

INTEGRATED WATER MANAGEMENT PLAN

Proposed Residential Flat Building with Basement Carpark

DIAN, Rose Bay

2A & 2-6 Conway Avenue, 38-40 Carlisle Street, and 15-15A Fernleigh
Avenue, Rose Bay NSW

Job No. 251004
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EXECUTIVE SUMMARY

This Integrated Water Management Plan (IWMP) supports the State Significant Development Application (SSD-101842729) for a new Infill Affordable Housing, multi-unit residential building with basement levels at Conway Avenue, Carlisle Street and Fernleigh Avenue, Rose Bay. The plan assesses stormwater quantity, quality, lawful discharge, construction-phase erosion control, and operational maintenance requirements.

This IWMP has been prepared having regard to relevant NSW Government water management objectives, including the NSW Integrated Water Cycle Management Framework, WaterNSW guidelines (where applicable), Woollahra Municipal Council Development Control Plan, and Sydney Water servicing and discharge requirements. Stormwater is managed independently of Sydney Water wastewater infrastructure, and no direct discharge to controlled waters or Sydney Water assets is proposed beyond Council-approved connections.

The site naturally drains toward the southern and eastern road corridors, connecting into Council's pit and pipe network at the Conway Avenue / Carlisle Street inter Section. Subsoil drainage water from the basement is not permitted to discharge into Council's kerb and gutter. No groundwater was encountered during geotechnical investigation, with only minor intermittent seepage expected, however additional monitoring is recommended prior to detailed design.

On-site Stormwater Detention (OSD) is required under Woollahra DCP 2015 and Annexure A draft condition D.34. A below-ground OSD with a minimum storage volume of 77.6 m³ has been adopted on a rate basis (25 m³ per 1,000 m² of site area) and modelled using DRAINS software in accordance with AR&R 2019 hydrology and Council's Permissible Site Discharge (PSD) limit of 105.5 L/s for the 1% AEP event. Results confirm stormwater runoff from the post-development site is effectively mitigated across all relevant storm events achieving Council's allowable discharge targets. Additional OSD storage to absorb bypass (pervious and impervious) catchments will be confirmed at Construction Certificate stage by re-running the DRAINS model with bypass catchments included.

No groundwater was encountered during preliminary geotechnical investigations, with only the potential for minor perched or intermittent seepage identified. The proposed civil stormwater and basement drainage strategy does not rely on ongoing groundwater extraction or permanent dewatering. Any further groundwater monitoring or assessment requirements are to be addressed separately through geotechnical and hydrogeological investigations prior to Construction Certificate.

Water quality performance has been modelled using MUSIC. The proposed treatment train includes rainwater harvesting and underground water-quality treatment via proprietary stormwater treatment devices. The MUSIC results meet Woollahra DCP pollutant reduction targets for TSS, TP, TN and Gross

Pollutants.

It is the conclusion of this IWMP that the correct installation of these key design elements will ensure that the management of stormwater quantity and quality complies with necessary state and local government policies and is recommended for approval.

**Integrated Water Management Plan for DIAN, Rose Bay
Proposed Class 2 Residential Flat Building with Basement Carpark at
2A & 2-6 Conway Ave, 38-40 Carlisle St, and 15A-15 Fernleigh Ave, Rose Bay NSW
Job N° 251004 (SSD-101842729)**

1.0 INTRODUCTION

This Integrated Water Management Plan (IWMP) has been prepared to support a State Significant Development Application (SSD-101842729) for the proposed development site at 2A & 2-6 Conway Avenue, 38-40 Carlisle Street, and 15A-15 Fernleigh Avenue, Rose Bay. The purpose of this report is to address the management of stormwater quantity and quality to ensure that the proposed development complies with all necessary state and local government policies.

This amended report responds to submissions received on the Environmental Impact Statement, including the Woollahra Municipal Council submission (Section 27 Stormwater, 2 March 2026), the NSW DCCEW Water Group submission (17 March 2026) as it interfaces with basement subsoil drainage, and Annexure A draft conditions (D.6, D.32, D.34). A consolidated Response to Submissions Summary is provided in Appendix A4.

1.1 OBJECTIVES

The objectives of the IWMP proposed are:

- Minimise the quantity of pollutants such as sediment, oil, nutrients and litter being exported from site to receiving waterways.
- Minimise potential harm to the environment and downstream ecosystems.
- Minimise potential flood impacts from the development.

This will be achieved through the implementation of:

- Management strategies and devices which reduce water pollution discharging from the subject site.
- Control erosion and sediment runoff during the construction phase.

This report describes the design process for specification of the following key infrastructure elements that will ensure the management of stormwater to achieve necessary standards:

- Rainwater harvesting and Onsite Detention (OSD) storage considerations for quantity mitigation.
- Filtration area considerations for quality treatment.

1.2 IWMP REQUIREMENTS

This assessment has been undertaken in accordance the Secretary's Environmental Assessment Requirements (SEARs), the NSW Integrated Water Cycle Management Framework best practice guide (March 2025), and Woollahra DCP 2015. Supporting datasets include:

- Architectural drawings prepared by MHNDU (Project No. 25-135 Drawings dated 17.12.2025)

- Preliminary Geotechnical Investigation prepared by EI Australia (E26891.G03 dated 25.11.2025)
- Topographical Survey prepared by Rygate Surveyors (Ref: 80854 Rev. C Sheets 1-3 dated 17.10.2025)
- Flood Impact and Risk Assessment prepared by RTS Civil (Job.251004 dated 05.12.2025)
- Woollahra Municipal Council Development Control Plan (Woollahra DCP 2015)
- Applicable legislation and planning controls

2.0 SITE AND DEVELOPMENT CONTEXT

This Section of the report summaries the development site conditions and conditions surrounding the site.

2.1 LOCATION AND TOPOGRAPHY

The total site area is approximately 3,105 m². The development site is bounded by Conway Avenue to the south, Carlisle Street to the east and Fernleigh Avenue to the north. Ground levels generally range from approximately RL 46.8 to 40.0 m AHD along Fernleigh Avenue, RL 40.0 m to 37.0 m AHD along Carlisle Street, and RL 43.0 to 37.0 m AHD along Conway Avenue, falling toward the southern and eastern road corridors. This provides a natural drainage path toward the existing Council drainage network within Carlisle Street, ultimately draining to Rose Bay.

The general site locality is illustrated in Figure 1 with the existing detail survey plan included in Appendix A1.

2.2 EXISTING DRAINAGE CONDITIONS

The existing site drainage currently drains to the street gutters along Conway Avenue and Carlisle Street. Council records indicate a series of inlet pit and pipe network exists at the corner of Conway Avenue and Carlisle Street, conveying flow to south within the Council drainage network. Refer Appendix A1 for details.

2.3 PROPOSED DEVELOPMENT

The Dian Rose Bay development comprises the demolition of existing improvements and construction of an eight storey, high quality Residential Flat Building, including 15% aspirational affordable housing floorspace, suited to key workers. The proposed works also include basement parking, new driveway access, and upgraded drainage infrastructure. The proposed development extent is shown in Figure 2.

Based on the supplied information, we understand that the proposed development will comprise of:

- Demolition of existing dwellings.
- Construction of a multi-unit residential building with basement parking
- Driveway access via Conway Avenue.
- Two to three below ground basement levels.
- The ground floor levels located at RL 44.70m and 40.50m AHD.
- The basement levels are accessed by the driveway entrance, internal lifts and staircases.

Finished floor levels and all sensitive uses are elevated above mapped flood levels and are not expected to experience direct inundation during design flood events, provided minimum freeboard is achieved in accordance with Council requirements.

Roofed and hardstand areas will increase relative to existing conditions, necessitating incorporation of WSUD and water-quality treatment measures.

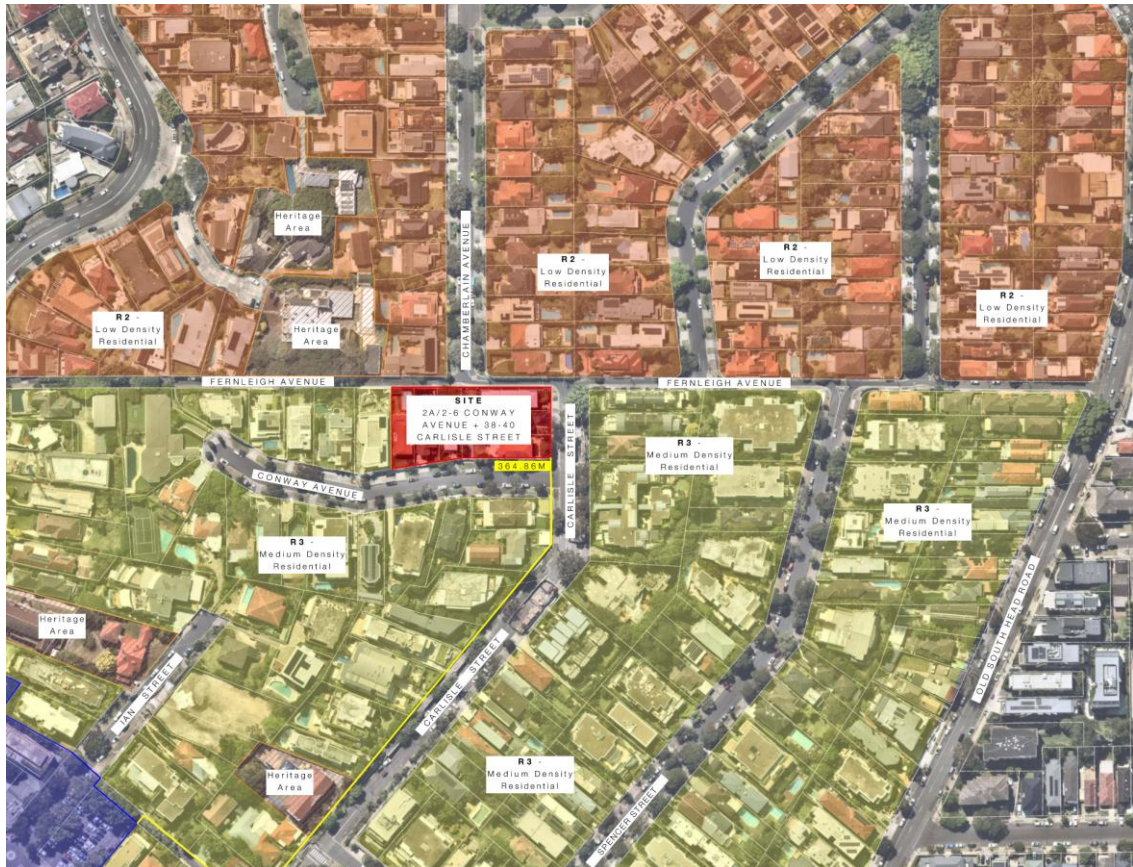


Figure 1 – Site Location and Surrounding Area (MHNDU)



Figure 2 – Proposed Lower Ground Floor Plan (MHNDU)

3.0 LAWFUL POINT OF DISCHARGE

Following the development of the site, the internal runoff will be collected, detained, and treated prior to discharge to Council's stormwater network.

3.1 SITE DISCHARGE

Details for connection to Council's network are detailed on the conceptual stormwater management plans and have been designed according to Section E2.2.5 – Connection to Council's Drainage Systems of Woollahra DCP 2015. The proposed stormwater discharge is to Council's stormwater drainage network only and does not connect to or rely upon Sydney Water stormwater assets. No discharge to controlled waters is proposed. The conceptual stormwater system has been designed in accordance with Woollahra DCP 2015 and relevant NSW Government water management principles.

All runoff from the site will be conveyed by direct connection to the existing kerb inlet pit at the corner of Conway Avenue and Carlisle Street. In accordance with Annexure A draft condition D.34(b) and (c), the proposed works comprise a new minimum 900 × 900 boundary junction pit located within the site frontage with the outlet pipe set at minimum 1% grade per AS3500.3; a new Class 4, 375 mm steel reinforced concrete pipe (RCP) across Conway Avenue replacing the existing 225 mm Council pipe and connecting into the existing 450 mm RCP at the southern corner of Conway Avenue and Carlisle Street; and a new 600 × 600 reinforced concrete junction pit at the kerb inlet, to the satisfaction of Council and Council's Specification for Roadworks, Drainage and Miscellaneous Works (2012). Separate approval under Section 138 of the Roads Act 1993 will be obtained from Council prior to the issue of any Construction Certificate.

3.2 BASEMENT AND SUBSOIL DRAINAGE

All below-ground structures are to be appropriately waterproofed and designed such that any subsoil or seepage water is NOT discharged to Council's kerb and gutter, in accordance with Sections E2.2.5 and E2.2.10 of Woollahra DCP 2015. Supporting geotechnical, structural and hydrogeological documentation is recommended prior to Construction Certificate to confirm subsurface conditions and to inform final basement waterproofing and seepage management measures. The "no subsoil drainage / seepage water discharged to kerb and gutter" requirement of Annexure A draft condition D.34(i) will be clearly annotated on the Construction Certificate stormwater drawings (SW001A through SW203A).

This IWMP does not constitute a Groundwater Impact Assessment. Groundwater conditions, seepage behaviour and any dewatering requirements are to be addressed separately within the Preliminary Geotechnical Investigation and any subsequent hydrogeological assessments prepared for the project.

Based on EI Australia's Preliminary Geotechnical Investigation (E26891.G03), no groundwater was encountered during the investigation, and only the potential for minor perched or intermittent seepage was

identified. Accordingly, the conceptual basement drainage arrangement comprises an internal AS3500.3 compliant sump/wet-well pump-out system with a minimum storage capacity of 9 m³ and a maximum pump rate of 10 L/s, in accordance with Annexure A draft condition D.34(g). Pump-out discharge is directed to the proposed OSD system. The system is intended for intermittent seepage only and is NOT sized for continuous groundwater disposal or permanent dewatering.

At the time of this Issue 02, EI Australia's current recommendation is for a drained basement. Ongoing groundwater monitoring is being undertaken by EI Australia to quantify construction and operational water take and to confirm the basis of design. The ongoing dewatering strategy and the ultimate discharge point are to be confirmed by EI Australia upon completion of monitoring, within the Construction Phase Hydrogeological Report (CPHR) and associated Dewatering Management Plan (DMP).

The outcomes of EI Australia's ongoing monitoring may alter this basis. Should monitoring identify continuous groundwater inflow, the pump-out system specified above will require re-sizing and re-specification, and the discharge strategy (including any licence, exemption, or pre-treatment requirements under the Water Management Act 2000 / WM Regulation 2025) will be addressed by EI Australia. The approved IWMP will be updated at Construction Certificate stage if a change in basis is required. In all cases, subsoil and seepage water collected from the basement will not be discharged to Council's kerb and gutter or stormwater network.

4.0 STORMWATER QUANTITY MANAGEMENT

This Section of this report will quantify the stormwater quantity parameters. The potential impact to quality runoff has been assessed to determine stormwater detention requirements for the development.

Hydrological and hydraulic analysis has been undertaken using the computer software DRAINS in conjunction with DCP requirements. The DRAINS program (version 2025.01.9147.24925 – 64 bit) is a modelling software package developed for the design and analysis of urban stormwater drainage systems.

Site specific hydrology has been obtained from Australia's Bureau of Meteorology (BoM) including Initial and Continuing Loss hydrological modelling in accordance with ARR2019 procedures using the Rose Bay station (066062). The critical duration is expected between 90 minutes and 3 hours consistent with nearby catchments.

4.1 OBJECTIVES

The controls outlined in Section E2.2.4 – Onsite Detention (OSD) of Stormwater of Woollahra DCP 2015 are designed to:

- To reduce and mitigate the peak stormwater flow from a developed site and allow the controlled release of stormwater to the public stormwater system and
- To reduce flood risk in urban areas.

The OSD storage is to be designed in accordance with the storage versus discharge relationships as summarised in Table 1.

Table 1 – DCP Onsite Detention (OSD) Minimum Requirements

OSD Requirements Per 1,000 m ² of the Total Site Area		
Permissible Site Discharge (l/s)	Minimum Site Storage Requirements (m ³)	Storm Event
24	4	39% AEP (1 in 2 Year ARI)
34	20	1% AEP (1 in 100 ARI)

Further to the DCP requirements, this assessment has considered pre- and post-development peak discharge rates across a full range of design storm events, including the 63% (1 in 1 Year ARI), 39% (1 in 2 Year ARI), 10%, 5%, 2%, and 1% AEP events.

4.2 SITE PERVIOUS AND IMPERVIOUS AREAS

Below is a summary of the overall site conditions considered in the DRAINS model.

- Total Combined Site Area: 3,105 m²
- Pre-Development Impervious Area: 2,324 m² (75% Impervious)
- Post-Development Impervious Area: 2,481 m² (80% Impervious)

Therefore, the proposed development increases impervious area by approximately 167 m² which represents approximately 6 % of the total site area.

4.3 PRE- AND POST-DEVELOPMENT CONDITIONS

The calculated pre- and post-developed flows are summarised in Table 2 and Appendix A3 outlines the calculations, methodology and input parameters used to undertake the pre-development hydrologic modelling for the pre- and post-developed site.

Table 2 –Site Peak Discharge Flow Rates Pre- vs Post-Development Conditions

Storm Event (AEP)	Peak Discharge (m ³ /s)		
	Pre-Development	Post-Development	Difference
63%	0.066	0.070	+0.004
39%	0.083	0.088	+0.005
10%	0.136	0.135	-0.001
5%	0.155	0.159	+0.004
2%	0.185	0.188	+0.003
1%	0.213	0.215	+0.002

Although there is negligible difference between pre- and post-development flows, OSD is required according to the DCP requirements.

4.4 STORMWATER MITIGATION

The total OSD volume required to offset the raingarden requirement by the DCP for the development according to Section E2.2.4 is calculated to be 77.6 m³ (25 m³/1,000 m²) as indicated in Table 3.

Table 3 – Development Onsite Detention (OSD) DCP Requirements

OSD Requirements Per 1,000 m ² of the Total Site Area		
Permissible Site Discharge (l/s)	Minimum Site Storage Requirements (m ³)	Storm Event
74.5	12.4	39% AEP (1 in 2 Year ARI)
105.6	77.6	1% AEP (1 in 100 ARI)

Further hydrologic and hydraulic modelling has been carried out to ensure these DCP requirements are achieved for all required storm events. Calculations indicate that the Council required PSD is achieved for the proposed development.

Refer Figure 3, Figure 4 and Table 4 for the DRAINS summary of the hydrologic and hydraulic calculations, and to Appendix A2 for more details.

Table 4 – Site Peak Discharge Flow Rates Pre- vs Post-Development *Conditions*

Storm Event (AEP)	Peak Discharge (m ³ /s)		
	Pre-Development	Post-Development	Post-Mitigated (OSD)
63%	0.066	0.070	0.051
39%	0.083	0.088	0.059
10%	0.136	0.135	0.077
5%	0.155	0.159	0.085
2%	0.185	0.188	0.095
1%	0.213	0.215	0.105

The above table utilises the flows derived from the ILSAX calculations from the DRAINS model. The results demonstrate that the inclusion of a 77.6 m³ (38.80 m² × 2.00 m average ponding depth) below blockwork cast in-situ OSD tank achieves the DCP requirements. The OSD tank is proposed to be located below a planter towards the corner of Conway Avenue and Carlisle Street. DRAINS modelling has been carried out in accordance with Annexure A draft condition D.34(d) on the following basis: a time of concentration of 5 minutes is adopted for both pervious and impervious areas; no high early discharge chamber is adopted; the OSD orifice centreline is set above the downstream Hydraulic Grade Line at the connecting kerb inlet, with the top-of-kerb adopted as the tailwater condition and the orifice invert to be confirmed above the 1% AEP HGL at the Construction Certificate stage; and the design excludes any reliance on submerged-outlet hydraulics or non-return valves.. Additional OSD storage to absorb the runoff from bypass (pervious and impervious) areas will be incorporated at Construction Certificate stage via a re-run of the DRAINS model. A bypass-catchment plan quantifying the areas draining to and bypassing the OSD system, together with the DRAINS results summary, will be included on the detailed Construction Certificate stormwater drawings.

The OSD tank was modelled having the following:

- Outlet Pipe: 300 mm diameter pipe
- Orifice Size: 195mm diameter orifice
- Orifice Centreline: Base of tank (allow for sump)
- Overflow Pipe: 150mm diameter with invert located 2.0 m above tank base + emergency weir.

The minimum OSD storage volume of 77.6 m³ adopted in this report is fixed by the rate-based requirement under Annexure A draft condition D.34(d) (25 m³ per 1,000 m² of site area). Final OSD storage volume will be confirmed at the Construction Certificate stage to incorporate any additional storage required to offset bypass catchments per D.34(d). Refer to Appendix A4 for the consolidated Response to Submissions on Council Section 27 Stormwater and Annexure A draft conditions D.34, D.35 and D.32.

Internal stormwater drainage (gutters, downpipes, pipes and pits) within the development is designed for the 1% AEP event in any location where an unimpeded overland flow path to the street drainage system is not available, in accordance with Annexure A draft condition D.34(j). Interceptor drains will be provided at the site boundary to prevent stormwater flows from the site crossing the public footpath, in accordance with D.34(k).

Downstream conveyance capacity has been considered in response to FPD Planning consolidated comment Section 6.8 (public submissions). The DRAINS model confirms that combined post-development flows - surface runoff after OSD attenuation, basement pump-out (max 10 L/s) and incidental seepage - discharge to the Council drainage system below the PSD limit of 105.5 L/s for the 1% AEP event without significant surcharging the receiving infrastructure. Final confirmation of downstream capacity will be carried out at Construction Certificate stage in conjunction with the bypass-catchment DRAINS update referenced above.

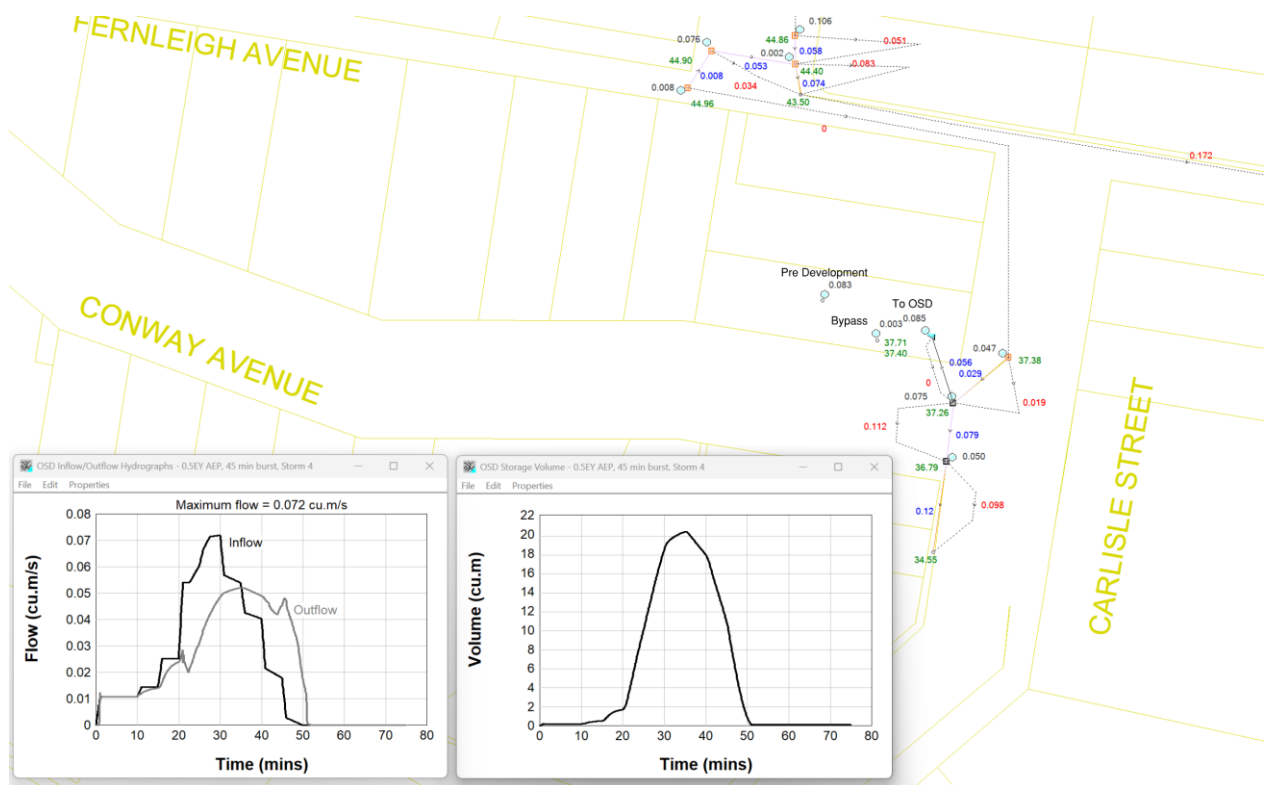


Figure 3 – 39% AEP Event OSD Summary of the Development DRAINS Model

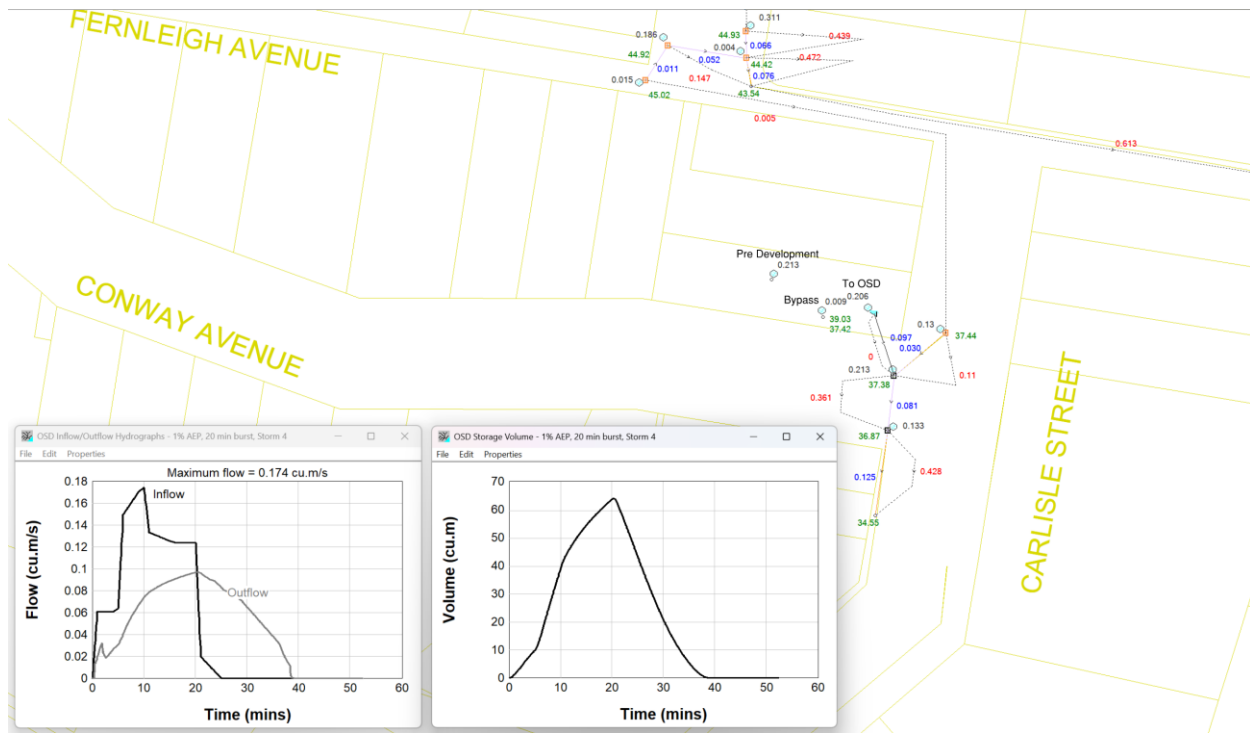


Figure 4 – 1% AEP Event OSD Summary of the Development DRAINS Model

4.5 CLIMATE CHANGE CONSIDERATIONS

The minimum OSD storage volume of 77.6 m³ adopted in this report is set by the rate-based requirement of Annexure A draft condition D.34(d) (25 m³ per 1,000 m² of site area), not by the DRAINS-derived storage volume. The rate-based volume is independent of design rainfall intensity and therefore inherently absorbs near-term climate change uplift. The Construction Certificate stage DRAINS update for bypass catchments (refer Section 4.4) will be re-run with a climate change rainfall intensity factor of 1.77 (SSP5-8.5, 2090 horizon, per AR&R Book 1 Chapter 6 / NSW Government Common Planning Assumptions). Where the climate-uplifted DRAINS run identifies storage demand greater than 77.6 m³, the OSD volume will be increased accordingly; where it does not, the rate-based 77.6 m³ remains controlling. PSD remains capped at 105.5 L/s for the 1% AEP event in all scenarios.

5.0 STORMWATER QUALITY

This Section of this report will quantify the stormwater quality parameters. The potential impact to quality runoff has been assessed to determine Water Sensitive Urban Design (WSUD) requirements for the development.

5.1 STORMWATER QUALITY OBJECTIVES

The controls outlined in Section s E2.2.2 and E2.2.3 – Water Sensitive Urban Design and Stormwater Treatment of Woollahra DCP 2015 are designed to ultimately meet the water quality environmental targets. Best management practices are also recommended to be implemented for the development site. Where practicable, methods such as first flush devices, and discharging stormwater to landscaped or grassed areas prior to discharge are to be incorporated where opportunity is available.

The following load reduction targets are required to be achieved when assessing the post-development treatment train (comparison of unmitigated developed case versus developed mitigated case).

- 85% reduction in Total Suspended Sediment (TSS)
- 65% reduction in Total Phosphorus (TP)
- 45% reduction in Total Nitrogen (TN)
- 90% reduction in Gross Pollutants (GP) > 5 mm

5.2 POLLUTANT CONCERNS

The pollutants of concern are summarised below. These pollutants can have adverse environmental impacts within the downstream catchment. It is proposed to adopt Site-Based Water Sensitive Urban Design to provide capture and treatment to the below mentioned pollutants. Refer to Table 5 for Typical Pollutant examples.

Table 5 – Potential Pollutant Sources

POLLUTANT	SOURCE
Litter	Paper, Construction Packaging, Food Waste, Cement, Off - Cuts
Sediment	Unprotected Exposed Soils, Stockpiles, Erosion
Hydrocarbons	Fuel and Oil Spills, Leaks from Machinery
Toxic Materials	Cement Slurry, Asphalt Primer, Solvents, Cleaning Agents
PH Altering Substances	Acid Sulphate Soils, Cement Slurry, Wash Water
Thermal Pollution	Vehicles and Machinery, Increased Impervious Areas

5.3 CONSTRUCTION PHASE

Refer Section 7.0 of this report.

5.4 STORMWATER QUALITY MODELLING

Stormwater pollutant modelling for the development has been generated using

- MUSIC Version 6.3.0 - 'Model for Urban Stormwater Improvement Conceptualisation'
- Rainfall Station 66062 Sydney Observatory Hill with a 6 Minute Time Step 1962 To 1966
- CMA source nodes utilizing modified % impervious area, rainfall threshold, soil properties & pollutant concentration
- No drainage routing between nodes.

5.4.1 CATCHMENT AREAS

The catchment areas used for the water quality assessment are limited to the development area. The subject site has been separated into pollutant source nodes for MUSIC modelling using the "split catchment" approach as indicated in Table 6.

Table 6 – MUSIC Model Catchment Parameters

Catchment ID	Total Area (m ²)	Fraction Impervious
Roof Area to RWT	664	100%
Impervious Area to OSD	1,671	100%
Pervious Area to OSD	616	0%
Bypass area	154	75%

5.4.2 MUSIC MODEL TREATMENT TRAIN

As the management of urban stormwater is a holistic approach with specific management measures needing to be implemented in series to form a treatment train. The correct utilisation of various devices within the treatment train is imperative to target the desired pollutants, from gross solids to the fine colloidal particles. Figure 5 shows the MUSIC model layout for the development.

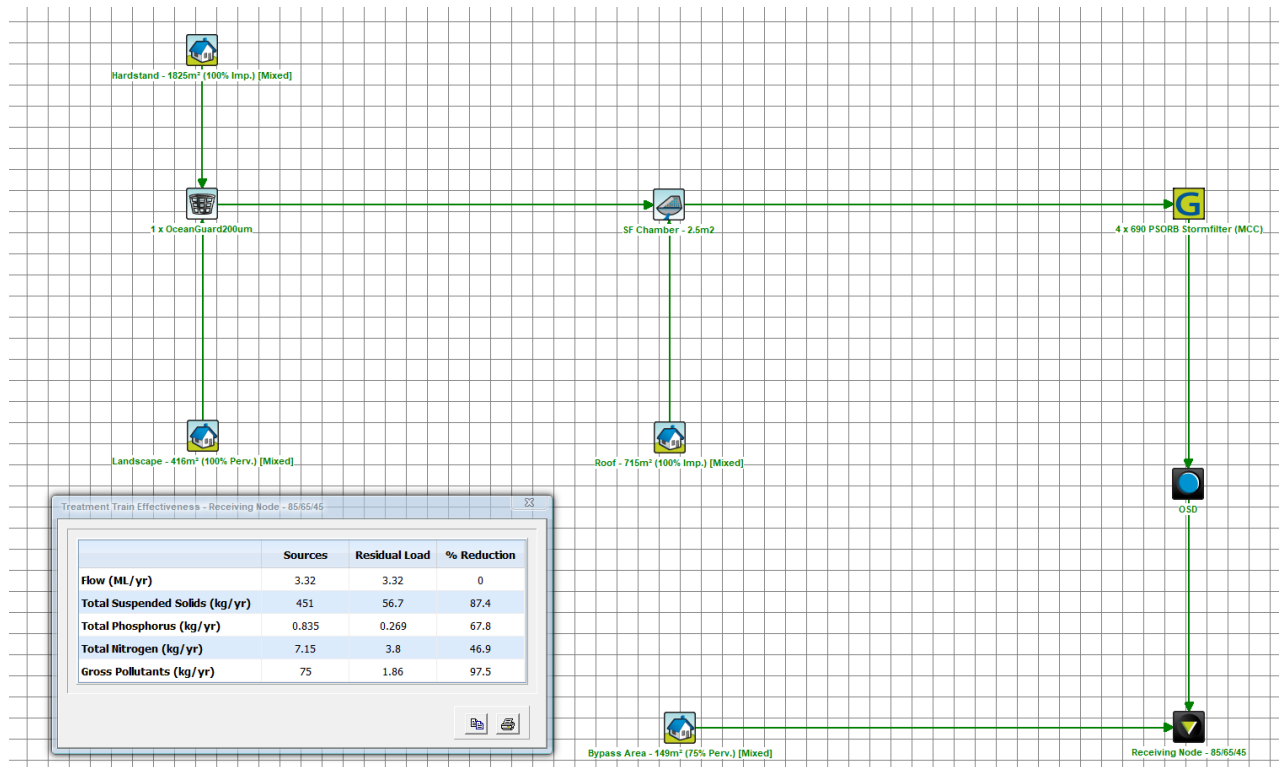


Figure 5 – MUSIC Model Treatment Train

5.5 PROPOSED TREATMENT MEASURES

The proposed stormwater treatment train will consist of the following Stormwater Quality Improvement Devices (SQID's):

- A Rainwater Harvesting Tank (RWT) to BASIX requirements:
 - The majority, if not all, roof water from the proposed building is to be directed to the rainwater harvesting system which overflows to the onsite water quality treatment tank located within the OSD tank underground. Roof water drainage directed to the tank is to be designed by the hydraulic engineer and BASIX requirements.
- A stormwater quality treatment tank with two (2) treatment chambers located within the OSD tank:
 - All hardstand and landscape areas from the proposed building will be collected by field inlets, grates and drains as designed by the hydraulic engineer and directed to the stormwater quality treatment tank located underground.
 - All surface runoff within the development area on the ground floor levels, hardstand and soft stand areas that gravitate directly to the stormwater quality treatment tank will be captured by the strategically placed first chamber 1 x Ocean Guard basket (By Ocean Protect) to remove large particles prior to further treatment.
 - The basement pump-out system is also proposed to be directed to the first chamber.
 - The second chamber is fitted with 4 × Storm Filter 690 PSORB cartridges with a minimum

treatment bay (SF Chamber) area of 2.5 m², supplied by Ocean Protect, in accordance with Annexure A draft condition D.34(h).

- Surface runoff within the development area that cannot gravitate directly to the stormwater quality treatment tank will be directed to the boundary pit that is proposed to be fitted with a debris screen prior to discharging into Council's belowground stormwater network.
- As this development is a residential development, regular maintenance will be undertaken to the landscape areas to remove gross pollutants from the site.

Refer to Figure 6, Figure 7 and Appendix A2 for more details.

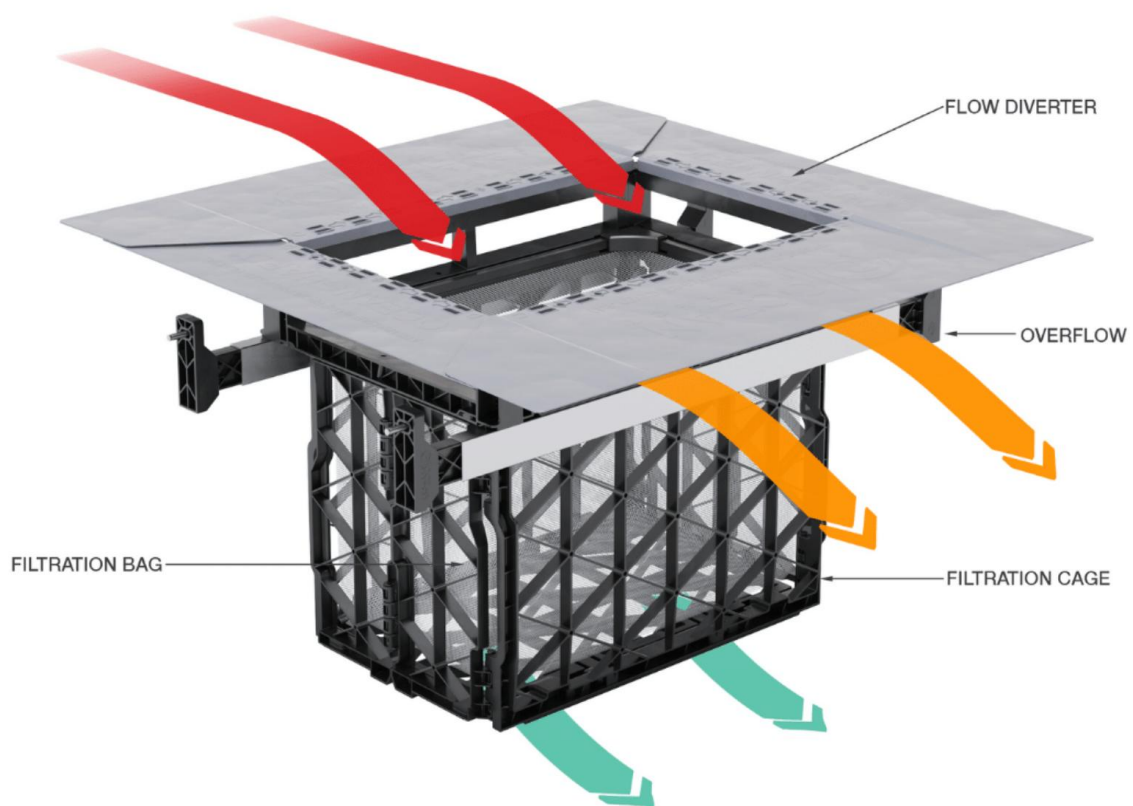


Figure 6 – Ocean Protect Ocean Guard Basket Detail

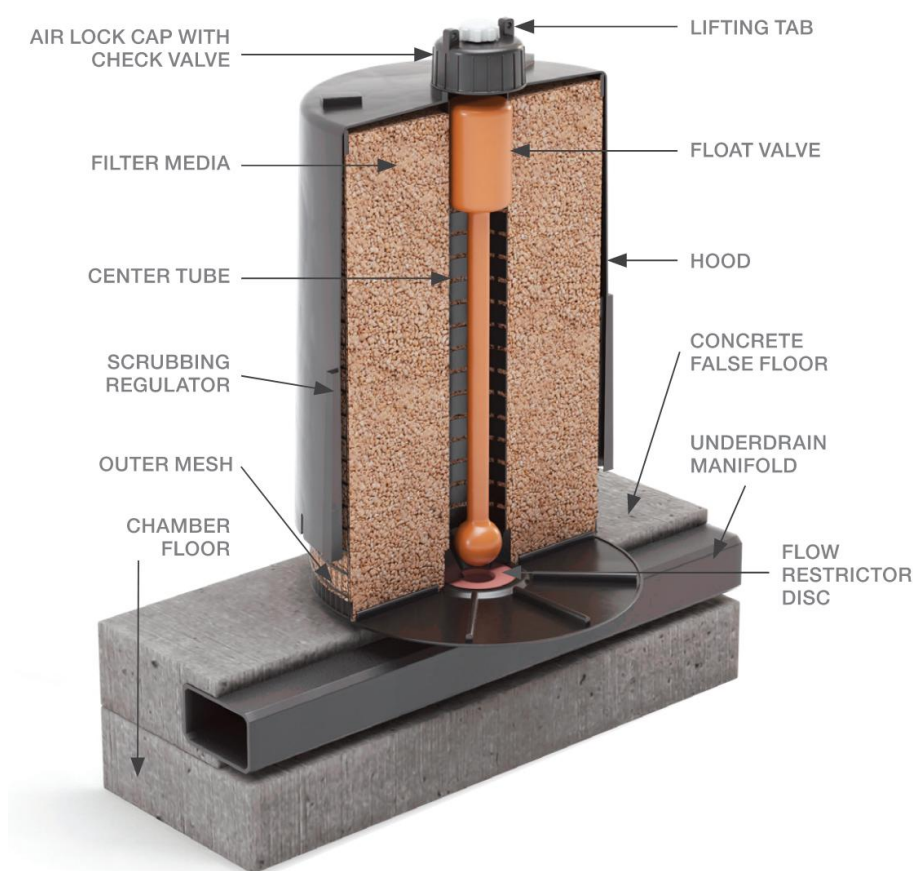


Figure 1 – Ocean Protect Storm Filter Cartridge Detail

5.7 TREATMENT TRAIN EFFECTIVENESS

The results of the MUSIC modelling compared to the stated water quality target removal requirements are presented in Table 7.

