

WATERLOO METRO QUARTER OVER STATION DEVELOPMENT

Environmental Impact Statement Appendix V – Integrated Water Management Report

SSD-79307746 Central Precinct

Detailed State Significant Development
Development Application

Prepared for **WL Developer Pty Ltd**

16 September 2025

Report Amendment Register

| Issue Ref | Amended Section(s) | Issue/Amendment Details | Author(s) | Reviewer | Date |
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| P01 | ALL | Preliminary Issue | Viet Lam (RBG) Mark Labid (RBG) Lachlan Berg (WSce) | Allen Ang (RBG) | 14/08/25 |
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Contents

| | | |
|-----|--|----|
| 1. | Introduction..... | 1 |
| 1.1 | Purpose of the Report | 1 |
| 1.2 | Secretary’s Environmental Assessment Requirements..... | 1 |
| 1.3 | Proposed Development | 2 |
| 1.4 | Site Description | 2 |
| 1.5 | Reference Documents..... | 3 |
| 1.6 | Relevant Standard and Design Guidelines | 4 |
| 1.7 | Abbreviations and Definitions..... | 4 |
| 2. | Methodology | 5 |
| 2.1 | Site Analysis & Baseline Assessment..... | 5 |
| 2.2 | Stormwater Management Strategy..... | 5 |
| 2.3 | Stakeholder Engagement & Regulatory Compliance | 5 |
| 2.4 | Implementation & Monitoring Framework..... | 5 |
| 3. | Design Inputs and Guidelines..... | 5 |
| 3.1 | Consultation | 5 |
| 3.2 | Other Consultants Inputs..... | 6 |
| 3.3 | Design Rainfall Intensities | 6 |
| 3.4 | Stormwater Design Criteria..... | 8 |
| 3.5 | Ground Condition Assessment..... | 10 |
| 4. | Existing Drainage Infrastructure | 11 |
| 5. | Stormwater Management Design..... | 12 |
| 5.1 | Design Philosophy | 12 |
| 5.2 | Proposed Stormwater Design..... | 12 |
| 5.3 | Water Sensitive Urban Design..... | 18 |
| 6. | Wastewater Management | 21 |
| 6.1 | Sanitary Plumbing & Drainage..... | 21 |
| 6.2 | Trade Waste | 21 |
| 6.3 | Construction and Maintenance..... | 21 |
| 7. | Erosion and Sediment Control..... | 21 |
| 7.1 | Design Intent and Criteria | 21 |
| 7.2 | Site Protection and Sediment Control Measures | 21 |
| 7.3 | Site Access | 22 |
| 8. | Conclusion | 22 |

Appendix A Civil Documentation

- Appendix A-1 Sydney Water OSD Requirements
- Appendix A-2 City of Sydney Council OSD Requirements
- Appendix A-3 Confirmation of Building 3 & 4 OSD Calculation
- Appendix A-4 Civil Drawings
- Appendix A-5 MUSIC Report
- Appendix A-6 DRAINS Report

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1. Introduction

This report has been prepared by Robert Bird Group (RBG) and Warren Smith Consulting Engineer (WSce) on behalf of WL Developer Pty Ltd (the applicant) to accompany a State Significant Development Application (SSDA) for the detailed Central Precinct SSD (SSD-79307746), located within the Waterloo Metro Quarter (WMQ) at 150 Cope Street, Waterloo. This SSD will replace the previous detailed approval applying to the Central precinct.

This report has been prepared to respond to Item 15 of the Planning Secretary's Environmental Assessment Requirements (SEARs) issued by Department of Planning, Infrastructure and Housing (DPHI) on 13 February 2025.

1.1 Purpose of the Report

This document forms the basis for the stormwater and wastewater management design and documentation for the project. This report provides reference information, design standards and inputs, a description of the existing site and the proposed works, and discussion on the hydrological and hydraulic analysis of the proposed stormwater and wastewater design.

1.2 Secretary's Environmental Assessment Requirements

This Stormwater Management Report has been prepared in accordance with the following directions contained within the Secretary's Environmental Assessment Requirements (SEARs) that were issued by DPHI for this project [Reference: SSD-79307746] as well as the conditions of consent issued for the concept SSD DA:

Table 1-1: SEARs Requirements and Conditions of Concept Approval

| Requirements | Report Reference |
|--|--|
| 15. Water Management | |
| <ul style="list-style-type: none">Detail the proposed drainage design and servicing infrastructure to be incorporated as part of the development (stormwater and wastewater). | Refer to Section 3, 5 and 7 of this report for the stormwater component. |
| <ul style="list-style-type: none">Demonstrate how the development complies with council's drainage requirements and identify proposed stormwater treatment and water quality management measures to minimise adverse environmental impacts. | Refer to the ¹ Section 6 for the Wastewater Management Plan |
| Condition B23 of the Amended Concept SSD-10441: | |
| <ul style="list-style-type: none">Future development applications shall be accompanied by a Flood and Stormwater Impact Assessment. The Assessment must demonstrate the conclusions and recommendations of the Concept Water Quality, Flooding | Refer to WSP's Report (Ref: PS219170-HYD-REP-WMQC-Central Precinct) for the Flood Impact Assessment. |

| Requirements | Report Reference |
|--|--|
| and Stormwater Report dated 31 October 2018 prepared by AECOM. | Refer to Section 5 of this report for the stormwater and water quality assessment. |

Note 1: Section 6 – Wastewater Management has been prepared by the Building Services Hydraulic Consultant, WSce, as part of the Integrated Water Management Plan report to address the requirements of SEARs Item 15.

1.3 Proposed Development

This application seeks consent for the design, construction and operation of a 26 storey (including plant level) mixed use building within the Central Precinct (the site) of the WMQ estate. The proposal comprises a Co-living housing tower above a three-storey podium containing retail and community facility in the form of a childcare centre. As provided thus far, the proposal comprises:

- Ground level retail tenancies, community facility, and childcare, co-living and shared basement access lobbies
- Community centre in the form of a childcare centre at Level 1 and Level 2
- A Co-living housing tower from Levels 3 to 24 comprising:
 - Self-contained co-living accommodation rooms across 20 levels, with capacity for around 500 rooms
 - Indoor and outdoor communal amenity at Levels 3 and 24
 - Communal space also provided on each accommodation level;
- Ground level vehicular access from Church Square shared zone to the shared basement, delivery of a pedestrian thoroughfare through the site, landscaping and public domain works.
- Indicative building signage zones

This application is submitted for concurrent assessment with a DA to amend the Waterloo Metro Over Station Development (OSD) Concept DA (SSD 9393) (the Concept DA) - referred to as the Second Amending Concept DA. The Second Amending Concept DA seeks consent to modify the existing concept approval as it relates to the Northern and Central Precincts, by amending the building envelopes to redistribute floor space to suit a new mix of land uses. This Central Precinct SSD will be consistent with the Concept DA as amended.

Separately, a Detailed SSDA for the detailed design, construction and operation of the Northern Precinct (SSD-79307758) and a Section 4.55 Modification Application to modify the approved detailed Basement SSDA (SSD 10438), will be concurrently submitted with this application.

1.4 Site Description

The subject site comprises of the following allotments and legal description at the date of this report:

| | |
|--------------------------------------|--|
| 1368 Raglan Street - Lot 4 DP 215751 | 124-128 Cope Street - Lot 2 DP 228641 |
| 59 Botany Road - Lot 5 DP 215751 | 69-83 Botany Road - Lot 1 DP 1084919 |
| 65 Botany Road - Lot 1 DP 814205 | 130-134 Cope Street - Lot 12 DP 399757 |



67 Botany Road - Lot 1 DP 228641

The whole site is a rectangular shape allotment and has a total approximate site area of 12,870 m².

The figure below shows the Central Precinct, shaded in green, in relation to the overall WMQ site to which this DA applies.

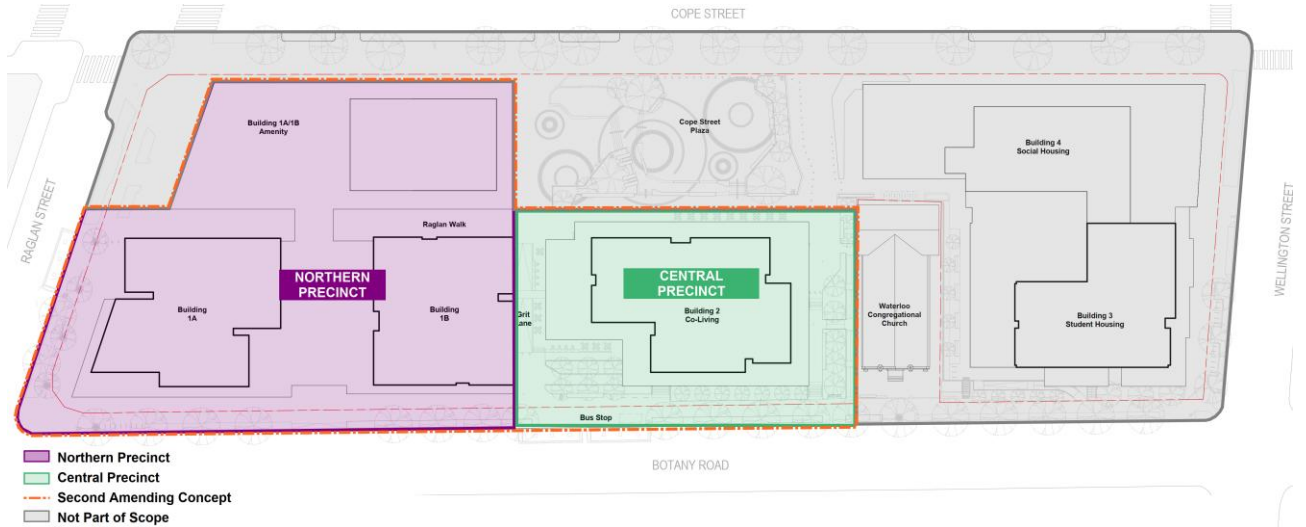


Figure 1 – Waterloo Metro Quarter Site Precinct (Source: Waterloo Collective - Project Brief)

This application seeks consent for the design, construction and operation of a mixed-use development within the Central Precinct (the site) of the Waterloo Metro Quarter.

1.5 Reference Documents

The following documentation has been made available to RBG to review and incorporate in the development of the STW management Report. This information has been used to determine design requirements for the development which will then form the basis of the designs:

Table 1-2: Desktop Review Documents

| Document | Revision Date | Rev | Author |
|--|---------------|-------|--------------|
| BD2 – Architectural Drawing | | 01 | Bates Smart |
| Geotechnical Interpretive Report WLD Review_Geotech_PS219170-WSP-GEO-REP-001 RevA | 25.07.2025 | A | WSP |
| Waterloo Precinct – Stormwater Quality and Quantity Update | 07.03.2022 | 001 | WSP |
| Appendix X - Waterloo Design Amenity Guidelines | 30.09.2020 | Final | Sydney Metro |
| Water Quality, Flooding and Stormwater Report | 31.10.2018 | G | AECOM |
| Appendix O1 - Stormwater Management & Flood Impact - Central Precinct WMQ-BLD2-WSP-DR-RPT-001 | 30.07.2020 | 5 | WSP |

1.6 Relevant Standard and Design Guidelines

The water management proposals for the site are in accordance with the following standards:

Table 1-3: Design Guidelines

| Author/Document | Standard/Description |
|-----------------|--|
| AR&R 2019 | Australian Rainfall and Runoff 2019 |
| AS3500.3:2021 | Plumbing and Drainage, Part 3: Stormwater |
| AS/NZS 3798 | Guidelines on Earthworks for Commercial and Residential Developments |
| NCC 2019 | National Construction Code of Australia 2019 |
| City of Sydney | Sydney Streets Technical Specifications |
| City of Sydney | Public Domain Manual 2021 |
| City of Sydney | A4 Drainage Design |
| AUSTROADS | Guide to Road Design |
| RMS | R11 Specification |
| DPHI | NSW Flood Risk Management Manual |

1.7 Abbreviations and Definitions

The following abbreviation are included in this concept report.

Table 1-4: Abbreviations

| Abbreviation | Description |
|--------------|---|
| AHD | Australian Height Datum |
| CoS | City of Sydney |
| DCP | Development Control Plan |
| DPE | Department of Planning and Environment |
| FFL | Finished Floor Level |
| GIS | Geographic Information System |
| IWMP | Integrated Water Management Plan |
| MMC | Modern Methods of Construction |
| OSD | On Site Detention |
| RBG | Robert Bird Group |
| RMS | Roads and Maritime Services |
| SSD | State Significant Development |
| SSTS | Sydney Streets Technical Specifications |
| WSUD | Water Sensitive Urban Design |

2. Methodology

The Stormwater Management Report follows a structured methodology, integrating technical analysis and stakeholder engagement to ensure optimal outcomes.

2.1 Site Analysis & Baseline Assessment

As part of a general site analysis, RBG have reviewed the existing hydrological conditions, rainfall patterns, and soil permeability. A baseline assessment has been completed which involves assessing the site constraints, including flooding, drainage capacity, and water table levels. Performing this site analysis and baseline assessment has assisted in identifying opportunities for water reuse and stormwater treatment.

2.2 Stormwater Management Strategy

Hydrological and hydraulic modelling has been performed to design the proposed additions and modifications to the existing stormwater infrastructure. A treatment train approach will be implemented to facilitate the integration of stormwater filter systems, rain gardens, and WSUD assets where possible.

2.3 Stakeholder Engagement & Regulatory Compliance

RBG have coordinated with City of Sydney Council, water authorities, and environmental agencies to ensure that the proposed stormwater management design is compliant with the relevant regulatory authorities. RBG have prepared SSDA-compliant documentation addressing planning and environmental conditions.

2.4 Implementation & Monitoring Framework

RBG will develop an asset management plan for long-term system maintenance of the drainage infrastructure before a Construction Certificate is issued. This monitoring framework will include adaptive management strategies that can be implemented to refine water performance over time. This methodology ensures that the Integrated Water Management strategy aligns with project objectives while delivering sustainable, functional, and compliant water management solutions for the SSDA.

3. Design Inputs and Guidelines

3.1 Consultation

Robert Bird Group has liaised with the project team throughout the process of design development. This included collaborative workshops with the design team to ensure that the architectural scheme was coordinated to address stormwater design considerations.

Council and Sydney Water were also approached directly to obtain advice on on-site detention design for the site to inform the assessment that is provided herein. Correspondence from the relevant authorities on this

matter is attached in Appendix A-1 and A-2. Obtaining the authority's recommended stormwater design parameters helps ensure that the proposed stormwater infrastructure is designed appropriately.

3.2 Other Consultants Inputs

The concept stormwater design is based on:

- Architectural drawings provided by Bates Smart for Building 2 (Central Precinct)
- As-built Levels and Topographic Survey by Veris as provided by WL Developer
- As-built Cope Street Plaza and Stormwater Management Plan provided by WSP (Northern and Southern Precinct)
- As-built Waterloo Metro Station and Basement Shoring design drawings provided by John Holland

3.3 Design Rainfall Intensities

The stormwater system has been designed in compliance with the Sydney Streets Technical Specifications and the Australian Rainfall and Runoff Guide 2019. It is engineered to ensure functionality during storm events up to a 1:100 Average Recurrence Interval (ARI) storm.

Design rainfall intensities are based on the latest rainfall intensity and frequency data provided by the Bureau of Meteorology (BOM) in accordance with AR&R 2019, as summarised below.

| Duration | Annual Exceedance Probability (AEP) | | | | | | |
|----------|-------------------------------------|------|------|------|------|------|------|
| | 63.2% | 50%# | 20%* | 10% | 5% | 2% | 1% |
| 1 min | 145 | 163 | 219 | 257 | 295 | 344 | 382 |
| 2 min | 121 | 136 | 180 | 211 | 240 | 281 | 314 |
| 3 min | 112 | 125 | 167 | 195 | 223 | 261 | 291 |
| 4 min | 105 | 118 | 157 | 184 | 211 | 247 | 274 |
| 5 min | 99.2 | 111 | 149 | 175 | 200 | 234 | 260 |
| 6 min | 94.0 | 106 | 142 | 166 | 190 | 222 | 247 |
| 10 min | 78.0 | 87.8 | 118 | 139 | 159 | 186 | 206 |
| 15 min | 64.9 | 73.0 | 98.5 | 116 | 133 | 155 | 172 |
| 20 min | 56.0 | 62.9 | 84.9 | 99.7 | 114 | 133 | 148 |
| 25 min | 49.4 | 55.6 | 74.9 | 88.0 | 101 | 118 | 130 |
| 30 min | 44.5 | 50.0 | 67.2 | 79.0 | 90.4 | 106 | 117 |
| 45 min | 34.7 | 39.0 | 52.3 | 61.4 | 70.3 | 82.2 | 91.4 |
| 1 hour | 28.9 | 32.4 | 43.4 | 51.0 | 58.4 | 68.5 | 76.3 |
| 1.5 hour | 22.3 | 24.9 | 33.4 | 39.2 | 45.0 | 52.8 | 59.0 |
| 2 hour | 18.5 | 20.7 | 27.7 | 32.6 | 37.4 | 44.1 | 49.4 |
| 3 hour | 14.3 | 16.0 | 21.4 | 25.3 | 29.1 | 34.5 | 38.7 |
| 4.5 hour | 11.1 | 12.5 | 16.7 | 19.8 | 22.9 | 27.2 | 30.7 |
| 6 hour | 9.36 | 10.5 | 14.1 | 16.8 | 19.5 | 23.2 | 26.2 |
| 9 hour | 7.36 | 8.26 | 11.2 | 13.4 | 15.6 | 18.7 | 21.2 |
| 12 hour | 6.22 | 6.99 | 9.58 | 11.5 | 13.4 | 16.1 | 18.2 |
| 18 hour | 4.90 | 5.53 | 7.65 | 9.21 | 10.8 | 13.0 | 14.7 |
| 24 hour | 4.12 | 4.67 | 6.51 | 7.85 | 9.24 | 11.1 | 12.6 |
| 30 hour | 3.60 | 4.09 | 5.72 | 6.91 | 8.14 | 9.79 | 11.1 |
| 36 hour | 3.21 | 3.65 | 5.12 | 6.20 | 7.30 | 8.78 | 9.94 |
| 48 hour | 2.66 | 3.03 | 4.28 | 5.17 | 6.09 | 7.32 | 8.27 |
| 72 hour | 2.01 | 2.30 | 3.24 | 3.92 | 4.60 | 5.50 | 6.20 |
| 96 hour | 1.62 | 1.86 | 2.62 | 3.15 | 3.69 | 4.39 | 4.93 |
| 120 hour | 1.37 | 1.56 | 2.20 | 2.63 | 3.07 | 3.64 | 4.06 |
| 144 hour | 1.18 | 1.35 | 1.89 | 2.26 | 2.62 | 3.09 | 3.44 |
| 168 hour | 1.04 | 1.19 | 1.65 | 1.97 | 2.28 | 2.68 | 2.97 |

Figure 2 – Design Rainfall Intensities (Source: Bureau of Meteorology Design Rainfall Data System 2016)



3.4 Stormwater Design Criteria

The stormwater design criteria are outlined as below:

Table 3-1: Stormwater Conveyance System Design Criteria

| Parameter | Criteria Adopted | Source | | | | | | | | | | | |
|--|---|--------------------------------|--------------|--------------------------|----------|----------------------------------|------|------|-------------|--------------------------|--------------|----|--|
| Hydrological Analysis | DRAINS ILSAX hydrological model | SSTS 4.5.8 | | | | | | | | | | | |
| Design Storm Events | Minor Storm – 5% AEP for inground drainage piped system Major Storm – 1% AEP Stormwater networks shall also be analysed for the 20% AEP and 10% AEP when: <ul style="list-style-type: none"> Connecting to an existing stormwater network with capacity less than the 5% AEP Overland flow paths are obstructed by other road features such as thresholds or kerb extensions Entry points to adjacent existing buildings are below the 5% AEP (Stormwater shall not result in adverse impacts on private property for the 20% AEP, 10% AEP, 5% AEP and 1% AEP) | SSTS 4.7.2.1 SSTS 4.7.4 | | | | | | | | | | | |
| Storm Duration | All design storms simulated for the following durations: <ul style="list-style-type: none"> 5, 10, 15, 20, 25, 30, 45, 60, 90, 120 minutes | | | | | | | | | | | | |
| Run-off Coefficients | Roofed area – 1.0 Unroofed impervious area – 0.9 Unroofed pervious area – 0.42 | AS/NZS 3500.3:2021 5.4.6 | | | | | | | | | | | |
| Time of Concentration (T_c) | T _c used for design of surface water drainage systems is 5 minutes | AS/NZS 3500.3:2021 5.4.4 | | | | | | | | | | | |
| Hydraulic Grade Line Analysis | Maximum HGL level shall be 150 mm below ground level at each pit or manhole and along the pipeline for the design AEP event. Pipe Friction Coefficients <table border="1" style="margin-left: 20px;"> <thead> <tr> <th>PIPE MATERIAL</th> <th>MANNINGS 'n'</th> <th>COLEBROOK-WHITE 'K' (mm)</th> </tr> </thead> <tbody> <tr> <td>Concrete</td> <td>0.013</td> <td>0.60</td> </tr> <tr> <td>uPVC</td> <td>0.009</td> <td>0.03</td> </tr> </tbody> </table> | PIPE MATERIAL | MANNINGS 'n' | COLEBROOK-WHITE 'K' (mm) | Concrete | 0.013 | 0.60 | uPVC | 0.009 | 0.03 | SSTS 4.7.3.5 | | |
| PIPE MATERIAL | MANNINGS 'n' | COLEBROOK-WHITE 'K' (mm) | | | | | | | | | | | |
| Concrete | 0.013 | 0.60 | | | | | | | | | | | |
| uPVC | 0.009 | 0.03 | | | | | | | | | | | |
| Pit loss coefficient | Pit losses shall be determined in accordance with Missouri Charts | SSTS 4.7.3.4 | | | | | | | | | | | |
| Minimum Pipe Sizes | DN 90 corrugated perforated plastic drainage pipe, Class 1000 for subsoil drainage Within council lands – min DN 375 mm and max DB 1200 mm | SSTS 4.14.2 and 10.4.1.4 | | | | | | | | | | | |
| Pipe Grade | <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;">Pit Size</td> <td style="width: 20%;">Min. Grade</td> <td style="width: 20%;">Max. Grade</td> <td style="width: 30%;"></td> </tr> <tr> <td>375mm <= diameter/width < 1200mm</td> <td>1%</td> <td>10%</td> <td rowspan="2">SSTS 4.10.3</td> </tr> <tr> <td>Diameter/width => 1200mm</td> <td>1%</td> <td>5%</td> </tr> </table> | Pit Size | Min. Grade | Max. Grade | | 375mm <= diameter/width < 1200mm | 1% | 10% | SSTS 4.10.3 | Diameter/width => 1200mm | 1% | 5% | |
| Pit Size | Min. Grade | Max. Grade | | | | | | | | | | | |
| 375mm <= diameter/width < 1200mm | 1% | 10% | SSTS 4.10.3 | | | | | | | | | | |
| Diameter/width => 1200mm | 1% | 5% | | | | | | | | | | | |



| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|---|------------------------------|-----------------------------|--------------|--|-----------------|--------|---------------------|-----|-------|--------------------|----------|-------|-----------------------|-----|-----|----------------------|-----|-----|--------------|-------------|-----|-----|------|-------|-----|-----|------|-----------------------------|
| Pipe Cover | minimum 0.6 metres | SSTS 4.10.6 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Pit grade | 5% across all pits regardless of changes in diameter or direction. | SSTS 4.10.3 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Pipe inlet | <table border="0"> <tr> <td>Pit type</td> <td>On grade</td> <td>Sag blockage</td> </tr> <tr> <td></td> <td>blockage factor</td> <td>factor</td> </tr> <tr> <td>kerb inlet <= 1.0 m</td> <td>50%</td> <td>70%</td> </tr> <tr> <td>kerb inlet > 1.0 m</td> <td>20%</td> <td>50%</td> </tr> <tr> <td>V grate or grate only</td> <td>90%</td> <td>90%</td> </tr> <tr> <td>Strip drain or other</td> <td>95%</td> <td>95%</td> </tr> </table> | Pit type | On grade | Sag blockage | | blockage factor | factor | kerb inlet <= 1.0 m | 50% | 70% | kerb inlet > 1.0 m | 20% | 50% | V grate or grate only | 90% | 90% | Strip drain or other | 95% | 95% | SSTS 4.7.3.2 | | | | | | | | | |
| Pit type | On grade | Sag blockage | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | blockage factor | factor | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| kerb inlet <= 1.0 m | 50% | 70% | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| kerb inlet > 1.0 m | 20% | 50% | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| V grate or grate only | 90% | 90% | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Strip drain or other | 95% | 95% | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Pit Size | <table border="0"> <tr> <td rowspan="2">Depth to Invert of Outlet</td> <td colspan="3">Minimum Internal Dimensions</td> </tr> <tr> <td colspan="2">Rectangular</td> <td>Circular</td> </tr> <tr> <td></td> <td>Width</td> <td>Length</td> <td>Diameter</td> </tr> <tr> <td>≤ 600</td> <td>450</td> <td>450</td> <td>600</td> </tr> <tr> <td>>600, ≤900</td> <td>600</td> <td>600</td> <td>900</td> </tr> <tr> <td>>900, ≤1200</td> <td>600</td> <td>900</td> <td>1000</td> </tr> <tr> <td>>1200</td> <td>900</td> <td>900</td> <td>1000</td> </tr> </table> | Depth to Invert of Outlet | Minimum Internal Dimensions | | | Rectangular | | Circular | | Width | Length | Diameter | ≤ 600 | 450 | 450 | 600 | >600, ≤900 | 600 | 600 | 900 | >900, ≤1200 | 600 | 900 | 1000 | >1200 | 900 | 900 | 1000 | AS3500.3:2021 Table 7.5.2.1 |
| Depth to Invert of Outlet | Minimum Internal Dimensions | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Rectangular | | Circular | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Width | Length | Diameter | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ≤ 600 | 450 | 450 | 600 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| >600, ≤900 | 600 | 600 | 900 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| >900, ≤1200 | 600 | 900 | 1000 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| >1200 | 900 | 900 | 1000 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Drainage Pit | <p>Drainage pits shall be cast in situ, reinforced and benched internally with mass concrete as detailed on the CoS Standard drawings.</p> <p>The walls and base shall be reinforced as specified on the CoS standard drawings.</p> | SSTS 10.6.10 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Step Irons | Where drainage pits exceed 1 metre in depth, approved step irons must be installed as shown on the standard drawings. | SSTS 10.6.10 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1% AEP Overland flow path safety factor | <p>For Pedestrian and Shared Zones: Max Depth = 50mm Max Flow width = 1.5m Velocity x depth shall not be greater than 0.40m²/s</p> <p>For Carriageways <=7meters wide: Max depth = 100mm Max flow width = 3m Velocity x depth shall not be greater than 0.60m²/s</p> <p>For Carriageways >7meters wide: Max depth = 150mm Max flow width = 3.5m Velocity x depth shall not be greater than 0.60m²/s</p> | SSTS 7.3.3.3 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Downstream boundary conditions | <p>Where a network is being sized in accordance with the Minor Storm requirements, the downstream starting level for the hydraulic grade line shall be the higher of the following for the Minor Storm:</p> <ul style="list-style-type: none"> • The obvert of the pipe • Ocean Boundary Conditions consistent with the relevant City of Sydney flood study • Hydraulic Grade Line of the downstream connection conduit • 150mm below the surface, where the downstream conduit capacity is less than the 5% AEP | SSTS 4.7.3.5 | | | | | | | | | | | | | | | | | | | | | | | | | | | |



| | | |
|--|---|--|
| | <p>Where the impacts of a proposed network are being analysed, the downstream starting level for the hydraulic grade line shall be the higher of the following:</p> <ul style="list-style-type: none"> • The obvert of the pipe • The hydraulic grade line of the downstream network for the same storm event • For flood prone land, flood levels reported in the relevant CoS flood study <p>Ocean boundary conditions consistent with the relevant CoS flood study.</p> | |
|--|---|--|

3.4.1 OSD Design

The On-site Detention (OSD) design criteria are outlined as below:

- AS 2865 – 2009 Safe Working in a Confined Space
- Sydney Water’s On-Site Detention Guide (Refer to Section 5.2)
- AS/NZS 3500.3:2021 Stormwater Drainage

3.5 Ground Condition Assessment

WSP’s investigations, supplemented by previous studies, indicate that the Waterloo Metro Quarter site is generally underlain by a variable thin layer of fill over Quaternary aeolian sands, beneath which occur residual silty clay soils derived from the weathered Ashfield Shale.

The sub-surface profile transitions through the Ashfield Shale, the interbedded sandstones and shales of the Mittagong Formation, and into the Hawkesbury Sandstone, a fine to coarse grained quartz sandstone with minor shale laminations. The depth to rock varies across the site, generally dipping northwest, with soil thickness increasing from approximately 7m to 13m. These conditions have been confirmed by boreholes, cone penetration tests, laboratory analyses, and geological mapping undertaken by WSP, the Sydney Metro investigations, and the TSE contraction during the station box excavation.

Piezometers for groundwater monitoring were previously installed at 9 locations in the project site vicinity.

The geotechnical assessment conducted by WSP indicate that groundwater levels are typically between 3m to 5m below ground level (RL of 10 to 12 m AHD) within the Quaternary sands. It is possible that the groundwater table in the sand is perched at some locations. Groundwater inflows were recorded at approximately 4m below ground level (RL 12 m AHD) during drilling.

The highest level of groundwater seepage stains along the western boundary of the station box interface observed during a site walk conducted by WSP noted to be along the second row of anchors, which were installed between RL 8.5m to 9.5m AHD. Most of the top level of ground anchors which were installed between RL 12.5m to 13.4m AHD did not exhibit groundwater seepage stains. However, it is noted that below average levels of rainfall were recorded in Sydney in the months preceding the site visit and has caused the groundwater table to be depressed below original design groundwater levels. Notwithstanding this, due to the high permeability of the sands, the serviceable design (permanent) groundwater level for the station box design was taken at the ground level, as there is potential for groundwater level to rise very quickly during flood events. For Ultimate limit state design, the groundwater level is understood to be set at the Probable Maximum Flood (PMF) level.

Refer to WMQ-SITE-WSP-GT-RPT-001 for further geotechnical information.



4. Existing Drainage Infrastructure

The entire development area (of which the Central Precinct is one part) discharges to four (4) frontages; Botany Road, Cope, Wellington and Raglan Street. Botany Road frontage is serviced by a 750 mm diameter pipe with undersized and poorly maintained inlet pits (based on recent visual inspection on-site). There is a stormwater main located under the kerb and gutter of Cope Street where a Sydney Water owned box culvert is located (under the western footpath).

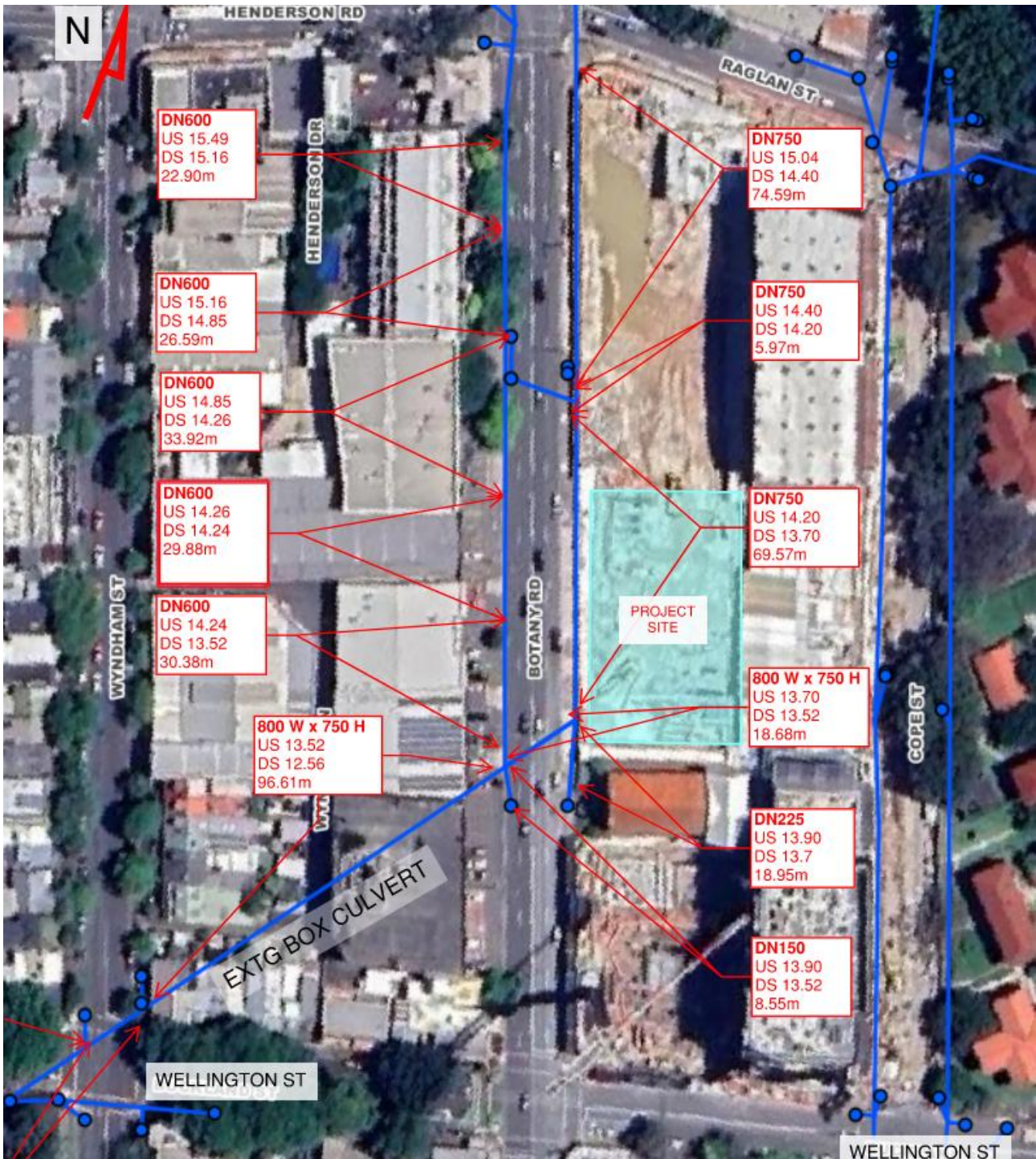


Figure 3 – Existing Stormwater Network for Information Only (Source: CoS GIS Mapping) Invert levels need to be verified on site.

Wellington Street is serviced by surface water drainage infrastructure, including drainage pit connections located at the intersection of Wellington and Cope Street, which discharges into the Cope Street drainage network. Similarly, Raglan Street is provided with drainage pit connections at its intersection with Cope Street, also discharging into the Cope Street drainage infrastructure.

The overall site contributes runoff to Sheas Creek via Sydney Water's trunk drainage system, which ultimately drains to Alexandra Canal and then into Botany Bay.

Under existing conditions for a 100-year Average Recurrence Interval (ARI) storm event with a 2-hour duration, the peak site discharge rate is approximately $1.3 \text{ m}^3/\text{s}$, primarily via overland flow to Council's kerb and gutter system. Detailed calculations of the existing peak discharge are provided in Section 3.4.2 of the *Water Quality, Flooding and Stormwater Report (AECOM, 2018)*. It is noted that there are no stormwater quantity management systems present within WMQ except for the Southern Precinct (Building 3&4) which was recently constructed and completed in 2025.

5. Stormwater Management Design

5.1 Design Philosophy

The stormwater design concept for the project focuses on incorporating elements that:

- Align with the planning and architectural visions while meeting functional requirements.
- Minimize disturbance to the surrounding area by preserving existing catchments for stormwater drainage and reducing the need for extensive earthworks.
- Utilize natural systems wherever feasible.
- Integrate seamlessly within the site, emphasizing constructability, safety, and minimal operational disruption.

The key principles guiding the civil stormwater design include:

- Delivering value for money
- Ensuring the design is fit for purpose
- Guaranteeing long-term reliability
- Reducing maintenance requirements and associated costs
- Emphasizing water-sensitive urban design and sustainability

5.2 Proposed Stormwater Design

The post-development stormwater catchment will be collected and conveyed to the rainwater tank and water quality chamber as per the intended design. The system will include underground pits, pipes, a rainwater tank for roof drainage, and a water quality treatment device. All of which will be connected prior to discharging into the Council's legal stormwater connection point.

Minor storm events (5% AEP and below) within Church Square and the public domain will be managed through the stormwater conveyance system. In the case of major storms (1% AEP and above), excess water will flow overland via the road kerb and gutter system at Botany Road.

The discharge point for the stormwater network will be via existing pit at Botany Road footpath as shown in Figure 4. The existing pit has an indicative invert level of IL 13.70m AHD as shown in the Council QGIS system, however the actual connection detail is subject to further detailed survey information in the detailed design phase.

