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CIVIL ENGINEERING REPORT FOR SSD APPLICATION

PROPOSED DEVELOPMENT AT LOT 9, DP 1205673, 28 MCPHERSON ST BANKSMEADOW NSW

Prepared For:
Orica Australia

Prepared by:
Costin Roe Consulting
Level 1, 8 Windmill Street
WALSH BAY NSW 2000

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	Name	**Signature**
Prepared by	Shahid Mahfouz/ Xavier Cure	
Checked by	Mark Wilson	
Issued by	Xavier Cure	
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1 INTRODUCTION

1.1 Background

This Civil Engineering Report has been prepared by Costin Roe Consulting in support of a State Significant Development (SSD) Application submitted to the NSW Department of Planning and Environment (DoPE), for a proposed warehouse distribution and office development at Lot 9, DP 1205673, 28 McPherson Street, Banksmeadow, NSW.

Orica proposes to construct the industrial warehouse estate comprising 2 warehouses and car parking areas on a suspended deck.

1.2 Scope

Costin Roe Consulting Pty Ltd has been commissioned by Orica to prepare this Civil Engineering Report in support of the proposed application for development of the site.

This report responds to the Project SEARS (Secretary's Environmental Assessment Requirements), and in particular:

Soils and Water – including:

- a description of the water demands and a breakdown of water supplies, including a detailed site water balance
- identification of any water licensing requirements under the *Water Act 1912* or *Water Management Act 2000*
- details of proposed erosion and sediment controls during construction
- an assessment of potential impacts on surface and groundwater resources, drainage patterns, soil (stability, salinity and acid sulfate soils), related infrastructure, watercourses and riparian land and
- proposed mitigation, management and monitoring measures

Infrastructure Requirements – including:

- a detailed written and/or graphical description of infrastructure required on the site
- identification of any infrastructure upgrades required off-site to facilitate the development, and describe any arrangements to ensure that the upgrades will be implemented in a timely manner and maintained
- an infrastructure delivery and staging plan, including a description of how infrastructure on and off-site will be co-ordinated and funded to ensure it is in place prior to the commencement of construction
- an assessment of the impacts of the development (construction and operation) on existing infrastructure surrounding the site

This report also provides a summary of the design principles and planning objectives for the following civil engineering components of the project:

- Site Works (earthworks & retaining walls);
- Stormwater Management including stormwater quantity and quality;
- Flooding consideration; and
- Erosion Control.

The engineering objectives for the development are to create a site which, based on the proposed architectural layout, responds to the topography and site constraints and to provide an appropriate and economical stormwater management system which incorporates best practice in water sensitive urban design and is consistent with the requirements of council's water quality objectives.

A set of drawings have been prepared to show the proposed finished levels, stormwater drainage layout, sediment and erosion controls, water quantity and water quality requirements for the development. These drawings are conceptual only and subject to change during detail design.

1.3 Authority Jurisdiction

The consent authority is the NSW Department of Planning and Environment. The site is located within Bayside local government area. The engineering requirements of the former Botany City Council apply until such time that the newly amalgamated Bayside Council (Council) adopts its own set of DCP and policy documents. At the time of writing, the codes and policies of the previous LGA, Botany City Council apply. Specifically, the stormwater management and engineering requirements as set out in *Part 3G* & *Part 10* of the Botany City Council *Development Control Plan 2013* have been adopted for the engineering concept included in this report and concept design package.

2 INFRASTRUCTURE SERVICES – EXTENSIONS AND UPGRADES

The subject site at Lot 9, DP 1205673, 28 McPherson Street Banksmeadow has been serviced with key municipal services as part of the previous Southlands Redevelopment Project. Given that the site currently operates as compensatory flood basin, services were not directly connected to the premises. However, services were extended during the wider Southlands project such that only minor extensions are now required to service the subject site.

An overview of the existing and proposed infrastructure requirements for the development is outlined in the following sections. The report considers the supply and management of the following services required for the development of the property:

- Potable Water (drinking water);
- Waste Water (sewer);
- Electricity; &
- Communications

Specifically, the report provides an overview of the following information:

- Layout and capacity of existing service networks based on services plan provided by CARDNO & RYGATE SURVEYORS.
- Dial Before You Dig (DBYD) information; and
- Indicative utility demands for the current development proposals where available.

Comments in this report are based on current land use and known service strategy for the area and advice from Sydney Water Feasibility Letter dated 23 November 2018, and Ausgrid letter dated 31 January 2019.

Orica GTP Infrastructure

Importantly the redevelopment of the site has no impact on the Groundwater Treatment Plant (GTP) infrastructure operated by Orica on the site and in the area. Components of that GTP infrastructure are currently located on the site and will be maintained.

This existing infrastructure includes ground water wells, monitoring wells and pipework. This infrastructure is located immediately behind the existing McPherson Street masonry fence and will be subdivided from the development site and maintained in Orica ownership. The proposed 10 metre wide strip of land housing this infrastructure will allow for access to all well heads and ongoing operation and maintenance.

The creation of the new entry driveway from McPherson Street does not impact on this existing infrastructure but will require a single monitoring well to be recessed into a pit below the driveway. Other than that, all infrastructure will remain unchanged.

2.1 Potable Water (drinking water)

Sydney Water is the servicing authority for potable water in the suburb of Banksmeadow.

Rose Atkins Rimmer Infrastructure (RARI) have been engaged as the Sydney Water Servicing Coordinators to coordinate the delivery of services to the site.

RARI have approached Sydney Water regarding the development for the subject and have lodged a feasibility application for the site.

The DBYD information obtained shows that a 150mm DICL water main is present along the full length of the property frontage to McPherson Street. This main would need to be extended into the site to suit the new development and the subdivision of the land which will need to be designed by a Sydney Water Service Coordinator, being RARI in this case.

Further pressure testing would be required to confirm the ability and requirements for firefighting and sprinkler systems. We understand further investigations are being undertaken by RARI in this regard.

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

The strategy and design for the required extension of the system will be performed by a Sydney Water Service Coordinator. at detailed design stage.

2.2 Waste Water (sewer)

Sydney Water is the servicing authority for sewage disposal in the suburb of Banksmeadow.

RARI were the designers of the Southlands Pressure Sewer System and are familiar and aware of the servicing issues for the subject site, and therefore have been engaged as the water service coordinators for this project.

Gravity sewer is currently unavailable in the vicinity of the proposed development area. However, Sydney Water have previously agreed for the earlier Southlands development that a new pressure sewer could be installed to meet the needs of the servicing area. Such pressure sewer is currently installed as a 75mm PE line and sits inside Lot 9 within a Sydney Water easement extending from the south west region of the property and underneath Nant Street and runs into the nearby property at Lot 6. Hence, a connection to the Southlands Industrial Pressure Sewer System would therefore be required to service the proposed development via a pressure connection.

Confirmation of the proposed strategy and ability to connect to the system constructed will need to be performed in conjunction with Sydney Water via RARI during project application stage and detailed design.

Modelling of the required flows and the exact sizing details of the connection will be determined during the design phase by RARI.

2.3 Electricity

The subject site is located at McPherson Street Banksmeadow, where Ausgrid is the electricity network provider. The client has contacted Ausgrid to discuss electrical supply to the site.

At the property boundary adjacent to McPherson Street, there are two HV cables representing the one feeder PA 32 from Matraville Zone Substation. Further across the railway line there are two additional feeders, one from the Port Botany Zone Substation and one from the Matraville Zone Substation.

Supply can be provided, pending Ausgrid approval on application for connection, to the site from one of these feeders as determined by Ausgrid. Provision of supply would be from a single or multiple kiosk substation arrangement, to be established by the customer and connected into one of these feeders, depending on the load required for the site.

Latest advice from Ausgrid dated 31 January, 2019 confirms that:

- There is capacity in the network for a 1000kVA substation load.
- Connection into the site must come directly from McPherson Street
- Application for connection will be required for Ausgrid to commit to the load application.

2.4 Communications

As part of the development of the Southlands project, communications infrastructure was installed along the frontage of Lot 9 McPherson Street. Telstra has provided a construction plan for the purpose of placing Telstra conduits to the new development.

Future connection of infrastructure into the new development will therefore be an extension of this existing infrastructure and will require liaison with NBN.

Groundwater

There will be no extraction or injection of Groundwater and therefore there will not be any water licensing requirements under the *Water Act 1912* or *Water Management Act 2000.*

Services Delivery

As each of the servicing Authorities have confirmed availability of services to the site, the minor extensions that are required will be carried out as part of the construction of the project, and will not delay construction.

3 DEVELOPMENT SITE

3.1 Location

The proposed development is located on Lot 9, DP 1205673, 28 McPherson Street in the suburb of Banksmeadow, as shown in **Figure 3.1**.

The site forms part of a larger site, formerly known as the Southlands Industrial Development. The site is bounded by the Australian Government Detector Dog Facility to the north and an 8-unit industrial development (under construction), the Botany goods railway line corridor to the east, McPherson Street to the south, and Nant Street and the Springvale Drain to the west.

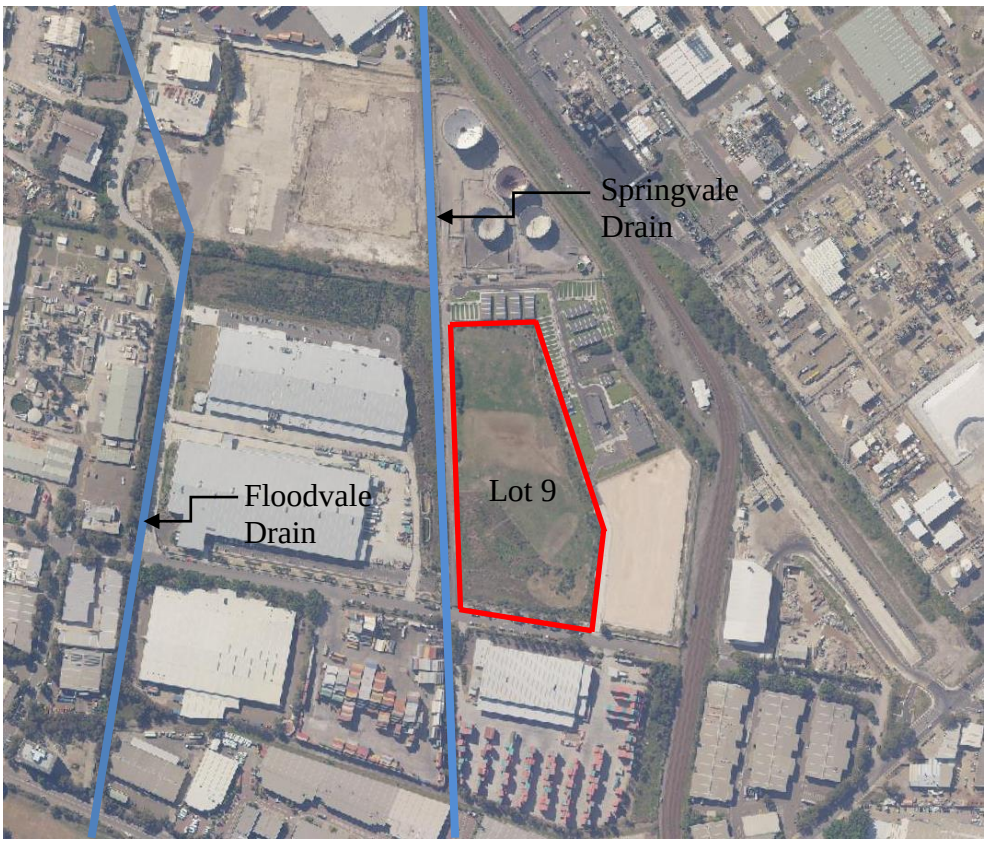

Figure 3.1. Locality Map (Source: SIX Maps 2018)

3.2 Topography & Description

The land forms part of the former Orica Australia "Southlands Industrial Development" Land and is approximately 4.13 Ha. The site has undergone previous remedial and flood storage works during 2015 as documented by Cardno Engineers and completed by Orica.

The site is currently undeveloped land which is currently utilised as a above ground offline flood storage basin. Existing levels through the site varies between RL 3.0m AHD and RL 3.6m AHD.

Surrounding levels on McPherson Street are approximately RL 3.5m AHD.

The existing basin drains into Springvale Drain across the unformed Nant Street. There is no proposed change to this drainage regime as part of the development.

Surrounding levels on McPherson Street are approximately R.L 3.5m AHD.

3.3 Proposed Development

The proposed development is for construction of two (2) warehouses and offices. The whole of the building will be suspended such that the operations of the existing flood storage basins are maintained following development of the site. The proposed ground floor level will be constructed at RL 6.7m AHD, allowing for freeboard to the 1% AEP flood level and allowing for structural zones to be clear of the flood waters. A clear area at generally a minimum of 2.5 metres is therefore maintained across the site for future access under the deck.

The suspended carpark level fronting McPherson Street is proposed at RL 5.2m, allowing continued access to the basin area below.

The typical use for the warehouse buildings will be for distribution, where each of the buildings will comprise a single level steel framed warehouse, ancillary office space, car parking areas, truck circulation and loading zones, fire brigade perimeter access and landscaping. The proposed development layout prepared by Axis Architectural is shown on **Figure 3.2**.

An access driveway from McPherson Street to the development area will also be constructed providing access to the proposed development.

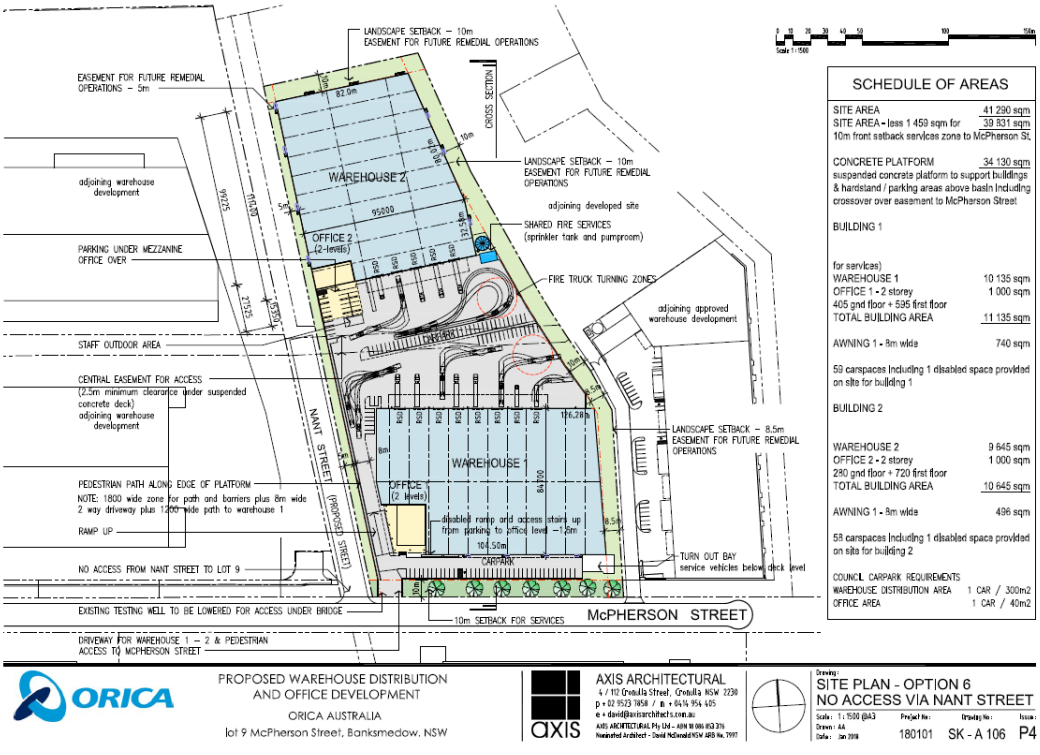

Figure 3.2 Proposed Development Layout

3.4 Existing Stormwater Drainage

The site is currently undeveloped with no formal drainage.

The legal point of discharge is to drain directly into the Orica flood basin located on Lot 9, which subsequently drains to the Springvale Drain, as shown in **Figure 3.3**.

Existing inter-allotment easements are present within the site in favour of the adjoining facilities located to the east and north of the development site. Lands to the east being 28A and 28B McPherson Street drain onto Lot 9 but have rights to drain into a 3 metre wide stormwater easement that runs around the eastern and southern edge of the site only. Flow paths from these properties will be maintained in the proposed designs.

Figure 3.3 Site Drainage in relation Springvale Drain

3.5 Proposed Stormwater Drainage System

As per general engineering practice and the guidelines of Council, the proposed stormwater drainage system for the development will comprise a minor and major

system to safely and efficiently convey collected stormwater run-off from the development.

The minor system is to consist of a piped drainage system which has been designed to accommodate the 1 in 20-year ARI storm event (Q20). This results in the piped system being able to convey all stormwater runoff up to and including the Q20 event. The major system through new paved areas has been designed to cater for storms up to and including the 1 in 100-year ARI storm event (Q100). The major system employs the use of defined overland flow paths to safely convey excess run-off from the site.

The design of the stormwater system for this site will be based on relevant national design guidelines, Australian Standard Codes of Practice, the Council standards 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, throughout new paved areas, to ensure that any increase in the detrimental effects of pollution are mitigated, Council's Water Quality Objectives are met and that the demand on potable water resources is reduced.

The layout of the proposed stormwater drainage system can be found on drawing **Co9349.12-DA40** as included in **Appendix A**.

The objectives for the management of stormwater quantity and quality for the proposed application are consistent with the Council's requirements and previous approvals and agreements with council regarding the management of stormwater quality and quantity.

A summary of the means by which the stormwater quality and quantity objectives are achieved are as follows. **Section 6** of this report discusses the proposed water quantity management in detail, as does **Section 7** pertaining to the proposed water quality management.

- *Water Quantity*
  All detention requirements for the site are accommodated into the compensatory flood basin located on the development site. **Section 6** of this report discusses this further.
- *Water Quality*
  Treatment of stormwater flows will be performed by a treatment train which comprises of pit inserts, rainwater reuse and infiltration within the flood compensation basin.

4 SITE WORKS

4.1 Bulk Earthworks

The proposed development will be constructed on suspended concrete slabs, supported by columns, and therefore no bulk earthworks will be undertaken to facilitate the construction of the development. Accordingly there will be no impacts such as increased salinity or disturbance to acid sulphate soils as a result of the works.

Minor capping and trimming will be required for the installation of a geotextile separation layer and a road-base capping acting as a working platform for the drilling works.

Soil Erosion and Sediment Control measures will also be provided for the development – please refer to the Soil and Water Management Plan in **Section 8** of this report.

4.2 Embankment Stability

To assist in maintaining embankment stability permanent batters slopes will be no steeper than 3 horizontal to 1 vertical, while temporary batters will be no steeper than 2 horizontal to 1 vertical.

Existing site batters to the east and north will be maintained and existing vegetation is to be retained on these batters.New planting will supplement the existing.

4.3 Retaining Walls

Due to the existing topography and the nature of the proposed development, retaining walls will not be required for the site. Batters will remain as per existing conditions, and existing vegetation on batters will be retained.

