



Cabramatta East Precinct Development Remedial Action Plan

Moon Investments Pty Ltd

Report

JBS&G 65196 | 153,165

11 July 2023





We acknowledge the Traditional Custodians of Country throughout Australia and their connections to land, sea and community.

We pay respect to Elders past and present and in the spirit of reconciliation, we commit to working together for our shared future.

Caring for Country The Journey of JBS&G
Artist: Patrick Caruso, Eastern Arrernte



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Abbreviations

Term	Definition
AECs	Areas of Environmental Concern
ASS	Acid Sulfate Soils
ASTs	Above Ground Storage Tanks
BEL	Base Excavation Level
BGL	Below Ground Level
BGS	Below Ground Surface
BTEX	Benzene, Toluene, Ethylbenzene and Xylene
CEMP	Construction Environmental Management Plan
COPC	Contaminant of Potential Concern
CSM	Conceptual Site Model
DP	Deposited Plan
DQI	Data Quality Indicator
DQO	Data Quality Objective
DSI	Detailed Site Investigation
ENM	Excavated Natural Material
EPA	NSW Environment Protection Agency
ESD	Ecologically Sustainable Development
HIL	Health Investigation Level
HSL	Health Screening Level
JBS&G	JBS&G Australia Pty Ltd
NEPC	National Environment Protection Council
OCPs	Organochlorine Pesticides
PAHS	Polycyclic Aromatic Hydrocarbons
PARCCS	Precision, accuracy, representativeness, comparability, completeness and sensitivity
PCBs	Polychlorinated biphenyl
PSI	Preliminary Site Investigation
QA/QC	Quality Assurance/ Quality Control
RAP	Remedial Action Plan
RPD	Relative Percent Difference
SAS	Site Audit Statement
SWL	Standing Water Level
TRH	Total Recoverable Hydrocarbons
WHSP	Work, Health and Safety Plan
UF	Unexpected Finds
USTs	Underground Storage Tanks
VENM	Virgin Excavated Natural Material

Executive Summary

JBS&G Australia Pty Ltd (JBS&G) was engaged by Moon Investments Pty Ltd (the client) to produce a Remedial Action Plan (RAP) for land located at 76-86 Broomfield Street and 139 & 147-151 Cabramatta Road East, Cabramatta NSW (the site), legally identified as Lot 7 Section E in Deposited Plan (DP) 4420, Lots 1 & 2 DP 205759, Lot 10 DP 255023, Lots 5 to 8 DP 25618 and Lot 2 DP 580587. The combined total area of the site is approximately 0.8 hectares. The site location and layout are presented on **Figure 1** and **Figure 2**, respectively.

It is understood that the client proposes to redevelop the site by demolishing existing site structures to accommodate a mixed-use development comprising three towers with three levels of basement car parking across the site. The development will be undertaken in stages. The proposed redevelopment plans for the site are shown in **Appendix B**.

A Preliminary Site Investigation (PSI, JK Environments 2023¹), comprising a site inspection and desktop assessment, was previously completed for the site. The PSI report identified potential contamination sources and areas of environmental concern (AECs) for the site. The report recommended an intrusive detailed site investigation to confirm the suitability of the site for the proposed development.

A Detailed Site Investigation (DSI, JBS&G 2023²) comprising intrusive investigation including soil, groundwater and soil vapour sampling was undertaken. Concentrations of lead and zinc in fill soils; heavy metals in groundwater; and cis-1,2-dichloroethene in soil vapour detected above the adopted site criteria were not considered to pose risks to future on-site receptors. The DSI concluded that the site can be made suitable for the proposed mixed-use development including a multi-level basement across the footprint of the site with the preparation and implementation of a RAP for the removal and appropriate disposal of fill material from the site.

With consideration to the assessment of the established hierarchies for soil remediation options presented in **Section 5.3** and to the site-specific contaminants and proposed environmental setting, the preferred strategy for remediation is the excavation and offsite disposal to a licensed waste facility of the fill materials.

Subject to the successful implementation of the measures described in this RAP and subject to the limitations in **Section 12**, it is concluded that the site can be made suitable for the proposed mixed-use development including a multi-level basement across the footprint of the site as outlined in design plans in **Appendix B**.

¹ Preliminary Site Investigation (PSI), Proposed Cabramatta East Precinct Development, 76-86 Broomfield Street, 139 and 147-151 Cabramatta Road East, Cabramatta NSW. JK Environments Pty Ltd, dated 5 May 2023, ref: E35971PTTrpt (JK Environments 2023)

² Detailed Site Investigation, 76-86 Broomfield Street, 139 and 147-151 Cabramatta Road East, Cabramatta NSW. JBS&G Australia Pty Ltd, dated 22 June 2023, ref: 152 560 / 65196 (JBS&G 2023)

1. Introduction

1.1 Introduction and Background

JBS&G Australia Pty Ltd (JBS&G) was engaged by Moon Investments Pty Ltd (the client) to produce a Remedial Action Plan (RAP) for land located at 76-86 Broomfield Street and 139 & 147-151 Cabramatta Road East, Cabramatta NSW (the site), legally identified as Lot 7 Section E in Deposited Plan (DP) 4420, Lots 1 & 2 DP 205759, Lot 10 DP 255023, Lots 5 to 8 DP 25618 and Lot 2 DP 580587. The combined total area of the site is approximately 0.8 hectares. The site location and layout are presented on **Figure 1** and **Figure 2**, respectively.

It is understood that the client proposes to redevelop the site by demolishing existing site structures to accommodate a mixed-use development comprising three towers with three levels of basement car parking across the site. The development will be undertaken in stages. The proposed redevelopment plans for the site are shown in **Appendix B**.

A Preliminary Site Investigation (PSI, JK Environments 2023³), comprising a site inspection and desktop assessment, was previously completed for the site. The PSI report identified potential contamination sources and areas of environmental concern (AECs) for the site. The report recommended an intrusive detailed site investigation to confirm the suitability of the site for the proposed development.

A Detailed Site Investigation (DSI, JBS&G 2023⁴) comprising intrusive investigation including soil, groundwater and soil vapour sampling was undertaken. Concentrations of lead and zinc in fill soils; heavy metals in groundwater; and cis-1,2-dichloroethene in soil vapour detected above the adopted site criteria were not considered to pose risks to future on-site receptors. The DSI concluded that the site can be made suitable for the proposed mixed-use development including a multi-level basement across the footprint of the site with the preparation and implementation of a RAP for the removal and appropriate disposal of fill material from the site.

This RAP has been prepared with reference to relevant guidelines made or approved by the NSW Environment Protection Authority (EPA) inclusive of NEPC (2013) and the requirements of *State Environmental Planning Policy (Resilience and Hazards) 2021*.

1.2 Objectives

The objectives of this RAP are to:

- Define the extent of remedial works required for the proposed redevelopment to remove the potential contamination risks for the proposed development such that the site can be made suitable for the intended mixed land use, consistent with the requirements of Chapter 4 Remediation of Land of *State Environmental Planning Policy (Resilience and Hazards) 2021*;
- Establish a framework and methodologies to validate the removal of site contamination as identified as posing a potential risk; and
- Include provision for management of environmental and safety risks during the implementation of the remedial works, and guidance for the any requirements of ongoing management of impacted materials retained on the site.

³ Preliminary Site Investigation (PSI), Proposed Cabramatta East Precinct Development, 76-86 Broomfield Street, 139 and 147-151 Cabramatta Road East, Cabramatta NSW. JK Environments Pty Ltd, dated 5 May 2023, ref: E35971PTTrpt (JK Environments 2023)

⁴ Detailed Site Investigation, 76-86 Broomfield Street, 139 and 147-151 Cabramatta Road East, Cabramatta NSW. JBS&G Australia Pty Ltd, dated 22 June 2023, ref: 152 560 / 65196 (JBS&G 2023)

2. Site Condition & Setting

2.1 Site Identification

The site location is shown on **Figure 1**. The site layout and associated cadastral boundaries are shown on **Figure 2**. The site details are summarised in **Table 2.1** and described in detail in the following sections.

Table 2.1 Site Identification

Lot / DP Number	Lot 7 Section E in DP 4420, Lots 1 & 2 DP 205759, Lot 10 DP 255023, Lots 5 to 8 DP 25618 and Lot 2 DP 580587
Street Address	76-86 Broomfield Street and 139 & 147-151 Cabramatta Road East, Cabramatta NSW
Local Government Authority	Fairfield City Council
Site Area	Approximately 0.8 hectares
Current Zoning	MU1: Mixed Use under <i>Fairfield Local Environmental Plan 2013</i>
Geographic Coordinates (approximate centre of site) (GDA94-MGA56)	E: 309490 N: 6247611
Previous Land Use	Residential, agricultural and commercial
Current Land Use	Commercial (retail, offices, restaurant, pub)
Proposed Land Use	Mixed use commercial and residential

2.2 Site Description

A detailed site inspection was completed by an appropriately qualified and experienced JBS&G environmental consultant on 11 July 2022. Access was limited to areas external to the buildings.

The site is an irregular shaped block of land comprising commercial properties and carpark spaces, accessed via Broomfield Street (entry) and Cabramatta Road East (exit). Multiple commercial buildings occupy the site and current uses of the site are summarised in **Table 2.2**.

Table 2.2 Summary of Current Site Uses

Lot	Address	Current Use
Lot 7 Section E DP4420	76 Broomfield Street	Three-storey building used as tutoring offices.
Lot 1 DP205759	84 Broomfield Street	Single - two storey structure being utilised as the Stardust Hotel and Restaurant.
Lot 2 DP205759	86 Broomfield Street	Single - two storey structure being utilised as a locksmith.
Lot 5 DP25618	151 Cabramatta Road East	Two storey structure being utilised by an accountant.
Lot 6 DP25618	151 Cabramatta Road East	Two storey structure being utilised by a real estate agent.
Lot 7 DP25618	151 Cabramatta Road East	Two storey structure being utilised by a butcher.
Lot 8 DP25618	147-149 Cabramatta Road East	Two storey structures that were vacant and a carpark at the rear.
Lot 2 DP580587	139 Cabramatta Road East	Single storey building utilised as a pharmacy.
Lot 10 DP255023	84 Broomfield Street	Carpark with three 20-foot containers were located, one to the east and two in the northwest.

All buildings were generally of brick and concrete construction, and potentially comprise hazardous building materials. The site surface comprised a combination of building footprint, concrete and asphalt, with surface drainage serviced by stormwater drains.

2.3 Surrounding Landuse

The land uses surrounding the site have been identified as follows:

- North – the site is bound by a residential property, Seventh-Day Adventist Church, multi-storey carpark and apartment blocks, and low density residential properties further beyond;
- East – the site is bound by apartment blocks, commercial shops, Cabramatta Anglican Church, Macedonian Orthodox Church St Nikola and low density residential properties further beyond;
- South – the site is bound by Cabramatta Road East, commercial buildings, apartment blocks and low density residential properties further beyond; and
- West – the site is bound by Broomfield Street, Cabramatta Train Station/ railway line and commercial shops beyond.

2.4 Natural Site Setting

The environmental setting of the site as informed by site observations and the PSI (JK Environments 2023) is presented in **Table 2.3**.

Table 2.3 Site Setting Summary

Environmental Aspect	Characteristics
Topography	The site is generally flat, with a very gentle slope towards the north. Parts of the site may have been levelled to accommodate the existing development.
Geology & Soil	The site is underlain by Bringelly Shale of the Wianamatta Group, which typically consists of shale, carbonaceous claystone, claystone, laminite, fine to medium grained lithic sandstone, rare coal and tuff. The site is located within the Blacktown soil landscape. Blacktown soils are characterised by moderate erodibility with some higher local occurrences, low dispersity and localised areas of moderate salinity.
Hydrology	Surface water bodies were not identified in the immediate vicinity of the site. The closest surface water body is Orphan School Creek located approximately 1km, down-gradient, to the north of the site.
Hydrogeology	A total of 55 groundwater bores are registered within 2 km of the site. In summary: • The nearest registered bore located approximately 930 m from the site is listed as being utilised for monitoring purposes; • The majority of the bores are registered for monitoring purposes; • The closest bores registered for domestic or irrigation uses are listed as 1,125 m from the site; and • The drillers log information from the closest registered bores typically identified fill and/or clay soil to depths of 5.5-14 m, underlain by shale bedrock. A standing water level (SWL) was only recorded in one bore, at 3.7m below ground level (m bgl). Subsurface conditions at the site are likely to consist of relatively low permeability (residual) soils overlying shallow bedrock. The potential for viable groundwater abstraction and use of groundwater under these conditions is considered to be low. There is a reticulated water supply in the area and consumption of groundwater is not expected to occur. Groundwater flow direction is anticipated to be towards the north based on local topography and surface water features.

Acid Sulfate Soils (ASS)	The site is not located in an identified ASS risk area.
Salinity	The site is located within a region identified as being of moderate salinity potential. The moderate classification is attributed to scattered areas of scalding and indicator vegetation, in areas where salinity concentrations have not been mapped. Saline areas may occur in this zone, which have not been identified or may occur if risk factors change adversely.

2.5 Summary of Site Historical Records Review

A summary of the review of site historical records as outlined in the PSI (JK Environments 2023) is presented in **Table 2.4**.

Table 2.4 Site Historical Records Summary

Information Source	Details
EPA and Department of Defence Databases	NSW EPA and Department of Defence databases did not return any results on records in relation to contamination on-site. Results for sites within 1 km of the site did not identify any off-site sources of contamination for the site.
Australian and NSW Heritage Registers	No results returned on-site.
Section 10.7 Planning Certificate	A summary of the relevant details from the section 10.7 (2 and 5) planning certificates for the site is as follows: - The land is not deemed to be significantly contaminated; subject to a management order; subject of an approved voluntary management proposal; or subject to an on-going management order under the provisions of the CLM Act 1997. - The land is not the subject of a Site Audit Statement (SAS). - The land is not located within an acid sulfate soil risk area. - The land is not located in a heritage conservation area. - Department of Infrastructure, Planning and Natural Resources map at the 1:100,000 scale '<i>Salinity Potential in Western Sydney 2002</i>' indicates there is potential for salinity in the region.
Aerial Photographs	1930: Several residential-type structures were visible on the Broomfield Street frontage properties, at 76-86 Broomfield Street. The lot in the east of the site and lots to the south of the site appeared to be vacant and grassed. 1943: A commercial-type building was now visible on 147-149 Cabramatta Road East. 1955/56: A commercial type building was visible at the northern end of 151 Broomfield Street. This building extended out of the site to the north. Several additional outbuildings were also visible at the rear of No. 139 and 147-149 Cabramatta Road East. 1961: Construction and clearing was occurring at the site. 1965: Development completed on 84-86 Broomfield Street (consistent with current day). 1970: An extension of the building located at 151 Cabramatta Road East (consistent with current day). 1982: Building replaced at 76 Broomfield Street (consistent with current day). A commercial type building was now present at 139 Cabramatta Road East. 1986-present: Site remains relatively unchanged.
Historical Land Titles	Between 1924 and the present day, the properties comprising the site have been owned by various individuals, including a depot manager, motor mechanic, builders, labourers, picture theatre proprietors, newspaper proprietors, newsagents, medical practitioners, and an orchardist. Between 1959 and the present day, the properties have been owned by private companies.

SafeWork NSW Dangerous Goods Records	Licences for the storage of dangerous goods including underground fuel storage tanks (USTs), above ground storage tanks (ASTs) or chemicals were not identified for the site.
Historical Business Directory	A motor garage/service station was registered at the site at no. 82 or 84-86 Broomfield Street between 1948 and 1972. Between 1950 and 1990, four dry cleaners and two motor garages/service stations were registered at locations between 10 and 200 m from the site. The above businesses are considered to be potential on-site and off-site sources of contamination.

3. Previous Site Investigations

3.1 Preliminary Site Investigation (JK Environments 2023)

A Preliminary Site Investigation (JK Environments 2023) was completed for the site in May 2023 to identify past or present potentially contaminating activities impacting the site and assess the need for further investigation. Review of available site background and historical information, and a site inspection were undertaken and a conceptual site model developed.

The PSI concluded there is potential for site contamination from the following potential sources / AECs:

- Fill material;
- Historical motor mechanic activities;
- Potential historical agricultural use;
- Use of pesticides;
- Hazardous building materials (former and existing buildings); and
- Off-site dry cleaning and motor garage/service station sites.

Intrusive investigation of the site was recommended to establish the contamination status of the site, suitability for the proposed development and any requirement for remediation. Other investigations including a hazardous building materials survey prior to demolition of buildings; waste classification of material proposed to be excavated; and salinity investigations were also recommended to be undertaken.

3.2 Detailed Site Investigation (JBS&G 2023)

A Detailed Site Investigation (DSI, JBS&G 2023) was completed for the site in June 2023 to determine the contamination status of the site with regard to the proposed mixed-use high-density development. An intrusive investigation including soil, groundwater and soil vapour sampling was undertaken at the site. The investigation addressed the areas of environmental concern as outlined in the PSI (JK Environments 2023), **Table 3.1** provides a summary of the investigation approach.

Table 3.1 Summary of Investigation Approach

Areas of Environmental Concern	Justification	Number of Samples		
		Soil	Groundwater	Soil Vapour
Potential for contaminated fill through import of material during levelling activities to achieve the existing levels, hazardous building material from historic demolition works and/or historical agricultural landuse.	Samples were placed across the site within accessible locations to assess the site wide fill.	10 locations	-	-
Historical mechanics workshop (title identified a part of the site was owner by a motor mechanic)	Sample locations in the vicinity of 84 Broomfield Street where the mechanics was potentially located.	-	1 location	3 locations
Historical Offsite Dry cleaners	Sample locations surrounding the southeast boundary, area of site closest to the former dry cleaners.	2 locations	2 locations	5 locations

Samples were analysed for relevant contaminants of potential concern:

- Soil samples were analysed for heavy metals, total recoverable hydrocarbons (TRH), polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyl (PCBs), organochlorine pesticides (OCPs), volatile organic compounds (VOCs), PFAS and asbestos;
- Groundwater samples were analysed for heavy metals, TRH, VOCs, PAH, PFAS; and
- Soil vapour samples were analysed for VOCs and TRH.

Based on the results of the DSI undertaken at the site, the following were concluded:

- Concentrations of lead and zinc were detected in fill soil (maximum depth of 0.4 m below ground level) above the adopted health criteria and ecological criterion, respectively;
- Concentrations of copper, nickel and zinc were reported in groundwater above the adopted ANZG (2018) marine water 95% species protection guideline values are typical of urban environments and likely to be associated with regional groundwater conditions;
- The detection of cis-1,2-dichloroethene above the adopted site criteria in soil vapour at one location indicates there is potential for some migration of impact from a neighbouring former dry cleaning operation however, the single isolated occurrence does not pose a risk to on-site receptors as source material will be removed as part of the proposed site development.
- There are no issues relating to background soil concentrations that require further consideration;
- There are no aesthetic issues;
- The results do not indicate any potential migration of contaminants off the site; and
- Under the proposed development plans which includes the excavation of a multi-level basement across the footprint of the site, there are no unacceptable risks posed to future on-site receptors.

On the basis of the above, the DSI concluded that the site can be made suitable for the proposed mixed-use development including a multi-level basement across the footprint of the site as outlined in the design plans, with the development and implementation of a RAP to document the removal and appropriate disposal of fill material from across the site.

The development of an Unexpected Finds Protocol was also recommended to manage the potential presence of asbestos which may be encountered during development works but may not have been detected as part of the site investigation.

The figures from the DSI are included within the RAP. The analytical summary tables from the DSI are presented in **Appendix A**.

4. Conceptual Site Model

Based on the findings of the DSI (JBS&G 2023) the following pre-remediation conceptual site model (CSM) has been developed for the site.

4.1 Contamination Sources and Contaminants of Potential Concern

Based on the findings of the previous site investigations, the sources of contamination and associated contaminants of potential concern (COPC) have been identified and are summarised in **Table 4.1**.

Table 4.1 Contamination Sources and Contaminants of Potential Concern

Contamination Source	Potentially Affected Media	COPC
Fill imported from various sources used during levelling activities to achieve the existing site levels	Soil Groundwater	Heavy Metals
Historical dry cleaner located upgradient of site	Soil vapour	VOCs

4.2 Potential for Migration

The potential for contaminants to migrate is a combination of:

- The nature of the contaminants (solid/liquid and mobility characteristics);
- The extent of the contaminants (isolated or widespread);
- The location of the contaminants (surface soils or at depth); and
- The site topography, geology, hydrology and hydrogeology.

Contaminants generally migrate from a site via a combination of windblown dusts, rainwater infiltration, groundwater migration and surface water runoff.

4.3 Potential Receptors and Exposure Pathways

Potential receptors and exposure pathways to the contamination identified within the site under the proposed future development include:

- Current and future site users/visitors who may potentially be exposed to COPCs through direct contact with or ingestion of impacted soils and/or inhalation of vapours (volatile compounds) associated with impacted soils;
- Excavation/construction/maintenance workers conducting activities at the site, who may potentially be exposed to COPCs through direct contact with impacted soils present within excavations and/or inhalation of vapours associated with impacted soils;
- Ecological receptors include fauna and flora species within the landscaped areas of the site, and aquatic ecology within the receiving waters of Orphan School Creek; and
- Existing and/or future users/occupants of and/or workers at adjoining properties should contamination migrate from the site.

The site will be covered by concrete and building footprints, presenting no potential ecological receptors.

4.4 Preferential Pathways

For the purpose of this assessment, preferential pathways have been defined as natural and/or man-made pathways that result in the preferential migration of COPC as either via waters or vapours.

Man-made preferential pathways are likely present throughout the site, generally associated with areas of previously disturbed natural ground present beneath the existing ground surface, including areas where underground services have been installed. Depending upon fill soil characteristics, fill materials and disturbed natural soil are anticipated to have a higher permeability than the underlying natural soils and/or bedrock.

5. Remedial Strategy

5.1 Remedial Goal

The goal for the remediation of identified environmental impact is to:

- Remove or manage potentially unacceptable risks to human health from identified contamination at the site;
- Remove or manage potentially unacceptable ecological risks from identified contamination at the site;
- Ensure any unexpected contamination finds are assessed, managed and validated appropriately for the proposed land use;
- Validate the remedial works in accordance with the relevant NSW EPA guidelines and with reference to the site-specific validation assessment criteria; and
- Document the validation process; and
- Undertake remedial works in a manner that best complies with the principles of ecologically sustainable development (ESD).

5.2 Extent of Remediation

Based on the site investigations as summarised in **Section 3**, and subject to the limitations listed in **Section 11**, the fill materials underlying the site were observed to be generally heterogeneous in nature. The concentrations of lead and zinc in soil reported above the adopted site criteria were identified in fill soil at a maximum depth of 0.4 m below ground level.

The proposed redevelopment of the site (**Appendix B**) requires the bulk excavation and off-site disposal of soil materials (fill and natural) to facilitate the multi-level basement construction across the footprint of the site. As such, the remediation of identified contaminated soils at the site is considered to be ancillary to construction activities.

5.3 Assessment of Remediation Options

The National Environmental Protection Measure (NEPC 2013) preferred hierarchy for soil remediation and management as adopted by NSW EPA (EPA 2017) is as follows:

- *On-site treatment of the contamination so that it is either destroyed or the associated risk is reduced to an acceptable level;*
or,
- *Off-site treatment of excavated soil so that the contaminant is destroyed, or the associated risk is reduced to an acceptable level, after which the soil is returned to the site; or*
If the above are not practicable,
- *Consolidation and isolation of the soil on site by containment with a properly designed barrier;*
or,
- *Removal of contaminated material to an approved facility, followed, where necessary, by replacement with appropriate material;*
or,
- *Where the assessment indicates remediation would have no net environmental benefit or would have a net adverse environmental effect, implementation of an appropriate management strategy.*

Based on the proposed development works involving soil materials within the basement footprint being excavated and disposed of from the site, an assessment of potential remediation options applicable to identified site contamination is provided in **Table 3.1**.

Table 5.1: Remediation Options Assessment Matrix

Remedial Option	Applicability	Assessment
1. On-site Treatment (so that the contaminants are either destroyed or the associated hazards are reduced to an acceptable level)	Impacted soil treated by chemical immobilisation of identified heavy metals would be disposed of off-site to meet development requirements.	Not a Suitable Option
2. Off-site Treatment (so that the contaminants are either destroyed or the associated hazards are reduced to an acceptable level, after which the soil is returned to the site)	As fill is to be disposed of offsite this is not a suitable approach.	Not a Suitable Option
3. On-site in situ management of the soil by physical separation, and ongoing management.	Due to the shallow nature of groundwater (approximately 2.5 m bgs), and consideration of the proposed construction requirements, there is minimal space available for the relocation of impacted materials to other parts of the site.	Not a Suitable Option
4. Excavation and Off-site Removal of Impacted Material.	There are currently suitably licensed waste facilities in the Sydney Metropolitan region capable of accepting the identified contaminants within fill materials. With consideration to the proposed redevelopment scheme and the extent of excavation required to facilitate the construction of the basement, the sources of the identified impacts in fill and soil vapour will be removed. This option is considered to be viable.	Preferred Option

5.4 Preferred Remedial Strategy

With consideration to the assessment of the established hierarchies for soil remediation options presented in **Section 5.3** and to the site-specific contaminants and proposed environmental setting, the preferred strategy for remediation is as follows:

- Material within the basement footprint: Fill materials will be excavated and disposed off-site to a licensed waste facility.

The proposed implementation of the remediation approach is described in **Section 6**.

6. Remedial Scope of Works

6.1 Site Establishment

All safety and environmental controls are to be implemented as the first stage of remediation works, as outlined in **Section 9.2**. It is anticipated that all remedial works will be undertaken concurrently with demolition and development excavation works at the site, and will include, but not necessarily be limited to:

- Locate and isolate all required utilities in the proximity of the works;
- Assess need for traffic controls;
- Work area security fencing;
- Site signage and contact numbers;
- Sediment fencing (attached to security fencing); and
- Stormwater runoff sediment controls (hay bales).

6.2 Excavation and Off-site Removal of Site Fill Materials

The site fill materials will be excavated and disposed offsite to facilitate the basement construction.

Where excavation of fill material is required across the site to achieve construction sub-grade levels, the installation of services, etc; this material is proposed to be managed via off-site disposal to an appropriately licensed facility. Following identification of the location and extent of material to be removed, a review of the existing data will be completed to identify whether a waste classification based on existing available data may be prepared for the material, or alternatively additional sampling and laboratory analysis will be implemented to appropriately characterise the material prior to off-site disposal.

All materials requiring offsite disposal will require to be assessed in accordance with the *Waste Classification Guidelines, Part 1: Classifying Waste* (NSW EPA 2014) and be disposed at a facility lawfully able to accept such wastes.

The material will be excavated under the supervision of the Remediation Consultant with appropriate training, licences and experience, under the supervision of an appropriately experienced environmental consultant. The material stockpiled on hardstand/durable plastic, placed in a skip bin or alternatively directly loaded onto a haulage vehicle for off-site disposal. The material will be removed from site under a waste classification as per EPA guidance for disposal to a facility lawfully able to accept the material.

6.3 Validation

Validation of the remedial works will be conducted by the Environmental Consultant to demonstrate the remediation objectives have been achieved. Details of the validation program are provided in **Section 6**.

6.4 Site Disestablishment

On completion of the remediation works all plant / equipment and safety / environmental controls shall be removed from the site by the appointed Remediation Contractor. All equipment used during remediation works will need to be appropriately decontaminated or disposed of as waste by the Remediation Contractor, in accordance with relevant waste regulations.

7. Validation Plan

7.1 Overview

Validation data is required to be collected to verify the effectiveness of the remedial works and document the final site conditions as being suitable for the proposed future use(s).

The following sections establish the DQOs to be adopted during validation of the site remediation works.

7.2 State the Problem

Previous investigations (**Section 3**) have identified the presence of impacted site fill materials that represent a potential environmental and human health risk, and thus require remediation / management for the site to be considered suitable for the mixed-use development.

During remediation activities, sufficient validation of site activities is required to demonstrate that the identified environmental and health-based risks to site users have been adequately managed to render the site suitable for the residential with garden/accessible soil land use.

7.2.1 Identify the Decision

The decisions which are required to be made for validation of the site are:

1. Have contaminated materials containing elevated concentrations of heavy metals been appropriately remediated and disposed from the site?
2. Have materials disposed from the site been appropriately classified and disposed from the site in accordance with the EPA (2014) Waste Classification Guidelines, Part 1: Classifying Waste and disposed of at facilities lawfully able to accept such waste?
3. Where unexpected finds were identified, has assessment of potential risks been undertaken in accordance with the RAP and any additional remediation and validation been completed in accordance with the RAP objectives?
4. Is the site suitable for the proposed use?

7.2.2 Identify Inputs to the Decision?

Inputs to the decisions are:

- Field observations in relation to inspection of excavated fill, excavation bases, walls and stockpiles for odours, sheen, discolouration, and other indicators of potential contamination.
- Soil characterisation/validation analysis data collected from the base and walls (where accessible or present) of remedial works area excavations.
- Waste classification and/or material characterisation data obtained during assessment of fill materials/soils.
- Materials tracking records.
- Importation assessment criteria.
- Disposal dockets and relevant documents in relation to appropriate disposal of material to be removed from site/site as part of the remediation works (landfill dockets, beneficial reuse/recycling dockets).
- Data quality indicators as assessed by quality assurance/quality control (QA/QC).

7.2.3 Define the Study Boundaries

The site is legally identified as Lot 7 Section E in DP 4420, Lots 1 & 2 DP 205759, Lot 10 DP 255023, Lots 5 to 8 DP 25618 and Lot 2 DP 580587 with a combined total area of approximately 0.8 hectares. The site location and layout are presented on **Figure 1** and **Figure 2**, respectively.

The vertical extent of the works will be the extent of fill across the site.

7.2.4 Develop a Decision Rule

The decision rules adopted to answer the decisions identified in **Table 6.1** below.

Table 7.1: Decision Rules

Decisions Required to be Made	Decision Rule
1. Have contaminated materials containing elevated concentrations of heavy metals been appropriately remediated and disposed from the site?	Following excavation and offsite disposal of fill materials from within the basement footprint, have natural materials been appropriately characterised in accordance with the sampling frequency outlined in Table 6.3 , and the analytical data indicates that the materials are suitable for the applicable residential with garden/accessible soil land use, then the answer is Yes . Otherwise, the decision is No .
2. Have materials disposed from the site been appropriately classified and disposed from the site in accordance with the EPA (2014) Waste Classification Guidelines, Part 1: Classifying Waste and disposed of at facilities lawfully able to accept such waste?	Excess soil/materials requiring off-site disposal are required to be classified in accordance with applicable EPA guidelines, immobilisation approvals and exemption documents as approved by the NSW EPA. If fill materials have been classified in accordance with EPA (2014) and/or immobilisation approvals and exemption documents as approved by the NSW EPA and waste disposal dockets have been provided demonstrating lawful disposal, then the answer to the decision is Yes . Otherwise, the answer to the decision is No .
3. Where unexpected finds were identified, has assessment of potential risks been undertaken in accordance with the RAP and any additional remediation and validation been completed in accordance with the RAP objectives?	If unexpected finds have been suitably characterised such that determinations on the required remediation/management can be undertaken, and whether the implemented remediation actions have been suitably validation such that the unexpected find does not inhibit the ability to draw conclusions regarding site suitability, then the answer is Yes . Otherwise, the answer to the decision is No .
4. Is the site suitable for the proposed uses?	If all other decisions have been met the answer to the above is Yes . Otherwise, the answer to the decision is No .

7.2.5 Specify Limits of Decision Error

This step is to establish the decision maker's tolerable limits on decision errors, which are used to establish performance goals for limiting uncertainty in the data. Data generated during this project must be appropriate to allow decisions to be made with confidence.

Specific limits for this project have been adopted in accordance with the appropriate guidance from the NSW EPA, NEPC (2013), appropriate indicators of data quality (DQIs used to assess QA/QC) and standard JBS&G procedures for field sampling and handling.

To assess the usability of the data prior to making decisions, the data will be assessed against pre-determined DQIs for completeness, comparability, representativeness, precision and accuracy.

The pre-determined Data Quality Indicators (DQIs) established for the project are discussed below in relation to precision, accuracy, representativeness, comparability, completeness and sensitivity (PARCCS parameters), and are shown in **Table 6.2**.

- **Precision** - measures the reproducibility of measurements under a given set of conditions. The precision of the laboratory data and sampling techniques is assessed by calculating the Relative Percent Difference (RPD) of duplicate samples.
- **Accuracy** - measures the bias in a measurement system. The accuracy of the laboratory data that are generated during this study is a measure of the closeness of the analytical results obtained by a method to the 'true' value. Accuracy is assessed by reference to the analytical results of laboratory control samples, laboratory spikes and analyses against reference standards.
- **Representativeness** –expresses the degree which sample data accurately and precisely represent a characteristic of a population or an environmental condition. Representativeness is achieved by collecting samples on a representative basis across the site, and by using an adequate number of sample locations to characterise the site to the required accuracy.
- **Comparability** - expresses the confidence with which one data set can be compared with another. This is achieved through maintaining a level of consistency in techniques used to collect samples; ensuring analysing laboratories use consistent analysis techniques and reporting methods.
- **Completeness** – is defined as the percentage of measurements made which are judged to be valid measurements. The completeness goal is set at there being sufficient valid data generated during the study.
- **Sensitivity** – expresses the appropriateness of the chosen laboratory methods, including the limits of reporting, in producing reliable data in relation to the adopted criteria.

If any of the DQIs are not met, further assessment of the data set will be required in order to determine whether the non-conformance has significant effects on the usefulness of the data. Corrective action to correct an adverse impact on the reliability of the dataset may include, but is not limited to, the request of further information from samplers and/or analytical laboratories, downgrading of the quality of the data or alternatively, re-collection of the data.

Table 7.1 Data Quality Indicators

Data Quality Indicators	Frequency	Data Quality Criteria
Precision		
Field duplicate (intra laboratory)	1 / 20 samples/media	<50% RPD ¹
Field Triplicate (Inter laboratory)	1 / 20 samples/media	<50% RPD ¹
Laboratory Duplicates	1 / 20 samples/media	<50% RPD ¹
Accuracy		
Surrogate spikes	All organic samples	70-130% recovery
Laboratory control samples	1 per lab batch	70-130% recovery
Matrix spikes	1 per lab batch	70-130% recovery
Representativeness		
Sampling appropriate for media and analytes	All samples	.. ²
Samples extracted and analysed within holding times.	-	Soil: organics (14 days), inorganics (6 months) Groundwater: metals (6 months, other than mercury – 28 days), sVOCs (>C ₁₀ – 7 days), volatiles (C ₆ -C ₉ – 14 days) Soil vapour: sorbent tubes VOCs/TRH (28 days)
Laboratory blanks	1 per lab batch	<LOR

Trip spike	1 per lab batch	70-130% recovery
Trip blank	1 per lab batch	<LOR
Field blank (PFAS & Soil Vapour)	1 per sampling event/media	<LOR
Equipment/rinsate blank	1 per sampling event/media	<LOR
Comparability		
Standard operating procedures for sample collection & handling	All samples	All samples
Standard analytical methods used for all analyses	All samples	NATA accredited method
Consistent field conditions, sampling staff and laboratory analysis	All samples	All samples ²
Limits of reporting appropriate and consistent	All samples	All samples ²
Completeness		
Sample description and COCs completed and appropriate	All samples	All samples ²
Appropriate documentation	All samples	All samples ²
Satisfactory frequency and result for QC samples	All QA/QC samples	95% compliance
Data from critical samples is considered valid	-	Critical samples valid
Sensitivity		
Analytical methods and limits of recovery appropriate for media and adopted site assessment criteria	All samples	LOR ≤ site assessment criteria

¹ If the RPD between duplicates is greater than the pre-determined data quality indicator, a judgment will be made as to whether the excess is critical in relation to the validation of the data set or unacceptable sampling error is occurring in the field.

² A qualitative assessment of compliance with standard procedures and appropriate sample collection methods will be completed during the DQI compliance assessment.

