



Stormwater Management Report

Barings Compass Centre, Bankstown

Job Number: Revision: Date of issue:
23334 P02 21 June 2024

Document Number:
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BARINGS

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Report Amendment Register

Issue Ref	Amended Section(s)	Issue/Amendment Details	Author(s)	Reviewer	Date
P01	All	Preliminary Issue - DRAFT	Nghia Ly, Veya Santos	Chris Waite	22/04/24
P02	Section 1,3, 4 and 5	Preliminary Issue	Nghia Ly, Veya Santos	Chris Waite	21/06/24



Executive Summary

Robert Bird Group (RBG) were commissioned by PTW to undertake the civil and stormwater design for the proposed Barings Compass Centre development located at 83-99 North Terrace, Bankstown. The purpose of this report is to outline the design parameters for stormwater design to ensure the site and locality infrastructure will be adequately protected from stormwater. The stormwater management report describes the hydrologic and hydraulic design undertaken and mitigation measures proposed for the development of Barings Compass Centre.

This Stormwater Management Report has been prepared on behalf of Barings (**the applicant**), in support of the Development Application (DA) for a mixed-use development, featuring:

- Site preparation and early works, including demolition of all existing structures, bulk excavation, any required remediation and tree removal.
- Construction and use of a five (5) storey mixed use and three towers, comprising:
 - 19 storey hotel tower in the south-west corner of the site;
 - 24 storey residential tower in the south-east corner of the site;
 - 24 storey residential tower in the north-east corner of the site;
- Ground floor retail
- Car parking on levels 1, 2, and 3 of the podium
- Construction and use of two level basement car park
- Street frontage commercial premises across the podium levels

The DA relates to land identified as 83-99 North Terrace, Bankstown which is legally described as DP 5541, DA 507818, DP 5541 and DP207810 (**the site**). The site is within Canterbury-Bankstown Council.

The DA seeks development consent for the demolition of the existing buildings and vegetation and construction of a mixed-used development with the site landscaping and associated site infrastructure.

Contents

Executive Summary ii

1. Introduction.....1

 1.1 Scope.....1

 1.2 Project Overview 1

2. Design Inputs and Guidelines 2

 2.1 Consultation2

 2.2 Codes and Guidelines.....2

 2.3 Other Consultants Inputs3

 2.4 Design Rainfall Intensities.....3

 2.5 Design Criteria and Requirements.....5

3. Flood Risk Assessment..... 7

4. Stormwater Quantity Management 9

 4.1 On-site Detention Tank Requirements..... 9

 4.2 On-site Detention Tank Criteria 9

 4.3 On-site Detention Tank design 10

5. Stormwater Quality Management 14

 5.1 Design Philosophy14

 5.2 Drainage Design 15

6. Erosion and Sediment Control..... 15

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1. Introduction

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The DA relates to land identified as 83-99 North Terrace, Bankstown which is legally described as DP 5541, DP 5541 and DP207810 (**the site**). The site is within City of Canterbury-Bankstown Council.

The DA seeks development consent for the demolition of the existing buildings and vegetation and construction of a mixed-used development with the site landscaping and associated site infrastructure.

1.1 Scope

This document forms the basis for the stormwater management design and documentation for the project.

This report provides reference information, standards and inputs, a description of the existing site and the proposed works, discussion on the hydrological and hydraulic analysis of the proposed stormwater design.

1.2 Project Overview

The project site is located at 83-99 North Terrace, Bankstown within Bankstown Council area. The site is bounded by Former Library Site and reserve to the North, North Terrace to the South, The Appian Way to the East and Fetherstone Street and property 3 Fetherstone Street to the West. The site is located within the City of Canterbury-Bankstown Council.

The proposed development will specifically compromise the following:

- Site preparation and excavation
- Construction of a new mixed-use development, comprising:
 - Site Area: 8,175.4 sqm
 - Total Gross Floor Area: 4,0874 sqm
 - Building A GFA: 9,534 sqm
 - Building B GFA: 12,378 sqm
 - Building C GFA: 12,209 sqm
 - The vehicular access is proposed off Fetherstone Street



The site locality is shown in Figure 1 below:

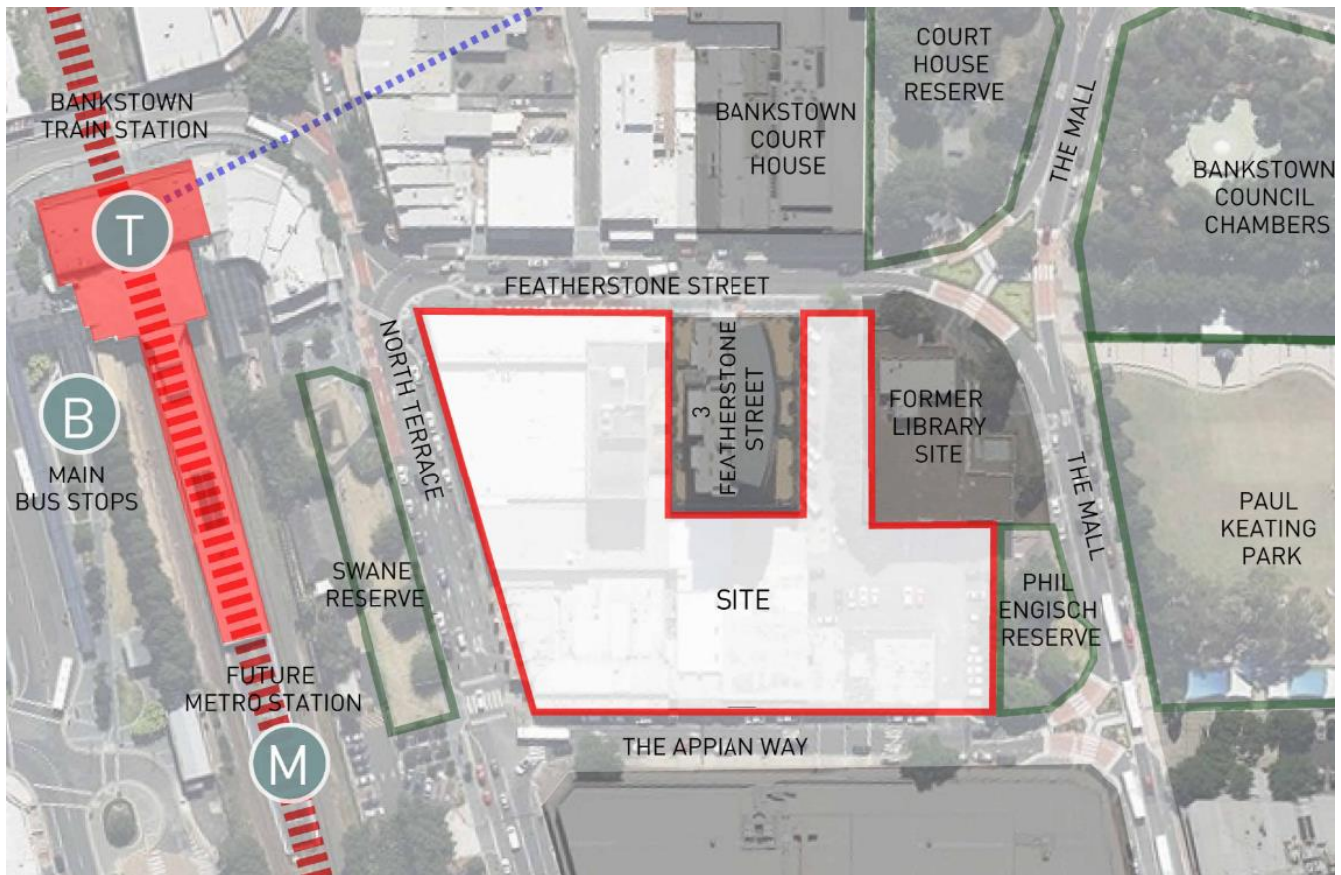


Figure 1 - Site Locality (PTW-DA-A100021)

2. Design Inputs and Guidelines

2.1 Consultation

Robert Bird Group has consulted with the project team during the concept design stages. RBG had contact with Canterbury Bankstown Council engineer on 29th September 2023 regarding Flood and overland flow study. The proposed stormwater design will be carried out in accordance with City of Canterbury-Bankstown Council's Development Control Plan (DCP), Canterbury-Bankstown Local Environmental Plan 2023 clause 6.3 and advice from the Stormwater System Report attached in Appendix A.

2.2 Codes and Guidelines

The stormwater drainage design of the project to date has been carried out in accordance with the relevant local, state and national design guidelines and Australian Standard Codes of practices including the following:

- Canterbury-Bankstown Council Development Control Plan 2023
- Canterbury-Bankstown Local Environmental Plan 2023 Clause 6.3

- Performance Guide For Engineering Design & Construction 2005
- Australian Rainfall and Runoff 2019 (ARR 2019)
- AS3500 National Plumbing and Drainage Codes

2.3 Other Consultants Inputs

The concept stormwater design is based on:

- Architectural plans provided by PTW, dated 16/04/24.
- Survey drawings provided by Craig & Rhodes
 - REF: 136-23 dated 22/06/23

2.4 Design Rainfall Intensities

The stormwater system has been designed in accordance with the Development Engineering Design Guidelines and the Australian Rainfall and Runoff Guide 2019. The drainage has been designed to ensure facilities are available for use in weather events up to a 1:100 ARI storm.

Design rainfall intensities are based on the current rainfall intensity and frequency data extracted from the Bureau of Meteorology (BOM) in accordance with AR&R 2019. This is summarised in Figure 2 below.

Duration	Annual Exceedance Probability (AEP)						
	63.2%	50%#	20%*	10%	5%	2%	1%
1 min	131	145	187	215	243	278	305
2 min	108	117	147	167	188	215	235
3 min	100	109	138	157	177	202	221
4 min	94.4	103	131	150	169	194	212
5 min	89.4	98.2	126	144	162	186	204
10 min	70.8	78.4	102	117	132	151	166
15 min	58.8	65.2	84.8	97.7	110	126	138
20 min	50.6	56.0	72.7	83.8	94.3	108	118
25 min	44.6	49.3	63.8	73.4	82.7	94.7	104
30 min	40.0	44.2	57.0	65.6	73.8	84.5	92.6
45 min	31.1	34.1	43.7	50.2	56.5	64.8	71.1
1 hour	25.8	28.2	36.0	41.3	46.5	53.4	58.6
1.5 hour	19.8	21.6	27.4	31.4	35.4	40.7	44.9
2 hour	16.4	17.9	22.6	26.0	29.3	33.8	37.4
3 hour	12.7	13.8	17.5	20.2	22.8	26.5	29.4
4.5 hour	9.86	10.8	13.8	16.0	18.2	21.2	23.7
6 hour	8.30	9.12	11.8	13.7	15.6	18.3	20.5
9 hour	6.56	7.26	9.54	11.2	12.8	15.2	17.1
12 hour	5.56	6.20	8.27	9.75	11.3	13.4	15.1
18 hour	4.40	4.96	6.77	8.06	9.37	11.2	12.6
24 hour	3.71	4.22	5.85	7.01	8.18	9.78	11.1
30 hour	3.24	3.70	5.19	6.25	7.32	8.76	9.89
36 hour	2.89	3.31	4.69	5.66	6.64	7.95	8.98
48 hour	2.39	2.76	3.94	4.78	5.62	6.72	7.57
72 hour	1.79	2.08	3.00	3.64	4.27	5.10	5.73
96 hour	1.44	1.67	2.40	2.91	3.42	4.06	4.55
120 hour	1.21	1.40	2.00	2.41	2.82	3.34	3.74
144 hour	1.04	1.20	1.70	2.04	2.38	2.81	3.14
168 hour	0.914	1.05	1.48	1.76	2.05	2.41	2.70

Figure 2. Design Rainfall Intensities

2.5 Design Criteria and Requirements

Table 1 below have summarised the design criteria for the hydrology and hydraulic analysis.

Table 1 Hydrology & Hydraulic design Criteria

Hydrological & Hydraulic Design Criteria	
Parameter	Criteria Adopted
Hydrological Analysis	Horton ILSAX hydrological model in DRAINS
Rainfall Intensities	Design rainfall intensities are based on the current rainfall intensity and frequency data extracted from the 2016 IFDs of Bureau of Meteorology (BOM) as attached in Appendix A.
Design Storm Events	Minor: 20% AEP Major: 1% AEP
Run-off Coefficients	To be calculated using the AS3500.3 Standard
Time of Concentration (T_c)	TC has been calculated using the Kinematic Wave Equation. T _c shall be not less than 5 minute or greater than 20 minutes within urban catchment.
Hydraulic Grade Line Analysis	The Colebrook-White formula will be used with a roughness coefficient of 0.15 for all reinforced concrete pipes.
Pit loss coefficient	QUDM Charts Procedure
Design pipe flow velocities	Minimum velocity: absolute minimum 0.7m/s, preferable minimum 1.0m/s for self-cleaning Maximum velocity: absolute maximum 7.0 m/s, preferable minimum 5.0m/s to prevent any pipe scouring.
Minimum Pipe Sizes	In ground for internal site – 150mm dia. External area – matching existing public drainage pipe sizes
Pipe Cover	Pedestrian Area (not subject to vehicle loading) – minimum 300mm for RCP or uPVC pipes; Pedestrian Area (subject to vehicle loading) – minimum 450mm for RCP or uPVC pipes; Trafficable Area (sealed road) – minimum 600mm for RCP or uPVC pipes Reduced pipe cover for RCBC per manufacturer's requirements.
Pit Freeboard	The water surface level for inlet pits shall be 0.15m below the invert of the gutter or 0.15m below the underside of the lid for junction pits.
Pit Inlet Capacities	Pit blockage:

	Inlet Type	% Capacity Blockage		
	Sag Side Entry	20%		
	Sag Grated	50%		
	Sag Combination	0%		
	On grade Combination	20%		
	On grade Grated	50%		
All new pits are to be constructed using galvanised steel type grates and kerb inlet pits are to have a minimum internal lintel width of 2.4 metres.				

Pit Size	Minimum pit size	Depth to Invert	Pipe diameter	
	450mm x 450mm	Up to 600mm	150mm to 300mm	
	600mm x 600mm	600mm to 1.0m	Up to 300mm	
	750mm x 900mm	Over 1.0m	Over 300mm	

(Source: AS3500.3)

Step Irons	Step irons are required for all pits deeper than 1000mm.			
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Overland flow path safety factor	Flow Hazard Regimes for People				
	Type	Maximum DxV (m2/s)	Maximum Water Depth (m)	Maximum velocity (m/s)	
	Children (H.M*=25 to 50)	0.4	0.5	3.0	
	Adults (H.M>50)	0.6	1.2	3.0	

*Note: The best measure of physical attributes for human stability is the parameter H.M (mkg), the product of subject height (H; m) and mass (M; kg) (Cox et al., 2010).