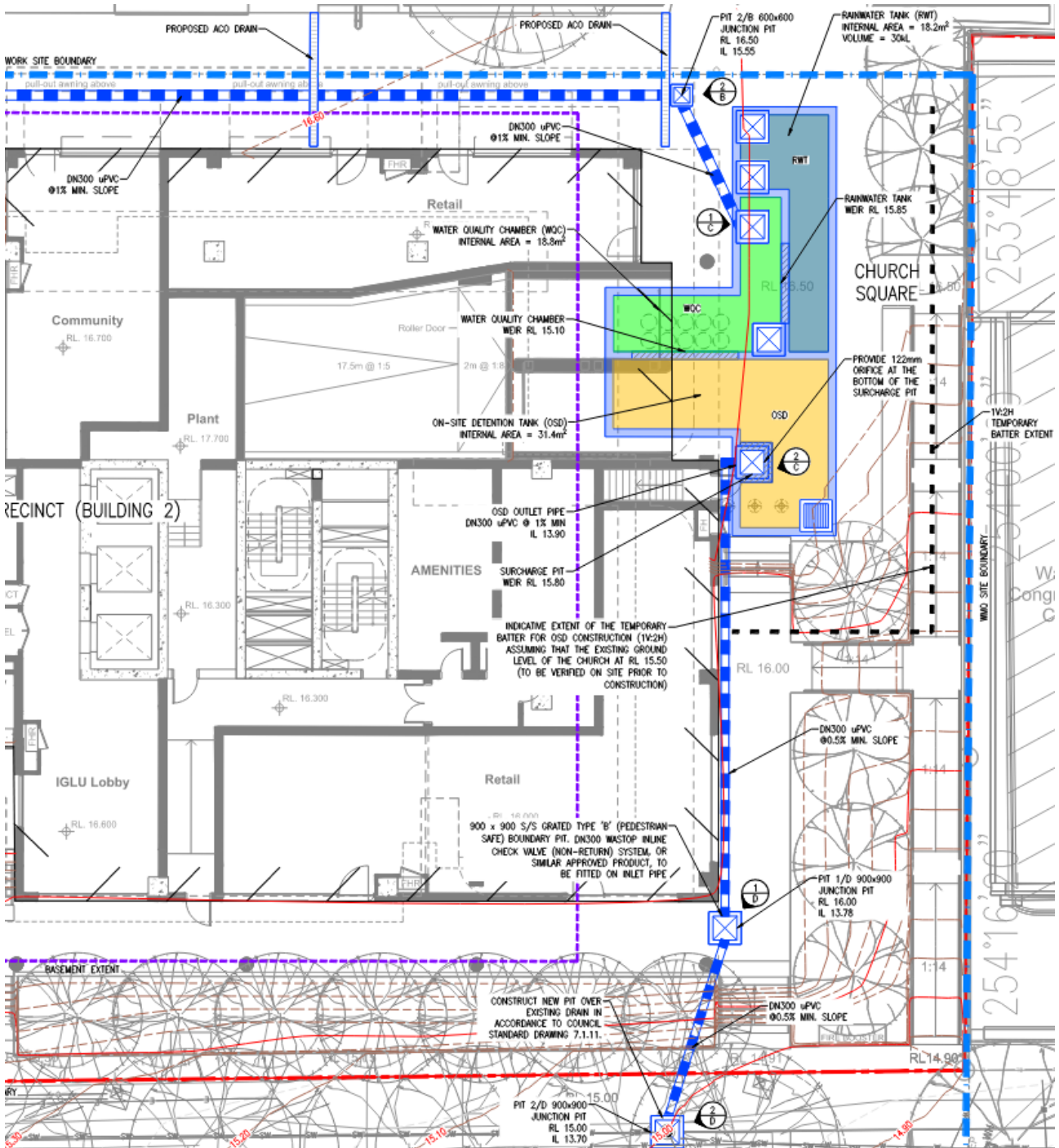


Figure 4 - Proposed Stormwater Design - Central Precinct Building 2. Drawing WMQ-BD2-RBG-CV-DRG-C8261 (Appendix A-4).

Refer to the Civil Engineering Plans prepared by RBG attached in Appendix A-4 for more stormwater details.



5.2.1 Permissible Site Discharge (PSD) and On-Site Detention Requirements

Sydney Water has advised of the required stormwater quantity controls for the entire Waterloo Metro Quarter site, which has a total area of 12,870 square metres:

Table 5-1: Sydney Water Requirements for the Waterloo Metro Quarter Overall Site

| On-site Detention | Permitted Site Discharge (PSD) |
|--------------------|--------------------------------|
| 191 m ³ | 480 L/s |

The original on-site detention volume requirement for the site was 208 m³ with PSD of 503 L/s. These were the requirements that Sydney Water issued for the proposed development back in 2016 where the site area being considered was 13,500 m². These numbers have been updated based on the new scheme provided to Sydney Water as part of the authority consultation.

Refer to Sydney Water correspondence attached in Appendix A-1.

The approval for the On-Site Detention would only be given as part of the Section 73 application for this development. The On-Site Detention is to be designed according to the above values and submitted to Sydney Water for approval with the Section 73 application. The following details are to be included in the submission for On-Site Detention approval:

- Location of the On-Site Detention in relation to the development
- Location of the On-Site Detention in relation to overall stormwater network of the property
- Plan and Elevation of the On-Site Detention tank with all dimensions
- Orifice plate calculation

5.2.2 Catchment Areas

The overall Waterloo Metro Quarter development site catchment areas are shown in the figure below.

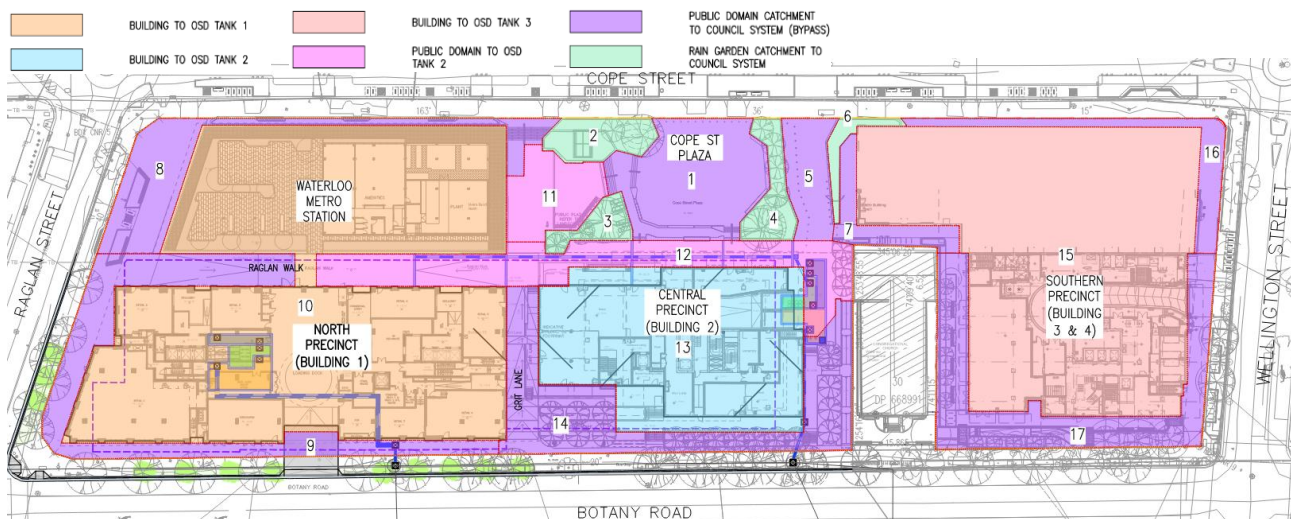


Figure 5 – Overall Waterloo Metro Quarter Site Catchment Areas. Drawing WMQ-BD2-RBG-CV-DRG-C8271 (Appendix A-4).

The areas for each site are shown in the table below.

Table 5-2: Stormwater Catchment Areas (All Precincts)

| | Catchment Number | Bypass Area (sq.m.) | Captured Area (sq.m.) | Total Site Area (sq.m.) |
|---------------------------|------------------|---------------------|-----------------------|-------------------------|
| Cope Street Plaza | 1 | 564 | | |
| | 2 | | 148 | |
| | 3 | | 90 | |
| | 4 | | 136 | |
| | 5 | 190 | | |
| | 6 | | 58 | |
| Subtotal | | 754 | 432 | 1,186 |
| Station | 7 | 148 | | |
| | 8 | 438 | | |
| Subtotal | | 586 | 0 | 586 |
| Building 1 | 9 | 665 | | |
| | 10 | | 3,812 | |
| Subtotal | | 665 | 3,812 | 4,477 |
| Building 2 | 11 | | 249 | |
| | 12 | | 670 | |
| | 13 | | 1,416 | |
| | 14 | 746 | | |
| Subtotal | | 746 | 2,335 | 3,081 |
| Building 3 & 4 | 15 | | 2,696 | |
| | 16 | 204 | | |
| | 17 | 641 | | |
| Subtotal | | 845 | 2,695 | 3,540 |
| Total Site Area | | 3,596 | 9,274 | 12,870 |

5.2.3 Hydraulic Analysis

The hydrology and hydraulic analysis for the site was developed using DRAINS software. The hydrological parameters used in DRAINS are in accordance with the City of Sydney DCP (Refer to Section 3.4). The intensity-frequency-duration (IFD) data for the site was extracted from Bureau of Meteorology (BOM) website in accordance with AR&R 2019, as presented in Section 3.3.

The flows from the DRAINS model have been tabulated below to ensure that the site meets the required PSD rate and OSD volume:



Table 5-3: On-Site Detention and Permissible Site Discharge (All precincts)

| | Required Permissible Site Discharge, PSD (L/s) | Proposed On-Site Detention Volume (cu.m.) | Bypass Flow Discharge, Q_b (L/s) | Captured Flow Discharge, Q_c (L/s) | Combined Flow Discharge, Q_t (L/s) |
|-------------------------------------|--|---|------------------------------------|--------------------------------------|--------------------------------------|
| Building 1 (Northern Precinct) | 167 | 142.8 | 46 | 61 | 107 |
| Building 2 (Central Precinct) | 115 | 80.1 | 46 | 41 | 87 |
| Cope Street Plaza & Station | 66 | 0.0 | 112 | 0 | 112 |
| Building 3&4 (Southern Precinct) | 132 | 62.5 | 53 | 121 | 174 |
| Total | 480 | 285.4 | 257 | 223 | 480 |

Several DRAINS model iterations have been carried out to ensure compliance with the overall permissible site discharge. This has been achieved by restricting flows from the proposed OSD tanks using orifice plates installed over the primary outlet pipes or discharge chamber pit. Refer to Appendix A-4 Civil Drawings for the orifice size calculation.

OSD Tank 1 – Building 1

Building 1 OSD is an above ground tank located at the mezzanine level adjacent to the loading dock zone. Refer to the separate report *WMQ-BD1-RBG-CV-RPT-001* for the detailed discussion of this tank.

OSD Tank 2 – Building 2

The design of the Building 2 OSD tank has been optimised to minimise the captured flow across the site in line with the site-wide OSD storage and PSD requirement set by Sydney Water. The tank is located within Church Square, below the carpark entry for Building 2. It is designed to provide a total storage volume of 80.1 cu.m for stormwater event up to 100-years ARI, with a peak captured flow rate of 41L/s. A contingency for emergency overflow has been incorporated within the discharge chamber pit of the OSD tank. In the event of an overflow, excess stormwater will be conveyed via 300 mm diameter stormwater pipe that connects to the existing pit at Botany Road. The pit will be reconstructed in accordance with Council standards, as the existing structure is outdated. A 1V:2H temporary batter is proposed during construction to ensure that the zone of influence will not affect the existing church structure to the south. Refer to Figure 4 for the OSD configuration and arrangement plan.

OSD Tank 3 – Building 3 & 4

The OSD tank servicing Buildings 3 and 4 has been modelled based on the latest plans from the Southern Precinct team, reflecting the as-constructed condition on site. As the Southern Precinct has already been approved, RBG has prepared the model in accordance with the current site conditions as part of the broader site-wide assessment for PSD and OSD volume calculations. Refer to the endorsement provided by the stormwater civil designer from WSP for Building 3 & 4 OSD, along with the associated volume and PSD calculations included in Appendix A-3.



5.2.4 Drainage Point of Discharge

The proposed stormwater drainage point of discharge for the Central Precinct is proposed to be located to the west of Building 2, connecting to the existing 750 mm diameter pipe at Botany Road. It should be noted that the pit invert level and existing pipe size must be confirmed through a detailed survey prior to construction. For details of the connection location, refer to civil drawing *WMQ-BD2-RBG-CV-DRG-C8261* in Appendix A-4 of this report.

5.2.5 Concept Conditions of Consent Requirements

Condition B23 of the Amended Concept SSD-10441 requires that future development applications shall be accompanied by a Flood and Stormwater Impact Assessment. The Assessment must demonstrate the conclusions and recommendations of the Concept Water Quality, Flooding and Stormwater Report dated 31 October 2018 prepared by AECOM.

The recommended DCP provision relevant to stormwater quantity is provided in Table 4 of the Water Quality, Flooding and Stormwater Report prepared by AECOM.

- The total on-Site detention volume for the site is 480m³ which is more than the 208m³ required by Sydney Water (original site requirement)

The 2018 report does not clarify why the proposed total OSD tank volume has increased from the Sydney Water requirement of 208m³ to 480m³. It should be noted that the DRAINS model results were not included in the report to verify this number.

The updated DRAINS model at this stage demonstrates that 285.4m³ of on-site detention is adequate to reduce the peak stormwater flows from the site for all precinct, and is in deemed compliance with the PSD and OSD storage volume requirement from Sydney Water. Refer to Section 5.2.6 for further discussion.

5.2.6 Waterloo Design and Amenity Guideline Requirements

The objectives of the *Waterloo Design Amenity Guidelines* (March 2020) in relation to stormwater and flooding (Section 3S) are as follows:

- Improve water quality and reduce stormwater runoff
- Manage flooding impacts and provide design responses that are integrated with the public domain and ensure street activation

The design criteria related to stormwater design are as follows:

- Provide a total on-site detention volume of approximately 480m³.
- On-site detention should be situated above the 100 year ARI flood level to facilitate discharge into potentially fully charged stormwater pipes.

In the updated DRAINS model carried out by RBG (as documented in Table 5-3 of Section 5.2.3), the required OSD volume has been optimized and has been reduced to 285.4m³ based on the current site-wide drainage conditions. Detailed DRAINS modelling results for the entire site is provided in Appendix A-6.

The OSD tank for Building 2 is proposed to be located underground at RL 14.1 (base of the tank level) which is below the 100-year ARI flood level at Botany Road (approximately RL 15.7). This arrangement has been coordinated with the City of Sydney Council to ensure compliance with the flood management requirements.

The intention of the design is to enable the OSD storage to drain by gravity following peak storm events (e.g. 1% AEP) by provision of a non-return check valve at the primary outlet. Correspondence with CoS is provided in Appendix A-2.

5.3 Water Sensitive Urban Design

5.3.1 WSUD Requirements

To enhance the quality of stormwater leaving the site, a Water Sensitive Urban Design (WSUD) Concept proposal has been developed. Preliminary analysis using MUSIC, in accordance with Sydney Street Technical Specification, was conducted to assess the water quality in the post-development scenario. The specification mandates the achievement of Water Quality Targets, as detailed in Table 5-4.

Table 5-4 WSUD Targets

| | Water Quality (% Reduction in Pollutant Loads) | | | |
|---|--|------------------------|------------------|----------------|
| | Gross Pollutants (<5mm) | Total Suspended Solids | Total Phosphorus | Total Nitrogen |
| Sydney Water Reduction Targets | 90 | 85 | 60 | 45 |
| City of Sydney Reduction Targets | 90 | 85 | 65 | 45 |
| Reduction Targets Adopted (consistent with CoS and Green Star requirements) | 90 | 85 | 65 | 45 |
| Actual Targets Achieved (refer to Section 5.3.3) | 96.8 | 86.6 | 72 | 63 |

These requirements have been adopted as they provide the highest level of water quality treatment (and are the same as the City of Sydney’s requirements)

The proposed stormwater quality strategy for the site is described in detail below.

5.3.2 WSUD Design

Water sensitive urban design (WSUD) principles have been applied to reduce runoff quantities and limit stormwater pollution levels by incorporating pervious surfaces in the public domain zone where practical, to maximise stormwater infiltration.

WSUD aims to minimise the impacts of developments on the quantity and quality of stormwater runoff, to decrease flooding risk and reduce the effects of waterborne pollution on receiving waterways. This is an important consideration during an urban development’s planning and design process to satisfy the ecological and sustainable outcomes as required by the City of Sydney Council.

The site has been simplified in the MUSIC modelling by defining sub-catchments, including the roof, terrace, and proposed laneway at ground level. The results presented in Section 5.3.3 reflect the proposed water treatment and water-reuse strategies for the site.



A stormwater quality treatment strategy has been developed for the site to reduce pollutant discharge from surface runoff. The primary treatment measure incorporates the use of Stormfilter Cartridges, specifically PSorb units by Ocean Protect (or other Council approved equivalents), which are effective in removing Total Suspended Solids (TSS), Phosphorus and nitrogen. Roof and pavement runoff will be directed to a dedicated water quality chamber located at the property boundary prior to discharge into the Council stormwater system.

The water quality model for the site was created using MUSIC software. The main method of treatment within the proposed development is as follows:

- 10 nos. of Stormfilter cartridges to be installed in Water Quality Chamber for Building 2

Additional water quality treatment methods to be provided are as follows:

- A 30KL rainwater tank located within Building 2 providing stormwater reuse for non-potable purposes (e.g. irrigation, flushing, etc.)
- A first flush diverter is to be installed on the drainage pipe upstream of the rainwater tank connection. (Refer to Building Services Hydraulic Engineer Design)
- EnviroPod filters (or equivalent) to be installed in all stormwater inlet pits on the site providing effective removal of gross pollutant and TSS with ease of maintenance
- Landscaping to be incorporated in-front of the building, along Botany Road and along the boundary to Waterloo Congregational Church

5.3.3 Music Model

The previous MUSIC model for the entire precinct has been updated with the new catchments zones to show the stormwater treatment devices required to meet the Council’s water quality standards.

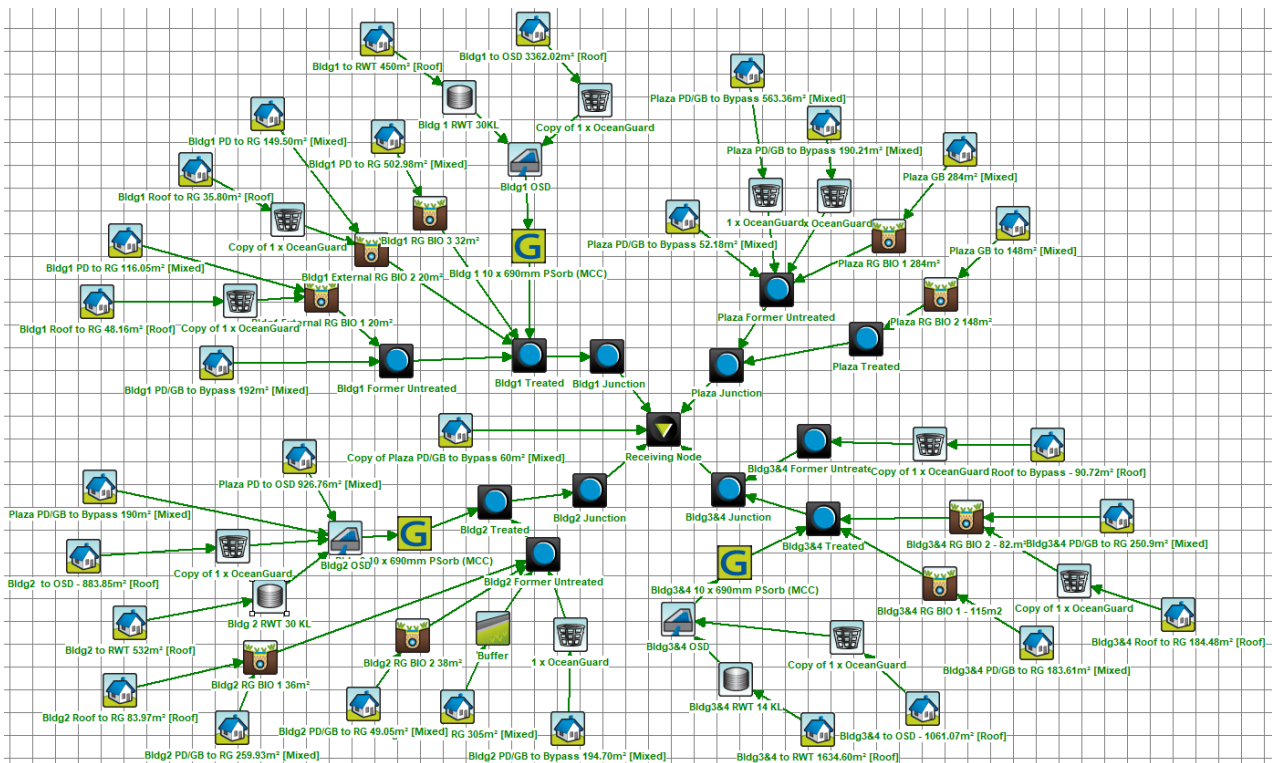


Figure 6 – Waterloo Metro Over Station Development - MUSIC Model



| | Sources | Residual Load | % Reduction |
|---------------------------------------|---------|---------------|-------------|
| Flow (ML/yr) | 14.5 | 12 | 17.5 |
| Total Suspended Solids (kg/yr) | 941 | 126 | 86.6 |
| Total Phosphorus (kg/yr) | 2.72 | 0.761 | 72 |
| Total Nitrogen (kg/yr) | 31.4 | 11.6 | 63 |
| Gross Pollutants (kg/yr) | 351 | 11.1 | 96.8 |

Figure 7 - Treatment Train Effectiveness - Receiving Node

The simulation run on MUSIC demonstrates that the model remains compliant with the adopted Water Quality reduction targets as shown in Section 5.3.1.

Detailed results of the current MUSIC model for the entire site are attached in Appendix A-5.

5.3.4 Green Star Impact

The project aims to achieve third-party certification using the Green Building Council of Australia (GBCA) Green Star rating tool, a widely recognized and independent assurance scheme both in Australia and internationally.

5.3.4.1 Pollution Reduction Targets

The pollution reduction targets from the Green Star requirement are shown in the figure below.

| Pollutant | Reduction Target (% of the post development annual average load) |
|---|--|
| Total Suspended Solids (TSS) ¹ | 85% |
| Gross Pollutants | 90% |
| Total Nitrogen (TN) ² | 45% |
| Total Phosphorus (TP) ² | 65% |

Environmental Management

Minimise the risk of chemical pollutants and other toxicants entering the stormwater system, including by, but not limited to:

- Chemical storage, loading, refuelling or work areas must install bunding, with any spills draining to trade waste or appropriate treatment devices. These areas must have an awning or roofing to separately divert rainfall into the stormwater system.
- If a site has more than 200m² of uncovered areas where vehicles are likely to transit and/or park, then hydrocarbon treatment devices must be installed, specified to remove at least 98% of hydrocarbons, sized to treat a 1-in-3 month ARI (4EY) flow. Electric vehicle only parking areas do not count towards the total.

¹Load based on the following particulate size distribution (by mass): 20% <20 µm; 20% 20-60 µm; 20% 60-150 µm; 20% 150-400 µm; 20% 400-2000 µm.

²Load includes particulate and dissolved fraction.

Figure 8 – Green Star Pollution Reduction Target

The Green Star targets for the proposed development are achieved with the proposed WSUD measures as highlighted in Section 5.3.3.



6. Wastewater Management

6.1 Sanitary Plumbing & Drainage

All sanitary plumbing and drainage from Building 2 will discharge to the Sydney Water sewer main located in Botany Road independently from Buildings 1A and 1B. Gravity drainage will be utilised where practicable. All sanitary plumbing and drainage systems will be designed in accordance with AS/NZS 3500.2.

6.2 Trade Waste

Trade waste discharges from retail areas and bin wash-down rooms will pass through trade waste pre-treatment devices prior to connection to the sanitary waste pump-out pit. All trade waste pre-treatment devices will be designed in accordance with Sydney Water requirements and AS/NZS 3500.2.

6.3 Construction and Maintenance

During construction, sediment and erosion control measures, as well as spill prevention procedures, are to be implemented to prevent contamination of the sewer or stormwater systems. Post-construction, pump-out pits and trade waste pre-treatment devices will be subject to a regular inspection and maintenance program to ensure ongoing compliance and operational reliability.

7. Erosion and Sediment Control

7.1 Design Intent and Criteria

To maintain the water quality during the construction stage, erosion and sediment control measures will be installed. The sediment and erosion control design criteria are outlined as below:

- AS/NZS 3500.3:2021 Stormwater Drainage
- Managing Urban Stormwater Soil & Construction (2004) by Landcom (The Blue Book)
- Sydney Water Onsite Stormwater Detention Policy (2021)
- City of Sydney Stormwater Drainage Manual (2017)

7.2 Site Protection and Sediment Control Measures

Before commencing any aboveground works on site, sediment and erosion control measures must be implemented in accordance with the civil engineering drawings, Council requirements and the Blue Book. These measures represent a minimum standard; the Contractor will need to adapt and stage the sediment control measures based on construction site constraints such as program, methodology and phases. These measures may include:

- Installing a temporary site security fence
- Erecting sediment fencing downstream of disturbed areas and topsoil stockpiles

- Implement dust control measures, such as covering stockpiles, installing fence hessian, and watering exposed areas
- Placing hay bales or mesh and gravel inlet filters around existing drains and inlet pits
- Locating stockpiled material, including topsoil, as far away as possible from natural watercourses or temporary overland flow paths and stabilizing all stockpiles and embankment through hydroseeding or hydro mulching.

Refer to the Civil Engineering Plans prepared by RBG attached in Appendix A-4.

Detailed erosion and sediment controls will be confirmed before a Construction Certificate is issued. The preliminary erosion and sediment controls that are shown on the Civil Engineering Plans have been provided for the purpose of demonstrating that, in due course, the proposed development will be capable of implementing suitable measures to minimise the potential for silt-laden runoff from the site.

7.3 Site Access

The shakers grid with a wash-down facility will be provided at the site access from the Botany Road. The wash-down water will be directed to the sediment basin and undergo a water quality assessment before being discharged into the Council's stormwater system.

8. Conclusion

The proposed stormwater and wastewater management plan, along with the WSUD strategy is consistent with the guidelines established by Sydney Water and City of Sydney Council. It appropriately addresses Item 15 of the Secretary's Environment Assessment Requirements (SEARs), the conditions of consent issued for the concept SSD Application, and the Waterloo Design and Amenity Guidelines.

The legal point of discharge for Building 2 On-Site Detention Tank is proposed to be located to the west of Building 2, connecting to the existing 750 mm diameter pipe in Botany Road. It should be noted that both pit invert level and existing pipe size must be verified by a detailed survey prior to construction. The OSD tank design complies with the Sydney Water's requirements for detention volume and permissible discharge (PSD) rates.

Water quality modelling indicates that the proposed stormwater treatment train including a rainwater re-use tank, water quality chamber, treatment devices, and the OSD balance tank will achieve the post-development water quality objectives.

Sediment and erosion control measures will be implemented and maintained throughout the construction period. While the proposed sediment and erosion plan is preliminary, it demonstrates that the development is capable of incorporating appropriate measures to minimise the risk of silt-laden runoff from the site.

The proposed wastewater management strategy for Building 2 ensures all sanitary and trade waste discharges are effectively collected, treated, and conveyed to the Sydney Water sewer system in compliance with AS/NZS 3500.2 and Sydney Water requirements. The inclusion of pump-out pits with emergency storage, along with trade waste pre-treatment devices, provides safeguards against environmental impact, operational failure, and non-compliance.

Further refinement of the proposed design and modelling are expected during the detailed design stage, which may result in minor adjustments in the locations of infrastructure and structures. However, the final design must continue to meet the performance outcomes specified in this report.



Appendix A

Civil Documentation

Waterloo Metro Quarter – Central Precinct SSD-
79307746

A-1 Sydney Water OSD Requirements

RE: [External] Waterloo Metro Quarter Over Station Development - Updated Requirements



Jeya Jeyadevan <JEYA.JEYADEVAN@sydneywater.c
To Mark LABID
Cc Allen ANG



Tue 8/07/2025 2:33 PM

You replied to this message on 8/07/2025 4:02 PM.
If there are problems with how this message is displayed, [click here to view it in a web browser](#).
[Click here to download pictures](#). To help protect your privacy, Outlook prevented automatic download of some pictures in this message.

Mark,

The On-Site Detention requirements for the 12,900 square meters site at 59-121 Botany Rd, Waterloo, are as follows:

- On Site Detention 191 cubic meters
- Permissible Site Discharge 480 L/s

The approval for the On Site Detention would only be given as part of the Section 73 application for this development. The On Site Detention is to be designed according to the above values and submitted to Sydney Water for approval with the Section 73 application. The following details are to be included in your submission for On Site Detention approval:

- Location of the On Site Detention in relation to the development
- Location of the On Site Detention in relation to overall stormwater network of the property
- Plan and Elevation of the On Site Detention tank with all dimensions
- Orifice plate calculation

OSD Details submission and Section 73

On-Site Detention requirements is one of the conditions for Section 73 application. Therefore, application for "Section 73" is to be lodged prior to Sydney Water give approval for On-Site Detention. However, if you have not completed the design of the On-Site Detention at the time of the "Section 73" application, your stormwater designer can send the On-Site Detention details directly to stormwater@sydneywater.com.au for the approval. No need to send these details through Water Servicing Coordinator. However, the time spent on reviewing On-Site Detention details and issue of the On-Site Detention approval letter by the internal staff would be captured using the Case Number for Section 73 for this development and you need to pay those cost prior to issue the Section 73 certificate.

Best Regards

Jeya Jeyadevan
Senior Capability Assessor
Water and Environment Services
Sydney Water, Level 13, 1 Smith Street, Parramatta NSW 2150



A-2 City of Sydney Council OSD Requirements

RE: City of Sydney - OSD Level Requirement - Waterloo Metro Quarter site



Paul Brisby <Pbrisby@cityofsydney.nsw.gov.au>
To: Mark LABID



Fri 11/07/2025 1:44 PM

i Follow up. Start by Friday, 11 July 2025. Due by Friday, 11 July 2025.
You replied to this message on 14/07/2025 8:58 AM.
If there are problems with how this message is displayed, click here to view it in a web browser.

This message is from an external sender

Please do not click the links or attachments and do not respond to this message if you are unsure of its origin.

Hi Mark

Yes the OSD storage needs to drain by gravity so a non-return valve to prevent backflow would be acceptable.

From: Mark LABID <mark.labid@robertbird.com.au>
Sent: Tuesday, 8 July 2025 4:46 PM
To: Paul Brisby <Pbrisby@cityofsydney.nsw.gov.au>
Cc: Jane Grant <JGrant@cityofsydney.nsw.gov.au>; Allen ANG <Allen.Ang@robertbird.com.au>
Subject: RE: City of Sydney - OSD Level Requirement - Waterloo Metro Quarter site

Caution: This email came from outside the organisation. Don't click links or open attachments unless you know the sender, and were expecting this email.

Hi Paul,

Thank you for highlighting these TfNSW assets where we are proposing to connect our OSD tanks to.

In terms of OSD design, if we provide a non-return valve at the primary outlet of the underground OSD for Building 2, and allowing the OSD storage to drain by gravity after the peak storm events, would this arrangement comply with the Council?

Sydney Water's PSD and SSR requirements do not specify OSD provisions from a flood level perspective. We just received today the requirements from Sydney Water for this site which are as follows:

- On Site Detention 191 cubic meters
- Permissible Site Discharge 480 L/s

Best regards,

Mark LABID

Engineer
Robert Bird Group Pty Ltd
t: 02 82463200
w: www.robertbird.com
a: Level 6, 100 Pacific Highway, North Sydney, NSW, Australia 2060

From: Paul Brisby <Pbrisby@cityofsydney.nsw.gov.au>
Sent: Tuesday, 8 July 2025 4:10 PM
To: Mark LABID <mark.labid@robertbird.com.au>
Cc: Jane Grant <JGrant@cityofsydney.nsw.gov.au>; Allen ANG <Allen.Ang@robertbird.com.au>
Subject: RE: City of Sydney - OSD Level Requirement - Waterloo Metro Quarter site

Hi Mark

Please note that those connection points in Botany Road are TfNSW assets and you will need their approval to connect.

Whilst OSD approval is required from Sydney Water.



A-3 Confirmation of Building 3 & 4 OSD Calculation

Re: BLD1 and BLD2 OSD & Rainwater Tank Coordination

From Mr Jack Robertson - Waterloo Developer
 ▶ To (3) Mr Mark Labid - Robert Bird Group (+2 more...)
 ▶ Cc (7) Mr Allen Ang - Robert Bird Group (+6 more...)
 Sent Wednesday, July 23, 2025 12:07:02 PM AEST (GMT +10:00)
 Status N/A

▼ ATTRIBUTES

Attribute 1 Civil, Hydraulic
 Attribute 2 Building 1 (North), Building 2 (Centre)

▼ MESSAGE

Mark,

WSP has provided confirmation on the below values for building 3 OSD size and flows (slight difference from your values).
 Let me know if you need anything further.

Table 3 – Current modelled Detention Tank sizing and associated flow:

| | Permissible Site Discharge (L/S) | On Site Detention Volume (CU.M) | Bypass Flow Discharge (L/S) | Captured Flow Discharge (L/S) |
|---------------|----------------------------------|---------------------------------|-----------------------------|-------------------------------|
| Building 3*&4 | 139 | 62.54 | 53 | 121 |

Regards,

Jack

▼ MESSAGE

Thanks, Jack.

We will match what they have provided for the captured flow discharge.

Best regards,
 Mark



A-4 Civil Drawings



WATERLOO METRO QUARTER DEVELOPMENT

BUILDING 2

CIVIL ENGINEERING DRAWINGS

| Sheet List Table | |
|--------------------------|---------------------------------------|
| Sheet Number | Sheet Title |
| WMQ-BD2-RBG-CV-DRG-C8200 | COVER SHEET |
| WMQ-BD2-RBG-CV-DRG-C8205 | GENERAL NOTES |
| WMQ-BD2-RBG-CV-DRG-C8210 | OVERALL SITE PLAN |
| WMQ-BD2-RBG-CV-DRG-C8215 | EROSION AND SEDIMENT CONTROL PLAN |
| WMQ-BD2-RBG-CV-DRG-C8218 | EROSION AND SEDIMENT CONTROL DETAILS |
| WMQ-BD2-RBG-CV-DRG-C8221 | GENERAL ARRANGEMENT PLAN BUILDING 2 |
| WMQ-BD2-RBG-CV-DRG-C8226 | CIVIL DETAILS |
| WMQ-BD2-RBG-CV-DRG-C8256 | PAVEMENT AND JOINTING DETAILS |
| WMQ-BD2-RBG-CV-DRG-C8261 | STORMWATER MANAGEMENT PLAN BUILDING 2 |
| WMQ-BD2-RBG-CV-DRG-C8266 | STORMWATER DETAILS |
| WMQ-BD2-RBG-CV-DRG-C8271 | STORMWATER CATCHMENT PLAN - OSD |
| WMQ-BD2-RBG-CV-DRG-C8272 | STORMWATER CATCHMENT PLAN - WSUD |
| WMQ-BD2-RBG-CV-DRG-C8281 | OSD TANK DETAILS BUILDING 2 |



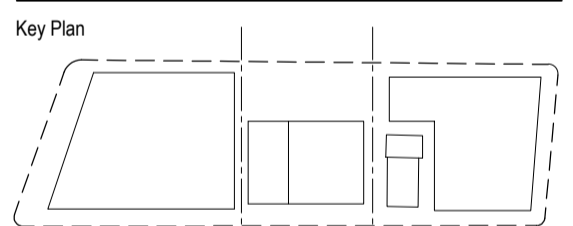
LOCALITY PLAN
SCALE 1:1000

| Recent revision history | # | Status | Description | Date |
|-------------------------|---|--------|-------------------------|----------|
| A | - | - | ISSUED FOR COORDINATION | 03.09.25 |

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Client
WATERLOO COLLECTIVE
JOHN HOLLAND | mirvac

NSW GOVERNMENT | M sydney METRO

Consultant
RobertBirdGroup
on company

Project
WATERLOO METRO QUARTER DEVELOPMENT

| | | | |
|----------------|-------|------------|--------|
| Project number | 18445 | Size check | 25mm |
| Checked | ML | Approved | AA |
| Sheet size | A1 | Scale | 1:1000 |

Sheet title
COVER SHEET

Status
FOR APPROVAL

Sheet number
WMQ-BD2-RBG-CV-DRG-C8200

Revision
A

GENERAL NOTES

- THESE DRAWINGS SHALL BE READ IN CONJUNCTION WITH ALL OTHER ENGINEERING DRAWINGS AND CITY OF SYDNEY (COS) SPECIFICATIONS, SYDNEY STREETS TECHNICAL SPECIFICATION AND WITH SUCH OTHER WRITTEN INSTRUCTIONS AS MAY BE ISSUED DURING THE COURSE OF THE CONTRACT. ANY DISCREPANCIES BETWEEN THESE NOTES AND COS SPECIFICATION COS TAKE PRECEDENCE.
- THESE ENGINEERING PLANS ARE TO BE READ IN CONJUNCTION WITH PROJECT SPECIFICATIONS AND OTHER CONSULTANTS DOCUMENTATION ON THE PROJECT.
- THESE ENGINEERING PLANS HAVE BEEN PREPARED FROM INFORMATION AVAILABLE AT THE TIME OF ISSUE. AS THIS INFORMATION MAY BE THE SUBJECT OF CHANGE PRIOR TO OR DURING CONSTRUCTION THE CONTRACTOR IS TO ADVISE THE ENGINEER WHERE DISCREPANCIES OCCUR.
- THESE DRAWINGS SHALL NOT BE USED FOR FINAL SETOUT OF THE PROJECT UNLESS SPECIFICALLY STATED.
- ALL WORK TO BE CARRIED OUT IN ACCORDANCE WITH THE RESPECTIVE COUNCIL STANDARDS, GUIDELINES AND TECHNICAL MANUALS.
- ALL WORKS SHALL HAVE SMOOTH JUNCTIONS WITH EXISTING.
- ALL SURFACES SHALL BE EVEN GRADED AT MINIMUM 1% TO PREVENT SURFACE WATER PONDING.
- WHERE CERTIFICATION IS REQUIRED, INSPECTIONS ARE TO BE PERFORMED BY A DULY APPOINTED INSPECTOR FROM 'ROBERT BIRD GROUP'. THESE INSPECTIONS ARE TO BE PERFORMED IN ACCORDANCE WITH THE INSPECTION & TEST PLANS PREPARED BY 'ROBERT BIRD GROUP'. THE INSPECTOR IS TO BE GIVEN A MINIMUM NOTICE AS DETAILED IN THE SPECIFICATIONS.
- ALL MATERIALS SHALL COMPLY WITH WHAT IS SHOWN ON THE PROJECT DRAWINGS AND IN THE PROJECT SPECIFICATIONS.
- THE CONTRACTOR SHALL VERIFY THE LOCATIONS OF ALL EXISTING SERVICES WITH ALL RELEVANT SERVICE AUTHORITIES PRIOR TO THE COMMENCEMENT OF CONSTRUCTION. A COPY OF THE LOCATIONS OF THE EXISTING SERVICES IS TO BE PROVIDED TO THE MANAGING CONTRACTOR BY THE SERVICES ENGINEER. CONTRACTOR TO NOTIFY MANAGING CONTRACTOR OF ANY POTENTIAL CLASHES.
- THE CONTRACTOR SHALL VERIFY OFFSET PEGS AND BENCHMARK LEVELS, AND ADVISE THE MANAGING CONTRACTOR OF ANY DISCREPANCY PRIOR TO COMMENCING CONSTRUCTION.
- THE CONTRACTOR SHALL VERIFY THE EXISTING LEVELS WHERE NEW WORKS ARE TO JOIN TO EXISTING WORKS, AND ADVISE THE MANAGING CONTRACTOR OF ANY DISCREPANCY PRIOR TO COMMENCING CONSTRUCTION.
- THE CONTRACTOR SHALL CHECK OR OBTAIN ALL DIMENSIONS RELEVANT TO SETTING OUT OF SITE WORKS.
- DURING CONSTRUCTION THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING THE STABILITY OF THE WORKS AND ENSURE NO PART IS OVERSTRESSED. THE DESIGN AND CERTIFICATION OF ALL FORMWORK AND BACKPROPPING IS TO BE THE RESPONSIBILITY OF THE CONTRACTOR.
- THE CONTRACTOR IS TO OBTAIN DESIGN ADVICE FROM A SUITABLY QUALIFIED ENGINEER REGARDING DEMOLITION, RETROFITTING, TEMPORARY WORKS, HEALTH & SAFETY AND NUISANCE. THIS HAS BEEN REFERRED TO AS THE "CONTRACTORS ENGINEER" THROUGHOUT THE REMAINING NOTES.
- FORMWORK STRIPPING: UNLESS SPECIFIED OTHERWISE IN THE PROJECT DOCUMENTATION, MINIMUM STRIPPING TIMES FOR IN-SITU CONCRETE FORMWORK SHALL COMPLY WITH SECTION 5.4.3 (TABLE 5.4.1) OF AS3610-"FORMWORK FOR CONCRETE".
- WORKMANSHIP AND MATERIALS SHALL BE IN ACCORDANCE WITH THE CURRENT AUSTRALIAN STANDARDS AND BCA STATUTORY REQUIREMENTS, EXCEPT WHERE VARIED BY THE CONTRACT DOCUMENTS.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR ENSURING THAT SUFFICIENT TOLERANCES ARE PROVIDED AND INTEGRATED THROUGHOUT ALL ELEMENTS OF THE WORKS.
- ALL DIMENSIONS ARE IN METRES UNLESS STATED OTHERWISE.
- ALL LEVELS ARE TO AUSTRALIAN HEIGHT DATUM (A.H.D.).
- DESIGN LEVELS AND SETOUT DETAILED HEREIN ARE DERIVED FROM THE LANDSCAPE AND ARCHITECTURAL CONCEPT PLANS. CONTRACTOR SHALL CONFIRM LEVELS ARE COORDINATED PRIOR TO COMMENCING WORKS. EXISTING LEVELS ARE DERIVED FROM SURVEY DATA. CONTRACTOR TO CONFIRM ALL ON SITE PRIOR TO COMMENCING WORKS.

