development** – including: – an assessment of how the development will incorporate ecologically sustainable development principles in all phases of the development − the use of green walls, green roof and/or cool roof into the design and − climate change projections developed for the Sydney Metropolitan area and how they are used. • **Infrastructure Requirements** – including: – details of infrastructure required on the site and identification of any upgrades required to facilitate the development – details of any impacts on existing easements – an assessment of the impacts of the development (construction and operation) on existing infrastructure surrounding the site.
Plans and Documents	The EIS must include all relevant plans, architectural drawings, diagrams and relevant documentation required under Schedule 1 of the Environmental Planning and Assessment Regulation 2000. You should provide these as part of the EIS rather than as separate documents.

Consultation	During the preparation of the EIS, you must consult with the relevant local, State or Commonwealth Government authorities, service providers, community groups and affected landowners. In particular you must consult with: • Cumberland Council • Blacktown City Council • Transport for NSW (including former Roads and Maritime Services) • Environment, Energy and Science Division (formerly Office of Environment and Heritage) • Fire and Rescue NSW • Heritage NSW • WaterNSW • Sydney Water • surrounding local residents and stakeholders. The EIS must describe the consultation process and the issues raised and identify where the design of the development has been amended in response to these issues. Where amendments have not been made to address an issue, a short explanation should be provided.
Further consultation after 2 years	If you do not lodge an EIS for the development within 2 years of the issue date of these SEARs, you must consult with the Secretary in relation to any further requirements for lodgement.
References	The assessment of the key issues listed above must take into account relevant guidelines, policies, and plans as identified. While not exhaustive, the following attachment contains a list of some of the guidelines, policies, and plans that may be relevant to the environmental assessment of this development.

ATTACHMENT 1

Technical and Policy Guidelines

The following guidelines may assist in the preparation of the environmental impact statement. This list is not exhaustive and not all of these guidelines may be relevant to your proposal.

Many of these documents can be found on the following websites:

http://www.planning.nsw.gov.au

http://www.shop.nsw.gov.au/index.jsp

http://www.australia.gov.au/publications

http://www.epa.nsw.gov.au/

http://www.environment.nsw.gov.au/

http://www.dpi.nsw.gov.au/

Policies, Guidelines & Plans

Policies, Guidelines & Plans

Aspect	Policy / Methodology
Visual	
	Control of Obtrusive Effects of Outdoor Lighting (AS 2482)
Heritage	
	Heritage Act 1977
	NSW Heritage Manual (HO and DUAP, 1996)
	The Burra Charter (ICOMOS Australia, 2013)
	Statements of Heritage Impact (HO and DUAP, 2002)
	Code of Practice for the Archaeological Investigation of Aboriginal Objects in New South Wales (DECCW, 2010)
	Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW (DECCW, 2011)
	Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010 (DECCW, 2010)
Traffic, Transport and Access	
	Roads Act 1993
	State Environmental Planning Policy (Infrastructure) 2007
	Guide to Traffic Generating Development (RTA, 2002 as updated)
	Road Design Guide (RMS, 2015-2017)

Policies, Guidelines & Plans

Aspect	Policy / Methodology
	Guide to Traffic Management – Pt 12: Traffic Impacts of Development (Austroads, 2016)
	Guidelines for Planning and Assessment of Road Freight Access in Industrial Areas (Austroads, 2014)
	Bicycle Parking Facilities: Guidelines for Design and Installation (AS 2890.3:2015)
	Integrated Public Transport Service Planning Guidelines: Sydney Metropolitan Area (TfNSW, 2013)
	Future Transport Strategy 2056 (TfNSW, 2018)
	Greater Sydney Services and Infrastructure Plan (TfNSW, 2018)
	NSW Freight & Ports Plan 2018-2023 (TfNSW, 2018)
Soils and Water	
Erosion and Sediment	Managing Urban Stormwater: Soils & Construction (Landcom, 2004)
	Soil and Landscape Issues in Environmental Impact Assessment (DLWC, 2000)
	Wind Erosion – 2nd Edition (DIPNR, 2003)
Groundwater	National Water Quality Management Strategy Guidelines for Groundwater Protection in Australia (ARMCANZ/ANZECC, 2000)
	NSW State Groundwater Policy Framework Document (DLWC, 1997)
	NSW Aquifer Interference Policy (NOW, 2012)
	Water Sharing Plan for the Greater Metropolitan Region Groundwater Sources (NOW, 2011)
	Storing and Handling Liquids: Environmental Protection (DECC, 2007)
Stormwater	Managing Urban Stormwater: Strategic Framework. Draft (EPA, 1996)
	Managing Urban Stormwater: Council Handbook. Draft (EPA, 1997)
	Managing Urban Stormwater: Treatment Techniques (DEC, 2006)
	Managing Urban Stormwater: Source Control. Draft (EPA, 1998)
	Managing Urban Stormwater: Harvesting and Reuse (DEC, 2006)
Wastewater	National Water Quality Management Strategy: Guidelines for Sewerage Systems - Effluent Management (ARMCANZ/ANZECC, 1997)
	National Water Quality Management Strategy: Guidelines for Sewerage Systems - Use of Reclaimed Water (ARMCANZ/ANZECC, 2000)
	National Water Quality Management Strategy – Guidelines for Water Recycling: Managing Health and Environmental Risks (Phase 1) (EPHC, NRMMC & AHMC, 2006)
	National Water Quality Management Strategy – Guidelines for Water Recycling: Managing Health and Environmental Risks (Phase 2) (EPHC, NRMMC & AHMC, 2009)
Contamination	State Environmental Planning Policy No. 55 – Remediation of Land
Noise and Vibration	
	Assessing Vibration: A Technical Guide (DEC, 2006)

Policies, Guidelines & Plans

Aspect	Policy / Methodology
	Noise Policy for Industry (EPA, 2017)
	Environmental Criteria for Road Traffic Noise (EPA, 1999)
	Noise Guide for Local Government (EPA, 2013)
	Interim Construction Noise Guideline (DECC, 2009)
Air Quality	
Air Quality	Protection of the Environment Operations (Clean Air) Regulation 2002
	Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales (DEC, 2007)
	Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales (EPA, 2016)
Greenhouse Gas	AGO Factors and Methods Workbook (AGO, 2018)
	Guidelines for Energy Savings Action Plans (DEUS, 2005)
Hazards and Risk	
	State Environmental Planning Policy No. 33 – Hazardous and Offensive Development
	Applying SEPP 33 – Hazardous and Offensive Development Application Guidelines (DoP, 2011)
Biodiversity	
	Biodiversity Conservation Act 2016
	Biodiversity Assessment Method (OEH, 2017)
	Guidelines for Controlled Activities on Waterfront Land (NRAR, 2018)
Waste	
	Waste Avoidance and Resource Recovery Strategy 2014-21 (EPA, 2014)
Bushfire	
	Planning for Bushfire Protection (RFS, 2006)
Social	
	Social Impact Assessment Guideline (DPE, 2017)
Upper Canal and Warragamba Pipeline Corridors	
	Guidelines for Development Adjacent to the Upper Canal and Warragamba Pipelines (WaterNSW, 2018)

ATTACHMENT 2

Government Authority Responses to Request for Key Issues

Appendix D
Site Survey

0 40 80 120 160 200 METRES

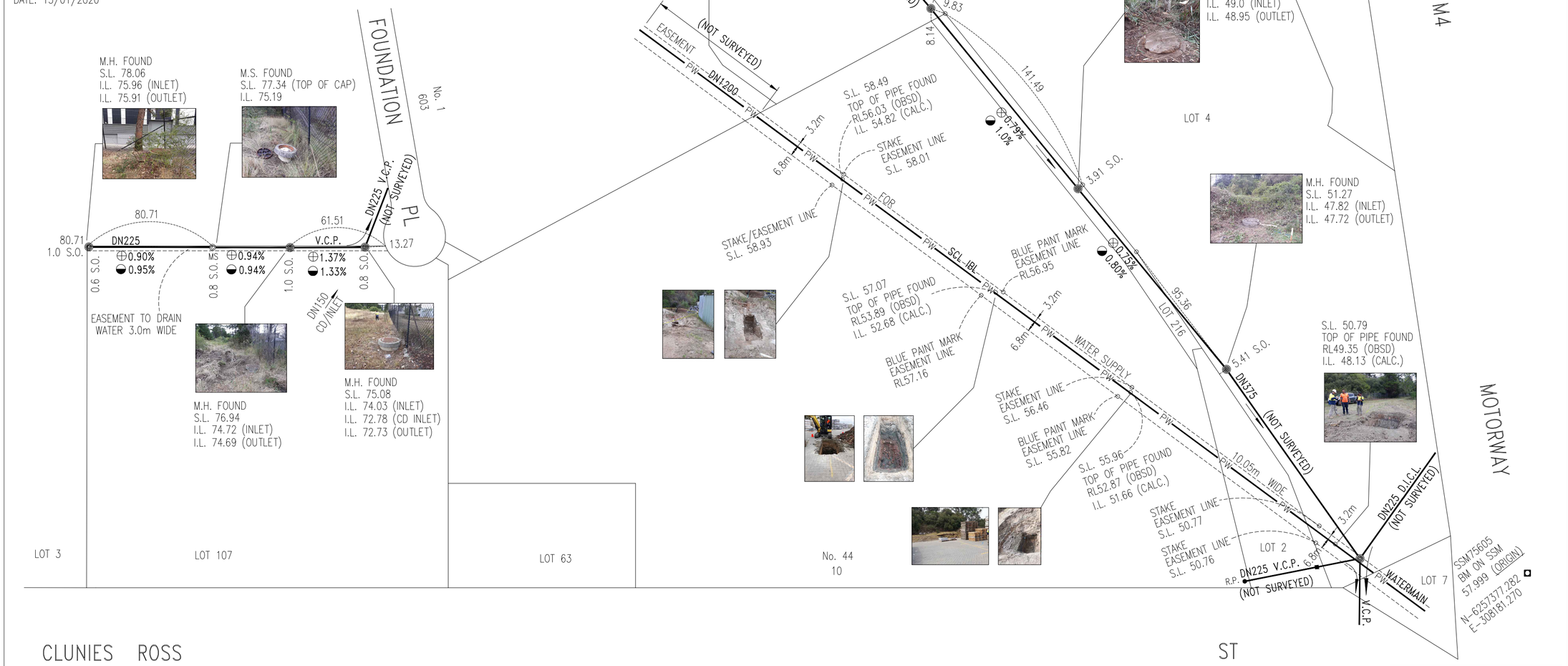
SYDNEY WATER ASSET PROTECTION SURVEY AND PLAN PREPARED BY:

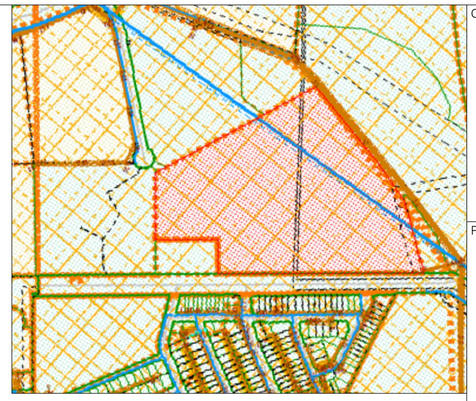
1. LANDPARTNERS PTY LTD, WATER SERVICE COORDINATOR
   PO BOX1144, DUNDAS NSW 2117

   FOR:
   ALIRO GROUP
   LEVEL 32, GOVERNOR MACQUARIE TOWER
   1 FARRER PLACE, SYDNEY NSW 2000

2. DATE OF INSPECTIONS: 07.01.20 – 09.01.20
3. 1:1 ZONE OF INFLUENCE
4. LANDPARTNERS KEY PERSONNEL: CRAIG PATON & NATHAN SANTOS.
5. DO NOT SCALE FROM THIS PLAN (EXCEPT ELECTRONICALLY).
   ALL ASSETS PLOTTED TO MGA COORDINATE SYSTEM USE DIMENSIONS ONLY.
6. ASSET LOCATION METHOD : PHYSICAL DETECTION OF ASSETS.
   DAY 1 SURVEYOR ATTENDED ONSITE TO LOCATE & MARK EASEMENT LINES, WATERMAINS LOCATIONS. AND DETERMINED REAL PROPERTY BOUNDARIES.
   DAY 2 CONSTRUCTOR ATTENDED SITE & EXPOSED WATERMAINS FOR THE SURVEYOR TO DETERMINED TOP OF PIPE. SURVEYOR MARKED APPROX. LOCATION OF SEWER M.H. (AS PER HYDRA INFORMATION).
   DAY 3 CONSTRUCTOR CLEARED VEGETATION TO ACCESS M.H. LOCATIONS. SURVEYOR DETERMINED LOCATION OF M.H.'s WITH MGA CO-ORDINATES. WSC's MEASURED DEPTHS/COVER OF SEWER M.H.'s.

I, CRAIG PATON OF LANDPARTNERS PTY LTD BEING ACCREDITED TO CARRY OUT A SERVICE PROTECTION REPORT, CERTIFY THAT THE INFORMATION SHOWN ON THIS REPORT IS ACCURATE AND HAS BEEN PREPARED IN ACCORDANCE WITH THE RELEVANT INSTRUCTIONS.
DATE: 15/01/2020





HYDRA MAP
(NOT TO SCALE)

CLIENT

ALIRO GROUP
LEVEL 32
GOVERNOR MACQUARIE TOWER
1 FARRER PLACE
SYDNEY NSW 2000

PROJECT

SYDNEY WATER ASSET PROTECTION REPORT

AT

44 CLUNIES ROSS ST
PROSPECT NSW 2148

LEGEND

	SEWER MAIN
	MAINTENANCE HOLE
MS	MAINTENANCE SHAFT
R.P.	MAINTENANCE SHAFT
	SEWER GRADES AS PER SYDNEY WATER RECORDS
	OBSERVED GRADE
PW	WATERMAIN
M.H.	MAINTENANCE HOLE
DN	DIAMETER
DICL	DUCTILE IRON CEMENT LINED
V.C.P.	VITRIFIED CLAY PIPE
S.O.	SQUARE OFF (PERPENDICULAR)
S.L.	NATURAL SURFACE LEVEL
I.L.	INVERT LEVEL
R.L.	REDUCED LEVEL
OBSD	OBSERVED
CALC.	CALCULATED

REV	DESCRIPTION	DRAWN	DATE
A	FIRST ISSUE	NS	17.01.20

LANDPARTNERS built environment consultants

Sydney Office
Level 2, 23-29 South Street
Rydalmere NSW 2116
PO Box 1144
Dundas NSW 2117

p: (02) 9685 2000
f: (02) 9685 2001
e: info@landpartners.com.au
w: www.landpartners.com.au

ISO 9001 Quality Management AS 4801 OHSMS

HEIGHT DATUM: AHD	LOCAL AUTHORITY: BLACKTOWN COUNCIL	
HEIGHT ORIGIN: SSM75605 RL57.999	SCALE: 1:2000 (A2)	
CO-ORD SYSTEM: GDA2020	SURVEYOR: SA	DATE OF SURVEY: 08.01.20
MGA2020 CO-ORD SOURCE: SSM130419 N-6256704.882 E-307837.575	DRAWN: NS	DATE: 16.01.20
AUTOCAD FILE: 74855SWAP	CHECKED: C.P.	DATE: 16.01.20
ARCHIVE FILE: 74855SWAP	APPROVED: C.P.	DATE: 17.01.20
PLAN NUMBER: A2-74855SWAPR		REV: A

GDA2020

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Appendix E
Meeting Minutes
Blacktown City Council – 17 September 2019

MEETING MINUTES

Issue date:	29 November 2019	**Project Name:**	44 Clunies Ross Street, Greystanes
Meeting date:	17 September 2019	**Project No.:**	Co13251.06
Meeting Location:	Blacktown City Council offices		

Attendee	Company	Contact
John Molteno	Blacktown City Council	JM
Jey Mahendra	Blacktown City Council	JM
Approximately 5 other technical officers	Blacktown City Council	No records
Andrew Needham	Aliro	AN
Ben Keen	ISPT	BK
Mark Wilson	Director, Costin Roe Consulting Pty Ltd	MW
Xavier Cure	Associate Director, Costin Roe Consulting Pty Ltd	XC

No.	Notes/Action	Responsibility	Action by
1	**General Meeting Discussion Notes**		
1.a	AN and BK described the proposed overall precinct, land parcels and development. Also this development in relation to the overall context of the area and progression of the industrial precinct, and key strategic position of the land parcel as noted: (i) the intent to lodge and SSDA within 4-6 months of the meeting. (ii) From strategic point AN confirmed proposed uses to be warehouse/ distribution type users + pharmacy, trade etc. No bulky goods. Similar in nature to the nearby Greystanes Quarry Estate users.		

	(iii) SSD application with warehousing use over the whole site as a masterplan. Any specific uses would be separate or mods. (iv) Note all properties will be consolidated as a single lot. ISPT will hold this in perpetuity, will develop and leasehold all tenancies. (v) 5 star green star rating is intended for the overall estate.		
1.b	MW presented and discussed drawings relating to the stormwater management concepts proposed and discussed in Items 1.c to 1.f below: **Co13251.06-C40** and **Co13251.06-C32** <u>Note:</u> Drawings were provided to Council by Aliro prior to meeting.		
1.c	MW discussed the existing regional/ council owned detention system on the north of the site, and water quality wetland/ basin on the north-west of the site (which service this site and the broader industrial catchment) both currently encroach onto the subject development property.		
1.d	MW discussed that as part of the development of the land it is proposed to modify the regional basin to remove the existing encroachment of OSD storage and water quality basin on the site as set out in the concept drawings presented.		
1.e	MW noted the proposal and that a general discussion held with Tony Merrilees approximately 6-8 months prior to the meeting regarding high level requirements for adjusting the detention system. These included maintaining pre and post development flood storage, ensuring no affectation to upstream downstream or adjacent properties, ensuring no change in water quality provisions		
1.f	MW noted it is proposed to include additional storage to the existing basin to provide capacity for stormwater detention requirements for the whole of the proposed development.		
1.g	MW request drawings of regional basin from John Molteno.		

2	**Discussion from Council/ Mr John Molteno (JM) relating to the proposed basin and drainage considerations**		
2.a	JM noted the basin is a prescribed dam, however managed by Council. Any proposed modification or works to the basin would need to be confirmed and passed through council, and the NSW Dam Safety Committee for approval prior to any works in addition to the SSD process.		
2.b	Given the below technical items can be worked through, the modification to the basin and wetland would be able to be supported by council.		
2.c	Technical items to consider as follows: (i) affectation to upstream, downstream or adjoining properties. (ii) Pre and post development flood storage is required to be maintained up to the 1% AEP flood level. (iii) Need to review PMF performance post development compared to pre-development and confirm flood safety requirements are maintained. (iv) Underground cables noted in and around the clay core embankment - CRC to check DBYD. (v) Access paths for pedestrian and AWD vehicles and construction machinery required around basin. (vi) Noted dispersive clays are present in the area. A geotechnical investigation will be required. (vii) An REF assessment will be required for any works in and around the base of the detention system. (viii) The development water quality and quantity would need to meet Part J water quality requirements.		
2.d	Urban heat + tree canopy would need to be considered for the overall development.		

Appendix F
Dial Before You Dig Information

Indicative Plans

Issue Date:	06/03/2020	DIAL BEFORE YOU DIG www.1100.com.au
Location:	44 Clunies Ross Street , Prospect , NSW , 2148	

1	6	11
2	7	12
3	8	13
4	9	14
5	10	15

LEGEND

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

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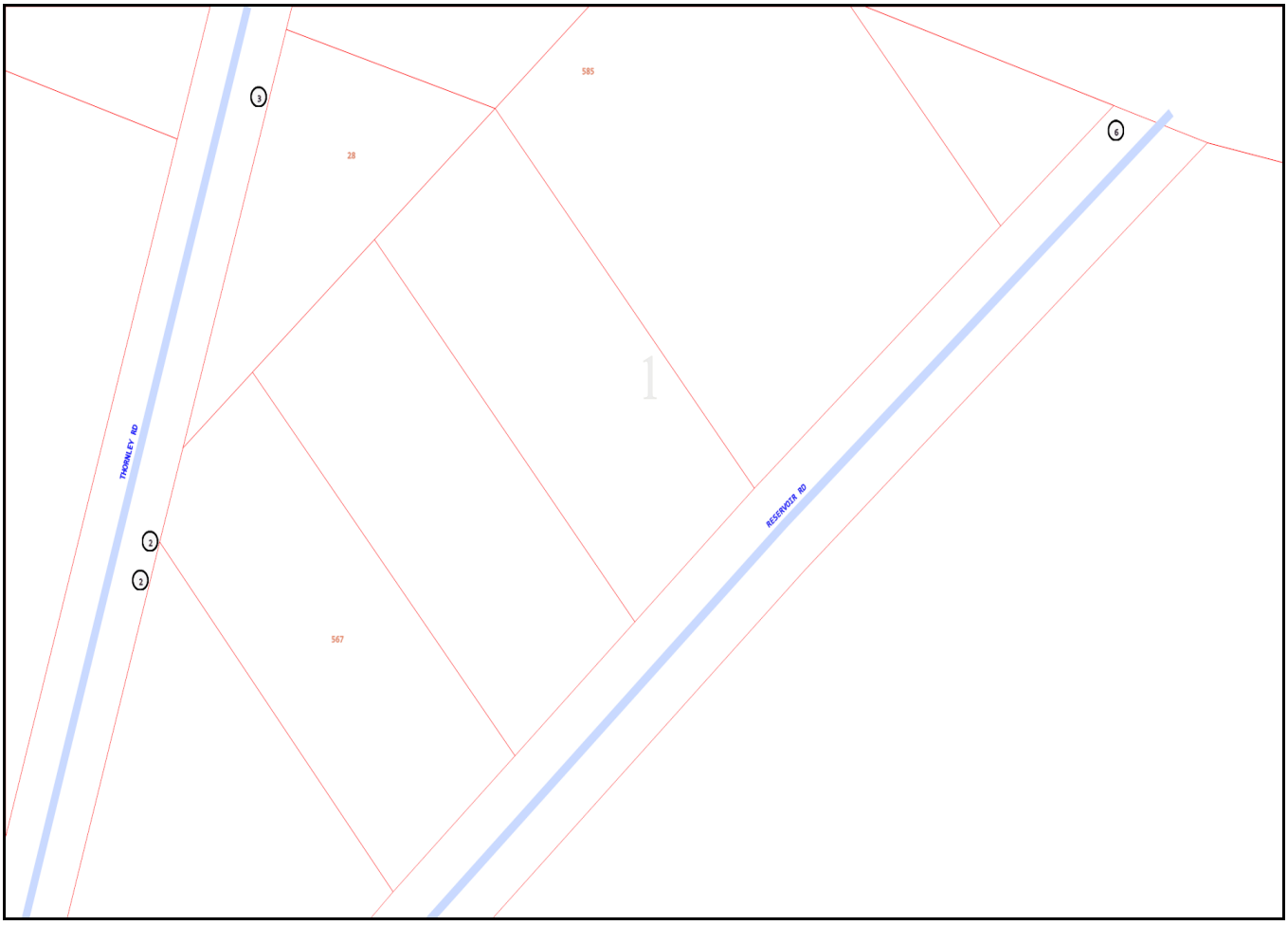
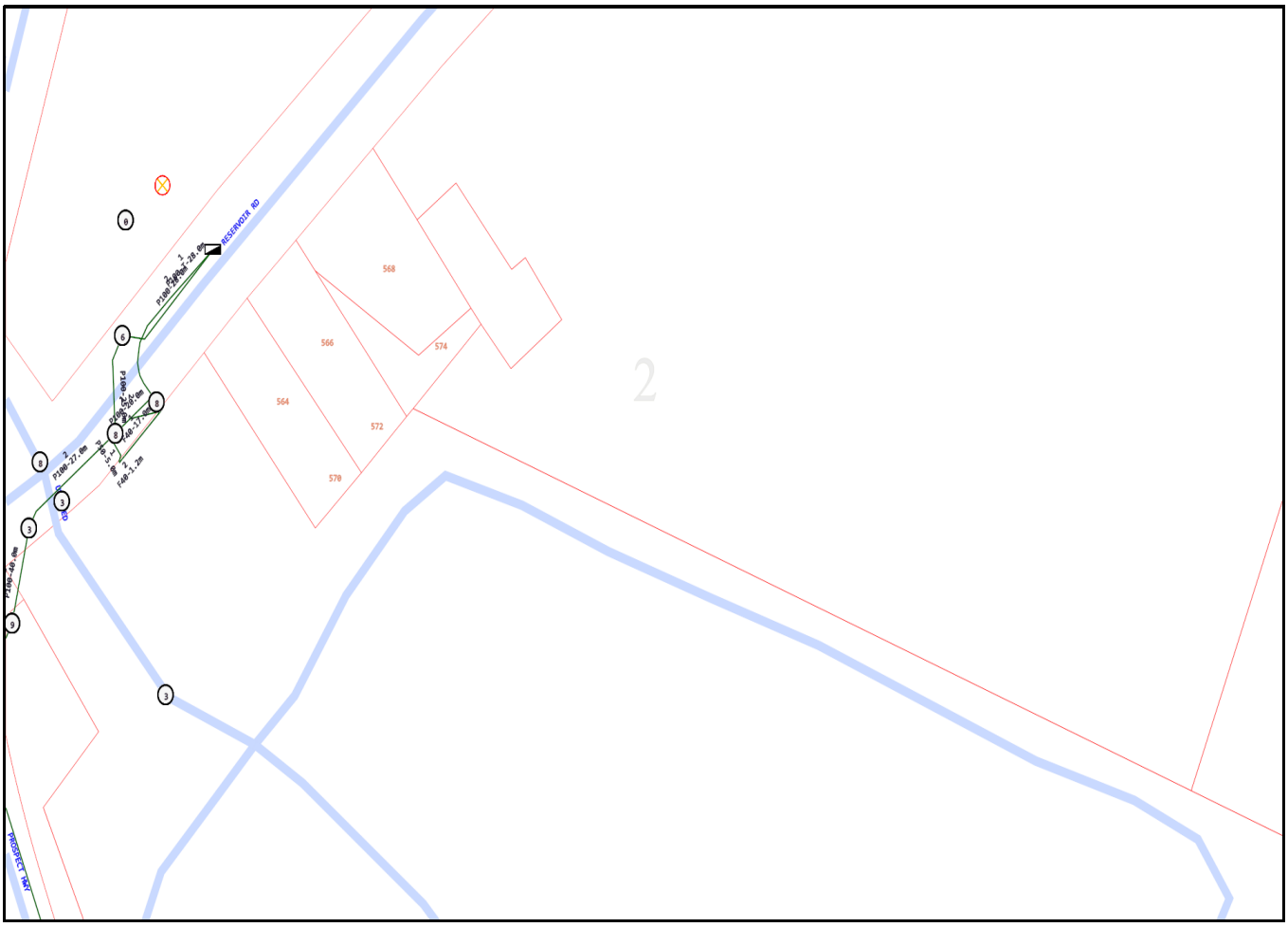
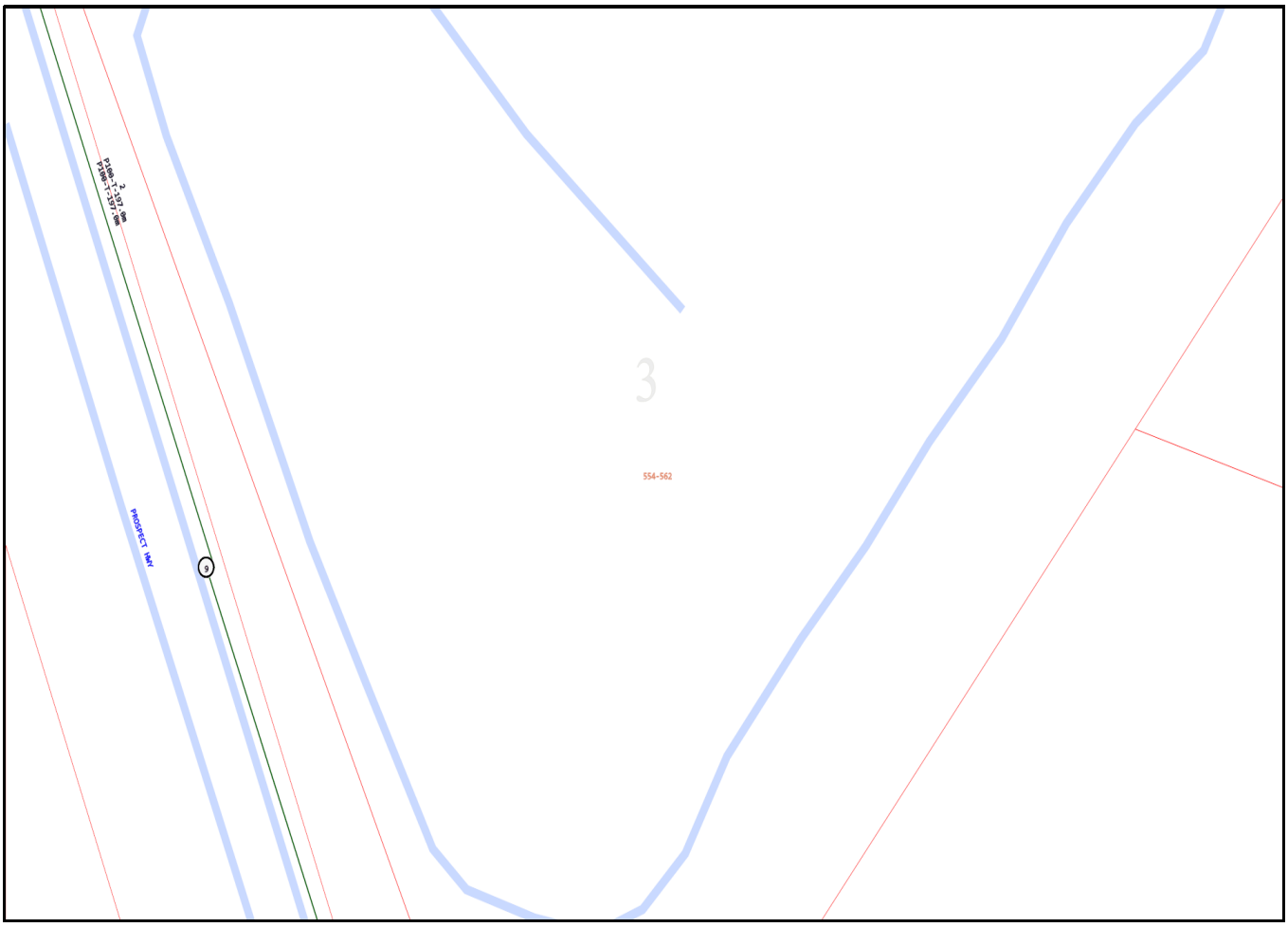
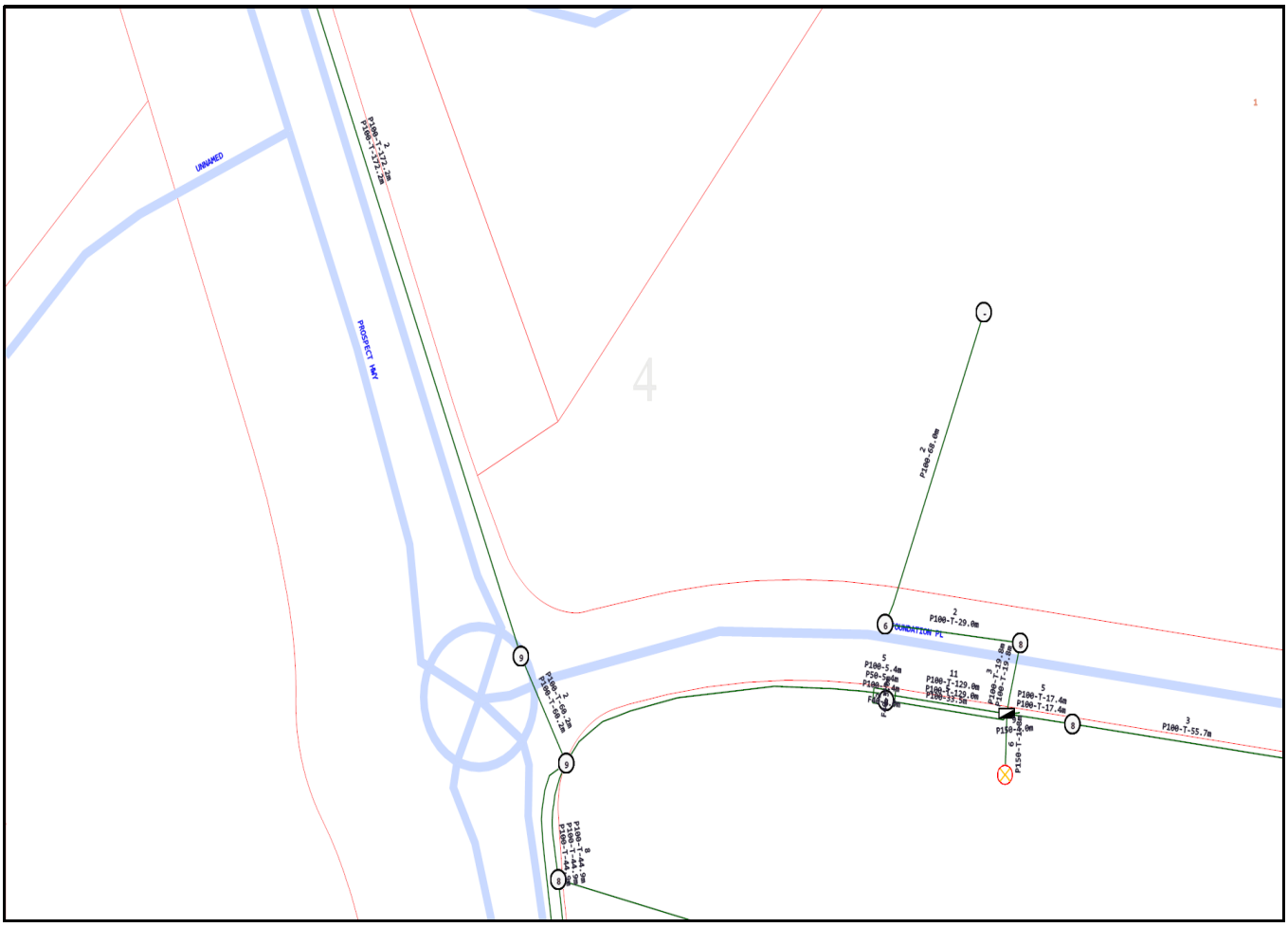

585
28
1
THORNLEY RD
RESERVOIR RD
567


RESERVOIR RD
568
566
574
564
572
570
PROSPECT HWY


PROSPECT WAY
9
3
554-562



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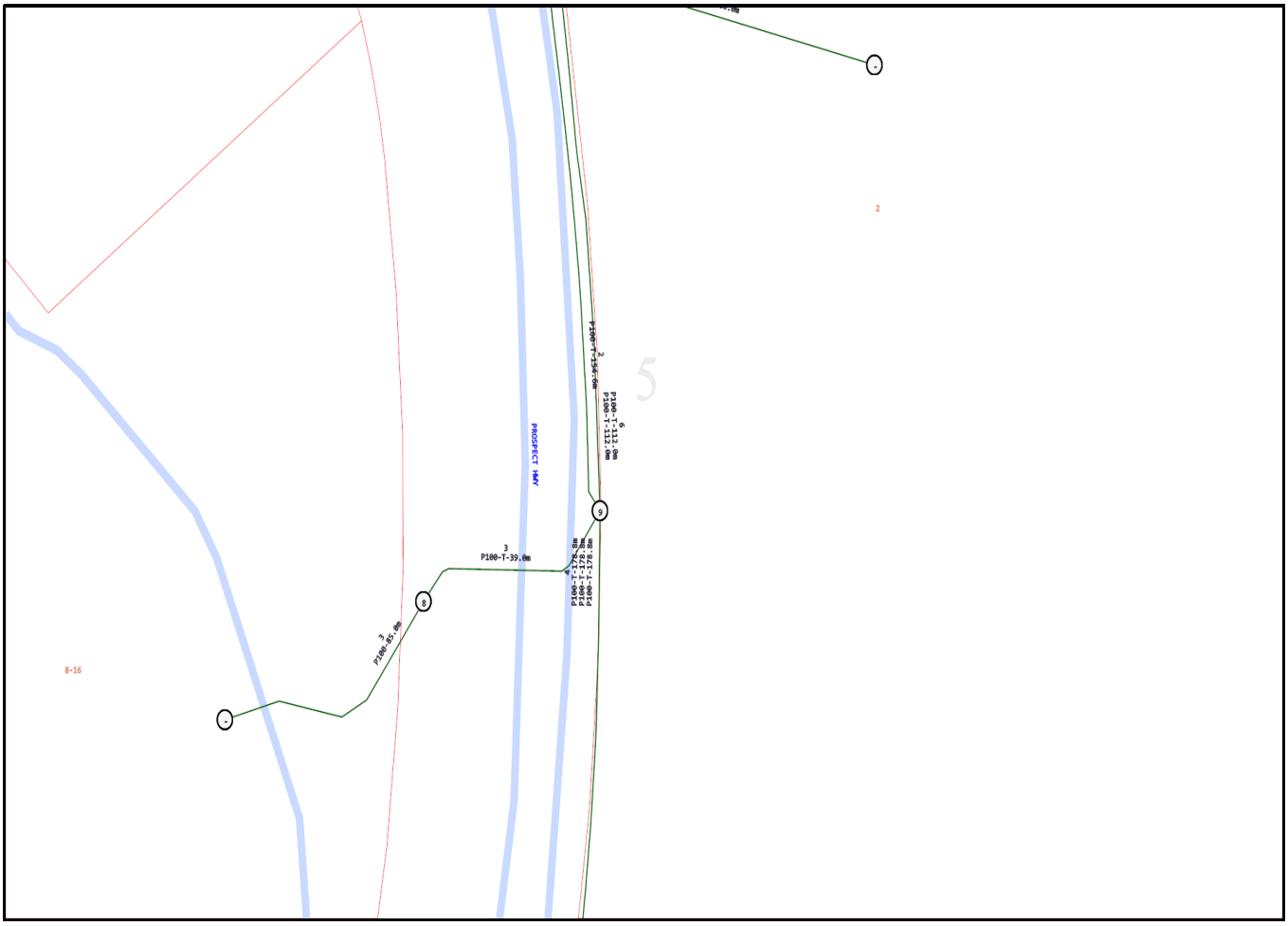
Email info@nbn.com.au Web nbn.com.au