Interim Flow Hazard Regimes for Vehicles (Shand et al., 2011)							
Class of vehicle	Length (m)	Kerb Weight (kg)	Ground Clearance (m)	Limiting Still Water Depth1 (m)	Limiting high velocity flow depth2 (m)	Limiting Velocity 3 (m/s)	Equation of Stability (m2/s)



	Small passenger	<4.3	<1250	<0.12	0.3	0.1	3.0	$DxV \leq 0.3$
	Large passenger	>4.3	>1250	>0.12	0.4	0.15	3.0	$DxV \leq 0.45$
	Large 4WD	>4.5	>2000	>0.22	0.5	0.2	3.0	$DxV \leq 0.6$
Notes: 1. At velocity = 0 m/s; 2. At velocity = 3.0 m/s; 3. At low depth. (Source: ARR 2019) Velocity-depth product (VxD) shall be limited to 0.4 (m^2/s) for flows in an overland flow path where there is high pedestrian use and/or vehicular use as per Council's Development Engineering Standards Guide.								
Freeboard to finished floor levels	Finished floor levels of existing and new buildings are to be set a minimum of 0.3m above the OSD storage's maximum design water surface level or 500mm above the 100-year ARI flood level. Garage floor levels are to be set 0.1m above the OSD storage's maximum design water surface level.							

3. Flood Risk Assessment

The Canterbury-Bankstown flood control matrix dictates minimum floor level requirements based on flood risk for various land use types. Non-habitable and retail floors must be at 5% Annual Exceedance Probability (AEP) Flood Level, while habitable floors with access points to the basement require 1% AEP Flood Level plus 500mm freeboard, refer to the Stormwater System Report in Appendix A.

In a Flood Impact Assessment report conducted by Xavier Knight, dated 30/05/2024 Rev B, it was found that the runoff along Fetherstone Street and North Terrace remains shallow, with depths generally below 50mm for the 1% AEP and below 150mm for the PMF event. Consequently, this area is classified as low flood risk and is exempt from council flood controls. This is shown in the 1% AEP Map as shown in Figure 5. As recommended, precautionary measures are proposed for the site by providing a crest in the driveway with an elevation of 150mm above the boundary level at a 1:20 slope, refer to Figure 3. Additionally, stormwater pits and trench are to be installed under the ramp closest to the former library to capture accidental runoff from the crest level and aid in draining the area after a storm event, refer to Figure 4.





Figure 5. 1% AEP Flood Map (Source: Flood impact assessment report by Xavier Knight)

4. Stormwater Quantity Management

4.1 On-site Detention Tank Requirements

As per City of Canterbury Bankstown Council DCP section 4.2, for multi-dwelling development will require OSD regardless of the impervious area before and after the development, and regardless of whether the site falls towards to the street.

4.2 On-site Detention Tank Criteria

Table 2: OSD Design Criteria

OSD Design Criteria	
Maximum Discharge	The OSD to be designed and constructed to control stormwater runoff from the development site such that, for 5 to 100-year ARI events, peak stormwater discharges from the site do not exceed pre-development stormwater discharge.

Location	OSD to be located away from any natural watercourses and overland flow paths and are not to be inundated in any events up to and including 100-year ARI event.		
Minimum flow to OSD	A minimum of 70% of the site piped stormwater system and 70% of the sites overland flow must drain through the OSD system.		
Emergency overflow spillway	An emergency overflow spillway, free of obstructions, must be provided in a location not having an impact on adjoining properties.		
Hydrological Analysis	Horton ILSAX hydrological model in DRAINS		
Ponding depths	Use	Desirable maximum depth	Absolute maximum
	Pedestrian ways	0.05m	0.05m
	Parking/paved area	0.15m	0.2m
	Landscaping- residential	0.3m	0.3m
	Fenced storage	1m	1.5m
	Underground with lockable access	No limit	No limit
DCP	The storage volume provided such that the total OSD discharge and bypass flow from the site does not exceed the maximum permissible site discharge. The discharge control pit is designed to have a two-stage orifice. The first stage orifice limits the discharge of 20% AEP flows (5-year ARI) and the second stage orifice is designed to restrict flows for larger events up to 1% AEP flow (100-year ARI).		
Orifice	Minimum diameter 50mm		

4.3 On-site Detention Tank design

The site will require onsite detention (OSD) to limit the post-development stormwater discharge to the pre-development rate. OSD storage is proposed to be above the flood levels at the point of connection to the road drainage. A total of approximately 115 m³ of storage is currently proposed for the site this includes an allowance for stormwater treatment devices to be contained inside the tank and assumed bypass area of 20% of total site area.

The storage volume provided such that the total OSD discharge and bypass flow from the site does not exceed the maximum permissible site discharge. The discharge control pit is designed to have a two-stage orifice. The first stage orifice limits the discharge of 20% AEP flows (5-year ARI) and the second stage orifice is designed to restrict flows for larger events up to 1% AEP flow (100-year ARI).

The location of the OSD is located in the under the retail room in the Southwest corner of the site as shown in the Figure 6 below. The OSD tank is located away from any natural watercourses and overland flow paths and are not inundated in any events up to and including 1% AEP event (100-year ARI). Refer to Appendix B for details.

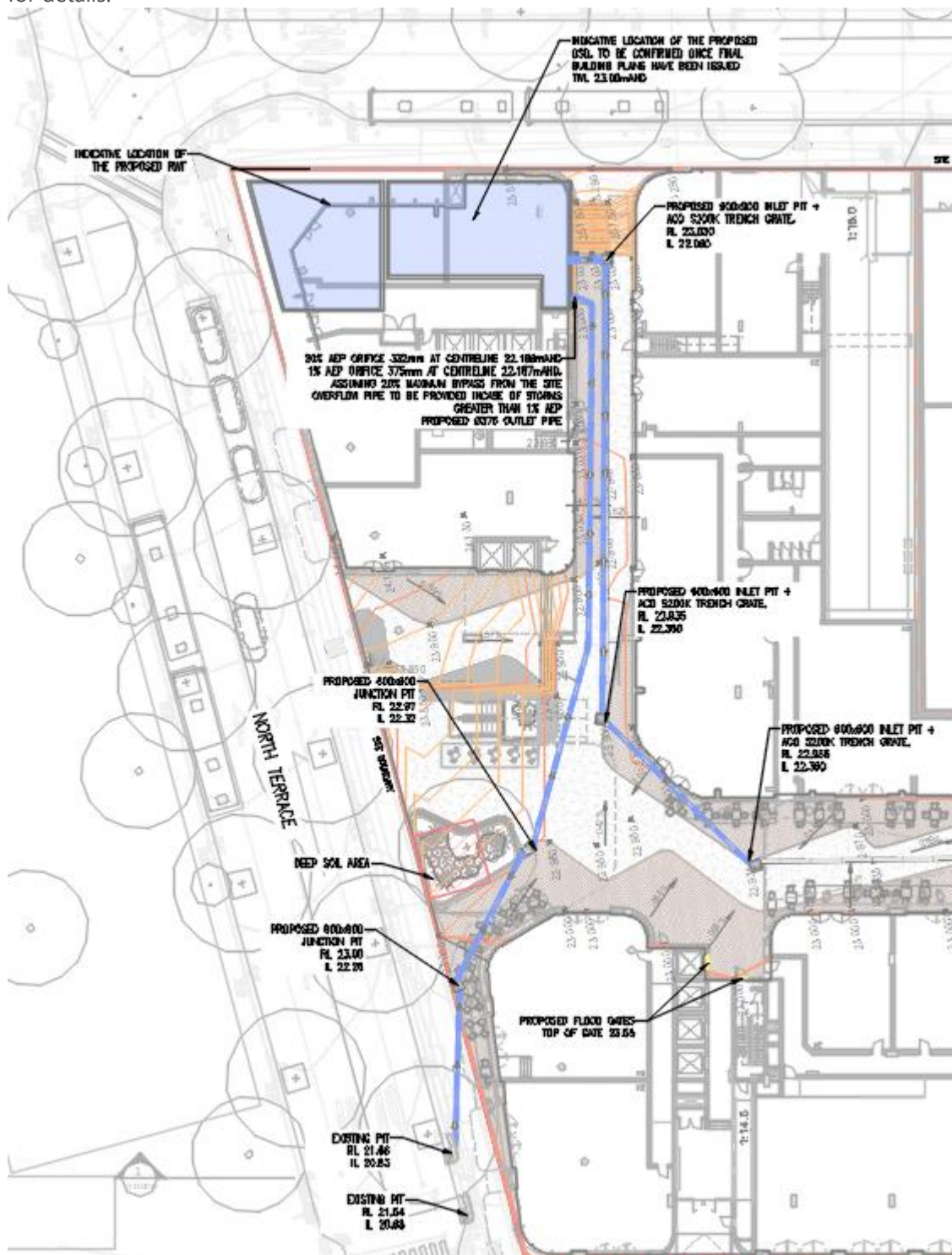


Figure 6: OSD tank and discharge point location

4.4 Drains Results

The volume/discharge relationship determined in the DRAINS model results shown below restrict total flows from the development site to match the site runoff prior to development for all AEP events 20% up to 1% AEP.

Results for median storm in critical 20% AEP ensembles using Full Unsteady hydraulic model.

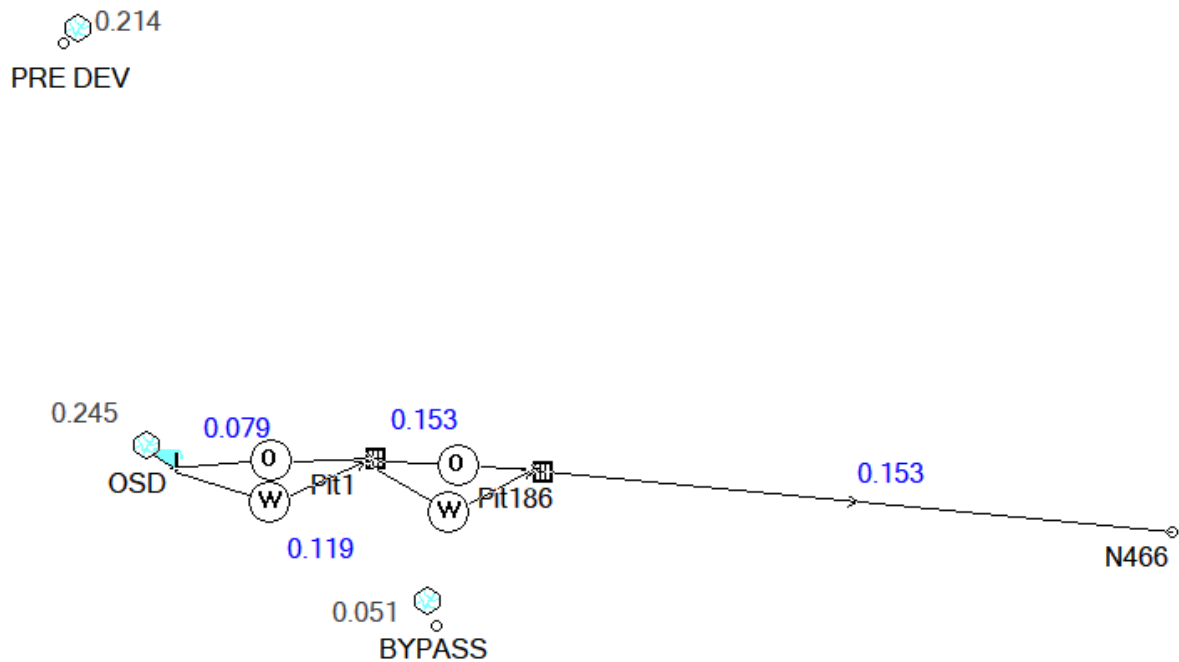


Figure 7: 20% AEP DRAINS Results

Results for median storm in critical 10% AEP ensembles using Full Unsteady hydraulic model.

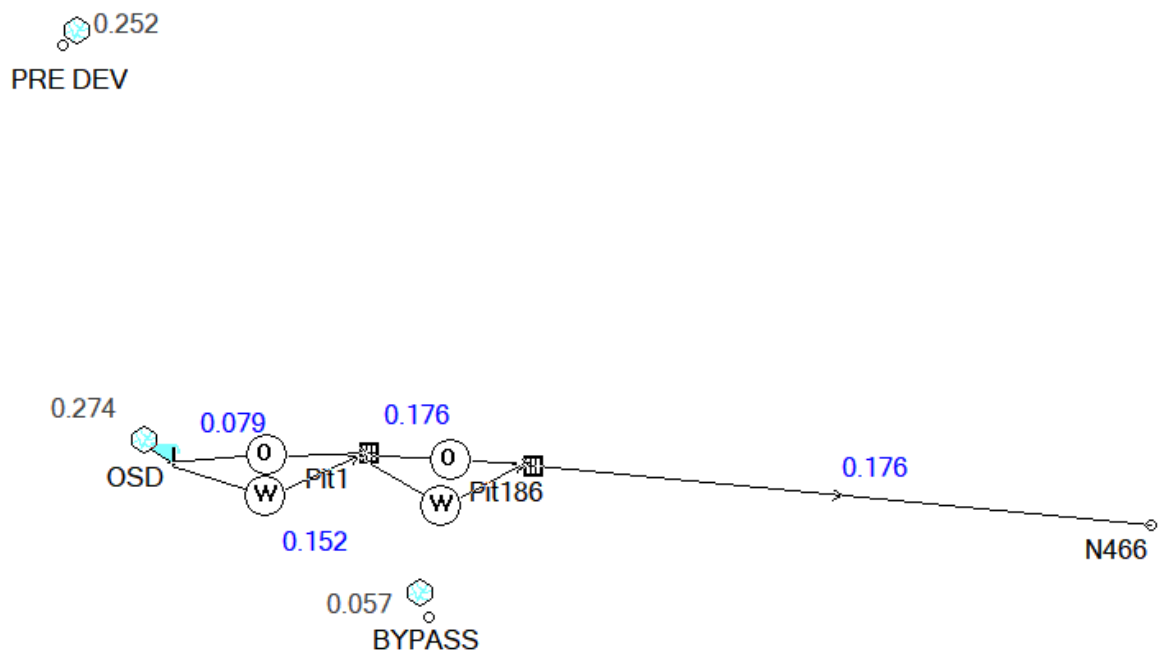


Figure 8: 10% AEP DRAINS Results

Results for median storm in critical 5% AEP ensembles using Full Unsteady hydraulic model.