Table 7 – Table of MUSIC Model Parameters

Potential Pollutant	Target	MUSIC Results
Total Suspended Solids (kg/yr)	85%	88%
Total Phosphorus (kg/yr)	65%	69%
Total Nitrogen (kg/yr)	45%	48%
Gross Pollutants (kg/yr)	90%	97%

Therefore, the results indicate that the proposed treatment system is efficient in achieving DCP water quality objectives and exceeds the minimum required pollutant reduction targets.

Refer to Appendix A2 for more details.

6.0 EROSION AND SEDIMENT CONTROL

Prior to and during the construction phase of the project, an erosion and sediment control plan will be implemented to prevent sediment laden stormwater from entering the Council drainage network. A conceptual Erosion and Sediment Control Plan (ESCP) is recommended to be provided in accordance with the “Blue Book” - Managing Urban Stormwater: Soils and Construction (Landcom NSW).

Further details regarding the proposed erosion and sediment control measures will be provided during the Construction Certificate stage of the development.

6.1 PRE-DEVELOPMENT PHASE

Prior to construction commencing, the following erosion and sediment control measures will need to be installed around the subject site to minimise disturbance and ensure the quality of runoff discharging from the site is of an acceptable standard:

- Sediment barriers to be installed on all entrances to downstream stormwater infrastructure (i.e., gully pits)
- Designation of transport routes through the site to minimise vegetation disturbance
- Maximise retention of existing vegetation to reduce soil disturbance and provide filter strip treatment for runoff
- Install construction entry and exit shakedown areas
- Sediment fences are to be installed on the downstream boundaries of the subject site
- Install dust control measures as required.

6.2 CONSTRUCTION PHASE

The ESCP is to outline the erosion and sediment control processes for the duration of the project. Emphasis should be placed firstly on minimising erosion then on preventing movement of sediment. The clearing of the site leaves the land surface susceptible to increased erosion. The eroded particles can be transported off site and into natural waterways causing siltation, loss of hydraulic capacity and environmental stress. The ESCP aims to minimise the extent of erosion of the site, restrict movement of soil particles and mitigate the impacts of the works on the natural environment.

Key ESCP measures include:

- Early installation and progressive implementation of erosion controls.
- Protection of disturbed ground using temporary vegetation, sediment fencing, diversion banks and geotextiles.
- Early construction of permanent drainage and sediment control structures, including basins, culverts, traps and catch drains.

- Progressive revegetation of disturbed areas and stabilisation of culvert construction surfaces using geotextile.
- Control of runoff from embankments through temporary shaping, batter drains and windrows.
- Erosion and sediment controls to associated areas such as access tracks, compound areas and internal construction roads.
- Diversion of runoff from disturbed areas into sediment capture structures and installation of temporary sediment traps at strategic locations.
- Management of turbid water following storm events through flocculation or extraction for dust suppression or construction use.
- Routine maintenance of sediment controls to ensure functionality at all times and secure storage of removed sediment where remobilisation cannot occur.
- Minimisation of tracking of mud or soil onto Conway Avenue and Carlisle Street through shakers and wash-bays.
- Regular inspections by qualified personnel, at least weekly and following significant rainfall, with adjustments made as required.
- Dust control through watering and progressive revegetation.
- Procedures ensuring no basin discharge occurs until acceptable water quality is achieved.
- Compliance with EPA requirements and the “Managing Urban Stormwater: Soils and Construction” (Blue Book) guidelines.

6.3 CONSTRUCTION MAINTENANCE

All erosion and sediment control devices are to be maintained through the entire phase of the development leading up to the operational phase. Erosion and sediment control devices will need to be monitored closely throughout the entire project to ensure they are operating correctly and efficiently. No erosion and sediment control devices are to be removed unless otherwise authorised by a suitably qualified engineer or the site superintendent.

7.0 MAINTENANCE STRATEGY

The maintenance strategy relating to the internal drainage system involves inspecting and maintaining the following structures:

- On-site Stormwater Detention systems including the orifice plates and the mesh screens
- Storm Filters and Chamber
- Ocean Guard Basket and Chamber
- Rainwater tank.

The body corporate managing the development, or their contractors, have the obligation to inspect and maintain these structures.

7.1 TANK MAINTENANCE SUMMARY

The following summary indicates the minimum requirements for the inspection of the OSD and Rainwater Harvesting tank components, including the maintenance procedures to be adopted.

Onsite Detention (OSD) Tank:

- Inspection Frequency: Every 6 months
- Inspection Items: Check for mesh screen blockage and sediment accumulation
- Maintenance:
 - Remove leaves and debris from screen
 - Clean accumulated sediment

Rainwater Harvesting Tank:

- Inspection Frequency: Every 6 months to 1 year
- Inspection Items: Check for internal blockage and debris accumulation
- Maintenance:
 - Remove debris from first flush device and tank

7.2 WATER QUALITY MAINTENANCE SUMMARY

The following summary indicates the minimum requirements for the inspection of the Water Quality components, including the maintenance procedures to be adopted.

Ocean Protect Ocean Guard Basket and Chamber:

- Inspection Frequency: Every 6 months
- Inspection Items: Visual condition and operational performance
- Maintenance:
 - Undertaken by qualified maintenance contractor
 - Follow Ocean Protect “Operation and Maintenance Guidelines” (O&M)

Ocean Protect Storm Filters and Chamber:

- **Minor Maintenance:** Every 2 years and after major storm events
 - Inspection Frequency: Every 6 months
 - Undertaken by qualified maintenance contractor
 - Follow Ocean Protect O&M Guidelines
- **Major Maintenance:** Annually (more frequently only if spills occur)
 - Undertaken by qualified maintenance contractor
 - Follow Ocean Protect O&M procedures

8.0 RECOMMENDATIONS AND CONCLUSION

This IWMP supports the State Significant Development Application (SSD-101842729) for the development at 2A & 2-6 Conway Avenue, 38-40 Carlisle Street, and 15A-15 Fernleigh Avenue, Rose Bay. This report has described the design process and specification of the following key design elements which manage the potential impact of stormwater runoff to downstream properties and receiving waters.

The following stormwater management elements are to be incorporated into the development:

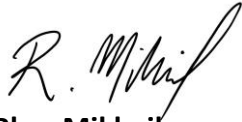
- All runoff from the site will be conveyed by direct connection to the existing kerb inlet pit at the corner of Conway Avenue and Carlisle Street, via a new minimum 900 × 900 boundary junction pit within the site frontage. The existing 225 mm Council pipe will be upgraded to a new Class 4, 375 mm steel reinforced concrete pipe (RCP) across Conway Avenue, with a new 600 × 600 reinforced concrete junction pit at the kerb inlet, in accordance with Annexure A draft condition D.34(b)–(c). Separate Section 138 Roads Act 1993 approval will be obtained prior to Construction Certificate.
- Incorporation of an onsite detention system with a minimum storage volume of 77.6 m³ (rate-based per D.34(d), with additional volume to be added at Construction Certificate stage to absorb bypass catchments) is required to mitigate potential increases in site runoff. The system is configured with:
 - A 300 mm diameter outlet fitted with a 195 mm diameter orifice plate.
 - A 150 mm diameter overflow pipe with invert located 2.0 m above tank base, plus emergency weir.
- Surface runoff within the development area will gravitate to the stormwater quality treatment tank consisting of 2 x treatment chambers.
 - The first chamber consisting of 1 x Ocean Guard basket (By Ocean Protect) to remove large particles prior to further treatment. The basement pump-out system is also proposed to be directed to the first chamber.
 - The second chamber consisting of 4 x Storm Filter 690Psorb cartridges with minimum treatment bay area of 2.5 m² (By Ocean Protect).

- Surface runoff that cannot gravitate to the stormwater quality treatment tank will be directed to the boundary pit fitted with a debris screen.

A basement pump-out system with a minimum storage capacity of 9 m³ and a maximum pump rate of 10 L/s, in accordance with AS3500.3 and Annexure A draft condition D.34(g), with discharge directed to the OSD system.

It is the conclusion of this IWMP that the correct installation of these key design elements will ensure that the management of stormwater quantity and quality complies with necessary state and local government policies and is recommended for approval. Please contact the author should additional clarification be required.

RTS CIVIL CONSULTING ENGINEERS PTY LTD

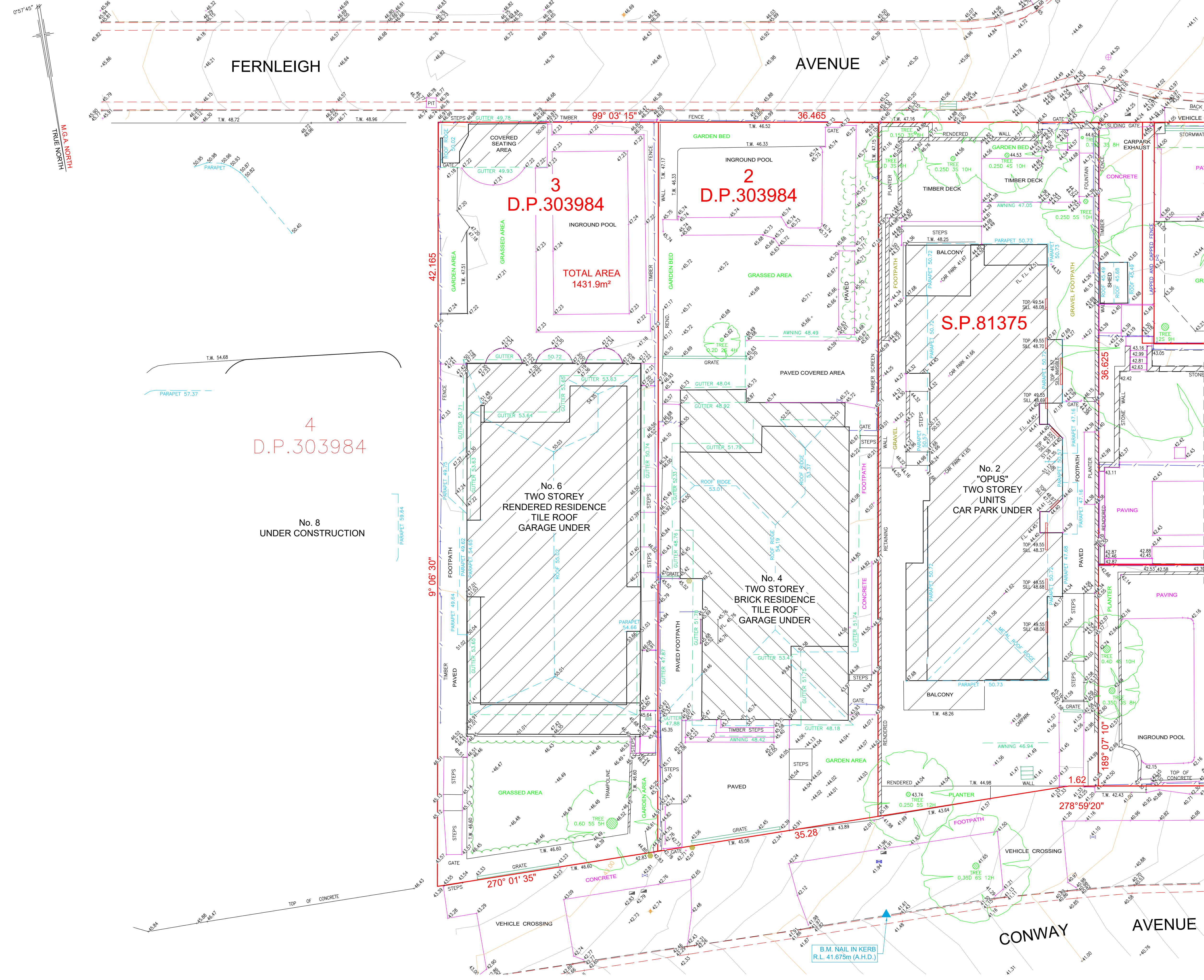


Rhys Mikhail

Director | Principal Engineer | Design Practitioner
BE (Civil) Hons MIEAust CPEng NER RPEQ APEC IntPE(Aus)

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APPENDIX A1 – SITE SURVEY & ARCHITECTURAL PLANS



IF ACCURATE LOCATION OF SERVICES IS REQUIRED SERVICE TRACE IS RECOMMENDED.

ADDITIONAL INFORMATION SHOWN ON PLAN AND ELEVATIONS OF ADJOINING PROPERTIES HAS BEEN OBTAINED BY REMOTE SURVEY METHODS FROM WITHIN SUBJECT LAND AND STREET.

RESTRICTED VISIBILITY ALONG THE EASTERN AND WESTERN BOUNDARIES OF THE SUBJECT LAND HAS PREVENTED DIRECT MEASUREMENTS TO THE ADJOINING BUILDINGS.

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BEARINGS SHOWN RELATE TO M.G.A. NORTH.

VISIBLE SURFACE PITS ONLY SHOWN.

THE EXISTENCE AND POSITION OF UNDERGROUND SERVICES HAS NOT BEEN INVESTIGATED.

BOUNDARIES HAVE BEEN SURVEYED IN
ACCORDANCE WITH THE SURVEYING &
SPATIAL INFORMATION REGULATION 2024.

Michael Brown

M.A. BROWN, B.Surv. M.I.S.
Registered Land Surveyor
Surveyor ID: SU008739

LEGEND					
	ELECTRICITY PIT		WATER METER		BENCHMARK
	ELEC POLE WITH LIGHT		WATER TAP		GROUND CONTROL POINT
	ELECTRICITY POLE		STOP VALVE		PERMANENT MARK
	LIGHT POLE		HYDRANT		STATE SURVEY MARK
	TRAFFIC SIGNAL		STORM WATER GRATE		REFERENCE MARK
	ELECTRICITY PILLAR		STORM WATER GRATE		BIN
	MULTI FUNCTION POLE		STORM WATER MANHOLE		CAMERA
	GAS METER		STORM WATER PIPE		HILLS HOIST
	GAS VALVE		DOWNPIPE		MAILBOX
	POLE (UNSPECIFIED)		SEWER INSPECTION POINT		SIGN
	PIT (UNSPECIFIED)		MANHOLE SEWER		PARKING METER
	MANHOLE (UNSPECIFIED)		MANHOLE SEWER		FIRE HYDRANT
	TELECOM PIT		BOLLARD		GATE
	TELECOM PILLAR				STORM WATER
	RTA PIT				TOP OF BANK
	T.W. OF WALL				BOTTOM OF BANK
	B.W. OF WALL				OVERHEAD POWER LINE

C	17/10/2025	DETAIL 38-40 CARLISLE ST, 15 FERNLEIGH AVENUE INCL (80907)
B	26/08/2025	TRUE NORTH INCLUDED ON PLAN
A	05/08/2025	ISSUED FOR INFORMATION
REV.	DATE	AMENDMENTS

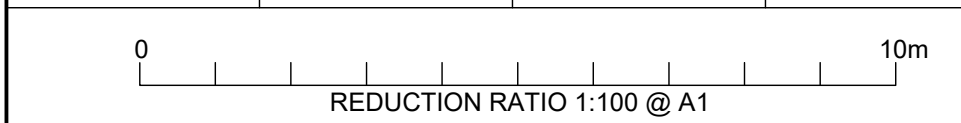
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SURVEYORS

SURVEYING SINCE 1893

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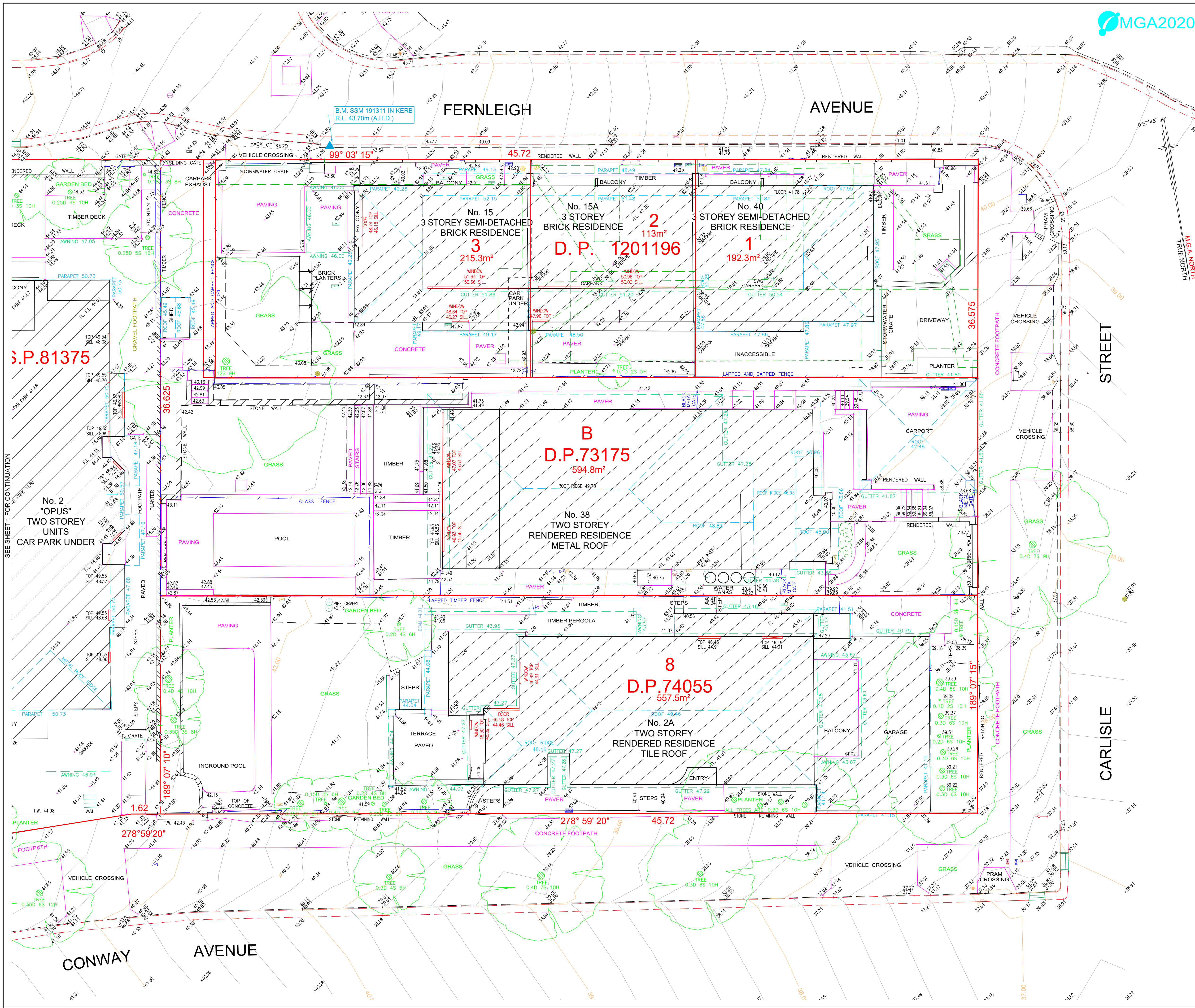
MATHIESON PROPERTY

LOCALITY	ROSE BAY
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	ROSE BAY
L.G.A.	WOOLLAHRA

PLAN
SHOWING DETAIL & LEVELS
2-6 CONWAY AVENUE
S.P. 81375, LOT 2-3 D.P.303984

REFERENCE No.	PLAN No.	DATE	SHEET NO 1
80854	80854-C.DWG	05/08/2025	OF 3 SHEETS



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POSITIVE COVENANT ON LOTS 1, 2 AND 3 IN D.P.1201196

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Michael Brown
M.A. BROWN, B.Surv. M.I.S.
Registered Land Surveyor
Surveyor ID: SU008739

LEGEND	
	ELECTRICITY PIT
	ELEC POLE WITH LIGHT
	ELECTRICITY POLE
	LIGHT POLE
	TRAFFIC SIGNAL
	ELECTRICITY PILLAR
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	GAS METER
	GAS VALVE
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	BOLLARD
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	CAMERA
	HILLS HOIST
	MAILBOX
	SIGN
	FIRE HYDRANT
	PARKING METER
	GATE
	STORMWATER
	TOP OF BANK
	BOTTOM OF BANK
	OVERHEAD POWER LINES

REV.	DATE	AMENDMENTS
C	17/10/2025	DETAIL 38-40 CARLISLE ST, 15 FERNLEIGH AVENUE INCL (80907)
B	26/08/2025	TRUE NORTH INCLUDED ON PLAN
A	05/08/2025	ISSUED FOR INFORMATION

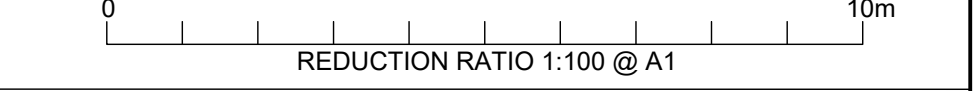
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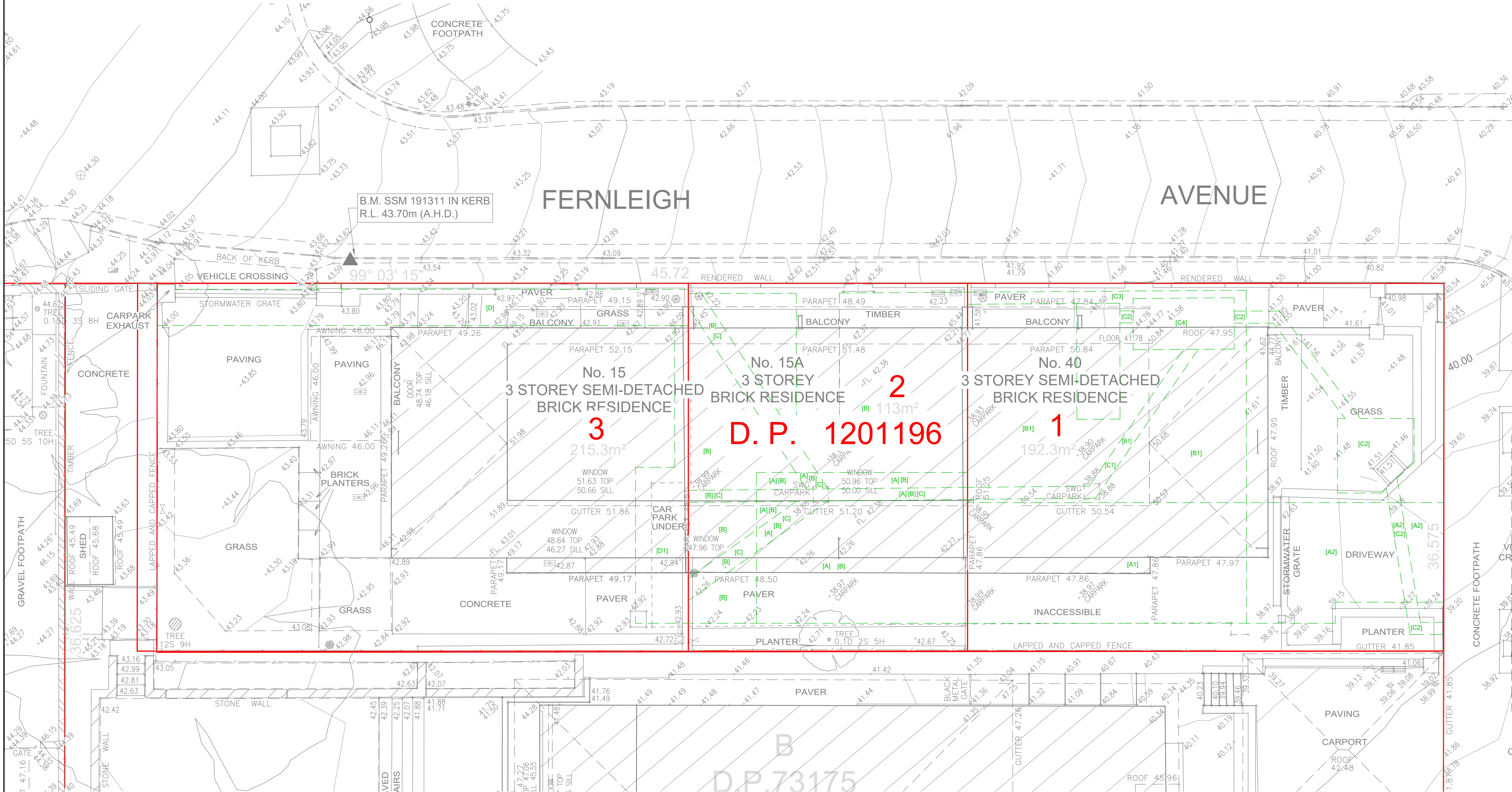
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CLIENT	MATHIESON PROPERTY
LOCALITY	ROSE BAY
L.G.A.	WOOLLAHRA

PLAN
SHOWING DETAIL & LEVELS
2A CONWAY AVENUE,
38 & 40 CARLISLE STREET,
15 & 15A FERNLEIGH AVENUE
LOT 8 D.P.74055, LOT B D.P.73175 & LOT1-3 D.P.1201196

REFERENCE No.	PLAN No.	DATE	SHEET No 2
80854	80854-C.DWG	05/08/2025	OF 3 SHEETS



- [A] RIGHT OF CARRIAGEWAY 5 WIDE LIMITED IN DEPTH TO R.L. 38.9 AND HEIGHT TO R.L. 41.5
- [A1] RIGHT OF CARRIAGEWAY 4 WIDE LIMITED IN DEPTH TO R.L. 38.9 AND HEIGHT TO R.L. 41.1
- [A2] RIGHT OF CARRIAGEWAY 3.3 WIDE AND 4 WIDE
- [B] EASEMENT FOR DRAINAGE & SERVICES VARIABLE WIDTH LIMITED IN DEPTH TO R.L. 41.6 AND HEIGHT TO R.L. 42
- [B1] EASEMENT FOR DRAINAGE & SERVICES VARIABLE WIDTH LIMITED IN DEPTH TO R.L. 41.1 AND HEIGHT TO R.L. 41.4
- [C] EASEMENT FOR DRAINAGE 0.4 & 0.6 WIDE LIMITED IN DEPTH TO R.L. 38.3 AND HEIGHT TO R.L. 38.9
- [C1] EASEMENT FOR DRAINAGE 0.4 WIDE LIMITED IN DEPTH TO R.L. 38.3 AND HEIGHT TO R.L. 38.9
- [C2] EASEMENT FOR DRAINAGE 0.4 WIDE AND VARIABLE WIDTH
- [C3] EASEMENT FOR DRAINAGE 0.4 WIDE & VARIABLE WIDTH LIMITED IN DEPTH TO R.L. 38.9 AND HEIGHT TO R.L. 41.1
- [C4] EASEMENT FOR DRAINAGE AND PUMP OUT PIT 1.7 WIDE LIMITED IN DEPTH TO R.L. 37.25 AND HEIGHT TO R.L. 38.9
- [D] EASEMENT FOR CAR PARK EXHAUST 1.2 WIDE AND VARIABLE WIDTH
- [D1] EASEMENT FOR CAR PARK EXHAUST, AIRCONDITION UNIT, METER BOX AND SERVICES 0.45 WIDE & 1.7 WIDE LIMITED IN DEPTH TO R.L. 38.9 AND HEIGHT TO R.L. 42

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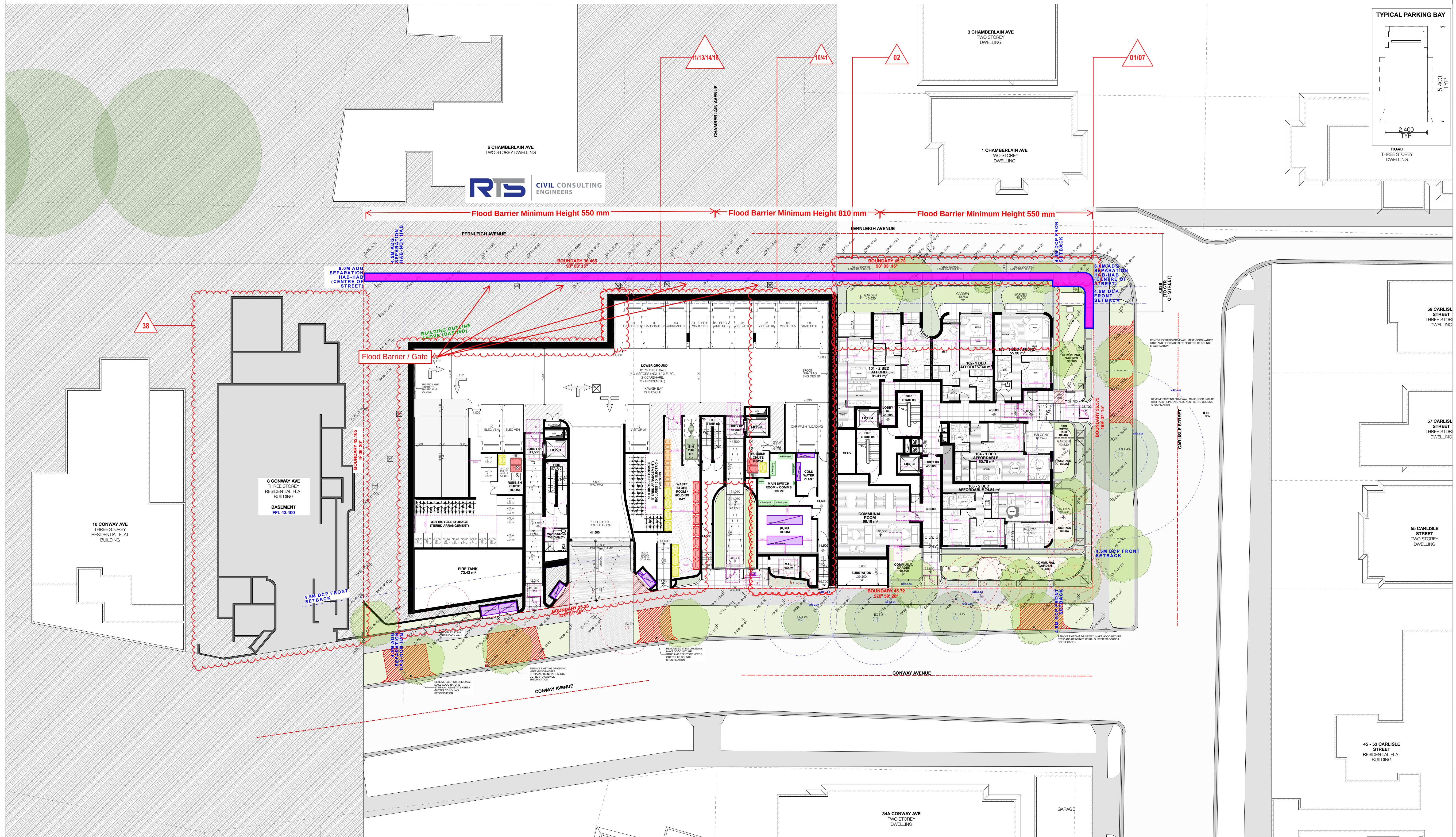
Michael Brown

M.A. BROWN, B.Surv. M.I.S.
Registered Land Surveyor
Surveyor ID: SU008739

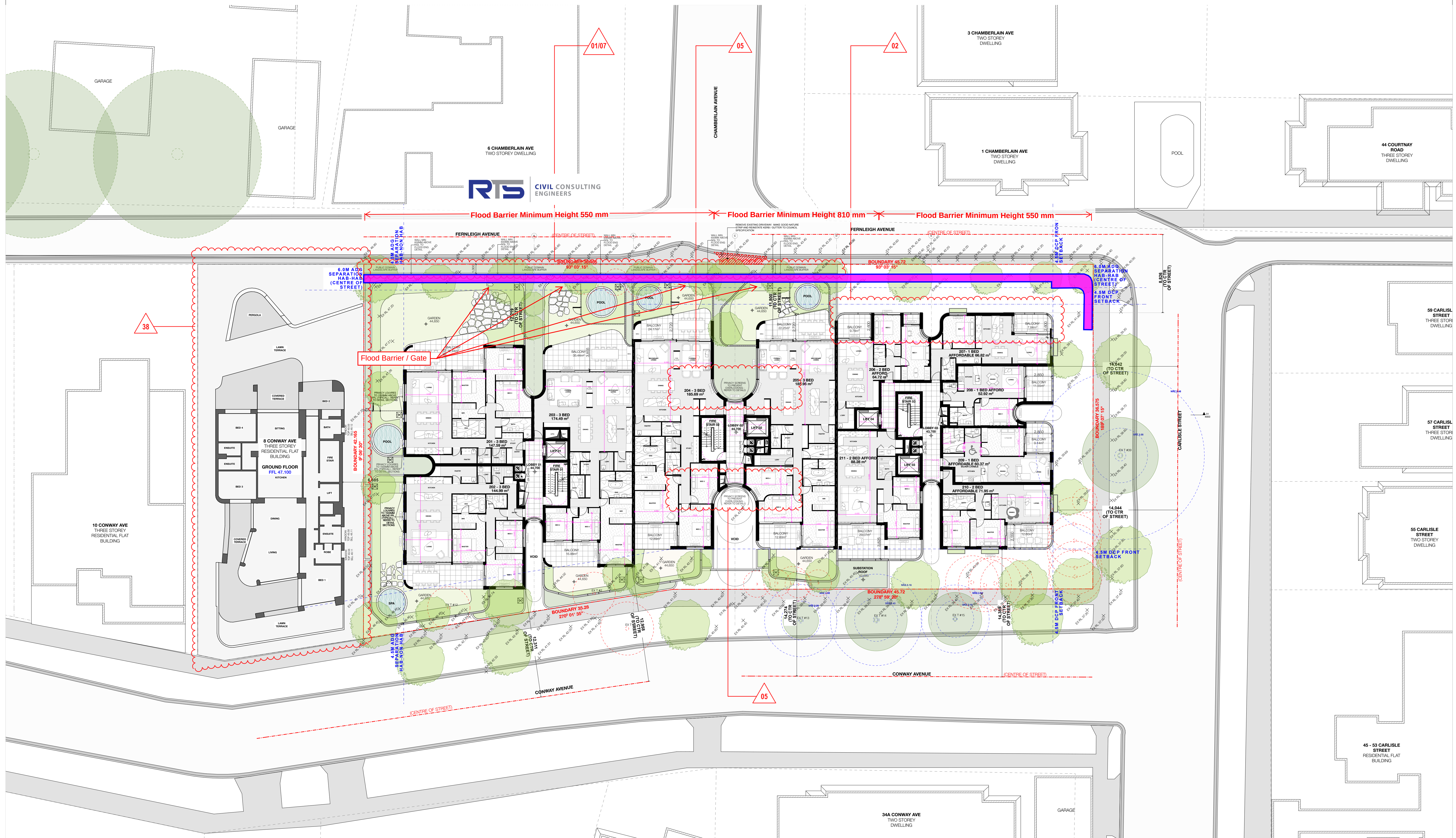
- LEGEND
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 - ELECTRICITY POLE
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 - TRAFFIC SIGNAL
 - ELECTRICITY PILLAR
 - MULTI FUNCTION POLE
 - GAS METER
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 - POLE (UNSPECIFIED)
 - PIT (UNSPECIFIED)
 - MANHOLE (UNSPECIFIED)
 - TELECOM PIT
 - TELECOM PILLAR
 - RTA PIT
 - T.W. TOP OF WALL
 - B.W. BOTTOM OF WALL
 - WATER METER
 - WATER TAP
 - STOP VALVE
 - HYDRANT
 - STORM WATER GRATE
 - STORM WATER GRATE
 - STORM WATER MANHOLE
 - STORM WATER PIT
 - DOWNPIPE
 - SEWER INSPECTION POINT
 - MANHOLE SEWER
 - MANHOLE SEWER
 - BOLLARD
 - BENCHMARK
 - GROUND CONTROL POINT
 - PERMANENT MARK
 - STATE SURVEY MARK
 - REFERENCE MARK
 - BIN
 - CAMERA
 - HILLS HOIST
 - MAILBOX
 - SIGN
 - PARKING METER
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B	26/08/2025	TRUE NORTH INCLUDED ON PLAN		
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REV.	DATE	AMENDMENTS		
		RYGATE SURVEYORS Rygate & Company Pty Limited P.W. Rygate & West ABN 61 001 204 897 surveyors@rygate.com.au rygate.com.au SURVEYING SINCE 1983 Suite 903 Level 9, 171 Clarence St. Sydney NSW 2000 P +61 2 9262 6800 F +61 2 9262 6843 W surveyors@rygate.com.au rygate.com.au SUBDIVISION STRATA PLANS STRATUM SUBDIVISION LEASE PLANS TOPOGRAPHIC SURVEYS GPS SURVEYS 3D MODELLING RACECOURSE DESIGN PROJECT MANAGEMENT SUN SHADOW DIAGRAMS		
SURVEYOR		DRAWN	CHECKED	APPROVED
A.C. / L.M.		T.O.	A.C.	S.H.B.
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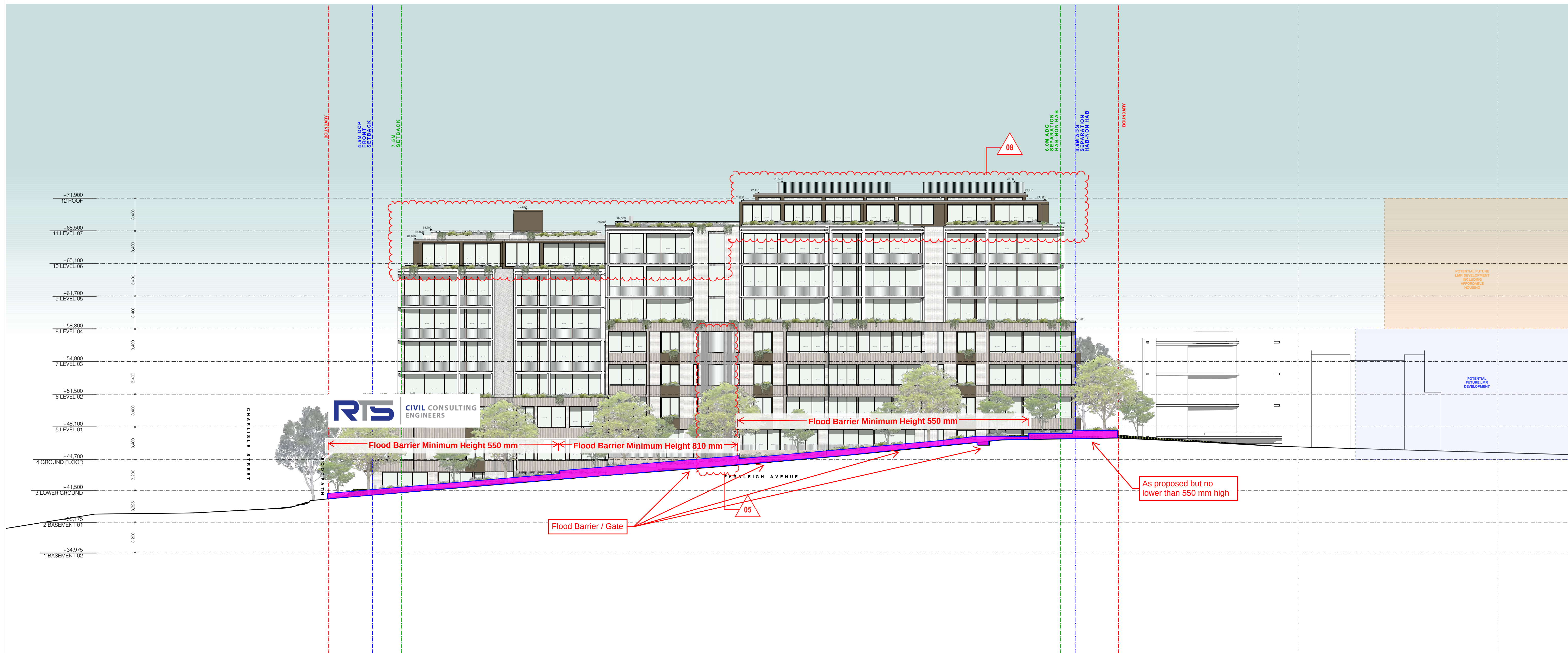
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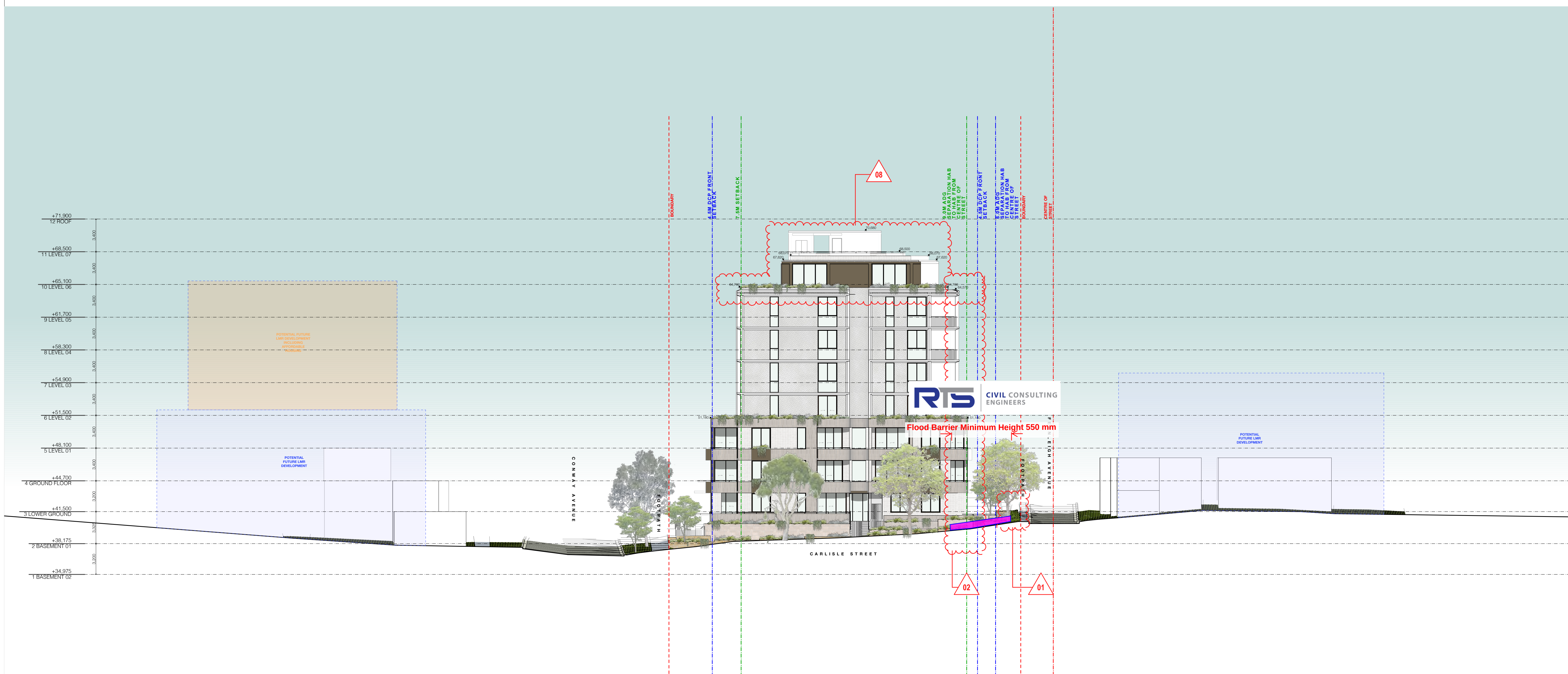
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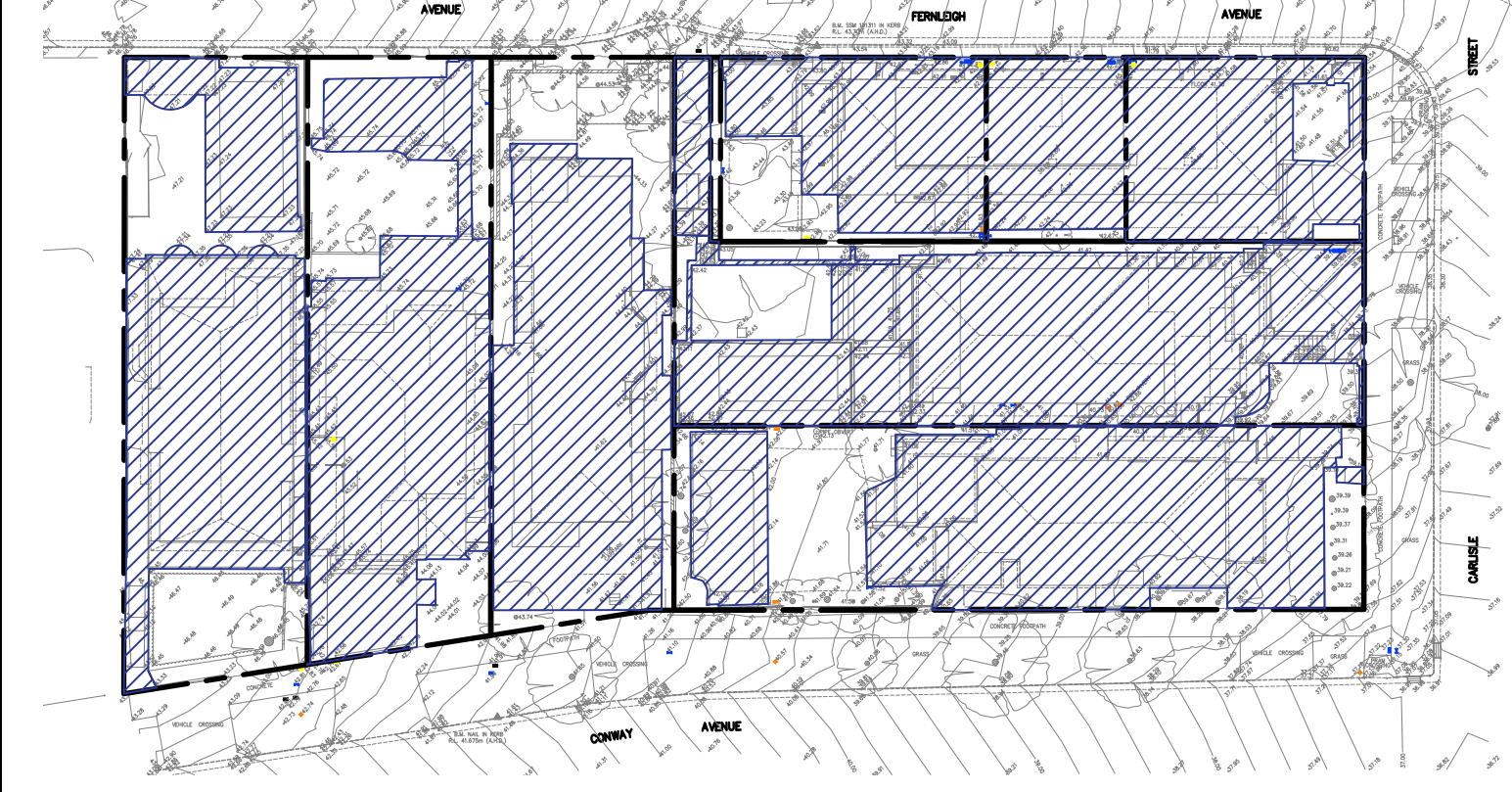
ELEVATION NORTH