7.2.6 Optimise the Design for Obtaining Data

The validation sampling design is summarised for each specific type of validation works as follows. The validation/characterisation sampling and analytical program for the site is outlined in **Table 6.3**.

Fill Materials (Within Basement Footprint)

With reference to the CSM (**Section 4**), only fill materials are expected to be contaminated. As such, the vertical extent of remediation within the basement footprint will be to natural materials, expected to be between 0.2 m and 1.5 m bgs within the site.

Validation sampling of natural materials at the base of the basement excavation following the removal of fill materials shall be completed at the frequency of one sample per 100 m² (i.e. 10m x 10m grid).

Soil samples shall be analysed for heavy metals. In addition, the field scientist will also be required to confirm via the collection of field collected data including observations of staining, odours, and PID readings to supplement the analytical validation data.

Materials Characterisation

VENM

VENM shall be as defined under the *Protection of the Environment Operations (POEO) Act 1997* and characterised by at least five samples per source site and one per 1,000 m³ being collected if more than 5,000 m³. Visual inspection is required.

ENM

Sampling and analysis are required to be undertaken as per the exemption. Asbestos analysis is also required for all ENM proposed to be imported to the site. Visual inspection is required.

Waste Classification

Materials required to be sampled for offsite disposal, pursuant to the *Waste Classification Guidelines, Part 1: Classifying Waste* (NSW EPA 2014) shall be sampled at an appropriate rate to characterise the materials prior to offsite disposal.

Sampling of materials as per the ENM exemption (or similar) requires to be undertaken in accordance with the exemption.

Sampling of site sourced materials as per a VENM classification will require the collection of at least 10 samples with one per 1,000 m³ being collected if more than 10,000 m³ has been removed.

Table 6.3: Validation Sample Plan

Validation Sample Type	Frequency	Analytes
Basement Excavation Fill/Natural Interface		
Base of Excavation	1 sample per 100 m ²	Heavy Metals
Material Importation		
VENM	If adequate source site documentation is available, then no sampling is required, beyond visual inspection when the material arrives to site. In the event that no chemical data is available, minimum of 5 samples per source site / material type to 5,000 m³ then 1 sample per 1,000 m³ thereafter.	Heavy Metals TRH/BTEX PAHs OCPs/PCBs Asbestos (500 mL)
Material under NSW EPA Resource Recovery Exemptions	1 per 70 m ³	Heavy Metals TRH/BTEX PAHs Asbestos (500 mL) In addition to suite as required by exemption

7.2.7 Soil Sampling Methodology

Sample Handling

During the collection of soil samples, features such as seepage, discolouration, staining, odours and other indications of contamination shall be noted on field reporting sheets/field logs.

Collected soil samples shall be immediately transferred to sample containers of appropriate composition (glass jars) fitted with Teflon sealed lids. Where asbestos analysis is required samples shall be collected and placed in new 500 mL zip lock bags. Sample labels shall record sample identification number and date and time of sampling. Sample containers shall be transferred to a chilled ice box for sample preservation prior to and

during shipment to the testing laboratory. A chain-of-custody form shall be completed and forwarded with the samples to the testing laboratory, containing the following information:

- Sample identification;
- Signature of sampler;
- Date of collection;
- Type of sample;
- Number and type of container;
- Inclusive dates of possession; and
- Signature of receiver.

Stockpile Soil Sampling Methodology

For stockpile sampling, if required, material will be obtained from a minimum depth of 300 mm below the surface of the stockpile at the time of sampling. Following each sample, non-disposable hand tools will be decontaminated. Where possible, disturbance to soils prior to sampling should be minimised so as to avoid the potential loss of volatile fractions from soils.

During the collection of soil samples, features such as seepage, discolouration, staining, odours and other indications of contamination will be noted on the field documentation and a PID will be used, as appropriate, to assess the potential occurrence of volatile compounds.

PID Screening

Should PID screening of soils be required, soil samples obtained for PID screening will be placed in a sealed plastic bag for approximately 5 minutes to equilibrate, prior to a PID being attached to the bag. Readings will then be monitored for a period of approximately 30 seconds or until values stabilise and the stabilise/highest reading will be recorded on the field sample forms. The PID will be calibrated prior to the commencement of field works and then check readings will be completed on a daily basis during the field program using suitable calibration gas. If required, the PID will be re-calibrated during the field program in accordance with manufacturer's instructions.

Field Duplicate and Triplicate Preparation

Field soil duplicate and triplicate samples for the validation assessment will be obtained during sampling using the procedures outlined above at a frequency of 1 in 20 primary samples for both field intra-laboratory duplicates and field inter-laboratory duplicates. The soil samples will be divided laterally into three samples with minimal disturbance to reduce the potential for loss of volatiles and placed in three clean glass jars and/or plastic bags. All jars will be filled with no headspace to reduce the potential for loss of volatiles and separately labelled as the primary, duplicate and triplicate samples before being placed in the same chilled esky for laboratory transport.

Decontamination of Sampling Equipment

The following procedure will be used to clean non-disposable equipment, including the trowel, prior to the collection of each sample:

- Scrubbing with a wire brush to remove excess material;
- Pressure spray with Decon 90 detergent and potable water mix;
- Pressure spray rinse with potable water; and
- Air drying.

Rinsate samples will be obtained during the field decontamination procedures at regular intervals during validation sampling activities that do not utilise disposable sample equipment. Each rinsate sample will be obtained by rinsing the trowel (or other equipment) with laboratory grade demineralised water following the decontamination procedure. The water sample will be appropriately preserved and stored with the site soil samples prior to and during transport to the laboratory for chemical analysis.

7.2.8 Laboratory Analysis

NATA accredited laboratories shall be used for all analysis of samples. Appropriate methods and LORs are required for comparison to relevant criteria.

7.3 Validation Criteria

7.3.1 Materials within Basement Footprint

Based on the proposed development scenario, concentrations of contaminants at the lateral and vertical extents of remedial excavations shall be compared against adopted criteria as follows:

- Human health investigation levels for heavy metals consistent with residential with garden/accessible soil land use, as per NEPC (2013) – (HIL-A).

The development will encompass a mixed-use where childcare centres are able to be developed, NEPC (2013⁵) land use Setting A for residential with garden/accessible soil and including childcare centres, preschools and primary schools is adopted.

Application of Soil Assessment Criteria

For soils to be considered as meeting the health/ecological based assessment criteria (i.e., not posing an unacceptable risk), the following criteria will be adopted:

Either:

- All contaminant concentrations were less than the adopted site assessment criteria,

Or:

- The upper 95% confidence limit on the average concentration for each analyte (calculated for samples collected from consistent soil horizons, stratigraphy or material types) was below the adopted criterion;
- No single analyte concentration exceeded 250% of the adopted criterion; and
- The standard deviation of the results was less than 50% of the criterion.

7.3.2 Material Characterisation for Off-site Disposal

All materials to be disposed off-site disposal shall be classified in accordance with EPA (2014) *Waste Classification Guidelines* or an appropriate exemption as created under the *Protection of the Environment Operations (Waste) Regulation 2014*.

Material will require to be removed to a facility lawfully able to receive it.

⁵ *National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013)*. National Environment Protection Council (NEPC 2013)

7.3.3 Imported Materials

In accordance with current EPA policy, only material that does not represent an environmental or health risk at the receiving site may be considered for resource recovery. Imported materials will only be accepted to the site if they meet the restrictions placed on these materials and meet the definition of:

- Virgin Excavated Natural Material (VENM) as defined in the *Protection of the Environment Operations Act (1997) Schedule 1*;
- Excavated Natural Material (ENM) as defined in EPA (2014); or
- Resource recovery materials as per an EPA exemption.

All material imported onto the site are required to be accompanied by appropriate documentation that has been verified by the appointed site contamination (environmental) consultant.

7.4 Validation Report

At the completion of site remediation works, a validation report will be prepared in general accordance with EPA (2020) *Guidelines for Consultants Reporting on Contaminated Site* (or as updated), documenting the works as completed.

This report will contain information including:

- Details of the remediation works conducted;
- Present all sampling field notes and laboratory data including calibration certificates for field monitoring equipment, environmental monitoring etc.;
- Undertake an assessment of QA/QC of analytical data generated by the works and identify data that is reliable for use in characterising the site;
- Sort data into data sets as required by the decision rules;
- Assess whether sufficient data has been obtained to meet required limits on decision error;
- Undertake assessment to the decision rules and identify any environmental data which causes decision rules to be failed;
- Information demonstrating compliance with appropriate regulations and guidelines;
- Any variations to the strategy undertaken during the implementation of the remedial works;
- Results of all environmental monitoring undertaken during the course of the remedial works;
- Details of any environmental incidents occurring during the course of the remedial works and the actions undertaken in response to these incidents;
- Verification of regulatory compliance;
- Provide a summary of waste disposal activities and volumes of waste removed from the Site including supply of all waste disposal dockets confirming final waste disposal/landfill destination;
- Provide a summary of material importation activities (general fill soil/crushed rock, growing media, earthworks aggregates, drainage backfill etc), including material source, type, assessment of suitability, approximate quantities, date of importation and final placement location; and
- Provide a comment on the suitability of the Site for the proposed use.

The report will serve to document the remediation works for future reference.

8. Regulatory and Planning Requirements

The following planning requirements for the proposed remedial works are presented.

SEPP (Resilience and Hazards) 2021

Development consent for remediation works is addressed by reference to SEPP (Resilience and Hazards) 2021.

The proposed remediation works are classified as 'Category 2' Remediation Works – i.e. not requiring consent. The notification requirements of SEPP (Resilience and Hazards) 2021 include notification to council 30 days before Category 2 remediation works commence. The proposed works do not constitute Category 1 works because:

- The work is not Designated Development under Schedule 3 of the EPA&A Regulation or under a planning instrument.
- The work proposed is not on land identified as critical habitat under the Threatened Species Conservation Act 1995.
- Consideration of s.5A of the EP&A Act indicates the remediation work is not likely to have a significant effect on threatened species, populations, ecological communities or their habitats.
- The work is not proposed in an area or zone to which any classifications to the following effect apply under an environmental planning instrument:
 - Coastal protection;
 - Conservation or heritage conservation;
 - Habitat area, habitat protection area, habitat or wildlife corridor;
 - Environmental protection;
 - Escarpment, escarpment protection or escarpment preservation;
 - Floodway;
 - Littoral rainforest;
 - Nature reserve;
 - Scenic area or scenic protection;
 - Wetland, or
 - Carried out or to be carried out on any land in a manner that does not comply with a policy made under the contaminated land planning guidelines by the council for any local government area in which the land is situated (or if the land is within the unincorporated area, the Western Lands Commissioner).
- The work does not require consent under another SEPP or regional environmental plan.

In addition, the notification should also include relevant contact details and a proposed remediation schedule. Notice is also required to be given to Council within 30 days of remediation works completion. Alternatively, given the works are ancillary to the proposed development works, consent may be given for the remediation works as part of the broader development consent, thereby superseding the Category 2 prior notification requirements.

Environment Planning and Assessment Regulation 2000 – Schedule 3 Designated Development

The proposed remediation works do not constitute designated development.

It is anticipated that the proposed remediation works will not incorporate any on-site treatment of soil. However, in the event that soil is required to be pre-treated prior to off-site disposal, an assessment of potential triggers for the works to be designated development as presented in Schedule 3 – Clause 15 will be required to be completed.

Protection of the Environment Operations Act 1997

All potential discharges from the remediation works will require to be maintained below applicable assessment criteria/threshold guidelines during the remediation works. This would apply to potential emissions in air and water. Levels of discharges are typically assessed at a site boundary.

Site specific environmental management plans, as prepared and maintained by remedial contractors, will require to ensure appropriate controls and monitoring criteria to assess compliance with these aspects.

The proposed remediation/validation activities are not required to be licensed under the *Protection of the Environment Operation Act (1997)*. The site is less than 3 ha in area, does not propose handling of greater than 30,000 m³ of contaminated fill and hence does not trigger the licensing requirements.

Water Management Act 2000

Dewatering may be required for the proposed redevelopment works and as such, notification and/or approvals may be required to be sought from the NSW Department of Primary Industry - Water (DPI-Water).

Protection of the Environment Operations (Waste) Regulation 2014

The regulations make requirements relating to non-licensed waste activities and waste transporting. The proposed works will not require to be licensed. The regulation requires that wastes are stored in an environmentally safe manner. It also stipulates that vehicles used to transport waste must be covered when loaded. This regulation also details additional tracking requirements for vehicles carrying Special (Asbestos) waste.

Provision is provided in the Regulation and EPA (2014) guidelines for the NSW EPA to approve the immobilisation of contaminants in waste (if required).

It is noted that no waste will be received at the site and only VENM, excavated natural material (ENM) or materials covered by a NSW EPA exemption will be imported to the site/site.

Waste Classification Guidelines (EPA 2014)

All wastes generated and proposed to be disposed off-site shall be assessed, classified and managed in accordance with this guideline. Where wastes require immobilisation prior to off-site disposal (to reduce waste classifications) an immobilisation approval shall be sought in accordance with Part 2 of this guideline, or otherwise General Approvals for the immobilisation of wastes in soils as historically issued by the NSW EPA. Immobilisations are only anticipated to be required with unexpected finds.

Work Health and Safety Act 2011 and Work Health and Safety Regulation 2018

The information and data provided in this RAP should be considered by the Principal/Remediation Contractor in preparation of its health and safety plans for the remedial works.

9. Contingency Plan

A review of the proposed contamination-related aspects of the works associated with development the site has been undertaken and has identified a number of potential risks, outlined in the following sections that required the development of contingencies to ensure that the objectives of this RAP are met.

The Contingency Plan is required to be part of the CEMP, as described in **Section 10**, below, and part of the Work Health and Safety Plan (WHSP), as described in **Section 10**.

9.1 Unexpected Finds

The possibility exists for hazards that have not been identified to date to be present within fill materials or underlying existing pavements/building on the site. The nature of hazards which may be present and which may be discovered at the site are generally detectable through visual or olfactory means, for example:

- The presence of significant aggregates of friable asbestos materials (visible) as opposed to minor occurrences of fragments or fibre bundles in soil; and/or
- Excessive quantities of Construction/Demolition Waste (visible); and/or
- Hydrocarbon impacted materials (visible/odorous); and/or
- Drums, waste pits, former pipework or USTs (visible); and/or
- Oily Ash and/or oily slag contaminated soils/fill materials (visible/odorous); and/or
- Tarry like impacted soil/fill material (visible/odorous); and/or
- Potential chlorinated hydrocarbon impact (sweet odour soils).

As a precautionary measure to ensure the protection of the workforce and surrounding community, should any of the abovementioned substances (or any other unexpected potentially hazardous substance) be identified, the procedure summarised in **Figure 9.1** is to be followed.

An enlarged version of the Unexpected Finds Protocol, suitable for use on the site, should be posted in the Site Office and referred to during the site-specific induction by the Principal Contractor.

The sampling strategy for each “unexpected find” shall be designed by a suitably qualified environmental consultant. The strategy will, however, be aimed at determining the nature of the substance – that is, is it hazardous and, if so, is it at concentrations which pose an unacceptable risk to human health or the environment.

The sampling frequency of the identified substance/materials shall meet the minimum requirements outlined in *Sampling design guidelines – Part 1 application* (EPA 2022).

9.1.1 Change in Development Plans

In the event that the development plans are changed from those available at the time of preparation of this RAP, particularly where significant amendment of the extent of permanent paving at the site and/or, consideration of the suitability of the proposed remedial strategy will be required.

9.1.2 Emissions Complaints

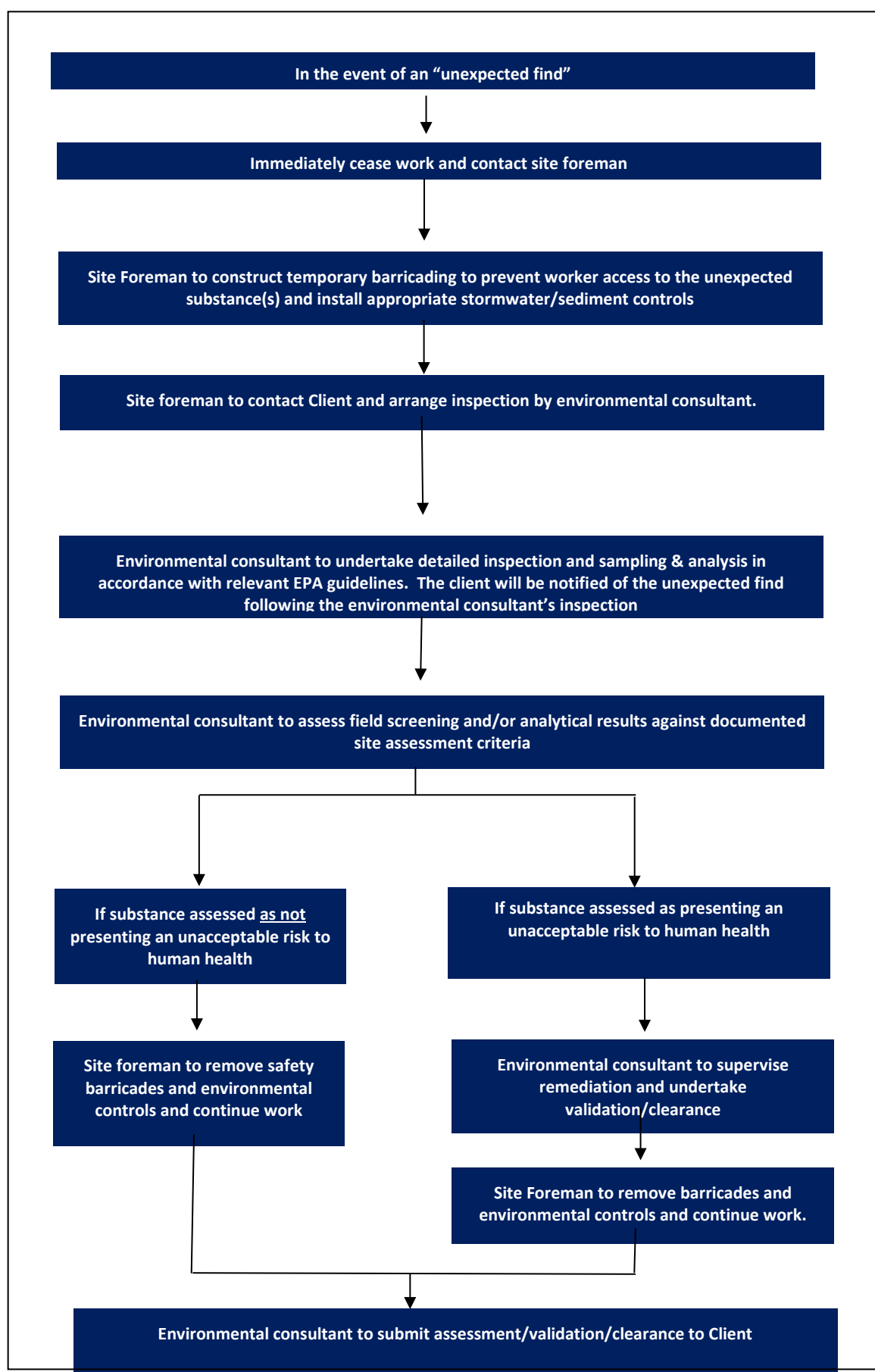
Due to the nature of the activities identified within the site, there is a potential for complaints to be received from members of the public and/or occupants of surrounding properties relating to environmental emissions including:

- Odour emissions arising from handling of malodorous soil;
- Noise and vibration arising from excavation, piling and other works;
- Dust emissions arising from excavation, material handling and placement; and
- Visibly impacted water quality in surface water discharge from the site.

Monitoring of all environmental emissions shall be undertaken during the works as detailed in the CEMP (discussed in **Section 10.1**) and appropriate actions taken to further control emissions following receipt of a complaint. The CEMP shall contain provision for contingency actions where excessive emissions occur, however it is anticipated that one or more of the following actions will be considered:

- Increased application of odour screening/masking chemicals on odorous materials;
- Disturbance of soils during meteorologically favourable periods only; and/or
- Covering of impacted soils.

Figure 9.1: Unexpected Finds Protocol



10. Other Remediation Documents

10.1 Environmental Management

10.1.1 Preparation of a Construction Environmental Management Plan (CEMP)

Prior to commencement of remediation works, a CEMP shall be prepared by the Principal Contractor or the Principal Contractors Remediation Contractor, which documents the environmental monitoring and management measures required to be implemented during the remediation and construction related activities associated with the construction of the site.

The CEMP shall address each of the nominated items in **Section 9.1.2** and shall include the Contingency Plan, referred to in **Section 7**. Additional environmental management requirements may be required as part of development consent.

10.1.2 Required Elements/Procedures

An assessment of the proposed activities and the associated elements required to be incorporated into the CEMP is provided in **Table 9.1**. The CEMP is required to address each of the required elements and procedures in full detail and to include detailed monitoring processes and procedures, corrective actions and reporting requirements.

Table 10.1 Required Elements of the CEMP

Element	Specific Minimum Requirements to be included in CEMP
1. Dust Control	Provisions for dust control if required.
2. Flora and Fauna	N/A
3. Heritage/Archaeological	N/A
4. Visual Impacts	N/A
5. Emergency Response	As appropriate. Procedures required for spill incident response including material storage breach.
6. Noise Control	Hours of operation. Boundary monitoring at commencement of work site activities with potential for environmental noise emissions. Potential noise monitoring at nearest receptors. Procedures for control and management of noise emissions, as appropriate (e.g., restricted hours).
7. Traffic	Controls on vehicle movements on public roads. Controls on transport in asbestos exclusion zones (if required)
8. Protection of Adjoining Structures	N/A
9. Odour Control	Procedures for management of potentially odorous works.
10. Handling of Contaminated Soil and Groundwater	Soil and water (if encountered) management (stockpiling, site access, excavation pump out, reinstatement).
11. Soil Storage/Placement Areas	Soil and water management (stockpiling, site access, excavation pump out, reinstatement). Bunding. Heavy vehicle/personnel decontamination. Interim storage requirements for materials requiring later treatment.

	Site drainage requirements, incorporating clean/dirty areas and modifications to existing surface water and drainage controls beneath retained pavements. Monitoring as required.
12. Sediment Control	Bunding. Collection/treatment/handling impacted sediments.
13. Operation of Site Office	As appropriate.
14. Asbestos Works	Required notifications, permits, signage and exclusion zones. Required personal (e.g. Class A or B removalist). PPE and decontamination. Staging of asbestos and non-asbestos works.
15. Environmental Monitoring	Monitoring of dusts, noise, odour and fibres (if required). Monitoring as required for vibration and water releases. Inspection checklists and field forms.
16. Environmental Criteria	Soil criteria as sourced from RAP.
17. Material Classification	As detailed in this RAP.
18. Waste Management	All waste materials classified in accordance with the RAP are required to be disposed of at a licensed waste facility that are lawfully able to accept such materials. Material tracking in the form of disposal dockets will be required for the purposes of satisfying the validation report.
19. Community Relations Plan	Client to provide project specific communication protocols, incorporating nomination of specific contact persons & details and requirements for communications/response register.
20. Incident Reporting	As appropriate, including standard form/checklist.
21. Security and Signage	Secure site perimeter. Site boundary signage. Remediation exclusion zone signage where required.
22. EMP Review	As appropriate.
23. Training	As appropriate. Contamination awareness training for all workers.
24. Contact Details	Company/personnel details, including names/phone numbers for: - Principal Contractor - Site Auditor (if involved) - Environmental Consultant - Contractor - OH&S Compliance - Environmental Compliance

10.2 Health and Safety

10.2.1 Work Health and Safety Management Plan

A WHSP shall be prepared by the Remediation Contractor prior to commencement of remediation works. The Plan shall contain procedures and requirements that are to be implemented as a minimum during the works, in addition to the Contingency Plan, referred to in **Section 8.1**.

The objectives of the WHSP are:

- To apply standard procedures that minimises risks resulting from the works;
- To ensure all employees are provided with appropriate training, equipment and support to consistently perform their duties in a safe manner; and
- To have procedures to protect other site workers and the general public.

These objectives will be achieved by:

- Assignment of responsibilities;
- An evaluation of hazards;
- Establishment of personal protection standards, mandatory safety practices and procedures;
- Monitoring of potential hazards and implementation of corrective measures; and
- Provision for contingencies that may arise while operations are being conducted within the site.

10.2.2 Additional Consideration of Chemical Contaminants

In addition to general assessment of the potential for exposure to chemical contaminants the WHSP should also include specific consideration of additional contaminants such as asbestos distributed throughout fill materials.

As a precautionary measure, the WHSP should include the requirement for the plan to be revised in the event of an unexpected find of contaminated material during remediation and/or construction.

When working with contaminated materials in general, care needs to be taken to ensure that the contamination is not introduced to the worker via ingestion, inhalation or absorption. The WHSP must detail the PPE and decontamination requirements to be followed to control the risks posed by potential exposure to chemical contaminants at/within the site.

11. Conclusions

Subject to the successful implementation of the measures described in this RAP and subject to the limitations in **Section 12**, it is concluded that the site can be made suitable for the proposed mixed-use development including a multi-level basement across the footprint of the site as outlined in design plans in **Appendix B**.

12. Limitations

This report has been prepared for use by the client who has commissioned the works in accordance with the project brief only, and has been based in part on information obtained from the client and other parties.

The advice herein relates only to this project and all results conclusions and recommendations made should be reviewed by a competent person with experience in environmental investigations, before being used for any other purpose.

JBS&G accepts no liability for use or interpretation by any person or body other than the client who commissioned the works. This report should not be reproduced without prior approval by the client, or amended in any way without prior approval by JBS&G, and should not be relied upon by other parties, who should make their own enquiries.

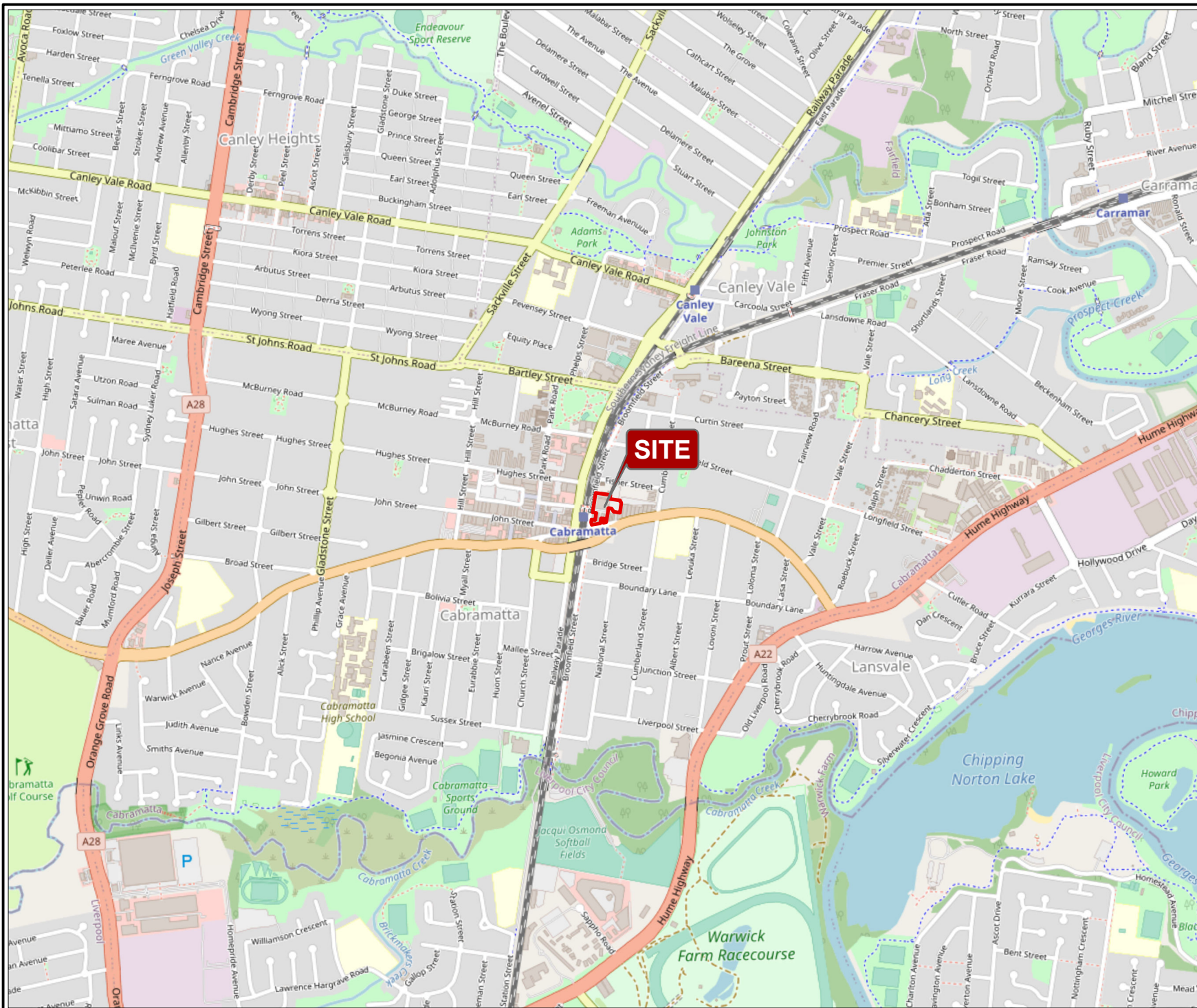
Sampling and chemical analysis of environmental media is based on appropriate guidance documents made and approved by the relevant regulatory authorities. Conclusions arising from the review and assessment of environmental data are based on the sampling and analysis considered appropriate based on the regulatory requirements.

Limited sampling and laboratory analyses were undertaken as part of the investigations undertaken, as described herein. Ground conditions between sampling locations and media may vary, and this should be considered when extrapolating between sampling points. Chemical analytes are based on the information detailed in the site history. Further chemicals or categories of chemicals may exist at the site, which were not identified in the site history and which may not be expected at the site.

Changes to the subsurface conditions may occur subsequent to the investigations described herein, through natural processes or through the intentional or accidental addition of contaminants. The conclusions and recommendations reached in this report are based on the information obtained at the time of the investigations.

This report does not provide a complete assessment of the environmental status of the site, and it is limited to the scope defined herein. Should information become available regarding conditions at the site including previously unknown sources of contamination, JBS&G reserves the right to review the report in the context of the additional information.

Figures



Legend
 Approximate Site Boundary



Job No: 65196

Client: Moon Investments

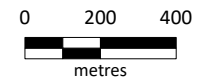
Version: R01 Rev A

Date 19/06/2023

Drawn By: EC

Checked By: AS

Scale 1:20,000



Coord. Sys. GDA2020 MGA Zone 56

**76-86 Broomfield Street
 and 139, 147-151
 Cabramatta Road East
 Cabramatta NSW**

SITE LOCATION

FIGURE 1



Legend
[Red Line] Approximate Site Boundary
[Yellow Line] NSW Cadastre



Job No: 65196

Client: Moon Investments

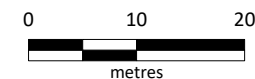
Version: R01 Rev A

Date 22/06/2023

Drawn By: EC

Checked By: AS

Scale 1:700



Coord. Sys. GDA2020 MGA Zone 56

**76-86 Broomfield Street
and 139, 147-151
Cabramatta Road East
Cabramatta NSW**

SITE LAYOUT

FIGURE 2



Legend

 Approximate Site Boundary

Sample Locations (JBS&G, 2023)

● Borehole

⊕ Monitoring Well

■ Soil Vapour



Job No: 65196

Client: Moon Investments

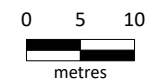
Version: R01 Rev A

Date 19/06/2023

Drawn By: EP

Checked By: AS

Scale 1:700



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and 139, 147-151
Cabramatta Road East
Cabramatta NSW**

SAMPLE LOCATIONS

FIGURE 3



- Legend**
- Approximate Site Boundary
 - Inferred Ground Water Flow
 - Standing Water Level (AHD)
 - Sample Locations (JBS&G, 2023)**
 - Borehole
 - ⊕ Monitoring Well
 - Soil Vapour



Job No: 65196

Client: Moon Investments

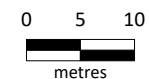
Version: R01 Rev A

Date 19/06/2023

Drawn By: EP

Checked By: AS

Scale 1:700



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**76-86 Broomfield Street
and 139, 147-151
Cabramatta Road East
Cabramatta NSW**

GROUNDWATER ELEVATION

FIGURE 4

Appendix A Summary Tables



	Metals & Metalloids								TPHs (NEPC 1999)					TRHs (NEPC 2013)						BTEXN																	
	Arsenic	Cadmium	Chromium (III+VI)	Copper	Lead	Mercury	Nickel	Zinc	C6-C9 Fraction	C10-C14 Fraction	C15-C28 Fraction	C29-C36 Fraction	C10-C36 Fraction (Sum of Total)	C6-C10	C10-C16	C16-C34	C34-C40	C10-C40 (Sum of total)	F1 (C6-C10 minus BTEX)	F2 (C10-C16 less Naphthalene)	Benzene	Toluene	Ethylbenzene	Xylene (o)	Xylene (m & p)	Xylene Total	Naphthalene_VOC	Acenaphthene	Acenaphthylene	Anthracene	Benz(a)anthracene	Benzo(a)pyrene	Benzo(a)pyrene TEQ (LOR)	Benzo(a)pyrene TEQ calc (Half)	Benzo(a)pyrene TEQ calc (Zero)	Benzo(b-j)fluoranthene	
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL	2	0.4	5	5	5	0.1	5	5	20	20	50	50	50	20	50	100	100	100	20	50	0.1	0.1	0.1	0.1	0.2	0.3	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	
NEPM 2013 Table 1B(1-5) Generic EIL - Urban Residential and Public Open Space	100		190	60	1100		30	70																		170											
NEPM 2013 Table 1B(6) ESLs for Urban Res, Fine Soil																1300	5600		180	120	65	105	125			45					0.7						
NEPM 2013 Table 1A(1) HILs Res A Soil	100	20	100	6000	300	40	400	7400																									3	3	3		
NEPM 2013 Table 1A(3) Res A/B Soil HSL for Vapour Intrusion, Clay																			50	280	0.7	480	NL			110	5										
NEPM 2013 Table 7 Res A Soil HSL for Asbestos in Soil																																					
PFAS NEMP 2020 Table 2 Health Residential min soil access																																					

Sample ID	Lab Report Number	Date																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
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Project Number: 65196
Project Name: Cabramtta East Precinct Development DSI

[illegible]



	Chlorinated Alkanes																		Chlorinated Alkenes										Solvents	Polychlorinated						
	1,1,1,2-tetrachloroethane	1,1,1-trichloroethane	1,1,2,2-tetrachloroethane	1,1,2-trichloroethane	1,1-dichloroethane	1,2,3-trichloropropane	1,2-dibromo-3-chloropropane	1,2-dichloroethane	1,2-dichloropropane	1,3-dichloropropane	2,2-dichloropropane	Bromochloromethane	Carbon tetrachloride	Chloroethane	Chloromethane	Dichlorodifluoromethane	Dichloromethane	Trichlorofluoromethane	1,1-dichloroethene	1,1-dichloropropene	2-chlorotoluene	3-chloropropene	4-chlorotoluene	cis-1,2-dichloroethene	cis-1,3-dichloropropene	Tetrachloroethene	trans-1,2-dichloroethene	trans-1,3-dichloropropene	Trichloroethene	Vinyl Chloride	Acetone	Arochlor 1016	Arochlor 1221	Arochlor 1232	Arochlor 1242	
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL	0.5	0.5	0.5	0.5	0.5	0.5	1	0.5	0.5	0.5	1	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	1	1	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.1	0.1	0.1	0.1
NEPM 2013 Table 1B(1-5) Generic EIL - Urban Residential and Public Open Space																																				
NEPM 2013 Table 1B(6) ESLs for Urban Res, Fine Soil																																				
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PFAS NEMP 2020 Table 2 Health Residential min soil access																																				