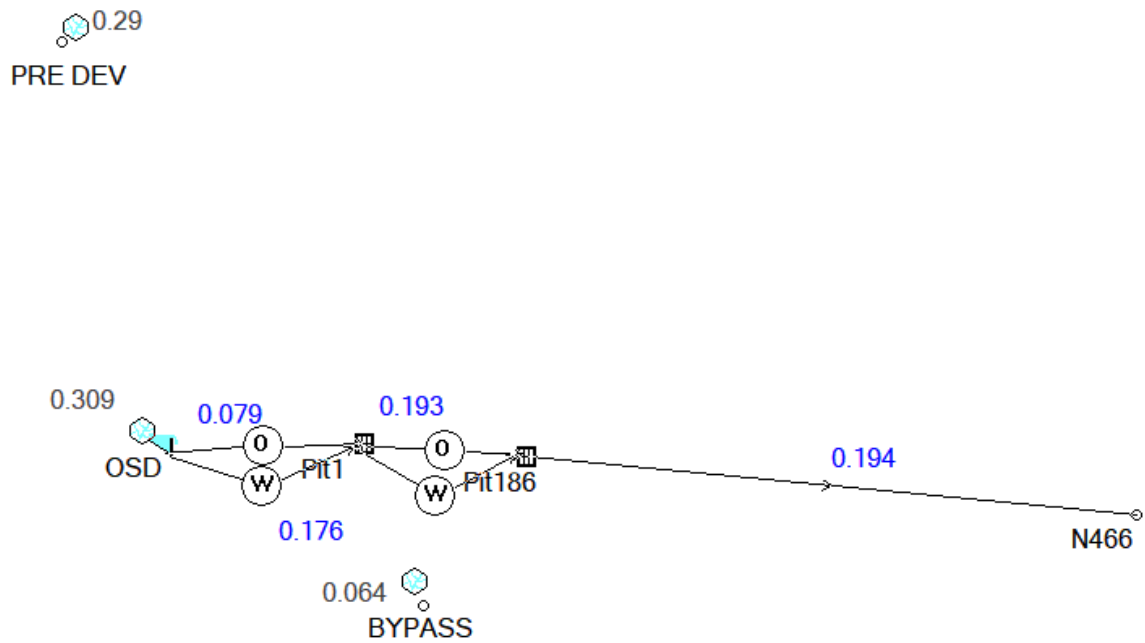


Figure 9: 5% AEP DRAINS Results

Results for median storm in critical 2% AEP ensembles using Full Unsteady hydraulic model.

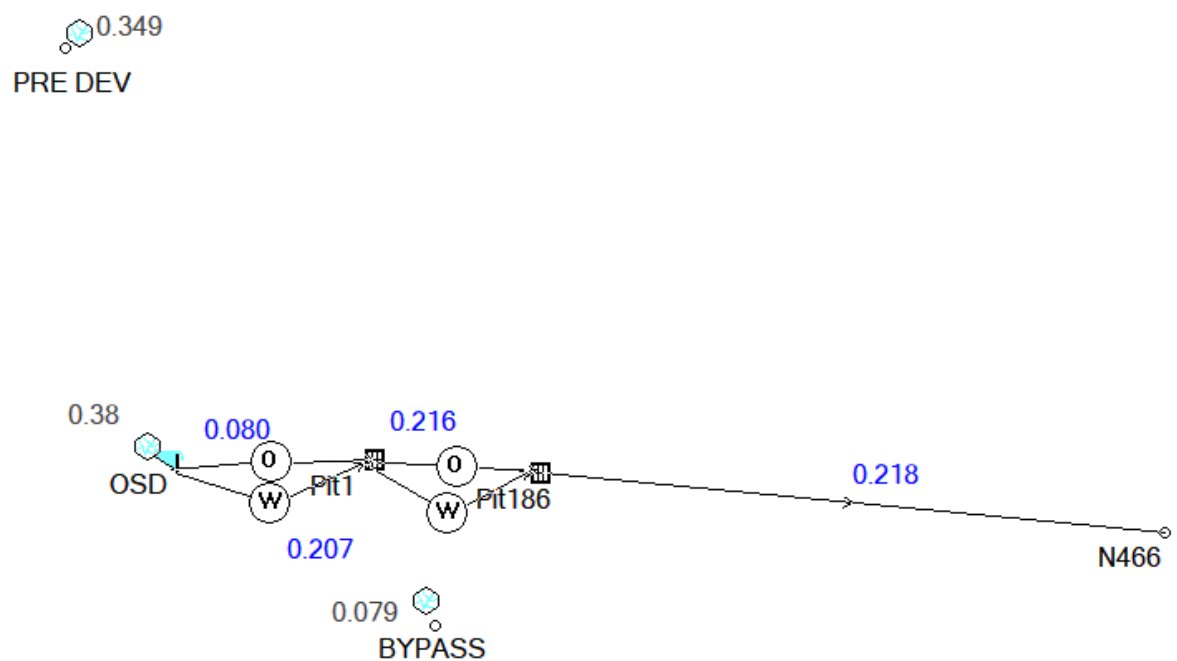


Figure 10: 2% AEP DRAINS Results

Results for median storm in critical 1% AEP ensembles using Full Unsteady hydraulic model.

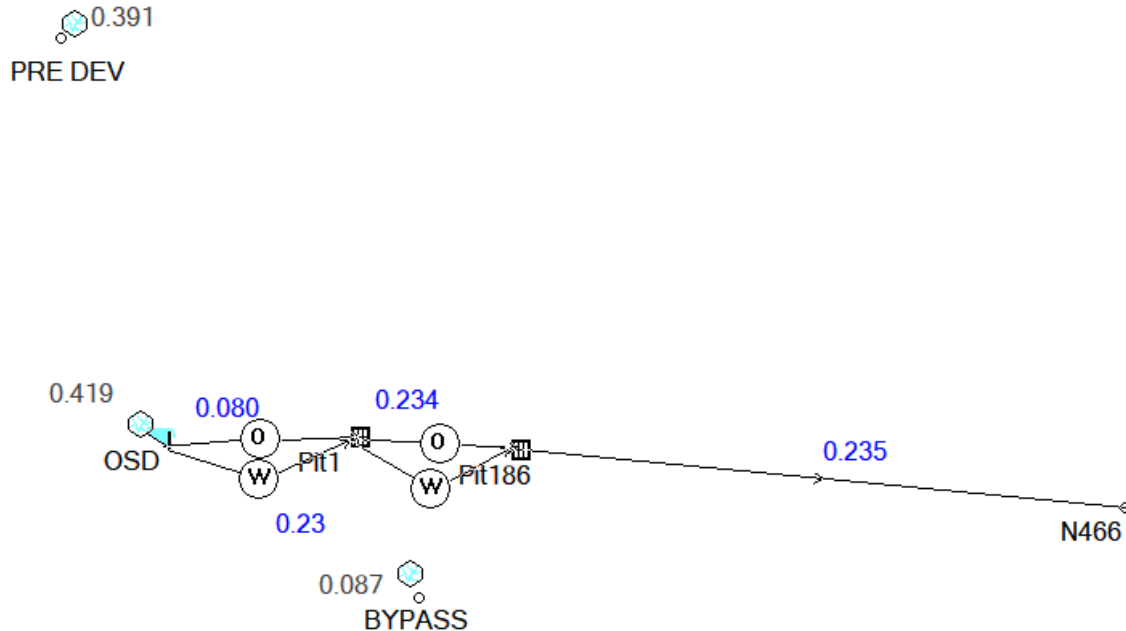


Figure 11: 1% AEP DRAINS Results

5. Stormwater Quality Management

5.1 Design Philosophy

The stormwater design concept for the project is to provide elements that:

- Promote the planning and architectural visions and adhere to the functional requirements.
- Provide minimal disturbance to the region, maintaining catchments for stormwater drainage paths and reduced earthworks.
- Provide natural systems where possible.
- Propose assets that are seamless within the site, incorporate constructability aspects, are safe and minimise nuisance for the operational phase of the building.

5.2 Drainage Design

According to Canterbury-Bankstown DCP 2023, the minimum pollution control requirements for all developments are provided in council's standard drawings.

Appropriate stormwater pollution control system for the proposed development will be in accordance to:

- The EPA manual on managing urban stormwater (treatment techniques)
- Stormwater Treatment Devices User Guide (NSW Supply) - Government Contract No.019, July 1999, Department of Public Works and Services
- The relevant Australian Standards for pollution control devices

Minor storm flows will be directed through the network. The major storm will surcharge into overland flow paths and conveyed across the site to the legal point of discharge via in ground drainage system.

The discharge points for the stormwater network will be at the existing pit located at the corner of the Appian Way and North Terrace.

The existing kerb inlet pit has a surface level of RL21.66m AHD and IL20.83 as shown in Figure 5.

6. Erosion and Sediment Control

To maintain the water quality during the construction stage, erosion and sediment control measures will be installed. Soil management measures shall follow the Landcom guidelines – Managing Urban Stormwater Runoff: Soils and Construction ("Blue Book").

Potential erosion and sediment control measures for the development may include, but not limited to, the following:

1. Sediment fences around stockpiles and construction zones where soils are exposed;
2. Settlement tanks/basins;
3. Catch drains/bunds to collect construction site runoff and convey flows to the settlement basin;
4. Sediment protection devices on existing and proposed inlet pits, i.e. filter socks; and
5. Truck Wash/Shaker Grid at all site access/egress points



Appendix A

Council Flood Letter

Barings Compass Centre, Bankstown



Level 1, 66 - 72 Rickard Road, Bankstown NSW
PO Box 8, Bankstown NSW 1885
Tel: (02) 9707 9010 - Fax: (02) 9707 9408
DX 11220 BANKSTOWN
council@cbc.city.nsw.gov.au

CITY OF CANTERBURY BANKSTOWN

To: Minh Nghia Ly
LEVEL 6, 100 Pacific Hwy
NORTH SYDNEY NSW 2060

STORMWATER SYSTEM REPORT 99 North Terrace, BANKSTOWN NSW 2200

Date: 26-Jul-2023
Ref: WP-SIAONL-1506/2023
Development type: Childcare Centre/Commercial

NO

FLOOD/OVERLAND FLOW STUDY REQUIRED

The site is affected by the following private and Council stormwater system components:

- A 1.83 m wide private drainage easement & 3 m wide Council drainage easement located within the site.
- Overland flowpath [floodway] for excess stormwater runoff from the upstream catchment and associated with the drainage system located north and east of the site.
- Stormwater inundation from excess stormwater runoff from the upstream catchment and associated with the drainage system through The Mall & The Appian Way.

The site will be subject to stormwater inundation from this overland flowpath during large storm events. Refer to the attached "**100 Year ARI Flood & PMF Extent Maps from Salt Pan Creek Catchment Study**" showing the flood contours to m AHD**. Provision should be made on site, and at boundary fences, for this stormwater runoff to pass unobstructed over the site. Stormwater flowing naturally onto the site must not be impeded or diverted.

For this development, a flood /overland flow study to determine the 100 year ARI* water surface level is not necessary provided that the **proposed development including floor levels, shall comply with the development controls specified in Chapter 2.2 (Flood Risk Management) Schedule 5, of Canterbury-Bankstown's Development Control Plan 2023 - Catchments Affected by Stormwater Flooding.**

The Development Application submission shall be based on an AHD datum for levels where sites are affected by overland flow / flooding. Refer Canterbury-Bankstown Council's *Development Engineering Standards June 2023**.**

Habitable floor levels are to be at least 500mm above the 100-year ARI* flood level at the site adjacent to the proposed buildings.

Runoff on the site, and naturally draining to it is to be collected and disposed of to Council's requirements detailed in Canterbury-Bankstown Council's *Development Engineering Standards****.

This report is given without the benefit of development plans or a site survey. Council may choose to vary some report requirements following evaluation of detailed plans when they are submitted.

This report relates to the exposure of the subject site to Council's stormwater system, both underground and overland. It does not assess the suitability or otherwise of this site for the proposed development.

* Average Recurrence Interval

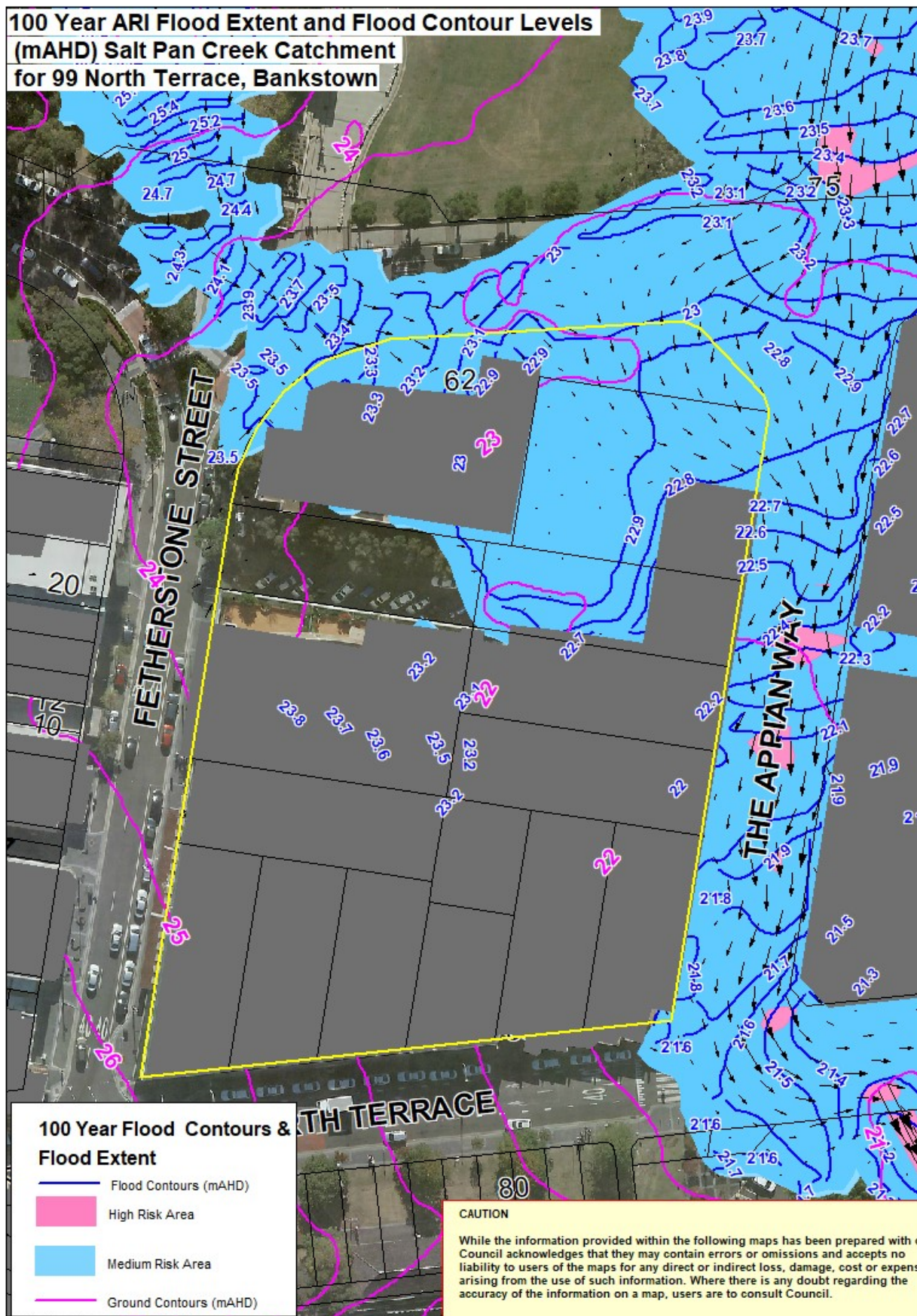
** Australian Height Datum

*** Canterbury Bankstown's Development Control Plan 2023 is available from Council's Customer Service Centre or Council Webpage.