[illegible][illegible]

ELEVATION EAST

[illegible][illegible]

APPENDIX A2 – CIVIL ENGINEERING DRAWINGS



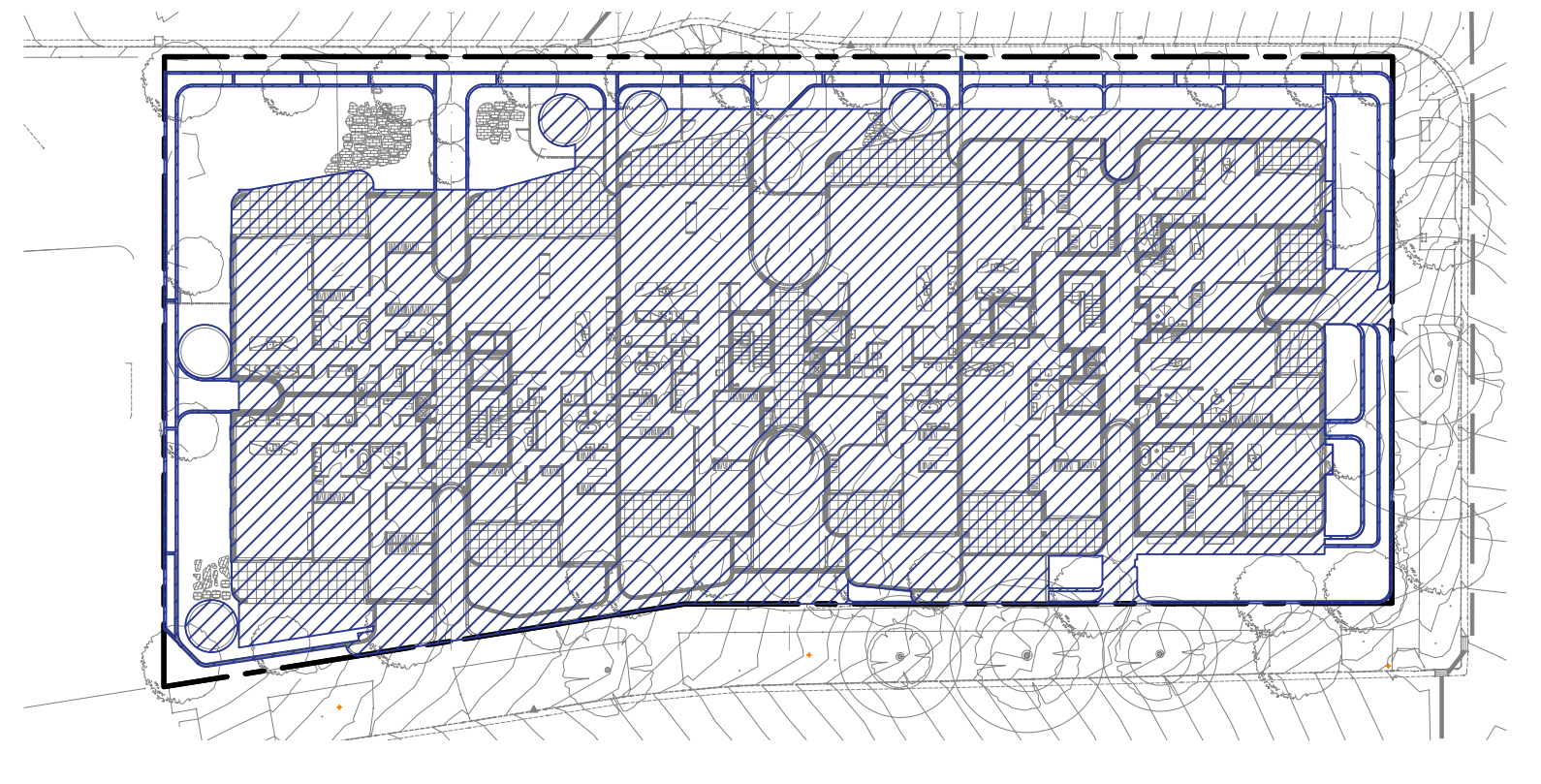
EXISTING IMPERVIOUS AREA: 2324m² (75%)
SCALE = 1 : 500

NOT FOR CONSTRUCTION

RTS

CIVIL CONSULTING ENGINEERS

RESIDENTIAL FLAT BUILDING WITH BASEMENT
DIAN ROSE BAY



PROPOSED IMPERVIOUS AREA: 2452m² (79%)
SCALE = 1 : 500

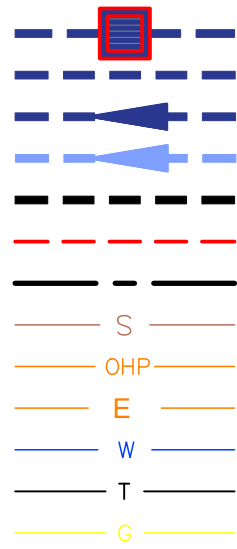
STORMWATER DRAINAGE NOTES:

- ALL PIPES TO BE 100mm Ø UNLESS NOTED OTHERWISE.
- ALL PIPES TO BE uPVC TO AS 1254–2002 UNLESS NOTED OTHERWISE.
- ALL PIPES TO BE LAYED AT 1 % MINIMUM GRADE UNLESS NOTED OTHERWISE.
- ALL PIPES SHALL BE LAYED ON A 75mm SAND BED, COMPACTED TO 100% S.M.D.D. BELOW PAVEMENTS. (NO COMPACTION REQUIRED BELOW LANDSCAPING). COVER TO SURFACE FROM TOP OF PIPE TO BE 300mm MINIMUM. BACKFILL TO BE ADEQUATELY CONSOLIDATED AROUND PIPES BY METHOD OF RAMMING AND WATERING IN. TRENCHES TO BE FILLED WITH GRANULAR MATERIAL AS SPECIFIED.
- ALL DOWN PIPES TO BE 100mm Ø UNLESS NOTED OTHERWISE.
- DOWN PIPE LOCATIONS ARE INDICATIVE ONLY. LOCATIONS TO BE CONFIRMED WITH ARCHITECT PRIOR TO COMMENCEMENT WITH WORK.
- PROVIDE CLEANING EYES AT ALL DOWNPIPES.
- ALL PITS TO BE CAST INSITU OR, IF PRECAST, APPROVED BY ENGINEER. CAST INSITU PITS TO HAVE 150mm THICK CONCRETE WALLS AND BASE. WALLS TO BE REINFORCED WITH 1 N12 TOP TIE UNLESS NOTED OTHERWISE. CAST INSITU PITS GREATER THAN 1000 DEEP TO BE MINIMUM 900x600 AND TO HAVE 150mm THICK CONCRETE WALLS AND BASE. WALLS TO BE REINFORCED WITH N12 AT 250 EACH WAY UNLESS NOTED OTHERWISE.
- ALL PITS GREATER THAN 1000mm DEEP SHALL HAVE STEP IRONS AS PER COUNCIL STANDARDS.
- ALL WORK TO BE IN ACCORDANCE WITH LOCAL COUNCIL STANDARDS AND SPECIFICATIONS.
- PRIOR TO COMMENCING ANY SITE WORKS THE CONTRACTOR SHALL IMPLEMENT EROSION CONTROL MEASURES TO APPROVED SEDIMENT AND EROSION CONTROL PLAN, EPA GUIDELINES AND COUNCIL SPECIFICATIONS. ALL MEASURES TO REMAIN IN PLACE UNTIL COMPLETION AND STABILIZATION OF THE SITE TO COUNCIL SATISFACTION.
- ALL LEVELS SHOWN ARE TO AHD UNLESS NOTED OTHERWISE.
- ENSURE THAT ALL PITS AND STORMWATER PIPES ARE LOCATED CLEAR FROM TREE ROOT SYSTEMS.
- ALL EXISTING EARTHENWARE PIPES TO BE UPGRADED TO uPVC.
- ALL WORKS TO BE IN ACCORDANCE WITH AS 3500.3:2018 NATIONAL PLUMBING DRAINAGE CODE PART 3 – STORMWATER DRAINAGE.
- UNLESS NOTED OTHERWISE, SUB–SOIL DRAINS ARE TO BE INSTALLED IN ACCORDANCE WITH AS3500.3 ALONGSIDE WALLS THAT IMPEDE THE NATURAL FLOW OF GROUNDWATER. THIS MAY ALSO INVOLVE TRENCHING INTO THE CLAY OR ROCK SUBGRADE TO DIRECT GROUNDWATER AWAY FROM STRUCTURES.
- IF NOT INDICATED ON PLANS, PROVIDE LEAF CATCHERS TO ALL DOWNPIPES.
- EXISTING STORMWATER SYSTEM TO BE CHECKED AND UPGRADED AS REQUIRED IN ACCORDANCE WITH AS 3500.3:2018.
- CARE SHOULD BE TAKEN WHEN UNDERTAKING WORKS IN THE VICINITY OF SELECTED TREES NOT TO DISTURB THE TREE ROOT SYSTEM. HAND DIGGING OF TRENCHES MAY BE NECESSARY. REFER ARBORISTS REPORT WHERE REQUIRED.
- CONTRACTOR TO LOCATE ALL EXISTING SERVICES PRIOR TO EXCAVATION AND NOTIFY ENGINEER OF ANY POTENTIAL CLASHES WITH THE PROPOSED DRAINAGE EASEMENT PIPE LINE.
- ALL SUB–SOIL DRAINAGE TO BE INSTALLED IN ACCORDANCE WITH THE STRUCTURAL AND GEOTECHNICAL REQUIREMENTS, AUSTRALIAN STANDARDS AS 3500.3:2018 AND IS TO BE DIRECTED TO THE SITE DRAINAGE SYSTEM BY MEANS OF GRAVITY DISCHARGE ONLY. DO NOT CONNECT SUB–SOIL PIPES TO AREAS WITH HIGHER SURFACE LEVELS U.N.O..
- ALL PIPES SHOWN ARE INDICATIVE ONLY AND MINIMUM CLEARANCES FROM THE EXTERNAL WALLS OF BUILDINGS, FOR THE EXCAVATION OF TRENCHES, ARE TO BE PROVIDED IN ACCORDANCE WITH AS 3500.3:2018.
- ANY COMPONENTS OF THE EXISTING SYSTEM PROPOSED TO BE RETAINED ARE TO BE CERTIFIED DURING CONSTRUCTION TO BE IN GOOD CONDITION AND OF ADEQUATE CAPACITY TO CONVEY ADDITIONAL RUNOFF AND BE REPLACED OR UPGRADED IF REQUIRED.
- ANY CHARGED PIPES MUST BE A MINIMUM OF 100mm (UNLESS NOTED OTHERWISE) WITH ALL JOINTS MUST BE SOLVENT WELDED. A CLEANING EYE, OR FLUSH OUT POINT, MUST BE PROVIDED AT THE LOW POINT IN THE SYSTEM WITHIN A PIT THAT CAN BE DRAINED TO AN ONSITE DISPERSAL SYSTEM.
- PROVISION IS TO BE MADE FOR THE COLLECTION AND DISPOSAL IN AN APPROVED MANNER OF ANY OVERLAND FLOW OR SUB–SURFACE FLOW ENTERING THE SUBJECT PROPERTY, OR CONCENTRATED AS A RESULT OF THE PROPOSED WORKS. ANY REDIRECTION OR TREATMENT OF FLOWS ENTERING THE PROPERTY SHALL NOT ADVERSELY AFFECT ANY OTHER PROPERTIES.
- PREVENT ANY STORMWATER EGRESS INTO ADJACENT PROPERTIES BY CREATING PHYSICAL BARRIERS AND SURFACE DRAINAGE INTERCEPTION.
- GUTTER GUARDS MUST BE INSTALLED ON ALL GUTTERS TO MINIMISE DEBRIS ENTERING THE SYSTEM.
- ALL SUB–SOIL DRAINAGES, STRIP DRAINS AND DRAINAGE PITS SHALL DISCHARGE TO THE ESTABLISHED SITE DISCHARGE POINT U.N.O AND BE CONSTRUCTED IN ACCORDANCE WITH AS3500.3:2018 REQUIREMENTS.
- OVERFLOW PATHS SHALL BE PROVIDED TO ALLOW FOR FLOWS IN EXCESS OF THE CAPACITY OF THE PIPE/DRAINAGE SYSTEM DRAINING THE SITE.
- WHERE ANY NEW STORMWATER DRAINAGE SYSTEM CROSSES THE FOOTPATH AREA WITHIN ANY ROAD, SEPERATE APPROVAL UNDER SECTION 138 OF THE ROAD ACT 1993 MUST BE OBTAINED FROM COUNCIL FOR THOSE WORKS PRIOR TO THE ISSUE OF ANY CONSTRUCTION CERTIFICATE.
- CONCEALED DOWNPIPES MUST BE INSTALLED IN ACCORDANCE WITH SECTION 4.5.6 OF AUSTRALIAN STANDARDS AS3500.3:2018 REQUIREMENTS. BUILDER TO ENSURE LOCATIONS DO NOT RESTRICT NORMAL OPERATION OF DOORS, WINDOWS, ACCESS OPENINGS OR OCCUPANCY OF A BUILDING, DO NOT CAUSE NUISANCE OR LEAD TO INJURY OF A PERSON, DO NOT INTERFERE WITH THE STRUCTURAL INTEGRITY OF THE WALL OR COLUMN, AS CLOSE AS PRACTICABLE TO THE SUPPORTING STRUCTURE, ARE PROTECTED FROM MECHANICAL DAMAGE, AT LEAST 100mm CLEAR OF ANY ELECTRICAL CABLE OR GAS PIPE, AT LEAST 50mm FROM ANY OTHER PIPEWORK OR SERVICE. CONCEALED DOWNPIPES TO HAVE INSPECTION OPENINGS THAT EXTEND TO THE FACE OF THE WALL OR SLAB FOR MAINTENANCE. SEAMS AND JOINTS TO BE WATERTIGHT. IF INSPECTION OPENINGS ARE REQUIRED FOR TESTING AND MAINTENANCE PURPOSES, INSPECTION OPENINGS SHALL HAVE A NOMINAL SIZE OF NOT LESS THAN THE NOMINAL DIAMETER OF THE DOWNPIPE.
- WHERE A DOWNPIPE IS CONNECTED TO A SITE STORMWATER DRAIN LOCATED BELOW A SLAB–ON–GROUND, THE CONNECTION OF A CONCEALED DOWNPIPE SHALL BE LOCATED ABOVE THE LEVEL OF THE FLOOR.
- SUPPORT SYSTEMS OF DOWNPIPES OR PIPEWORK MUST BE INSTALLED IN ACCORDANCE AUSTRALIAN STANDARDS AS3500.3:2018 REQUIREMENTS.
- FOR CONCEALED EAVES GUTTERS, U.N.O THE TOP EDGE OF THE FASCIA SHOULD NOT BE LESS THAN 25mm BELOW THE TOP OF THE BACK OF THE GUTTER, OR INTEGRAL FLASHING (TAIL) WITH THE TOP EDGE OF THE FLASHING NOT LESS THAN 25mm ABOVE THE TOP OF THE FASCIA.
- THE FOLLOWING ABBREVIATIONS DENOTE:
FSL – FINISHED SURFACE LEVEL OR RL – REDUCED LEVEL
IL – INVERT LEVEL OF PIPE
INV. – INVERT LEVEL OF PIT
CL – CENTRELINE OF ORIFICE
TWL – TOP WATER LEVEL



LOCALITY PLAN
NOT TO SCALE

LEGEND



- STORMWATER PIT
- NEW STORMWATER PIPE
- STORMWATER PIPE FLOW DIRECTION
- STORMWATER PIPE TO RWT
- EXISTING STORMWATER PIPE
- FLUSH–OUT LINE
- BOUNDARY LINE
- EXISTING SEWER MAIN
- EXISTING OVERHEAD POWER LINES
- EXISTING ELECTRICITY LINE
- EXISTING WATER MAINS
- EXISTING TELECOMMUNICATIONS LINE
- EXISTING GAS MAINS

- DENOTES DOWNPIPE
- DENOTES SIZE OF DOWNPIPE
- STORMWATER DOWNPIPE TO OSD – INDICATIVE ONLY
- STORMWATER VERTICAL PIPE TO PP1 – INDICATIVE ONLY
- STORMWATER VERTICAL TRANSFER PIPE BETWEEN LEVELS – INDICATIVE ONLY
- DOWNPIPE OVER
- DOWNPIPE UNDER
- 100ø/80 RAINWATER OUTLET (SPS TRUFLO)
- 100ø/80 RAINWATER OUTLET WITH PLANTER ADAPTOR (SPS TRUFLO)
- 200mmø RAINWATER OUTLET
- 200mm WIDE GRATED STRIP DRAIN TO OSD
- 100mm GRATED STRIP DRAIN TO OSD
- 100mm GRATED STRIP DRAIN TO BOUNDARY PIT
- GRATED STRIP DRAIN TO FLOOD GATE REQUIREMENTS – SEE FIRA
- 200ø CARPARK FLOOR DRAIN
- 100ø BASEMENT PERIMETER DRAIN
- 100 MIN. WIDE INTERNAL OPEN DISH DRAIN
- 900x900 GRATED ACCESS HATCH
- 300x300 GRATED INSPECTION LID
- 900x900 SEALED ACCESS HATCH
- 900x900 GRATED ACCESS HATCH
- 0.0m³ MIN. BASEMENT PUMP OUT PIT
- 77,600L MIN. ONSITE STORMWATER DETENTION TANK
- 9,000L RAINWATER TANK – 3,000L MIN. BASIX REQUIREMENTS
- 4 x STORMFILTER 690P sorb FILTERS & 1 x OCEANGUARD200um OR APPROVED EQUIVALENT WITHIN OSD TANK

RAINWATER HARVESTING REQUIREMENTS:

- CONSIDERING THE ROOF CATCHMENT AREA, LOCATION OF PROPERTY, INTENDED USE OF RAINWATER AND GARDEN SIZE WE RECOMMEND PROVIDING A RAINWATER TANK FOR USE AS PER BASIX REQUIREMENTS, HCCRENS WATER SMART PRACTICE NOTE (N).4) AND THE NSW HEALTH REQUIRMENTS FOR NON DRINKING USE ONLY AS FOLLOWS:
a) TO WATER GARDEN AREAS b) TO BASIX REQUIREMENTS
- THE TANKS PROVIDED WILL REDUCE PRESSURE ON COUNCIL'S STORMWATER INFRASTRUCTURE.
- REFERENCES: COOMBS P.J. & KUCZERA G. (2001), "RAINWATER TANK DESIGN FOR WATER SUPPLY & STORMWATER MANAGEMENT." STORMWATER INDUSTRY ASSOCIATION REGIONAL CONFERENCE. PATRICK DUPONT & STEVE SHACKEL, "RAINWATER" AUSTRALIAN GOVERNMENT (2004), "GUIDANCE ON USE OF RAINWATER TANKS".
- ALL CONNECTIONS TO PLUMBING AND RAINWATER TANKS TO BE IN ACCORDANCE WITH SYDNEY WATERS' GUIDE "INSTALLING A RAINWATER TANK" AVAILABLE AT www.sydneywater.com.au OR FROM LOCAL COUNCIL GUIDELINES.
- PROVIDE A DUAL SUPPLY SYSTEM AND BACKFLOW PREVENTION SYSTEM IN ACCORDANCE WITH "BASIX–DESIGN GUIDE FOR SINGLE DWELLINGS" BY NSW DEPARTMENT OF INFRASTRUCTURE, PLANNING AND NATURAL RESOURCES AND AS3500.1.
- IF NOT SPECIFIED ON PLANS, THE FIRST FLUSH SYSTEM IS TO HAVE A MINIMUM SIZE OF 20L PER 100m² OF ROOF CATCHMENT AREA PRIOR TO ENTERING THE RAINWATER TANK. INDIVIDUAL SITE ANALYSIS IS REQUIRED IN HEAVILY POLLUTED AREAS TO DETERMINE IF LARGER VOLUMES OF FIRST FLUSH RAINWATER ARE TO BE DIVERTED. IF IN DOUBT, CHECK WITH LOCAL HEALTH AUTHORITIES.
- SCREENED DOWNPIPE RAINWATER HEAD OR OTHER SUITABLE LEAF AND DEBRIS DEVICE TO BE INSTALLED ON EACH DOWNPIPE. SCREEN MESH TO BE 4–6mm AND DESIGNED TO BE SELF–CLEANING.
- FIRST FLUSH DEVICES, OR APPROVED ALTERNATIVE, TO BE INSTALLED WITH AN AUTOMATED DIVERSION AND DRAINAGE SYSTEM, THAT IS, NO MANUAL DIVERSION AND DRAINAGE VALVES. REFER TYPICAL FLUSH OUT PIT FOR DETAILS. THIS SHOULD CATER FOR THE FIRST 1mm OF RAINFALL.
- BEFORE PURCHASING MATERIALS OR PAINT TO BE USED ON ROOF CATCHMENT AREAS, THE MANUFACTURER'S RECOMMENDATIONS ON LABELS AND BROCHURES FOR RAINWATER TANK SUITABILITY TO BE READ AND ADHERED TO.
- PRE–STORAGE PITS FOR UNDERGROUND RAINWATER STORAGE TANKS AND FLUSH OUT PITS MAY ASSIST IN LIMITING SILT, AND PREVENT VERMIN, INSECTS (INCLUDING MOSQUITOES) AND DEBRIS FROM ENTERING THE RAINWATER STORAGE AREA.
- RAINWATER TANK TO BE WATER PROOFED IN ACCORDANCE WITH HB 230–200B
- BUILDER OR PLUMBER TO ENSURE THE INSTALLATION OF THE RAINWATER TANK SYSTEM IS IN ACCORDANCE WITH THE RELEVANT AUSTRALIAN STANDARDS AND THE RAINWATER TANK DESIGN AND INSTALLATION HANDBOOK – HB 230–200B. IF IN DOUBT CONTACT ENGINEER.
- NOISE EMISSIONS FROM ANY PUMPS DO NOT EXCEED 5dB(A) ABOVE AMBIENT BACKGROUND NOISE LEVEL MEASURED AT THE ALLOTMENT BOUNDARY.
- AT THE COMPLETION OF THE WATER SERVICE INSTALLATION AND PRIOR TO HYDROSTATIC TESTING, THE SYSTEM SHALL BE THOROUGHLY FLUSHED TO REMOVE ANY FOREIGN MATTER. THE FLUSHING SHALL BE UNDERTAKEN IN ACCORDANCE WITH AS3500.1 REQUIREMENTS – APPENDIX I, PARAGRAPH I3 AND CONTINUE UNTIL THE FLUSHED WATER RUNS COMPLETELY CLEAR. THE SYSTEM SHALL THEN BE PRESSURE TESTED IN ACCORDANCE WITH CLAUSE 16.3.1.
- AT THE COMPLETION OF THE WATER SERVICE INSTALLATION THE RAINWATER STORAGE TANKS ARE TO BE TESTED IN ACCORDANCE WITH SECTION 16 OF AS3500.1.

SURVEY NOTES:

- THE EXISTING SITE CONDITIONS SHOWN ON THE FOLLOWING DRAWINGS HAVE BEEN INVESTIGATED BY THE PROJECT SURVEY. THE INFORMATION IS SHOWN TO PROVIDE A BASIS FOR DESIGN. RTS CIVIL CONSULTING ENGINEERS PTY LTD DOES NOT GUARANTEE THE ACCURACY OR COMPLETENESS OF THE SURVEY BASE.
- SHOULD DISCREPANCIES BE ENCOUNTERED DURING CONSTRUCTION BETWEEN THE SURVEY DATA AND ACTUAL FIELD DATA, CONTACT THE ENGINEER.
- REFERENCE SHOULD BE MADE DIRECTLY TO THE SURVEYOR BEFORE SETTING OUT.

EXISTING UNDERGROUND SERVICES NOTES:

- THE LOCATIONS OF UNDERGROUND SERVICES SHOWN IN THIS SET OF DRAWINGS HAVE BEEN PLOTTED FROM SURVEY INFORMATION AND SERVICE AUTHORITY INFORMATION. THE SERVICE INFORMATION HAS BEEN PREPARED ONLY TO SHOW THE APPROXIMATE POSITIONS OF ANY KNOWN SERVICES AND MAY NOT BE AS CONSTRUCTED OR ACCURATE.
- RTS CIVIL CONSULTING ENGINEERS PTY LTD CANNOT GUARANTEE THE SERVICES INFORMATION SHOWN ON THESE DRAWINGS ACCURATELY INDICATES THE PRESENCE OR ABSENCE OF SERVICES OR THEIR LOCATION AND WILL ACCEPT NO LIABILITY FOR INACCURACIES IN THE SERVICES INFORMATION SHOWN FROM ANY CAUSE WHATSOEVER.
- CONTRACTORS SHALL TAKE DUE CARE WHEN EXCAVATING ONSITE INCLUDING HAND EXCAVATION WHERE NECESSARY.
- CONTRACTORS ARE TO CONTACT THE RELEVANT SERVICE AUTHORITY PRIOR TO COMMENCEMENT OF EXCAVATION WORKS.
- CONTRACTORS ARE TO UNDERTAKE A SERVICES SEARCH, PRIOR TO COMMENCEMENT OF WORKS ON SITE. SEARCH RESULTS ARE TO BE KEPT ON SITE AT ALL TIMES.
- CONTRACTOR IS TO CONFIRM FINDINGS FOR THE LOCAL COUNCIL OR SYDNEY WATER IN RELATION TO THE SEWER OR WATER MAINS LOCATED. CONFIRMATION OF MAINS IS REQUIRED PRIOR TO CONSTRUCTION. POSSIBLE CONFLICT OF SERVICES ARE TO BE REPORTED TO THE SUPERINTENDENT OR ENGINEER FOR FURTHER DIRECTIONS.

EXTERNAL NOTES:

- ALL ACTIVITIES AND WORKS EXTERNAL TO THE SITE, OR THAT AFFECT PUBLIC ROADS, ARE TO BE CARRIED OUT IN ACCORDANCE WITH COUNCIL'S CODES AND STANDARDS.
- PUBLIC FOOTPATHS SHALL BE RECONSTRUCTED TO THE SATISFACTION OF COUNCIL'S DIRECTOR OF ENGINEERING SERVICES. A ROAD OPENING PERMIT SHALL BE OBTAINED FOR ALL WORKS CARRIED OUT IN A PUBLIC OR COUNCIL CONTROLLED LAND.
- RESTORATION OF LANDSCAPING, ROADS AND PATHS SHALL BE TO COUNCIL'S REQUIREMENTS. ALL OTHER RESTORATION SHALL BE TO THE SATISFACTION OF THE AFFECTED PARTIES.
- WHERE WORKS ARE UNDERTAKEN ON PUBLIC ROADS, ADEQUATE TRAFFIC CONTROL AND DIRECTIONS TO MOTORISTS SHALL BE PROVIDED BY OTHERS.

DRAWING SCHEDULE:

- SW001 – COVER PAGE, NOTES & CALCULATIONS SHEET 1 OF 2
- SW002 – COVER PAGE, NOTES & CALCULATIONS SHEET 2 OF 2
- SW100 – BASEMENT 2 STORMWATER MANAGEMENT PLAN
- SW101 – BASEMENT 1 STORMWATER MANAGEMENT PLAN
- SW102 – LOWER GROUND STORMWATER MANAGEMENT PLAN
- SW103 – GROUND STORMWATER MANAGEMENT PLAN
- SW104 – SITE STORMWATER CATCHMENT PLAN
- SW200 – STORMWATER DRAINAGE DETAILS SHEET 1 OF 4
- SW201 – STORMWATER DRAINAGE DETAILS SHEET 2 OF 4
- SW202 – STORMWATER DRAINAGE DETAILS SHEET 3 OF 4
- SW203 – STORMWATER DRAINAGE DETAILS SHEET 4 OF 4

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NO INVESTIGATION OF UNDERGROUND SERVICES HAS BEEN MADE. ALL RELEVANT AUTHORITIES SHOULD BE NOTIFIED PRIOR TO ANY EXCAVATION ON OR NEAR THE SITE.

DEVELOPERS & EXCAVATORS MAY BE HELD FINANCIALLY RESPONSIBLE BY THE ASSET OWNER SHOULD THEY DAMAGE UNDERGROUND NETWORKS.

CARELESS DIGGING CAN DIGGING CAN:

- CAUSE DEATH OR SERIOUS INJURY TO WORKERS AND THE GENERAL PUBLIC
- INCONVENIENCE USERS OF ELECTRICITY, GAS, WATER AND COMMUNICATIONS
- LEAD TO CRIMINAL PROSECUTION AND DAMAGES CLAIMS
- CAUSE EXPENSIVE FINANCIAL LOSSES TO BUSINESS
- CUT OFF EMERGENCY SERVICES
- DELAY PROJECT COMPLETION TIMES WHILE THE DAMAGE IS REPAIRED

MINIMISE YOUR RISK AND DIAL BEFORE YOU DIG. – TEL. 1100

ALL DIMENSIONS MUST BE VERIFIED ON SITE BY BUILDER BEFORE COMMENCING WITH WORK.

AT ORIGINAL				BY BUILDER BEFORE COMMENCING WITH WORK.											
				Issued for: DEVELOPMENT APPLICATION	Title:	Initial:	Date:	 RTS CIVIL CONSULTING ENGINEERS STORMWATER • CIVIL • FLOOD MITIGATION ABN: 81 615 065 588 Phone: 0490 507 300 Email: admin@rtscivil.com.au Web: rtscivil.com.au	Architect:	 MHNDUNION	Project and Drawing Title: 2–6 CONWAY AVENUE & 38–40 CARLISLE STREET, ROSEBAY COVERPAGE, NOTES & CALCULATIONS SHEET 1 OF 2	Local Council: WOOLLAHRA COUNCIL			
			Approved by:	DESIGN	R.M	28.10.2025	Client: TWO CONWAY PTY LTD		Project Number: 251004			Drawing ID: SW001	Issue: B		
B	07.05.26	RESPONSE TO SUBMISSIONS	R.M	Date : 07.05.26  Rhys Mikhail Director Principal Engineer NER: 2570082 RPEQ: 17480 BEng (Civil) Hons MIEAust CPEng NER RPEQ APEC INtPE(Aus)	DRAWN	S.M								28.10.2025	
A	18.12.25	STORMWATER MANAGEMENT PLAN FOR DA SUBMISSION	R.M		CHECKED	R.M								18.12.2025	
Rev:	Date:	Description:	Reviewed:		APPROVED	R.M	18.12.2025								

NOTES:
1. U.N.O REFER TO THE COVERPAGE 001 SERIES FOR DETAILED NOTES AND CALCULATIONS.
2. ALL DIMENSIONS SHALL BE VERIFIED ONSITE BY BUILDER BEFORE COMMENCING WITH WORK.

STORMWATER PUMP-OUT AND ‘WET WELL’ NOTES:

1. PUMPED SYSTEMS ARE FOR AREAS NORMALLY LESS THAN 2,000m2 WHERE IT IS NOT POSSIBLE FOR THE STORMWATER TO BE DISCHARGED BY GRAVITY THROUGH THE AVAILABLE GRAVITATIONAL POINT OF CONNECTION. ALL WORKS ARE TO BE IN ACCORDANCE WITH AS3500.3 – PLUMBING AND DRAINAGE: STORMWATER DRAINAGE – SECTION 9 – PUMPED SYSTEMS.
2. TO ENSURE THAT SEEPAGE WATER IS NOT BEING PUMPED CONTINUALLY OUT TO THE STREET, THE PUMPS IN THE BASEMENT OR LOWER LEVEL OF PROPERTY SHALL BE ADJUSTED TO PERMIT STORAGE IN THE SYSTEM PRIOR TO THE PUMPS SWITCHING ON (REFER DETAILS FOR STORAGE VOLUME AND LEVELS). THE PUMPS SHOULD THEN DISCHARGE ALL WATER SO THAT ONLY MINIMAL WATER REMAINS OVER THE PUMP INTAKE, AS REQUIRED BY THE MANUFACTURER.
3. THE PUMPS SHALL OPERATE ALTERNATELY TO LEVELS INDICATED ON THE SUPPLIED ENGINEERING DETAILS WITH BOTH PUMPS OPERATING IN UNISON AT THE LEVELS INDICATED (SYSTEM TO BE FITTED WITH ALARM SYSTEM – BY OTHERS). THE SECOND PUMP WILL BEING TO OPERATE IF THE WATER LEVEL CONTINUES TO RISE ABOVE THE MAXIMUM WATER LEVEL AFTER THE FIRST PUMP HAS COME ON. SIGNAGE IS TO BE DISPLAYED WITHIN THE LOW AREA OF THE BASEMENT INDICATING PERMIT ADDITIONAL STORAGE VOLUME IS EXPECTED (UP TO 200mm IN DEPTH) DURING A MAJOR STORM EVENT.
4. THE REQUIRED PUMPING RATE SHALL BE CALCULATED BASED ON AN ASSESSMENT OF THE EXPECTED INFLOW AND, WHERE APPROPRIATE, THE ALLOWABLE DISCHARGE RATE. HOWEVER, UNLESS NOTED OTHERWISE, THE MINIMUM PUMP CAPACITY OF A BASEMENT (BELOWGROUND) SYSTEM SHOULD NOT BE LESS THAN 10 L/s.
5. PUMPS SHALL BE IN DUPLICATE THE MAXIMUM CAPACITY OF EACH PUMP SHALL BE SELECTED SO THAT THE CAPACITY OF THE SYSTEM RECEIVING THE DISCHARGE IS NOT EXCEEDED. THE PUMP CONTROLS SHALL BE SET UP TO ENABLE ALTERNATE PUMP OPERATION AT EACH START IN THE EVENT THAT A PUMP FAILS TO OPERATE WHEN THE WATER LEVEL IN THE WET WELL REACHES THE PUMP START, THE OTHER PUMP SHALL BE ACTIVATED AND A VISIBLE ALARM INITIATED. IF BOTH PUMPS FAIL TO OPERATE AN AUDIBLE ALARM SHALL BE INITIATED IN ACCORDANCE WITH SECTION 8.3.7 OF AS3500.3. LOCATE HIGH AND LOW LEVEL ALARMS CLEAR OF INLETS TO PREVENT FALSE ALARMS. THE HIGH LEVEL ALARM SHOULD BE SET NO HIGHER THAN 100 MM ABOVE THE INVERT OF THE INLET PIPE, PROVIDED THAT FLOODING OF HABITABLE OR STORAGE AREAS AND VEHICLE GARAGES SHALL BE AVOIDED. WHERE FLOODING COULD OCCUR THE OVERFLOW AND HIGH-LEVEL ALARM SHALL BE LOWERED ACCORDINGLY TO PREVENT FLOODING.
6. THE MINIMUM WET WELL STORAGE BETWEEN THE HIGH AND LOW WORKING LEVELS EXPRESSED IN CUBIC METRES SHALL BE 1% OF THE CATCHMENT AREA IN m2 BUT IN ANY CASE SHALL NOT BE LESS THAN 3 m3, OR AS OTHERWISE DIRECTED OR APPROVED BY THE AUTHORITY HAVING JURISDICTION.
7. THE CAPACITY OF THE PUMPED SYSTEM (WET WELL) SHALL BE ACHIEVED BY A COMBINATION OF PUMP CAPACITY AND WET WELL STORAGE BETWEEN THE HIGH AND LOW WORKING LEVELS OF THE WET WELL. THE COMBINED EFFECTIVE STORAGE COMPRISING THE VOLUME ABLE TO BE PUMPED IN 30 MIN PLUS THE WET WELL STORAGE SHALL NOT BE LESS THAN THE VOLUME OF THE RUN-OFF FROM THE STORM OF ARI = 10 YEARS AND DURATION OF 120 MIN, OR AS OTHERWISE DIRECTED BY THE AUTHORITY HAVING JURISDICTION.
8. PUMPING EQUIPMENT SHALL BE SECURELY FIXED TO THE WET WELL USING CORROSION RESISTANT FIXINGS.
9. PUMPS SHALL BE FITTED WITH A GATE VALVE AND NON-RETURN VALVE ON THE DELIVERY SIDE OF EACH PUMP.
10. PUMPS SHALL HAVE FLANGES OR UNIONS INSTALLED TO FACILITATE REMOVAL.
11. PUMPS SHALL BE CONTROLLED SO AS TO LIMIT THE NUMBER OF STARTS PER HOUR TO WITHIN THE CAPACITY OF THE ELECTRICAL MOTORS AND EQUIPMENT, AND SHALL, AS FAR AS PRACTICABLE, EMPTY THE CONTENTS OF THE WET WELL AT EACH OPERATION.
12. PUMPS ARE TO OPERATE ONLY DURING HOURS SPECIFIED BY THE AUTHORITY HAVING JURISDICTION.
13. VALUE OF HEAD IS TO BE CONFIRMED ONCE EXCAVATION COMPLETE AND PRIOR TO ORDERING PUMPS AND EQUIPMENT.
14. PUMP SPECIFICATIONS AND PRESSUE PIPE DIAMETER ARE TO BE DETERMINED BY THE PUMP MANUFACTURER.
15. PROVIDE LITTER SCREEN ABOVE PUMP SET.
16. ALL ELECTRICAL MOTORS AND EQUIPMENT SHALL BE INSTALLED IN ACCORDANCE WITH AS3000.

