IGS INTEGRATED GROUP SERVICES

149-163 MILTON STREET, ASHBURY NSW 2193

STORMWATER MANAGEMENT
OSD CALCULATION & WSUD

Project No. EN-N23-262

Date: 28/02/2025

Document Control

Project Name: ASHBURY STAGE 2
Address: 149-163 Milton Street, Ashbury NSW 2193

Title of Report: Stormwater Management and WSUD

Name of Client: Coronation Property

Integrated Group Services
192-200 Euston Road,
Alexandria NSW 2015

Tel: +61 2 8488 4600
ABN 68 163 019 029
https://www.igs.com.au/

REVISION	DATE	DETAILS
1	24.05.2024	DRAFT ISSUE
2	10.10.2024	APPROVAL ISSUE
3	28.02.2025	APPROVAL ISSUE

	NAME	DATE	SIGNATURE
Prepared By:	Jane Chen	28.02.2025	J.C
Reviewed By:	Prabeg Sharma	28.02.2025	P.S
Approved By:	Prabeg Sharma	28.02.2025	P.S

TABLE OF CONTENTS

Contents

1. Introduction

IGS has been engaged to develop a concept stormwater management plan for the proposed development at 149-163 Milton Street, Ashbury. The site encompasses an area of approximately (16450.0 m^2 and is within the jurisdiction of the Canterbury–Bankstown Council Government Area).
The primary objective of this assessment is to address the specific requirements outlined in the regulations and requirements regarding the stormwater management strategy for this project. A review of the documents and appropriate controls is listed below.

1. **State Environmental Planning Policy (Biodiversity and Conservation 2021), Chapter 6 – Water Catchments, Division 2, Section 6.6.**

(1) In deciding whether to grant development consent to development on land in a regulated catchment, the consent authority must consider the following—

(a) Whether the development will have a neutral or beneficial effect on the quality of water entering a waterway,

Proposed Water filtration measures are consistent with the NorBE Guidelines, where the water quality provides a beneficial effect on the water quality entering the council's stormwater drainage infrastructure.

(b) whether the development will have an adverse impact on water flow in a natural waterbody,

The peak discharge to post-development flow rates for all storm intensities and durations up to and including a 1% annual exceedance probability (AEP) storm event are limited to Predevelopment flow rates. Thus, the development is not anticipated to adversely impact the water flow in a natural water body.

(c) whether the development will increase the amount of stormwater run-off from a site,

Stormwater run-off from the site is limited to Pre-Development conditions for all storm events. Two OSD tanks with a total capacity of 14,0430 KL are proposed to store stormwater runoff upto a volume of 1% AEP Storm events. Post-discharge from the site is limited to pre-discharge flows.

(d) whether the development will incorporate on-site stormwater retention, infiltration or reuse,

Development Proposes a 20KL rainwater tank for Reuse to be used for irrigation purposes or as mentioned in the BASIX requirements.

(e) the impact of the development on the level and quality of the water table,

All groundwater seepage is collected and treated before discharging into the environment. No impact on the level and water quality of the water table is anticipated.

(f) the cumulative environmental impact of the development on the regulated catchment,

The total area of the site is 1.645 Ha. The proposal seeks to improve the stormwater management system within the site as compared to the existing scenario. Thus, we anticipate a positive impact on the whole catchment and downstream of the site.

(g) whether the development makes adequate provisions to protect the quality and quantity of groundwater.

The Groundwater Take Assessment Report from EI-Australia, dated 28 September 2023, indicates that the anticipated volume of groundwater during the operational phase is approximately 1,500 litres per day (0.47 ML per year). The basement perimeter drainage system is proposed to effectively manage this seepage, which is further treated and released to the council's stormwater networks downstream.

2. **Canterbury – Bankstown Council's Local Environmental Plan (CBLEP) (2023), Part 6.3 Stormwater Management and Water Sensitive Urban Design, Section 3.**

(3) Development consent must not be granted to development on land to which this clause applies unless the consent authority is satisfied that the development

(a) is designed to maximise the use of water-permeable surfaces on the land having regard to the soil characteristics affecting on-site infiltration of water, and

On – Site permeable surfaces are proposed to comply with the deep soil ares requirements. Infiltration is encouraged within the proposed water permeable surfaces. This condition will be further adressed by Landscape Architects.

(b) includes, if practicable, on-site stormwater retention for use as an alternative supply to mains water, groundwater or river water, and

The rainwater Tank system is used as an alternative supply to mains and uses the top-up system from the water mains to maintain the water demand to meet the BASIX requirements.

(c) avoids significant adverse impacts of stormwater runoff on the land on which the development is carried out, adjoining properties and infrastructure, native bushland and receiving waters, or if the impact cannot be reasonably avoided, minimises and mitigates the impact, and

The proposed stormwater management system proposes 20KL On-site Retention and 14,0430 KL of OSD system and limits the stormwater water discharge to less than the existing conditions. Thus, no significant adverse impact of stormwater runoff on the land is anticipated.

(d) includes riparian, stormwater and flooding measures, and

A sediment erosion control plan is prepared per the Bluebook and Council's requirements to limit any erosion and sediment from the site. All stormwater discharge from the site is proposed to be treated before releasing to the council infrastructure

(e) is designed to incorporate the following water-sensitive urban design principles—

(i) protection and enhancement of water quality by improving the quality of stormwater runoff from urban catchments,

(ii) minimisation of harmful impacts of urban development on water balance and on surface and groundwater flow regimes,

(iii) integration of stormwater management systems into the landscape in a way that provides multiple benefits, including water quality protection, stormwater retention and detention, public open space and recreational and visual amenities.

The proposed stormwater management system collects, treats, stores, and releases stormwater from the hard surface through an integrated retention, treatment, and detention system. Stormwater treatment measures are proposed to have a beneficial effect on site discharge. The MUSIC Model assessment is performed as per the NorBE Guidelines. All landscape areas are proposed to maximise stormwater infiltration and filtration. Stormwater discharge from the site is limited to all storm events. Thus, the proposed stormwater management system meets the water–sensitive urban design principles.

3. **Canterbury-Bankstown Council's Development Control Plan (CBDCP) (2023).**

Below is a review of the document and appropriate controls are listed below.

1. **Section 5.4** – Maximum stormwater discharge to the kerb and gutter

The maximum direct discharge from the site to the kerb and gutter must be limited to 30 litres per second at any one discharge point for the 10-year ARI storm. It may be required that multiple RHSs be installed to meet the capacity requirements of the discharge from the site. If this is the case, they must be installed in accordance with Council's Standard Drawing S-107. If the site discharge is greater than 30 l/s, a connection to Council's underground pipe system may be required. OSD may be provided, or increased to limit the discharge to permissible flows. All underground direct connections to Council pipelines are to be constructed

in accordance with Council Standard Drawing S-107 and inspected by Council prior to backfilling.

Stormwater from the site is discharged to the existing drainage easement at the rear of the site.

2. **Section 7.0** – OSD (On-Site Detention)

- OSD must be designed and constructed to control stormwater runoff from development sites such that, for 5 to 100-year ARI events, peak stormwater discharges from the site do not exceed pre-development stormwater discharges.
- OSD storage volume shall be provided such that the total OSD discharge and bypass flow from the site does not exceed the maximum permissible site discharge determined using one of the Council approved calculation methods.
- A minimum of 70% of the site piped stormwater system and 70% of the site's overland flow must drain through the OSD system. Stormwater from the catchment upstream of the development shall be collected separately and conveyed around the site without detention.
- Design flow rates from all development sites requiring (OSD) shall be computed by a time-area hydrograph method such as ILSAX, DRAINS or other industry accepted method. The simplified method, given below, may be used for single dwellings and dual occupancies where required.
- The storage required is a volume that will restrict total flows from the development site to match the site runoff prior to development, for a given ARI. The volume/discharge relationship determined shall be for all ARIs for the range of 5 to 100-year ARI. The effects of all storms from 10, 20, 30 and 45 minutes are to be examined.
- As it is normally impractical to use a single outlet of fixed diameter to restrict flows for the range of events from 5-year to 100-year ARI, the discharge control pit should be designed to have a two-stage outlet. The first stage outlet should limit discharge to pre-development 5-year ARI flow (Qp5) and the second stage outlet should be designed to restrict flows for larger events up to and including Qp100.

The assessment utilised the DRAINS modelling to calculate the OSD volume and determine the PSD requirements.

2. OSD VOLUME CALULATION USING DRAINS ANALYSIS.

Drains Model Input Layout

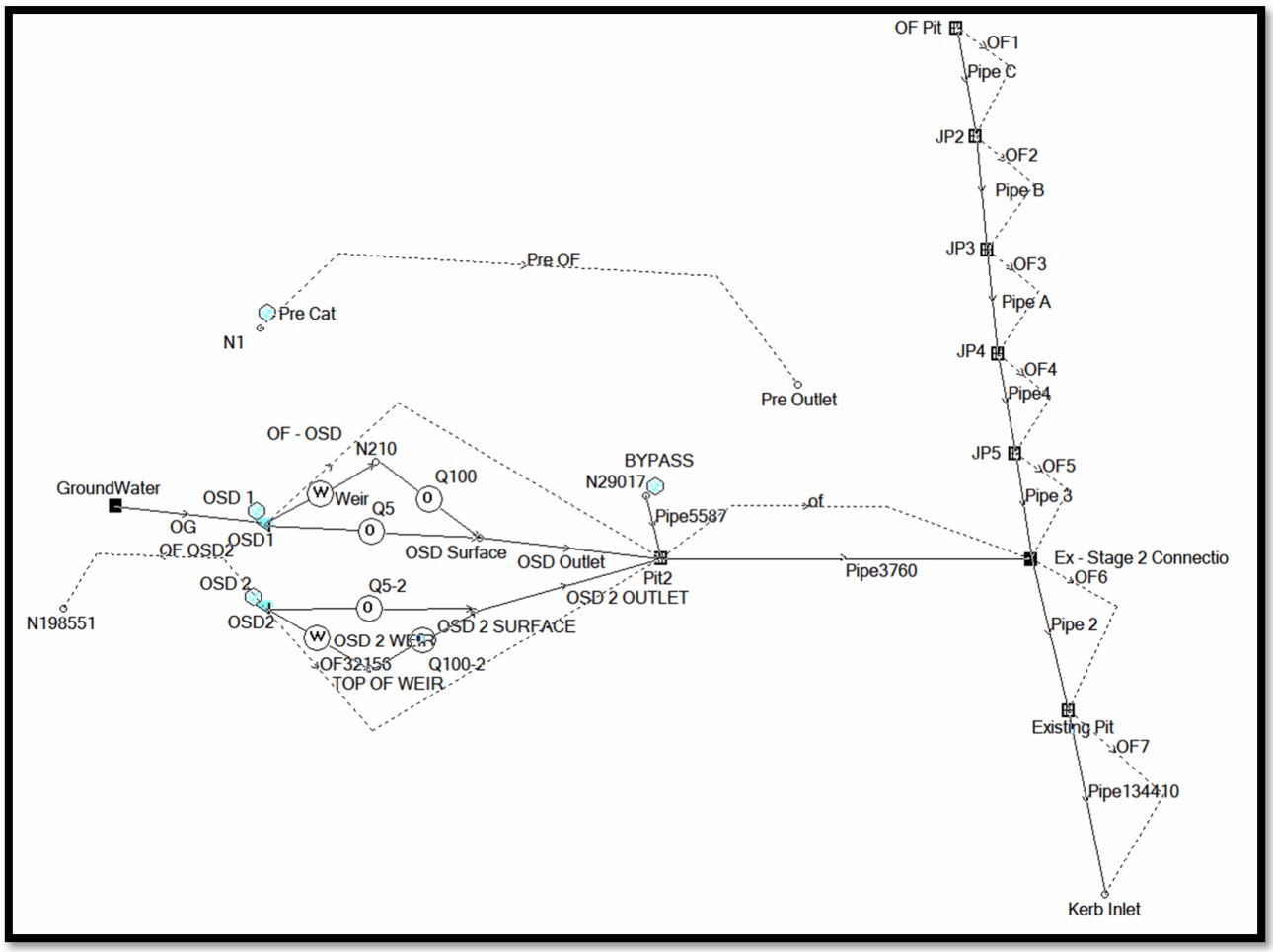


Figure 1: Drains Model Layout

2.1 Ground Water Input within the DRAINS MODEL.

Groundwater Discharge is taken from the Groundwater Take Assessment Report from EI Australia, E22851.G12_Rev1, Dated 28 September 2023. The report is part of the Attachment.

The summary is presented below.

Table 3 Summary of Analysis Results

Direction	Inflow per m length of perimeter wall (m^3/sec)	Inflow per m length of perimeter wall (m^3/day)	Inflow into excavation (m^3/day)	Total Inflow during construction (ML/180 days)
EW	1.01×10^{-7}	0.008	0.88	0.160
NS	3.47×10^{-8}	0.003	0.40	0.072

So, Total ground water inflow = (0.88 + 0.4) m3/day = 1.2m3/day = 0.000014 m3/s = 0.014 l/s. This is added as the base flow and added to OSD of the DRAINS Model.

2.2 20% AEP ANALYSIS

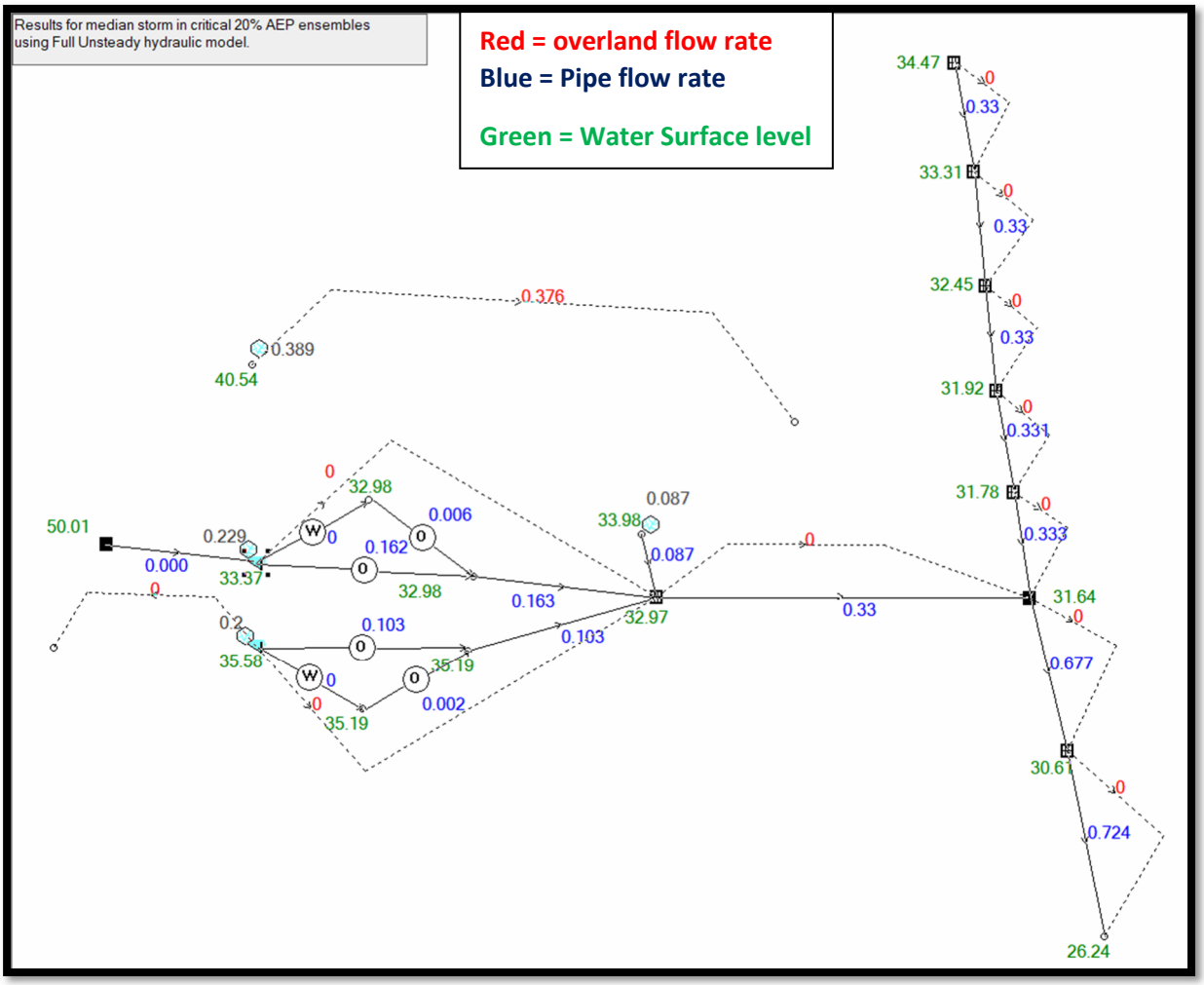


Figure 2: 20% AEP ANALYSIS

- Existing Site Discharged (20% AEP) = 376 l/s (Approx.)
- Post Development Discharge (20% AEP) = 330 l/s (Approximate)
- Required OSD 1 Volume = 29.69 m3 (As per DRAINS Analysis)
- Provided OSD 1 Volume = 73.40 m3 (Approximate)
- OSD 1 - 5% AEP Orifice = 350 mm
- Centre of Orifice = 32.925 m AHD
- OSD 1 - 1% AEP Orifice = 380 mm

- Centre of Orifice = 32.925 m AHD
- The maximum Water level in OSD Tank = 33.37 m AHD

- Required OSD 2 Volume = 51.67 m3 (Approximate)
- Provided OSD 2 Volume = 67.03 m3 (Approximate)
- OSD 2 - 5% AEP Orifice = 280 mm
- Centre of Orifice = 35.225 m AHD
- OSD 2 - 1% AEP Orifice = 320 mm
- Centre of Orifice = 35.250 m AHD
- The maximum Water level in OSD Tank = 35.58 m AHD