5 STORMWATER HYDROLGICAL MODELLING AND ANALYSIS

5.1 General Design Principles

The design of the stormwater system for this site will be based on relevant national design guidelines, Australian Standard Codes of Practice, Council's *Guidelines for the Design of Stormwater Drainage Systems Within the City of Botany Bay* 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" (1987 Edition), Volumes 1 and 2 (AR&R).

Storm events for the 2 to 100 Year ARI events have been assessed.

5.2 Minor/ Major System Design

The piped stormwater drainage (minor) system has been designed to accommodate the 20-year ARI storm event (Q20). Overland flow paths (major) which will convey all stormwater runoff up to and including the Q100 event have also been provided which will limit major property damage and any risk to the public in the event of a piped system failure.

5.3 Rainfall Data

Rainfall Intensity Frequency Duration (IFD) data used as a basis for ILSAX modelling for the 2 to 100 Year ARI events, was taken from *The Bureau of Meteorology Online IFD Tool*.

5.4 Runoff Models

Calculation of the runoff from storms of the design ARI will be calculated with the catchment modelling software DRAINS.

The design parameters for the ILSAX model are to be based on typical values and parameters for the area and are as follows:

Model	Model for Design and analysis run	Rational method	
	Rational Method Procedure	ARR87	
	Soil Type-Normal	3.0	
	Paved (Impervious) Area Depression Storage	1	mm
	Supplementary Area Depression Storage	1	mm
	Grassed (Pervious) Area Depression Storage	5	mm
AMC	Antecedent Moisture Condition (ARI=1-5 years)	2.5	
AMC	Antecedent Moisture Condition (ARI=10-20 years)	3.0	
AMC	Antecedent Moisture Condition (ARI=50-100 years)	3.5	
	Sag Pit Blocking Factor (Minor Systems)	0	
	On Grade Pit Blocking Factor (Minor Systems)	0	
	Sag Pit Blocking Factor (Major Systems)	0.5	
	On Grade Pit Blocking Factor (Major Systems)	0.2	
	Minor Storm Pit Freeboard	150	mm

Table 5.1: DRAINS ILSAX Parameters

5.5 Hydraulics

5.5.1 General Requirements

Hydraulic calculations will be carried out utilising DRAINS modelling software during the detail design stage to ensure that all surface and subsurface drainage systems perform to or exceed the required standard.

5.5.2 Freeboard

The calculated water surface level in open junctions of the piped stormwater system will not exceed a freeboard level of 150mm below the finished ground level, for the peak runoff from the Minor System runoff. Where the pipes and junctions are sealed, this freeboard would not be required.

5.5.3 Public Safety

For all areas subject to pedestrian traffic, the product (dV) of the depth of flow d (in metres) and the velocity of flow V (in metres per second) will be limited to 0.4, for all storms up to the 100-year ARI.

For other areas, the dV product will be limited to 0.6 for stability of vehicular traffic (whether parked or in motion) for all storms up to the 100-year ARI.

5.5.4 Inlet Pit Spacing

The spacing of inlets throughout the site will be such that the depth of flow, for the Major System design storm runoff, will not exceed the top of the kerb (150mm above gutter invert).

5.5.5 Overland Flow

Flow paths in the existing basin will remain to convey all storms up to and including the 100-year ARI within the site to Springvale Drain. These flow paths will convey stormwater from the site to the flood management basin discussed previously.

It is noted the site is subject to overland flow from external catchments as noted in **Section 5.6** below.

5.6 External Catchments & Flooding

Flooding and flood planning levels have been defined in flood modelling produced by Aurecon in 2015 as part of the Southlands Development Approval MP 06_0191. A number of iterations of flood modelling were made with final sign off from the DoPE in November 2015 (refer **Appendix C**).

More recent flood studies have been completed by BMT WBM specifically for this development as shown in **Figure 5.1**.

The Southlands flood analysis and strategy was prepared by Aurecon in 2007 and updated in 2010 and was developed as part of a Major Project Application (MP 06_0191) for the entire Southlands site. The flood solution for the site was embodied in two Aurecon reports namely:

1. *Southlands Remediation/ Development Project Flood Investigations, 2 November 2007, Connell Wagner (now Aurecon); and*
2. *Review pf Orica Southlands Remediation and Development Hydraulic Modelling Report - Response to Exhibition Submissions/Comments" – 29 November 2010.*

The floodplain strategy established, approved, constructed and finally certified for the site was developed on the following key principles:

- Filling (above the 1:100 event) and development of two large areas within the site for further industrial development; and
- Construction of a large compensatory detention basin (approx. 6.5 Ha of the total site area) to the east and west of the Springvale Drain and immediately upstream of McPherson Street that provides additional floodplain storage to compensate for the amount lost due to the proposed filling. At RL 4.2 m AHD the compensatory floodplain storage capacity of the site is similar for the existing and Stage 1 development (i.e. no loss of storage within the site).

The flood studies and the subsequent review of the as built conditions indicated that as a result of construction of the proposed works there will be no significant increase in

flood levels (taken as > 0.01m) on surrounding properties or change in peak flows or velocities.

The NSW Department of Planning and Environment confirmed the suitability of the final as constructed situation by way of an approval letter dated 2 November 2015.

Orica has recently engaged BMT WBM to conduct a flood study and obtain a flood assessment report at Lot 9, 28 McPherson street, Banksmeadow specifically for the current development. The BMT WBM flood extent and depth can be observed in **Figure 5.1**.

The assessment confirmed the following:

- The flood assessment confirms that the proposed suspended warehouse can be constructed over the existing flood compensation basin with little to no impact to the existing flooding strategy and outcomes of the assessment as approved in 2015.
- The estimated flood level during the 1 in 100-year ARI event is RL 4.10m AHD.
- The flood planning level, allowing for 500mm freeboard to the 1 in 100-year ARI event, is R.L 4.60m AHD.
- The probable maximum flood level is confirmed to be RL 5.0m AHD.
- The proposed building level is RL 6.70m AHD and the minimum external level is RL 5.2m AHD, both levels are seen to be above the minimum flood planning requirements and will be above the PMF flood level.

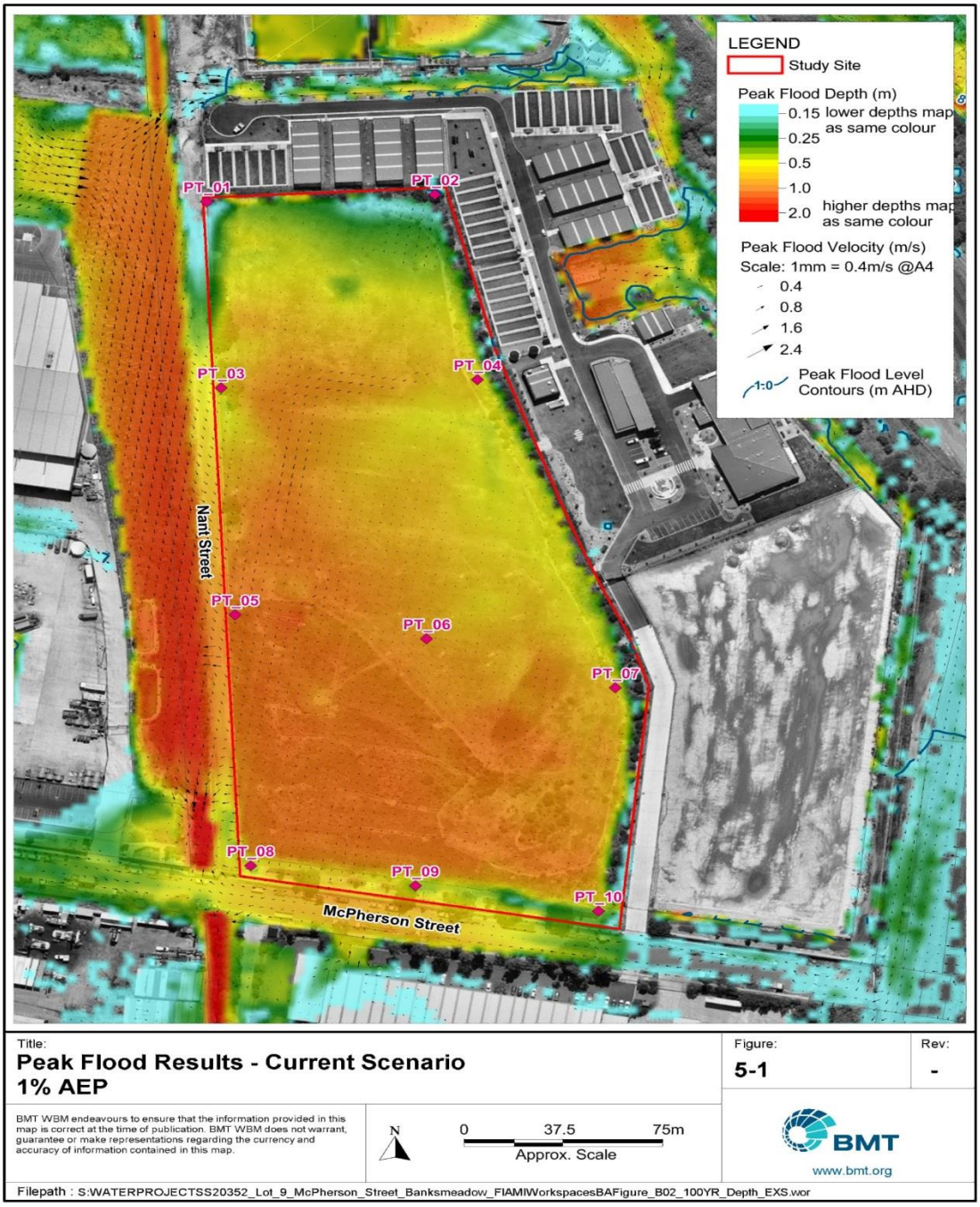

Figure 5.1. 1 in 100 year (1% AEP) Flood Depth (Source: BMT WBM)

6 WATER QUANTITY MANAGEMENT

Council adopts the principles of Water Quantity Management, commonly termed "On-site Detention (OSD)", to ensure the cumulative effect of development does not have a detrimental effect on the existing stormwater infrastructure and watercourses located within their LGA downstream from the site.

As discussed in **Section 5.6**, OSD was embodied as a key initial principle in the Southlands Industrial Development land design in the earliest Aurecon flood assessment and designs. However, following review by the DoPE, and their independent consultant WMA Water, OSD was removed in favour of accommodating all stormwater detention within the compensatory flood basin adjacent to the Springvale Drain. WMA Water noted that sufficient detention capacity could be provided within the very large flood management/ detention basin provided on the Southlands site.

Accordingly, all detention requirements for the Southlands Industrial Development land, including the subject site were accommodated within the compensatory flood basin located on Lot 9. This approach has been adopted and agreed in the Stage 1 development of the land by Goodman on the western side of the Southlands property and for the properties developed on the eastern side.

The development site discharges directly into the flood compensation/ detention basin, and ultimately into the Springvale Drain. As such no OSD is required or proposed as part of the development.

It is noted that the need for OSD has been discussed with the proponent and the Council in the pre-development application meeting held during February 2017 for the adjoining development. It was confirmed in this meeting by Council's Development Engineer Mr Alex Vasilouski that OSD was not required for the adjoining development discharging into the flood compensation basin given the detention and flood storage arrangement provided as part of the Southland Industrial Land development.

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 so as to minimise the adverse impact these pollutants could have on receiving waters and to also meet the requirements specified by Council.

Council has nominated, in Section 3G.4 of their *DCP 2013*, the requirements for stormwater quality for "all new development except new single residential dwellings" which are to be performed on a site catchment wide basis. The requirements are presented in terms of annual percentage pollutant reduction over a developed catchment and are as follows:

Gross Pollutants	90%
Total Suspended Solids	80%
Total Phosphorus	55%
Total Nitrogen	40%

7.2 Proposed Stormwater Treatment System

Roof, hardstand, car parking, roads and other extensive paved areas are required to be treated by the Stormwater Treatment Measures (STM). The STM shall be sized according to the whole catchment area of the Site. The STM for the development are based on a treatment train approach, as discussed in the NSW EPA document *Managing Urban Stormwater: Treatment Techniques*, to ensure that all of the objectives above are met.

Components of the treatment train for the development are as follows:

- Primary treatment to parking and hardstand areas is via Stormwater360 S200 Enviropod pit inserts;
- Tertiary treatment of all site water will be treated via infiltration in the flood storage zone/detention basin. The infiltration area is based on a proportion of the basin based on the proportion of the site catchment which is draining to it.

In order to estimate the number of Stormfilters and Enviropods required to meet the requirements of councils load based pollution reduction objectives, a MUSIC model has been prepared based on a nominal 1Ha catchment site. The 1Ha site allows for breakdown of different surfaces per the Site & Ground Floor Layout and will enable a per-hectare rate to be defined which can be applied to the different building catchments.

7.3 Stormwater Quality Modelling

7.3.1 Introduction

The MUSIC model was chosen to model water quality. This model, released by the Cooperative Research Centre for Catchment Hydrology (CRCCH), 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 the proposed systems and changes to land use are appropriate for their catchments and capable of meeting specified water quality objectives (CRC 2002). The water quality constituents modelled in MUSIC, 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 3G.4 of their *DCP 2013* and nominated in **Section 7.1** of this report were used as a basis for assessing the effectiveness of the selected treatment trains.

The MUSIC model "*9349.12-Rev1.sqz*" was set up to examine the effectiveness of the water quality treatment train and to predict if Council's requirements have been achieved. The layout of the MUSIC model is presented in **Appendix B**.

Modelling parameters used are based on those nominated in the Sydney Catchment Management Authority (SCA) document *Using Music in Sydney's Drinking Water Catchment – A Sydney Catchment Authority Standard (2012)* and *Draft NSW MUSIC Modelling Guidelines (2011).*

7.3.2 Rainfall Data

As per the recommendation of Table 3-1 of *Draft NSW MUSIC Modelling Guidelines (2011), s*ix minute pluviographic data for the Sydney Meteorological Office Station was 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	Sydney Meteorological Office
Rainfall Period	5 January 1962 – 31 December 1966
Evapotanspiration	Sydney Monthly Areal PET
Model Timestep	6 minutes

7.3.3 Rainfall Runoff Parameters

Parameter	**Value**
Rainfall Threshold	1.00
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

7.3.4 Pollutant Concentrations & Source Nodes

Pollutant concentrations for source nodes are based on parameters adopted by the SCA as per **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	NA	NA	NA	NA	NA	NA
	Roads	1.20	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

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.

The relevant stormwater catchment sizes are listed below in **Table 7.2** and their configuration within the MUSIC model is shown in **Appendix B**.

Catchment	**Area (Ha)**	**Source Node**	**% Impervious**	**Stormwater Treatment**
Roof (Warehouse 1 & 2)	2.110	R1 & R2 Roof	100	Enviropod EP200 Pit Inserts Infiltration Basin
Carpark at Warehouse 1	0.180	Parking Area	100	Enviropod EP200 Pit Inserts Infiltration Basin
Hardstand &Carpark between Warehouse 1 & 2	1.101	Hardstand	100	Enviropod EP200 Pit Inserts Infiltration Basin
Bypass	0.734	Bypass	95	Enviropod EP200 Pit Inserts Infiltration Basin
Total	4.125			

Table 7.2. Music Model Source Nodes

7.3.5 Treatment Nodes

Infiltration system and SW360 Enviropod nodes have been used in the modelling of the development.

It is noted that the infiltration node, within the flood storage basin, has been modelled in MUSIC to simulate treatment during low flow and non-flood scenario. The infiltration node allows for a high flow bypass which would operate when flows from the site are greater than 100 l/s. This flow is based on the 1 in 3-month flow from the site and

would simulate a conservative model for the site during the period when the flood basin operates and would not provide treatment to the site. It is noted that the model is conservative in that the flood basin is not expected to operate until flood events which are greater than 1 in 5-year ARI which would mean that possible higher treatment of stormwater from the site. This is considered a suitable and conservative modelling approach for the treatment of stormwater from this site.

7.3.6 Results

Table 7.3 shows 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
Total Suspended Solids (kg/yr)	6310	770	87.8
Total Phosphorus (kg/yr)	13.5	2.32	82.8
Total Nitrogen (kg/yr)	94.8	16.9	82.1
Gross Pollutants (kg/yr)	927	88.4	90.5

Table 7.3. MUSIC analysis results

The model results indicate that, through the use of the STM in the treatment train, pollutant load reductions for Total Suspended Solids, Total Phosphorous, Total Nitrogen and Gross Pollutants will meet the requirements of Section 3G.4 of Council's *DCP 2013* on an overall catchment basis.

7.3.7 Modelling Discussion

MUSIC modelling has been performed to assess the effectiveness of the selected treatment trains and to ensure that the pollutant retention requirements of 3G of Council's DCP2013 have been met.

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

Given the expected low source loadings of hydrocarbons and oil/grease and removal efficiencies of the treatment devices we consider that the requirements of the Botany City Council have been met.

The requirements set by council have been met as per the following:

- It was confirmed in a meeting with Council's Development Engineer Mr Alex Vasilouski that OSD was not required for the adjoining development discharging into the flood compensation basin given the detention and flood storage arrangement provided as part of the Southland Industrial Land development.

- Stormwater quality controls set by Council have been adhered to. Hence, stormwater pollutant reduction targets have been met as per the results generated by the MUSIC Modelling Software and provided in **Table 7.3**.

- Infiltration systems and Enviropods have been set into the MUSIC Modelling process to treat the water prior to discharge into the basin & subsequently the Springvale Drain.

7.4 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.

For the purposes of this development, we refer to a rainwater harvesting system, where benefits of collected stormwater from roof areas over a stormwater harvesting system can be made as rainwater is generally less polluted than stormwater drainage.

Rainwater harvesting is proposed for this development with re-use for non-potable 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 in accordance with the requirements *Part 10* of the Botany City Council *Development Control Plan 2013*.

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 will be designed using MUSIC software to balance the supply and demand, based on the requirements of Botany City Council to provide reduction in non-potable water demand.

7.5 Maintenance and Monitoring

It is important that each component of the water quality treatment train is properly operated and maintained. In order to achieve the design treatment objectives, an indicative maintenance schedule has been prepared (refer to **Table 7.4** 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 7.4. 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 top soil in eroded area and cover and secure with biodegradable fabric. Cut hole in fabric and revegetate.
INLET & JUNCTION PITS			
Inside Pit	Six Monthly	Maintenance Contractor	Remove grate and inspect internal walls and base, repair where required. Remove any collected sediment, debris, litter.
Outside of Pit	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

MAINTENANCE ACTION	FREQUENCY	RESPONSIBILITY	PROCEDURE
			repairs.
STORMWATER360 ENVIROPOD INSERTS			
Refer Manufacturers Operation and Maintenance Manual for Enviropod maintenance requirements.	Refer Manufacturers Operation and Maintenance Manuel	Maintenance Contractor	Refer Manufacturers Operation and Maintenance Manuel

8 EROSION & SEDIMENT CONTROL PLAN

An Erosion and Sediment Control Plan (ESCP) is shown on drawing **Co9349.12-DA20** in **Appendix A**. These are conceptual plans only providing sufficient detail to clearly show that the works can proceed without undue pollution to receiving waters. A detailed plan will be prepared once consent is given and before works start.