Sample ID	Lab Report Number	Date																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
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Project Name: Cabramatta East Precinct Development DS





	Aroclors				Polychlorinated Biphenyls (PCBs)																Perfluorinated Compounds (PFCs)																PFAS						
	Arochlor 1248	Arochlor 1254	Arochlor 1260	PCBs (Sum of total)	Perfluorobutanoic acid (PFBA)	Perfluoropentanoic acid (PFPeA)	Perfluorohexanoic acid (PFHxA)	Perfluoroheptanoic acid (PFHpA)	Perfluorooctanoic acid (PFOA)	Perfluorononanoic acid (PFNA)	Perfluorodecanoic acid (PFDA)	Perfluoroundecanoic acid (PFUnDA)	Perfluorododecanoic acid (PFDoDA)	Perfluorotridecanoic acid (PFTriDA)	Perfluorotetradecanoic acid (PFTeDA)	Perfluorooctane sulfonamide (FOSA)	N-Methyl perfluorooctane sulfonamide (NMeFOSA)	N-Ethyl perfluorooctane sulfonamide (NEtFOSA)	N-Methylperfluorooctanesulfonamidoethanol (N-MeFOSE)	N-ethylperfluorooctanesulfonamidoethanol (NEtFOSE)	N-methylperfluorooctane sulfonamidoacetic acid (NMeFOSAA)	N-ethyl-perfluorooctanesulfonamidoacetic acid (NEtFOSAA)	Perfluoropropanesulfonic acid (PFPrS)	Perfluorobutanesulfonic acid (PFBS)	Perfluoropentanesulfonic acid (PFPeS)	Perfluorohexanesulfonic acid (PFHxS)	Perfluoroheptane sulfonic acid (PFHpS)	Perfluorooctanesulfonic acid (PFOS)	Perfluorodecenesulfonic acid (PFDS)	1H,1H,2H,2H-perfluorohexanesulfonic acid (4:2 FTSA)													
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg												
EQL	0.1	0.1	0.1	0.1	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.01	0.01	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005												
NEPM 2013 Table 1B(1-5) Generic EIL - Urban Residential and Public Open Space																																											
NEPM 2013 Table 1B(6) ESLs for Urban Res, Fine Soil																																											
NEPM 2013 Table 1A(1) HILs Res A Soil				1																																							
NEPM 2013 Table 1A(3) Res A/B Soil HSL for Vapour Intrusion, Clay																																											
NEPM 2013 Table 7 Res A Soil HSL for Asbestos in Soil																																											
PFAS NEMP 2020 Table 2 Health Residential min soil access									20																		2		2														

[illegible]



										MAH										Miscellaneous Hydrocarbons								Chlorinated Benzenes							
	1H,1H,2H,2H-perfluorooctanesulfonic acid (6:2 FTSA)	1H,1H,2H,2H-perfluorodecanesulfonic acid (8:2 FTSA)	1H,1H,2H,2H-perfluorododecanesulfonic acid (10:2 FTSA)	Sum of PFHxS and PFOS	Sum of enHealth PFAS (PFHxS + PFOS + PFOA)*	Sum of US EPA PFAS (PFOS + PFOA)*	Sum of WA DWER PFAS (n=10)*	Sum of PFAS	Perfluorononanesulfonic acid ion	1,2,4-trimethylbenzene	1,3,5-trimethylbenzene	n-butylbenzene	n-propylbenzene	p-isopropyltoluene	sec-butylbenzene	Styrene	tert-butylbenzene	Total MAH	Bromobenzene	Isopropylbenzene	1,2-dibromoethane	Bromomethane	Cyclohexane	Dibromomethane	Iodomethane	4-Methyl-2-pentanone	Methyl Ethyl Ketone	1,2,3-trichlorobenzene	1,2,4-trichlorobenzene	1,2-Dichlorobenzene	1,3-dichlorobenzene	1,4-dichlorobenzene	Chlorobenzene	Hexachlorobenzene	
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/KG	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	
EQL	0.01	0.005	0.005	0.005	0.005	0.005	0.01	0.05	0.005	0.5	0.5	1	1	1	1	0.5	1	0.5	0.5	0.5	0.5	0.5	1	0.5	0.5	0.5	0.5	0.5	1	1	0.5	0.5	0.5	0.5	0.05
NEPM 2013 Table 1B(1-5) Generic EIL - Urban Residential and Public Open Space																																			
NEPM 2013 Table 1B(6) ESLs for Urban Res, Fine Soil																																			
NEPM 2013 Table 1A(1) HILs Res A Soil																																			10
NEPM 2013 Table 1A(3) Res A/B Soil HSL for Vapour Intrusion, Clay																																			
NEPM 2013 Table 7 Res A Soil HSL for Asbestos in Soil																																			
PFAS NEMP 2020 Table 2 Health Residential min soil access				2																															

Sample ID	Lab Report Number	Date																																			
BH01_0.3_0.4	995556	29/05/2023	<0.01	<0.005	<0.005	<0.005	<0.005	<0.005	<0.01	<0.05	<0.005	<0.5	<0.5	-	-	-	-	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	<0.5	<0.5	<0.5	<0.5	<0.5
QA01	324505	29/05/2023	<0.0001	<0.0002	<0.0002	0.0007	-	0.0007	-	0.0007	-	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	-	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	
QC01	995556	29/05/2023	<0.01	<0.005	<0.005	<0.005	<0.005	<0.005	<0.01	<0.05	<0.005	<0.5	<0.5	-	-	-	-	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	<0.5	<0.5	<0.5	<0.5	<0.05
BH02_0.3_0.4	995556	29/05/2023	-	-	-	-	-	-	-	-	-	<0.5	<0.5	-	-	-	-	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	<0.5	<0.5	<0.5	<0.5	-
BH03_0.3_0.4	995556	29/05/2023	-	-	-	-	-	-	-	-	-	<0.5	<0.5	-	-	-	-	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	<0.5	<0.5	<0.5	<0.5	<0.05
BH04_0.3_0.4	995556	29/05/2023	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
BH04_1_1.1	995556	29/05/2023	-	-	-	-	-	-	-	-	-	<0.5	<0.5	-	-	-	-	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	<0.5	<0.5	<0.5	<0.5	-
BH05_0.3_0.4	995556	30/05/2023	<0.01	<0.005	<0.005	<0.005	<0.005	<0.005	<0.01	<0.05	<0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
BH05_0.5_0.6	995556	30/05/2023	-	-	-	-	-	-	-	-	-	<0.5	<0.5	-	-	-	-	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	<0.5	<0.5	<0.5	<0.5	-
BH06_0.3_0.4	995556	29/05/2023	-	-	-	-	-	-	-	-	-	<0.5	<0.5	-	-	-	-	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	<0.5	<0.5	<0.5	<0.5	<0.5
BH07_0.3_0.4	995556	29/05/2023	-	-	-	-	-	-	-	-	-	<0.5	<0.5	-	-	-	-	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	<0.5	<0.5	<0.5	<0.5	<0.5
MW01_0.3_0.4	995556	29/05/2023	<0.01	<0.005	<0.005	<0.005	<0.005	<0.005	<0.01	<0.05	<0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.05	
MW02_0.3_0.4	995556	29/05/2023	-	-	-	-	-	-	-	-	-	<0.5	<0.5	-	-	-	-	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	<0.5	<0.5	<0.5	<0.5	-
MW03_0.2_0.3	995556	29/05/2023	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
MW03_1_1.1	995556	29/05/2023	<0.01	<0.005	<0.005	<0.005	<0.005	<0.005	<0.01	<0.05	<0.005	<0.5	<0.5	-	-	-	-	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	<0.5	<0.5	<0.5	<0.5	<0.05
MW03_7_7.1	995556	29/05/2023	-	-	-	-	-	-	-	-	-	<0.5	<0.5	-	-	-	-	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	<0.5	<0.5	<0.5	<0.5	-





	Trihalomethanes				Organic Sulfur Compounds	Asbestos - Eurofins						
	Dibromochloromethane	Chloroform	Tribromomethane	Bromodichloromethane	Carbon disulfide	Approximate Sample Mass	Asbestos from ACM in Soil	Asbestos from FA & AF in Soil	Organic Fibres - Comment	Respirable Fibres - Comment	Synthetic Fibres - Comment	Asbestos Reported Result
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	g	% (w/w)	% (w/w)	Comment	Comment	Comment	Comment
EQL	0.5	0.5	0.5	0.5	0.5							
NEPM 2013 Table 1B(1-5) Generic EIL - Urban Residential and Public Open Space												
NEPM 2013 Table 1B(6) ESLs for Urban Res, Fine Soil												
NEPM 2013 Table 1A(1) HILs Res A Soil												
NEPM 2013 Table 1A(3) Res A/B Soil HSL for Vapour Intrusion, Clay												
NEPM 2013 Table 7 Res A Soil HSL for Asbestos in Soil							0.01	0.001				
PFAS NEMP 2020 Table 2 Health Residential min soil access												

Sample ID	Lab Report Number	Date												
BH01_0.3_0.4	995556	29/05/2023	<0.5	<0.5	<0.5	<0.5	<0.5	1154	0	0	Organic Fibres Detected	No Trace Asbestos Detected	Nil	No Asbestos Detected
QA01	324505	29/05/2023	<1	<1	<1	<1	-	-	<0.01	<0.001	-	-	-	-
QC01	995556	29/05/2023	<0.5	<0.5	<0.5	<0.5	<0.5	1004	0	0	Organic Fibres Detected	No Trace Asbestos Detected	Nil	No Asbestos Detected
BH02_0.3_0.4	995556	29/05/2023	<0.5	<0.5	<0.5	<0.5	<0.5	1034	0	0	Organic Fibres Detected	No Trace Asbestos Detected	Nil	No Asbestos Detected
BH03_0.3_0.4	995556	29/05/2023	<0.5	<0.5	<0.5	<0.5	<0.5	1186	0	0	Organic Fibres Detected	No Trace Asbestos Detected	Nil	No Asbestos Detected
BH04_0.3_0.4	995556	29/05/2023	-	-	-	-	-	1029	0	0	Organic Fibres Detected	No Trace Asbestos Detected	Nil	No Asbestos Detected
BH04_1_1.1	995556	29/05/2023	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	-	-	-	-	-
BH05_0.3_0.4	995556	30/05/2023	-	-	-	-	-	1084	0	0	Organic Fibres Detected	No Trace Asbestos Detected	Nil	No Asbestos Detected
BH05_0.5_0.6	995556	30/05/2023	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	-	-	-	-	-
BH06_0.3_0.4	995556	29/05/2023	<0.5	<0.5	<0.5	<0.5	<0.5	911	0	0	Organic Fibres Detected	No Trace Asbestos Detected	Nil	No Asbestos Detected
BH07_0.3_0.4	995556	29/05/2023	<0.5	<0.5	<0.5	<0.5	<0.5	916	0	0	Organic Fibres Detected	No Trace Asbestos Detected	Nil	No Asbestos Detected
MW01_0.3_0.4	995556	29/05/2023	-	-	-	-	-	719	0	0	Organic Fibres Detected	No Trace Asbestos Detected	Nil	No Asbestos Detected
MW02_0.3_0.4	995556	29/05/2023	<0.5	<0.5	<0.5	<0.5	<0.5	1004	0	0	Organic Fibres Detected	No Trace Asbestos Detected	Nil	No Asbestos Detected
MW03_0.2_0.3	995556	29/05/2023	-	-	-	-	-	1244	0	0	Organic Fibres Detected	No Trace Asbestos Detected	Nil	No Asbestos Detected
MW03_1_1.1	995556	29/05/2023	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	-	-	-	-	-
MW03_7_7.1	995556	29/05/2023	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	-	-	-	-	-





	Heavy Metals							TPHs (NEPC 1999)					TRHs (NEPC 2013)								BTEXN											
	Arsenic (Filtered)	Cadmium (Filtered)	Chromium (III+VI) (Filtered)	Copper (Filtered)	Lead (Filtered)	Mercury (Filtered)	Nickel (Filtered)	Zinc (Filtered)	C6-C9 Fraction	C10-C14 Fraction	C15-C28 Fraction	C29-C36 Fraction	C10-C36 Fraction (Sum of Total)	C6-C10	C10-C16	C16-C34	C34-C40	C10-C40 (Sum of total)	F1 (C6-C10 minus BTEX)	F2 (C10-C16 less Naphthalene)	Benzene	Toluene	Ethylbenzene	Xylene (o)	Xylene (m & p)	Xylene Total	Naphthalene_VOC	Acenaphthene	Acenaphthylene	Anthracene	Benz(a)anthracene	Benzo(a)pyrene
	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
EQL	0.001	0.0002	0.001	0.001	0.001	0.0001	0.001	0.005	0.02	0.05	0.1	0.1	0.1	0.02	0.05	0.1	0.1	0.1	0.02	0.05	0.001	0.001	0.001	0.001	0.002	0.003	0.01	0.001	0.001	0.001	0.001	0.001
NHMRC (2008) Recreational as 10x the drinking water criteria (2011)	0.1	0.02	0.5	20	0.1	0.01	0.2														0.01	8	3	6	6	6					0.0001	
ANZG (2018) Marine water 95% toxicant DGVs		0.0055	0.0044	0.0013	0.0044	0.0004	0.07	0.008													0.7	0.18	0.08		0.075		0.07			0.0004		0.0002
CRC Care 2011 Table A2 Vapour Intrusion HSL-A Residential (Low Density), Clay														NL	NL						4.6	NL	NL			NL	NL					
NEPM 2013 Table 1A(4) Res HSL A/B GW for Vapour Intrusion, Clay																			NL	NL	NL	NL			NL	NL						
PFAS NEMP 2020 Table 5 Interim marine 95%																																

Sample ID	Lab Report Number	Date	<0.001	0.0007	<0.001	0.002	<0.001	<0.0001	0.085	0.21	<0.02	<0.05	<0.1	<0.1	<0.1	<0.02	<0.05	<0.1	<0.1	<0.1	<0.02	<0.05	<0.001	<0.001	<0.001	<0.001	<0.002	<0.003	<0.01	<0.001	<0.001	<0.001	<0.001
MW01	996556/999571	5/06/2023	<0.001	0.0007	<0.001	0.002	<0.001	<0.0001	0.085	0.21	<0.02	<0.05	<0.1	<0.1	<0.1	<0.02	<0.05	<0.1	<0.1	<0.1	<0.02	<0.05	<0.001	<0.001	<0.001	<0.001	<0.002	<0.003	<0.01	<0.001	<0.001	<0.001	<0.001
MW02	996556/999571	5/06/2023	0.002	0.0026	<0.001	0.001	<0.001	<0.0001	0.26	0.33	<0.02	<0.05	<0.1	<0.1	<0.1	<0.02	<0.05	<0.1	<0.1	<0.1	<0.02	<0.05	<0.001	<0.001	<0.001	<0.001	<0.002	<0.003	<0.01	<0.001	<0.001	<0.001	<0.001
MW03	996556/999571	5/06/2023	0.002	0.0002	<0.001	0.001	<0.001	<0.0001	0.036	0.097	<0.02	<0.05	<0.1	<0.1	<0.1	<0.02	<0.05	<0.1	<0.1	<0.1	<0.02	<0.05	<0.001	<0.001	<0.001	<0.001	<0.002	<0.003	<0.01	<0.001	<0.001	<0.001	<0.001
QA01	324973	5/06/2023	0.003	0.0003	0.002	0.002	<0.001	<0.00005	0.037	0.11	<0.01	<0.05	<0.1	<0.1	<0.05	<0.01	<0.05	<0.1	<0.1	<0.05	-	-	<0.001	<0.001	<0.001	<0.001	<0.002	-	-	<0.0001	<0.0001	<0.0001	<0.0001
QC01	996556/999571	5/06/2023	0.003	0.0002	<0.001	0.001	<0.001	<0.0001	0.042	0.1	<0.02	<0.05	<0.1	<0.1	<0.1	<0.02	<0.05	<0.1	<0.1	<0.1	<0.02	<0.05	<0.001	<0.001	<0.001	<0.001	<0.002	<0.003	<0.01	<0.001	<0.001	<0.001	<0.001





PAH																Chlorinated Alkanes															
	Benzo(a)pyrene TEQ	Benzo(b+j)fluoranthene	Benzo(b+j+k)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-c,d)pyrene	Naphthalene	Phenanthrene	Pyrene	PAHs (Sum of total)	1,1,1,2-tetrachloroethane	1,1,1-trichloroethane	1,1,2,2-tetrachloroethane	1,1,2-trichloroethane	1,1-dichloroethane	1,2,3-trichloropropane	1,2-dibromo-3-chloropropane	1,2-dichloroethane	1,2-dichloropropane	1,3-dichloropropane	2,2-dichloropropane	Bromochloromethane	Carbon tetrachloride	Chloroethane	Chloromethane		
	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L		
EQL	0.0005	0.001	0.0002	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.005	0.005		
NHMRC (2008) Recreational as 10x the drinking water criteria (2011)																						0.03					0.03				
ANZG (2018) Marine water 95% toxicant DGVs								0.0014			0.07	0.002				0.27	0.4	1.9				1.9	0.9	1.1			0.24				
CRC Care 2011 Table A2 Vapour Intrusion HSL-A Residential (Low Density), Clay											NL																				
NEPM 2013 Table 1A(4) Res HSL A/B GW for Vapour Intrusion, Clay											NL																				
PFAS NEMP 2020 Table 5 Interim marine 95%																															

Sample ID	Lab Report Number	Date																												
MW01	996556/999571	5/06/2023	-	<0.001	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	-	<0.001	<0.001	<0.001	-	<0.001	<0.001	<0.005	<0.005
MW02	996556/999571	5/06/2023	-	<0.001	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	-	<0.001	<0.001	<0.001	-	<0.001	<0.001	<0.005	<0.005
MW03	996556/999571	5/06/2023	-	<0.001	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	-	<0.001	<0.001	<0.001	-	<0.001	<0.001	<0.005	<0.005
QA01	324973	5/06/2023	<0.0005	-	<0.0002	<0.0001	-	<0.0001	<0.0001	<0.0001	<0.0002	<0.0001	<0.0001	<0.0001	<0.0001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.01	<0.01	
QC01	996556/999571	5/06/2023	-	<0.001	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	-	<0.001	<0.001	<0.001	-	<0.001	<0.001	<0.005	<0.005



			Chlorinated Alkenes														Solvents																		
			Dichlorodifluoromethane	Dichloromethane	Trichlorofluoromethane	1,1-dichloroethene	1,1-dichloropropene	2-chlorotoluene	3-chloropropene	4-chlorotoluene	cis-1,2-dichloroethene	cis-1,3-dichloropropene	Tetrachloroethene	trans-1,2-dichloroethene	trans-1,3-dichloropropene	Trichloroethene	Vinyl Chloride	Acetone	Perfluorobutanoic acid (PFBA)	Perfluoropentanoic acid (PFPeA)	Perfluorohexanoic acid (PFHxA)	Perfluoroheptanoic acid (PFHpA)	Perfluorooctanoic acid (PFOA)	Perfluorononanoic acid (PFNA)	Perfluorodecanoic acid (PFDA)	Perfluoroundecanoic acid (PFUnDA)	Perfluorododecanoic acid (PFDoDA)	Perfluorotridecanoic acid (PFTriDA)	Perfluorotetradecanoic acid (PFTeDA)	Perfluorooctane sulfonamide (FOSA)	N-Methyl perfluorooctane sulfonamide (NMeFOSA)	N-Ethyl perfluorooctane sulfonamide (NEFOSA)	N-Methylperfluorooctanesulfonamidoethanol (N-MeFOSE)	N-ethylperfluorooctanesulfonamidoethanol (NEFOSE)	N-methylperfluorooctane sulfonamidoacetic acid (NMeFOSAA)
EQL	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	
NHMRC (2008) Recreational as 10x the drinking water criteria (2011)		0.04		0.3					0.6		0.5	0.6			0.003	140					5.6														
ANZG (2018) Marine water 95% toxicant DGVs		4		0.7							0.07			0.33	0.1																				
CRC Care 2011 Table A2 Vapour Intrusion HSL-A Residential (Low Density), Clay																																			
NEPM 2013 Table 1A(4) Res HSL A/B GW for Vapour Intrusion, Clay																																			
PFAS NEMP 2020 Table 5 Interim marine 95%																					220														
Sample ID	Lab Report Number	Date																																	
MW01	996556/999571	5/06/2023	<0.005	<0.005	<0.005	<0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.005	<0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.05	<0.05	<0.05	<0.05	<0.05
MW02	996556/999571	5/06/2023	<0.005	<0.005	<0.005	<0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.005	<0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.05	<0.05	<0.05	<0.05	<0.05
MW03	996556/999571	5/06/2023	<0.005	<0.005	<0.005	<0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.005	<0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.05	<0.05	<0.05	<0.05	<0.05	
QA01	324973	5/06/2023	<0.01	-	<0.01	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.01	-	<0.02	<0.02	<0.01	<0.01	<0.01	<0.01	<0.02	<0.02	<0.05	<0.1	<0.5	<0.1	<0.05	<0.1	<0.05	<0.05	<0.5	<0.02	
QC01	996556/999571	5/06/2023	<0.005	<0.005	<0.005	<0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.005	<0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	

Table B: Groundwater Analytical Data Summary
Project Number: 65196
Project Name: Cabramtta East Precinct Development DSI





PFAS																				MAH										Miscellaneous Hyd				
	N-ethyl-perfluorooctanesulfonamidoacetic acid (NEtFOSAA)	Perfluoropropanesulfonic acid (PFPrS)	Perfluorobutanesulfonic acid (PFBS)	Perfluoropentanesulfonic acid (PFPeS)	Perfluorohexanesulfonic acid (PFHxS)	Perfluoroheptane sulfonic acid (PFHpS)	Perfluorooctanesulfonic acid (PFOs)	Perfluorodecanesulfonic acid (PFDS)	1H,1H,2H,2H-perfluorohexanesulfonic acid (4:2 FTSA)	1H,1H,2H,2H-perfluorooctanesulfonic acid (6:2 FTSA)	1H,1H,2H,2H-perfluorodecanesulfonic acid (8:2 FTSA)	1H,1H,2H,2H-perfluorododecanesulfonic acid (10:2 FTSA)	Sum of PFHxS and PFOs	Sum of enHealth PFAS (PFHxS + PFOS + PFOA) *	Sum of US EPA PFAS (PFOS + PFOA) *	Sum of WA DWER PFAS (n=10) *	Sum of PFAS	Perfluorononanesulfonic acid ion																
	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	UG/L	µg/L	µg/L	µg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
EQL	0.05	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.05	0.01	0.01	0.01	0.01	0.01	0.05	0.1	0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.003	0.001	0.001	0.001	0.005	0.001	0.001	
NHMRC (2008) Recreational as 10x the drinking water criteria (2011)					0.7		0.7						0.7											0.3					0.01	0.01				
ANZG (2018) Marine water 95% toxicant DGVs																												0.03						
CRC Care 2011 Table A2 Vapour Intrusion HSL-A Residential (Low Density), Clay																																		
NEPM 2013 Table 1A(4) Res HSL A/B GW for Vapour Intrusion, Clay																																		
PFAS NEMP 2020 Table 5 Interim marine 95%							0.13																											

Sample ID	Lab Report Number	Date	<0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.05	<0.01	<0.01	<0.01	<0.01	<0.05	<0.1	<0.01	<0.001	<0.001	-	-	-	-	<0.001	-	<0.003	<0.001	<0.001	<0.001	<0.001	<0.005	-	<0.001	
MW01	996556/999571	5/06/2023	<0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.05	<0.1	<0.01	<0.001	<0.001	-	-	-	-	<0.001	-	<0.003	<0.001	<0.001	<0.001	<0.001	<0.005	-	<0.001
MW02	996556/999571	5/06/2023	<0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.05	<0.1	<0.01	<0.001	<0.001	-	-	-	-	<0.001	-	<0.003	<0.001	<0.001	<0.001	<0.001	<0.005	-	<0.001
MW03	996556/999571	5/06/2023	<0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.05	<0.1	<0.01	<0.001	<0.001	-	-	-	-	<0.001	-	<0.003	<0.001	<0.001	<0.001	<0.001	<0.005	-	<0.001
QA01	324973	5/06/2023	<0.02	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.02	<0.01	<0.01	<0.02	<0.01	-	<0.01	-	<0.01	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	-	<0.001	<0.001	<0.001	<0.01	<0.001	<0.001		
QC01	996556/999571	5/06/2023	<0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.05	<0.01	<0.01	<0.01	<0.01	<0.05	<0.1	<0.01	<0.001	<0.001	-	-	-	-	<0.001	-	<0.003	<0.001	<0.001	<0.001	<0.001	<0.005	-	<0.001	

Table B: Groundwater Analytical Data Summary
Project Number: 65196
Project Name: Cabramtta East Precinct Development DSI





	rocarbons			Chlorinated Benzenes								Trihalomethanes				Organic Sulfur Compounds	Major Cations		Ionic Balance	Chlorinated Hydrocarbons
	Iodomethane	4-Methyl-2-pentanone	Methyl Ethyl Ketone	1,2,3-trichlorobenzene	1,2,4-trichlorobenzene	1,2-Dichlorobenzene	1,3-dichlorobenzene	1,4-dichlorobenzene	Chlorobenzene	Hexachlorobenzene	Dibromochloromethane	Chloroform	Tribromomethane	Bromodichloromethane	Carbon disulfide	Calcium	Magnesium	Hardness as CaCO3	Hexachlorobutadiene	
EQL	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	
	0.001	0.005	0.005	0.001	0.001	0.001	0.001	0.001	0.001	0.0002	0.001	0.005	0.001	0.001	0.001	0.5	0.5	1	0.001	
NHMRC (2008) Recreational as 10x the drinking water criteria (2011)						15		0.4	3										0.007	
ANZG (2018) Marine water 95% toxicant DGVs					0.08				0.055	0.0001		0.77								
CRC Care 2011 Table A2 Vapour Intrusion HSL-A Residential (Low Density), Clay																				
NEPM 2013 Table 1A(4) Res HSL A/B GW for Vapour Intrusion, Clay																				
PFAS NEMP 2020 Table 5 Interim marine 95%																				

Sample ID	Lab Report Number	Date	<0.001	<0.005	<0.005	-	-	<0.001	<0.001	<0.001	<0.001	-	<0.001	<0.005	<0.001	<0.001	<0.001	43	690	3000	-
MW01	996556/999571	5/06/2023	<0.001	<0.005	<0.005	-	-	<0.001	<0.001	<0.001	<0.001	-	<0.001	<0.005	<0.001	<0.001	<0.001	37	670	2900	-
MW02	996556/999571	5/06/2023	<0.001	<0.005	<0.005	-	-	<0.001	<0.001	<0.001	<0.001	-	<0.001	<0.005	<0.001	<0.001	<0.001	5.7	11	59	-
MW03	996556/999571	5/06/2023	<0.001	<0.005	<0.005	-	-	<0.001	<0.001	<0.001	<0.001	-	<0.001	<0.005	<0.001	<0.001	<0.001	5.7	11	59	-
QA01	324973	5/06/2023	-	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	-	<0.001	<0.001	<0.001	<0.001	<0.001	-	-	-	<0.001
QC01	996556/999571	5/06/2023	<0.001	<0.005	<0.005	-	-	<0.001	<0.001	<0.001	<0.001	-	<0.001	<0.005	<0.001	<0.001	<0.001	-	-	-	-

Table C: Groundwater Parameters

Project Number: 65196

Project Name: Cabramatta East Precinct Development



Location	Date	Depth to SWL (m b TOC)	Depth to EoH (m b TOC)	Dissolved Oxygen (mg/L)	Temperature (°C)	pH (pH units)	EC (µs/cm)	ORP (mV)
MW01	5/06/2023	1.894	6.826	2.64	19.2	5.55	17881	158.4
MW02	5/06/2023	2.444	6.679	2.84	21.1	5.55	15288	205.8
MW03	5/06/2023	2.337	9.882	2.87	22.3	5.66	7973	130.4

Table E: Soil Vapour Parameters

Project Number: 65196

Project Name: Cabramatta East Precinct Development DSI



Location	Oxygen (%)	Methane (%)	Carbon Dioxide (%)	PID (ppm)
SV01	19.5	0	0.1	46.1
SV02	17.4	0	2	0.7
SV03	19.1	0	0.7	1.1
SV04	19.6	0	0.4	0.7
SV05	12.9	0	1.5	0.5
SV06	20.3	0	0.1	26.6
SV07	18.3	0	0.4	2
SV08	20.2	0	0.1	20

Appendix B Proposed Redevelopment Plans

BROOMFIELD STREET, CABRAMATTA

DEVELOPMENT APPLICATION CIVIL ENGINEERING PACKAGE



LOCALITY PLAN

SOURCE : NEARMAP.COM.AU (©2022)

Sheet List Table

Sheet Number	Sheet Title
DAC0000	COVER SHEET, DRAWING SCHEDULE AND LOCALITY PLAN
DAC0101	SPECIFICATION NOTES
DAC0201	GENERAL ARRANGEMENT PLAN
DAC1001	SEDIMENT AND SOIL EROSION CONTROL PLAN
DAC1101	SEDIMENT AND SOIL EROSION CONTROL DETAILS
DAC2001	BULK EARTHWORKS CUT TO FILL PLAN
DAC2201	BULK EARTHWORKS CUT TO FILL SECTIONS- SHEET 01
DAC2202	BULK EARTHWORKS CUT TO FILL SECTIONS- SHEET 02
DAC2203	BULK EARTHWORKS CUT TO FILL SECTIONS- SHEET 03
DAC3001	SITEWORKS AND STORMWATER MANAGEMENT PLAN - SHEET 01
DAC3002	SITEWORKS AND STORMWATER MANAGEMENT PLAN - SHEET 02
DAC3003	SITEWORKS AND STORMWATER MANAGEMENT PLAN - SHEET 03
DAC3004	SITEWORKS AND STORMWATER MANAGEMENT PLAN - SHEET 04
DAC3011	TYPICAL SECTIONS
DAC4101	STAGE 1 STORMWATER LONGITUDINAL SECTIONS - SHEET 01
DAC4102	STAGE 1 STORMWATER LONGITUDINAL SECTIONS - SHEET 02
DAC4103	STAGE 2 STORMWATER LONGITUDINAL SECTIONS - SHEET 01
DAC4104	STAGE 2 STORMWATER LONGITUDINAL SECTIONS - SHEET 02
DAC4201	STORMWATER CATCHMENT PLAN
DAC5001	ALIGNMENT CONTROL PLAN
DAC5101	LONGITUDINAL SECTIONS
DAC5201	CROSS SECTIONS - SHEET 01
DAC5202	CROSS SECTIONS - SHEET 02
DAC5203	CROSS SECTIONS - SHEET 03
DAC9001	DETAILS SHEET

DRAWN: U MANDAL
DESIGNED: J CARROLL
JOB MANAGER: B LAWRENCE
VERIFIER:

REVISION	DESCRIPTION	ISSUED	VER'D	APP'D	DATE
01	ISSUED FOR DEVELOPMENT APPLICATION	UM		JC	08.05.23
02	RE-ISSUED FOR DEVELOPMENT APPLICATION	UM		JC	11.05.23

CLIENT	ARCHITECT
MOON INVESTMENTS	plus architecture
DRAWING NOT TO BE USED FOR CONSTRUCTION UNLESS VERIFICATION SIGNATURE HAS BEEN ADDED	THE COPYRIGHT OF THIS DRAWING REMAINS WITH NORTHROP CONSULTING ENGINEERS PTY LTD

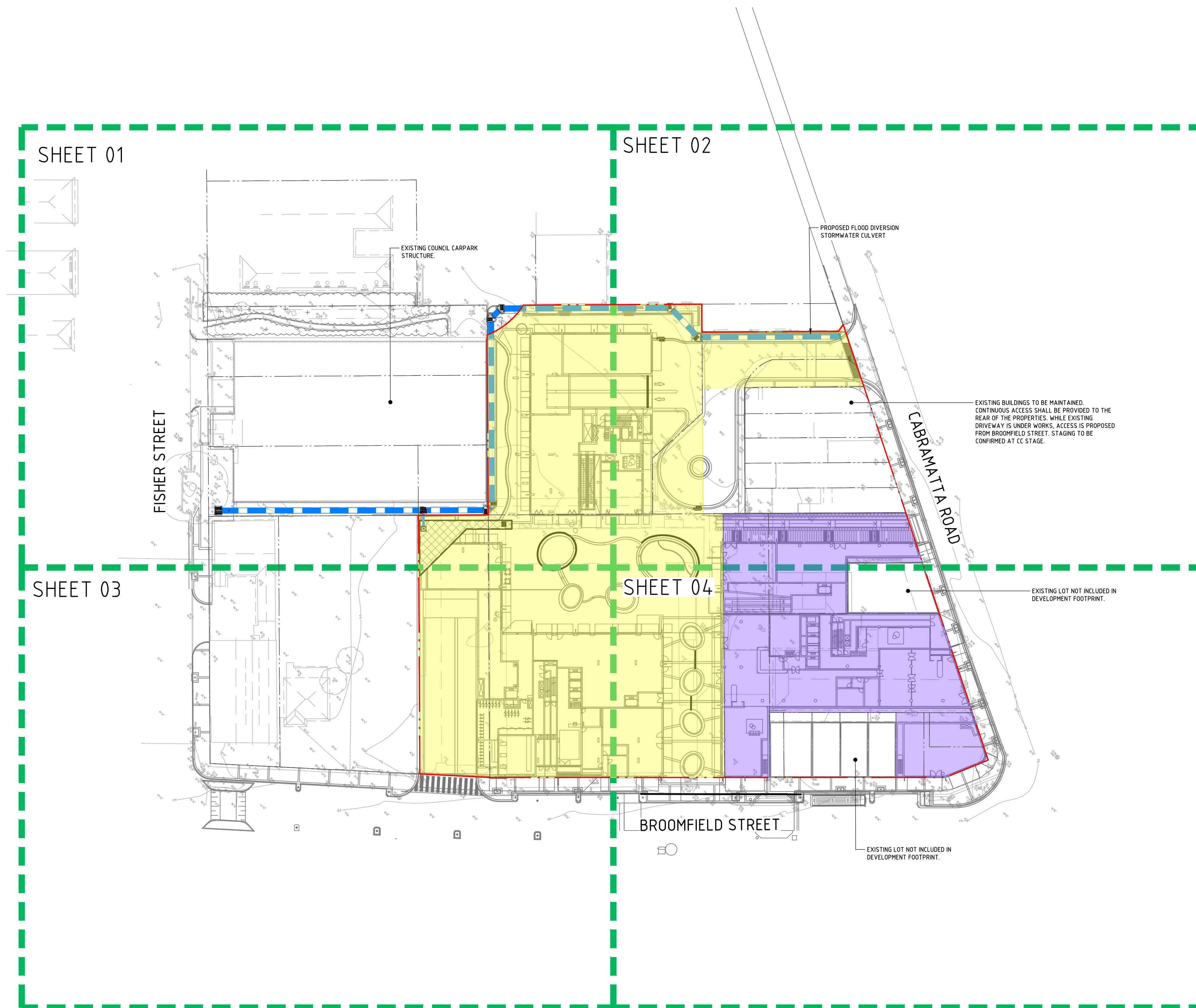
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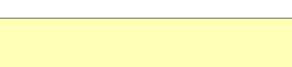
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Sydney	BROOMFIELD STREET CABRAMATTA
Level 11 345 George Street, Sydney NSW 2000	
Ph (02) 9241 4188 Fax (02) 9241 4324	
Email sydney@northrop.com.au ABN 81 094 433 100	

DRAWING TITLE	JOB NUMBER
CIVIL ENGINEERING PACKAGE DEVELOPMENT APPLICATION	183030-01
COVER SHEET, DRAWING SCHEDULE AND LOCALITY PLAN	DRAWING NUMBER DAC0000
	REVISION 02
	DRAWING SHEET SIZE = A1