SITE LEVELS NOTES

- GRADES ARE SHOWN FOR GUIDANCE ONLY. SET OUT FROM LEVELS ONLY.

SURVEY NOTES

- THE SURVEY INFORMATION SHOWN ON ROBERT BIRD GROUP DRAWINGS HAS BEEN OVERLAID FROM INFORMATION PROVIDED IN THE DETAILED SURVEY BY VERIS, FILE REF: 202254-DETL-001 REV A, DATED 04.05.2020. ROBERT BIRD GROUP DOES NOT GUARANTEE THAT THE SURVEY INFORMATION IS ACCURATE, AND ACCEPTS NO LIABILITY FOR INACCURACIES.

SEDIMENT AND EROSION CONTROL NOTES

- EROSION AND SEDIMENT CONTROL MEASURES ARE TO BE PROVIDED IN ACCORDANCE WITH SPECIFICATION AND THE EPA LANDCOM 2004, MANAGING URBAN STORMWATER, SOILS AND CONSTRUCTION, VOLUME 1. ALL WORKS SHALL BE COMPLETED PRIOR TO CONSTRUCTION COMMENCING.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR IMPLEMENTING ALL REQUIRED SEDIMENT AND EROSION CONTROL MEASURES AND FOR THE MAINTENANCE AND ONGOING OPERATION OF ALL CONTROL MEASURES. ALL CONTROL FEATURES ARE TO BE REGULARLY INSPECTED TO ENSURE CORRECT OPERATION.
- THE CONTRACTOR IS ALSO TO PROVIDE & MAINTAIN EFFECTIVE DUST CONTROL MEASURES TO THE SATISFACTION OF THE ENGINEER AND ALL CARE IS TO BE UNDERTAKEN TO AVOID PUBLIC COMPLAINT
- REFER TO ROBERT BIRD GROUP'S DRAWING SHEET WMQ-BLD1-RBG-CV-DRG-C8215 AND WMQ-BLD1-RBG-CV-DRG-C8218 FOR EROSION AND SEDIMENT CONTROL NOTES AND DETAILS.

EARTHWORKS NOTES

- THE CONTRACTOR IS RESPONSIBLE FOR THE REMOVAL, COMPACTION AND DISPOSAL OF ALL EXCAVATED MATERIAL.
- ALL EARTHWORKS AREAS ARE TO BE LEFT IN A FREE DRAINING STATE.
- PROOF ROLL SUBGRADE TO REVEAL SOFT SPOTS. SOFT SPOTS TO BE REMOVED AND BACKFILLED. ALL NATURAL SUBGRADE IS TO BE COMPACTED TO IN ACCORDANCE WITH AS1289 PRIOR TO PLACEMENT OF FILL MATERIAL.
- MATERIAL WON FROM THE SITE TO BE INSPECTED BY THE GEOTECHNICAL ENGINEER FOR APPROVAL PRIOR TO USE AS FILL. ALL FILL TO BE COMPACTED TO MIN. 98% STANDARD COMPACTION IN 200mm MAXIMUM THICK LAYERS IN ACCORDANCE WITH AS1289.
- TEST CERTIFICATES ON THE FILL MATERIAL SHALL BE SUPPLIED TO THE SUPERINTENDENT FOR APPROVAL PRIOR TO THE USE OF THE FILL MATERIAL.

EXISTING SERVICES NOTES

- EXISTING SERVICES MAY NOT BE SHOWN ON THE DRAWINGS.
- WHERE EXISTING SERVICES ARE SHOWN, NO GUARANTEE IS GIVEN THAT ALL EXISTING SERVICES ARE SHOWN.
- EXISTING SERVICES SHOWN ARE INDICATIVE ONLY.
- THE CONTRACTOR SHALL HAVE UNDERTAKEN THEIR OWN INVESTIGATIONS AS TO THE EXISTENCE AND LOCATION OF SERVICES AND THEIR POTENTIAL IMPACT ON THE WORKS PRIOR TO TENDERING FOR THE WORKS, INCLUDING, BUT NOT LIMITED TO, VISITING THE SITE AND DIAL BEFORE YOU DIG SEARCHES. WHERE THE CONTRACTOR BELIEVES EXISTING SERVICES MAY IMPACT THE WORKS THEY SHALL IDENTIFY POTENTIAL IMPACTS TO THE PRINCIPAL OR MANAGING CONTRACTOR PRIOR TO EXECUTION OF A CONTRACT OF SERVICES. THE CONTRACTOR SHALL NOT BE ENTITLED TO A VARIATION FOR BEING UNAWARE OF THE EXISTENCE OF EXISTING SERVICES WHERE REASONABLE ACTIONS WOULD HAVE IDENTIFIED THEIR EXISTENCE.
- THE CONTRACTOR SHALL DETERMINE THE EXACT POSITION AND LEVEL OF EXISTING SERVICES PRIOR TO COMMENCING CONSTRUCTION.
- THE CONTRACTOR SHALL CONTACT THE RELEVANT SERVICE AUTHORITY PRIOR TO ANY WORKS WITHIN CLOSE PROXIMITY OF SERVICES AND COMPLY WITH THE RELEVANT AUTHORITIES REQUIREMENTS INCLUDING MINIMUM CLEARANCE FOR CONSTRUCTION MACHINERY AND COMMISSIONING OF AN ACCREDITED PLANT LOCATOR IF REQUIRED.
- ANY DAMAGE TO EXISTING SERVICES IS THE RESPONSIBILITY OF THE CONTRACTOR. THE CONTRACTOR SHALL PROTECT ALL SERVICES AND SHALL RECTIFY ANY DAMAGE AT THEIR EXPENSE.
- EXISTING SERVICE COVERS MUST BE RAISED OR LOWERED AS APPROPRIATE TO BE SET FLUSH WITH THE FINISHED CONSTRUCTED SURFACE, INCLUDING SLOPING THE COVER TO MATCH CROSSFALLS, UNLESS SPECIFIED OTHERWISE.

HEALTH & SAFETY

- THE CONTRACTOR SHALL DEVELOP, IMPLEMENT AND ADMINISTER A WORKPLACE HEALTH AND SAFETY PROGRAM THAT WILL ENSURE THAT ALL CONSTRUCTION ACTIVITIES ARE PERFORMED TO THE RELEVANT WORKPLACE HEALTH AND SAFETY REQUIREMENTS AND ANY OTHER RELEVANT STATUTORY REQUIREMENTS.

- THE WORKPLACE HEALTH AND SAFETY PROGRAM MUST BE CO-ORDINATED WITH ADJOINING PROPERTY OWNERS AND ALL RELEVANT PARTIES AS NECESSARY TO ENSURE A SAFE BUILDING ENVIRONMENT AT ALL TIMES.

NUISANCE

- THE CONTRACTOR SHALL DEVELOP, IMPLEMENT, AND ADMINISTER A PLAN THAT WILL ENSURE THE MANAGEMENT OF NOISE AND VIBRATION RESULTING FROM CONSTRUCTION WORKS. REFER TO SPECIFICATIONS FOR REQUIRED LIMITS, OTHERWISE, CONTACT ENGINEER FOR GUIDANCE.
- THE CONTRACTOR WILL NEED TO ENSURE ALL ADJOINING PROPERTY REQUIREMENTS RELATING TO NOISE AND VIBRATION ARE MET.
- IF IT IS ESTABLISHED THAT THERE ARE NO SITE SPECIFIC REQUIREMENTS, THEN THE CONTRACTOR SHALL REFER TO MINIMUM REQUIREMENTS FOR ABATEMENT OF NOISE AND VIBRATION NOMINATED BY RELEVANT STATUTORY REQUIREMENTS
- THE CONTRACTOR WILL NEED TO PREPARE AND ADVISE ON MONITORING AND MANAGEMENT OF NOISE AND VIBRATION BASED ON PROFESSIONAL ADVICE FROM SUITABLY QUALIFIED PERSON OR PERSONS.

RETAINING WALL NOTES

- RETAINING WALLS SHALL BE IN ACCORDANCE WITH AS 4678-2002 EARTH RETAINING STRUCTURES.
- CONTRACTOR TO ENSURE NO CONSTRUCTION OR OTHER ADVERSE LOADS ACT ON RETAINING STRUCTURES.

LANDSCAPING NOTES

- REFER TO LANDSCAPE ARCHITECTS DRAWINGS FOR LANDSCAPING DETAILS.

WARNING

BEWARE OF UNDERGROUND SERVICES
THE LOCATION OF UNDERGROUND SERVICES ARE
INDICATIVE ONLY AND THEIR EXACT POSITION
SHOULD BE PROVEN ON SITE. NO GUARANTEE IS
GIVEN THAT ALL OR ANY EXISTING SERVICES ARE SHOWN.

WORKS WITHIN THE JURISDICTION OF LOCAL AUTHORITIES

WORKS WITHIN THE JURISDICTION OF LOCAL AUTHORITIES SHALL BE
CONSTRUCTED IN ACCORDANCE WITH ALL REQUIREMENTS AND INSTRUCTIONS
OF THE RELEVANT LOCAL AUTHORITY. THE CONTRACTOR MUST CONTACT THE
RELEVANT AUTHORITY PRIOR TO COMMENCEMENT AND DURING THE WORKS TO
ENSURE THE REQUIRED PERMITS AND PREPARATIONS ARE IN PLACE AND
ALLOW INSPECTION OF THE WORKS AT POINTS REQUIRED BY THE RELEVANT
AUTHORITY TO ENABLE SIGNOFF OF THE WORKS AT COMPLETION BY THE
RELEVANT AUTHORITY. FAILURE TO DO SO MAY NECESSITATE REMOVAL AND
RECONSTRUCTION OF ALL OR PART OF THE WORKS.

STORMWATER DRAINAGE NOTES

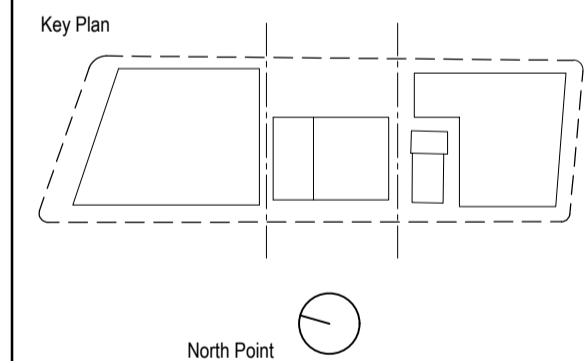
- INSTALLATION AND CONSTRUCTION TO BE IN ACCORDANCE WITH THE RELEVANT SPECIFICATIONS, AS 3500.3, LOCAL AUTHORITY STANDARDS AS APPROPRIATE UNLESS OTHERWISE DIRECTED.
- THE CONTRACTOR SHALL CONFIRM THE LEVEL AND POSITION OF EXISTING DRAINS AND PITS BEING CONNECTED TO PRIOR TO STARTING CONSTRUCTION.
- THE CONTRACTOR SHALL INVESTIGATE AND ACCURATELY LOCATE EXISTING DRAINAGE THAT IS REQUIRED TO BE RETAINED FOR THE SITE (E.G. DOWNPIPE CONNECTIONS FOR EXISTING BUILDINGS AND EXISTING SITE DRAINS THAT MAY BE CROSSING THE SITE). SUCH EXISTING DRAINAGE SHALL REMAIN UNDAMAGED AND BE GIVEN ALL NECESSARY PROTECTION. ANY DAMAGE TO EXISTING DRAINAGE SHALL BE REPAIRED OR DIVERTED AT THE CONTRACTORS EXPENSE. THE CONTRACTOR SHALL REFER EXISTING DRAINAGE CLASHES WITH THE PROPOSED WORKS TO THE ENGINEER FOR CLARIFICATION.
- PRIOR TO STARTING CONSTRUCTION THE CONTRACTOR MUST SET OUT THE DRAINAGE ALIGNMENT ON THE GROUND AND REPORT ON ANY OBSTRUCTIONS THAT MAY NECESSITATE AMENDMENTS TO THE PROPOSED ALIGNMENT.
- THE CONTRACTOR SHALL USE EXISTING SERVICE LOCATION DETECTION METHODS ALONG THE ALIGNMENT OF ALL PROPOSED STORMWATER DRAINS TO IDENTIFY CROSSING SERVICES PRIOR TO CONSTRUCTION. CROSSING SERVICES SHALL BE MARKED ON THE GROUND.
- THE CONTRACTOR SHALL INVESTIGATE AND CONFIRM EXISTING SERVICES CLEARANCES FROM EXACT LOCATIONS (E.G. POTHOLING) PRIOR TO CONSTRUCTION AND REPORT ANY CLASHES TO THE ENGINEER FOR CLARIFICATION.
- PIPELAYING SHALL COMMENCE AT THE DOWNSTREAM END OF THE DRAINAGE SYSTEM AND PROCEED IN AN UPSTREAM DIRECTION. PIPE SOCKETS AND REBATES SHALL POINT UPSTREAM.
- EXISTING OBSOLETE DRAINS AND PITS UNDER PROPOSED BUILDINGS AND PAVEMENTS ARE TO BE REMOVED TO WASTE AND BACKFILLED AS PER DRAINAGE TRENCH DETAIL UNLESS ALLOWED TO REMAIN BY THE ENGINEER.
- THE CONTRACTOR SHALL NOT REMOVE ANY EXISTING OBSOLETE UNDERGROUND DRAINAGE SYSTEM UNTIL WORKS HAVE BEEN DONE TO CATER FOR DRAINAGE OF THE SITE.
- PIPES UP TO AND INCLUDING 300MM DIAMETER TO BE CLASS SN8 UPVC RUBBER RING JOINT PRODUCED IN ACCORDANCE WITH AS 1254 REQUIREMENTS FOR "BEST ENVIRONMENTAL PRACTICE FOR PVC PIPES AND FITTINGS" OR APPROVED SIMILAR UNLESS OTHERWISE ANNOTATED.
- PIPES GREATER THAN 300mm Ø TO BE RCRRJ CLASS "2" UNLESS OTHERWISE ANNOTATED.
- ALL IN GROUND PIPES UP TO 600mm DIAMETER TO BE RUBBER RING JOINTED.
- PIPE GRADES ARE SHOWN FOR GUIDANCE ONLY AND/OR TO INFORM MINIMUM GRADE REQUIREMENTS. INVERT LEVELS SHALL BE USED FOR SETOUT AND TO DETERMINE EXACT GRADES FOR CONSTRUCTION.
- DOWNPIPE CONNECTIONS TO BE THE SAME DIAMETER AS DOWNPIPES AND LAID AT A MINIMUM GRADE OF 1:100 WITH MINIMUM COVER AS SPECIFIED IN AUSTRALIAN STANDARDS.
- WHERE DOWNPIPES DO NOT DISCHARGE DIRECTLY TO OPEN GRATES, PROVIDE INSPECTION OPENINGS ABOVE GROUND IN ALL DOWNPIPES TO ALLOW FOR MAINTENANCE ACCESS.
- EXISTING AND PROPOSED COVERS MUST BE SET FLUSH WITH THE FINISHED CONSTRUCTED SURFACE, INCLUDING SLOPING THE COVER TO MATCH CROSSFALLS, UNLESS SPECIFIED OTHERWISE.
- ALL INSPECTION OPENINGS TO BE BROUGHT TO THE SURFACE AND CAPPED TO APPROPRIATE LOAD CAPACITY FOR AREA OF USE.
- ALL PITS ARE TO BE CAST IN-SITU AS PER THE STORMWATER DRAINAGE DETAILS UNLESS NOTED OTHERWISE.
- ALL PITS ARE TO BE BENCHED WITH A STEEL TROWELLED FINISH TO PROVIDE SMOOTH FLOW THROUGH THE PIT.
- ALLOW TO CLEAN AND FLUSH ALL EXISTING PITS AND PIPES FROM POINT OF NEW CONNECTION TO POINT OF DISCHARGE FROM THE SITE IN ADDITION TO FLUSHING ALL NEW DRAINAGE AT COMPLETION OF THE WORKS.
- THE CONTRACTOR SHALL COMPLY WITH CONFINED SPACE REQUIREMENTS TO AS 2865.
- THE CONTRACTOR SHALL PROVIDE AS-CONSTRUCTED DRAWINGS OF THE STORMWATER DRAINAGE NETWORK AT COMPLETION OF THE WORKS.
- CONNECT ALL SUBSOIL DRAINS TO THE NEAREST AVAILABLE STORMWATER PIT THAT HAS AN INVERT LEVEL ABLE TO ACCOMMODATE THE SUBSOIL DRAIN AT MINIMUM GRADE.
- FLUSHING POINTS ARE TO BE PROVIDED AT THE UPSTREAM END OF ALL SUBSOIL DRAINS WHERE ACCESS CANNOT BE OBTAINED VIA PITS. PROVIDE ADDITIONAL FLUSHING POINTS AT A SPACING NO GREATER THAN 50 METERS.

| # | Status | Description | Date |
|---|--------|-------------------------|----------|
| A | | ISSUED FOR COORDINATION | 03.09.25 |

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Project
WATERLOO METRO QUARTER DEVELOPMENT

| Project number | Size check |
|----------------|-------------|
| 18445 | 25mm |
| Checked ML | Approved AA |
| Sheet size A1 | Scale 1:100 |

Sheet title
GENERAL NOTES

Status
FOR APPROVAL

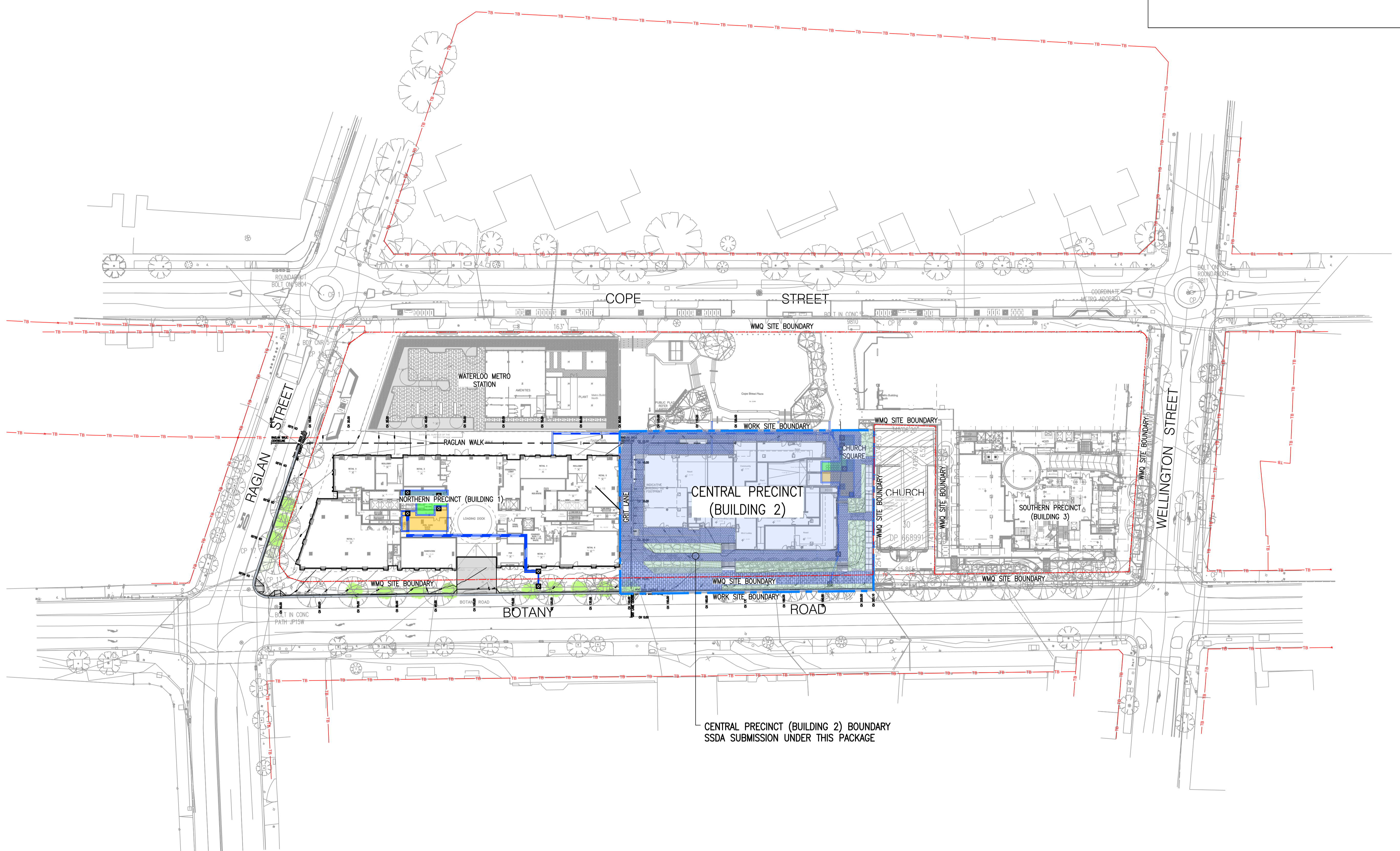
Sheet number
WMQ-BD2-RBG-CV-DRG-C8205

Revision
A

LEGEND

--- WMQ SITE BOUNDARY

--- BUILDING 2 EXTENT OF WORK

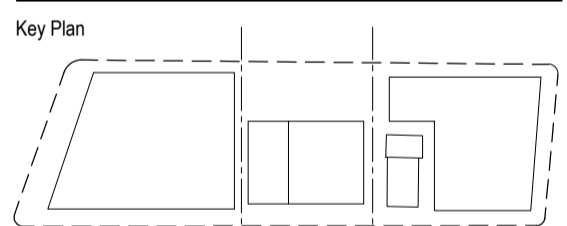
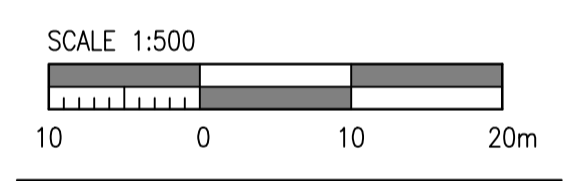


CENTRAL PRECINCT (BUILDING 2) BOUNDARY
SSDA SUBMISSION UNDER THIS PACKAGE

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Client

WATERLOO COLLECTIVE

JOHN HOLLAND | mirvac

NSW GOVERNMENT | **sydney METRO**

Consultant

RobertBirdGroup
an on company

Project
WATERLOO METRO QUARTER DEVELOPMENT

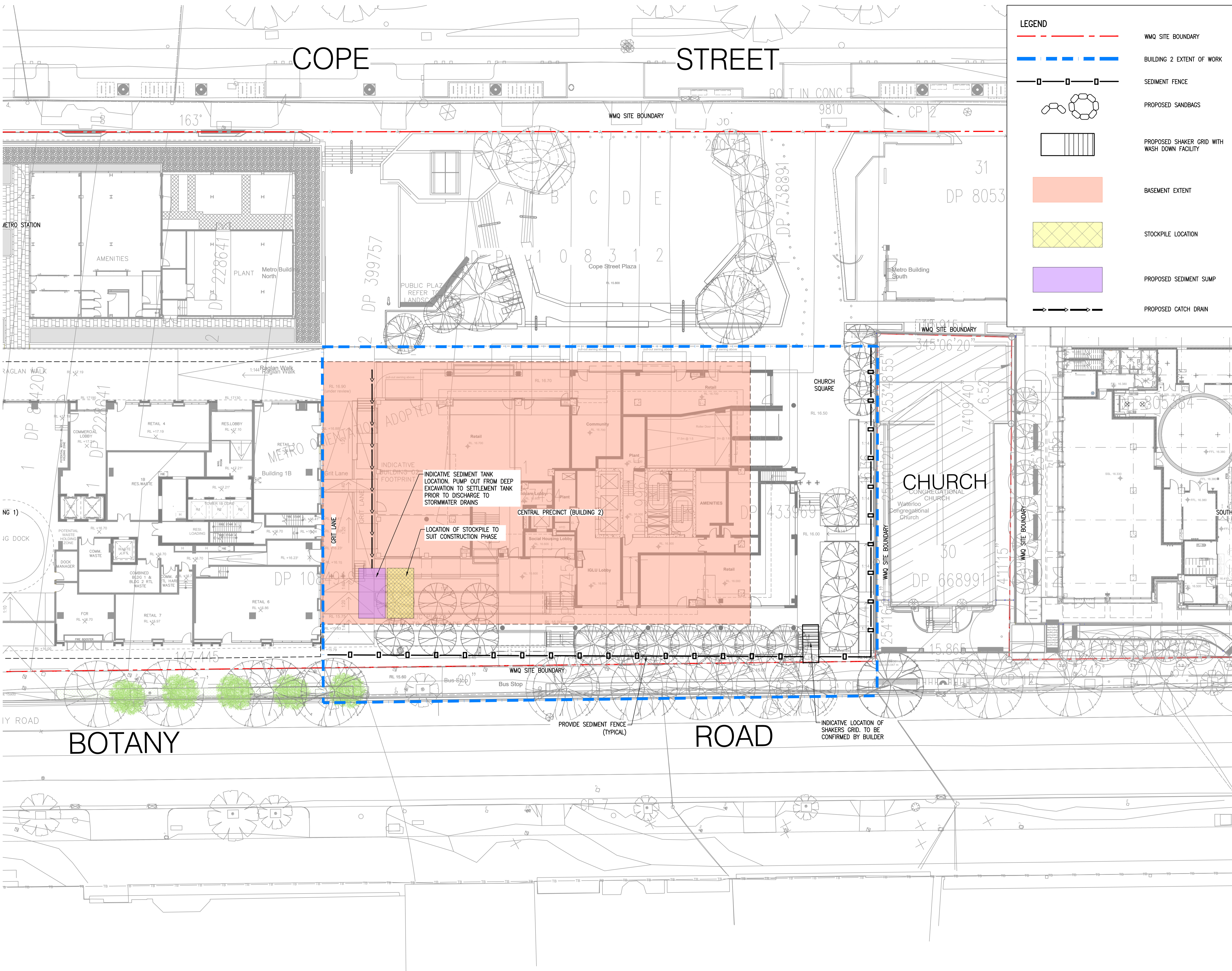
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|----------------|-------|------------|-------|
| Project number | 18445 | Size check | 25mm |
| Checked | ML | Approved | AA |
| Sheet size | A1 | Scale | 1:500 |

Sheet title
OVERALL SITE PLAN

Status
FOR APPROVAL

Sheet number
WMQ-BD2-RBG-CV-DRG-C8210

Revision
A



LEGEND

- WMQ SITE BOUNDARY
- BUILDING 2 EXTENT OF WORK
- SEDIMENT FENCE
- PROPOSED SANDBAGS
- PROPOSED SHAKER GRID WITH WASH DOWN FACILITY
- BASEMENT EXTENT
- STOCKPILE LOCATION
- PROPOSED SEDIMENT SUMP
- PROPOSED CATCH DRAIN

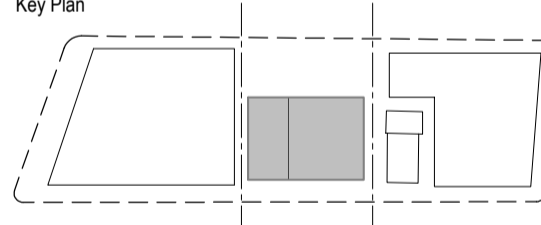
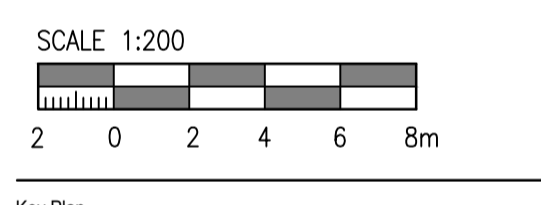
Recent revision history

| # | Status | Description | Date |
|---|-------------------------|-------------|----------|
| A | ISSUED FOR COORDINATION | | 13.08.25 |

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Client

WATERLOO COLLECTIVE

JOHN HOLLAND | mirvac

NSW GOVERNMENT | sydney METRO

Consultant

RobertBirdGroup

an on company

Project

WATERLOO METRO QUARTER DEVELOPMENT

Project number 18445

Checked ML Approved AA

Size check 25mm

Sheet size A1 Scale 1:200

Sheet title

EROSION AND SEDIMENT CONTROL PLAN

Status

FOR APPROVAL

Sheet number

WMQ-BD2-RBG-CV-DRG-C8215

Revision

A

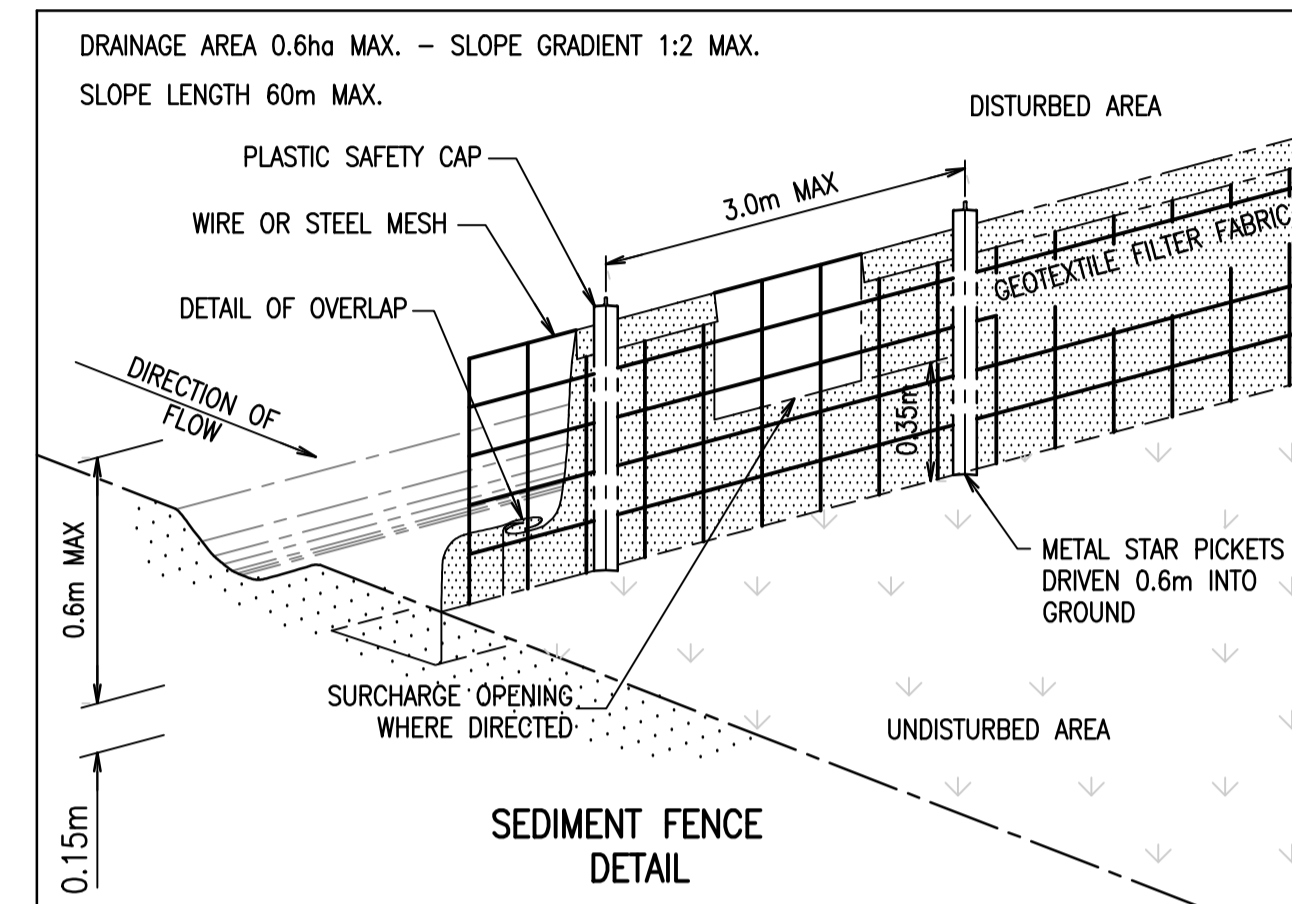
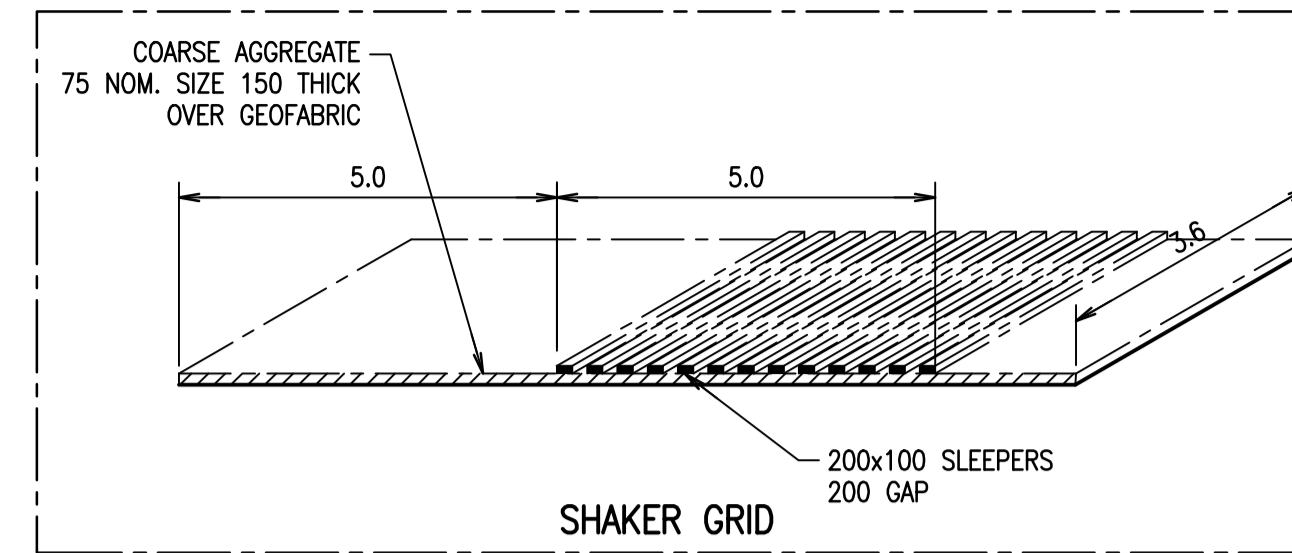
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LAND DISTURBANCE NOTES:

- LD1. ACCESS AREAS ARE TO BE LIMITED TO A MAXIMUM WIDTH OF 10 METERS THE SITE MANAGER WILL DETERMINE AND MARK THE LOCATION OF THESE ZONES ON-SITE. ALL SITE WORKERS WILL CLEARLY RECOGNIZE THOSE BOUNDARIES THAT, WHERE APPROPRIATE, ARE IDENTIFIED WITH A BARRIER FENCING (UPSLOPE) AND SEDIMENT FENCING (DOWNSLOPE) OR SIMILAR MATERIALS.
- LD2. ENTRY TO LANDS NOT REQUIRED FOR CONSTRUCTION OR ACCESS IS PROHIBITED EXCEPT FOR ESSENTIAL THINNING OF PLANT GROWTH.
- LD3. WORKS ARE TO PROCEED IN THE FOLLOWING SEQUENCE:
 - A) INSTALL ALL BARRIER AND SEDIMENT FENCING WHERE SHOWN ON THE PLAN.
 - B) CONSTRUCT THE STABILISED SITE ACCESS.
 - C) CONSTRUCT DIVERSION DRAINS AS REQUIRED.
 - D) INSTALL MESH AND GRAVEL INLETS FOR ANY ADJACENT KERB INLETS.
 - E) INSTALL GEOTEXTILE INLET FILTERS AROUND ANY ON-SITE DROP INLET PITS.
 - F) CLEAR SITE AND STRIP AND STOCKPILE TOPSOIL IN LOCATIONS SHOWN ON THE PLAN.
 - G) UNDERTAKE ALL ESSENTIAL CONSTRUCTION WORKS ENSURING THAT ROOF AND/OR PAVED AREA STORMWATER SYSTEMS ARE CONNECTED TO PERMANENT DRAINAGE AS SOON AS PRACTICABLE.
 - H) GRADE LOT AREAS TO FINAL GRADES AND APPLY PERMANENT STABILISATION (LANDSCAPING) WITHIN 20 DAYS OF COMPLETION OF CONSTRUCTION WORKS.
 - I) REMOVE TEMPORARY EROSION CONTROL MEASURES AFTER THE PERMANENT LANDSCAPING HAS BEEN COMPLETED.
- LD4. ENSURE THAT SLOPE LENGTHS DO NOT EXCEED 80 METRES WHERE PRACTICABLE. SLOPE LENGTHS ARE DETERMINED BY SILTATION FENCING AND CATCH DRAIN SPACING.