2.3 10% AEP ANALYSIS

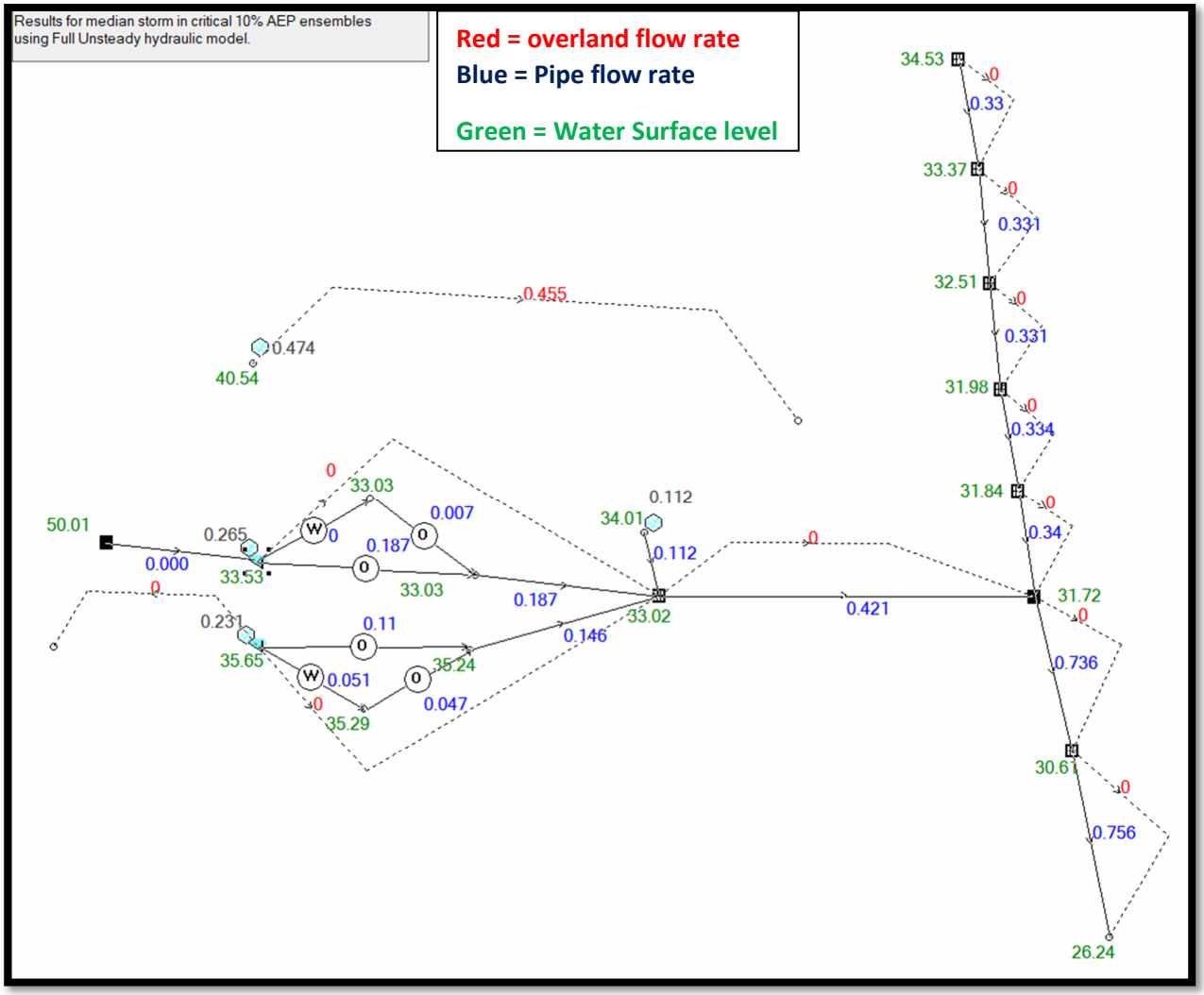


Figure 3: 10% AEP ANALYSIS

- Existing Site Discharged (10% AEP) = 455 l/s (Approx.)
- Post Development Discharge (10% AEP) = 421 l/s (Approximate)
- Required OSD 1 Volume = 37.09 m3 (As per DRAINS Analysis)
- Provided OSD 1 Volume = 73.40 m3 (Approximate)
- OSD 1 - 5% AEP Orifice = 350 mm
- Centre of Orifice = 32.925 m AHD

- OSD 1 - 1% AEP Orifice = 380 mm
- Centre of Orifice = 32.925 m AHD
- The maximum Water level in OSD Tank = 33.53 m AHD

- Required OSD 2 Volume = 58.24 m3 (Approximate)
- Provided OSD 2 Volume = 67.03 m3 (Approximate)
- OSD 2 - 5% AEP Orifice = 280 mm
- Centre of Orifice = 35.225 m AHD
- OSD 2 - 1% AEP Orifice = 320 mm
- Centre of Orifice = 35.250 m AHD
- The maximum Water level in OSD Tank = 35.65 m AHD

2.4 5% AEP ANALYSIS

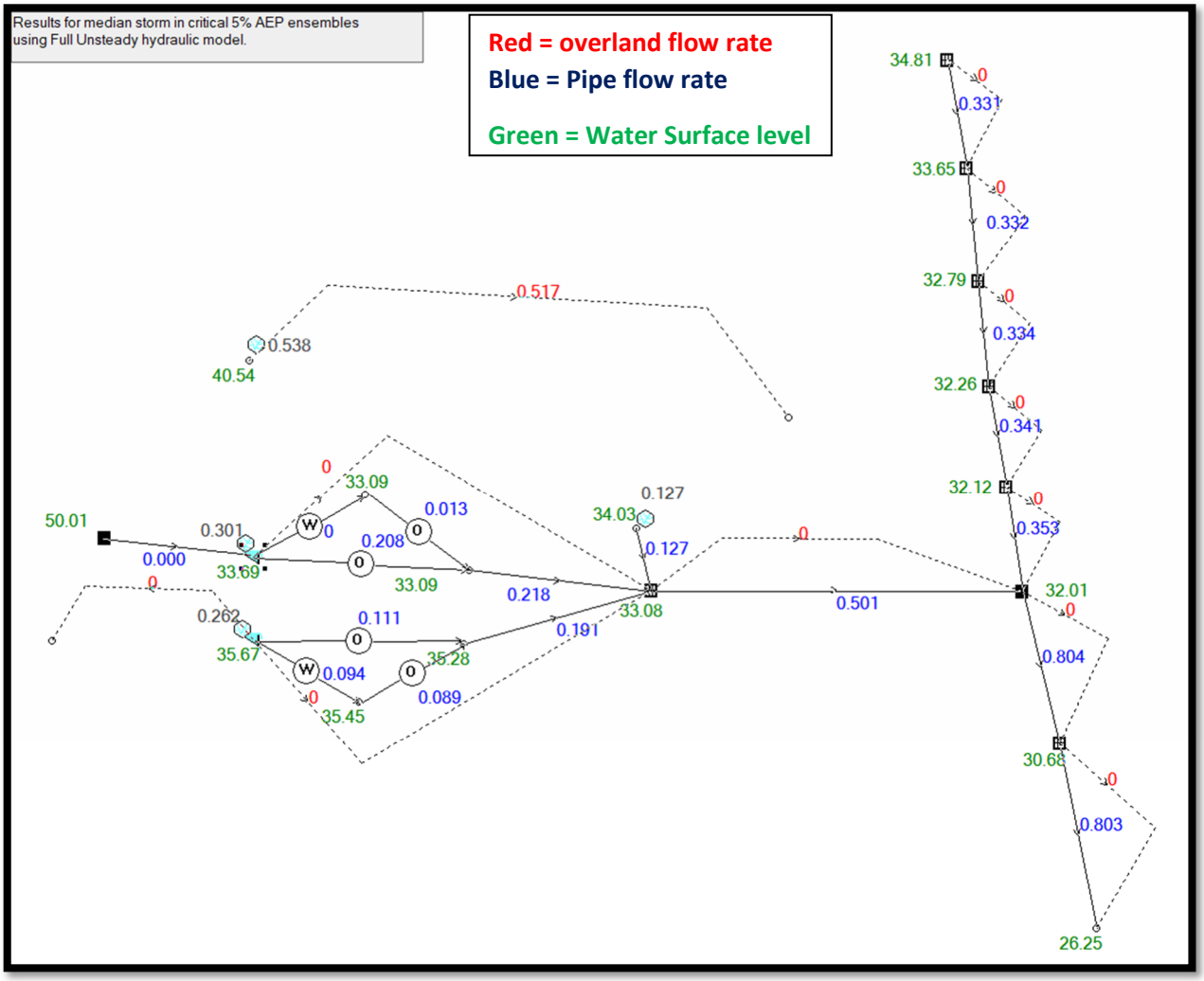


Figure 4: 5% AEP ANALYSIS

- Existing Site Discharged (5% AEP) = 517 l/s (Approx.)
- Post Development Discharge (5% AEP) = 501 l/s (Approximate)
- Required OSD 1 Volume = 44.05 m3 (As per DRAINS Analysis)
- Provided OSD 1 Volume = 73.40 m3 (Approximate)

- OSD 1 - 5% AEP Orifice = 350 mm
- Centre of Orifice = 32.925 m AHD
- OSD 1 - 1% AEP Orifice = 380 mm
- Centre of Orifice = 32.925 m AHD
- The maximum Water level in OSD Tank = 33.68 m AHD

- Required OSD 2 Volume = 60.50 m3 (Approximate)
- Provided OSD 2 Volume = 67.03 m3 (Approximate)
- OSD 2 - 5% AEP Orifice = 280 mm
- Centre of Orifice = 35.225 m AHD
- OSD 2 - 1% AEP Orifice = 320 mm
- Centre of Orifice = 35.250 m AHD
- The maximum Water level in OSD Tank = 35.67 m AHD

2.5 2% AEP ANALYSIS

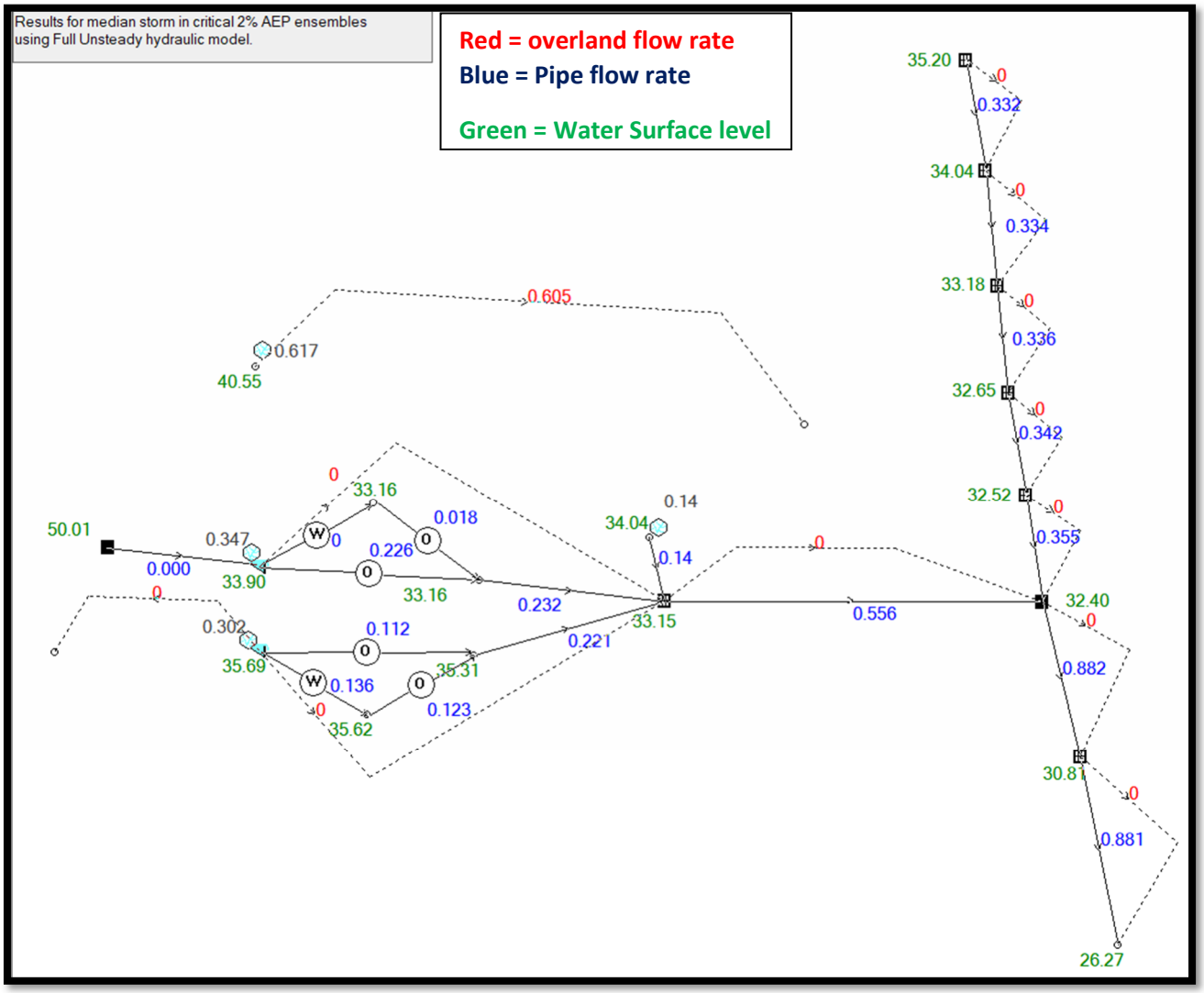


Figure 5: 2% AEP ANALYSIS

- Existing Site Discharged (2% AEP) = 605 l/s (Approx.)
- Post Development Discharge (2% AEP) = 556 l/s (Approximate)
- Required OSD 1 Volume = 53.72 m3 (As per DRAINS Analysis)

- Provided OSD 1 Volume = 73.40 m3 (Approximate)
- OSD 1 - 5% AEP Orifice = 350 mm
- Centre of Orifice = 32.925 m AHD
- OSD 1 - 1% AEP Orifice = 380 mm
- Centre of Orifice = 32.925 m AHD
- The maximum Water level in OSD Tank = 33.90 m AHD

- Required OSD 2 Volume = 62.37 m3 (Approximate)
- Provided OSD 2 Volume = 67.03 m3 (Approximate)
- OSD 2 - 5% AEP Orifice = 280 mm
- Centre of Orifice = 35.225 m AHD
- OSD 2 - 1% AEP Orifice = 320 mm
- Centre of Orifice = 35.250 m AHD
- The maximum Water level in OSD Tank = 35.69 m AHD

2.6 1% AEP ANALYSIS

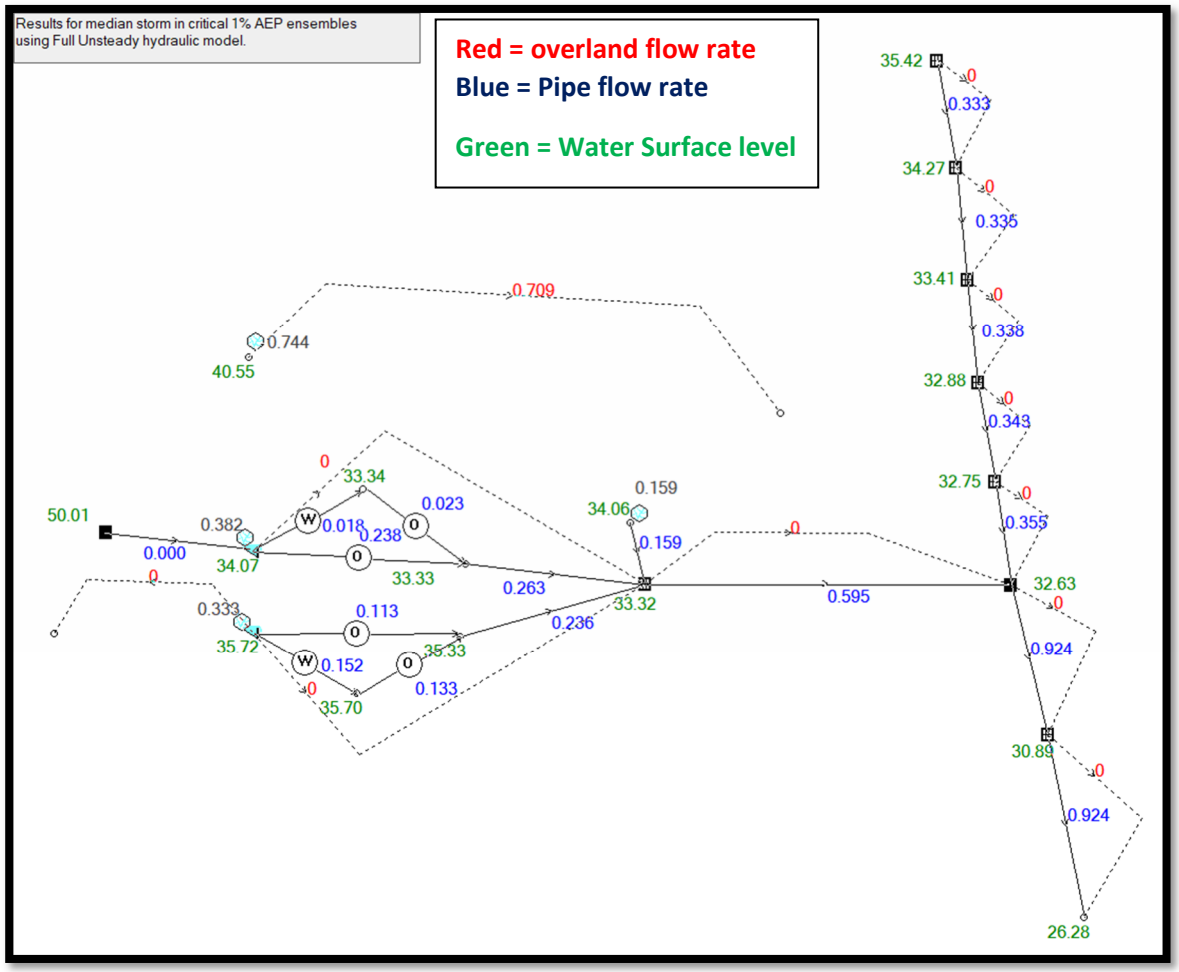


Figure 6: Drains Model for 1% AEP.