NOT FOR CONSTRUCTION



LEGEND

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	EXISTING BOUNDARY LINE
	EXISTING CONTOURS
	SHEET LAYOUT @ 200 SCALE
	STAGE 1 WORK EXTENT
	STAGE 2 WORK EXTENT

NOT FOR CONSTRUCTION

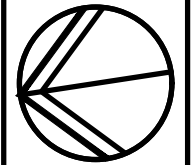
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02	RE-ISSUED FOR DEVELOPMENT APPLICATION	UM		JC	09.05.23							DRAWING NUMBER	REVISION
03	RE-ISSUED FOR DEVELOPMENT APPLICATION	UM		JC	11.05.23							DAC0201	03
												DRAWING SHEET SIZE = A1	
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DESIGNED: J CARROLL
JOB MANAGER: B LAWRENCE
VERIFIER:

REVISION	DESCRIPTION	ISSUED	VER'D	APP'D	DATE
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02	RE-ISSUED FOR DEVELOPMENT APPLICATION	UM		JC	11.05.23

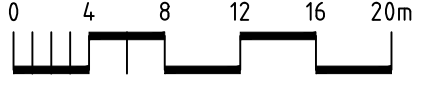
CLIENT	ARCHITECT
MOON INVESTMENTS	plus architecture
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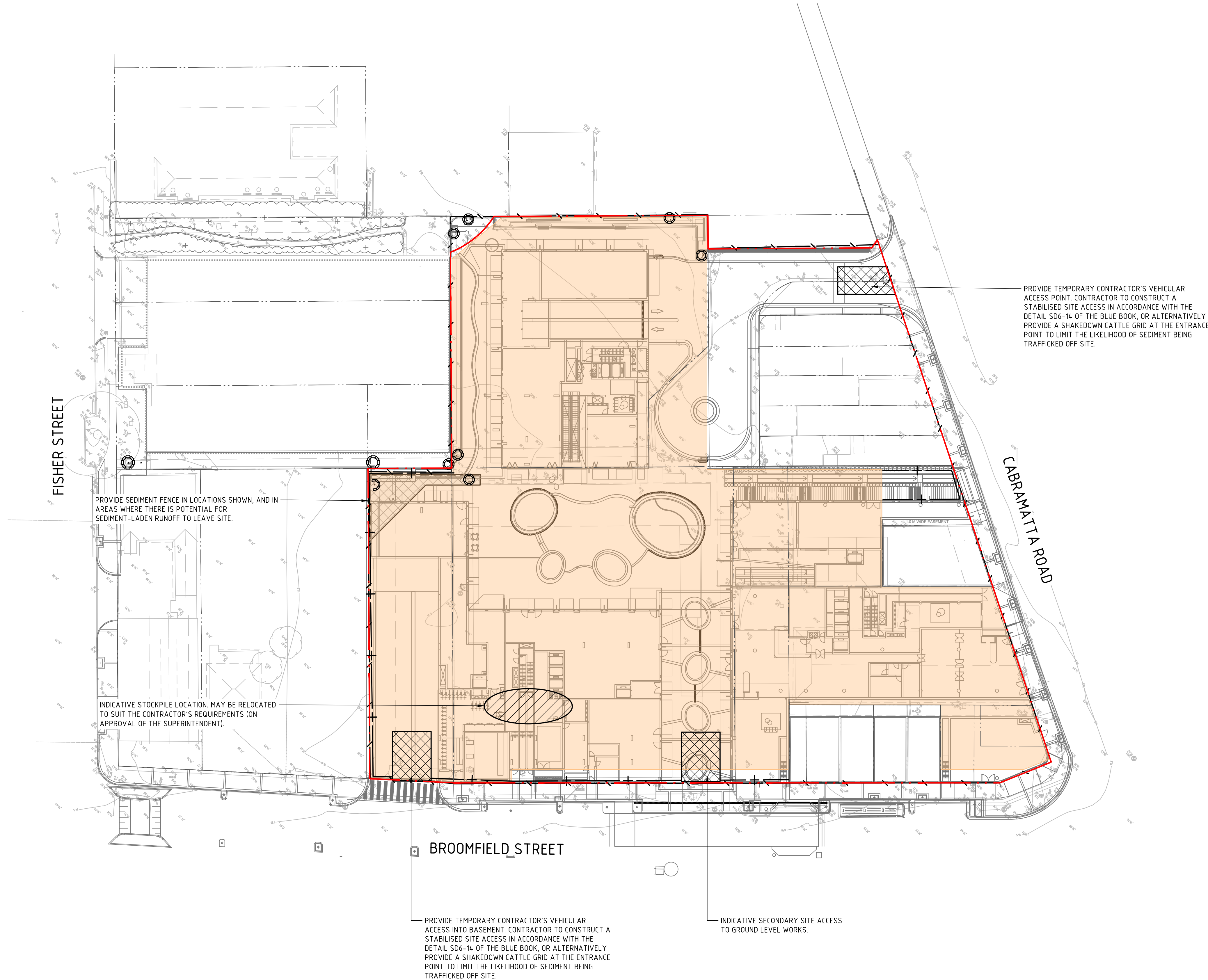
NORTHROP
Sydney
Level 11 345 George Street, Sydney NSW 2000
Ph (02) 9241 4188 Fax (02) 9241 4324
Email sydney@northrop.com.au ABN 81 094 433 100

PROJECT
BROOMFIELD STREET CABRAMATTA

DRAWING TITLE
CIVIL ENGINEERING PACKAGE DEVELOPMENT APPLICATION SEDIMENT AND SOIL EROSION CONTROL PLAN

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DRAWING NUMBER	REVISION
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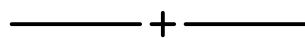
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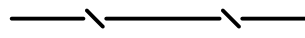


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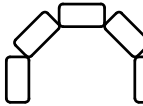
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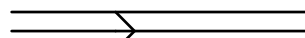
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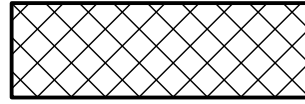
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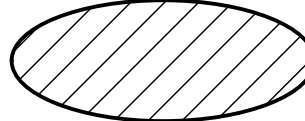
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 WIRE MESH AND GRAVEL
SEDIMENT FILTER

 SANDBAG SEDIMENT FILTER

 DRAINAGE SWALE

 STABILISED SITE ACCESS

 STOCKPILE

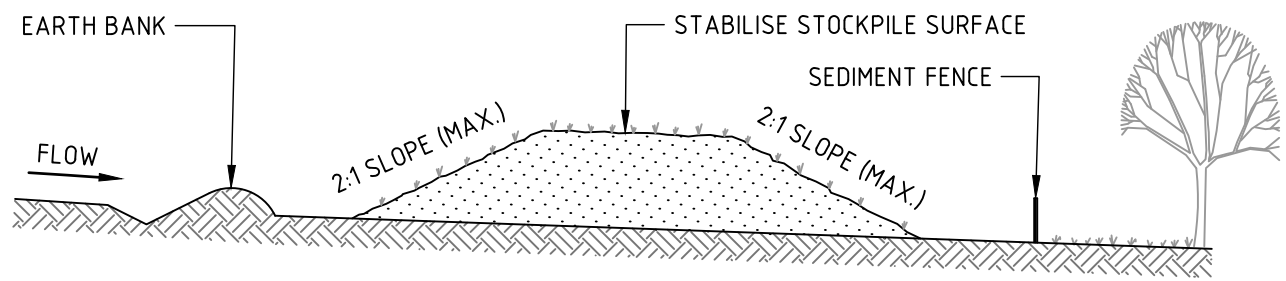
 PROPOSED BASEMENT EXTENTS

GENERAL NOTES:

- ALL GRATED TRENCH DRAINS INSTALLED SHALL BE PROTECTED FROM SEDIMENT VIA GEOTEXTILE INLET FILTERS OR SIMILAR.
- CONTINUOUS ACCESS SHALL BE PROVIDED TO REAR GARAGES OF THE FOLLOWING LOTS:
 - LOT 1, DP212183
 - LOT 2, DP212183
 - LOT 7, DP29232
 - LOT 8, DP29232
 - LOT 9, DP580587
- PONDING IN THE BASEMENT MAY OCCUR DURING RAIN EVENTS. PUMPING OF ANY PONDED WATER MAY BE NECESSARY (UPON APPROVAL OF THE SUPERINTENDENT). ALL WATER PUMPED OR OTHERWISE REMOVED FROM EXCAVATIONS OR BASEMENT AREAS MUST BE FILTERED TO ACHIEVE SUSPENDED SOLIDS/NON-FILTERABLE RESIDUE LEVELS COMPLYING WITH THE "AUSTRALIA WATER QUALITY GUIDELINES FOR FRESH AND MARINE WATERS", AND AS APPROVED BY THE RELEVANT COUNCIL AUTHORITY. IN THEIR ABSENCE, PUMPED WATER SHOULD COMPLY WITH THE FOLLOWING CHARACTERISTICS AS A MINIMUM:
 - pH BETWEEN 6.5-6.8
 - TOTAL SUSPENDED SOLIDS - 50mg/L; AND
 - ELECTRICAL CONDUCTIVITY OF 0.2ms/cm, OR LESS THAN OR EQUAL TO BACKGROUND LEVELS.

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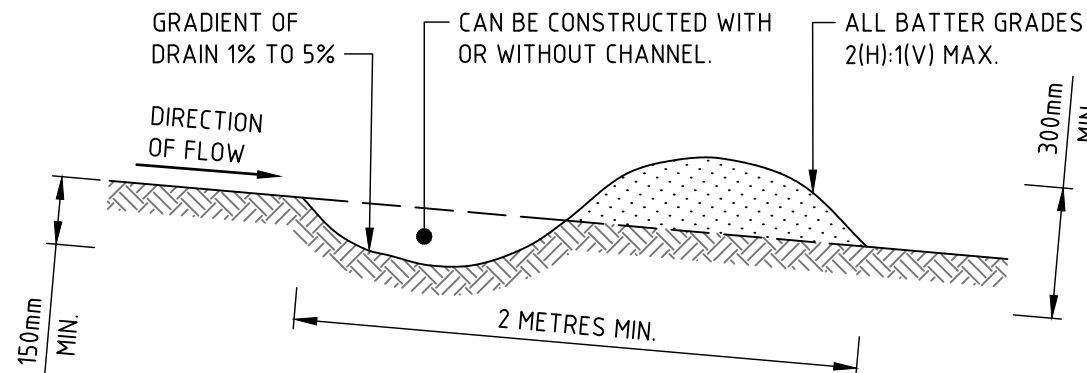
DRAWN: U MANDAL
 DESIGNED: J CARROLL
 JOB MANAGER: B LAWRENCE
 VERIFIER:



CONSTRUCTION NOTES

1. PLACE STOCKPILES MORE THAN 2m (PREFERABLY 5m) FROM EXISTING VEGETATION, CONCENTRATED WATER FLOW, ROADS AND HAZARD AREAS.
2. CONSTRUCT ON THE CONTOUR AS LOW, FLAT, ELONGATED MOUNDS.
3. WHERE THERE IS SUFFICIENT AREA, TOPSOIL STOCKPILES SHALL BE LESS THAN 2m IN HEIGHT.
4. WHERE THEY ARE TO BE IN PLACE FOR MORE THAN 10 DAYS, STABILISE FOLLOWING THE APPROVED ESCP OR SWMP TO REDUCE THE C-FACTOR TO LESS THAN 0.10.
5. CONSTRUCT EARTH BANKS (STANDARD DRAWING 5-5) ON THE UPSLOPE SIDE TO DIVERT WATER AROUND STOCKPILES AND SEDIMENT FENCES (STANDARD DRAWING 6-8) 1 TO 2m DOWNSLOPE.

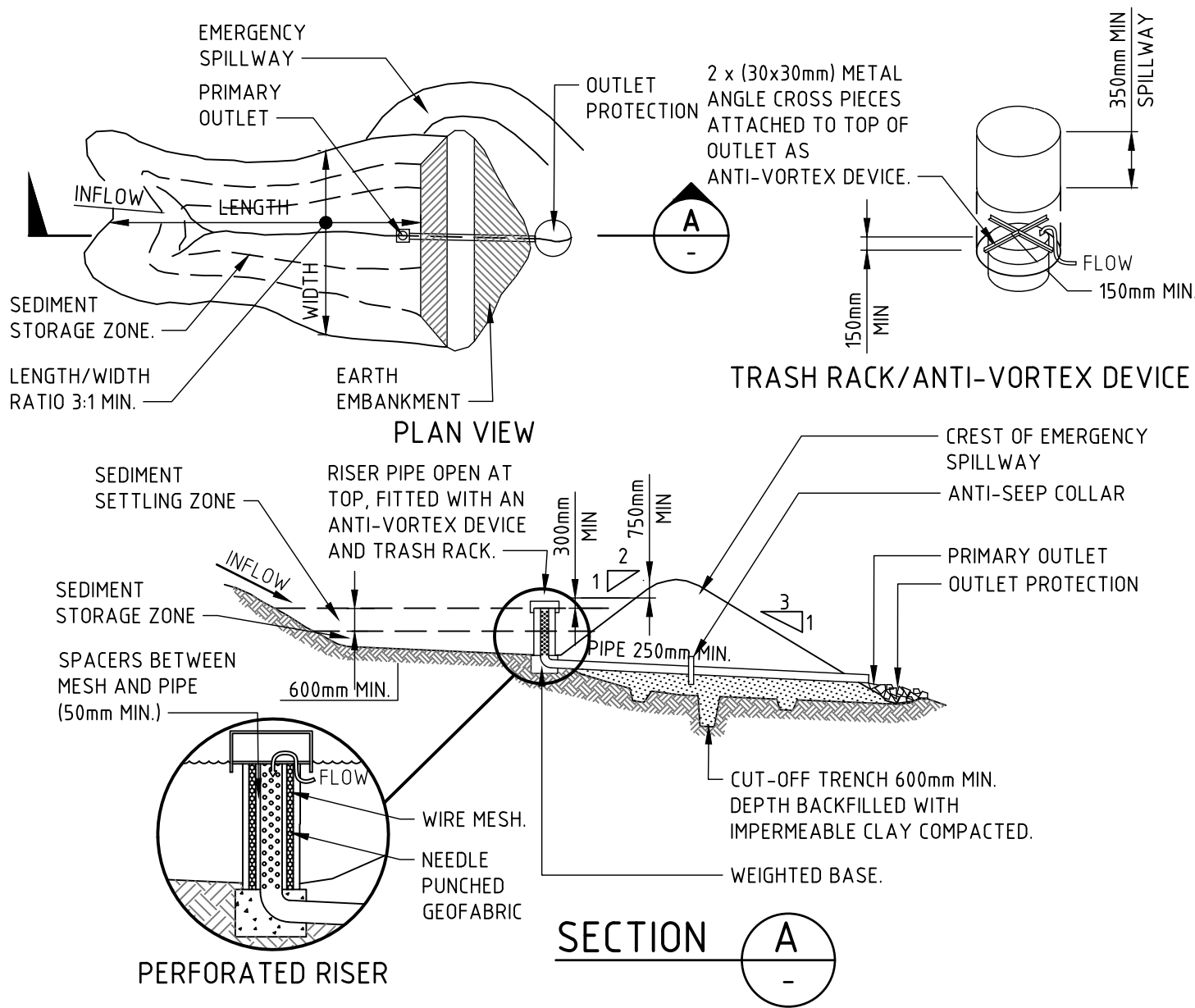
STOCKPILE



CONSTRUCTION NOTES

1. BUILD WITH GRADIENTS BETWEEN 1 AND 5 PERCENT.
2. AVOID REMOVING TREES AND SHRUBS IF POSSIBLE - WORK AROUND THEM.
3. ENSURE THE STRUCTURES ARE FREE OF PROJECTIONS OR OTHER IRREGULARITIES THAT COULD IMPEDE WATER FLOW.
4. BUILD THE DRAINS WITH CIRCULAR, PARABOLIC OR TRAPEZOIDAL CROSS SECTIONS, NOT V SHAPED.
5. ENSURE THE BANKS ARE PROPERLY COMPACTED TO PREVENT FAILURE.
6. COMPLETE PERMANENT OR TEMPORARY STABILISATION WITHIN 10 DAYS OF CONSTRUCTION.

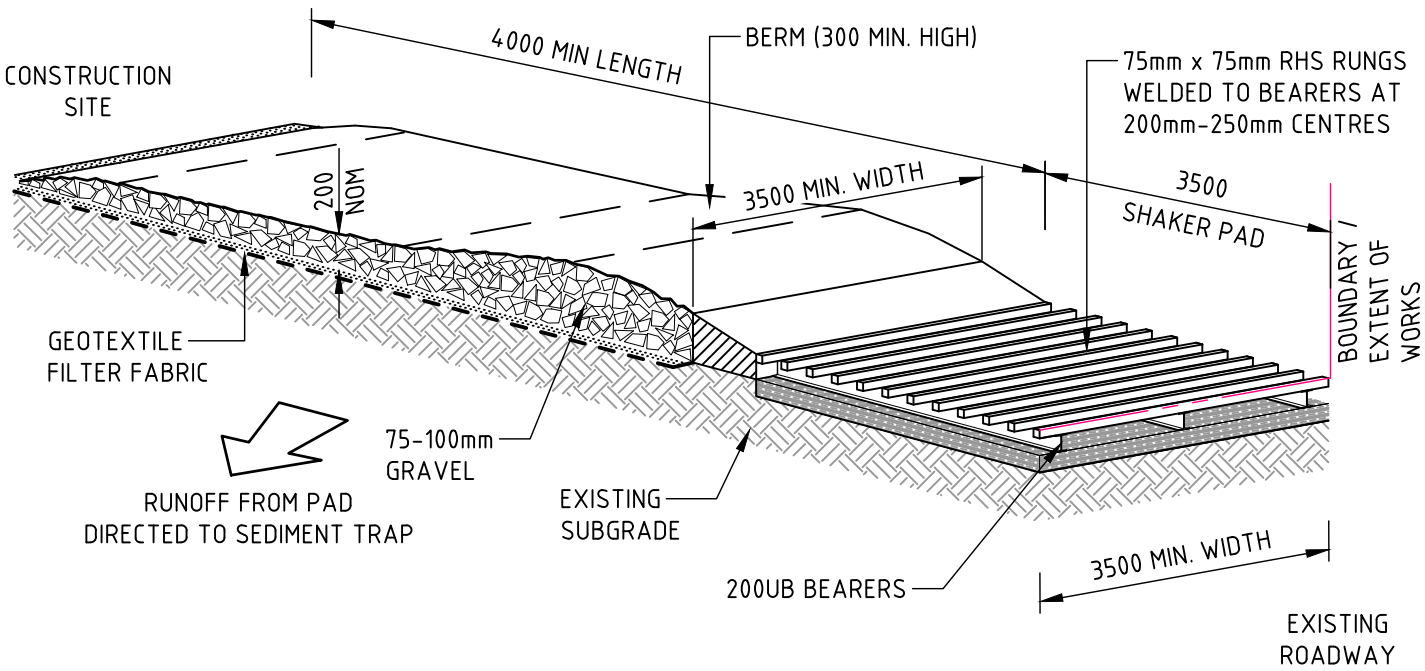
NOTE: ONLY TO BE USED AS TEMPORARY BANK WHERE MAXIMUM UPSLOPE LENGTH IS 80 METRES.
DRAINAGE SWALE - LOW FLOW



CONSTRUCTION NOTES

1. REMOVE ALL VEGETATION AND TOPSOIL FROM UNDER THE DAM WALL AND FROM WITHIN THE STORAGE AREA.
2. FORM A CUT OFF TRENCH UNDER THE CENTRELINE OF THE EMBANKMENT 600mm DEEP AND 1200mm WIDE, EXTENDING TO A POINT ON THE WATERCOURSE WALL ABOVE THE RISER SILL LEVEL.
3. MAINTAIN THE TRENCH FREE OF WATER AND RECOMPACT THE MATERIALS WITH EQUIPMENT AS SPECIFIED IN THE SWMP TO 95 PER CENT STANDARD PROCTOR DENSITY.
4. SELECT FILL ACCORDING TO THE SWMP THAT IS FREE FROM ROOTS, WOOD, ROCK, LARGE STONE OR FOREIGN MATERIAL.
5. PREPARE THE SITE UNDER THE EMBANKMENT BY RIPPING TO AT LEAST 100mm TO HELP BOND THE COMPACTED FILL TO THE EXISTING SUBSTRATE.
6. SPREAD THE FILL IN 100mm TO 150mm LAYERS AND COMPACT IT AT OPTIMUM MOISTURE CONTENT FOLLOWING THE SWMP.
7. INSTALL THE PIPE OUTLET WITH SEEPAGE COLLARS AS SPECIFIED IN THE SWMP AND STANDARD DRAWING 6-3B.
8. FORM BATTER GRADES AT 2(H):1(V) UPSTREAM AND 3(H):1(V) DOWNSTREAM OR AS SPECIFIED IN THE SWMP.

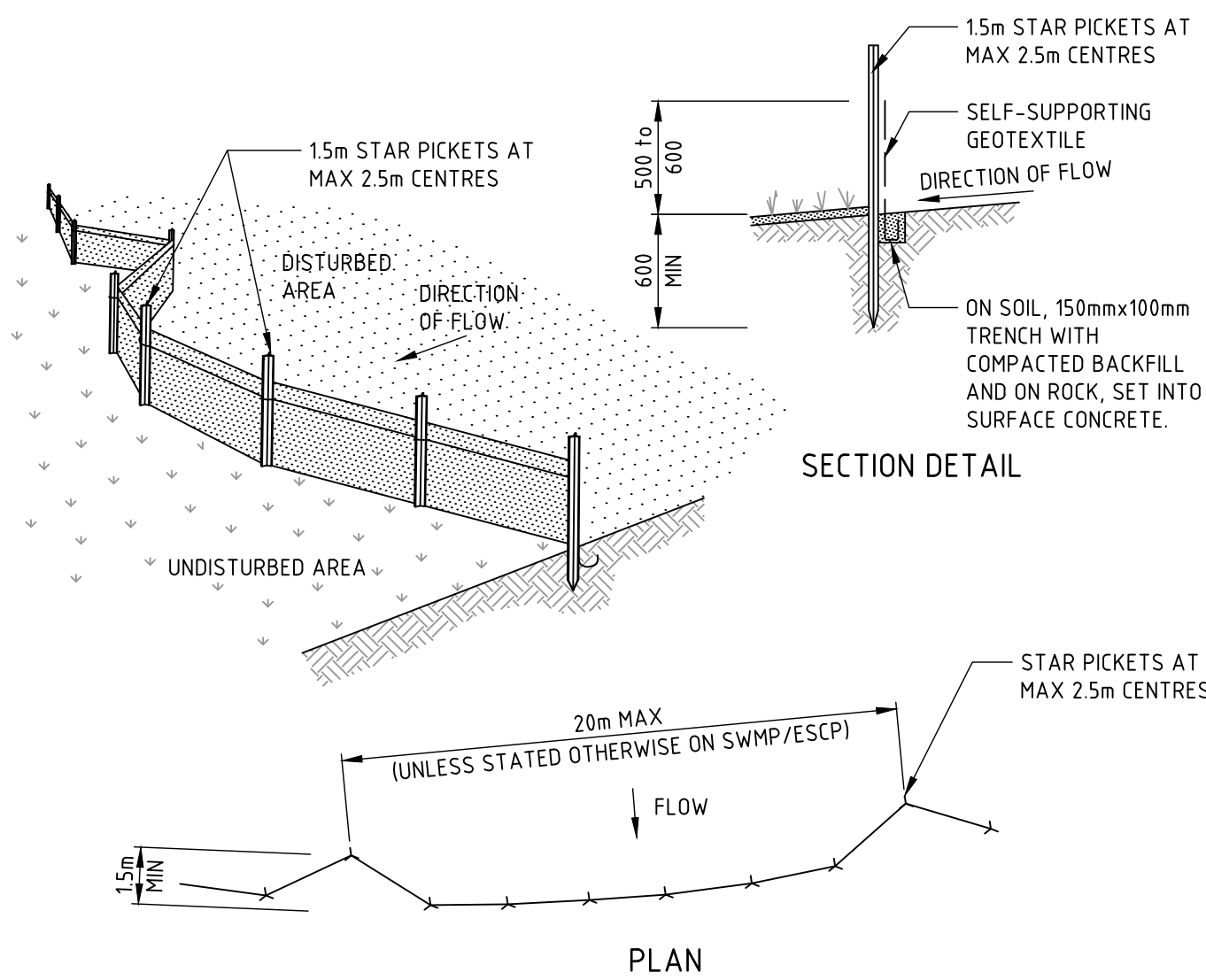
(APPLIES TO 'TYPE C' SOILS ONLY)
EARTH BASIN - DRY



CONSTRUCTION NOTES

1. THE TEMPORARY ACCESS SHALL BE MAINTAINED IN A CONDITION THAT PREVENTS TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHTS OF WAY.
 - THIS MAY REQUIRE PERIODIC TOP DRESSING WITH ADDITIONAL GRAVEL AS CONDITIONS DEMAND AND REPAIR AND/OR CLEANOUT OF ANY MEASURES USED TO TRAP SEDIMENT.
2. ALL SEDIMENT SPILLED, DROPPED, WASHED OR TRACKED ONTO PUBLIC RIGHTS OF WAY MUST BE REMOVED IMMEDIATELY.
3. INSTALL BARRIER ON EITHER SIDE OF SHAKER PAD. TO ENSURE VEHICLES ARE GUIDED ON TO THE PAD.
4. INVERT OF SHAKER PAD TO BE DRAINED VIA AGRICULTURAL PIPE WRAPPED IN GEOTEXTILE FABRIC.

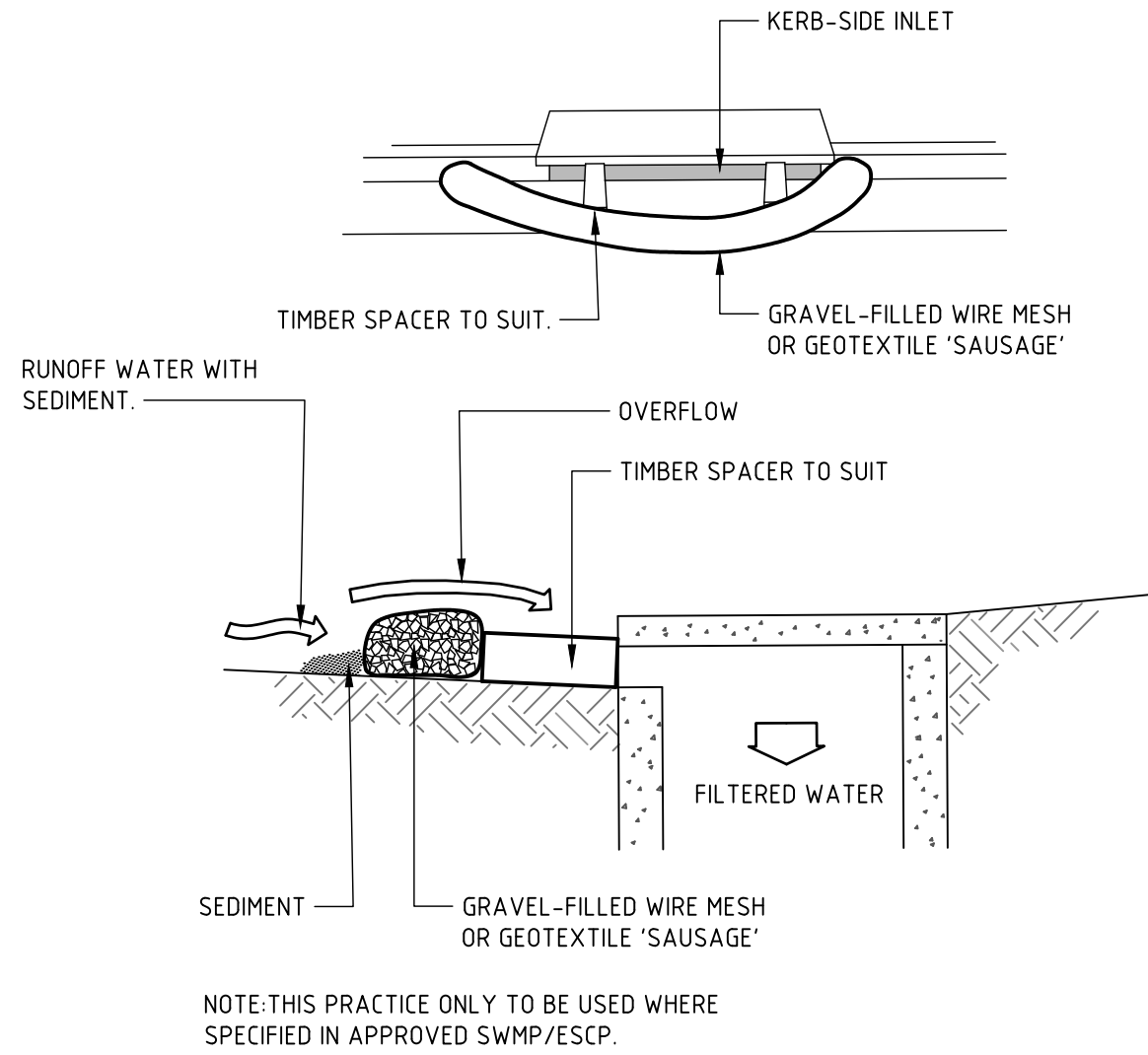
STABILISED SITE ACCESS



CONSTRUCTION NOTES

1. CONSTRUCT SEDIMENT FENCES AS CLOSE AS POSSIBLE TO BEING PARALLEL TO THE CONTOURS OF THE SITE, BUT WITH SMALL RETURNS AS SHOWN IN THE DRAWING TO LIMIT THE CATCHMENT AREA OF ANY ONE SECTION. THE CATCHMENT AREA SHOULD BE SMALL ENOUGH TO LIMIT WATER FLOW IF CONCENTRATED AT ONE POINT TO 50 LITRES PER SECOND IN THE DESIGN STORM EVENT, USUALLY THE 10-YEAR EVENT.
2. CUT A 150mm DEEP TRENCH ALONG THE UPSLOPE LINE OF THE FENCE FOR THE BOTTOM OF THE FABRIC TO BE ENTRENCHED.
3. DRIVE 1.5 METRE LONG STAR PICKETS INTO GROUND AT 2.5 METRE INTERVALS (MAX) AT THE DOWNSLOPE EDGE OF THE TRENCH. ENSURE ANY STAR PICKETS ARE FITTED WITH SAFETY CAPS.
4. FIX SELF-SUPPORTING GEOTEXTILE TO THE UPSLOPE SIDE OF THE POSTS ENSURING IT GOES TO THE BASE OF THE TRENCH. FIX THE GEOTEXTILE WITH WIRE TIES OR AS RECOMMENDED BY THE MANUFACTURER. ONLY USE GEOTEXTILE SPECIFICALLY PRODUCED FOR SEDIMENT FENCING. THE USE OF SHADE CLOTH FOR THIS PURPOSE IS NOT SATISFACTORY.
5. JOIN SECTIONS OF FABRIC AT A SUPPORT POST WITH A 150mm OVERLAP.
6. BACKFILL THE TRENCH OVER THE BASE OF THE FABRIC AND COMPACT IT THOROUGHLY OVER THE GEOTEXTILE.

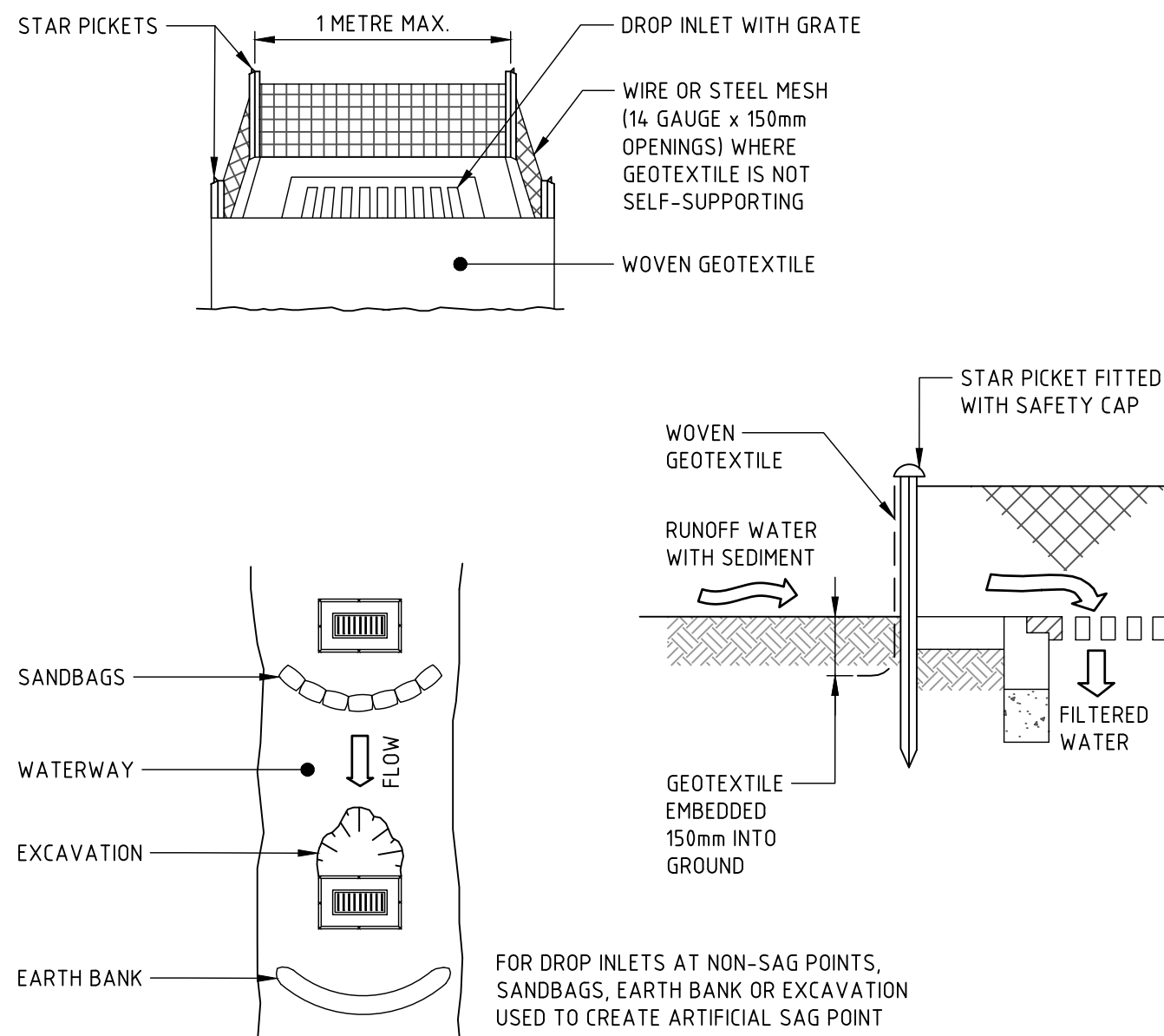
SEDIMENT FENCE



CONSTRUCTION NOTES

1. INSTALL FILTERS TO KERB INLETS ONLY AT SAG POINTS.
2. FABRICATE A SLEEVE MADE FROM GEOTEXTILE OR WIRE MESH LONGER THAN THE LENGTH OF THE INLET PIT AND FILL IT WITH 25mm TO 50mm GRAVEL.
3. FORM AN ELLIPTICAL CROSS-SECTION ABOUT 150mm HIGH x 400mm WIDE.
4. PLACE THE FILTER AT THE OPENING LEAVING AT LEAST A 100mm SPACE BETWEEN IT AND THE KERB INLET. MAINTAIN THE OPENING WITH SPACER BLOCKS.
5. FORM A SEAL WITH THE KERB TO PREVENT SEDIMENT BYPASSING THE FILTER.
6. SANDBAGS FILLED WITH GRAVEL CAN SUBSTITUTE FOR THE MESH OR GEOTEXTILE PROVIDING THEY ARE PLACED SO THAT THEY FIRMLY ABUT EACH OTHER AND SEDIMENT-LADEN WATERS CANNOT PASS BETWEEN.