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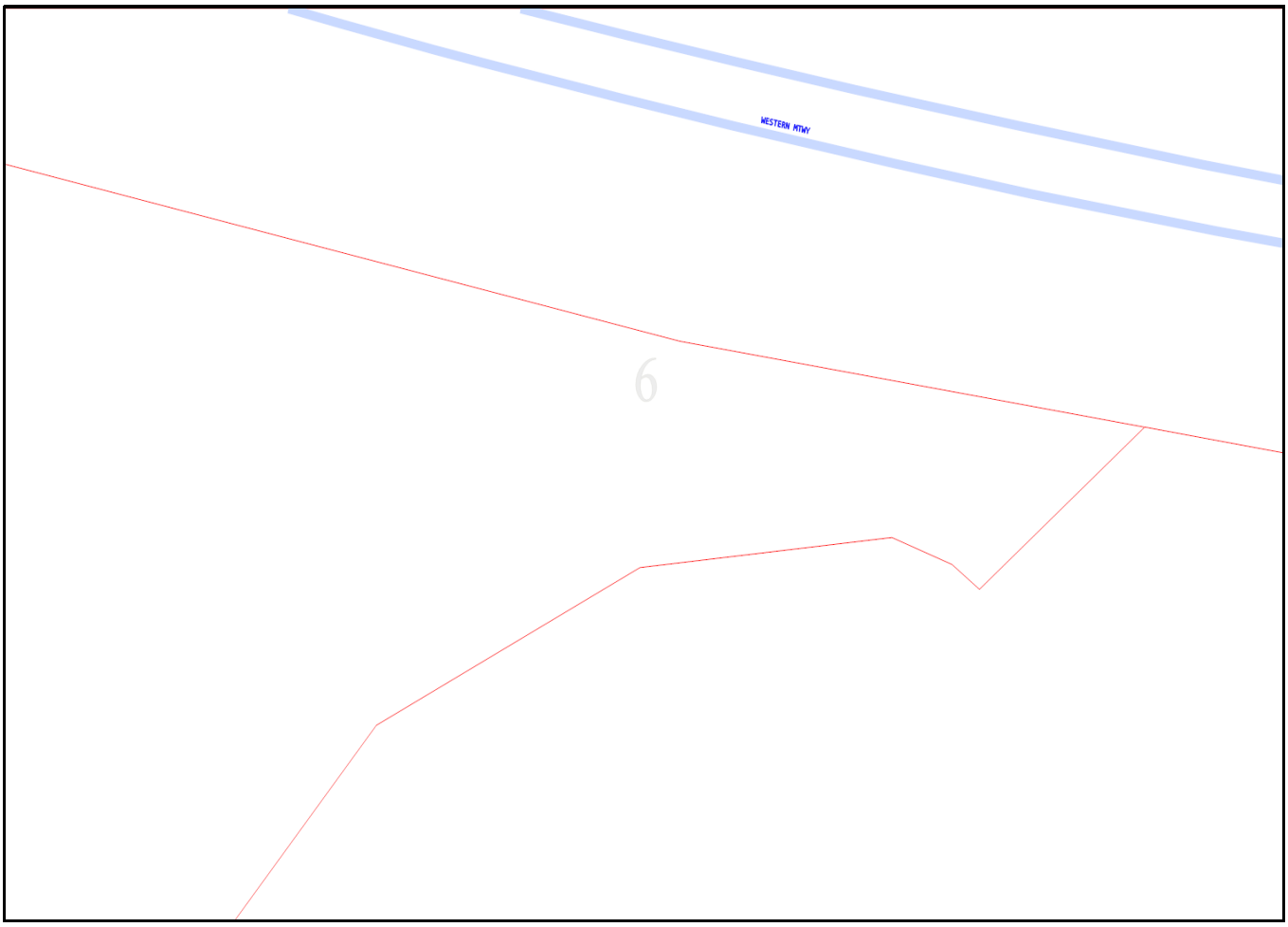
WESTERN HTWY
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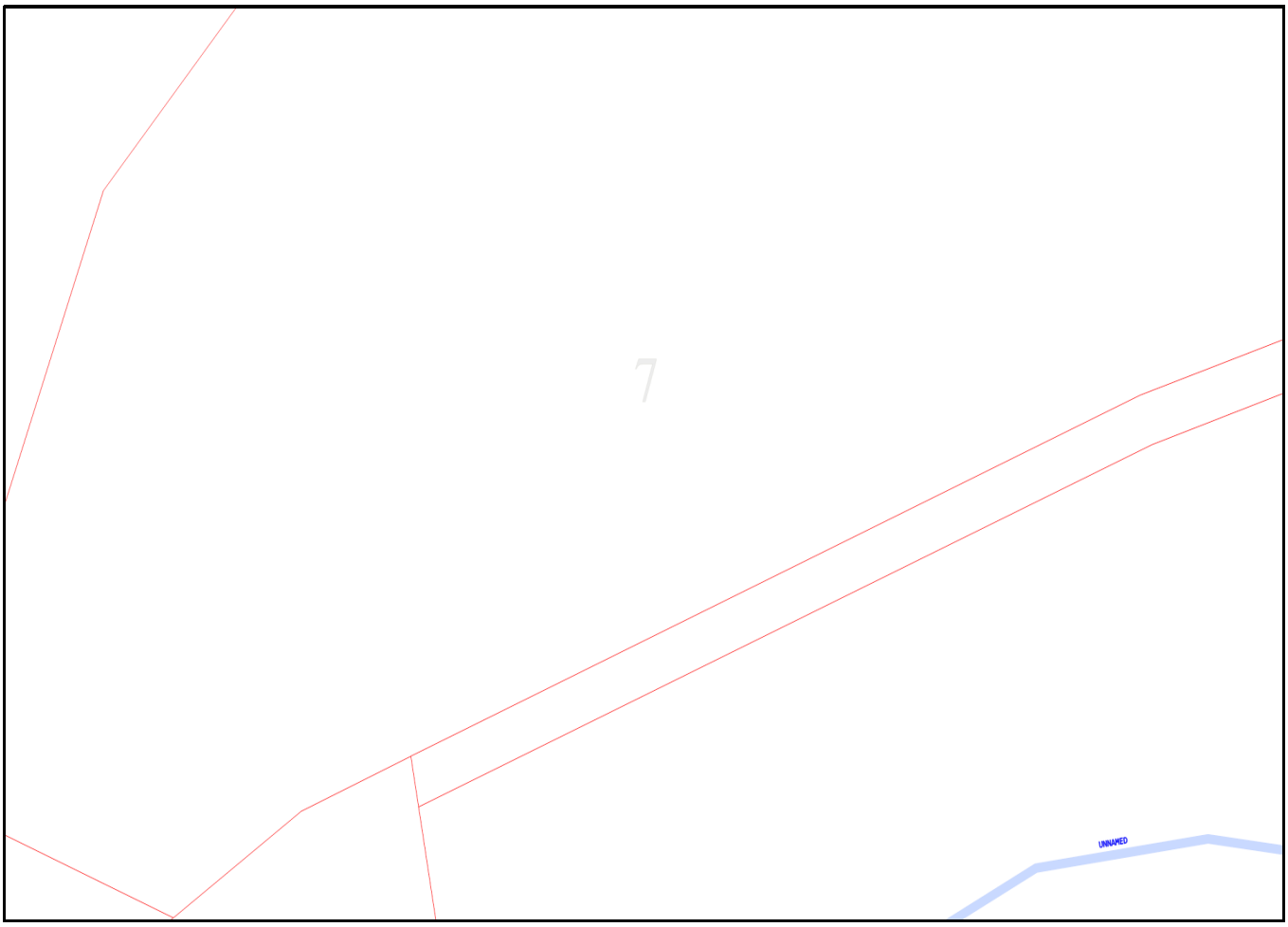

Level 11, 100 Arthur Street, North Sydney NSW 2060
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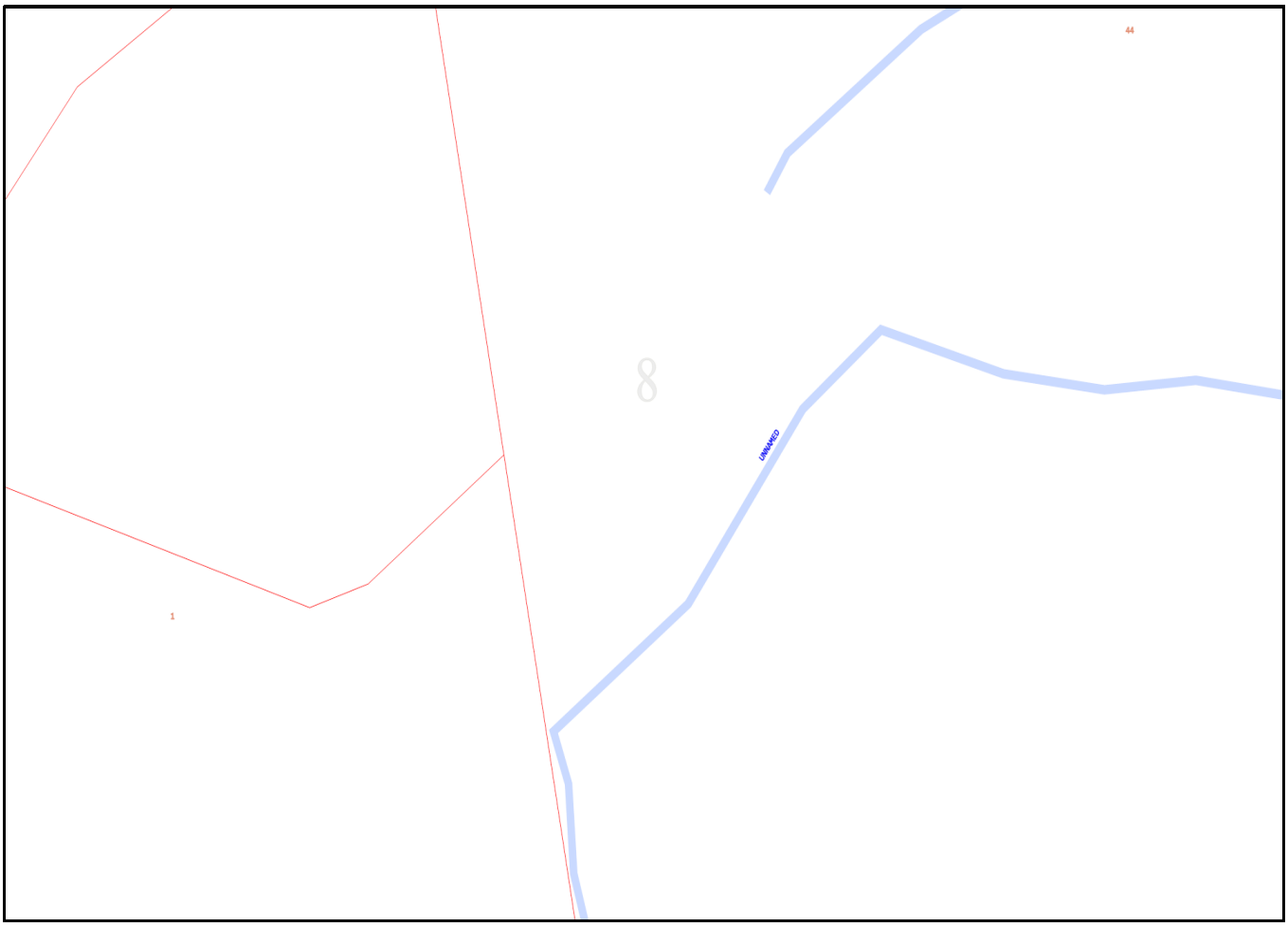
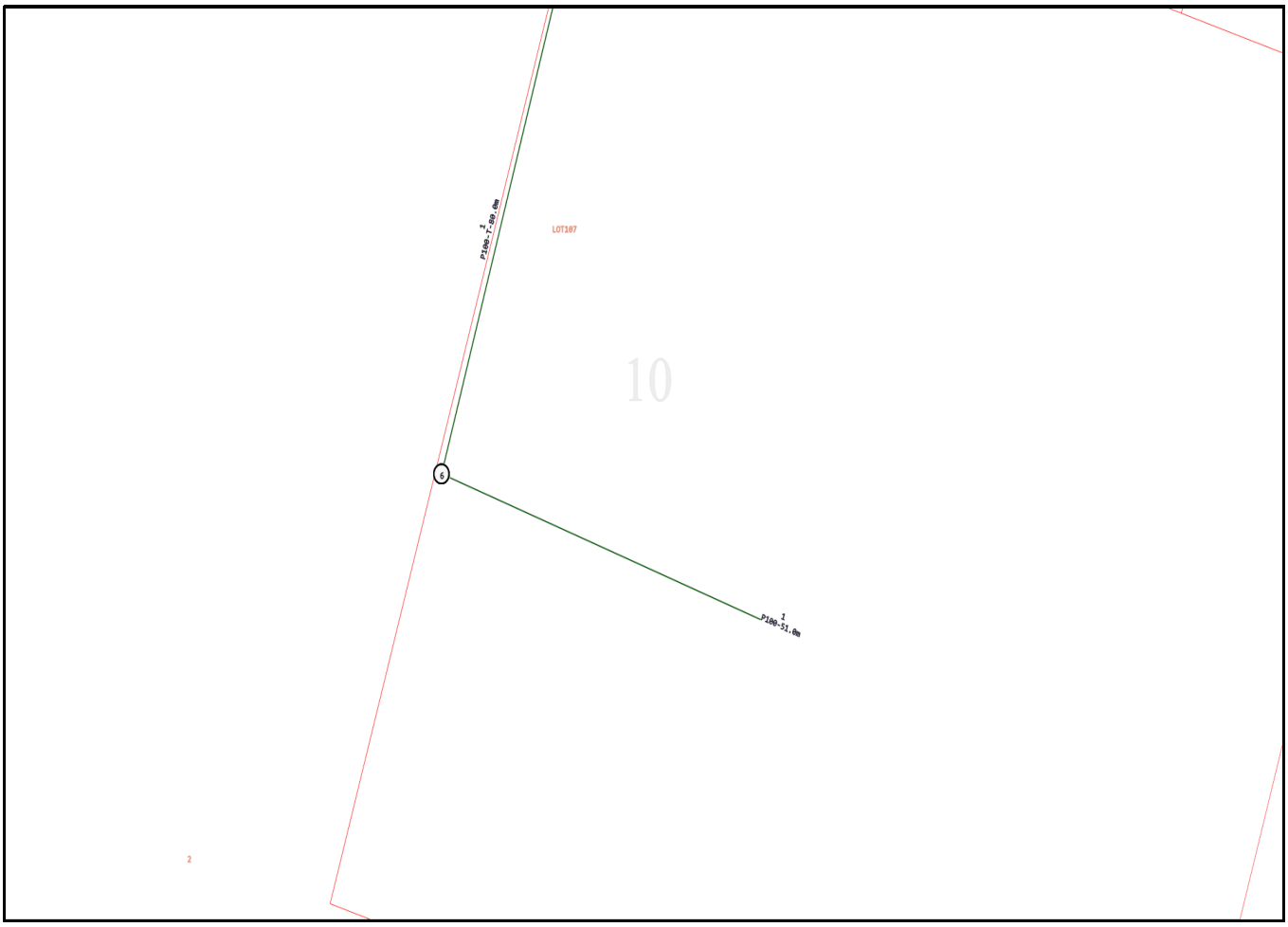
Email info@nbn.com.au Web nbn.com.au


44
8
UNNAMED
1

FOUNDATION PL
3
P100-T-154.4m


LOT107
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6
P100-51.0m
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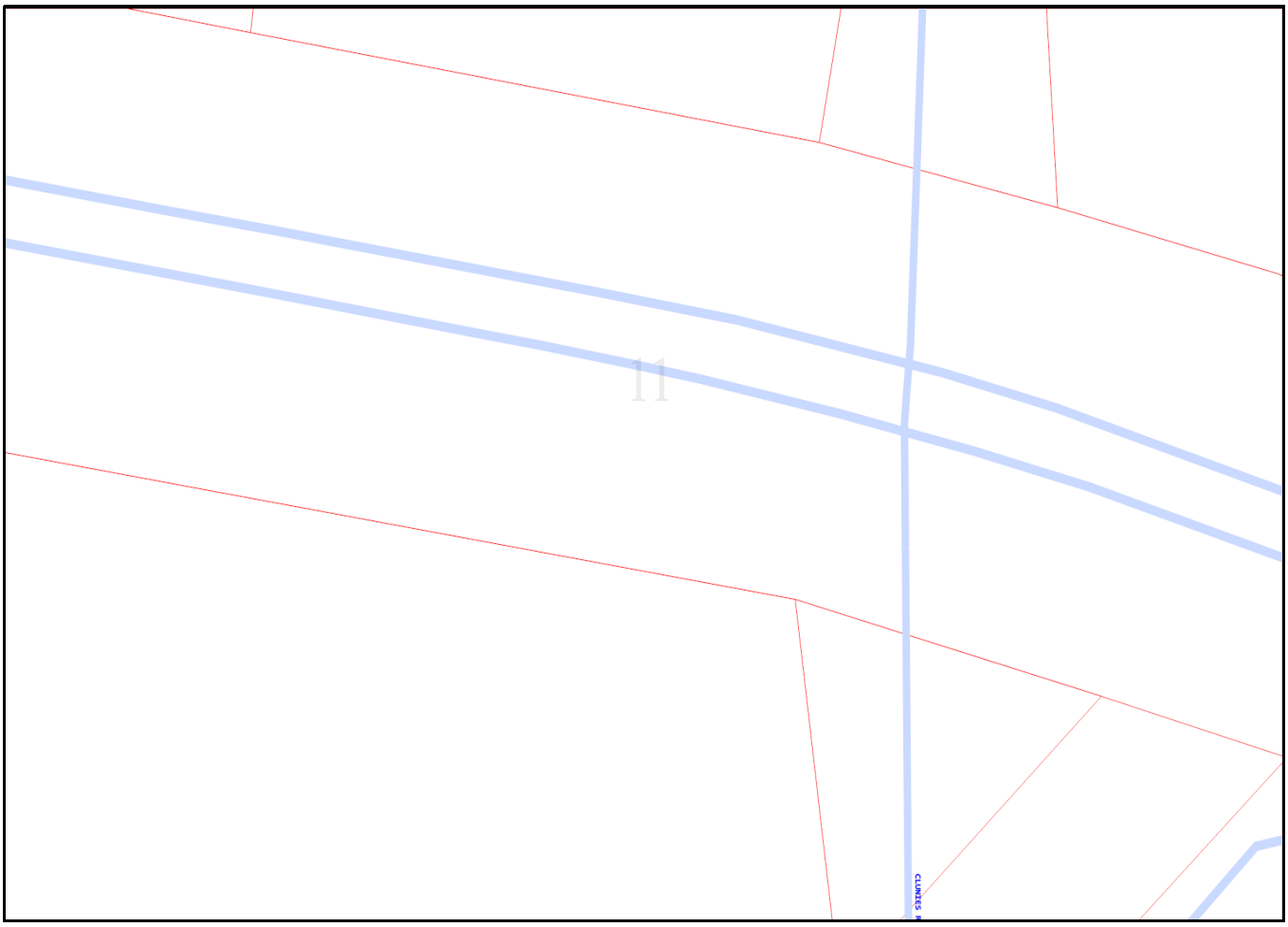
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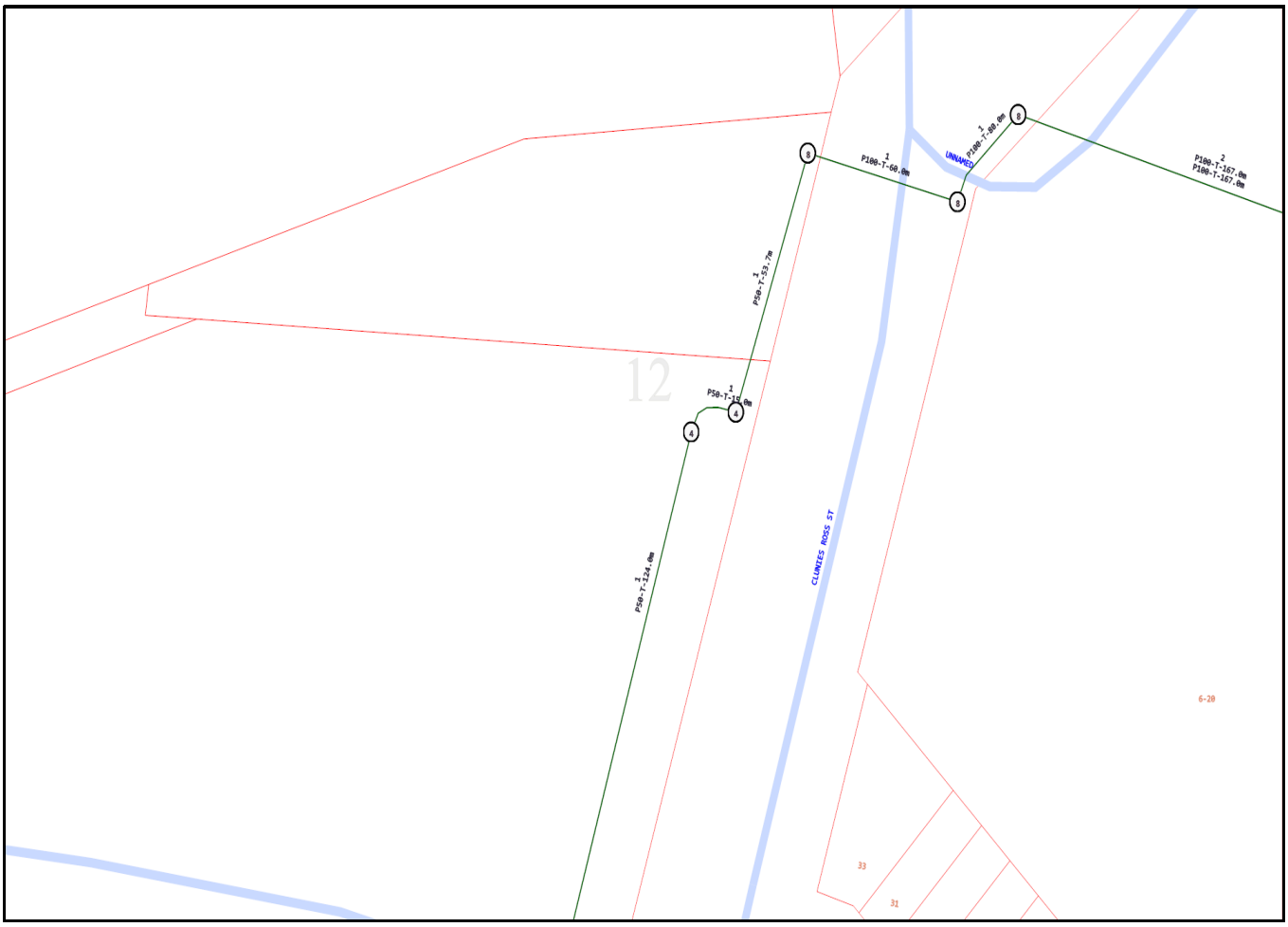
CLARES



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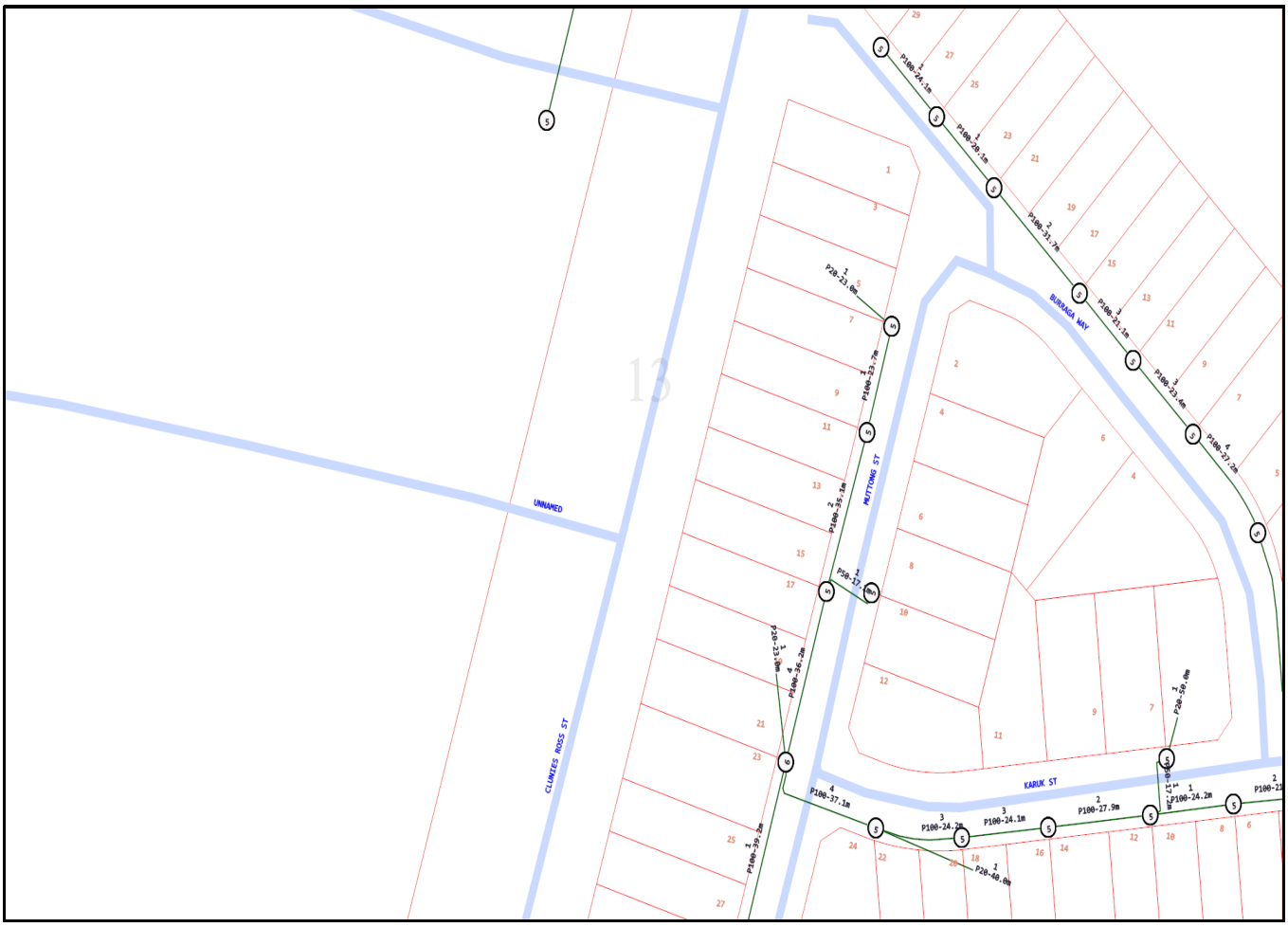
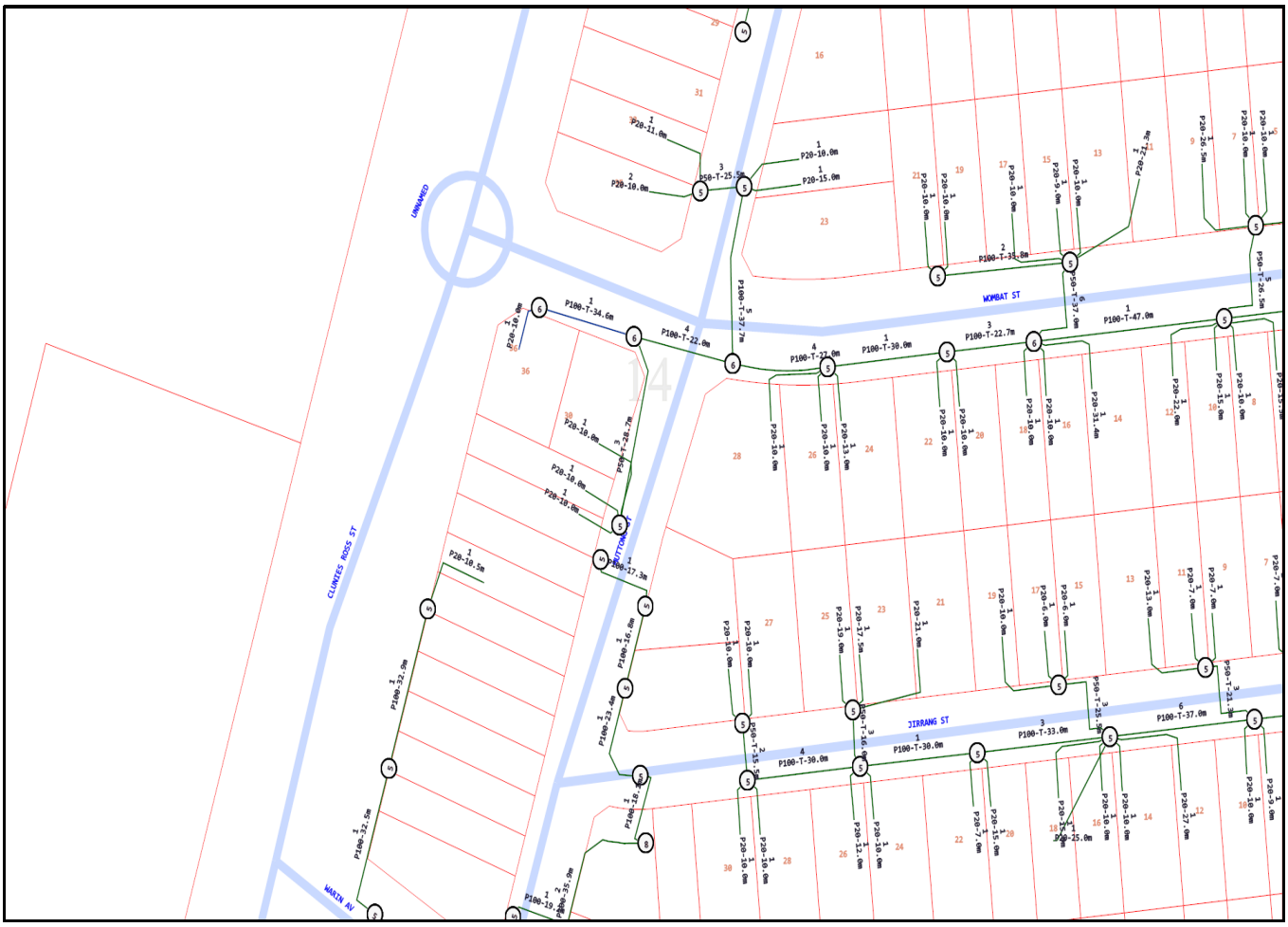

UNNAMED
CLUNIES ROSS ST
MUTTONG ST
BURAGA WAY
KARUK ST



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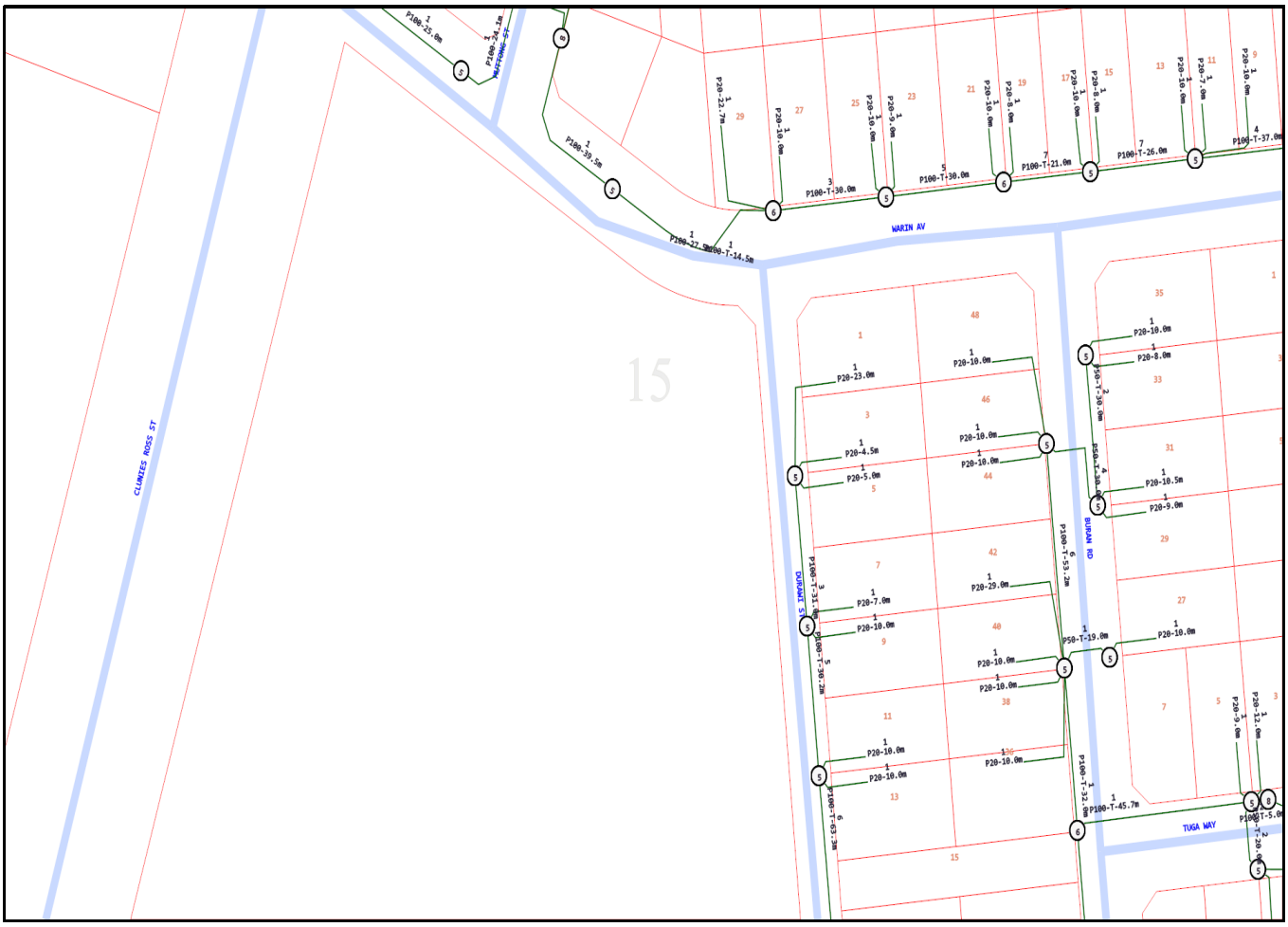
Email info@nbn.com.au Web nbn.com.au



Emergency Contacts

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

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Response Cover Letter

Date: 06/03/2020

PIPE Networks
Level 17, 127 Creek St
Brisbane QLD 4000
Phone: +61 732339895
Fax: +61 732339880

To:
Ms Erika Watkinson - Customer ID: 1737314
Costin Roe Consulting Pty Ltd - Ms Erika Watkinson
PO Box N419
Sydney
NSW
2000

Email: erika.watkinson@costinroe.com.au
Phone: 02 9251 7699
Fax: Not Supplied
Mobile: Not Supplied

Dear Ms Erika Watkinson

The following is our response to your Dial Before You Dig enquiry.

Assets Affected: PIPE Networks

Sequence Number: 95550396

Location: 44 Clunies Ross Street
Prospect
NSW
2148

Commencement Date: 07/03/2020

Please read over the attached documents for more information about your enquiry.

DISCLAIMER: *No responsibility/liability is taken by PIPE Networks for any inaccuracy, error, omission or action based on the information supplied in this correspondence.*

Note: *If the works fall in an area that adjacent to PIPE Networks infrastructure, a pre-inspection is required prior to commencement of works. Contact PIPE Networks to arrange an inspection time.* ***NO WORKS TO COMMENCE PRIOR TO INSPECTION.***

Level 17, PIPE Networks House, 127 Creek Street, Brisbane 4000
PH:(07) 3233 9895 FAX:(07) 3233 9880

Attention: Ms Erika Watkinson
Fax: Not Supplied
DBYD Enquiry Number: 95550396

Date: 06/03/2020

Location: 44 Clunies Ross Street
Prospect
NSW
2148

DBYD ENQUIRY RETURN:

PIPE Networks **DOES** own or operate telecommunications network infrastructure within the area detailed above.

The affected network **is contained in the PIPE Networks duct network** and can be found on **PIPE Networks** own network plans.

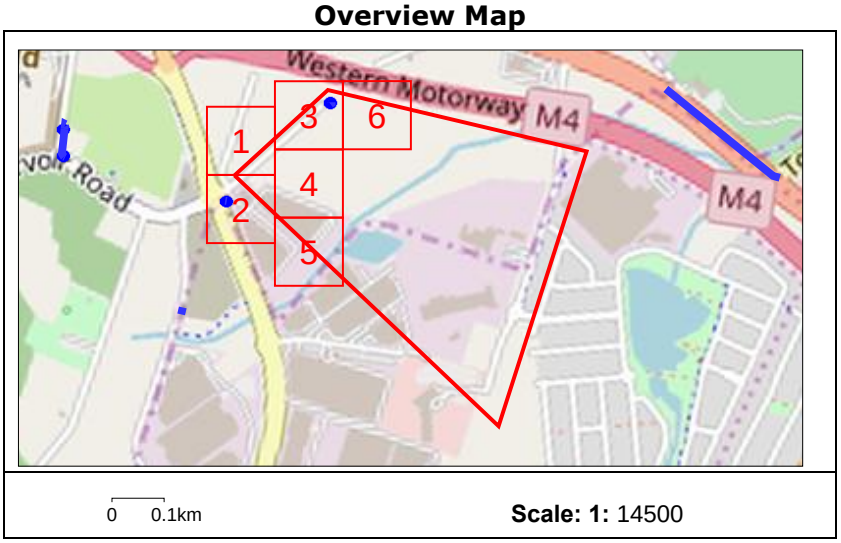
This network is vital to our operations and as such, it is critical that no works commence within the area until a PIPE Networks representative has contacted you.

A PIPE Networks representative will contact you within 24 hours to further discuss your intended works. If you do not hear from PIPE networks within 24hours please call us for assistance.

Due to continued network expansion, this network information can only be considered valid and accurate for 28 days from issue.

PIPE Networks will seek compensation for any damage to its network through negligence or ignorance of your duty of care.

Overview Map



PIPE Networks (for information specific to this job only)
Ph (07) 3233 9895
Email: dbyd@pipenetworks.com

DISCLAIMER: *No responsibility/liability is taken by PIPE Networks for any inaccuracy, error, omission or action based on the information supplied in this correspondence.*

Note: *If the works fall in an area that adjacent to PIPE Networks infrastructure, a pre-inspection is required prior to commencement of works. Contact PIPE Networks to arrange an inspection time.* ***NO WORKS TO COMMENCE PRIOR TO INSPECTION.***

Only PIPE Networks' duct displayed.

For location of PIPE Networks cable in third-party duct, please contact third-party named on attached cover letter.