- Existing Site Discharged (1% AEP) = 709 l/s (Approx.)
- Post Development Discharge (1% AEP) = 595 l/s (Approximate)
- Required OSD 1 Volume = 62.79 m3 (As per DRAINS Analysis)
- Provided OSD 1 Volume = 73.40 m3 (Approximate)
- OSD 1 - 5% AEP Orifice = 350 mm
- Centre of Orifice = 32.925 m AHD

- OSD 1 - 1% AEP Orifice = 380 mm
- Centre of Orifice = 32.925 m AHD
- The maximum Water level in OSD Tank = 34.07 m AHD

- Required OSD 2 Volume = 65.79 m3 (Approximate)
- Provided OSD 2 Volume = 67.03 m3 (Approximate)
- OSD 2 - 5% AEP Orifice = 280 mm
- Centre of Orifice = 35.225 m AHD
- OSD 2 - 1% AEP Orifice = 320 mm
- Centre of Orifice = 35.250 m AHD
- The maximum Water level in OSD Tank = 35.72 m AHD

2.7 HYDRAULIC GRADE LINE

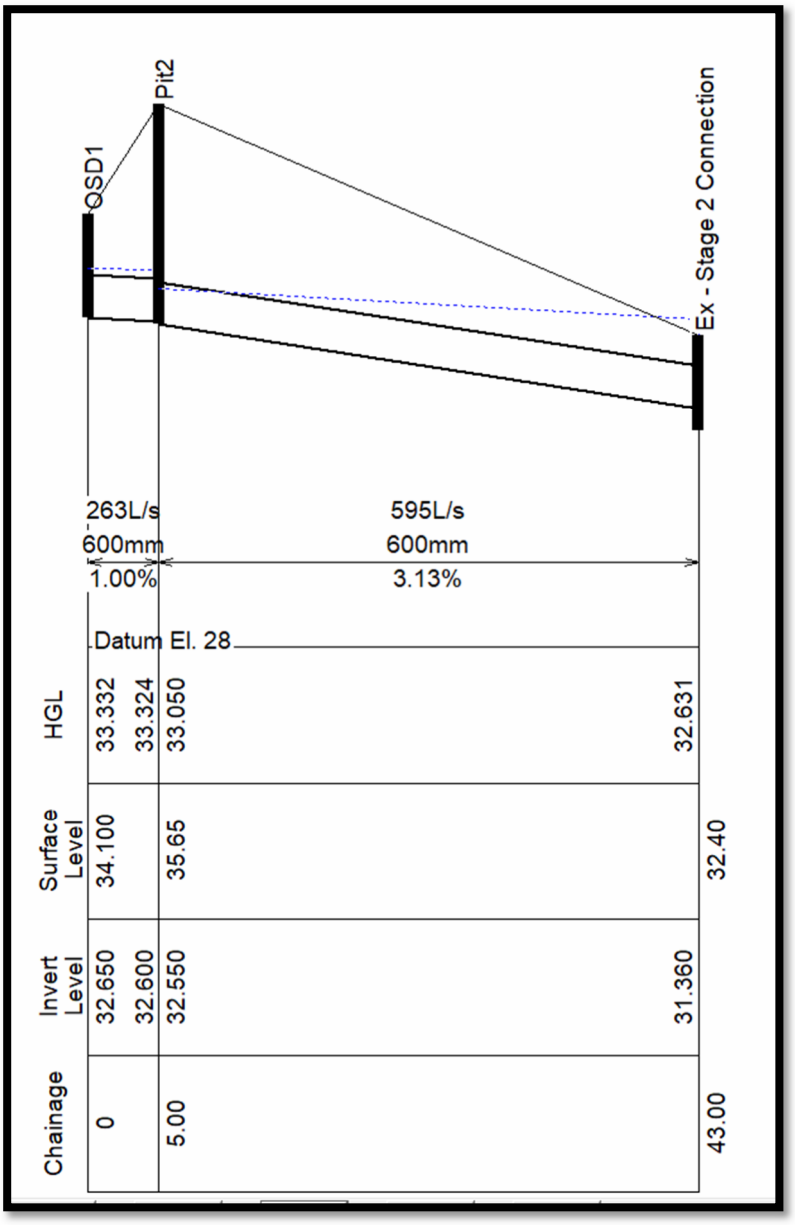


Figure 7: HGL Analysis for 1% AEP storm events for OSD1

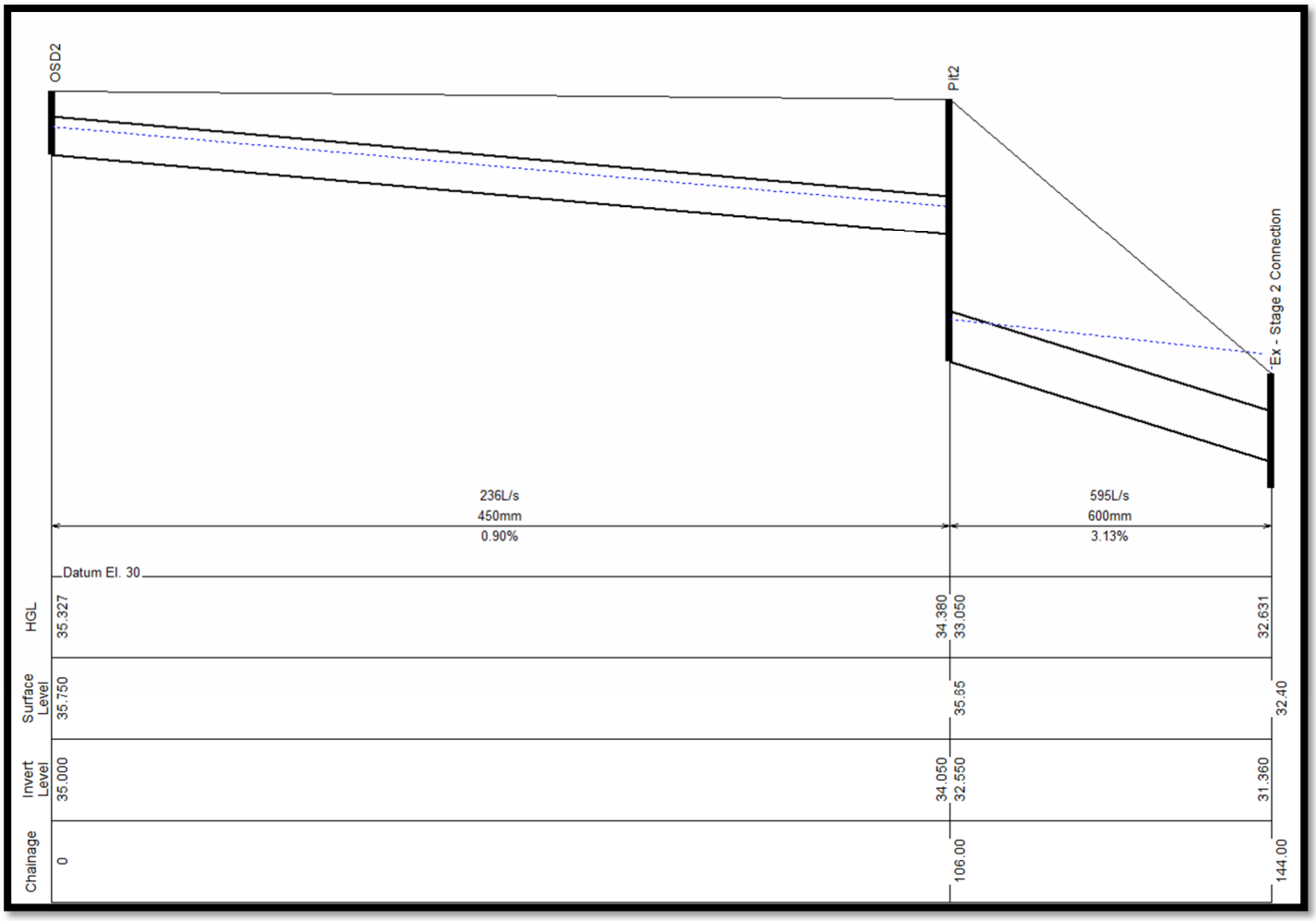


Figure 8. Hydraulic Grade Line During 1% AEP Storm Events For OSD 2

2.8 SUMMARY

Below is a comprehensive summary of the DRAINS Analysis:

RAINFALL EVENTS	PRE PSD (L/S)	POST PSD (L/S)	REQUIRED OSD1 (LITRES)	PROVIDED OSD1 (LITRES)	REQUIRED OSD2 (LITRES)	PROVIDED OSD2 (LITRES)
20% AEP	376	329	29,690	73,400	51,670	67,030
10% AEP	455	421	37,090		58,240	
5% AEP	517	501	44,050		60,500	
2% AEP	605	556	53,720		62,370	
1% AEP	709	595	62,790		65,790	

As per the DRAINS Model, the peak discharge to Predevelopment flow rates for all storm intensities and durations up to and including a 1% annual exceedance probability (AEP) storm event is limited to Postdevelopment flow rates.

3. WATER QUALITY MANAGEMENT

3.1 SUMMARY

The Stormwater Quality Measures are designed to comply with the State and Environmental Planning Policy Amendment (Water Catchments) 2022 under the Environmental Planning and Assessment Act 1979. The proposed water filtration measures will have beneficial effects on water quality.

Pollutant	**Proposed Average Pollution Load Reduction (%)**
Gross Pollutants	87.00%
Total Suspended Solids (TSS)	79.10%
Total Phosphorus (TP)	73.50%
Total Nitrogen (TN)	44.60%

3.2 MUSIC MODELLING

The development proposal includes two 10 kL Rainwater tank, and two filtration system is proposed on the side of the On-site detention (OSD) tank. A comprehensive catchment plan has been prepared to ascertain the catchment area that directs runoff towards the proposed filtration system. Refer to the attached catchment plans below.

The following treatment measures are required to achieve the intended targets.

- OSD 1: 16 m^2 Filter chamber, with 10 x Standard (460) PSORB StormFilters with an 690mm weir wall.
- OSD 2: 16 m^2 Filter chamber, with 8 x Standard (460) PSORB StormFilters with an 690mm weir wall.

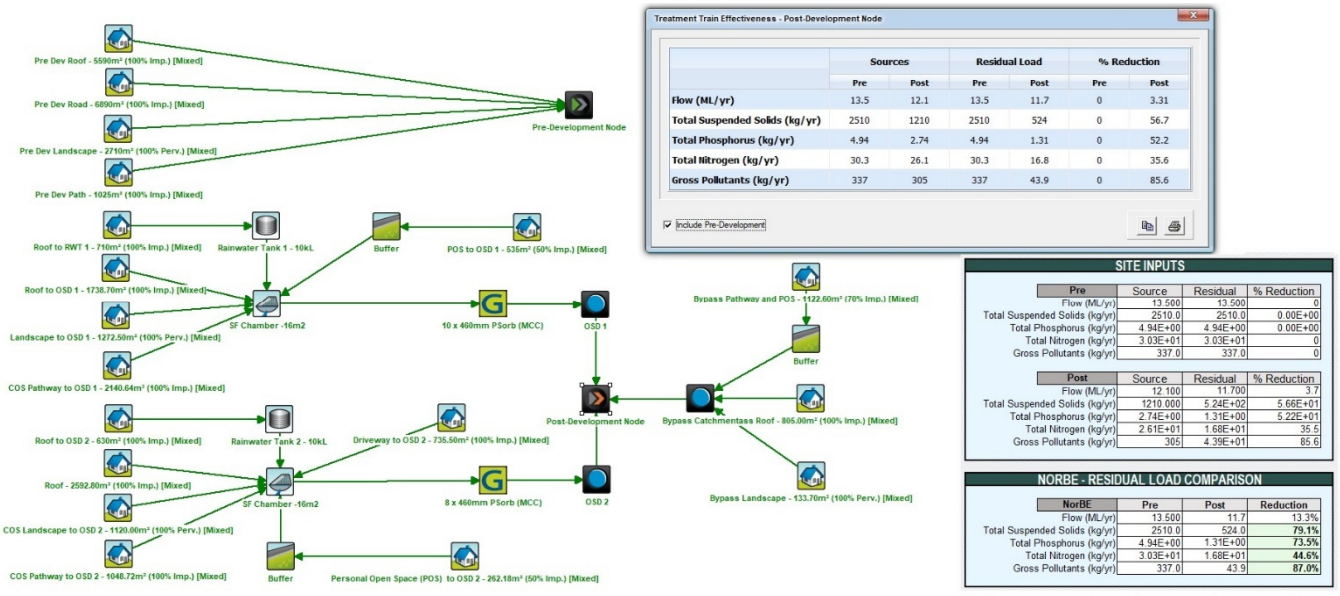


Figure 9: Music Model to meet SEPP Requirement.

4. EASEMENT PIPE CAPACITY ANALYSIS

A capacity assessment of the 600-diameter pipe within the existing drainage easement at the rear has been undertaken based on the Proposed Drainage Works Drawing, Project Number 2626 – CC, Drawing Number CIV—2020 to CIV—2024. As part of the Stage 1 project, a new 450 DIA RCP has been under-bored beneath the 600-diameter drainage pipe. An OSD system with a volume of 167.20 m3 has been provided as part of the stage 1 project. Refer to the summary input below for an analysis of the easement pipe capacity.

Stage 1 OSD Discharge for 1% AEP storm events – Q (1% AEP) – 0.330 m3/s (This input has been inputted as Baseflow). – Based on the provided DRAINS model for stage 1.

Stage 2 OSD Discharge during 1% AEP Storm Events – Q (1% AEP) – 0.595 m3/s.

(The Groundwater discharge is added to the OSD 2Stage 2 as baseflow, as mentioned in section 2.1).

Thus, the modelling indicates that the existing easement pipe has enough capacity to cater to both Stage 1 and 2 discharge for upto 1% AEP stormevents.

5. SUMMARY

Based on the findings of this analysis, the peak discharge is limited to predevelopment flow rates for all storm intensities and durations up to and including a 1% annual exceedance probability (AEP) storm event. The water quality targets have also been successfully met to ensure compliance with the SEPP Guidelines and Canterbury-Bankstown Council's Development Control Plan (CBDCP) 2023.

6. ATTACHMENTS

1. DRAINS DATA
2. DRAINS 20% AEP Results
3. DRAINS 10% AEP Results
4. DRAINS 5% AEP Results
5. DRAINS 2% AEP Results
6. DRAINS 1% AEP Results
7. Catchment Plan
8. Geotechnical Report
9. Stage 1 OSD Detail

Drains DATA

PIT / NODE DETAILS Version 15

Name	Type	Family	Size	Ponding Volume (cu.m)	Pressure Change Coeff. Ku	Surface Elev (m)	Max Pond Depth (m)	Base Inflow (cu.m/s)	Blocking Factor	x	y	Bolt-down lid	id	Part Full Shock Loss	Inflow Hydrograph	Pit is	Internal Width (mm)	Inflow is Misaligned	Minor Safe Pond Depth (m)	Major Safe Pond Depth (m)
N1	Node					40.5		0		691.866	-314.101		3		No					
Pre Outlet	Node					32.5		0		1041.339	-351.235		5		No					
N29017	Node					36		0		942.477	-423.09		720354		No					
Pit2	OnGrade	1200 Squar	1.2		1.5	35.65		0.0001	0	952.122	-463.6	No	119830	1 x Ku	No	New				
Ex - Stage 2	OnGrade	1200 Squar	1.2		1.5	32.4		0	0	1193	-464	Yes	27978141	1 x Ku	No	New				
Existing Pit	OnGrade	1200 Squar	1.2		1.5	32.2		0	0	1216.667	-562.5	No	27999005	1 x Ku	No	New				
Kerb Inlet	Node					27.09		0		1240.833	-682.5		28003028		No					
N198551	Node							0		564.39	-495.91		13668227		No					
OF Pit	OnGrade	1200 Squar	1.2		1.5	36.55		0.33	0	1144.167	-119.167	No	27974149	1 x Ku	No	New				
JP2	OnGrade	1200 Squar	1.2		1.5	36.38		0	0	1156.667	-189.167	No	27979516	1 x Ku	No	New				
JP3	OnGrade	1200 Squar	1.2		1.5	34.53		0	0	1164.167	-262.5	No	27982485	1 x Ku	No	New				
JP4	OnGrade	1200 Squar	1.2		1.5	33.79		0	0	1170.833	-330.833	No	27989302	1 x Ku	No	New				
JP5	OnGrade	1200 Squar	1.2		1.5	33.15		0	0	1182.5	-395.833	No	27975426	1 x Ku	No	New				
OSD Surfac	Node					35.75		0		834.131	-450.338		422		No					
TOP OF WE	Node					35.5		0		763.132	-536.071		1404242		No					
OSD 2 SUR	Node					36.85		0		831.117	-498.228		1403035		No					
N210	Node					34.05		0		767.13	-401.389		693		No					