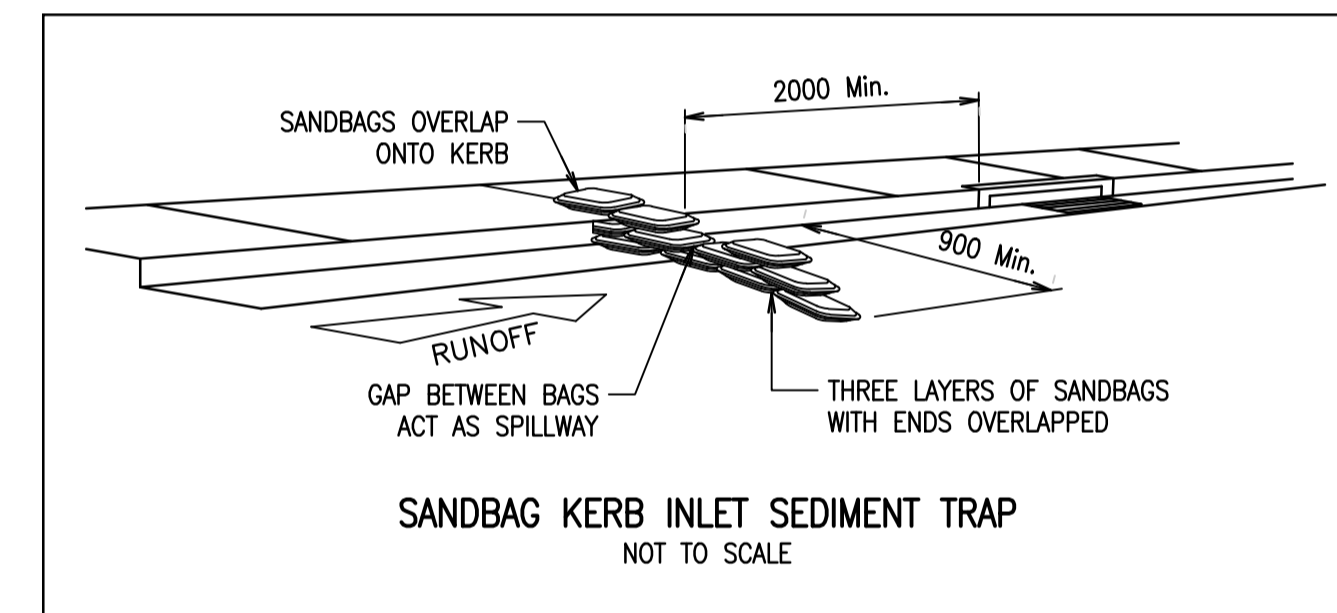
INSTALLATION

1. EXCAVATE A TRENCH AT LEAST 150mm DEEP.
2. DRIVE POSTS 600-600mm INTO GROUND AT A MAXIMUM SPACING OF 3.0m CENTRES.
3. PLACE AND FIX SUPPORT MESH (F52) TO POST.
4. LAY BIDIM GEOTEXTILE (SF 2000) AGAINST THE SUPPORT MESH AND FIX BY TIE WIRE, STAPLES OR HOG RINGS.
5. PLACE BIDIM IN TRENCH AND BACKFILL WITH SOIL.
6. SOIL ON BOTH SIDES OF THE FENCE MUST BE COMPACTED TO AVOID SEEPAGE UNDER THE BARRIER.

NOTE: POSITION OF SEDIMENT FENCE AS DIRECTED BY MANAGING CONTRACTOR. FENCE TO REMAIN IN PLACE UNTIL EXCAVATION IS BELOW FOOTPATH LEVEL. PROVIDE 2mx2m TURFED AREA ON DOWNSTREAM SIDE OF FENCE AT SURCHARGE OPENINGS, TO BE CONFIRMED BY CONTRACTOR ON SITE.

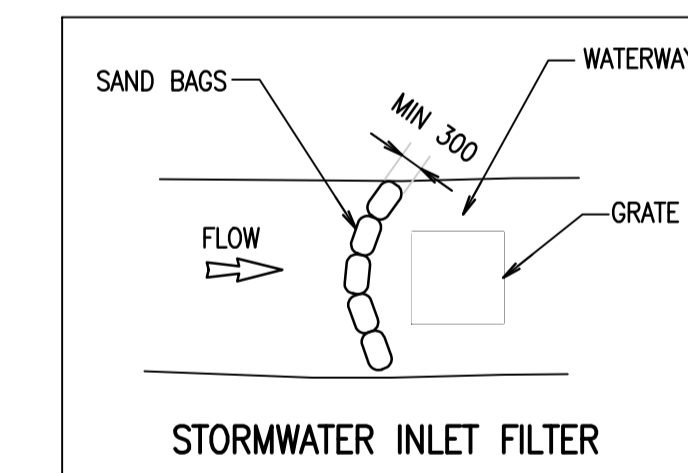
SOIL EROSION CONTROL NOTES:

- SE1. EARTH BATTERS WILL BE CONSTRUCTED WITH AS LOW A GRADIENT AS PRACTICABLE BUT NO STEEPER, UNLESS OTHERWISE NOTED, THAN THAT RECOMMENDED BY GEOTECHNICAL REPORT.
- SE2. ALL WATERWAYS, DRAINS, SPILLWAYS AND THEIR OUTLETS WILL BE CONSTRUCTED TO BE STABLE IN AT LEAST THE 1:20 YEAR ARI, TIME OF CONCENTRATION STORM EVENT.
- SE3. WATERWAYS AND OTHER AREAS SUBJECT TO CONCENTRATED FLOWS AFTER CONSTRUCTION ARE TO HAVE A MAXIMUM GROUND COVER C-FACTOR OF 0.05 (70% GROUND COVER) WITHIN 10 WORKING DAYS FROM COMPLETION OF FORMATION. FOOT AND VEHICULAR TRAFFIC WILL BE PROHIBITED IN THESE AREAS.
- SE4. STOCKPILES AFTER CONSTRUCTION ARE TO HAVE A MAXIMUM GROUND COVER C-FACTOR OF 0.1% (60% GROUND COVER) WITHIN 10 WORKING DAYS FROM COMPLETION OF FORMATION.
- SE5. ALL LANDS, INCLUDING WATERWAYS AND STOCKPILES DURING CONSTRUCTION ARE TO HAVE A MAXIMUM GROUND COVER C-FACTOR OF 0.15 (50% GROUND COVER) WITHIN 20 WORKING DAYS FROM INACTIVITY EVEN THOUGH WORKS MAY CONTINUE LATER.
- SE6. PERMANENT REHABILITATION OF LANDS AFTER CONSTRUCTION WILL ACHIEVE A GROUND COVER C-FACTOR OF LESS THAN 0.1 AND LESS THAN 0.05 WITHIN 60 DAYS. NEWLY PLANTED LANDS WILL BE WATERED REGULARLY UNTIL AN EFFECTIVE COVER IS ESTABLISHED AND PLANTS ARE GROWING VIGOROUSLY. FOLLOW-UP SEED AND FERTILISER WILL BE APPLIED AS NECESSARY.



WASTE CONTROL NOTES:

- WC1. ACCEPTABLE BINS WILL BE PROVIDED FOR ANY CONCRETE AND MORTAR SLURRIES, PAINTS, ACID WASHING, LIGHTWEIGHT WASTE MATERIALS AND LITTER. CLEARANCE SERVICES WILL BE PROVIDED AT LEAST WEEKLY. DISPOSAL OF WASTE WILL BE IN A MANNER APPROVED BY THE SITE CONTRACTOR.
- WC2. ALL POSSIBLE POLLUTANT MATERIALS ARE TO BE STORED WELL CLEAR OF ANY POORLY DRAINED AREAS, FLOW PRONE AREAS, STREAMBANKS, CHANNELS AND STORMWATER DRAINAGE AREAS. STORE SUCH MATERIALS IN A DESIGNATED AREA UNDER COVER WHERE POSSIBLE AND WITHIN CONTAINMENT BUNDS.
- WC3. ALL SITE STAFF AND SUBCONTRACTORS ARE TO BE INFORMED OF THEIR OBLIGATION TO USE WASTE CONTROL FACILITIES PROVIDED.
- WC4. ANY DE-WATERING ACTIVITIES ARE TO BE CLOSELY MONITORED TO ENSURE THAT WATER IS NOT POLLUTED BY SEDIMENT, TOXIC MATERIALS OR PETROLEUM PRODUCTS.
- WC5. PROVIDE DESIGNATED VEHICULAR WASHDOWN AND MAINTENANCE AREAS WHICH ARE TO HAVE CONTAINMENT BUNDS.



GENERAL NOTES:

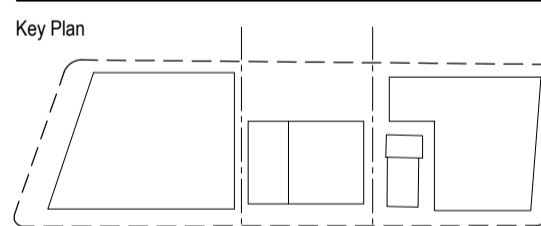
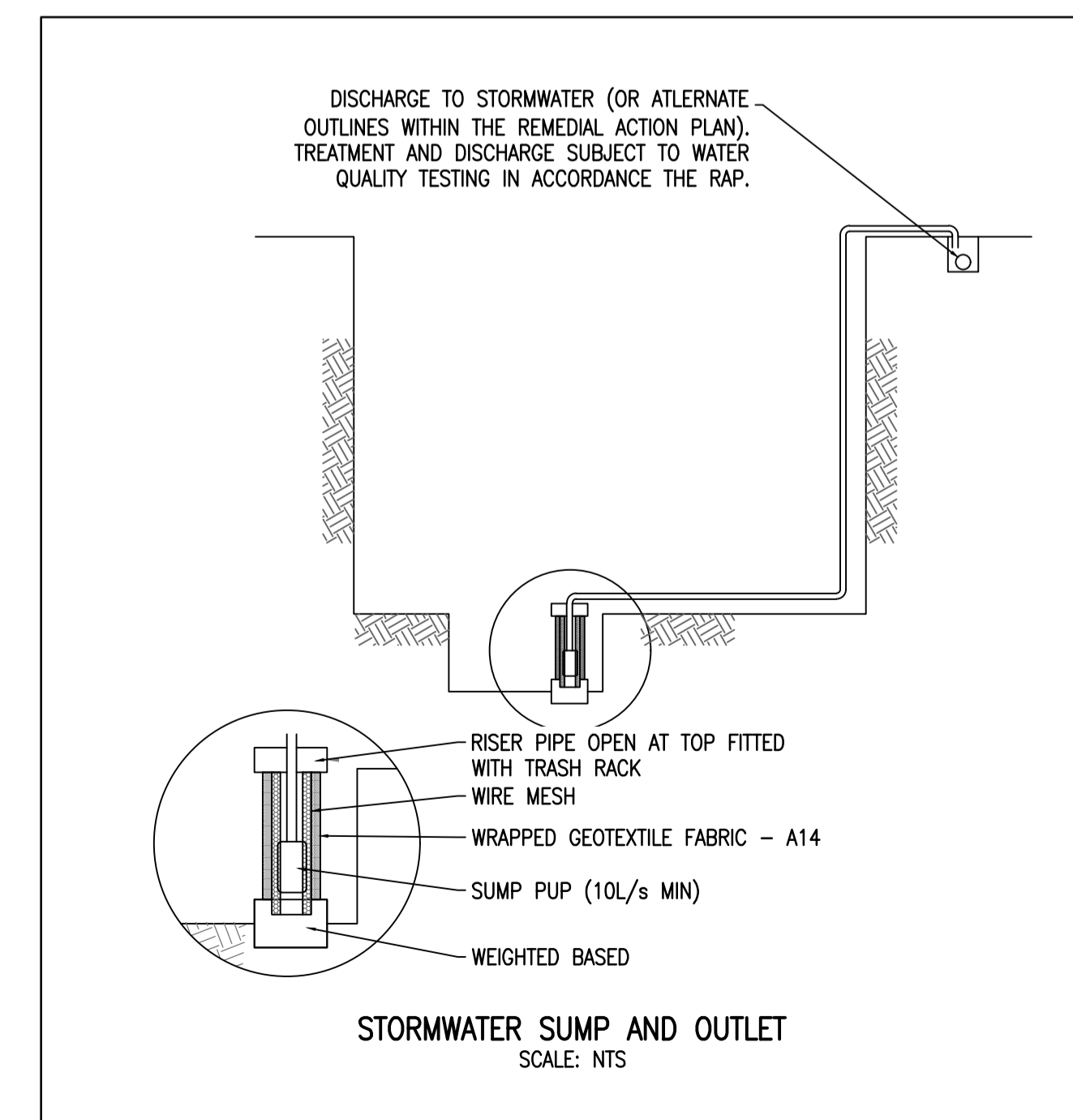
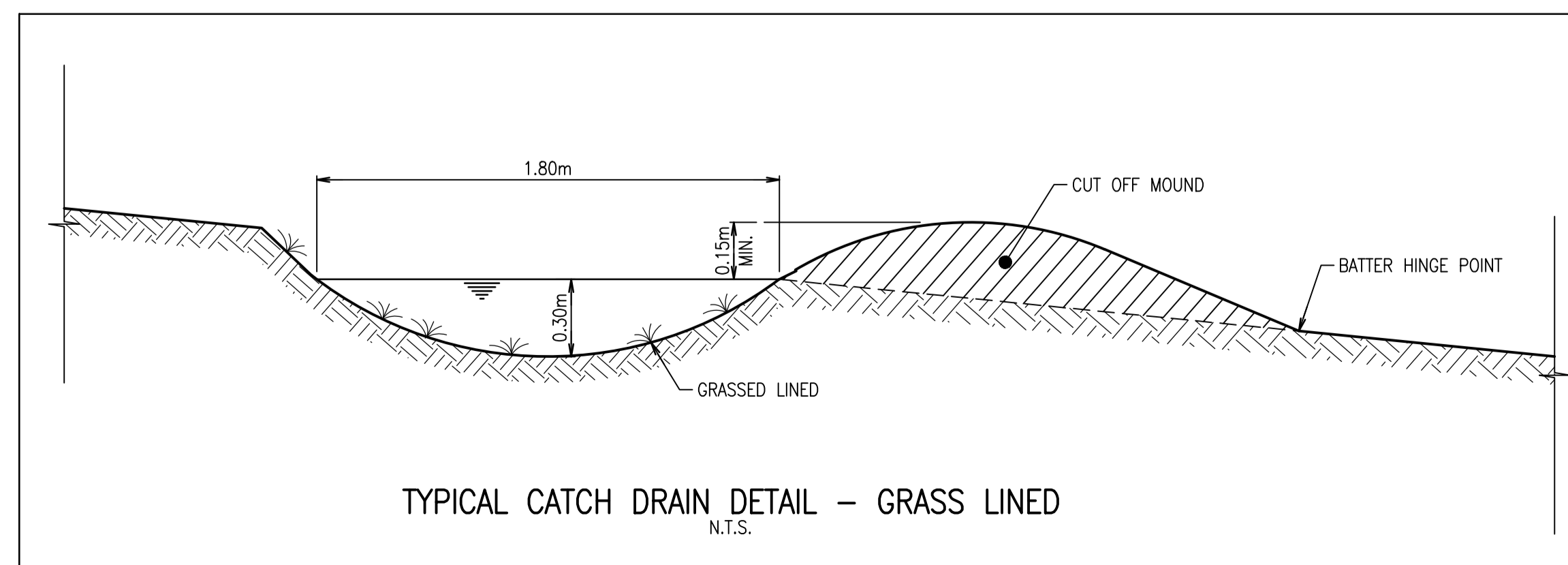
- A1. THIS SOIL AND WATER MANAGEMENT PLAN IS TO BE READ IN CONJUNCTION WITH OTHER ENGINEERING PLANS RELATING TO THIS DEVELOPMENT.
- A2. CONTRACTORS WILL ENSURE THAT ALL SOIL AND WATER MANAGEMENT WORKS ARE UNDERTAKEN AS INSTRUCTED IN THIS SPECIFICATION AND CONSTRUCTED FOLLOWING THE CITY OF SYDNEY COUNCIL REQUIREMENTS AND TO LANDCOM - MANAGING URBAN STORMWATER: SOIL AND CONSTRUCTION, 4th EDITION, MAR 2004.
- A3. REFER GEOTECHNICAL REPORT FOR EARTHWORKS AND PARAMETERS.
- A4. ALL CONSTRUCTION VEHICLES SHALL ENTER AND EXIT THE SITE VIA THE APPROVED CONSTRUCTION ENTRY/EXIT ROUTE.
- A5. ALL VEHICLES LEAVING THE SITE SHALL BE CLEANED AND INSPECTED BEFORE LEAVING.
- A6. MAINTAIN ALL STORMWATER PIPES AND PITS CLEAR OF DEBRIS AND SEDIMENT. INSPECT STORMWATER SYSTEM AND CLEAN OUT AFTER EACH STORM EVENT.
- A7. CLEAN OUT ALL EROSION AND SEDIMENT CONTROL DEVICES AFTER EACH STORM EVENT.
- A8. ALL DISTURBED AREAS SHALL BE REVEGETATED AS SOON AS THE RELEVANT WORKS HAVE BEEN COMPLETED.
- A9. KERB INLET SOCKS TO BE PROVIDED ON DOWNSTREAM PITS.

SITE MAINTENANCE NOTES:

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

SEDIMENT CONTROL NOTES:

- SC1. SEDIMENT FENCES WILL BE INSTALLED AS SHOWN ON THE PLAN AND ELSEWHERE AT THE DISCRETION OF THE SITE CONTRACTOR TO CONTAIN SOIL AS NEAR AS POSSIBLE TO THEIR SOURCE.
- SC2. SEDIMENT FENCES WILL NOT HAVE CATCHMENT AREAS EXCEEDING 900 SQUARE METRES AND HAVE A STORAGE DEPTH OF AT LEAST 0.6 METRES.
- SC3. SEDIMENT FENCES SHOULD LAST FOR UP TO SIX MONTHS BUT REQUIRE REGULAR MAINTENANCE AND WEEKLY CHECKS. IT MUST REMAIN VERTICAL AND KEYED INTO THE SOIL. DAMAGED FENCES MUST BE REPAIRED PROMPTLY.
- SC4. SEDIMENT FENCES NEED TO BE TRENCHED IN AT LEAST 150mm AND BURIED SO THE WATER FLOWS THROUGH AND NOT UNDERNEATH.
- SC5. SEDIMENT REMOVED FROM ANY TRAPPING DEVICES WILL BE RELOCATED WHERE FURTHER POLLUTION TO DOWNSLOPE LANDS AND WATERWAYS CANNOT OCCUR.
- SC6. STOCKPILES ARE NOT TO BE LOCATED WITHIN 5 METERS OF HAZARD AREAS INCLUDING AREAS OF HIGH VELOCITY FLOWS SUCH AS WATERWAYS, PAVED AREAS AND DRIVEWAYS.
- SC7. WATER WILL BE PREVENTED FROM DIRECTLY ENTERING THE PERMANENT DRAINAGE SYSTEM UNLESS THE CATCHMENT AREA HAS BEEN PERMANENTLY LANDSCAPED AND/OR WATER HAS BEEN TREATED BY AN APPROVED DEVICE.
- SC8. TEMPORARY SEDIMENT TRAPS WILL REMAIN IN PLACE UNTIL AFTER THE LANDS THEY ARE PROTECTING ARE COMPLETELY REHABILITATED.
- SC9. ACCESS TO SITES SHOULD BE STABILIZED TO REDUCE THE LIKELIHOOD OF VEHICLES TRACKING SOIL MATERIALS ONTO PUBLIC ROADS AND ENSURE ALL-WEATHER ENTRY/EXIT.



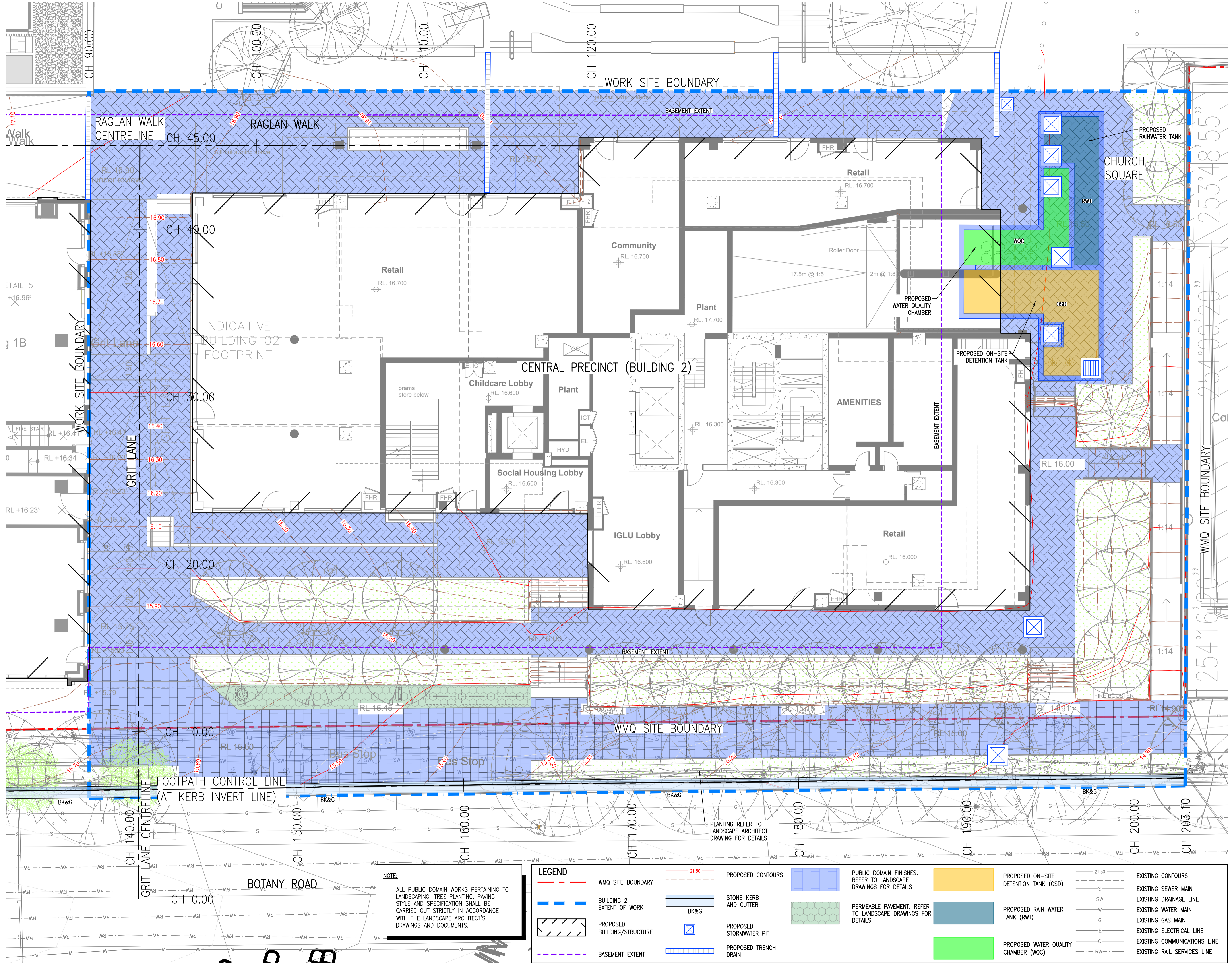
Project
WATERLOO METRO QUARTER DEVELOPMENT

| | |
|----------------|-------------|
| Project number | Size check |
| 18445 | 25mm |
| Checked ML | Approved AA |
| Sheet size A1 | Scale NTS |

Sheet title
EROSION AND SEDIMENT CONTROL DETAILS

Status
FOR APPROVAL

Sheet number
WMQ-BD2-RBG-CV-DRG-C8218 A



NOTE:
ALL PUBLIC DOMAIN WORKS PERTAINING TO LANDSCAPING, TREE PLANTING, PAVING STYLE AND SPECIFICATION SHALL BE CARRIED OUT STRICTLY IN ACCORDANCE WITH THE LANDSCAPE ARCHITECT'S DRAWINGS AND DOCUMENTS.

| LEGEND | |
|--------|---|
| | WMQ SITE BOUNDARY |
| | BUILDING 2 EXTENT OF WORK |
| | PROPOSED BUILDING/STRUCTURE |
| | BASEMENT EXTENT |
| | PROPOSED CONTOURS |
| | STONE KERB AND GUTTER |
| | PROPOSED STORMWATER PIT |
| | PROPOSED TRENCH DRAIN |
| | PUBLIC DOMAIN FINISHES. REFER TO LANDSCAPE DRAWINGS FOR DETAILS |
| | PERMEABLE PAVEMENT. REFER TO LANDSCAPE DRAWINGS FOR DETAILS |
| | PROPOSED ON-SITE DETENTION TANK (OSD) |
| | PROPOSED RAIN WATER TANK (RWT) |
| | PROPOSED WATER QUALITY CHAMBER (WQC) |
| | 21.50 EXISTING CONTOURS |
| | S EXISTING SEWER MAIN |
| | SW EXISTING DRAINAGE LINE |
| | W EXISTING WATER MAIN |
| | G EXISTING GAS MAIN |
| | E EXISTING ELECTRICAL LINE |
| | C EXISTING COMMUNICATIONS LINE |
| | RW EXISTING RAIL SERVICES LINE |

Recent revision history
 # Status Description Date
 A ISSUED FOR COORDINATION 03.09.25

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SCALE 1:100
 1 0 1 2 3 4m

Key Plan

North Point

Client
WATERLOO COLLECTIVE
 JOHN HOLLAND | mirvac

NSW GOVERNMENT | sydney METRO

Consultant
Robert Bird Group
 on company

Project
 WATERLOO METRO QUARTER DEVELOPMENT

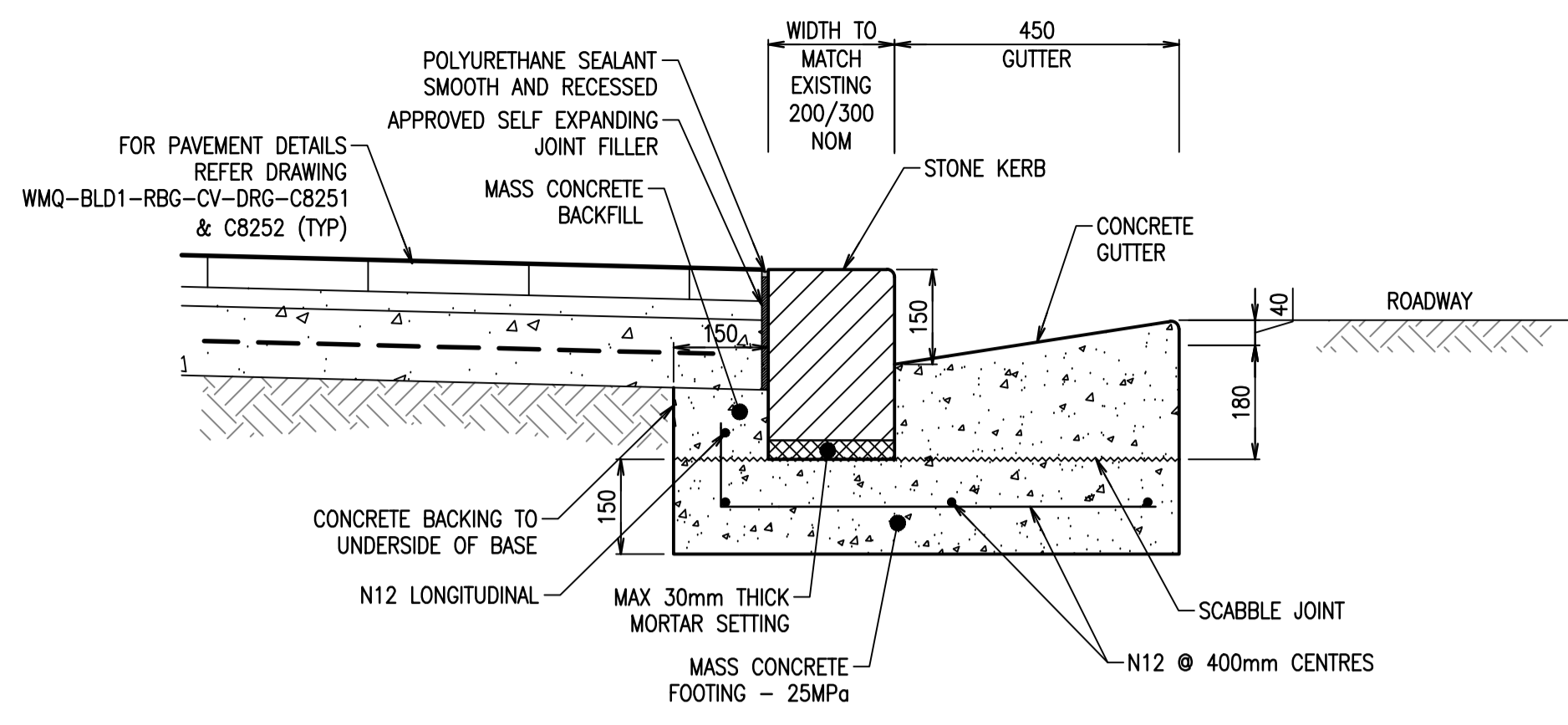
Project number 18445 Size check 25mm
 Checked ML Approved AA Sheet size A1 Scale 1:100

Sheet title
 GENERAL ARRANGEMENT PLAN BUILDING 2

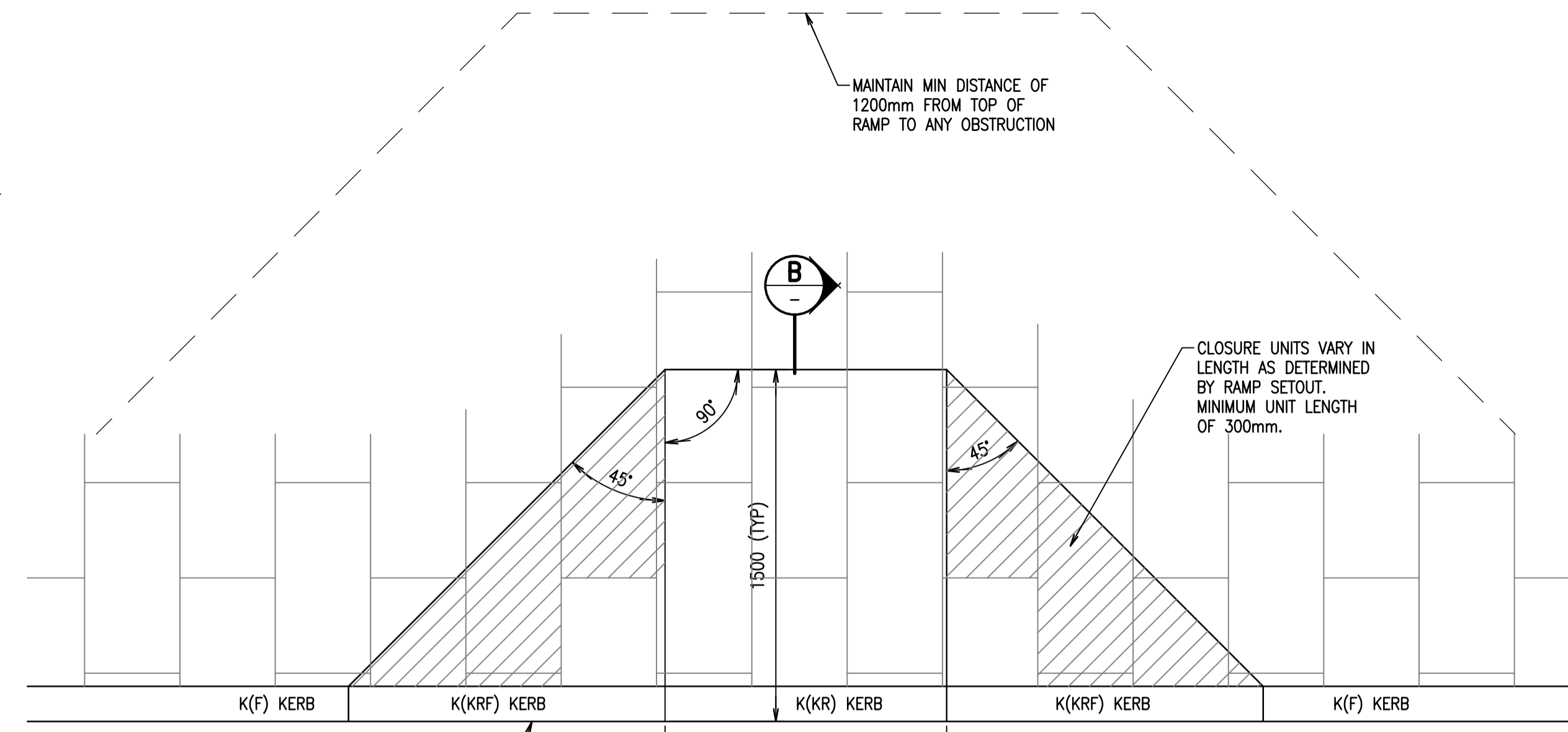
Status
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Sheet number WMQ-BD2-RBG-CV-DRG-C8221 A Revision

Date generated 9/9/2025 3:15:00 PM P:\2018 JOBS\18445B WATERLOO OSDS WORKING DRGS & BIM MODELS\CV\AUTOCAD\DRAWINGS\BUILDING 2\WMQ-BD2-RBG-CV-DRG-C8221.DWG