INSTALLATION OF PIPEWORK NEAR AND UNDER BUILDINGS NOTES:

- THE FOLLOWING APPLY TO A DRAIN IN CLOSE PROXIMITY TO FOOTINGS OR FOUNDATIONS:
1. WHERE THE DRAIN PASSES UNDER A STRIP FOOTING, ITS ANGLE OF INTERSECTION WITH THE FOOTING IN THE HORIZONTAL PLANE SHALL BE NOT LESS THAN 45°, AND THE MINIMUM CLEARANCE BETWEEN THE TOP OF THE DRAIN TO THE UNDERSIDE OF THE FOOTING SHALL BE 25mm.
2. IF THE DRAIN IS LAID THROUGH FOOTINGS OR WALLS, OTHER THAN BELOW-GROUND EXTERNAL WALLS, IT SHALL BE INSTALLED WITH AN ANNULAR SPACE OF NOT LESS THAN 25mm FILLED WITH A LINER OF FLEXIBLE MATERIAL.
3. THE DRAIN MAY BE LAID THROUGH BELOW-GROUND EXTERNAL WALLS, PROVIDED--
- a. TWO FLEXIBLE JOINTS ARE PROVIDED EXTERNALLY WITHIN 800mm OF THE EXTERNAL FACE OF THE WALL, AND SUCH JOINTS ARE NOT LESS THAN 600mm APART; AND
- b.THE PENETRATION OF THE WALL IS MADE WATERTIGHT.
4. WHERE THE DRAIN IS TO BE LAID PARALLEL TO A FOOTING, THE TRENCH SHALL BE LOCATED AS FOLLOWS:
- a. THE DRAIN SHALL BE LAID--
- b. IN ACCORDANCE WITH NCC VOLUME TWO; AND
- c. FOR SINGLE DWELLINGS, AS SHOWN IN FIGURE 6.2.8 OF AS3500.3.

INSPECTIONS BY ENGINEER

- 48 HOURS NOTICE IS REQUIRED BEFORE ANY SITE INSPECTION. ANY STRUCTURAL ELEMENT NOT INSPECTED BY RTS CIVIL WILL NOT BE CERTIFIED BY RTS CIVIL CONSULTING ENGINEERS PTY LTD.
1. BEARING STRATA OF ALL FOOTINGS PRIOR TO CONCRETE POUR BY GEOTECHNICAL ENGINEER.
2. ANY REINFORCEMENT PRIOR TO CONCRETE POUR.
3. TIMBER AND STEEL FRAMING PRIOR TO CLADDING OR LINING.
4. STEEL LINTELS AFTER INSTALLATION.
5. CONTACT YOUR PCA (PRINCIPAL CERTIFYING AUTHORITY) AS TO REQUIREMENTS FOR MANDATORY CRITICAL STAGE INSPECTIONS IN ACCORDANCE WITH REVISED EP&A ACT REGULATIONS EFFECTIVE JULY 1, 2004.
6. INSPECTION BY GEOTECHNICAL ENGINEER OVER 1.5m OF VERTICAL CUT THROUGH SANDSTONE BED ROCK TO PERMIT IDENTIFICATION OF DEFECTS AND REMEDIAL MEASURES INITIATED.
7. SCHEDULE OF CONSTRUCTION STAGES REQUIRING INSPECTION:
- a. FOLLOWING PLACEMENT OF PIPE BEDDING MATERIAL. CONFIRM TRENCH/PIPE LOCATION, ADEQUACY OF DEPTH OF COVER, BEDDING MATERIAL AND DEPTH.
- b. FOLLOWING JOINING OF PIPES AND CONNECTION TO COUNCIL’S STORMWATER SYSTEM.
- c. FOR DISPERSION TRENCH SYSTEMS:–
- (i) FOLLOWING SET OUT TO CONFIRM LOCATION, LENGTH AND VOLUME OF STORAGE.
8. ALL INSPECTIONS TO BE CONFIRMED PRIOR TO CONSTRUCTION APPROVAL.

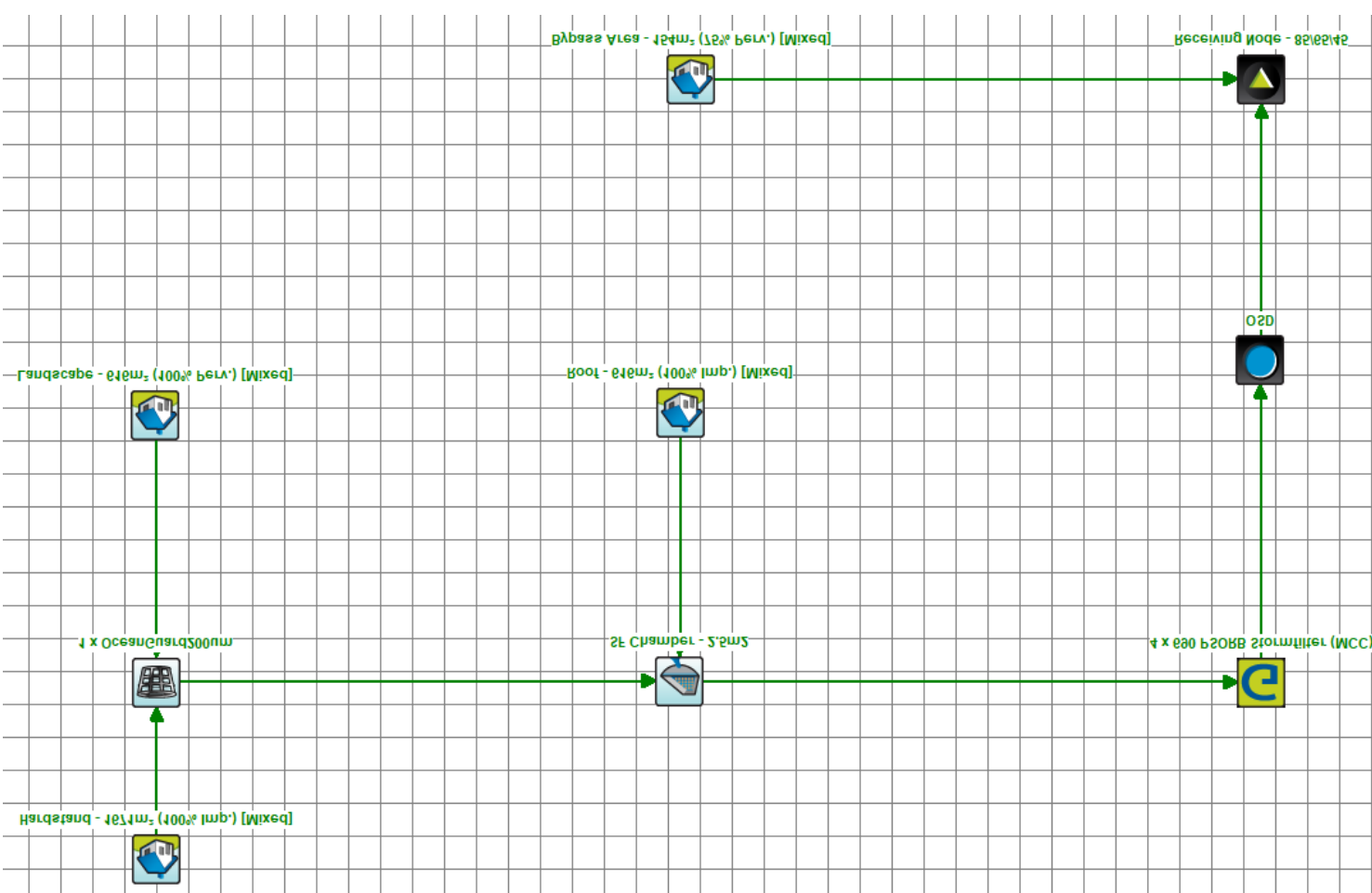
NOTE:
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NOT FOR CONSTRUCTION

ONSITE DRAINAGE CALCULATIONS ACCORDING TO WOOLLAHRA COUNCIL (DCP 2015)				
TOTAL SITE AREA		3,105 m ² > 500 m ²		
TOTAL EXISTING SITE IMPERVIOUS AREA		2,324 m ²		
TOTAL PROPOSED SITE IMPERVIOUS AREA		2,452 m ²		
INCREASE IN IMPERVIOUS AREA		128 m ² > 40 m ²		
DEVELOPMENT TYPE		KNOCK-DOWN REBUILD		
THEREFORE ONSITE DETENTION (OSD or SSR) IS NOT REQUIRED FOR THIS DEVELOPMENT.				
COUNCIL OSD REQUIREMENTS PER 1,000 m ² FOR TOTAL SITE AREA:				
ARI EVENT	PSD \ 1,000 m ²	SSR \ 1,000 m ²	PSD \ SITE	SSR \ SITE
1 IN 2 YEAR	24.0 L/s	4.0 m ³	74.5 L/s	12.4 m ³
1 IN 100 YEAR	34.0 L/s	20.0 m ³ 25.0* m ³	105.6 L/s	62.1 m ³ 77.6 m ³
*RATE REQUIRED TO OFFSET RAINGARDEN – APPLIED				
ONSITE DETENTION DETAILS (USING DRAINS MODEL)				
PORTION THROUGH OSD		98 %		
PRE DEVELOPMENT SITE DISCHARGE				
2 YR (39% AEP STORM EVENT)		83 L/s		
20 YR (5% AEP STORM EVENT)		155 L/s		
100 YR (1% AEP STORM EVENT)		213 L/s		
POST DEVELOPMENT SITE DISCHARGE		OSD	OVERFLOW	BYPASS
2 YR (39% AEP STORM EVENT)		58 L/s	0 L/s	1 L/s
20 YR (5% AEP STORM EVENT)		82 L/s	0 L/s	3 L/s
100 YR (1% AEP STORM EVENT)		102 L/s	0 L/s	4 L/s
ONSITE DETENTION TANK DETAILS				
REQUIRED OSD VOLUME		62.1 m ³ (DRAINS MODEL)		
OVERFLOW TO STREET		YES		
OSD TANK VOLUME PROVIDED – NO RAINGARDEN		77.6 m ³ (39.0m ² x 2.0m DEPTH)		
RAINWATER TANK DETAILS				
VOLUME OF RAINWATER (BASIX)		3.0 m ³		
RAINWATER TANK VOLUME PROVIDED		9.0 m ³ (4.5m ² x 2.0m DEPTH)		
WATER SENSITIVE URBAN DESIGN TO WOOLLAHRA DCP 2015 CHAPTER E2 SECTION E.2.2.2 WSUD & E.2.2.3 STORMWATER TREATMENT REQUIREMENTS				
WSUD MUSIC SUMMARY	% REDUCTION OCEAN PROTECT	% REDUCTION ATLAN	TARGET	
TOTAL SUSPENDED SOLIDS (TSS)	88	86 %	85 %	
TOTAL PHOSPHOROUS (TP)	69	66 %	65 %	
TOTAL NITROGEN (TN)	48	64 %	45 %	
GROSS POLUTANTS (GP)	97	97 %	90 %	

NOTE:
THE SUBSTITUTION OF AN "EQUIVALENT" DEVICE FOR THE STORMWATER TREATMENT MEASURE APPROVED UNDER THE DEVELOPMENT CONSENT MUST SUBMITTED TO THE PRINCIPAL CERTIFYING AUTHORITY FOR APPROVAL PRIOR TO INSTALLATION.

ONSITE DRAINAGE PUMP OUT CALCULATIONS – AUSTRALIAN STANDARDS AS3500.3 – PUMP OUT TANK PP1 – REFER TYPICAL DETAILS			
REQUIRED VOLUME:			
AREA DRAINING TO THE PUMPOUT PIT = 55 m ²		(DRIVEWAY + ENTRANCE AREA)	
PRELIMINARY SEEPAGE RATE (PER LOT) = 3 L/min		(DISCUSSED WITH GEOTEC)	
SEEPAGE RATE APPLIED = 24 L/min		(MUST BE CONFIRMED AT CC STAGE)	
		= 0.40 L/s	
VOLUME ACCUMULATED (100 YEAR ARI, 2 HOUR STORM):			
Q = F x C x I x A = [1/3600 x 1.08 x 49.8 x 55] + 0.40 = 1.22 L/s			
VOLUME ACCUMULATED (100 YEAR ARI, 2 HOUR STORM):			
V _{100/120} = (1.22L/s x 2hrs x 3600s)/1000 = 8.80 m ³		WET WELL STORAGE CAPACITY = V _{100/120} - PC ₃₀ = 0.0 m ³ = V _{100/120} = 8.80 m ³	
PUMP OUT RATE (100 YEAR ARI, 5 MIN STORM):			
Q _{PUMPED} = [1/3600 x 1.08 x 265 x 55] + 0.40 = 4.77 L/s (10.0 L/s MIN.)			
VOLUME PUMPED IN 30 MINS:			
PC ₃₀ = (10.00L/s x 0.5hrs x 3600s)/1000 = 18.00 m ³			
VOLUME PUMPED IN 5 MINS:			
PC ₅ = (10.00L/s x 0.083hrs x 3600s)/1000 = 3.00 m ³		VOLUME PROVIDED = 9.00 m ³	
DUAL SUBMERSIBLE PUMPS OR EQUIVALENT TO BE INSTALLED IN SUMP AND CONNECTED TO CONTROL PANEL ALLOWING FOR THE PUMPS TO OPERATE SIMULTANEOUSLY ON HIGH LEVEL ALARMS AT 10.0L/s (PER PUMP) AT 9.0m HEAD. FINAL PUMP SPECIFICATION (DUTY, ELECTRICAL COMPLIANCE, HAZARDOUS AREA CLASSIFICATION IF REQUIRED) TO BE CONFIRMED BY BUILDING HYDRAULIC/ELECTRICAL SERVICES ENGINEER.			



Treatment Train Effectiveness - Receiving Node - 85/65/45			
	Sources	Residual Load	% Reduction
Flow (ML/yr)	3.11	3.11	0
Total Suspended Solids (kg/yr)	422	50.2	88.1
Total Phosphorus (kg/yr)	0.784	0.241	69.2
Total Nitrogen (kg/yr)	6.67	3.46	48.1
Gross Pollutants (kg/yr)	67.5	1.86	97.3

MUSIC MODEL SUMMARY

SEE SW104

SEDIMENT AND EROSION CONTROL NOTES:

1. SILT FENCE AND ASSOCIATED WORKS INCLUDING INTERCEPTOR DRAIN IS TO BE INSTALLED BEFORE THE COMMENCEMENT OF ANY EXCAVATION.
2. GEOTECHNICAL ENGINEER IS TO PROVIDE SITE STABILITY REQUIREMENTS. CUTS ARE TO BE EXECUTED TO THE REQUIRED LEVEL USING CONVENTIONAL EXCAVATION MACHINERY. AS A GUIDE, INITIALLY THE DEPTH OF FILL/CLAY IS TO BE ESTABLISHED TO ENSURE NEIGHBOURING PROPERTIES ARE NOT ADVERSELY AFFECTED. EARTH BATTERS TO BE A MAXIMUM SLOPE OF 1.0m VERT. TO 1.7m HORIZ. (AS PER GEOTECHNICAL REPORT). ANY BATTERS GREATER THAN 1.0m VERT. TO 1.7m HORIZ. ARE TO BE ADEQUATELY SHORED IN ACCORDANCE WITH GEOTECHNICAL ENGINEERS DETAILS AND INSTRUCTIONS.
3. ANY PERMANENT RETAINING STRUCTURE IS TO BE CONSTRUCTED IN ACCORDANCE WITH THE ENGINEERS DETAILS AND INSTRUCTIONS.
4. ALL PERMANENT RETAINING STRUCTURES ARE TO BE COMPLETED WITH MINIMUM DELAY FOLLOWING EXCAVATION.
5. ALL EROSION AND SEDIMENT CONTROL MEASURES TO BE INSPECTED AND MAINTAINED DAILY BY SITE MANAGER.
6. CONTRACTOR TO MINIMISE DISTURBED AREAS.
7. ALL STOCKPILES TO BE CLEAR FROM DRAINS, GUTTERS AND FOOTPATHS.
8. DRAINAGE IS TO BE CONNECTED TO STORMWATER SYSTEM AS SOON AS POSSIBLE.
9. ROADS AND FOOTPATH TO BE SWEEP DAILY.
10. CONSTRUCTION VEHICLES ARE TO LEAVE AND ENTER THE SITE OVER AN ALL WEATHER SURFACE CONSISTING OF COURSE CRUSHED STONE OR BLUE METAL CONSTRUCTED WITHIN THE FRONT SETBACK AREA OPPOSITE THE EXISTING FOOTPATH CROSSING UNLESS NOTED OTHERWISE.
11. EXCAVATION MACHINERY ARE TO BE UNLOADED AND LOADED UPON THIS ALL WEATHER SURFACE. CONCRETE PUMPS AND TRUCKS WILL ALSO UTILISE THE ALL WEATHER SURFACE FOR THEIR OPERATIONS.
12. MATERIALS WILL BE UNLOADED UPON THE ALL WEATHER SURFACE WITHIN THE FRONT SETBACK AREA BY MEANS OF CRANES MOUNTED ON THE BACK OF DELIVERY TRUCKS OR UNLOADED BY HAND. A MOBILE CRANE MAY BE REQUIRED DURING THE CONSTRUCTION PROCESS.
13. SOME STOCKPILING OF TOPSOIL REMOVED FROM THE BUILDING AREA MAY BE STORED ON THE SITE DURING THE CONSTRUCTION WITHIN THE PROPERTY IN AN AREA ENCLOSED WITHIN THE SEDIMENT CONTROL FENCING.
14. ALL EXCAVATED & CONSTRUCTION MATERIALS, SHED, SKIP BINS, TEMPORARY WATER CLOSETS, SPOIL AND EQUIPMENT, ETC SHALL BE KEPT WITHIN THE PROPERTY. NO VEHICLES OR MACHINES SHALL BE KEPT WITHIN THE PROPERTY. NO VEHICLES OR MACHINES SHALL STAND ON COUNCIL FOOTPATHS FOR LARGE LENGTHS OF TIME.
15. ALL RUBBISH & RECYCLABLE MATERIAL SHALL BE STOCKPILED IN WASTE BINS IN THE AREA NOMINATED ON THE SITE PLAN WITHIN THE SITE BOUNDARY. PUBLIC PROPERTY SHALL BE KEPT FREE OF RUBBISH AND RECYCLABLES AT ALL TIMES ANY WASTE MATERIALS SHALL BE REGULARLY COLLECTED FROM THE SITE AND DISPOSED OF IN AN APPROPRIATE FASHION.
16. ANY BUILDING OR DEMOLITION WORKS INVOLVING ASBESTOS SHALL BE CARRIED OUT IN ACCORDANCE WITH THE RELAVANT STANDARDS.
17. VEHICLES LEAVING THE SITE WILL DO SO VIA THE ALL WEATHER BALLAST DRIVEWAY MADE OF COURSE AGGREGATE OR SIMILAR LOCATED WITHIN THE FRONT SETBACK AREA OF THE DEVELOPMENT. ANY DIRT OR MATERIAL DEPOSITED ON THE ROAD RESERVE OR ROADWAY IS TO BE PROMPTLY CLEANED.
18. ANY EXCAVATED AREA REQUIRING SUPPORT WILL BE UNDERTAKEN BY THE OWNER USING STRUCTURALLY APPROVED RETAINING STRUCTURES.
19. ADEQUATE SAFETY SIGNAGE MUST BE ERECTED IN A PROMINENT POSITION ON THE WORK SITE, WARNING OF UNAUTHORISED ENTRY TO WORK SITE AND INTENDING DANGERS.
20. SAFETY FENCES SHALL BE PROVIDED AROUND ALL BOUNDARIES UNLESS A CONTINUOUS STRUCTURALLY ADEQUATE FENCE PRESENTLY EXISTS. THE FENCING SHALL BE ADEQUATE TO RESTRICT PUBLIC ACCESS TO THE SITE WHEN BUILDING WORK IS NOT IN PROGRESS OR THE SITE IS UNOCCUPIED.
21. NOISE LEVELS SHALL NOT EXCEED COUNCIL REGULATION LEVELS. BUILDING AND DEMOLITION WORKS SHALL ONLY BE CARRIED OUT BETWEEN HOURS AND DAYS SPECIFIED BY COUNCIL.
22. GEOTEXTILE FABRIC SHALL BE PLACED ON THE INSIDE OF THE SITE. FENCING PRIOR TO SITE DISTURBANCE TO PREVENT SEDIMENT WASHING FROM CLEARED AND DISTURBED AREAS OF THE SITE INTO THE STORMWATER SYSTEM. DURING CONSTRUCTION, UNLESS OTHERWISE NOTED, UNCONTAMINATED RUNOFF FROM CLEARED OR DISTURBED AREAS ARE TO BE DIRECTED TO A TEMPORARY SILT ARRESTOR PIT THAT SHALL BE PROVIDED WITHIN THE SITE AT THE STREET BOUNDARY PROCESSING SITE STORMWATER BEFORE IT IS DISCHARGED TO THE STREET DRAINAGE SYSTEM OR WATERCOURSE.
23. ALL TOP SOIL STRIPPED & STOCKPILED ONSITE IS TO BE BE PLACED IN NOMINATED AREAS ON PLAN OR TO COUNCIL REQUIREMENTS. ALL DISTURBED AREAS ARE TO BE STABILISED UPON THE COMPLETION OF BUILDING WORKS.
24. ALL SEDIMENT CONTROL STRUCTURES ARE TO BE CONTINUALLY MAINTAINED DURING CONSTRUCTION AND INSPECTED FOR STRUCTURAL DAMAGE AFTER EACH RAINFALL EVENT, WITH TRAPPED SEDIMENT BEING REMOVED TO THE TOPSOIL STOCKPILE.
25. WHERE THERE IS THE POTENTIAL OF SITE EROSION TO PRODUCE EXCESSIVE SEDIMENT RUNOFF, SUITABLE GEOTEXTILE BARRIERS SHALL BE PLACED TO ALLEVIATE THE RISK ACCORDINGLY. BARE SURFACES SHALL BE KEPT MOIST TO REDUCE DUST LEVELS. GEOTEXTILE FABRIC LOCATED ON THE INSIDE OF FENCES SHALL ALSO BE UTILISED FOR DUST CONTROL WHERE NECESSARY.
26. ALL WORK SHALL BE GENERALLY CARRIED OUT IN ACCORDANCE WITH:
- a) LOCAL AUTHORITY REQUIREMENTS
- b) EPA – POLLUTION CONTROL MANUAL FOR URBAN STORMWATER
- c) LANDCOM NSW – MANAGING URBAN STORMWATER: SOILS AND CONSTRUCTION ("BLUE BOOK")
27. PRIOR TO DISCHARGE OF SITE STORMWATER, GROUNDWATER AND SEEPAGE WATER INTO COUNCIL'S STORMWATER SYSTEM, CONTRACTORS MUST UNDERTAKE WATER QUALITY TESTS IN CONJUNCTION WITH A SUITABLY QUALIFIED ENVIRONMENT CONSULTANT OUTLIN THE FOLLOWING:
- a) COMPLIANCE WITH THE CRITERIA OF THE AUSTRALIAN AND NEW ZEALAND GUIDELINES FOR FRESH AND MARINE WATER QUALITY (2000)
- b) IF SUBJECT TO THE ENVIRONMENTAL CONSULTANTS ADVICE, PROVIDE REMEDIAL MEASURES TO IMPROVE THE QUALITY OF WATER THAT IS TO BE DISCHARGED INTO COUNCIL'S STORMWATER DRAINAGE SYSTEM. THIS SHOULD INCLUDE COMMENTS FROM A SUITABLY QUALIFIED ENVIRONMENTAL CONSULTANT CONFIRMING THE SUITABILITY OF THESE REMEDIAL MEASURES TO MANAGE THE WATER DISCHARGED FROM THE SITE INTO COUNCIL'S STORMWATER DRAINAGE SYSTEM. OUTLINING THE PROPOSED, ONGOING MONITORING, CONTINGENCY PLANS AND VALIDATION PROGRAM THAT WILL BE IN PLACE TO CONTINUALLY MONITOR THE QUALITY OF WATER DISCHARGED FROM THE SITE. THIS SHOULD OUTLINE THE FREQUENCY OF WATER QUALITY TESTING THAT WILL BE UNDERTAKEN BY A SUITABLY QUALIFIED ENVIRONMENTAL CONSULTANT.

MINIMUM INTERNAL DIMENSIONS FOR STORMWATER AND INLET PITS AS3500.3 – TABLE 7.5.2.1			
DEPTH TO INVERT OF OUTLET	MINIMUM INTERNAL DIMENSIONS (mm)		
	RECTANGULAR		CIRCULAR
	Width	Length	Diameter ϕ
≤ 450	350	350	–
≤ 600	450	450	600
$> 600 \leq 900$	600	600	900
$> 900 \leq 1200$	600		1000
> 1200	900	900	1000



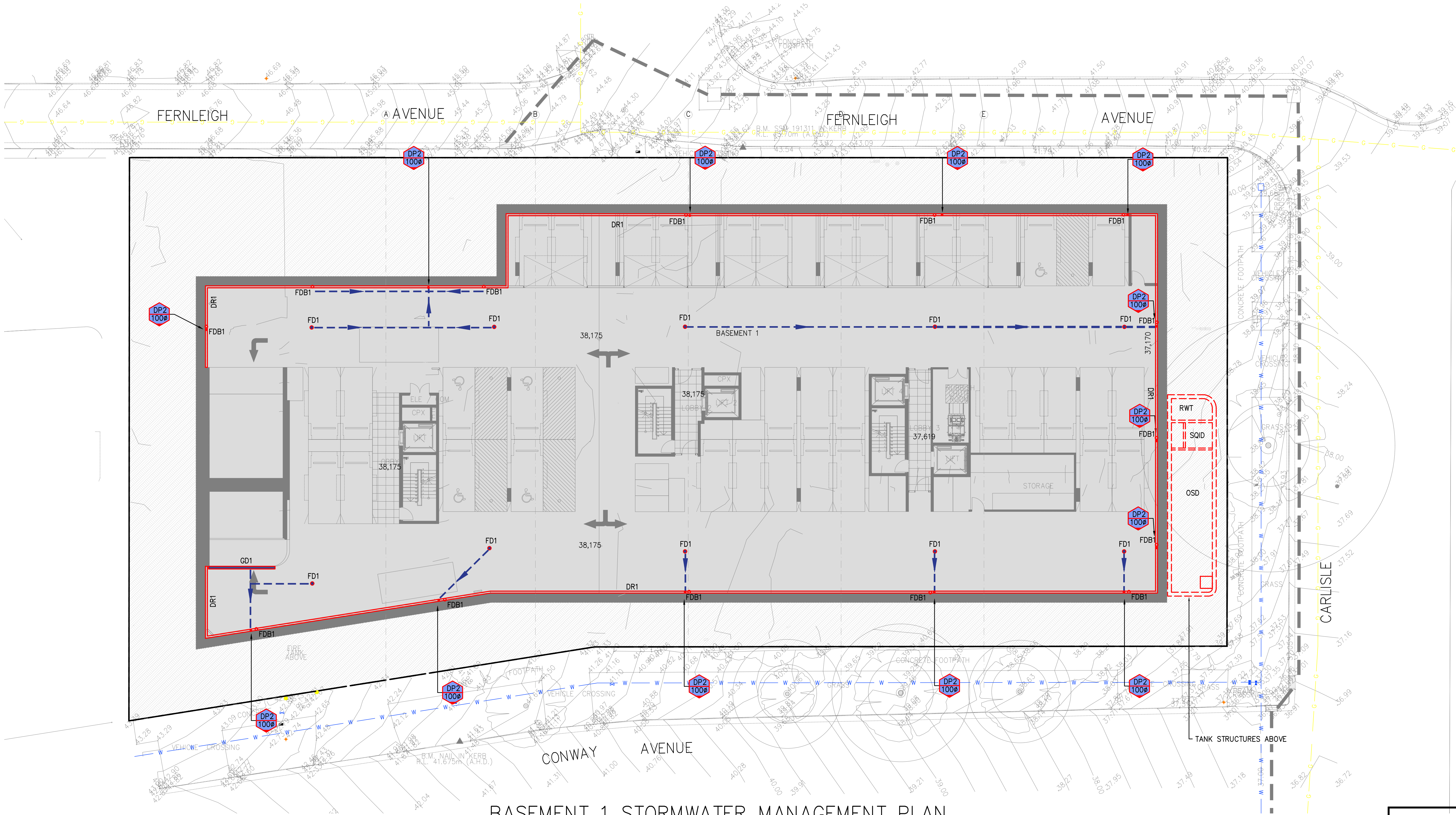
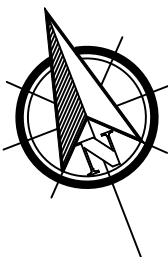
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				Approved by:	DESIGN	R.M	28.10.2025												
					DRAWN	S.M	28.10.2025												
B	07.05.26	RESPONSE TO SUBMISSIONS	R.M	Date : 07.05.26	CHECKED	R.M	18.12.2025												
A	18.12.25	STORMWATER MANAGEMENT PLAN FOR DA SUBMISSION	R.M	Rhys Mikhail Director Principal Engineer NER: 2570082 RPEQ: 17480 BEng (Civil) Hons MIEAust CPEng NER RPEQ APEC INtPE(Aus)	APPROVED	R.M	18.12.2025												
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				Client: TWO CONWAY PTY LTD				Project and Drawing Title: 2-6 CONWAY AVENUE & 38-40 CARLISLE STREET, ROSEBAY				Local Council: WOOLLAHRA COUNCIL				Project Number: 251004			
								COVERPAGE, NOTES & CALCULATIONS				Drawing ID: SW002				Issue: B			
								SHEET 2 OF 2											



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			Approved by:			DESIGN			R.M			28.10.2025						WOOLLAHRA COUNCIL											
B 07.05.26 RESPONSE TO SUBMISSIONS R.M			Date : 07.05.26 R. Mikhail Rhys Mikhail Director Principal Engineer NER: 2570082 RPEQ: 17480 BEng (Civil) Hons MIEAust CPEng NER RPEQ APEC InPE(Aus)			DRAWN			S.M			28.10.2025						Project Number:											
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Rev: Date: Description: Reviewed:			APPROVED R.M 18.12.2025												Client:			TWO CONWAY PTY LTD			Issue:								
																		251004 SW100 B											

NOTES:
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2. ALL DIMENSIONS SHALL BE VERIFIED ONSITE BY
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BASEMENT 1 STORMWATER MANAGEMENT PLAN

SCALE = 1 : 150

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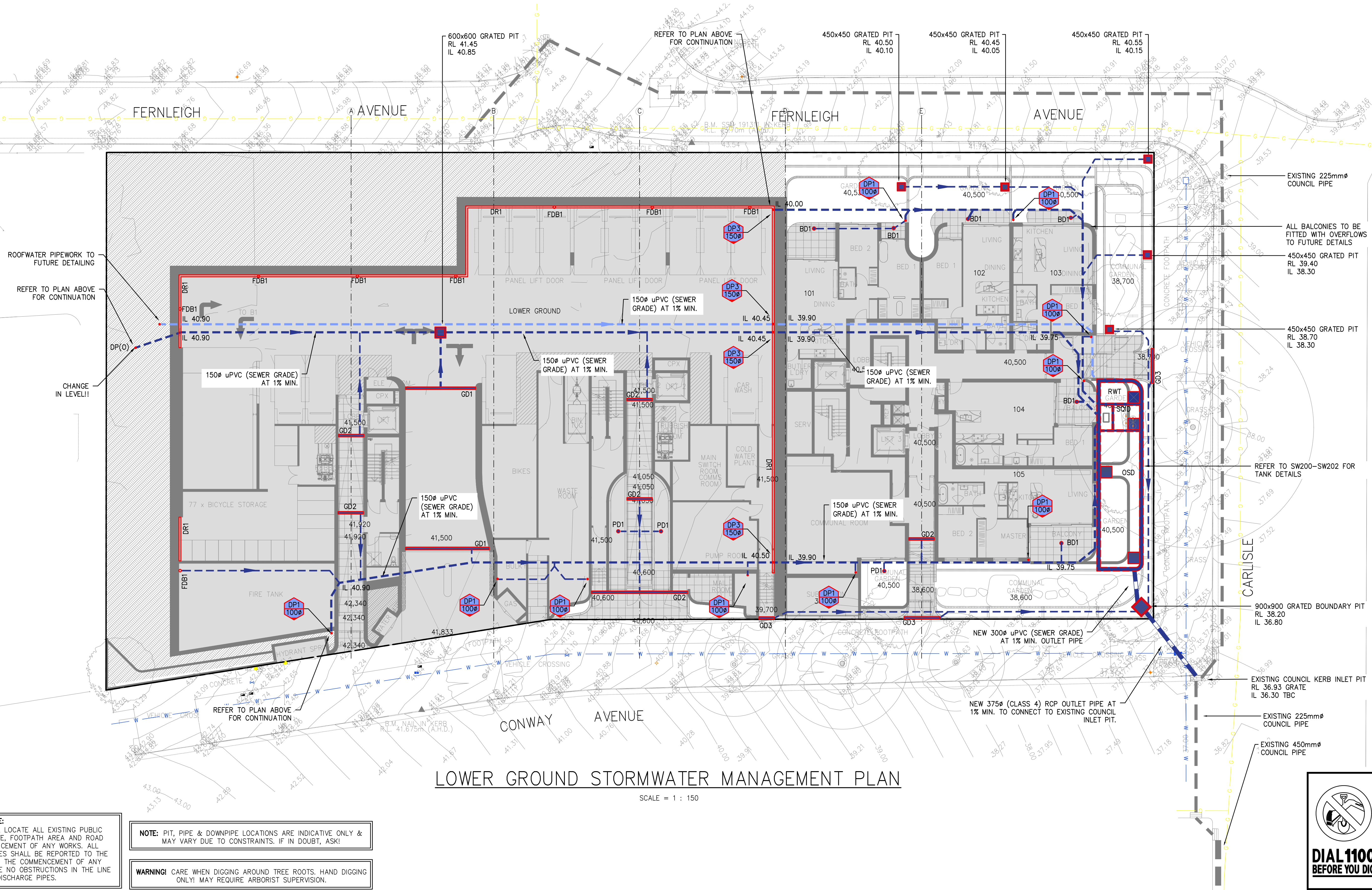
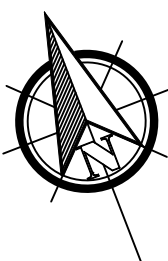
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A1 ORIGINAL																									
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				Approved by:			DESIGN	R.M	28.10.2025		MHNDUNION		2-6 CONWAY AVENUE & 38-40 CARLISLE STREET, ROSEBAY BASEMENT 1 STORMWATER MANAGEMENT PLAN				WOOLLAHRA COUNCIL								
B	07.05.26	RESPONSE TO SUBMISSIONS	R.M	Date : 07.05.26 Rhys Mikhail Director Principal Engineer NER: 2570082 RPEQ: 17480 BEng (Civil) Hons MIEAust CPEng NER RPEQ APEC IntPE(Aus)			DRAWN	S.M	28.10.2025																
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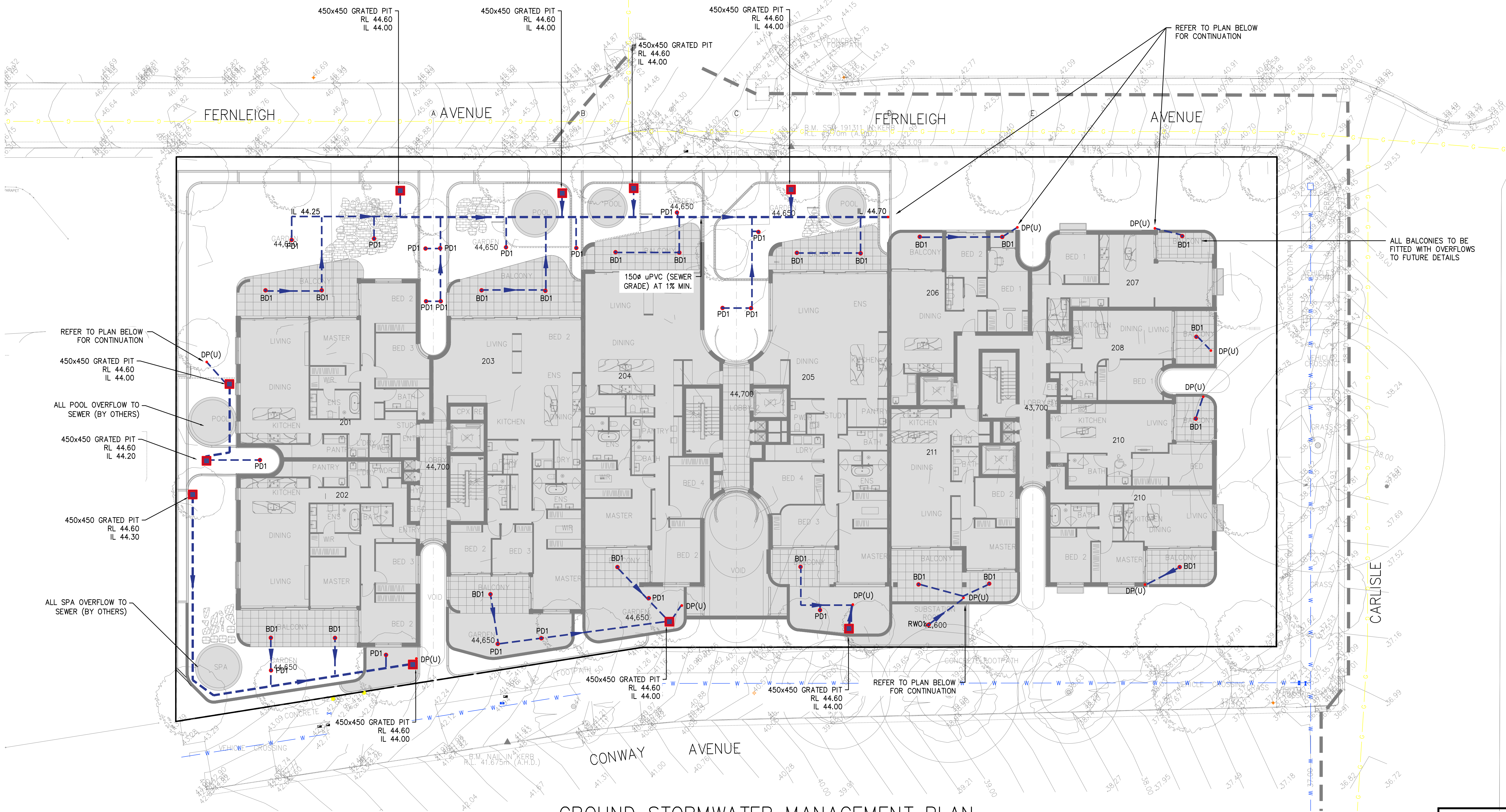
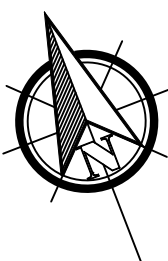


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				Approved by:		DESIGN	R.M	28.10.2025			Client:					WOOLLAHRA COUNCIL			
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A	18.12.25	STORMWATER MANAGEMENT PLAN FOR DA SUBMISSION	R.M			CHECKED	R.M	18.12.2025								251004		SW102	B
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NOTES:
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GROUND STORMWATER MANAGEMENT PLAN

SCALE = 1 : 150

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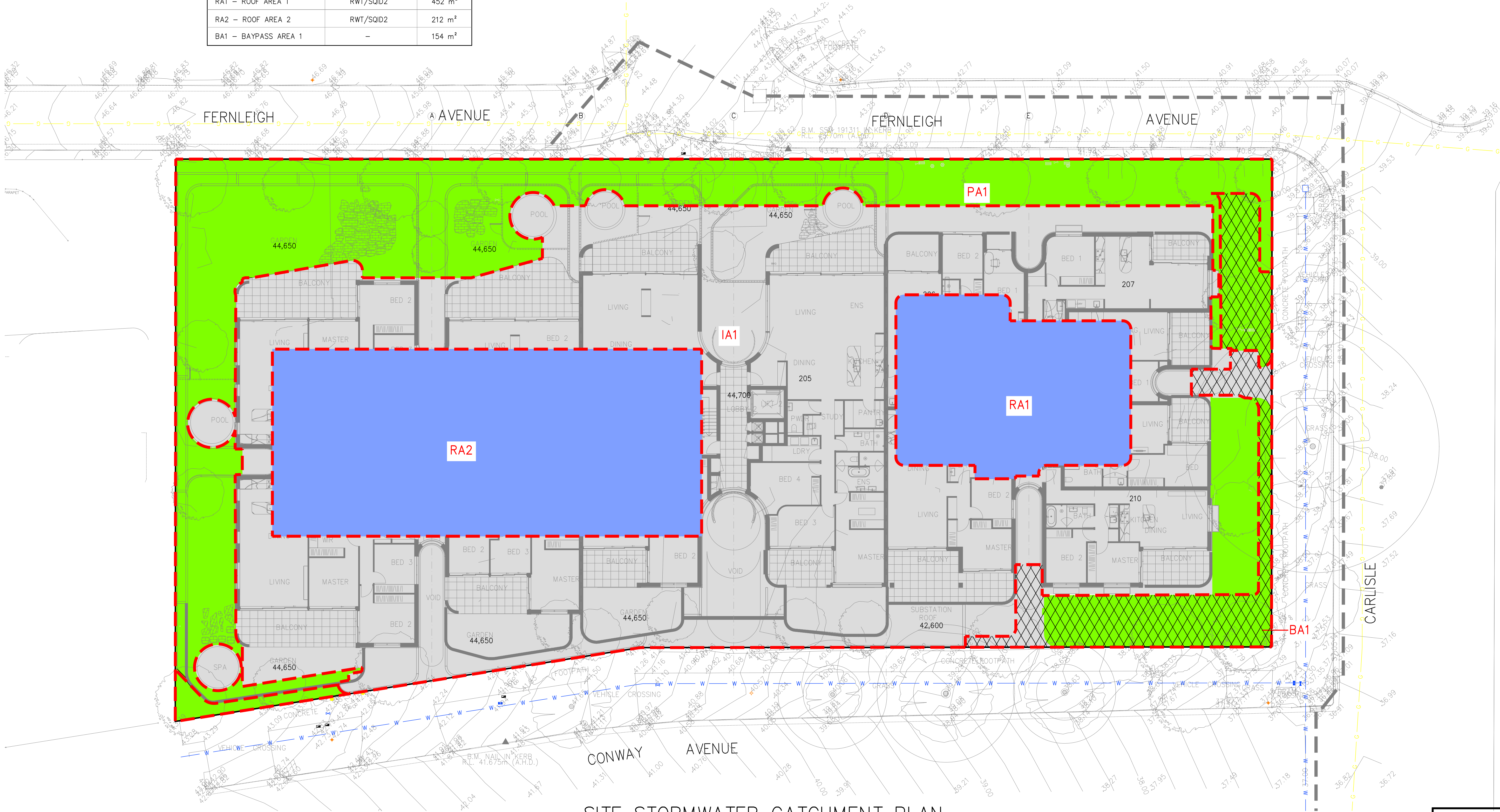
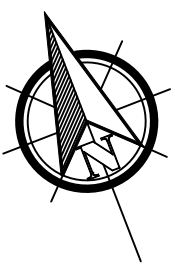
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				Issued for: DEVELOPMENT APPLICATION			Title:	Initial:	Date:	RTS CIVIL CONSULTING ENGINEERS STORMWATER • CIVIL • FLOOD MITIGATION ABN: 81 615 065 588 Phone: 0490 507 300 Email: admin@rtscivil.com.au Web: rtscivil.com.au			Architect: MHNDUNION		Project and Drawing Title: 2-6 CONWAY AVENUE & 38-40 CARLISLE STREET, ROSEBAY GROUND STORMWATER MANAGEMENT PLAN			Local Council: WOOLLAHRA COUNCIL		
Approved by:			DESIGN	R.M	28.10.2025															
Date : 07.05.26 Rhys Mikhail Director Principal Engineer NER: 2570082 RPEQ: 17480 BEng (Civil) Hons MIEAust CPEng NER RPEQ APEC IntPE(Aus)			DRAWN	S.M	28.10.2025															
			CHECKED	R.M	18.12.2025															
B	07.05.26	RESPONSE TO SUBMISSIONS	R.M				APPROVED	R.M	18.12.2025											
A	18.12.25	STORMWATER MANAGEMENT PLAN FOR DA SUBMISSION	R.M																	
Rev:	Date:	Description:	Reviewed:																	

NOTES:
1. U.N.O REFER TO THE COVERPAGE 001 SERIES FOR DETAILED NOTES AND CALCULATIONS.
2. ALL DIMENSIONS SHALL BE VERIFIED ONSITE BY BUILDER BEFORE COMMENCING WITH WORK.