DETENTION BASIN DETAILS

Name	Elev	Surf. Area	Not Used	Outlet Type	K	Dia(mm)	Centre RL	Pit Family	Pit Type	x	y	HED	Crest RL	Crest Lengt	id
OSD1	32.65	7.5		None						695	-441.667	No			421
	32.7	7.86													
	32.73	45													
	33.99	45													
	34	61.38													
	34.1	61.38													
OSD2	35	0.72		None						694.478	-495.214	No			1402217
	35.04	0.72													
	35.05	97.15													
	35.1	97.15													
	35.15	97.15													
	35.75	97.15													

SUB-CATCHMENT DETAILS

Name	Pit or Node	Total Area (ha)	EIA %	Perv Area %	RIA %	EIA Time (min)	Perv Time (min)	RIA Time (min)	EIA Length (m)	Perv Length (m)	RIA Length (m)	EIA Slope(%) %	Perv Slope %	RIA Slope %	EIA Rough	Perv Rough	RIA Rough	Rainfall Multiplier
Pre Cat	N1	1.545	0	100	0	5	8	2										1
OSD 1	OSD1	0.6426	95	5	0	5	8	2										1

BYPASS	N29017	0.3162	70	30	0	5	8	2										1
OSD 2	OSD2	0.5594	95	5	0	5	8	2										1

PIPE DETAILS

Name	From	To	Length (m)	U/S IL (m)	D/S IL (m)	Slope (%)	Type	Dia (mm)	I.D. (mm)	Rough	Pipe Is	No. Pipes	Chg From	At Chg	Chg (m)	Rl (m)	Chg (m)	RL (m)	etc (m)
Pipe5587	N29017	Pit2	5	33.8	33.76	0.8	Concrete, u	450	450	0.013	New	1	N29017	0					
Pipe3760	Pit2	Ex - Stage 2	38	32.55	31.36	3.13	Concrete, u	600	600	0.013	New	1	Pit2	0					
Pipe 2	Ex - Stage 2	Existing Pit	41.315	31.04	30.03	2.44	Concrete, r	600	600	0.013	New	1	Ex - Stage 2	0					
Pipe13441(	Existing Pit	Kerb Inlet	69.335	30.01	25.94	5.87	Concrete, u	600	600	0.013	New	1	Existing Pit	0					
Pipe C	OF Pit	JP2	62.9	32.78	32.05	1.16	Concrete, u	450	450	0.013	New	1	OF Pit	0					
Pipe 7	OF Pit	JP2	62.9	34.7	34.06	1.02	Concrete, u	600	600	0.013	New	1	OF Pit	0					
Pipe B	JP2	JP3	39.945	32.03	31.57	1.15	Concrete, u	450	450	0.013	New	1	JP2	0					
Pipe 6	JP2	JP3	39.945	34.01	32.76	3.13	Concrete, u	600	600	0.013	New	1	JP2	0					
Pipe A	JP3	JP4	15.215	31.55	31.38	1.12	Concrete, u	450	450	0.013	New	1	JP3	0					
Pipe 5	JP3	JP4	15.2	32.74	31.92	5.39	Concrete, u	600	600	0.013	New	1	JP3	0					
Pipe4	JP4	JP5	10.735	31.37	31.27	0.93	Concrete, u	600	600	0.013	New	1	JP4	0					
Pipe 3	JP5	Ex - Stage 2	4.545	31.26	31.05	4.62	Concrete, u	600	600	0.013	New	1	JP5	0					
OSD Outlet	OSD Surfac	Pit2	5	32.65	32.6	1	Concrete, u	600	600	0.013	New	1	OSD Surfac	0					
OSD 2 OUT	OSD 2 SUR	Pit2	106	35	34.05	0.9	Concrete, u	450	450	0.013	New	1	OSD 2 SUR	0					

DETAILS of SERVICES CROSSING PIPES

Pipe	Chg (m)	Bottom Elev (m)	Height of S (m)	Chg (m)	Bottom Elev (m)	Height of S (m)	Chg (m)	Bottom Elev (m)	Height of S (m)	etc etc

CHANNEL DETAILS

Name	From	To	Type	Length (m)	U/S IL (m)	D/S IL (m)	Slope (%)	Base Width (m)	L.B. Slope (1:?)	R.B. Slope (1:?)	Manning n	Depth (m)	Roofed

OVERFLOW ROUTE DETAILS

Name	From	To	Travel Time (min)	Spill Level (m)	Crest Length (m)	Weir Coeff. C	Cross Section	Safe Depth Major Storr (m)	SafeDepth Minor Storr (m)	Safe DxV (sq.m/sec)	Bed Slope (%)	D/S Area Contributing %		id	U/S IL	D/S IL	Length (m)
Pre OF	N1	Pre Outlet	1.7				Dummy us	0.2	0.05	0.6	1	0		8	40.5	32.5	185
OF - OSD	OSD1	Pit2	0.2	37.5	0.9	1.7	Dummy us	0.2	0.05	0.6	1	0		2621	35.7	35.65	20
of	Pit2	Ex - Stage 2	0.4				Dummy us	0.2	0.05	0.6	1	0		121010	35.65	32.4	40
OF6	Ex - Stage 2	Existing Pit	0.3				4 m wide pa	0.3	0.15	0.4	1	0		28041206	32.4	32.2	41.3
OF7	Existing Pit	Kerb Inlet	0.6				Dummy us	0.2	0.05	0.6	1	0		28042041	32.2	27.09	69.3
OF OSD2	OSD2	N198551	0.4	36.85	0.9	1.7	Dummy us	0.2	0.05	0.6	1	0		13671122	36.85	36.5	40
OF32156	OSD2	Pit2	0.5	36.85	0.9	1.7	Dummy us	0.2	0.05	0.6	1	0		1558292	36.85	35.65	50
OF1	OF Pit	JP2	0.5				4 m wide pa	0.3	0.15	0.4	1	0		28035009	36.55	36.38	62.9
OF2	JP2	JP3	0.4				Dummy us	0.2	0.05	0.6	1	0		28038076	36.38	34.53	39.9
OF3	JP3	JP4	0.1				Dummy us	0.2	0.05	0.6	1	0		28038971	34.53	33.79	15.2
OF4	JP4	JP5	0.1				Dummy us	0.2	0.05	0.6	1	0		28039920	33.79	33.15	10.7
OF5	JP5	Ex - Stage 2	0.1				Dummy us	0.2	0.05	0.6	1	0		28040269	33.15	32.4	4.5

PIPE COVER DETAILS

Name	Type	Dia (mm)	Safe Cover	Cover (m)	
Pipe5587	Concrete, u	450	0.6	1.4	
Pipe3760	Concrete, u	600	0.6	0.39	Unsafe
Pipe 2	Concrete, r	600	0.45	0.71	
Pipe13441(	Concrete, u	600	0.6	0.5	Unsafe
Pipe C	Concrete, u	450	0.6	3.28	
Pipe 7	Concrete, u	600	0.6	1.2	
Pipe B	Concrete, u	450	0.6	2.47	
Pipe 6	Concrete, u	600	0.6	1.13	
Pipe A	Concrete, u	450	0.6	1.92	
Pipe 5	Concrete, u	600	0.6	1.14	
Pipe4	Concrete, u	600	0.6	1.23	
Pipe 3	Concrete, u	600	0.6	0.71	
OSD Outlet	Concrete, u	600	0.6	2.41	
OSD 2 OUT	Concrete, u	450	0.6	1.11	

This model has no pipes with non-return valves

20% AEP RESULTS

DRAINS results prepared from Version 2023.11.8726.15750

PIT / NODE DETAILS

Name	Max HGL	Max Pond HGL	Max Surfac Flow Arrivir (cu.m/s)	Max Pond Volume (cu.m)	Min Freeboard (m)	Overflow (cu.m/s)	Constraint
N1	40.54		0.466				
N29017	33.98		0.12				
Pit2	32.97		0		2.68	0	None
Ex - Stage 2	31.64		0		0.76	0	None
Existing Pit	30.61		0		1.59	0	None
Kerb Inlet	26.24		0				
OF Pit	34.47		0		2.08	0	None
JP2	33.31		0		3.07	0	None
JP3	32.45		0		2.08	0	None
JP4	31.92		0		1.87	0	None
JP5	31.78		0		1.37	0	None
OSD Surfac	32.98		0				
TOP OF WE	35.19		0				
OSD 2 SUR	35.19		0				
N210	32.98		0				

SUB-CATCHMENT DETAILS

Name	Max Flow Q (cu.m/s)	EIA Max Q (cu.m/s)	Remaining Max Q (cu.m/s)	EIA Tc (cu.m/s)	RIA Tc (min)	PA Tc (min)	Due to Storm (min)
Pre Cat	0.389	0	0.389	5	2	8	20% AEP, 15 min burst, Storm 4
OSD 1	0.229	0.228	0.002	5	2	8	20% AEP, 5 min burst, Storm 1
BYPASS	0.087	0.083	0.005	5	2	8	20% AEP, 5 min burst, Storm 1
OSD 2	0.2	0.198	0.001	5	2	8	20% AEP, 5 min burst, Storm 1

PIPE DETAILS

Name	Max Q (cu.m/s)	Max V (m/s)	Max U/S HGL (m)	Max D/S HGL (m)	Due to Storm
Pipe5587	0.087	1.44	33.983	33.942	20% AEP, 5 min burst, Storm 1
Pipe3760	0.329	2.5	32.923	31.644	20% AEP, 10 min burst, Storm 8

Pipe 2	0.686	2.63	31.56	30.611	20% AEP, 20 min burst, Storm 1
Pipe13441(	0.723	5.22	30.538	26.235	20% AEP, 15 min burst, Storm 6
Pipe C	0.33	2.08	34.146	33.309	20% AEP, 10 min burst, Storm 1
Pipe 7	0	0	34.473	34.06	20% AEP, 5 min burst, Storm 1
Pipe B	0.33	2.08	32.981	32.449	20% AEP, 10 min burst, Storm 8
Pipe 6	0	0	33.309	32.76	20% AEP, 5 min burst, Storm 1
Pipe A	0.33	2.08	32.121	31.917	20% AEP, 10 min burst, Storm 10
Pipe 5	0	0	32.449	31.92	20% AEP, 5 min burst, Storm 1
Pipe4	0.331	1.48	31.814	31.777	20% AEP, 15 min burst, Storm 4
Pipe 3	0.333	1.65	31.663	31.644	20% AEP, 10 min burst, Storm 8
OSD Outlet	0.163	1.04	32.975	32.966	20% AEP, 10 min burst, Storm 8
OSD 2 OUT	0.103	1.58	35.193	34.243	20% AEP, 20 min burst, Storm 4

CHANNEL DETAILS

Name	Max Q (cu.m/s)	Max V (m/s)	Due to Storm

OVERFLOW ROUTE DETAILS

Name	Max Q U/S	Max Q D/S	Safe Q	Max D	Max DxV	Max Width	Max V	Due to Storm
Pre OF	0.376	0.371	0.362	0.038	0.04	16.7	1.13	20% AEP, 15 min burst, Storm 4
OF - OSD	0	0	0.362	0	0	0	0	
Weir	0	0	-3E+38	0	0	0	0	
Q5	0.162	0	0	0.22	0.01	49.99	0.02	20% AEP, 10 min burst, Storm 8
of	0	0	0.362	0	0	0	0	
OF6	0	0	0.908	0	0	0	0	
OF7	0	0	0.362	0	0	0	0	
OF OSD2	0	0	0.362	0	0	0	0	
OF32156	0	0	0.362	0	0	0	0	
OSD 2 WEI	0	0	0	0	0	0	0	
Q5-2	0.103	0	0	0.22	0	49.99	0.01	20% AEP, 20 min burst, Storm 4
OF1	0	0	0.908	0	0	0	0	
OF2	0	0	0.362	0	0	0	0	
OF3	0	0	0.362	0	0	0	0	
OF4	0	0	0.362	0	0	0	0	
OF5	0	0	0.362	0	0	0	0	
Q100-2	0.002	0	-2.5E+38	0.22	0	49.99	0	20% AEP, 15 min burst, Storm 4
Q100	0.006	0	-1.8E+38	0.22	0	49.99	0	20% AEP, 5 min burst, Storm 1

DETENTION BASIN DETAILS

Name	Max WL	MaxVol	Max Q Total	Max Q Low Level	Max Q High Level
OSD1	33.37	29.7	0.162	0	0.162
OSD2	35.58	51.7	0.103	0	0.103

Run Log for DRAINS v2023.11.8726.15750 - Easement Pipe Capacity Assesment

{\colortbl;\red0\green0\blue0;\red192\green0\blue0;}Run Log for DRAINS v2023.11.8726.15750 - Easement Pipe Capacity Assesment.drn run at 16:32:54 on 10/10/2024 using Watercom Drains v2023.11.8726.15750

No water upwelling from any pit.

Freeboard was adequate at all pits.

Flows were safe in all overflow routes.

10% AEP RESULTS

DRAINS results prepared from Version 2023.11.8726.15750

PIT / NODE DETAILS

Name	Max HGL	Max Pond HGL	Max Surfac Flow Arrivir (cu.m/s)	Version 8 Max Pond Volume (cu.m)	Min Freeboard (m)	Overflow (cu.m/s)	Constraint
N1	40.54		0.551				
N29017	34.01		0.144				
Pit2	33.02		0		2.63	0	None
Ex - Stage 2	31.72		0		0.68	0	None
Existing Pit	30.61		0		1.59	0	None
Kerb Inlet	26.24		0				
OF Pit	34.53		0		2.02	0	None
JP2	33.36		0		3.02	0	None
JP3	32.5		0		2.03	0	None
JP4	31.97		0		1.82	0	None
JP5	31.84		0		1.31	0	None
OSD Surfac	33.03		0				
TOP OF WE	35.29		0				
OSD 2 SUR	35.24		0				
N210	33.03		0				

SUB-CATCHMENT DETAILS

Name	Max Flow Q (cu.m/s)	EIA Max Q (cu.m/s)	Remaining Max Q (cu.m/s)	EIA Tc (cu.m/s)	RIA Tc (min)	PA Tc (min)	Due to Storm (min)
Pre Cat	0.474	0	0.474	5	2	8	10% AEP, 15 min burst, Storm 6
OSD 1	0.265	0.262	0.003	5	2	8	10% AEP, 5 min burst, Storm 1
BYPASS	0.112	0.083	0.029	5	2	8	10% AEP, 15 min burst, Storm 5
OSD 2	0.231	0.229	0.003	5	2	8	10% AEP, 5 min burst, Storm 1

PIPE DETAILS

Name	Max Q (cu.m/s)	Max V (m/s)	Max U/S HGL (m)	Max D/S HGL (m)	Due to Storm
Pipe5587	0.112	1.55	34.01	33.968	10% AEP, 15 min burst, Storm 5
Pipe3760	0.421	2.38	32.972	31.719	10% AEP, 15 min burst, Storm 6

Pipe 2	0.735	2.78	31.571	30.613	10% AEP, 15 min burst, Storm 6
Pipe13441(	0.756	5.28	30.545	26.243	10% AEP, 15 min burst, Storm 6
Pipe C	0.33	2.08	34.201	33.364	10% AEP, 15 min burst, Storm 6
Pipe 7	0	0	34.528	34.06	10% AEP, 5 min burst, Storm 1
Pipe B	0.331	2.08	33.036	32.504	10% AEP, 15 min burst, Storm 6
Pipe 6	0	0	33.364	32.76	10% AEP, 5 min burst, Storm 1
Pipe A	0.331	2.08	32.176	31.973	10% AEP, 15 min burst, Storm 6
Pipe 5	0	0	32.504	31.973	10% AEP, 5 min burst, Storm 1
Pipe4	0.337	1.34	31.868	31.837	10% AEP, 15 min burst, Storm 6
Pipe 3	0.342	1.43	31.734	31.719	10% AEP, 15 min burst, Storm 6
OSD Outlet	0.187	0.99	33.03	33.024	10% AEP, 15 min burst, Storm 3
OSD 2 OUT	0.146	1.74	35.237	34.284	10% AEP, 15 min burst, Storm 5

CHANNEL DETAILS

Name	Max Q (cu.m/s)	Max V (m/s)	Due to Storm

OVERFLOW ROUTE DETAILS

Name	Max Q U/S	Max Q D/S	Safe Q	Max D	Max DxV	Max Width	Max V	Due to Storm
Pre OF	0.455	0.451	0.362	0.041	0.05	17.79	1.17	10% AEP, 15 min burst, Storm 6
OF - OSD	0	0	0.362	0	0	0	0	
Weir	0	0	-3E+38	0	0	0	0	
Q5	0.187	0	0	0.22	0.01	49.99	0.03	10% AEP, 15 min burst, Storm 3
of	0	0	0.362	0	0	0	0	
OF6	0	0	0.908	0	0	0	0	
OF7	0	0	0.362	0	0	0	0	
OF OSD2	0	0	0.362	0	0	0	0	
OF32156	0	0	0.362	0	0	0	0	
OSD 2 WEI	0.051	0	0	0.22	0	49.99	0.01	10% AEP, 15 min burst, Storm 5
Q5-2	0.11	0	0	0.22	0	49.99	0.02	10% AEP, 15 min burst, Storm 4
OF1	0	0	0.908	0	0	0	0	
OF2	0	0	0.362	0	0	0	0	
OF3	0	0	0.362	0	0	0	0	
OF4	0	0	0.362	0	0	0	0	
OF5	0	0	0.362	0	0	0	0	
Q100-2	0.047	0	-2.5E+38	0.22	0	49.99	0.01	10% AEP, 15 min burst, Storm 5
Q100	0.007	0	-1.8E+38	0.22	0	49.99	0	10% AEP, 15 min burst, Storm 4

DETENTION BASIN DETAILS

Name	Max WL	MaxVol	Max Q Total	Max Q Low Level	Max Q High Level
OSD1	33.53	37.1	0.187	0	0.187
OSD2	35.65	58.2	0.16	0	0.16

Run Log for DRAINS v2023.11.8726.15750 - Easement Pipe Capacity Assesment

{\colortbl;\red0\green0\blue0;\red192\green0\blue0;}Run Log for DRAINS v2023.11.8726.15750 - Easement Pipe Capacity Assesment.drn run at 16:31:47 on 10/10/2024 using Watercom Drains v2023.11.8726.15750

No water upwelling from any pit.