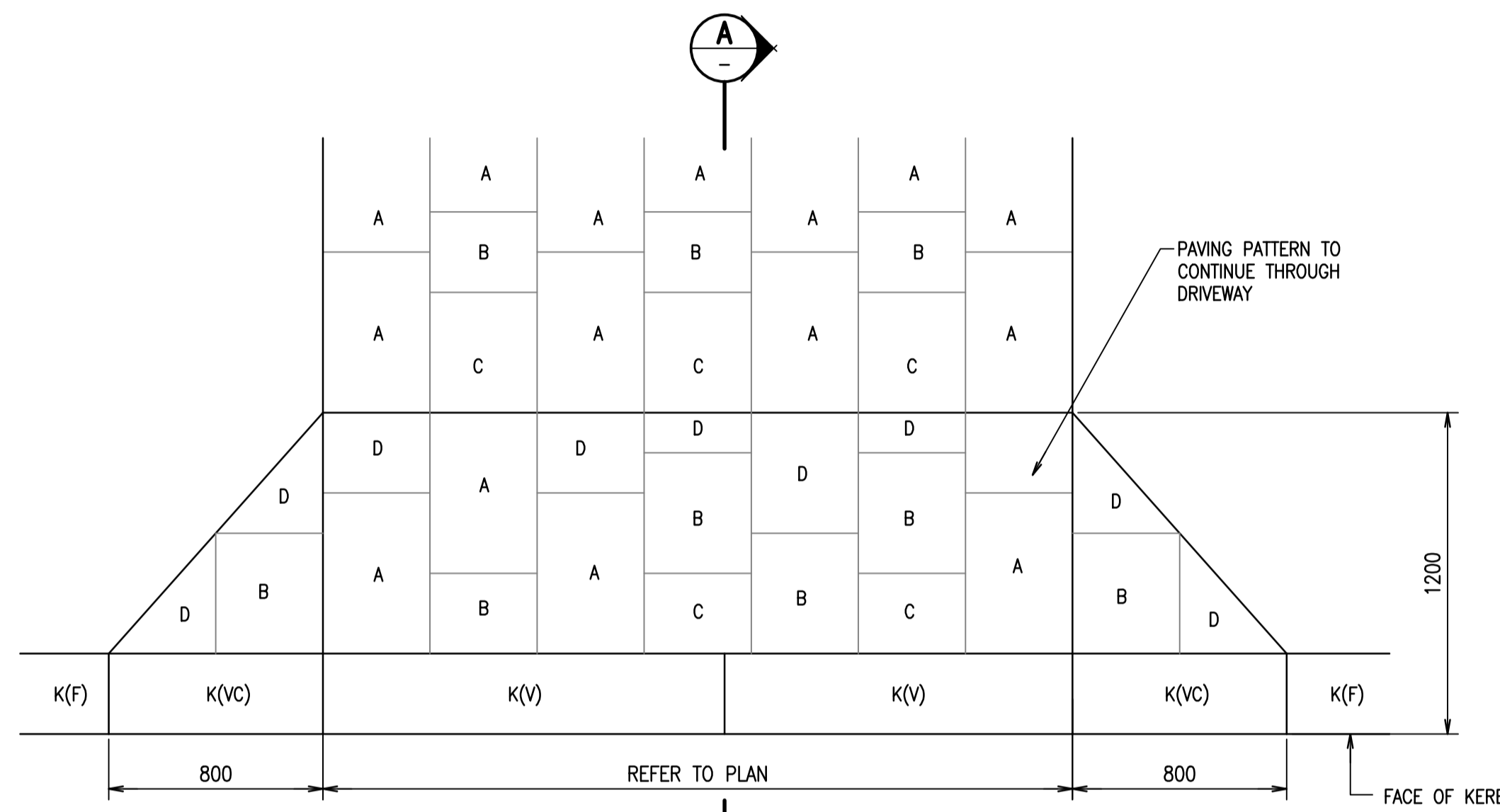


BLUESTONE KERB WITH CONCRETE GUTTER (BK&G)
SCALE 1:10



KERB TYPES:
 TYPE K(F): FULL HEIGHT
 TYPE K(KRF): PEDESTRIAN CHAMFERED TO FALL
 TYPE K(KR): PEDESTRIAN CROSSOVER
 REFER TO CITY OF SYDNEY STANDARD DRAWING 2.3.6 - CONCRETE UNIT PAVING PEDESTRIAN RAMP FOR SPECIFICATION DETAILS

PEDESTRIAN RAMP IN CONCRETE PAVER FOOTPATH
SCALE 1:20

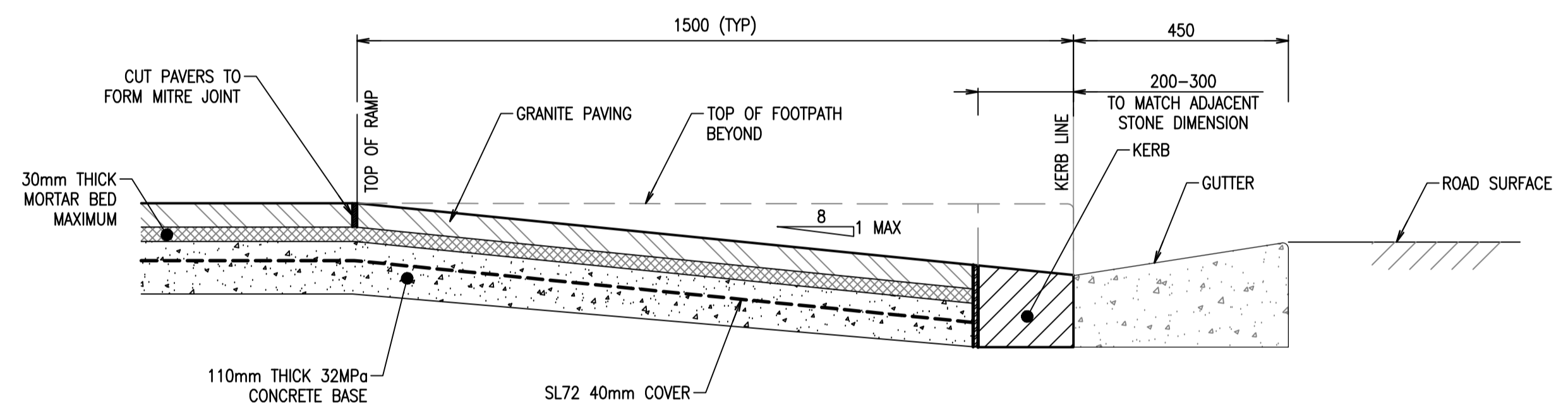


PAVER SIZES:
 TYPE A: 600x400x60mm
 TYPE B: 450x400x60mm
 TYPE C: 300x400x60mm
 TYPE D: SPECIAL CUT

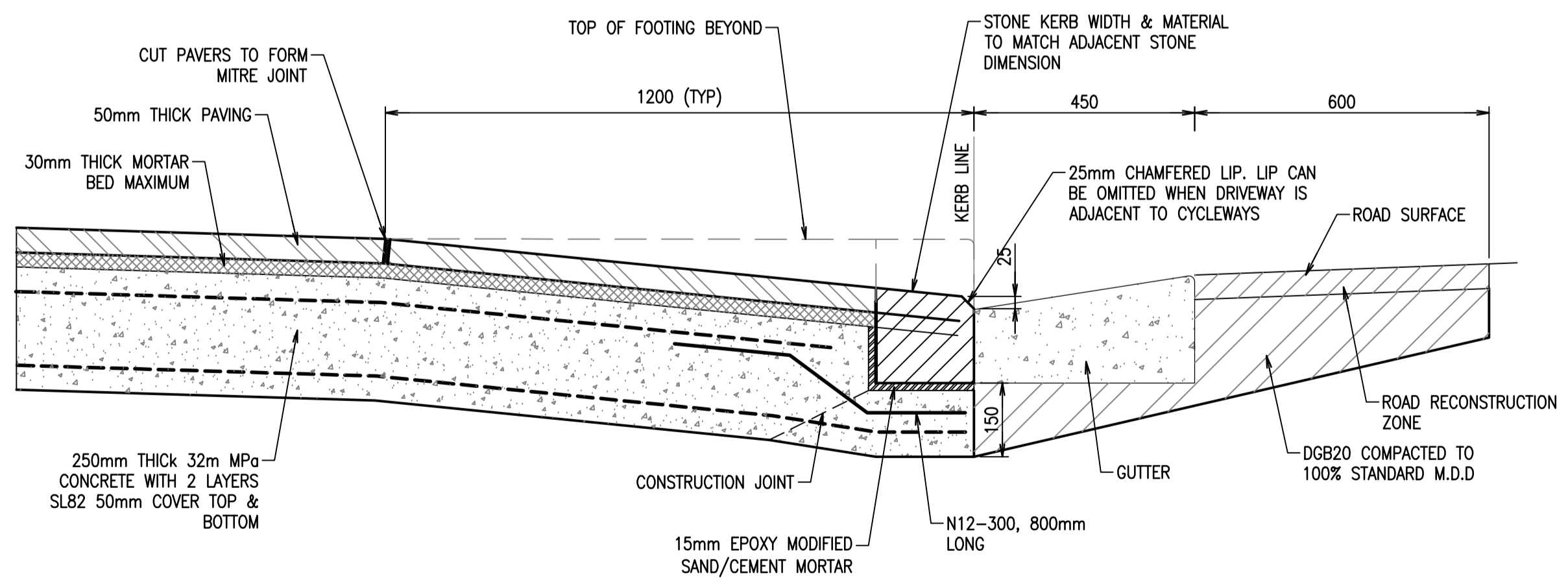
KERB TYPES:
 TYPE K(F): FULL HEIGHT
 TYPE K(V): VEHICULAR CHAMFERED TO FALL
 TYPE K(V): VEHICULAR CROSSOVER

VEHICULAR CROSSING PLAN
SCALE 1:20

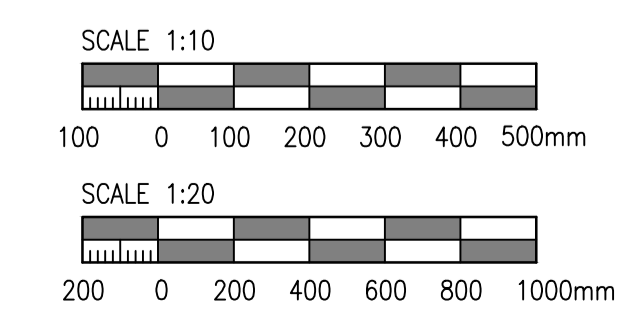
REFER TO CITY OF SYDNEY STANDARD DRAWING 2.3.9 - CONCRETE UNIT PAVING VEHICULAR CROSSING FOR SPECIFICATION DETAILS



PEDESTRIAN RAMP IN CONCRETE PAVER FOOTPATH SECTION (B)
SCALE 1:10



LAY BACK SECTION - CONCRETE VEHICULAR CROSSING (A)
SCALE 1:10

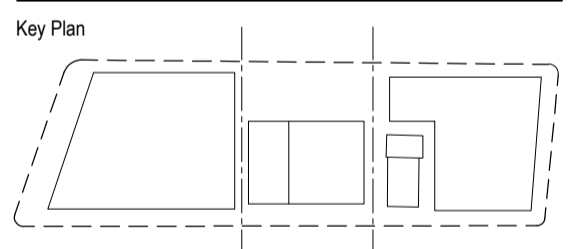


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|-------------------------|-------------------------|-------------|----------|
| A | ISSUED FOR COORDINATION | | 02.09.25 |

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Client

WATERLOO COLLECTIVE
JOHN HOLLAND | mirvac

NSW GOVERNMENT | **sydney METRO**

Consultant

RobertBirdGroup
an company

Project
WATERLOO METRO QUARTER DEVELOPMENT

| Project number | Size check |
|----------------|----------------|
| 18445 | 25mm |
| Checked ML | Approved AA |
| Sheet size A1 | Scale AS SHOWN |

Sheet title
CIVIL DETAILS

Status
FOR APPROVAL

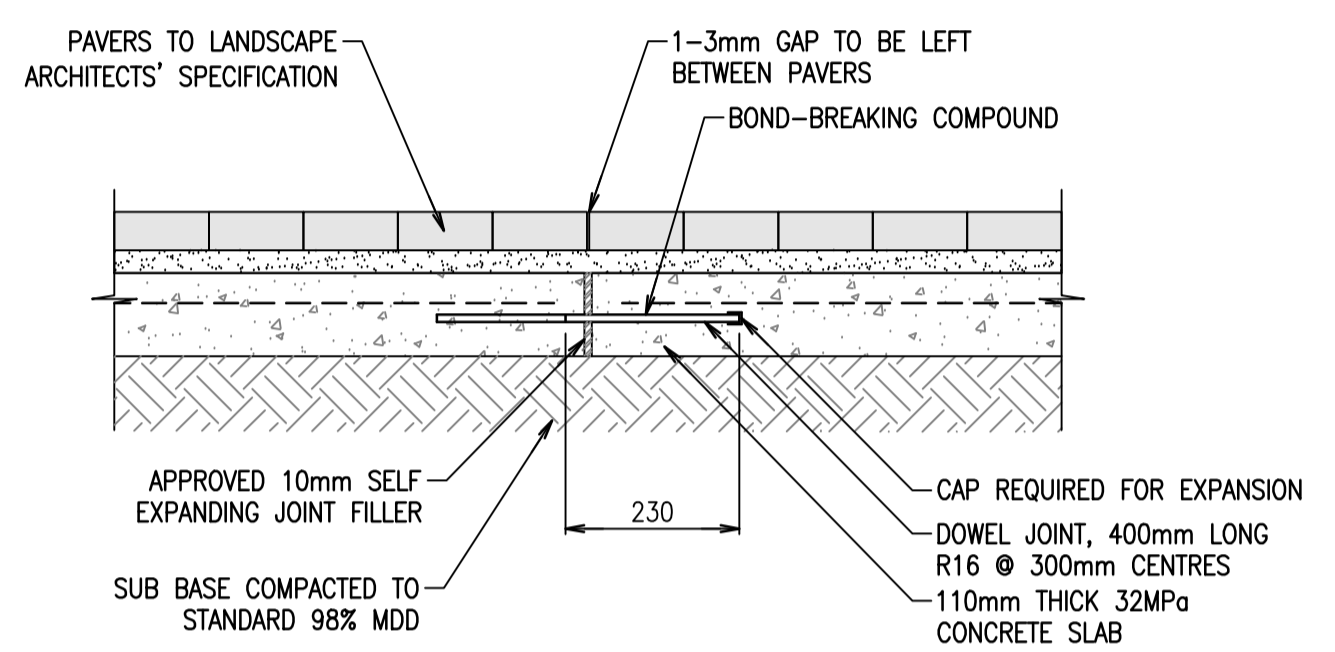
Sheet number
WMQ-BD2-RBG-CV-DRG-C8226

Revision
A

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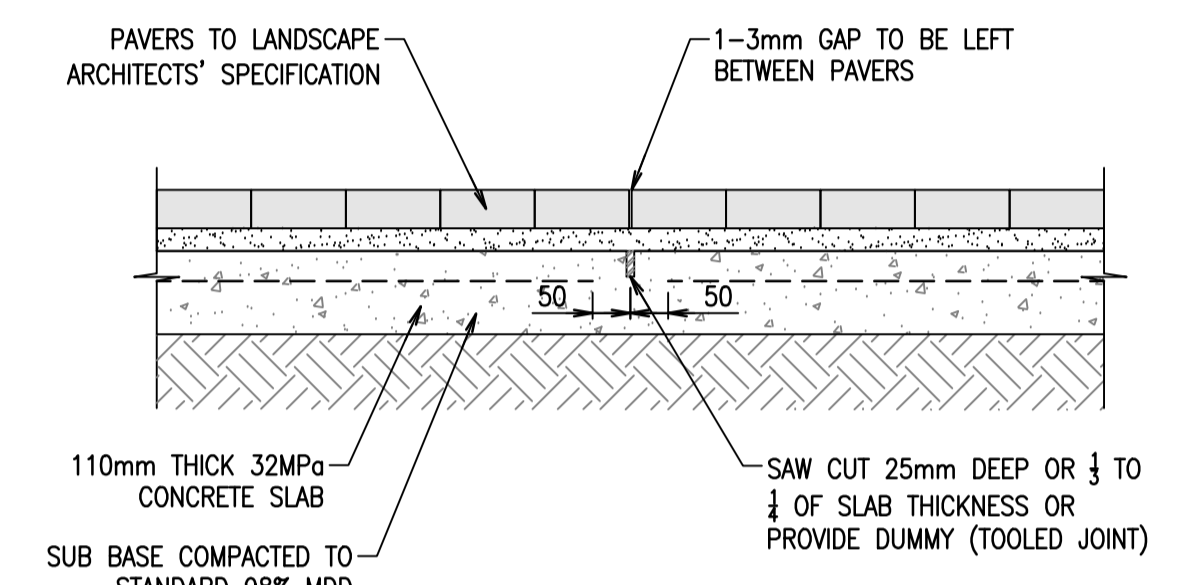
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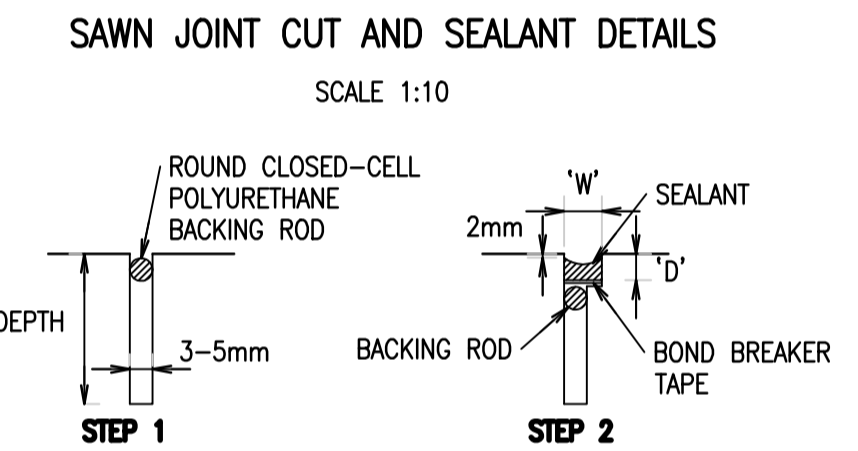


EXPANSION JOINT (E.J.)
SCALE 1:10

NOTE: BOND-BREAKING COMPONENT AND END CAP MAY BE REPLACED WITH A PURPOSE-MADE DOWEL SLEEVE.



CONTRACTION/CONTROL JOINT
SCALE 1:10



SAWN JOINT CUT AND SEALANT DETAILS
SCALE 1:10



MOVEMENT JOINT SEALANT DETAILS
(FOR DCJ, DEJ, KJ & DDJ JOINTS)

STEP 1:
INITIAL CUT TO DEPTH 't/4' ('t/3 FOR STEEL FIBRE REINFORCED CONCRETE) WITHIN 1 DAY OF POURING CONCRETE. INSERT POLYURETHANE BACKING ROD TO PREVENT INGRESS OF DIRT UNTIL SEALANT APPLIED (MIN 28 DAYS LATER). ROD DIAMETER TO BE MIN. 1.25 x CUT WIDTH.

STEP 2:
REMOVE ALL DIRT FROM SAW CUT, USING HIGH PRESSURE COMPRESSED AIR. REPLACE BACKING ROD WITH LARGER DIAMETER IF LOOSE. PUSH BACKING ROD INTO SAW CUT 1mm BELOW DEPTH 'D'. IF NECESSARY, REMOVE AND REPLACE BACKING ROD. WIDEN SAW CUT TO WIDTH 'W' AND DEPTH 'D' WITH ADDITIONAL SAW CUT/CUTS. REMOVE ALL FOREIGN MATERIAL USING HIGH PRESSURE WATER WASH. DRY USING HIGH PRESSURE COMPRESSED AIR AND ALLOW ADDITIONAL 16 HRS TO DRY THOROUGHLY. INSTALL POLYETHYLENE BOND BREAKER TAPE. PRIME FACES OF CUT CONCRETE (REFER TABLE BELOW) IN ACCORDANCE WITH MANUFACTURERS RECOMMENDATIONS.

STEPS:

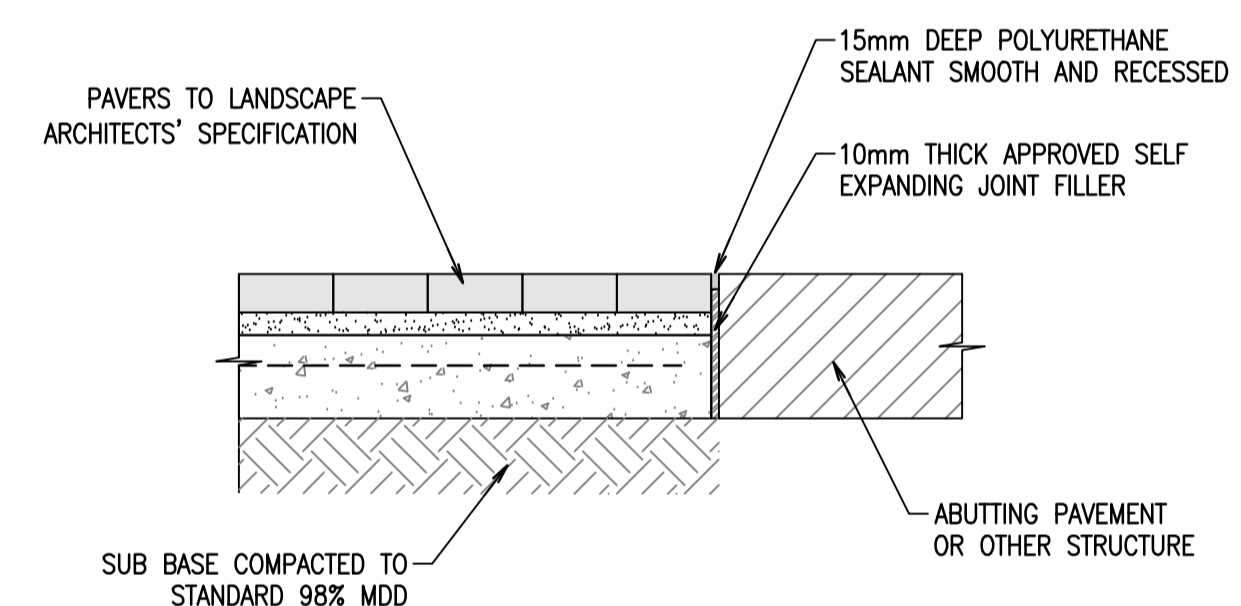
- FORM REBATE IN SLAB 2 AGAINST FACE OF SLAB 1.
- AFTER SLAB CURING PERIOD (MIN. 28 DAYS) WASH OUT REBATE USING HIGH PRESSURE WATER. DRY USING HIGH PRESSURE COMPRESSED AIR AND ALLOW ADDITIONAL 16HRS TO DRY THOROUGHLY.
- INSTALL POLYETHYLENE BOND BREAKER TAPE FOR FULL WIDTH 'W'. FOR IJ, EJ AND DEJ JOINTS OMIT BOND BREAKER TAPE.
- PRIME FACES OF SIDES OF REBATE (REFER SEALANT TABLE)
- INSTALL SEALANT AS SPECIFIED (REFER SEALANT TABLE) IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.

| SEALANT DIMENSIONS | | |
|----------------------|------------------------|------------------------|
| MEAN SLAB LENGTH (m) | SEALANT WIDTH 'W' (mm) | SEALANT DEPTH 'D' (mm) |
| ≤4 | 7 ± 1 | 7 ± 1 |
| 5 | 9 ± 2 | 7 ± 1 |
| 6 | 9 ± 2 | 7 ± 1 |

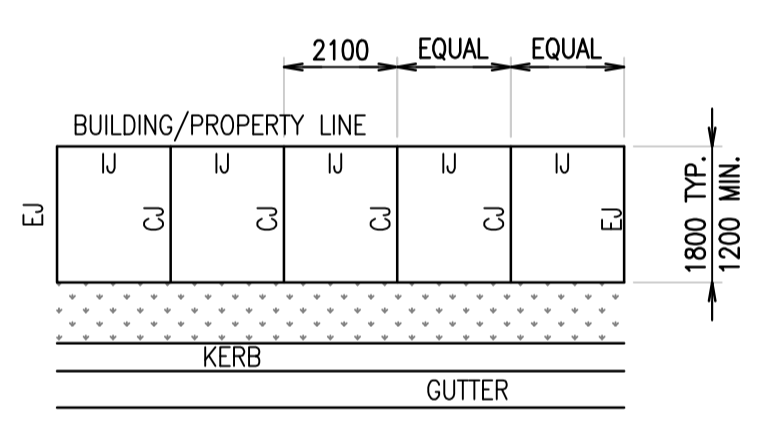
| LOCATION | SEALANT | PRIMER |
|--------------------------------|-------------------|------------------|
| AREAS SUBJECT TO FUEL SPILLAGE | THIOFLEX 600 | FOSROC PRIMER 14 |
| OTHER EXTERNAL PAVEMENTS | EMER-ROAD SEAL SL | FOSROC PRIMER 10 |

ALTERNATIVE SEALANTS MUST HAVE

- MOVEMENT ACCOMMODATION FACTOR +/- 50%
- PRIMER TO MANUFACTURER'S SPECIFICATION
- INSTALLATION TO MANUFACTURER'S RECOMMENDATIONS
- PRIOR APPROVAL BY MANAGING CONTRACTOR.

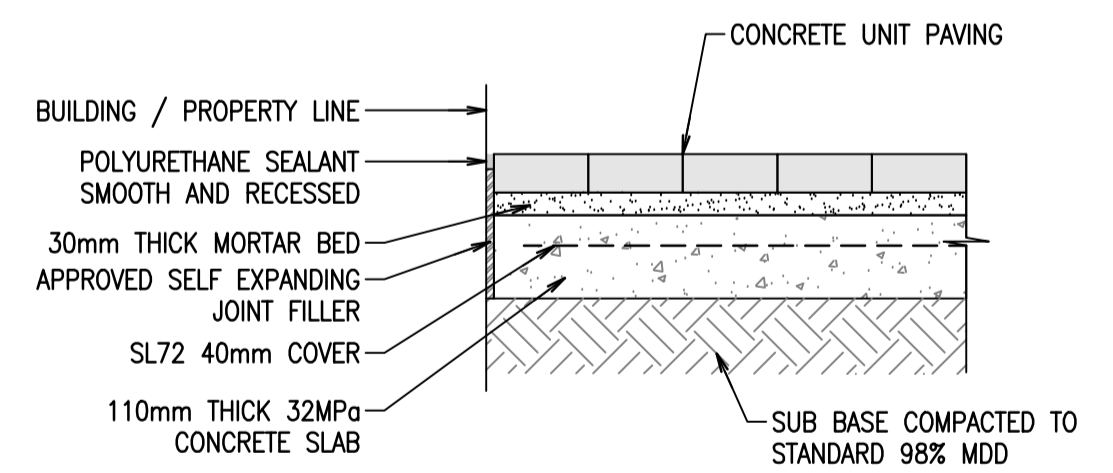


ISOLATION JOINT
SCALE 1:10

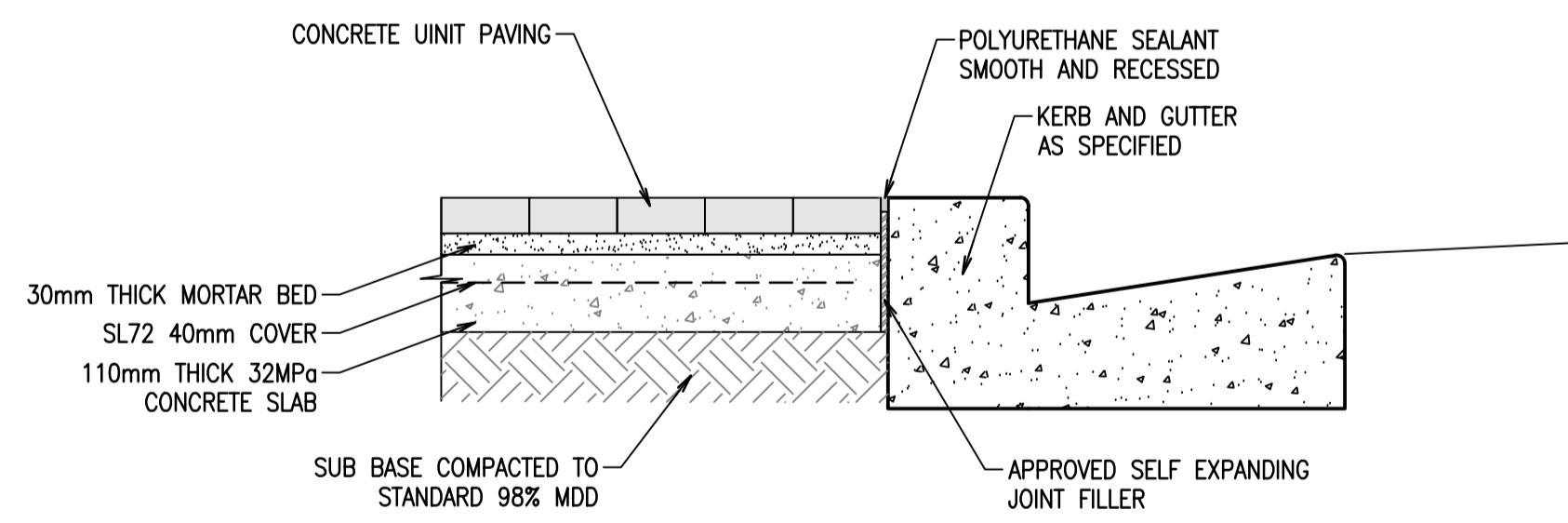


TYPICAL JOINTING
NTS

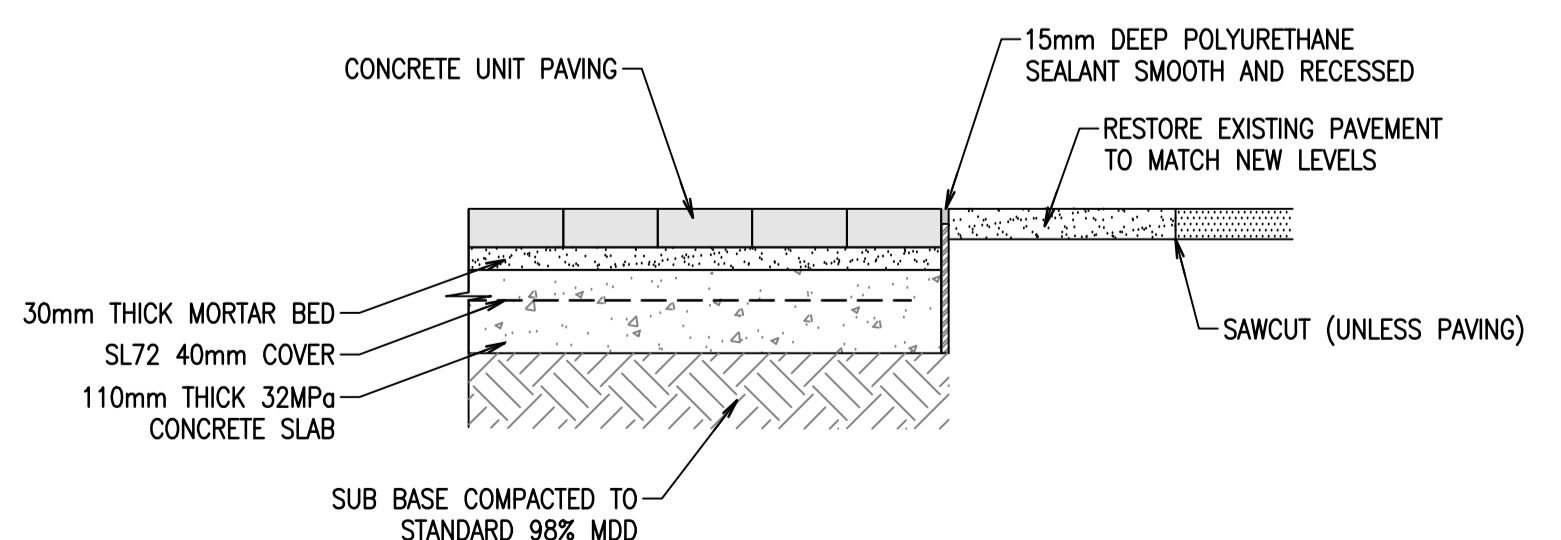
CJ: TOOLED JOINT
EJ: EXPANSION JOINT



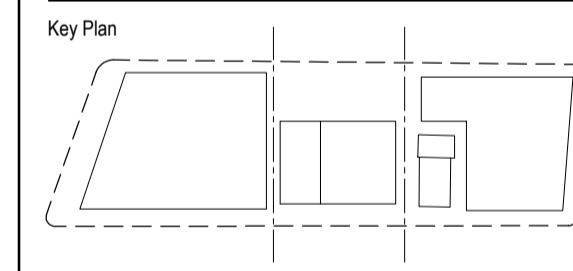
JUNCTION WITH BUILDING
SCALE 1:10



JUNCTION WITH BACK OF KERB
SCALE 1:10



JUNCTION WITH EXISTING PAVEMENT
SCALE 1:10



Client

North Point

WATERLOO COLLECTIVE

JOHN HOLLAND | mirvac

NSW GOVERNMENT

sydney METRO

Consultant

RobertBirdGroup
an company

Project
WATERLOO METRO QUARTER DEVELOPMENT

Project number
18445

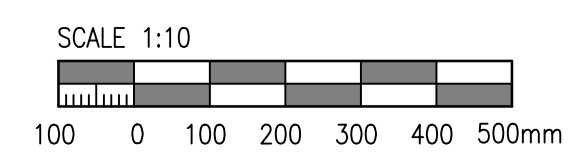
Size check
25mm

Checked ML AA A1 1:100

Sheet title
PAVEMENT AND JOINTING DETAILS

Status
FOR APPROVAL

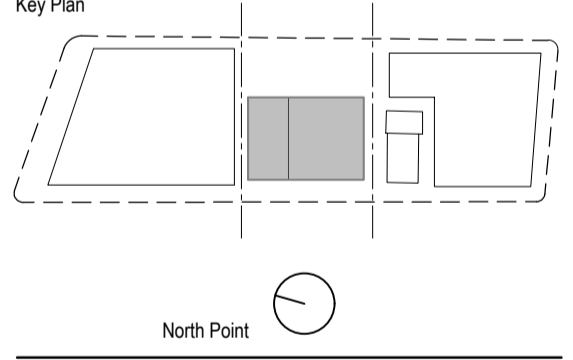
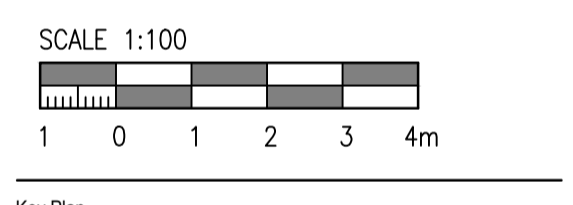
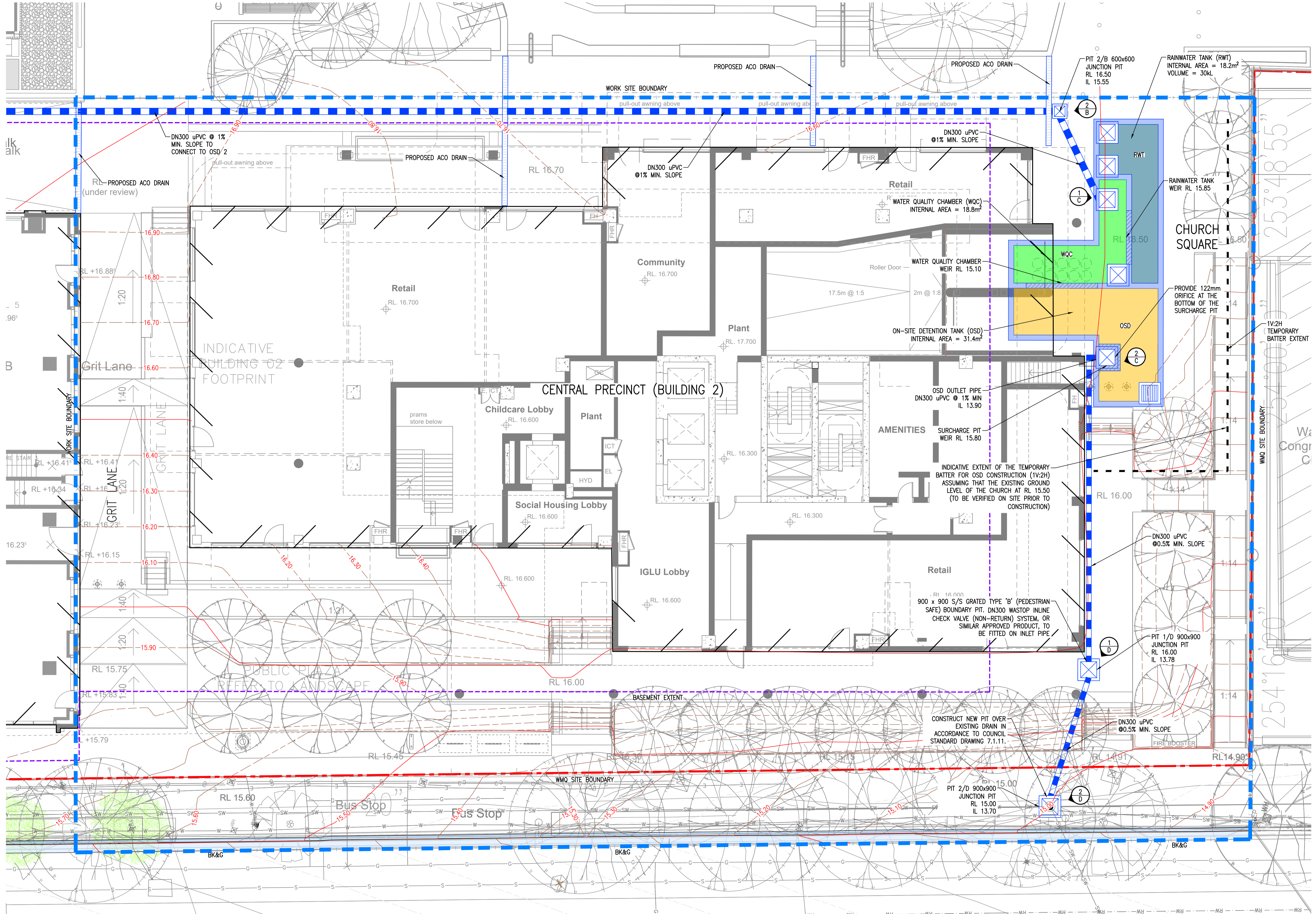
Sheet number
WMQ-BD2-RBG-CV-DRG-C8256 A



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Client
WATERLOO COLLECTIVE
 JOHN HOLLAND | mirvac