Enquiry Number: 95550396

Map Sheet: 1

Scale: 1:750

0 0.008km

LEGEND

DBYD Request Area

Line

Area

Asset

Manhole

Duct

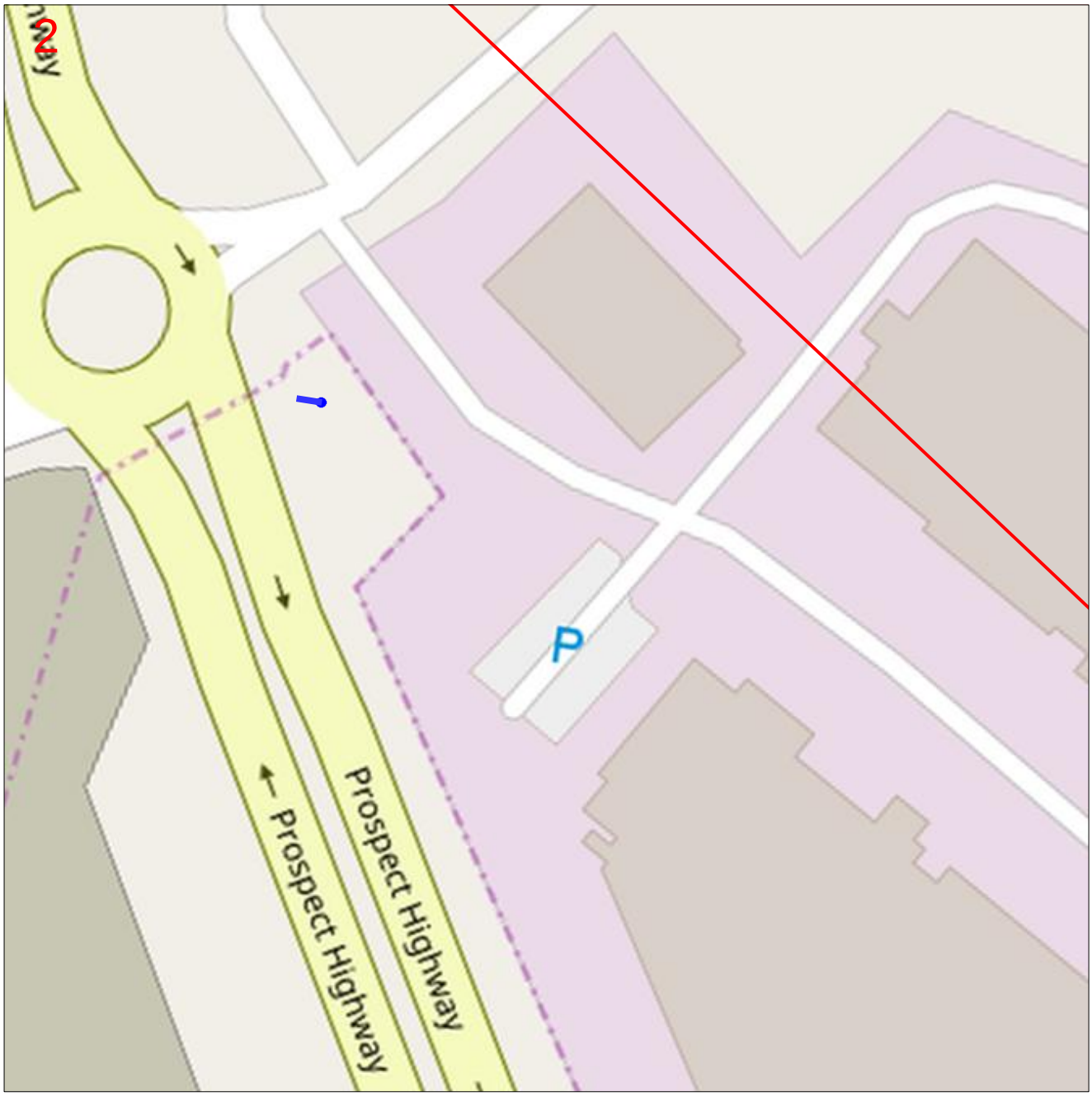
N

DISCLAIMER: *No responsibility/liability is taken by PIPE Networks for any inaccuracy, error, omission or action based on the information supplied in this correspondence.* *© 2013 PIPE Networks Ltd.*

Note: *If the works fall in an area that is adjacent to PIPE Networks infrastructure, a pre-inspection is required prior to commencement of works. Contact PIPE Networks to arrange an inspection time.* ***NO WORKS TO COMMENCE PRIOR TO INSPECTION.***

Only PIPE Networks' duct displayed.

For location of PIPE Networks cable in third-party duct, please contact third-party named on attached cover letter.



Enquiry Number: 95550396

Map Sheet: 2

Scale: 1:750

0 0.008km

LEGEND

DBYD Request Area

Line

Area

Asset

Manhole

Duct

N

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Note: *If the works fall in an area that is adjacent to PIPE Networks infrastructure, a pre-inspection is required prior to commencement of works. Contact PIPE Networks to arrange an inspection time.* ***NO WORKS TO COMMENCE PRIOR TO INSPECTION.***

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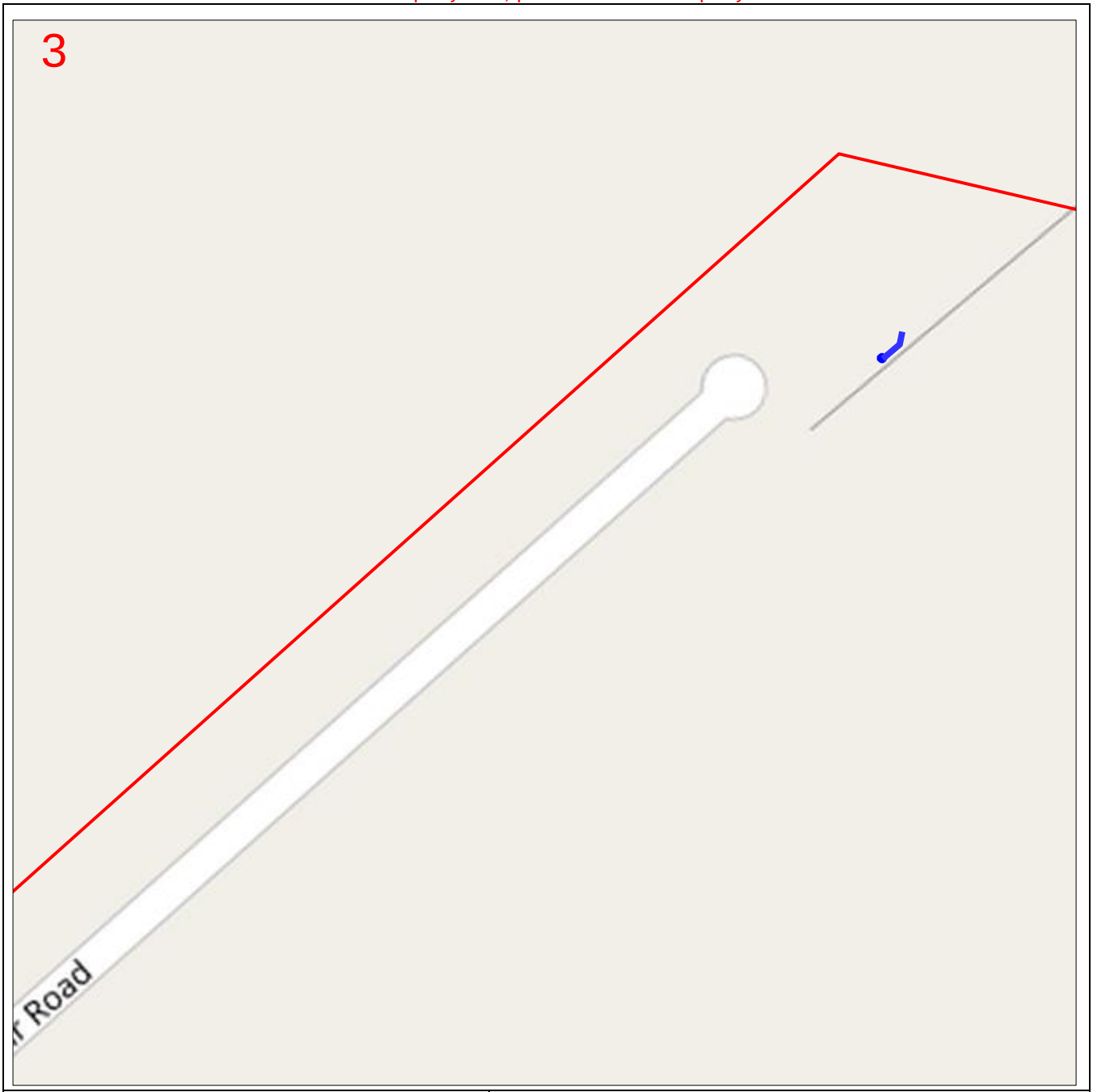

Enquiry Number: 95550396

Map Sheet: 3

Scale: 1:750

0 0.008km

LEGEND

DBYD Request Area

Line

Area

Asset

Manhole

Duct

N

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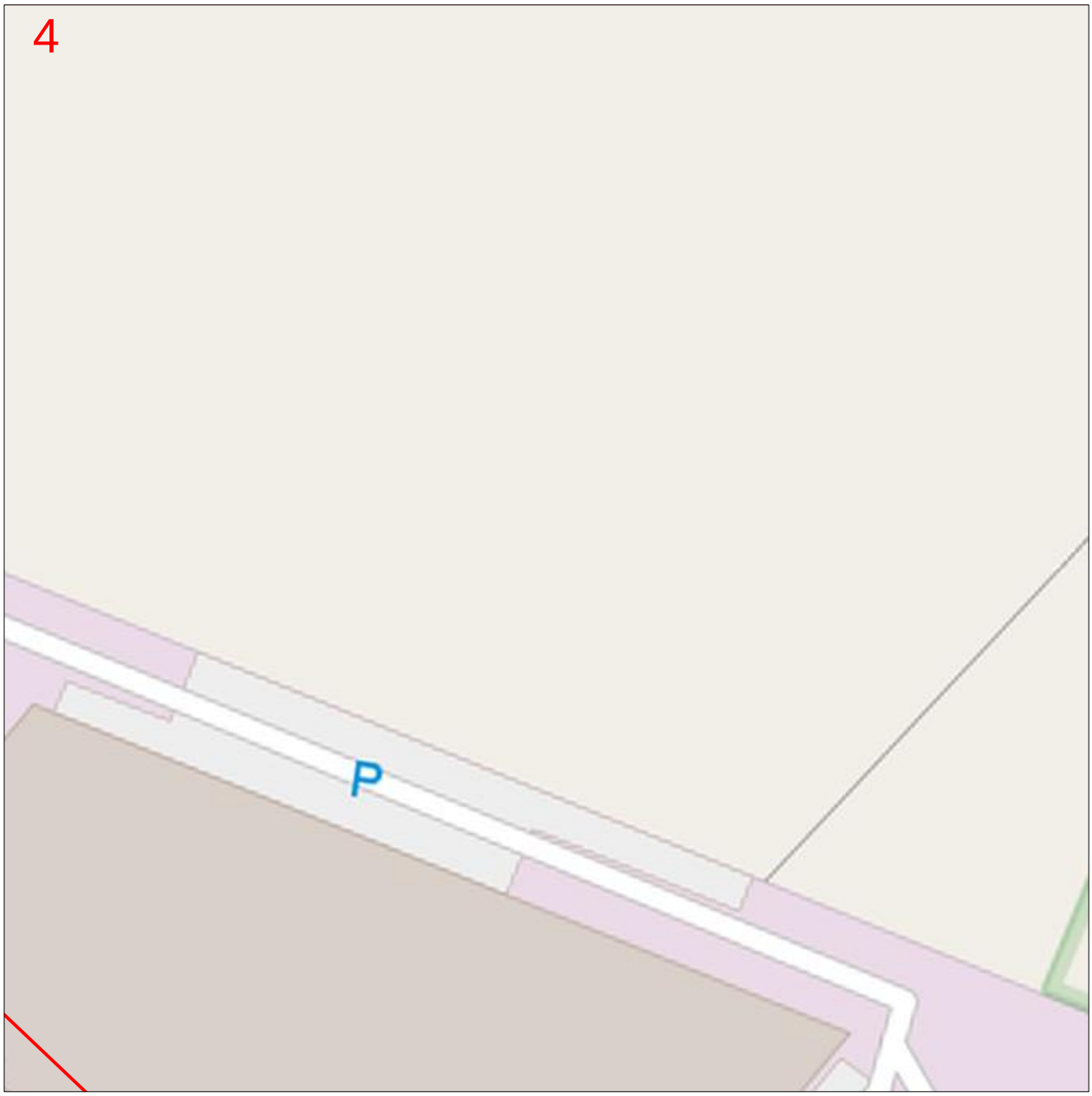
Note: *If the works fall in an area that is adjacent to PIPE Networks infrastructure, a pre-inspection is required prior to commencement of works. Contact PIPE Networks to arrange an inspection time.* ***NO WORKS TO COMMENCE PRIOR TO INSPECTION.***

Only PIPE Networks' duct displayed.

For location of PIPE Networks cable in third-party duct, please contact third-party named on attached cover letter.



Enquiry Number: 95550396

Map Sheet: 4

Scale: 1:750

0 0.008km

LEGEND

DBYD Request Area

Line

Area

Asset

Manhole

Duct

N

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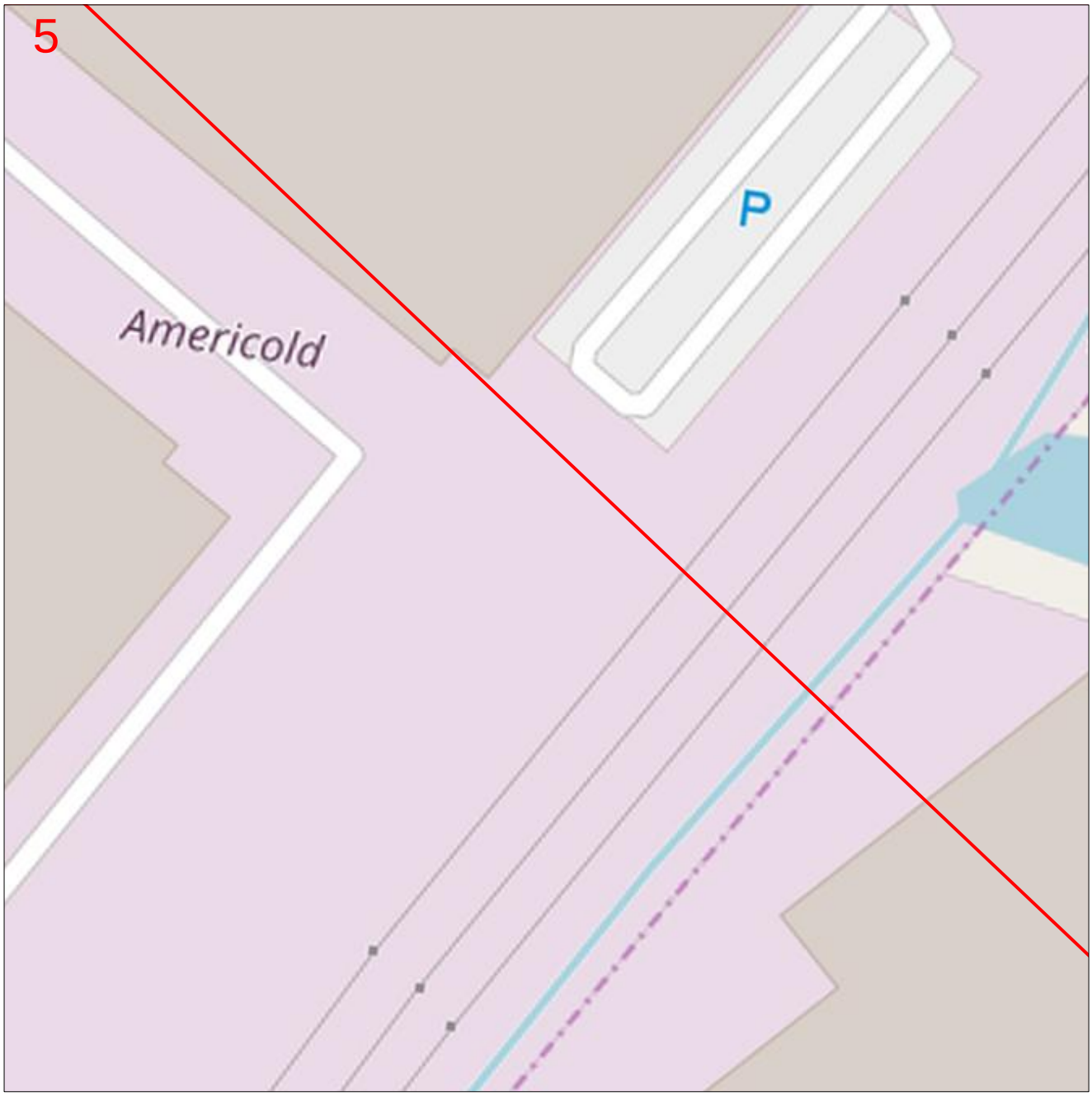
Note: *If the works fall in an area that is adjacent to PIPE Networks infrastructure, a pre-inspection is required prior to commencement of works. Contact PIPE Networks to arrange an inspection time.* ***NO WORKS TO COMMENCE PRIOR TO INSPECTION.***

Only PIPE Networks' duct displayed.

For location of PIPE Networks cable in third-party duct, please contact third-party named on attached cover letter.



Enquiry Number: 95550396

Map Sheet: 5

Scale: 1:750

0 0.008km

LEGEND

DBYD Request Area **Asset**

Line

Area

Manhole

Duct

N

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Note: *If the works fall in an area that is adjacent to PIPE Networks infrastructure, a pre-inspection is required prior to commencement of works. Contact PIPE Networks to arrange an inspection time.* ***NO WORKS TO COMMENCE PRIOR TO INSPECTION.***

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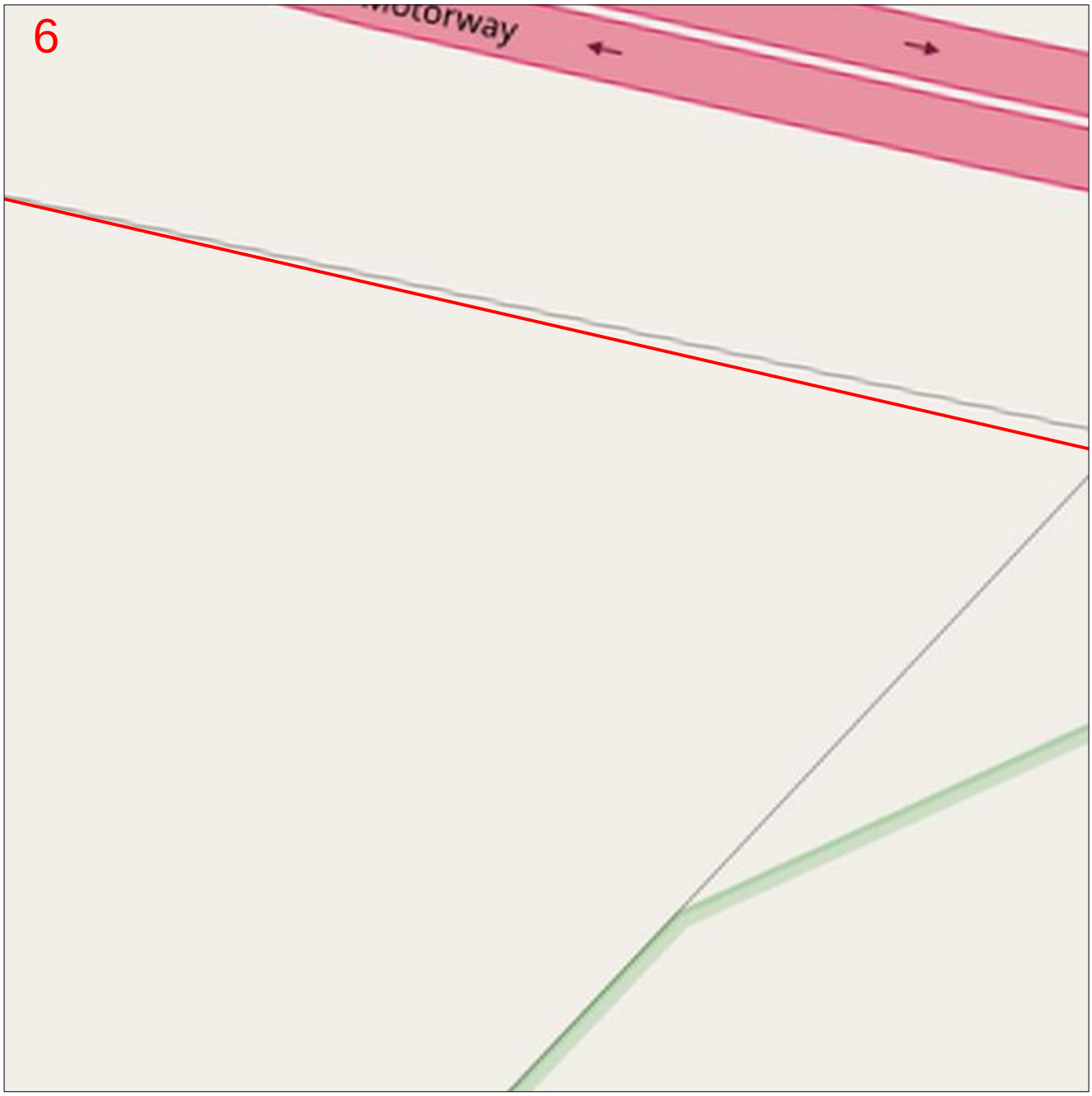

Enquiry Number: 95550396

Map Sheet: 6

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0 0.008km

LEGEND

DBYD Request Area **Asset**

Line

Area

Manhole

Duct

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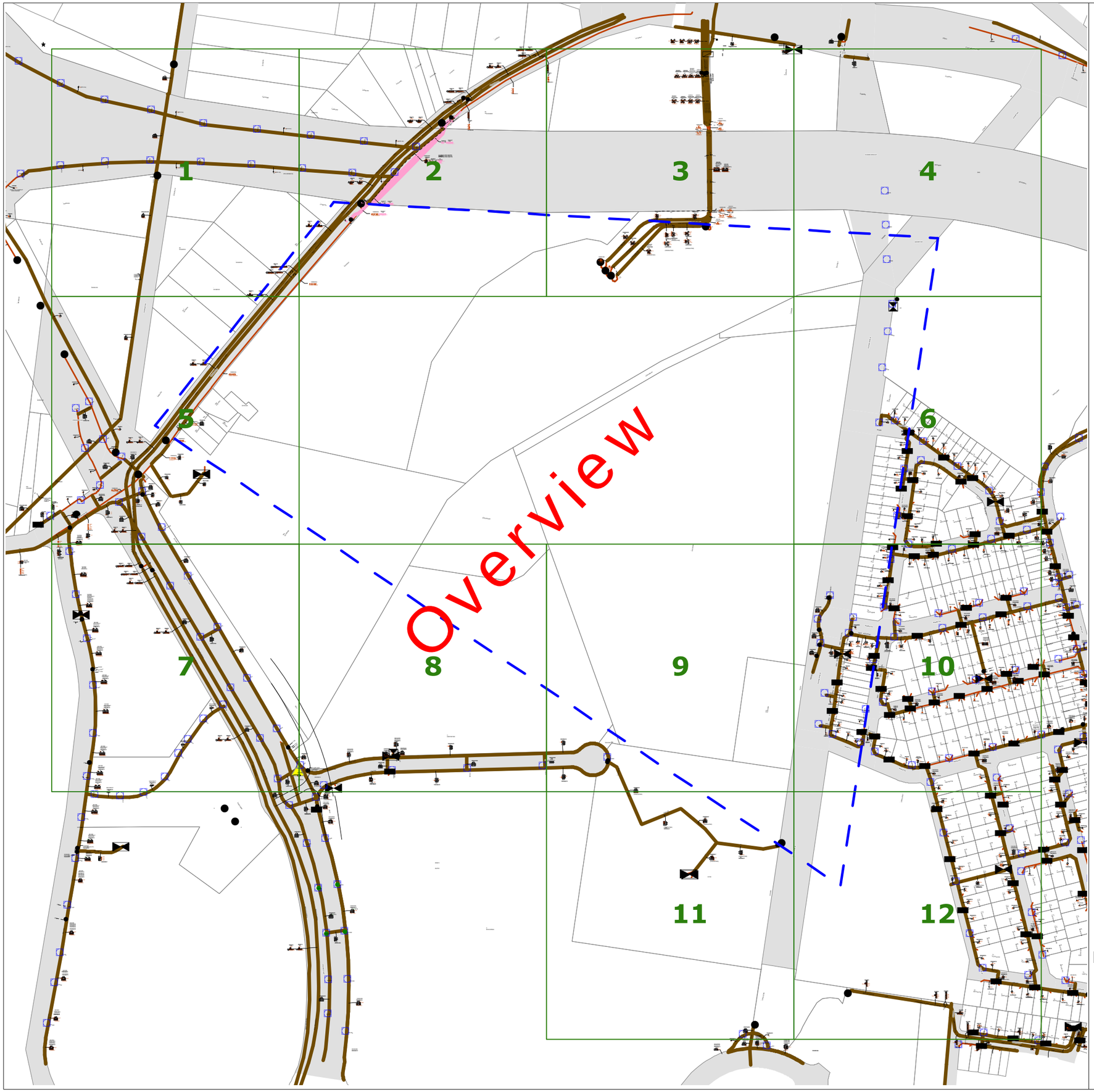

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4 WORKING DAYS BEFORE COMMENCING WORK

LEGEND

- or — Street light column
- Padmount substation
- or — Overground pillar (O.G.Box)
- Underground pit
- Duct run
- Cable run
- Typical duct section
- Asbestos warning

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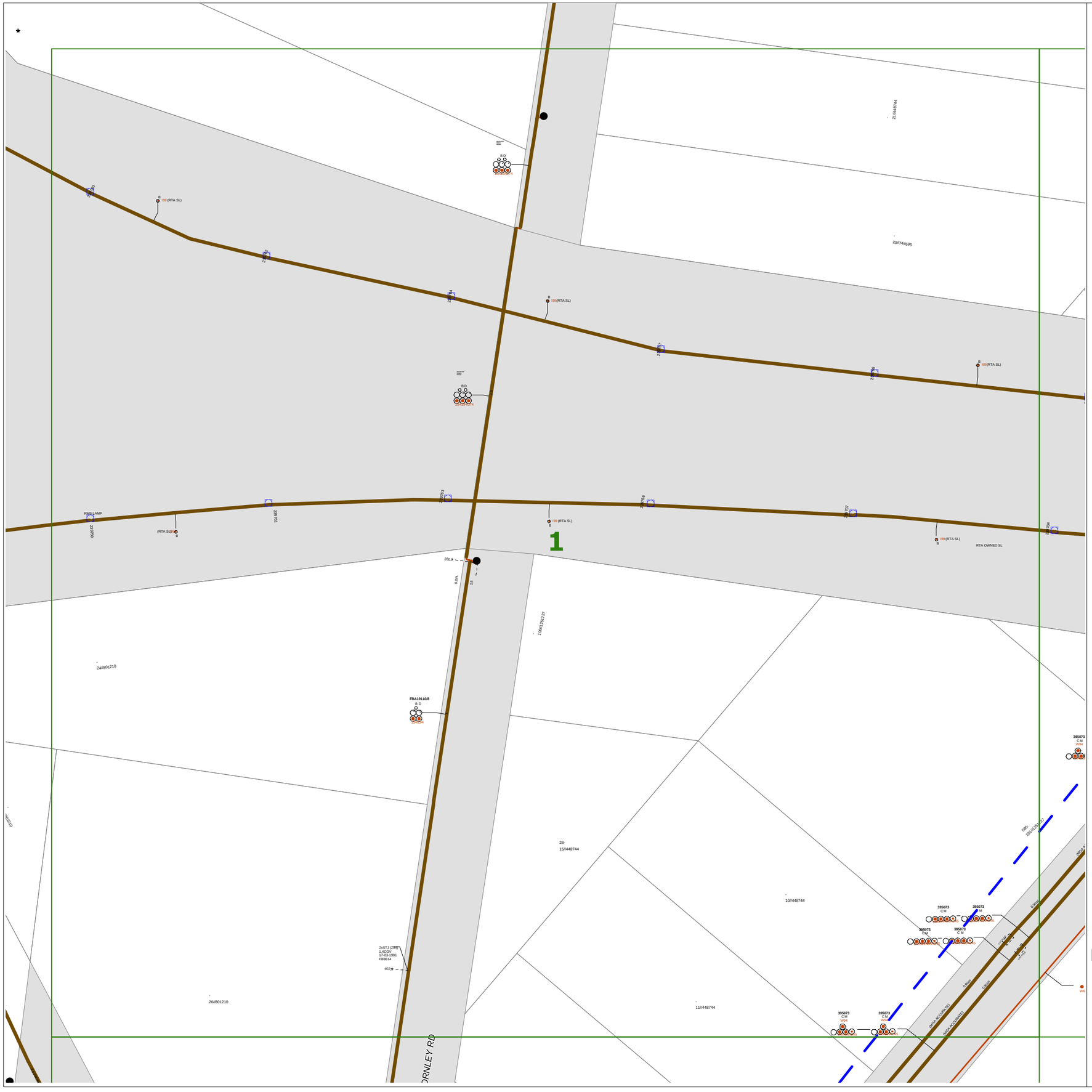
NOT TO SCALE

DBYD Sequence No.:	95550397
Issued Date:	06/03/2020

Cadastre: © Land and Property Information 2015, 2016



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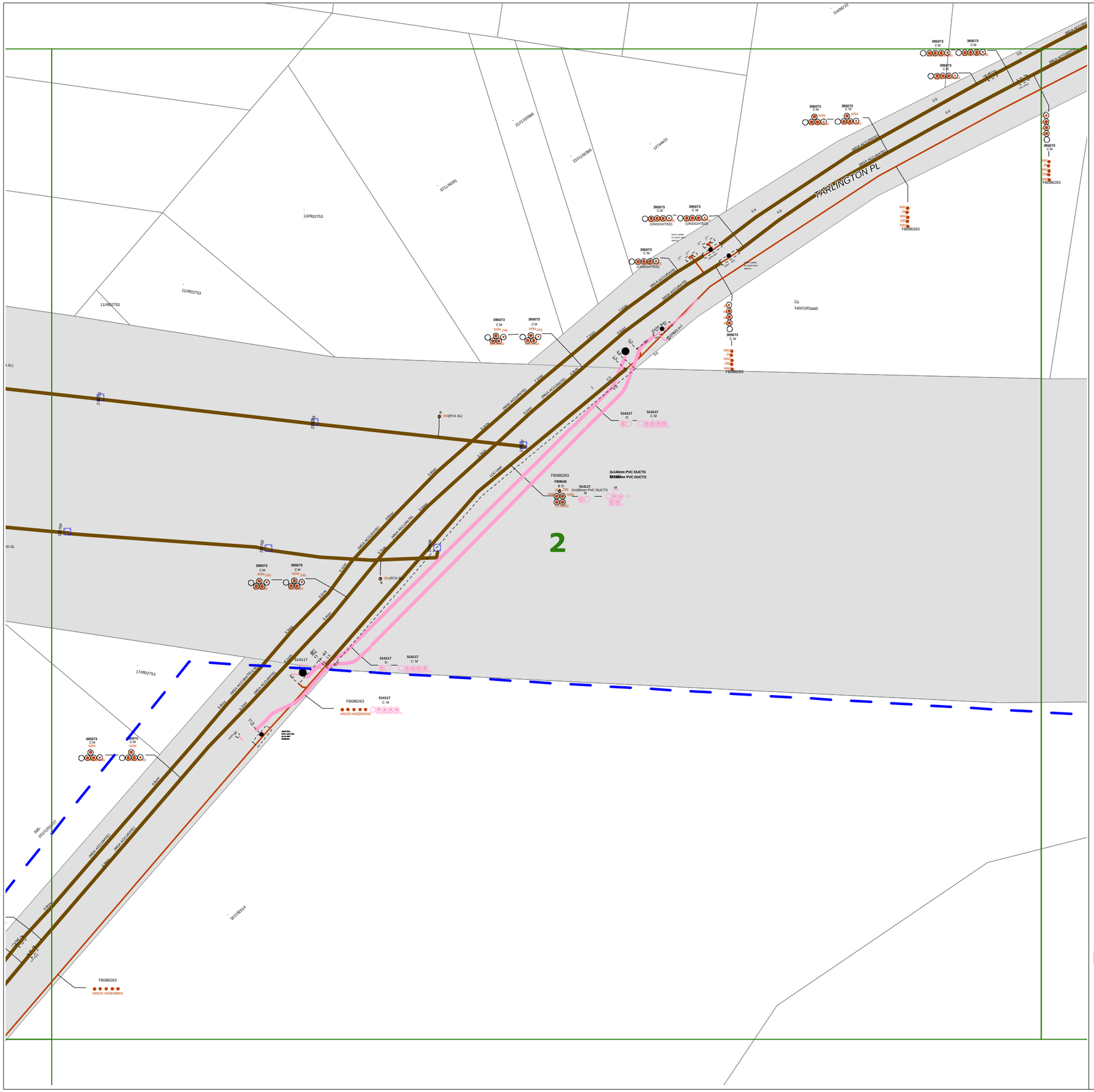

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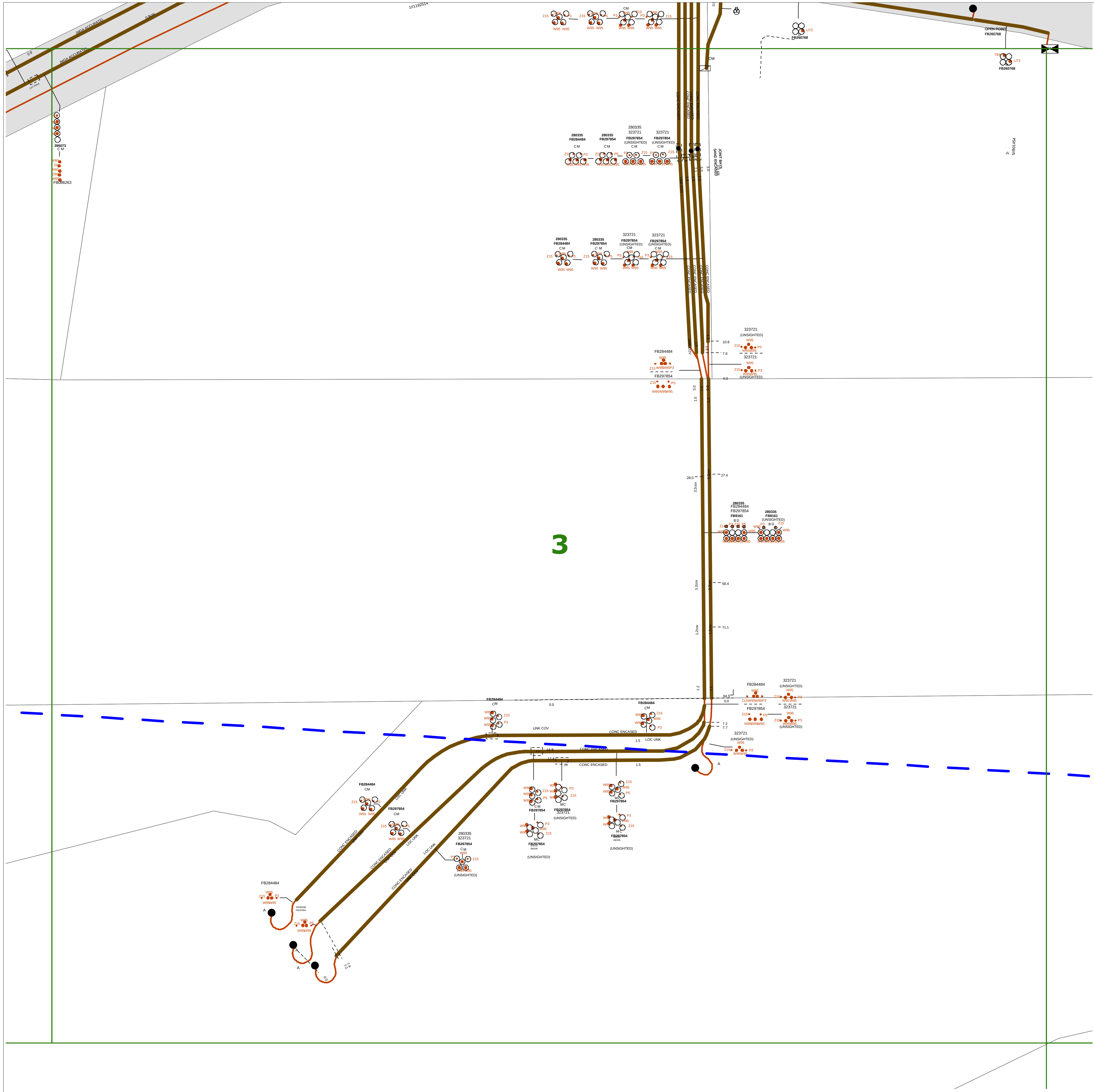

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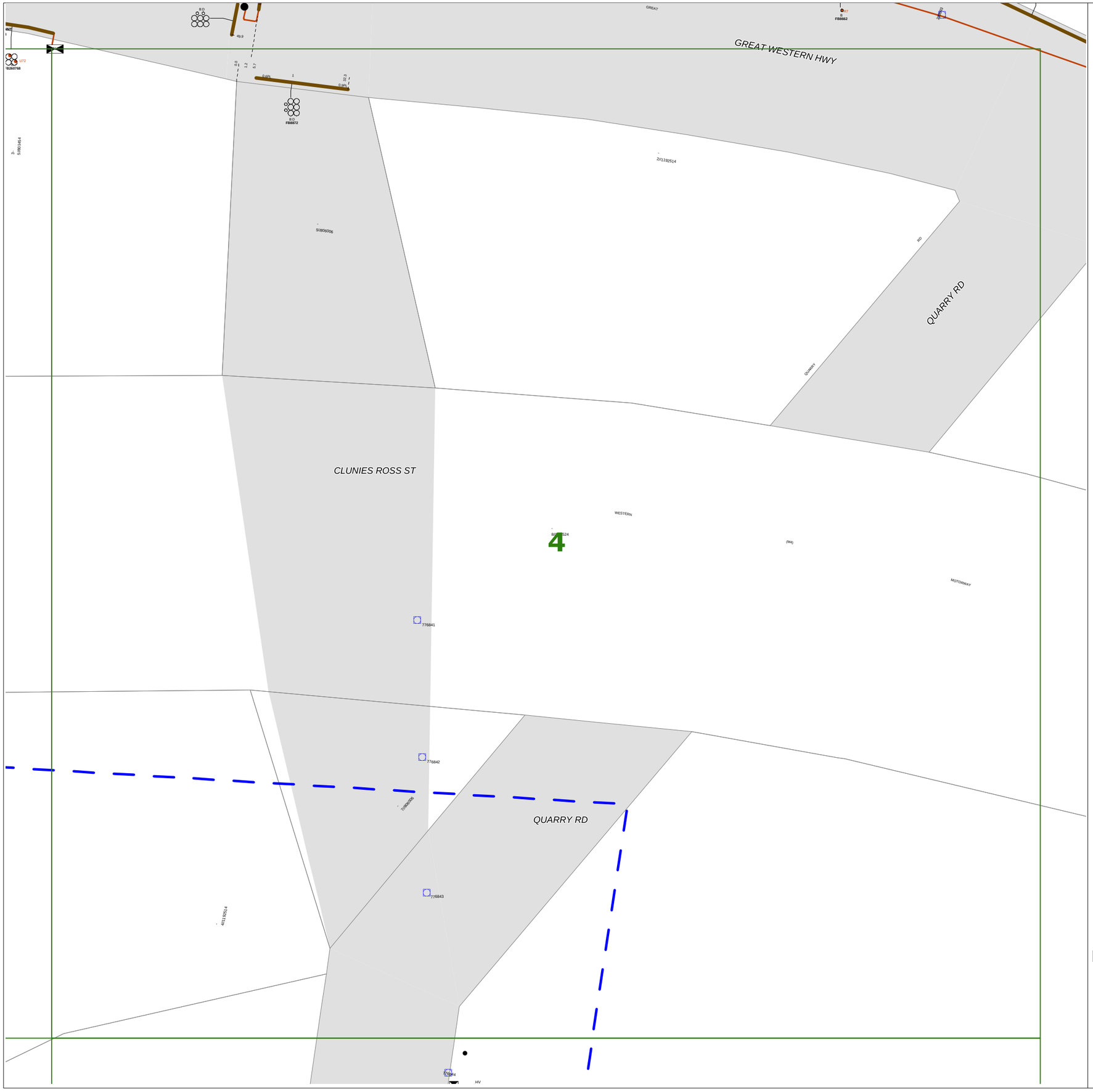