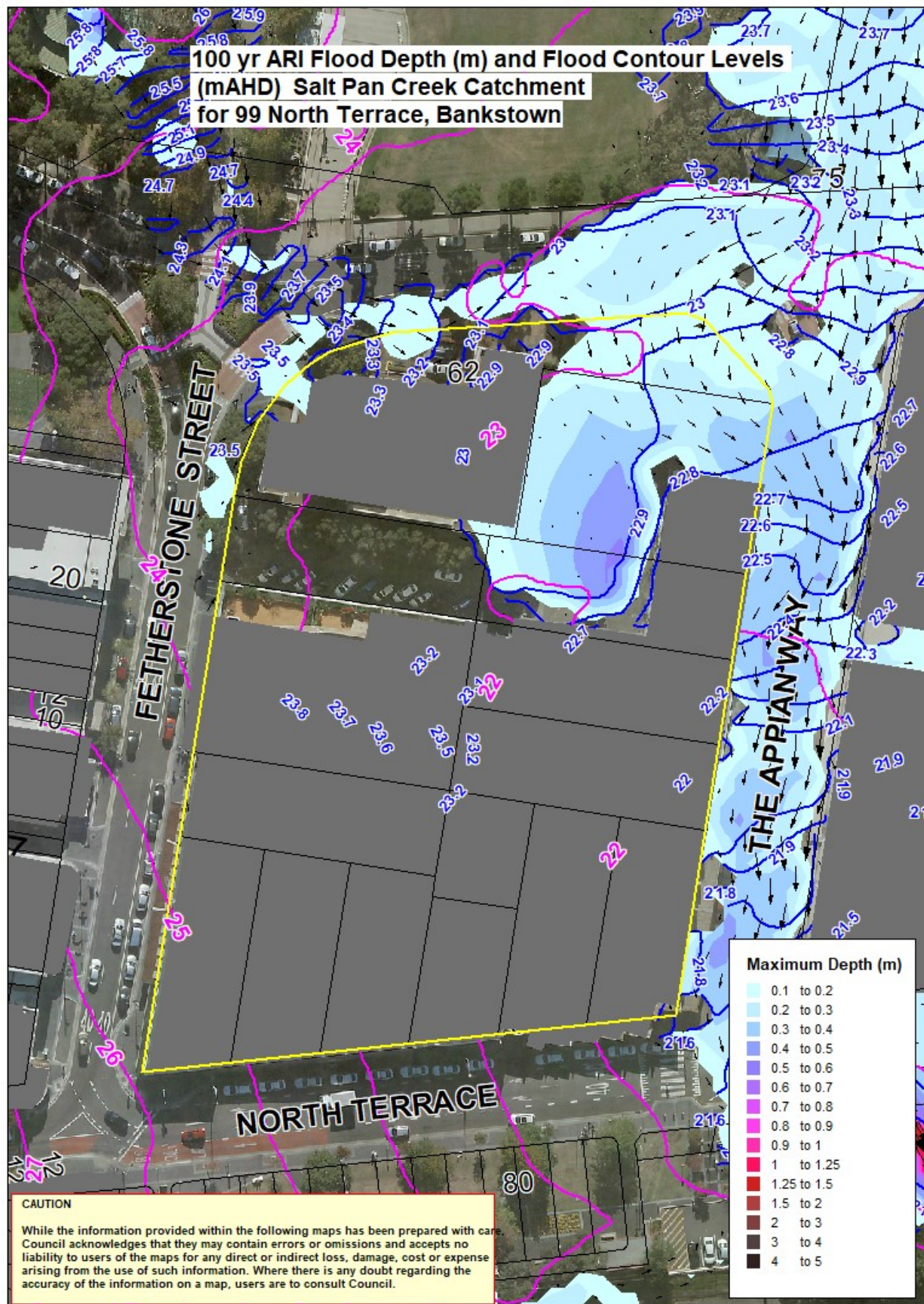
PMF Probable Maximum flood

Mustafa Ways
ENGINEER

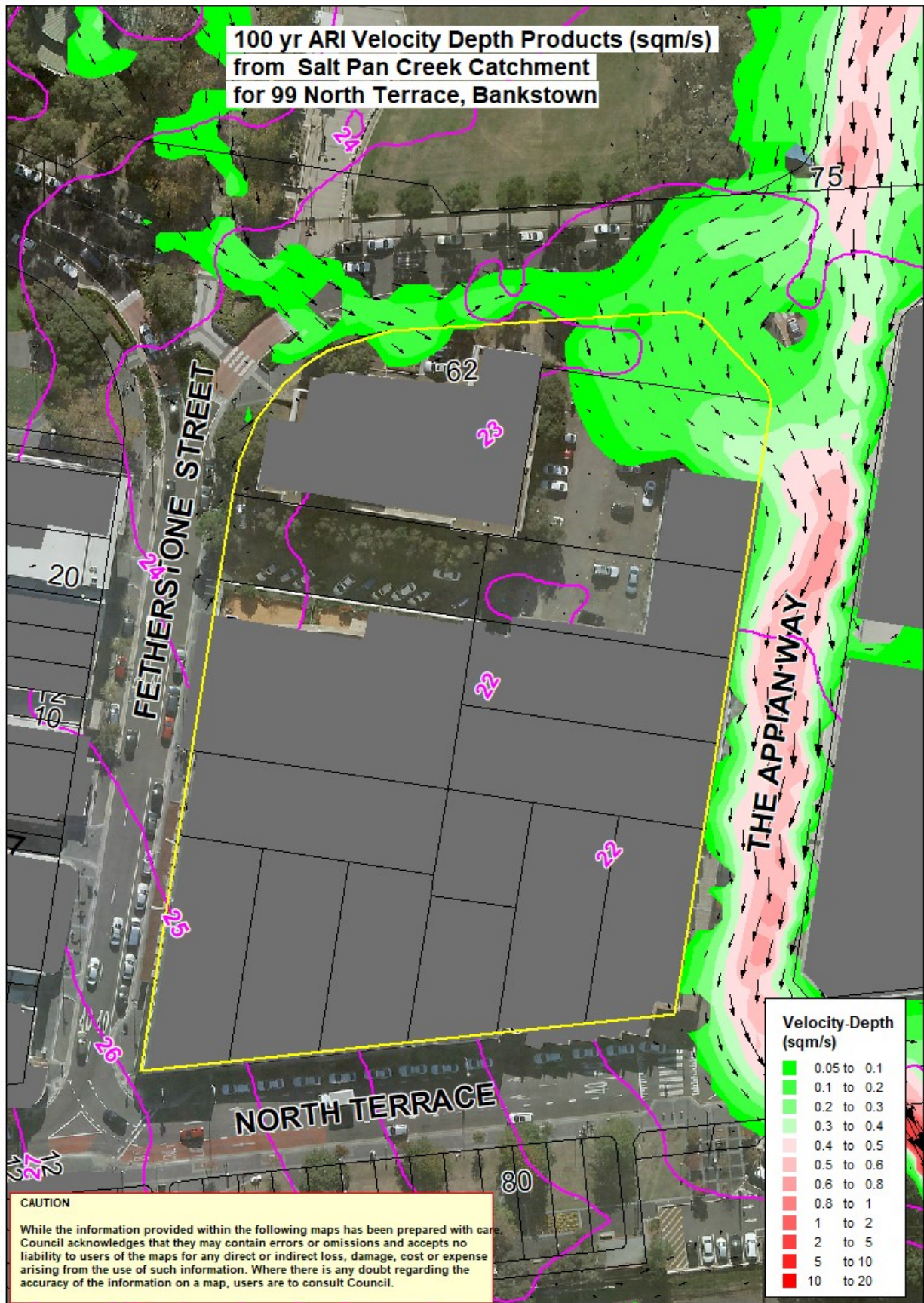
**100 Year ARI Flood Extent and Flood Contour Levels
(mAHD) Salt Pan Creek Catchment
for 99 North Terrace, Bankstown**



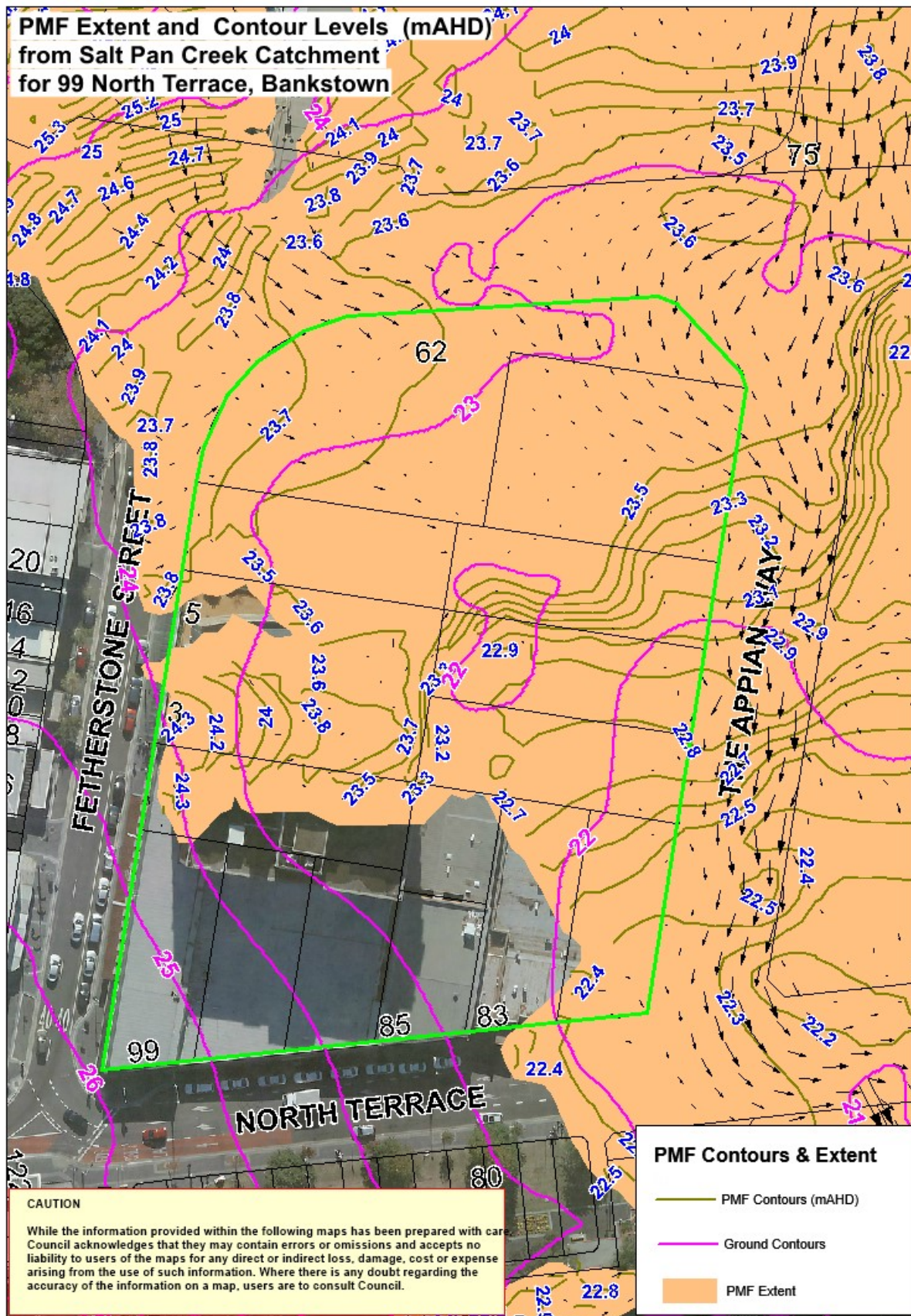
100 yr ARI Flood Depth (m) and Flood Contour Levels (mAHD) Salt Pan Creek Catchment for 99 North Terrace, Bankstown



**100 yr ARI Velocity Depth Products (sqm/s)
from Salt Pan Creek Catchment
for 99 North Terrace, Bankstown**



PMF Extent and Contour Levels (mAHD)
from Salt Pan Creek Catchment
for 99 North Terrace, Bankstown



CAUTION

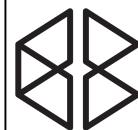
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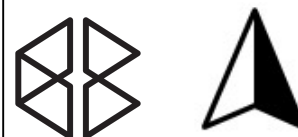
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Metres 20 40 60

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LEGEND

-  Canterbury Bankstown LGA
-  Surrounding LGA's

Jetty

-  Jetty

Parcel Associate

Parcel Frontage

-  Parcel Frontage

Parcel Boundary

-  Parcel Boundary

Parcel Easements (Line)

-  Parcel Easements (Line)

Parcel Easements (Polygon)

-  Parcel Easements (Polygon)

Contours (Major 10m)

-  Contours (Major 10m)

Contours (Intermediate 5m)

-  Contours (Intermediate 5m)

