

JFP URBAN CONSULTANTS

SITE BASED STORMWATER MANAGEMENT PLAN

Proposed Development at
10 POOLE WAY, BUSHLAND BEACH
for
BHAVIN GANDHI





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 10 POOLE WAY, BUSHLAND BEACH
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B4818EA1_DA1_SBSMP – Revision A
 October 2025

JFP Urban Consultants Pty Ltd

Prepared by: D. Koch

Approved by: H. Watson

RPEQ 6200

Revision	Date	Details	Prepared By	Approved By	Signature
A	15/10/2025	Original Issue	DK	HW	



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1. INTRODUCTION

JFP Urban Consultants Pty Ltd was commissioned by BHAVIN GANDHI to compile this *Site Based Stormwater Management Plan* (“SBSMP”) to support the townhouse development at 10 Poole Way Bushland Beach (“site”). Refer to **Appendix A** for the proposed development layout.

Flood mitigation and stormwater quantity management have been addressed in previous development applications for the site. Pre-lodgement meeting minutes (refer **Appendix B**) indicate that where the developed site impervious area is less than 90%, stormwater quantity management (eg. onsite detention) is not required.

Proprietary stormwater quality treatment devices are proposed for the operational phase stormwater quality management of the townhouse site.

2. SITE CHARACTERISTICS

2.1 LOCATION

The site is in the TCC local government area. The real property description is Lot 4 on SP333154 with site access from Poole Way. The site is bounded by Mount Low Parkway to the east, Commercial activities to the south, vacant land to the west and a drainage channel and head wall to the north. The site area is 4674m². Refer to **Figure 1**.



Figure 1 – Site Location (TCC Mapping)

2.2 LAND USE

The site is currently vacant and predominately pervious.

2.3 TOPOGRAPHY, DRAINAGE & FLOODING

The existing site topography generally falls from south-west to north-east at grades of around 2%. The surface levels range from approximately RL 7.25m AHD on the south-western side to approximately RL 5.50m AHD on the north-eastern side.

A drainage channel traverses the northern boundary of the site. Previous engineering reporting has determined that the site is generally above the 1%AEP flood inundation line.