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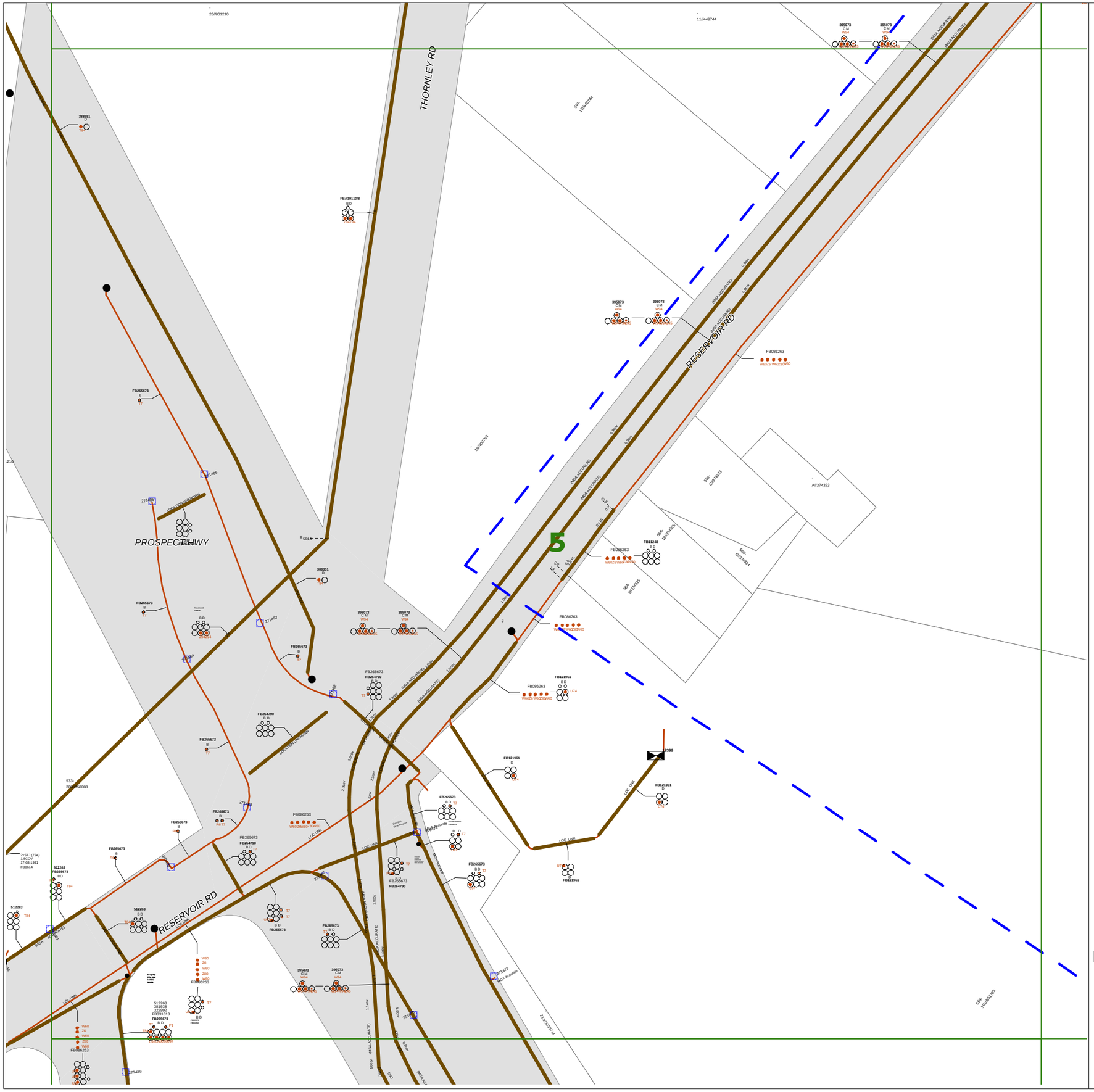

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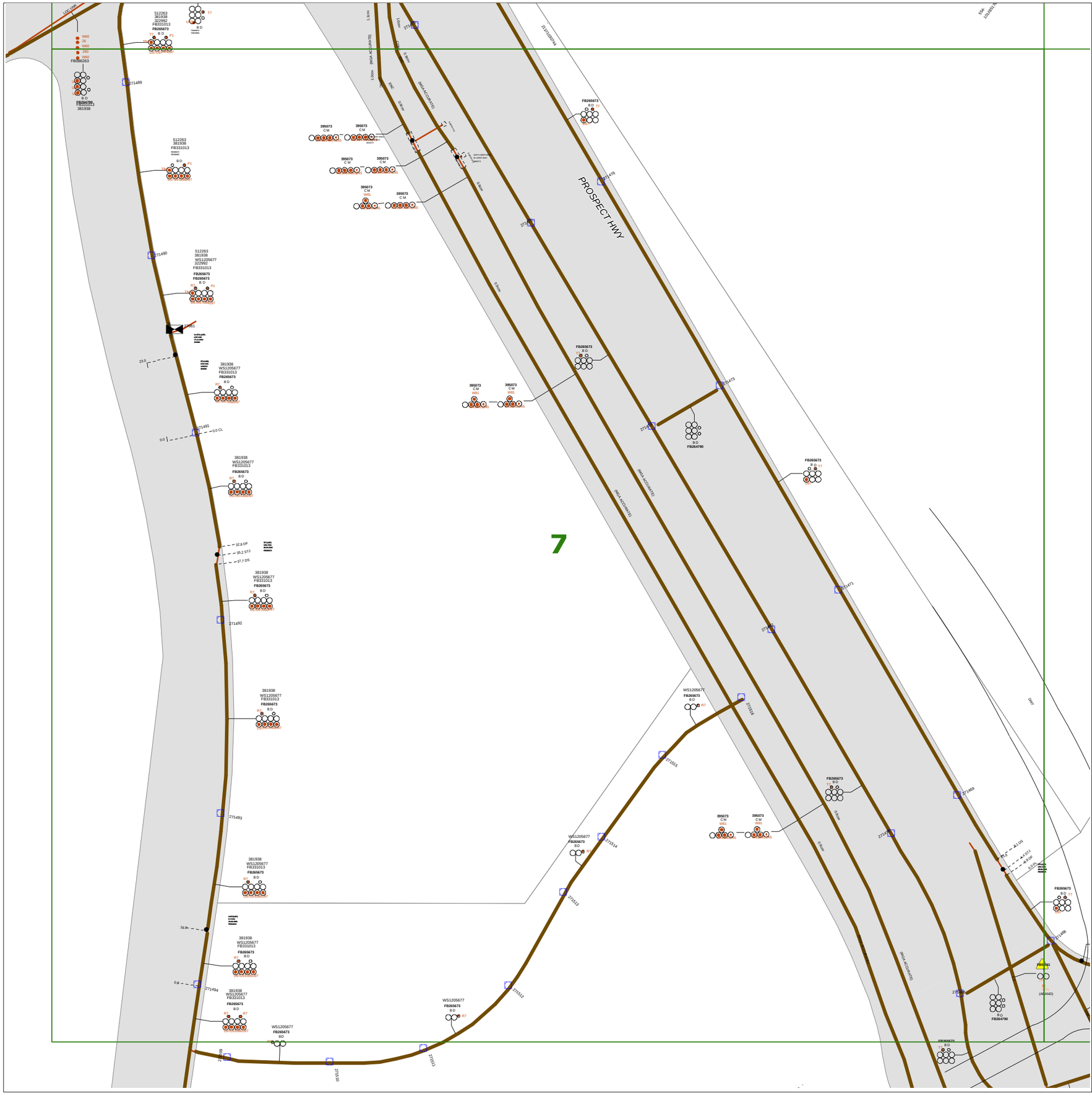

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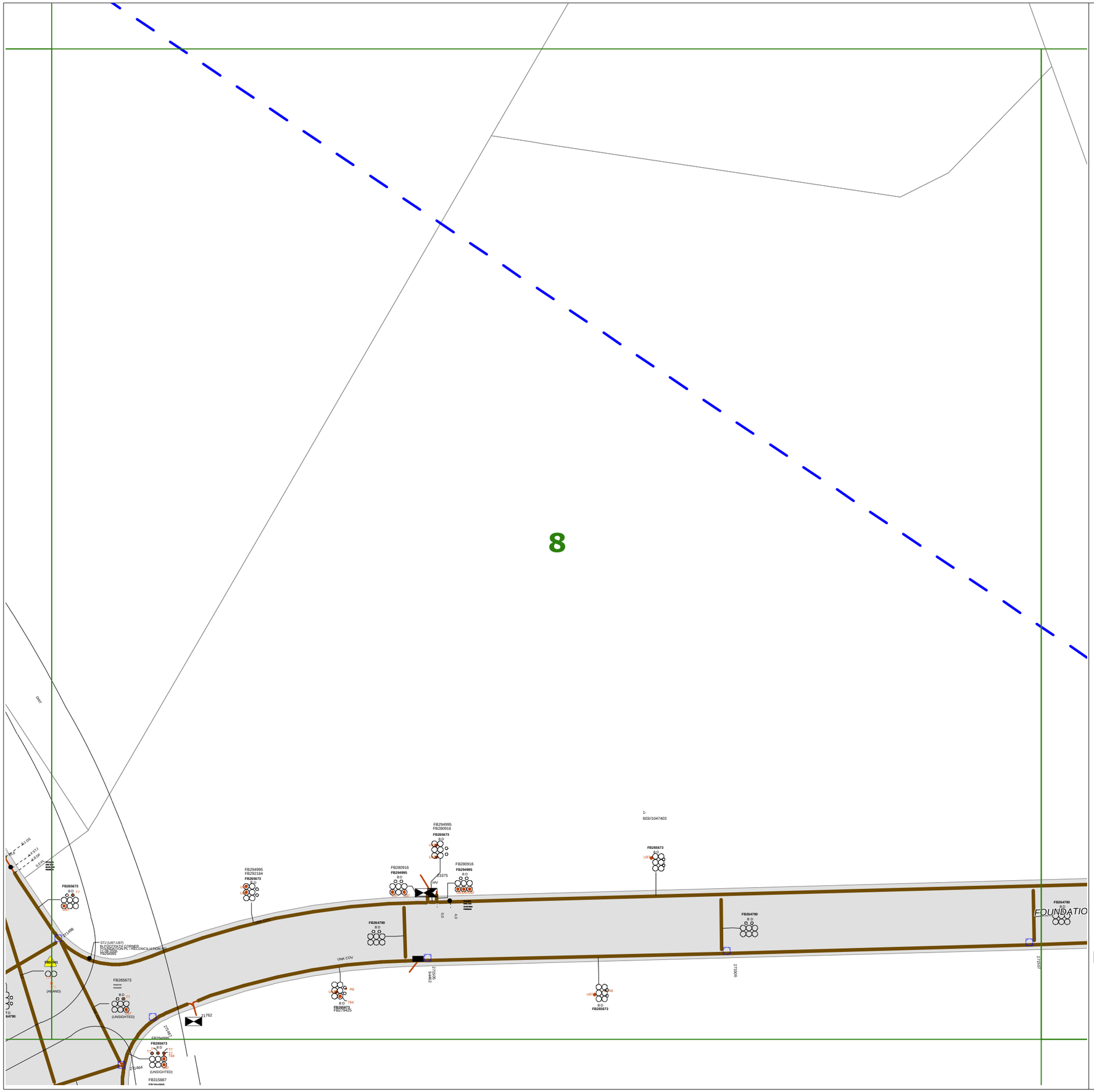

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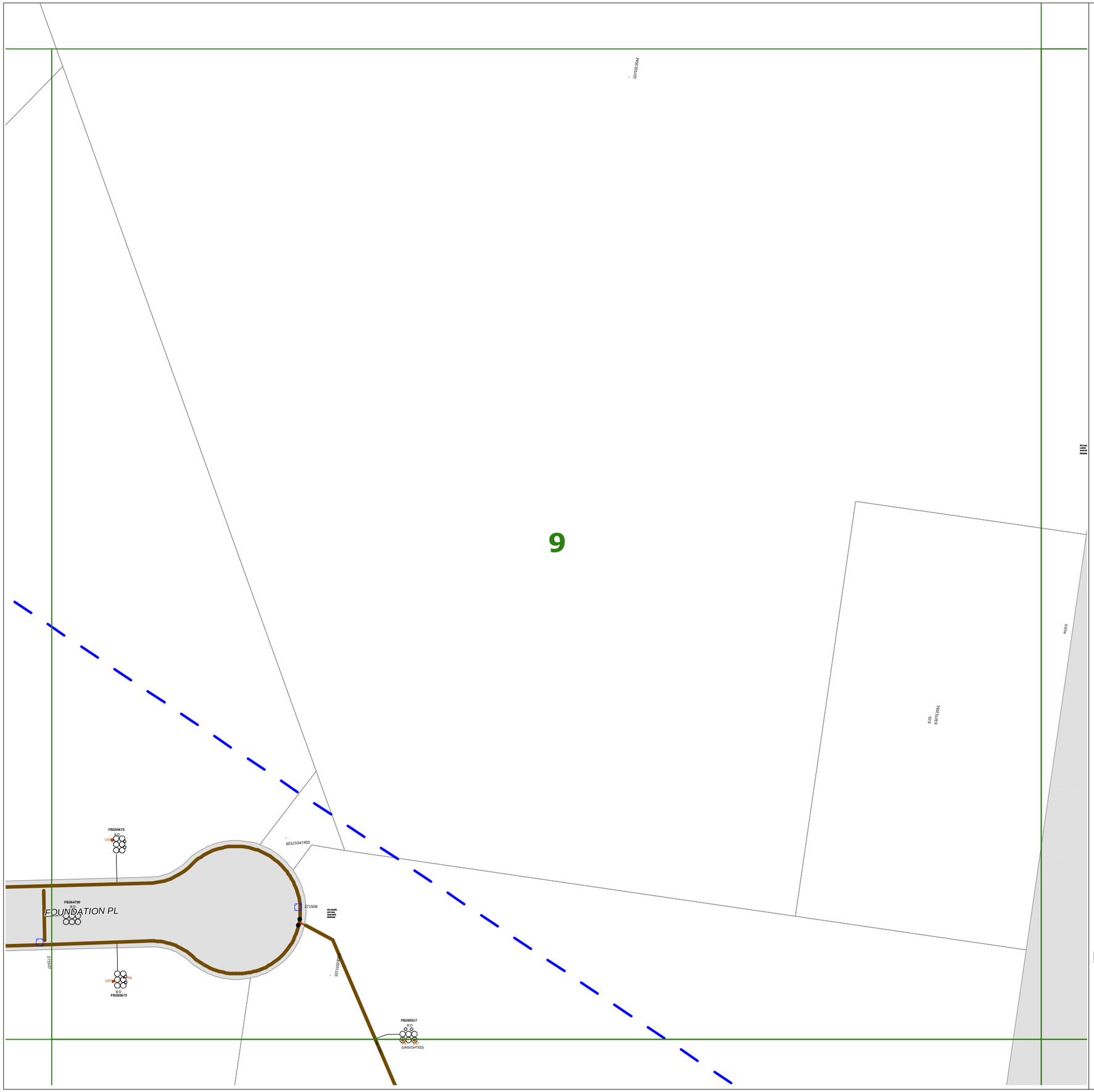

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WARNING
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ENDEAVOUR ENERGY TRANSMISSION, PILOT,
COMMUNICATION OR FIBRE OPTIC CABLES
PLEASE RING **9853 7121** or **MOB. 0407 468 626**
4 WORKING DAYS BEFORE COMMENCING WORK

LEGEND

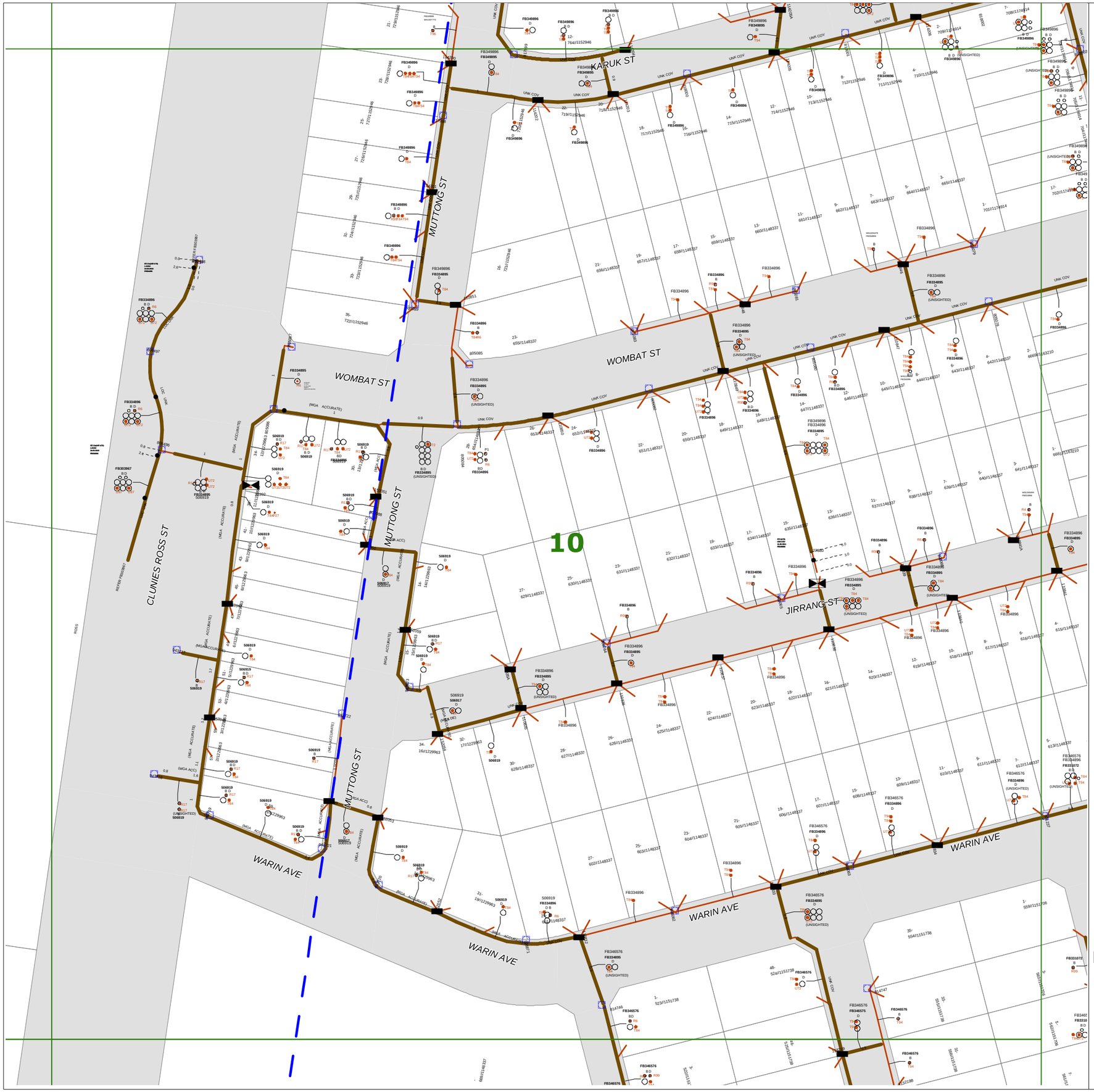
- or — Street light column
- Padmount substation
- or — Overground pillar (O.G.Box)
- Underground pit
- Duct run
- Cable run
- Typical duct section
- Asbestos warning

N

NOT TO SCALE

DBYD Sequence No.:	95550397
Issued Date:	06/03/2020

Cadastre: © Land and Property Information 2015, 2016



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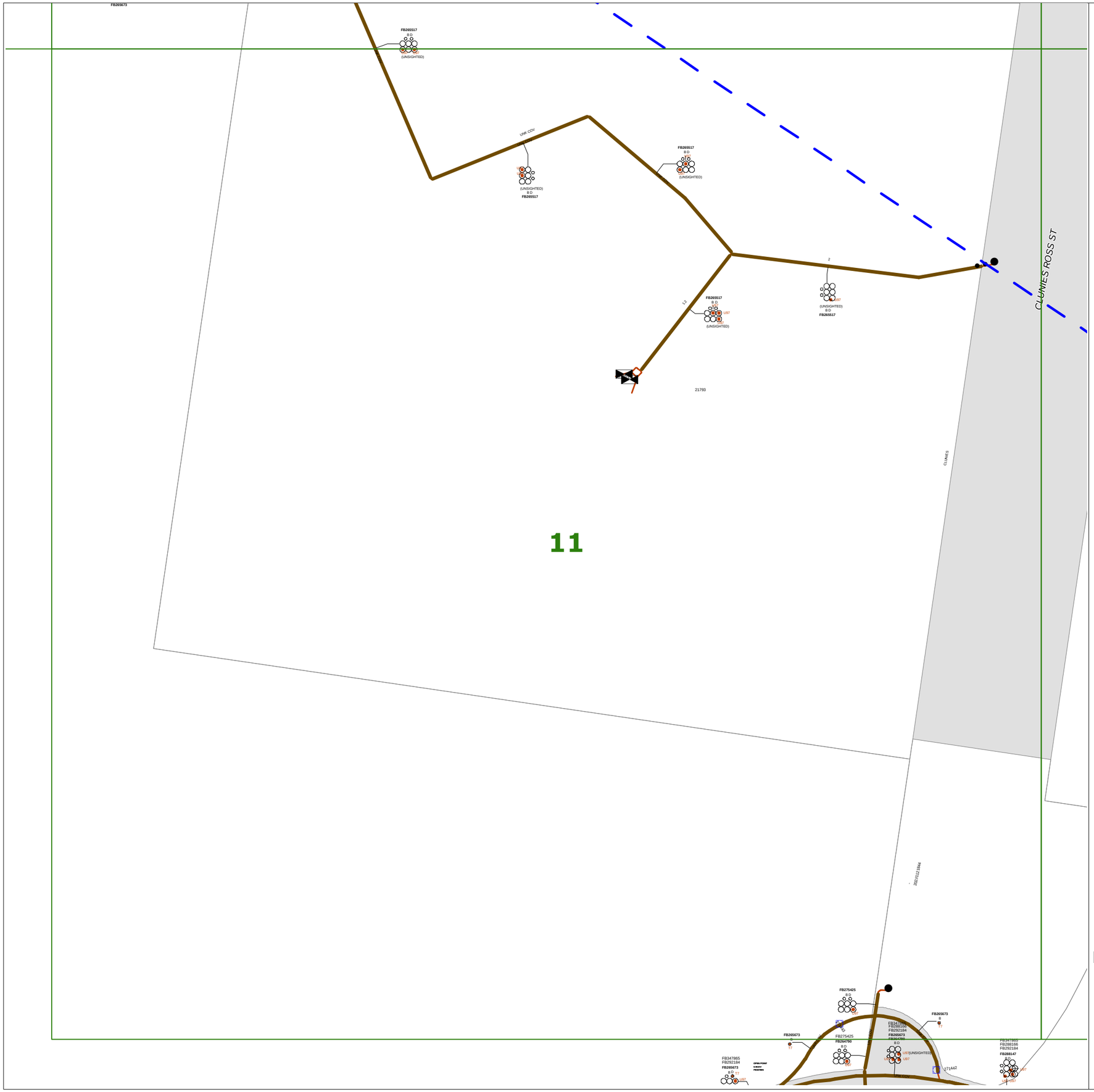

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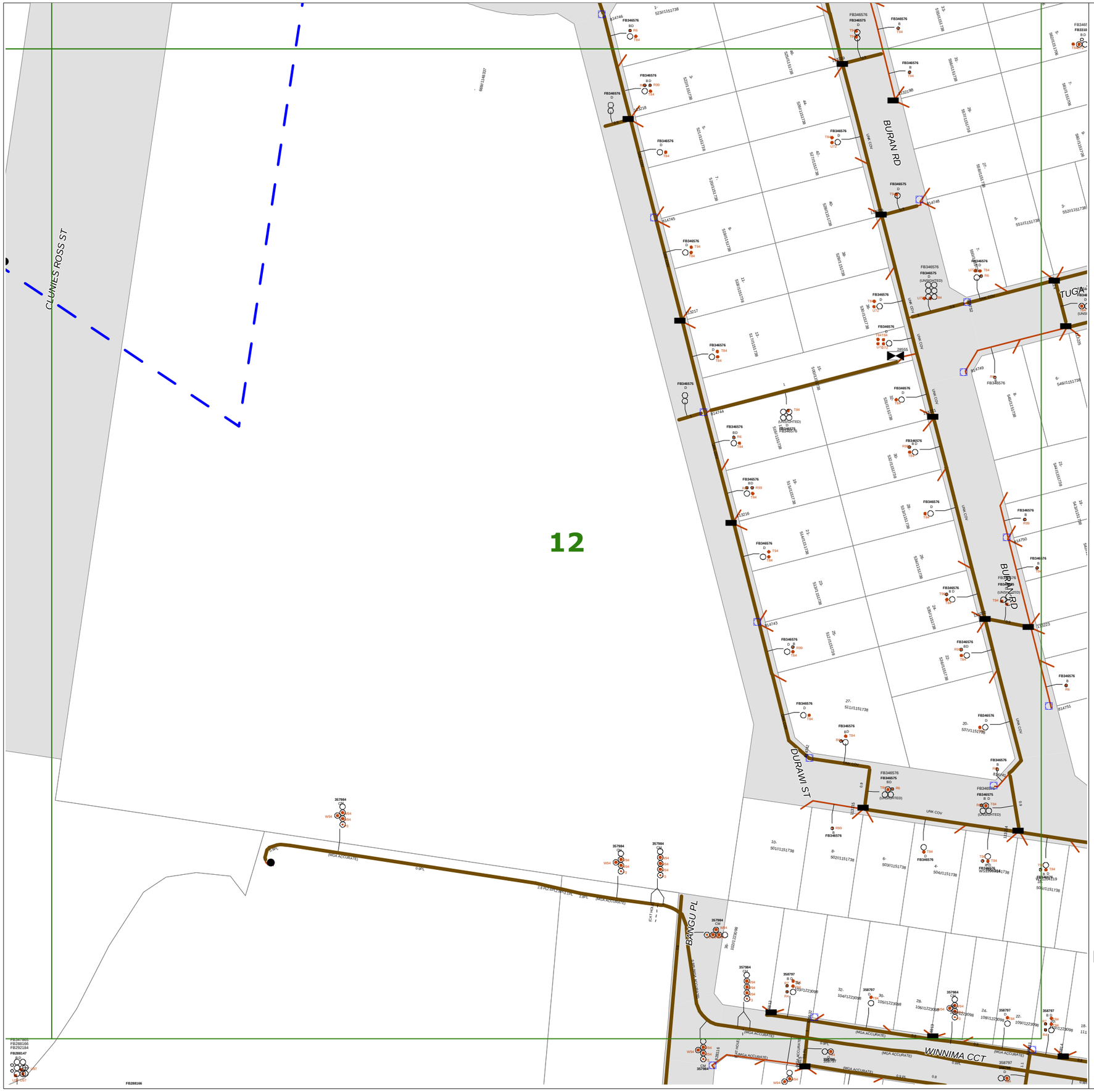

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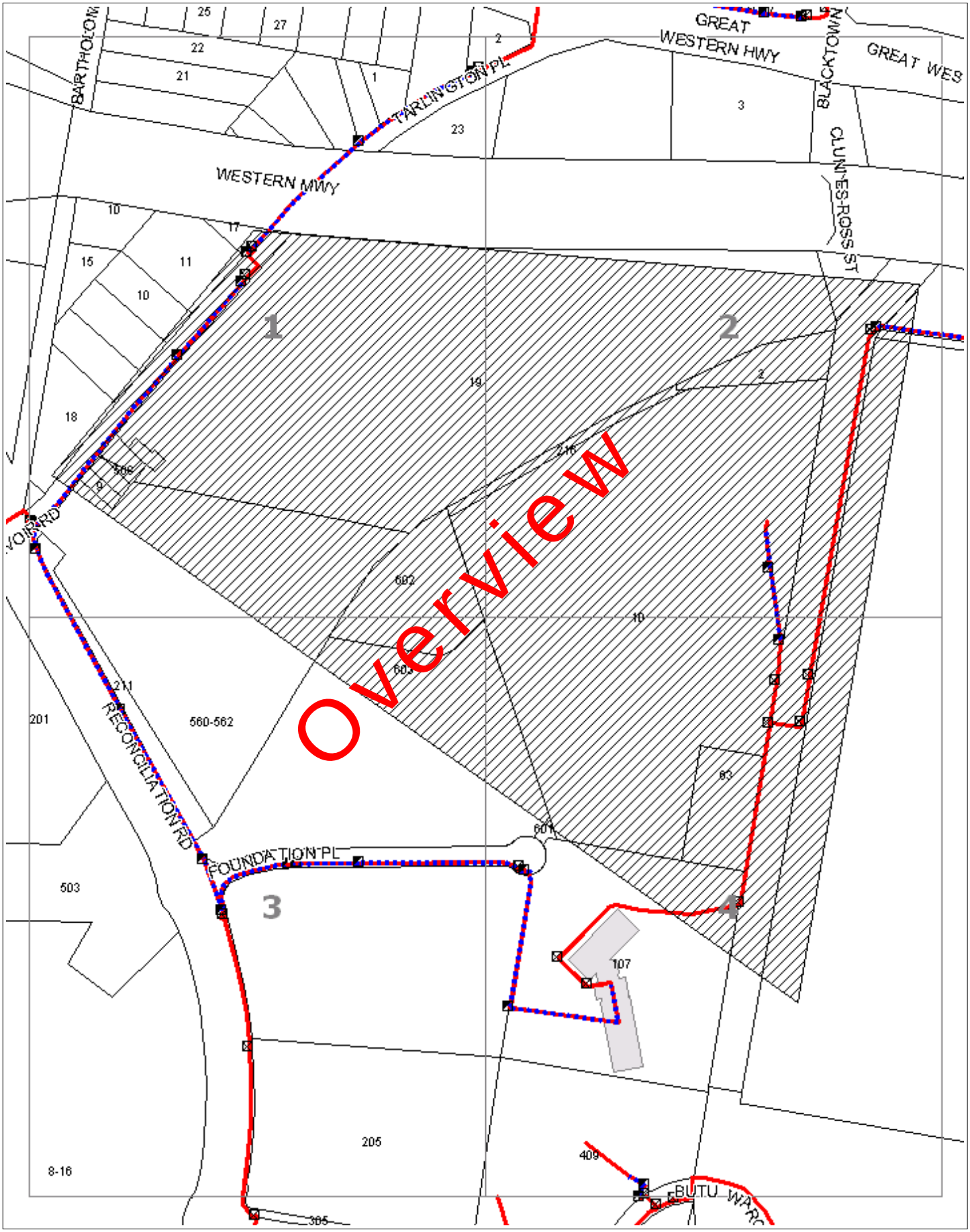

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Optus Plans and information supplied are valid for 30 days from the date of issue. If this timeline has elapsed please raise a new enquiry.

Sequence Number: 95550399

Date Generated: 06/03/2020

For all Optus DBYD plan enquiries –
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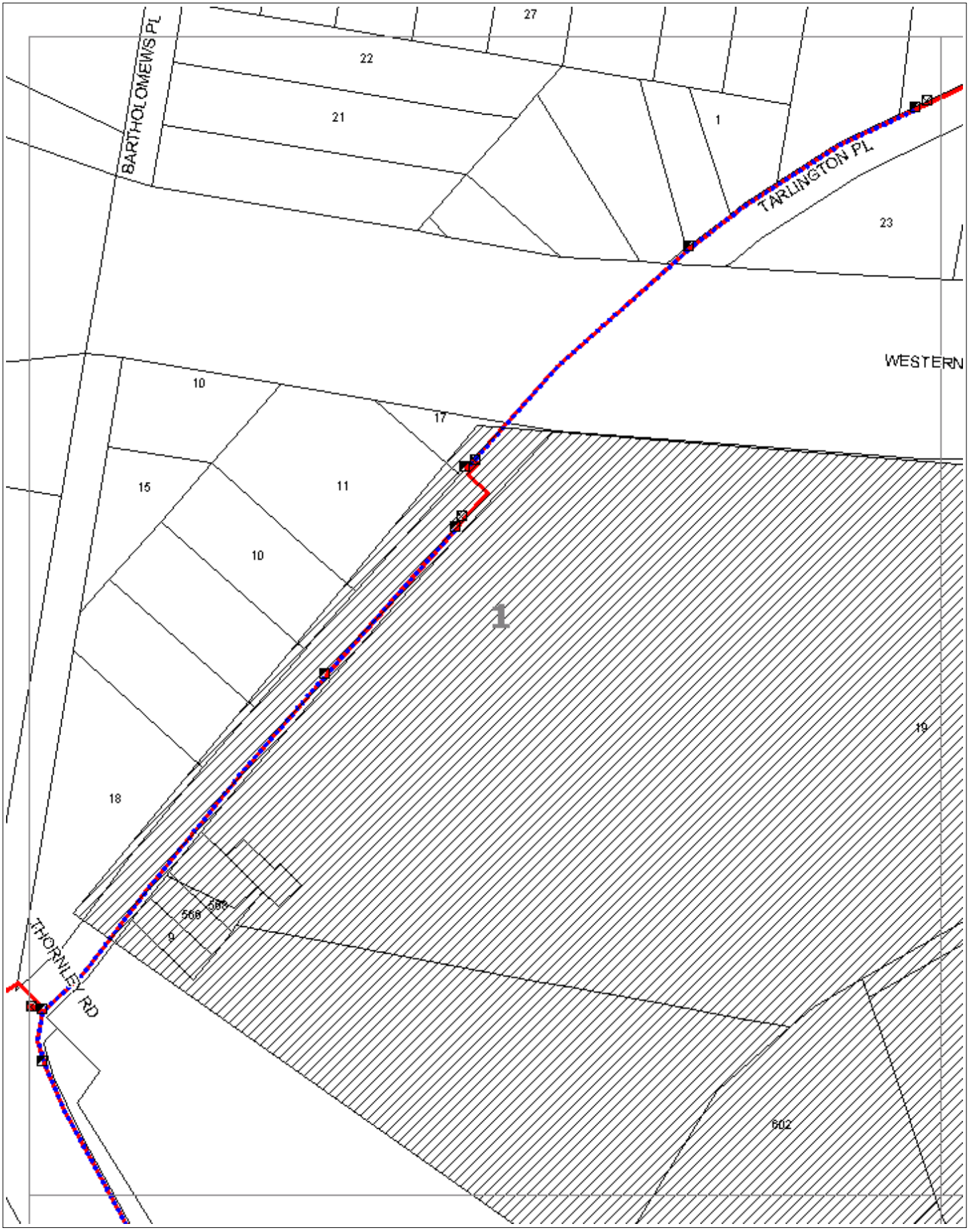
For urgent onsite assistance contact 1800 505 777
Optus Limited ACN 052 833 208



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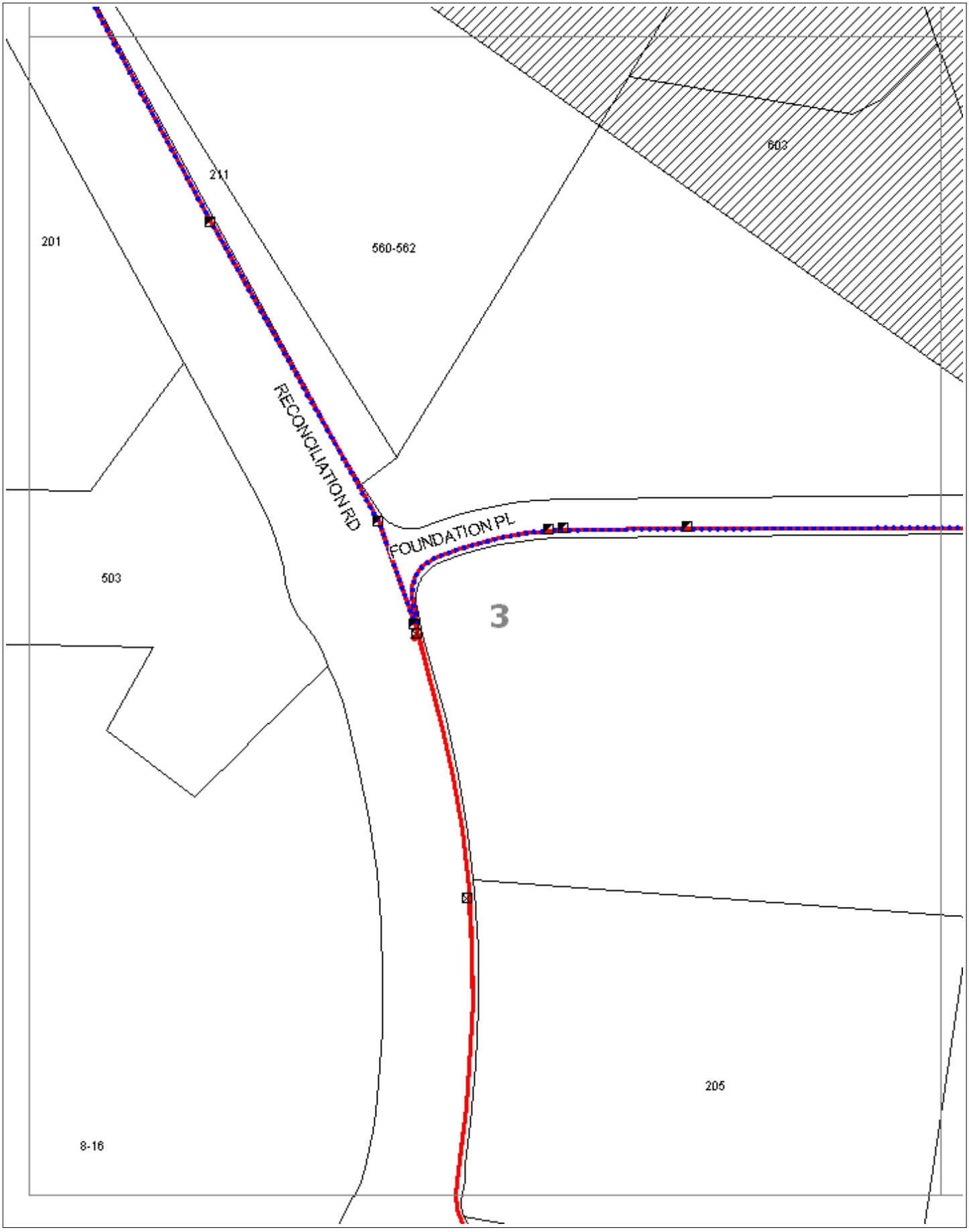