8.1 General Conditions

1. The ESCP will be read in conjunction with the engineering plans, and any other plans or written instructions that may be issued 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 specification and constructed following the guidelines stated in Managing Urban Stormwater, Soils and Construction (1998) and council specifications.
3. All subcontractors will be informed of their responsibilities in minimising the potential for soil erosion and pollution to down slope areas.

8.2 Land Disturbance

1. Where practicable, the soil erosion hazard on the site will be kept as low as possible and as recommended in **Table 8.1**.

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.
Access areas	Limited to a maximum width of 5 metres	The site manager will determine and mark the location of these zones onsite. They can vary in position to best conserve existing vegetation and protect downstream areas while being considerate of the needs of efficient works activities. All site workers will clearly recognise these boundaries.
Remaining lands	Entry prohibited except for essential management works	

Table 8.1 Limitations to access

8.3 Recommended Erosion and Sediment Control measures

1. Clearly visible barrier fencing shall be installed as shown on the plan 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 remain on the surface at the completion of works.
3. Where practicable, schedule the construction program so that the time from starting land disturbance to stabilisation has a duration of less than six months.
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. Permanent earth batters are to be formed with gradient as referenced by the geotechnical report. Temporary earth batters during construction shall be formed in accordance with a gradient as practical but not steeper than:
    - 2H:1V where slope length is less than 7 meters
    - 2.5H:1V where slope length is between 7 and 10 meters
    - 3H:1V where slope length is between 10 and 12 meters
    - 4H:1V where slope length is between 12 and 18 meters
    - 5H:1V where slope length is between 18 and 27 meters
    - 6H:1V where slope length is greater than 27 meters
8. All earthworks, including waterways/drains/spillways and their outlets, will be constructed to be stable in at least the design storm event.
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 sufficient 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.

8.4 Recommended Pollution Control measures

1. Stockpiles will not be located within 5 meters 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 meters, a storage depth (including both settling and settled zones) of at least 0.6 meters, and internal dimensions that provide maximum surface area for settling, and
   c) Provide a return of 1 meter 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 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 stabilised.

8.5 Recommended Waste Management measures

Acceptable bind will be provided for any concrete and mortar slurries, paints, acid washings, lightweight waste materials and litter. Clearance service will be provided at least weekly.

8.6 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.
   - 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

- Forwarding a signed duplicate of the completed Check Sheet to the project manager/developer for their information

2. In addition, a suitably qualified person 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. The responsible person will ensure that:
   - The plan is being implemented correctly
   - Repairs are undertaken as required
   - Essential modifications are made to the plan if and when necessary

   The report shall carry 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 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 of installing additional diversion upslope.
   - 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 meters 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 or less 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 stabilised
12. Litter, debris and sediment will be removed from the gross pollutant traps and trash racks as required.

9 CONCLUSION

This Civil Engineering Report has been prepared in support of the State Significant Development Application associated with the proposed warehouse facility at Lot 9, DP 1205673, McPherson Street, Banksmeadow.

All municipal services are readily available to the site and minor extensions only are likely required.

There is no impact on existing site infrastructure, particularly the Orica Groundwater Treatment Infrastructure. This will all be maintained and kept in Orica ownership on a separate lot of land.

A civil engineering strategy for the site has been developed which provides a best practice solution within the constraints of the existing landform and proposed subdivision layout, and is consistent with previous approvals, stormwater management and flood management strategies. Within this design a stormwater quality management strategy has been developed to reduce both peak flows and pollutant load leaving this site to remain consist with the existing flows.

The stormwater management for the proposed development has been designed in accordance with the Botany City Council *2013 Development Control Plan*, in particular *Part 3G – Stormwater Management* and *Part 10 – Stormwater Management Technical Guidelines*.

The detail contained in this report provides sufficient information to demonstrate that the proposed buildings can be constructed with appropriate engineering and stormwater management measures integrated into the building layout and design.

10 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);
- Botany City Council –Guidelines for the Design of Stormwater Drainage Systems within the City of Botany Bay (v7); and
- *Using Music in Sydney's Drinking Water Catchment – A Sydney Catchment Authority Standard (2012).*
- Water Sensitive Urban Design – "Technical Guidelines for Western Sydney" by URS Australia Pty Ltd, May 2004

Appendix A

DRAWINGS BY COSTIN ROE CONSULTING

PROPOSED WAREHOUSE DISTRIBUTION AND OFFICE DEVELOPMENT
28 MCPHERSON ST, BANKSMEADOW
CIVIL PACKAGE FOR SSD

DRAWING LIST

DRAWING NO.	DRAWING TITLE
C09349.12-DA10	DRAWING LIST & GENERAL NOTES
C09349.12-DA 20	EROSION & SEDIMENT CONTROL PLAN & DETAILS
C09349.12-DA 30	SITE PREPARATION PLAN
C09349.12-DA 40	STORMWATER KEY PLAN
C09349.12-DA 41	STORMWATER DRAINAGE PLAN -SHEET 1
C09349.12-DA 42	STORMWATER DRAINAGE PLAN -SHEET 2
C09349.12-DA 45	STORMWATER DRAINAGE DETAILS- SHEET 1
C09349.12-DA 51	FINISHED LEVELS PLAN-SHEET 1
C09349.12-DA 52	FINISHED LEVELS PLAN-SHEET 2

LOCALITY PLAN
N.T.S

GENERAL NOTES:

G1 THESE DRAWINGS SHALL BE READ IN CONJUNCTION WITH ALL ARCHITECTURAL AND OTHER CONSULTANTS' 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.

G2 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.

G3 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.

G4 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.

G5 UNLESS NOTED OTHERWISE ALL LEVELS ARE IN METRES AND ALL DIMENSIONS ARE IN MILLIMETRES.

G6 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.

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 100 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.

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.

SITE PREPARATION NOTES:

1. ALL EARTHWORKS SHALL BE COMPLETED GENERALLY IN ACCORDANCE WITH THE GUIDELINES SPECIFIED BY THE GEOTECHNICAL ENGINEER UNDER LEVEL 1 SUPERVISION.
2. EXISTING LEVELS ARE BASED ON INFORMATION PROVIDED BY RYGATE SURVEYORS TITLED PLAN SHOWING DETAIL AND PLAN LEVELS LOT 9 D.P.1205673 NO.28 MCPHERSON STREET DATED 30.10.18 .
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.
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.
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.

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 SLOPE 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. ALL FOOTPATHS ARE TO FALL AWAY FROM THE BUILDING AT 2.5% NOMINAL. GRADE.
12. ALL PAVEMENTS ARE TO BE SET AT 50mm BELOW THE FINISHED FLOOR LEVEL OF THE WAREHOUSE AND OFFICE AREAS.

FOR INFORMATION ONLY

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ARCHITECT: axis

CLIENT: DBL Property Pty Limited
Development Managers and Property Advisors
Suite 2, Upper Ground Floor
437 Kent Street
Sydney NSW 2000
P 61 2 8278 7662
M 61 0419 696 408
E jlord@dblproperty.com W www.dblproperty.com

PROJECT: PROPOSED WAREHOUSE
DISTRIBUTION AND OFFICE DEVELOPMENT
28 MCPHERSON ST,BANKSMEADOW NSW

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
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Costin Roe Consulting Pty Ltd.
Consulting Engineers ACN 003 696 446
Level 1, 8 Windmill Street
Walsh Bay, Sydney NSW 2000
Tel: (02) 9251-7699 Fax: (02) 9241-3731
email: mail@costinroe.com.au ©

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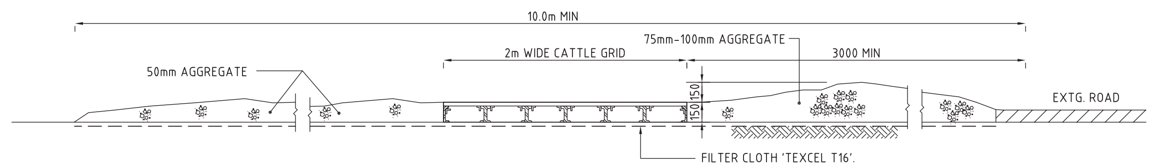
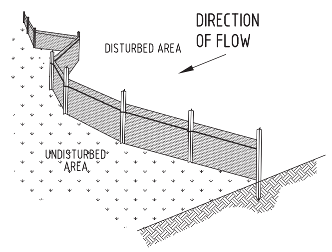
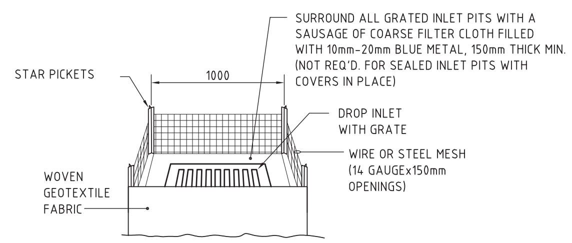
DRAWING TITLE: DRAWING LIST AND GENERAL NOTES
DRAWING No: 9349.12-DA10
ISSUE: B



SECTION 1:20 (1/DA20) : STABILISED CONSTRUCTION ENTRANCE 'TRUCK SHAKER'



TYPICAL SILT FENCE DETAIL
N.T.S.
PROVIDE 1m RETURNS AT 30m INTERVALS.
TYPICAL



GRATED INLET PIT FILTER DETAIL
N.T.S

LEGEND:

PROVIDE 1m RETURNS TO SILT FENCE AT 30m MAX. INTERVALS.
TYPICAL (N.S.O.P.)

- DENOTES DIRECTION OF OVERLAND FLOW
- DENOTES SILT FENCE WITH CATCH DRAIN
- DENOTES GRATED INLET PIT FILTER

NOTE:

NO SEDIMENTATION BASIN IS REQUIRED AS THE TOTAL DISTURBED AREA IS LESS THAN 2,500m². ALTERNATE METHODS HAVE BEEN EMPLOYED TO PROTECT THE RECEIVING WATERS.

NOTE:

REFER TO DRAWING C09349.12-DA10 FOR EROSION CONTROL NOTES.

EROSION AND SEDIMENT CONTROL PLAN & DETAILS
1:500

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

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ARCHITECT: axis

CLIENT: DBL Property Pty Limited, Development Managers and Property Advisors

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Consulting Engineers
Level 1, 8 Windmill Street
Walsh Bay, Sydney NSW 2000
Tel: (02) 9251-7699 Fax: (02) 9241-3731
email: mail@costinroe.com.au ©

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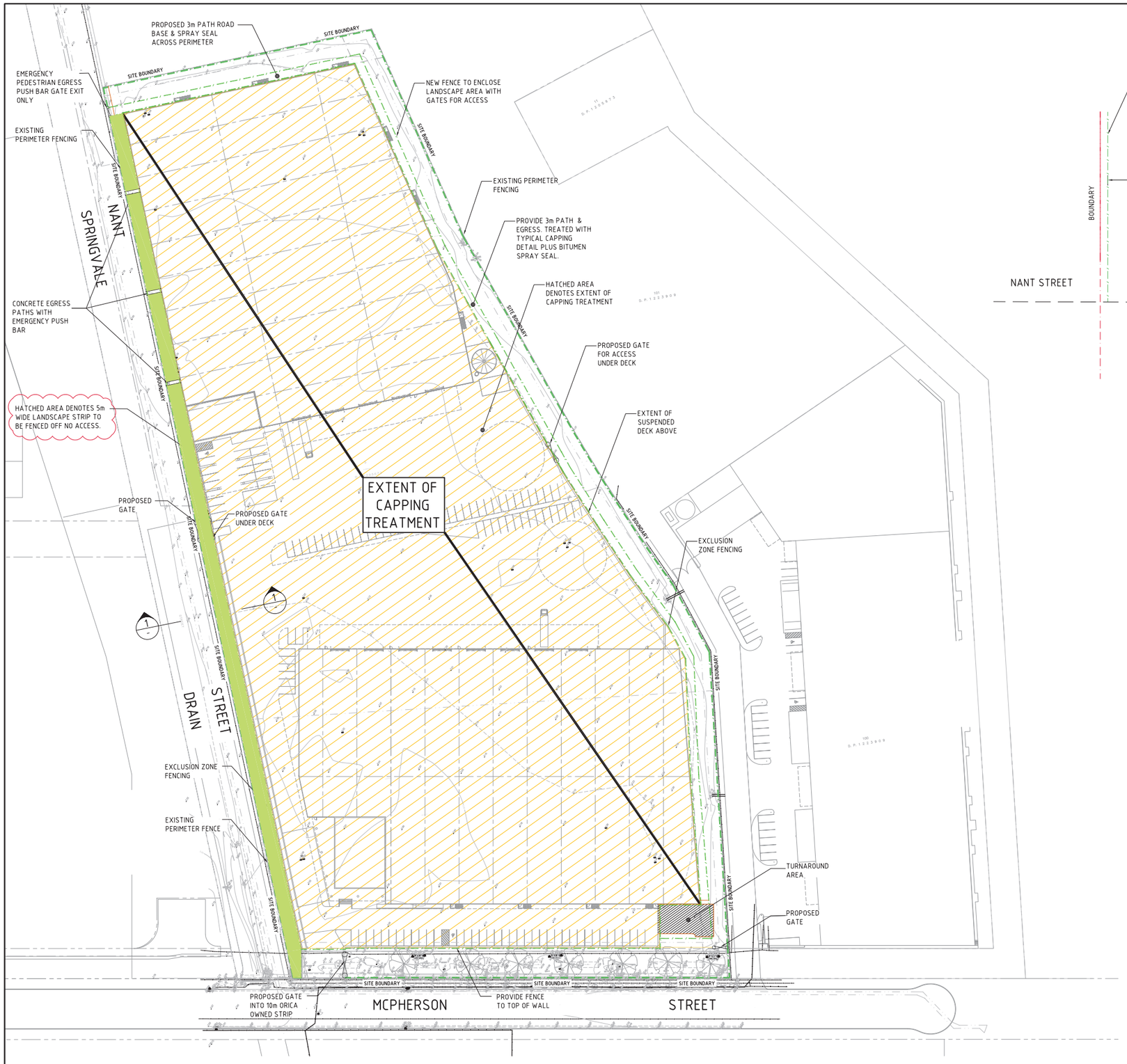
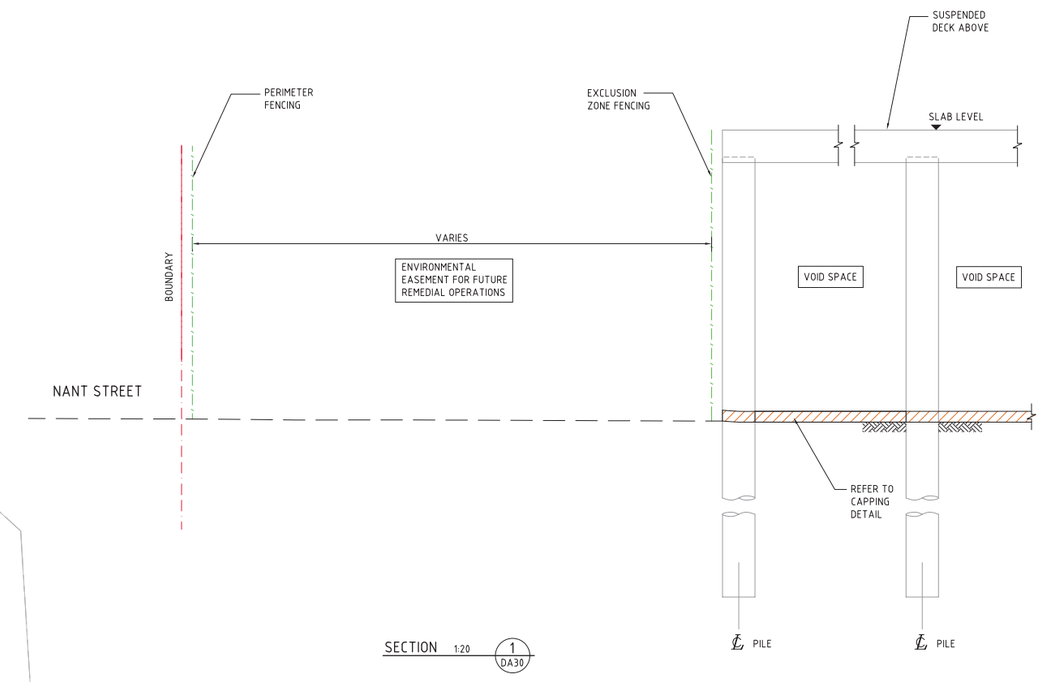
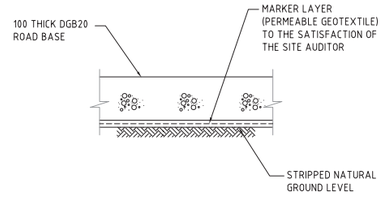
DRAWING TITLE: EROSION AND SEDIMENT CONTROL PLAN & DETAILS
DRAWING No: 9349.12-DA 20
ISSUE: B



SITE PREPARATION PLAN
1:500



SECTION 1:20 — 1 / DA30



CAPPING DETAIL
SCALE 1:5

SITE PREPARATION NOTES:

1. STRIP ANY TOPSOIL OR DELETERIOUS MATERIAL AND DISPOSE OFF FROM SITE OR STORE AS DIRECTED.
2. EXISTING SUBGRADE TO BE PROOF ROLLED TO THE SATISFACTION OF THE GEOTECHNICAL ENGINEER.
3. INSTALL MARKER LAYER TO THE SATISFACTION OF THE SITE AUDITOR.
4. PLACE ROAD BASE AS NOTED ON CAPPING DETAIL.
5. FOLLOWING COMPLETION OF PILING WORKS, ROAD BASE TO BE BROKEN UP TO ALLOW FOR INFILTRATION TO BASE OF OPEN BASIN.