WSUD MUSIC MODELLING CATCHMENT DETAILS		
CATCHMENT	TREATMENT DEVICE	AREA
IA1 – IMPERVIOUS AREA 1	SQID1	1,671 m ²
PA1 – PERVIOUS AREA 1	SQID1	616 m ²
RA1 – ROOF AREA 1	RWT/SQID2	452 m ²
RA2 – ROOF AREA 2	RWT/SQID2	212 m ²
BA1 – BAYPASS AREA 1	–	154 m ²

NOT FOR CONSTRUCTION



SITE STORMWATER CATCHMENT PLAN

SCALE = 1 : 150

NOTE:
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NOTE: PIT, PIPE & DOWNPIPE LOCATIONS ARE INDICATIVE ONLY & MAY VARY DUE TO CONSTRAINTS. IF IN DOUBT, ASK!

WARNING! CARE WHEN DIGGING AROUND TREE ROOTS. HAND DIGGING ONLY! MAY REQUIRE ARBORIST SUPERVISION.

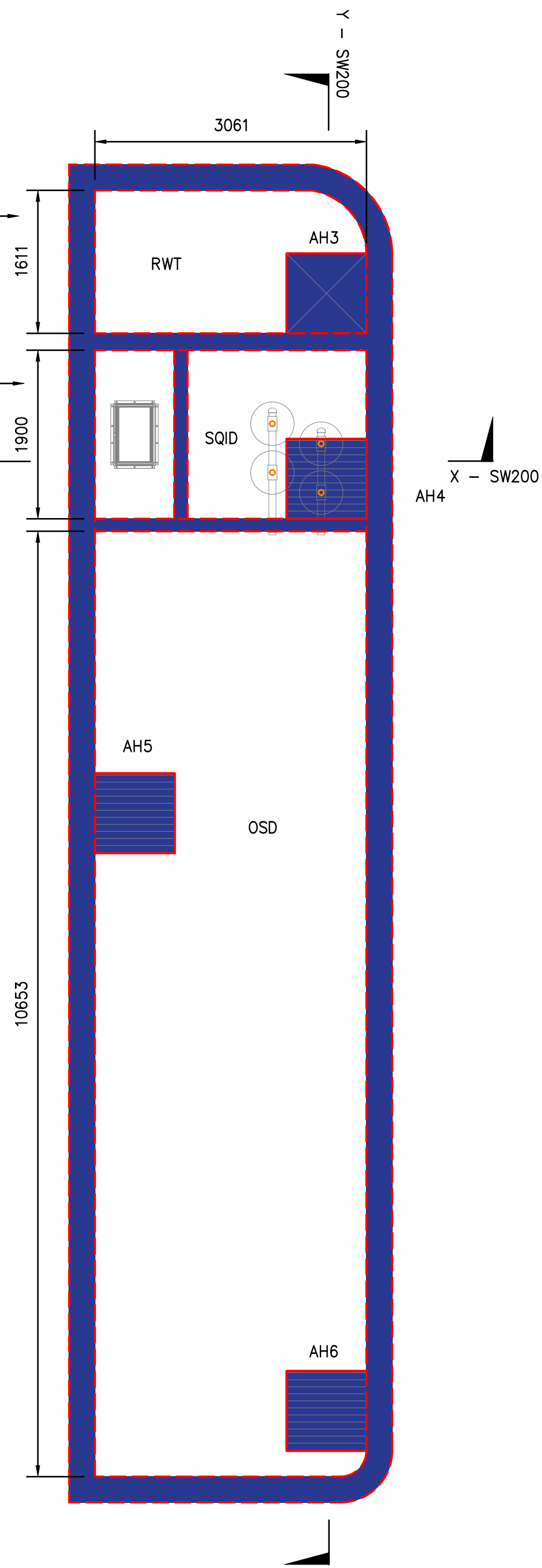
DIAL 1100
BEFORE YOU DIE

A1 ORIGINAL																		
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				Approved by:		DESIGN	R.M	28.10.2025			Client:					WOOLLAHRA COUNCIL		
B	07.05.26	RESPONSE TO SUBMISSIONS	R.M	Date : 07.05.26 Rhys Mikhail Director Principal Engineer NER: 2570082 RPEQ: 17480 BEng (Civil) Hons MIEAust CPEng NER RPEQ APEC INPE(Aus)		DRAWN	S.M	28.10.2025			TWO CONWAY PTY LTD					Project Number:		
A	18.12.25	STORMWATER MANAGEMENT PLAN FOR DA SUBMISSION	R.M			CHECKED	R.M	18.12.2025								Drawing ID:		
Rev:	Date:	Description:	Reviewed:			APPROVED	R.M	18.12.2025	The document is produced by RTS Civil Consulting Engineers Pty Ltd (RTS) solely for the benefit of and use by the client in accordance with the terms and conditions of RTS. RTS does not and shall not assume any responsibility or liability whatsoever to any third party arising out of any use or reliance by third party on the content of this document.		Issue:							
											251004			SW104		B		

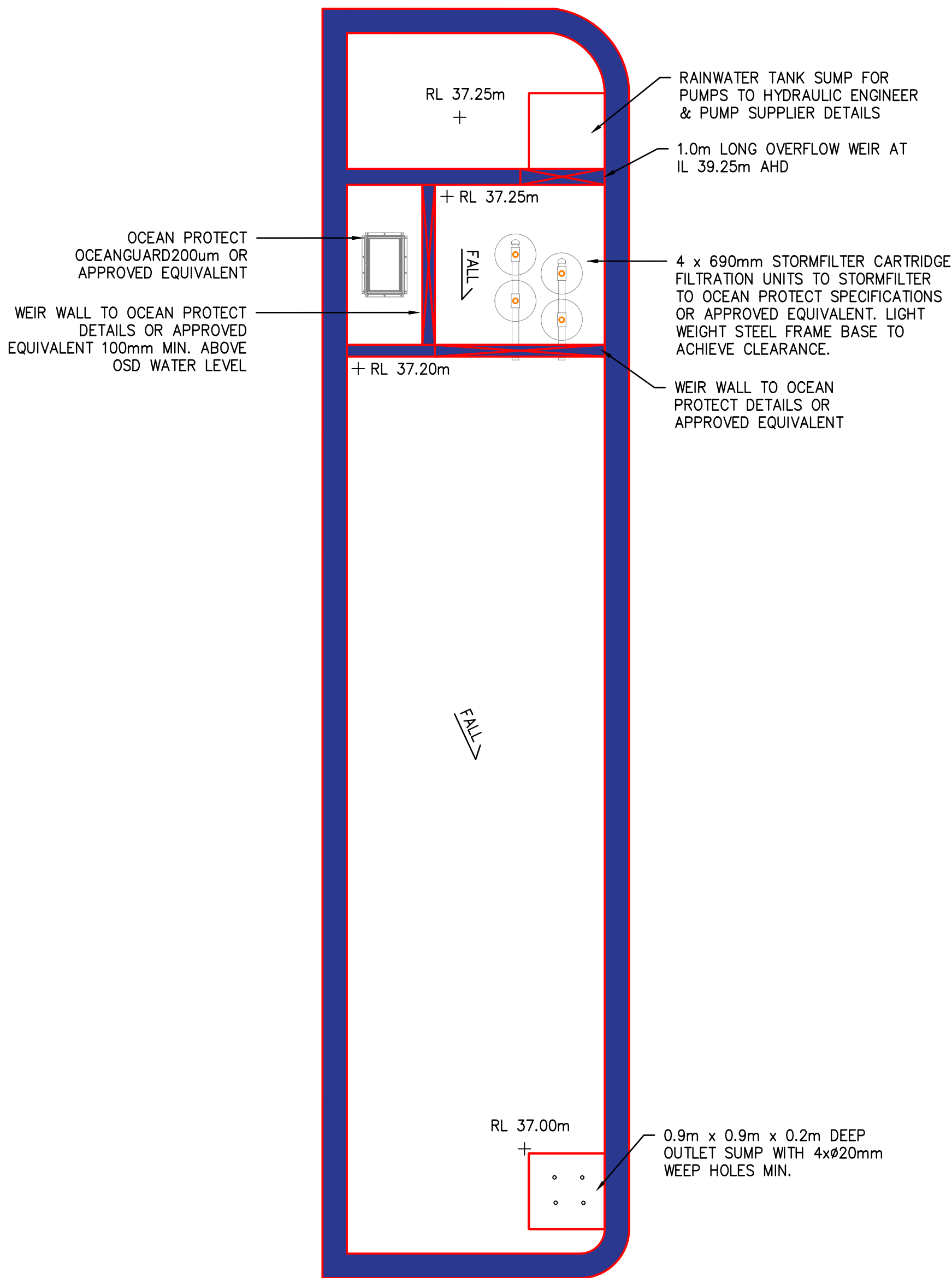
1. U.N.O REFER TO THE COVERPAGE 001 SERIES FOR DETAILED NOTES AND CALCULATIONS.
2. ALL DIMENSIONS SHALL BE VERIFIED ONSITE BY BUILDER BEFORE COMMENCING WITH WORK.

ALL ROOF RUNOFF TO BE DIRECTED TO
RAINWATER TANK TO BASIX REQUIREMENTS

ALL SURFACE RUNOFF, ROOF RUNOFF THAT CANNOT
ENTER RAINWATER TANK & BASEMENT PUMP-OUT
LINE TO ENTER TANK SYSTEM VIA FIRST SQID
CHAMBER FITTED WITH 1 x OCEAN PROTECT
OCEANGUARD200um OR APPROVED EQUIVALENT



SCALE = 1 : 50



SCALE = 1 : 50

THE BUILDER/CONTRACTOR SHALL LOCATE ALL EXISTING PUBLIC UTILITY SERVICES WITHIN THE SITE, FOOTPATH AREA AND ROAD, RESERVE PRIOR TO THE COMMENCEMENT OF ANY WORKS. ALL LOCATIONS AND LEVELS OF SERVICES SHALL BE REPORTED TO THE STORMWATER ENGINEER PRIOR TO THE COMMENCEMENT OF ANY WORKS TO ENSURE THAT THERE ARE NO OBSTRUCTIONS IN THE LINE OF THE DRAINAGE DISCHARGE PIPES.



A1 ORIGINAL																					
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				Approved by:		DESIGN	R.M	28.10.2025			Client:					TWO CONWAY PTY LTD			WOOLLAHRA COUNCIL Project Number: 251004 Drawing ID: SW200 Issue: B		
B	07.05.26	RESPONSE TO SUBMISSIONS	R.M	Date : 07.05.26 Rhys Mikhail Director Principal Engineer NER: 2570082 RPEQ: 17480 BEng (Civil) Hons MIEAust CPEng NER RPEQ APEC INPE(Aus)		DRAWN	S.M	28.10.2025			The document is produced by RTS Civil Consulting Engineers Pty Ltd (RTS) solely for the benefit of and use by the client in accordance with the terms and conditions of RTS. RTS does not and shall not assume any responsibility or liability whatsoever to any third party arising out of any use or reliance by third party on the content of this document.										
A	18.12.25	STORMWATER MANAGEMENT PLAN FOR DA SUBMISSION	R.M			CHECKED	R.M	18.12.2025													
Rev:	Date:	Description:	Reviewed:			APPROVED	R.M	18.12.2025													

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Technical drawing showing the cross-section detail of a water quality, rainwater, and onsite stormwater detention tank. The drawing includes various components and structural details:

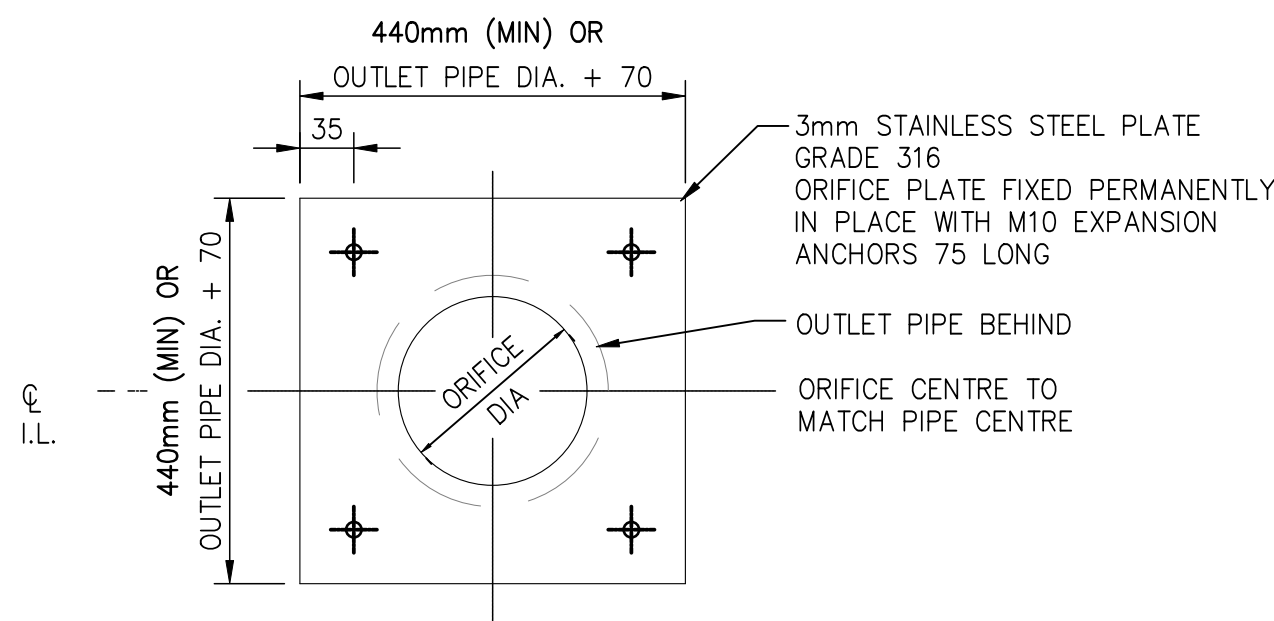
- 900x900 GRATED BOUNDARY PIT** (RL 38.45 MAX. RL 38.20)
- MAXI MESH DEBRIS SCREEN**
- BYPASS INLET PIPES**
- 375mmØ (CLASS 4) RCP OUTLET PIPE**
- 1.0m WIDE x 0.2m HIGH MIN. EMERGENCY OVERFLOW WEIR**
- 150mmØ OVERFLOW PIPE**
- OSD: 77,600L MIN. ONSITE STORMWATER DETENTION TANK (39.0m² x 2.0m AVE. DEEP APPROX.)**
- MAXI MESH DEBRIS SCREEN**
- 195mmØ ORIFICE CL 37.00m**
- 300mmØ OUTLET PIPE**
- BLUE METAL**
- BIDIM A24 OR SIMILAR GEOTEXTILE FILTER FABRIC**
- 900x900 GRATED (GALV.) ACCESS LID WITH STEP IRONS TO AS1657 REQUIREMENTS**
- 900x900 GRATED (GALV.) ACCESS LID WITH STEP IRONS TO AS1657 REQUIREMENTS**
- 900x900 GRATED (GALV.) ACCESS LID WITH STEP IRONS TO AS1657 REQUIREMENTS**
- 900x900 GRATED (GALV.) ACCESS LID WITH STEP IRONS TO AS1657 REQUIREMENTS**
- INLET PIPES**
- PUMP OUT LINE TO BE DIRECTLY CONNECTED TO SQID. PUMP OUT LINE TO PUMP SUPPLIER SPECIFICATIONS. NON-RETURN VALVE REQUIRED. ALIGNMENT SHOWN INDICATIVE ONLY.**
- PLANTER**
- PLANTER**
- PLANTER**
- PLANTER**
- ROOFWATER INLET PIPES**
- 1.0m WIDE x 0.2m HIGH MIN. OVERFLOW WEIR WITH NON-RETURN FLAP**
- RWT: 9,000L RAINWATER HARVESTING TANK - 3,000L MIN BASIX (4.5m² x 2.0m AVE. DEEP APPROX.)**
- 4 x STORMFILTER 690Psorb BY OCEAN PROTECT OR APPROVED EQUIVALENT**
- FALSE FLOOR POURED BY OCEAN PROTECT AFTER UNDERDRAIN INSTALLATION**
- WATER PROOF MEMBRANE TO ARCHITECTS DETAIL**
- TANK & RETAINING STRUCTURES TO STRUCTURAL ENGINEERS DETAILS**
- SECTION Y-Y: WATER QUALITY, RAINWATER & ONSITE STORMWATER DETENTION TANK DETAIL**

SECTION Y-Y: WATER QUALITY, RAINWATER & ONSITE STORMWATER DETENTION TANK DETAIL

SCALE 1:20

EXISTING KERB INLET SECTION (TYP.)

SCALE = 1 : 20



ORIFICE PLATE DETAIL

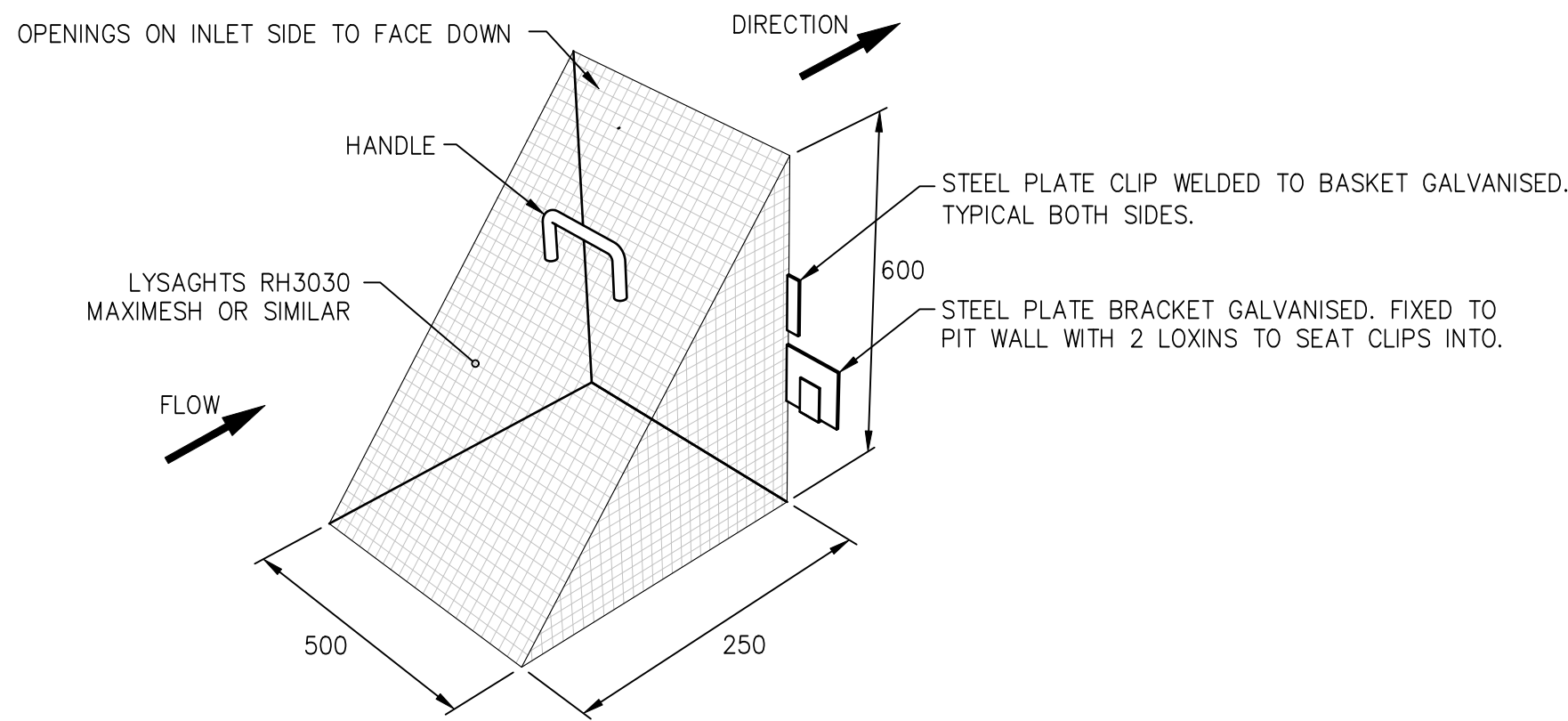
SCALE = N.T.S.

PUMP OUT SYSTEM
FAILURE IN BASEMENT
WHEN LIGHT IS
FLASHING AND SIREN
SOUNDING

CONFINED SPACE
 NO ENTRY WITHOUT
 CONFINED SPACE
 TRAINING

TYPICAL TANK SIGNAGE

N.T.S



MAXI MESH SCREEN DETAIL

SCALE = N.T.S.

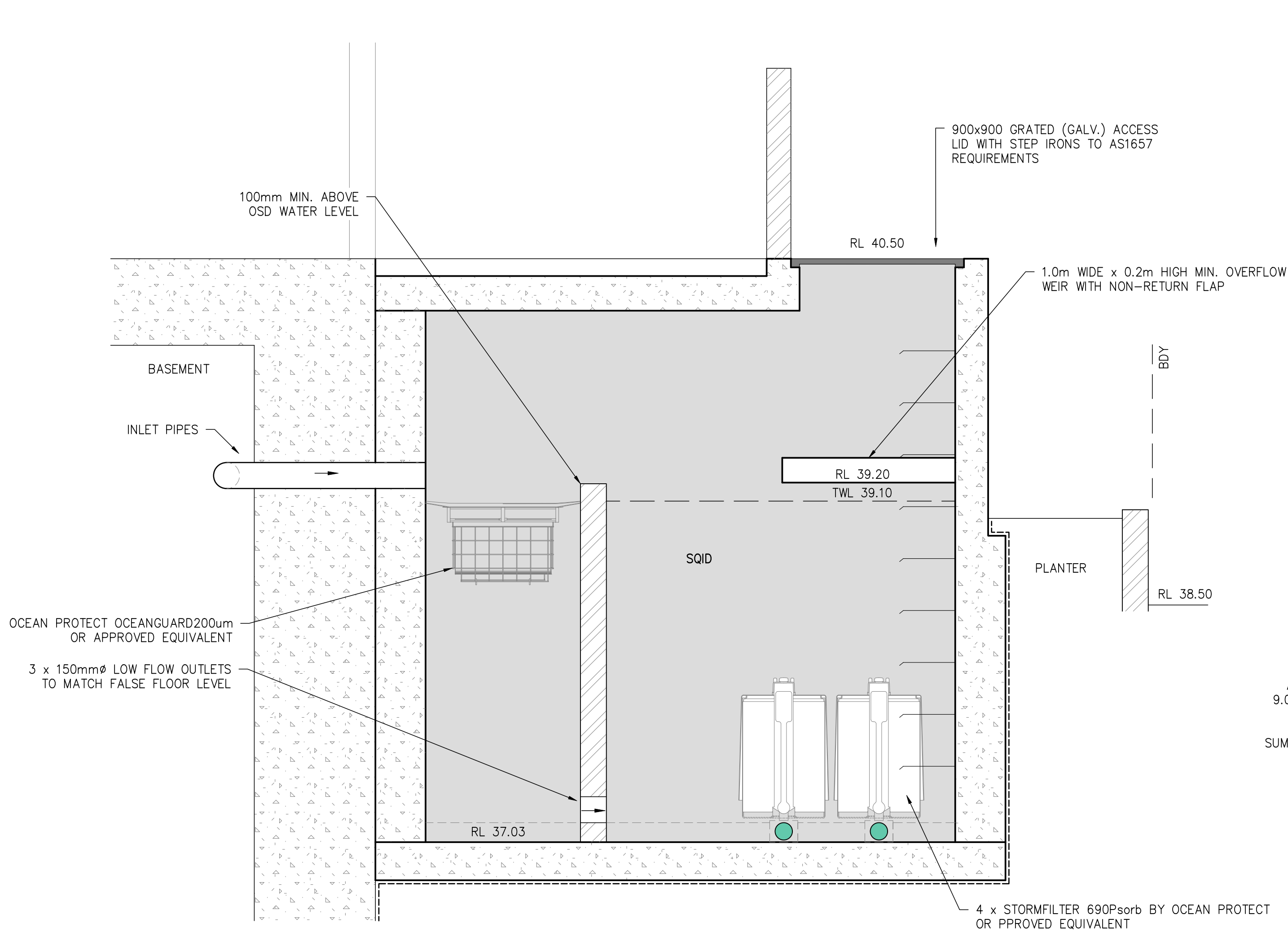
NOTE:

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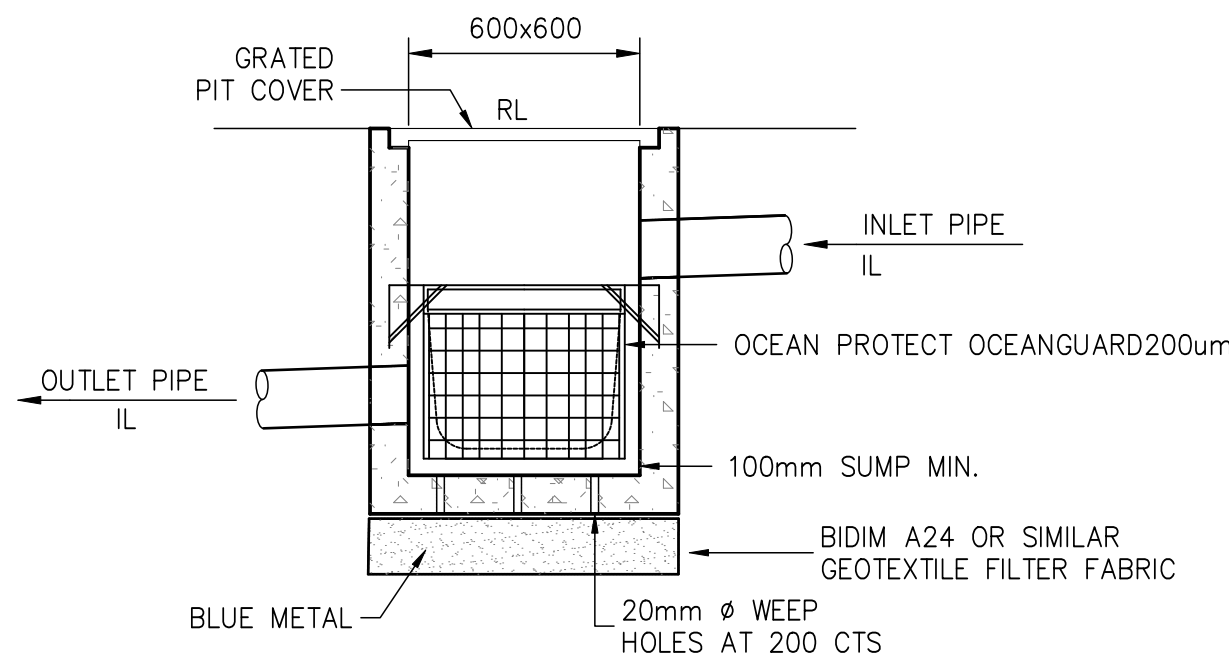
A1 ORIGINAL																		
				Issued for: DEVELOPMENT APPLICATION		Title:	Initial:	Date:	RTS CIVIL CONSULTING ENGINEERS STORMWATER • CIVIL • FLOOD MITIGATION ABN: 81 615 065 588 Phone: 0490 507 300 Email: admin@rtscivil.com.au Web: rtscivil.com.au		Architect:		Project and Drawing Title: 2-6 CONWAY AVENUE & 38-40 CARLISLE STREET, ROSEBAY STORMWATER DRAINAGE DETAILS SHEET 2 OF 4		Local Council:			
				Approved by:		DESIGN	R.M	28.10.2025			Client:				TWO CONWAY PTY LTD		Project Number:	
B	07.05.26	RESPONSE TO SUBMISSIONS	R.M	Date : 07.05.26 Rhys Mikhail Director Principal Engineer NER: 2570082 RPEQ: 17480 BEng (Civil) Hons MIEAust CPEng NER RPEQ APEC INPE(Aus)		DRAWN	S.M	28.10.2025									Drawing ID:	
A	18.12.25	STORMWATER MANAGEMENT PLAN FOR DA SUBMISSION	R.M			CHECKED	R.M	18.12.2025									Issue:	
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														SW201				
														B				

NOTES:
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NOT FOR CONSTRUCTION



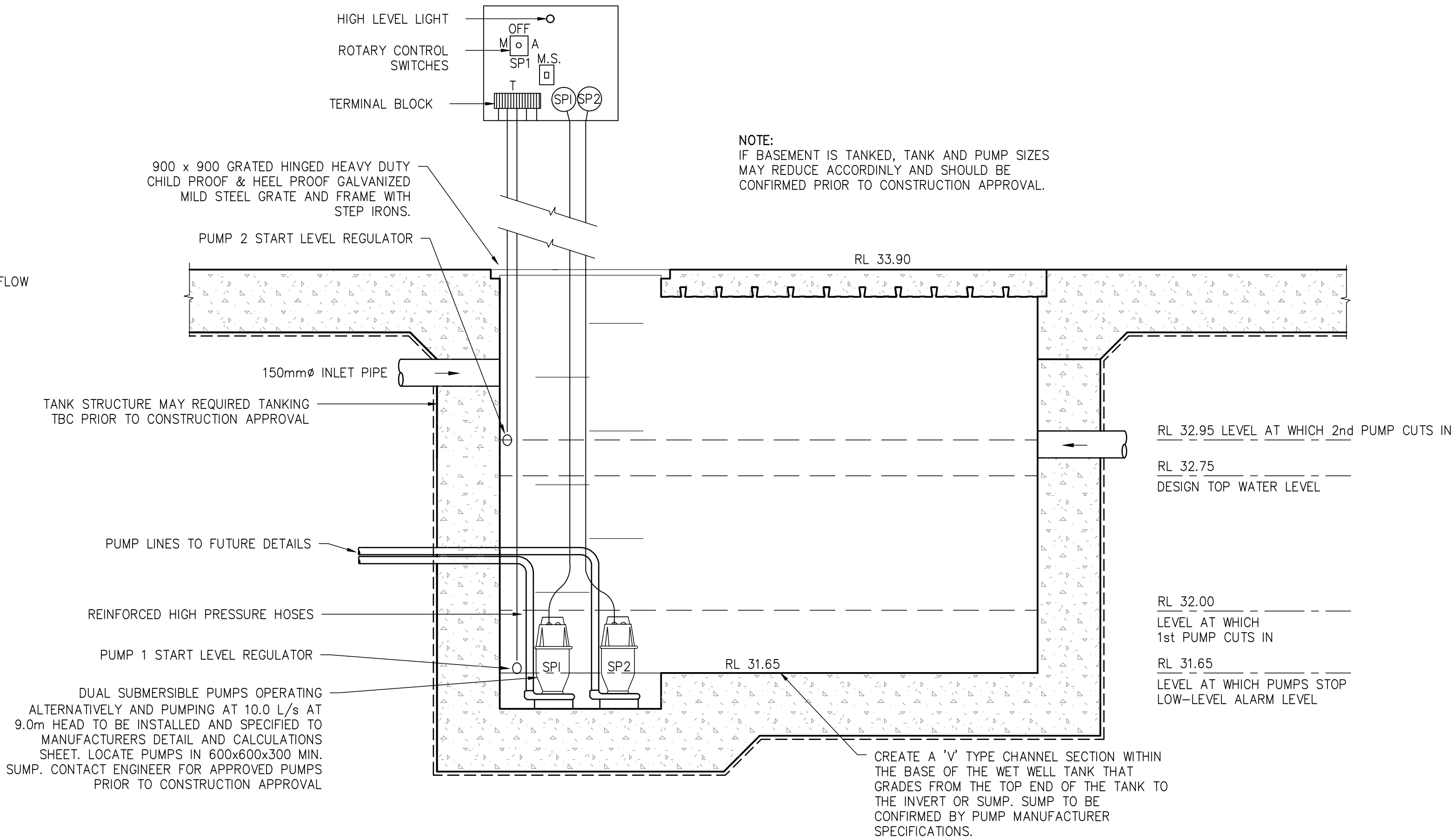
TANK & RETAINING STRUCTURES TO STRUCTURAL ENGINEERS DETAILS
SECTION X-X: WATER QUALITY & ONSITE STORMWATER DETENTION TANK DETAIL
SCALE 1:20



NOTE:
PRECAST OR CAST INSITU PIT. REFER STORMWATER NOTES OR PROVIDE ALTERNATE POLYPROPYLENE PIT BY MANUFACTURER IF APPROVED BY ENGINEER

PITS WITH SQID FILTER DETAIL
SCALE = 1 : 20

NOTE:
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TANK STRUCTURE TO STRUCTURAL ENGINEERS DETAILS
BASEMENT WET WELL (PP1 PUMP-OUT TANK) DETAIL
SCALE = 1 : 20

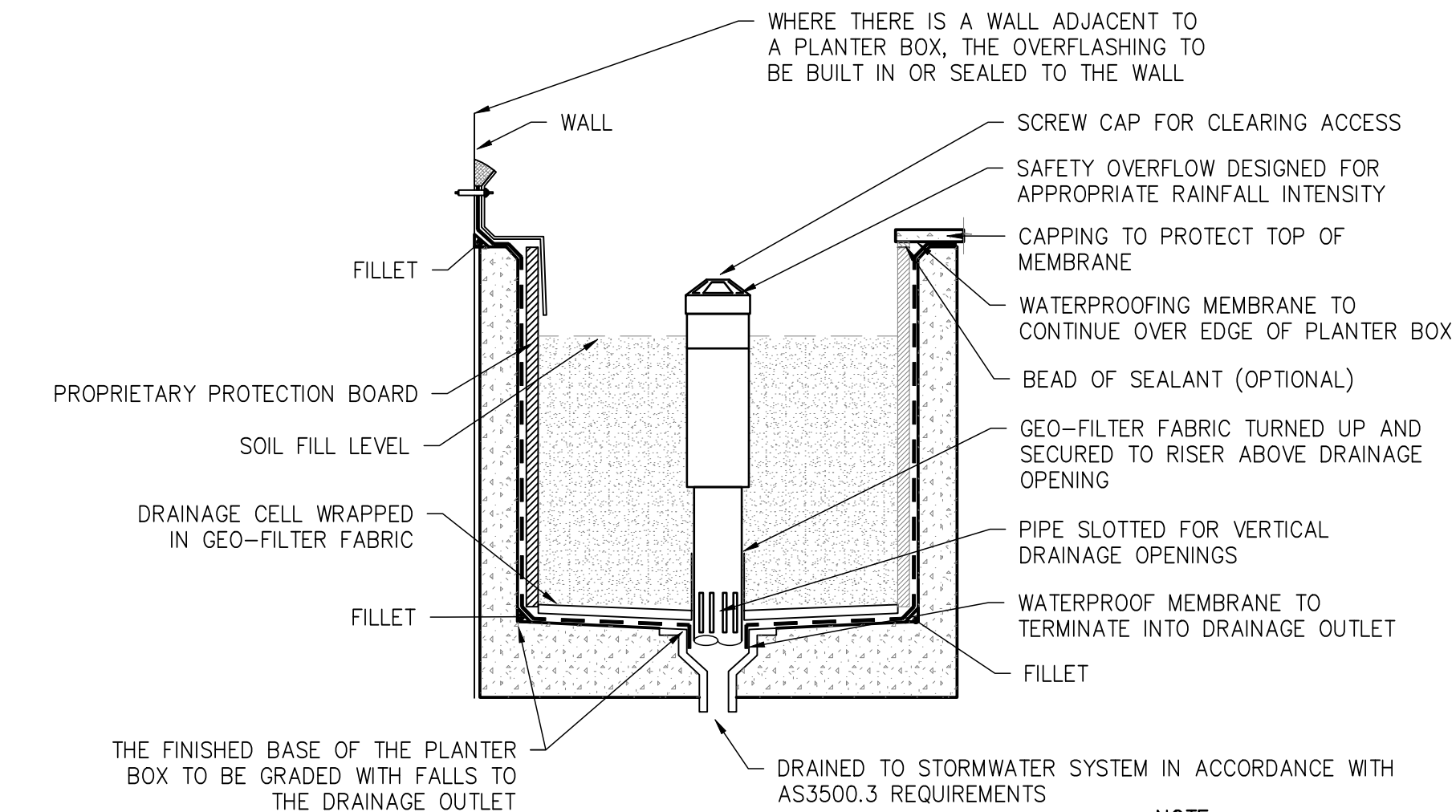
TYPICAL PUMP-OUT NOTES:

- THE PUMP-OUT SYSTEM IS DESIGNED TO WORK IN THE FOLLOWING MANNER:
1. A LOW LEVEL FLOAT SHALL BE PROVIDED TO ENSURE THAT THE MINIMUM REQUIRED WATER LEVEL IS MAINTAINED WITHIN THE SUMP AREA OF THE BELOW GROUND TANK. IN THIS REGARD LOW LEVEL FLOAT WILL FUNCTION AS AN OFF SWITCH FOR THE PUMP AND TO SET 100mm ABOVE BOTTOM OF TANK TO ALLOW 100mm DEPTH OF WATER MAINTAINED AT ALL TIMES.
 2. A SECOND FLOAT SHALL BE PROVIDED AT A HIGHER LEVEL, APPROXIMATELY 300mm ABOVE THE MINIMUM WATER LEVEL (I.E. 300mm ABOVE LOWER LEVEL FLOAT), WHEREBY THE PUMP WILL OPERATE & DRAIN THE TANK TO THE LEVEL OF THE LOW LEVEL FLOAT.
 3. A THIRD FLOAT SHALL BE SET NOT HIGHER THAN 100mm ABOVE THE INVERT OF THE INLET PIPE. THIS FLOAT SHOULD ACTIVATE THE ALARM.
 4. AN ALARM SYSTEM SHALL BE PROVIDED WITH A FLASHING STROBE LIGHT ALARM AND AN AUDIBLE ALARM WHICH ARE TO BE LOCATED AT THE DRIVEWAY ENTRANCE TO THE BASEMENT LEVEL. THE ALARM SYSTEM SHALL BE PROVIDED WITH A BATTERY BACK-UP IN CASE OF POWER FAILURE.
 5. THE PUMP CONTROLS SHALL BE SET UP TO ENABLE ALTERNATE PUMP OPERATION AT EACH START. IN THE EVENT A PUMP FAILS TO OPERATE WHEN THE WATER LEVEL IN THE WET WELL REACHES THE PUMP START, THE OTHER PUMP SHALL BE ACTIVATED, AND A FLASHING STROBE LIGHT ALARM INITIATED. IN THE EVENT THAT BOTH PUMPS FAIL TO OPERATE, AN AUDIBLE ALARM SHALL BE INITIATED.
 6. PUMPS SHALL BE FITTED WITH A GATE VALVE AND NON-RETURN VALVE ON THE DELIVERY SIDE OF EACH PUMP. THE VALVES SHOULD BE ACCESSIBLE WITHOUT HAVING TO ENTER THE WELL.
 7. WET-WELL STRUCTURE TO STRUCTURAL ENGINEERS DETAILS. SUB-SOIL OR TANKING DETAILS TO BE CONFIRMED BY GEOTECHNICAL AND STRUCTURAL ENGINEERS PRIOR TO DETAILED DESIGN.
 8. FINAL PUMP SPECIFICATION (DUTY, ELECTRICAL COMPLIANCE, HAZARDOUS AREA CLASSIFICATION IF REQUIRED) TO BE CONFIRMED BY BUILDING HYDRAULIC/ELECTRICAL SERVICES ENGINEER.
 9. REFER TO THE COVERPAGE 001 SERIES FOR ONSITE DRAINAGE PUMP OUT CALCULATIONS AND ADDITIONAL DETAILS.