NSW GOVERNMENT | **sydney METRO**

Consultant
RobertBirdGroup
 an on company

Project
 WATERLOO METRO QUARTER DEVELOPMENT

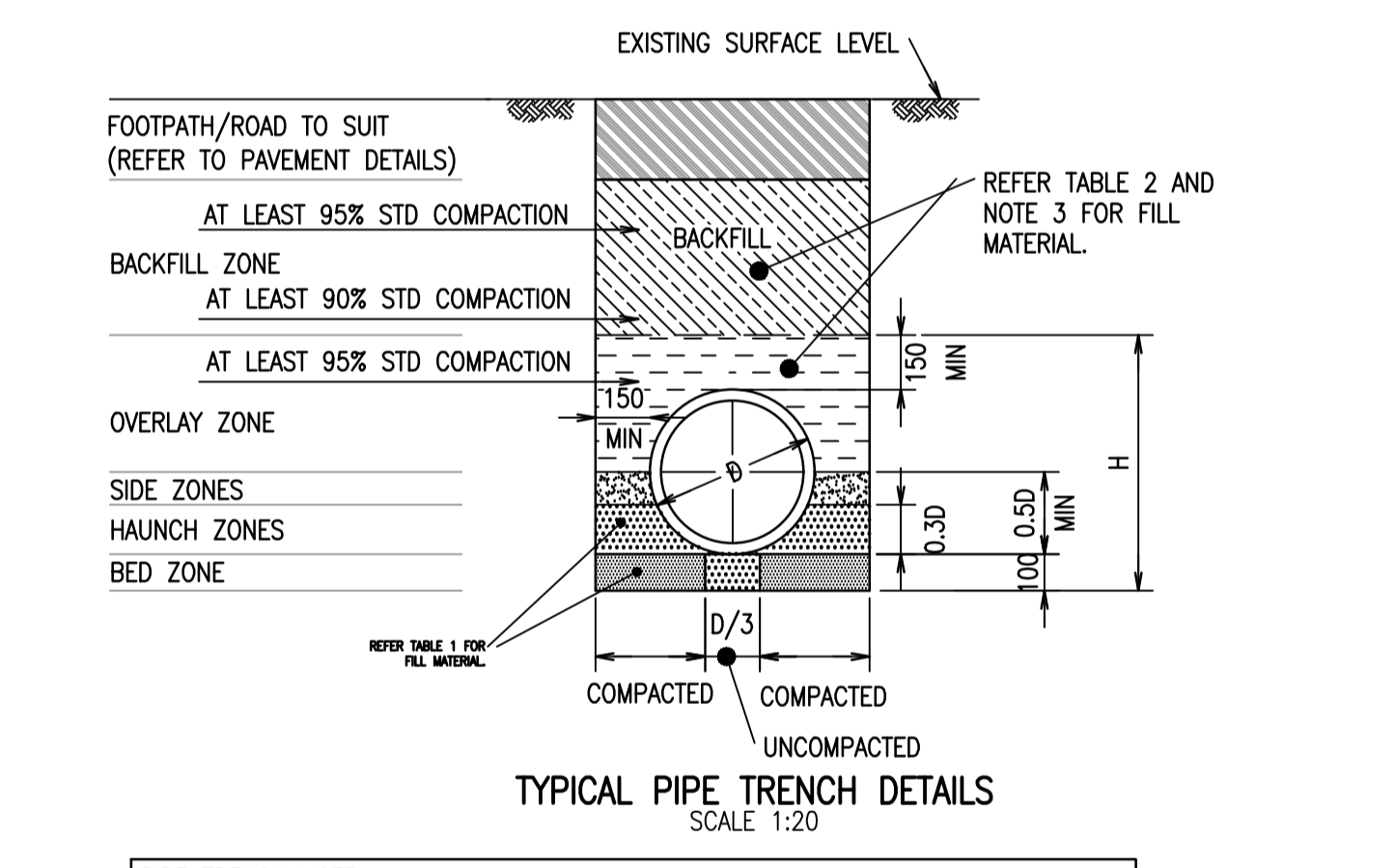
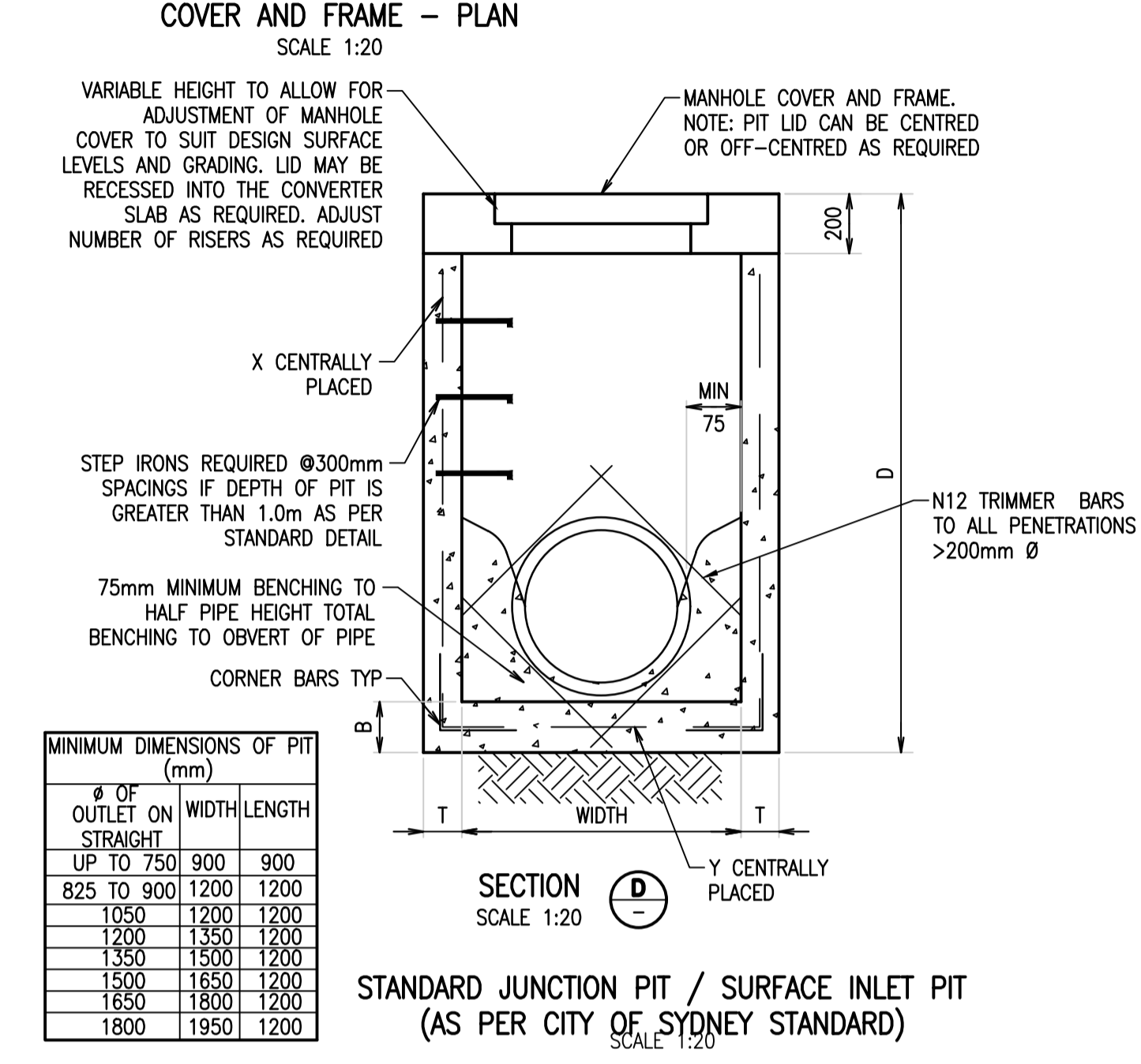
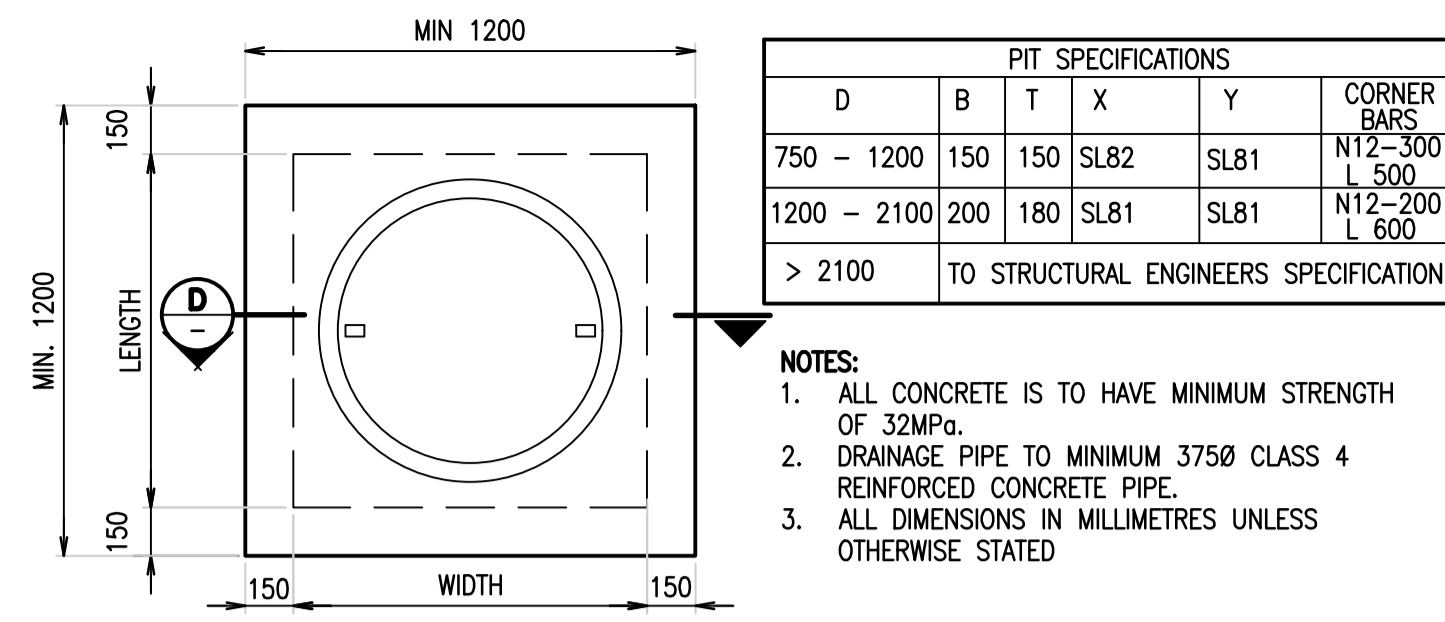
Project number 18445
 Checked ML Approved AA
 Size check 25mm
 Sheet size A1 Scale 1:100

Sheet title
STORMWATER MANAGEMENT PLAN BUILDING 2

Status
FOR APPROVAL
 Sheet number **WMQ-BD2-RBG-CV-DRG-C8261** A

OSD 2
 DEPTH INTERNAL = 1.9m
 BASE LEVEL = RL 14.1
 SLAB UNDERSIDE = RL 13.7
 EFFECTIVE DEPTH = 1.7m
 (1% AEP WATER DEPTH)

| LEGEND | |
|--------|------------------------------|
| | WMQ SITE BOUNDARY |
| | BUILDING 2 EXTENT OF WORK |
| | PROPOSED BUILDING/STRUCTURE |
| | BASEMENT EXTENT |
| | PROPOSED CONTOURS |
| | STONE KERB AND GUTTER |
| | BK&G |
| | PROPOSED STORMWATER PIT |
| | PROPOSED TRENCH DRAIN |
| | EXISTING CONTOURS |
| | EXISTING SEWER MAIN |
| | EXISTING DRAINAGE LINE |
| | EXISTING WATER MAIN |
| | EXISTING GAS MAIN |
| | EXISTING ELECTRICAL LINE |
| | EXISTING COMMUNICATIONS LINE |
| | EXISTING RAIL SERVICES LINE |



PIPE TRENCH NOTE:

- MATERIAL FOR FILL AND PIPE SUPPORT INCLUDING BEDDING, HAUNCH AND SIDE ZONES, PIPE OVERLAY AND BACKFILL SHALL BE SELECT FILL CONSISTING OF FREE DRAINING GRANULAR MATERIAL HAVING A PARTICLE SIZE DISTRIBUTION, DETERMINED IN ACCORDANCE WITH AS1289.3.6.1. GRADING LIMITS FOR SELECT FILL SHALL BE IN ACCORDANCE WITH AS3725 AS TABULATED IN TABLE 1 & TABLE 2.
- REFER TO COS COUNCIL B10 STORMWATER DRAINAGE SPECIFICATION FOR FILL MATERIAL FOR STORMWATER TRENCHES DETAILS.
- FILL MATERIAL FOR PIPE OVERLAY AND PIPE BACKFILL ZONE SHALL BE OBTAINED WHICH IS FREE FROM STONES GREATER THAN 100mm AND WITH NOT MORE THAN 20% OF STONES BETWEEN 75mm AND 100mm IN SIZE.

| TABLE 1: GRADING LIMITS FOR SELECT FILL IN BED AND HAUNCH ZONES | | TABLE 2: GRADING LIMITS FOR SELECT FILL IN SIDE ZONES | |
|---|--------------------|---|--------------------|
| SIEVE SIZE (mm) | WEIGHT PASSING (%) | SIEVE SIZE (mm) | WEIGHT PASSING (%) |
| 19.0 | 100 | 75.0 | 100 |
| 2.36 | 100-50 | 9.5 | 100-50 |
| 0.60 | 90-20 | 2.36 | 100-30 |
| 0.30 | 60-10 | 0.60 | 50-15 |
| 0.15 | 25-0 | 0.075 | 25-0 |
| 0.075 | 10-0 | | |

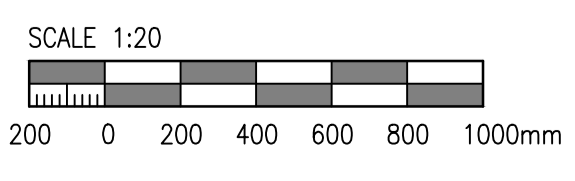
GRATE/COVER NOTES:

ALL CONCRETE IS TO HAVE MINIMUM STRENGTH OF 32MPa.

ALL SURFACE INLET PITS TO HAVE CLASS C GALVANISED STEEL BIKESAFE GRATE - CIVILCAST DI44M (450mm) OR DI99M (900mm) - OR APPROVED EQUIVALENT

ALL JUNCTION PITS TO HAVE CLASS C CAST IRON COVER - CIVILCAST DI44B ST (450mm) OR CI99B ST (900mm) OR APPROVED EQUIVALENT

BURIED JUNCTION PIT TO HAVE CLASS D CAST IRON COVER - CIVILCAST CI990 ST (900mm) OR APPROVED EQUIVALENT

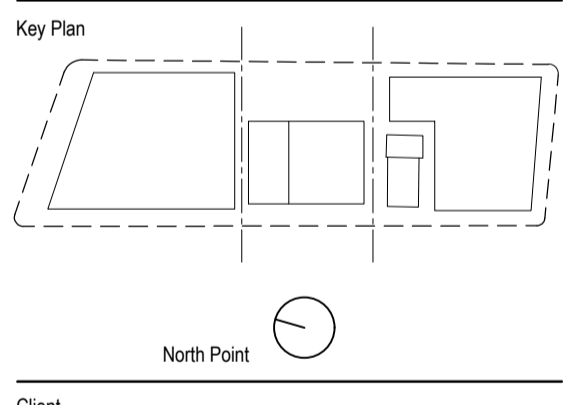


| Recent revision history | | |
|-------------------------|--------|-------------------------|
| # | Status | Description |
| A | | ISSUED FOR COORDINATION |

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Client
WATERLOO COLLECTIVE
 JOHN HOLLAND | mirvac

NSW GOVERNMENT | M sydney METRO

Consultant
RobertBirdGroup
 an company

Project
 WATERLOO METRO QUARTER DEVELOPMENT

Project number: 18445
 Checked: ML, Approved: AA, Sheet size: A1, Scale: 1:100

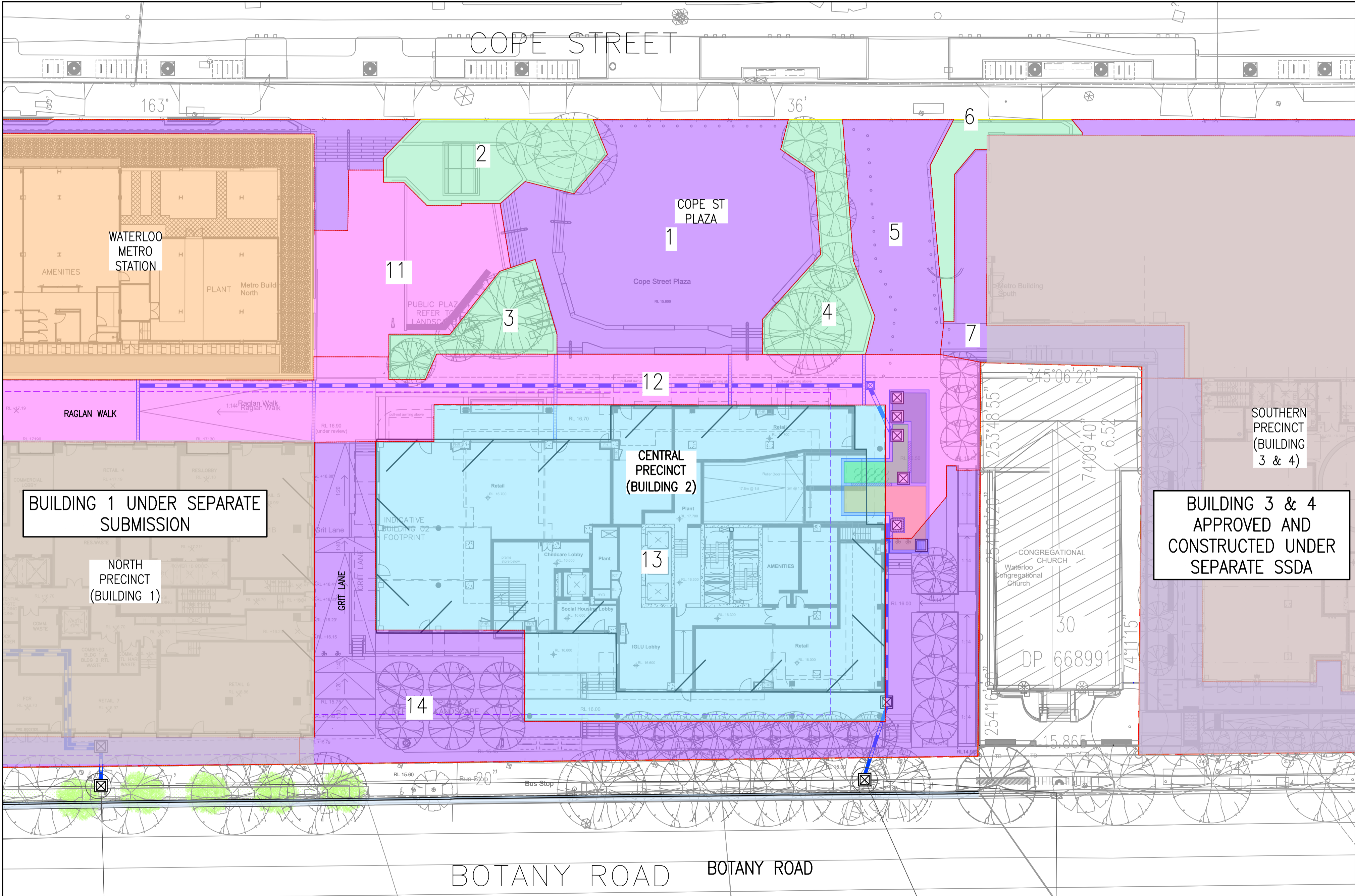
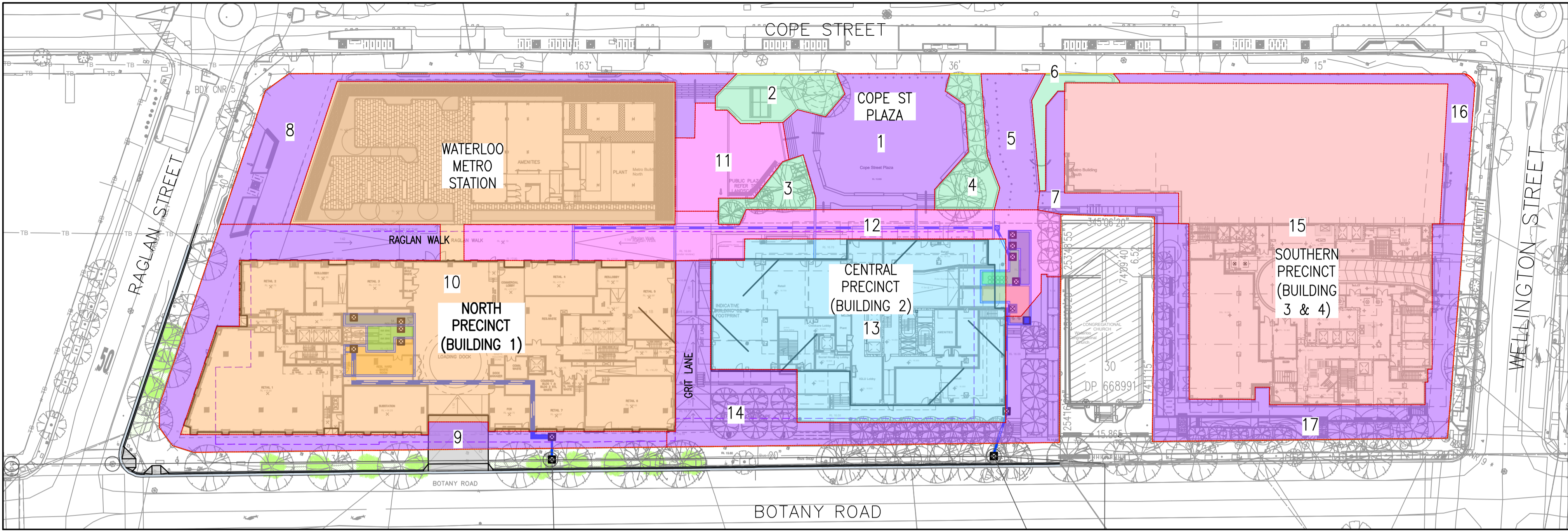
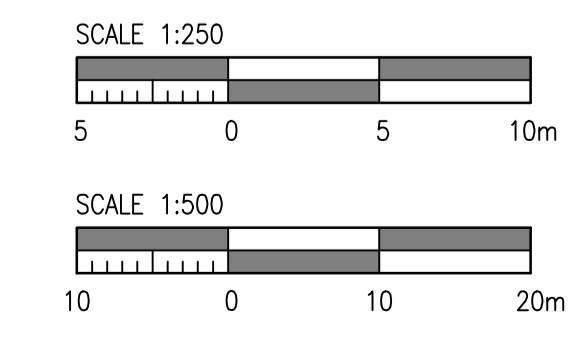
Sheet title
STORMWATER DETAILS

Status
FOR APPROVAL
 Sheet number: WMQ-BD2-RBG-CV-DRG-C8266, Revision: A

| OSD CATCHMENT | | | | |
|------------------------|----------------|--------------------|----------------------|-------------------------|
| | Catch No. | Bypass Area (sq.m) | Captured Area (sq.m) | Total Site Area (sq.m.) |
| Cope St | 1.000 | 563.310 | | |
| | 2.000 | | 148.400 | |
| | 3.000 | | 89.740 | |
| | 4.000 | | 135.860 | |
| | 5.000 | 190.210 | | |
| | 6.000 | | 57.930 | |
| Total | | 753.520 | 431.930 | 1185.450 |
| Station | 7.000 | 148.410 | | |
| | 8.000 | 437.840 | | |
| | Total | 586.250 | 0 | 586.250 |
| Building 1 | 9.000 | 664.890 | | |
| | 10.000 | | 3812.020 | |
| | Total | 664.890 | 3812.020 | 4476.910 |
| Building 2 | 11.000 | | 249.020 | |
| | 12.000 | | 670.010 | |
| | 13.000 | | 1415.850 | |
| | 14.000 | 746.000 | | |
| Total | 746.000 | 2334.880 | 3080.880 | |
| Building 3 & 4 | 15.000 | | 2695.670 | |
| | 16.000 | 203.880 | | |
| | 17.000 | 641.640 | | |
| Total | 845.520 | 2695.670 | 3541.190 | |
| TOTAL SITE AREA | | 7192.360 | 18549.000 | 12870.680 |

LEGEND

- WMQ SITE BOUNDARY
- BUILDING TO OSD TANK 1
- BUILDING TO OSD TANK 2
- BUILDING TO OSD TANK 3
- PUBLIC DOMAIN TO OSD TANK 2
- PUBLIC DOMAIN CATCHMENT TO COUNCIL SYSTEM (BYPASS)
- RAIN GARDEN CATCHMENT TO COUNCIL SYSTEM

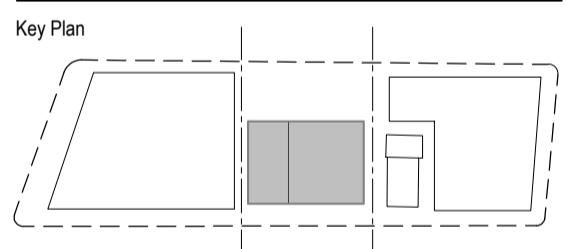


| Revision | Status | Description | Date |
|----------|-------------------------|-------------|----------|
| A | ISSUED FOR COORDINATION | | 03.09.25 |

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Client: **WATERLOO COLLECTIVE**
JOHN HOLLAND | mirvac

NSW GOVERNMENT | **sydney METRO**

Consultant: **RobertBirdGroup**
an on company

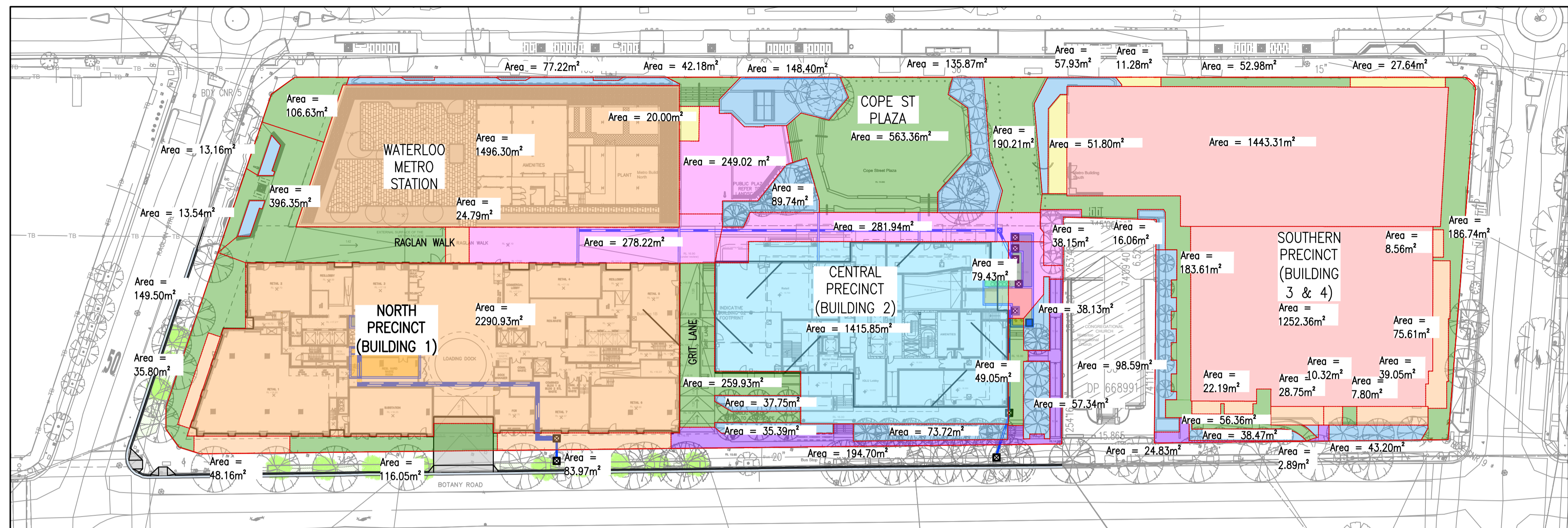
Project: **WATERLOO METRO QUARTER DEVELOPMENT**

| | | | |
|----------------|-------|------------|----------|
| Project number | 18445 | Size check | 25mm |
| Checked ML | AA | Sheet size | A1 |
| | | Scale | AS SHOWN |

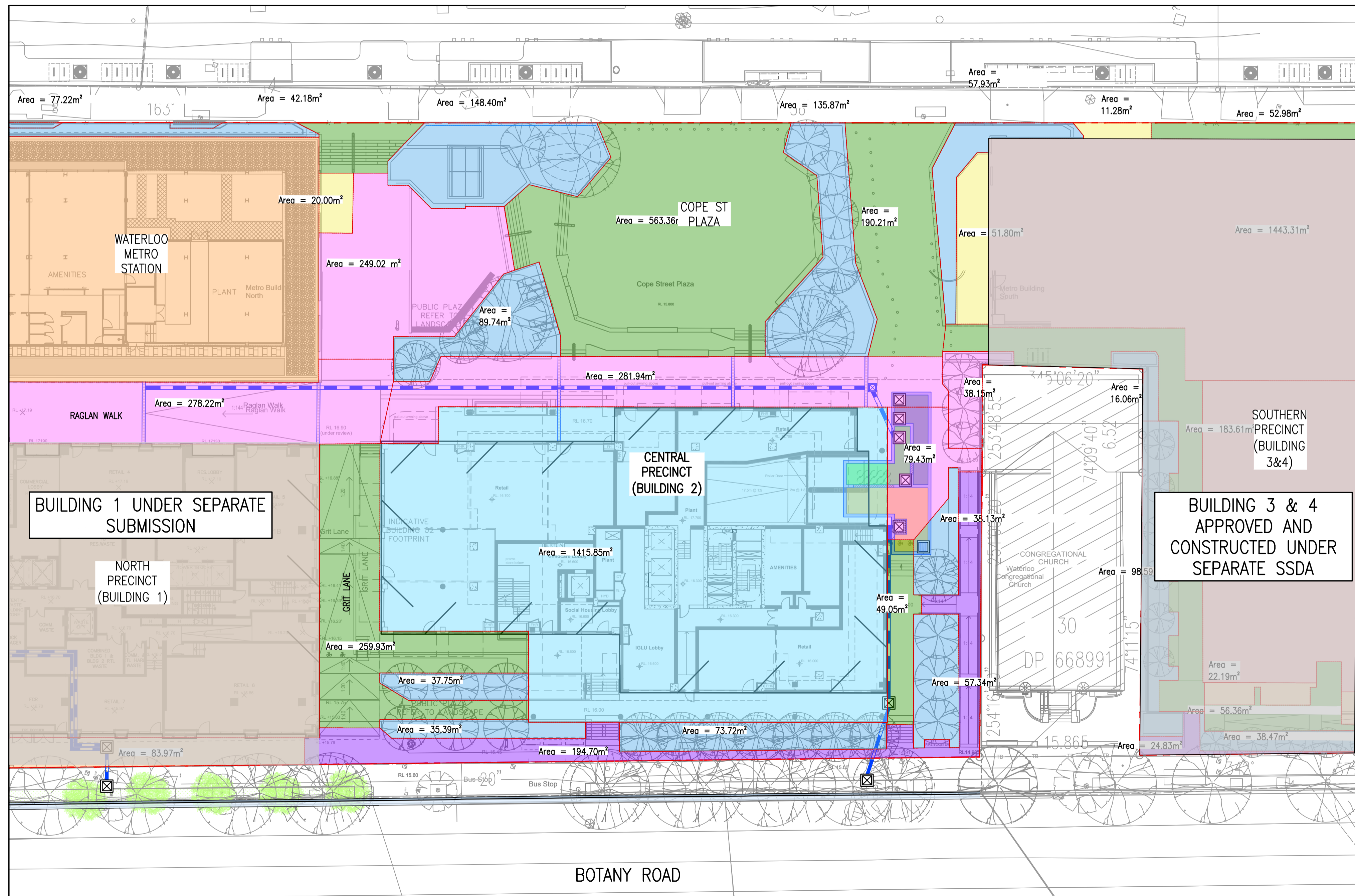
Sheet title: **STORMWATER CATCHMENT PLAN - OSD**

| | |
|--------------|--------------------------|
| Status | FOR APPROVAL |
| Sheet number | WMQ-BD2-RBG-CV-DRG-C8271 |
| Revision | A |

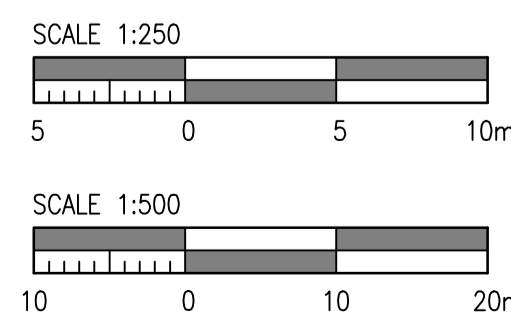
| LEGEND | |
|--------|---------------------------------|
| | WMQ SITE BOUNDARY |
| | BUILDING TO OSD TANK 1 |
| | BUILDING TO OSD TANK 2 |
| | BUILDING TO OSD TANK 3 |
| | BUILDING TO RAIN GARDEN |
| | BUILDING TO COUNCIL SYSTEM |
| | RAIN GARDEN TO COUNCIL SYSTEM |
| | PUBLIC DOMAIN TO COUNCIL SYSTEM |
| | PUBLIC DOMAIN TO RAIN GARDEN |
| | PUBLIC DOMAIN TO OSD TANK 2 |



WMQ OVERALL WSUD CATCHMENT PLAN
SCALE 1:500



BUILDING 2 WSUD CATCHMENT PLAN
SCALE 1:250

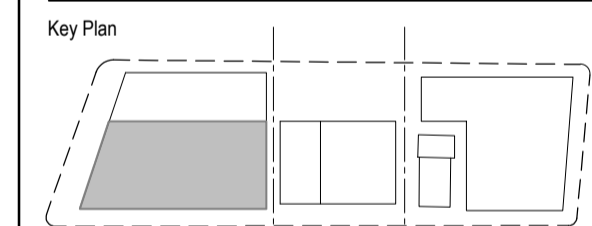


| Recent revision history | Status | Description | Date |
|-------------------------|-------------------------|-------------|----------|
| A | ISSUED FOR COORDINATION | | 03.09.25 |

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Client

WATERLOO COLLECTIVE

JOHN HOLLAND | mirvac

NSW GOVERNMENT | M sydney METRO

Consultant

Robert Bird Group

an on company

Project

WATERLOO METRO QUARTER DEVELOPMENT

| Project number | Size check | | |
|----------------|------------|------------|----------|
| 18445 | 25mm | | |
| Checked | Approved | Sheet size | Scale |
| ML | AA | A1 | AS SHOWN |

Sheet title

STORMWATER CATCHMENT PLAN - WSUD

| Status | Revision |
|--------------|----------------------------|
| FOR APPROVAL | |
| Sheet number | WMQ-BD2-RBG-CV-DRG-C8272 A |