Freeboard was adequate at all pits.

Flows were safe in all overflow routes.

5% AEP RESULTS

DRAINS results prepared from Version 2023.11.8726.15750

PIT / NODE DETAILS

Name	Max HGL	Max Pond HGL	Max Surfac Flow Arrivir (cu.m/s)	Max Pond Volume (cu.m)	Min Freeboard (m)	Overflow (cu.m/s)	Constraint
N1	40.55		0.838				
N29017	34.06		0.213				
Pit2	33.21		0		2.44	0	None
Ex - Stage 2	32.54		0		0	0	Outlet System
Existing Pit	30.86		0		1.34	0	None
Kerb Inlet	26.28		0				
OF Pit	34.8		0		1.75	0	None
JP2	33.82		0		2.56	0	None
JP3	32.98		0		1.55	0	None
JP4	32.78		0		1.01	0	None
JP5	32.65		0		0.5	0	None
OSD Surfac	33.22		0				
TOP OF WE	35.7		0				
OSD 2 SUR	35.33		0				
N210	33.22		0				

SUB-CATCHMENT DETAILS

Name	Max Flow Q (cu.m/s)	EIA Max Q (cu.m/s)	Remaining Max Q (cu.m/s)	EIA Tc (cu.m/s)	RIA Tc (min)	PA Tc (min)	Due to Storm (min)
Pre Cat	0.744	0	0.744	5	2	8	1% AEP, 10 min burst, Storm 7
OSD 1	0.382	0.374	0.008	5	2	8	1% AEP, 5 min burst, Storm 1
BYPASS	0.159	0.136	0.023	5	2	8	1% AEP, 5 min burst, Storm 1
OSD 2	0.333	0.326	0.007	5	2	8	1% AEP, 5 min burst, Storm 1

PIPE DETAILS

Name	Max Q (cu.m/s)	Max V (m/s)	Max U/S HGL (m)	Max D/S HGL (m)	Due to Storm
Pipe5587	0.159	1.72	34.06	34.014	1% AEP, 5 min burst, Storm 1
Pipe3760	0.616	2.43	33.055	32.539	1% AEP, 10 min burst, Storm 3

Pipe 2	0.907	3.21	31.754	30.856	1% AEP, 15 min burst, Storm 8
Pipe13441(	0.907	5.52	30.574	26.279	1% AEP, 15 min burst, Storm 8
Pipe C	0.331	2.08	34.525	33.821	1% AEP, 5 min burst, Storm 1
Pipe 7	0.026	1.2	34.801	34.139	1% AEP, 15 min burst, Storm 8
Pipe B	0.335	2.11	33.499	32.975	1% AEP, 10 min burst, Storm 2
Pipe 6	0	0	33.821	32.975	1% AEP, 5 min burst, Storm 1
Pipe A	0.337	2.12	32.855	32.781	1% AEP, 20 min burst, Storm 1
Pipe 5	0.126	1.2	32.975	32.781	1% AEP, 15 min burst, Storm 8
Pipe4	0.379	1.34	32.681	32.651	1% AEP, 10 min burst, Storm 7
Pipe 3	0.382	1.35	32.551	32.539	1% AEP, 10 min burst, Storm 7
OSD Outlet	0.256	0.92	33.223	33.215	1% AEP, 10 min burst, Storm 4
OSD 2 OUT	0.236	1.91	35.327	34.38	1% AEP, 10 min burst, Storm 7

CHANNEL DETAILS

Name	Max Q (cu.m/s)	Max V (m/s)	Due to Storm

OVERFLOW ROUTE DETAILS

Name	Max Q U/S	Max Q D/S	Safe Q	Max D	Max DxV	Max Width	Max V	Due to Storm
Pre OF	0.711	0.704	10.912	0.049	0.06	20.79	1.33	1% AEP, 10 min burst, Storm 7
OF - OSD	0	0	10.912	0	0	0	0	
Weir	0.006	0	-3E+38	0.22	0	49.99	0	1% AEP, 10 min burst, Storm 7
Q5	0.242	0	0	0.22	0.01	49.99	0.03	1% AEP, 10 min burst, Storm 1
of	0	0	10.912	0	0	0	0	
OF6	0	0	1.479	0	0	0	0	
OF7	0	0	10.912	0	0	0	0	
OF OSD2	0	0	10.912	0	0	0	0	
OF32156	0	0	10.912	0	0	0	0	
OSD 2 WEI	0.152	0	0	0.22	0	49.99	0.02	1% AEP, 10 min burst, Storm 4
Q5-2	0.113	0	0	0.22	0	49.99	0.02	1% AEP, 10 min burst, Storm 6
OF1	0	0	1.479	0	0	0	0	
OF2	0	0	10.912	0	0	0	0	
OF3	0	0	10.912	0	0	0	0	
OF4	0	0	10.912	0	0	0	0	
OF5	0	0	10.912	0	0	0	0	
Q100-2	0.133	0	-2.6E+38	0.22	0	49.99	0.02	1% AEP, 10 min burst, Storm 7
Q100	0.017	0	-1.7E+38	0.22	0	49.99	0	1% AEP, 10 min burst, Storm 2

DETENTION BASIN DETAILS

Name	Max WL	MaxVol	Max Q Total	Max Q Low Level	Max Q High Level
OSD1	34.06	62.1	0.247	0	0.247
OSD2	35.72	65.8	0.265	0	0.265

Run Log for DRAINS v2023.11.8726.15750 - Easement Pipe Capacity Assesment

{\colortbl;\red0\green0\blue0;\red192\green0\blue0;}Run Log for DRAINS v2023.11.8726.15750 - Easement Pipe Capacity Assesment.drn run at 16:30:24 on 10/10/2024 using Watercom Drains v2023.11.8726.15750

No water upwelling from any pit.

Freeboard was adequate at all pits.

Flows were safe in all overflow routes.

2% AEP RESULTS

DRAINS results prepared from Version 2023.11.8726.15750

PIT / NODE DETAILS

Name	Max HGL	Max Pond HGL	Max Surfac Flow Arrivir (cu.m/s)	Max Pond Volume (cu.m)	Min Freeboard (m)	Overflow (cu.m/s)	Constraint
N1	40.55		0.763				
N29017	34.04		0.194				
Pit2	33.15		0		2.5	0	None
Ex - Stage 2	32.27		0		0.13	0	None
Existing Pit	30.77		0		1.43	0	None
Kerb Inlet	26.27		0				
OF Pit	34.77		0		1.78	0	None
JP2	33.72		0		2.66	0	None
JP3	32.88		0		1.65	0	None
JP4	32.51		0		1.28	0	None
JP5	32.38		0		0.77	0	None
OSD Surfac	33.15		0				
TOP OF WE	35.62		0				
OSD 2 SUR	35.31		0				
N210	33.15		0				

SUB-CATCHMENT DETAILS

Name	Max Flow Q (cu.m/s)	EIA Max Q (cu.m/s)	Remaining Max Q (cu.m/s)	EIA Tc (cu.m/s)	RIA Tc (min)	PA Tc (min)	Due to Storm (min)
Pre Cat	0.617	0	0.617	5	2	8	2% AEP, 15 min burst, Storm 8
OSD 1	0.347	0.342	0.005	5	2	8	2% AEP, 5 min burst, Storm 1
BYPASS	0.14	0.124	0.016	5	2	8	2% AEP, 5 min burst, Storm 1
OSD 2	0.302	0.298	0.005	5	2	8	2% AEP, 5 min burst, Storm 1

PIPE DETAILS

Name	Max Q (cu.m/s)	Max V (m/s)	Max U/S HGL (m)	Max D/S HGL (m)	Due to Storm
Pipe5587	0.14	1.66	34.04	33.996	2% AEP, 5 min burst, Storm 1
Pipe3760	0.554	2.26	33.036	32.274	2% AEP, 10 min burst, Storm 7

Pipe 2	0.857	3.14	31.595	30.77	2% AEP, 15 min burst, Storm 8
Pipe13441(	0.857	5.44	30.565	26.267	2% AEP, 15 min burst, Storm 8
Pipe C	0.331	2.08	34.478	33.723	2% AEP, 45 min burst, Storm 1
Pipe 7	0.016	0.9	34.773	34.127	2% AEP, 15 min burst, Storm 8
Pipe B	0.334	2.1	33.403	32.882	2% AEP, 30 min burst, Storm 3
Pipe 6	0	0	33.723	32.882	2% AEP, 5 min burst, Storm 1
Pipe A	0.337	2.12	32.652	32.511	2% AEP, 10 min burst, Storm 6
Pipe 5	0.048	0.9	32.882	32.511	2% AEP, 15 min burst, Storm 8
Pipe4	0.363	1.28	32.412	32.383	2% AEP, 10 min burst, Storm 7
Pipe 3	0.365	1.29	32.286	32.274	2% AEP, 10 min burst, Storm 7
OSD Outlet	0.232	0.92	33.154	33.147	2% AEP, 10 min burst, Storm 5
OSD 2 OUT	0.22	1.89	35.31	34.361	2% AEP, 10 min burst, Storm 7

CHANNEL DETAILS

Name	Max Q (cu.m/s)	Max V (m/s)	Due to Storm

OVERFLOW ROUTE DETAILS

Name	Max Q U/S	Max Q D/S	Safe Q	Max D	Max DxV	Max Width	Max V	Due to Storm
Pre OF	0.603	0.6	10.912	0.046	0.06	19.53	1.26	2% AEP, 15 min burst, Storm 8
OF - OSD	0	0	10.912	0	0	0	0	
Weir	0	0	-3E+38	0	0	0	0	
Q5	0.228	0	0	0.22	0.01	49.99	0.03	2% AEP, 10 min burst, Storm 1
of	0	0	10.912	0	0	0	0	
OF6	0	0	1.479	0	0	0	0	
OF7	0	0	10.912	0	0	0	0	
OF OSD2	0	0	10.912	0	0	0	0	
OF32156	0	0	10.912	0	0	0	0	
OSD 2 WEI	0.136	0	0	0.22	0	49.99	0.02	2% AEP, 10 min burst, Storm 7
Q5-2	0.112	0	0	0.22	0	49.99	0.02	2% AEP, 10 min burst, Storm 5
OF1	0	0	1.479	0	0	0	0	
OF2	0	0	10.912	0	0	0	0	
OF3	0	0	10.912	0	0	0	0	
OF4	0	0	10.912	0	0	0	0	
OF5	0	0	10.912	0	0	0	0	
Q100-2	0.123	0	-2.6E+38	0.22	0	49.99	0.02	2% AEP, 10 min burst, Storm 7
Q100	0.017	0	-1.7E+38	0.22	0	49.99	0	2% AEP, 10 min burst, Storm 7

DETENTION BASIN DETAILS

Name	Max WL	MaxVol	Max Q Total	Max Q Low Level	Max Q High Level
OSD1	33.9	53.6	0.228	0	0.228
OSD2	35.69	62.4	0.248	0	0.248

Run Log for DRAINS v2023.11.8726.15750 - Easement Pipe Capacity Assesment

{\colortbl;\red0\green0\blue0;\red192\green0\blue0;}Run Log for DRAINS v2023.11.8726.15750 - Easement Pipe Capacity Assesment.drn run at 16:31:09 on 10/10/2024 using Watercom Drains v2023.11.8726.15750

No water upwelling from any pit.

Freeboard was adequate at all pits.

Flows were safe in all overflow routes.

1% AEP RESULTS

DRAINS results prepared from Version 2023.11.8726.15750

PIT / NODE DETAILS

Name	Max HGL	Max Pond HGL	Max Surfac Flow Arrivir (cu.m/s)	Max Pond Volume (cu.m)	Min Freeboard (m)	Overflow (cu.m/s)	Constraint
N1	40.55		0.838				
N29017	34.06		0.213				
Pit2	33.21		0		2.44	0	None
Ex - Stage 2	32.54		0		0	0	Outlet System
Existing Pit	30.86		0		1.34	0	None
Kerb Inlet	26.28		0				
OF Pit	34.8		0		1.75	0	None
JP2	33.82		0		2.56	0	None
JP3	32.98		0		1.55	0	None
JP4	32.78		0		1.01	0	None
JP5	32.65		0		0.5	0	None
OSD Surfac	33.22		0				
TOP OF WE	35.7		0				
OSD 2 SUR	35.33		0				
N210	33.22		0				

SUB-CATCHMENT DETAILS

Name	Max Flow Q (cu.m/s)	EIA Max Q (cu.m/s)	Remaining Max Q (cu.m/s)	EIA Tc (cu.m/s)	RIA Tc (min)	PA Tc (min)	Due to Storm (min)
Pre Cat	0.744	0	0.744	5	2	8	1% AEP, 10 min burst, Storm 7
OSD 1	0.382	0.374	0.008	5	2	8	1% AEP, 5 min burst, Storm 1
BYPASS	0.159	0.136	0.023	5	2	8	1% AEP, 5 min burst, Storm 1
OSD 2	0.333	0.326	0.007	5	2	8	1% AEP, 5 min burst, Storm 1

PIPE DETAILS

Name	Max Q (cu.m/s)	Max V (m/s)	Max U/S HGL (m)	Max D/S HGL (m)	Due to Storm
Pipe5587	0.159	1.72	34.06	34.014	1% AEP, 5 min burst, Storm 1
Pipe3760	0.616	2.43	33.055	32.539	1% AEP, 10 min burst, Storm 3

Pipe 2	0.907	3.21	31.754	30.856	1% AEP, 15 min burst, Storm 8
Pipe13441(	0.907	5.52	30.574	26.279	1% AEP, 15 min burst, Storm 8
Pipe C	0.331	2.08	34.525	33.821	1% AEP, 5 min burst, Storm 1
Pipe 7	0.026	1.2	34.801	34.139	1% AEP, 15 min burst, Storm 8
Pipe B	0.335	2.11	33.499	32.975	1% AEP, 10 min burst, Storm 2
Pipe 6	0	0	33.821	32.975	1% AEP, 5 min burst, Storm 1
Pipe A	0.337	2.12	32.855	32.781	1% AEP, 20 min burst, Storm 1
Pipe 5	0.126	1.2	32.975	32.781	1% AEP, 15 min burst, Storm 8
Pipe4	0.379	1.34	32.681	32.651	1% AEP, 10 min burst, Storm 7
Pipe 3	0.382	1.35	32.551	32.539	1% AEP, 10 min burst, Storm 7
OSD Outlet	0.256	0.92	33.223	33.215	1% AEP, 10 min burst, Storm 4
OSD 2 OUT	0.236	1.91	35.327	34.38	1% AEP, 10 min burst, Storm 7

CHANNEL DETAILS

Name	Max Q (cu.m/s)	Max V (m/s)	Due to Storm

OVERFLOW ROUTE DETAILS

Name	Max Q U/S	Max Q D/S	Safe Q	Max D	Max DxV	Max Width	Max V	Due to Storm
Pre OF	0.711	0.704	10.912	0.049	0.06	20.79	1.33	1% AEP, 10 min burst, Storm 7
OF - OSD	0	0	10.912	0	0	0	0	
Weir	0.006	0	-3E+38	0.22	0	49.99	0	1% AEP, 10 min burst, Storm 7
Q5	0.242	0	0	0.22	0.01	49.99	0.03	1% AEP, 10 min burst, Storm 1
of	0	0	10.912	0	0	0	0	
OF6	0	0	1.479	0	0	0	0	
OF7	0	0	10.912	0	0	0	0	
OF OSD2	0	0	10.912	0	0	0	0	
OF32156	0	0	10.912	0	0	0	0	
OSD 2 WEI	0.152	0	0	0.22	0	49.99	0.02	1% AEP, 10 min burst, Storm 4
Q5-2	0.113	0	0	0.22	0	49.99	0.02	1% AEP, 10 min burst, Storm 6
OF1	0	0	1.479	0	0	0	0	
OF2	0	0	10.912	0	0	0	0	
OF3	0	0	10.912	0	0	0	0	
OF4	0	0	10.912	0	0	0	0	
OF5	0	0	10.912	0	0	0	0	
Q100-2	0.133	0	-2.6E+38	0.22	0	49.99	0.02	1% AEP, 10 min burst, Storm 7
Q100	0.017	0	-1.7E+38	0.22	0	49.99	0	1% AEP, 10 min burst, Storm 2

DETENTION BASIN DETAILS

Name	Max WL	MaxVol	Max Q Total	Max Q Low Level	Max Q High Level
OSD1	34.06	62.1	0.247	0	0.247
OSD2	35.72	65.8	0.265	0	0.265

Run Log for DRAINS v2023.11.8726.15750 - Easement Pipe Capacity Assesment

{\colortbl;\red0\green0\blue0;\red192\green0\blue0;}Run Log for DRAINS v2023.11.8726.15750 - Easement Pipe Capacity Assesment.drn run at 16:29:49 on 10/10/2024 using Watercom Drains v2023.11.8726.15750

No water upwelling from any pit.

Freeboard was adequate at all pits.

Flows were safe in all overflow routes.

CATCHMENT PLAN LEGEND

SITE AREA: 16450.00 m² (APPROX.)

TOTAL AREA DRAINING TO STAGE 1 OSD: 1000.00 m² (APPROX.)
PRE-CATCHMENT AREA FOR DRAINS MODELLING = 1.545Ha
POST CATCHMENT AREA TO OSD 1 = 6426.00 m² (APPROX.)
POST CATCHEMTN AREA TO OSD 2 = 5594.00 m² (APPROX.)
TOTAL BY-PASS AREA = 3162.00 m² (APPROX.)