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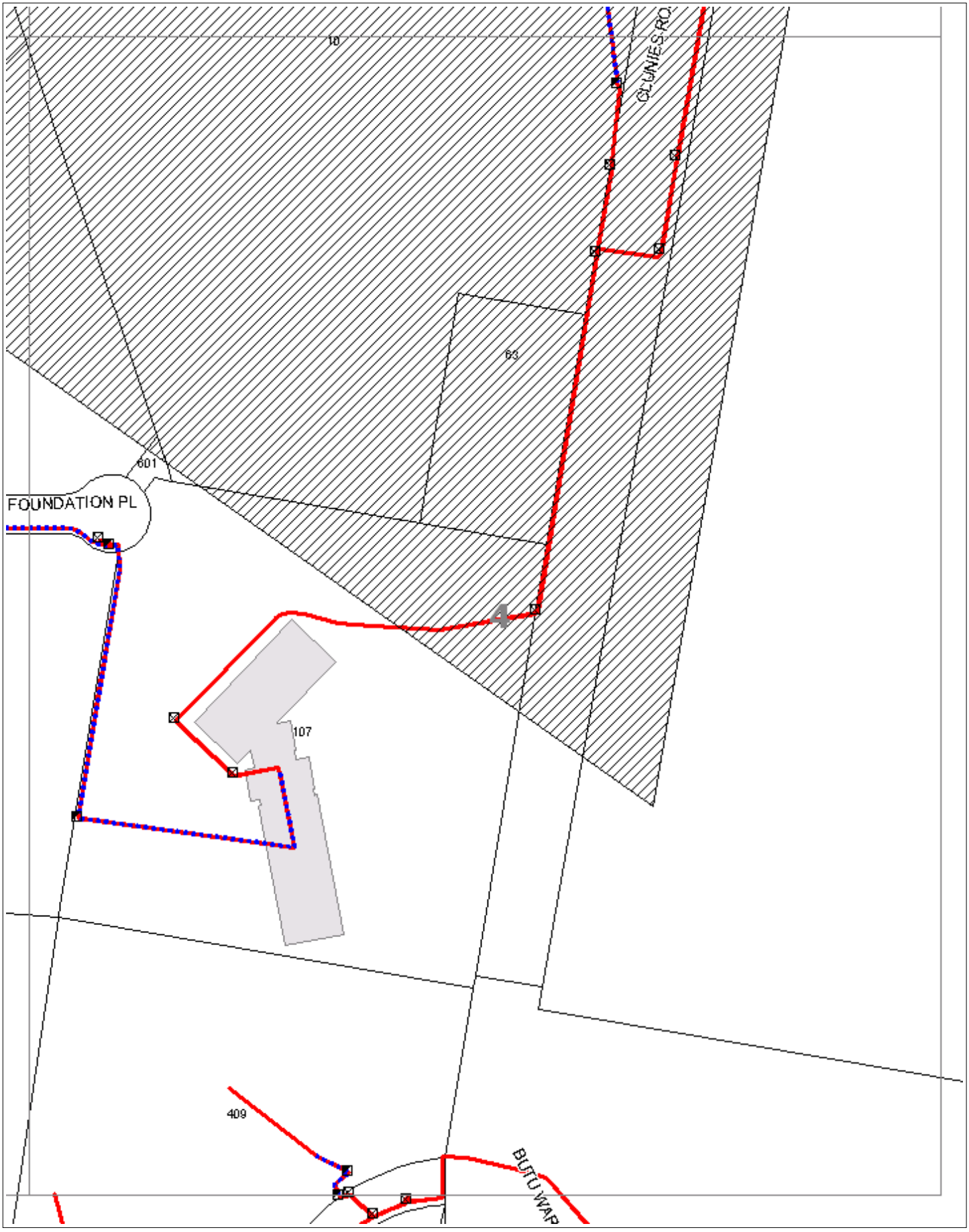

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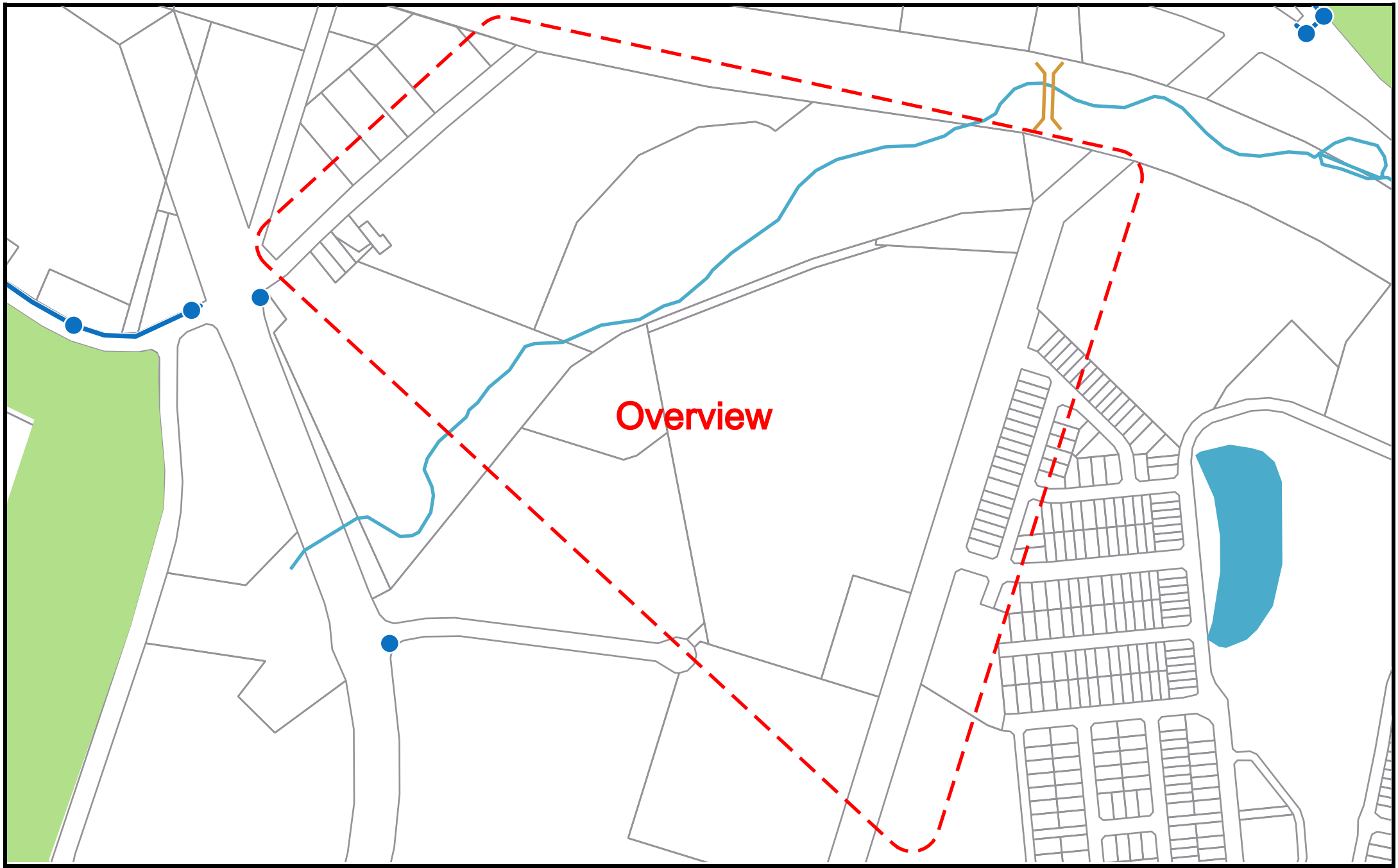


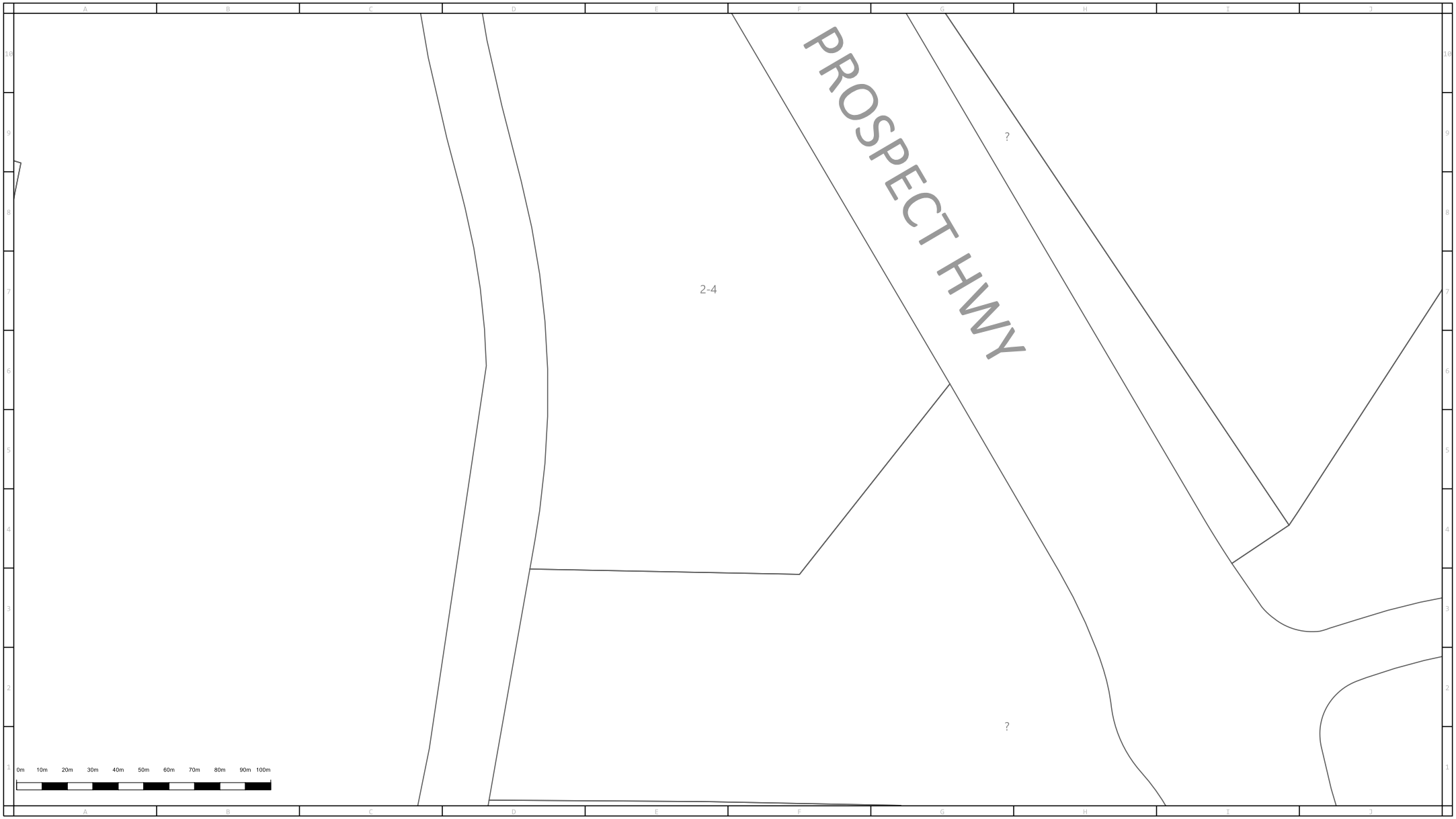
SEQUENCE NUMBER: 95550403
JOB NUMBER: 19165192
ADDRESS: 44 Clunies Ross Street, Prospect, NSW 2148

LEGEND
Vocus Group Pit
Vocus Group Conduit

SCALE: 1:5365

The Vocus Group includes related bodies corporate of Vocus Communications Limited ACN 084 115 499.

DBYD Authority: Jemena Gas Networks (NSW) **DBYD Location:** 44 Clunies Ross Street Prospect NSW, 2148



Jemena
ABN 87 003 004 322

Main	In Service	Proposed
Unknown Pressure		
Distribution - 2 kPa		
Distribution - 7 kPa		
Distribution - 30 kPa		
Distribution - 100 kPa		
Distribution - 210 kPa		
Distribution - 300 kPa		
Distribution - 400 kPa		

Main	
Proposed Isolate (coloured according to kPa)	
Isolated Service	
Conduit or Casing	
Size & Material (PL - Plastic, PVC, PE, NY, ST)	100 PVC

High Pressure Main & Pipeline	In Service	Proposed
Critical Main (Treat as High Pressure Main)		
Secondary Network - 1050 kPa		
Isolated Steel Main (Treat as High Pressure Main)		
Primary - 3500 kPa		
JGN Trunk - 7000 kPa		
Transmission		

Fittings, Valves & Regulators		
Siphon	Distance in metres of Main from Boundary Line	~1.5
Valve	MBK = Metres Back of Kerb	
Regulator Set	MFL = Metres from Fence Line	
Regulator Station	50mm Nylon main inserted in 6 inch (Nominal Bore) Cast Iron Main	6NB 50MM NY
Automatic Line Break Valve	32mm Nylon main inserted into 50mm Steel Main	50MM 32MM NY

N W E S

Scale: 1:2000

Issue Date: 06/03/2020
DBYD Seq No: 95550400
DBYD Job No: 19165192

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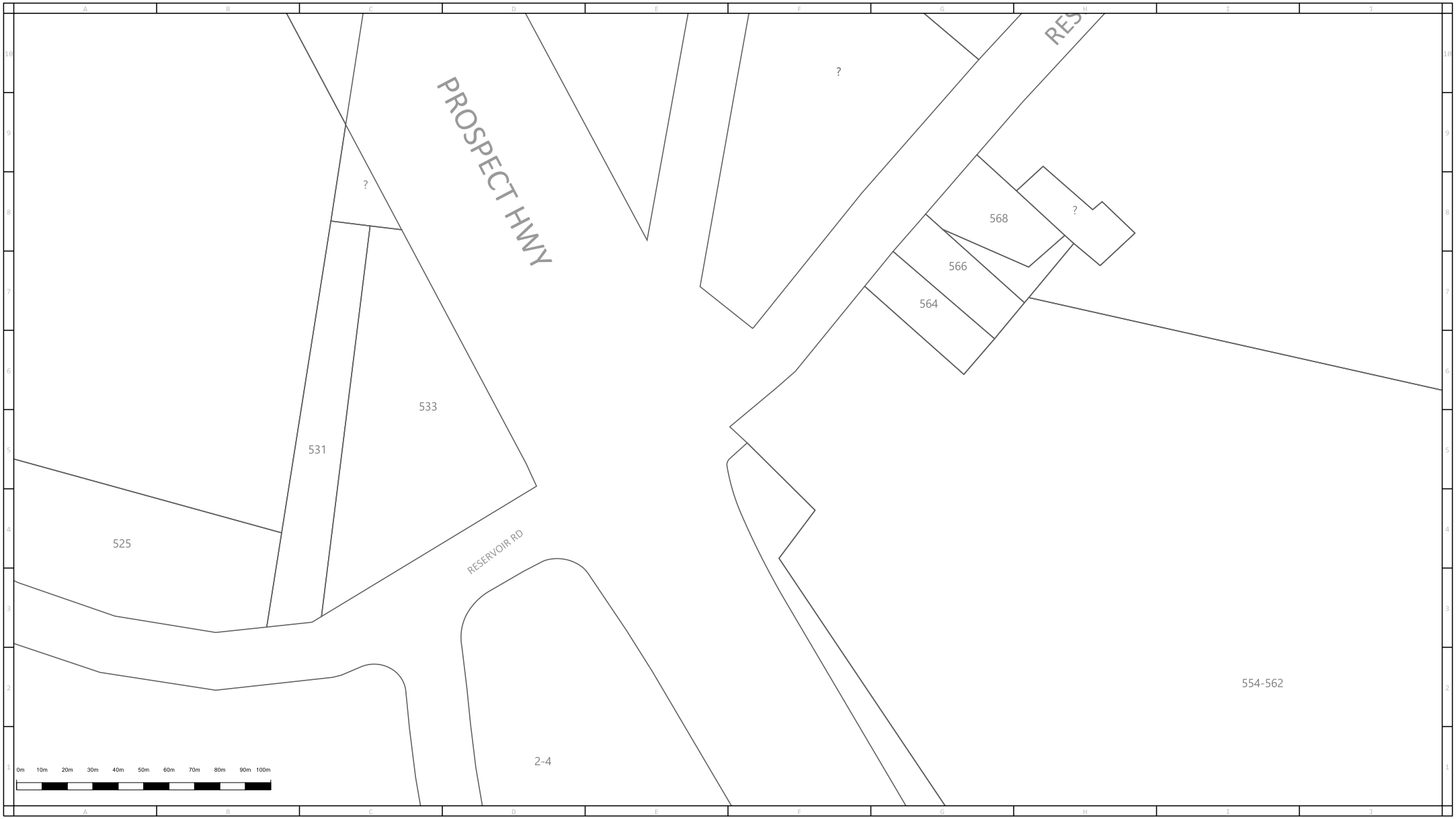
DBYD Authority: Jemena Gas Networks (NSW) **DBYD Location:** 44 Clunies Ross Street Prospect NSW, 2148



Jemena
ABN 87 003 004 322

Main	In Service	Proposed
Unknown Pressure		
Distribution - 2 kPa		
Distribution - 7 kPa		
Distribution - 30 kPa		
Distribution - 100 kPa		
Distribution - 210 kPa		
Distribution - 300 kPa		
Distribution - 400 kPa		

Main	
Proposed Isolate (coloured according to kPa)	
Isolated Service	
Conduit or Casing	
Size & Material (PL - Plastic, PVC, PE, NY, ST)	100 PVC

High Pressure Main & Pipeline	In Service	Proposed
Critical Main (Treat as High Pressure Main)		
Secondary Network - 1050 kPa		
Isolated Steel Main (Treat as High Pressure Main)		
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JGN Trunk - 7000 kPa		
Transmission		

Fittings, Valves & Regulators		
Siphon	Distance in metres of Main from Boundary Line	~1.5
Valve	MBK = Metres Back of Kerb	
Regulator Set	MFL = Metres from Fence Line	
Regulator Station	50mm Nylon main inserted in 6 inch (Nominal Bore) Cast Iron Main	6 NB 50MM NY
Automatic Line Break Valve	32mm Nylon main inserted into 50mm Steel Main	50 MM 32MM NY

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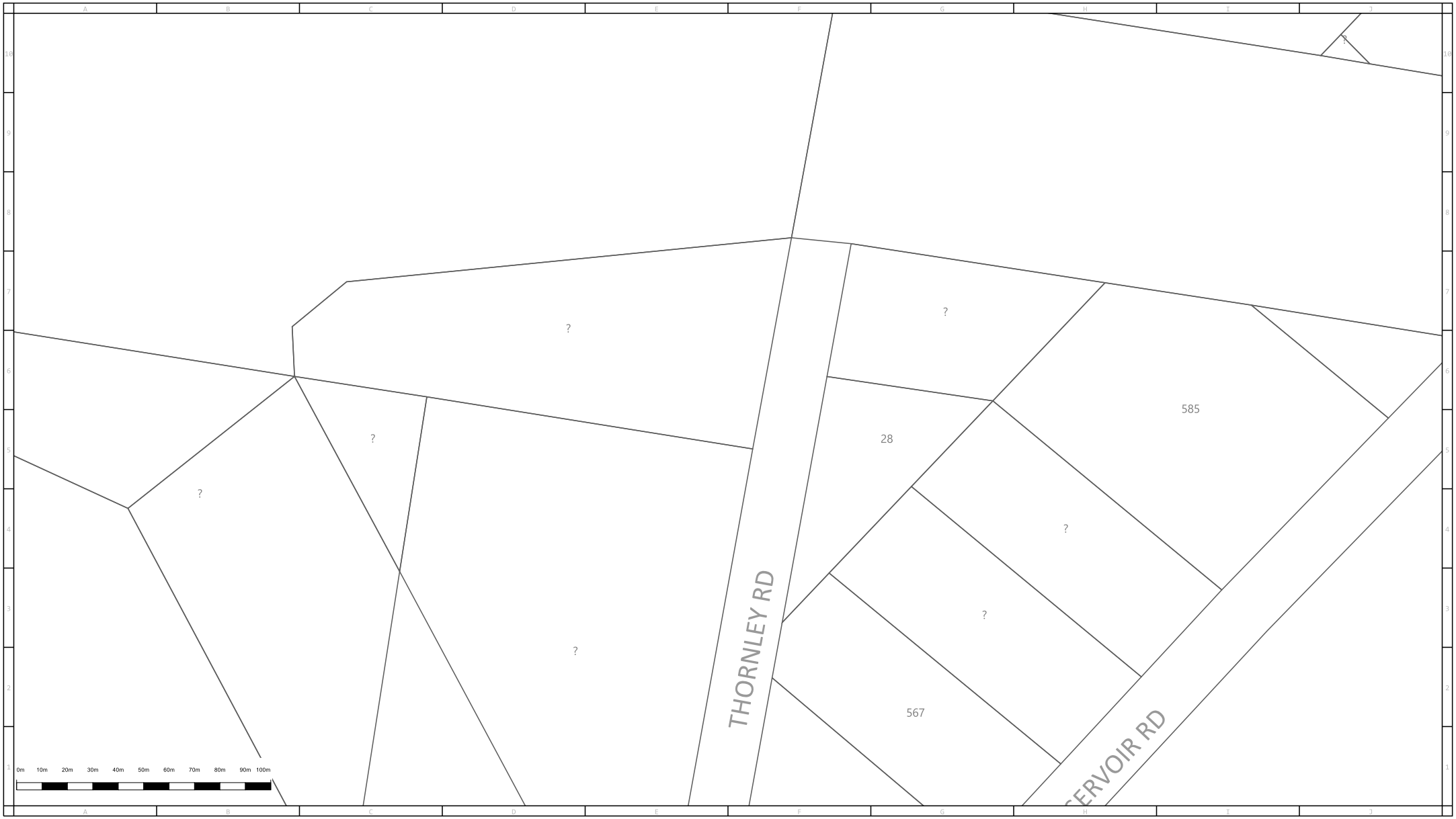

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Distribution - 210 kPa		
Distribution - 300 kPa		
Distribution - 400 kPa		

Main	
Proposed Isolate (coloured according to kPa)	
Isolated Service	
Conduit or Casing	
Size & Material (PL - Plastic, PVC, PE, NY, ST)	*100 PVC*

High Pressure Main & Pipeline	In Service	Proposed
Critical Main (Treat as High Pressure Main)		
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Transmission		

Fittings, Valves & Regulators		
Siphon	Distance in metres of Main from Boundary Line	~1.5
Valve	MBK = Metres Back of Kerb	
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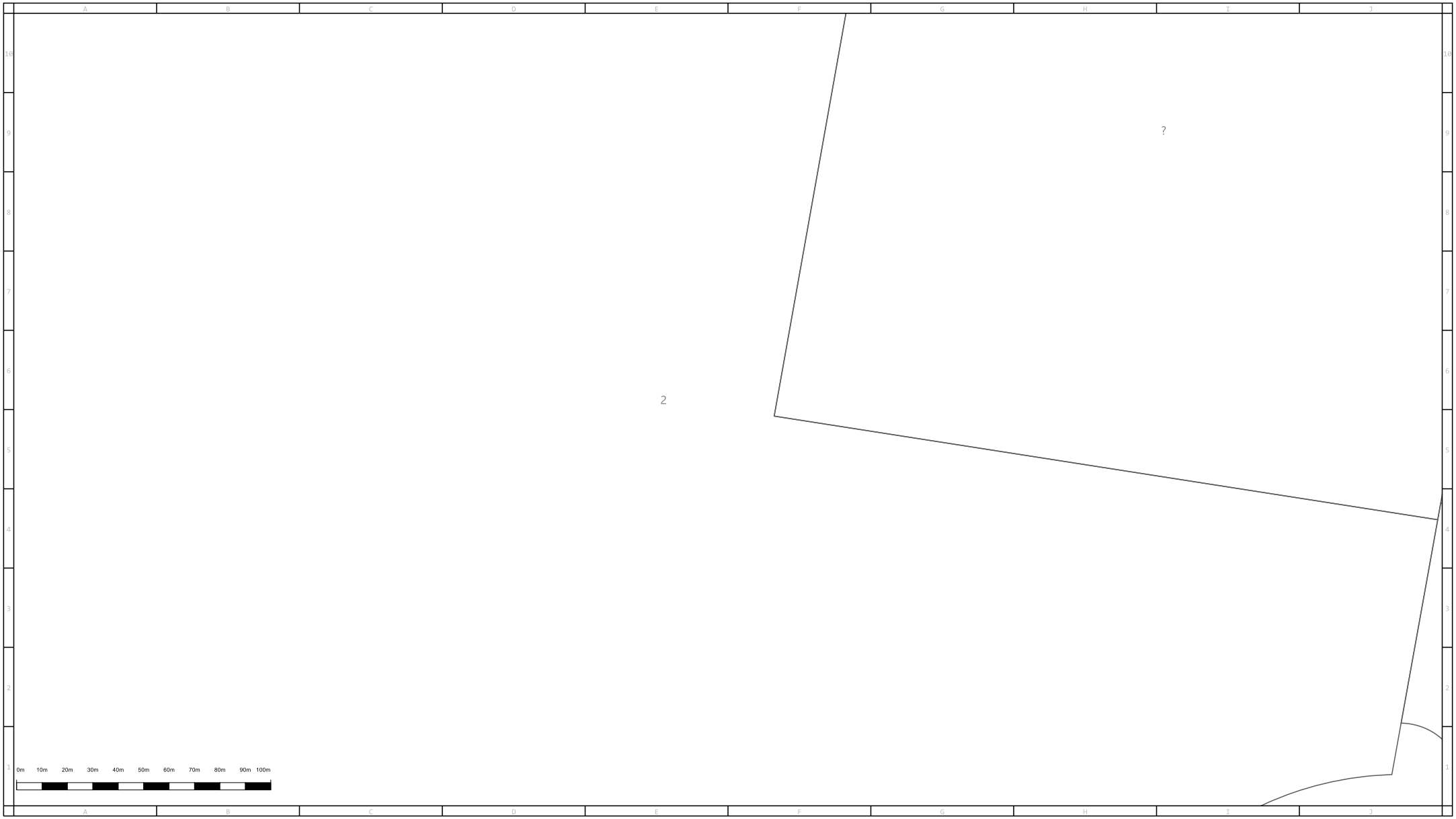

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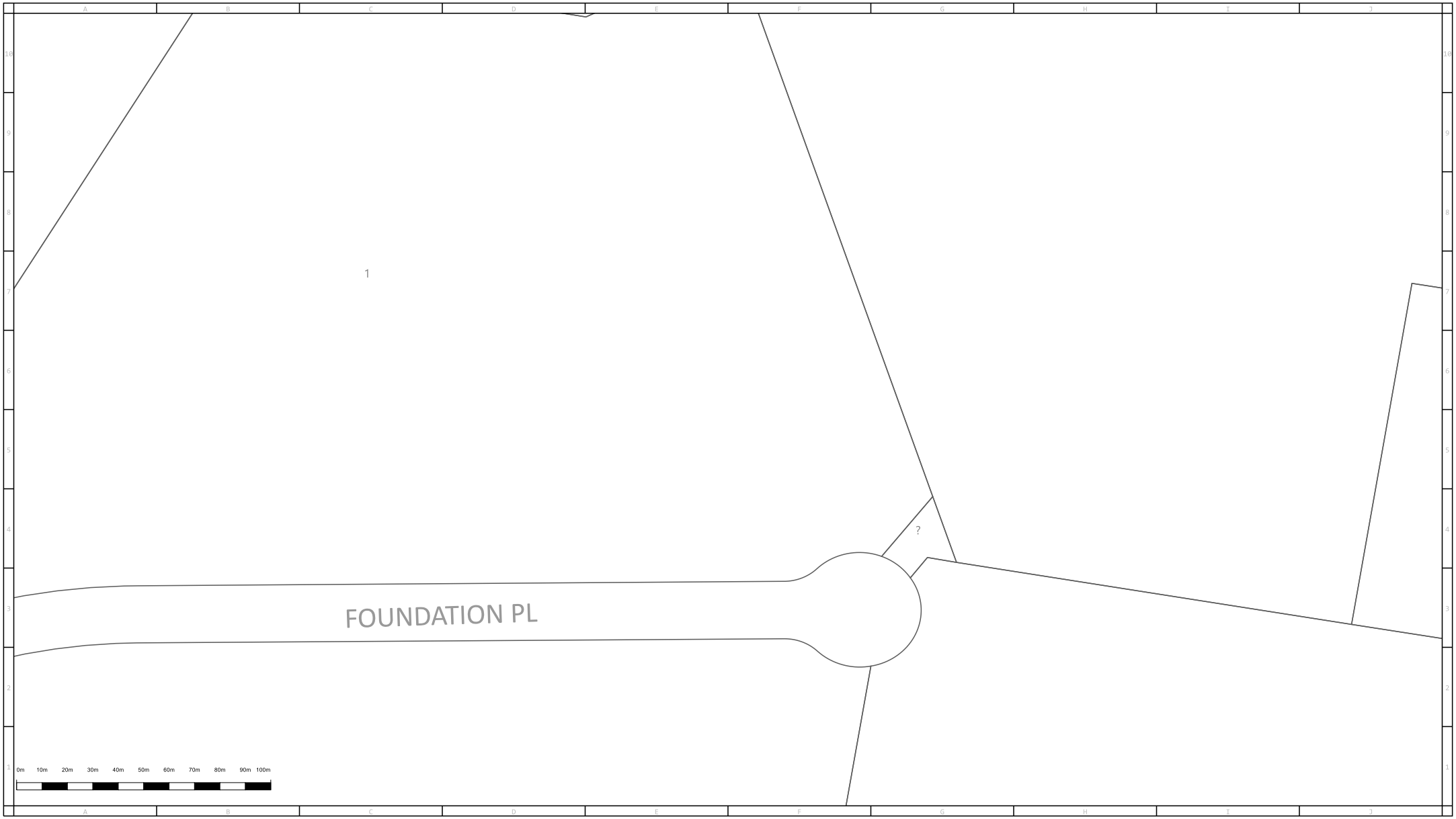

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Regulator Set	MFL = Metres from Fence Line	
Regulator Station	50mm Nylon main inserted in 6 inch (Nominal Bore) Cast Iron Main	6NB 50MM NY
Automatic Line Break Valve	32mm Nylon main inserted into 50mm Steel Main	50MM 32MM NY

N W E S

Scale: 1:2000

Issue Date: 06/03/2020
DBYD Seq No: 95550400
DBYD Job No: 19165192

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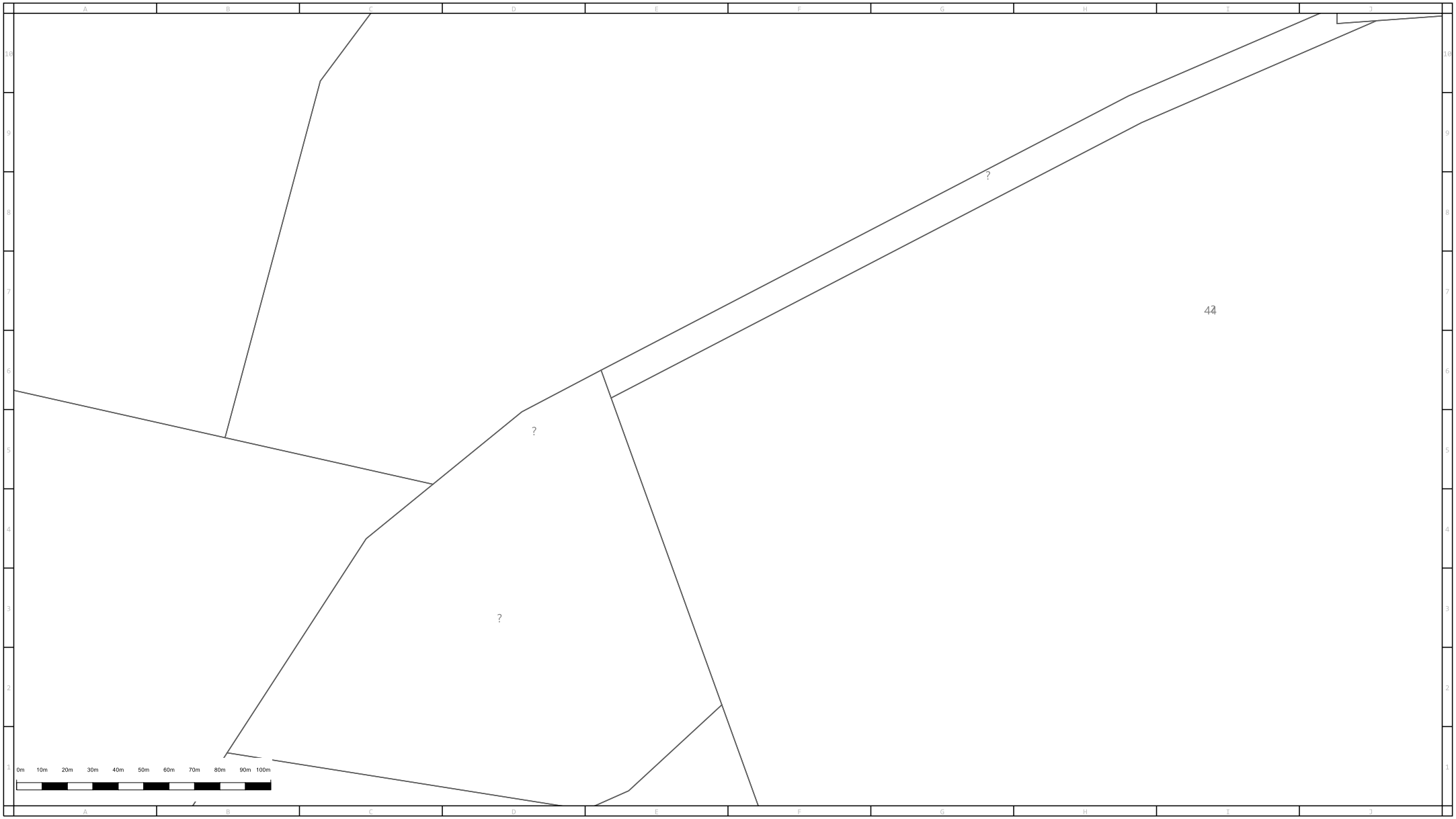
DBYD Authority: Jemena Gas Networks (NSW) **DBYD Location:** 44 Clunies Ross Street Prospect NSW, 2148



Jemena
ABN 87 003 004 322

Main	In Service	Proposed
Unknown Pressure		
Distribution - 2 kPa		
Distribution - 7 kPa		
Distribution - 30 kPa		
Distribution - 100 kPa		
Distribution - 210 kPa		
Distribution - 300 kPa		
Distribution - 400 kPa		

Main	
Proposed Isolate (coloured according to kPa)	
Isolated Service	
Conduit or Casing	
Size & Material (PL - Plastic, PVC, PE, NY, ST)	*100 PVC*

High Pressure Main & Pipeline	In Service	Proposed
Critical Main (Treat as High Pressure Main)		
Secondary Network - 1050 kPa		
Isolated Steel Main (Treat as High Pressure Main)		
Primary - 3500 kPa		
JGN Trunk - 7000 kPa		
Transmission		

Fittings, Valves & Regulators		
Siphon	Distance in metres of Main from Boundary Line	~1.5
Valve	MBK = Metres Back of Kerb	
Regulator Set	MFL = Metres from Fence Line	
Regulator Station	50mm Nylon main inserted in 6 inch (Nominal Bore) Cast Iron Main	6 NB 50MM NY
Automatic Line Break Valve	32mm Nylon main inserted into 50mm Steel Main	50 MM 32MM NY

N W E S

Scale: 1:2000

Issue Date: 06/03/2020
DBYD Seq No: 95550400
DBYD Job No: 19165192

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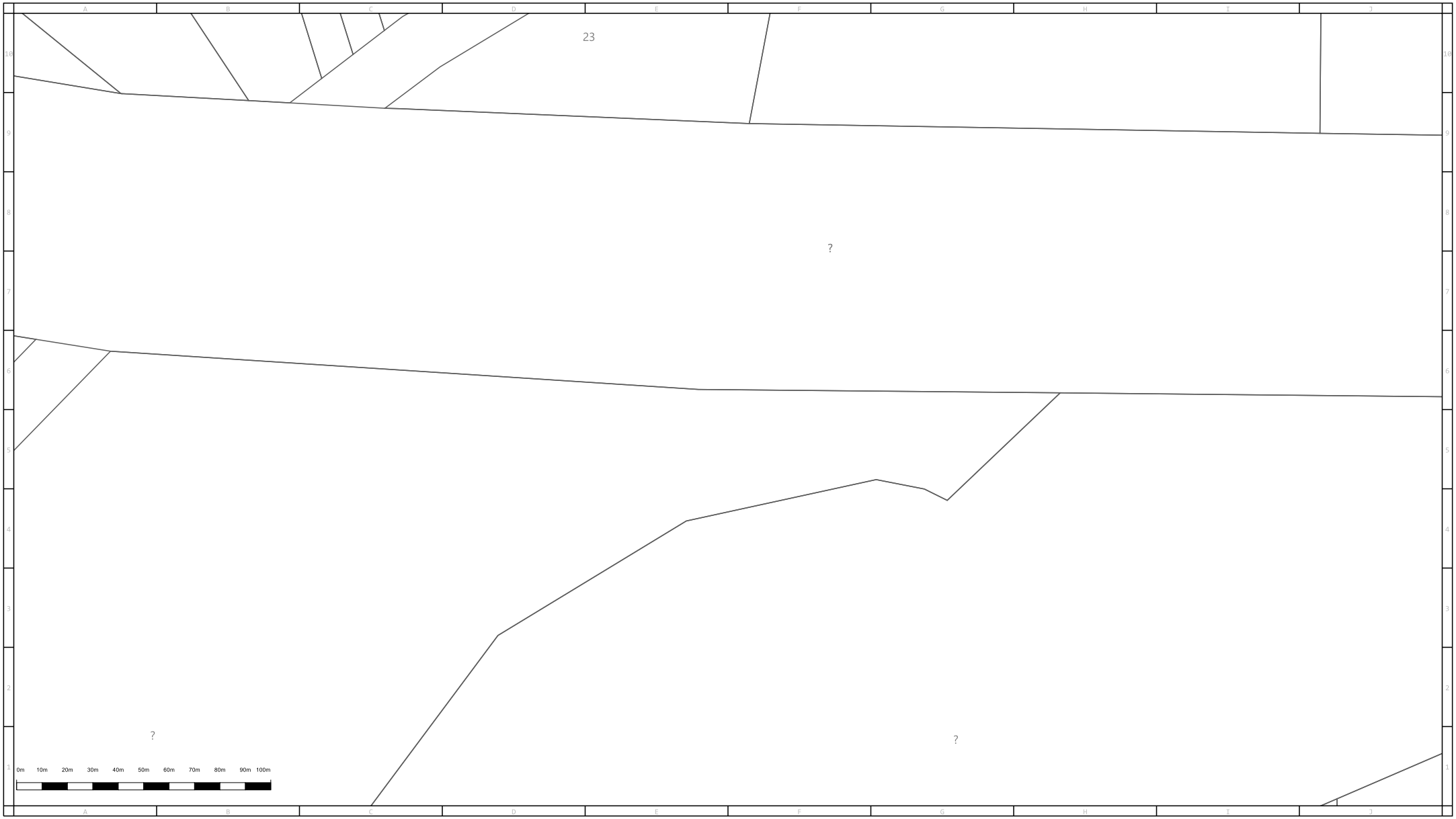

Jemena
ABN 87 003 004 322

Main	In Service	Proposed
Unknown Pressure		
Distribution - 2 kPa		
Distribution - 7 kPa		
Distribution - 30 kPa		
Distribution - 100 kPa		
Distribution - 210 kPa		
Distribution - 300 kPa		
Distribution - 400 kPa		