WIRE MESH AND GRAVEL SEDIMENT FILTER



CONSTRUCTION NOTES

1. FABRICATE A SEDIMENT BARRIER MADE FROM GEOTEXTILE OR STRAW BALES.
2. FOLLOW STANDARD DRAWING 6-7 AND STANDARD DRAWING 6-8 FOR INSTALLATION PROCEDURES FOR THE STRAW BALES OR GEOFABRIC. REDUCE THE PICKET SPACING TO 1 METRE CENTRES.
3. IN WATERWAYS, ARTIFICIAL SAG POINTS CAN BE CREATED WITH SANDBAGS OR EARTH BANKS AS SHOWN IN THE DRAWING.
4. DO NOT COVER THE INLET WITH GEOTEXTILE UNLESS THE DESIGN IS ADEQUATE TO ALLOW FOR ALL WATERS TO BYPASS IT.

GEOTEXTILE INLET FILTER TRAPS

NOT FOR CONSTRUCTION

REVISION	DESCRIPTION	ISSUED	VER'D	APP'D	DATE	CLIENT	ARCHITECT	PROJECT	DRAWING TITLE	JOB NUMBER
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02	RE-ISSUED FOR DEVELOPMENT APPLICATION	UM		JC	11.05.23					
						DRAWING NOT TO BE USED FOR CONSTRUCTION UNLESS VERIFICATION SIGNATURE HAS BEEN ADDED	THE COPYRIGHT OF THIS DRAWING REMAINS WITH NORTHROP CONSULTING ENGINEERS PTY LTD	NOT TO SCALE	CIVIL ENGINEERING PACKAGE DEVELOPMENT APPLICATION SEDIMENT AND SOIL EROSION CONTROL DETAILS	DRAWING NUMBER DAC1101
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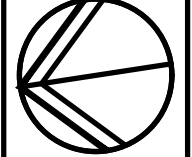
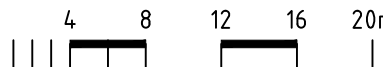
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DRAWN: U MANDAL
DESIGNED: J CARROLL
JOB MANAGER: B LAWRENCE
VERIFIER:

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01	ISSUED FOR DEVELOPMENT APPLICATION	UM		JC	08.05.23
02	RE-ISSUED FOR DEVELOPMENT APPLICATION	UM		JC	11.05.23

CLIENT
MOON INVESTMENTS
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ARCHITECT
plus architecture
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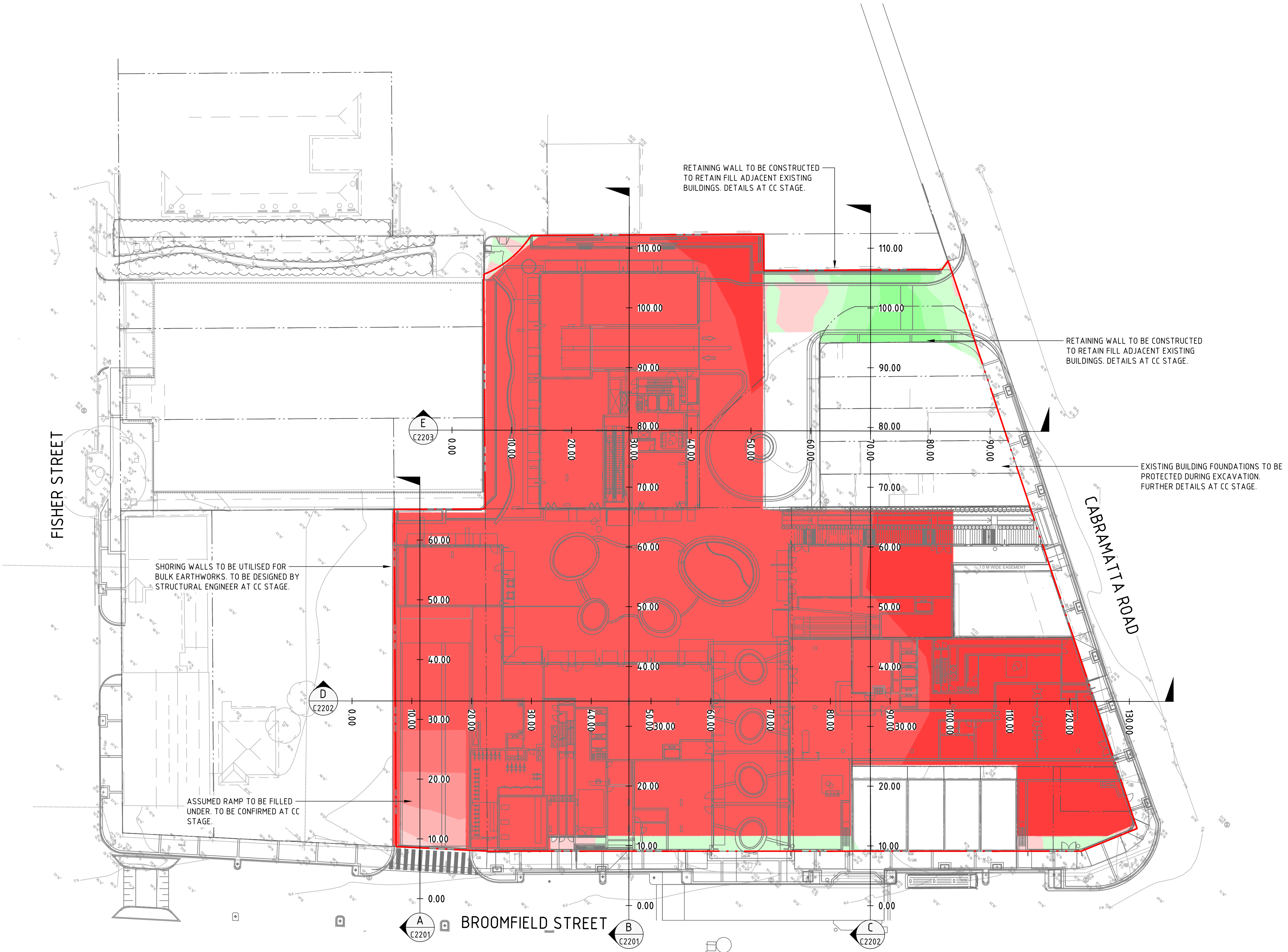
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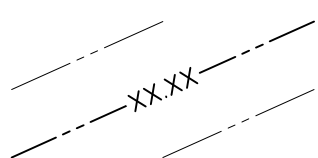
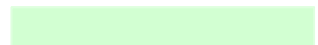
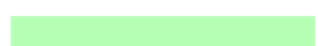
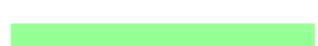
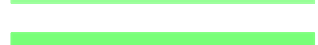
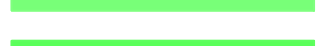
PROJECT
BROOMFIELD STREET CABRAMATTA

DRAWING TITLE
CIVIL ENGINEERING PACKAGE DEVELOPMENT APPLICATION BULK EARTHWORKS CUT TO FILL PLAN

JOB NUMBER	
183030-01	
DRAWING NUMBER	REVISION
DAC2001	02
DRAWING SHEET SIZE = A1	

NOT FOR CONSTRUCTION



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	EXISTING BOUNDARY LINE
	PROPOSED CONTOURS
DEPTH OF CUT	
	- 999m TO - 15.0m
	- 15.0m TO - 10.0m
	- 10.0m TO - 5.0m
	- 5.0m TO - 2.0m
	- 2.0m TO - 1.0m
	- 1.0m TO - 0.5m
	- 0.5m TO - 0.25m
	- 0.25m TO - 0.0m
DEPTH OF FILL	
	0.0m TO 0.25m
	0.25m TO 0.5m
	0.5m TO 1.0m
	1.0m TO 2.0m
	2.0m TO 5.0m
	5.0m TO 10.0m
	10.0m TO 15.0m
	15.0m TO 999m

GENERAL NOTES:	
1.	REFER SPECIFICATIONS NOTES FOR EARTHWORKS GENERAL REQUIREMENTS.
2.	ALL WORKS TO BE CARRIED OUT IN ACCORDANCE WITH COUNCIL / RELEVANT AUTHORITY SPECIFICATIONS AND DETAILS.
3.	CAD FILES / DTM FILES TO BE SUPPLIED IN AUTOCAD FORMAT FOR SETOUT PURPOSES (UPON REQUEST).
4.	STRIP EXISTING TOPSOIL IN CONSULTATION WITH THE GEOTECHNICAL ENGINEER / REPORT. FOR THE PURPOSES OF EARTHWORKS CALCULATIONS, NO TOPSOIL STRIPPING DEPTH HAS BEEN ASSUMED. GROUND SLAB DEPTH OF 200mm HAS BEEN ASSUMED WHERE REQUIRED.
5.	NO ALLOWANCE HAS BEEN MADE FOR BULKING FACTORS. NOTE ALL VOLUMES DEPICTED ARE SOLID VOLUMES ONLY AND MAY NOT REFLECT DETAILED EARTHWORKS.
6.	NO ALLOWANCE HAS BEEN MADE FOR DETAILED EARTHWORKS, ie SERVICE TRENCHING, DETAILED EXCAVATION, FOOTINGS, RETAINING WALLS AND THE LIKE. CONTRACTOR IS TO ALLOW FOR REMOVAL OF ALL EXCESS MATERIAL GENERATED BY THE WORKS.
7.	THE CONTRACTOR SHALL USE FINAL SURFACE LEVELS AND TYPICAL PAVEMENT DETAILS FOR ACTUAL EARTHWORKS LEVELS.
8.	APPROXIMATE BULK EARTHWORK VALUES AS FOLLOWS; 8.1 CUT 83,310 cu.m 8.2 FILL 119 cu.m 8.3 BALANCE 83,191 cu.m 8.4 NOTE: SITE STRIPPING VOLUMES HAVE NOT BEEN INCLUDED IN ABOVE CALCULATIONS.
9.	SHEARING WALLS HAVE BEEN ASSUMED FOR ALL EXCAVATIONS. CONTRACTOR TO CONFIRM ADEQUACY WITH GEOTECHNICAL ENGINEER.

15	15 373	4.7	4.7
20	15 311	4.7	4.7
25	15 249	4.7	4.7
30	15 217	4.7	4.7
35	15 181	4.7	4.7
40	15 15	4.7	4.7
45	15 163	4.7	4.7
50	15 159	4.7	4.7
55	15 153	4.7	4.7
60	15 147	4.7	4.7
65	15 117	4.7	4.7
70	15 096	4.7	4.7
75	15 139	4.7	4.7
80	15 177	4.7	4.7
85	15 261	4.7	4.7
90	15 355	4.7	4.7
95	15 446	4.7	4.7
100	15 545	4.7	4.7
105	15 649	4.7	4.7
110	15 754	4.7	4.7

0	15 158		
5	15		
10	15 22	4.7	
15	15 216	4.7	
20	15 658	4.7	
25	14 994	4.7	
30	14 968	4.7	
35	14 976	4.7	
40	14 872	4.7	
45	14 829	4.7	
50	14 833	4.7	
55	14 813	4.7	
60	14 707	4.7	
65	14 864		
69 245	14 706		

ARCHITECT

plus
architecture

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Sydney

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Email sydney@northrop.com.au ABN 81 094 433 100

DRAWING TITLE

**CIVIL ENGINEERING PACKAGE
DEVELOPMENT APPLICATION**

**BULK EARTHWORKS CUT TO FILL
SECTIONS- SHEET 01**

REVISION	DESCRIPTION	ISSUED	VER'D	APP'D	DATE
01	ISSUED FOR DEVELOPMENT APPLICATION	UM		JC	08.05.23
02	RE-ISSUED FOR DEVELOPMENT APPLICATION	UM		JC	11.05.23

DRAWN: U. MANDAL DESIGNED: J. CARROLL JOB MANAGER: B. LAWRENCE VERIFIER:

Drawn: U. Mandal Designed: J. Carroll Job Manager: B. Lawrence Verifier:

Revision	Description	Issued	Ver'd	App'd	Date
01	ISSUED FOR DEVELOPMENT APPLICATION	UM		JC	08.05.23
02	RE-ISSUED FOR DEVELOPMENT APPLICATION	UM		JC	11.05.23

Client
MOON INVESTMENTS
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Architect
plus architecture
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SCALE 1:200@ A1
SCALE 1:200@ A1



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Project
BROOMFIELD STREET CABRAMATTA

Drawing Title
CIVIL ENGINEERING PACKAGE DEVELOPMENT APPLICATION BULK EARTHWORKS CUT TO FILL SECTIONS- SHEET 02

Job Number
183030-01
Drawing Number
DAC2202
Revision
02
DRAWING SHEET SIZE = A1

LEGEND

DENOTES BULK CUT AREA

DENOTES BULK FILL AREA

DATUM RL -5.0				
BULK EARTHWORKS SURFACE				
DEPTH				
EXISTING SURFACE	14.804	14.926	14.974	14.977
CHAINAGE	0	5	10	15

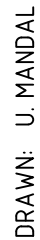
BULK EARTHWORKS D
HORIZONTAL SCALE 1:200@A1
VERTICAL SCALE 1:200@A1

DATUM RL -5.0				
BULK EARTHWORKS SURFACE				
DEPTH				
EXISTING SURFACE	15.904	15.942	15.888	15.834
CHAINAGE	0	5	10	15

BULK EARTHWORKS C
HORIZONTAL SCALE 1:200@A1
VERTICAL SCALE 1:200@A1

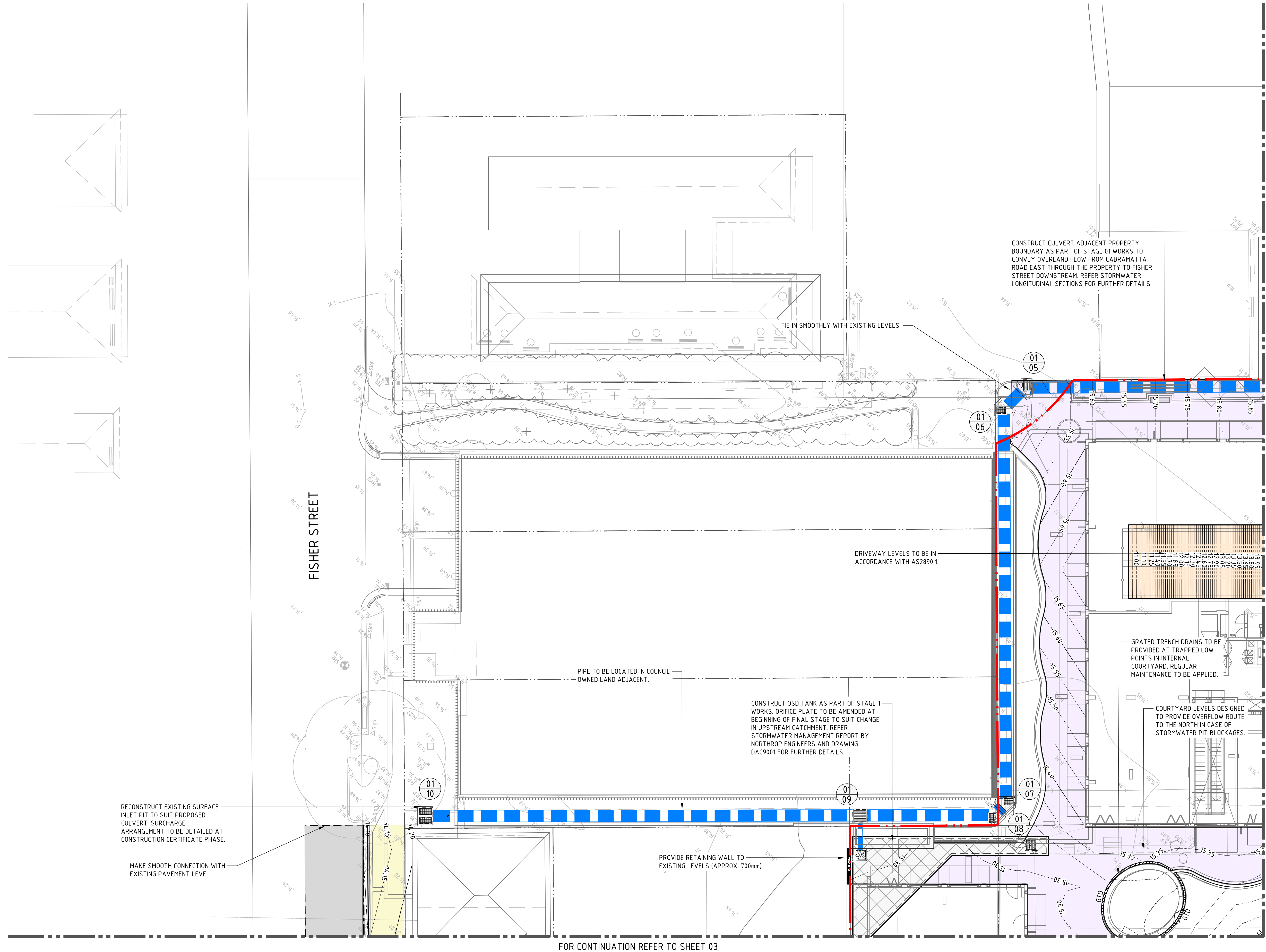
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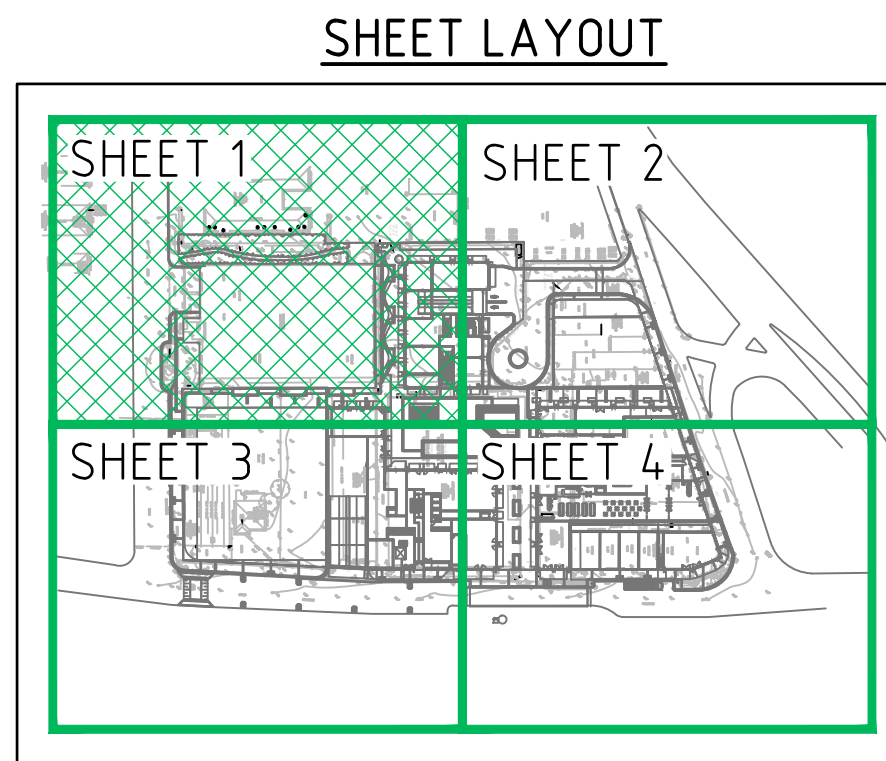
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DESIGNED: J. CARROLL
JOB MANAGER: B. LAWRENCE
VERIFIER:



LEGEND

- SITE BOUNDARY LINE
- EXISTING BOUNDARY LINE
- PROPOSED KERB
- SAWCUT AND PAVEMENT INFILL
- K0 KERB ONLY
- KG KERB AND GUTTER
- VC VEHICULAR CROSSING
- KR KERB RAMP
- PROPOSED CONTOURS
- EXISTING CONTOURS
- EXISTING DRAINAGE STRUCTURE
- NEW DRAINAGE STRUCTURE
- STORMWATER PIPE
- GRATED TRENCH DRAIN
- ON-SITE DETENTION TANK
- STORMWATER PIT TAG LINE ID / STRUCTURE No.
- PODIUM PAVEMENT
- PEDESTRIAN PAVEMENT - REFER FAIRFIELD CITY COUNCIL DETAIL P-1
- FLEXIBLE PAVEMENT
- RIGID PAVEMENT - (CONSTRUCTED IN ACCORDANCE WITH FAIRFIELD CITY COUNCIL TYPICAL DETAIL S-1)



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REVISION	DESCRIPTION	ISSUED	VER'D	APP'D	DATE
01	ISSUED FOR DEVELOPMENT APPLICATION	UM		JC	08.05.23
02	RE-ISSUED FOR DEVELOPMENT APPLICATION	UM		JC	09.05.23
03	RE-ISSUED FOR DEVELOPMENT APPLICATION	UM		JC	11.05.23

CLIENT	MOON INVESTMENTS
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ARCHITECT	plus architecture
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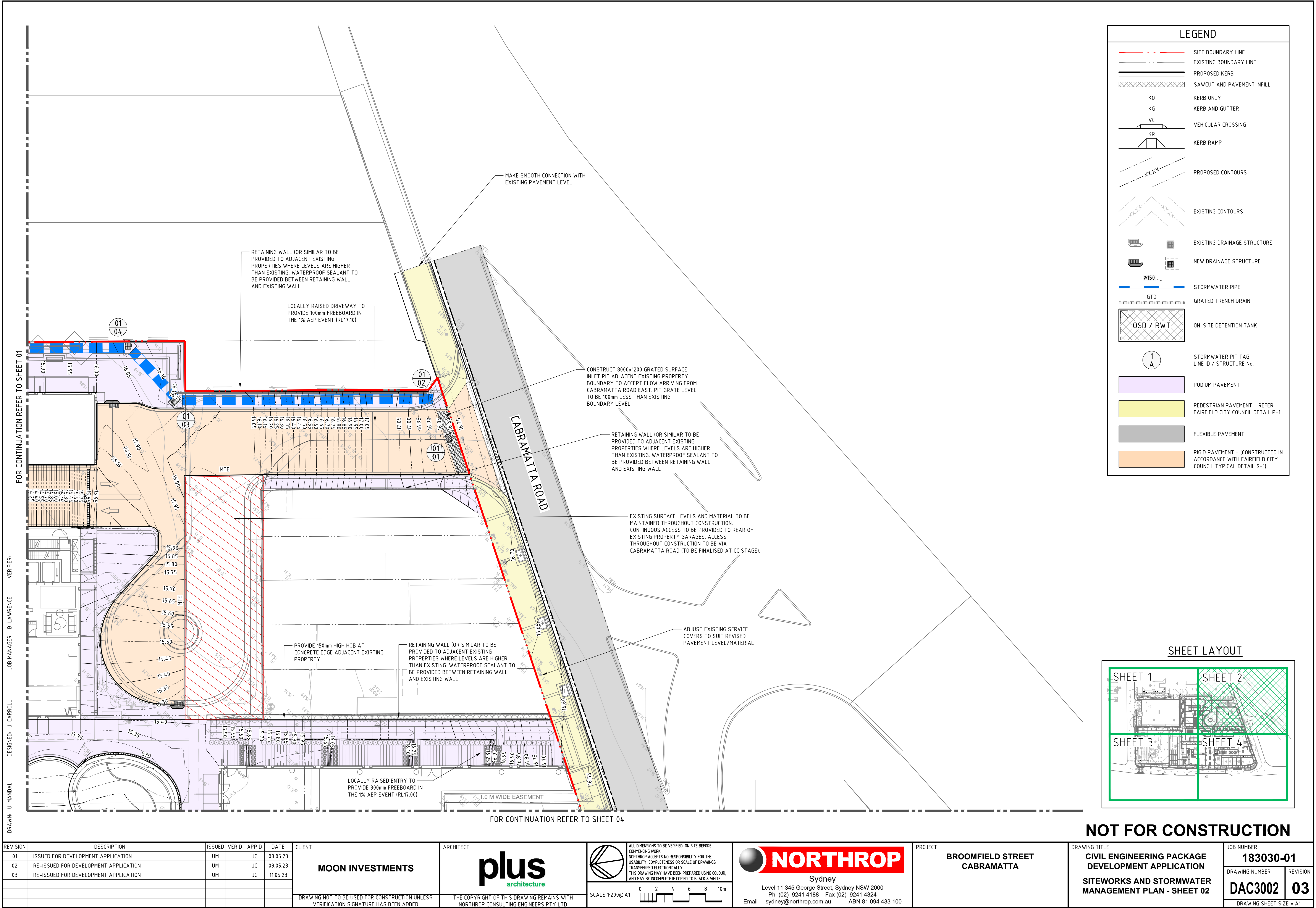
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PROJECT	BROOMFIELD STREET CABRAMATTA
---------	---------------------------------

DRAWING TITLE	CIVIL ENGINEERING PACKAGE DEVELOPMENT APPLICATION SITEWORKS AND STORMWATER MANAGEMENT PLAN - SHEET 01
---------------	--

JOB NUMBER	183030-01
DRAWING NUMBER	DAC3001
REVISION	03
DRAWING SHEET SIZE = A1	



DRAWN: U MANDAL
DESIGNED: J CARROLL
JOB MANAGER: B LAWRENCE
VERIFIER:

REVISION	DESCRIPTION	ISSUED	VER'D	APP'D	DATE
01	ISSUED FOR DEVELOPMENT APPLICATION	UM		JC	08.05.23
02	RE-ISSUED FOR DEVELOPMENT APPLICATION	UM		JC	09.05.23
03	RE-ISSUED FOR DEVELOPMENT APPLICATION	UM		JC	11.05.23

CLIENT	ARCHITECT
MOON INVESTMENTS	plus architecture
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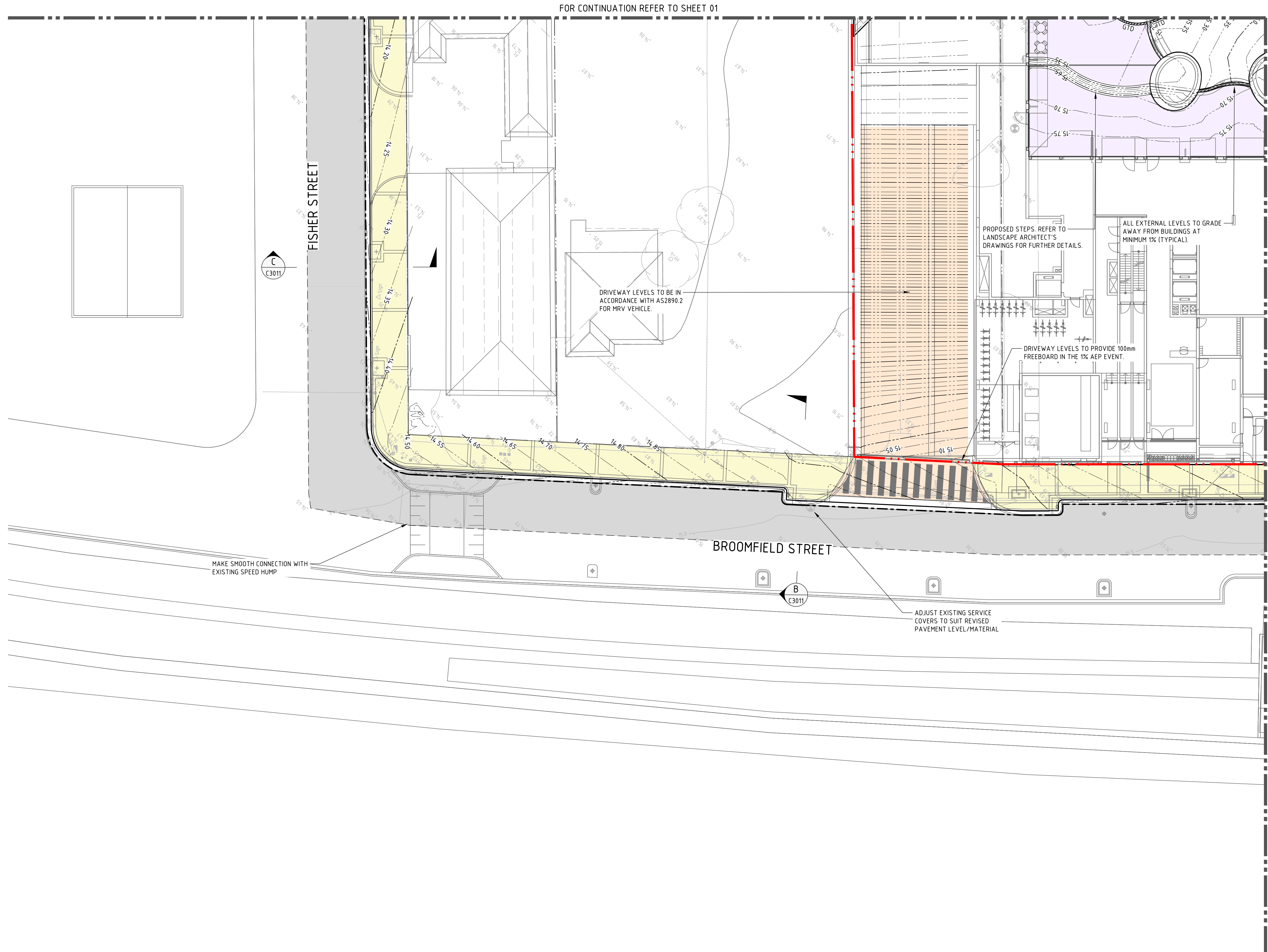
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SCALE 1:200@A1
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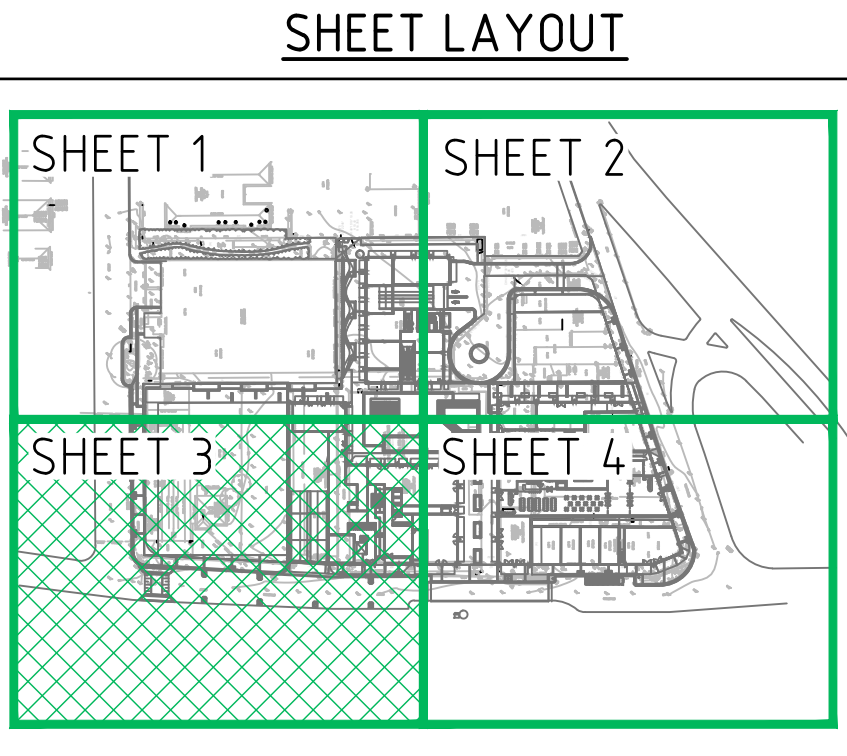
PROJECT
BROOMFIELD STREET CABRAMATTA

DRAWING TITLE
CIVIL ENGINEERING PACKAGE DEVELOPMENT APPLICATION SITEWORKS AND STORMWATER MANAGEMENT PLAN - SHEET 03

JOB NUMBER	REVISION
183030-01	
DRAWING NUMBER	03
DAC3003	
DRAWING SHEET SIZE = A1	



LEGEND	
	SITE BOUNDARY LINE
	EXISTING BOUNDARY LINE
	PROPOSED KERB
	SAWCUT AND PAVEMENT INFILL
K0	KERB ONLY
KG	KERB AND GUTTER
VC	VEHICULAR CROSSING
KR	KERB RAMP
	PROPOSED CONTOURS
	EXISTING CONTOURS
	EXISTING DRAINAGE STRUCTURE
	NEW DRAINAGE STRUCTURE
	STORMWATER PIPE
	GRATED TRENCH DRAIN
	ON-SITE DETENTION TANK
	STORMWATER PIT TAG LINE ID / STRUCTURE No.
	PODIUM PAVEMENT
	PEDESTRIAN PAVEMENT - REFER FAIRFIELD CITY COUNCIL DETAIL P-1
	FLEXIBLE PAVEMENT
	RIGID PAVEMENT - (CONSTRUCTED IN ACCORDANCE WITH FAIRFIELD CITY COUNCIL TYPICAL DETAIL S-1)



NOT FOR CONSTRUCTION

Architectural site plan of a building complex, likely a school or institutional facility, showing flood management details. The plan includes a building footprint with various rooms, corridors, and outdoor areas. A yellow-shaded area along the perimeter indicates a flood-prone zone or a specific drainage catchment area. A red line traces a path along the building's edge, possibly representing a flood wall or a specific drainage boundary. A blue line segment is also visible near the bottom right corner of the building. The plan is annotated with several key features and instructions:

- ALL GRATED TRENCH DRAINS TO BE CONNECTED TO OSD TANK (BYPASS REUSE CHAMBER). REFER TO HYDRAULIC DRAWINGS FOR CONNECTION DETAILS.** (Pointing to a trench drain system within the building footprint)
- EXTENDED PRAM CROSSING FLUSH WITH WOMBAT CROSSING.** (Pointing to a crossing area at the bottom left)
- BROOMFIELD STREET** (Label for the street running horizontally across the middle of the plan)
- CABRANATA ROAD** (Label for the road running diagonally along the right side of the plan)
- FLOATING FLOOD GATE TO RL:17.17. DETAILS AT CC STAGE** (Two locations: one near the top right corner and one near the bottom right corner)
- PROVIDE GRATED TRENCH DRAIN AS PER EXISTING SCENARIO** (Pointing to a trench drain location near the bottom right corner)
- MAKE SMOOTH CONNECTION WITH EXISTING PAVEMENT LEVEL** (Pointing to a transition area near the bottom right corner)

The plan also includes numerous spot levels (e.g., 15.60, 15.55, 15.75, 15.70, 16.20, 16.25, 16.30, 16.35, 16.40, 16.45, 16.50) and a north arrow pointing towards the top right. A scale bar is located in the bottom left corner.