ORIFICE SIZE

$$PSD = Q_{OSD}$$

$$Q_{OSD} = C_d * A * \sqrt{2gH}$$

$$= C_d * \frac{\pi d^2}{4} * \sqrt{2gH}$$

$$d^2 = \frac{4Q_{OSD}}{\pi * C_d * \sqrt{2gH}}$$

$$d = \sqrt{\frac{4Q_{OSD}}{\pi * C_d * \sqrt{2gH}}}$$

where $Q = PSD = 41 \frac{L}{s}$

$C_d = 0.61$

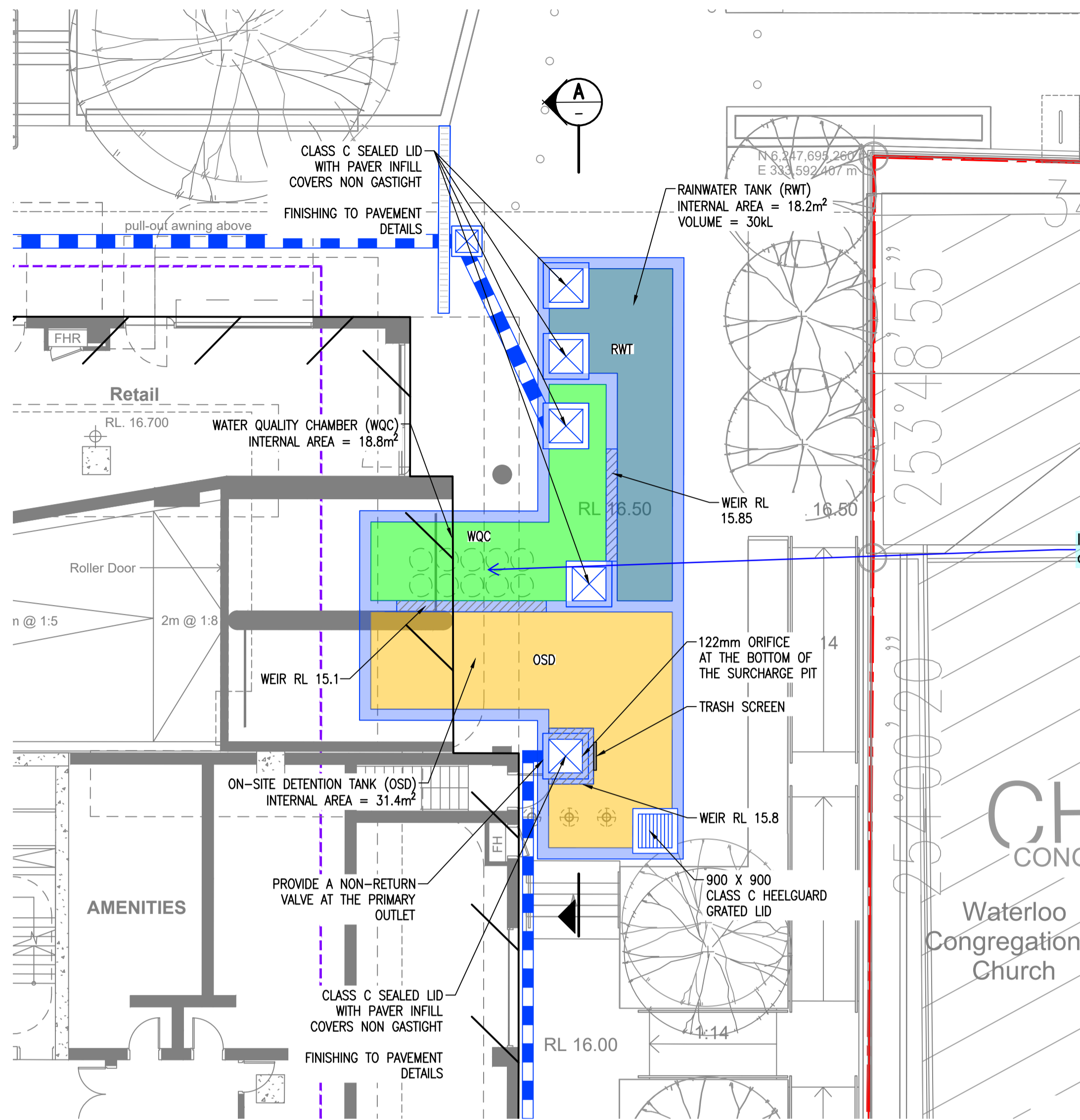
$H = 1.70m$

$g = 9.81 \frac{m^2}{s}$

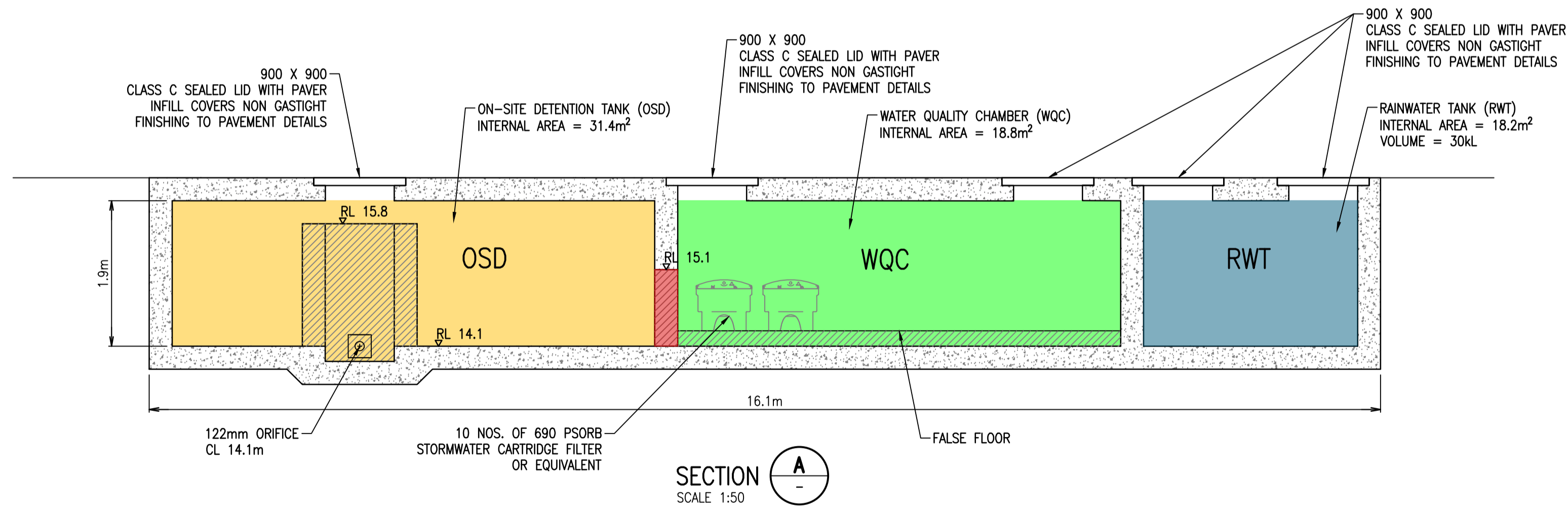
$$d = \sqrt{\frac{4(41)}{\pi * 0.61 * \sqrt{2 * 9.81 * 1.70 * 1000}}}$$

$= 0.122m$

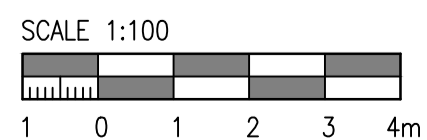
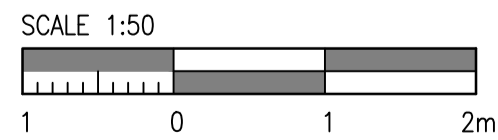
$d = 122mm$



BUILDING 2 OSD PLAN
SCALE 1:100

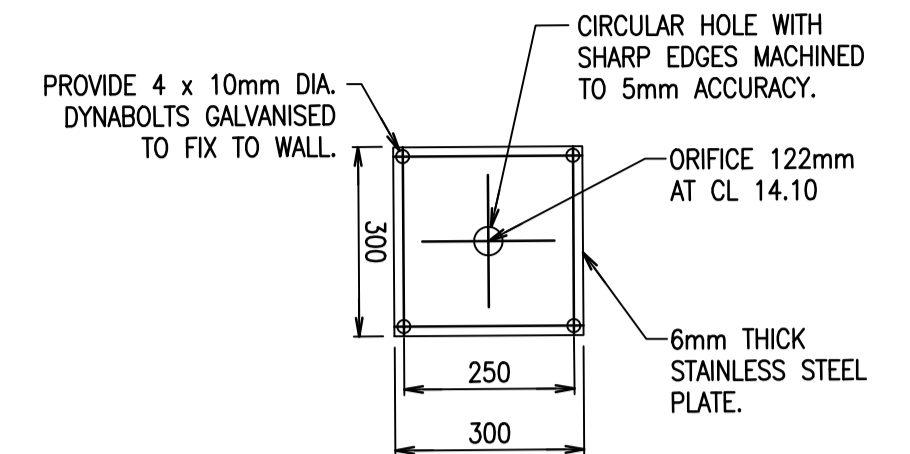


SECTION A-A
SCALE 1:50

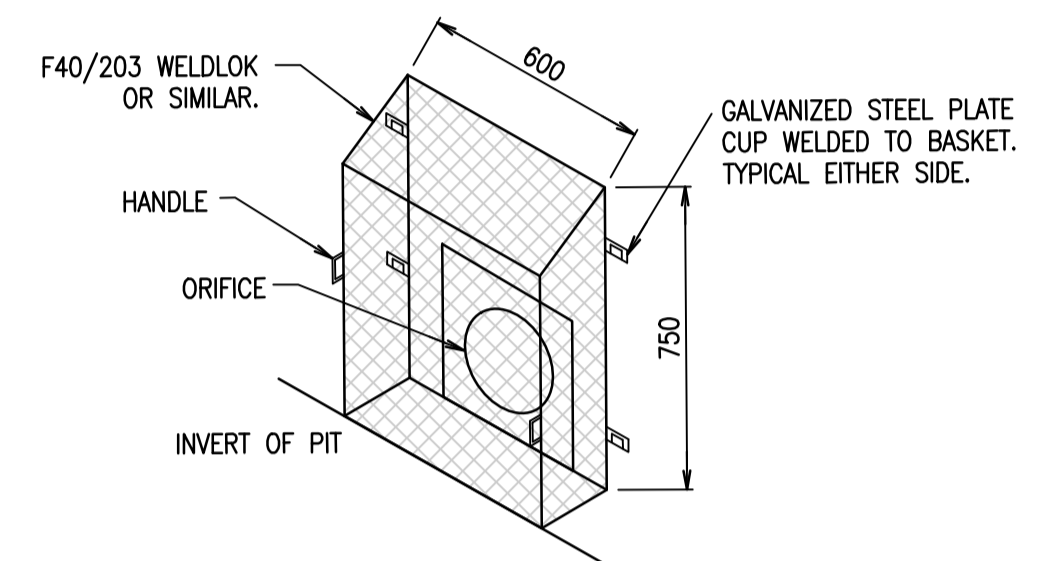


CONFINED SPACE WARNING SIGN
SCALE NTS

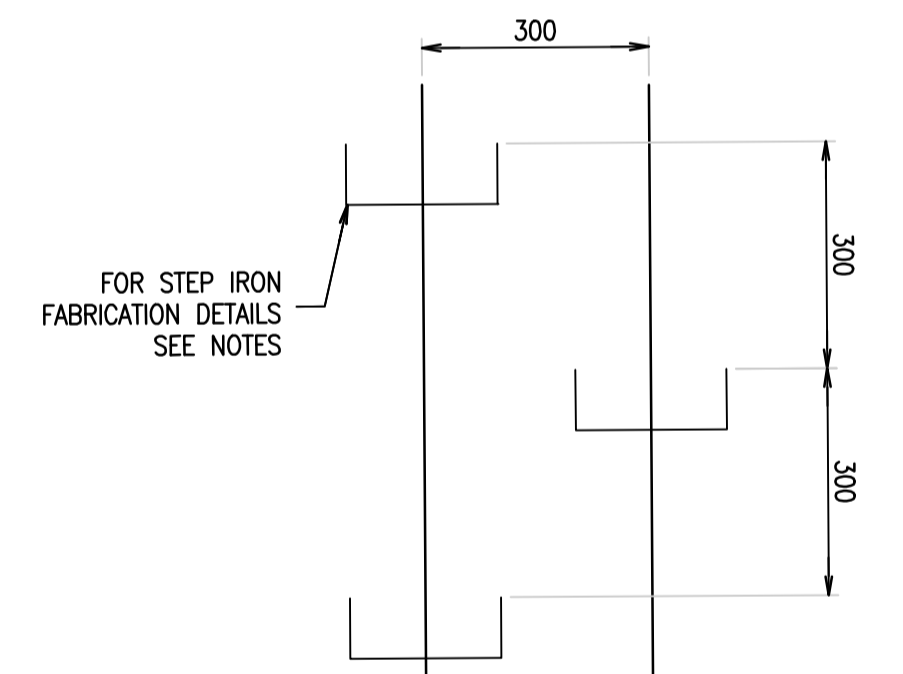
| |
|---|
| OSD 2 |
| DEPTH INTERNAL = 1.9m |
| BASE LEVEL = RL 14.1 |
| SLAB UNDERSIDE = RL 13.7 |
| EFFECTIVE DEPTH = 1.7m (1% AEP WATER DEPTH) |



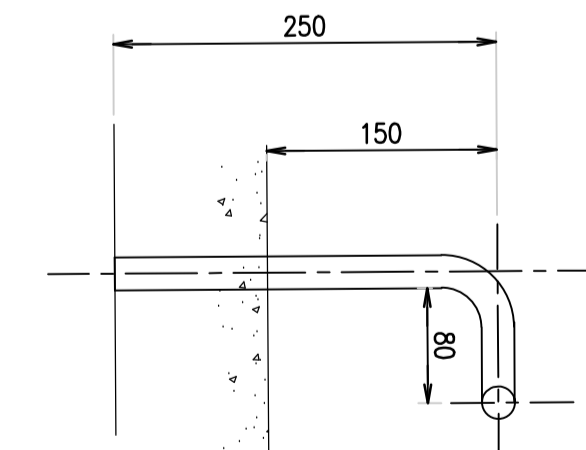
ORIFICE PLATE DETAIL
SCALE 1:20



TRASH SCREEN DETAIL
SCALE 1:20



STEP IRON ARRANGEMENT - ELEVATION
SCALE 1:10



SECTION SCALE 1:5
STANDARD STEP IRONS

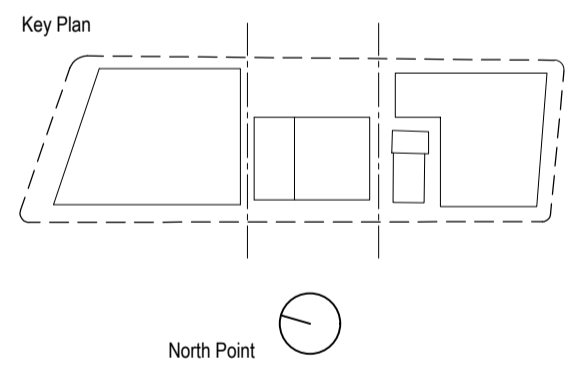
- NOTES:**
- STEP IRONS TO BE FABRICATED FROM 20mm Ø M.S.
 - ALL BENDS TO BE FORMED AROUND 12mm DIAMETER PIN
 - STEP IRONS TO BE PROVIDED IN PITS DEEPER THAN 1.0m
 - STEP IRONS TO BE HOT DIPPED GALVANISED
 - STEP IRONS TO BE LOCATED DIRECTLY ABOVE PIT OUTLET PIPE

| Recent revision history | Status | Description | Date |
|-------------------------|-------------------------|-------------|----------|
| A | ISSUED FOR COORDINATION | | 03.09.25 |

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Client
WATERLOO COLLECTIVE
JOHN HOLLAND | mirvac

NSW GOVERNMENT | M sydney METRO

Consultant
RobertBirdGroup
an on company

Project
WATERLOO METRO QUARTER DEVELOPMENT

| | |
|----------------|-------------|
| Project number | Size check |
| 18445 | 25mm |
| Checked ML | Approved AA |
| Sheet size A1 | Scale 1:100 |

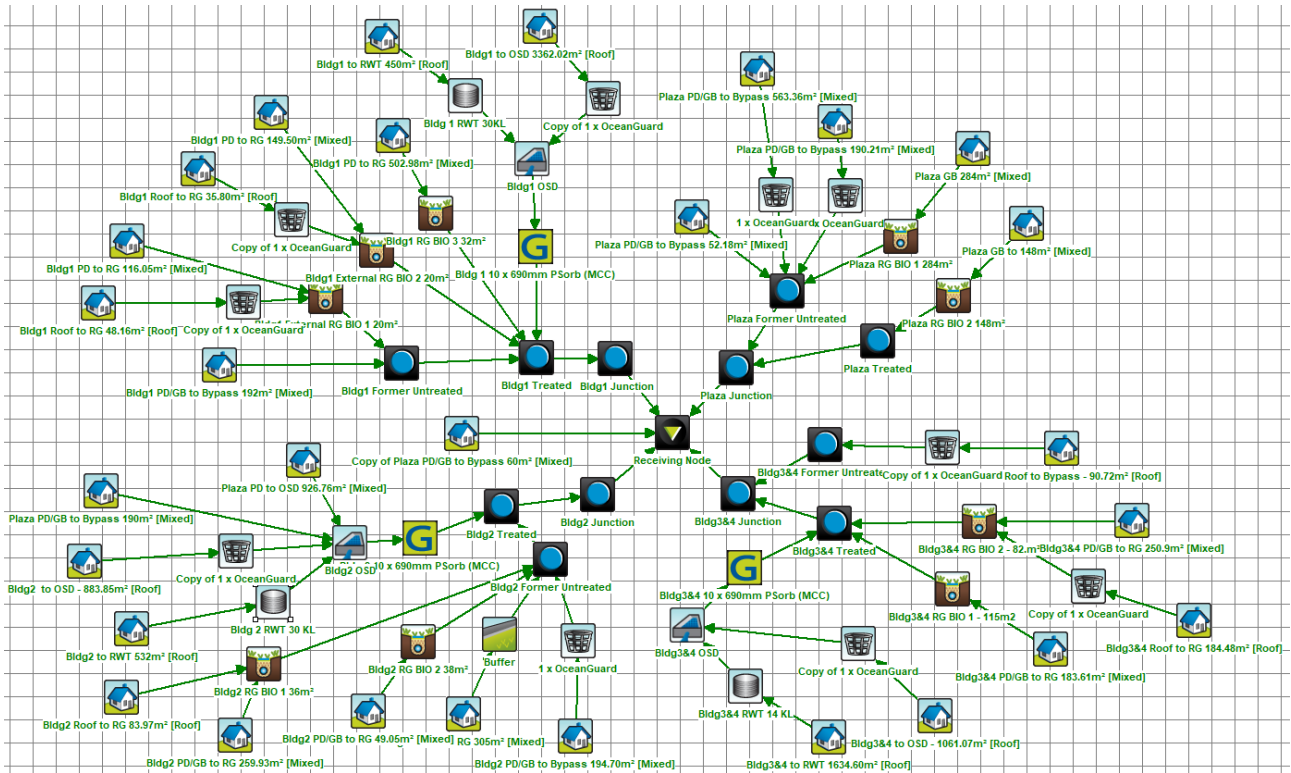
Sheet title
OSD TANK DETAILS BUILDING 2

Status
FOR APPROVAL

Sheet number
WMQ-BD2-RBG-CV-DRG-C8281

Revision
A

A-5 MUSIC Report



MUSIC-link Report

| Project Details | | Company Details | |
|---------------------------------|------------------------------------|-----------------|--|
| Project: | Waterloo Metro Over Station | Company: | Robert Bird Group |
| Report Export Date: | 24/07/2025 | Contact: | Allen Ang |
| Catchment Name: | Waterloo OSD - WSUD Rev up V2 | Address: | Lv 6, 100 Pacific Highway, North Sydney 2060 NSW |
| Catchment Area: | 1.298ha | Phone: | 02 8246 3200 |
| Impervious Area*: | 89.02% | Email: | allen.ang@robertbird.com.au |
| Rainfall Station: | 66062 SYDNEY | | |
| Modelling Time-step: | 6 Minutes | | |
| Modelling Period: | 1/01/1982 - 31/12/1986 11:54:00 PM | | |
| Mean Annual Rainfall: | 1278mm | | |
| Evapotranspiration: | 1265mm | | |
| MUSIC Version: | 6.3.0 | | |
| MUSIC-link data Version: | 6.33 | | |
| Study Area: | City of Sydney Sandy Soil | | |
| Scenario: | City of Sydney Development | | |

* takes into account area from all source nodes that link to the chosen reporting node, excluding Import Data Nodes

| Treatment Train Effectiveness | | Treatment Nodes | | Source Nodes | |
|-------------------------------|-----------|----------------------|--------|-------------------|--------|
| Node: Receiving Node | Reduction | Node Type | Number | Node Type | Number |
| Flow | 17.5% | Bio Retention Node | 9 | Urban Source Node | 29 |
| TSS | 86.4% | Rain Water Tank Node | 3 | | |
| TP | 71.9% | Detention Basin Node | 3 | | |
| TN | 63% | Buffer Node | 1 | | |
| GP | 96.8% | Generic Node | 3 | | |
| | | GPT Node | 10 | | |

Comments

Passing Parameters

| Node Type | Node Name | Parameter | Min | Max | Actual |
|-----------|-----------------------------|--|-----|------|--------|
| Bio | Bldg1 External RG BIO 1 20m | Exfiltration Rate (mm/hr) | 0 | None | 0 |
| Bio | Bldg1 External RG BIO 1 20m | Hi-flow bypass rate (cum/sec) | 0 | None | 100 |
| Bio | Bldg1 External RG BIO 1 20m | Orthophosphate Content in Filter (mg/kg) | 0 | 55 | 55 |
| Bio | Bldg1 External RG BIO 1 20m | PET Scaling Factor | 2.1 | 2.1 | 2.1 |
| Bio | Bldg1 External RG BIO 1 20m | Total Nitrogen Content in Filter (mg/kg) | 1 | 800 | 400 |
| Bio | Bldg1 External RG BIO 2 20m | Exfiltration Rate (mm/hr) | 0 | None | 0 |
| Bio | Bldg1 External RG BIO 2 20m | Hi-flow bypass rate (cum/sec) | 0 | None | 100 |
| Bio | Bldg1 External RG BIO 2 20m | Orthophosphate Content in Filter (mg/kg) | 0 | 55 | 55 |
| Bio | Bldg1 External RG BIO 2 20m | PET Scaling Factor | 2.1 | 2.1 | 2.1 |
| Bio | Bldg1 External RG BIO 2 20m | Total Nitrogen Content in Filter (mg/kg) | 1 | 800 | 400 |
| Bio | Bldg1 RG BIO 3 32m | Exfiltration Rate (mm/hr) | 0 | None | 0 |
| Bio | Bldg1 RG BIO 3 32m | Hi-flow bypass rate (cum/sec) | 0 | None | 100 |
| Bio | Bldg1 RG BIO 3 32m | Orthophosphate Content in Filter (mg/kg) | 0 | 55 | 55 |
| Bio | Bldg1 RG BIO 3 32m | PET Scaling Factor | 2.1 | 2.1 | 2.1 |
| Bio | Bldg1 RG BIO 3 32m | Total Nitrogen Content in Filter (mg/kg) | 1 | 800 | 400 |
| Bio | Bldg2 RG BIO 1 36m | Exfiltration Rate (mm/hr) | 0 | None | 0 |
| Bio | Bldg2 RG BIO 1 36m | Hi-flow bypass rate (cum/sec) | 0 | None | 100 |
| Bio | Bldg2 RG BIO 1 36m | Orthophosphate Content in Filter (mg/kg) | 0 | 55 | 55 |
| Bio | Bldg2 RG BIO 1 36m | PET Scaling Factor | 2.1 | 2.1 | 2.1 |
| Bio | Bldg2 RG BIO 1 36m | Total Nitrogen Content in Filter (mg/kg) | 1 | 800 | 400 |
| Bio | Bldg2 RG BIO 2 38m | Exfiltration Rate (mm/hr) | 0 | None | 0 |
| Bio | Bldg2 RG BIO 2 38m | Hi-flow bypass rate (cum/sec) | 0 | None | 100 |
| Bio | Bldg2 RG BIO 2 38m | Orthophosphate Content in Filter (mg/kg) | 0 | 55 | 55 |
| Bio | Bldg2 RG BIO 2 38m | PET Scaling Factor | 2.1 | 2.1 | 2.1 |
| Bio | Bldg2 RG BIO 2 38m | Total Nitrogen Content in Filter (mg/kg) | 1 | 800 | 400 |
| Bio | Bldg3&4 RG BIO 1 - 115m2 | Exfiltration Rate (mm/hr) | 0 | None | 0 |
| Bio | Bldg3&4 RG BIO 1 - 115m2 | Hi-flow bypass rate (cum/sec) | 0 | None | 100 |
| Bio | Bldg3&4 RG BIO 1 - 115m2 | Orthophosphate Content in Filter (mg/kg) | 0 | 55 | 55 |
| Bio | Bldg3&4 RG BIO 1 - 115m2 | PET Scaling Factor | 2.1 | 2.1 | 2.1 |
| Bio | Bldg3&4 RG BIO 1 - 115m2 | Total Nitrogen Content in Filter (mg/kg) | 1 | 800 | 400 |
| Bio | Bldg3&4 RG BIO 2 - 82.m | Exfiltration Rate (mm/hr) | 0 | None | 0 |
| Bio | Bldg3&4 RG BIO 2 - 82.m | Hi-flow bypass rate (cum/sec) | 0 | None | 100 |
| Bio | Bldg3&4 RG BIO 2 - 82.m | Orthophosphate Content in Filter (mg/kg) | 0 | 55 | 55 |
| Bio | Bldg3&4 RG BIO 2 - 82.m | PET Scaling Factor | 2.1 | 2.1 | 2.1 |
| Bio | Bldg3&4 RG BIO 2 - 82.m | Total Nitrogen Content in Filter (mg/kg) | 1 | 800 | 400 |
| Bio | Plaza RG BIO 1 284m | Exfiltration Rate (mm/hr) | 0 | None | 0 |
| Bio | Plaza RG BIO 1 284m | Hi-flow bypass rate (cum/sec) | 0 | None | 100 |
| Bio | Plaza RG BIO 1 284m | Orthophosphate Content in Filter (mg/kg) | 0 | 55 | 55 |
| Bio | Plaza RG BIO 1 284m | PET Scaling Factor | 2.1 | 2.1 | 2.1 |
| Bio | Plaza RG BIO 1 284m | Total Nitrogen Content in Filter (mg/kg) | 1 | 800 | 400 |

Only certain parameters are reported when they pass validation

| Node Type | Node Name | Parameter | Min | Max | Actual |
|-----------|----------------------------|--|------|------|---------|
| Bio | Plaza RG BIO 2 148m | Exfiltration Rate (mm/hr) | 0 | None | 0 |
| Bio | Plaza RG BIO 2 148m | Hi-flow bypass rate (cum/sec) | 0 | None | 100 |
| Bio | Plaza RG BIO 2 148m | Orthophosphate Content in Filter (mg/kg) | 0 | 55 | 55 |
| Bio | Plaza RG BIO 2 148m | PET Scaling Factor | 2.1 | 2.1 | 2.1 |
| Bio | Plaza RG BIO 2 148m | Total Nitrogen Content in Filter (mg/kg) | 1 | 800 | 400 |
| Buffer | Buffer | Proportion of upstream impervious area treated | None | None | 1 |
| Detention | Bldg1 OSD | % Reuse Demand Met | None | None | 0 |
| Detention | Bldg2 OSD | % Reuse Demand Met | None | None | 0 |
| Detention | Bldg3&4 OSD | % Reuse Demand Met | None | None | 0 |
| GPT | 1 x OceanGuard | Hi-flow bypass rate (cum/sec) | None | 99 | 0.02 |
| GPT | 1 x OceanGuard | Hi-flow bypass rate (cum/sec) | None | 99 | 0.02 |
| GPT | 1 x OceanGuard | Hi-flow bypass rate (cum/sec) | None | 99 | 0.02 |
| GPT | Copy of 1 x OceanGuard | Hi-flow bypass rate (cum/sec) | None | 99 | 0.02 |
| GPT | Copy of 1 x OceanGuard | Hi-flow bypass rate (cum/sec) | None | 99 | 0.02 |
| GPT | Copy of 1 x OceanGuard | Hi-flow bypass rate (cum/sec) | None | 99 | 0.02 |
| GPT | Copy of 1 x OceanGuard | Hi-flow bypass rate (cum/sec) | None | 99 | 0.02 |
| GPT | Copy of 1 x OceanGuard | Hi-flow bypass rate (cum/sec) | None | 99 | 0.02 |
| GPT | Copy of 1 x OceanGuard | Hi-flow bypass rate (cum/sec) | None | 99 | 0.02 |
| GPT | Copy of 1 x OceanGuard | Hi-flow bypass rate (cum/sec) | None | 99 | 0.02 |
| GPT | Copy of 1 x OceanGuard | Hi-flow bypass rate (cum/sec) | None | 99 | 0.02 |
| Rain | Bldg 1 RWT 30KL | % Reuse Demand Met | None | None | 13.3639 |
| Rain | Bldg 2 RWT 30 KL | % Reuse Demand Met | None | None | 15.08 |
| Rain | Bldg3&4 RWT 14 KL | % Reuse Demand Met | None | None | 23.3525 |
| Receiving | Receiving Node | % Load Reduction | None | None | 17.5 |
| Receiving | Receiving Node | GP % Load Reduction | 90 | None | 96.8 |
| Receiving | Receiving Node | TN % Load Reduction | 45 | None | 63 |
| Receiving | Receiving Node | TP % Load Reduction | 65 | None | 71.9 |
| Receiving | Receiving Node | TSS % Load Reduction | 85 | None | 86.4 |
| Urban | Bldg1 PD to RG 116.05m | Area Impervious (ha) | None | None | 0.012 |
| Urban | Bldg1 PD to RG 116.05m | Area Pervious (ha) | None | None | 0 |
| Urban | Bldg1 PD to RG 116.05m | Total Area (ha) | None | None | 0.012 |
| Urban | Bldg1 PD to RG 149.50m | Area Impervious (ha) | None | None | 0.015 |
| Urban | Bldg1 PD to RG 149.50m | Area Pervious (ha) | None | None | 0 |
| Urban | Bldg1 PD to RG 149.50m | Total Area (ha) | None | None | 0.015 |
| Urban | Bldg1 PD to RG 502.98m | Area Impervious (ha) | None | None | 0.033 |
| Urban | Bldg1 PD to RG 502.98m | Area Pervious (ha) | None | None | 0.016 |
| Urban | Bldg1 PD to RG 502.98m | Total Area (ha) | None | None | 0.05 |
| Urban | Bldg1 PD/GB to Bypass 192m | Area Impervious (ha) | None | None | 0.012 |
| Urban | Bldg1 PD/GB to Bypass 192m | Area Pervious (ha) | None | None | 0.006 |
| Urban | Bldg1 PD/GB to Bypass 192m | Total Area (ha) | None | None | 0.019 |
| Urban | Bldg1 Roof to RG 35.80m | Area Impervious (ha) | None | None | 0.004 |

Only certain parameters are reported when they pass validation

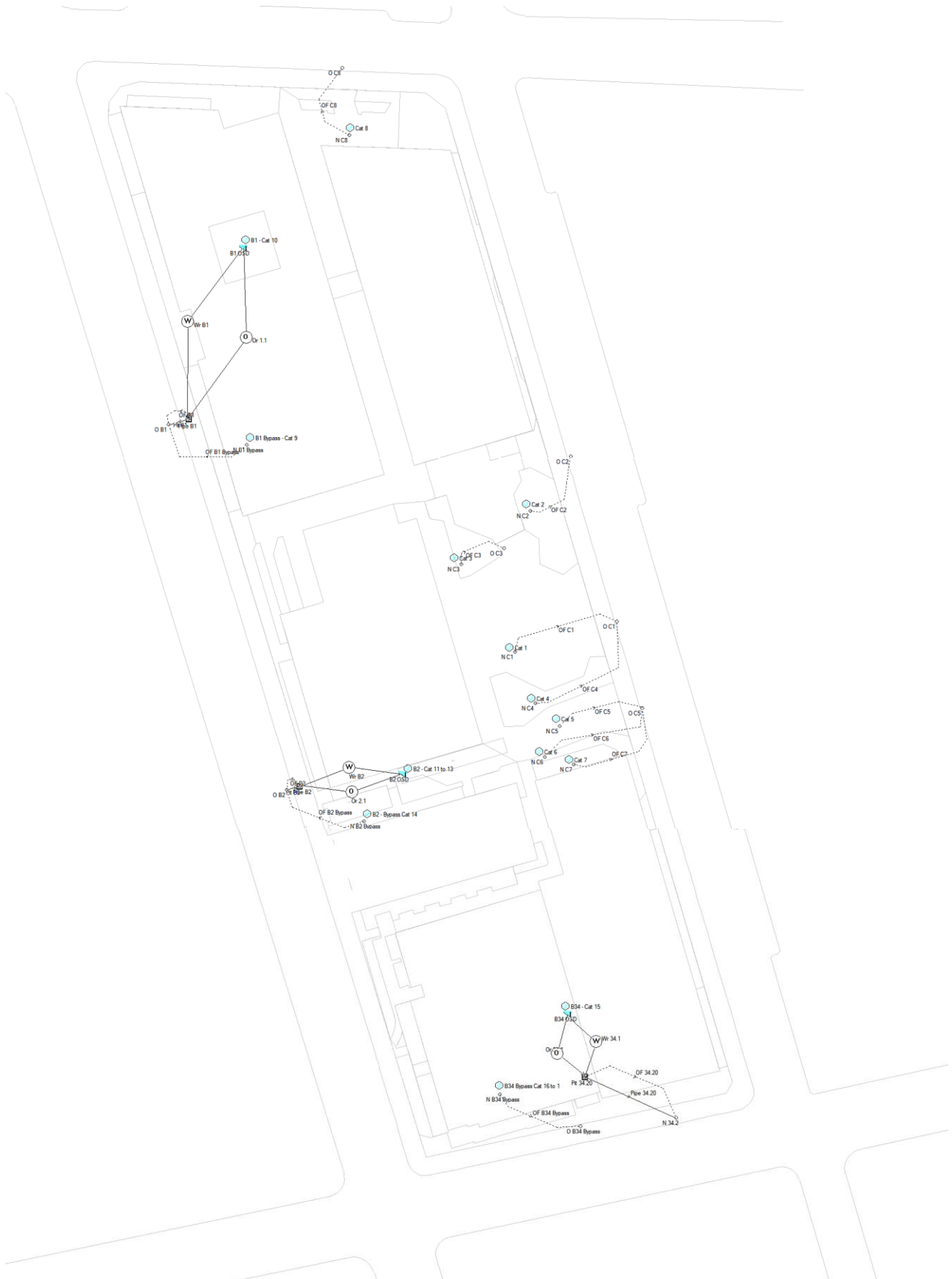
| Node Type | Node Name | Parameter | Min | Max | Actual |
|-----------|---------------------------------|----------------------|------|------|--------|
| Urban | Bldg1 Roof to RG 35.80m | Area Pervious (ha) | None | None | 0 |
| Urban | Bldg1 Roof to RG 35.80m | Total Area (ha) | None | None | 0.004 |
| Urban | Bldg1 Roof to RG 48.16m | Area Impervious (ha) | None | None | 0.005 |
| Urban | Bldg1 Roof to RG 48.16m | Area Pervious (ha) | None | None | 0 |
| Urban | Bldg1 Roof to RG 48.16m | Total Area (ha) | None | None | 0.005 |
| Urban | Bldg1 to OSD 3362.02m | Area Impervious (ha) | None | None | 0.336 |
| Urban | Bldg1 to OSD 3362.02m | Area Pervious (ha) | None | None | 0 |
| Urban | Bldg1 to OSD 3362.02m | Total Area (ha) | None | None | 0.336 |
| Urban | Bldg1 to RWT 450m | Area Impervious (ha) | None | None | 0.045 |
| Urban | Bldg1 to RWT 450m | Area Pervious (ha) | None | None | 0 |
| Urban | Bldg1 to RWT 450m | Total Area (ha) | None | None | 0.045 |
| Urban | Bldg2 to OSD - 883.85m | Area Impervious (ha) | None | None | 0.088 |
| Urban | Bldg2 to OSD - 883.85m | Area Pervious (ha) | None | None | 0 |
| Urban | Bldg2 to OSD - 883.85m | Total Area (ha) | None | None | 0.088 |
| Urban | Bldg2 PD/GB to Bypass 194.70m | Area Impervious (ha) | None | None | 0.019 |
| Urban | Bldg2 PD/GB to Bypass 194.70m | Area Pervious (ha) | None | None | 0 |
| Urban | Bldg2 PD/GB to Bypass 194.70m | Total Area (ha) | None | None | 0.019 |
| Urban | Bldg2 PD/GB to RG 259.93m | Area Impervious (ha) | None | None | 0.021 |
| Urban | Bldg2 PD/GB to RG 259.93m | Area Pervious (ha) | None | None | 0.004 |
| Urban | Bldg2 PD/GB to RG 259.93m | Total Area (ha) | None | None | 0.026 |
| Urban | Bldg2 PD/GB to RG 305m | Area Impervious (ha) | None | None | 0.018 |
| Urban | Bldg2 PD/GB to RG 305m | Area Pervious (ha) | None | None | 0.012 |
| Urban | Bldg2 PD/GB to RG 305m | Total Area (ha) | None | None | 0.031 |
| Urban | Bldg2 PD/GB to RG 49.05m | Area Impervious (ha) | None | None | 0.004 |
| Urban | Bldg2 PD/GB to RG 49.05m | Area Pervious (ha) | None | None | 0.000 |
| Urban | Bldg2 PD/GB to RG 49.05m | Total Area (ha) | None | None | 0.005 |
| Urban | Bldg2 Roof to RG 83.97m | Area Impervious (ha) | None | None | 0.008 |
| Urban | Bldg2 Roof to RG 83.97m | Area Pervious (ha) | None | None | 0 |
| Urban | Bldg2 Roof to RG 83.97m | Total Area (ha) | None | None | 0.008 |
| Urban | Bldg2 to RWT 532m | Area Impervious (ha) | None | None | 0.053 |
| Urban | Bldg2 to RWT 532m | Area Pervious (ha) | None | None | 0 |
| Urban | Bldg2 to RWT 532m | Total Area (ha) | None | None | 0.053 |
| Urban | Bldg3&4 PD/GB to RG 183.61m | Area Impervious (ha) | None | None | 0.010 |
| Urban | Bldg3&4 PD/GB to RG 183.61m | Area Pervious (ha) | None | None | 0.007 |
| Urban | Bldg3&4 PD/GB to RG 183.61m | Total Area (ha) | None | None | 0.018 |
| Urban | Bldg3&4 PD/GB to RG 250.9m | Area Impervious (ha) | None | None | 0.013 |
| Urban | Bldg3&4 PD/GB to RG 250.9m | Area Pervious (ha) | None | None | 0.011 |
| Urban | Bldg3&4 PD/GB to RG 250.9m | Total Area (ha) | None | None | 0.025 |
| Urban | Bldg3&4 Roof to Bypass - 90.72m | Area Impervious (ha) | None | None | 0.009 |
| Urban | Bldg3&4 Roof to Bypass - 90.72m | Area Pervious (ha) | None | None | 0 |