Main	
Proposed Isolate (coloured according to kPa)	
Isolated Service	
Conduit or Casing	
Size & Material (PL - Plastic, PVC, PE, NY, ST)	*100 PVC*

High Pressure Main & Pipeline	In Service	Proposed
Critical Main (Treat as High Pressure Main)		
Secondary Network - 1050 kPa		
Isolated Steel Main (Treat as High Pressure Main)		
Primary - 3500 kPa		
JGN Trunk - 7000 kPa		
Transmission		

Fittings, Valves & Regulators		
Siphon	Distance in metres of Main from Boundary Line	~1.5
Valve	MBK = Metres Back of Kerb	
Regulator Set	MFL = Metres from Fence Line	
Regulator Station	50mm Nylon main inserted in 6 inch (Nominal Bore) Cast Iron Main	6NB 50MM NY
Automatic Line Break Valve	32mm Nylon main inserted into 50mm Steel Main	50MM 32MM NY

N W E S

Scale: 1:2000

Issue Date: 06/03/2020
DBYD Seq No: 95550400
DBYD Job No: 19165192

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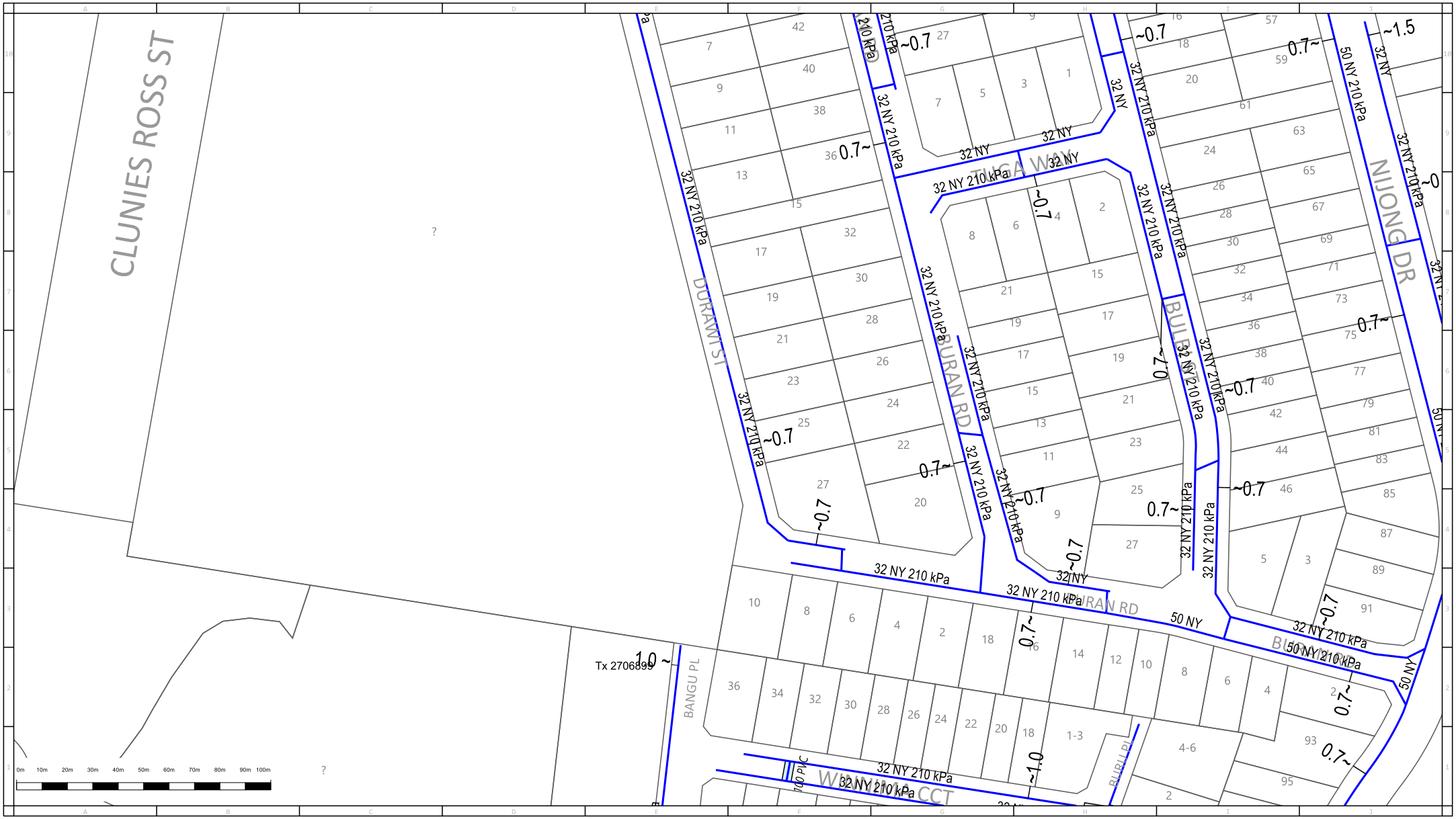

Jemena
ABN 87 003 004 322

Main	In Service	Proposed
Unknown Pressure		
Distribution - 2 kPa		
Distribution - 7 kPa		
Distribution - 30 kPa		
Distribution - 100 kPa		
Distribution - 210 kPa		
Distribution - 300 kPa		
Distribution - 400 kPa		

Main	
Proposed Isolate (coloured according to kPa)	
Isolated Service	
Conduit or Casing	
Size & Material (PL - Plastic, PVC, PE, NY, ST)	100 PVC

High Pressure Main & Pipeline	In Service	Proposed
Critical Main (Treat as High Pressure Main)		
Secondary Network - 1050 kPa		
Isolated Steel Main (Treat as High Pressure Main)		
Primary - 3500 kPa		
JGN Trunk - 7000 kPa		
Transmission		

Fittings, Valves & Regulators: Siphon, Valve, Regulator Set, Regulator Station, Automatic Line Break Valve

~1.5 Distance in metres of Main from Boundary Line
MBK = Metres Back of Kerb
MFL = Metres from Fence Line
6 NB 50MM NY — 50mm Nylon main inserted in 6 inch (Nominal Bore) Cast Iron Main
50 MM 32MM NY — 32mm Nylon main inserted into 50mm Steel Main

N W E S

Issue Date: 06/03/2020
DBYD Seq No: 95550400
DBYD Job No: 19165192
Scale: 1:2000

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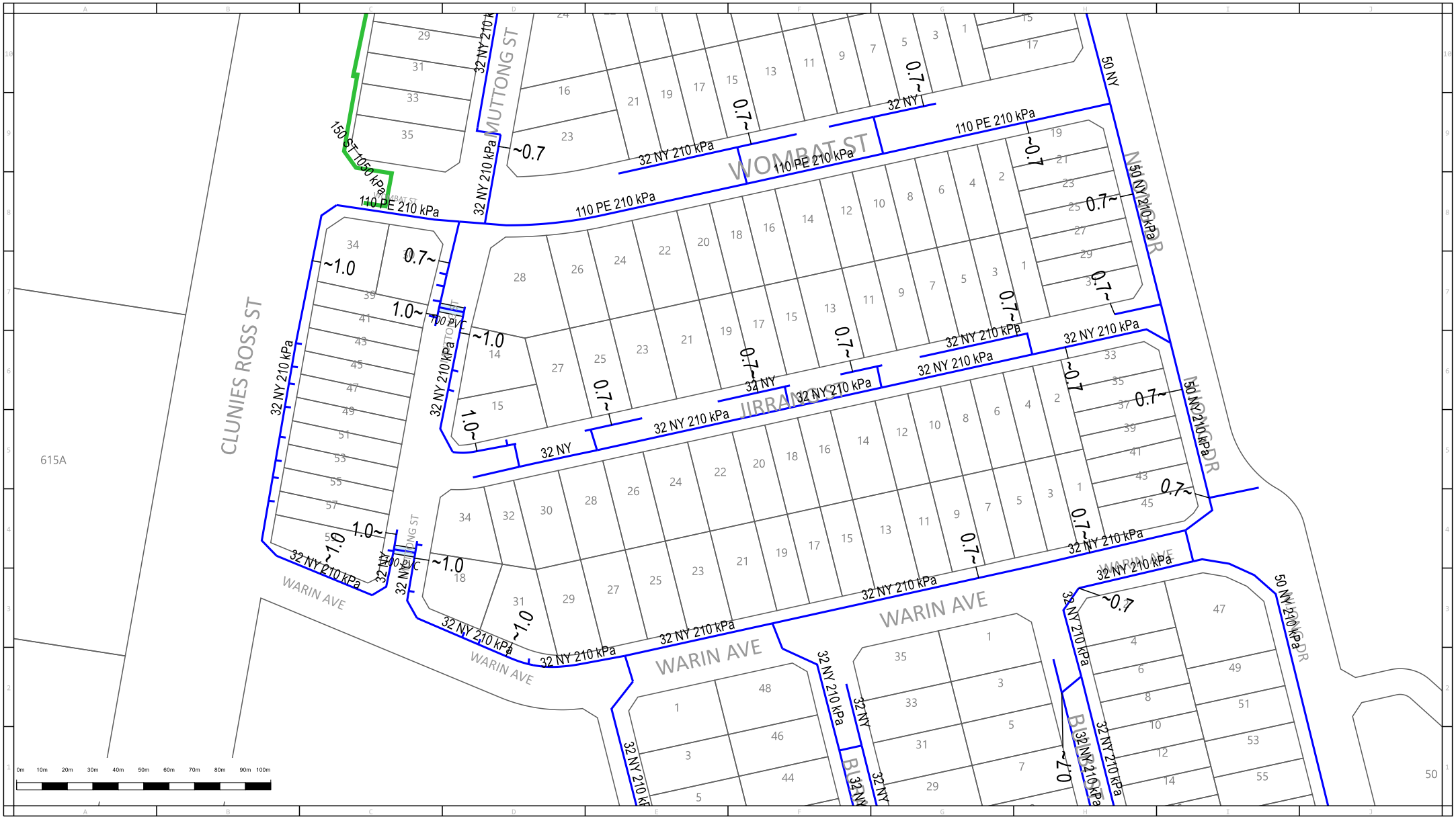

Jemena
ABN 87 003 004 322

Main	In Service	Proposed
Unknown Pressure		
Distribution - 2 kPa		
Distribution - 7 kPa		
Distribution - 30 kPa		
Distribution - 100 kPa		
Distribution - 210 kPa		
Distribution - 300 kPa		
Distribution - 400 kPa		

Main
Proposed Isolate (coloured according to kPa)
Isolated Service
Conduit or Casing
Size & Material (PL - Plastic, PVC, PE, NY, ST) — 100 PVC

High Pressure Main & Pipeline	In Service	Proposed
Critical Main (Treat as High Pressure Main)		
Secondary Network - 1050 kPa		
Isolated Steel Main (Treat as High Pressure Main)		
Primary - 3500 kPa		
JGN Trunk - 7000 kPa		
Transmission		

Fittings, Valves & Regulators	
Siphon	Distance in metres of Main from Boundary Line ~1.5
Valve	MBK = Metres Back of Kerb
Regulator Set	MFL = Metres from Fence Line
Regulator Station	50mm Nylon main inserted in 6 inch (Nominal Bore) Cast Iron Main — 6NB 50MM NY
Automatic Line Break Valve	32mm Nylon main inserted into 50mm Steel Main — 50MM 32MM NY

N W E S

Issue Date: 06/03/2020
DBYD Seq No: 95550400
DBYD Job No: 19165192
Scale: 1:2000

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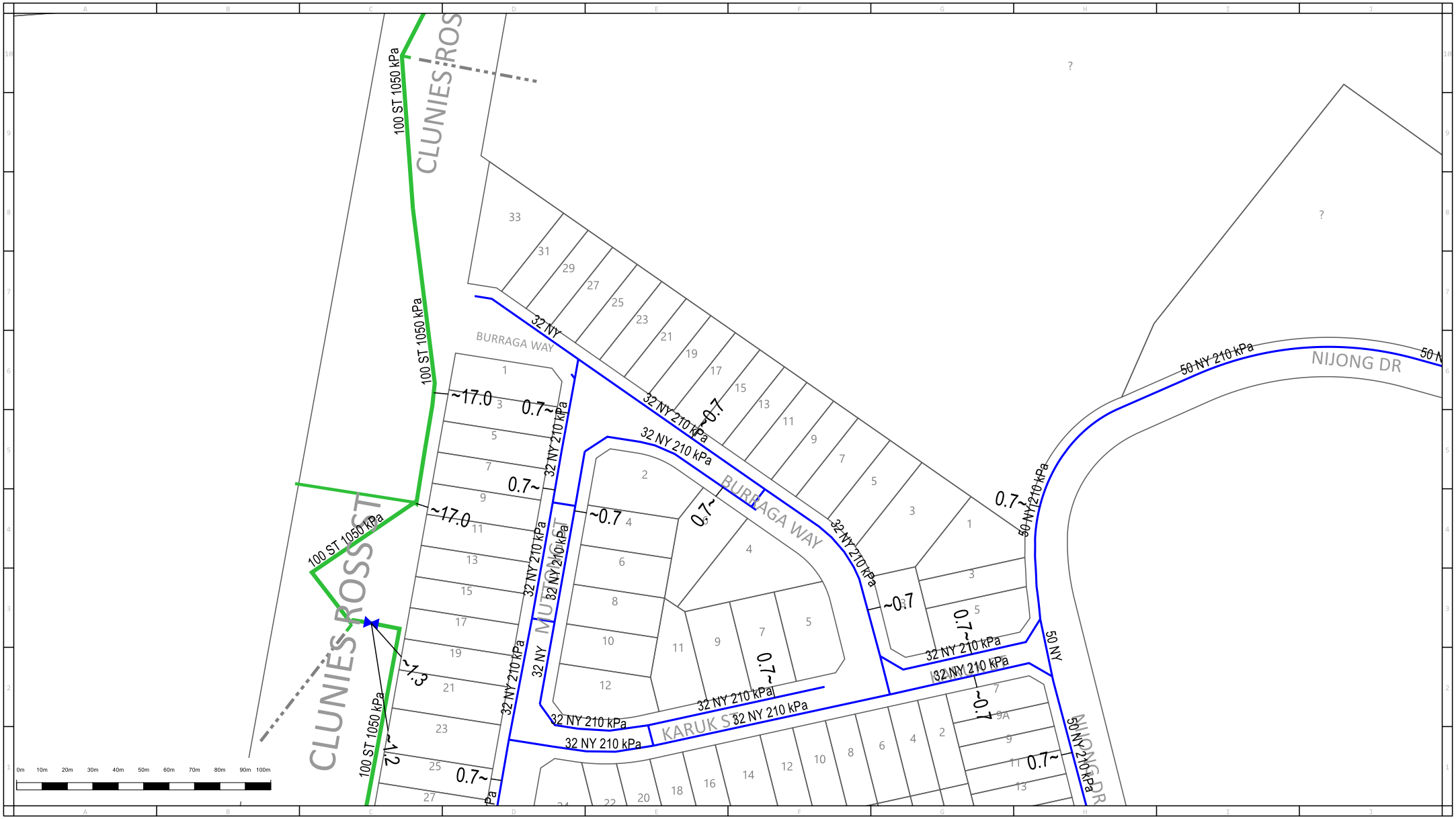

Jemena
ABN 87 003 004 322

Main	In Service	Proposed
Unknown Pressure		
Distribution - 2 kPa		
Distribution - 7 kPa		
Distribution - 30 kPa		
Distribution - 100 kPa		
Distribution - 210 kPa		
Distribution - 300 kPa		
Distribution - 400 kPa		

Main	
Proposed Isolate (coloured according to kPa)	
Isolated Service	
Conduit or Casing	
Size & Material (PL - Plastic, PVC, PE, NY, ST)	100 PVC

High Pressure Main & Pipeline	In Service	Proposed
Critical Main (Treat as High Pressure Main)		
Secondary Network - 1050 kPa		
Isolated Steel Main (Treat as High Pressure Main)		
Primary - 3500 kPa		
JGN Trunk - 7000 kPa		
Transmission		

Fittings, Valves & Regulators	
Siphon	
Valve	
Regulator Set	
Regulator Station	
Automatic Line Break Valve	

Distance in metres of Main from Boundary Line ~1.5
MBK = Metres Back of Kerb
MFL = Metres from Fence Line
50mm Nylon main inserted in 6 inch (Nominal Bore) Cast Iron Main (6)NB 50MM NY
32mm Nylon main inserted into 50mm Steel Main (50)MM 32MM NY

N W E S

Scale: 1:2000

Issue Date: 06/03/2020
DBYD Seq No: 95550400
DBYD Job No: 19165192

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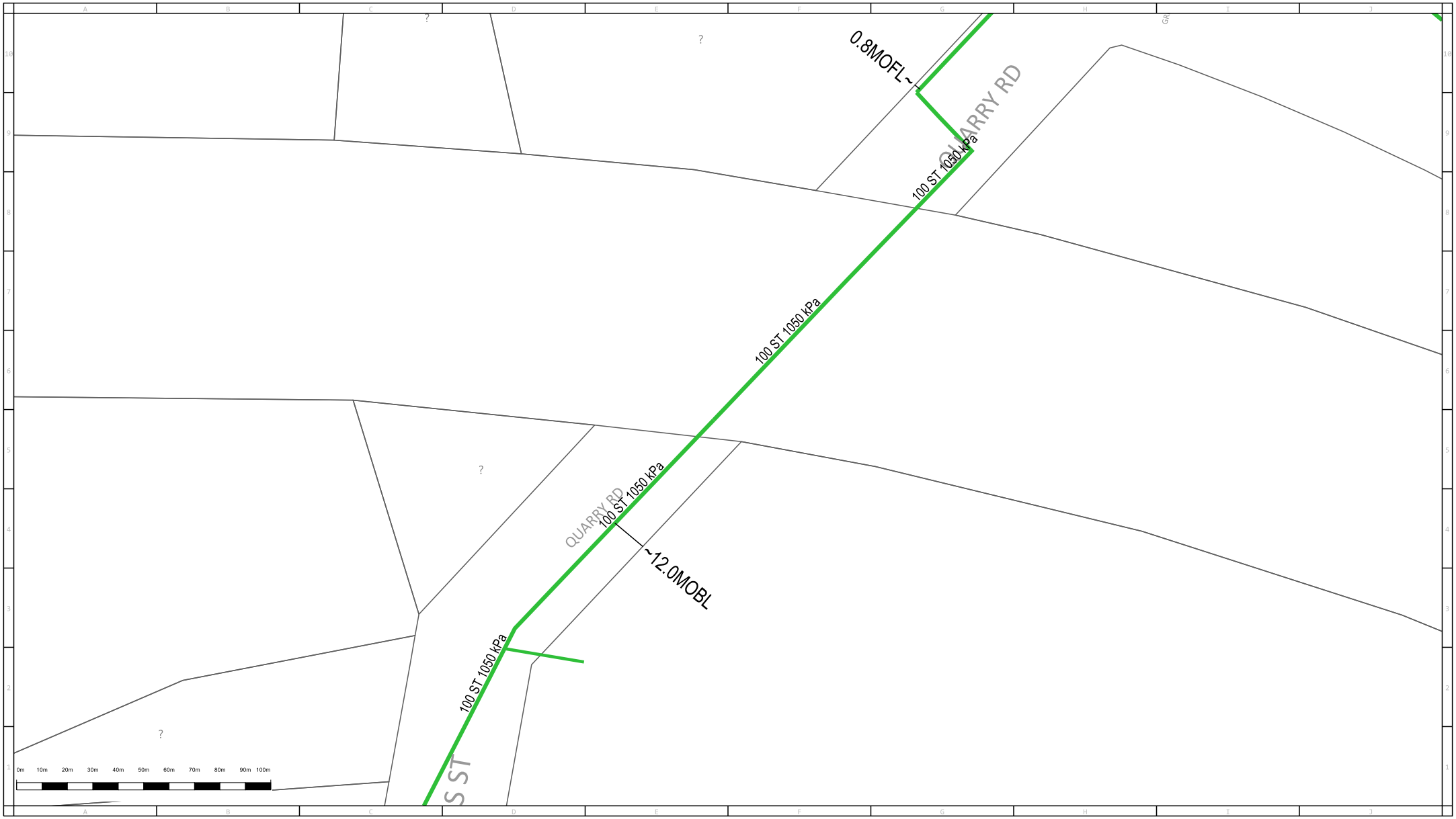

Jemena
ABN 87 003 004 322

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Unknown Pressure		
Distribution - 2 kPa		
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Distribution - 400 kPa		

Main	
Proposed Isolate (coloured according to kPa)	
Isolated Service	
Conduit or Casing	
Size & Material (PL - Plastic, PVC, PE, NY, ST)	*100 PVC*

High Pressure Main & Pipeline	In Service	Proposed
Critical Main (Treat as High Pressure Main)		
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Fittings, Valves & Regulators		
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N W E S

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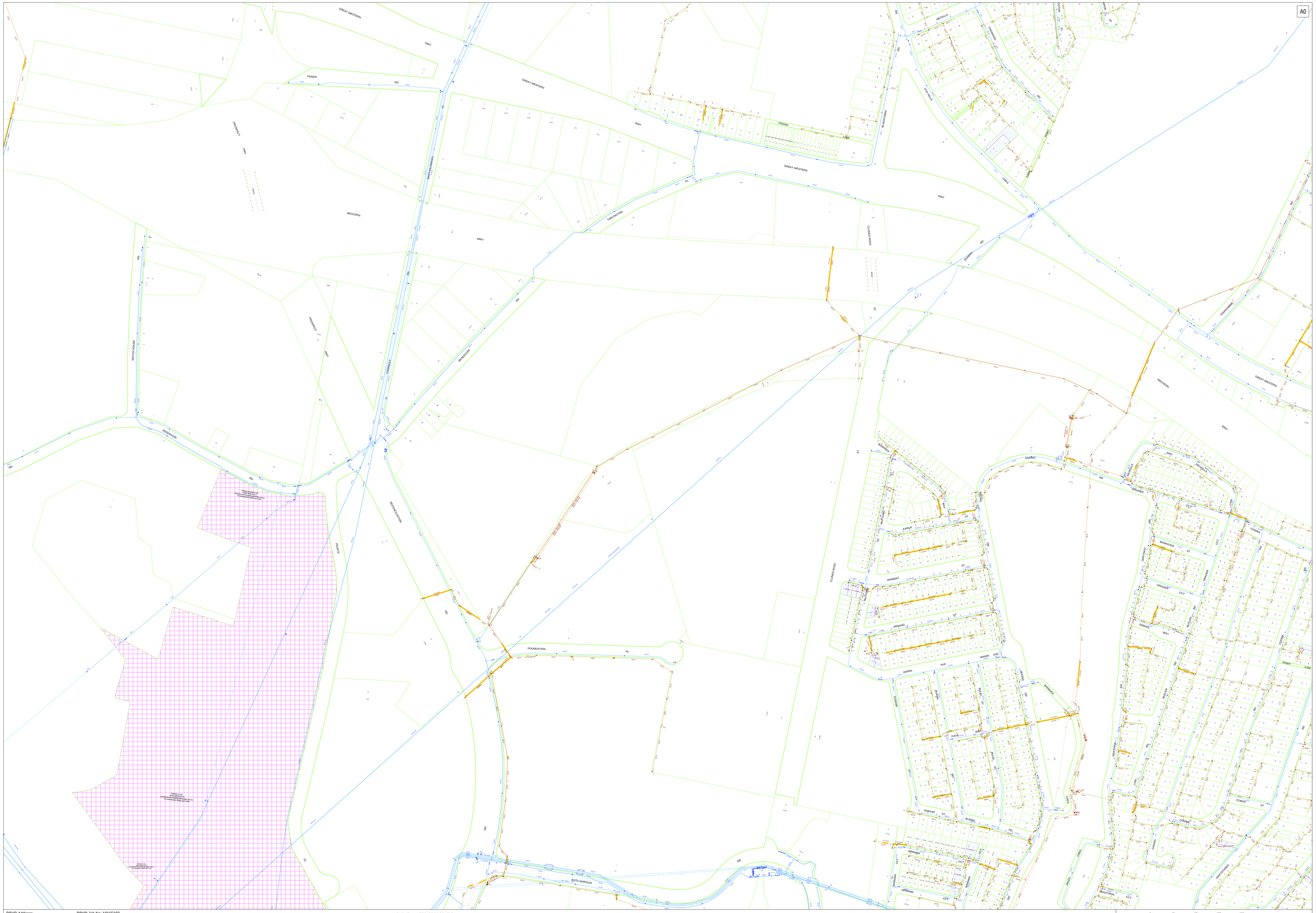

DBYD Address:
44 Clunies Ross Street
Prospect NSW 2148

DBYD Job No: 19165192
DBYD Sequence No: 95550401

SYDNEY WATER CORPORATION
No warranty is given that the information shown is complete or accurate.

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Scale: 1:2000
Date of Production: 06/03/2020 14:06:01

Appendix G
WAE – Regional Detention Basin

BLACKTOWN CITY COUNCIL

HOLROYD MUNICIPAL COUNCIL

DEPARTMENT OF WATER RESOURCES

GREYSTANES CREEK

RETARDING BASINS

These plans are supplied with the following warning that Council will not be responsible for any errors or omissions in these work as executed (WAE) plans.

You are responsible to carry out your own checks to confirm whether:

1. The plans are as conatructed in the field.
2. The calculations and levels are correct.
3. Any catchment areas or extents are correct.
4. Any other works have been carried out.
5. Any service locations shown are correct.

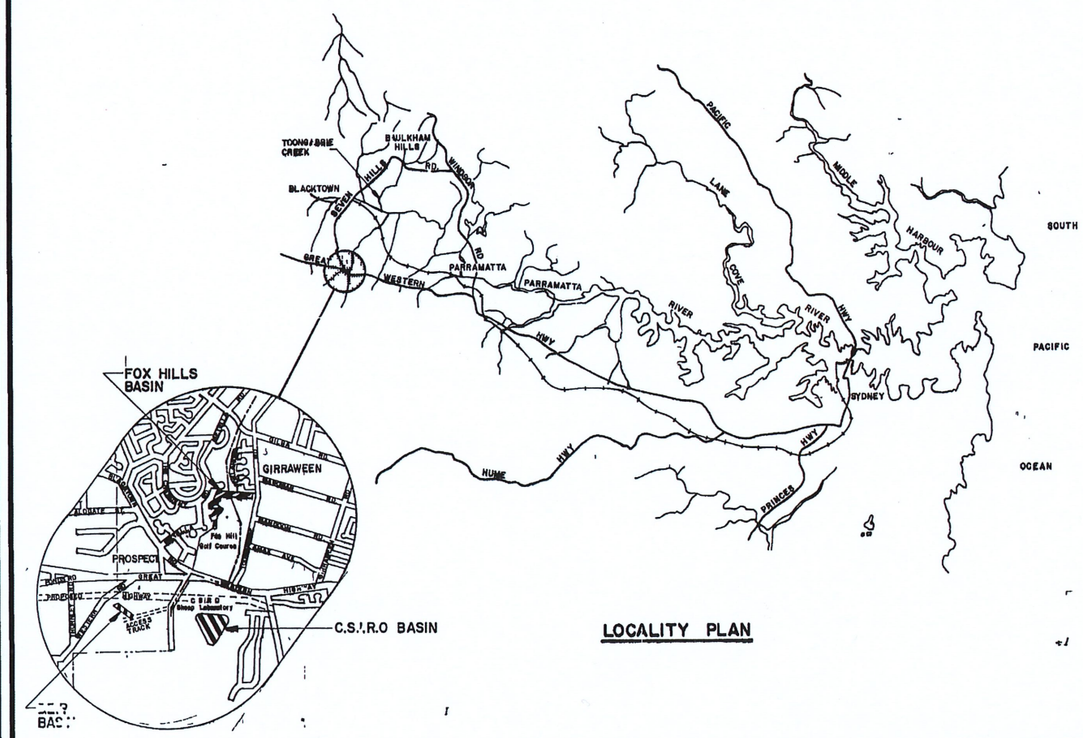
Proposed design works and floodmodelling should be based on field survey data and not on these WAE plans.

D.E.P. BASIN	SERIES 6191–B
FOX HILLS BASIN	SERIES 6191–C
C.S.I.R.O. BASIN	SERIES 6191–D

WILLING & PARTNERS
CONSULTING ENGINEERS

621 PACIFIC HIGHWAY
ST. LEONARDS 2065

TELEPHONE 439 8546



LOCALITY PLAN

E91/12V

DEPARTMENT OF WATER RESOURCES

GREYSTANES CREEK D.E.P. RETARDING BASIN

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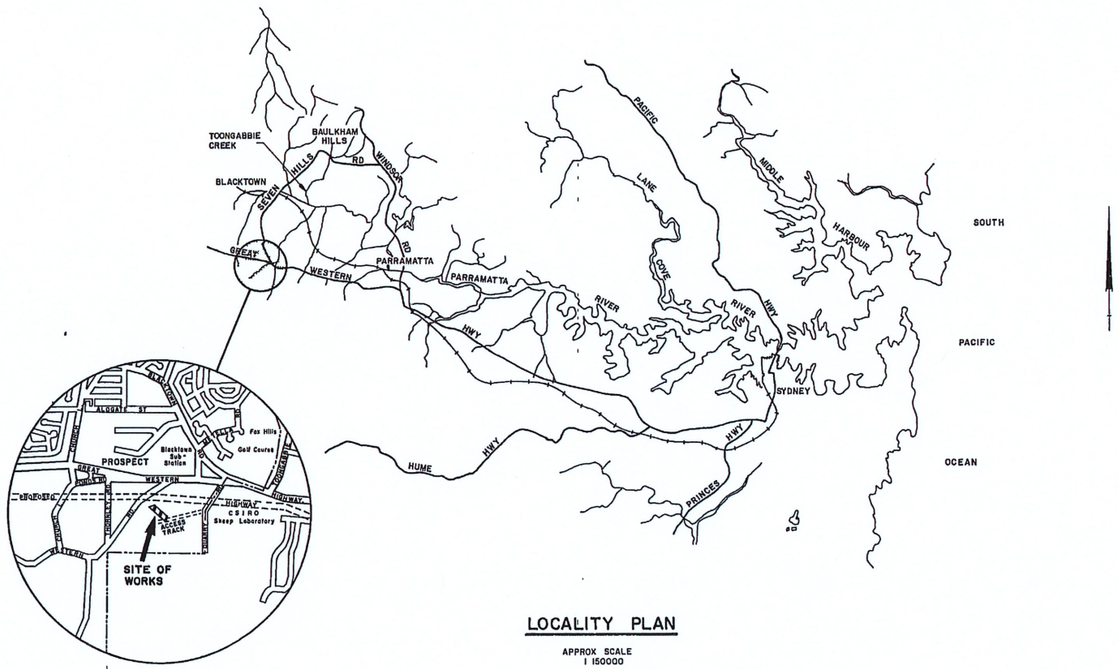
PROJECT DRAWINGS

6191B-1	SITE PLAN
6191B-2	SETTING OUT PLAN
6191B-3	GENERAL ARRANGEMENT
6191B-4	EMBANKMENT, SPILLWAY AND BASIN DETAILS
6191B-5	OUTLET CULVERT AND SEWER ENCASEMENT DETAILS
6191B-6	DRAINAGE STRUCTURE N°1 - OUTLET STRUCTURE AND ENERGY DISSIPATOR
6191B-7	DRAINAGE STRUCTURE N°2 - BASIN OUTLET
6191B-8	TRASH RACK DETAILS

WILLING & PARTNERS PTY. LTD.
CONSULTING ENGINEERS
1-3 ATCHISON ST.
ST. LEONARDS, N.S.W. 2065
TEL. 02 439 8546

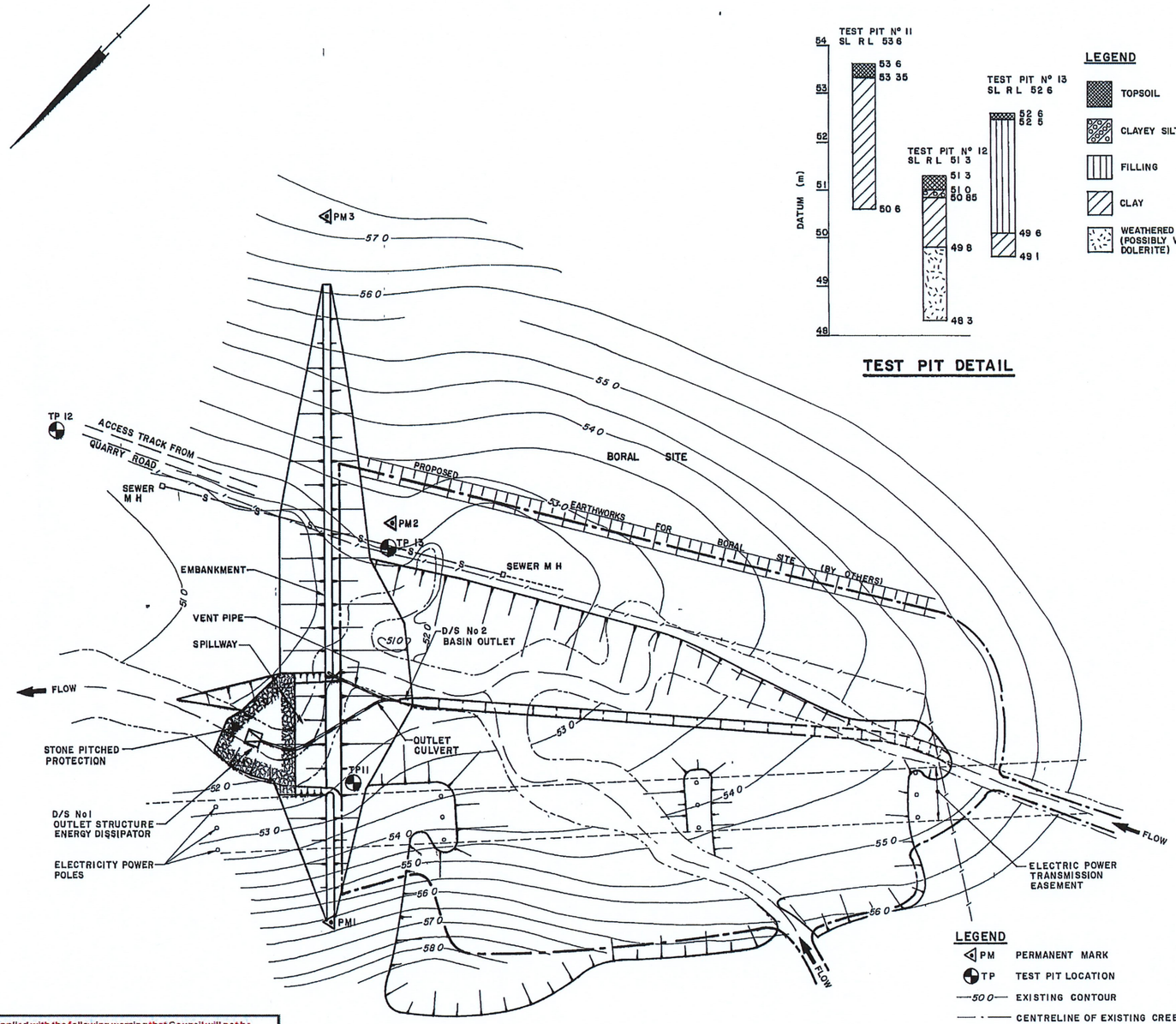


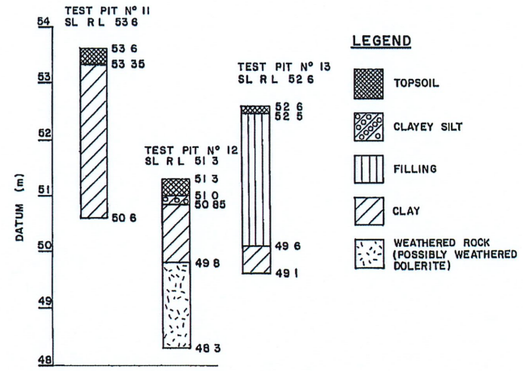
APPROX SCALE 1 25000

LOCALITY PLAN

APPROX SCALE 1 150000

E91/12V





TEST PIT DETAIL

GENERAL NOTES

1 DRAWINGS TO BE READ IN CONJUNCTION WITH THE SPECIFICATION
2 ALL LEVELS ARE TO AUSTRALIAN HEIGHT DATUM (A H D)
3 ALL DIMENSIONS ARE IN MILLIMETRES, UNLESS NOTED OTHERWISE AND ARE TO BE VERIFIED ON SITE
4 ALL SERVICES SHALL BE LOCATED PRIOR TO WORK COMMENCING
5 NO WORK SHALL COMMENCE IN THE VICINITY OF ANY SERVICES PRIOR TO NOTIFICATION OF THE RELEVANT AUTHORITY

CONCRETE NOTES

1 ALL CONCRETE TO HAVE A MINIMUM 28 DAY COMPRESSIVE STRENGTH OF 25 MPa, 75 MAXIMUM SLUMP, 20 MAXIMUM AGGREGATE SIZE AND TO BE IN ACCORDANCE WITH A S 1480
2 SUBGRADE UNDER DRAINAGE STRUCTURES TO BE COMPACTED TO MINIMUM OF 100% OF THE STANDARD MAXIMUM DRY DENSITY WHEN TESTED IN ACCORDANCE WITH A S 1289
3 ALL EXPOSED EDGES AND CORNERS TO BE PROVIDED WITH 25 x 25 CHAMFERS OR FILLETS UNLESS NOTED OTHERWISE
4 WEEPHOLES 50 DIA TO BE PROVIDED WHERE INDICATED ON THE DRAWING

REINFORCEMENT NOTES

1 SYMBOLS ON DRAWINGS FOR GRADE AND TYPE OF REINFORCEMENT
Y - WELDING GRADE DEFORMED BAR TO A S 1302
EXAMPLE GRADE DIA SPACING C/C
Y 16 200
F - WELDED WIRE FABRIC TO A S -1302
2 40 MINIMUM CLEAR COVER, UNLESS NOTED OTHERWISE
3 NF DENOTES NEAR FACE, FF DENOTES FAR FACE, EF DENOTES EACH FACE
4 MINIMUM BAR LAP TO BE 40 x BAR DIAMETER
5 BARS TO BE BENT WITH A MINIMUM DIAMETER OF 6 BAR DIAMETERS
6 FABRIC TO BE CUT NEATLY AROUND PIPES AND OPENINGS WHERE REQUIRED FABRIC LAP TO SQUARE AND MINIMUM 225

CIVIL NOTES

1 EMBANKMENT TO BE KEYED INTO SUBGRADE AND DEPTH TO BE APPROVED BY THE ENGINEER
2 EMBANKMENT FILL MATERIAL TO BE APPROVED BY THE ENGINEER
3 STONE PITCHING TO BE COMPOSED OF DURABLE MATERIAL OF NOMINAL SIZE 375 UNLESS SHOWN OTHERWISE
4 SUBGRADE UNDER EMBANKMENT AND KEY TO BE COMPACTED TO A MINIMUM OF 100% OF THE STANDARD MAXIMUM DRY DENSITY WHEN TESTED IN ACCORDANCE WITH A S 1289
5 ALL BUILDING RUBBLE AND DUMPED FILLING MATERIALS ENCOUNTERED DURING EXCAVATION OF EMBANKMENT KEY TO BE REMOVED AND DISPOSED OF TO THE SATISFACTION OF THE SUPERINTENDENT

LEGEND

PM PERMANENT MARK
TP TEST PIT LOCATION
500 EXISTING CONTOUR
CENTRELINE OF EXISTING CREEK
TOP OF CREEK BANK
BOUNDARY FENCE LINE
S EXISTING SEWER
CULVERT
4m WIDE CHANNEL
LIMIT OF WORKS
LIMIT OF 1% AEP INUNDATION (R L 55 2)

10 0 10 20 30 40 50 60 70
1 1000 (METRES)

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5. Any service locations shown are correct.