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				Approved by:			DESIGN		R.M	28.10.2025		MHNDUNION		2-6 CONWAY AVENUE & 38-40 CARLISLE STREET, ROSEBAY		WOOLLAHRA COUNCIL		
B				07.05.26	RESPONSE TO SUBMISSIONS			DRAWN	S.M	28.10.2025		Client:		STORMWATER DRAINAGE DETAILS		Project Number:		
A				18.12.25	STORMWATER MANAGEMENT PLAN FOR DA SUBMISSION			CHECKED	R.M	18.12.2025		TWO CONWAY PTY LTD		SHEET 3 OF 4		Drawing ID:		
Rev:				Date:	Description:			APPROVED	R.M	18.12.2025						Issue:		
					Reviewed:											251004 SW202 B		

NOTES:
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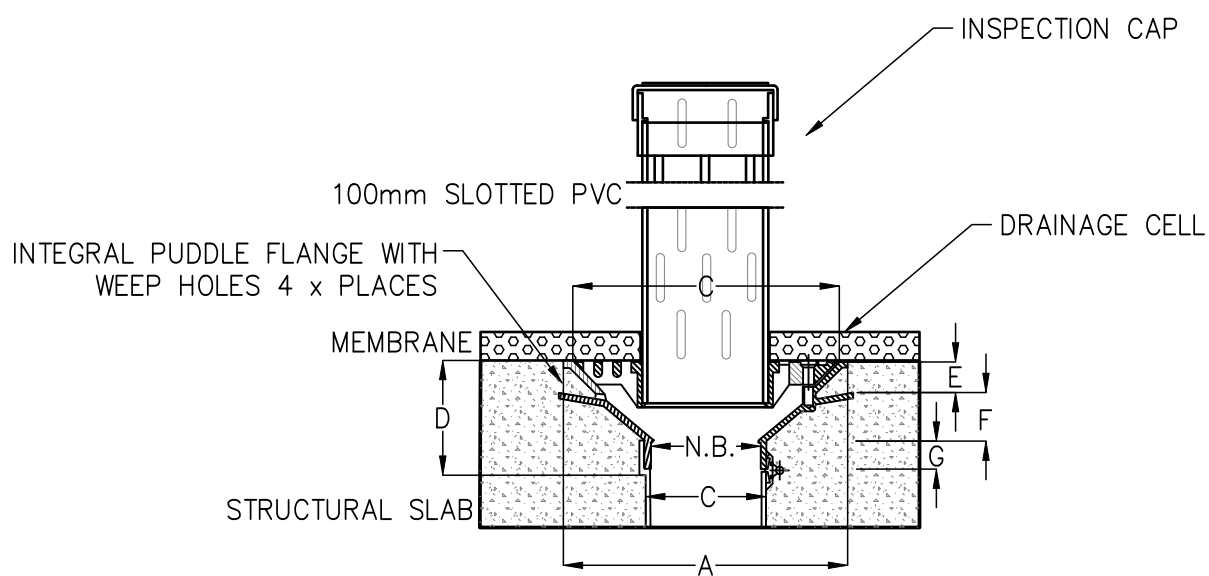


TYPICAL PLANTER BOX CONSTRUCTION

SCALE = NTS

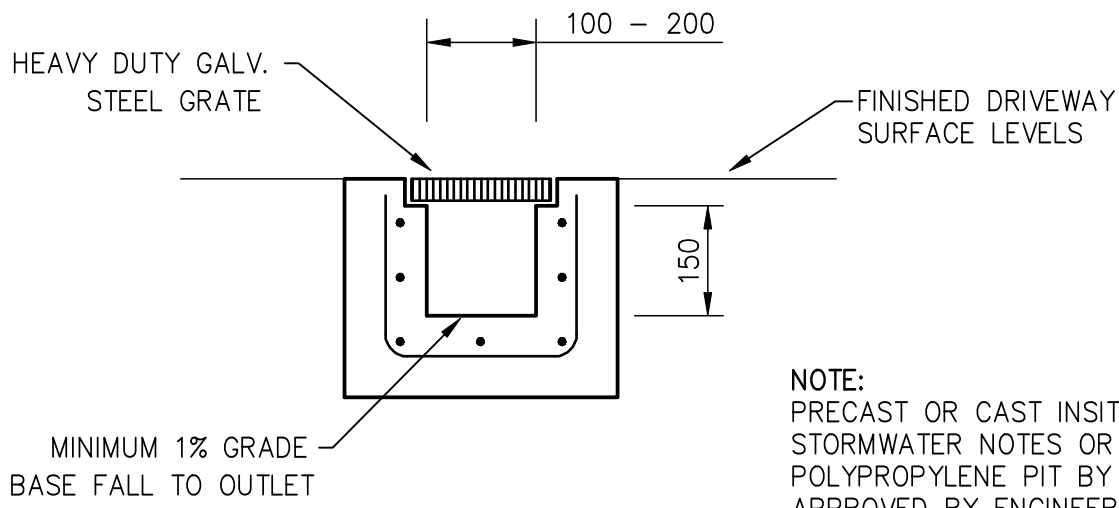
NOTE:
REFER TO ARCHITECT FOR SITE SPECIFIC DETAILS.

DIMENSIONS (mm)							
N.B.	A	B	C	D	E	F	G
100	260	240	103	106	28	45	25



PLANTER OUTLET WITH ADAPTER

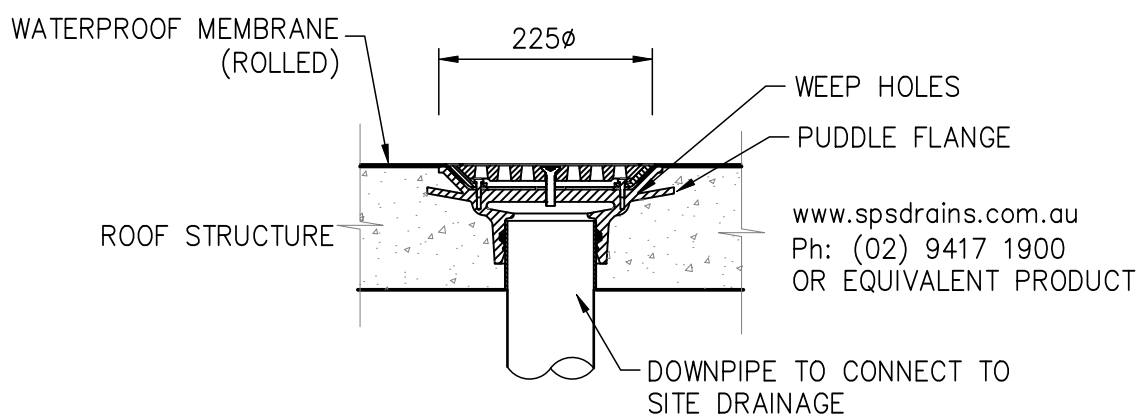
SCALE = N.T.S.



TYPICAL DRIVEWAY GRATED DRAIN (GD)

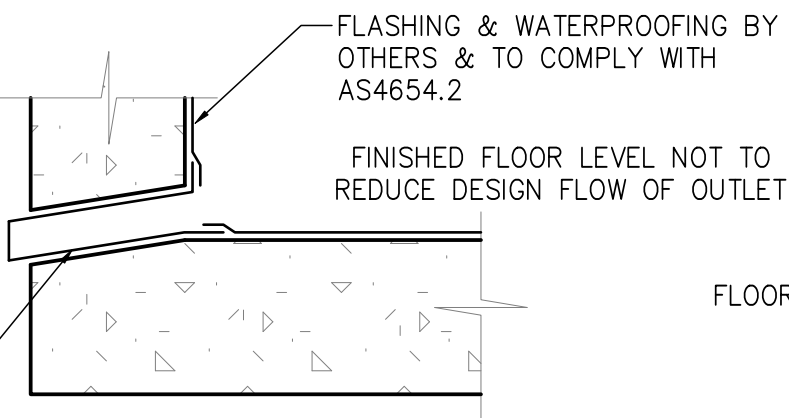
SCALE = 1 : 20

NOTE:
PRECAST OR CAST-INSITU PIT. REFER STORMWATER NOTES OR PROVIDE ALTERNATE POLYPROPYLENE PIT BY MANUFACTURER IF APPROVED BY ENGINEER



TYPICAL RAINWATER OUTLET (RWO) DETAIL

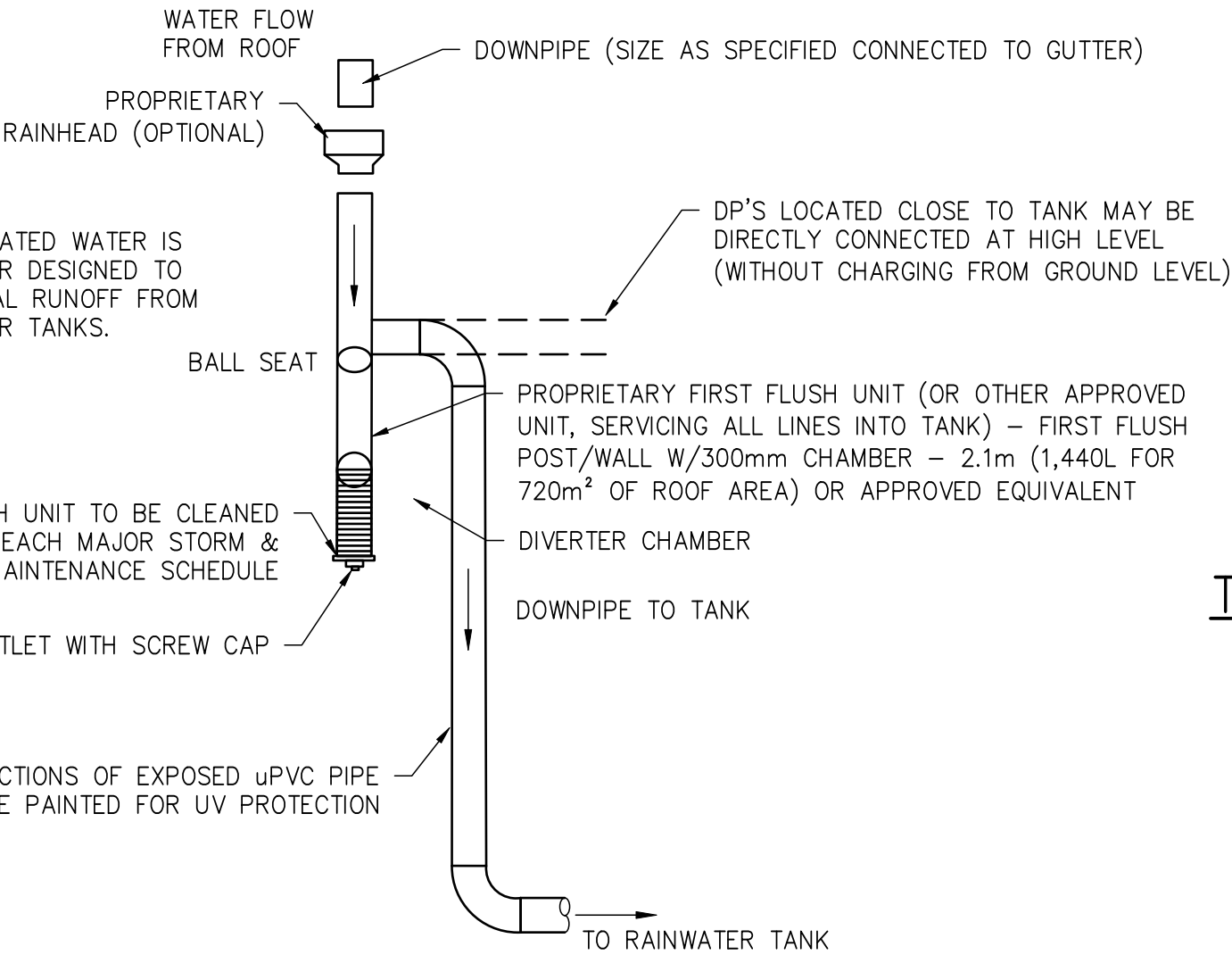
SCALE = 1 : 20



PREFORMED OUTLET TO PARAPET OR BALCONY OVERFLOW

NOT TO SCALE

PREFORMED OUTLET WITH FACE FLANGE TO AS3500.3, AS4654.2 & STRUCTURAL ENGINEERS REQUIREMENTS



TYPICAL WALL MOUNTED FIRST FLUSH DETAIL

NOT TO SCALE

NOTE: FIRST FLUSH OF CONTAMINATED WATER IS DIVERTED INTO CHAMBER. DIVERTOR DESIGNED TO CAUSE MINIMUM OF 1mm OF INITIAL RUNOFF FROM ROOF AREA TO BYPASS RAINWATER TANKS.

DP'S LOCATED CLOSE TO TANK MAY BE DIRECTLY CONNECTED AT HIGH LEVEL (WITHOUT CHARGING FROM GROUND LEVEL)

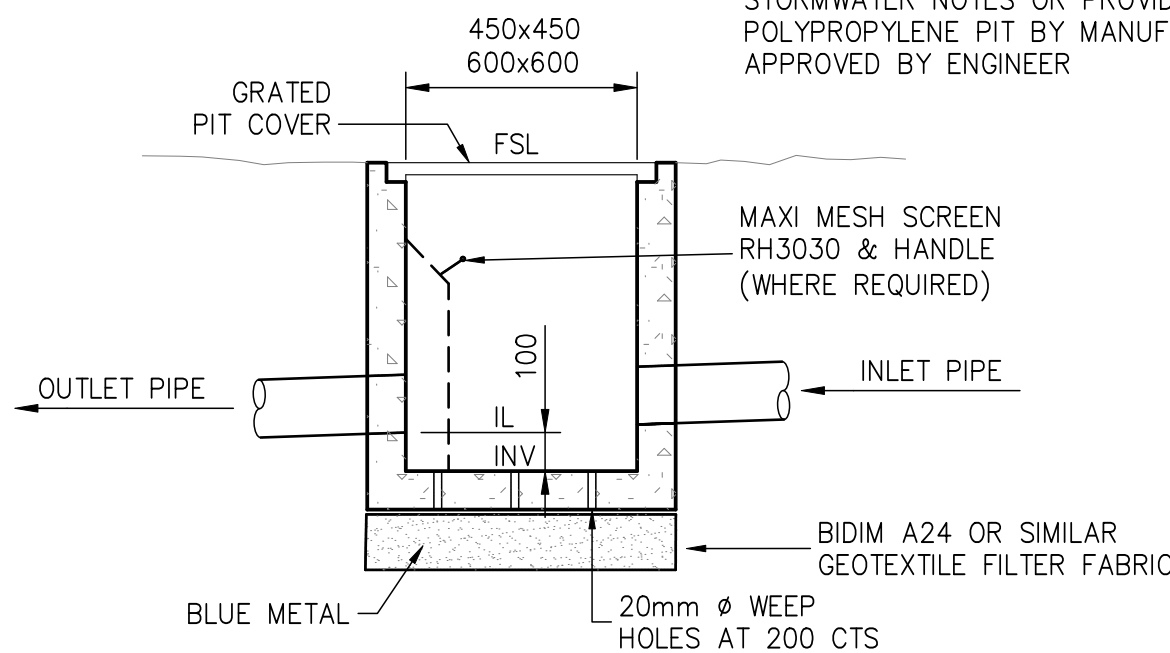
FIRST FLUSH UNIT TO BE CLEANED OUT AFTER EACH MAJOR STORM & AS PER MAINTENANCE SCHEDULE

PROPRIETARY FIRST FLUSH UNIT (OR OTHER APPROVED UNIT, SERVING ALL LINES INTO TANK) – FIRST FLUSH POST/WALL W/300mm CHAMBER – 2.1m (1,440L FOR 720m² OF ROOF AREA) OR APPROVED EQUIVALENT

DRIP OUTLET WITH SCREW CAP

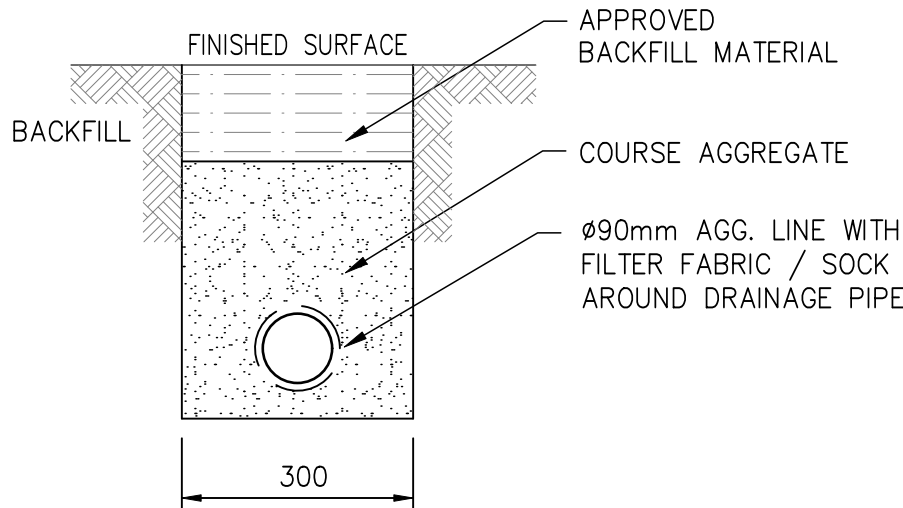
ALL SECTIONS OF EXPOSED uPVC PIPE ARE TO BE PAINTED FOR UV PROTECTION

NOTE:
PRECAST OR CAST INSITU PIT. REFER STORMWATER NOTES OR PROVIDE ALTERNATE POLYPROPYLENE PIT BY MANUFACTURER IF APPROVED BY ENGINEER



TYPICAL PIT DETAIL

SCALE = 1 : 20

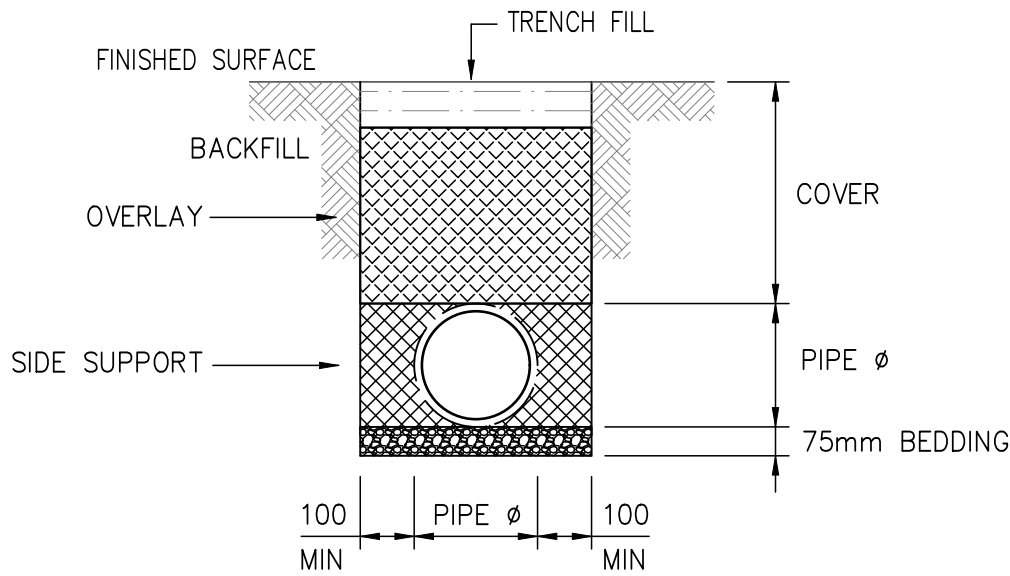


TYPICAL SUB-SOIL TRENCH DETAIL

SCALE = N.T.S.

NOTE:
PRECAST OR CAST INSITU PIT. REFER STORMWATER NOTES OR PROVIDE ALTERNATE POLYPROPYLENE PIT BY MANUFACTURER IF APPROVED BY ENGINEER

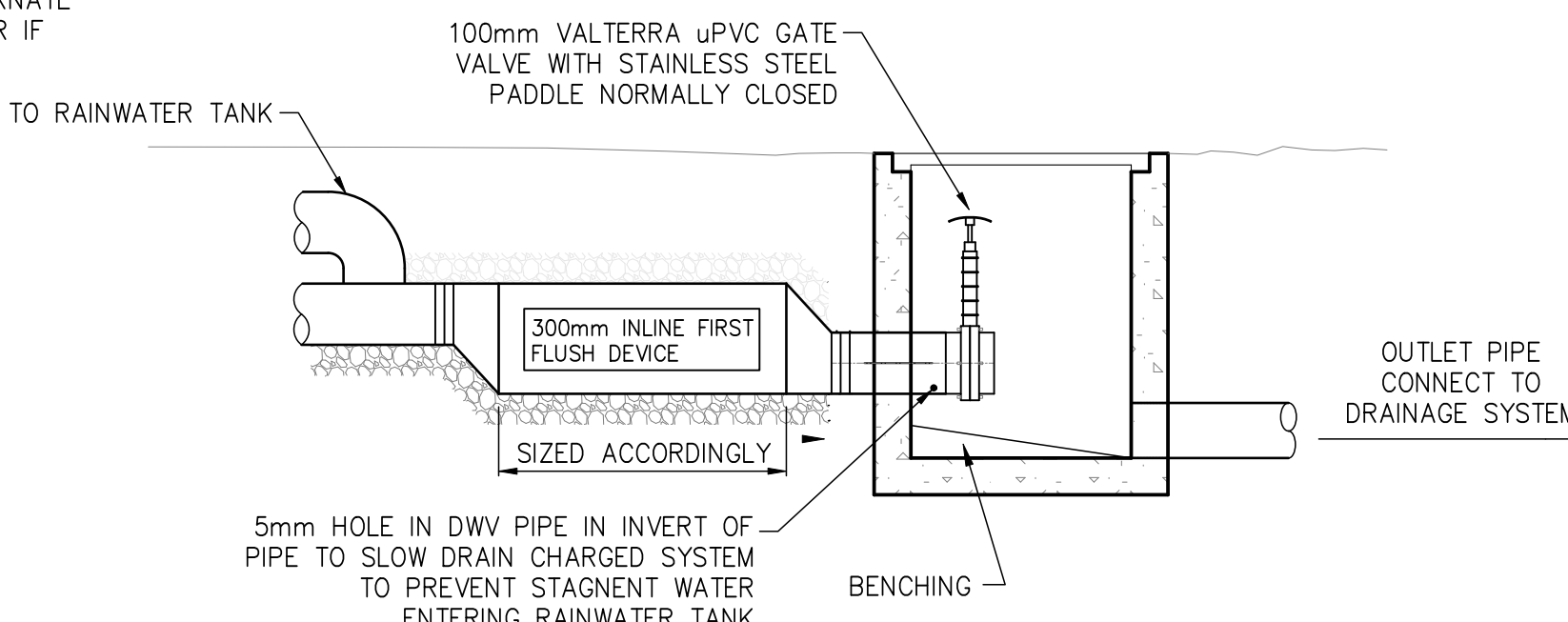
NOTE:
THIS CAN BE ANY TYPICAL PIT PROVIDED OR IF NEEDED TO BE FITTED AT LOW POINT OF SITE AND THERE IS NO ADEQUATE DISCHARGE POINT NEARBY, PROVIDE 300mm SUMP. CONTACT ENGINEER IF IN DOUBT.



TYPICAL uPVC PIPE TRENCH DETAIL

SCALE = N.T.S.

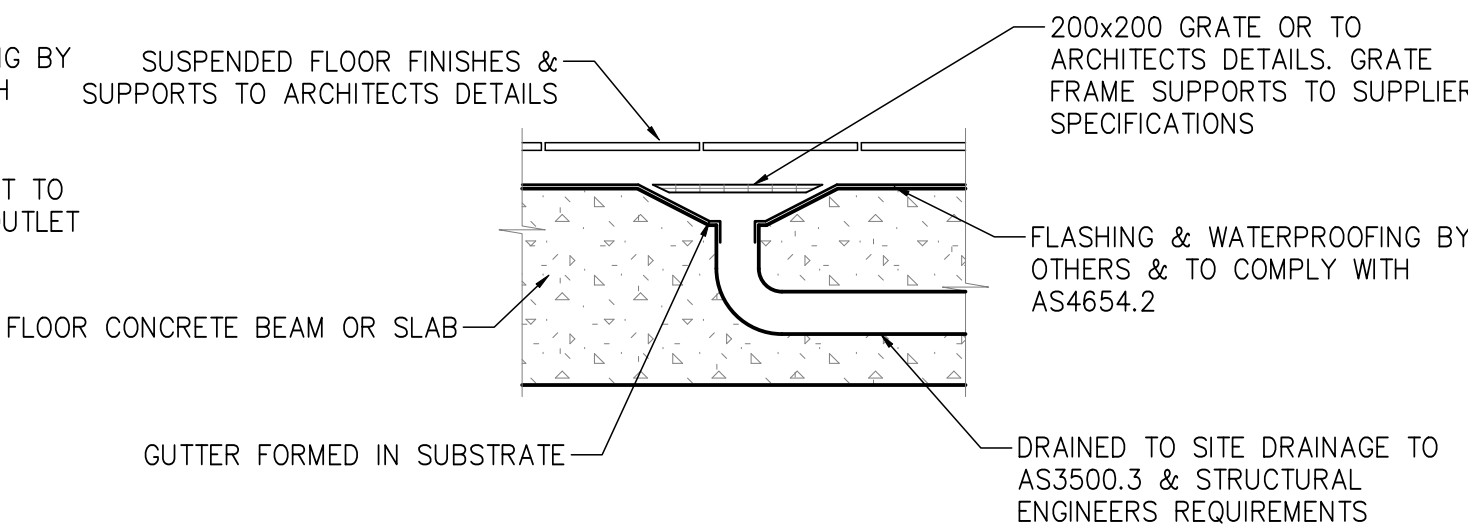
NOTE – STANDARD uPVC PIPE TRENCH:
SUITABLE BEDDING TO AS2032:
1. SAND FREE FROM ROCK OR OTHER HARD AND SHARP OBJECTS THAT WOULD BE RETAINED ON 13.2 SIEVE.
2. CRUSHED ROCK OR GRAVEL OF APPROVED GRADING UP TO MAXIMUM SIZE OF 14mm.
3. THE EXCAVATED MATERIAL MAY BE USED IF IT IS FREE FROM ROCK OR HARD MATTER AND BROKEN UP SO THAT IT CONTAINS NO SOIL LUMPS HAVING ANY DIMENSIONS GREATER THAN 75mm WHICH WOULD PREVENT ADEQUATE COMPACTION OF THE BEDDING.
SIDE SUPPORT: MATERIAL FOR PIPE SUPPORT SHOULD BE ADEQUATELY TAMPED IN LAYERS OF NOT MORE THAN 150mm.
OVERLAY: PIPE OVERLAY MATERIAL SHOULD BE LEVELED AND TAMPED IN LAYERS TO A MINIMUM HEIGHT OF 150mm ABOVE THE CROWN OF PIPE.
COVER: FOR MIN COVER REFER TO AS3500.3.



FIRST FLUSH DETAIL – INGROUND (OPTIONAL)

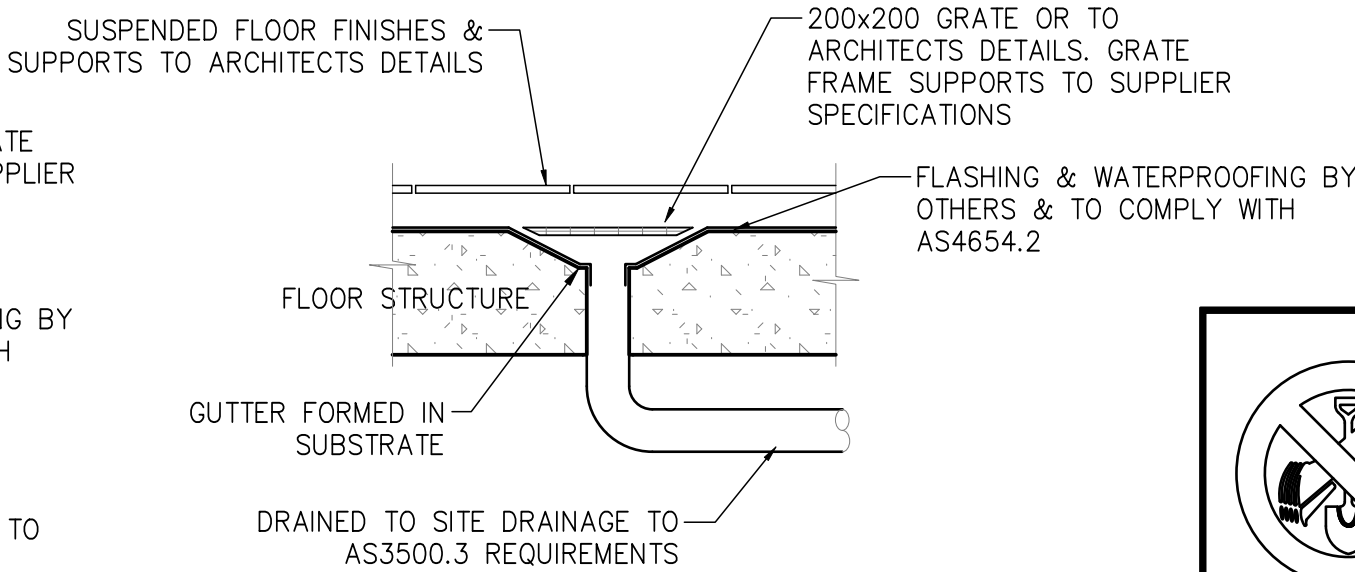
SCALE = 1 : 20

NOTE:
REFER TO ARCHITECT DETAILS FOR PLANTER & BALCONY DRAINAGE & WATERPROOFING REQUIREMENTS



STANDARD FLOOR PATIO DRAIN

SCALE = 1 : 20



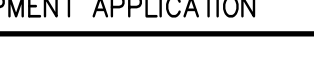
STANDARD FLOOR DRAIN (OPTION FOR BALCONIES ONLY)

SCALE = 1 : 20



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THE BUILDER/CONTRACTOR SHALL LOCATE ALL EXISTING PUBLIC UTILITY SERVICES WITHIN THE SITE, FOOTPATH AREA AND ROAD RESERVE PRIOR TO THE COMMENCEMENT OF ANY WORKS. ALL LOCATIONS AND LEVELS OF SERVICES SHALL BE REPORTED TO THE STORMWATER ENGINEER PRIOR TO THE COMMENCEMENT OF ANY WORKS TO ENSURE THAT THERE ARE NO OBSTRUCTIONS IN THE LINE OF THE DRAINAGE DISCHARGE PIPES.

NOTE:
FLOOR DRAINS TO BE INSTALLED WITHIN ALL PLANTERS AND PATIOS TO ARCHITECTS DETAILS AND AS3500.3 REQUIREMENTS. FLOOR DRAINS ARE TO DRAIN BY GRAVITY TO THE NEAREST DRAINAGE STRUCTURE AND MUST BE LOCATED AT LEAST 500mm ABOVE CONNECTION POINT. BALCONY HOBS TO ARCHITECT DETAILS. ENSURE ALL BALCONIES ARE FITTED WITH 2 x 50mmØ SPITTER PIPES TO ACT AS OVERFLOW POINT IN ACCORDANCE WITH AS4564.2:2012 REQUIREMENTS.
IF IN DOUBT, CONTACT THE ENGINEER.

A1 ORIGINAL		IF IN DOUBT, CONTACT THE ENGINEER.											
				Issued for: DEVELOPMENT APPLICATION	Title:	Initial:	Date:	 STORMWATER • CIVIL • FLOOD MITIGATION ABN: 81 615 065 588 Phone: 0490 507 300 Email: admin@rtscivil.com.au Web: rtscivil.com.au	Architect:	Project and Drawing Title: 2-6 CONWAY AVENUE & 38-40 CARLISLE STREET, ROSEBAY STORMWATER DRAINAGE DETAILS SHEET 4 OF 4	Local Council: WOOLLAHRA COUNCIL		
				Approved by:	DESIGN	R.M	28.10.2025		 Date : 07.05.26 Rhys Mikhail Director Principal Engineer NER: 2570082 RPEC: 17480 BEng (Civil) Hons MIEAust CPEng NER RPEQ APEC INTPE(Aus)				
B	07.05.26	RESPONSE TO SUBMISSIONS	R.M		DRAWN	S.M	28.10.2025						
A	18.12.25	STORMWATER MANAGEMENT PLAN FOR DA SUBMISSION	R.M		CHECKED	R.M	18.12.2025						
Rev:	Date:	Description:	Reviewed:		APPROVED	R.M	18.12.2025						
								The document is produced by RTS Civil Consulting Engineers Pty Ltd (RTS) solely for the benefit of and use by the client in accordance with the terms and conditions of RTS. RTS does not and shall not assume any responsibility or liability whatsoever to any third party arising out of any use or reliance by third party on the content of this document.	Client:	TWO CONWAY PTY LTD			

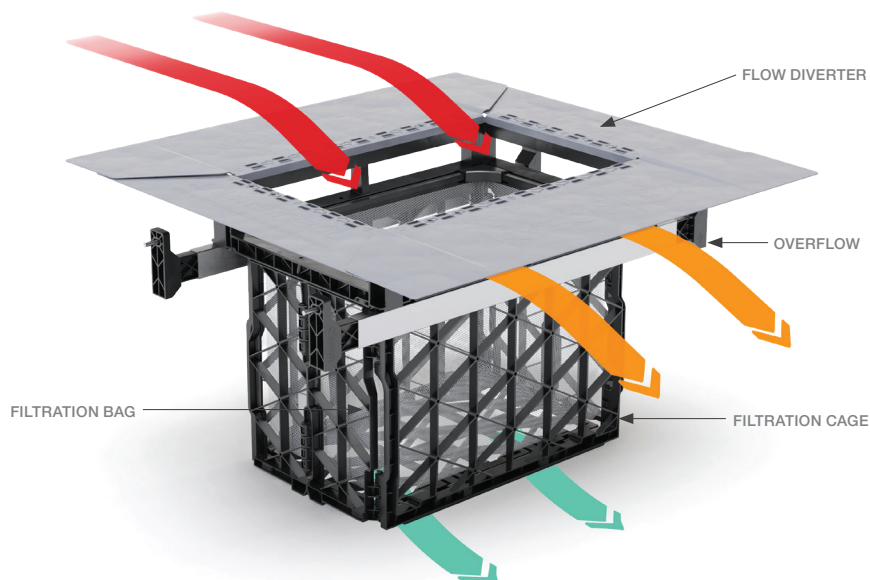
OceanGuard®

Gully Pit Basket

The OceanGuard® technology is a gully pit basket designed to fit within new and existing gully pits to remove pollution from stormwater runoff. The system has a choice of filtration liners, designed to remove gross pollutants, solids and other attached pollutants as either a stand-alone technology or as part of a 'treatment train' (with stormwater treatment assets located downstream to provide further treatment).

How does it work?

- Stormwater enters the OceanGuard® through a kerb inlet and/or grated inlet
- The flow diverter at top of the unit has a rigid high-density polyethylene (HDPE) skirt that is installed against the walls directing all incoming stormwater flows into the filtration bag
- Stormwater is filtered via direct screening through the filtration bag - 100% of incoming pollutants (greater than the opening in the filtration material) are captured and retained
- During large storm events the water elevation in the filtration bag can rise and peak flows are internally bypassed through slots created in the flow diverter which has no moving parts that may prematurely fail
- At the end of the storm event, sediment and debris settle into the base of the filtration bag
- The stored material will be stored in a dry state (until the next storm event), reducing the amount of organic decomposition





Features

- Flow diverter with static bypass assembly
- Multiple filtration bags from 200micron openings
- Heavy duty filtration cage
- Multiple sizes and configurations
- Removable filtration bags

Benefits

- Superior pollutant removal with high hydraulic efficiency
- Large pollution storage capacity
- Design flexibility
- Ease of maintenance, with no confined space entry
- Retained pollution stored in a dry state, reducing organic decomposition (and possible nutrient 'leaching')



Configurations and Applications

The OceanGuard® is available in several standard sizes, designed to fit pits ranging from 450 x 450mm up to 1200 x 1200mm. Custom sizings are also available for larger pits. With the ability to be installed in kerb entry, grated drain and field gully pits, the OceanGuard® is an ideal solution for a wide range of applications such as:

- Commercial, industrial and residential development, infill and redevelopment and stormwater quality retrofit applications
- Special projects, including highways, airports, seaports and military installations
- Pre-treatment for subsequent stormwater treatment assets (e.g. StormFilter®, biofiltration)

Maintenance

To ensure that each OceanGuard® achieves optimal performance, it is advisable that regular maintenance is performed. Typically, the OceanGuard® requires two to four minor services annually, which includes inspection and removal (and disposal) of retained material. The filter bag may need to be replaced occasionally (and/or works to the support frame undertaken), as required. Speak to the team at Ocean Protect who can help you maintain your OceanGuard®.

The Stormwater Management StormFilter®

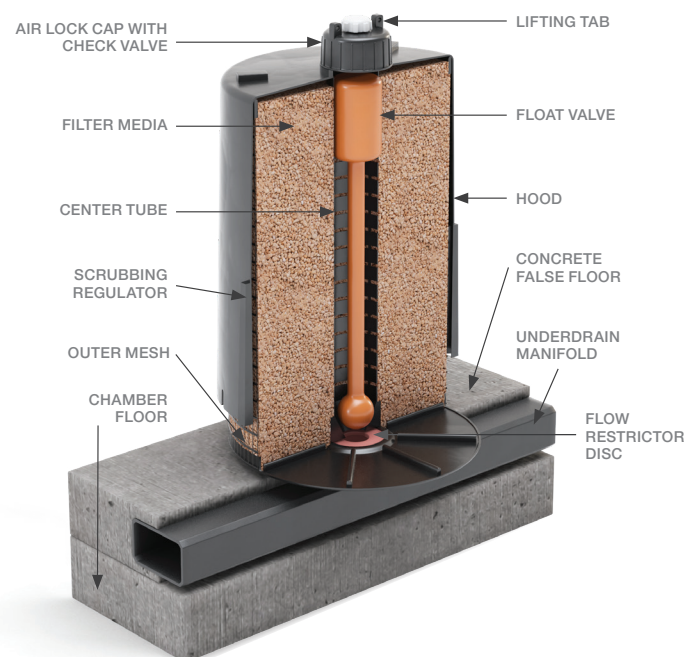
The Stormwater Management StormFilter® is a proprietary stormwater treatment asset (typically installed underground) and composed of one or more structures that house rechargeable, media-filled cartridges.

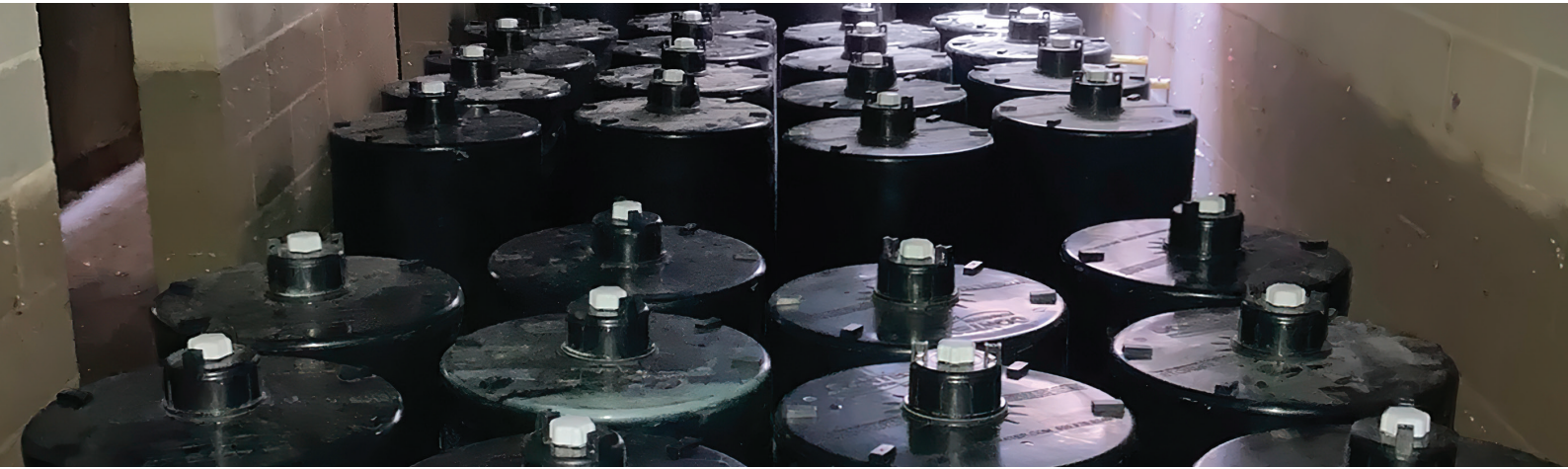
StormFilter® is typically applied to trap the most challenging pollutants within stormwater, such as total suspended solids, hydrocarbons, nutrients, metals, and other common pollutants. A range of media types are available, however, to target specific pollutants within stormwater, including PFAS (per-and poly-fluoroalkyl substances).

Since 2001, StormFilter® has been installed in a variety of applications to meet regulatory requirements set by authorities throughout Australia. At the start of 2022, there had already been over 38,000 StormFilter® cartridges installed within Australia and 300,000 globally.

How does it work?