LEGEND	
	SITE BOUNDARY LINE
	EXISTING BOUNDARY LINE
	PROPOSED KERB
	SAWCUT AND PAVEMENT INFILL
KO	KERB ONLY
KG	KERB AND GUTTER
VC	VEHICULAR CROSSING
	VEHICULAR CROSSING
KR	KERB RAMP
	KERB RAMP
	PROPOSED CONTOURS
	EXISTING CONTOURS
	EXISTING DRAINAGE STRUCTURE
	NEW DRAINAGE STRUCTURE
	STORMWATER PIPE
GTD	GRATED TRENCH DRAIN
	GRATED TRENCH DRAIN
	ON-SITE DETENTION TANK
	STORMWATER PIT TAG LINE ID / STRUCTURE No.
	PODIUM PAVEMENT
	PEDESTRIAN PAVEMENT - REFER FAIRFIELD CITY COUNCIL DETAIL P-1
	FLEXIBLE PAVEMENT
	RIGID PAVEMENT - (CONSTRUCTED IN ACCORDANCE WITH FAIRFIELD CITY COUNCIL TYPICAL DETAIL S-1)

DRAWING TITLE CIVIL ENGINEERING PACKAGE DEVELOPMENT APPLICATION SITeworks AND STORMwater MANAGEMENT PLAN - SHEET 04	JOB NUMBER 183030-01	
	DRAWING NUMBER DAC3004	REVISION 03
	DRAWING SHEET SIZE = A1	
	(Empty space for notes or additional information)	

REVISION	DESCRIPTION	ISSUED	VER'D	APP'D	DATE
01	ISSUED FOR DEVELOPMENT APPLICATION	UM		JC	08.05.23
02	RE-ISSUED FOR DEVELOPMENT APPLICATION	UM		JC	09.05.23
03	RE-ISSUED FOR DEVELOPMENT APPLICATION	UM		JC	11.05.23

CLIENT

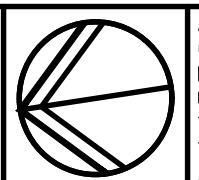
MOON INVESTMENTS

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ARCHITECT

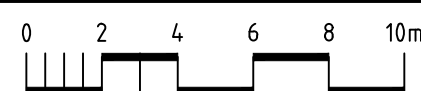
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architecture

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SCALE 1:200@ A1



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PROJECT **BROOMFIELD STREET
CABRAMATTA**

DRAWING TITLE

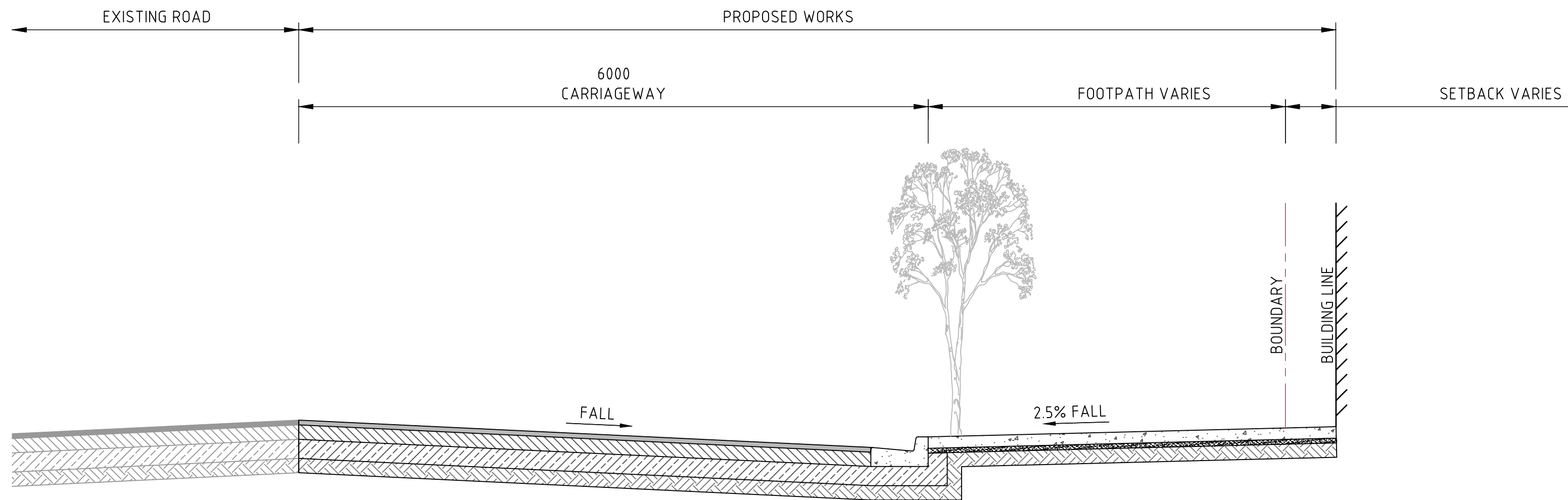
**CIVIL ENGINEERING PACKAGE
DEVELOPMENT APPLICATION**

**SITEWORKS AND STORMWATER
MANAGEMENT PLAN - SHEET 04**

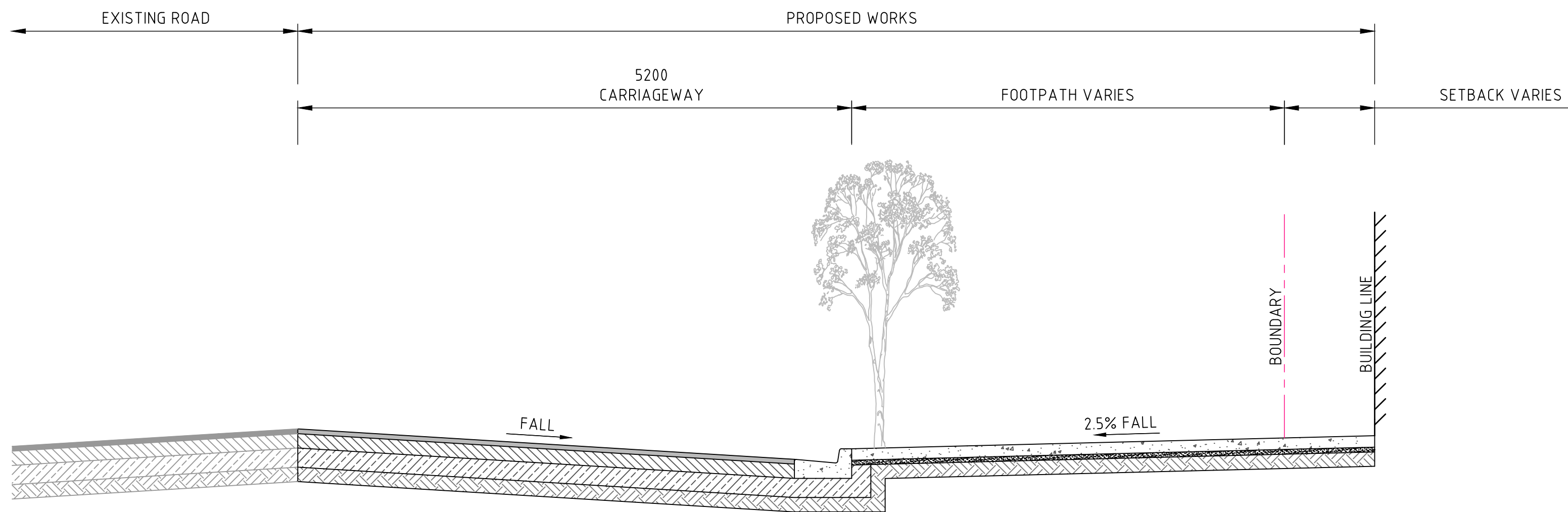
JOB NUMBER	
183030-01	
DRAWING NUMBER	REVISION
DAC3004	03
DRAWING SHEET SIZE = A1	

Plotted By : JAMIE CARROLL
Found : C:\2d\S\data\Northrop\SYN183030 - 01 Broomfield St. Cabramatta 40\183030-01-CAD\01-DA\183030-01 DAC3001.dwg

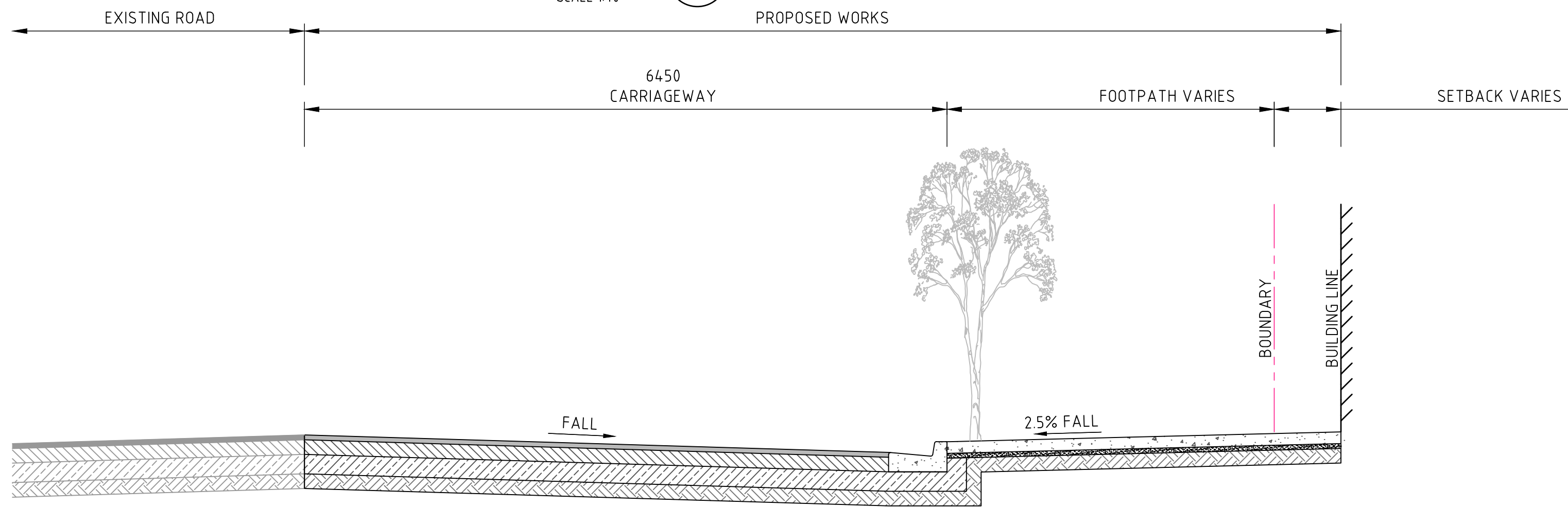
DRAWN: U MANDAL
DESIGNED: J CARROLL
JOB MANAGER: B LAWRENCE
VERIFIER:



CABRAMATTA ROAD EAST TYPICAL SECTION
SECTION A
SCALE 1:40
C04.01



BROOMFIELD STREET TYPICAL SECTION
SECTION B
SCALE 1:40
C04.01



FISHER STREET TYPICAL SECTION
SECTION C
SCALE 1:40
C04.01

NOT FOR CONSTRUCTION

REVISION	DESCRIPTION	ISSUED	VER'D	APP'D	DATE
01	ISSUED FOR DEVELOPMENT APPLICATION	UM		JC	08.05.23
02	RE-ISSUED FOR DEVELOPMENT APPLICATION	UM		JC	11.05.23

CLIENT
MOON INVESTMENTS
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ARCHITECT
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SCALE 1:40@A1
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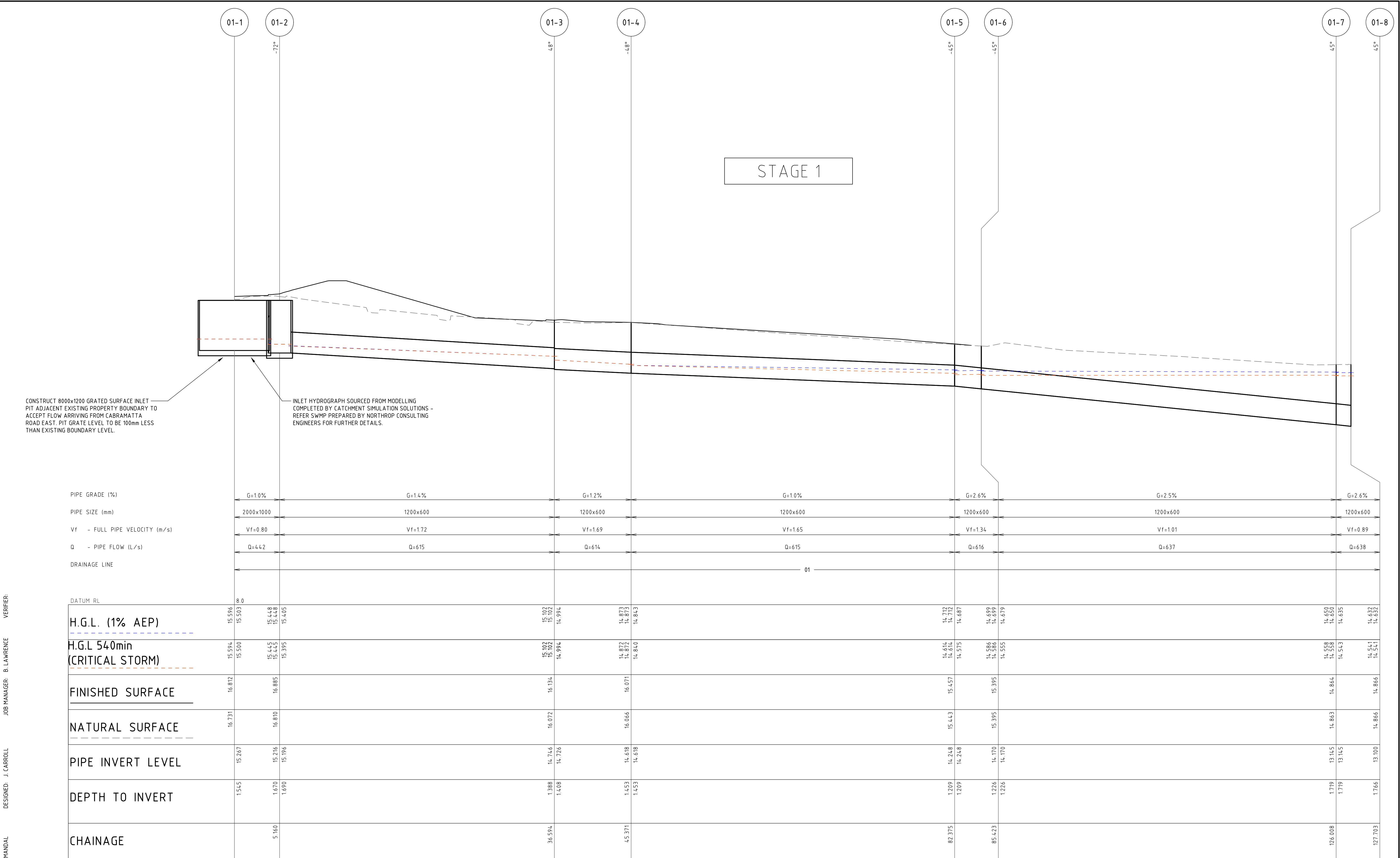
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PROJECT
BROOMFIELD STREET CABRAMATTA

DRAWING TITLE
CIVIL ENGINEERING PACKAGE DEVELOPMENT APPLICATION
TYPICAL SECTIONS

JOB NUMBER
183030-01
DRAWING NUMBER
DAC3011
REVISION
02
DRAWING SHEET SIZE = A1

DRAWN: U MANDAL DESIGNED: J CARROLL JOB MANAGER: B LAWRENCE VERIFIER:



LINE 01

NOT FOR CONSTRUCTION

REVISION	DESCRIPTION	ISSUED	VER'D	APP'D	DATE
01	ISSUED FOR DEVELOPMENT APPLICATION	UM		JC	08.05.23
02	RE-ISSUED FOR DEVELOPMENT APPLICATION	UM		JC	11.05.23

MOON INVESTMENTS

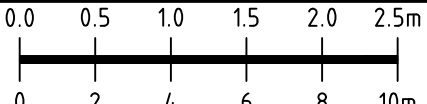
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SCALE 1:50 @ A1
SCALE 1:200 @ A1



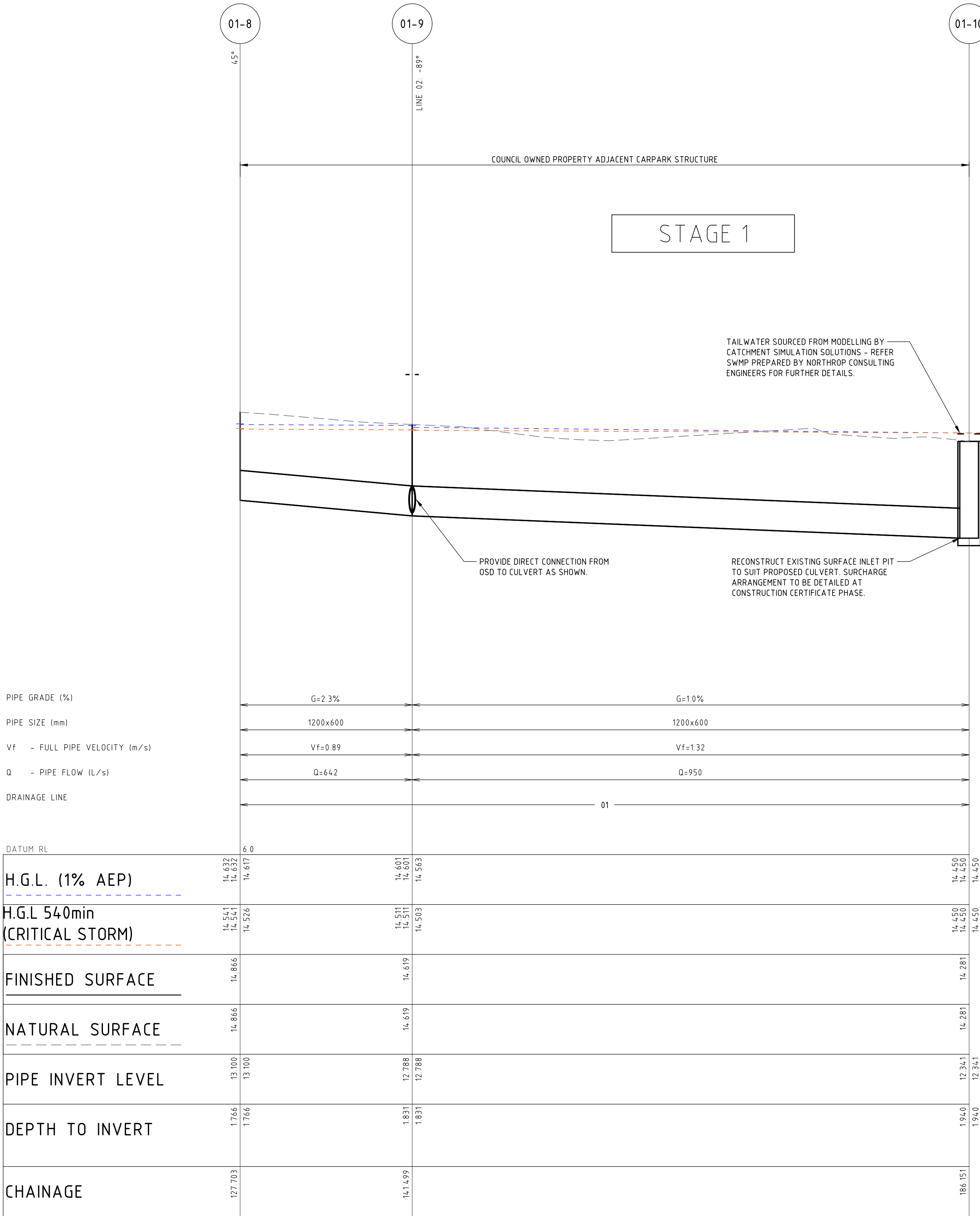
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PROJECT
BROOMFIELD STREET
CABRAMATTA

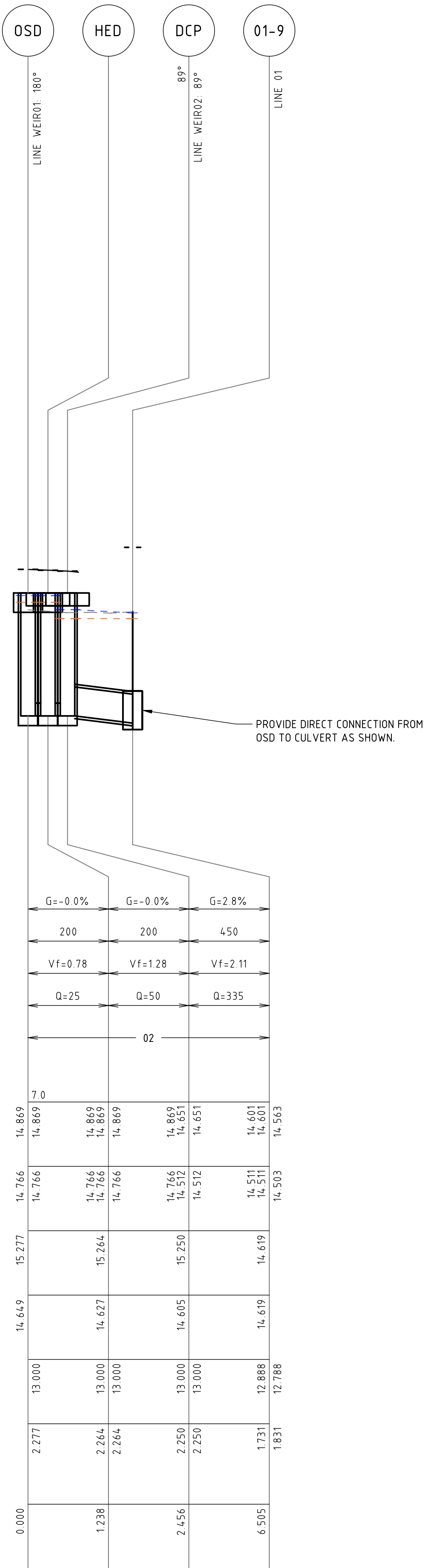
DRAWING TITLE
CIVIL ENGINEERING PACKAGE
DEVELOPMENT APPLICATION
STAGE 1 STORMWATER
LONGITUDINAL SECTIONS - SHEET 01

JOB NUMBER 183030-01	REVISION
DRAWING NUMBER DAC4101	02
DRAWING SHEET SIZE = A1	

DRAWN: U MANDAL DESIGNED: J CARROLL JOB MANAGER: B LAWRENCE VERIFIER:



LINE 01



LINE 02

NOT FOR CONSTRUCTION

REVISION	DESCRIPTION	ISSUED	VER'D	APP'D	DATE
01	ISSUED FOR DEVELOPMENT APPLICATION	UM		JC	08.05.23
02	RE-ISSUED FOR DEVELOPMENT APPLICATION	UM		JC	11.05.23

CLIENT	MOON INVESTMENTS
DRAWING NOT TO BE USED FOR CONSTRUCTION UNLESS VERIFICATION SIGNATURE HAS BEEN ADDED	

ARCHITECT	plus architecture
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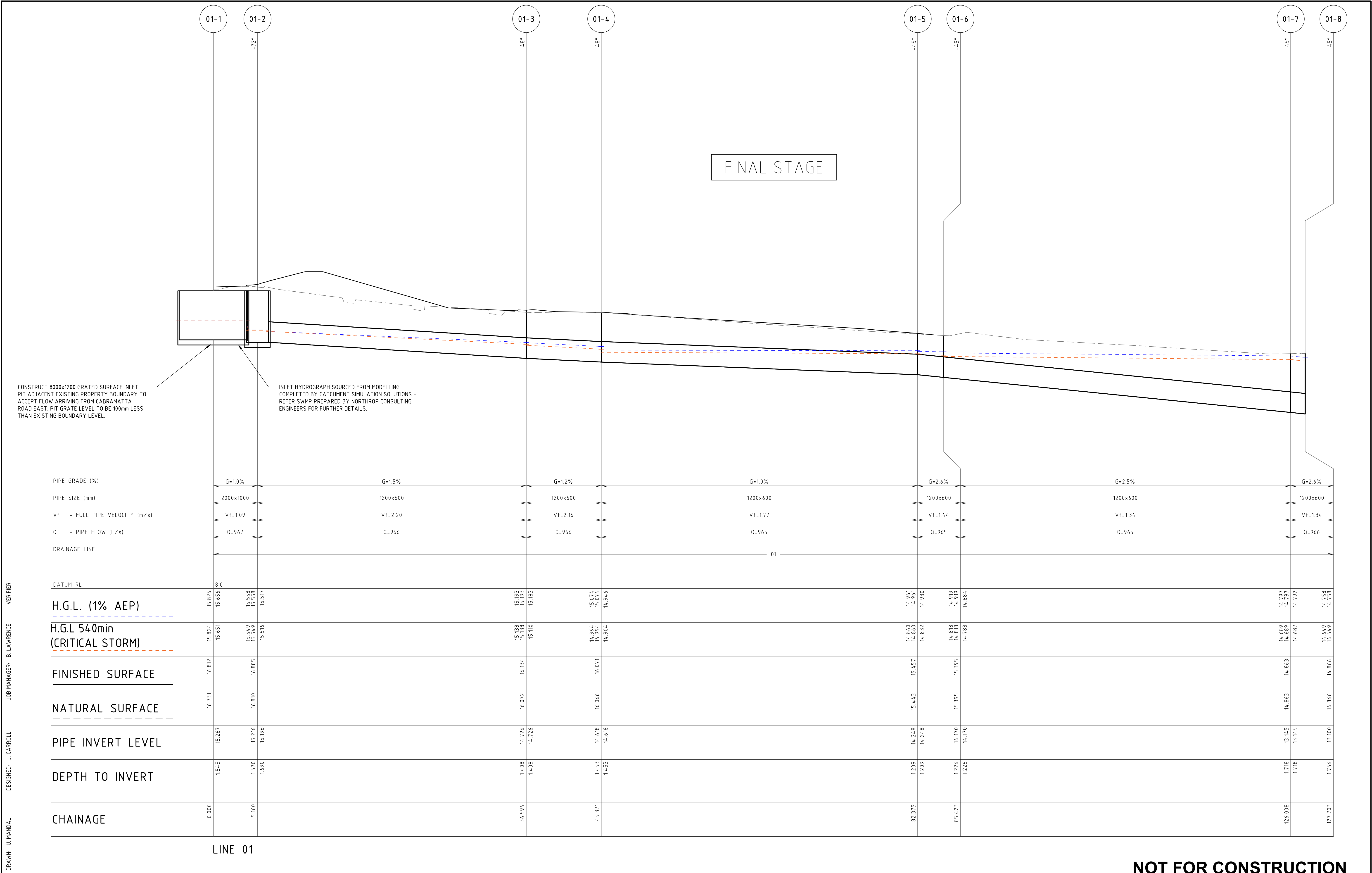
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PROJECT	BROOMFIELD STREET CABRAMATTA
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DRAWING TITLE	CIVIL ENGINEERING PACKAGE DEVELOPMENT APPLICATION STAGE 1 STORMWATER LONGITUDINAL SECTIONS - SHEET 02
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JOB NUMBER	183030-01
DRAWING NUMBER	DAC4102
REVISION	02
DRAWING SHEET SIZE	A1



REVISION	DESCRIPTION	ISSUED	VER'D	APP'D	DATE	CLIENT	ARCHITECT	PROJECT	DRAWING TITLE	JOB NUMBER
01	ISSUED FOR DEVELOPMENT APPLICATION	UM		JC	08.05.23	MOON INVESTMENTS	plus architecture	BROOMFIELD STREET CABRAMATTA	CIVIL ENGINEERING PACKAGE DEVELOPMENT APPLICATION	183030-01
02	RE-ISSUED FOR DEVELOPMENT APPLICATION	UM		JC	11.05.23				STAGE 2 STORMWATER LONGITUDINAL SECTIONS - SHEET 01	DRAWING NUMBER
										REVISION
										DAC4103
										02
										DRAWING SHEET SIZE = A1

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SCALE 1:50@ A1
SCALE 1:200@ A1

0 0.5 1.0 1.5 2.0 2.5m
0 2 4 6 8 10m

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PROJECT
BROOMFIELD STREET CABRAMATTA

DRAWING TITLE
CIVIL ENGINEERING PACKAGE DEVELOPMENT APPLICATION
STAGE 2 STORMWATER LONGITUDINAL SECTIONS - SHEET 01

JOB NUMBER
183030-01

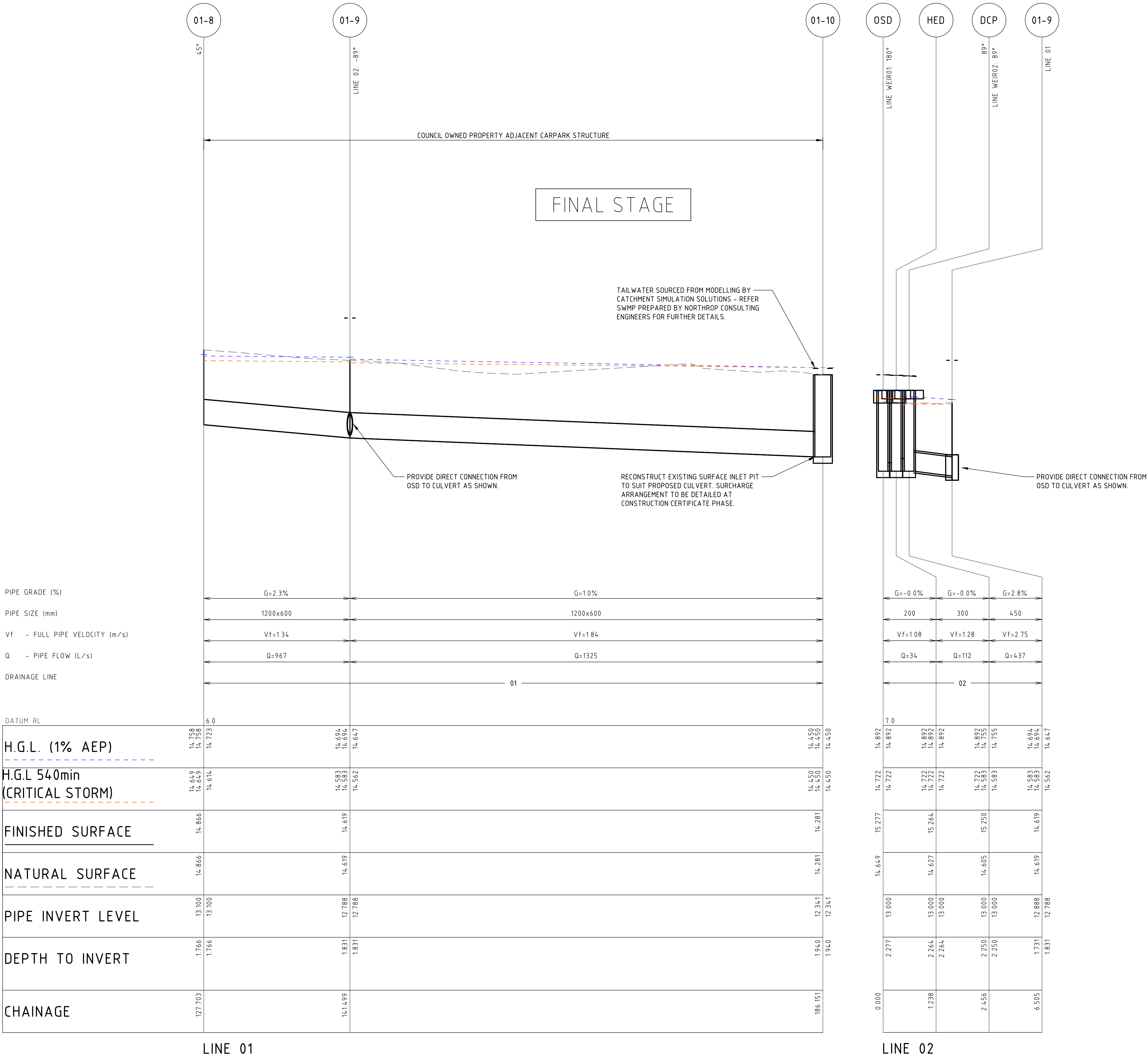
DRAWING NUMBER
DAC4103

REVISION
02

DRAWING SHEET SIZE = A1

Drawn By : J. CARROLL
Job Manager : B. LAWRENCE
Verifier :
Designed : J. CARROLL
Drawn : U. MANDAL
Pinned By : ANGUS FALLINS
Found : c:\2625\2625\Northrop\SYN183030-01-CAD\01-DA183030-01_DAC4103.dwg
Date : 16.04.2020 2:24 PM

DRAWN: U MANDAL DESIGNED: J CARROLL JOB MANAGER: B LAWRENCE VERIFIER:



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REVISION	DESCRIPTION	ISSUED	VER'D	APP'D	DATE
01	ISSUED FOR DEVELOPMENT APPLICATION	UM		JC	08.05.23
02	RE-ISSUED FOR DEVELOPMENT APPLICATION	UM		JC	11.05.23

CLIENT	MOON INVESTMENTS
DRAWING NOT TO BE USED FOR CONSTRUCTION UNLESS VERIFICATION SIGNATURE HAS BEEN ADDED	

ARCHITECT	plus architecture
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SCALE 1:50@A1 SCALE 1:200@A1	The image shows two horizontal scale bars. The top bar is for a scale of 1:50 at A1 size, with markings at 0.0, 0.5, 1.0, 1.5, 2.0, and 2.5 meters. The bottom bar is for a scale of 1:200 at A1 size, with markings at 0, 2, 4, 6, 8, and 10 meters. Both bars are represented by a solid black line with vertical tick marks at the specified intervals.