LEGEND:

- DENOTES EXTENT OF CAPPING TREATMENT
- DENOTES EXTENT OF FENCED LANDSCAPED AREA (NO ACCESS)
- DENOTES PERIMETER FENCING
- DENOTES EXCLUSION ZONE FENCING
- DENOTES GATES

50mm 0 100 200 300 400 500mm
SCALE 1:5 AT A0 SHEET SIZE

200mm 0 500 1000 1500 2000mm
SCALE 1:20 AT A0 SHEET SIZE

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

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ARCHITECT: axis

CLIENT: DBL Property Pty Limited
Development Managers and Property Advisors
Suite 2, Upper Ground Floor
437 Kent Street
Sydney NSW 2000
P 61 2 9270 7882
M 61 0419 036 408
E jford@dblproperty.com W www.dblproperty.com

PROJECT: PROPOSED WAREHOUSE
DISTRIBUTION AND OFFICE DEVELOPMENT
28 MCPHERSON ST,BANKSMEADOW NSW

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Costin Roe Consulting Pty Ltd.
Consulting Engineers
Level 1, 8 Windmill Street
Walsh Bay, Sydney NSW 2000
Tel: (02) 9251-7699 Fax: (02) 9041-3721
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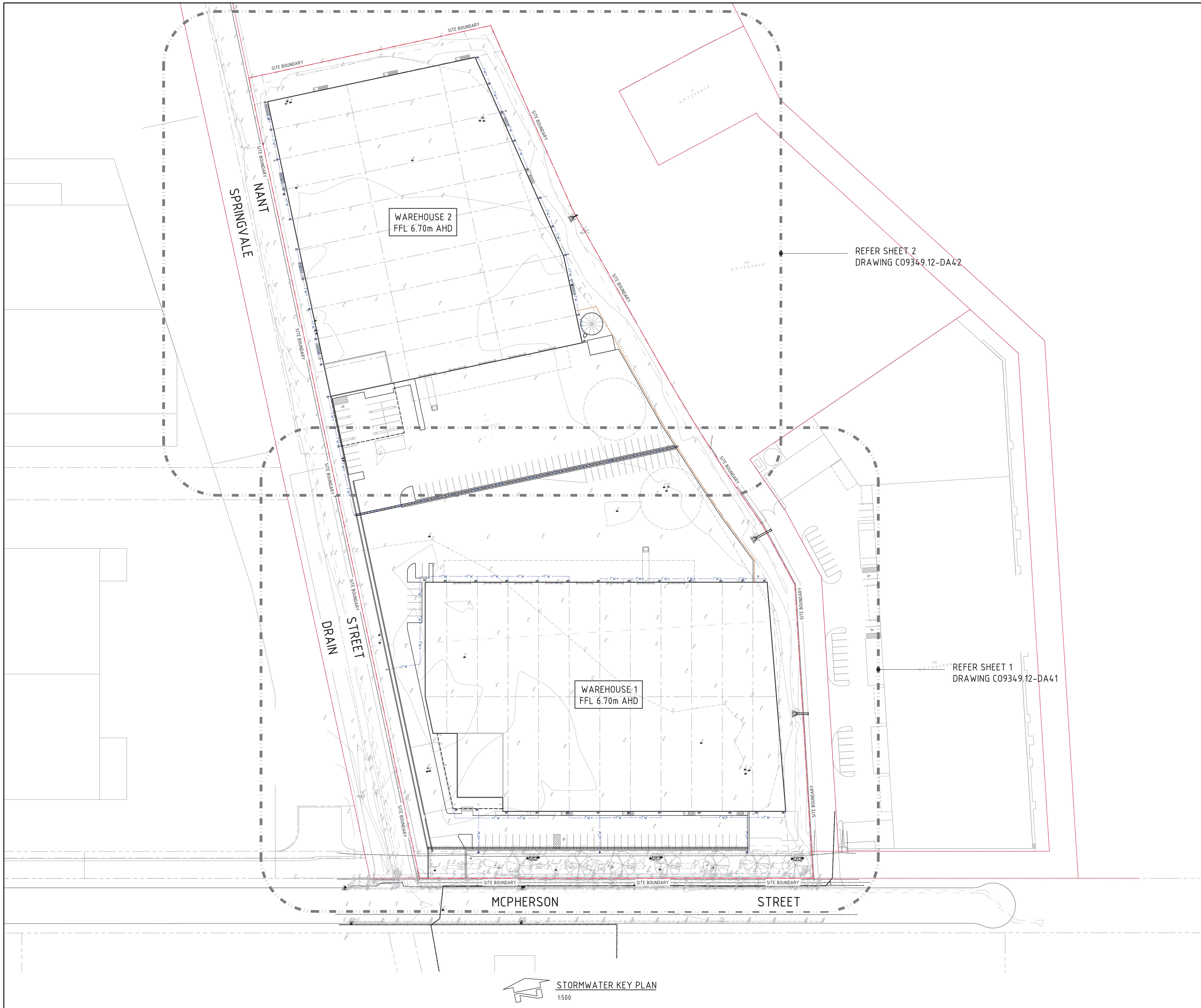
DRAWING TITLE: SITE PREPARATION PLAN
DRAWING No: 9349.12-DA 30
ISSUE: D



STORMWATER KEY PLAN
1:500

NOTE:
REFER TO DRAWING C09349.12-DA10 FOR STORMWATER NOTES.

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

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axis

CLIENT
DBL Property Pty Limited
Development Managers and Property Advisors
Suite 2, Upper Ground Floor
437 Kent Street
Sydney NSW 2000
P 61 2 8278 7662
M 61 0419 696 408
E jlord@dblproperty.com W www.dblproperty.com

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Costin Roe Consulting Pty Ltd.
Consulting Engineers ACN 003 696 446
Level 1, 8 Windmill Street
Walsh Bay, Sydney NSW 2000
Tel: (02) 9251-7699 Fax: (02) 9241-3731
email: mail@costinroe.com.au ©

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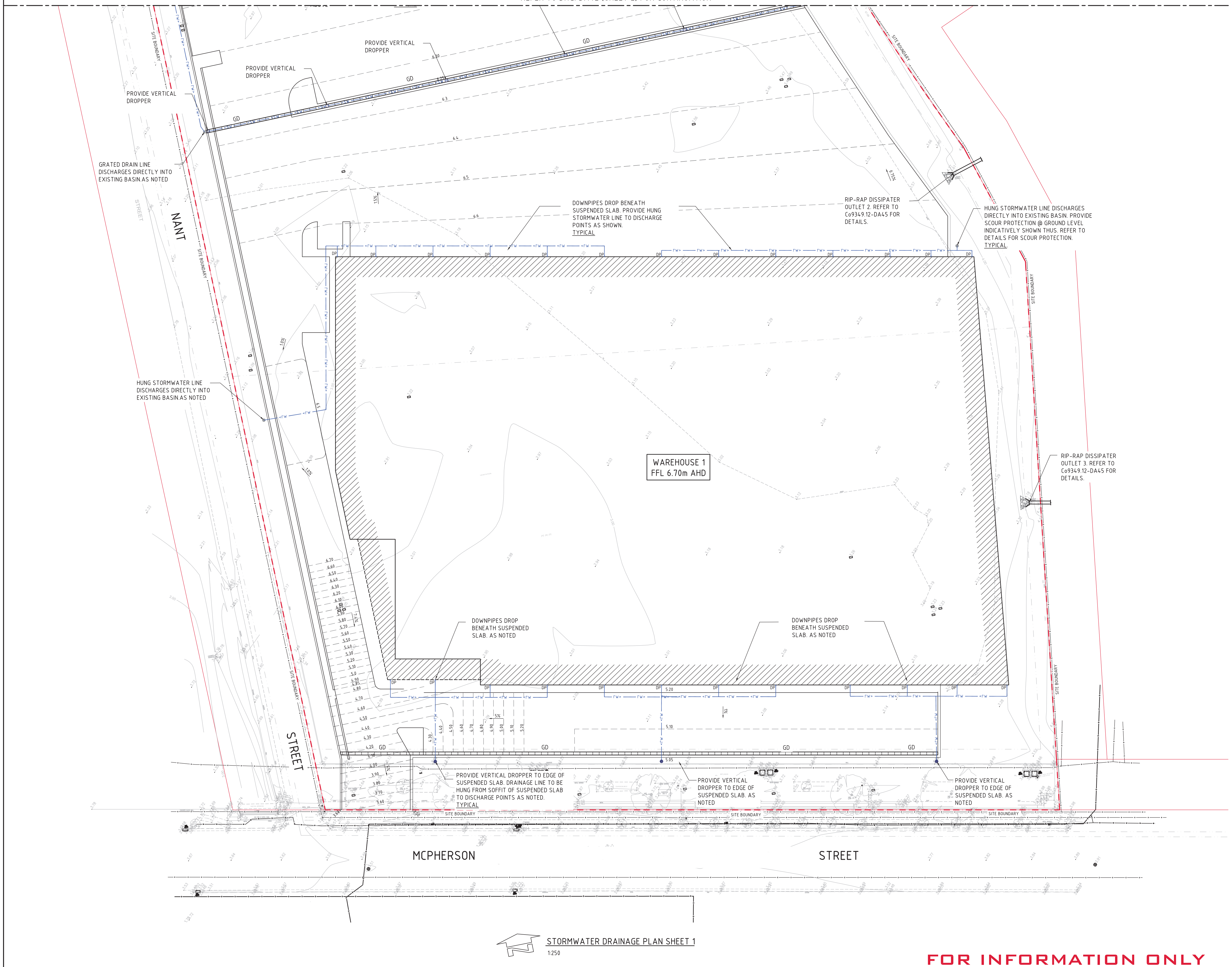
DRAWING TITLE
STORMWATER KEY PLAN
PLAN & DETAILS

DRAWING No 9349.12-DA 40
ISSUE B

REFER TO DRG. DA42 (SHEET 2) FOR CONTINUATION



LEGEND:

LEVELS DATUM IS AHD.

EXISTING SITE LEVELS AND DETAILS BASED ON SURVEY INFORMATION TITLED PLANS SHOWING DETAIL AND PLAN LEVELS LOT 9 D.P 1205673 NO.28 MCPHERSON STREET BY RYGATE SURVEYORS DATED 30.10.18

- ROOFWATER DOWNPIPE (INDICATIVE)
- SPOT LEVEL
- PAVEMENT FALL DIRECTION AND GRADE
- PROPOSED ROOFWATER LINE
- PROPOSED STORMWATER LINE
- GRATED DRAIN
- VERTICAL DROPPER
- DRAIN TO EXISTING BASIN
- FINISHED PAVEMENT CONTOUR (MAJOR) 0.5m INTERVALS
- FINISHED PAVEMENT CONTOUR (MINOR)

NOTE:

REFER TO DRAWING C09349.12-DA10 FOR STORMWATER NOTES.

STORMWATER DRAINAGE PLAN SHEET 1

1:250

FOR INFORMATION ONLY

SCALE 1:250 AT A0 SHEET SIZE

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CLIENT: DBL Property Pty Limited
Development Managers and Property Advisors
Suite 2, Upper Ground Floor
437 Kent Street
Sydney NSW 2000
P 61 2 8278 7662
M 61 0419 696 408
E jlord@dblproperty.com W www.dblproperty.com

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Costin Roe Consulting Pty Ltd.
Consulting Engineers ACN 003 696 446
Level 1, 8 Windmill Street
Walsh Bay, Sydney NSW 2000
Tel: (02) 9251-7699 Fax: (02) 9241-3731
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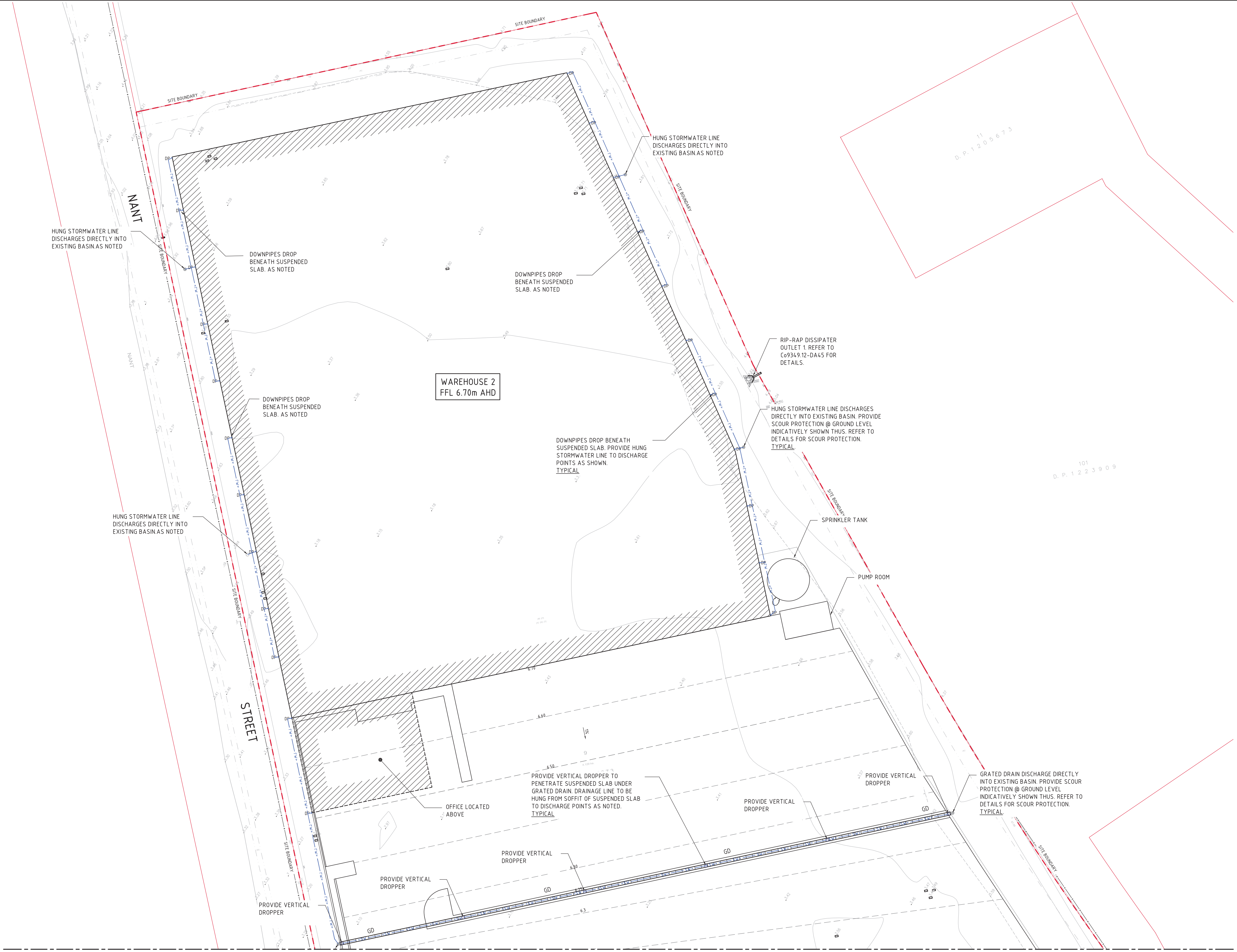
DRAWING TITLE: STORMWATER DRAINAGE PLAN SHEET 1

DRAWING No 9349.12-DA41 ISSUE B



SITE BOUNDARY
NANT
STREET
HUNG STORMWATER LINE DISCHARGES DIRECTLY INTO EXISTING BASIN AS NOTED
DOWNPIPES DROP BENEATH SUSPENDED SLAB. AS NOTED
WAREHOUSE 2
FFL 6.70m AHD
DOWNPIPES DROP BENEATH SUSPENDED SLAB. PROVIDE HUNG STORMWATER LINE TO DISCHARGE POINTS AS SHOWN. TYPICAL
RIP-RAP DISSIPATER OUTLET 1. REFER TO Co9349.12-DA45 FOR DETAILS.
HUNG STORMWATER LINE DISCHARGES DIRECTLY INTO EXISTING BASIN. PROVIDE SCOUR PROTECTION @ GROUND LEVEL INDICATIVELY SHOWN THUS. REFER TO DETAILS FOR SCOUR PROTECTION. TYPICAL
SPRINKLER TANK
PUMP ROOM
OFFICE LOCATED ABOVE
PROVIDE VERTICAL DROPPER TO PENETRATE SUSPENDED SLAB UNDER GRATED DRAIN. DRAINAGE LINE TO BE HUNG FROM SOFFIT OF SUSPENDED SLAB TO DISCHARGE POINTS AS NOTED. TYPICAL
PROVIDE VERTICAL DROPPER
GRATED DRAIN DISCHARGE DIRECTLY INTO EXISTING BASIN. PROVIDE SCOUR PROTECTION @ GROUND LEVEL INDICATIVELY SHOWN THUS. REFER TO DETAILS FOR SCOUR PROTECTION. TYPICAL
GD
D.P. 1205673
D.P. 1223909

LEGEND:

LEVELS DATUM IS AHD.

EXISTING SITE LEVELS AND DETAILS BASED ON SURVEY INFORMATION TITLED PLANS SHOWING DETAIL AND PLAN LEVELS LOT 9 D.P 1205673 NO.28 MCPHERSON STREET BY RYGATE SURVEYORS DATED 30.10.18

- DP - ROOFWATER DOWNPIPE (INDICATIVE)
- +60.00 - SPOT LEVEL
- 1% - PAVEMENT FALL DIRECTION AND GRADE
- RW - PROPOSED ROOFWATER LINE
- SW - PROPOSED STORMWATER LINE
- GRATED DRAIN
- VERTICAL DROPPER
- DRAIN TO EXISTING BASIN
- 50.00 - FINISHED PAVEMENT CONTOUR (MAJOR) 0.5m INTERVALS
- 50.10 - FINISHED PAVEMENT CONTOUR (MINOR)

NOTE:

REFER TO DRAWING C09349.12-DA10 FOR STORMWATER NOTES.