Proposed design works and flood modelling should be based on field survey data and not on these WAE plans.

DRAWING No.	SUBJECT	AMDT.	DESCRIPTION	DATE	INIT.
		A	AMEND LIMIT OF WORK & 1% INUNDATION LINES	5/12/89	C C

ASSOCIATED DRAWINGS — AMENDMENTS

WILLING & PARTNERS PTY LTD
CONSULTING ENGINEERS
1-3 ATCHISON STREET, ST LEONARDS 2065 TELEPHONE 439 8546

PRINCIPAL DATE

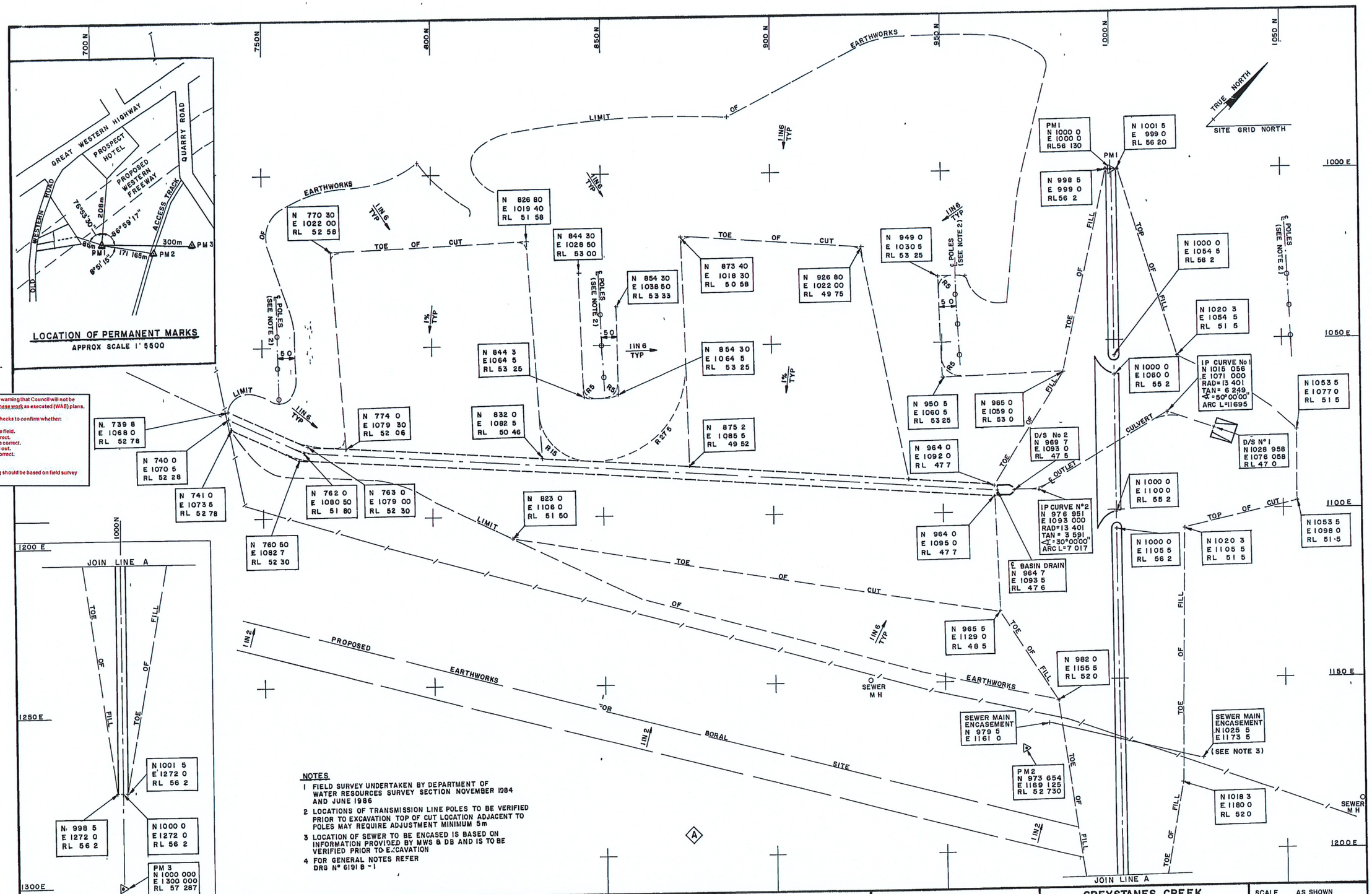
FOR DEPARTMENT OF WATER RESOURCES

GREYSTANES CREEK DEP RETARDING BASIN

SITE PLAN

SCALE AS SHOWN
DATE SEPT 1985
DESIGNED M H B
DRAWN K W
CHECKED

DRAWING No 6191 B - 1 A



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NOTES

1 FIELD SURVEY UNDERTAKEN BY DEPARTMENT OF WATER RESOURCES SURVEY SECTION NOVEMBER 1984 AND JUNE 1986

2 LOCATIONS OF TRANSMISSION LINE POLES TO BE VERIFIED PRIOR TO EXCAVATION TOP OF CUT LOCATION ADJACENT TO POLES MAY REQUIRE ADJUSTMENT MINIMUM 5m

3 LOCATION OF SEWER TO BE ENCASED IS BASED ON INFORMATION PROVIDED BY MWS & DB AND IS TO BE VERIFIED PRIOR TO EXCAVATION

4 FOR GENERAL NOTES REFER DRG N° 6191 B - 1

DRAWING No	SUBJECT	AMDT	DESCRIPTION	DATE	INIT
		A	AMEND CO-ORDINATES AND R L	5/12/89	C C

ASSOCIATED DRAWINGS — AMENDMENTS

WILLING & PARTNERS CONSULTING ENGINEERS
621 PACIFIC HIGHWAY, ST LEONARDS, NSW 2065 TELEPHONE 439 8546

PRINCIPAL DATE

FOR DEPARTMENT OF WATER RESOURCES

GREYSTANES CREEK DEP RETARDING BASIN

SETTING OUT PLAN

SCALE AS SHOWN
DATE DECEMBER 1989
DESIGNED M H B / A B
DRAWN K W
CHECKED

DRAWING No 6191 B - 2 A

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4. Any other works have been carried out.
5. Any service locations shown are correct.

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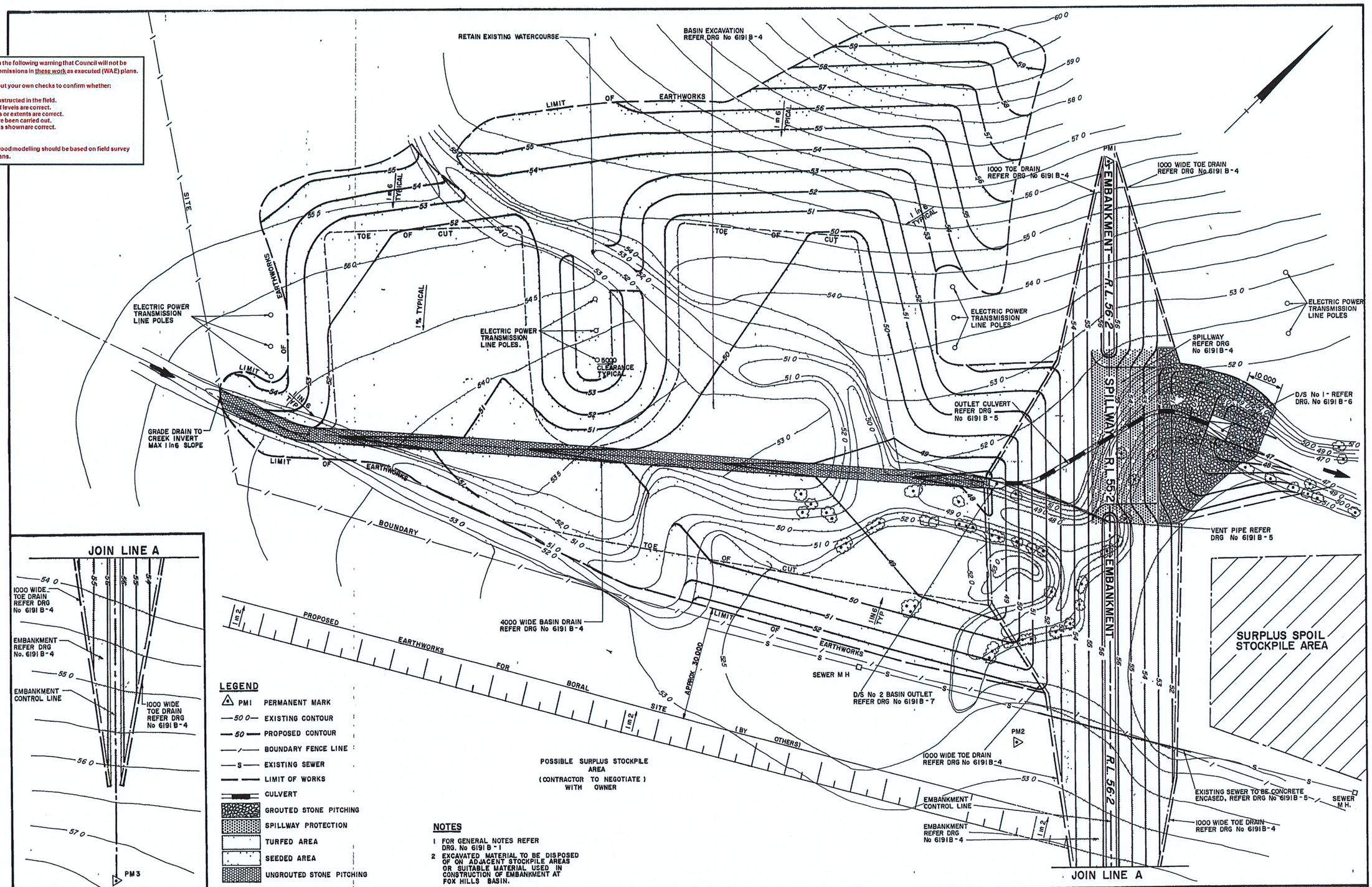

LEGEND

- PM1 PERMANENT MARK
- 50.0 EXISTING CONTOUR
- 50 PROPOSED CONTOUR
- BOUNDARY FENCE LINE
- S EXISTING SEWER
- LIMIT OF WORKS
- CULVERT
- GROUTED STONE PITCHING
- SPILLWAY PROTECTION
- TURFED AREA
- SEEDED AREA
- UNGROUTED STONE PITCHING

NOTES

1. FOR GENERAL NOTES REFER DRG. No 6191 B - 1
2. EXCAVATED MATERIAL TO BE DISPOSED OF ON ADJACENT STOCKPILE AREAS OR SUITABLE MATERIAL USED IN CONSTRUCTION OF EMBANKMENT AT FOX HILLS BASIN.

DRAWING No.	SUBJECT
6191 B - 7	DRAINAGE STRUCTURE No 2
6191 B - 6	DRAINAGE STRUCTURE No 1
6191 B - 5	CULVERT AND MISC DETAILS
6191 B - 4	EMBANKMENT & SPILLWAY DETAILS
6191 B	SETTING OUT DETAILS

ASSOCIATED DRAWINGS

AMDT	DESCRIPTION	DATE	INIT
A	AMEND BASIN DESIGN	27 11 89	CC

AMENDMENTS

10 000 0 10 000 20 000 30 000
1:500 (MILLIMETRES)

WILLING & PARTNERS CONSULTING ENGINEERS
621 PACIFIC HIGHWAY, ST LEONARDS, NSW 2065 TELEPHONE 439 8546

PRINCIPAL DATE

FOR DEPARTMENT OF WATER RESOURCES

GREYSTANES CREEK DEP RETARDING BASIN

GENERAL ARRANGEMENT

SCALE AS SHOWN
DATE NOV 1989
DESIGNED MHB / AB
DRAWN GH
CHECKED

DRAWING No 6191B - 3 A

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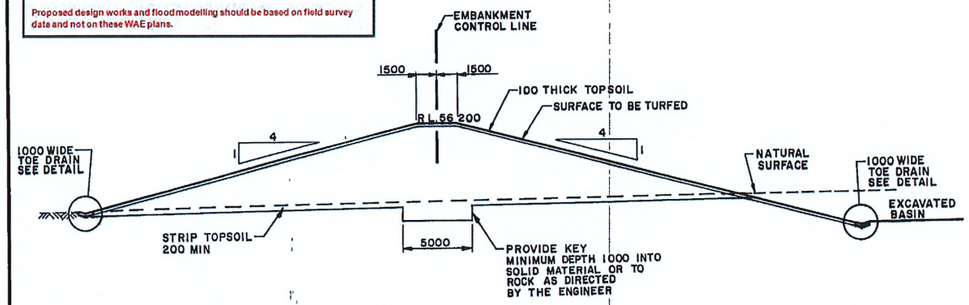
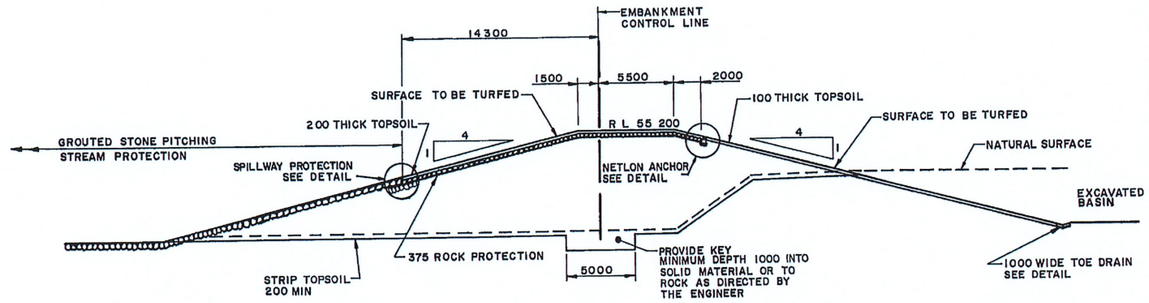


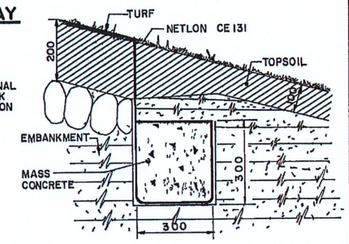
TYPICAL SECTION THROUGH EMBANKMENT

SCALE 1 200



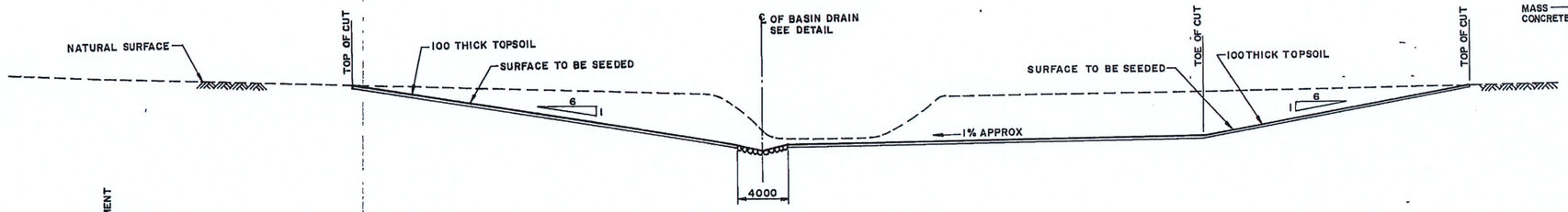
TYPICAL SECTION THROUGH SPILLWAY

SCALE 1 200



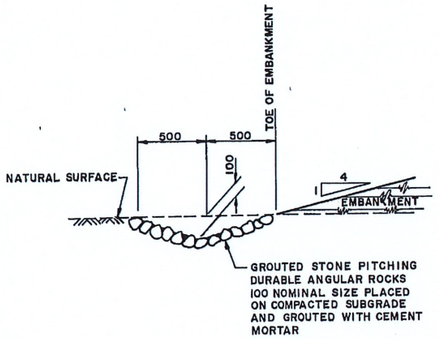
NETLON ANCHOR DETAIL

SCALE 1·10



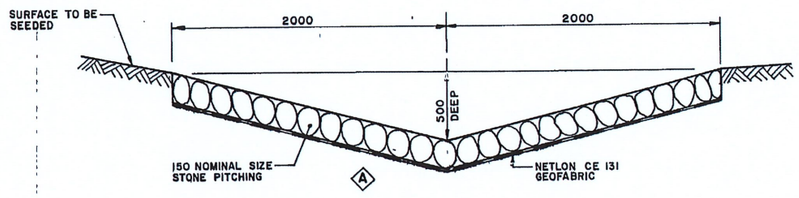
TYPICAL SECTION BASIN EXCAVATION

SCALE 1 200



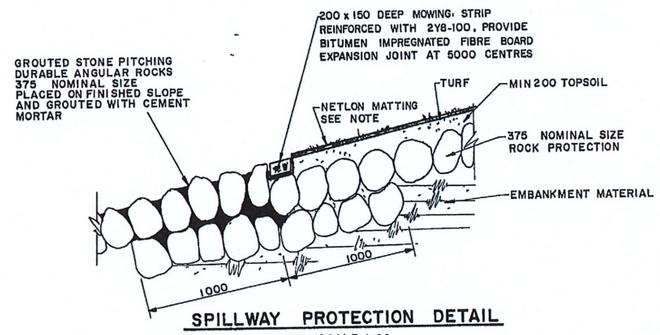
TOE DRAIN DETAIL

SCALE 1·20



BASIN DRAIN DETAIL

SCALE 1 20



SPILLWAY PROTECTION DETAIL

SCALE 1 20

NOTE

1 USE NETLON MAT CE 131 OR EQUIVALENT TO BE APPROVED BY THE SUPERINTENDENT ROLLS TO BE JOINED BY U V OR BLACK POLYETHELENE ROPING OR SIMILAR AT 1000 MAXIMUM SPACING ROLLS TO BE LOCATED LONGITUDINALLY DOWN THE EMBANKMENT SLOPE AS DIRECTED BY THE ENGINEER EXTENT OF MAT COVER AS SHOWN ON "TYPICAL SECTION THROUGH SPILLWAY" INTERMEDIATE PINNING AS MANUFACTURERS INSTRUCTIONS

2 COMPACTED FILL TO EMBANKMENT TO BE SCARIFIED BEFORE PLACING TOPSOIL.

NOTES

1 FOR GENERAL NOTES REFER DRG N° 6191 B - 1

2 FOR CONCRETE NOTES REFER DRG N° 6191 B - 1

01 0 01 02 03 04 05 06 07
1·10 (METRES)

02 0 02 04 06 08 10 12 14
1 20 (METRES)

2 0 2 4 6 8 10 12 14
1 200 (METRES)

DRAWING No.	SUBJECT	AMDT.	DESCRIPTION	DATE	INIT.
		A	REMOVE RENO MATTRESS NOTE	FEB 90	RJC

ASSOCIATED DRAWINGS — AMENDMENTS

WILLING & PARTNERS PTY LTD
CONSULTING ENGINEERS
1-3 ATCHISON STREET,
ST LEONARDS 2065 TELEPHONE 439 8546

PRINCIPAL DATE

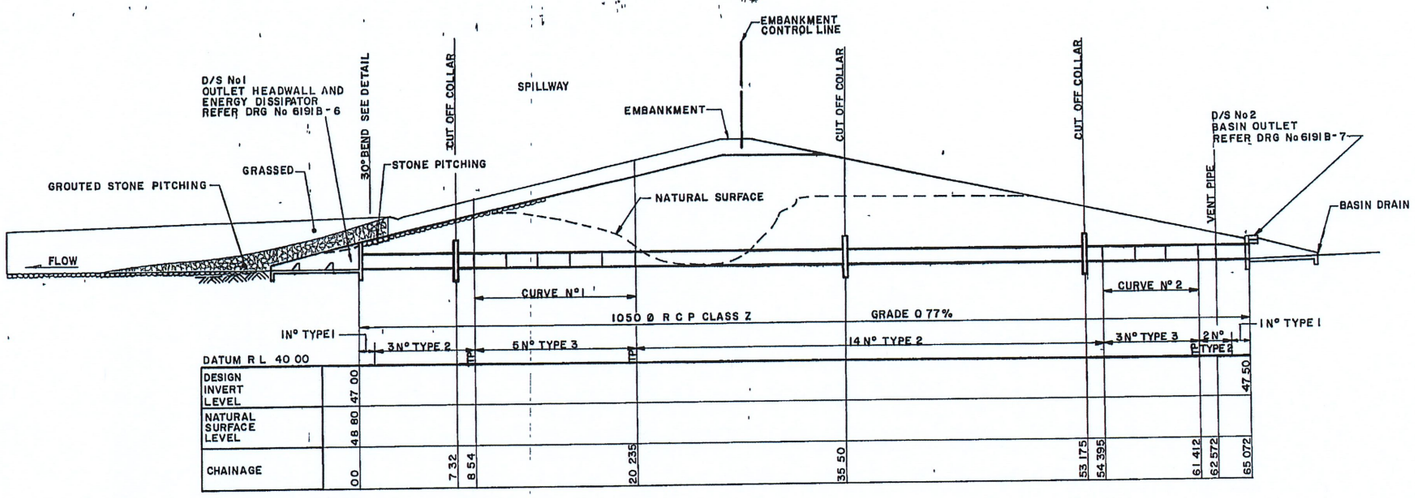
FOR DEPARTMENT OF WATER RESOURCES

GREYSTANES CREEK DEP RETARDING BASIN

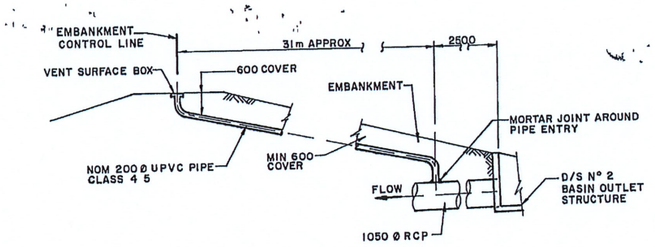
EMBANKMENT, SPILLWAY AND BASIN DETAILS

SCALE AS SHOWN
DATE AUG 1986
DESIGNED M H B
DRAWN K W
CHECKED

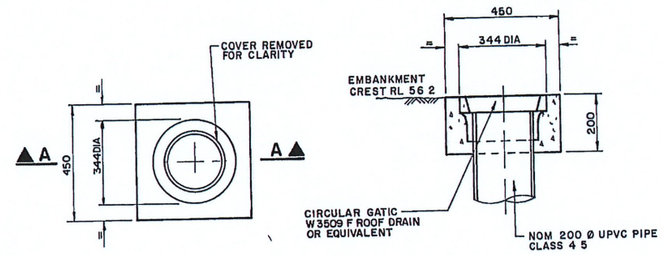
DRAWING No. 6191 B - 4 A



CULVERT LONG SECTION
SCALE 1 200

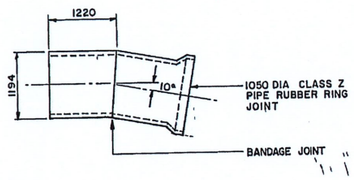


VENT PIPE DETAIL
NOT TO SCALE



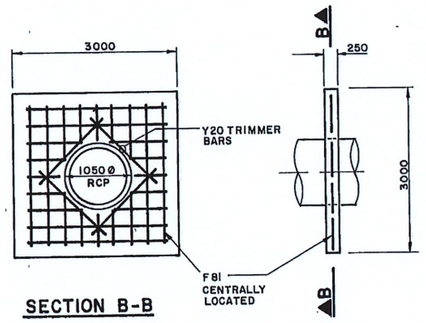
PLAN (A) SECTION A-A

VENT SURFACE BOX DETAIL
SCALE 1 10



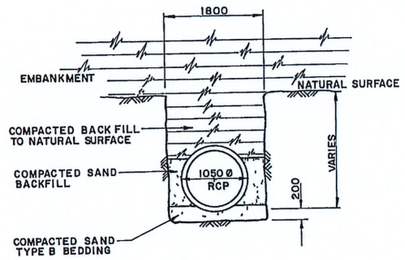
NOTE
1 TYPE 1 = 1 22 LONG PIPE
TYPE 2 = 2 44 LONG PIPE
STANDARD RUBBER RING JOINT R C P

TYPE 3 PIPE CURVE SECTION
SCALE 1 50



SECTION B-B

CUT OFF COLLAR DETAIL
SCALE 1 50



TRENCH DETAIL
SCALE 1 50

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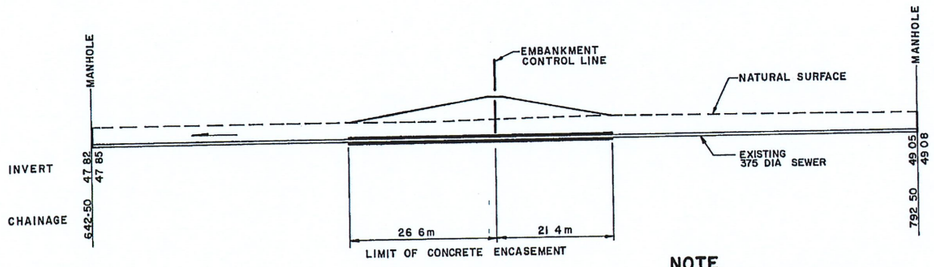
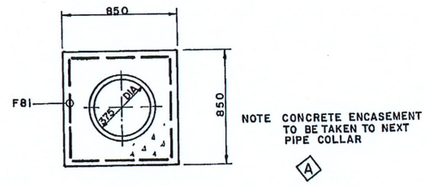


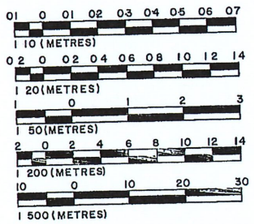
SEWER LONG SECTION
SCALE 1 500

NOTE
ALL INFORMATION REGARDING EXISTING SEWER OBTAINED FROM MWS & DB W O 57972 DRAWINGS DETAILS NOT GUARANTEED



CONCRETE ENCASEMENT OF SEWER TYPICAL SECTION
SCALE 1 20

NOTES
1 FOR GENERAL NOTES REFER DRG N° 6191 B - 1
2 FOR CONCRETE NOTES REFER DRG N° 6191 B - 1
3 FOR REINFORCEMENT NOTES REFER DRG N° 6191 B - 1



DRAWING No	SUBJECT	AMDT.	DESCRIPTION	DATE	INIT.
		A	ADD CONCRETE ENCASEMENT NOTE & AMEND VENT SURFACE BOX	FEB 90	R I C

ASSOCIATED DRAWINGS — AMENDMENTS

WILLING & PARTNERS PTY LTD
CONSULTING ENGINEERS
1-3 ATCHISON STREET, ST LEONARDS 2065 TELEPHONE 439 8546

PRINCIPAL DATE

FOR DEPARTMENT OF WATER RESOURCES

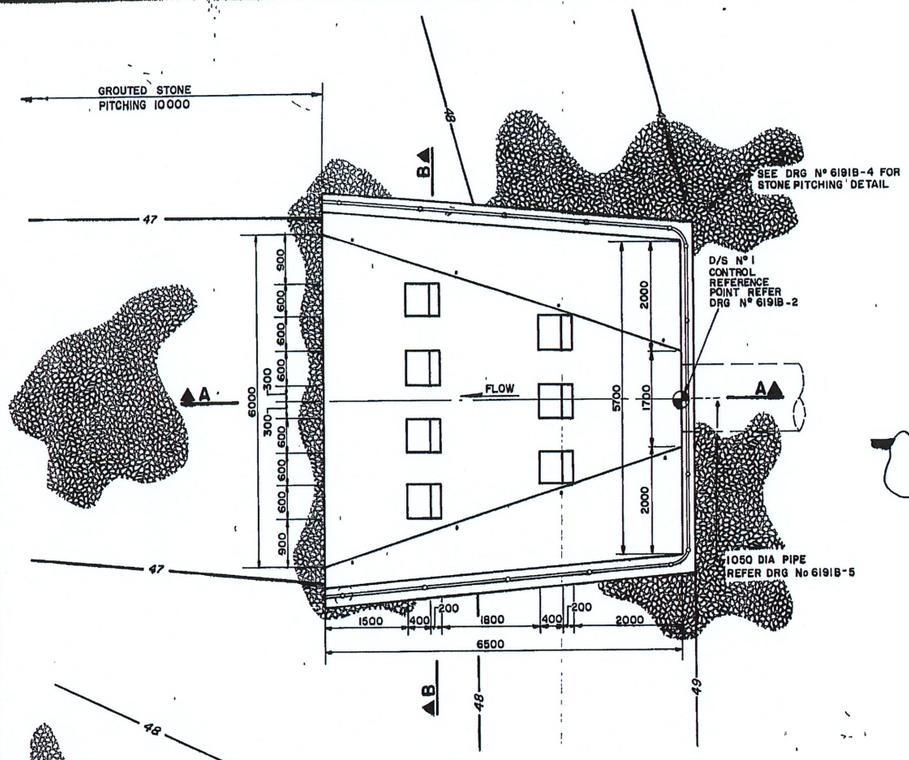
GREYSTANES CREEK DEP RETARDING BASIN

OUTLET CULVERT AND SEWER ENCASEMENT DETAILS

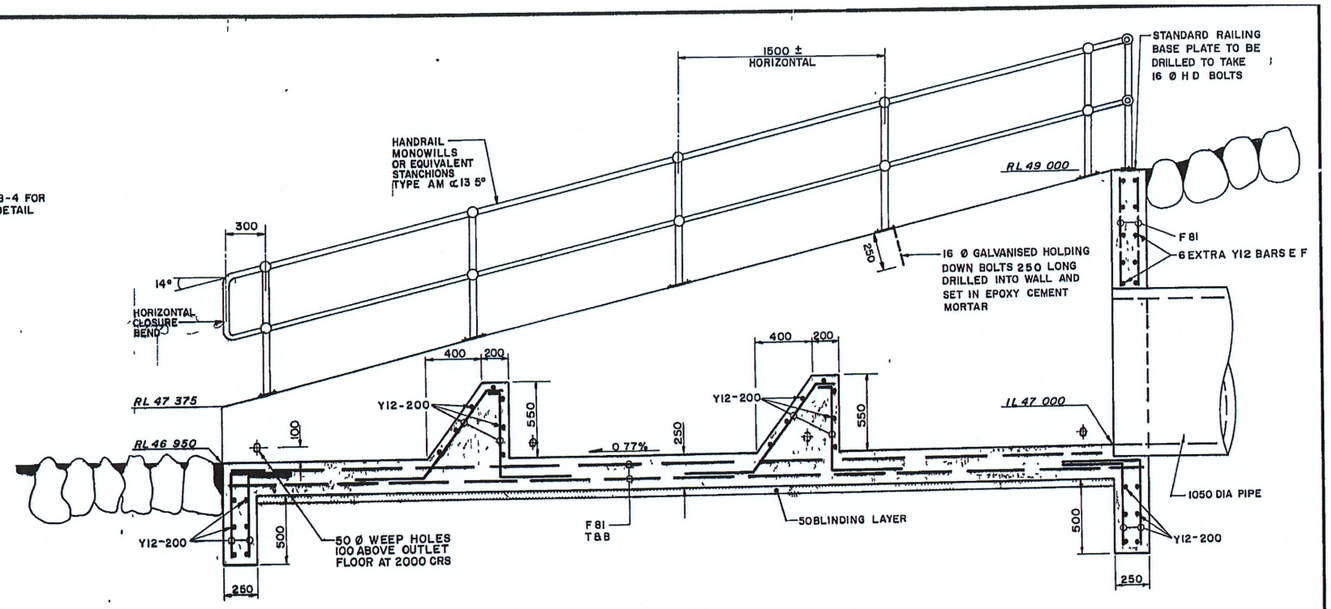
SCALE AS SHOWN
DATE AUG 1986
DESIGNED M H B
DRAWN K W
CHECKED

DRAWING No 6191B - 5 A

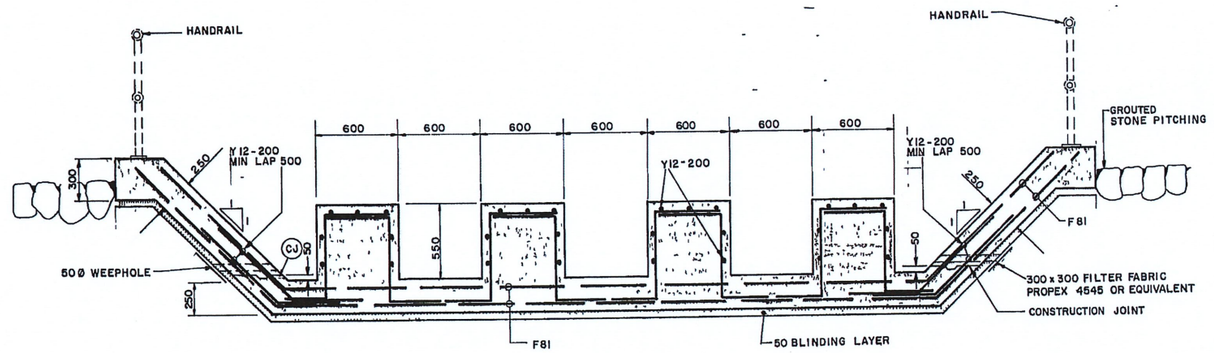
E91/12V 7 of 47



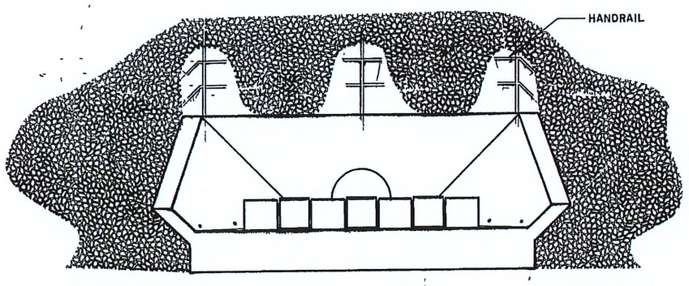
PLAN
SCALE 1:50



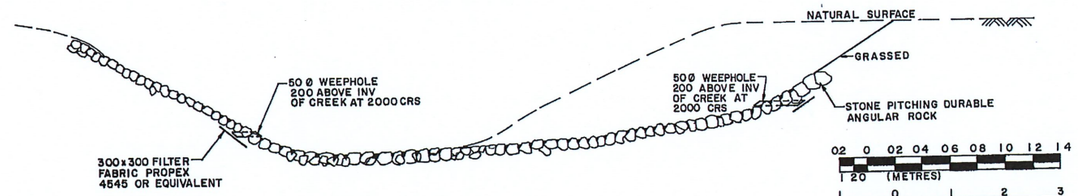
SECTION A-A
SCALE 1:20



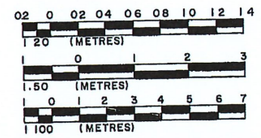
SECTION B-B
SCALE 1:20



FRONT ELEVATION
SCALE 1:50



TYPICAL SECTION GROUTED STONE PITCHING
SCALE 1:100



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NOTES

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2. FOR CONCRETE NOTES REFER DRG Nº 6191B-1
3. FOR REINFORCEMENT NOTES REFER DRG Nº 6191B-1