Level 11 345 George Street, Sydney NSW 2000 Ph (02) 9241 4188 Fax (02) 9241 4324 Email sydney@northrop.com.au ABN 81 094 433 100

PROJECT	BROOMFIELD STREET CABRAMATTA
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DRAWING TITLE	CIVIL ENGINEERING PACKAGE DEVELOPMENT APPLICATION STAGE 2 STORMWATER LONGITUDINAL SECTIONS - SHEET 02
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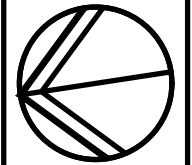
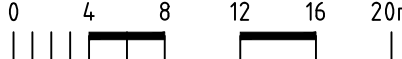
JOB NUMBER	183030-01
DRAWING NUMBER	DAC4104
REVISION	02
DRAWING SHEET SIZE	A1

DRAWN: U MANDAL
DESIGNED: J CARROLL
JOB MANAGER: B LAWRENCE
VERIFIER:

REVISION	DESCRIPTION	ISSUED	VER'D	APP'D	DATE
01	ISSUED FOR DEVELOPMENT APPLICATION	UM		JC	08.05.23
02	RE-ISSUED FOR DEVELOPMENT APPLICATION	UM		JC	11.05.23

CLIENT	MOON INVESTMENTS
DRAWING NOT TO BE USED FOR CONSTRUCTION UNLESS VERIFICATION SIGNATURE HAS BEEN ADDED	

ARCHITECT	plus architecture
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SCALE 1:400@ A1	

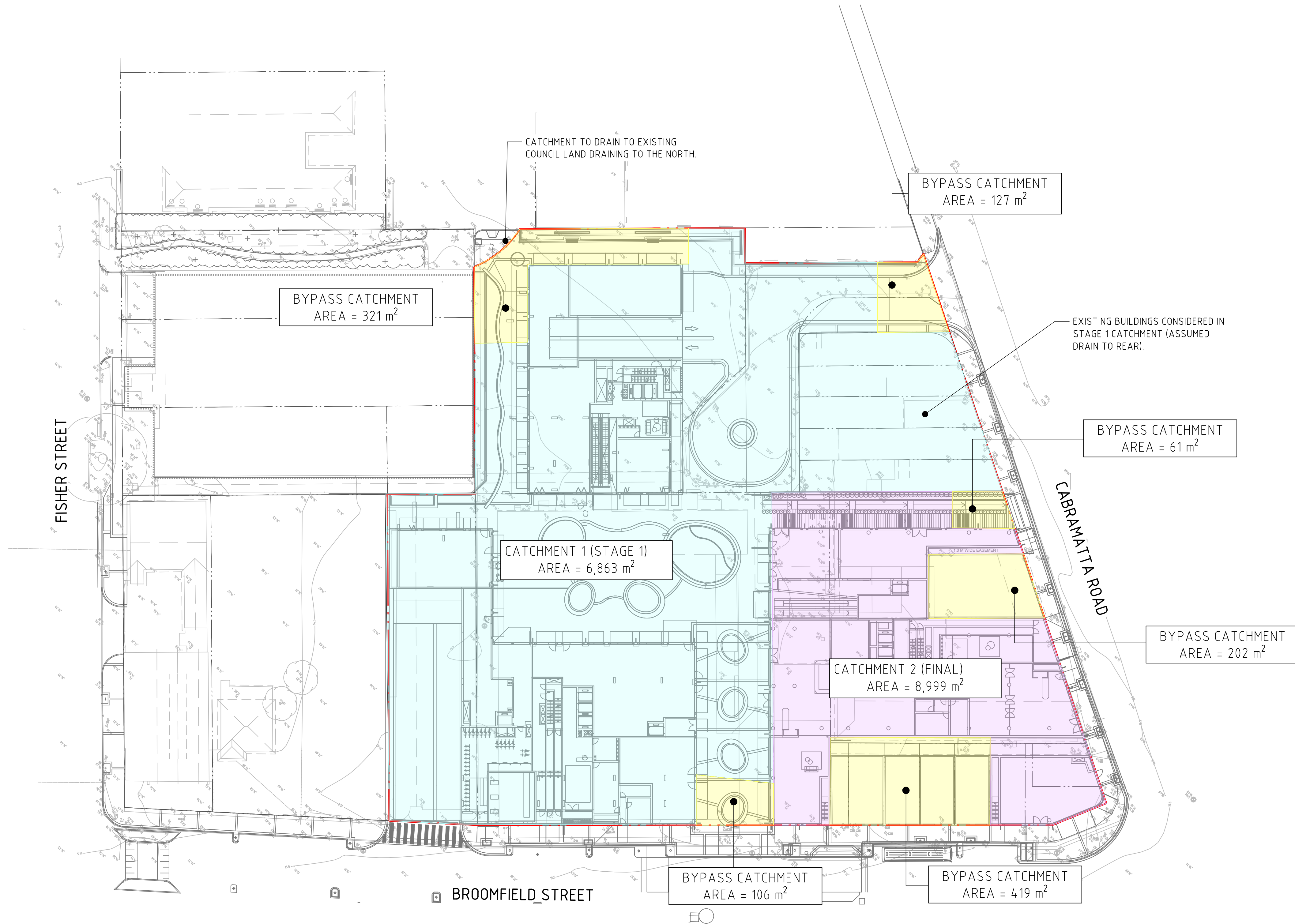
	NORTHROP Sydney Level 11 345 George Street, Sydney NSW 2000 Ph (02) 9241 4188 Fax (02) 9241 4324 Email sydney@northrop.com.au ABN 81 094 433 100
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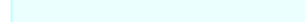
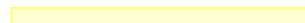
PROJECT	BROOMFIELD STREET CABRAMATTA
---------	---

DRAWING TITLE	CIVIL ENGINEERING PACKAGE DEVELOPMENT APPLICATION STORMWATER CATCHMENT PLAN
---------------	--

JOB NUMBER	183030-01
DRAWING NUMBER	DAC4201
REVISION	02
DRAWING SHEET SIZE = A1	

NOT FOR CONSTRUCTION



LEGEND	
	SITE BOUNDARY LINE
	EXISTING CONTOURS
	CATCHMENT BOUNDARY
	EXISTING DRAINAGE STRUCTURE
	NEW DRAINAGE STRUCTURE
	STORMWATER CATCHMENT - STAGE 1
	STORMWATER CATCHMENT - STAGE 2
	BYPASS CATCHMENT

DRAWN: U MANDAL
DESIGNED: J CARROLL
JOB MANAGER: B LAWRENCE
VERIFIER:

REVISION	DESCRIPTION	ISSUED	VER'D	APP'D	DATE
01	ISSUED FOR DEVELOPMENT APPLICATION	UM		JC	08.05.23
02	RE-ISSUED FOR DEVELOPMENT APPLICATION	UM		JC	11.05.23

CLIENT	ARCHITECT
MOON INVESTMENTS	plus architecture
DRAWING NOT TO BE USED FOR CONSTRUCTION UNLESS VERIFICATION SIGNATURE HAS BEEN ADDED	

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SCALE 1:400@A1
0 4 8 12 16 20m

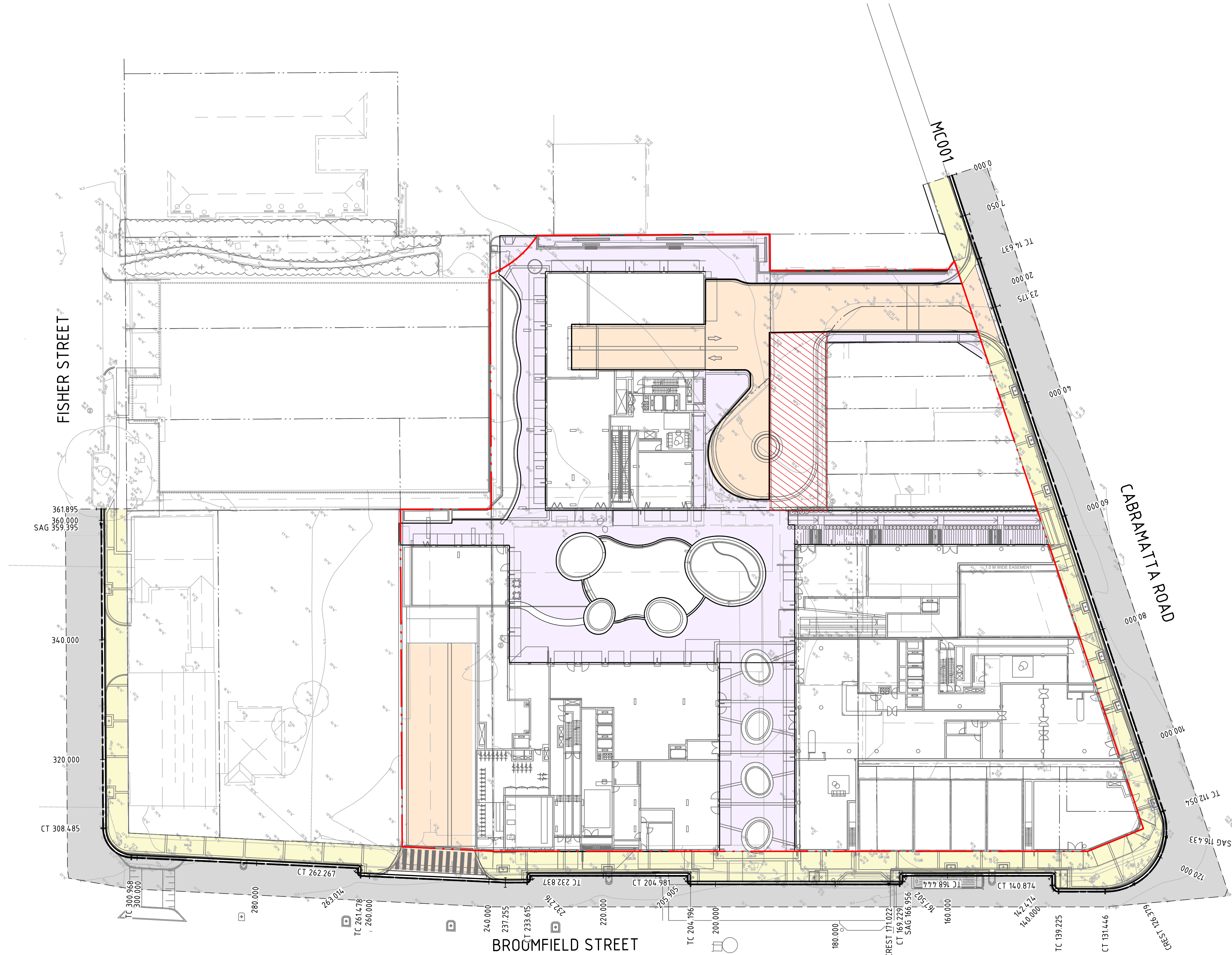
 Sydney Level 11 345 George Street, Sydney NSW 2000 Ph (02) 9241 4188 Fax (02) 9241 4324 Email sydney@northrop.com.au ABN 81 094 433 100

PROJECT
BROOMFIELD STREET CABRAMATTA

DRAWING TITLE
CIVIL ENGINEERING PACKAGE DEVELOPMENT APPLICATION ALIGNMENT CONTROL PLAN

JOB NUMBER	183030-01
DRAWING NUMBER	REVISION
DAC5001	02
DRAWING SHEET SIZE = A1	

NOT FOR CONSTRUCTION



LEGEND	
	PROPOSED SITE BOUNDARY LINE
	EXISTING BOUNDARY LINE
MC01	CONTROL LINE
	CHAINAGE
	TANGENT POINT

REVISION	DESCRIPTION	ISSUED	VER'D	APP'D	DATE
01	ISSUED FOR DEVELOPMENT APPLICATION	UM		JC	08.05.23
02	RE-ISSUED FOR DEVELOPMENT APPLICATION	UM		JC	11.05.23

CLIENT
MOON INVESTMENTS
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ARCHITECT
plus architecture
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SCALE 1:80 @A1 SCALE 1:400 @A1
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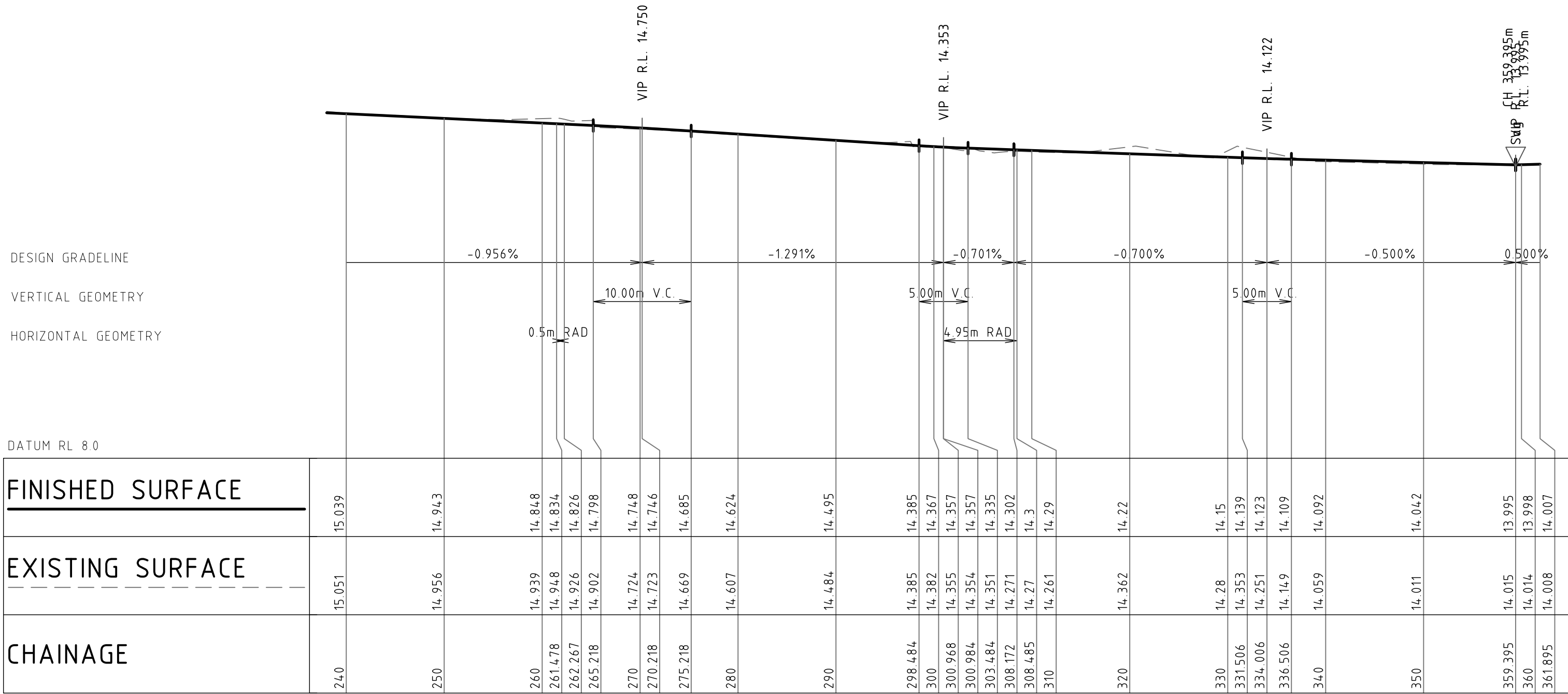
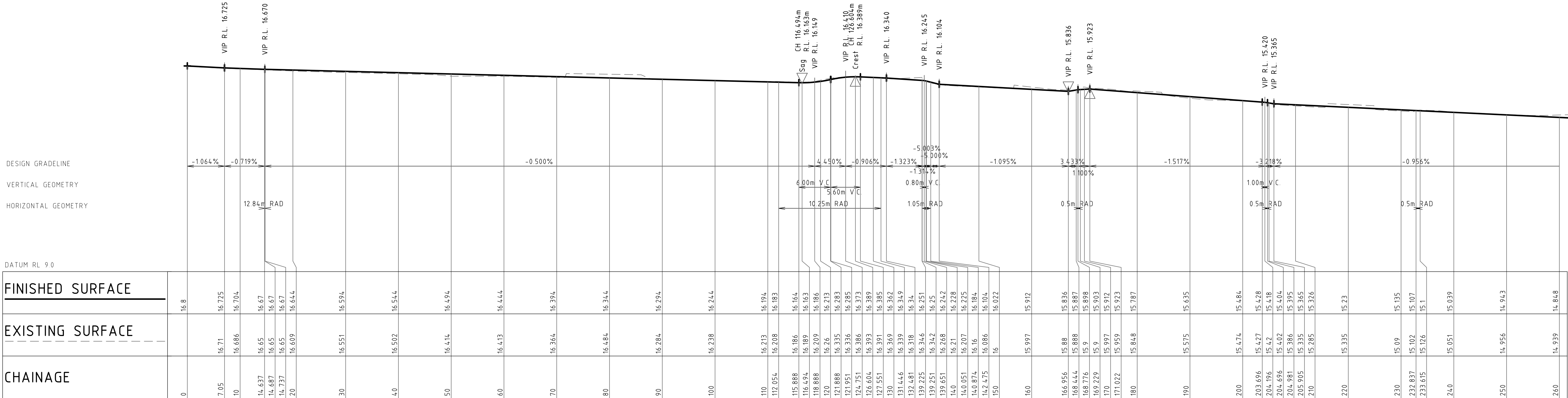
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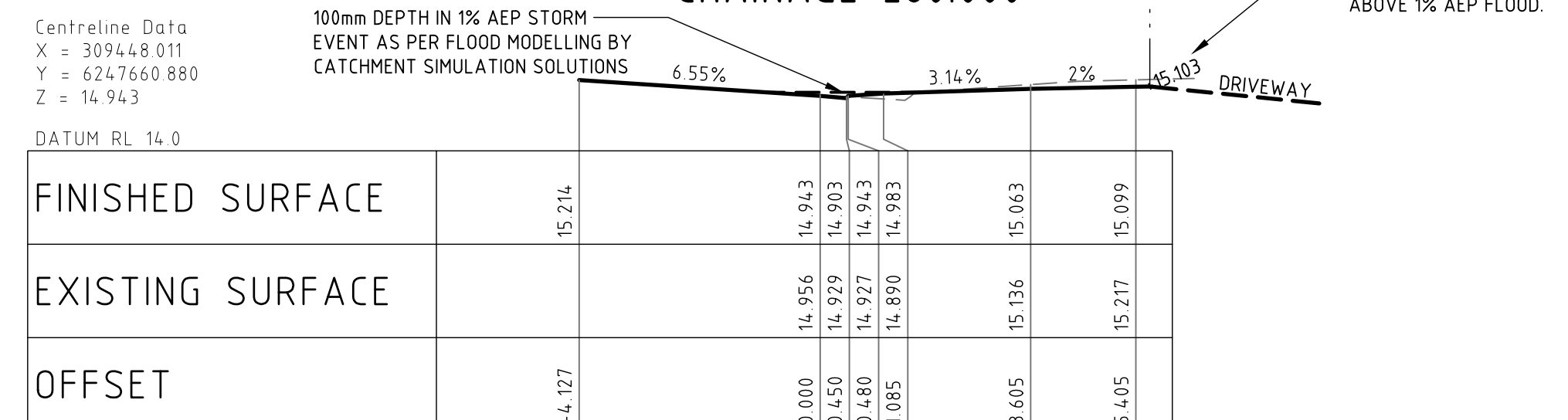
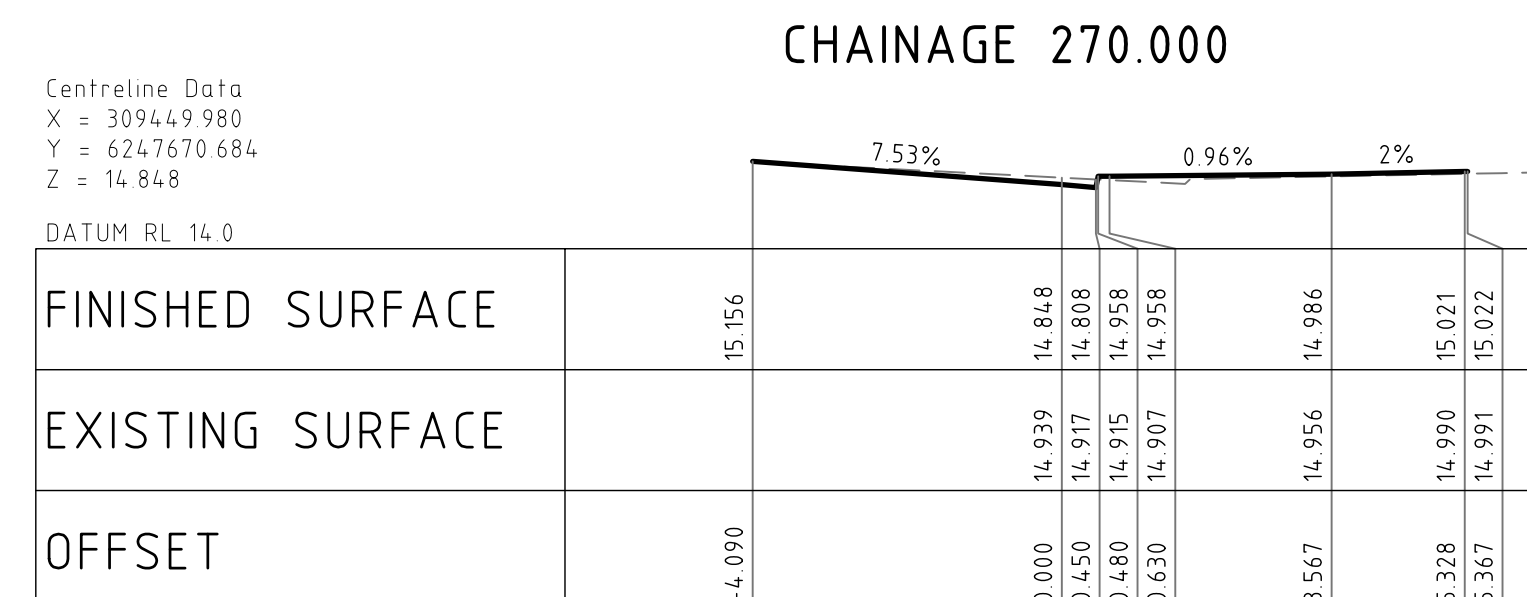
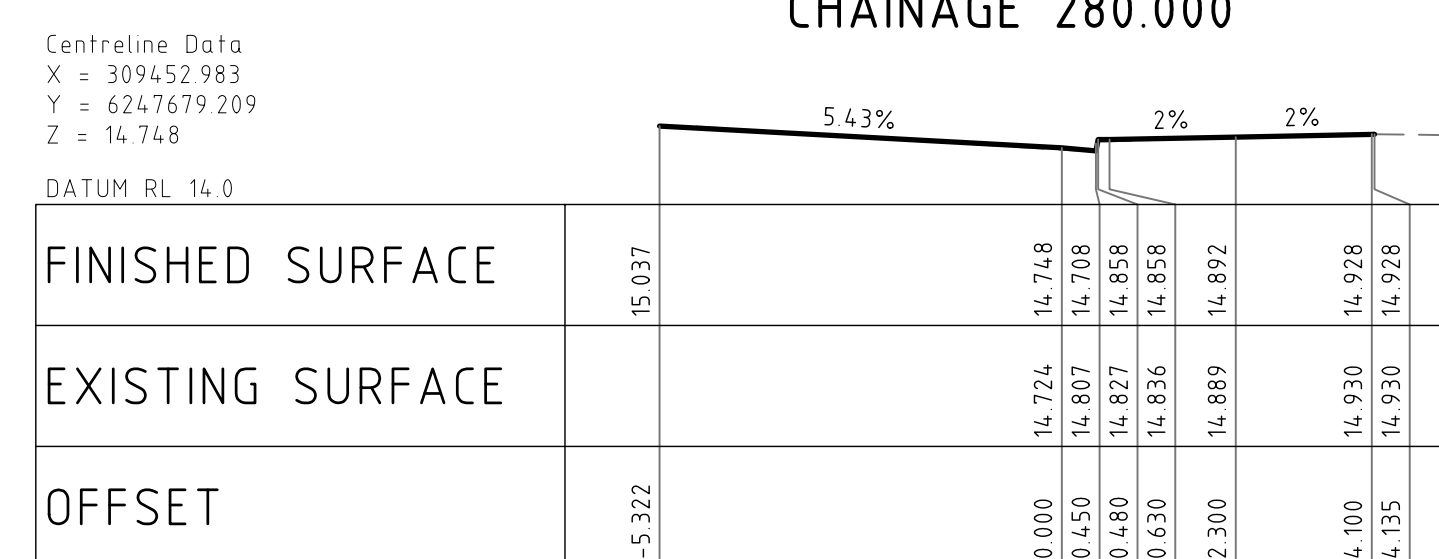
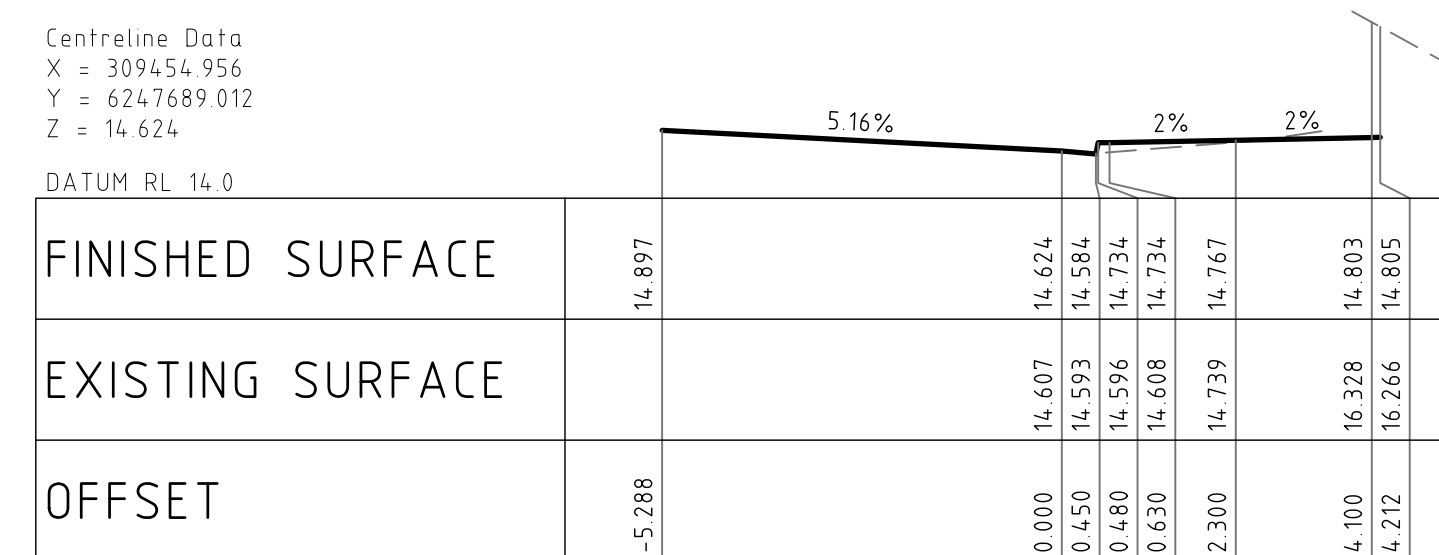
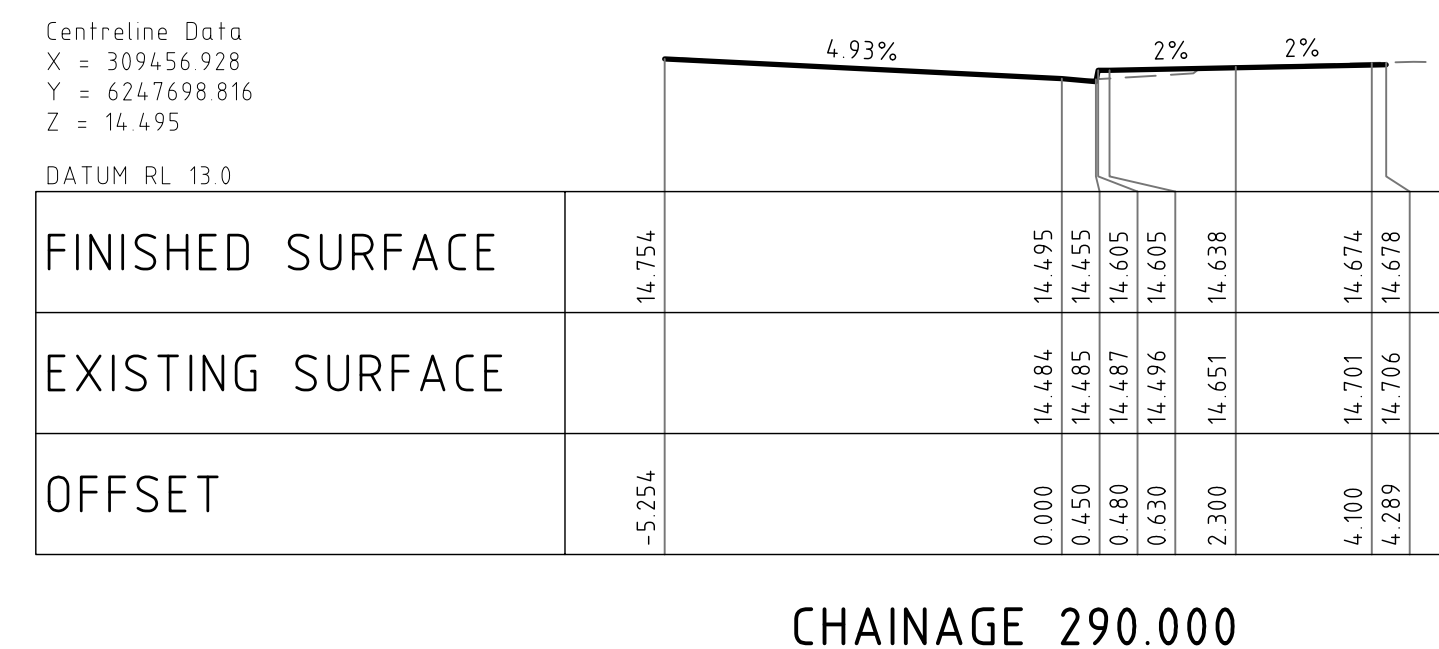
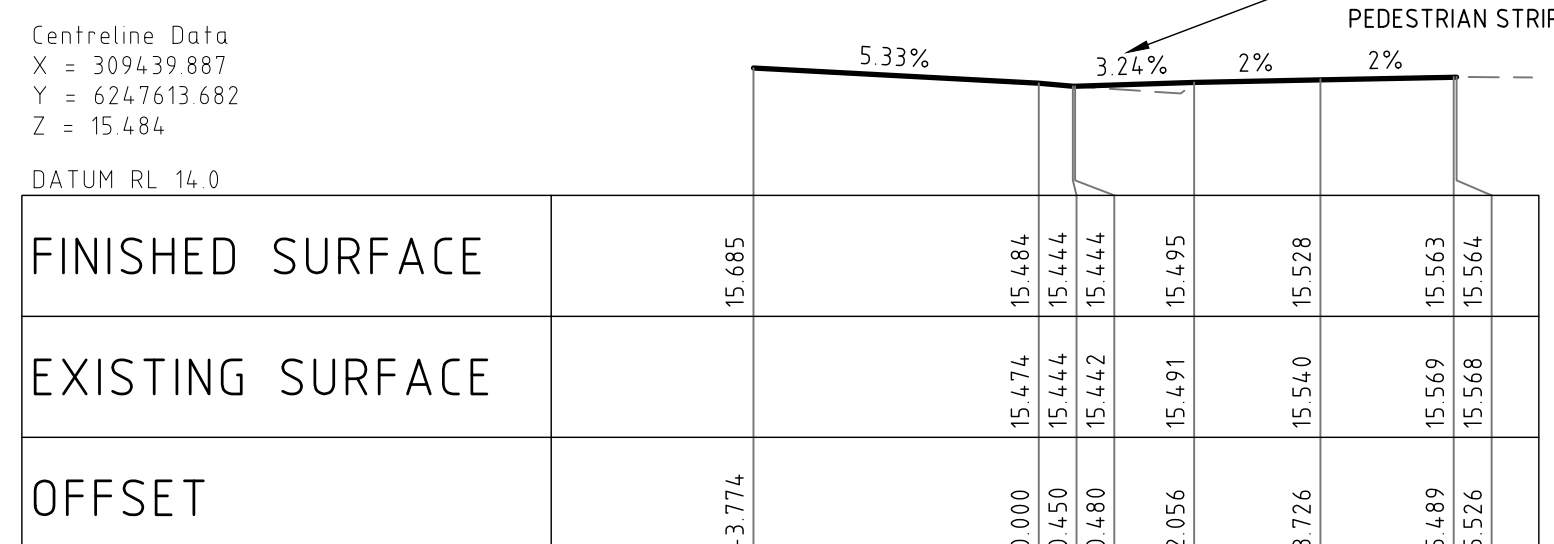
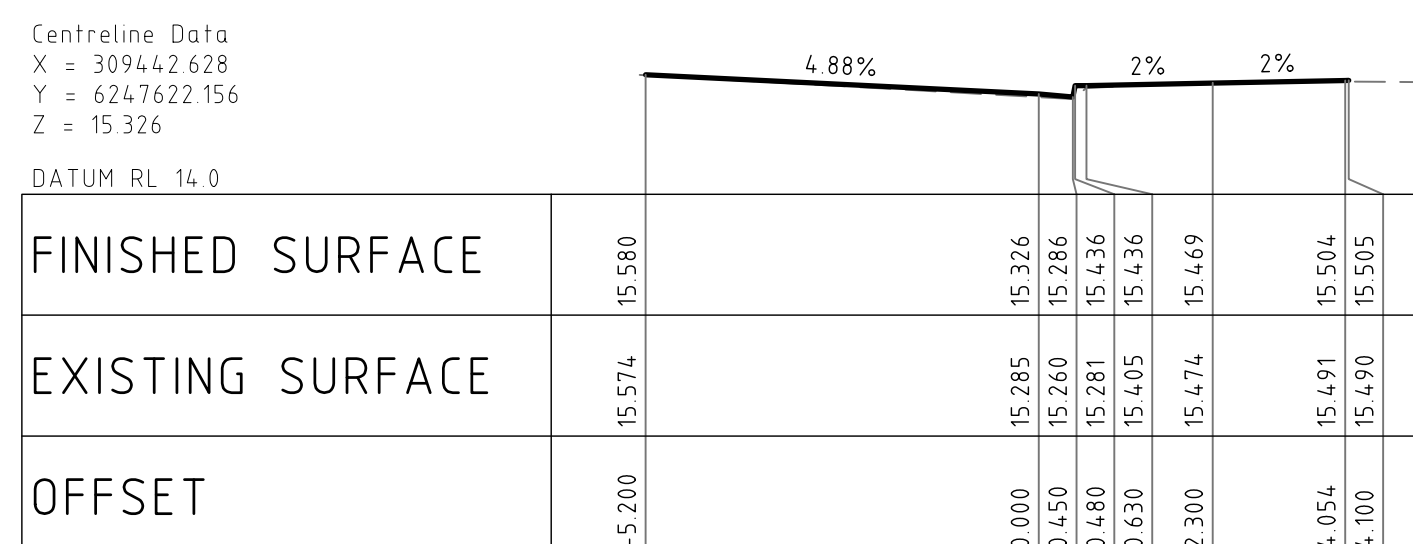
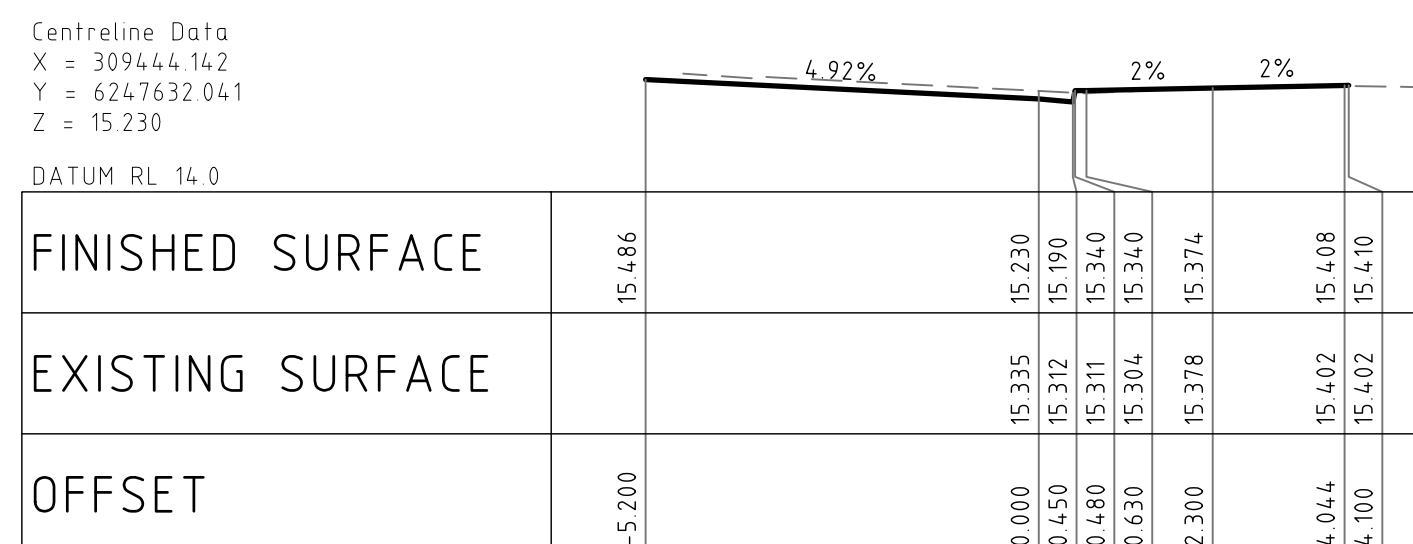
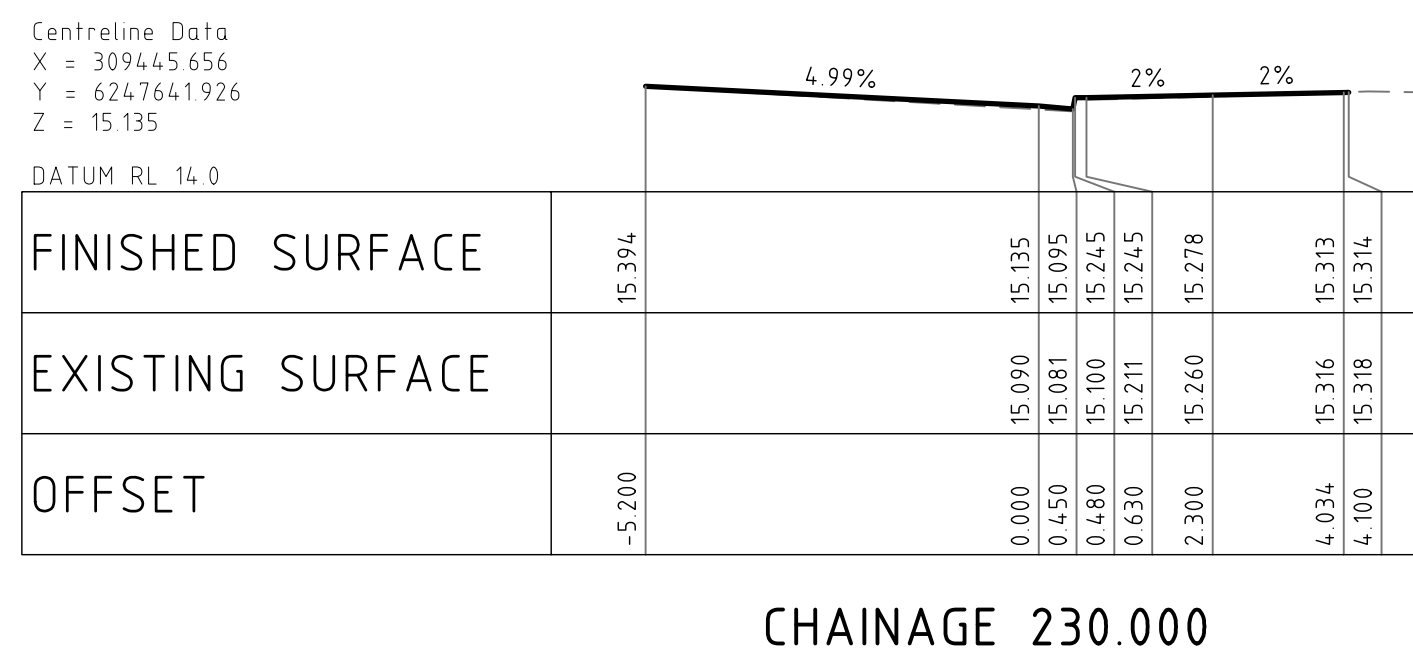
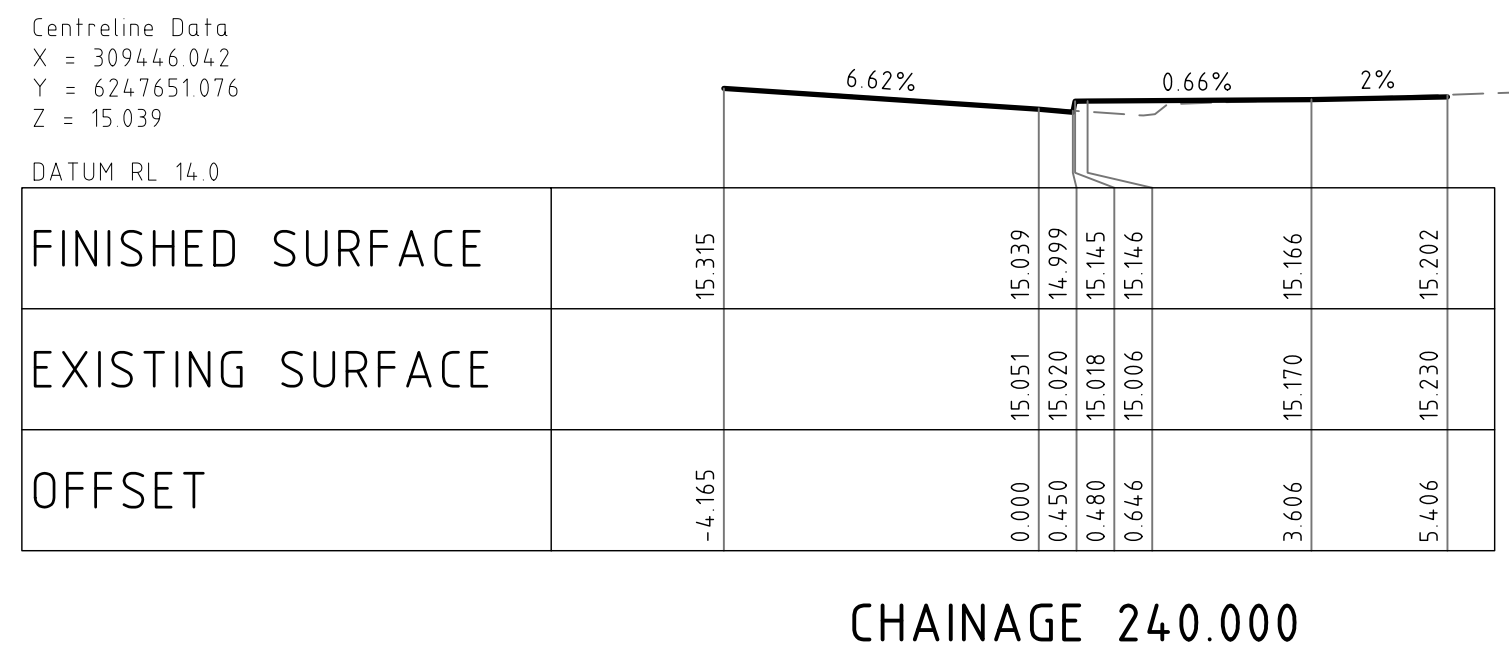
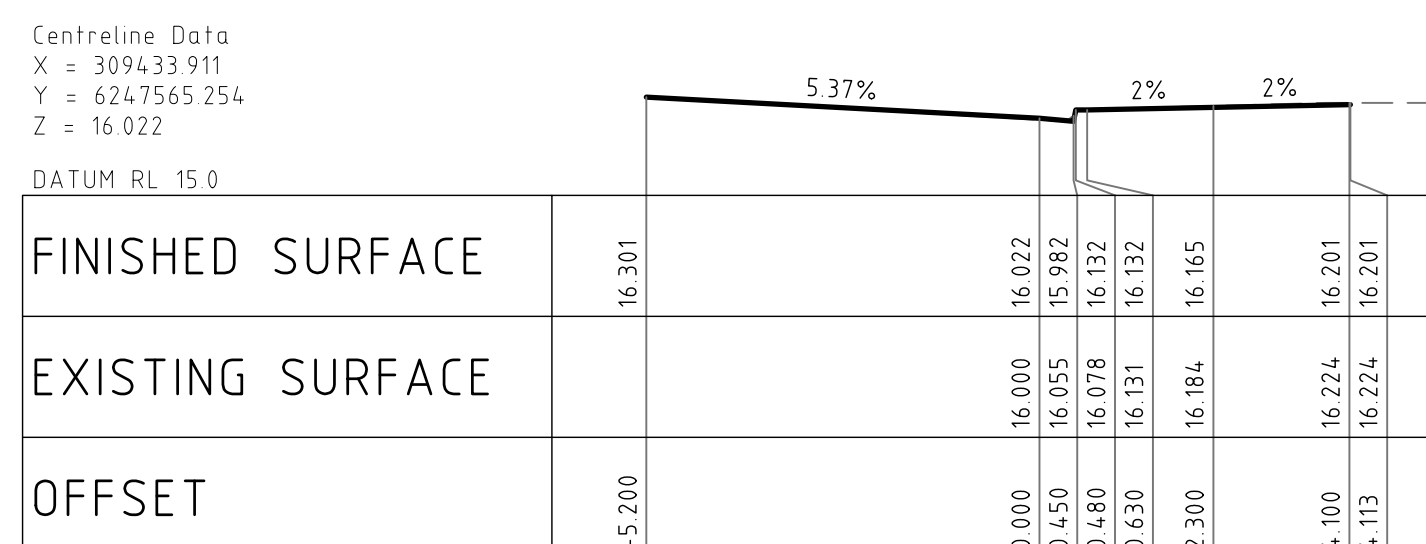
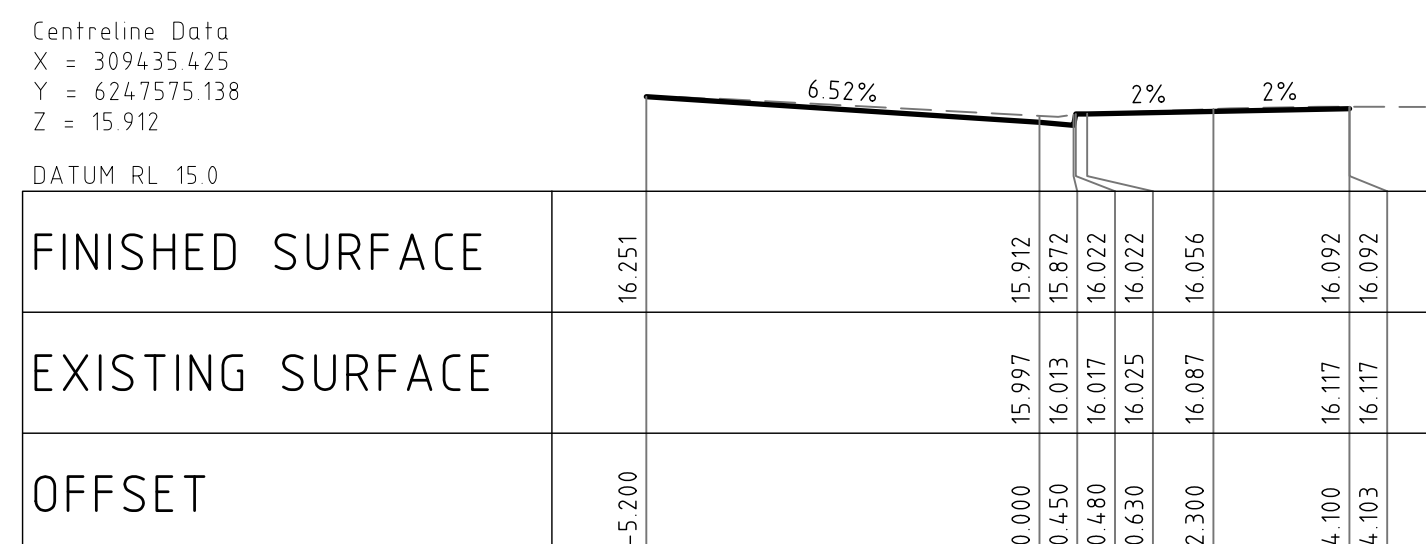
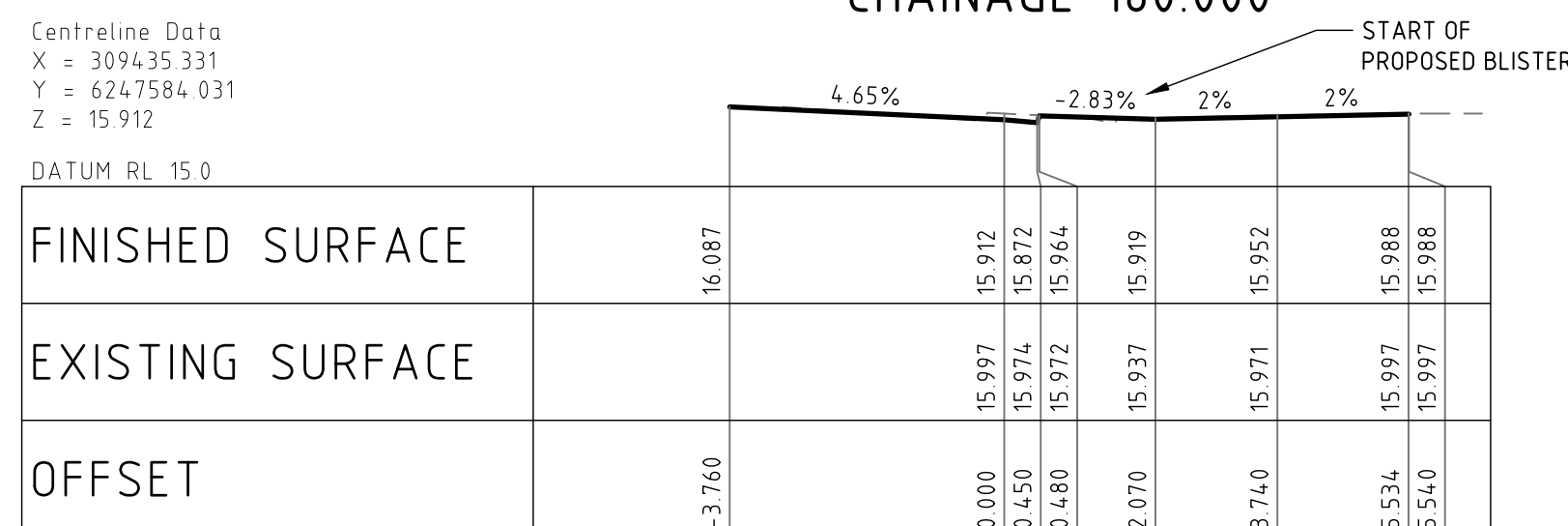
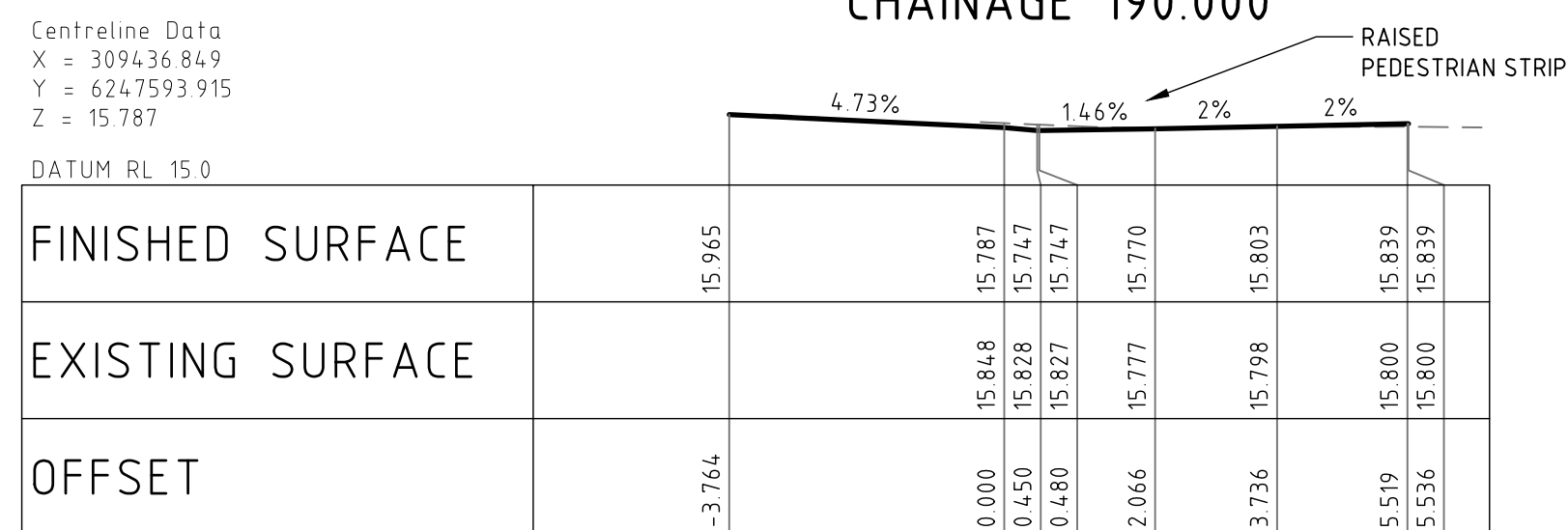
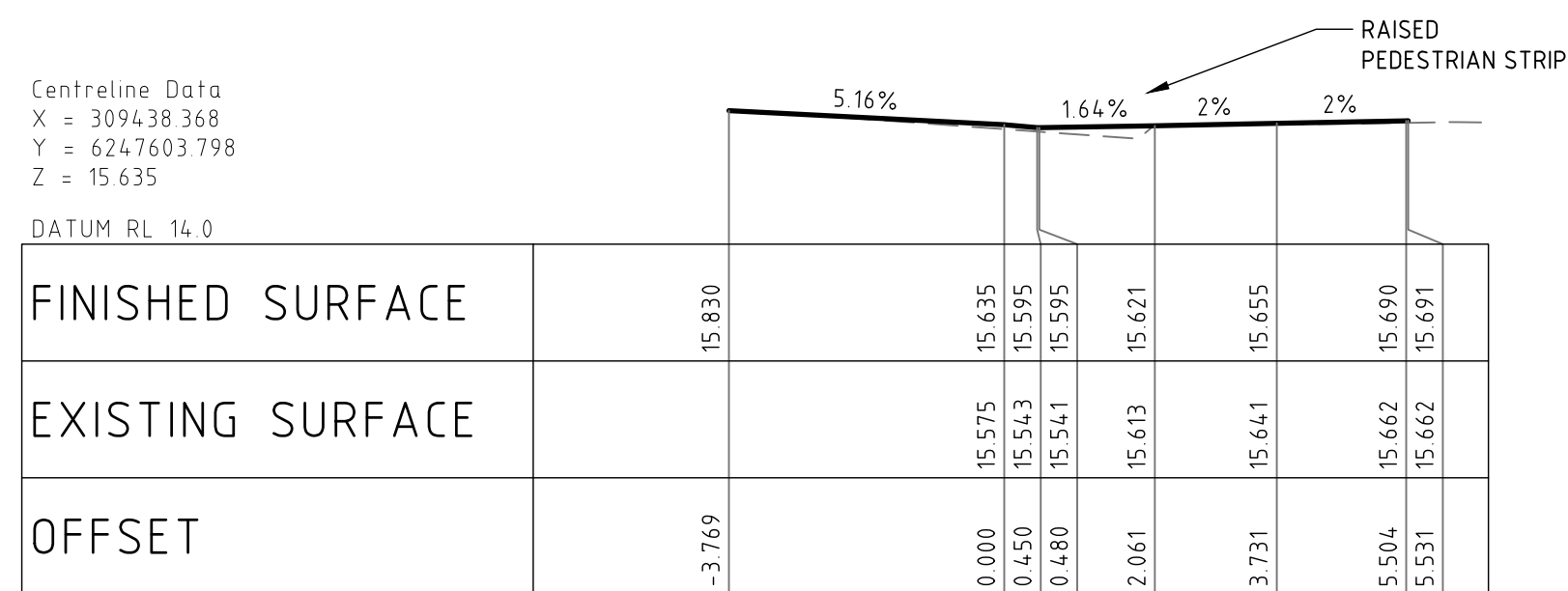
PROJECT
BROOMFIELD STREET CABRAMATTA