REFER TO DRG. DA41 (SHEET 1) FOR CONTINUATION

STORMWATER DRAINAGE PLAN SHEET 2

1:250

FOR INFORMATION ONLY

2m 0 5 10 15 20 25m

SCALE 1:250 AT A0 SHEET SIZE

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CLIENT: DBL Property Pty Limited
Development Managers and Property Advisors
Suite 2, Upper Ground Floor
437 Kent Street
Sydney NSW 2000
P 61 2 8278 7662
M 61 0419 696 408
E jlord@dblproperty.com W www.dblproperty.com

PROJECT: PROPOSED WAREHOUSE
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28 MCPHERSON ST,BANKSMEADOW NSW

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Consulting Engineers ACN 003 696 446
Level 1, 8 Windmill Street
Walsh Bay, Sydney NSW 2000
Tel: (02) 9251-7699 Fax: (02) 9241-3731
email: mail@costinroe.com.au ©

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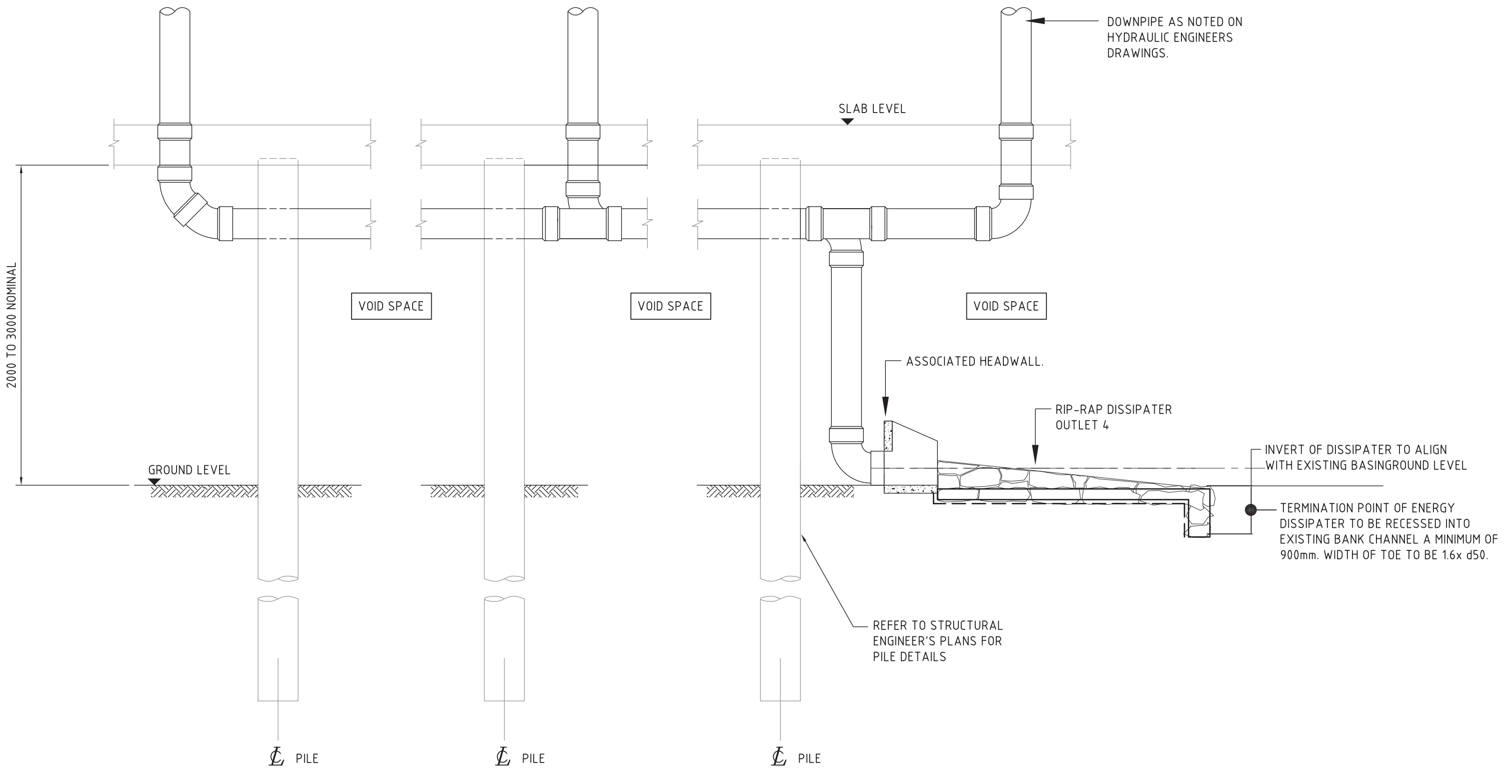
DRAWING TITLE: STORMWATER DRAINAGE PLAN SHEET 2

DRAWING No 9349.12-DA 42

ISSUE B



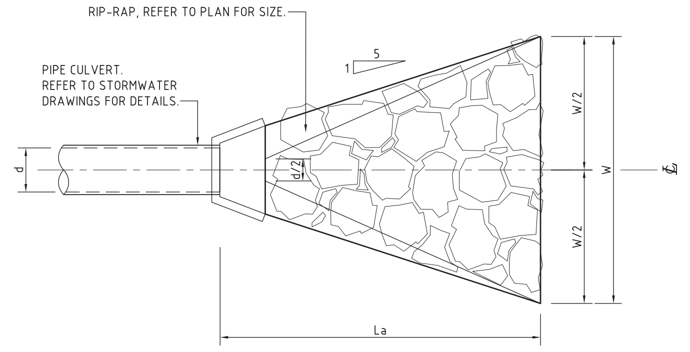
TYPICAL OUTLET TO EXISTING BASIN

SCALE 1:20

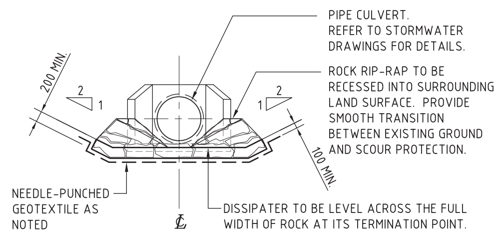
DISSIPATER NOTES :

1. ALIGN STRUCTURE EVENLY WITH BANK.
2. LOCATE STRUCTURE AT INVERT LEVEL OF STREAM AND POINT IN A DOWNSTREAM DIRECTION.
3. PIPE TO REST ON, AND BE PACKED IN, BY RIP-RAP (SIZE AS NOTED).
4. DISCHARGE INTO STREAM WHERE BEDROCK IS PRESENT, OTHERWISE SCOUR PROTECT AS REQUIRED.
5. SCOUR PROTECT THE OPPOSITE BANK AS REQUIRED. SCOUR PROTECTION TO BE PROVIDED WHERE OPPOSITE BANK IS WITHIN 12-14 TIMES THE PIPE DIAMETER.
6. RIP-RAP TO CONSIST OF ANGULAR RUN-OF-QUARRY ROCK (d50= 150mm MINIMUM) AS NOTED ON THE PLAN. RIP-RAP TO BE MINIMUM THICKNESS OF RIP-RAP LAYER TO BE 1.6x AVERAGE ROCK SIZE (d50).
7. RIP-RAP IS TO BE PLACED OVER A 200mm LAYER OF 140mm COBBLES OVER NEEDLE-PUNCHED GEOFAB A44.
8. PLACE ROCK SO THAT IT FORMS A DENSE, WELL-GRADED MASS OF ROCK WITH A MINIMUM OF VOIDS. THE FINISHED RIP-RAP SURFACE SHOULD BE FREE OF POCKETS OF SMALL ROCK OR CLUSTERS OF LARGE ROCKS.
9. GAPS IN RIP-RAP TO BE HAND PACKED WITH TOPSOIL & PLANTED WITH NATIVE SEDGES & RUSHES TO PROVIDE. THE INTENT IS FOR THERE TO BE NO VOIDS BETWEEN RIP-RAP BOULDERS.
10. ENSURE THE FINISHED ROCK SURFACE BLENDS WITH THE SURROUNDING GROUND LEVELS. NO OVERFALL OR PROTRUSION OF ROCK SHOULD BE APPARENT.
11. ENSURE THAT STORMWATER FROM SURROUNDING GROUND IS FREE TO ENTER THE STRUCTURE WITHOUT CAUSING UNDESIRABLE PONDING OR SCOUR.

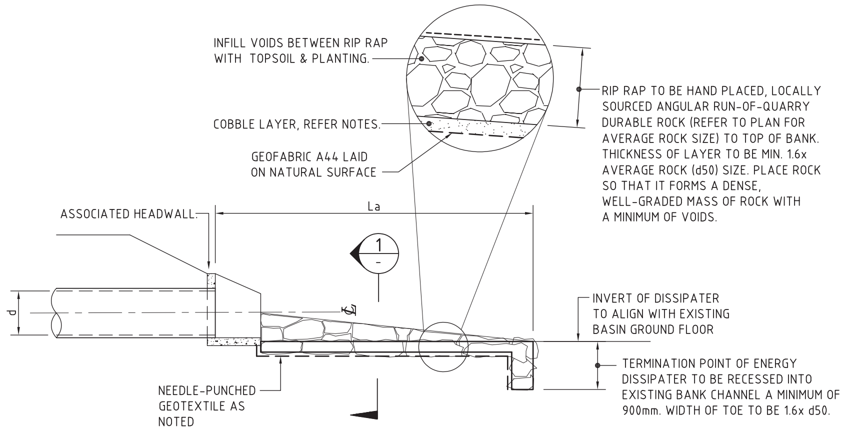
DISSIPATER SCHEDULE				
DISCHARGE POINT	d	La	W	RIP-RAP (d50)
OUTLET 1	225	2000	2300	150
OUTLET 2	600	5500	6100	200
OUTLET 3	600	5100	6100	200
OUTLET 4	300	3200	3500	150



PLAN



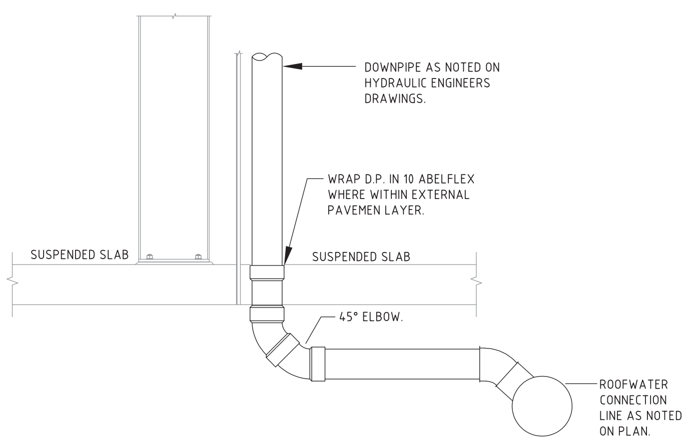
SECTION 1:50 1



SECTIONAL ELEVATION

STORMWATER OUTLET DISSIPATER WITH HEADWALL

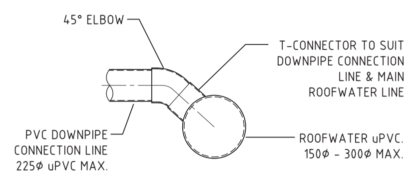
SCALE 1:50



DOWNPIPE TURN-UP DETAIL

(SUSPENDED SLAB)

SCALE 1:20



DOWN PIPE CONNECTION TO uPVC PIPE

1. PROPRIETARY T-PIECE CONNECTORS SHALL BE USED TO WHERE DIRECT CONNECTIONS ARE REQUIRED TO uPVC PIPES.
2. ALL JOINTS TO BE SEALED WITH SOLVENT WELDED JOINTS.
3. THE PVC PIPE SHALL NOT PROTUDE BEYOND THE INNER SURFACE OF THE STORMWATER PIPE.

SCALE 1:20

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

200mm 0 500 1000 1500 2000mm
SCALE 1:20 AT A0 SHEET SIZE

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Costin Roe Consulting Pty Ltd.
Consulting Engineers ACN 003 696 446
Level 1, 8 Windmill Street
Walsh Bay, Sydney NSW 2000
Tel: (02) 9251-7699 Fax: (02) 9241-3731
email: mail@costinroe.com.au ©

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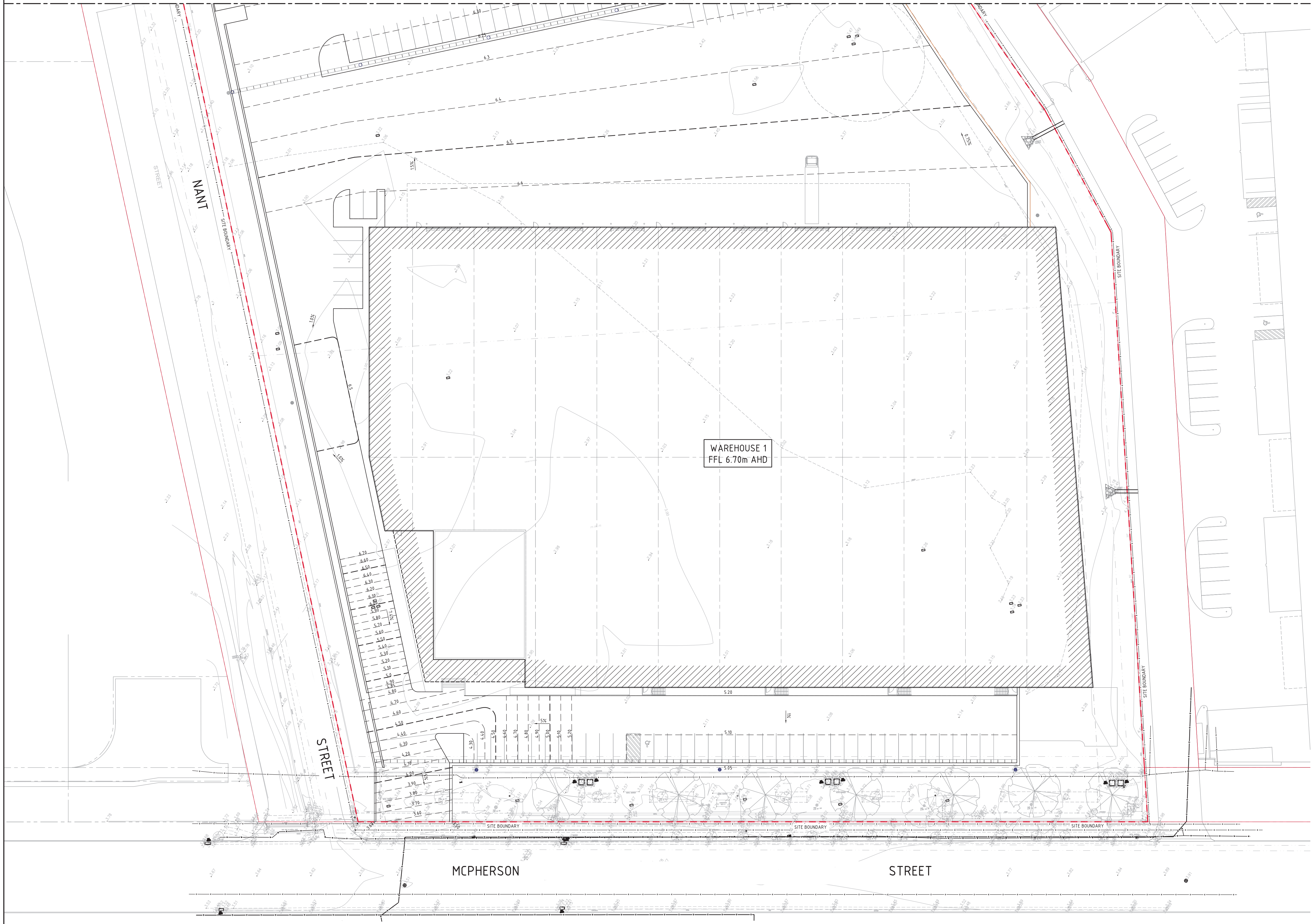
DRAWING TITLE: STORMWATER DRAINAGE DETAILS-SHEET 1

DRAWING No 9349.12-DA45 ISSUE B

REFER TO DRG. DA52 (SHEET 2) FOR CONTINUATION



FINISHED LEVELS PLAN SHEET 1
1:250

LEGEND:

LEVELS DATUM IS AHD.

EXISTING SITE LEVELS AND DETAILS BASED ON SURVEY INFORMATION TITLED PLANS SHOWING DETAIL AND PLAN LEVELS LOT 9 D.P 1205673 NO.28 MCPHERSON STREET BY RYGATE SURVEYORS DATED 30.10.18

- DP – ROOFWATER DOWNPIPE (INDICATIVE)
- +6.00 – FINISHED LEVEL SPOT LEVEL
- +6.70 – EXISTING SPOT HEIGHT
- 1% – PAVEMENT FALL DIRECTION AND GRADE
- GRATED DRAIN
- VERTICAL DROPPER
- DRAIN TO EXISTING BASIN
- 50.00 – FINISHED PAVEMENT CONTOUR (MAJOR) 0.5m INTERVALS
- 50.10 – FINISHED PAVEMENT CONTOUR (MINOR)

NOTE:

REFER TO DRAWING C09349.12-DA10 FOR FINISHED LEVELS NOTES.

2m 0 5 10 15 20 25m
SCALE 1:250 AT A1 SIZE PLOT

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AMENDMENTS	DATE	ISSUE
ISSUED FOR INFORMATION ONLY	30.01.19	B
ISSUED FOR INFORMATION ONLY	30.11.18	A

ARCHITECT: axis

CLIENT: DBL Property Pty Limited
Development Managers and Property Advisors
Suite 2, Upper Ground Floor
437 Kent Street
Sydney NSW 2000
P 61 2 8278 7662
M 61 0419 696 408
E jlord@dblproperty.com W www.dblproperty.com

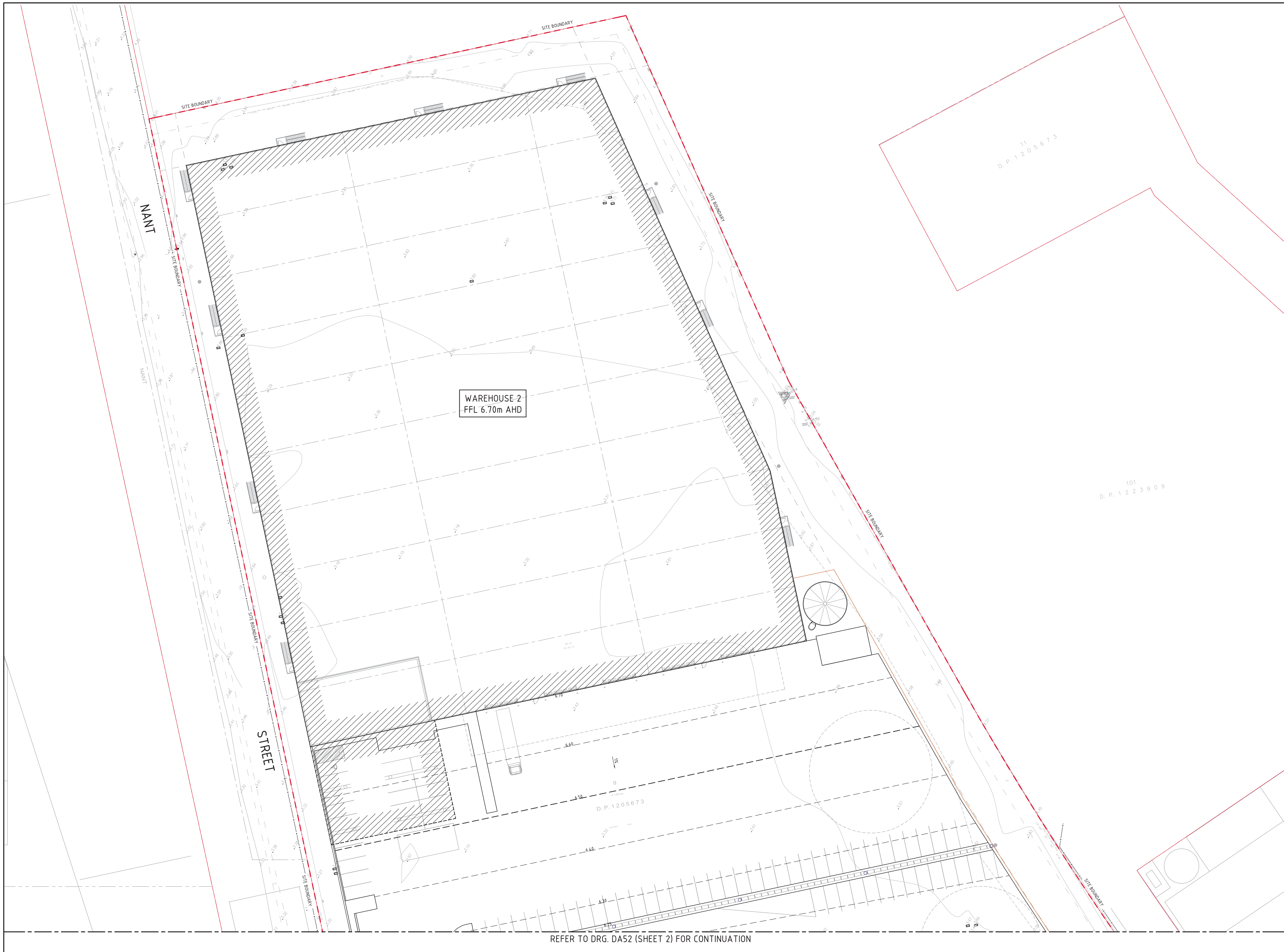
PROJECT: PROPOSED WAREHOUSE
DISTRIBUTION AND OFFICE DEVELOPMENT
28 MCPHERSON ST,BANKSMEADOW NSW

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
MW	SM	NOV '18	XC	A0	AS SHOWN	9349.12-DA51

Costin Roe Consulting Pty Ltd.
Consulting Engineers ACN 003 696 446
Level 1, 8 Windmill Street
Walsh Bay, Sydney NSW 2000
Tel: (02) 9251-7699 Fax: (02) 9241-3731
email: mail@costinroe.com.au ©

Costin Roe Consulting
PRECISION | COMMUNICATION | ACCOUNTABILITY

DRAWING TITLE: FINISHED LEVELS PLAN SHEET 1
DRAWING No: 9349.12-DA 51
ISSUE: B



FINISHED LEVELS PLAN SHEET 2
1:250

LEGEND:

LEVELS DATUM IS AHD.