- ROOF AREA TO OSD 1 1738.70 m² (APPROX.)
- LANDSCAPING AREA TO OSD 1 1273.30 m² (APPROX.)
- PATHWAY AREA TO OSD 1 2682.5 m² (APPROX.)
- ROOF AREA TO OSD 2 2593.1 m² (APPROX.)
- LANDSCAPING AREA TO OSD 2 1120.00 m² (APPROX.)
- PATHWAY AREA TO OSD 2 1310.90 m² (APPROX.)
- AREA TO RWT 1 728.00 m² (APPROX.)
- AREA TO RWT 2 580.00 m² (APPROX.)
- BYPASS PATHWAY : 1668.00 m² (APPROX)
- BYPASS LANDSCAPING 689.00 m² (APPROX)
- BY PASS ROOF 805.00 m² (APPROX)
- DRIVEWAY 705 m² (APPROX) TO STAGE 1.
- PATHWAY 295 m² (APPROX) TO STAGE 1.

0 2 4 6 8 10m
2 1
SCALE 1:100

AMENDMENTS/REVISIONS

Rev	Description	Initials	Date
1	ISSUE FOR APPROVAL	JC	28.05.24

AMENDMENTS/REVISIONS

Rev	Description	Initials	Date

CLIENT
CORONATION PROPERTY

ARCHITECT
SJB Architects
Level 2
490 Crown Street
Surry Hills NSW
2010 Australia
T 61 2 9380 9911
F 61 2 9380 9922
www.sjb.com.au

CONSULTANT
IGS INTEGRATED GROUP SERVICES
Phone +61 2 8488 4600 Fax +61 2 9475 4588
Address Suite 1.11, 75 Mary St, St Peters, NSW 2044 Australia
Web www.igs.com.au

PROJECT
149-163 MILTON ST,
ASHBURY

DRAWING TITLE
STORMWATER MANAGEMENT
CATCHMENT PLAN

FOR APPROVAL
NOT TO BE USED FOR CONSTRUCTION PURPOSES

DRAWN	DESIGNED	CHECKED	SCALE (AT FULL SIZE)	DATE
JC	JC	PS	1:100 @ A1	May-24

PROJECT No.	DRAWING No.	REVISION
EN-N23_262	CV-Z-3003	1

28 September 2023
E22851.G12_Rev1

Mr. Josh Tramonte
MN Builders
Level 2, 66 Wentworth Avenue
SURRY HILS NSW 2010

EI Australia
Suite 6.01, 55 Miller Street
PYRMONT, NSW 2009

ABN 42 909 129 957

E service@eiaustralia.com.au
W www.eiaustralia.com.au
T 02 9516 0722

Groundwater Take Assessment
Proposed Residential Development
149-163 Milton Street, Ashbury

1. INTRODUCTION

1.1. BACKGROUND

At the request of MN Builders (the Client), EI Australia (EI) has prepared this Groundwater Take Assessment for 149-163 Milton Street, Ashbury (the site).

The following documents were used to assist in the preparation of this analysis:

- Architectural drawings prepared by SJB Architects, Job No. 6119, Drawing No. DA-0101, Revision 16, dated 275 October 2021;
- Structural drawings prepared by EI Consulting – Job No. E22851, Drawing Nos., S02-02 to S02-8 rev B, dated 14 July 2020.
- Detailed Site Investigation Report prepared by EI, Referenced E22851 AA Rev0, dated 25 February 2016;
- Geotechnical Investigation prepared by EI, Referenced E22851 GA Rev2 dated, 4 September 2020;
- Dewatering Management Plan prepared by EI , Referenced E22851.E16_Rev0, dated 23 August 2021;
- Groundwater Take Assessment prepared by EI, Referenced E22851.G12 dated, 23 August 2021;
- Groundwater Monitoring prepared by EI for 165 Milton Street, Ashbury, Referenced E24185.G11.01, dated 28 October 2022. This report is attached to the end of this report.

Based on the provided documents, EI understands that the proposed development involves the demolition of the existing site structures and the construction of a low rise residential development overlying a stepped one-level basement. The Finished Floor Level (FFL) of the basements proposed to be RL 31.35 towards the western side of the site and RL 35.90m towards the eastern side of the site, with the majority of the basement FFL at RL 31.71m. The Bulk Excavation Level (BEL) is assumed to range between 31.0m to 35.60m to allow for the construction of the basement slab. To achieve the BEL, an estimated of excavation depth of between 2.3m to 4.8m Below Existing Ground Level (BEGL) is expected. Locally deeper excavations may be required for footings, service trenches, crane pads, and lift overrun pits.

1.2. ASSESSMENT OBJECTIVES

The objective of this GTA is to provide an estimation of the groundwater take volumes that require pumping out during the construction and operational stage of the development, estimation of the groundwater drawdown as a result of the dewatering, and its associated ground settlements (if any).

2. SITE MODEL

2.1. SUBSURFACE CONDITIONS PERMEABILITY

For the purpose of the groundwater take assessment, subsurface conditions encountered in BH1M and BH3M outlined our geotechnical investigation report (E22851 GA Rev2, dated 4 September 2020) have been adopted because of the variation in the subsurface conditions and surface levels across the site from east to west. A summary of the permeability values which were adopted for the assessment of groundwater take volumes are presented in **Table 1** below.

Table 1 Summary of Adopted Design Subsurface Conditions and Parameters (BH1M and BH3M)

Material [1]	Approximate Depth to Top of Unit (m BEGL) [2]	Approximate RL of Top of Unit (m AHD) [2]		Adopted Permeability (m/s)
		West	East	
Topsoil/Fill [3]	Surface	33.7	40.5	1.0×10^{-5}
Residual Soil [3]	1.2 to 1.8	32.5	38.7	1.0×10^{-8}
Class V Shale Bedrock [4]	2.5 to 3.2	31.2	37.3	8.0×10^{-9}
Class III Shale Bedrock [4]	8.5 to 9.5	25.2	31.0	1.0×10^{-7}
Class II Shale Bedrock [4]	9.9	-[5]	30.6 [5]	5.0×10^{-8}

Notes:

1 For more detailed descriptions of subsurface conditions reference should be made to the Geotechnical Investigation Report.
2 Depths and levels presented in **Table 1** above are generalised using the most conservative levels from the Geotechnical Investigation across the excavation area for the purpose of groundwater seepage modelling.
3 Permeability values have been correlated for material encountered during the GTA using Look (2014).
4 Permeability values have been correlated for material encountered during the GTA using Pells (2019).
5 Class II Shale Bedrock only encountered in BH3M and BH6.

2.2. GROUNDWATER OBSERVATIONS AND PUMP OUT TESTS

Groundwater observations were made within the monitoring wells (BH3M, BH4M and BH8M) on 22 August 2023. The details of Groundwater measurements are presented in **Table 2** below.

Table 2 Summary of Groundwater Levels

Monitoring Well / Test ID	Date of Observation	Approx. Depth to Groundwater (m BEGL)	Approx. RL of Groundwater (m AHD)
BH3M	22 August 2023	5.67	34.83
BH4M	22 August 2023	8.11	28.51
BH7M	22 August 2023	7.47	29.78
BH8M	22 August 2023	2.22	38.18

Notes:

1 Bulk excavation levels based on the supplied architectural drawings and our geotechnical investigation.

EI have also completed long-term groundwater monitoring on the site immediately to the south (165 Milton Street) for a period of at least three months between 13 July 2022 and 26 October 2022. BH201M and BH202M measured water levels varying from RL 35.11m to 35.50m and 35.70m to 35.90m, respectively. Hence, groundwater levels only varied by a maximum of 0.4m over the monitoring period.

A design groundwater level of RL 29.51m (towards western end, based on highest measured water well in BH4M) to RL 39.18m (towards eastern end, based on highest measured water well in BH8M) has been adopted for assessment of groundwater seepage inflow rates and groundwater take volumes within the excavation. An additional 1.0m has been added to the groundwater level recorded to allow for seasonal variation, which is higher than the variations observed in the long-term monitoring of 165 Milton Street. We also note the groundwater level is likely to be lower towards the western end given the presence of W.H. Wagner Oval which is at a lower elevation than the site, but the groundwater level in BH4M was used for conservatism.

2.3. SHORING SYSTEM

Based on the Structural Drawings, the shoring system will comprise of a combination of contiguous piles along the southern boundary, soldier piles on the north eastern corner of the basement and temporary batters. We understand

from the drawings and reports that the basement has been designed to be a drained basement and the walls have been modelled to be freely draining.

3. GROUNDWATER TAKE ASSESSMENT

3.1. GROUNDWATER SEEPAGE VOLUMES DURING CONSTRUCTION PHASE

Groundwater seepage analysis for flow through and beneath the shoring wall during construction has been undertaken using SEEP/W, a finite element groundwater seepage analysis software. SEEP/W estimates the seepage rate of water entering the excavation from beneath the shoring wall. This model estimates the volume of water which will be required to be dewatered during the construction of the basement and until the dewatering is turned off.

For the purpose of this modelling, it has been assumed that:

- The subsurface conditions were horizontal beyond the site. The permeability values presented in **Table 1** above were adopted for each unit.
- The shoring wall systems and temporary batters are assumed to be permeable and free to drain.
- For the simplicity of this model, temporary dewatering will be undertaken within the basement retaining wall perimeter to BEL, about RL 31.0m AHD.
- An external design groundwater level of RL 29.51m (towards western end) to RL 39.18m (towards eastern end) was assumed to be constant at 50m away from the excavation extent.
- The shoring wall surrounding the basement excavation has an average width of approximately 101m in the north-south direction and approximately 134m in the east-west direction.
    - The model section (A-A) was taken in an east-west direction through the excavation as shown with Section A-A on the attached **Figure 1**.
    - Seepage flows in to the excavation from the north and south directions were conservatively estimated using the in-flows measured from the western and eastern soldier pile wall/temporary batter from Section A-A for the entire length (134m).
- The basement is assumed to be constructed in 180 days.

The SEEP/W model is presented in **Appendix A. Table 3** below provides the estimated groundwater inflow rate into the basement.

Table 3 Summary of Analysis Results

Direction	Inflow per m length of perimeter wall (m^3/sec)	Inflow per m length of perimeter wall (m^3/day)	Inflow into excavation (m^3/day)	Total Inflow during construction (ML/180 days)
EW	1.01×10^{-7}	0.008	0.88	0.160
NS	3.47×10^{-8}	0.003	0.40	0.072

3.2. ASSESSMENT OF GROUNDWATER TAKE DURING OPERATIONAL PHASE

A drained basement using sub-soil drainage and a sump-and-pump system was assumed. Based on the SEEP/W results, the estimated volume of groundwater removed beneath the basement during the operational phase of the development is expected to be approximately 0.47ML per year.

4. CONCLUSIONS AND COMMENTS

Based on the findings of this report and within the limitations of available data, EI concludes that:

- Construction and operational phase groundwater take will be approximately:
  - 0.24ML / 180 days during construction
  - 0.47ML / year during operation
- The above estimate is based on the following assumptions:
  - The shoring wall systems are fully drained retention system;
  - Continuous dewatering in order to maintain the groundwater at a depth of BEL during construction, and construction of the basement will take 180 days;
  - The basement walls and slab will be designed as drained for the developments lifetime.
  - This assessment does not take into consideration any excavation that may be required for footings, service trenches, lift pits, or crane pads. This additional excavation, if required, is not expected to affect the retention or the dewatering system.
- The expected drawdown would be in the order of from 7.33m behind the shoring wall will be within the hard clay and bedrock profile and hence settlement due to drawdown is expected to be minimal and is unlikely to affect neighbouring properties.
- Based on our assessment, the groundwater volumes expected per year appear to be manageable using a drained basement system for its lifetime. Hence in our opinion “tanking” of the basement is not warranted and a drained basement is possible for the development.

Should any design or construction conditions differ from that adopted in this report; this GTA should be reviewed and updated as required.

5. LIMITATIONS

This report has been prepared for the exclusive use of MN Builders who is the only intended beneficiary of EI’s work. The scope of the inspections carried out for the purpose of this report is limited to those agreed with MN Builders.

No other party should rely on the document without the prior written consent of EI, and EI undertakes no duty, or accepts any responsibility or liability, to any third party who purports to rely upon this document without EI's approval.

EI has used a degree of care and skill ordinarily exercised in similar tasks by reputable members of the geotechnical industry in Australia as at the date of this document. No other warranty, expressed or implied, is made or intended. Each section of this report must be read in conjunction with the whole of this report, including its appendices and attachments.

The conclusions presented in this report are based on a limited assessment of conditions, with specific locations chosen to be as representative as possible under the given circumstances.

EI's professional opinions are reasonable and based on its professional judgment, experience, training and results from analytical data. EI may also have relied upon information provided by the Client and other third parties to prepare this document, some of which may not have been verified by EI.

EI's professional opinions contained in this document are subject to modification if additional information is obtained through further investigation, observations, or validation testing and analysis during remedial activities. In some cases, further testing and analysis may be required, which may result in a further report with different conclusions.

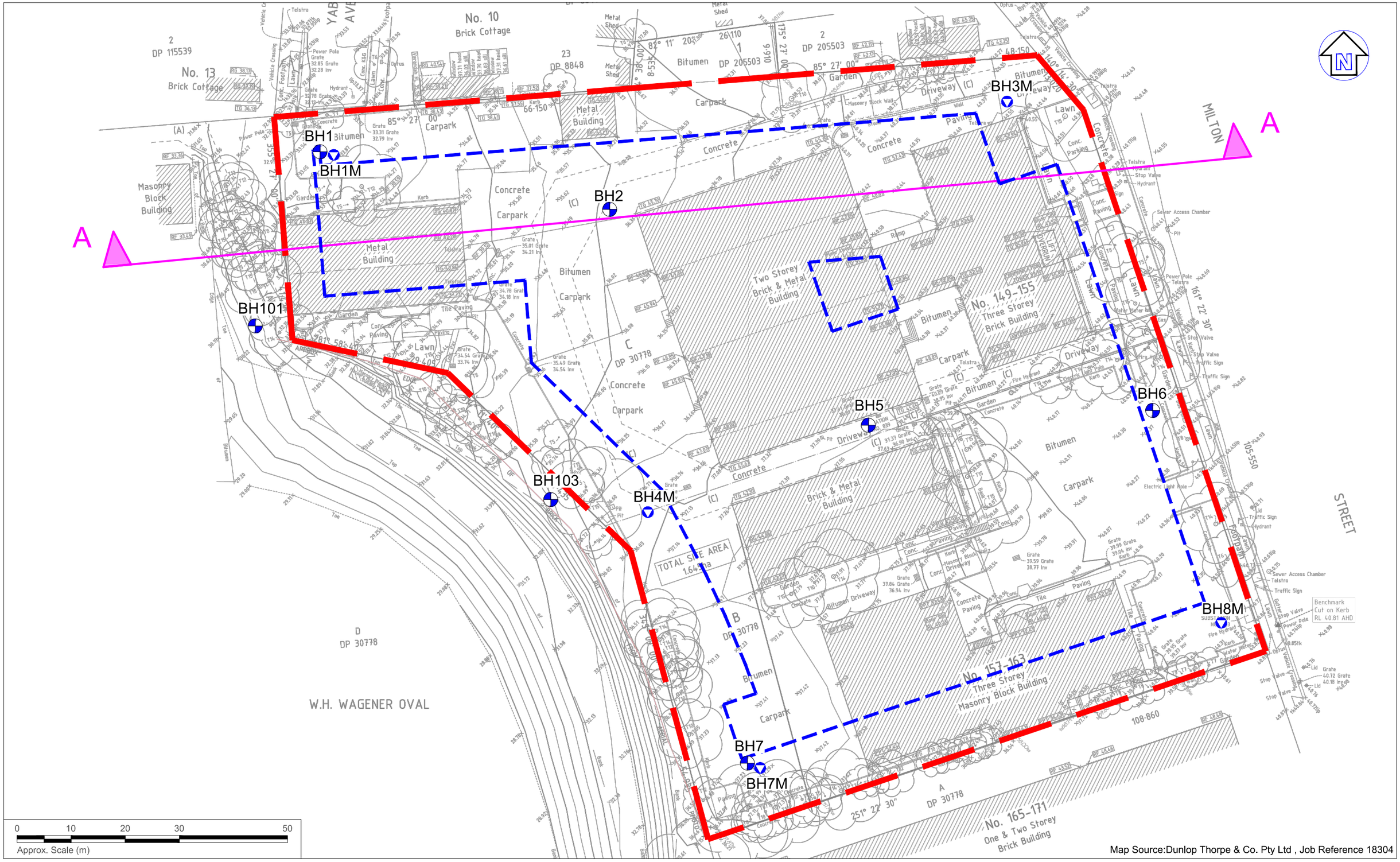
6. CLOSURE

Please do not hesitate to contact the undersigned should you have any questions.