Contours (Minor <5m)

-  Contours (Minor <5m)

Drains

-  Drains

Pits

-  Pits



Appendix B

Stormwater Plans

Barings Compass Centre, Bankstown

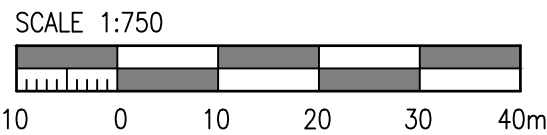
BARINGS COMPASS CENTRE

- BANKSTOWN

CIVIL ENGINEERING DRAWING SET



Sheet List Table	
Sheet Number	Sheet Title
80000	COVER SHEET
82001	EROSION AND SEDIMENT CONTROL PLAN
83001	GENERAL ARRANGEMENT PLAN
87001	STORMWATER MANAGEMENT PLAN
87101	STORMWATER DETAILS



Rev	Revision Description	By	App	Date
P01	FOR APPROVAL	HS	VS	22.04.2024
P02	FOR APPROVAL	VS	CW	21.06.2024

Rev	Revision Description	By	App	Date
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Scale 1:1 1:2 1:3 1:4 1:5 1:6 1:7 1:8

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Client

BARINGS

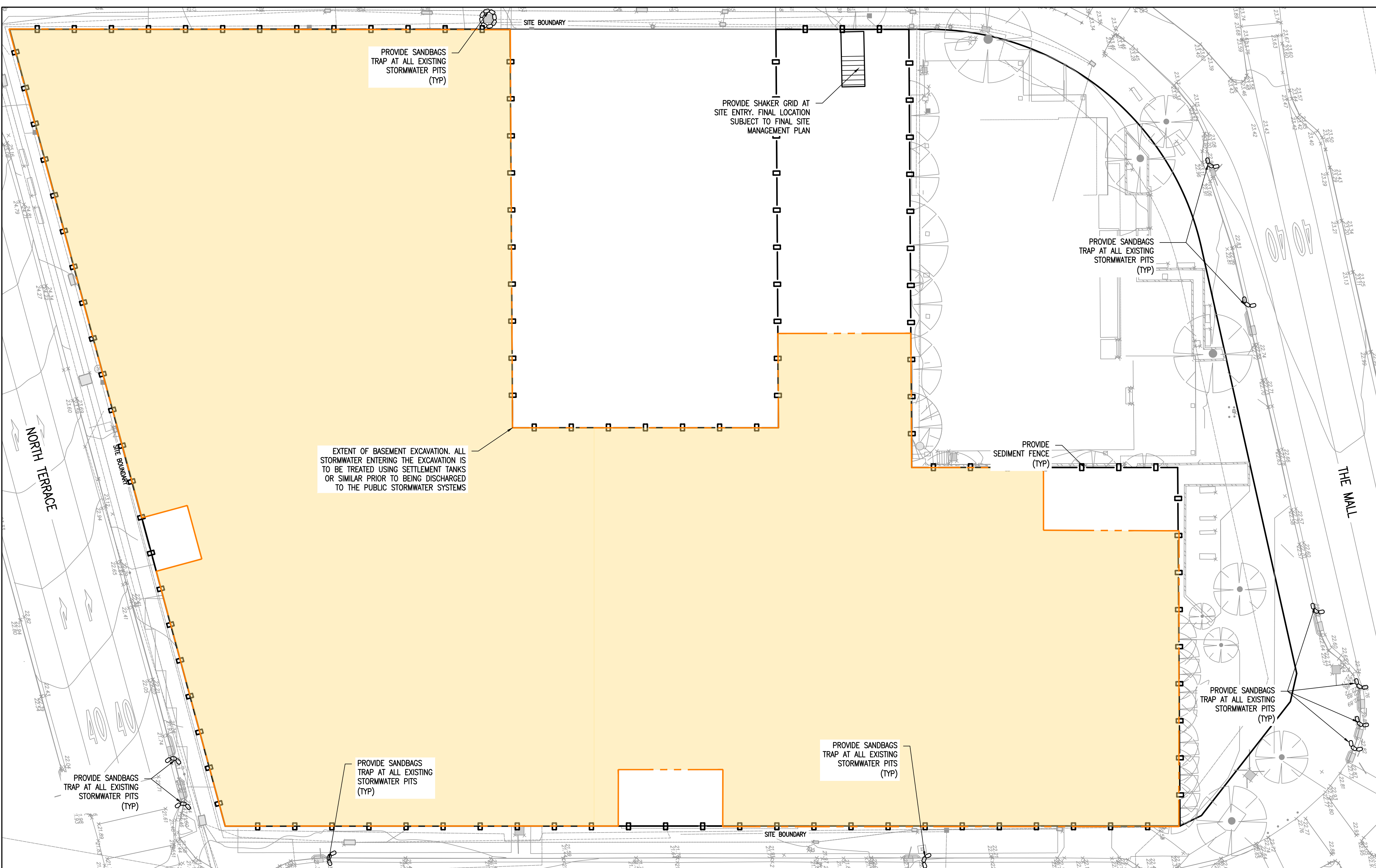
Title

COVER SHEET

Project

**BARINGS COMPASS CENTRE
BANKSTOWN**

Date 24.04.24 Scale at A1 1:750	Drawn H. ARIKAN Designer V. SANTOS	Design Checker N. LY Approved C.WATE Job No. 23334
Drawing Number 23491-RBG-XX-XX-DR-CV-80000		Revision P02

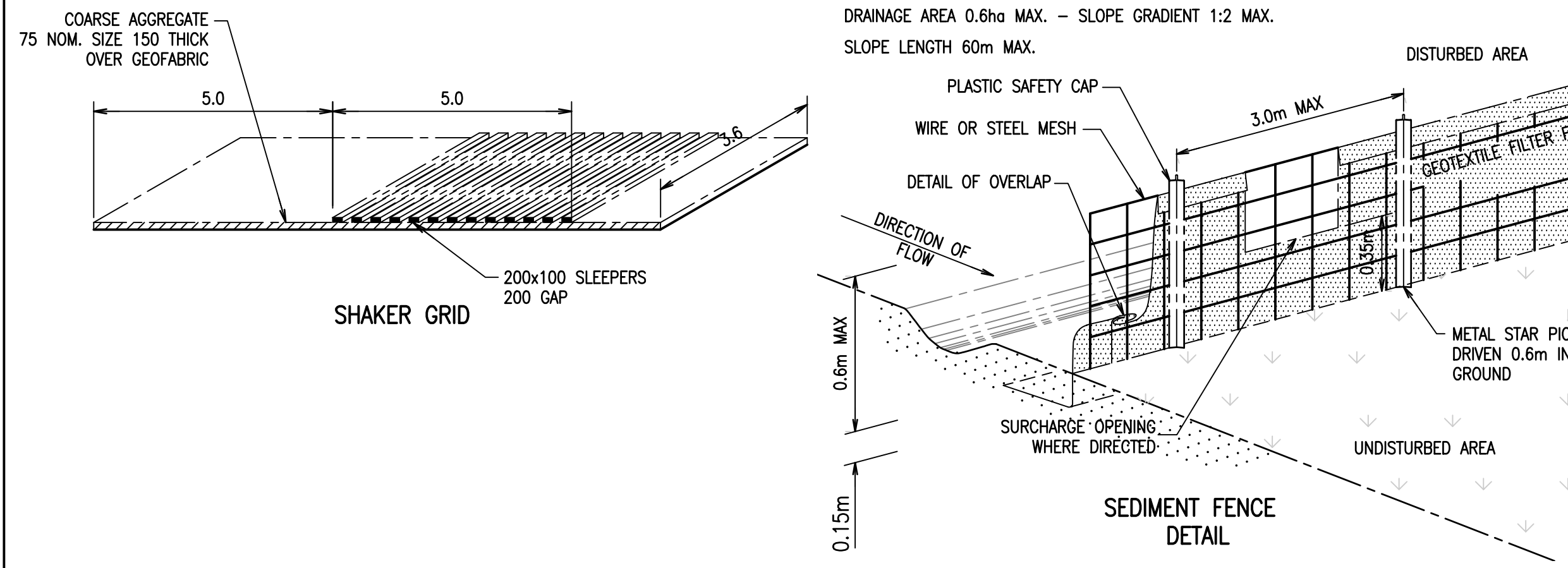


- GENERAL NOTES:**
- A1. THIS SOIL AND WATER MANAGEMENT PLAN IS TO BE READ IN CONJUNCTION WITH OTHER ENGINEERING PLANS RELATING TO THIS DEVELOPMENT.
 - A3. REFER GEOTECHNICAL REPORT FOR EARTHWORKS AND PARAMETERS.
 - A10. ALL CONSTRUCTION VEHICLES SHALL ENTER AND EXIT THE SITE VIA THE APPROVED CONSTRUCTION ENTRY/EXIT ROUTE.
 - A11. ALL VEHICLES LEAVING THE SITE SHALL BE CLEANED AND INSPECTED BEFORE LEAVING.
 - A12. MAINTAIN ALL STORMWATER PIPES AND PITS CLEAR OF DEBRIS AND SEDIMENT. INSPECT STORMWATER SYSTEM AND CLEAN OUT AFTER EACH STORM EVENT.
 - A13. CLEAN OUT ALL EROSION AND SEDIMENT CONTROL DEVICES AFTER EACH STORM EVENT.
 - A14. ALL DISTURBED AREAS SHALL BE REVEGETATED AS SOON AS THE RELEVANT WORKS HAVE BEEN COMPLETED.
 - A15. KERB INLET SOCKS TO BE PROVIDED ON DOWNSTREAM PITS.

- SEQUENCE OF WORKS**
- PRIOR TO COMMENCEMENT OF EXCAVATION THE FOLLOWING SOIL MANAGEMENT DEVICES MUST BE INSTALLED.
 - CONSTRUCT SILT CONTROL DEVICES BELOW THE SITE AND ACROSS ALL POTENTIAL RUNOFF SITES.
 - CO-ORDINATE CONSTRUCTION ENTRY/EXIT ROUTES WITH PROJECT MANAGER. ARRANGE SUITABLE LOCATION FOR THE INSPECTION OF TRUCKS PRIOR TO LEAVING SITE AND DIVERT RUNOFF TO SUITABLE CONTROL SYSTEM.
 - CONSTRUCT MEASURES TO DIVERT UPSTREAM FLOWS INTO EXISTING STORMWATER SYSTEM.
 - PROVIDE SANDBAG SEDIMENT TRAPS UPSTREAM OF EXISTING PITS.
 - LOCATE A 1.8 METRE CHAIN WIRE FENCE AROUND THE BOUNDARIES AND ATTACH HESSIAN CLOTH TO IT ON THE WINDWARD SIDE (TIES AT THE TOP CENTER AND BOTTOM AND AT 1 METRE INTERVALS.
 - DISTURBED AREAS ARE REGULARLY WATERED TO REDUCE DUST POLLUTION.
 - CONSTRUCT GEOTEXTILE FILTER PIT SURROUND AROUND ALL PROPOSED PITS AS THEY ARE CONSTRUCTED.
 - ON COMPLETION OF PAVEMENT PROVIDE SAND BAG KERB INLET SEDIMENT TRAPS AROUND PITS.
 - PROVIDE AND MAINTAIN A STRIP OF TURF ON BOTH SIDES OF ALL ROADS AFTER THE CONSTRUCTION OF KERBS.

- EROSION AND SEDIMENT CONTROL NOTES**
- ALL WORK SHALL BE GENERALLY CARRIED OUT IN ACCORDANCE WITH:
 - LOCAL AUTHORITY REQUIREMENTS,
 - EPA – POLLUTION CONTROL MANUAL FOR URBAN STORMWATER,
 - DEPARTMENT OF CONSERVATION AND LAND MANAGEMENT MANUAL- "URBAN EROSION & SEDIMENT CONTROL".
 - EROSION AND SEDIMENT CONTROL DRAWINGS AND NOTES ARE PROVIDED FOR THE WHOLE OF THE WORKS. SHOULD THE CONTRACTOR STAGE THESE WORKS THEN THE DESIGN MAY REQUIRE TO BE MODIFIED. VARIATION TO THESE DETAILS MAY REQUIRE TO BE APPROVED BY THE RELEVANT AUTHORITIES. THE EROSION AND SEDIMENT CONTROL PLAN SHALL BE IMPLEMENTED AND ADOPTED TO MEET THE VARYING SITUATIONS AS WORK ON SITE PROGRESSES.
 - MAINTAIN ALL EROSION AND SEDIMENT CONTROL DEVICES TO THE SATISFACTION OF THE SUPERINTENDENT AND THE LOCAL AUTHORITY.
 - WHEN STORMWATER PITS ARE CONSTRUCTED PREVENT SITE RUNOFF ENTERING THE PITS UNLESS SILT FENCES ARE ERECTED AROUND PITS.
 - MINIMIZE THE AREA OF SITE BEING DISTURBED AT ANY ONE TIME.
 - PROTECT ALL STOCKPILES OF MATERIALS FROM SCOUR AND EROSION. DO NOT STOCKPILE LOOSE MATERIAL IN ROADWAYS, NEAR DRAINAGE PITS OR IN WATERCOURSES.
 - ALL SOIL AND WATER CONTROL MEASURES ARE TO BE PUT BACK IN PLACE AT THE END OF EACH WORKING DAY, AND MODIFIED TO BEST SUIT SITE CONDITIONS.
 - CONTROL WATER FROM UPSTREAM OF THE SITE SUCH THAT IT DOES NOT ENTER THE DISTURBED SITE.
 - ALL CONSTRUCTION VEHICLES SHALL ENTER AND EXIT THE SITE VIA THE APPROVED CONSTRUCTION ENTRY/EXIT ROUTE.
 - ALL VEHICLES LEAVING THE SITE SHALL BE CLEANED AND INSPECTED BEFORE LEAVING.
 - MAINTAIN ALL STORMWATER PIPES AND PITS CLEAR OF DEBRIS AND SEDIMENT. INSPECT STORMWATER SYSTEM AND CLEAN OUT AFTER EACH STORM EVENT.
 - CLEAN OUT ALL EROSION AND SEDIMENT CONTROL DEVICES AFTER EACH STORM EVENT.
 - ALL DISTURBED AREAS SHALL BE REVEGETATED AS SOON AS THE RELEVANT WORKS HAVE BEEN COMPLETED.