EXISTING SITE LEVELS AND DETAILS BASED ON SURVEY INFORMATION TITLED PLANS SHOWING DETAIL AND PLAN LEVELS LOT 9 D.P 1205673 NO.28 MCPHERSON STREET BY RYGATE SURVEYORS DATED 30.10.18

- ROOFWATER DOWNPIPE (INDICATIVE)
- FINISHED LEVEL SPOT LEVEL
- EXISTING SPOT HEIGHT
- PAVEMENT FALL DIRECTION AND GRADE
- GRATED DRAIN
- VERTICAL DROPPER
- DRAIN TO EXISTING BASIN
- FINISHED PAVEMENT CONTOUR (MAJOR) 0.5m INTERVALS
- FINISHED PAVEMENT CONTOUR (MINOR)

NOTE:

REFER TO DRAWING C09349.12-DA10 FOR FINISHED LEVELS NOTES.

SCALE 1:250 AT A1 SIZE PLOT

FOR INFORMATION ONLY

AMENDMENTS	DATE	ISSUE
ISSUED FOR INFORMATION ONLY	30.01.19	B
ISSUED FOR INFORMATION ONLY	30.11.18	A

ARCHITECT: axis

CLIENT: DBL Property Pty Limited — Development Managers and Property Advisors

PROJECT: PROPOSED WAREHOUSE
DISTRIBUTION AND OFFICE DEVELOPMENT
28 MCPHERSON ST, BANKSMEADOW NSW

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
MW	SM	NOV '18	XC	A0	AS SHOWN	9349.12-DA52

Costin Roe Consulting Pty Ltd.
Consulting Engineers
Level 1, 8 Windmill Street
Walsh Bay, Sydney NSW 2000
Tel: (02) 9251-7699 Fax: (02) 9241-3731
email: mail@costinroe.com.au ©

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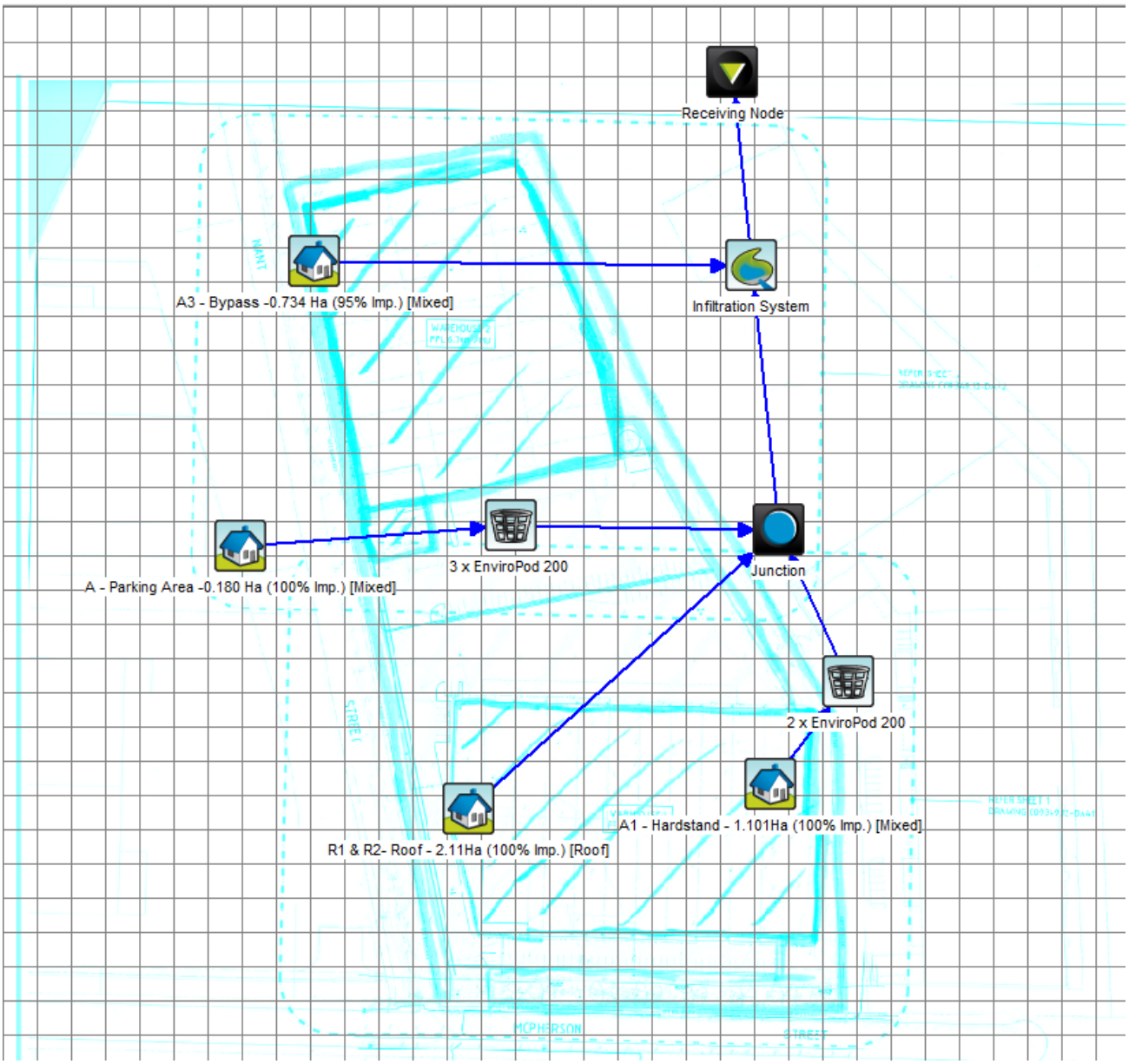
DRAWING TITLE: FINISHED LEVELS PLAN SHEET 2
DRAWING No: 9349.12-DA52 ISSUE: B

Appendix B

MUSIC MODEL CONFIGURATION



Appendix C

DIAL BEFORE YOU DIG INFORMATION (DBYD)

A3

Volatile Chlorinated Hydrocarbons and
Semi-volatile Chlorinated Hydrocarbons
in Groundwater and Soil.
t propertyenvironmental@sydneywater.com.au
or 8849 5155 for details

16-20
109
1
101
28B
LOT 1
1
Goods
Line
NANT
ST
LOT 2
2
Position Subject to Final SubD
6
75 PE
75 PE
Horizontal Directional Drilling
90 PE with 180 PE Encasing Pipe
150 DICL
75 PE
75 PE
63 PE
150 DICL
150 DICL
McPHERSON
ST
12
1
9-13
2
9-13
28A
100
28B
11
2
LOT 2
2
LOT 3
3
34
A
3
1
3
Goods

DBYD Address:
28 McPherson Street
Banksmeadow NSW 2019

DBYD Job No: 15580712

DBYD Sequence No: 79206753

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

SYDNEY WATER CORPORATION

Scale: 1:1500

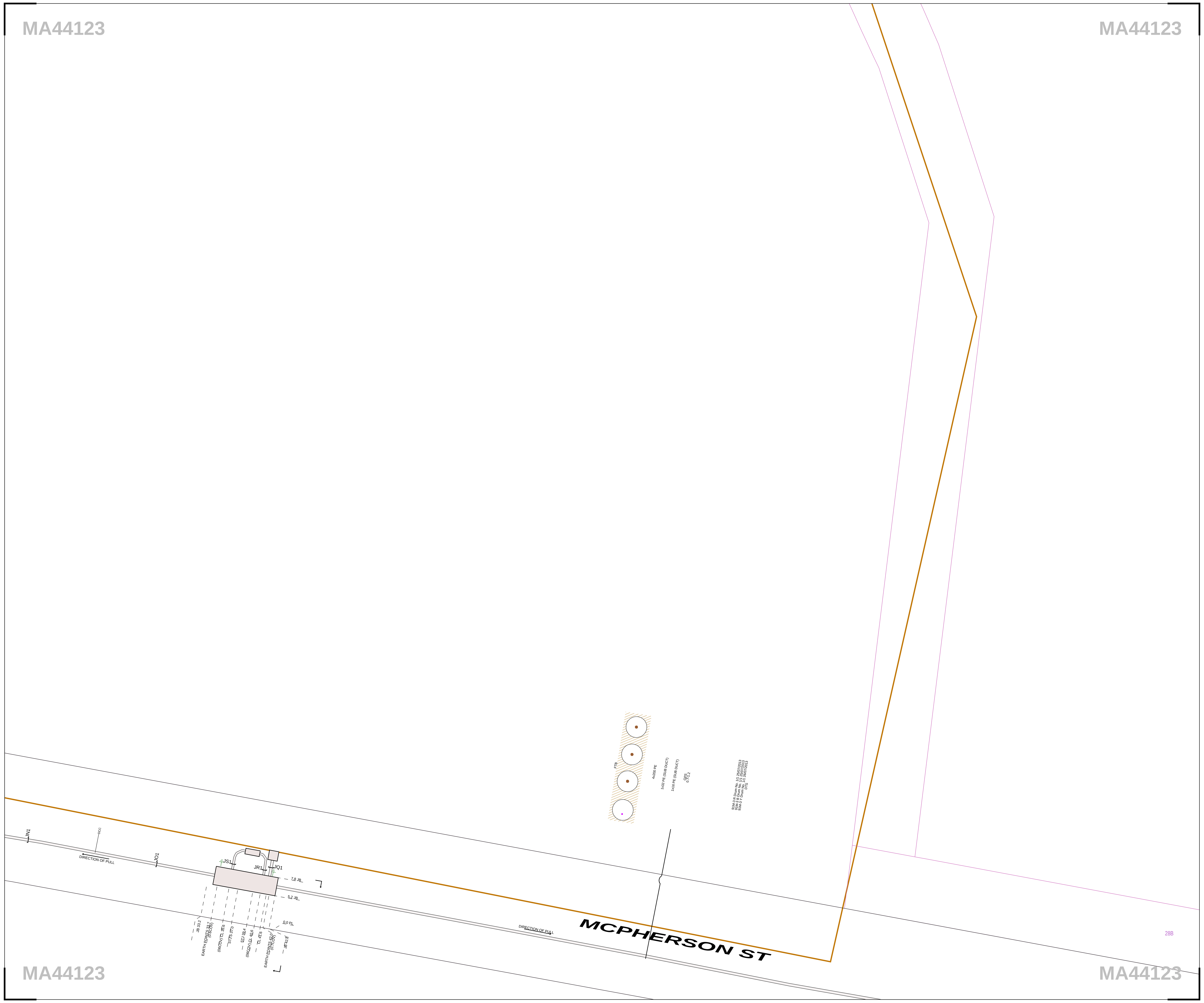
Date of Production: 15/01/2019

Plan 1 of 1

N

0m 7m 14m 21m 28m

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



WARNING

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

MA42334	MA42343	MA42344	ISG GRID
MA44112	MA44121	MA44122	
MA44114	MA44123	MA44124	
276G16	276H16	276J16	GRID
296G1	296H1	296J1	
296G2	296H2	296J2	

MA44123GMLA0

Transmission - 79206750

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

15 Jan 2019

Page 1 of 1

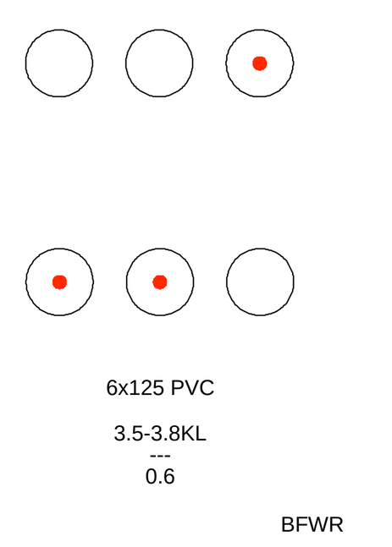
1:251

0 — 15 metres

N

Ausgrid

MA441 - BM1



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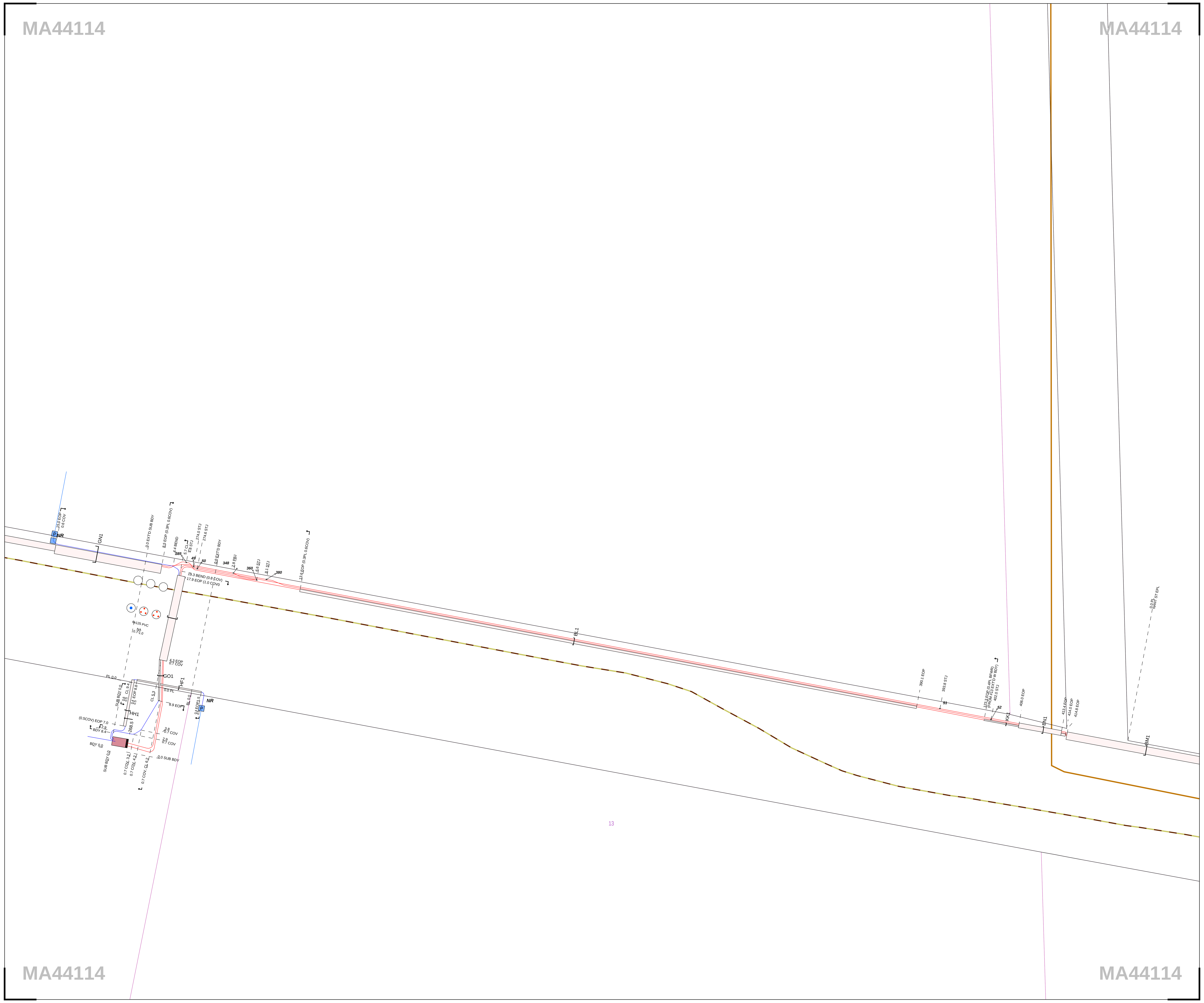

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ISG GRID

MA42334	MA42343	MA42344
MA44112	MA44121	MA44122
MA44114	MA44123	MA44124

GRID

276G16	276H16	276J16
296G1	296H1	296J1
296G2	296H2	296J2

MA44114GMLA0

Distribution - 79206750

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

15 Jan 2019

Page 1 of 1

1:251

0 — 15 metres

N

Ausgrid

A0 MOCS_std_plot

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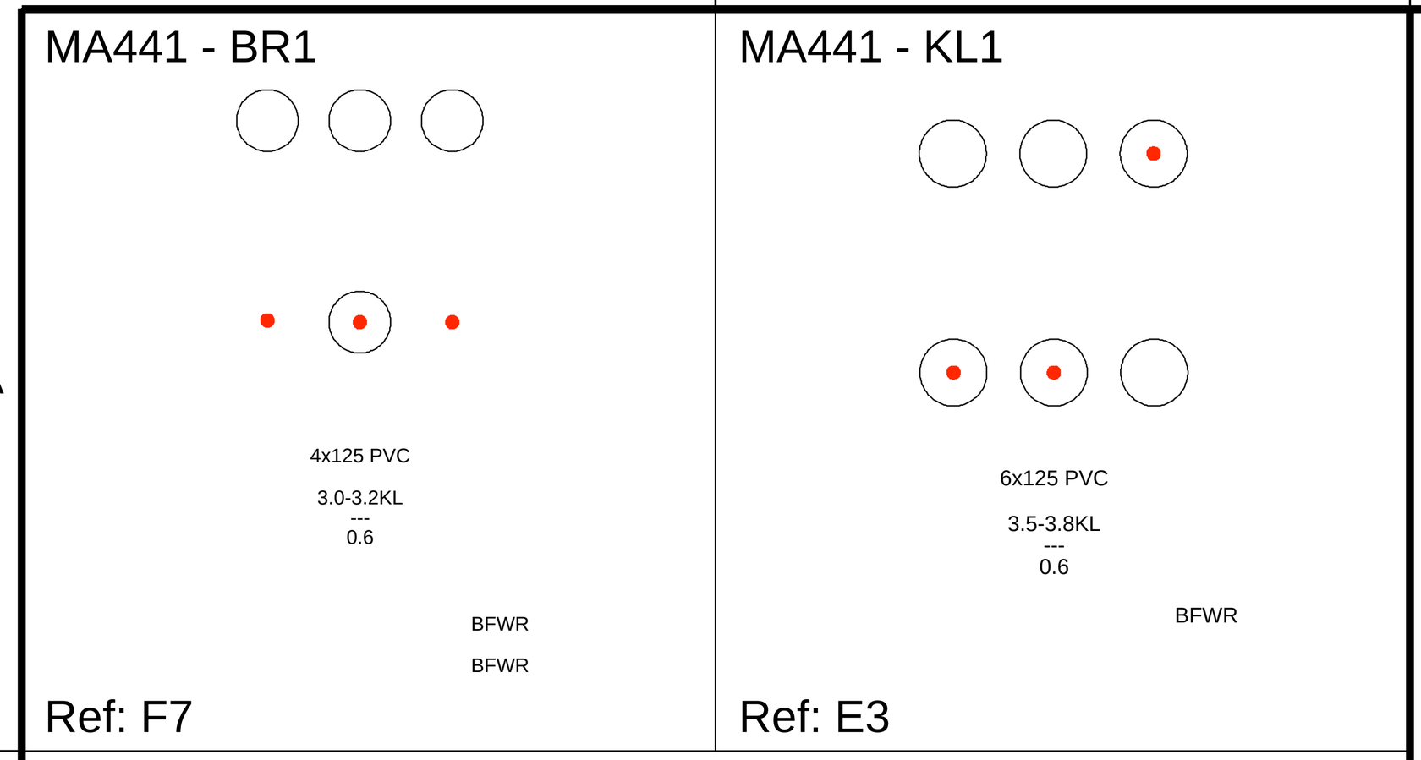