DRAWING No.	SUBJECT	AMDT.	DESCRIPTION	DATE	INIT.
ASSOCIATED DRAWINGS			AMENDMENTS		

WILLING & PARTNERS PTY. LTD
CONSULTING ENGINEERS
1-3 ATCHISON STREET, ST LEONARDS 2065 TELEPHONE 439 8546

PRINCIPAL DATE

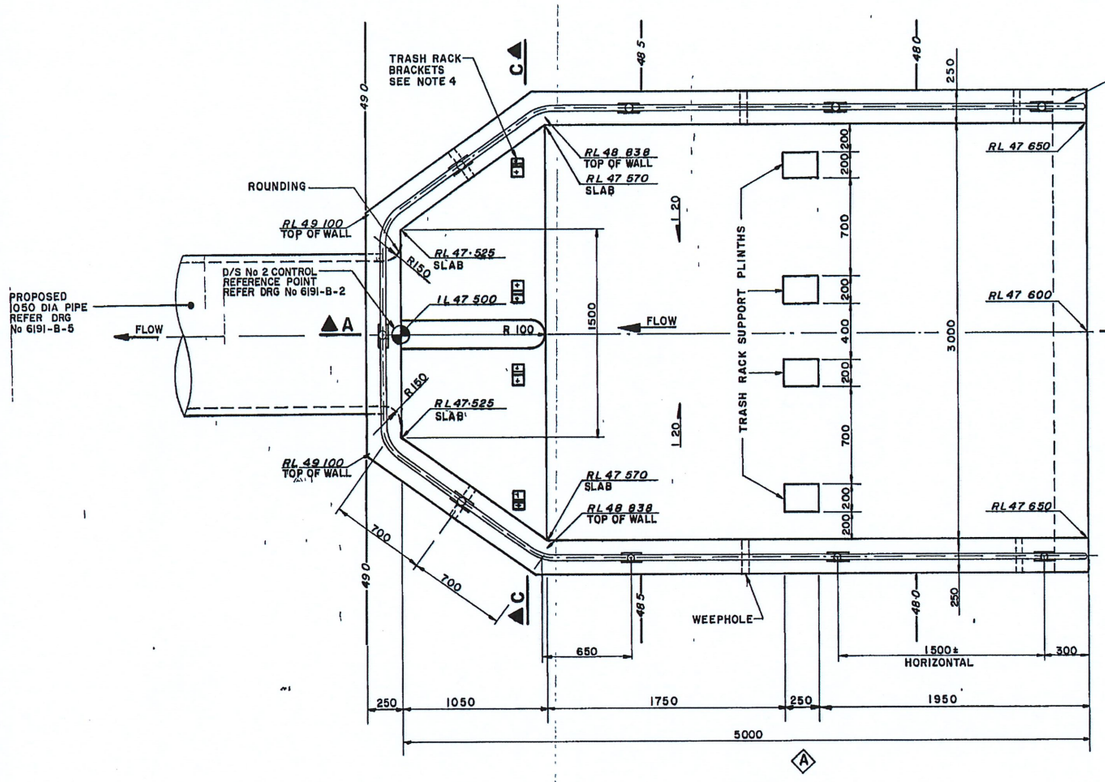
FOR DEPARTMENT OF WATER RESOURCES

GREYSTANES CREEK DEP RETARDING BASIN

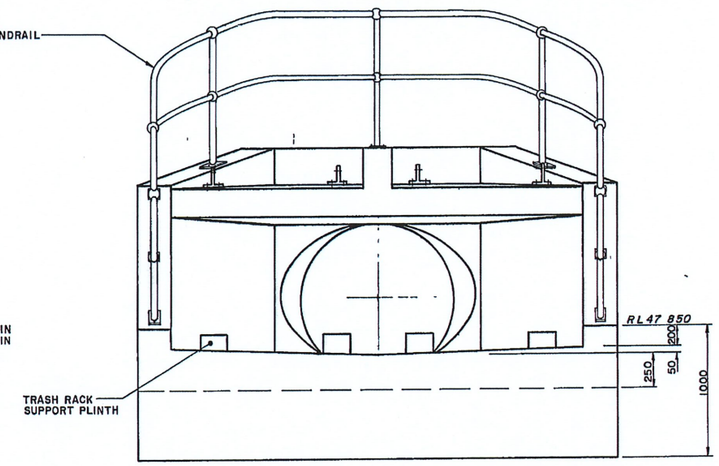
DRAINAGE STRUCTURE Nº 1 OUTLET STRUCTURE AND ENERGY DISSIPATOR

SCALE AS SHOWN
DATE AUGUST 1986
DESIGNED M H B
DRAWN G M D
CHECKED

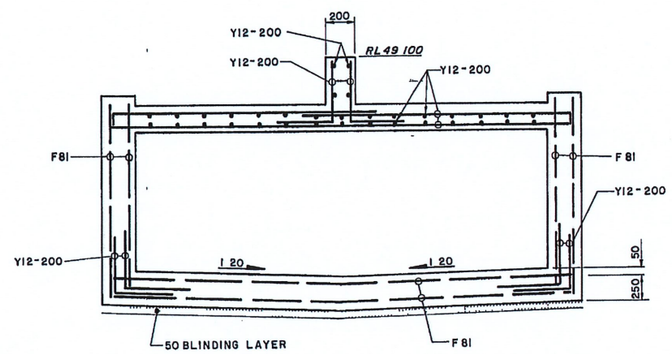
DRAWING No 6191B - 6



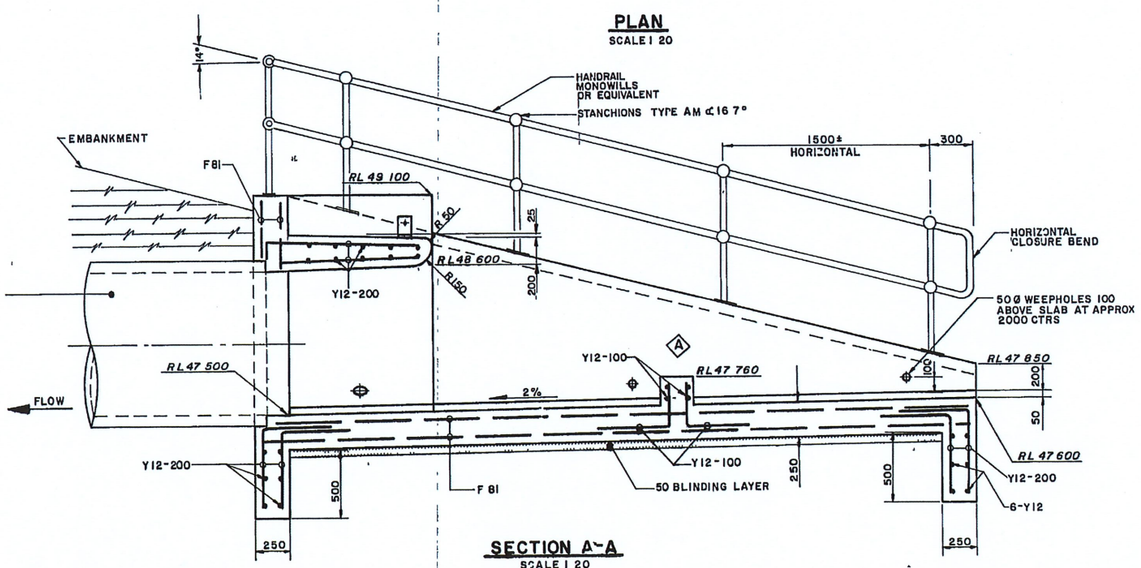
PLAN
SCALE 1 20



ELEVATION
SCALE 1 20



SECTION C-C
SCALE 1 20



SECTION A-A
SCALE 1 20

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NOTES

1. FOR 'GENERAL' NOTES REFER DRG Nº 6191 B - 1
2. FOR CONCRETE NOTES' REFER DRG Nº 6191 B - 1
3. FOR REINFORCEMENT NOTES REFER DRG Nº 6191 B - 1
4. FOR TRASH RACK DETAILS REFER DRG Nº 6191 B - 8

0.2 0 0.2 0.4 0.6 0.8 1.0 1.2 1.4
1 20 (METRES)

DRAWING No.	SUBJECT	AMDT.	DESCRIPTION	DATE	INIT.
ASSOCIATED DRAWINGS		A	ADJUST PLINTH SIZE		
			AMENDMENTS		

WILLING & PARTNERS PTY LTD
CONSULTING ENGINEERS
1-3 ATCHISON STREET, ST LEONARDS 2065 TELEPHONE 439 8546

PRINCIPAL DATE

FOR DEPARTMENT OF WATER RESOURCES

GREYSTANES CREEK DEP RETARDING BASIN

DRAINAGE STRUCTURE Nº 2 BASIN OUTLET

SCALE AS SHOWN
DATE AUG 1986
DESIGNED M H B
DRAWN G N D
CHECKED

DRAWING No. 6191B - 7 A

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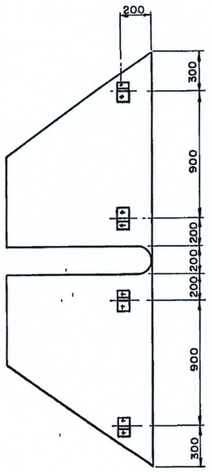
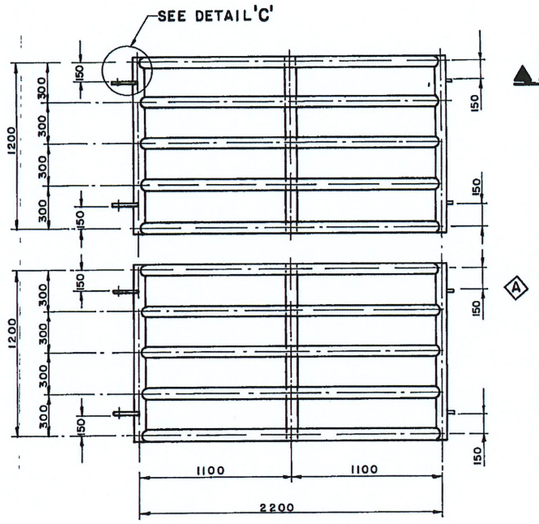
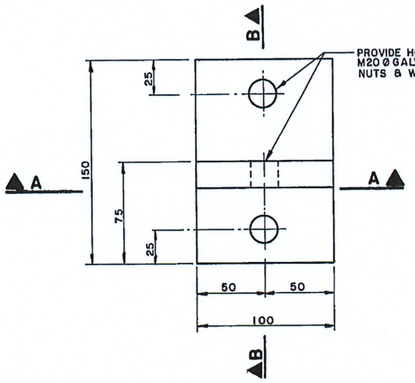


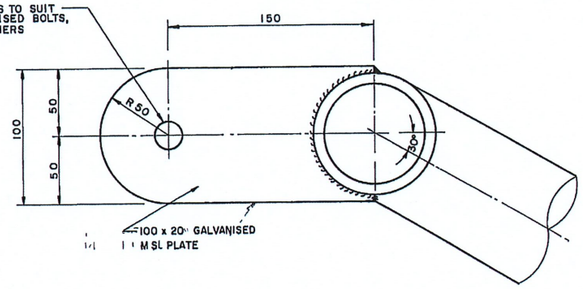
BRACKET LAYOUT PLAN
SCALE 1 20



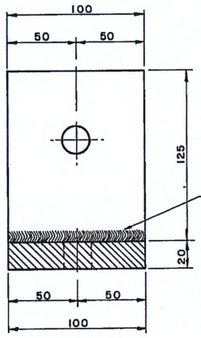
TRASH RACK PLAN
SCALE 1 20



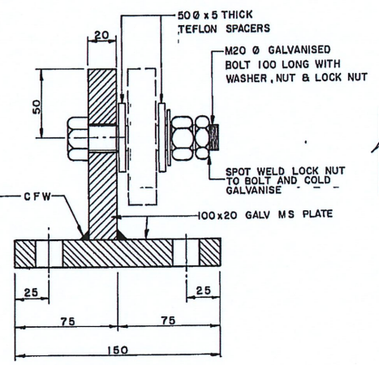
BRACKET PLAN
SCALE 1 2



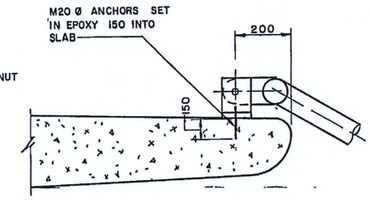
DETAIL 'C'
SCALE 1 2



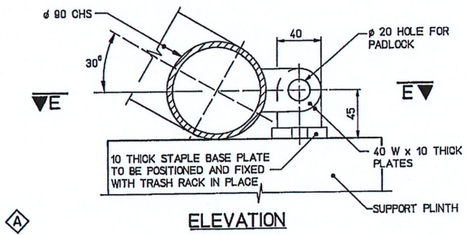
SECTION A-A
SCALE 1 2



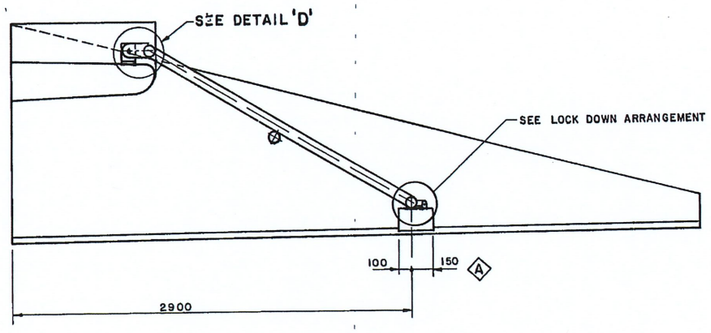
SECTION B-B
SCALE 1 2



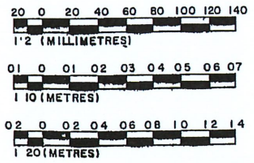
DETAIL 'D'
SCALE 1 10



ELEVATION

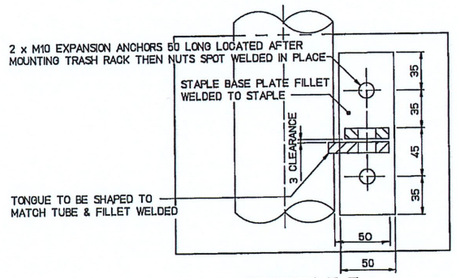


TRASH RACK ELEVATION
SCALE 1 20



NOTES

1. TRASH RACK TO BE FABRICATED FROM NOMINAL 88 9 O D STEEL CIRCULAR HOLLOW SECTION WITH WALL THICKNESS 4 88 TO AUSTRALIAN STANDARD AS 1163
2. TRASH RACK FRAME AND BRACKETS TO BE HOT DIPPED GALVANISED AFTER FABRICATION
3. ALL BOLTS, NUTS, WASHERS AND ANCHORS TO BE GALVANISED
4. FOR GENERAL NOTES REFER DRG Nº 6191 B - 1
5. ALL JOINTS IN TRASH RACK FRAMES TO BE CONTINUOUS FILLET WELDS
6. ALL EXPOSED ENDS OF TUBE TO BE PLUGGED BY WELDING
7. 4mm HOLE TO BE DRILLED INTO LOWPOINT OF EACH TUBE



SECTION E-E

LOCKING DOWN ARRANGEMENT
NTS

DRAWING No.	SUBJECT	AMDT.	DESCRIPTION	DATE	INIT.
		A	ADD NOTES 5 & 7 AND LOCK DOWN ARRANGEMENT	FEB 90	R I C

ASSOCIATED DRAWINGS — AMENDMENTS

WILLING & PARTNERS PTY LTD
CONSULTING ENGINEERS
1-3 ATCHISON STREET, ST LEONARDS 2065 TELEPHONE 439 8546

PRINCIPAL DATE

FOR DEPARTMENT OF WATER RESOURCES

GREYSTANES CREEK DEP RETARDING BASIN

TRASH RACK DETAILS

SCALE AS SHOWN
DATE AUG 1986
DESIGNED M H B
DRAWN K W
CHECKED

DRAWING No 6191 B - 8 A

Appendix H
Blacktown City Council Flood Letter

Blacktown
City Council

File no: 325885 337658

9 April 2020

Costin Roe Consulting Pty Ltd
PO Box N419
SYDNEY NSW 1220

Attention: Erika Watkinson

Dear Erika

44 Clunies Ross Street Prospect being Lot 10 in DP 1022044 and Clunies Ross Street Prospect being Lot 216 in DP 1030744

I refer to your email of 9th March 2020 regarding flood information for the above property.

Flood Assessment

This assessment is only based on the area of the Lot within the Blacktown City Council Local Government Area (LGA).

Based on the latest information available to us from consultants and/or statutory authorities, these properties are identified in the High, Medium and Low Flood Risk Precinct of the Girraween Creek floodplain.

Recommendations

1. The subdivision is to be filled to a minimum of 500 mm above the 1% Annual Exceedance Probability (AEP) flood level with 15% climate change.

2. The relevant 1% AEP flood level without climate change is 55.06 metres AHD at the south western boundary and a flood level of 47.99 metres AHD at the north eastern boundary.

3. A development application must provide a detail survey to AHD and certified (signed) by a registered surveyor. The survey is to include sufficient spot levels with contours and any existing floor levels. The survey plan will need to show the origin and level of the benchmark used and a local benchmark on top of kerb installed for use during construction.

4. Council will not allow the importing of any fill within the 1% AEP flood area without a supporting Flood Study to demonstrate no adverse impact.

5. Any future development within the 1% AEP flood area would have to prove that it does not increase the flood risk to life or the surrounding area and it must maintain an appropriate overland flow path.

Background

Flood related development controls apply to the land, which will be required to be complied with during the assessment of a development proposal.

Please read this letter in conjunction with Attachment A, General Flood Information and Attachment B, Complying Development Information

Council's flood mapping is available on Council's web site. To start go to http://maps.blacktown.nsw.gov.au. Council's flood mapping only covers the areas where it has information. A property that is not identified does not mean that there are no flood issues. It is the responsibility of the person enquiring to check the natural fall of the land and to ensure that the subject property is not affected by local stormwater overland flows that might affect existing or future development on this land.

Find attached a copy of an extract from Council's Geographical Information System (GIS) showing the approximate extent of Blacktown City's flood information in this area. Please note the disclaimer and the contour interval of 0.5 metres.

The above comments are preliminary and not complete. A more detailed assessment at development application stage may result in modifications and/or additions to these comments (This advice is not a guarantee of approval).

However, please also be advised that there may be other non-flood related issues that might impact on the use of the land.

If you would like to discuss this matter further, please contact me on 9839 6348.

Yours faithfully

Tony Merrilees

Senior Engineer (Drainage) Developments

Encl. Attachments A & B, Flood map & 1x Flood Level Maps.

Disclaimer:

Blacktown City Council gives notice and points out to all users of the information supplied herein, that the information is valid only on the date of issue. While the information herein is provided with all due care and in good faith, it is provided on the basis that Council will not accept any responsibility for and will not be liable for its contents or for any consequence arising from its use. Blacktown City Council also gives notice to all users of the information supplied herein, wherever any particular enquiry herein remains unanswered or has not been elaborated upon, such silence should not be interpreted as meaning or inferring either a negative or a positive response as the case may be.

Attachment A	General Flood Information
The flood levels supplied are for the pre-developed existing conditions	The flood levels supplied do not take climate change into consideration. These flood levels should not be used to set floor levels or to identify the extent of flooding over the property as our current flood models may not have included blockage factors nor changes in land-use and landform since the date of the study.
Probable Maximum Flood	This is the largest flood that could conceivably occur at a particular location. The PMF defines the extent of flood prone land that is, the floodplain. The risk of it happening in any one year is extremely rare and is considered to be between a 1 in 100,000 to a 1 in 10,000,000 chance.
1% AEP flood	This is a flood that has a probability of 1% (or a 1 in 100 chance) of occurring in any given year.
Flood risk precincts	Precincts have been defined based on hydraulic and survey information available to Council. In many cases a more definitive indication of flood risk precinct extents can be determined by relating surveyed ground levels at AHD to the relevant hydraulic and/or flood level criteria. The Low Flood Risk Precinct is all land within the floodplain, i.e. within the extent of the Probable Maximum Flood (PMF) but not identified as either a high flood risk or medium flood risk precinct. Therefore, the Low Flood Risk Precinct is all the land between the 1% AEP and PMF flood extents. The Medium Flood Risk Precinct is the land below the 1% AEP flood level subject to a low hydraulic hazard (in accordance with the provisional criteria outlined in the N.S.W. Government Floodplain Development Manual 2005). For more information on Complying Development see attachment B. The High Flood Risk Precinct is the land subject to a high hydraulic hazard (in accordance with the provisional criteria outlined in the N.S.W. Government Floodplain

	Development Manual 2005) in a 1% AEP flood event and/or subject to potential evacuation difficulties during a flood. For more information on Complying Development see attachment B.
"Development on Flood Prone Land" guidelines	Our guidelines can be found in "Blacktown Development Control Plan (DCP) 2015 Part A" publication. This publication is available on Council's Website "www.blacktown.nsw.gov.au". To find this document click on Planning and Development tab on the home page and then select Blacktown Development Control Plan 2015. This publication is currently under review in respect of floodplain planning issues.
Council's flood mapping is available on Council's web site	To start click Discover Blacktown tab on the home page and then select Maps Online and follow the instructions. Council's flood mapping only covers the areas where it has information. A property that is not identified does not mean that there are no flood issues. It is the responsibility of the person enquiring to check the natural fall of the land and to ensure that the subject property is not affected by local stormwater overland flows that might affect existing or future development on this land.
Flood Planning Level	The Flood Planning Level is a special area of the Low Flood Risk Precinct that is within the 0.5 m freeboard of the 1% AEP flood level.
We are currently reviewing the flood modelling in this area	**Finalisation of this modelling work may result in a variation to the quoted flood levels and amendments to our current flood mapping extents. The flood levels shown are under review and therefore are preliminary information only.**

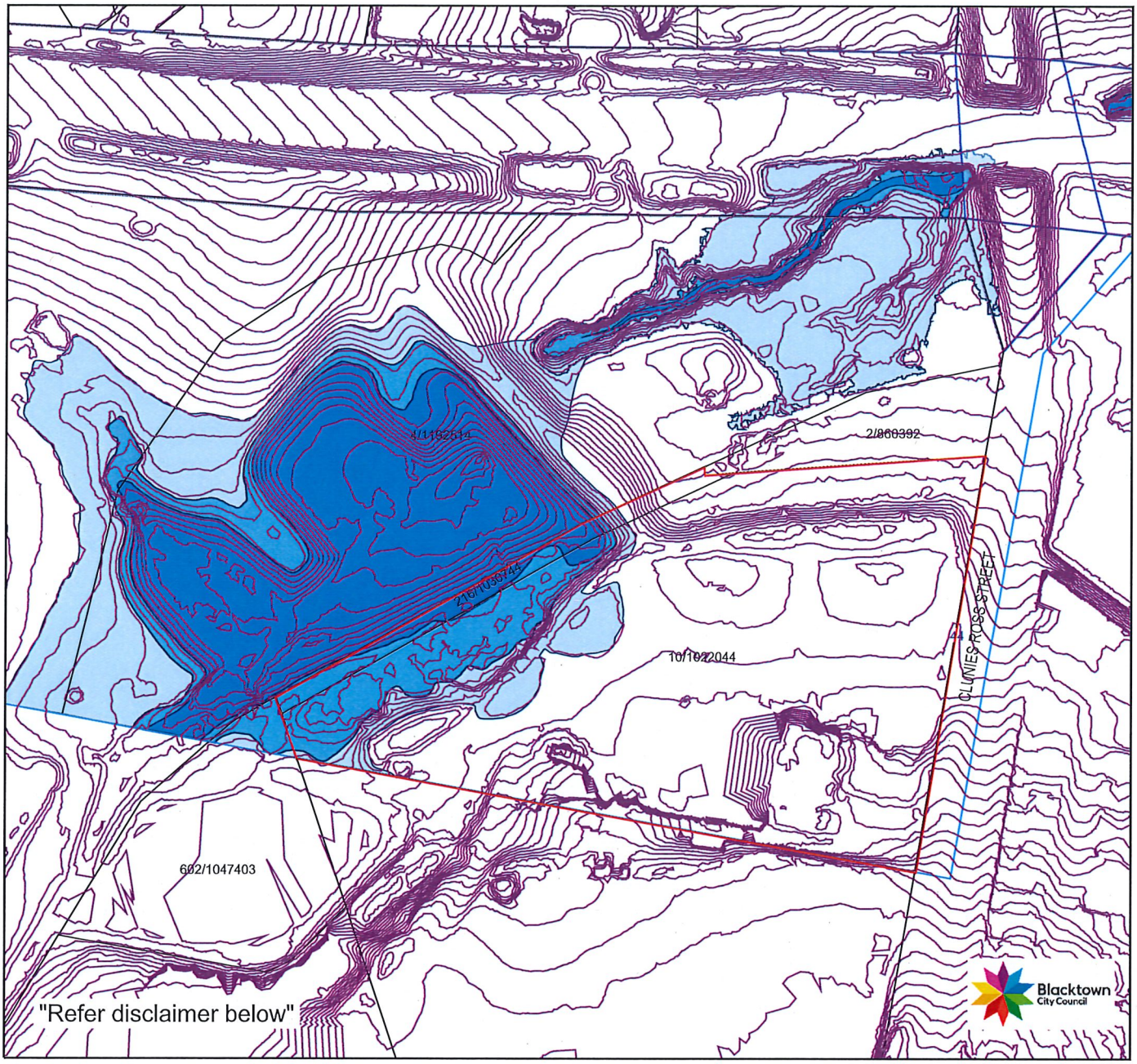
Attachment B **Complying Development Information**

The information you seek may vary between "complying development" i.e.: routine development which has minimal environmental impact, providing the design complies with each relevant development standard of the pertinent State Environmental Planning Policy (SEPP) or "local development" i.e.: development, including State significant development, which may have significant environmental impact and for which a Development Consent and Construction Certificate are required under the Environmental Planning and Assessment Act 1979.

The property is identified on Council's records as being a flood control lot as it is affected by "Medium Flood Risk Precinct" according to the latest information available to Council. The Medium Flood Risk Precinct is considered to be the equivalent of "a flow path" for the purposes of State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.

Where your enquiry relates to a proposed Complying Development Certificate (CDC), any flood control lot provisions of the relevant SEPP must be investigated.

The SEPP may provide that a CDC cannot be issued for any flood control lot until either Council or a professional engineer who specialises in hydraulic engineering (e.g.: a person holding the relevant accreditation under the NSW Building Professionals Board accreditation scheme) certifies that the land is not a flood storage area, a floodway area, a flow path, a high hazard area or a high-risk area.



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Plot Date: 31/03/2020

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BLACKTOWN CITY COUNCIL

Flood Risk Map

DISCLAIMER: The flood risk precincts shown are based on information available to Council and should be regarded as an indicative guide only. A more accurate indication of the extent of the respective flood risk precincts can be determined by relating surveyed ground levels at Australian Height Datum (AHD) to the hydraulic and/or flood level criteria determining flood risk precinct boundaries. This information may be obtained by a written request to Council accompanied by a ground level survey to AHD prepared by a Registered Surveyor. Should flood risk precinct extents be required for the purpose of a financial transaction of any nature, then the parties to that transaction should apply to Council for formal certification and/or seek independent legal or professional advice.

Scale 1:4000

- Parcel Extent.Motorway Extent
- Parcel Extent.Old System Deed Extent
- Parcel Extent.Torrens Title Extent
- Parcel LPI Extent.Motorway Extent
- Parcel LPI Extent.Old System Deed Extent
- Parcel LPI Extent.Torrens Title Extent
- Crossing.Extent
- Local Government Area.Gazetted Boundary
- Flood Extents.High Flood Risk Precinct
- Flood Extents.Medium Flood Risk Precinct
- Flood Extents.Low Flood Risk Precinct
- DTM Contour.45.0m Contour
- DTM Contour.45.5m Contour
- DTM Contour.46.0m Contour
- DTM Contour.46.5m Contour
- DTM Contour.47.0m Contour
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Plotted by: swadmin

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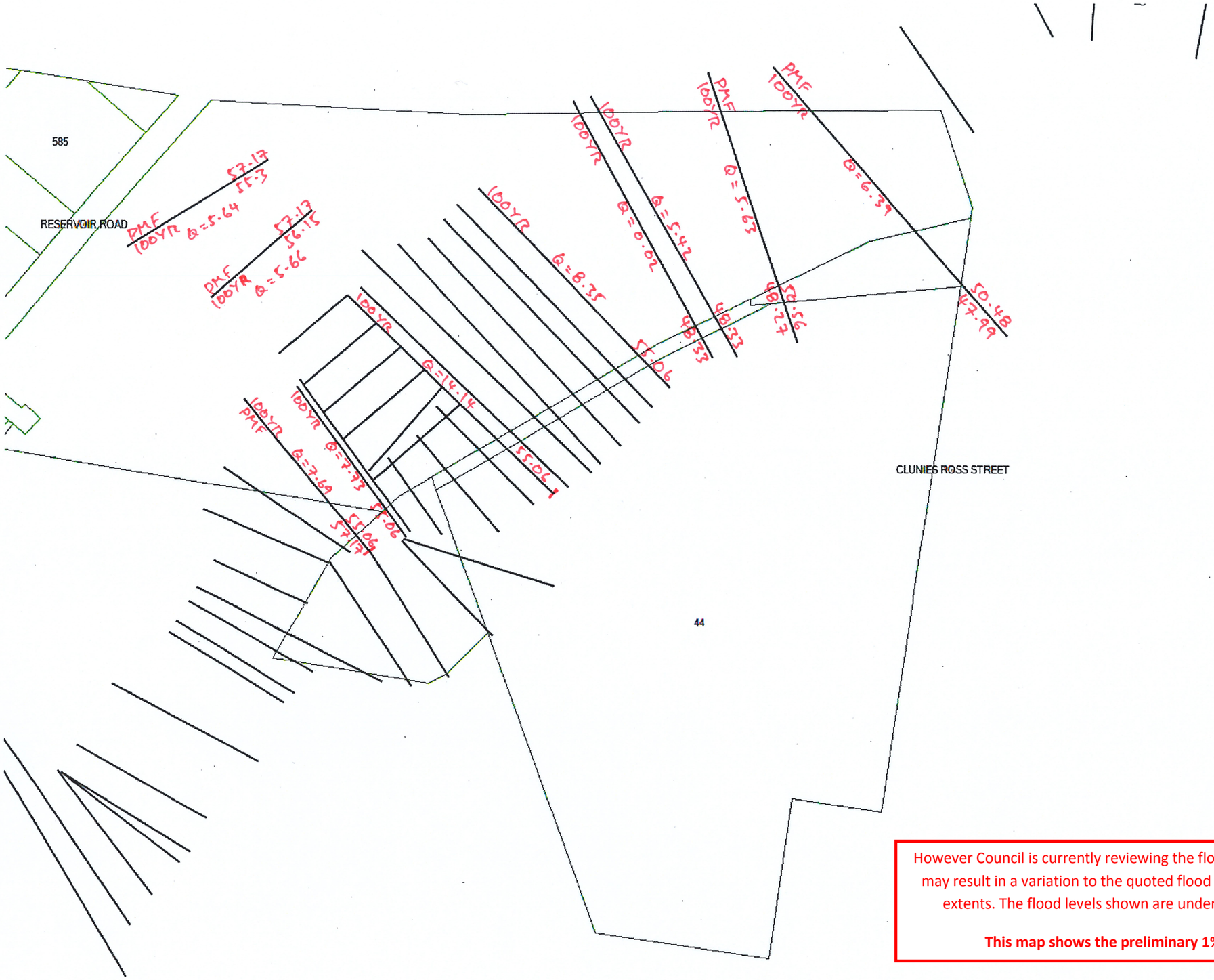


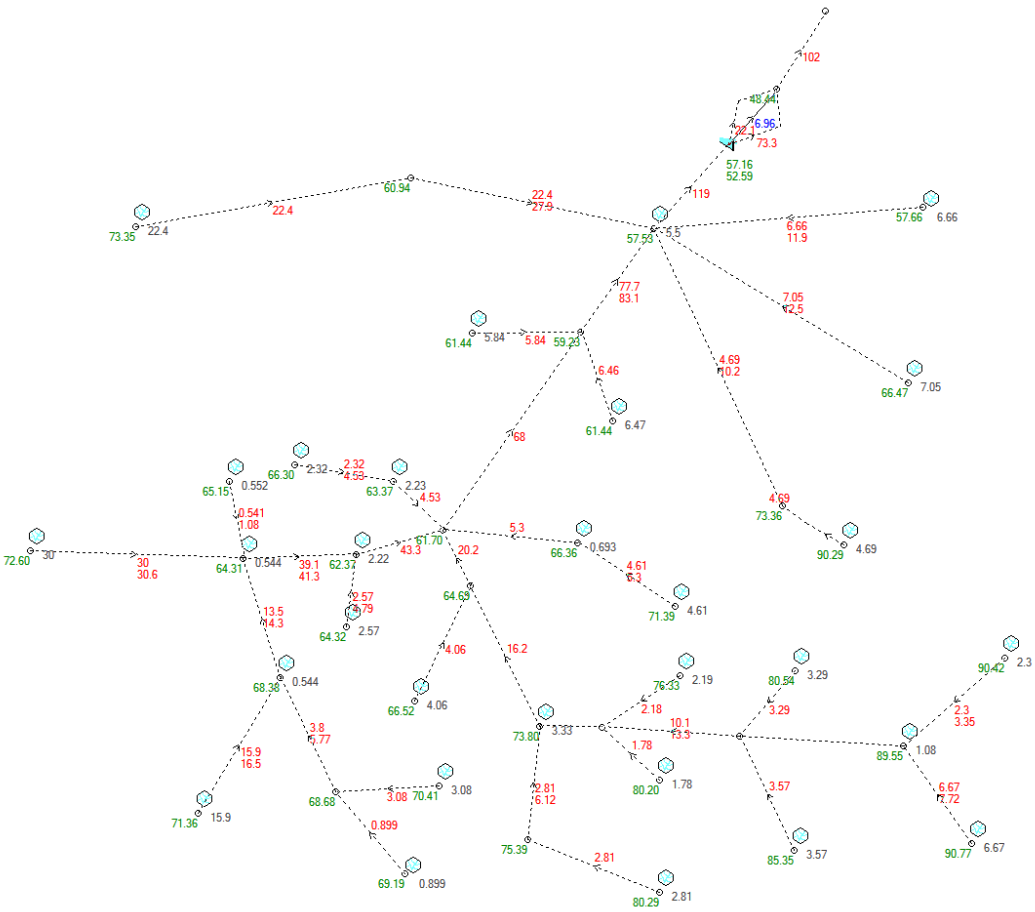
However Council is currently reviewing the flood modelling in this area. Finalisation of this modelling work may result in a variation to the quoted flood levels and amendments to Council's current flood mapping extents. The flood levels shown are under review and therefore are preliminary information only.

This map shows the preliminary 1% AEP flood levels in metres to AHD for the area.

However Council is currently reviewing the flood modelling in this area. Finalisation of this modelling work may result in a variation to the quoted flood levels and amendments to Council's current flood mapping extents. The flood levels shown are under review and therefore are preliminary information only.

This map shows the preliminary PMF levels in metres to AHD for the area.

Appendix I
RAFTS MODEL LAYOUT



Appendix J
Cumberland City Council Flood Letter
EC2020/0849, dated 19 October 2020

CUMBERLAND
CITY COUNCIL

RECEIVED
29 OCT 2020

19 October 2020

Our Reference EC2020/0849
Contact Rolyn Sario
Telephone 8757 9536

Erika Watkinson
Level 1, 8 Windmill Street
WALSH BAY NSW 2000

Dear Sir/Madam

FLOOD LEVELS AT NO LOT 10 PLT 1022044, PEMULWUY
BEING LOT 10 PLT 1022044

Council refers to your request dated 9 October 2020 requesting flood information at the above property.

The above property is shown to be affected by the 1% Annual Exceedance Probability (AEP) flood, according to the information available to Council from the "Greystanes Creek Overland Flood Study" prepared by Lyall & Associates Consulting Water Engineers in June 2017.

The 1% AEP flood level refers to a flood which has a 1% chance of being equalled or exceeded in any one year and this site has been assessed as a high flood risk. It should be noted that a flood could occur that is more severe than the 1% AEP flood at any time.

The maximum 1% AEP flood level relevant to the subject property has been determined (see the attached plan) to Australian Height Datum (AHD) as follows:

1. At location A - 76.2 mAHD
2. At location B - 75.0 mAHD
3. At location C - 74.0 mAHD
4. At location D - 73.0 mAHD
5. At location E - 72.0 mAHD
6. At location F - 71.0 mAHD
7. At location G - 70.0 mAHD
8. At location H - 69.0 mAHD
9. At location I - 68.0 mAHD
10. At location J - 67.0 mAHD
11. At location K - 66.0 mAHD
12. At location L - 65.0 mAHD
13. At location M - 64.0 mAHD
14. At location N - 55.2 mAHD
15. At location O - 54.5 mAHD

The subject property has been identified as Flood Control lot. Under the SEPP (Exempt & Complying Development) 2008 Regulation 3.36C, a Complying Development Certificate must not be issued for, "*any part of a flood control lot unless that part of the lot has been certified, for the purposes of the issue of the relevant complying development certificate, by the council or a professional engineer who specialises in hydraulic engineering as not being any of the following:*

a) a flood storage area,
b) a floodway area,
c) a flow path,
d) a high hazard area,
e) a high risk area."

Council has determined that part of the flood control lies in four of the five items above – items *a, c, d* and *e* therefore; a CDC cannot be issued on this site. The identified flood items are represented by the darker area within the 1% AEP flood extent on the attached map. If the development is proposed within any part of this zone (dark blue area), a pre and post flood study must accompany the Development Application. Alternatively, if the development is proposed within the uncoloured and/or light blue areas (flood fringe zone), a CDC may be considered for this site. However, the surface flows must not be impeded (blocked) and the redevelopment shall allow the free movement of the flood around any proposed structure(s).

In all cases, flood level on adjacent properties shall not be increased. Supporting documentation is to accompany the development.

Minimum habitable floor levels shall be 0.5m above the flood level at the upstream side of the structure. Minimum non-habitable floor levels (garages, laundry, sheds, etc.) shall be 0.15m above the flood level at the upstream side of the structure. Interpolation between flood levels is allowed.

The relationship between these levels and the ground surface may be determined by a survey of the property undertaken by a Registered Surveyor.

It should be noted that where the development or redevelopment of the property is proposed, reference should be made to the relevant Development Control Plan with regard to flooding and drainage issues. Please include a copy of this letter and map with any Development Application that you may lodge with Council for the subject site.

For modelling purposes, the models (pre and post development flood study) shall be calibrated to Council's 1%AEP Flood levels (or interpolated levels) at least 10 metres upstream and downstream from the property boundaries.

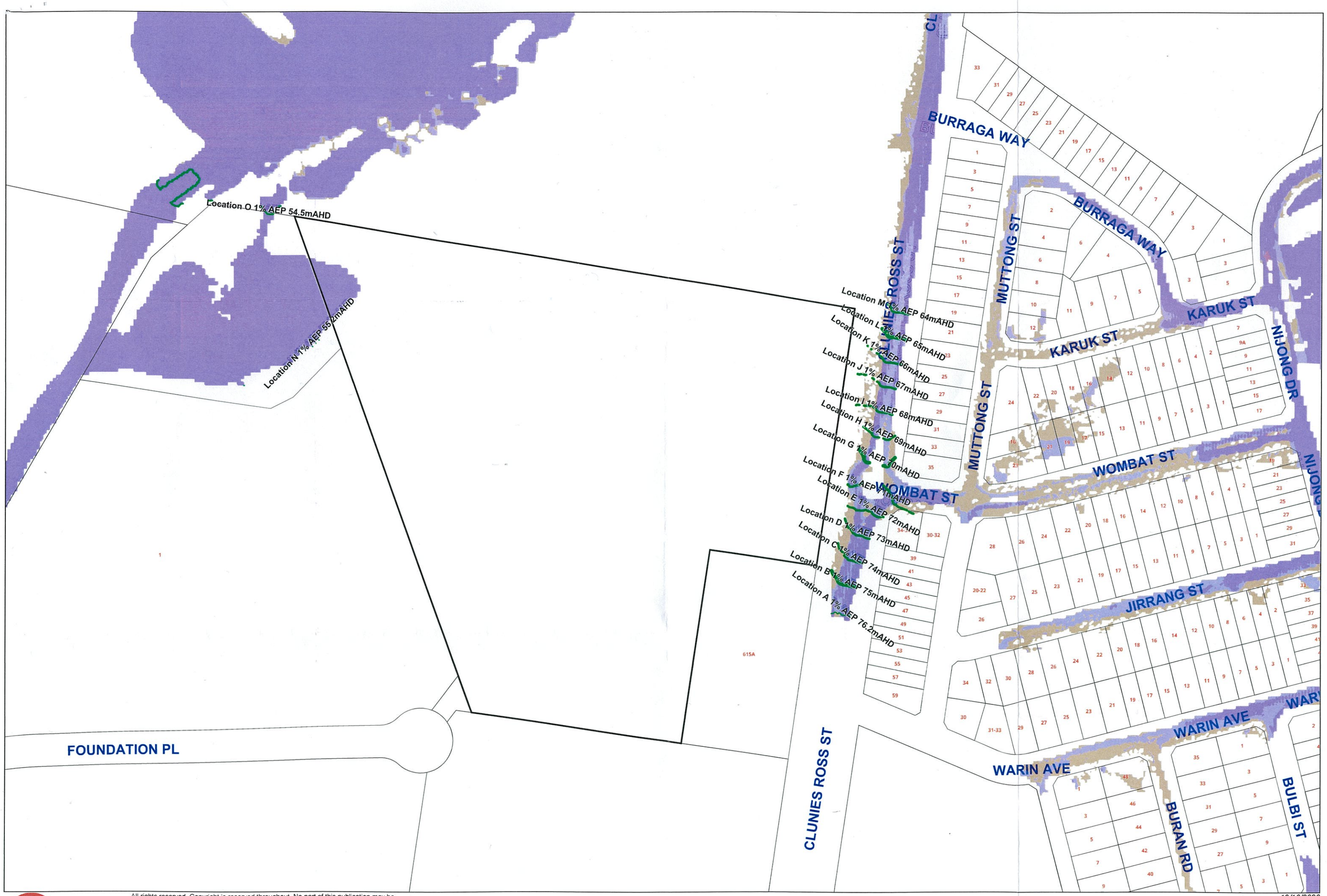
Note:
The brown shaded area on the attached Map represents the flood waters with a depth of flow less than 100mm and does not attract any flood controls. It is presented on the flood map to show the continuity of flooding within the area.

Flood levels are not static due to changing circumstances (e.g. revision of the flood model) and accordingly the above flood level is only valid for six months from the above date.

If you have any further enquiries regarding this matter please contact Council's Senior Stormwater Engineer, Mr Mark Evens on 8757 9538 or Council's Drainage Engineer, Mr Rolyn Sario on 02 8757 9536.

Yours sincerely,

SIVA SIVAKUMAR
MANAGER – ENGINEERING & TRAFFIC



CUMBERLAND COUNCIL

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19/10/2020

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