DRAWING TITLE
CIVIL ENGINEERING PACKAGE DEVELOPMENT APPLICATION LONGITUDINAL SECTIONS

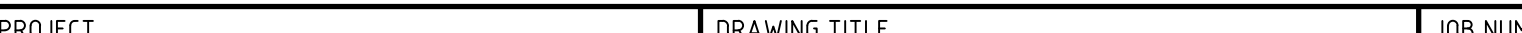
JOB NUMBER	183030-01
DRAWING NUMBER	REVISION
DAC5101	02
DRAWING SHEET SIZE = A1	

NOT FOR CONSTRUCTION





HORIZONTAL SCALE 1:100@A1
VERTICAL SCALE 1:100@A1

REVISION		DESCRIPTION	ISSUED	VER'D	APP'D	DATE	CLIENT	ARCHITECT	ALL DIMENSIONS TO BE VERIFIED ON SITE BEFORE COMMENCING WORK. NORTHROP ACCEPTS NO RESPONSIBILITY FOR THE USABILITY, COMPLETENESS OR SCALE OF DRAWINGS TRANSFERRED ELECTRONICALLY. THIS DRAWING MAY HAVE BEEN PREPARED USING COLOUR, AND MAY BE INCOMPLETE IF COPIED TO BLACK & WHITE.		 Sydney Level 11 345 George Street, Sydney NSW 2000 Ph (02) 9241 4188 Fax (02) 9241 4324 Email sydney@northrop.com.au ABN 81 094 433 100	PROJECT	DRAWING TITLE	JOB NUMBER	DRAWING NUMBER	REVISION	DRAWING SHEET SIZE = A1
01		ISSUED FOR DEVELOPMENT APPLICATION	UM		JC	08.05.23	MOON INVESTMENTS		SCALE 1:100 @ A1 0 1 2 3 4 5m	SCALE 1:100 @ A1 0 1 2 3 4 5m		BROOMFIELD STREET CABRAMATTA	CIVIL ENGINEERING PACKAGE DEVELOPMENT APPLICATION CROSS SECTIONS - SHEET 02	183030-01	DAC5202	02	
02		RE-ISSUED FOR DEVELOPMENT APPLICATION	UM		JC	11.05.23			DRAWING NOT TO BE USED FOR CONSTRUCTION UNLESS VERIFICATION SIGNATURE HAS BEEN ADDED	THE COPYRIGHT OF THIS DRAWING REMAINS WITH NORTHROP CONSULTING ENGINEERS PTY LTD							

DATUM RL 13.0

[illegible]

DATUM RL 13.0

[illegible]

DATUM RL 13.0

[illegible]

DATUM RL 13.0

[illegible]

2 = 14.507

DATUM RL 13.0							
FINISHED SURFACE	14.510			14.367			
				14.327			
				14.477			
EXISTING SURFACE			14.382	14.400	14.477	14.510	14.546
			14.399	14.400	14.406	14.468	14.483
OFFSET	2.19	0.000	0.450	0.480	0.530	0.300	0.000

HORIZONTAL SCALE 1:100@A1
VERTICAL SCALE 1:100@A1



DATUM RL 13.0

[illegible]

DATUM RL 13.0

[illegible]

DATUM RL 13.0

FINISHED SURFACE	14.326	14.042	14.002	14.152	14.185	
EXISTING SURFACE	14.285	14.011	13.988	13.986	14.190	14.221
OFFSET	-6.000	0.000	0.450	0.480	0.630	4.930

-6 000	14 285					14 326
		14 011	14 042			
		13 988	14 002			
		14 050	14 152			
		14 080	14 152			
		13 997	14 152			
		14 190	14 185			
	14 100	14 269	14 221			
	4 930	14 250	14 238			

REVISION	DESCRIPTION	ISSUED	VER'D	APP'D	DATE
01	ISSUED FOR DEVELOPMENT APPLICATION	UM		JC	08.05.23
02	RE-ISSUED FOR DEVELOPMENT APPLICATION	UM		JC	11.05.23

CLIENT

MOON INVESTMENTS

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ARCHITECT

plus
architecture

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Sydney

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Email sydney@northrop.com.au ABN 81 094 433 100

PROJECT

**BROOMFIELD STREET
CABRAMATTA**

DRAWING TITLE

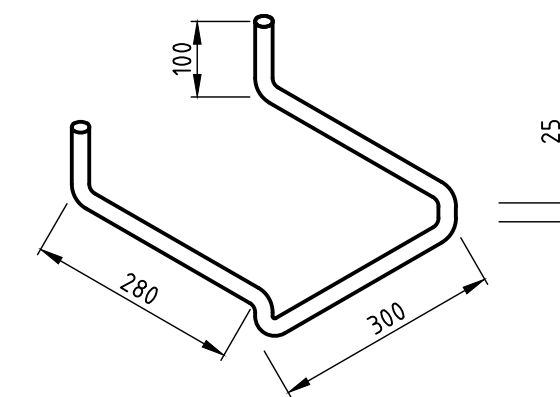
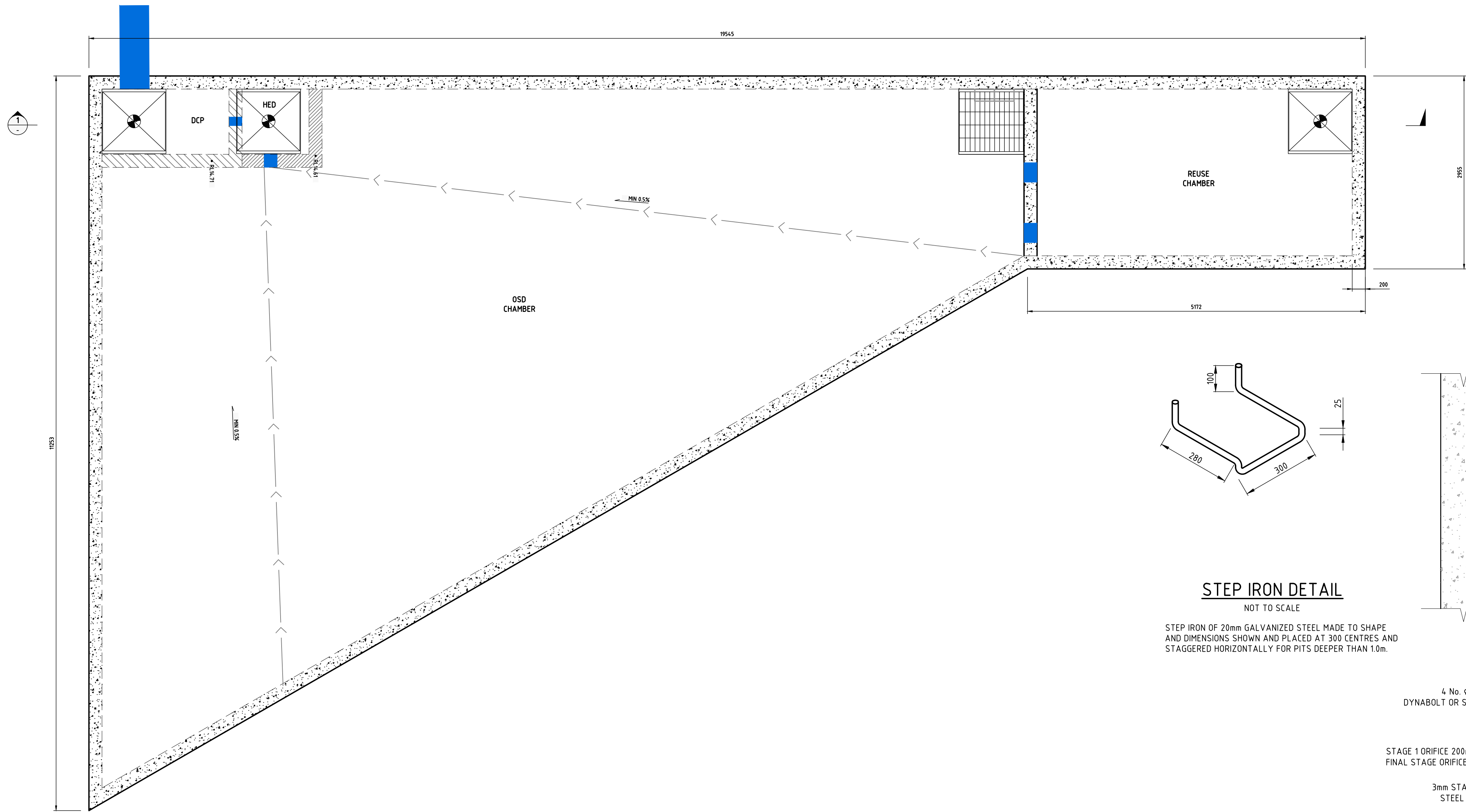
**CIVIL ENGINEERING PACKAGE
DEVELOPMENT APPLICATION
CROSS SECTIONS - SHEET 03**

JOB NUMBER	
183030-01	
DRAWING NUMBER	REVISION
DAC5203	02
DRAWING SHEET SIZE = A1	

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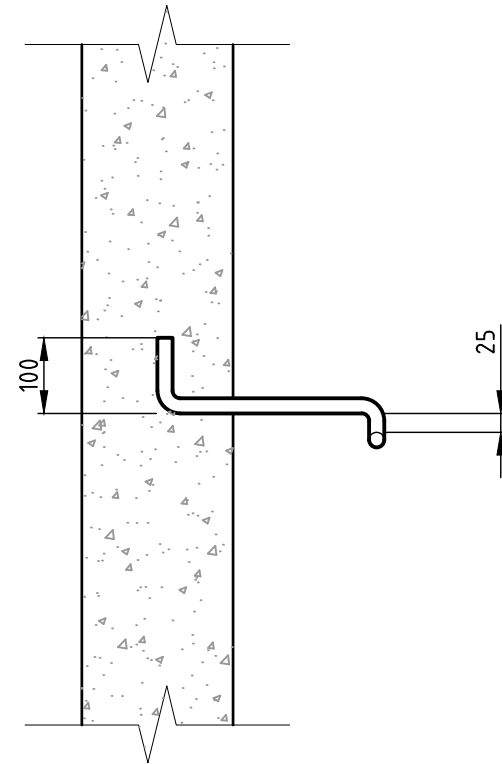
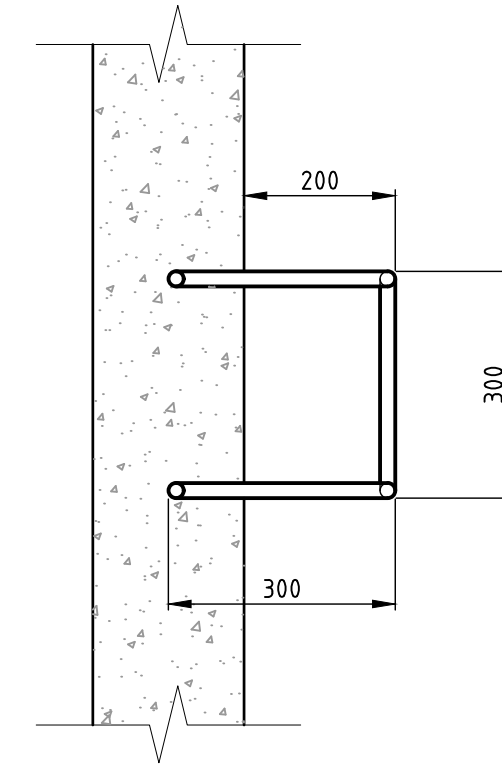
DRAWN: U MANDAL
DESIGNED: J CARROLL
JOB MANAGER: B LAWRENCE
VERIFIER:



STEP IRON DETAIL

NOT TO SCALE

STEP IRON OF 20mm GALVANIZED STEEL MADE TO SHAPE AND DIMENSIONS SHOWN AND PLACED AT 300 CENTRES AND STAGGERED HORIZONTALLY FOR PITS DEEPER THAN 1.0m.

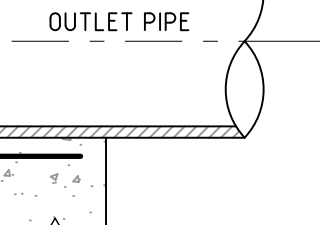


ORIFICE PLATE DETAIL

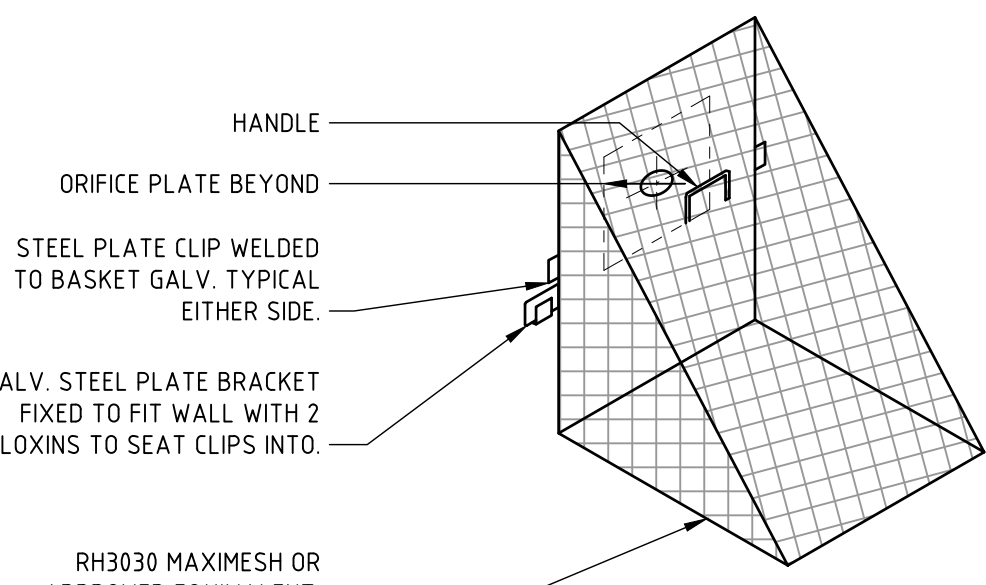
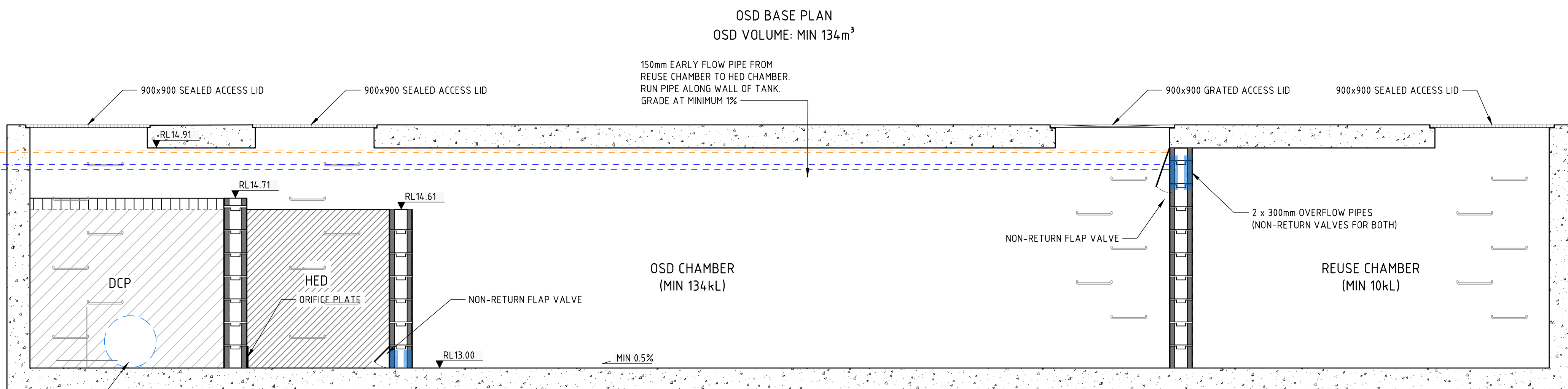
NOT TO SCALE

4 No. Ø10x100
DYNABOLT OR SIMILAR.

STAGE 1 ORIFICE 200mm
FINAL STAGE ORIFICE 300mm
3mm STAINLESS
STEEL PLATE.



OUTLET PIPE



TRASH SCREEN DETAIL

NOT TO SCALE

TO BE PROVIDED OVER ORIFICE PLATE SPECIFIED

TWL 14.892 - FINAL STAGE - CRITICAL STORM
TWL 14.869 - STAGE 1 - CRITICAL STORM
TWL 14.766 - STAGE 1 - 540min STORM
TWL 14.722 - FINAL STAGE - 540min STORM

REVISION	DESCRIPTION	ISSUED	VER'D	APP'D	DATE
01	ISSUED FOR DEVELOPMENT APPLICATION	UM		JC	08.05.23
02	RE-ISSUED FOR DEVELOPMENT APPLICATION	UM		JC	11.05.23

CLIENT	ARCHITECT
MOON INVESTMENTS	plus architecture
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0.0 0.2 0.4 0.6 0.8 1.0 1.2m	

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PROJECT	BROOMFIELD STREET CABRAMATTA
---------	---------------------------------

DRAWING TITLE	CIVIL ENGINEERING PACKAGE DEVELOPMENT APPLICATION DETAILS SHEET
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JOB NUMBER	183030-01
DRAWING NUMBER	DAC9001
REVISION	02
DRAWING SHEET SIZE	A1

NOT FOR CONSTRUCTION

Found: c:\2625\asia\Northrop\SYN183030-01-CAD\19-CABRAMATTA_001\183030-01-DAC9001.dwg
Plotted By: ANGUS FALLINS
Date: 16/04/2020 2:24 PM

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Document Status

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A	Alison Smith	Christine Louie	Christine Louie	DRAFT	11/07/2023



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Spencer Street Bunbury, WA 6230
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Hobart

Muwununa/Nuenon Country | Level 6,
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T: 03 6108 9054

Melbourne

Kulin Country | Level 5, 10 Queen
Street, Melbourne, VIC 3000
T: 03 9642 0599

Newcastle

Awabakal/Worimi Country | 61 / 63
Parry Street Newcastle West, NSW 2302
T: 02 8245 0300

Perth

Whadjuk Nyoongar Country | Allendale Square,
Level 9, 77 St Georges Terrace, WA 6000
T: 08 9380 3100

Sydney

Gadigal Country | Level 1, 50
Margaret Street, Sydney, NSW 2000
T: 02 8245 0300

Wollongong

Dharawal Country | Suite 1A, 280 - 286
Keira Street, Wollongong, NSW 2500
T: 02 4225 2647