For and on behalf of
EI Australia

Author	Technical Reviewer
	
Gokul Pothineni Geotechnical Engineer	Stephen Kim Senior Geotechnical Engineer

Attachments: Figure 1 – Section A-A
Appendix A – SEEP/W Model and Results
E24185.G11.01 – Groundwater Monitoring Report No. 1 for 165 Milton Street, Ashbury.
Important Information



Map Source:Dunlop Thorpe & Co. Pty Ltd , Job Reference 18304

LEGEND (all measurements are approximate)

- Site boundary
- Proposed basement boundary
- Borehole location
- Monitoring well location

eiaustralia
Practical Solutions for Built Environments
Suite 6.01, 55 Miller Street, PYRMONT 2009
Ph (02) 9516 0722 Fax (02) 9518 5088

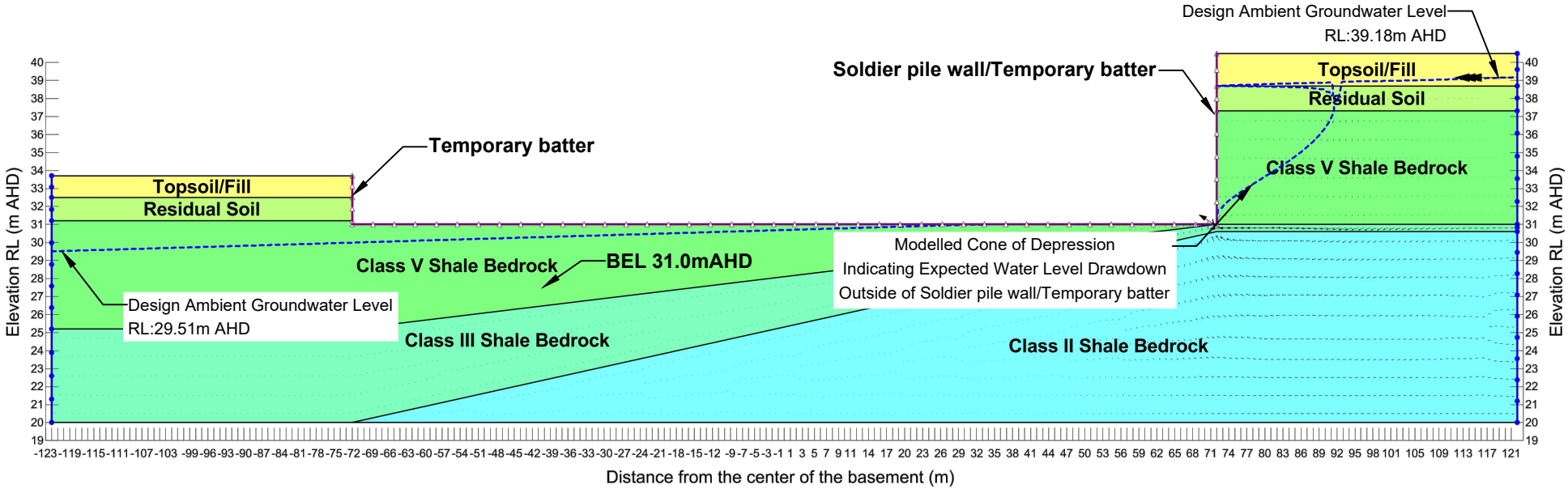
Drawn:	L.C.
Approved:	L.X.
Date:	06-10-23

MN Builders
Groundwater Take Assessment
149 - 163 Milton Street, Ashbury, NSW NSW

Sampling Location Plan

Figure: 2

Project: E22851.G12



eiaustralia
Contamination | Remediation | Geotechnical
Suite 6.01, 55 Miller Street, PYRMONT 2009
Ph (02) 9516 0722 Fax (02) 9518 5088

Drawn:	G.P.
Approved:	S.K.
Date:	26-09-23
Approx Scale:	As Shown

MN Builders Pty Ltd
Groundwater Take Assessment
149-163 Milton Street, Ashbury, NSW
SEEP/W Model and Results

Appendix:
A

Project: E22851.G12

Suite 6.01, 55 Miller Street
PYRMONT NSW 2009
www.eiaustralia.com.au
02 9516 0722

28 October 2022
E24185.G11.01

Mr Chris Gorton
Coronation Property Co. Pty Ltd
Level 2, 66 Wentworth Ave
SURRY HILLS NSW 2010

Groundwater Monitoring Report No. 1
165 Milton Street, Ashbury, NSW

EI Australia (EI) has been engaged to prepare this factual letter report to provide continual groundwater levels at the above site for minimum 3 months period prior to dewatering. The monitoring period is from Wednesday 13 July 2022 to Wednesday 26 October 2022.

Groundwater levels were collected during the monitoring period using data loggers installed on 13 July 2022 within monitoring wells BH201M and BH202M, which were installed by EI on 14 June 2022.

The data logger / monitoring well details and the groundwater levels observed during the monitoring period are summarised in Table 1 & 2 below.

Table 1 Summary of Data Logger & Well Installation Details

Monitoring Well ID	Top of Well RL (mAHD)	Existing Ground RL (mAHD)	Well Stickup (m)	Well Depth Below Ground (m) [1]	Sensor RL (mAHD)
BH201M	37.42	36.50	0.92	5.11	31.83
BH202M	37.59	37.00	0.59	6.31	30.90

Note 1: The level of the bottom of the well is based on manual measurements after the well installation. The measurement accounts for any variation of the well depth caused by factors such as infilling of material.

Table 2 Summary of Groundwater Levels

Monitoring Well ID	Baseline RL (mAHD) [1]	Highest Groundwater RL (mAHD)	Lowest Groundwater RL (mAHD)	Predicted Drawdown RL (mAHD)	Within Predicted Limits?
BH201M	35.30	35.50	35.11	N/A	N/A
BH202M	35.90	36.17	35.70	N/A	N/A

Note 1: The baseline level is calculated as an average of all groundwater levels recorded in the monitoring wells.

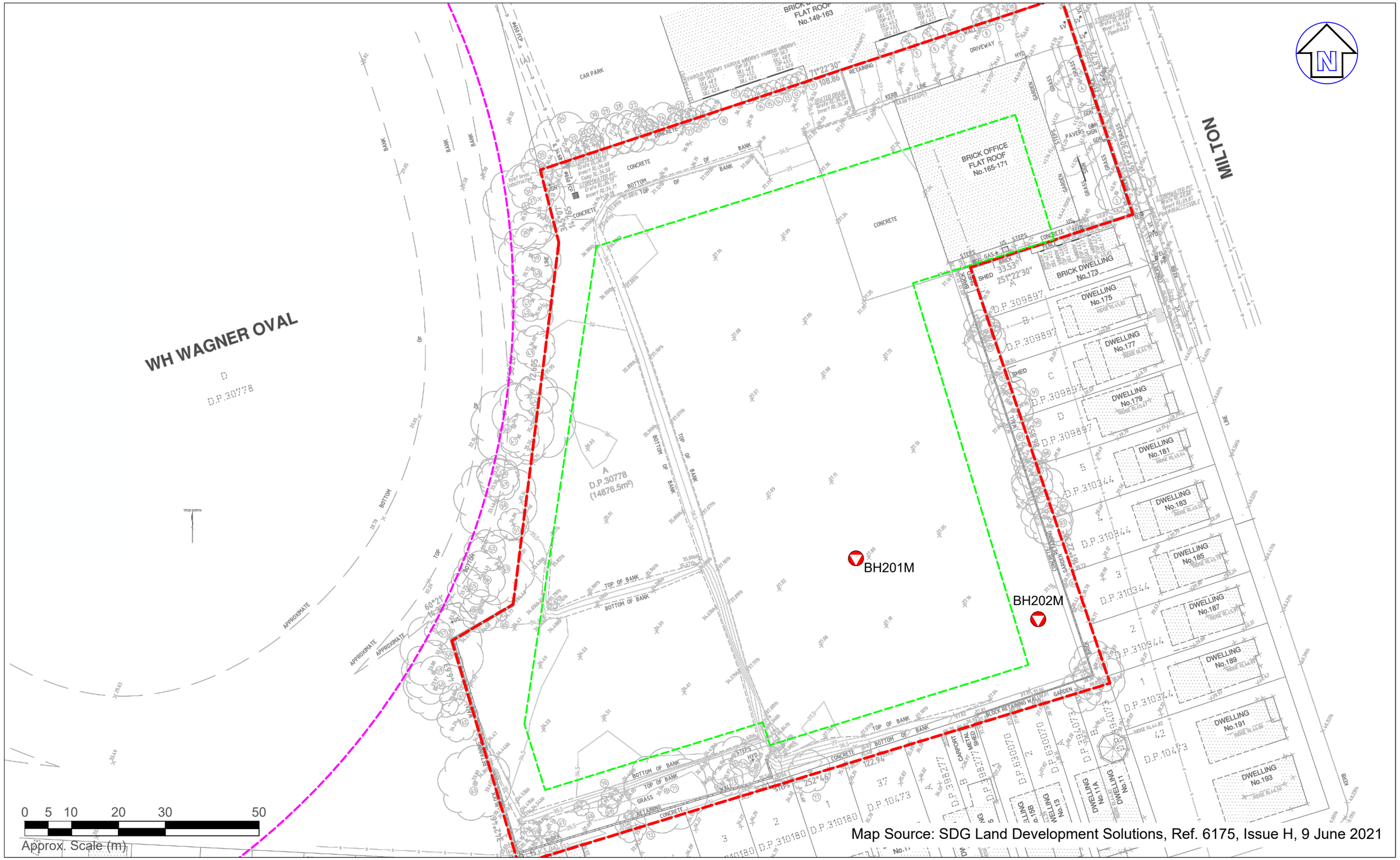
Please do not hesitate to contact the undersigned should you have any questions.

For and on behalf of:
EI AUSTRALIA

Author	Reviewer
Masar Jabbar	**David Saw**
Geotechnical Engineer	Geotechnical Engineer

Attachments:

Figure 1:	Data Logger Location Plan
Figure 2-3:	Groundwater Level, Daily Rainfall vs. Time From Wednesday 13 July 2022 to Wednesday 26 October 2022.
Important Information	



LEGEND

- Location of Data Logger, Groundwater Monitoring Well/Borehole Location (EI Australia, 14 June 2022)
- Approximate Site Boundary
- Proposed Basement Outline
- Approximate Quarry Extent

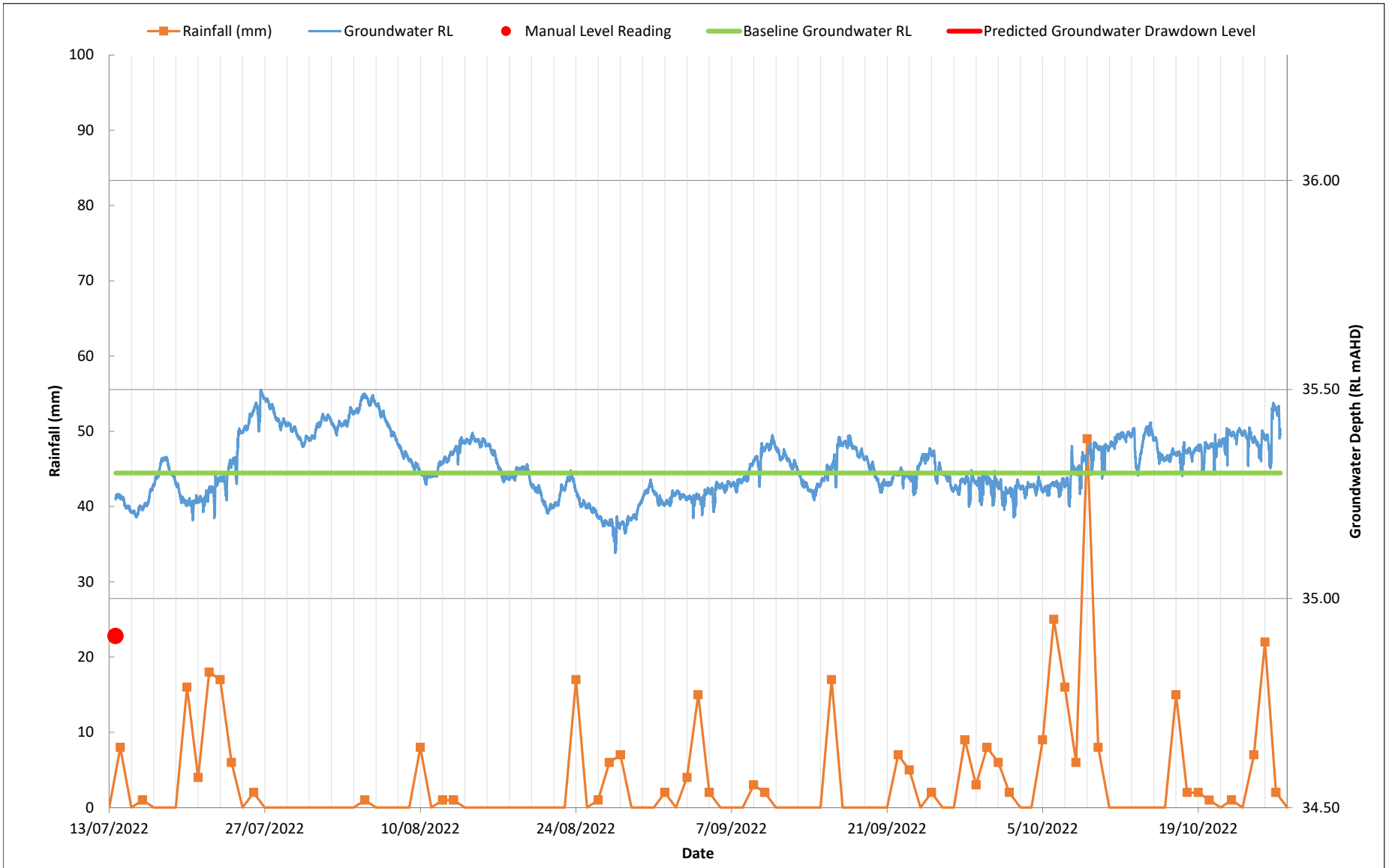
eiaustralia
Contamination | Remediation | Geotechnical
Suite 6.01, 55 Miller Street, PYRMONT 2009
Ph (02) 9516 0722 Fax (02) 9518 5088

Drawn:	MJ
Approved:	D.S
Date:	28/10/22

Coronation Property Pty Ltd
Groundwater Monitoring
165 Milton Street, Ashbury NSW
Data Logger Location Plan

Figure: 1

Project: E24185.G11



eiaustralia
Contamination | Remediation | Geotechnical
Suite 6.01, 55 Miller Street, PYRMONT 2009
Ph. (02) 9516 0722 Fax (02) 9518 5088

Drawn:	MJ
Approved:	DS
Date:	28/10/2022

Coronation Property Co. Pty Ltd

Groundwater Monitoring

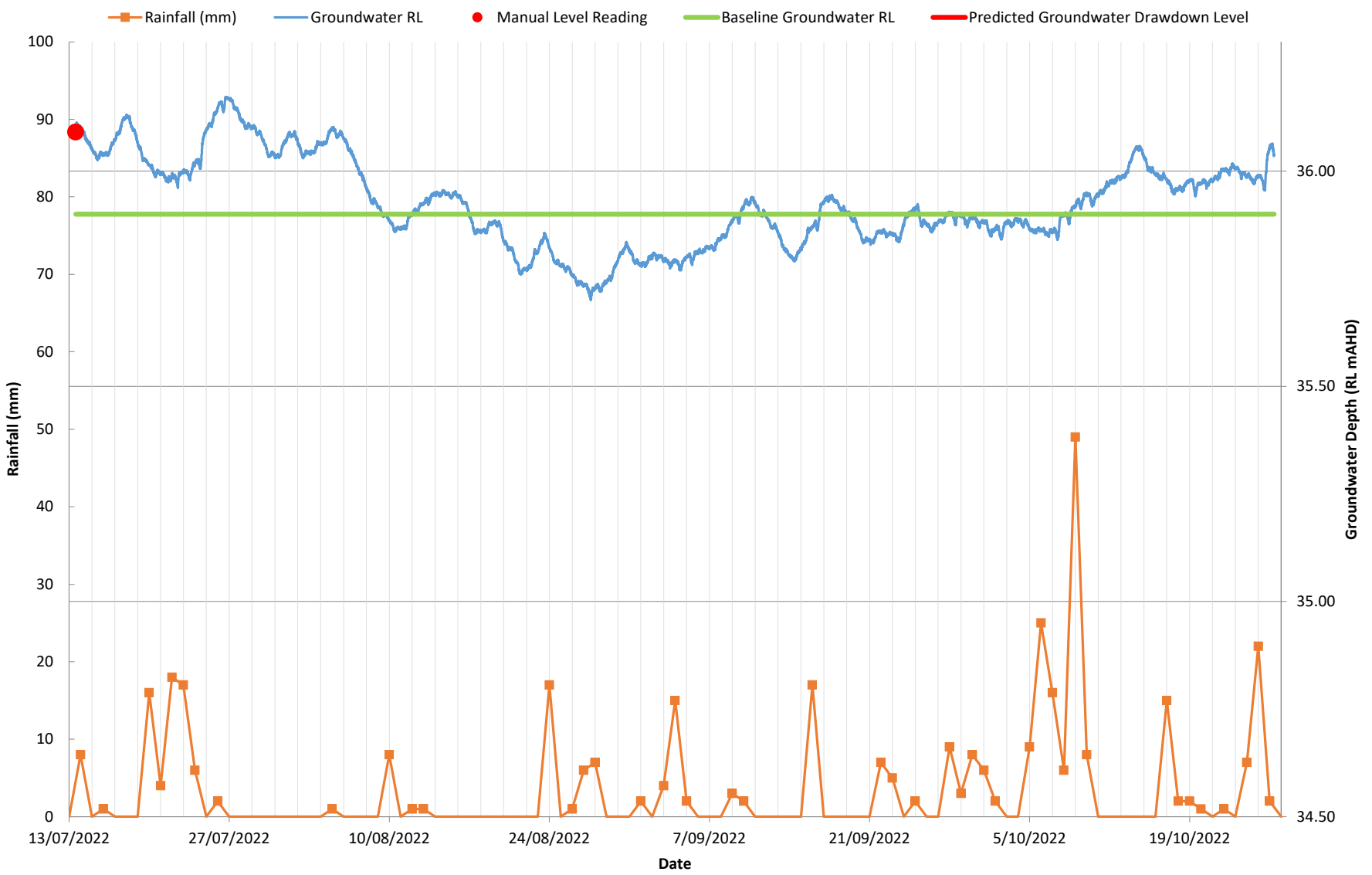
165 Milton Street, Ashbury, NSW

BH201M

Figure:

2

Project: E24185.G11.01



eiaustralia
Contamination | Remediation | Geotechnical
Suite 6.01, 55 Miller Street, PYRMONT 2009
Ph. (02) 9516 0722 Fax (02) 9518 5088

Drawn:	MJ
Approved:	DS
Date:	28/10/2022

Coronation Property Co. Pty Ltd

Groundwater Monitoring

165 Milton Street, Ashbury, NSW

BH202M

Figure:

3

Project: E24185.G11.01

Important Information

SCOPE OF SERVICES

The geotechnical report ("the report") has been prepared in accordance with the scope of services as set out in the contract, or as otherwise agreed, between the Client And EI Australia ("EI"). The scope of work may have been limited by a range of factors such as time, budget, access and/or site disturbance constraints.