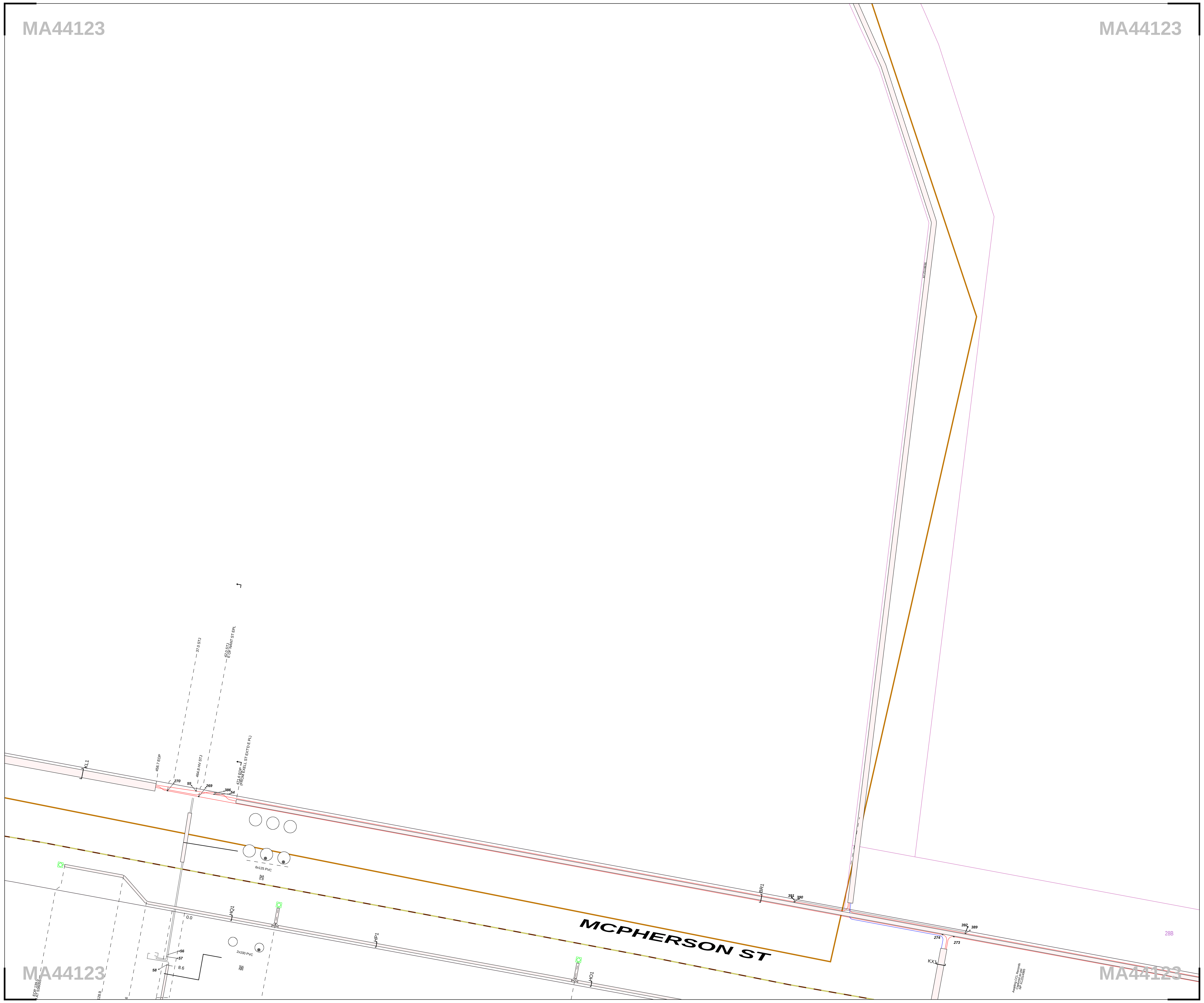

JOINT DETAIL REPORT

Map: MA441

No.	Bk-Pg	Pl/Cvr	Joint Location
54	2112-25	/0.50	5.9E OF CP E EXTN & 3.2N OF KERB
55	2112-25	/0.60	0.9E OF CP E EXTN & 2.8N OF KERB
269	ES09-0018		42 E MANT St E PL
270	ES09-0018		37 E MANT St
386	ES17-0095	/0.60	
390	ES17-0453	/0.60	AS PER GPS LOCATION
391	ES17-0453		AS PER GPS LOCATION

WARNING

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ISG GRID

MA42334	MA42343	MA42344
MA44112	MA44121	MA44122
MA44114	MA44123	MA44124

GRID

276G16	276H16	276J16
296G1	296H1	296J1
296G2	296H2	296J2

MA44123GMLA0

Distribution - 79206750

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

15 Jan 2019

Page 1 of 1

1:251

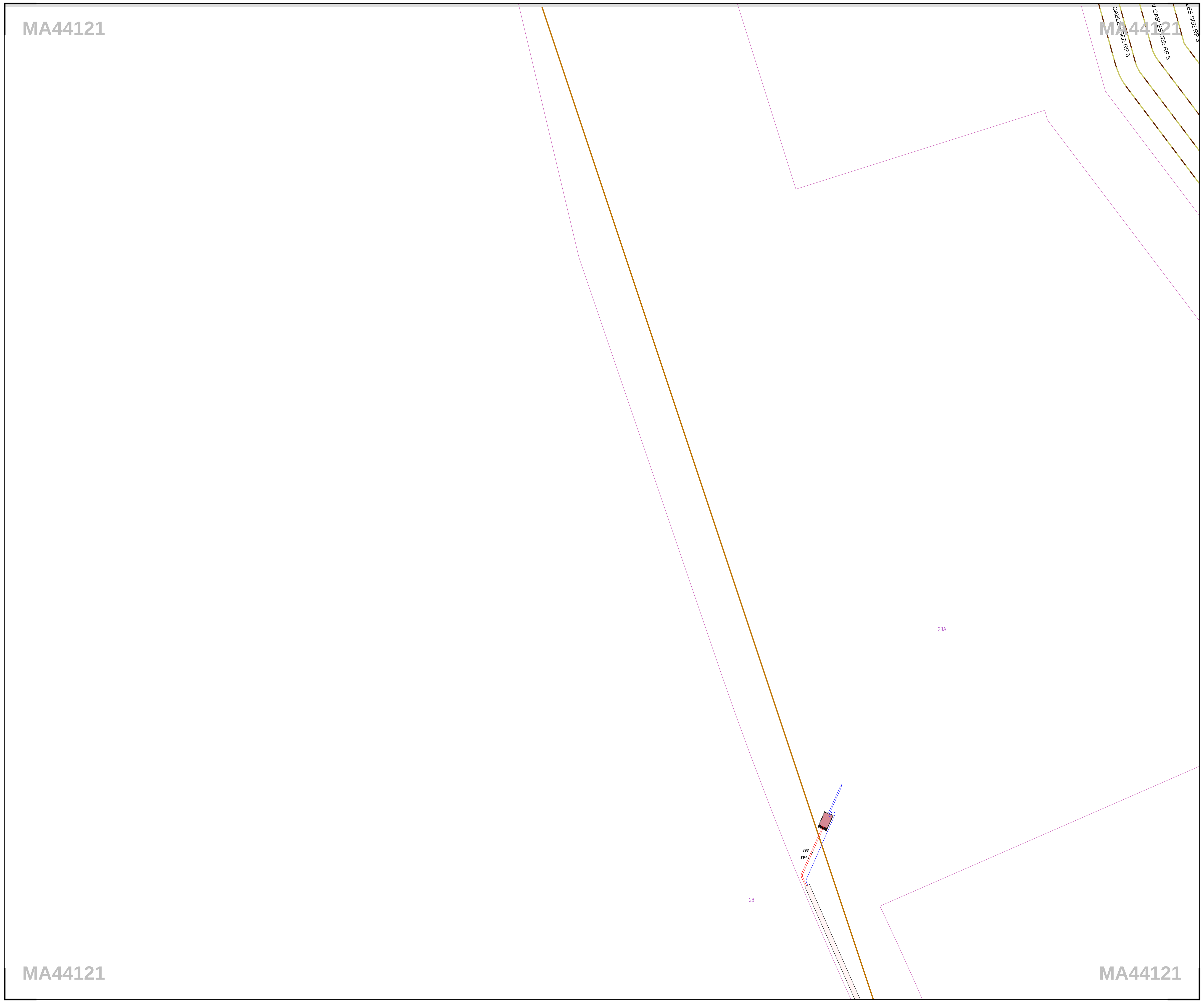
0 — 15 metres

N

Ausgrid

A0 MOCS_std_plot

E_79206750_MA44123GMLA0_1.hpgl2



JOINT DETAIL REPORT

No.	Bk-Pg	Pl/Cvr	Joint Location
Map: MA441			
393			CAPTURED AS PER NP
394			CAPTURED AS PER NP

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ISG GRID

MA42334	MA42343	MA42344
MA44112	MA44121	MA44122
MA44114	MA44123	MA44124

GRID

276G15	276H15	276J15
276G16	276H16	276J16
296G1	296H1	296J1

MA44121GMLA0

Distribution - 79206750

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

15 Jan 2019

Page 1 of 1

N

1:251

0 **15 metres**

Ausgrid

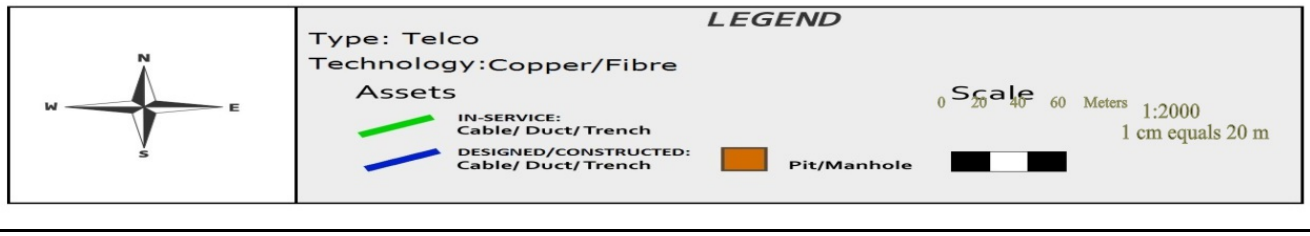
Indicative Plans

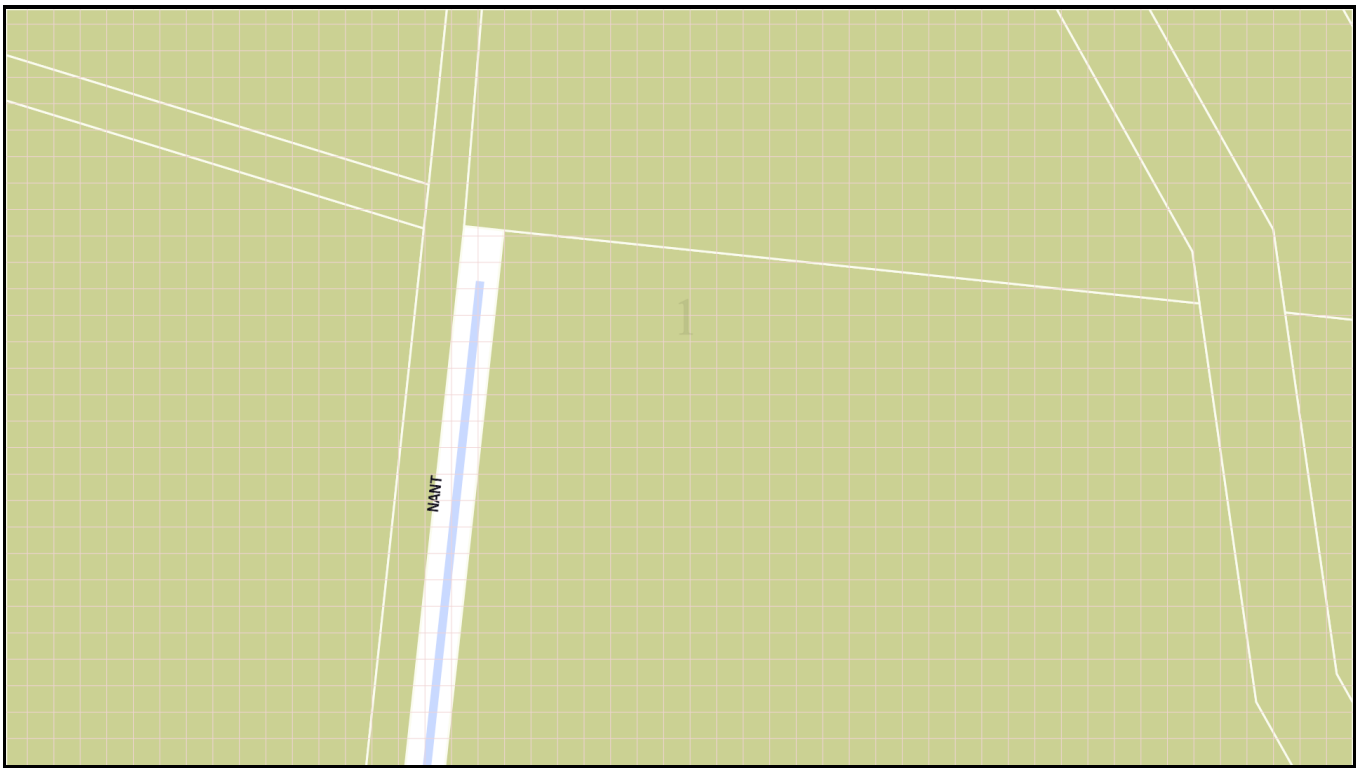
Issue Date:	15/01/2019
Location:	28 McPherson Street , Banksmeadow , NSW , 2019