- During a storm, runoff passes through the filtration media and starts filling the cartridge centre tube. The air inside the hood starts filling the cartridge centre tube. The air inside the hood is purged through a one-way check valve as the water rises
- When water reaches the top of the float, buoyant forces pull the float free and allow filtered water to exit the cartridge. A siphon is established within each cartridge that draws water uniformly across the full height of the media bed ensuring even distribution of pollutants and prolonged media longevity
- After a storm, the water level in the structure starts falling. A hanging water column remains under the cartridge hood until the water level reaches the scrubbing regulators at the bottom of the hood
- Air then rushes through the regulators, breaking the siphon and creating air bubbles that agitate the surface of the filter media, causing accumulated sediment to settle on the treatment bay floor. This unique surface-cleaning mechanism prevents surface blinding and further extends cartridge life





Features

- Siphon actuated, high surface area media cartridges
- Multiple cartridge heights
- Multiple media options
- Multiple configurations
- Maintenance intervals of one to five years, resulting in fewer maintenance events and reduced long-term ownership costs

Benefits

- Stormwater is drawn evenly through the filter media providing efficient, effective stormwater treatment
- Flexibility in arrangement and hydraulics to meet your sites needs
- Target specific pollutants including TSS, nutrients, heavy metals and hydrocarbons
- Lightweight, reusable cartridges



Configurations and Applications

The StormFilter® is available in a wide variety of configurations, such as precast concrete pits and tanks, custom above ground HDPE/aluminium tanks, and incorporated into on-site detention structures. When combined with the multiple cartridge heights and media options, the StormFilter® design flexibility makes it suitable for a wide range of applications such as:

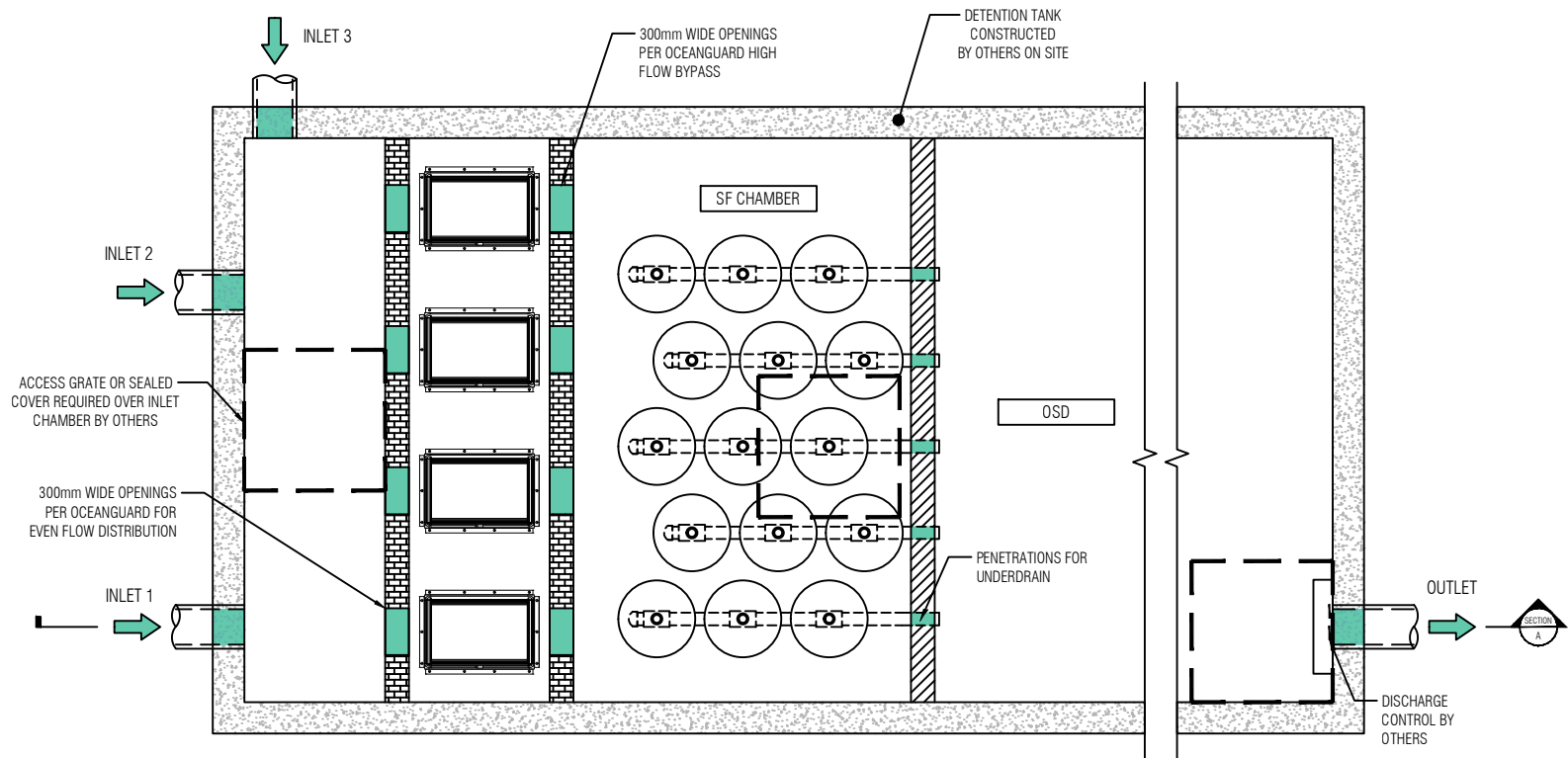
- Commercial, industrial and residential development, infill and redevelopment and stormwater quality retrofit applications
- Special projects, such as highways, airports, seaports and military installations
- Treatment for subsequent infiltration and stormwater harvesting and reuse

Maintenance

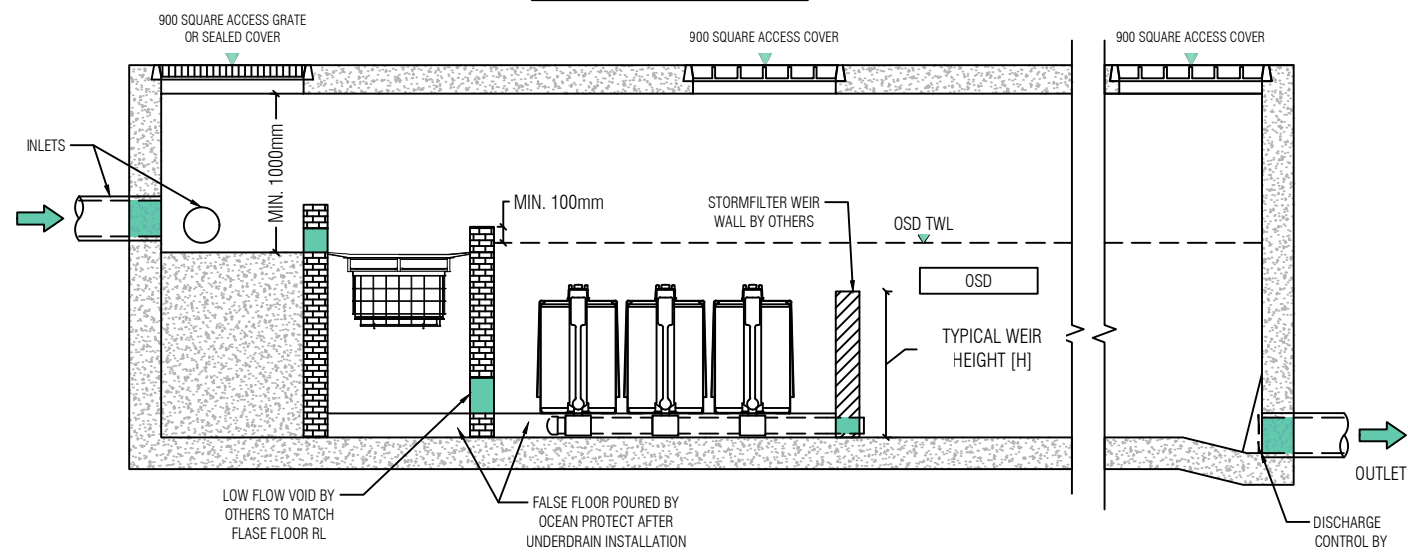
To ensure optimal performance, it is advisable that regular maintenance is performed for StormFilter®. Typically, the StormFilter® requires an inspection and removal of accumulated pollution.

Speak to the team at Ocean Protect who can help inspect and maintain your StormFilter®.

PLEASE NOTE: IF SITE IS LOCATED WITHIN COUNCILS WITH SPECIFIC OSD REQUIREMENTS (SUCH AS BLACKTOWN, CUMBERLAND, PARRAMATTA...ETC), VARIATION OF ARRANGEMENT WILL APPLY. CONTACT OCEAN PROTECT FOR MORE INFORMATION.



PLAN LAYOUT

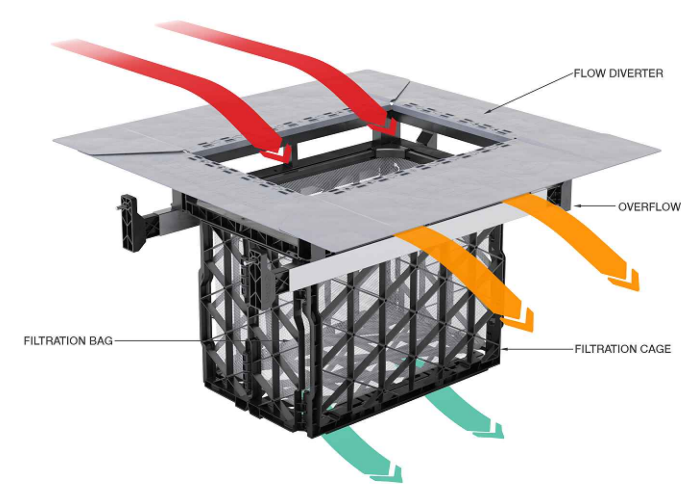


SECTION A

STORMFILTER DESIGN TABLE

- STORMFILTER TREATMENT CAPACITY VARIES BY NUMBER OF FILTER CARTRIDGES INSTALLED.
- THE STANDARD CONFIGURATION IS SHOWN. ACTUAL CONFIGURATION OF THE SPECIFIED STRUCTURE(S) PER CERTIFYING ENGINEER WILL BE SHOWN ON SUBMITTAL DRAWING(S).
- FILTER CARTRIDGES SHALL BE MEDIA-FILLED, PASSIVE, SIPHON ACTUATED, RADIAL FLOW, AND SELF-CLEANING. RADIAL MEDIA DEPTH SHALL BE 178mm.

CARTRIDGE NAME / SIPHON HEIGHT (mm)	690	460	310
CARTRIDGE PHYSICAL HEIGHT (mm)	840	600	600
TYPICAL WEIR HEIGHT [H] (mm)	920	690	540
CARTRIDGE FLOW RATE FOR ZPG MEDIA (L/s)	1.6	1.1	0.7
CARTRIDGE FLOW RATE FOR NPSORB MEDIA (L/s)	1.6	1.1	0.7
CARTRIDGE FLOW RATE FOR PSORB MEDIA (L/s)	0.9	0.46	0.39



PLAN ID	MAXIMUM PIT PLAN DIMENSIONS
S	450mm x 450mm
M	600mm x 600mm
L	900mm x 900mm
XL	1200mm x 1200mm

DEPTH ID	BAG DEPTH	OVERALL DEPTH
1	170	270
2	300	450
3	600	700

PLAN ID		DEPTH ID		
		1	2	3
	S	■	■	■
	M	■	■	■
	L	■	■	■
	XL	■	■	■

GENERAL NOTES

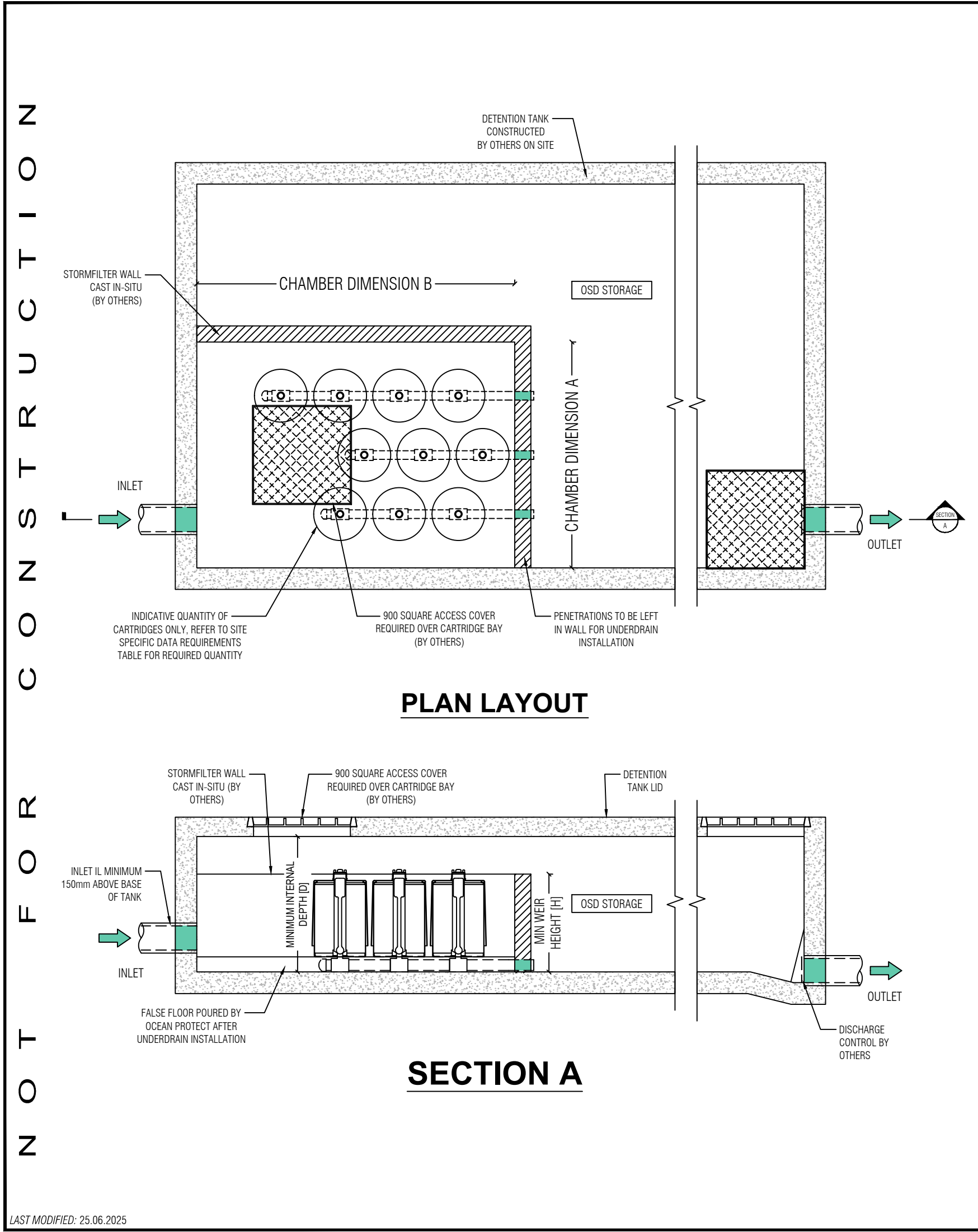
1. THE MINIMUM CLEARANCE DEPENDS ON THE CONFIGURATION (SEE NOTE 2) AND THE LOCAL COUNCIL REQUIREMENTS.
2. CLEARANCE FOR ANY PIT WITHOUT AN INLET PIPE (ONLY USED FOR SURFACE FLOW) CAN BE AS LOW AS 50mm. FOR OTHER PITS, THE RECOMMENDED CLEARANCE SHOULD BE GREATER OR EQUAL TO THE PIPE OBVERT SO AS NOT TO INHIBIT HYDRAULIC CAPACITY.
3. OCEAN PROTECT PROVIDES TWO FILTRATION BAG TYPES:- 200 MICRON BAGS FOR HIGHER WATER QUALITY FILTERING AND A COARSE BAG FOR TARGETING GROSS POLLUTANTS.
4. DRAWINGS NOT TO SCALE.



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OCEAN PROTECT
SINGLE-ACCESS MULTI- OCEANGUARD & STORMFILTER SYSTEM
DETENTION TANK ARRANGEMENT
SPECIFICATION DRAWING



STORMFILTER DESIGN TABLE

- STORMFILTER TREATMENT CAPACITY VARIES BY NUMBER OF FILTER CARTRIDGES INSTALLED.
- THE STANDARD CONFIGURATION IS SHOWN. ACTUAL CONFIGURATION OF THE SPECIFIED STRUCTURE(S) PER CERTIFYING ENGINEER WILL BE SHOWN ON SUBMITTAL DRAWING(S).
- FILTER CARTRIDGES SHALL BE MEDIA-FILLED, PASSIVE, SIPHON ACTUATED, RADIAL FLOW, AND SELF-CLEANING. RADIAL MEDIA DEPTH SHALL BE 178mm.

CARTRIDGE NAME / SIPHON HEIGHT (mm)	690	460	310
CARTRIDGE PHYSICAL HEIGHT (mm)	840	600	600
MINIMUM WEIR HEIGHT* [H] (mm)	910	690	540
MINIMUM INTERNAL DEPTH* [D] (mm)	1050	850	850
CARTRIDGE FLOW RATE FOR ZPG MEDIA (L/s)	1.6	1.1	0.7
CARTRIDGE FLOW RATE FOR PSORB MEDIA (L/s)	0.9	0.46	0.39

* MINIMUM WEIR HEIGHT MAY BE REDUCED IN CERTAIN CIRCUMSTANCES. CONTACT OCEAN PROTECT FOR MORE INFORMATION.

STORMFILTER CARTRIDGE DETAIL

SITE SPECIFIC DATA REQUIREMENTS

STRUCTURE ID	
NUMBER OF CARTRIDGES REQ'D	
SIPHON HEIGHT (310 / 460 / 690)	
MEDIA TYPE (ZPG / PSORB)	
WATER QUALITY FLOW RATE (L/S)	
DIMENSION A	
DIMENSION B	
TOTAL CARTRIDGE BAY AREA (A x B) TO MATCH AREA REQUIRED BY MUSIC MODELLING OR COUNCIL SPECIFIC REQUIREMENTS	

GENERAL NOTES

- INLET AND OUTLET PIPES TO BE IN ACCORDANCE WITH APPROVED PLANS.
- A HIGH FLOW BYPASS ARRANGEMENT OR DISSIPATION STRUCTURE MAY BE REQUIRED TO MINIMISE RE-SUSPENSION OF SOLIDS OR ANY SIGNIFICANT INERTIAL FORCES ON THE CARTRIDGES.
- ALL WATER QUALITY TREATMENT DEVICES REQUIRE PERIODIC MAINTENANCE. REFER TO OPERATION AND MAINTENANCE MANUAL FOR GUIDELINES AND ACCESS REQUIREMENTS.
- SITE SPECIFIC PRODUCTION DRAWING WILL BE PROVIDED ON PLACEMENT OF ORDER.
- THE INVERT LEVEL OF THE INLET PIPE MUST BE GREATER THAN THE RL OF THE FALSE FLOOR WITHIN THE CARTRIDGE CHAMBER.
- CONCRETE STRUCTURE AND ACCESS COVERS DESIGNED AND PROVIDED BY OTHERS. ACCESS COVERS TO BE A MINIMUM 900 X 900 ABOVE CARTRIDGES. OH&S REGARDING ACCESS COVERS AND TANK ACCESS TO BE ASSESSED BY OTHERS ON SITE.
- THE STRUCTURE THICKNESSES SHOWN ARE FOR REPRESENTATIONAL PURPOSES.
- DRAWINGS NOT TO SCALE.

INSTALLATION NOTES

- UNDERDRAIN AND FALSE FLOOR INSTALLED BY OCEAN PROTECT.

OCEAN PROTECT

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OCEAN PROTECT
STORMFILTER SYSTEM
DETENTION TANK ARRANGEMENT
SPECIFICATION DRAWING

LAST MODIFIED: 25.06.2025

APPENDIX A3 – MODEL DATA AND INFORMATION



Location

Label: Not provided
Latitude: -33.8687 [Nearest grid cell: 33.8625 (S)]
Longitude: 151.2733 [Nearest grid cell: 151.2625 (E)]

IFD Design Rainfall Depth (mm)

Issued: 07 December 2025

Rainfall depth for Durations, Exceedance per Year (EY), and Annual Exceedance Probabilities (AEP).
[FAQ for New ARR probability terminology](#)

Unit: mm

	Annual Exceedance Probability (AEP)						
Duration	63.2%	50%#	20%*	10%	5%	2%	1%
1 min	2.48	2.78	3.72	4.37	5.01	5.86	6.52
2 min	4.17	4.65	6.14	7.15	8.15	9.53	10.6
3 min	5.77	6.43	8.52	9.95	11.3	13.3	14.8
4 min	7.20	8.04	10.7	12.5	14.3	16.7	18.6
5 min	8.48	9.49	12.7	14.8	17.0	19.9	22.1
10 min	13.3	15.0	20.1	23.6	27.1	31.7	35.3
15 min	16.6	18.7	25.1	29.6	33.9	39.7	44.1
20 min	19.1	21.5	28.9	33.9	38.9	45.5	50.6
25 min	21.1	23.7	31.9	37.4	42.9	50.2	55.8
30 min	22.8	25.6	34.3	40.3	46.2	54.0	60.1
45 min	26.8	30.0	40.0	46.9	53.8	63.0	70.1
1 hour	29.8	33.3	44.3	51.9	59.5	69.7	77.7
1.5 hour	34.4	38.3	50.9	59.7	68.4	80.3	89.8
2 hour	38.0	42.4	56.2	65.9	75.7	89.0	99.6
3 hour	44.0	48.9	64.9	76.3	87.8	104	116
4.5 hour	51.0	56.7	75.6	89.1	103	122	137
6 hour	56.8	63.3	84.6	100	116	138	156
9 hour	66.5	74.2	100.0	119	138	165	187
12 hour	74.4	83.2	113	135	157	188	213
18 hour	87.1	97.9	134	161	188	226	257
24 hour	97.1	110	151	182	213	257	291
30 hour	105	119	165	199	234	281	319
36 hour	112	127	177	214	251	302	342
48 hour	124	141	196	237	278	335	378
72 hour	140	159	223	269	315	376	424
96 hour	151	172	241	289	337	401	450
120 hour	159	181	253	302	351	416	466

144 hour	165	188	261	312	361	426	475
168 hour	171	194	268	319	368	433	480

Note:
The 50% AEP IFD **does not** correspond to the 2 year Average Recurrence Interval (ARI) IFD.
Rather it corresponds to the 1.44 ARI.
* The 20% AEP IFD **does not** correspond to the 5 year Average Recurrence Interval (ARI) IFD.
Rather it corresponds to the 4.48 ARI.

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Location

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Latitude: -33.8687 [Nearest grid cell: 33.8625 (S)]

Longitude: 151.2733 [Nearest grid cell: 151.2625 (E)]

IFD Design Rainfall Intensity (mm/h)

Issued: 07 December 2025

Rainfall intensity for Durations, Exceedance per Year (EY), and Annual Exceedance Probabilities (AEP).

[FAQ for New ARR probability terminology](#)

Unit: **mm/h** ▼

Duration	Annual Exceedance Probability (AEP)						
	63.2%	50%#	20%*	10%	5%	2%	1%
1 min	149	167	223	262	301	352	391
2 min	125	139	184	215	244	286	319
3 min	115	129	170	199	227	266	296
4 min	108	121	160	188	215	251	280
5 min	102	114	152	178	204	239	265
10 min	79.9	89.7	121	142	163	190	212
15 min	66.5	74.7	101	118	136	159	176
20 min	57.4	64.4	86.6	102	117	137	152
25 min	50.7	56.9	76.4	89.8	103	120	134
30 min	45.7	51.2	68.7	80.6	92.4	108	120
45 min	35.7	39.9	53.4	62.6	71.7	83.9	93.5
1 hour	29.8	33.3	44.3	51.9	59.5	69.7	77.7
1.5 hour	22.9	25.6	34.0	39.8	45.6	53.6	59.8
2 hour	19.0	21.2	28.1	33.0	37.8	44.5	49.8
3 hour	14.7	16.3	21.6	25.4	29.3	34.6	38.8
4.5 hour	11.3	12.6	16.8	19.8	22.9	27.1	30.5
6 hour	9.47	10.5	14.1	16.7	19.3	23.0	25.9
9 hour	7.39	8.25	11.1	13.2	15.4	18.4	20.8
12 hour	6.20	6.94	9.41	11.2	13.1	15.7	17.8
18 hour	4.84	5.44	7.45	8.93	10.5	12.6	14.3
24 hour	4.05	4.56	6.29	7.57	8.89	10.7	12.1
30 hour	3.51	3.97	5.51	6.63	7.80	9.38	10.6
36 hour	3.12	3.54	4.92	5.93	6.98	8.39	9.51
48 hour	2.58	2.93	4.09	4.94	5.80	6.97	7.88
72 hour	1.94	2.21	3.10	3.73	4.37	5.23	5.89
96 hour	1.57	1.79	2.51	3.01	3.51	4.18	4.69
120 hour	1.32	1.51	2.10	2.52	2.93	3.47	3.88

144 hour	1.15	1.31	1.81	2.16	2.51	2.96	3.30
168 hour	1.02	1.16	1.60	1.90	2.19	2.57	2.86

Note:
The 50% AEP IFD **does not** correspond to the 2 year Average Recurrence Interval (ARI) IFD.
Rather it corresponds to the 1.44 ARI.
* The 20% AEP IFD **does not** correspond to the 5 year Average Recurrence Interval (ARI) IFD.
Rather it corresponds to the 4.48 ARI.

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Location

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Longitude: 151.2733 [Nearest grid cell: 151.2625 (E)]

Rare Design Rainfall Intensity (mm/h)

Issued: 07 December 2025

Rainfall intensity for Durations, Exceedance per Year (EY), and Annual Exceedance Probabilities (AEP).

[FAQ for New ARR probability terminology](#)

Duration	Annual Exceedance Probability (1 in x)				
	1 in 100	1 in 200	1 in 500	1 in 1000	1 in 2000
1 min	391	424	480	523	567
2 min	319	350	399	435	473
3 min	296	324	368	402	436
4 min	280	305	346	377	409
5 min	265	288	327	356	386
10 min	212	229	259	282	305
15 min	176	191	216	235	255
20 min	152	164	186	203	220
25 min	134	145	164	179	194
30 min	120	130	148	161	175
45 min	93.5	102	115	126	136
1 hour	77.7	84.6	96.0	105	113
1.5 hour	59.8	65.1	73.8	80.5	87.2
2 hour	49.8	54.1	61.3	66.8	72.4
3 hour	38.8	42.0	47.5	51.7	56.0
4.5 hour	30.5	32.9	37.2	40.5	43.8
6 hour	25.9	27.9	31.5	34.3	37.0
9 hour	20.8	22.3	25.1	27.4	29.6
12 hour	17.8	19.1	21.5	23.4	25.3
18 hour	14.3	15.4	17.4	18.9	20.5
24 hour	12.1	13.1	14.9	16.2	17.6
30 hour	10.6	11.9	13.6	15.0	16.4
36 hour	9.51	10.7	12.4	13.7	15.1
48 hour	7.88	8.95	10.3	11.4	12.6
72 hour	5.89	6.61	7.57	8.30	9.06
96 hour	4.69	5.20	5.90	6.43	6.97
120 hour	3.88	4.28	4.81	5.24	5.66

144 hour	3.30	3.62	4.06	4.43	4.78
168 hour	2.86	3.14	3.51	3.85	4.17

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Location

Label: Not provided

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Longitude: 151.2733 [Nearest grid cell: 151.2625 (E)]

Rare Design Rainfall Depth (mm)

Issued: 07 December 2025

Rainfall depth for Durations, Exceedance per Year (EY), and Annual Exceedance Probabilities (AEP).

[FAQ for New ARR probability terminology](#)

Duration	Annual Exceedance Probability (1 in x)				
	1 in 100	1 in 200	1 in 500	1 in 1000	1 in 2000
1 min	6.52	7.07	8.00	8.72	9.45
2 min	10.6	11.7	13.3	14.5	15.8
3 min	14.8	16.2	18.4	20.1	21.8
4 min	18.6	20.3	23.1	25.1	27.3
5 min	22.1	24.0	27.2	29.7	32.2
10 min	35.3	38.1	43.1	47.0	50.9
15 min	44.1	47.7	53.9	58.8	63.6
20 min	50.6	54.8	62.0	67.6	73.3
25 min	55.8	60.5	68.5	74.7	80.9
30 min	60.1	65.2	73.9	80.6	87.4
45 min	70.1	76.2	86.5	94.3	102
1 hour	77.7	84.6	96.0	105	113
1.5 hour	89.8	97.6	111	121	131
2 hour	99.6	108	123	134	145
3 hour	116	126	143	155	168
4.5 hour	137	148	167	182	197
6 hour	156	167	189	206	222
9 hour	187	201	226	246	266
12 hour	213	229	258	281	304
18 hour	257	277	313	341	368
24 hour	291	315	357	389	422
30 hour	319	356	408	450	493
36 hour	342	387	445	494	543
48 hour	378	429	495	548	604
72 hour	424	476	545	598	652
96 hour	450	500	566	617	669
120 hour	466	513	578	629	679

144 hour	475	522	585	638	689
168 hour	480	528	590	647	700

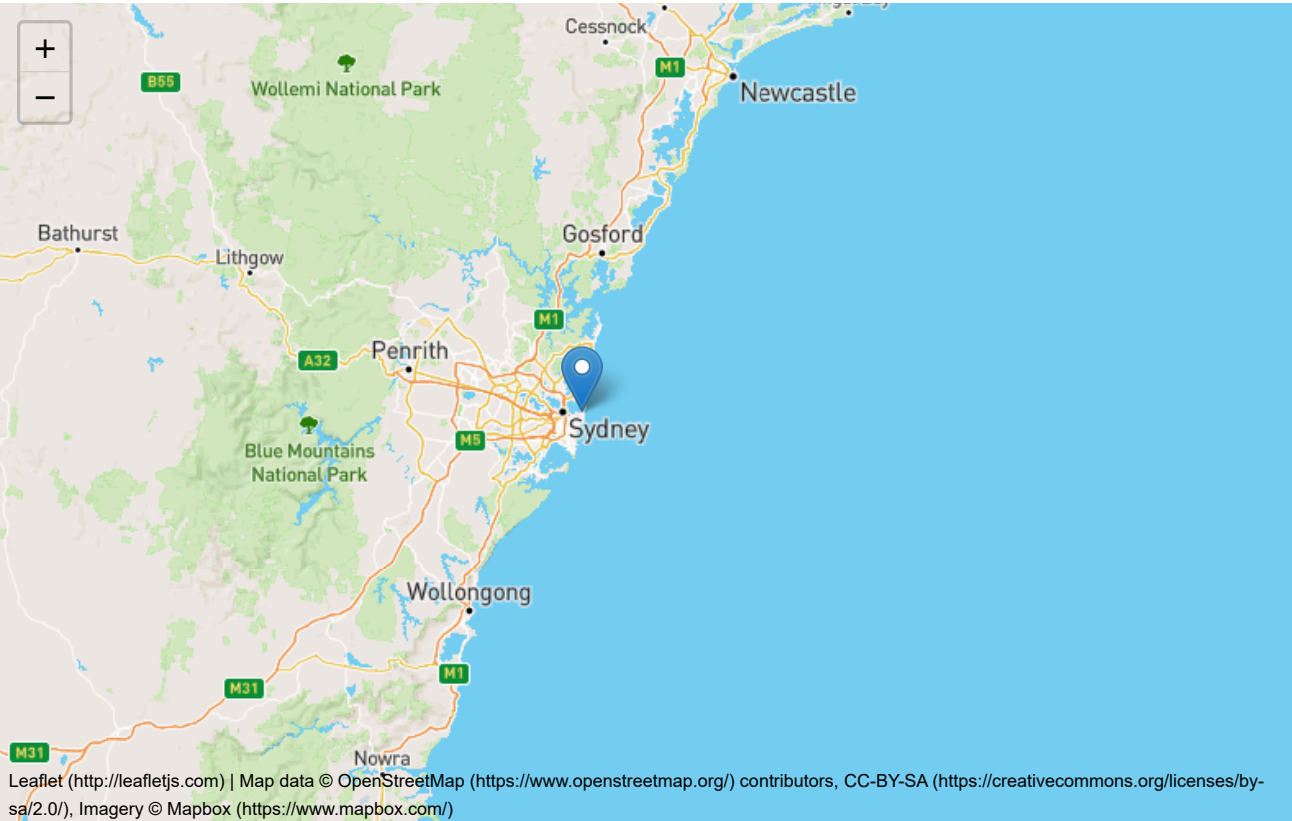
This page was created at **12:04 on Sunday 07 December 2025 (AEDT)**

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Australian Rainfall & Runoff Data Hub - Results

Input Data

Longitude	151.273
Latitude	-33.869
Selected Regions (clear)	
River Region	show
ARF Parameters	show
Storm Losses	show
Temporal Patterns	show
Areal Temporal Patterns	show
BOM IFDs	show
Median Preburst Depths and Ratios	show
10% Preburst Depths	show
25% Preburst Depths	show
75% Preburst Depths	show
90% Preburst Depths	show
Climate Change Factors	show
Probability Neutral Burst Initial Loss (/nsw_specific)	show



Data

River Region

Division	South East Coast (NSW)
River Number	13
River Name	Sydney Coast-Georges River

Layer Info

Time Accessed	07 December 2025 12:00PM
Version	2016_v1

ARF Parameters

$$ARF = Min \left\{ 1, \left[1 - a \left(Area^b - c \log_{10} Duration \right) Duration^{-d} + e Area^f Duration^g (0.3 + \log_{10} AEP) + h 10^{i Area \frac{Duration}{1440}} (0.3 + \log_{10} AEP) \right] \right\}$$

Zone	a	b	c	d	e	f	g	h	i
SE Coast	0.06	0.361	0.0	0.317	8.11e-05	0.651	0.0	0.0	0.0

Short Duration ARF

$$ARF = Min \left[1, 1 - 0.287 \left(Area^{0.265} - 0.439 \log_{10}(Duration) \right) . Duration^{-0.36} + 2.26 \times 10^{-3} \times Area^{0.226} . Duration^{0.125} (0.3 + \log_{10}(AEP)) + 0.0141 \times Area^{0.213} \times 10^{-0.021 \frac{(Duration-180)^2}{1440}} (0.3 + \log_{10}(AEP)) \right]$$

Layer Info

Time Accessed	07 December 2025 12:00PM
Version	2016_v1

Storm Losses

Note: Burst Loss = Storm Loss - Preburst

Note: These losses are only for rural use and are **NOT FOR DIRECT USE** in urban areas

Note: As this point is in NSW the advice provided on losses and pre-burst on the NSW Specific Tab of the ARR Data Hub (.nsw_specific) is to be considered. In NSW losses are derived considering a hierarchy of approaches depending on the available loss information. The continuing storm loss information from the ARR Datahub provided below should only be used where relevant under the loss hierarchy (level 5) and where used is to be multiplied by the factor of 0.4.

ID	17135.0
Storm Initial Losses (mm)	28.0
Storm Continuing Losses (mm/h)	1.6

Layer Info

Time Accessed	07 December 2025 12:00PM
Version	2016_v1

Temporal Patterns | Download (.zip) (static/temporal_patterns/TP/ECsouth.zip)

code	ECsouth
Label	East Coast South

Layer Info

Time Accessed	07 December 2025 12:00PM
Version	2016_v2

Areal Temporal Patterns | Download (.zip) (./static/temporal_patterns/Areal/Areal_ECsouth.zip)

code	ECsouth
arealabel	East Coast South

Layer Info

Time Accessed	07 December 2025 12:00PM
Version	2016_v2

BOM IFDs

Click here (http://www.bom.gov.au/water/designRainfalls/revised-ifd/?year=2016&coordinate_type=dd&latitude=-33.8687285278&longitude=151.273319979&sadmin=true&sdhr=true&sdday=true&user_label=) to obtain the IFD depths for catchment centroid from the BoM website

Layer Info

Time Accessed	07 December 2025 12:00PM
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Median Preburst Depths and Ratios

Values are of the format depth (ratio) with depth in mm

min (h)\AEP(%)	50	20	10	5	2	1
60 (1.0)	12.0 (0.362)	8.3 (0.188)	5.9 (0.113)	3.5 (0.059)	2.1 (0.030)	1.1 (0.014)
90 (1.5)	13.4 (0.350)	9.8 (0.192)	7.4 (0.123)	5.0 (0.074)	2.7 (0.034)	1.0 (0.011)
120 (2.0)	9.3 (0.219)	8.4 (0.150)	7.9 (0.119)	7.3 (0.097)	4.3 (0.048)	2.0 (0.020)
180 (3.0)	8.0 (0.163)	7.1 (0.110)	6.6 (0.086)	6.1 (0.069)	7.2 (0.069)	8.1 (0.069)
360 (6.0)	11.8 (0.186)	21.4 (0.253)	27.8 (0.278)	33.9 (0.293)	25.2 (0.183)	18.6 (0.120)
720 (12.0)	3.5 (0.042)	10.0 (0.089)	14.4 (0.107)	18.5 (0.118)	26.3 (0.140)	32.2 (0.151)
1080 (18.0)	3.9 (0.040)	9.3 (0.070)	12.9 (0.080)	16.4 (0.087)	26.4 (0.116)	33.8 (0.132)
1440 (24.0)	1.0 (0.009)	5.4 (0.036)	8.3 (0.046)	11.1 (0.052)	20.7 (0.081)	27.9 (0.096)
2160 (36.0)	0.0 (0.000)	2.6 (0.015)	4.3 (0.020)	6.0 (0.024)	9.2 (0.030)	11.6 (0.034)
2880 (48.0)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	1.8 (0.005)	3.2 (0.008)
4320 (72.0)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.9 (0.002)	1.5 (0.004)

Layer Info

Time Accessed	07 December 2025 12:00PM
Version	2018_v1
Note	Preburst interpolation methods for catchment wide preburst has been slightly altered. Point values remain unchanged.

10% Preburst Depths

Values are of the format depth (ratio) with depth in mm

min (h)\AEP(%)	50	20	10	5	2	1
60 (1.0)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)
90 (1.5)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)
120 (2.0)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)
180 (3.0)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)
360 (6.0)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)
720 (12.0)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)
1080 (18.0)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)
1440 (24.0)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)
2160 (36.0)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)
2880 (48.0)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)
4320 (72.0)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)

Layer Info

Time Accessed	07 December 2025 12:00PM
Version	2018_v1
Note	Preburst interpolation methods for catchment wide preburst has been slightly altered. Point values remain unchanged.

25% Preburst Depths

Values are of the format depth (ratio) with depth in mm

min (h)\AEP(%)	50	20	10	5	2	1
60 (1.0)	0.5 (0.015)	0.3 (0.006)	0.1 (0.003)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)
90 (1.5)	0.4 (0.010)	0.2 (0.004)	0.1 (0.002)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)
120 (2.0)	0.2 (0.004)	0.1 (0.002)	0.0 (0.001)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)
180 (3.0)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)
360 (6.0)	0.5 (0.008)	0.8 (0.009)	1.0 (0.010)	1.2 (0.010)	0.5 (0.004)	0.0 (0.000)
720 (12.0)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.1 (0.001)	0.2 (0.001)
1080 (18.0)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	2.3 (0.010)	4.0 (0.015)
1440 (24.0)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	1.3 (0.005)	2.3 (0.008)
2160 (36.0)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)
2880 (48.0)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)
4320 (72.0)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)

Layer Info

Time Accessed	07 December 2025 12:00PM
Version	2018_v1
Note	Preburst interpolation methods for catchment wide preburst has been slightly altered. Point values remain unchanged.

75% Preburst Depths

Values are of the format depth (ratio) with depth in mm

min (h)\AEP(%)	50	20	10	5	2	1
60 (1.0)	46.5 (1.397)	41.4 (0.934)	38.0 (0.732)	34.8 (0.585)	28.1 (0.403)	23.1 (0.298)
90 (1.5)	47.8 (1.246)	41.3 (0.812)	37.1 (0.621)	33.0 (0.482)	28.8 (0.358)	25.6 (0.286)
120 (2.0)	42.0 (0.992)	41.5 (0.737)	41.1 (0.623)	40.7 (0.538)	40.4 (0.454)	40.2 (0.403)
180 (3.0)	52.2 (1.067)	48.9 (0.754)	46.8 (0.613)	44.8 (0.510)	57.3 (0.553)	66.7 (0.573)
360 (6.0)	43.8 (0.692)	61.2 (0.723)	72.8 (0.727)	83.9 (0.723)	93.3 (0.676)	100.4 (0.645)
720 (12.0)	22.5 (0.270)	37.6 (0.333)	47.7 (0.354)	57.3 (0.364)	72.4 (0.384)	83.7 (0.393)
1080 (18.0)	23.8 (0.243)	39.7 (0.296)	50.3 (0.313)	60.4 (0.321)	74.0 (0.327)	84.2 (0.328)
1440 (24.0)	11.9 (0.109)	28.6 (0.189)	39.6 (0.218)	50.2 (0.235)	62.0 (0.242)	70.8 (0.243)
2160 (36.0)	8.0 (0.063)	21.2 (0.119)	29.9 (0.140)	38.2 (0.152)	51.8 (0.171)	62.0 (0.181)
2880 (48.0)	2.5 (0.018)	7.4 (0.038)	10.7 (0.045)	13.8 (0.050)	22.7 (0.068)	29.4 (0.078)
4320 (72.0)	0.0 (0.000)	0.9 (0.004)	1.6 (0.006)	2.2 (0.007)	20.2 (0.054)	33.7 (0.079)

Layer Info

Time Accessed	07 December 2025 12:00PM
Version	2018_v1
Note	Prebust interpolation methods for catchment wide preburst has been slightly altered. Point values remain unchanged.

90% Preburst Depths

Values are of the format depth (ratio) with depth in mm

min (h)\AEP(%)	50	20	10	5	2	1
60 (1.0)	98.8 (2.972)	98.7 (2.228)	98.7 (1.899)	98.6 (1.657)	105.6 (1.514)	110.8 (1.426)
90 (1.5)	107.9 (2.816)	116.2 (2.281)	121.7 (2.038)	126.9 (1.855)	124.4 (1.549)	122.6 (1.365)
120 (2.0)	90.6 (2.139)	102.9 (1.830)	111.0 (1.684)	118.8 (1.571)	118.8 (1.335)	118.8 (1.193)
180 (3.0)	90.5 (1.851)	123.2 (1.897)	144.8 (1.899)	165.6 (1.886)	149.7 (1.444)	137.7 (1.184)
360 (6.0)	80.6 (1.273)	107.1 (1.265)	124.7 (1.245)	141.5 (1.220)	164.3 (1.191)	181.3 (1.165)
720 (12.0)	45.1 (0.542)	77.8 (0.689)	99.3 (0.738)	120.1 (0.763)	138.4 (0.735)	152.2 (0.714)
1080 (18.0)	53.4 (0.546)	82.4 (0.615)	101.6 (0.633)	120.1 (0.637)	144.6 (0.639)	163.0 (0.635)
1440 (24.0)	46.4 (0.424)	75.8 (0.502)	95.2 (0.524)	113.8 (0.533)	121.8 (0.475)	127.8 (0.439)
2160 (36.0)	28.5 (0.224)	49.6 (0.280)	63.6 (0.298)	77.0 (0.307)	100.5 (0.333)	118.2 (0.345)
2880 (48.0)	15.8 (0.112)	40.1 (0.204)	56.2 (0.237)	71.7 (0.257)	90.2 (0.270)	104.1 (0.275)
4320 (72.0)	10.0 (0.063)	21.7 (0.097)	29.4 (0.109)	36.8 (0.117)	62.5 (0.166)	81.7 (0.193)

Layer Info

Time Accessed	07 December 2025 12:00PM
Version	2018_v1
Note	Preburst interpolation methods for catchment wide preburst has been slightly altered. Point values remain unchanged.