RELIANCE ON DATA

EI has relied on data provided by the Client and other individuals and organizations, to prepare the report. Such data may include surveys, analyses, designs, maps and plans. EI has not verified the accuracy or completeness of the data except as stated in the report. To the extent that the statements, opinions, facts, information, conclusions and/or recommendations ("conclusions") are based in whole or part on the data, EI will not be liable in relation to incorrect conclusions should any data, information or condition be incorrect or have been concealed, withheld, misrepresented or otherwise not fully disclosed to EI.

GEOTECHNICAL ENGINEERING

Geotechnical engineering is based extensively on judgment and opinion. It is far less exact than other engineering disciplines. Geotechnical engineering reports are prepared for a specific client, for a specific project and to meet specific needs, and may not be adequate for other clients or other purposes (e.g. a report prepared for a consulting civil engineer may not be adequate for a construction contractor). The report should not be used for other than its intended purpose without seeking additional geotechnical advice. Also, unless further geotechnical advice is obtained, the report cannot be used where the nature and/or details of the proposed development are changed.

LIMITATIONS OF SITE INVESTIGATION

The investigation programme undertaken is a professional estimate of the scope of investigation required to provide a general profile of subsurface conditions. The data derived from the site investigation programme and subsequent laboratory testing are extrapolated across the site to form an inferred geological model, and an engineering opinion is rendered about overall subsurface conditions and their likely behaviour with regard to the proposed development. Despite investigation, the actual conditions at the site might differ from those inferred to exist, since no subsurface exploration program, no matter how comprehensive, can reveal all subsurface details and anomalies. The engineering logs are the subjective interpretation of subsurface conditions at a particular location and time, made by trained personnel. The actual interface between materials may be more gradual or abrupt than a report indicates.

SUBSURFACE CONDITIONS ARE TIME DEPENDENT

Subsurface conditions can be modified by changing natural forces or man-made influences. The report is based on conditions that existed at the time of subsurface exploration. Construction operations adjacent to the site, and natural events such as floods, or ground water fluctuations, may also affect subsurface conditions, and thus the continuing adequacy of a geotechnical report. EI should be kept appraised of any such events, and should be consulted to determine if any additional tests are necessary.

VERIFICATION OF SITE CONDITIONS

Where ground conditions encountered at the site differ significantly from those anticipated in the report, either due to natural variability of subsurface conditions or construction activities, it is a condition of the report that EI be notified of any variations and be provided with an opportunity to review the recommendations of this report. Recognition of change of soil and rock conditions requires experience and it is recommended that a suitably experienced geotechnical engineer be engaged to visit the site with sufficient frequency to detect if conditions have changed significantly.

REPRODUCTION OF REPORTS

 Where information from the accompanying report is to be included in contract documents or engineering specification for the project, the entire report should be included in order to minimize the likelihood of misinterpretation from logs.

REPORT FOR BENEFIT OF CLIENT

The report has been prepared for the benefit of the Client and no other party. EI assumes no responsibility and will not be liable to any other person or organisation for or in relation to any matter dealt with or conclusions expressed in the report, or for any loss or damage suffered by any other person or organisation arising from matters dealt with or conclusions expressed in the report (including without limitation matters arising from any negligent act or omission of EI or for any loss or damage suffered by any other party relying upon the matters dealt with or conclusions expressed in the report). Other parties should not rely upon the report or the accuracy or completeness of any conclusions and should make their own inquiries and obtain independent advice in relation to such matters.

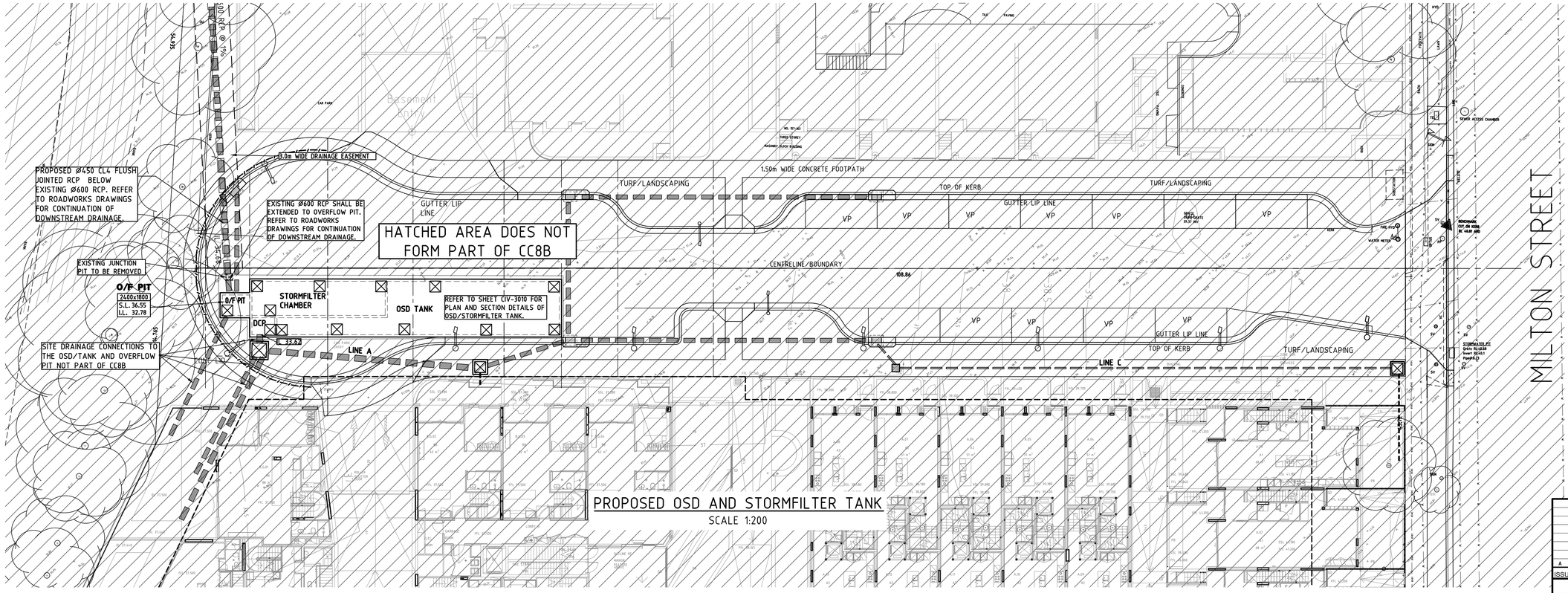
OTHER LIMITATIONS

EI will not be liable to update or revise the report to take into account any events or emergent circumstances or fact occurring or becoming apparent after the date of the report.

REGULATED DESIGN RECORD

Project Address:	165-171 Milton Street, Ashbury NSW 2193
Project Title:	ASHBURY TERRACES
Consent No: DA 512/2021	Body Corporate Reg No: N/A
Drawing Title: PROPOSED OSD AND STORMFILTER TANK	Drawing No: 2626-CC-CIV-3000

Rev	Date dd.mm.yy	Description	DP Full Name	Reg No
A	04.09.2024	Issued for Construction	Steve Arraj	DEP0000188



ISSUE	DESCRIPTION	BY	DATE
A	ISSUED FOR CONSTRUCTION	GB	04/09/2024

MANCE ARRAJ
CIVIL & STRUCTURAL ENGINEERS
First Floor, 278-282 Church Street, Parramatta
P.O. Box 2555 North Parramatta NSW 1750
Ph. 02 8897 8800 www.maengineers.com.au

PROJECT
ASHBURY TERRACES
165-171 MILTON STREET
ASHBURY NSW 2193

DRAWING TITLE
PROPOSED OSD AND STORMFILTER TANK

FOR COUNCIL / CONSTRUCTION CERTIFICATE ISSUE

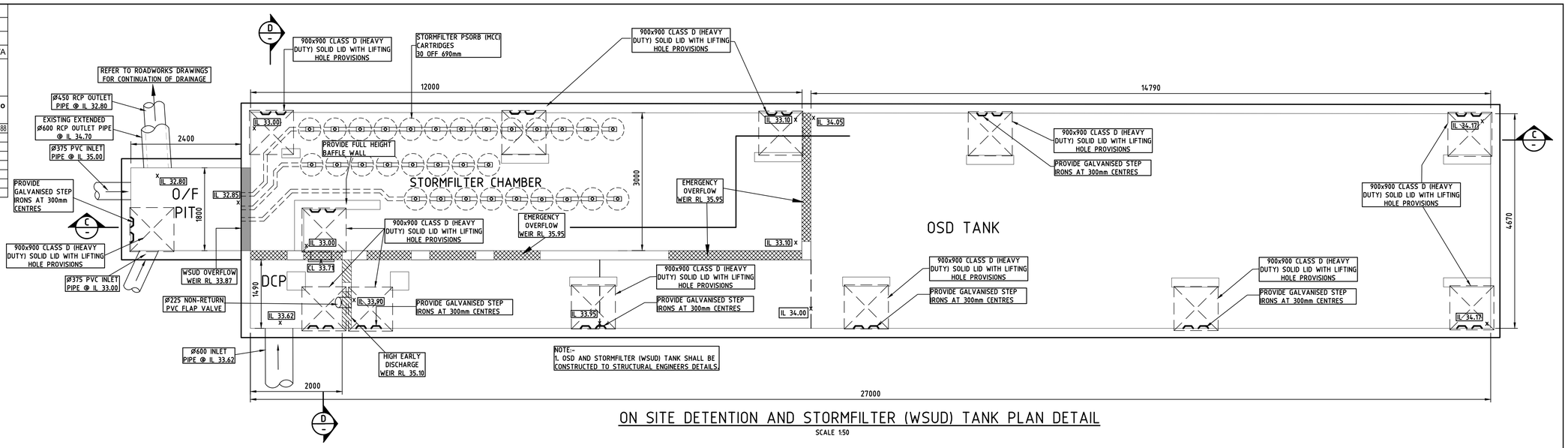
CHECKED BY
Signature: Steve Arraj
STEVE ARRAJ B.E.(Civil)
Date: 04.09.2024

DESIGNED GB	PROJECT NUMBER 2626-CC	ISSUE A
CHECKED SA		
DATUM AHD	DRAWING NUMBER CIV-3000	
SCALE AS INDICATED		A1

REGULATED DESIGN RECORD

Project Address:	165-171 Milton Street, Ashbury NSW 2193
Project Title:	ASHBURY TERRACES
Consent No: DA 512/2021/D	Body Corporate Reg No: N/A
Drawing Title: OSD, STORMFILTER TANK PLAN AND SECTION DETAILS	Drawing No: 2626-CC-CIV-3010

Rev	Date dd.mm.yy	Description	DP Full Name	Reg No
A	04.09.2024	Issued for Construction	Steve Arraj	DEP0000188

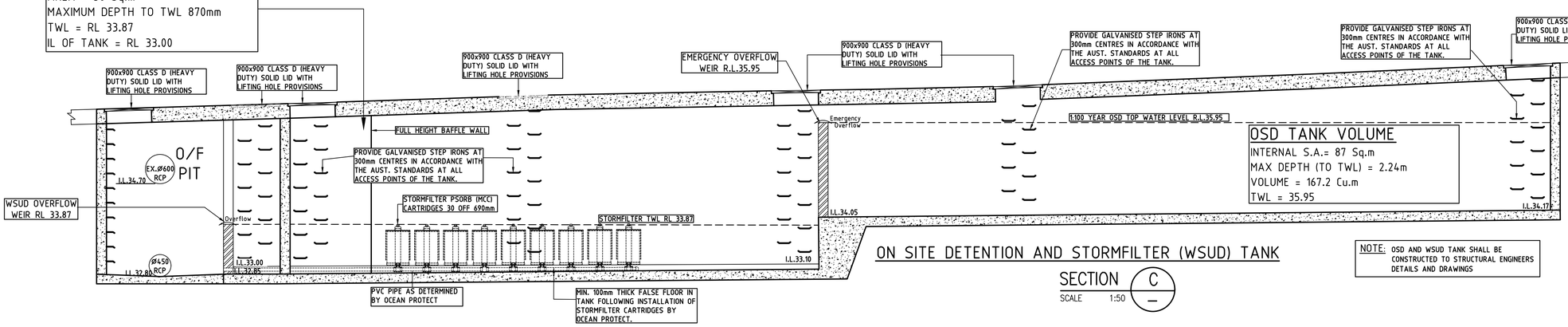


ON SITE DETENTION AND STORMFILTER (WSUD) TANK PLAN DETAIL

SCALE 1:50

STORMFILTER (WSUD) TANK
AREA = 36 Sq.m
MAXIMUM DEPTH TO TWL 870mm
TWL = RL 33.87
IL OF TANK = RL 33.00

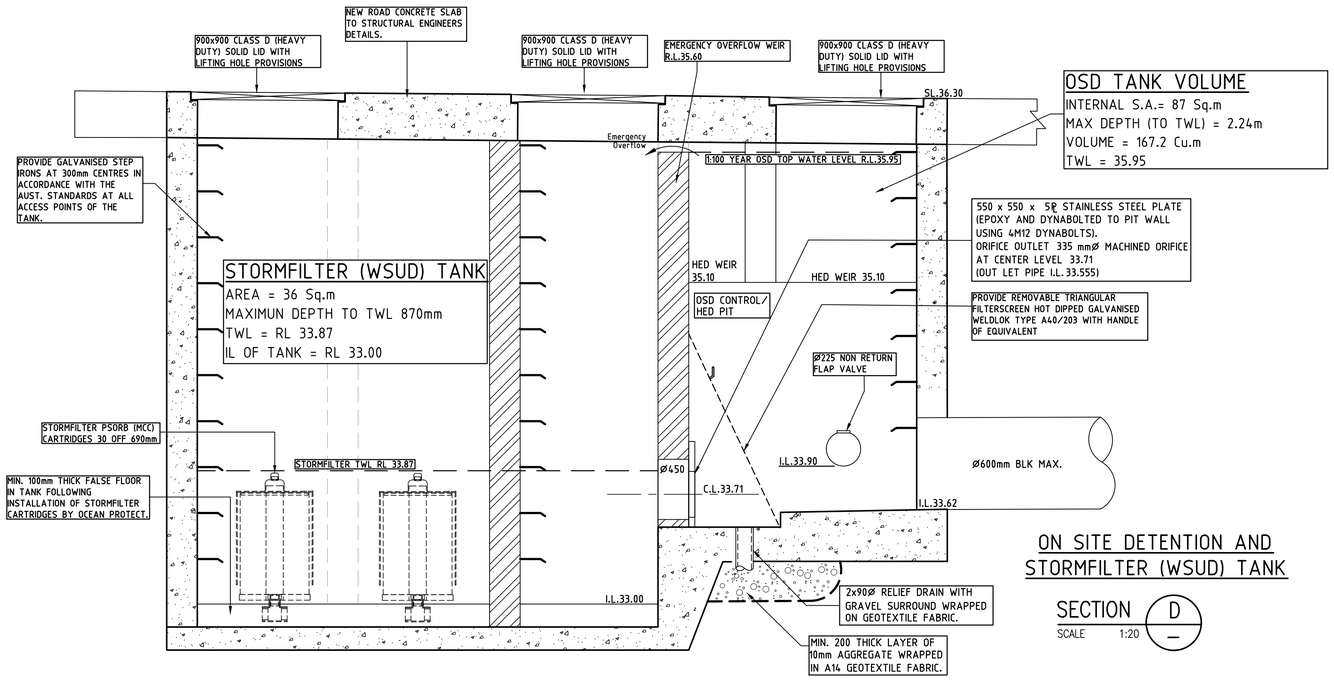
OSD TANK VOLUME
INTERNAL S.A.= 87 Sq.m
MAX DEPTH (TO TWL) = 2.24m
VOLUME = 167.2 Cu.m
TWL = 35.95



ON SITE DETENTION AND STORMFILTER (WSUD) TANK SECTION C

SCALE 1:50

NOTE: OSD AND WSUD TANK SHALL BE CONSTRUCTED TO STRUCTURAL ENGINEERS DETAILS AND DRAWINGS



ON SITE DETENTION AND STORMFILTER (WSUD) TANK SECTION D

SCALE 1:20

ISSUE	DESCRIPTION	BY	DATE
A	ISSUED FOR CONSTRUCTION	GB	04/09/2024

MANCE ARRAJ
CIVIL & STRUCTURAL ENGINEERS
First Floor, 278-282 Church Street, Parramatta
P.O. Box 2555 North Parramatta NSW 1750
Ph. 02 8897 8800 www.maengineers.com.au

PROJECT
ASHBURY TERRACES
165-171 MILTON STREET
ASHBURY NSW 2193

DRAWING TITLE
OSD AND STORMFILTER TANK PLAN AND SECTION DETAILS

FOR COUNCIL / CONSTRUCTION CERTIFICATE ISSUE

CHECKED BY
Signature: *Steve Arraj*
STEVE ARRAJ B.E.(Civil)
Date: 04.09.2024

DESIGNED	GB	PROJECT NUMBER 2626-CC	ISSUE A
CHECKED	SA		
DATUM	AHD	DRAWING NUMBER CIV-3010	A1
SCALE	AS INDICATED		