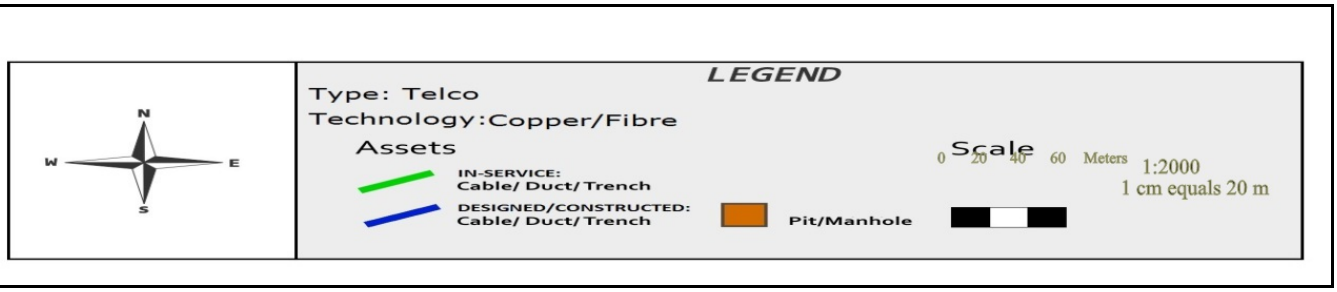
1

2

3

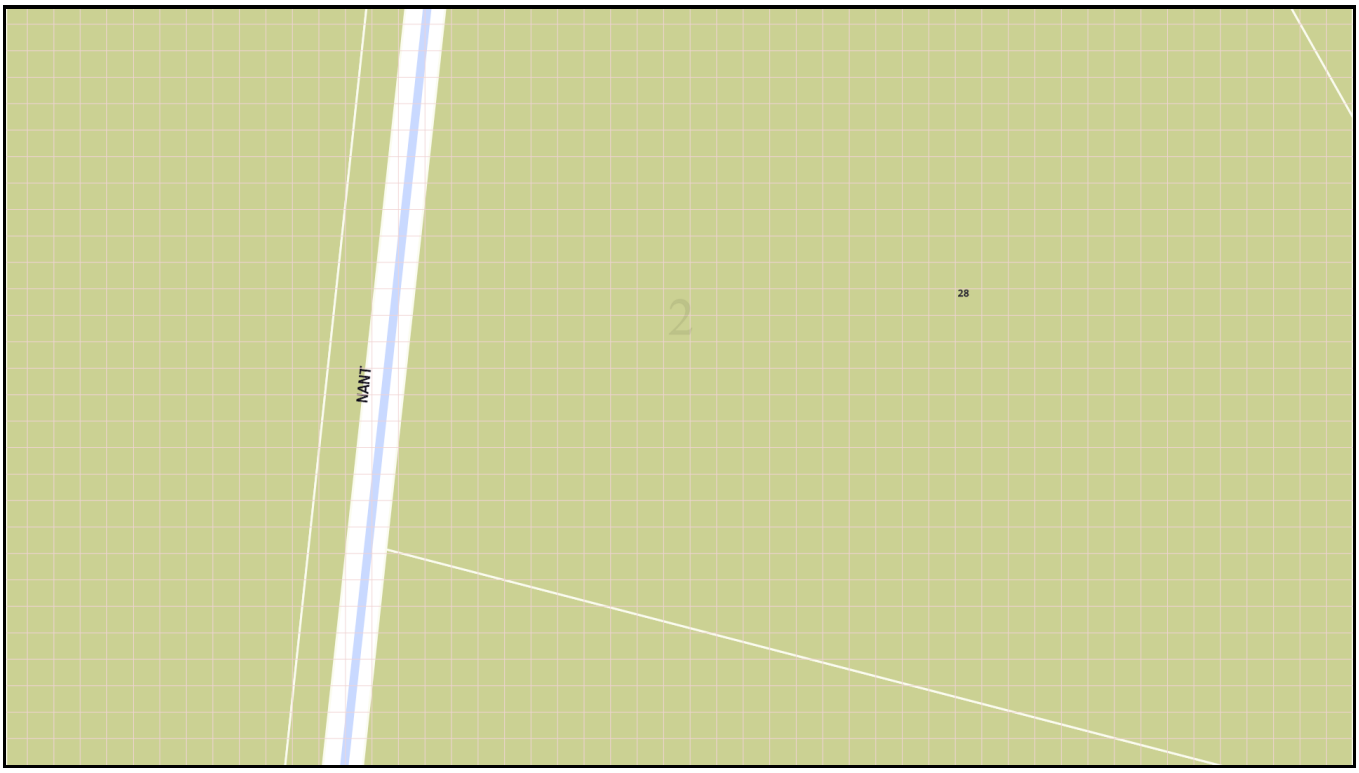


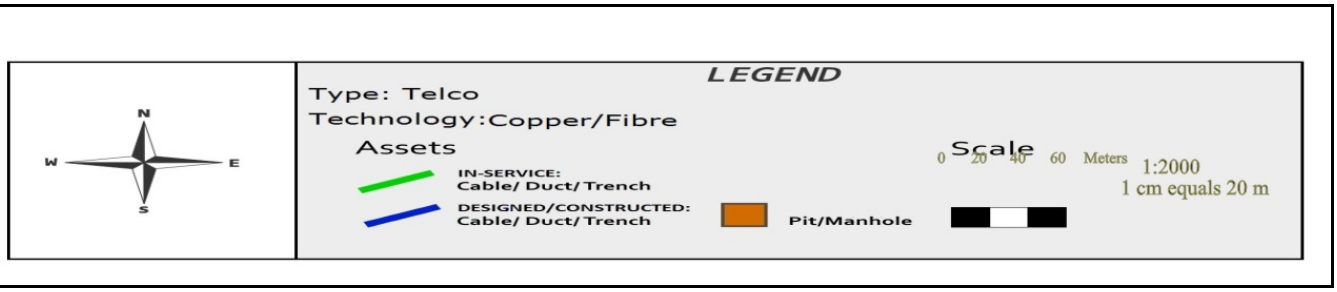




Level 11, 100 Arthur Street, North Sydney NSW 2060

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





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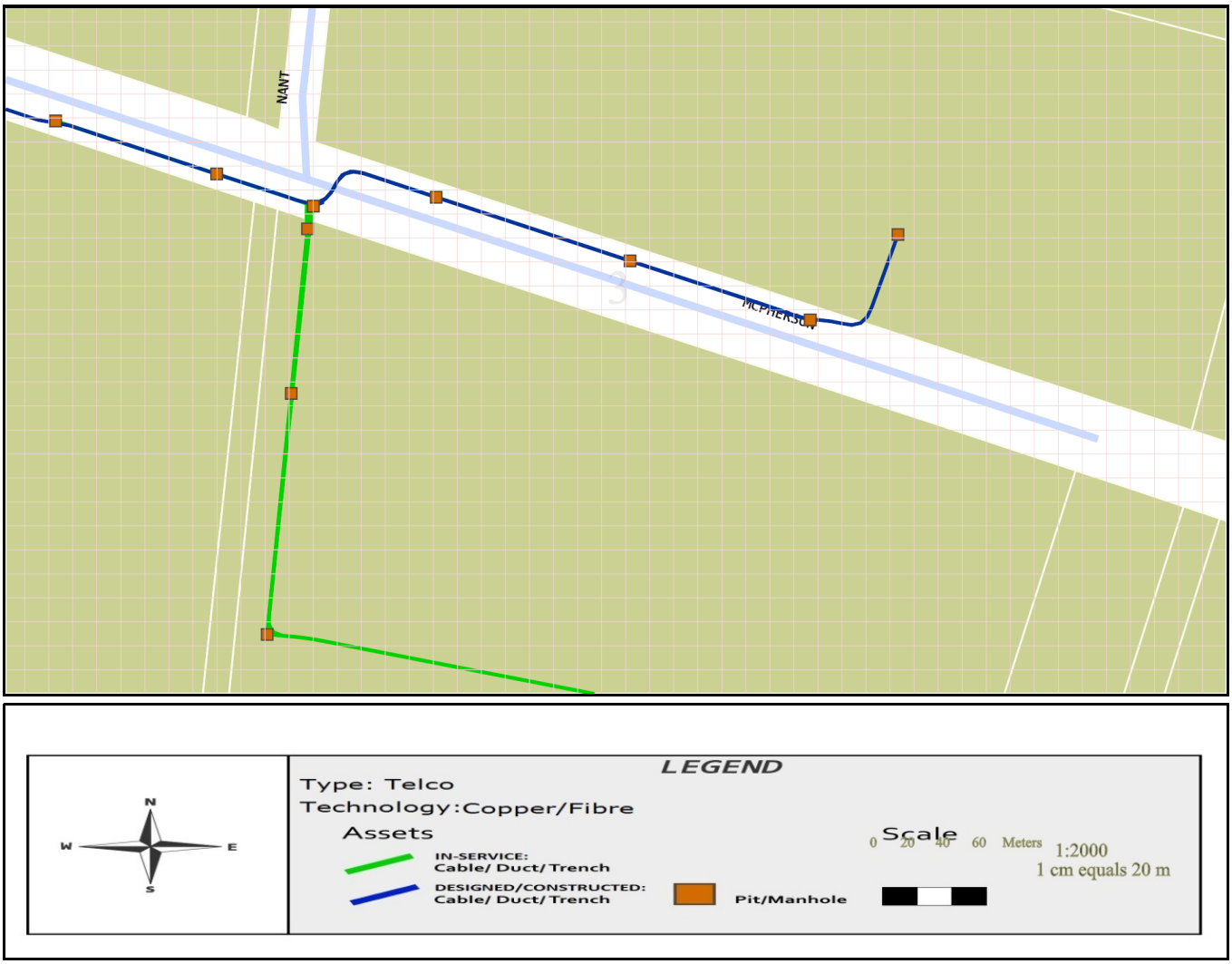
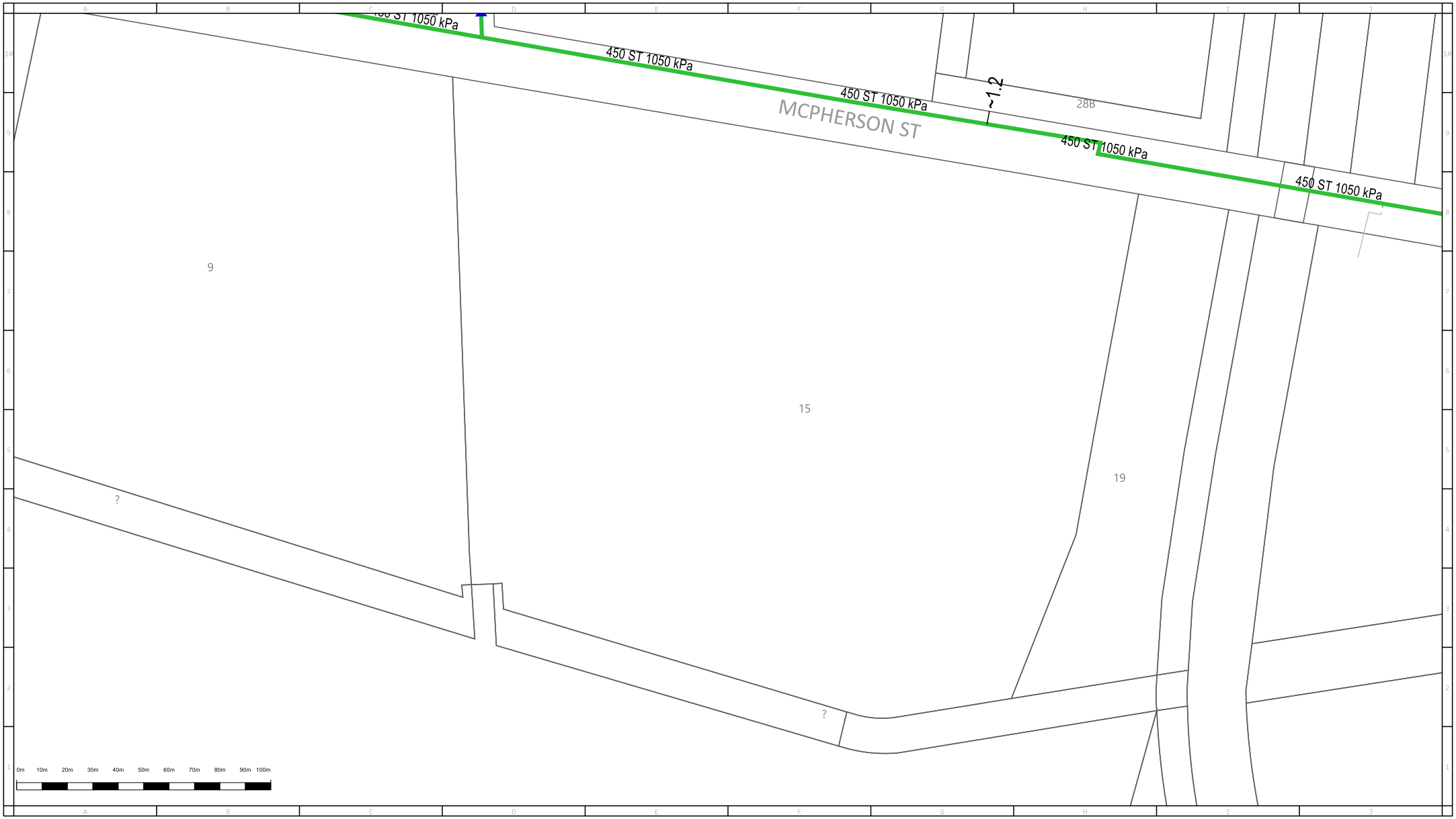


Emergency Contacts

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

DBYD Authority: Jemena Gas Networks (NSW)

DBYD Location: 28 McPherson Street Banksmeadow NSW, 2019



Jemena
ABN 87 003 004 322

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

Main	In Service	Proposed
Distribution - 210 kPa		
Distribution - 300 kPa		
Distribution - 400 kPa		

High Pressure Main & Pipeline	In Service	Proposed
Secondary - 1050 kPa		
Secondary Service		
Primary - 3500 kPa		
JGN Trunk - 7000 kPa		
Transmission		

Fittings, Valves & Regulators

Siphon

Valve

Distance in metres of Main from Boundary Line ~1.5

MBK = Metres Back of Kerb

MFL = Metres from Fence Line

Regulator Set

Regulator Station

Automatic Line Break Valve

N W E S

Scale: 1:2000

Issue Date: 15/01/2019

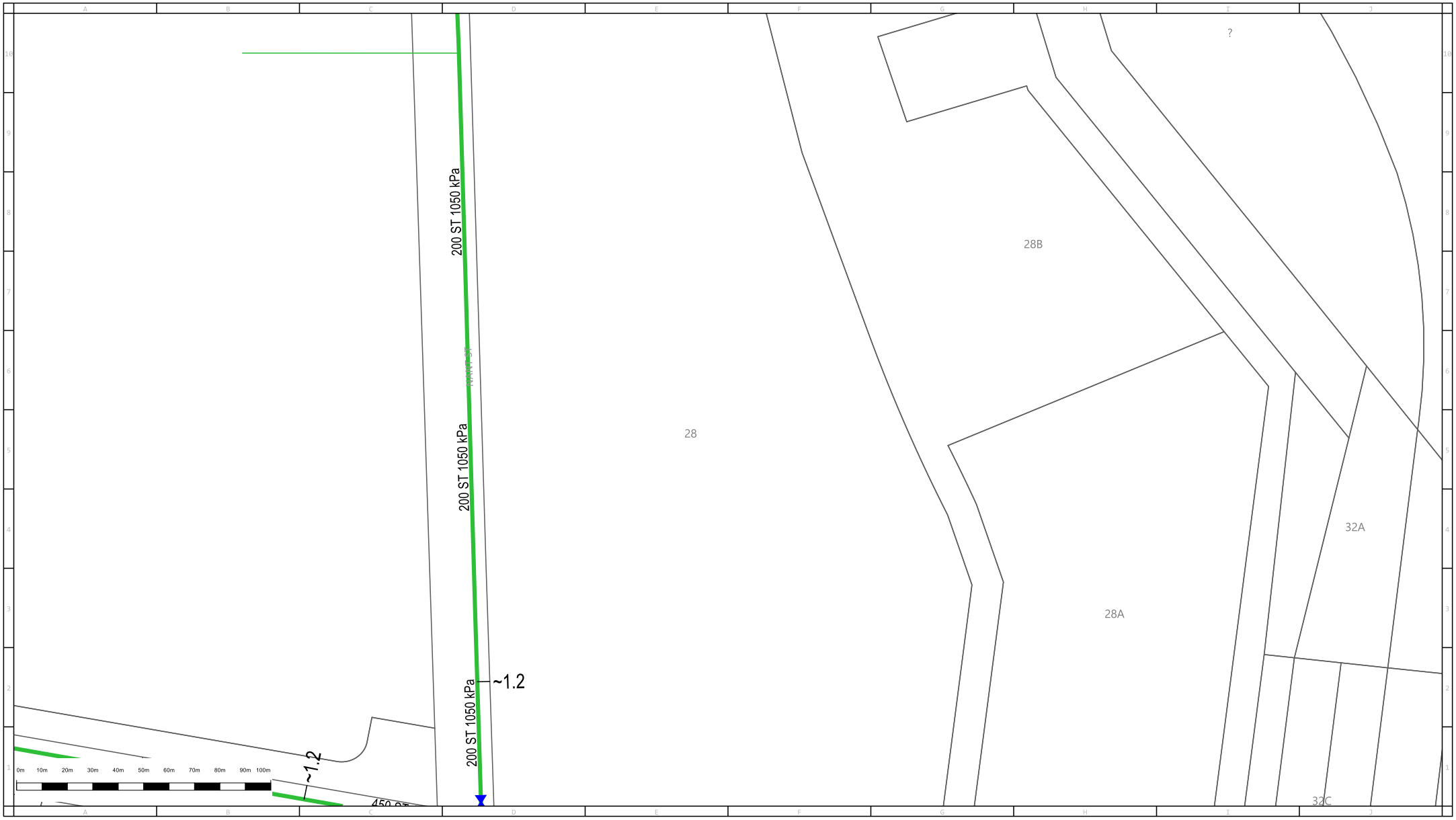
DBYD Seq No: 79206752

DBYD Job No: 15580712

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

DBYD Authority: Jemena Gas Networks (NSW)

DBYD Location: 28 McPherson Street Banksmeadow NSW, 2019



Jemena
ABN 87 003 004 322

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

Main	In Service	Proposed
Distribution - 210 kPa		
Distribution - 300 kPa		
Distribution - 400 kPa		

High Pressure Main & Pipeline	In Service	Proposed
Secondary - 1050 kPa		
Secondary Service		
Primary - 3500 kPa		
JGN Trunk - 7000 kPa		
Transmission		

Fittings, Valves & Regulators

Siphon
Valve
Distance in metres of Main from Boundary Line ~1.5
MBK = Metres Back of Kerb
MFL = Metres from Fence Line
Regulator Set
Regulator Station
Automatic Line Break Valve

N W E S

Scale: 1:2000

Issue Date: 15/01/2019
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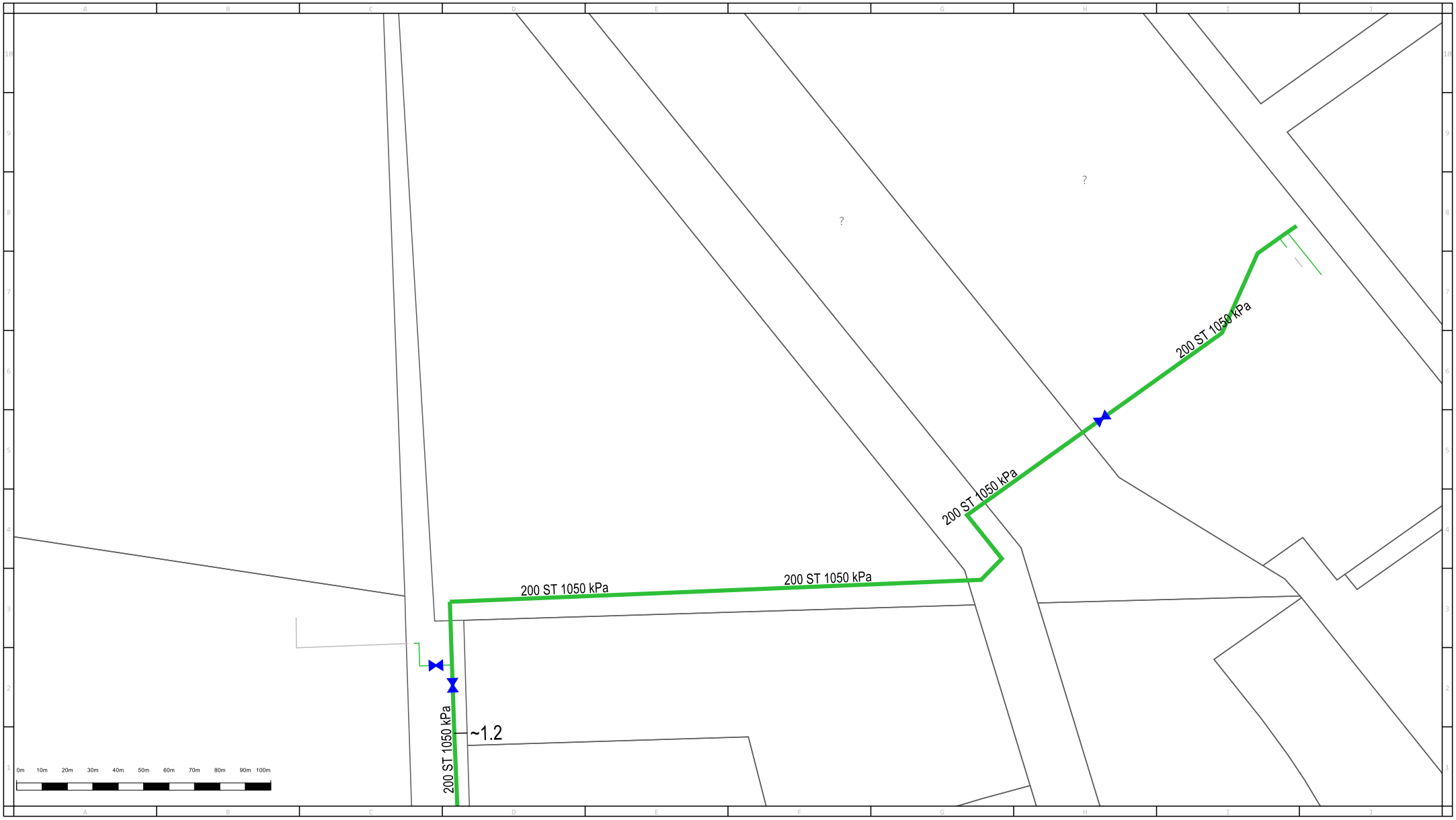

Jemena
ABN 87 003 004 322

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

Main	In Service	Proposed
Distribution - 210 kPa		
Distribution - 300 kPa		
Distribution - 400 kPa		

High Pressure Main & Pipeline	In Service	Proposed
Secondary - 1050 kPa		
Secondary Service		
Primary - 3500 kPa		
JGN Trunk - 7000 kPa		
Transmission		

Fittings, Valves & Regulators

Siphon

Valve

Distance in metres of Main from Boundary Line ~ 1.5

MBK = Metres Back of Kerb

MFL = Metres from Fence Line

Regulator Set

Regulator Station

Automatic Line Break Valve

N W E S

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