Climate Change Factors

Rainfall Factors

SSP1-2.6

Year	<1 hour	1.5 Hours	2 Hours	3 Hours	4.5 Hours	6 Hours	9 Hours	12 Hours	18 Hours	>24 Hours
2030	1.18	1.17	1.16	1.14	1.13	1.12	1.12	1.11	1.1	1.1
2040	1.21	1.19	1.17	1.16	1.15	1.14	1.13	1.12	1.11	1.11
2050	1.22	1.2	1.18	1.17	1.15	1.15	1.14	1.13	1.12	1.11
2060	1.23	1.21	1.2	1.18	1.17	1.16	1.15	1.14	1.13	1.12
2070	1.24	1.22	1.2	1.18	1.17	1.16	1.15	1.14	1.13	1.12
2080	1.23	1.21	1.2	1.18	1.17	1.16	1.15	1.14	1.13	1.12
2090	1.23	1.21	1.2	1.18	1.17	1.16	1.15	1.14	1.13	1.12
2100	1.22	1.2	1.19	1.17	1.16	1.15	1.14	1.13	1.12	1.12

SSP2-4.5

Year	<1 hour	1.5 Hours	2 Hours	3 Hours	4.5 Hours	6 Hours	9 Hours	12 Hours	18 Hours	>24 Hours
2030	1.18	1.17	1.16	1.14	1.13	1.12	1.12	1.11	1.1	1.1
2040	1.22	1.2	1.19	1.17	1.16	1.15	1.14	1.13	1.12	1.12
2050	1.27	1.24	1.23	1.21	1.19	1.18	1.17	1.16	1.15	1.14
2060	1.3	1.27	1.25	1.23	1.21	1.2	1.19	1.18	1.16	1.16
2070	1.33	1.3	1.28	1.26	1.24	1.22	1.21	1.19	1.18	1.17
2080	1.37	1.33	1.31	1.28	1.26	1.24	1.22	1.21	1.2	1.19
2090	1.4	1.36	1.34	1.31	1.28	1.26	1.24	1.23	1.21	1.2
2100	1.41	1.37	1.35	1.32	1.29	1.27	1.25	1.24	1.22	1.21

SSP3-7.0

Year	<1 hour	1.5 Hours	2 Hours	3 Hours	4.5 Hours	6 Hours	9 Hours	12 Hours	18 Hours	>24 Hours
2030	1.18	1.17	1.16	1.14	1.13	1.12	1.12	1.11	1.1	1.1
2040	1.23	1.21	1.2	1.18	1.17	1.16	1.15	1.14	1.13	1.12
2050	1.29	1.26	1.24	1.22	1.2	1.19	1.18	1.17	1.16	1.15
2060	1.35	1.32	1.3	1.27	1.25	1.23	1.22	1.2	1.19	1.18
2070	1.42	1.38	1.35	1.32	1.29	1.28	1.26	1.24	1.22	1.21
2080	1.5	1.45	1.42	1.38	1.35	1.33	1.3	1.28	1.26	1.25
2090	1.59	1.53	1.49	1.44	1.4	1.38	1.35	1.33	1.3	1.29
2100	1.66	1.59	1.55	1.5	1.45	1.42	1.39	1.37	1.34	1.32

SSP5-8.5

Year	<1 hour	1.5 Hours	2 Hours	3 Hours	4.5 Hours	6 Hours	9 Hours	12 Hours	18 Hours	>24 Hours
2030	1.2	1.18	1.17	1.16	1.14	1.13	1.13	1.12	1.11	1.11
2040	1.26	1.24	1.22	1.2	1.18	1.17	1.16	1.15	1.14	1.14
2050	1.34	1.31	1.29	1.26	1.24	1.23	1.21	1.2	1.18	1.18
2060	1.42	1.38	1.35	1.32	1.29	1.28	1.26	1.24	1.22	1.21
2070	1.52	1.47	1.43	1.4	1.36	1.34	1.31	1.29	1.27	1.26
2080	1.63	1.57	1.52	1.48	1.43	1.4	1.37	1.35	1.33	1.31
2090	1.77	1.69	1.64	1.58	1.52	1.49	1.45	1.42	1.39	1.37
2100	1.86	1.77	1.71	1.64	1.58	1.54	1.5	1.47	1.43	1.41

Loss Factors

Initial Loss (Adjustment Factors)

	Losses SSP1-2.6	Losses SSP2-4.5	Losses SSP3-7.0	Losses SSP5-8.5
2030	1.02	1.02	1.02	1.03
2040	1.03	1.03	1.03	1.03
2050	1.03	1.03	1.04	1.04
2060	1.03	1.04	1.04	1.05
2070	1.03	1.04	1.05	1.06
2080	1.03	1.05	1.06	1.07
2090	1.03	1.05	1.07	1.08
2100	1.03	1.05	1.07	1.09

Continuing Loss (Adjustment Factors)

	Losses SSP1-2.6	Losses SSP2-4.5	Losses SSP3-7.0	Losses SSP5-8.5
2030	1.04	1.05	1.05	1.05
2040	1.05	1.05	1.06	1.06
2050	1.06	1.06	1.07	1.08
2060	1.06	1.07	1.08	1.1
2070	1.06	1.08	1.1	1.12
2080	1.06	1.09	1.11	1.14
2090	1.06	1.09	1.13	1.16
2100	1.06	1.1	1.14	1.18

Temperature Changes (Degrees, Relative to 1961-1990 Baseline)

Year	SSP1-2.6	SSP2-4.5	SSP3-7.0	SSP5-8.5
2030	1.2	1.2	1.2	1.3
2040	1.3	1.4	1.5	1.6

Year	SSP1-2.6	SSP2-4.5	SSP3-7.0	SSP5-8.5
2050	1.4	1.7	1.8	2.1
2060	1.5	1.9	2.2	2.5
2070	1.5	2.1	2.5	3
2080	1.5	2.2	2.9	3.5
2090	1.5	2.4	3.3	4.1
2100	1.4	2.5	3.6	4.5

Layer Info

Time Accessed	07 December 2025 12:00PM
Version	2024_v1
Note	Updated climate change factors for IFD Initial loss and continuing loss based on IPCC AR6 temperature increases from the updated Climate Change Considerations (Book 1: Chapter 6) in ARR (Version 4.2). ARR recommends the use of Current and near-term (2030 midpoint). Medium-term (2050 midpoint) and Long-term (2090 midpoint)

Probability Neutral Burst Initial Loss

min (h)AEP(%)	50.0	20.0	10.0	5.0	2.0	1.0
60 (1.0)	11.6	7.8	8.9	8.5	8.2	6.4
90 (1.5)	11.9	8.3	9.5	9.5	9.4	6.5
120 (2.0)	13.3	8.9	9.9	9.7	9.4	5.7
180 (3.0)	13.3	9.7	10.7	10.2	8.8	4.5
360 (6.0)	13.0	8.8	8.6	7.9	9.0	3.0
720 (12.0)	18.3	13.0	12.7	10.9	12.1	3.2
1080 (18.0)	18.6	13.6	14.4	12.0	12.4	3.9
1440 (24.0)	21.6	16.4	16.5	14.2	14.9	4.4
2160 (36.0)	24.7	19.0	18.6	15.8	16.7	6.3
2880 (48.0)	27.7	22.4	21.7	23.1	19.9	9.5
4320 (72.0)	29.6	25.7	25.8	26.5	22.3	10.4

Layer Info

Time Accessed	07 December 2025 12:00PM
Version	2018_v1
Note	As this point is in NSW the advice provided on losses and pre-burst on the NSW Specific Tab of the ARR Data Hub (./nsw_specific) is to be considered. In NSW losses are derived considering a hierarchy of approaches depending on the available loss information. Probability neutral burst initial loss values for NSW are to be used in place of the standard initial loss and pre-burst as per the losses hierarchy.

Download TXT (downloads/4bf8e3c9-6b86-4989-b09e-9248097e6be1.txt)

Download JSON (downloads/03af5faa-18f1-4fe1-9238-ebb5f740be52.json)

Generating PDF... (downloads/b09e1a66-24fd-4c95-848c-3a6b8496c911.pdf)



ARRv4.2 Climate Change Factors

Inputs

Selected SSP: SSP3-7.0

Target/Design Year: 2090

Initial Losses

Input Initial Loss: 28.0 mm

Initial Loss Multiplier: 1.07

New Initial Loss: 29.96 mm

Continuing Losses

Input Cont. Loss: 1.6 mm/hr

Cont. Loss Multiplier: 1.13

New Cont. Loss: 1.808 mm/hr

3.3°C

of warming from a 1990 baseline.

Burst Duration	Duration in Mins	Depth Factor	α %/°C	Total % Increase
≤1 hour	60	1.59	15.1%	59.0%
1.5 Hours	90	1.53	13.8%	53.0%
2 Hours	120	1.49	12.8%	49.0%
3 Hours	180	1.44	11.7%	44.0%
4.5 Hours	270	1.4	10.7%	40.0%
6 Hours	360	1.38	10.3%	38.0%
9 Hours	540	1.35	9.5%	35.0%
12 Hours	720	1.33	9.0%	33.0%
18 Hours	1080	1.3	8.3%	30.0%
≥24 Hours	1440	1.29	8.0%	29.0%

Modified BOM File

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*** DATA MODIFIED ON 2025-12-07 WITH CLIMATE CHANGE FACTORS FOR SS

All Design Rainfall Depth (mm)

Issued:,31 October 2025

Location Label:,

Requested coordinate:,Latitude,-33.8687285278,Longitude,151.2733199

Nearest grid cell:,Latitude,33.8625 (S),Longitude,151.2625 (E)

*** DATA MODIFIED ON 2025-12-07 WITH CLIMATE CHANGE FACTORS FOR SS

,,Exceedances per Year (EY),Annual Exceedance Probability (AEP)

Duration,Duration in min,12EY,6EY,4EY,3EY,2EY,63.2%,50%,0.5EY,20%,0

1 min,1,1.7967,2.0193,2.4168,2.7189,3.1482,3.9432,4.4202,4.8972,5.9

2 min,2,3.2118,3.5934,4.2612,4.7382,5.4219,6.6303,7.3935,8.2044,9.7

3 min,3,4.3725,4.9131,5.8512,6.5349,7.4889,9.1743,10.2237,11.3526,1

4 min,4,5.3424,6.0261,7.2345,8.0931,9.3174,11.448,12.7836,14.1828,1

5 min,5,6.1851,6.996,8.4429,9.4605,10.9233,13.4832,15.0891,16.695,2

10 min,10,9.2061,10.5099,12.8313,14.5008,16.854,21.147,23.85,26.394

15 min,15,11.2095,12.8472,15.7569,17.808,20.988,26.394,29.733,32.91

20 min,20,12.72,14.6121,17.967,20.352,24.009,30.369,34.185,37.842,4

25 min,25,13.9602,16.059,19.716,22.419,26.394,33.549,37.683,41.817,

30 min,30,14.9937,17.172,21.306,24.168,28.461,36.252,40.704,45.156,

45 min,45,17.49,20.034,24.645,28.143,33.231,42.612,47.7,52.947,63.6

1 hour,60,19.239,22.101,27.348,31.164,36.888,47.382,52.947,58.671,7

1.5 hour,90,21.267,24.48,30.294,34.578,40.851,52.632,58.599,65.02

2 hour,120,22.946,26.373,32.482,37.101,43.955,56.62,63.176,70.03,83

3 hour,180,25.344,29.232,36.144,41.328,49.104,63.36,70.416,78.192,9
4.5 hour,270.0,28.28,32.62,40.6,46.48,55.16,71.4,79.38,88.2,105.84,
6 hour,360,30.774,35.604,44.298,50.922,60.582,78.384,87.354,97.014,
9 hour,540,34.56,40.23,50.355,57.915,69.12,89.775,100.17,111.24,135
12 hour,720,37.506,43.89,55.195,63.574,76.076,98.952,110.656,122.89
18 hour,1080,42.12,49.4,62.53,72.28,86.71,113.23,127.27,141.7,174.2
24 hour,1440,45.795,53.922,68.628,79.593,95.718,125.259,141.9,157.3
30 hour,1800,49.02,57.921,74.046,86.043,103.587,135.45,153.51,170.2
36 hour,2160,51.729,61.275,78.561,91.332,110.295,144.48,163.83,181.
48 hour,2880,55.857,66.564,85.785,99.975,121.002,159.96,181.89,201.
72 hour,4320,61.146,73.401,95.589,111.972,135.45,180.6,205.11,228.3
96 hour,5760,64.242,77.658,101.91,119.841,145.77,194.79,221.88,246.
120 hour,7200,65.919,80.496,106.425,125.517,153.51,205.11,233.49,251.
144 hour,8640,66.822,82.173,109.65,130.29,159.96,212.85,242.52,269.
168 hour,10080,67.338,83.334,112.101,132.87,163.83,220.59,250.26,27

Modified ARR Datahub Text File

[Copy](#)[Download .txt](#)

Results - ARR Data Hub

[STARTTEXT]

Input Data Information

[INPUTDATA]

Latitude,-33.868729

Longitude,151.273320

[END_INPUTDATA]

River Region

[RIVREG]

Division,South East Coast (NSW)

River Number,13

River Name,Sydney Coast-Georges River

[RIVREG_META]

Time Accessed,28 October 2025 04:13PM

Version,2016_v1

[END_RIVREG]

ARF Parameters

[LONGARF]

Zone,SE Coast

a,0.06

b,0.361

c,0.0

d,0.317

e,8.11e-05

f,0.651

g,0.0
h,0.0
i,0.0
[LONGARF_META]
Time Accessed,28 October 2025 04:13PM
Version,2016_v1
[END_LONGARF]

Storm Losses
[LOSSES]
ID,17135.0
Storm Initial Losses (mm),29.96
Storm Continuing Losses (mm/h),1.808
[LOSSES_META]
*** DATA MODIFIED ON 2025-12-07 WITH CLIMATE CHANGE FACTORS FOR SSP
Time Accessed,28 October 2025 04:13PM
Version,2016_v1
[END_LOSSES]

Temporal Patterns
[TP]
code,ECsouth
Label,East Coast South
[TP_META]
Time Accessed,28 October 2025 04:13PM
Version,2016_v2
[END_TP]

Areal Temporal Patterns
[ATP]
code,ECsouth
arealabel,East Coast South
[ATP_META]
Time Accessed,28 October 2025 04:13PM
Version,2016_v2
[END_ATP]

Median Preburst Depths and Ratios
[PREBURST]
min (h)\AEP(%),50,20,10,5,2,1
60 (1.0),19.08 (0.362),13.197 (0.188),9.381 (0.113),5.565 (0.059),3
90 (1.5),20.502 (0.350),14.994 (0.192),11.322 (0.123),7.65 (0.074),
120 (2.0),13.857 (0.219),12.516 (0.150),11.771 (0.119),10.877 (0.09
180 (3.0),11.52 (0.163),10.224 (0.110),9.504 (0.086),8.784 (0.069),
360 (6.0),16.284 (0.186),29.532 (0.253),38.364 (0.278),46.782 (0.29
720 (12.0),4.655 (0.042),13.3 (0.089),19.152 (0.107),24.605 (0.118)
1080 (18.0),5.07 (0.040),12.09 (0.070),16.77 (0.080),21.32 (0.087),
1440 (24.0),1.29 (0.009),6.966 (0.036),10.707 (0.046),14.319 (0.052
2160 (36.0),0.0 (0.000),3.354 (0.015),5.547 (0.020),7.74 (0.024),11

2880 (48.0),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),2.322 (1
4320 (72.0),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),1.161 (1
[PREBURST_META]

*** DATA MODIFIED ON 2025-12-07 WITH CLIMATE CHANGE FACTORS FOR SSP
Time Accessed,28 October 2025 04:13PM

Version,2018_v1

Note,Preburst interpolation methods for catchment wide preburst has
[END_PREBURST]From preburst class

10% Preburst Depths

[PREBURST10]

min (h)\AEP(%),50,20,10,5,2,1

60 (1.0),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000)
90 (1.5),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000)
120 (2.0),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000)
180 (3.0),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000)
360 (6.0),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000)
720 (12.0),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000)
1080 (18.0),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000)
1440 (24.0),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000)
2160 (36.0),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000)
2880 (48.0),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000)
4320 (72.0),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000)

[PREBURST10_META]

*** DATA MODIFIED ON 2025-12-07 WITH CLIMATE CHANGE FACTORS FOR SSP
Time Accessed,28 October 2025 04:13PM

Version,2018_v1

Note,Preburst interpolation methods for catchment wide preburst has
[END_PREBURST10]From preburst class

25% Preburst Depths

[PREBURST25]

min (h)\AEP(%),50,20,10,5,2,1

60 (1.0),0.795 (0.015),0.477 (0.006),0.159 (0.003),0.0 (0.000),0.0 (0.000)
90 (1.5),0.612 (0.010),0.306 (0.004),0.153 (0.002),0.0 (0.000),0.0 (0.000)
120 (2.0),0.298 (0.004),0.149 (0.002),0.0 (0.001),0.0 (0.000),0.0 (0.000)
180 (3.0),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000)
360 (6.0),0.69 (0.008),1.104 (0.009),1.38 (0.010),1.656 (0.010),0.612 (0.005)
720 (12.0),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.133 (0.001)
1080 (18.0),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),2.99 (0.001)
1440 (24.0),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),1.677 (0.001)
2160 (36.0),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000)
2880 (48.0),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000)
4320 (72.0),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000)

[PREBURST25_META]

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Time Accessed,28 October 2025 04:13PM

Version,2018_v1

Note,Preburst interpolation methods for catchment wide preburst has

[END_PREBURST25]From preburst class

75% Preburst Depths

[PREBURST75]

min (h)\AEP(%),50,20,10,5,2,1

60 (1.0),73.935 (1.397),65.826 (0.934),60.42 (0.732),55.332 (0.585)

90 (1.5),73.134 (1.246),63.189 (0.812),56.763 (0.621),50.49 (0.482)

120 (2.0),62.58 (0.992),61.835 (0.737),61.239 (0.623),60.643 (0.538)

180 (3.0),75.168 (1.067),70.416 (0.754),67.392 (0.613),64.512 (0.511)

360 (6.0),60.444 (0.692),84.456 (0.723),100.464 (0.727),115.782 (0.727)

720 (12.0),29.925 (0.270),50.008 (0.333),63.441 (0.354),76.209 (0.354)

1080 (18.0),30.94 (0.243),51.61 (0.296),65.39 (0.313),78.52 (0.321)

1440 (24.0),15.351 (0.109),36.894 (0.189),51.084 (0.218),64.758 (0.218)

2160 (36.0),10.32 (0.063),27.348 (0.119),38.571 (0.140),49.278 (0.140)

2880 (48.0),3.225 (0.018),9.546 (0.038),13.803 (0.045),17.802 (0.051)

4320 (72.0),0.0 (0.000),1.161 (0.004),2.064 (0.006),2.838 (0.007),2.838 (0.007)

[PREBURST75_META]

*** DATA MODIFIED ON 2025-12-07 WITH CLIMATE CHANGE FACTORS FOR SSP
Time Accessed,28 October 2025 04:13PM

Version,2018_v1

Note,Preburst interpolation methods for catchment wide preburst has

[END_PREBURST75]From preburst class

90% Preburst Depths

[PREBURST90]

min (h)\AEP(%),50,20,10,5,2,1

60 (1.0),157.092 (2.972),156.933 (2.228),156.933 (1.899),156.774 (1.899)

90 (1.5),165.087 (2.816),177.786 (2.281),186.201 (2.038),194.157 (2.038)

120 (2.0),134.994 (2.139),153.321 (1.830),165.39 (1.684),177.012 (1.684)

180 (3.0),130.32 (1.851),177.408 (1.897),208.512 (1.899),238.464 (1.899)

360 (6.0),111.228 (1.273),147.798 (1.265),172.086 (1.245),195.27 (1.245)

720 (12.0),59.983 (0.542),103.474 (0.689),132.069 (0.738),159.733 (0.738)

1080 (18.0),69.42 (0.546),107.12 (0.615),132.08 (0.633),156.13 (0.633)

1440 (24.0),59.856 (0.424),97.782 (0.502),122.808 (0.524),146.802 (0.524)

2160 (36.0),36.765 (0.224),63.984 (0.280),82.044 (0.298),99.33 (0.312)

2880 (48.0),20.382 (0.112),51.729 (0.204),72.498 (0.237),92.493 (0.237)

4320 (72.0),12.9 (0.063),27.993 (0.097),37.926 (0.109),47.472 (0.112)

[PREBURST90_META]

*** DATA MODIFIED ON 2025-12-07 WITH CLIMATE CHANGE FACTORS FOR SSP
Time Accessed,28 October 2025 04:13PM

Version,2018_v1

Note,Preburst interpolation methods for catchment wide preburst has

[END_PREBURST90]From preburst class

Climate Change Factors

[CCF]

[SSP1-2.6]

,<1 hour,1.5 Hours,2 Hours,3 Hours,4.5 Hours,6 Hours,9 Hours,12 Hours

2030,1.18,1.17,1.16,1.14,1.13,1.12,1.12,1.11,1.1,1.1

2040,1.21,1.19,1.17,1.16,1.15,1.14,1.13,1.12,1.11,1.11
 2050,1.22,1.2,1.18,1.17,1.15,1.15,1.14,1.13,1.12,1.11
 2060,1.23,1.21,1.2,1.18,1.17,1.16,1.15,1.14,1.13,1.12
 2070,1.24,1.22,1.2,1.18,1.17,1.16,1.15,1.14,1.13,1.12
 2080,1.23,1.21,1.2,1.18,1.17,1.16,1.15,1.14,1.13,1.12
 2090,1.23,1.21,1.2,1.18,1.17,1.16,1.15,1.14,1.13,1.12
 2100,1.22,1.2,1.19,1.17,1.16,1.15,1.14,1.13,1.12,1.12

[END_SSP1-2.6]

[SSP2-4.5]

,<1 hour,1.5 Hours,2 Hours,3 Hours,4.5 Hours,6 Hours,9 Hours,12 Hou

2030,1.18,1.17,1.16,1.14,1.13,1.12,1.12,1.11,1.1,1.1
 2040,1.22,1.2,1.19,1.17,1.16,1.15,1.14,1.13,1.12,1.12
 2050,1.27,1.24,1.23,1.21,1.19,1.18,1.17,1.16,1.15,1.14
 2060,1.3,1.27,1.25,1.23,1.21,1.2,1.19,1.18,1.16,1.16
 2070,1.33,1.3,1.28,1.26,1.24,1.22,1.21,1.19,1.18,1.17
 2080,1.37,1.33,1.31,1.28,1.26,1.24,1.22,1.21,1.2,1.19
 2090,1.4,1.36,1.34,1.31,1.28,1.26,1.24,1.23,1.21,1.2
 2100,1.41,1.37,1.35,1.32,1.29,1.27,1.25,1.24,1.22,1.21

[END_SSP2-4.5]

[SSP3-7.0]

,<1 hour,1.5 Hours,2 Hours,3 Hours,4.5 Hours,6 Hours,9 Hours,12 Hou

2030,1.18,1.17,1.16,1.14,1.13,1.12,1.12,1.11,1.1,1.1
 2040,1.23,1.21,1.2,1.18,1.17,1.16,1.15,1.14,1.13,1.12
 2050,1.29,1.26,1.24,1.22,1.2,1.19,1.18,1.17,1.16,1.15
 2060,1.35,1.32,1.3,1.27,1.25,1.23,1.22,1.2,1.19,1.18
 2070,1.42,1.38,1.35,1.32,1.29,1.28,1.26,1.24,1.22,1.21
 2080,1.5,1.45,1.42,1.38,1.35,1.33,1.3,1.28,1.26,1.25
 2090,1.59,1.53,1.49,1.44,1.4,1.38,1.35,1.33,1.3,1.29
 2100,1.66,1.59,1.55,1.5,1.45,1.42,1.39,1.37,1.34,1.32

[END_SSP3-7.0]

[SSP5-8.5]

,<1 hour,1.5 Hours,2 Hours,3 Hours,4.5 Hours,6 Hours,9 Hours,12 Hou

2030,1.2,1.18,1.17,1.16,1.14,1.13,1.13,1.12,1.11,1.11
 2040,1.26,1.24,1.22,1.2,1.18,1.17,1.16,1.15,1.14,1.14
 2050,1.34,1.31,1.29,1.26,1.24,1.23,1.21,1.2,1.18,1.18
 2060,1.42,1.38,1.35,1.32,1.29,1.28,1.26,1.24,1.22,1.21
 2070,1.52,1.47,1.43,1.4,1.36,1.34,1.31,1.29,1.27,1.26
 2080,1.63,1.57,1.52,1.48,1.43,1.4,1.37,1.35,1.33,1.31
 2090,1.77,1.69,1.64,1.58,1.52,1.49,1.45,1.42,1.39,1.37
 2100,1.86,1.77,1.71,1.64,1.58,1.54,1.5,1.47,1.43,1.41

[END_SSP5-8.5]

[Climate_Change_INITIAL_LOSS]

,Losses SSP1-2.6,Losses SSP2-4.5,Losses SSP3-7.0,Losses SSP5-8.5

2030,1.02,1.02,1.02,1.03
 2040,1.03,1.03,1.03,1.03
 2050,1.03,1.03,1.04,1.04
 2060,1.03,1.04,1.04,1.05
 2070,1.03,1.04,1.05,1.06
 2080,1.03,1.05,1.06,1.07

2090,1.03,1.05,1.07,1.08

2100,1.03,1.05,1.07,1.09

[END_Climate_Change_INITIAL_LOSS]

[Climate_Change_CONTINUING_LOSS]

, Losses SSP1-2.6, Losses SSP2-4.5, Losses SSP3-7.0, Losses SSP5-8.5

2030,1.04,1.05,1.05,1.05

2040,1.05,1.05,1.06,1.06

2050,1.06,1.06,1.07,1.08

2060,1.06,1.07,1.08,1.1

2070,1.06,1.08,1.1,1.12

2080,1.06,1.09,1.11,1.14

2090,1.06,1.09,1.13,1.16

2100,1.06,1.1,1.14,1.18

[END_Climate_Change_CONTINUING_LOSS]

[TEMPERATURE_CHANGES]

, SSP1-2.6, SSP2-4.5, SSP3-7.0, SSP5-8.5

2030,1.2,1.2,1.2,1.3

2040,1.3,1.4,1.5,1.6

2050,1.4,1.7,1.8,2.1

2060,1.5,1.9,2.2,2.5

2070,1.5,2.1,2.5,3.0

2080,1.5,2.2,2.9,3.5

2090,1.5,2.4,3.3,4.1

2100,1.4,2.5,3.6,4.5

[END_TEMPERATURE_CHANGES]

[CCF_META]

Time Accessed, 28 October 2025 04:13PM

Version, 2024_v1

Note, Updated climate change factors for IFD Initial loss and contin

[END_CCF]

Probability Neutral Burst Initial Loss

[BURSTIL]

min (h)\AEP(%), 50.0, 20.0, 10.0, 5.0, 2.0, 1.0

60 (1.0), 12.412, 8.346, 9.523, 9.095, 8.774, 6.848

90 (1.5), 12.733, 8.881, 10.165, 10.165, 10.058, 6.955

120 (2.0), 14.231, 9.523, 10.593, 10.379, 10.058, 6.099

180 (3.0), 14.231, 10.379, 11.449, 10.914, 9.416, 4.815

360 (6.0), 13.91, 9.416, 9.202, 8.453, 9.63, 3.21

720 (12.0), 19.581, 13.91, 13.589, 11.663, 12.947, 3.424

1080 (18.0), 19.902, 14.552, 15.408, 12.84, 13.268, 4.173

1440 (24.0), 23.112, 17.548, 17.655, 15.194, 15.943, 4.708

2160 (36.0), 26.429, 20.33, 19.902, 16.906, 17.869, 6.741

2880 (48.0), 29.639, 23.968, 23.219, 24.717, 21.293, 10.165

4320 (72.0), 31.672, 27.499, 27.606, 28.355, 23.861, 11.128

[BURSTIL_META]

*** DATA MODIFIED ON 2025-12-07 WITH CLIMATE CHANGE FACTORS FOR SSP

Time Accessed, 28 October 2025 04:13PM

Version,2018_v1

Note,As this point is in NSW the advice provided on losses and pre-

[END_BURSTIL]

Transformational Pre-burst Rainfall

[PREBURST_TRANS]

min (h)\AEP(%),50.0,20.0,10.0,5.0,2.0,1.0

60 (1.0),26.553,32.595,30.846,31.482,31.959,34.821

90 (1.5),25.092,30.6,28.764,28.764,28.917,33.354

120 (2.0),22.35,28.906,27.416,27.714,28.161,33.674

180 (3.0),21.6,26.784,25.344,26.064,28.08,34.272

360 (6.0),21.114,26.91,27.186,28.152,26.634,34.914

720 (12.0),13.3,20.349,20.748,23.142,21.546,33.383

1080 (18.0),12.61,19.11,18.07,21.19,20.67,31.72

1440 (24.0),8.643,15.351,15.222,18.189,17.286,30.831

2160 (36.0),4.644,11.997,12.513,16.125,14.964,28.38

2880 (48.0),0.774,7.611,8.514,6.708,10.836,24.252

4320 (72.0),0.0,3.354,3.225,2.322,7.74,23.091

[PREBURST_TRANS_META]

*** DATA MODIFIED ON 2025-12-07 WITH CLIMATE CHANGE FACTORS FOR SSP

The tranformational pre-burst is intended for software suppliers in

[END_PREBURST_TRANS]

[ENDTXT]

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APPENDIX A4 – RESPONSE TO SUBMISSIONS SUMMARY

This Appendix summarises RTS Civil's Response to Submissions received on the Environmental Impact Statement lodged for SSD-101842729, insofar as they relate to integrated water management and stormwater matters. The applicable submissions are:

- Woollahra Municipal Council submission (Section 27 Stormwater), dated 2 March 2026;
- Annexure A draft conditions of consent (Conditions D.6, D.32, D.34 and D.35 insofar as they affect stormwater and subsoil drainage);
- NSW DCCEEW Water Group submission (17 March 2026) – groundwater / dewatering interface with IWMP Section 3.2.

Flood-related submissions (DPHI Key Issues items 6 and 7, NSW SES and Council Section 26) are addressed in the companion Flood Impact and Risk Assessment Rev 02 (Appendix A6). A consolidated compliance matrix for the IWMP-relevant items is provided at the end of this Appendix.

SOURCE DOCUMENT REGISTER

The following short codes are used throughout this Appendix (and the compliance matrix at Section A4.4) when referencing source submissions and agency advice:

Code	Document	Type
DPHI	DPHI Key Issues Letter (24/03/2026) - 39-item Attachment A	Both
DCCEEW-CPHR	DCCEEW Conservation Programs, Heritage and Regulation (CPHR) Group - comments on FIRA (23/03/2026)	Flood
SES	NSW State Emergency Service comments (19/03/2026)	Flood
DCCEEW-W	DCCEEW Water Group comments (17/03/2026) - groundwater take, dewatering, WMA 2000 / Reg 2025 interface with IWMP Section 3.2	Storm
WC	Woollahra Council submission (02/03/2026) - incl. Section 26 Flood, Section 27 Stormwater	Both
WC-DC	Woollahra Council Draft Conditions of Consent (Annexure A to WC, without prejudice) - D.6, D.32, D.34, D.35 are the SW/Flood-relevant items	Both
FPD	FPD Planning consolidated RTS response tabulation (30/04/2026) - cross-reference index that re-tabulates Council, public and agency submissions; consolidator only, not a primary source	Both

A4.1 WOOLLAHRA COUNCIL – STORMWATER (SECTION 27) RESPONSE

Council's Section 27 submission and Annexure A draft condition D.34 require, in the absence of Water Sensitive Urban Design (WSUD) treatment per WDCP E2.2.3, the OSD storage volume to be provided at a minimum rate of 25 m³ per 1,000 m² of total site area. For the 3,105 m² site, this equates to a minimum OSD volume of 77.6 m³. This volume has been adopted for Issue 02 and supersedes the 62.1 m³ volume calculated under the base WDCP E2.2.4 rate in Section 4.4.

The following design parameters are committed:

- Minimum OSD storage volume: 77.6 m³, to be confirmed against DRAINS modelling at Construction Certificate stage including any additional storage required to offset bypass (pervious and impervious) areas.
- Permissible Site Discharge: 105.5 L/s for the 1% AEP event, consistent with Annexure A D.34(e).
- OSD orifice centreline set above the downstream Hydraulic Grade Line at the connecting kerb inlet, with the top-of-kerb adopted as the tailwater condition and the orifice invert to be confirmed above the 1% AEP HGL at Construction Certificate stage. The design excludes any reliance on submerged-outlet hydraulics or non-return valves.
- All invert levels (IL) and finished levels (FL) at junction pits and kerb inlet pits will be clearly shown on the detailed Construction Certificate stormwater drawings (SW001A through SW203A).

No raingarden WSUD treatment is proposed. Stormwater quality treatment is provided by the Ocean Protect proprietary devices specified in Section 5.5.

A4.2 NSW DCCEE WATER GROUP – INTERFACE WITH IWMP

The DCCEE Water Group submission addresses groundwater take, dewatering infrastructure and any water access licensing or exemption under the Water Management (General) Regulation 2025. These are matters outside the IWMP scope and are being addressed by EI Australia via the Construction Phase Hydrogeological Report (CPHR) and Dewatering Management Plan (DMP). For the IWMP interface:

The basement is currently on a drained basis, subject to EI Australia's ongoing groundwater monitoring (refer Section 3.2);

No construction or operational dewatering discharge will be released to Council's kerb and gutter or stormwater network;

If the EI Australia CPHR/DMP identifies any discharge route or treatment that intersects the stormwater system, this IWMP will be updated at Construction Certificate stage to reflect the final configuration;

The pump-out system specification in Section 3.2 may require revision upon completion of the groundwater monitoring.

A4.3 ANNEXURE A DRAFT CONDITIONS – IWMP RESPONSE

Condition D.6 (Flood Protection / FPL): addressed in the Flood Impact and Risk Assessment Rev 02, Appendix A6.

Condition D.34 (OSD / PSD / HGL / outlet arrangement): accepted in principle; final detailed design delivered at CC. Refer Section A4.1 above.

Condition D.32 (geotechnical and hydrogeological design / tanking / no subsoil discharge to kerb and gutter, with the corresponding stormwater drawings notation under D.34(i)): accepted. EI Australia to provide supporting geotechnical and hydrogeological certification. Section 3.2 of this IWMP confirms that subsoil and seepage water will not be discharged to Council's kerb and gutter or stormwater network.

A4.4 RFI RESPONSE COMPLIANCE MATRIX

The following compliance matrix tabulates the IWMP-relevant items from Annexure A draft conditions D.34, D.35 and D.32, together with FPD Planning consolidated comments for Section s 6 (Flooding & Stormwater) and 20 (Stormwater). Flood-only items (DPHI Key Issues items 6 and 7, NSW SES items 1–4, WLEP cl. 5.21) are tabulated in the FIRA Rev 02 Appendix A6.

Item	Source	RFI / Submission Matter	RTS Response (Summary)	Location / Compliance
DPHI #6	DPHI	Updated FIRA responding to DCCEEW and SES (flood).	Addressed in FIRA Rev 02.	FIRA Rev 02 App. A6 – Complies
WC Section 27	WC	OSD storage at minimum rate 25 m ³ /1,000 m ² of site area (=77.6 m ³) where no WSUD raingarden treatment is provided per WDCP E2.2.3.	Accepted. Rate-based 77.6 m ³ adopted; no raingarden WSUD; treatment via OceanGuard + 4× 690 PSORB SF Chamber per Section 5.5. Bypass-area top-up via DRAINS at CC.	IWMP Section 4.4, Section 4.5, Section 5.5, Section A4.1 – Complies
WC Section 27	WC	OSD outlet above downstream HGL using top-of-kerb as tailwater; no submerged outlet; no NRVs.	Accepted. Design basis confirmed.	IWMP Section 4 / SWMP – Complies
WC Section 27	WC	All ILs and FLs at junction pits and kerb inlet pits clearly shown on drawings.	Accepted. Reflected on CC drawings.	SWMP CC drawings – Complies at CC
WC-DC D.6	WC-DC	Flood Risk Management Plan; habitable +500 mm, parking +300 mm.	Addressed in FIRA Rev 02.	FIRA Rev 02 App. A6 – Complies at CC
WC-DC D.34	WC-DC	PSD 105.5 L/s; OSD 77.6 m ³ ; HGL; no submerged outlet; no NRVs; ILs/FLs shown.	Accepted. Final design at CC.	IWMP Section 4 / SWMP – Complies at CC
WC-DC D.32	WC-DC	Tanking / no subsoil discharge to kerb and gutter.	Accepted. EI Australia to provide geotech/hydrogeology; IWMP Section 3.2 confirms no kerb/gutter discharge.	IWMP Section 3.2 – Complies (Defer to EI Aus)
DCCEEW-W #1	DCCEEW-W	Quantify groundwater take; confirm tanked or drained; dewatering infrastructure and impact assessment.	Addressed by EI Australia CPHR/DMP. Current basis: drained subject to monitoring.	IWMP Section 3.2 – Defer to EI Australia
DCCEEW-W #2	DCCEEW-W	Aquifer interference impacts (if take >3 ML/yr).	Addressed by EI Australia.	EI Aus CPHR – Defer
DCCEEW-W #3	DCCEEW-W	Water access licence or exemption under WM Reg 2025 Sch 4.	Addressed by EI Australia.	EI Aus CPHR – Defer

Item	Source	RFI / Submission Matter	RTS Response (Summary)	Location / Compliance
WC-DC D.34(b)	WC-DC	Direct connection to existing kerb inlet pit via new 600×600 RC junction pit + new Class 4 375 mm RCP across Conway Ave (replacing existing 225 mm).	Accepted. Definitive commitment in IWMP Section 3.1 / Section 8.0; S138 Roads Act approval to be obtained pre-CC.	IWMP Section 3.1, Section 8.0 / SWMP – Complies (CC detail)
WC-DC D.34(c)	WC-DC	Min 900×900 boundary junction pit within site frontage; min 1% grade per AS3500.3.	Accepted. Committed in IWMP Section 3.1; SWMP layout to confirm at CC.	IWMP Section 3.1 / SWMP – Complies (CC detail)
WC-DC D.34(d)	WC-DC	OSD min 77.6 m ³ + additional storage via DRAINS for bypass (pervious + impervious); no high-early-discharge chamber; tc = 5 min for both areas; DRAINS results on drawings; bypass catchment plan.	Accepted. Adopted on rate basis (77.6 m ³); bypass DRAINS run + bypass-catchment plan deliverable at CC.	IWMP Section 4.4, Section 4.5 / SWMP – Adopted DA, bypass at CC
WC-DC D.34(g)	WC-DC	Basement pump-out: min 9 m ³ storage, max 10 L/s pump rate, AS3500.3, discharge to OSD.	Accepted. Committed in IWMP Section 3.2 and Section 8.0 recommendations.	IWMP Section 3.2, Section 8.0 – Complies
WC-DC D.34(h)	WC-DC	1× OceanGuard + 2.5 m ² SF Chamber with 4× 690 PSORB by Ocean Protect to meet WDCP E2.2.3 water-quality targets.	Accepted. Committed in IWMP Section 5.5; MUSIC results meet TSS/TP/TN/GP targets per Section 5.7.	IWMP Section 5.5, Section 5.7 – Complies
WC-DC D.34(i)	WC-DC	All below-ground structures fully tanked; no subsoil drainage / seepage to kerb and gutter; notation on drawings.	Accepted. Committed in IWMP Section 3.2; D.34(i) notation will be carried on SWMP drawings (SW001A–SW203A) at CC.	IWMP Section 3.2 / SWMP – Complies (CC drawings)
WC-DC D.34(j)	WC-DC	Internal drainage (gutters, downpipes, pipes, pits) designed for 1% AEP where no unimpeded overland flow path to street.	Accepted. Design intent committed in IWMP Section 4.4; calcs and details at CC.	IWMP Section 4.4 / SWMP – Adopted DA, calcs at CC
WC-DC D.34(k)	WC-DC	Interceptor drains at site boundary to prevent stormwater crossing footpath.	Accepted. Committed in IWMP Section 4.4; SWMP detail at CC.	IWMP Section 4.4 / SWMP – Adopted DA, detail at CC
WC-DC D.34 details	WC-DC	SWMP at 1:100, AR&R 2019, overland flow paths over impervious; OSD details (dims, outlet, plans/elev/Section s, access, structural, emergency overland path); RWT details (as for OSD).	Accepted. Layout, OSD and RWT detail packs to be issued with CC SWMP (SW001A–SW203A).	SWMP – CC detail
WC-DC D.34 (S138)	WC-DC	Section 138 Roads Act 1993 approval required prior to CC for Council connection works.	Acknowledged. S138 application by Builder/Mathieson prior to CC issue.	Builder action – Pre-CC

Item	Source	RFI / Submission Matter	RTS Response (Summary)	Location / Compliance
WC-DC D.35	WC-DC	Non-gravity drainage systems (charged, siphon, pump/sump) per WDCP 2015 Ch E2 - Stormwater & Flood Risk Management.	Accepted. Basement pump-out (D.34(g)) is the only non-gravity element; designed per AS3500.3 and WDCP Ch E2.	IWMP Section 3.2 – Complies
FPD Section 6.1	FPD (re public submission)	Existing stormwater infrastructure cannot handle heavy downpours.	Addressed via OSD attenuation to PSD 105.5 L/s and Class 4 375 mm RCP upgrade across Conway Ave per D.34(b).	IWMP Section 3.1, Section 4.4 – Complies
FPD Section 6.8	FPD (re public submission)	Downstream stormwater infrastructure capacity for basement pump-out + seepage + concentrated runoff without surcharge.	DRAINS confirms combined post-development discharge below PSD 105.5 L/s for 1% AEP without significant surcharging downstream infrastructure. Orifice geometry and final downstream capacity to be confirmed at CC alongside the bypass DRAINS update.	IWMP Section 4.4 (downstream-capacity para) – Complies
FPD Section 20.1	FPD (re WC Section 27)	Raingarden per WDCP E2.2.3 OR rate-based 77.6 m ³ OSD (25 m ³ /1,000 m ²).	Rate-based 77.6 m ³ adopted; no raingarden WSUD.	IWMP Section 4.4, Section A4.1 – Complies
FPD Section 20.2	FPD (re WC Section 27)	OSD invert above downstream HGL, top-of-kerb tailwater at connecting kerb inlet pit; no submerged outlet / NRV; all IL & FL at junction and kerb inlet pits on CC drawings (SW001A–SW203A).	Accepted. Design basis committed in IWMP Section 4.4 / Section A4.1; IL/FL detail on CC SWMP.	IWMP Section 4.4, Section A4.1 / SWMP – Complies (CC detail)

End of Appendix A4.