- SITE MAINTENANCE NOTES:**
- SM1. THE CONTRACTOR SHALL INSPECT THE SITE AT LEAST WEEKLY AND AT THE CONCLUSION OF EVERY STORM EVENT TO:
- ENSURE THAT DRAINS OPERATE PROPERLY AND TO EFFECT AND NECESSARY REPAIRS.
 - REMOVED SPILLED SAND OR OTHER MATERIALS FROM HAZARD AREAS, INCLUDING LANDS CLOSER THAN 5 METRES FROM AREAS OF LIKELY CONCENTRATED OR HIGH VELOCITY FLOWS ESPECIALLY WATERWAYS AND PAVED AREAS.
 - REMOVED TRAPPED SEDIMENT WHENEVER THE DESIGN CAPACITY OF THAT STRUCTURES HAS BEEN EXCEEDED.
 - ENSURE REHABILITATION LANDS HAVE EFFECTIVELY REDUCED THE EROSION HAZARD TO INITIATE UPGRADING OR REPAIR AS NECESSARY.
 - CONSTRUCT ADDITIONAL EROSION AND OR SEDIMENT CONTROL WORKS THAT MIGHT BECOME NECESSARY TO ENSURE THE DESIRED PROTECTION IS GIVEN TO DOWNSLOPE LANDS AND WATERWAYS. MAKE ONGOING CHANGES TO THE PLAN WHERE IT PROVES INADEQUATE IN PRACTICE OR IS SUBJECT TO CHANGES IN CONDITIONS ON THE WORK-SITE OR ELSEWHERE IN THE CATCHMENT.
 - MAINTAIN EROSION AND SEDIMENT CONTROL STRUCTURES IN A FULLY FUNCTIONING CONDITION UNTIL ALL EARTHWORK ACTIVITIES ARE COMPLETED AND THE SITE IS REHABILITATED.
- SM2. THE SITE SUPERINTENDENT WILL KEEP A LOGBOOK MAKING ENTRIES AT LEAST WEEKLY, IMMEDIATELY BEFORE FORECAST RAIN AND AFTER RAINFALL. ENTRIES WILL INCLUDE:
- THE VOLUME AND INTENSITY OF ANY RAINFALL EVENTS.
 - THE CONDITION OF ANY SOIL AND WATER MANAGEMENT WORKS.
 - THE CONDITION OF VEGETATION AND ANY NEED TO IRRIGATE.
 - THE NEED FOR DUST PREVENTION STRATEGIES
- THE LOGBOOK WILL BE KEPT ON-SITE AND MADE AVAILABLE TO ANY AUTHORISED PERSON UPON REQUEST. IT WILL BE GIVEN TO THE SUPERINTENDENT AT THE CONCLUSION OF THE WORKS.



- INSTALLATION**
- EXCAVATE A TRENCH AT LEAST 150mm DEEP.
 - DRIVE POSTS 500-600mm INTO GROUND AT A MAXIMUM SPACING OF 3.0m CENTRES.
 - PLACE AND FIX SUPPORT MESH (F52) TO POST.
 - LAY BIDIM GEOFABRIC (SF 2000) AGAINST THE SUPPORT MESH AND FIX BY TIE WIRE, STAPLES OR HOG RINGS.
 - PLACE BIDIM IN TRENCH AND BACKFILL WITH SOIL.
 - SOIL ON BOTH SIDES OF THE FENCE MUST BE COMPACTED TO AVOID SEEPAGE UNDER THE BARRIER.
- NOTE:** POSITION OF SEDIMENT FENCE AS DIRECTED BY MANAGING CONTRACTOR. FENCE TO REMAIN IN PLACE UNTIL EXCAVATION IS BELOW FOOTPATH LEVEL. PROVIDE 2mx2m TURFED AREA ON DOWNSTREAM SIDE OF FENCE AT SURCHARGE OPENINGS.

- NOTES:**
- PROVIDE THREE LAYERS OF SANDBAGS WITH THEIR ENDS OVERLAPPED AND ALSO OVERLAPPING ONTO THE KERB.
 - CREATE A GAP IN THE SANDBAGS TO ACT AS A SPILLWAY.
 - SANDBAG BARRIER TO BE Min. 2m FROM THE INLET AND EXTEND Min. 0.9m OUT FROM THE KERB.

GULLY INLET SANDBAG PROTECTION DETAIL

LEGEND

- PROPOSED BASEMENT EXCAVATION EXTENT
- PROPOSED SEDIMENT FENCE
- PROVIDE TEMPORARY SANDBAGS INLET PROTECTION AROUND PITS.
 - AFTER PAVEMENT WORKS IF CONSTRUCTION IS ONGOING UPSTREAM.
 - TO EXISTING GRATED PITS DOWNSTREAM OF CONSTRUCTION WORKS.
- PROPOSED SHAKER GRID

Rev Revision Description By App Date

P01	FOR APPROVAL	HS	VS	22.04.2024
P02	FOR APPROVAL	VS	CW	21.06.2024

Rev Revision Description By App Date

11	12	13	14	15	16	17	18
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ACN 010 580 248

Client

BARINGS

Title
EROSION AND SEDIMENT CONTROL PLAN

Project
BARINGS COMPASS CENTRE BANKSTOWN

Date
21.06.24
Scale of A1
1:250

Drawn
H. ARKAN

Designer
V. SANTOS

Design Checker
N. LY

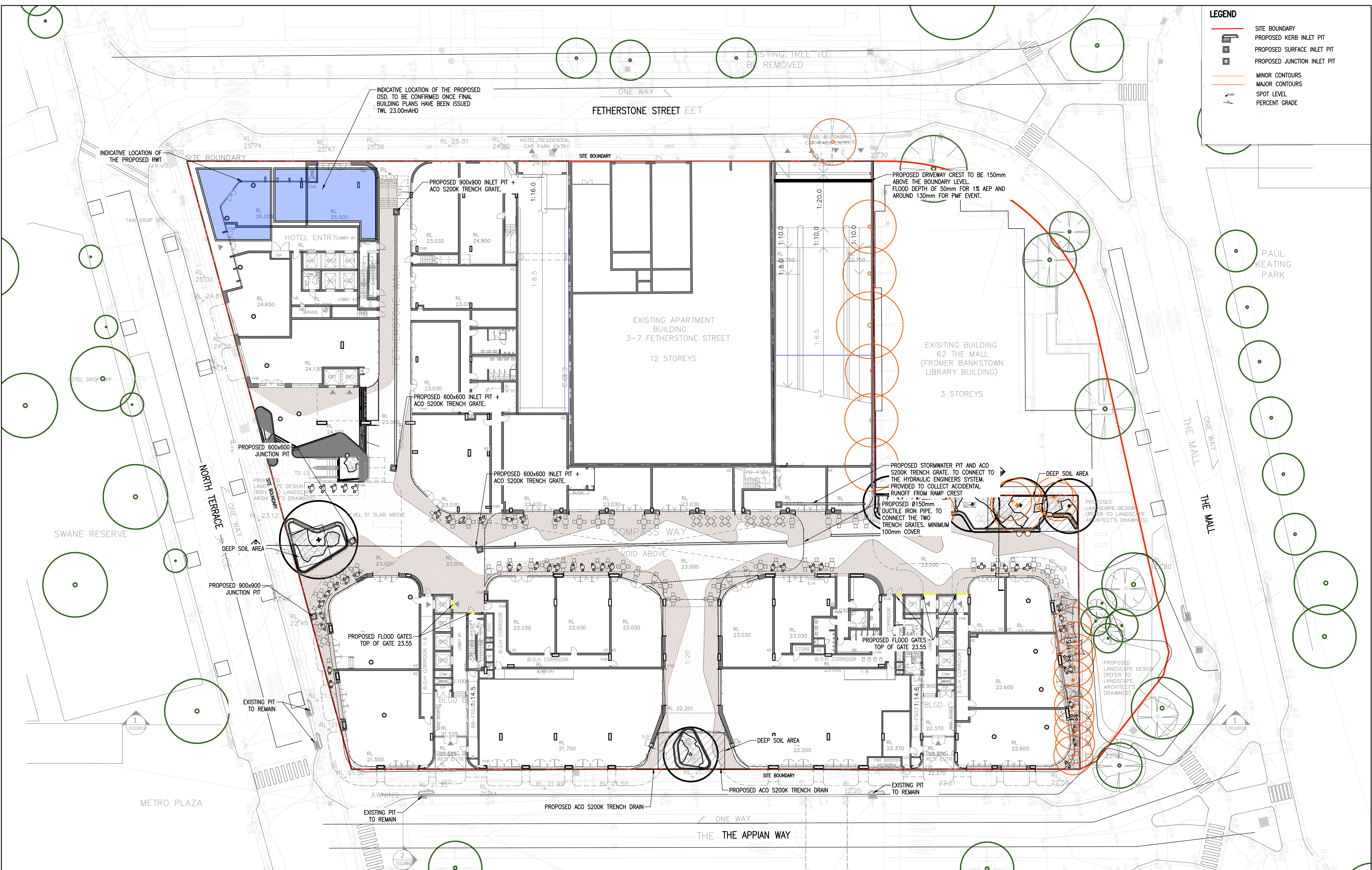
Approved
C.WATE

Job No.
23334

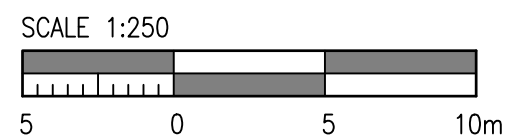
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Drawing Number
23334-RGB-XX-XX-DR-CV-82001

Revision
P02



- LEGEND**
- SITE BOUNDARY
 - PROPOSED KERB INLET PIT
 - PROPOSED SURFACE INLET PIT
 - PROPOSED JUNCTION INLET PIT
 - MINOR CONTOURS
 - MAJOR CONTOURS
 - SPOT LEVEL
 - PERCENT GRADE



Rev	Revision Description	By	App	Date
P01	FOR APPROVAL	HS	VS	22.04.2024
P02	FOR APPROVAL	VS	CW	21.06.2024