Only certain parameters are reported when they pass validation

| Node Type | Node Name | Parameter | Min | Max | Actual |
|-----------|-----------------------------------|----------------------|------|------|--------|
| Urban | Bldg3&4 Roof to Bypass - 90.72m | Total Area (ha) | None | None | 0.009 |
| Urban | Bldg3&4 Roof to RG 184.48m | Area Impervious (ha) | None | None | 0.019 |
| Urban | Bldg3&4 Roof to RG 184.48m | Area Pervious (ha) | None | None | 0 |
| Urban | Bldg3&4 Roof to RG 184.48m | Total Area (ha) | None | None | 0.019 |
| Urban | Bldg3&4 to OSD - 1061.07m | Area Impervious (ha) | None | None | 0.106 |
| Urban | Bldg3&4 to OSD - 1061.07m | Area Pervious (ha) | None | None | 0 |
| Urban | Bldg3&4 to OSD - 1061.07m | Total Area (ha) | None | None | 0.106 |
| Urban | Bldg3&4 to RWT 1634.60m | Area Impervious (ha) | None | None | 0.164 |
| Urban | Bldg3&4 to RWT 1634.60m | Area Pervious (ha) | None | None | 0 |
| Urban | Bldg3&4 to RWT 1634.60m | Total Area (ha) | None | None | 0.164 |
| Urban | Copy of Plaza PD/GB to Bypass 60m | Area Impervious (ha) | None | None | 0 |
| Urban | Copy of Plaza PD/GB to Bypass 60m | Area Pervious (ha) | None | None | 0.006 |
| Urban | Copy of Plaza PD/GB to Bypass 60m | Total Area (ha) | None | None | 0.006 |
| Urban | Plaza GB 284m | Area Impervious (ha) | None | None | 0.002 |
| Urban | Plaza GB 284m | Area Pervious (ha) | None | None | 0.025 |
| Urban | Plaza GB 284m | Total Area (ha) | None | None | 0.028 |
| Urban | Plaza GB to 148m | Area Impervious (ha) | None | None | 0.001 |
| Urban | Plaza GB to 148m | Area Pervious (ha) | None | None | 0.013 |
| Urban | Plaza GB to 148m | Total Area (ha) | None | None | 0.015 |
| Urban | Plaza PD to OSD 926.76m | Area Impervious (ha) | None | None | 0.078 |
| Urban | Plaza PD to OSD 926.76m | Area Pervious (ha) | None | None | 0.014 |
| Urban | Plaza PD to OSD 926.76m | Total Area (ha) | None | None | 0.093 |
| Urban | Plaza PD/GB to Bypass 190.21m | Area Impervious (ha) | None | None | 0.013 |
| Urban | Plaza PD/GB to Bypass 190.21m | Area Pervious (ha) | None | None | 0.005 |
| Urban | Plaza PD/GB to Bypass 190.21m | Total Area (ha) | None | None | 0.019 |
| Urban | Plaza PD/GB to Bypass 190m | Area Impervious (ha) | None | None | 0.019 |
| Urban | Plaza PD/GB to Bypass 190m | Area Pervious (ha) | None | None | 0 |
| Urban | Plaza PD/GB to Bypass 190m | Total Area (ha) | None | None | 0.019 |
| Urban | Plaza PD/GB to Bypass 52.18m | Area Impervious (ha) | None | None | 0.003 |
| Urban | Plaza PD/GB to Bypass 52.18m | Area Pervious (ha) | None | None | 0.001 |
| Urban | Plaza PD/GB to Bypass 52.18m | Total Area (ha) | None | None | 0.005 |
| Urban | Plaza PD/GB to Bypass 563.36m | Area Impervious (ha) | None | None | 0.039 |
| Urban | Plaza PD/GB to Bypass 563.36m | Area Pervious (ha) | None | None | 0.016 |
| Urban | Plaza PD/GB to Bypass 563.36m | Total Area (ha) | None | None | 0.056 |

Only certain parameters are reported when they pass validation

A-6 DRAINS Report



| PIT / NODE DETAILS | | Version 8 | | | | | |
|--------------------|---------|--------------|---------------------------|------------------------|-------------------|-------------------|------------|
| Name | Max HGL | Max Pond HGL | Max Surface Flow (cu.m/s) | Max Pond Volume (cu.m) | Min Freeboard (m) | Overflow (cu.m/s) | Constraint |
| N C7 | 17.12 | | 0.012 | | | | |
| N C2 | 17.51 | | 0.012 | | | | |
| N C3 | 17.18 | | 0.007 | | | | |
| N C4 | 17.06 | | 0.011 | | | | |
| N C1 | 16.32 | | 0.048 | | | | |
| N C6 | 17.05 | | 0.005 | | | | |
| N C5 | 16.51 | | 0.016 | | | | |
| N B34 Bypa | 16.49 | | 0.07 | | | | |
| N B1 Bypas | 16.41 | | 0.056 | | | | |
| N B2 Bypas | 16.41 | | 0.062 | | | | |
| N C8 | 16.4 | | 0.036 | | | | |
| Pit 34.20 | 21.12 | | 0 | | 3.58 | | 0 None |
| N 34.2 | 20.25 | | 0 | | | | |
| Pit B2 | 13.98 | | 0 | | 1.02 | | 0 None |
| O B2 | 13.84 | | 0.061 | | | | |
| Pit B1 | 13.04 | | 0 | | 2.45 | | 0 None |
| O B1 | 12.84 | | 0.056 | | | | |

SUB-CATCHMENT DETAILS

| Name | Max Flow Q (cu.m/s) | Paved Max Q (cu.m/s) | Grassed Max Q (cu.m/s) | Paved Tc (min) | Grassed Tc (min) | Supp. Tc (min) | Due to Storm |
|-------------|---------------------|----------------------|------------------------|----------------|------------------|----------------|---------------------------------|
| B2 - Cat 11 | 0.162 | 0.162 | 0 | 5 | 5 | 5 | 5 1% AEP, 5 min burst, Storm 1 |
| Cat 7 | 0.01 | 0.01 | 0 | 5 | 5 | 5 | 5 1% AEP, 5 min burst, Storm 1 |
| Cat 2 | 0.008 | 0.001 | 0.007 | 5 | 5 | 5 | 5 1% AEP, 10 min burst, Storm 1 |
| Cat 3 | 0.005 | 0.001 | 0.004 | 5 | 5 | 5 | 5 1% AEP, 10 min burst, Storm 1 |
| Cat 4 | 0.007 | 0.001 | 0.006 | 5 | 5 | 5 | 5 1% AEP, 10 min burst, Storm 1 |
| Cat 1 | 0.039 | 0.039 | 0 | 5 | 5 | 5 | 5 1% AEP, 5 min burst, Storm 1 |
| Cat 6 | 0.003 | 0.001 | 0.002 | 5 | 5 | 5 | 5 1% AEP, 10 min burst, Storm 1 |
| Cat 5 | 0.013 | 0.013 | 0 | 5 | 5 | 5 | 5 1% AEP, 5 min burst, Storm 1 |
| B34 Bypass | 0.054 | 0.046 | 0.009 | 5 | 5 | 5 | 5 1% AEP, 5 min burst, Storm 1 |
| B34 - Cat 1 | 0.186 | 0.186 | 0 | 5 | 5 | 5 | 5 1% AEP, 5 min burst, Storm 1 |
| B1 Bypass - | 0.046 | 0.046 | 0 | 5 | 5 | 5 | 5 1% AEP, 5 min burst, Storm 1 |
| B2 - Bypass | 0.046 | 0.035 | 0.011 | 5 | 5 | 5 | 5 1% AEP, 5 min burst, Storm 1 |
| Cat 8 | 0.028 | 0.023 | 0.005 | 5 | 5 | 5 | 5 1% AEP, 5 min burst, Storm 1 |
| B1 - Cat 10 | 0.263 | 0.263 | 0 | 5 | 5 | 5 | 5 1% AEP, 5 min burst, Storm 1 |

PIPE DETAILS

| Name | Max Q (cu.m/s) | Max V (m/s) | Max U/S HGL (m) | Max D/S HGL (m) | Due to Storm |
|------------|----------------|-------------|-----------------|-----------------|--------------------------------|
| Pipe 34.20 | 0.121 | 1.81 | 20.888 | 20.249 | 1% AEP, 20 min burst, Storm 10 |
| Pipe B2 | 0.041 | 1.3 | 13.984 | 13.84 | 1% AEP, 45 min burst, Storm 6 |
| Pipe B1 | 0.061 | 1.43 | 13.035 | 12.845 | 1% AEP, 45 min burst, Storm 6 |

CHANNEL DETAILS

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

OVERFLOW ROUTE DETAILS

| Name | Max Q U/S | Max Q D/S | Safe Q | Max D | Max DxV | Max Width | Max V | Due to Storm |
|--------|-----------|-----------|--------|-------|---------|-----------|-------|-------------------------------|
| Wr B2 | | | | | | | | |
| Or 2.1 | 0.041 | 0.041 | | | | | | 1% AEP, 45 min burst, Storm 6 |
| OF C7 | 0.01 | 0.01 | 1.355 | 0.015 | 0.01 | 1.53 | 0.87 | 1% AEP, 5 min burst, Storm 1 |
| OF C2 | 0.008 | 0.008 | 1.404 | 0.016 | 0.01 | 1.63 | 0.61 | 1% AEP, 10 min burst, Storm 1 |
| OF C3 | 0.005 | 0.005 | 1.447 | 0.015 | 0.01 | 1.53 | 0.42 | 1% AEP, 10 min burst, Storm 1 |
| OF C4 | 0.007 | 0.007 | 1.443 | 0.018 | 0.01 | 1.82 | 0.43 | 1% AEP, 10 min burst, Storm 1 |
| OF C1 | 0.038 | 0.038 | 1.441 | 0.029 | 0.02 | 4 | 0.68 | 1% AEP, 5 min burst, Storm 1 |
| OF C6 | 0.003 | 0.003 | 1.445 | 0.013 | 0 | 1.33 | 0.36 | 1% AEP, 10 min burst, Storm 1 |

| | | | | | | | |
|------------|-------|-------|-------|-------|------|---|-----------------------------------|
| OF C5 | 0.013 | 0.013 | 1.418 | 0.022 | 0.01 | 4 | 0.44 1% AEP, 5 min burst, Storm 1 |
| OF B34 Byp | 0.054 | 0.054 | 1.468 | 0.037 | 0.02 | 4 | 0.62 1% AEP, 5 min burst, Storm 1 |
| Wr 34.1 | 0.067 | 0.067 | | | | | 1% AEP, 20 min burst, Storm 3 |
| Or 34.1 | 0.051 | 0.051 | | | | | 1% AEP, 20 min burst, Storm 3 |
| OF B1 Bypa | 0.046 | 0.046 | 1.468 | 0.034 | 0.02 | 4 | 0.6 1% AEP, 5 min burst, Storm 1 |
| OF B2 Bypa | 0.046 | 0.046 | 1.468 | 0.035 | 0.02 | 4 | 0.58 1% AEP, 5 min burst, Storm 1 |
| OF C8 | 0.028 | 0.028 | 1.468 | 0.029 | 0.01 | 4 | 0.49 1% AEP, 5 min burst, Storm 1 |
| Wr B1 | | | | | | | |
| Or 1.1 | 0.061 | 0.061 | | | | | 1% AEP, 45 min burst, Storm 6 |
| OF 34.20 | 0 | 0 | 1.349 | 0 | 0 | 0 | 0 |
| OF B2 | 0 | 0 | 1.413 | 0 | 0 | 0 | 0 |
| OF B1 | 0 | 0 | 1.445 | 0 | 0 | 0 | 0 |

DETENTION BASIN DETAILS

| Name | Max WL | MaxVol | Max Q | | |
|---------|--------|--------|-------|-----------|------------|
| | | | Total | Low Level | High Level |
| B2 OSD | 15.8 | 80.1 | 0.041 | 0 | 0.041 |
| B34 OSD | 24.81 | 64.9 | 0.118 | 0 | 0.118 |
| B1 OSD | 21.4 | 142.8 | 0.061 | 0 | 0.061 |

Run Log for DRAINS v2025.01.9147.24925 - 18445O-RBG-XX-XX-M2-CV-00000-High Level v6 - Scenario A - Copy

Run Log for DRAINS v2025.01.9147.24925 - 18445O-RBG-XX-XX-M2-CV-00000-High Level v6 - Scenario A - Copy.drn run at 15:36:52 on 13/8/2025.

No water upwelling from any pit.
Freeboard was adequate at all pits.

Flows were safe in all overflow routes.

| PIT / NODE DETAILS | | Version 8 | | | | | |
|--------------------|---------|--------------|---------------------------|------------------------|-------------------|-------------------|------------|
| Name | Max HGL | Max Pond HGL | Max Surface Flow (cu.m/s) | Max Pond Volume (cu.m) | Min Freeboard (m) | Overflow (cu.m/s) | Constraint |
| N C7 | 17.12 | | 0.009 | | | | |
| N C2 | 17.51 | | 0.009 | | | | |
| N C3 | 17.17 | | 0.005 | | | | |
| N C4 | 17.06 | | 0.008 | | | | |
| N C1 | 16.32 | | 0.036 | | | | |
| N C6 | 17.05 | | 0.003 | | | | |
| N C5 | 16.51 | | 0.012 | | | | |
| N B34 Bypa | 16.48 | | 0.053 | | | | |
| N B1 Bypas | 16.4 | | 0.042 | | | | |
| N B2 Bypas | 16.4 | | 0.046 | | | | |
| N C8 | 16.4 | | 0.027 | | | | |
| Pit 34.20 | 20.64 | | 0 | | 4.06 | | 0 None |
| N 34.2 | 20.13 | | 0 | | | | |
| Pit B2 | 13.97 | | 0 | | 1.03 | | 0 None |
| O B2 | 13.83 | | 0.046 | | | | |
| Pit B1 | 13.02 | | 0 | | 2.46 | | 0 None |
| O B1 | 12.83 | | 0.042 | | | | |

| SUB-CATCHMENT DETAILS | | | | | | | |
|-----------------------|---------------------|----------------------|------------------------|----------------|------------------|----------------|----------------------------------|
| Name | Max Flow Q (cu.m/s) | Paved Max Q (cu.m/s) | Grassed Max Q (cu.m/s) | Paved Tc (min) | Grassed Tc (min) | Supp. Tc (min) | Due to Storm |
| B2 - Cat 11 | 0.123 | 0.123 | 0 | 5 | 5 | 5 | 5 5% AEP, 5 min burst, Storm 1 |
| Cat 7 | 0.008 | 0.008 | 0 | 5 | 5 | 5 | 5 5% AEP, 5 min burst, Storm 1 |
| Cat 2 | 0.006 | 0.001 | 0.005 | 5 | 5 | 5 | 5 5% AEP, 15 min burst, Storm 5 |
| Cat 3 | 0.004 | 0.001 | 0.003 | 5 | 5 | 5 | 5 5% AEP, 15 min burst, Storm 5 |
| Cat 4 | 0.006 | 0.001 | 0.005 | 5 | 5 | 5 | 5 5% AEP, 15 min burst, Storm 5 |
| Cat 1 | 0.029 | 0.029 | 0 | 5 | 5 | 5 | 5 5% AEP, 5 min burst, Storm 1 |
| Cat 6 | 0.003 | 0.001 | 0.002 | 5 | 5 | 5 | 5 5% AEP, 15 min burst, Storm 5 |
| Cat 5 | 0.01 | 0.01 | 0 | 5 | 5 | 5 | 5 5% AEP, 5 min burst, Storm 1 |
| B34 Bypass | 0.04 | 0.035 | 0.006 | 5 | 5 | 5 | 5 5% AEP, 5 min burst, Storm 1 |
| B34 - Cat 1 | 0.141 | 0.141 | 0 | 5 | 5 | 5 | 5 5% AEP, 5 min burst, Storm 1 |
| B1 Bypass - | 0.035 | 0.035 | 0 | 5 | 5 | 5 | 5 5% AEP, 5 min burst, Storm 1 |
| B2 - Bypass | 0.035 | 0.025 | 0.01 | 5 | 5 | 5 | 5 5% AEP, 15 min burst, Storm 10 |
| Cat 8 | 0.021 | 0.016 | 0.004 | 5 | 5 | 5 | 5 5% AEP, 15 min burst, Storm 10 |
| B1 - Cat 10 | 0.199 | 0.199 | 0 | 5 | 5 | 5 | 5 5% AEP, 5 min burst, Storm 1 |

| PIPE DETAILS | | | | | |
|--------------|----------------|-------------|-----------------|-----------------|-------------------------------|
| Name | Max Q (cu.m/s) | Max V (m/s) | Max U/S HGL (m) | Max D/S HGL (m) | Due to Storm |
| Pipe 34.20 | 0.05 | 1.47 | 20.633 | 20.13 | 5% AEP, 30 min burst, Storm 5 |
| Pipe B2 | 0.035 | 1.24 | 13.971 | 13.83 | 5% AEP, 30 min burst, Storm 8 |
| Pipe B1 | 0.054 | 1.37 | 13.024 | 12.836 | 5% AEP, 30 min burst, Storm 8 |

| CHANNEL DETAILS | | | |
|-----------------|----------------|-------------|--------------|
| Name | Max Q (cu.m/s) | Max V (m/s) | Due to Storm |
| | | | |

| OVERFLOW ROUTE DETAILS | | | | | | | | |
|------------------------|-----------|-----------|--------|-------|---------|-----------|-------|-------------------------------|
| Name | Max Q U/S | Max Q D/S | Safe Q | Max D | Max DxV | Max Width | Max V | Due to Storm |
| Wr B2 | | | | | | | | |
| Or 2.1 | 0.035 | 0.035 | | | | | | 5% AEP, 30 min burst, Storm 8 |
| OF C7 | 0.008 | 0.008 | 1.355 | 0.013 | 0.01 | 1.33 | 0.87 | 5% AEP, 5 min burst, Storm 1 |
| OF C2 | 0.006 | 0.006 | 1.404 | 0.014 | 0.01 | 1.43 | 0.58 | 5% AEP, 15 min burst, Storm 5 |
| OF C3 | 0.004 | 0.004 | 1.447 | 0.013 | 0.01 | 1.33 | 0.41 | 5% AEP, 15 min burst, Storm 3 |
| OF C4 | 0.005 | 0.005 | 1.413 | 0.016 | 0.01 | 1.63 | 0.4 | 5% AEP, 15 min burst, Storm 3 |
| OF C1 | 0.029 | 0.029 | 1.441 | 0.027 | 0.02 | 4 | 0.6 | 5% AEP, 5 min burst, Storm 1 |
| OF C6 | 0.002 | 0.002 | 1.445 | 0.011 | 0 | 1.13 | 0.37 | 5% AEP, 15 min burst, Storm 3 |

| | | | | | | | |
|------------|-------|-------|-------|-------|------|------|-------------------------------------|
| OF C5 | 0.01 | 0.01 | 1.418 | 0.018 | 0.01 | 1.82 | 0.57 5% AEP, 5 min burst, Storm 1 |
| OF B34 Byp | 0.04 | 0.04 | 1.112 | 0.033 | 0.02 | 4 | 0.56 5% AEP, 5 min burst, Storm 1 |
| Wr 34.1 | | | | | | | |
| Or 34.1 | 0.048 | 0.048 | | | | | 5% AEP, 30 min burst, Storm 8 |
| OF B1 Bypa | 0.035 | 0.035 | 1.112 | 0.031 | 0.02 | 4 | 0.54 5% AEP, 5 min burst, Storm 1 |
| OF B2 Bypa | 0.035 | 0.035 | 1.112 | 0.032 | 0.02 | 4 | 0.52 5% AEP, 15 min burst, Storm 10 |
| OF C8 | 0.021 | 0.021 | 1.112 | 0.027 | 0.01 | 4 | 0.42 5% AEP, 5 min burst, Storm 1 |
| Wr B1 | | | | | | | |
| Or 1.1 | 0.052 | 0.052 | | | | | 5% AEP, 30 min burst, Storm 8 |
| OF 34.20 | 0 | 0 | 1.349 | 0 | 0 | 0 | 0 |
| OF B2 | 0 | 0 | 1.413 | 0 | 0 | 0 | 0 |
| OF B1 | 0 | 0 | 1.395 | 0 | 0 | 0 | 0 |

DETENTION BASIN DETAILS

| Name | Max WL | MaxVol | Max Q | | |
|---------|--------|--------|-------|-----------|------------|
| | | | Total | Low Level | High Level |
| B2 OSD | 15.35 | 57.3 | 0.035 | 0 | 0.035 |
| B34 OSD | 24.51 | 55.6 | 0.048 | 0 | 0.048 |
| B1 OSD | 20.87 | 101.1 | 0.052 | 0 | 0.052 |

Run Log for DRAINS v2025.01.9147.24925 - 184450-RBG-XX-XX-M2-CV-00000-High Level v6 - Scenario A - Copy

Run Log for DRAINS v2025.01.9147.24925 - 184450-RBG-XX-XX-M2-CV-00000-High Level v6 - Scenario A - Copy.drn run at 15:45:10 on 13/8/2025.

No water upwelling from any pit.
Freeboard was adequate at all pits.

Flows were safe in all overflow routes.

| PIT / NODE DETAILS | | Version 8 | | | | | |
|--------------------|---------|--------------|---------------------------|------------------------|-------------------|-------------------|------------|
| Name | Max HGL | Max Pond HGL | Max Surface Flow (cu.m/s) | Max Pond Volume (cu.m) | Min Freeboard (m) | Overflow (cu.m/s) | Constraint |
| N C7 | 17.12 | | 0.008 | | | | |
| N C2 | 17.51 | | 0.007 | | | | |
| N C3 | 17.17 | | 0.005 | | | | |
| N C4 | 17.06 | | 0.007 | | | | |
| N C1 | 16.31 | | 0.031 | | | | |
| N C6 | 17.05 | | 0.003 | | | | |
| N C5 | 16.51 | | 0.011 | | | | |
| N B34 Bypa | 16.48 | | 0.046 | | | | |
| N B1 Bypas | 16.4 | | 0.037 | | | | |
| N B2 Bypas | 16.4 | | 0.04 | | | | |
| N C8 | 16.4 | | 0.024 | | | | |
| Pit 34.20 | 20.63 | | 0 | | 4.07 | 0 | None |
| N 34.2 | 20.12 | | 0 | | | | |
| Pit B2 | 13.96 | | 0 | | 1.04 | 0 | None |
| O B2 | 13.83 | | 0.04 | | | | |
| Pit B1 | 13.02 | | 0 | | 2.47 | 0 | None |
| O B1 | 12.83 | | 0.037 | | | | |

| SUB-CATCHMENT DETAILS | | | | | | | |
|-----------------------|---------------------|----------------------|------------------------|----------------|------------------|----------------|-----------------------------------|
| Name | Max Flow Q (cu.m/s) | Paved Max Q (cu.m/s) | Grassed Max Q (cu.m/s) | Paved Tc (min) | Grassed Tc (min) | Supp. Tc (min) | Due to Storm |
| B2 - Cat 11 | 0.106 | 0.106 | 0 | 5 | 5 | 5 | 5 10% AEP, 5 min burst, Storm 1 |
| Cat 7 | 0.007 | 0.007 | 0 | 5 | 5 | 5 | 5 10% AEP, 5 min burst, Storm 1 |
| Cat 2 | 0.005 | 0.001 | 0.004 | 5 | 5 | 5 | 5 10% AEP, 15 min burst, Storm 5 |
| Cat 3 | 0.003 | 0.001 | 0.002 | 5 | 5 | 5 | 5 10% AEP, 15 min burst, Storm 5 |
| Cat 4 | 0.005 | 0.001 | 0.004 | 5 | 5 | 5 | 5 10% AEP, 15 min burst, Storm 5 |
| Cat 1 | 0.026 | 0.026 | 0 | 5 | 5 | 5 | 5 10% AEP, 5 min burst, Storm 1 |
| Cat 6 | 0.002 | 0.001 | 0.001 | 5 | 5 | 5 | 5 10% AEP, 15 min burst, Storm 5 |
| Cat 5 | 0.009 | 0.009 | 0 | 5 | 5 | 5 | 5 10% AEP, 5 min burst, Storm 1 |
| B34 Bypass | 0.035 | 0.029 | 0.007 | 5 | 5 | 5 | 5 10% AEP, 15 min burst, Storm 10 |
| B34 - Cat 1 | 0.122 | 0.122 | 0 | 5 | 5 | 5 | 5 10% AEP, 5 min burst, Storm 1 |
| B1 Bypass - | 0.03 | 0.03 | 0 | 5 | 5 | 5 | 5 10% AEP, 5 min burst, Storm 1 |
| B2 - Bypass | 0.031 | 0.022 | 0.008 | 5 | 5 | 5 | 5 10% AEP, 15 min burst, Storm 4 |
| Cat 8 | 0.018 | 0.014 | 0.004 | 5 | 5 | 5 | 5 10% AEP, 15 min burst, Storm 10 |
| B1 - Cat 10 | 0.173 | 0.173 | 0 | 5 | 5 | 5 | 5 10% AEP, 5 min burst, Storm 1 |

| PIPE DETAILS | | | | | |
|--------------|----------------|-------------|-----------------|-----------------|--------------------------------|
| Name | Max Q (cu.m/s) | Max V (m/s) | Max U/S HGL (m) | Max D/S HGL (m) | Due to Storm |
| Pipe 34.20 | 0.047 | 1.44 | 20.626 | 20.123 | 10% AEP, 20 min burst, Storm 8 |
| Pipe B2 | 0.033 | 1.21 | 13.965 | 13.826 | 10% AEP, 30 min burst, Storm 8 |
| Pipe B1 | 0.05 | 1.35 | 13.017 | 12.829 | 10% AEP, 30 min burst, Storm 8 |

| CHANNEL DETAILS | | | |
|-----------------|----------------|-------------|--------------|
| Name | Max Q (cu.m/s) | Max V (m/s) | Due to Storm |
| | | | |

| OVERFLOW ROUTE DETAILS | | | | | | | | |
|------------------------|-----------|-----------|--------|-------|---------|-----------|-------|--------------------------------|
| Name | Max Q U/S | Max Q D/S | Safe Q | Max D | Max DxV | Max Width | Max V | Due to Storm |
| Wr B2 | | | | | | | | |
| Or 2.1 | 0.033 | 0.033 | | | | | | 10% AEP, 30 min burst, Storm 8 |
| OF C7 | 0.007 | 0.007 | 1.355 | 0.012 | 0.01 | 1.23 | 0.88 | 10% AEP, 5 min burst, Storm 1 |
| OF C2 | 0.005 | 0.005 | 1.404 | 0.013 | 0.01 | 1.33 | 0.57 | 10% AEP, 15 min burst, Storm 5 |
| OF C3 | 0.003 | 0.003 | 1.447 | 0.012 | 0 | 1.23 | 0.4 | 10% AEP, 15 min burst, Storm 5 |
| OF C4 | 0.004 | 0.004 | 1.413 | 0.015 | 0.01 | 1.53 | 0.38 | 10% AEP, 15 min burst, Storm 5 |
| OF C1 | 0.025 | 0.025 | 1.441 | 0.026 | 0.01 | 4 | 0.56 | 10% AEP, 5 min burst, Storm 1 |
| OF C6 | 0.002 | 0.002 | 1.445 | 0.01 | 0 | 1.04 | 0.37 | 10% AEP, 15 min burst, Storm 5 |

| | | | | | | | | |
|------------|-------|-------|-------|-------|------|------|------|---------------------------------|
| OF C5 | 0.008 | 0.008 | 1.418 | 0.017 | 0.01 | 1.73 | 0.55 | 10% AEP, 5 min burst, Storm 1 |
| OF B34 Byp | 0.035 | 0.035 | 1.112 | 0.032 | 0.02 | 4 | 0.52 | 10% AEP, 15 min burst, Storm 10 |
| Wr 34.1 | | | | | | | | |
| Or 34.1 | 0.044 | 0.044 | | | | | | 10% AEP, 30 min burst, Storm 4 |
| OF B1 Bypa | 0.03 | 0.03 | 1.112 | 0.03 | 0.02 | 4 | 0.5 | 10% AEP, 5 min burst, Storm 1 |
| OF B2 Bypa | 0.031 | 0.031 | 1.112 | 0.03 | 0.02 | 4 | 0.51 | 10% AEP, 15 min burst, Storm 10 |
| OF C8 | 0.018 | 0.018 | 1.112 | 0.026 | 0.01 | 4 | 0.41 | 10% AEP, 15 min burst, Storm 10 |
| Wr B1 | | | | | | | | |
| Or 1.1 | 0.048 | 0.048 | | | | | | 10% AEP, 30 min burst, Storm 8 |
| OF 34.20 | 0 | 0 | 1.349 | 0 | 0 | 0 | 0 | |
| OF B2 | 0 | 0 | 1.413 | 0 | 0 | 0 | 0 | |
| OF B1 | 0 | 0 | 1.395 | 0 | 0 | 0 | 0 | |

DETENTION BASIN DETAILS

| Name | Max WL | MaxVol | Max Q | | |
|---------|--------|--------|-------|-----------|------------|
| | | | Total | Low Level | High Level |
| B2 OSD | 15.16 | 47.8 | 0.033 | 0 | 0.033 |
| B34 OSD | 24.19 | 45.7 | 0.044 | 0 | 0.044 |
| B1 OSD | 20.67 | 84.9 | 0.048 | 0 | 0.048 |

Run Log for DRAINS v2025.01.9147.24925 - 18445O-RBG-XX-XX-M2-CV-00000-High Level v6 - Scenario A - Copy

Run Log for DRAINS v2025.01.9147.24925 - 18445O-RBG-XX-XX-M2-CV-00000-High Level v6 - Scenario A - Copy.drn run at 15:50:28 on 13/8/2025.

No water upwelling from any pit.
Freeboard was adequate at all pits.

Flows were safe in all overflow routes.

| PIT / NODE DETAILS | | Version 8 | | | | | |
|--------------------|---------|--------------|---------------------------|------------------------|-------------------|-------------------|------------|
| Name | Max HGL | Max Pond HGL | Max Surface Flow (cu.m/s) | Max Pond Volume (cu.m) | Min Freeboard (m) | Overflow (cu.m/s) | Constraint |
| N C7 | 17.12 | | 0.007 | | | | |
| N C2 | 17.51 | | 0.006 | | | | |
| N C3 | 17.17 | | 0.004 | | | | |
| N C4 | 17.05 | | 0.005 | | | | |
| N C1 | 16.31 | | 0.026 | | | | |
| N C6 | 17.05 | | 0.002 | | | | |
| N C5 | 16.51 | | 0.009 | | | | |
| N B34 Bypa | 16.48 | | 0.037 | | | | |
| N B1 Bypas | 16.4 | | 0.03 | | | | |
| N B2 Bypas | 16.4 | | 0.032 | | | | |
| N C8 | 16.39 | | 0.019 | | | | |
| Pit 34.20 | 20.63 | | 0 | | 4.07 | 0 | None |
| N 34.2 | 20.12 | | 0 | | | | |
| Pit B2 | 13.96 | | 0 | | 1.04 | 0 | None |
| O B2 | 13.82 | | 0.032 | | | | |
| Pit B1 | 13.01 | | 0 | | 2.48 | 0 | None |
| O B1 | 12.82 | | 0.03 | | | | |

| SUB-CATCHMENT DETAILS | | | | | | | |
|-----------------------|---------------------|----------------------|------------------------|----------------|------------------|----------------|----------------------------------|
| Name | Max Flow Q (cu.m/s) | Paved Max Q (cu.m/s) | Grassed Max Q (cu.m/s) | Paved Tc (min) | Grassed Tc (min) | Supp. Tc (min) | Due to Storm |
| B2 - Cat 11 | 0.089 | 0.089 | 0 | 5 | 5 | 5 | 5 20% AEP, 5 min burst, Storm 1 |
| Cat 7 | 0.006 | 0.006 | 0 | 5 | 5 | 5 | 5 20% AEP, 5 min burst, Storm 1 |
| Cat 2 | 0.004 | 0.001 | 0.003 | 5 | 5 | 5 | 5 20% AEP, 10 min burst, Storm 8 |
| Cat 3 | 0.002 | 0.001 | 0.002 | 5 | 5 | 5 | 5 20% AEP, 10 min burst, Storm 8 |
| Cat 4 | 0.004 | 0.001 | 0.003 | 5 | 5 | 5 | 5 20% AEP, 10 min burst, Storm 8 |
| Cat 1 | 0.021 | 0.021 | 0 | 5 | 5 | 5 | 5 20% AEP, 5 min burst, Storm 1 |
| Cat 6 | 0.002 | 0.001 | 0.001 | 5 | 5 | 5 | 5 20% AEP, 10 min burst, Storm 8 |
| Cat 5 | 0.007 | 0.007 | 0 | 5 | 5 | 5 | 5 20% AEP, 5 min burst, Storm 1 |
| B34 Bypass | 0.028 | 0.025 | 0.003 | 5 | 5 | 5 | 5 20% AEP, 5 min burst, Storm 1 |
| B34 - Cat 1 | 0.102 | 0.102 | 0 | 5 | 5 | 5 | 5 20% AEP, 5 min burst, Storm 1 |
| B1 Bypass - | 0.025 | 0.025 | 0 | 5 | 5 | 5 | 5 20% AEP, 5 min burst, Storm 1 |
| B2 - Bypass | 0.023 | 0.02 | 0.006 | 5 | 5 | 5 | 5 20% AEP, 10 min burst, Storm 3 |
| Cat 8 | 0.014 | 0.013 | 0.002 | 5 | 5 | 5 | 5 20% AEP, 5 min burst, Storm 1 |
| B1 - Cat 10 | 0.145 | 0.145 | 0 | 5 | 5 | 5 | 5 20% AEP, 5 min burst, Storm 1 |

| PIPE DETAILS | | | | | |
|--------------|----------------|-------------|-----------------|-----------------|---------------------------------|
| Name | Max Q (cu.m/s) | Max V (m/s) | Max U/S HGL (m) | Max D/S HGL (m) | Due to Storm |
| Pipe 34.20 | 0.043 | 1.41 | 20.62 | 20.118 | 20% AEP, 25 min burst, Storm 6 |
| Pipe B2 | 0.029 | 1.18 | 13.957 | 13.82 | 20% AEP, 25 min burst, Storm 6 |
| Pipe B1 | 0.045 | 1.33 | 13.008 | 12.822 | 20% AEP, 45 min burst, Storm 10 |

| CHANNEL DETAILS | | | |
|-----------------|----------------|-------------|--------------|
| Name | Max Q (cu.m/s) | Max V (m/s) | Due to Storm |
| | | | |

| OVERFLOW ROUTE DETAILS | | | | | | | | |
|------------------------|-----------|-----------|--------|-------|---------|-----------|-------|--------------------------------|
| Name | Max Q U/S | Max Q D/S | Safe Q | Max D | Max DxV | Max Width | Max V | Due to Storm |
| Wr B2 | | | | | | | | |
| Or 2.1 | 0.029 | 0.029 | | | | | | 20% AEP, 25 min burst, Storm 6 |
| OF C7 | 0.006 | 0.006 | 1.355 | 0.012 | 0.01 | 1.23 | 0.74 | 20% AEP, 5 min burst, Storm 1 |
| OF C2 | 0.004 | 0.004 | 1.404 | 0.012 | 0.01 | 1.23 | 0.51 | 20% AEP, 10 min burst, Storm 8 |
| OF C3 | 0.002 | 0.002 | 1.447 | 0.011 | 0 | 1.13 | 0.37 | 20% AEP, 10 min burst, Storm 8 |
| OF C4 | 0.003 | 0.003 | 1.413 | 0.013 | 0.01 | 1.33 | 0.39 | 20% AEP, 10 min burst, Storm 8 |
| OF C1 | 0.021 | 0.021 | 1.441 | 0.025 | 0.01 | 4 | 0.51 | 20% AEP, 5 min burst, Storm 1 |
| OF C6 | 0.002 | 0.002 | 1.445 | 0.01 | 0 | 1.04 | 0.29 | 20% AEP, 10 min burst, Storm 8 |

| | | | | | | | |
|------------|-------|-------|-------|-------|------|------|-------------------------------------|
| OF C5 | 0.007 | 0.007 | 1.418 | 0.016 | 0.01 | 1.63 | 0.51 20% AEP, 5 min burst, Storm 1 |
| OF B34 Byp | 0.028 | 0.028 | 1.112 | 0.029 | 0.01 | 4 | 0.5 20% AEP, 5 min burst, Storm 1 |
| Wr 34.1 | | | | | | | |
| Or 34.1 | 0.041 | 0.041 | | | | | 20% AEP, 25 min burst, Storm 6 |
| OF B1 Bypa | 0.025 | 0.025 | 1.112 | 0.029 | 0.01 | 4 | 0.45 20% AEP, 5 min burst, Storm 1 |
| OF B2 Bypa | 0.023 | 0.023 | 1.112 | 0.028 | 0.01 | 4 | 0.45 20% AEP, 10 min burst, Storm 3 |
| OF C8 | 0.014 | 0.014 | 1.112 | 0.024 | 0.01 | 4 | 0.39 20% AEP, 5 min burst, Storm 1 |
| Wr B1 | | | | | | | |
| Or 1.1 | 0.043 | 0.043 | | | | | 20% AEP, 45 min burst, Storm 10 |
| OF 34.20 | 0 | 0 | 1.349 | 0 | 0 | 0 | 0 |
| OF B2 | 0 | 0 | 1.413 | 0 | 0 | 0 | 0 |
| OF B1 | 0 | 0 | 1.395 | 0 | 0 | 0 | 0 |

DETENTION BASIN DETAILS

| Name | Max WL | MaxVol | Max Q | | |
|---------|--------|--------|-------|-----------|------------|
| | | | Total | Low Level | High Level |
| B2 OSD | 14.96 | 37.9 | 0.029 | 0 | 0.029 |
| B34 OSD | 23.92 | 37.1 | 0.041 | 0 | 0.041 |
| B1 OSD | 20.46 | 68.8 | 0.043 | 0 | 0.043 |

Run Log for DRAINS v2025.01.9147.24925 - 18445O-RBG-XX-XX-M2-CV-00000-High Level v6 - Scenario A - Copy

Run Log for DRAINS v2025.01.9147.24925 - 18445O-RBG-XX-XX-M2-CV-00000-High Level v6 - Scenario A - Copy.drn run at 15:52:11 on 13/8/2025.

No water upwelling from any pit.
Freeboard was adequate at all pits.

Flows were safe in all overflow routes.

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