Rev	Revision Description	By	App	Date

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Client

BARINGS

Title
GENERAL ARRANGEMENT PLAN

Project
BARINGS COMPASS CENTRE BANKSTOWN

Date
21.06.24
Scale of A1
1:250

Drawn
H. ARKAN

Designer
V. SANTOS

Design Checker
N. LY

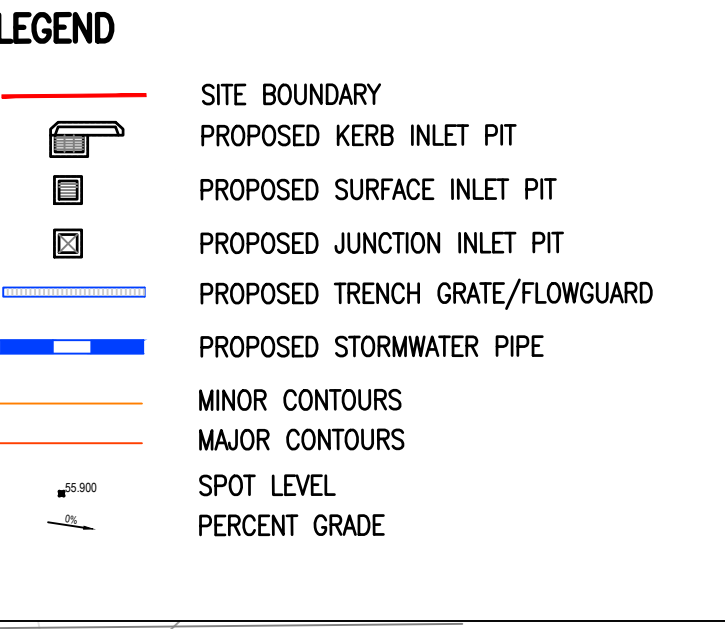
Approved
C. WATE

Job No.
23334

Drawing Number
23334-RGB-XX-XX-DR-CV-83001

Revision
P02

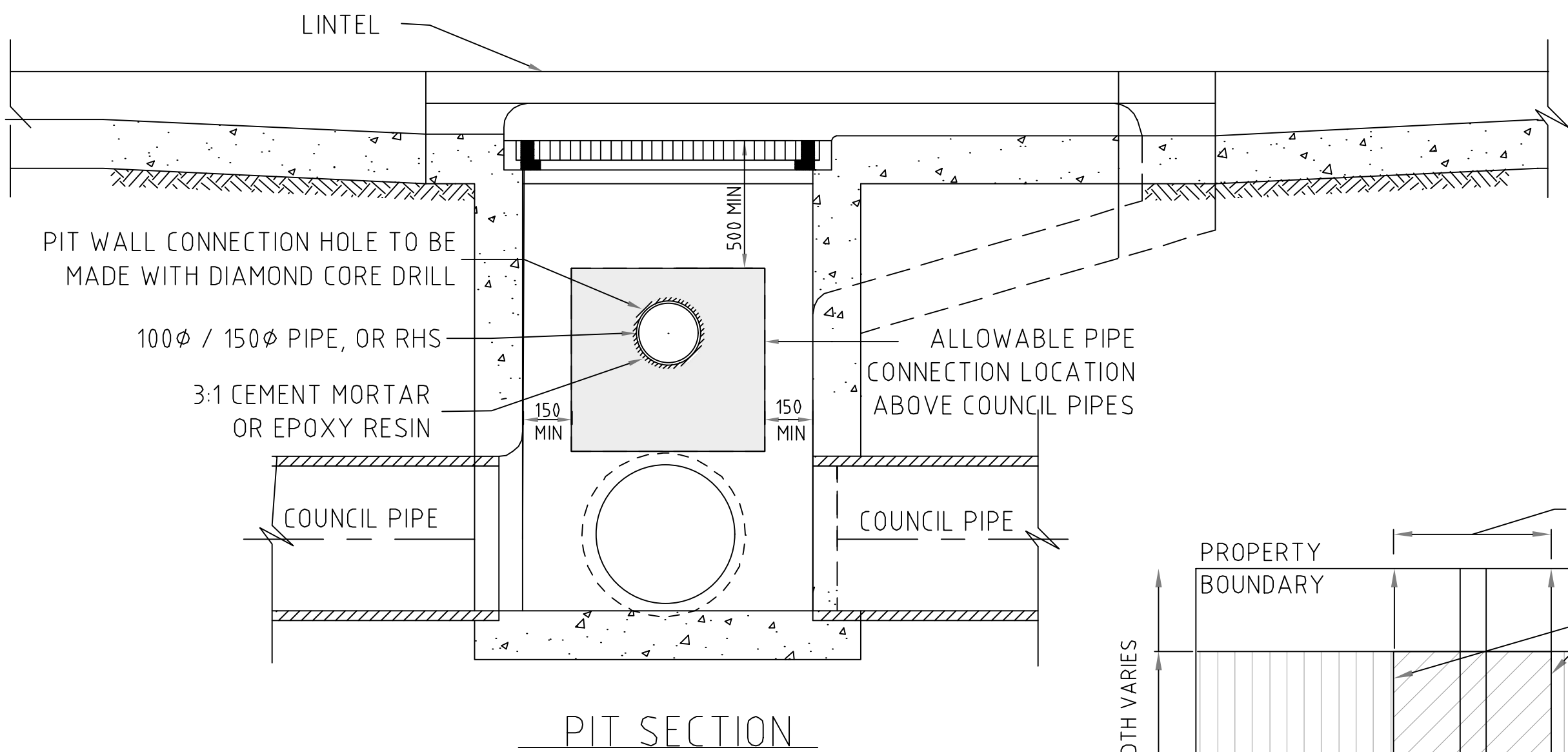
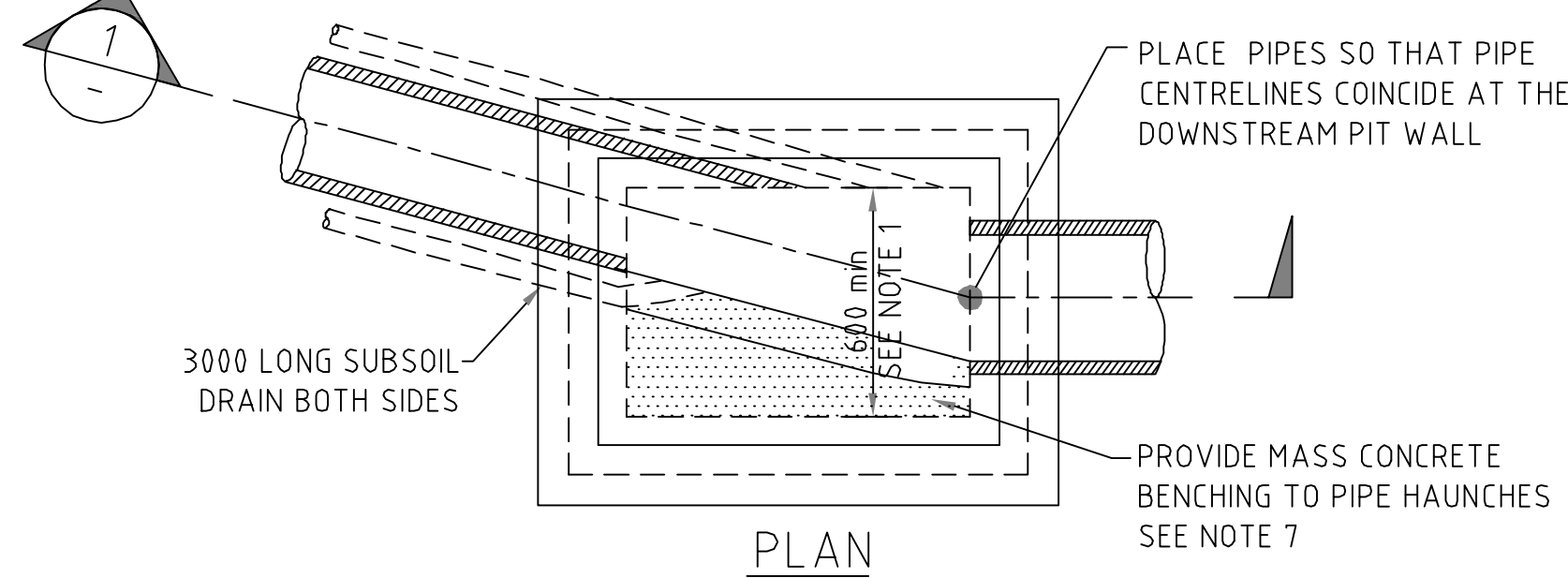
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FOR APPROVAL NOT FOR CONSTRUCTION

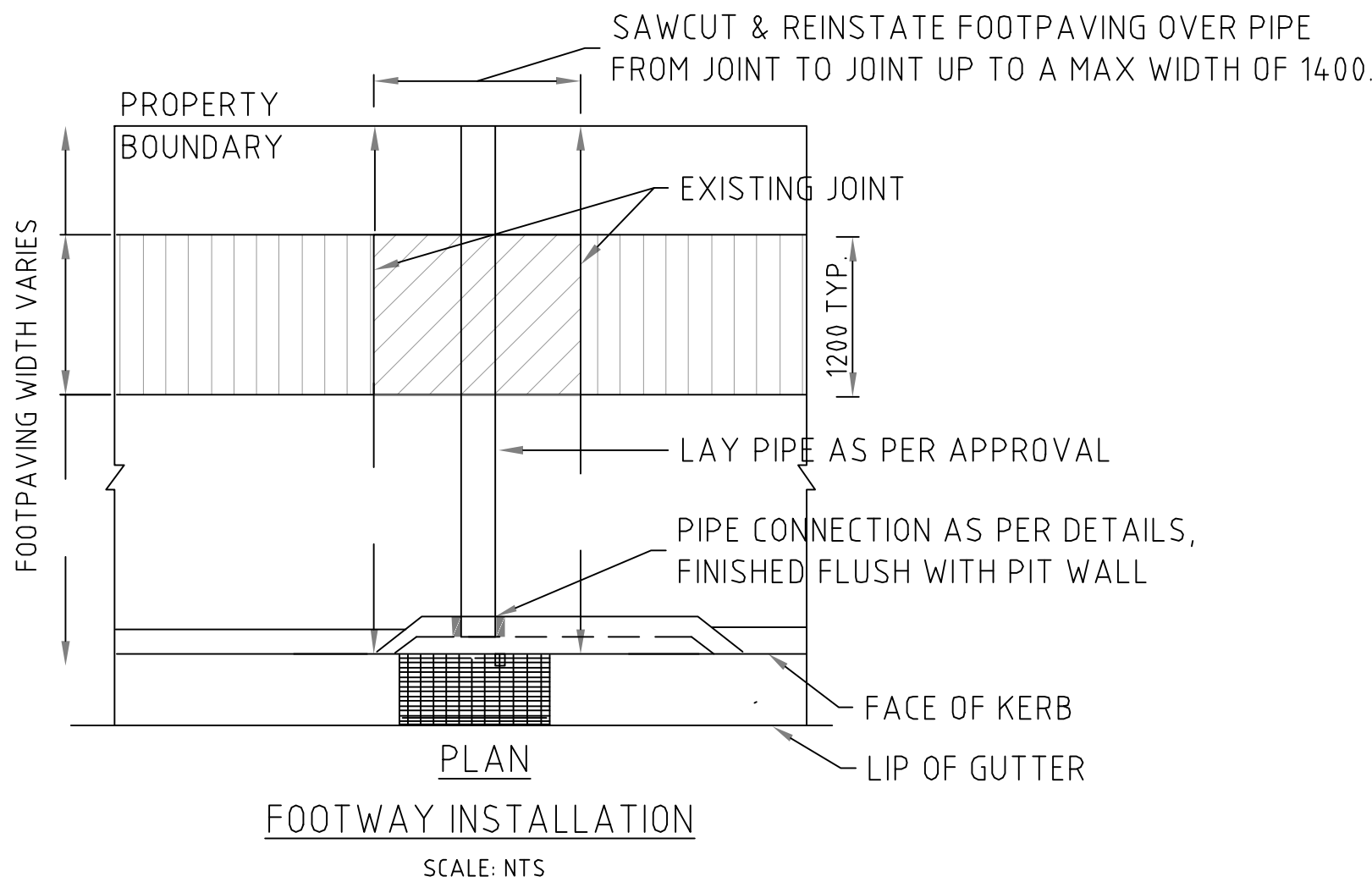
Drawing Number	Revision
23334_P02_XY_XY_DP_CV_87001	P02

1. MINIMUM INTERNAL DIMENSIONS :
 - 600 x 600 FOR DEPTH LESS THAN 800.
 - 900 x 600 FOR DEPTH OF 800 TO 1800.
2. SIDE WALLS OF PITS WITH DEPTH 1500 TO 1800 ARE TO BE REINFORCED WITH SL82 MESH CHAIRLIFT PLACED AND RETURNED 300 INTO BASE. IF DEPTH OF PIT EXCEEDS 1800, REFER TO STANDARD DRAWING S-104.
3. COMPRESSIVE STRENGTH OF CONCRETE (F_c) AT 28 DAYS TO BE MIN. 25MPa.
4. 100 DIA. SUBSOIL DRAINAGE PIPE 3000 LONG WRAPPED IN FABRIC SOCK TO BE PLACED ADJACENT TO INLET PIPES ON BOTH SIDES AND 100 MINIMUM ABOVE PIT FLOOR.
5. STEP IRON LADDER TO BE PROVIDED. FOR PITS DEEPER THAN 1200 AND PLACED ON A WALL CLEAR OF FLOW WHERE POSSIBLE. REFER TO BCC S-122 FOR DETAILS.
6. SELECTED GRANULAR MATERIAL BACK FILL SHALL BE PLACED AGAINST THE FULL HEIGHT OF THE VERTICAL WALLS FOR A HORIZONTAL DISTANCE EQUAL TO ONE-THIRD THE HEIGHT OF THE STRUCTURE.
7. APPROVED PRE CAST CONCRETE PITS MAY BE USED IN ACCORDANCE WITH MANUFACTURERS SPECIFICATION.
8. PROVIDE CONCRETE BENCHING AROUND PIT TO SUIT INLET & OUTLET PIPES AS DETAILED.
9. THE INLET PIPE OBVERT IS TO BE NO HIGHER THAN THE OUTLET PIPE OBVERT.
10. ALL DIMENSIONS ARE IN MILLIMETRES.

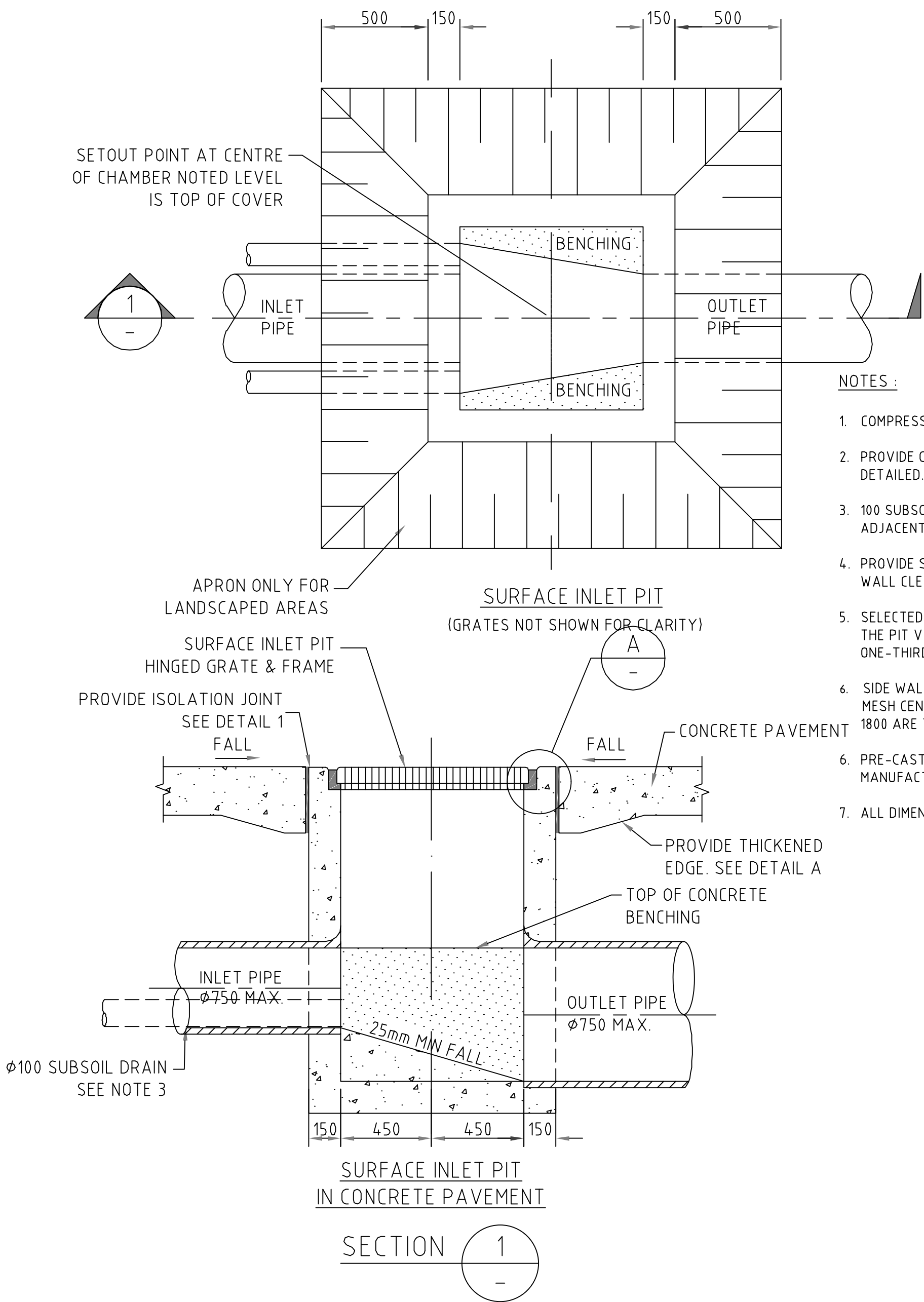


NOTES:

1. FOR PIPE TYPE, SIZE, AND LOCATION ACROSS FOOTWAY REFER TO THE APPROVED WORK PERMIT PLAN.
2. DEVELOPMENTS OTHER THAN SINGLE DWELLINGS AND DUAL OCCUPANCIES ARE TO USE HOT DIP GALVANISED STEEL RHS BOX SECTIONS 5MM THICK, 100 MAX HIGH AND 200 MAX WIDE, ACROSS THE FOOTWAY.
3. SINGLE DWELLINGS AND DUAL OCCUPANCIES MAY USE 100 DIA. OR 150 DIA. uPVC PIPE FOR ROOF WATER OUTLET (RWO). PIPES TO BE EXTRA HEAVY DUTY SEWER GRADE - SN825N10.
4. REFER TO STD DWG S-004 FOR PIPE CLEARANCE REQUIREMENTS TO VFCs, PUBLIC UTILITY STRUCTURES, AND TREES.
5. PIPE OR RHS LOCATION TO BE AT LEAST 500MM BELOW GUTTER INVERT, AT LEAST 150 CLEAR OF SIDE WALLS, AND ABOVE TOP OF EXISTING COUNCIL STORMWATER PIPES. THE LOCATION MUST NOT AFFECT THE STRUCTURAL INTEGRITY OF THE PIT.
6. PIT CONNECTION TO BE MADE WITH DIAMOND SAW DRILL CORE(S).
7. REINSTATE PIT WALL USING EPOXY RESIN, OR 3:1 CEMENT MORTAR, FULLY AROUND PIPE.
8. PIPE / RHS CONNECTION IS TO FINISH FLUSH WITH PIT WALL.
9. SAWCUT AND REMOVE FOOTPAVING OVER PIPE FROM EXISTING JOINT TO EXISTING JOINT WITH A MAXIMUM WIDTH OF 1400. FOR JOINT WIDTHS >1400 SAWCUT WIDTH CAN BE HALF JOINT SPACING AS DIRECTED.
10. REINSTATE FOOTPAVING TO MATCH EXISTING WITH ISOLATION JOINTS BOTH SIDES.
11. REINSTATE ALL DISTURBED FOOTWAY AREAS TO MATCH EXISTING.



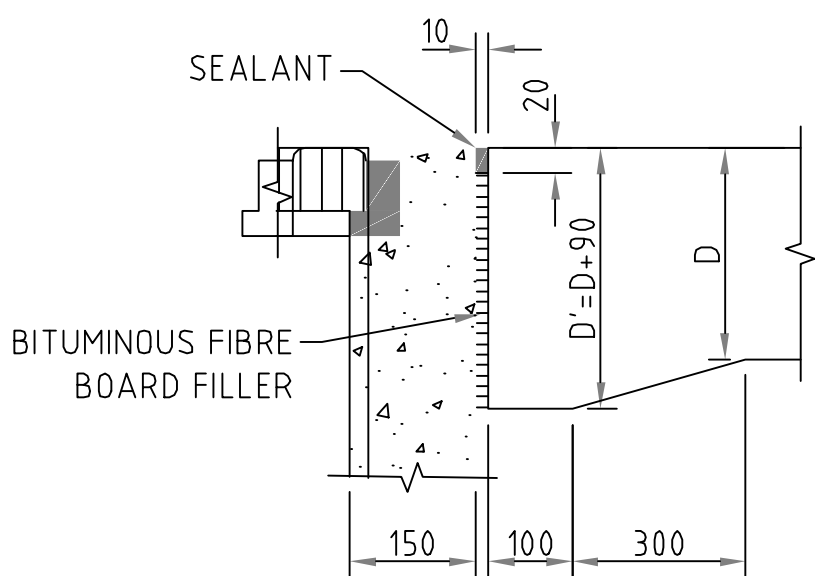
ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE



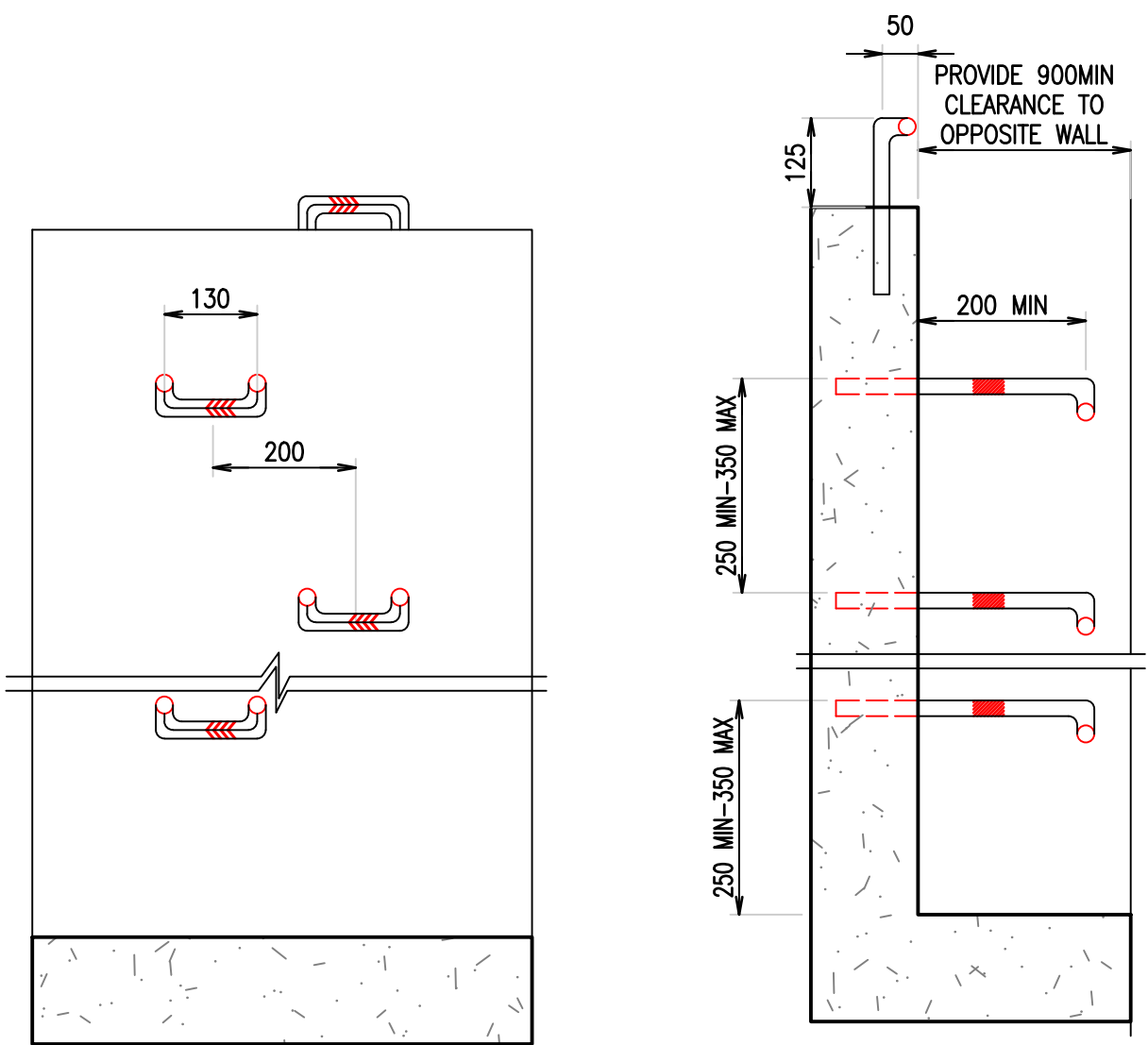
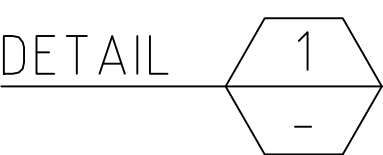
<u>MINIMUM PIT SIZES:</u>
600x600 FOR PITS LESS THAN 600 DEPTH
900x600 FOR PITS 600 TO 1200 DEPTH
900x900 FOR PITS GREATER THAN 1200 DEPTH

NOTES :

1. COMPRESSIVE STRENGTH OF CONCRETE F_c AT 28 DAYS TO BE MIN. 25 MPa.
2. PROVIDE CONCRETE BENCHING ACROSS PIT TO SUIT INLET & OUTLET PIPES AS DETAILLED.
3. 100 SUBSOIL DRAINAGE PIPE 3000 LONG WRAPPED IN FABRIC SOCK TO BE PLACED ADJACENT TO INLET PIPES ON BOTH SIDES AND 100 MINIMUM ABOVE PIT FLOOR.
4. PROVIDE STEP IRON LADDER WHERE PIT IS DEEPER THAN 1200 PLACED ON A WALL CLEAR OF FLOW WHERE POSSIBLE. SEE BCC STANDARD S-122 FOR DETAILS
5. SELECTED GRANULAR BACK FILL IS TO BE PLACED AGAINST THE FULL HEIGHT OF THE PIT VERTICAL FACES AND FOR A HORIZONTAL DISTANCE EQUAL TO ONE-THIRD THE HEIGHT OF THE STRUCTURE.
6. SIDE WALLS OF PITS WITH DEPTH 1500 - 1800 ARE TO BE REINFORCED WITH SL82 MESH CENTRALLY PLACED AND RETURNED 300 INTO BASE. PITS DEEPER THAN 1800 ARE TO BE DESIGNED BY A CERTIFIED STRUCTURAL ENGINEER
7. PRE-CAST CONCRETE PITS MAY BE INSTALLED IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS.
8. ALL DIMENSIONS ARE IN MILLIMETRES.



ISOLATION JOINT



SECTION

SCALE 1:10

STEP IRON LADDER REQUIREMENTS

1. STEP IRON LADDER IS TO COMPLY WITH AS 1657.
2. VERTICAL RISE NOT TO EXCEED 6m
3. STEP IRONS:
 - MATERIAL TO BE 24mm DIAMETER SOLID LOW CARB STEEL OF EQUIVALENT PERFORMANCE
 - TREAD DEPTH NOT LESS THAN 24mm CLEAR WIDTH OF EACH TREAD SHALL BE 150mm – 550mm.
4. INSTALLATION:
 - STEP IRONS TO BE SPACED EVENLY FROM TOP TO BOTTOM NOT LESS THAN 250mm OR MORE THAN 350mm.
 - STEP IRONS TO BE FIXED INTO WALL 85mm MIN. USING AN APPROVED EPOXY.
 - PROVIDE 200mm MINIMUM STEP CLEARANCE FROM WALL, TO SIDE EDGE OF STEP IRON.
 - EACH ALTERNATE STEP IRON SHALL BE OFFSET 200mm.
 - PROVIDE 900mm MINIMUM CLEARANCE TO OPPOSITE WALL.
 - LOCATE LADDER CLEAR OF THROUGH FLOW OF WATER WHERE POSSIBLE.

Rev Revision Description			By App Date	Rev Revision Description			By App Date	Scale 11 12 13 14 15 16 17 18 Disclaimer: Robert Bird Group Pty Ltd ACN 010 580 246 and its related entities (RBS) do not warrant the accuracy, currency or completeness of any information or data they supply or transfer by electronic means. You are responsible for verifying that any information or data supplied or transferred by electronic means matches the information or data on the corresponding PDF or DWG version issued by RBS. RBS will not be liable for any loss or damage you or any other party incurs as a result of acting in reliance on any information or data supplied or transferred by electronic means and you release RBS from any liability for any loss or damage however caused which you or any other party may directly or indirectly suffer in connection with your access to or use of that information or data. RBS provides this information for the express purpose contemplated by the underlying terms of engagement for the project which must not be used for any other purpose. The information is not a contractual document. Unless otherwise agreed in writing by RBS, all intellectual property rights in any information supplied by RBS are owned by, or licensed to, RBS. RBS only provides you with a non-transferable, fully revocable licence to use the intellectual property rights for the express purpose. DO NOT SCALE DRAWINGS, USE FIGURED DIMENSIONS REFER TO GENERAL NOTES UNLESS NOTED OTHERWISE  Member of the Surbana Jurong Group SYDNEY OFFICE Robert Bird Group Pty Ltd PO Box 5461 North Sydney, NSW 2059 Level 6, 100 Pacific Highway North Sydney NSW 2060 Ph: (02) 8246 3200 Fax: (02) 8246 3201 Email: sydney@robertbird.com.au Web: www.robertbird.com ACN 010 580 246												Client	Title STORMWATER DETAILS Project BARINGS COMPASS CENTRE BANKSTOWN Date 21.06.24 Scale at A1 AS SHOWN Drawn H. ARKAN Designer V. SANTOS Job No. 23334 Design Checker N. LY Approved C.WATE 23334			Date 21.06.24 Scale at A1 AS SHOWN Drawn H. ARKAN Designer V. SANTOS Job No. 23334 Design Checker N. LY Approved C.WATE 23334			Date 21.06.24 Scale at A1 AS SHOWN Drawn H. ARKAN Designer V. SANTOS Job No. 23334 Design Checker N. LY Approved C.WATE 23334			Date 21.06.24 Scale at A1 AS SHOWN Drawn H. ARKAN Designer V. SANTOS Job No. 23334 Design Checker N. LY Approved C.WATE 23334			Date 21.06.24 Scale at A1 AS SHOWN Drawn H. ARKAN Designer V. SANTOS Job No. 23334 Design Checker N. LY Approved C.WATE 23334			Date 21.06.24 Scale at A1 AS SHOWN Drawn H. ARKAN Designer V. SANTOS Job No. 23334 Design Checker N. LY Approved C.WATE 23334			Date 21.06.24 Scale at A1 AS SHOWN Drawn H. ARKAN Designer V. SANTOS Job No. 23334 Design Checker N. LY Approved C.WATE 23334			Date 21.06.24 Scale at A1 AS SHOWN Drawn H. ARKAN Designer V. SANTOS Job No. 23334 Design Checker N. LY Approved C.WATE 23334			Date 21.06.24 Scale at A1 AS SHOWN Drawn H. ARKAN Designer V. SANTOS Job No. 23334 Design Checker N. LY Approved C.WATE 23334			Date 21.06.24 Scale at A1 AS SHOWN Drawn H. ARKAN Designer V. SANTOS Job No. 23334 Design Checker N. LY Approved C.WATE 23334			Date 21.06.24 Scale at A1 AS SHOWN Drawn H. ARKAN Designer V. SANTOS Job No. 23334 Design Checker N. LY Approved C.WATE 23334			Date 21.06.24 Scale at A1 AS SHOWN Drawn H. ARKAN Designer V. SANTOS Job No. 23334 Design Checker N. LY Approved C.WATE 23334			Date 21.06.24 Scale at A1 AS SHOWN Drawn H. ARKAN Designer V. SANTOS Job No. 23334 Design Checker N. LY Approved C.WATE 23334			Date 21.06.24 Scale at A1 AS SHOWN Drawn H. ARKAN Designer V. SANTOS Job No. 23334 Design Checker N. LY Approved C.WATE 23334			Date 21.06.24 Scale at A1 AS SHOWN Drawn H. ARKAN Designer V. SANTOS Job No. 23334 Design Checker N. LY Approved C.WATE 23334			Date 21.06.24 Scale at A1 AS SHOWN Drawn H. ARKAN Designer V. SANTOS Job No. 23334 Design Checker N. LY Approved C.WATE 23334			Date 21.06.24 Scale at A1 AS SHOWN Drawn H. ARKAN Designer V. SANTOS Job No. 23334
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