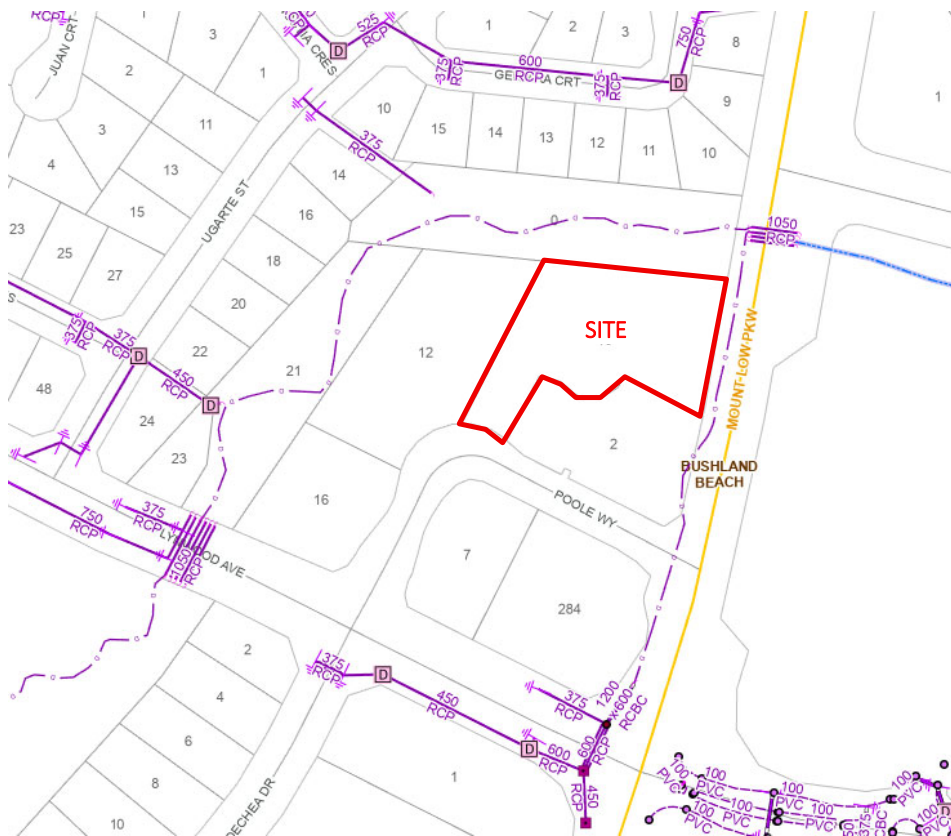


Figure 2 – Drainage- Extract form Council Mapping 2025

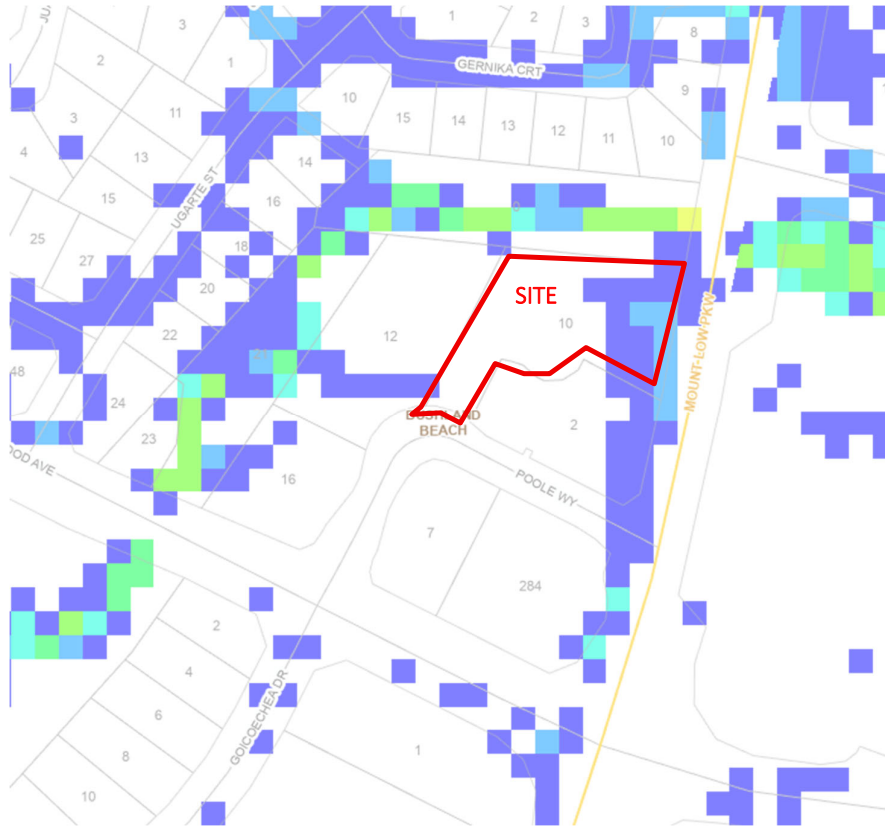


Figure 3 – 1%AEP Flood Inundation Areas – Extract from Council Mapping 2025



3. STORMWATER QUANTITY

3.1 LAWFUL POINT OF DISCHARGE

The lawful point of discharge (“LPD”) for the townhouse development is the existing drainage channel and headwall to the northeast of the site.

3.2 PREVIOUS ENGINEERING REPORTING STORMWATER MITIGATION

An Engineering Report was undertaken for the site by Northern Consulting Engineers 26 October 2021 which specifies the following:

1. Flood impact assessment has demonstrated that the proposed development can occur in a manner that there are no adverse or material offsite impacts.
2. With changes to impervious areas (analysis assumes development built-out to 90% impervious), the increase in runoff can be adequately mitigated with re-profiling of the western and northern drain. Subsequently no further mitigation measures are required.

3.3 PRE LODGEMENT MEETING MINUTES - STORMWATER

Stormwater mitigation extracted from the Council Pre-lodgement Meeting Minutes on 30 April 2025 (refer **Appendix B**);

Flood hazard overlay code

• *Finished surface levels on the subject lot are above the 1% AEP flood levels reported by Council’s latest flood modelling. Based on this, a flood impact assessment is not warranted for this development.*

Healthy waters code

• *Stormwater quantity – Per Engineering Report by Northern Consulting Engineers, it was identified that the lots can be developed to a fraction impervious of 90% without requiring any mitigation (other than creek re-profiling which has already occurred). If a greater fraction impervious is proposed for this development, some runoff mitigation / detention may be required.*

The above indicates that no further Flood Investigation is required for the site. The proposed development has been designed to ensure all properties are a minimum 300mm above the 1% AEP flood inundation level.



Refer **Table 1** which summarises Finished Floor Levels and 1% AEP Flood Levels for the site.

Table 1 - Finished Floor Levels and 1% AEP Flood Levels

	Floor Level	1% AEP Level *	Freeboard (m)
Unit 1	7.55	7.25	0.30
Unit 2	7.55	7.25	0.30
Unit 3	6.65	na	-
Unit 4	6.65	na	-
Unit 5	6.45	na	-
Unit 6	6.45	na	-
Unit 7	6.20	na	-
Unit 8	6.20	na	-
Unit 9	6.20	5.85	0.35
Unit 10	6.20	5.85	0.35
Unit 11	6.10	5.80	0.30
Unit 12	6.10	5.75	0.35
Unit 13	5.95	5.65	0.30
Unit 14	5.95	5.65	0.30
Unit 15	6.20	5.70	0.50
Unit 16	6.20	5.70	0.50
Unit 17	6.50	6.00	0.50
Unit 18	6.50	6.00	0.50
Unit 19	6.75	6.30	0.45
Unit 20	6.75	6.30	0.45

*Extracted from Councils Online Mapping

NB Unit 3-Unit 8 are not affected by external flooding

Additionally, Council's Pre-lodgement Meeting Minutes note that where the site impervious area is less than 90% onsite stormwater mitigation is not required.

The fraction impervious for the site is has been calculated to be 80% (<90% - refer **Table 4**). Onsite detention is therefore not recommended.



4. STORMWATER QUALITY MANAGEMENT

4.1 CONSTRUCTION PHASE STORMWATER QUALITY MANAGEMENT

4.1.1 INTRODUCTION

This section provides conceptual stormwater quality management strategies for construction phase of the townhouse site. No modelling has been undertaken at this stage. Erosion and Sediment Control (“ESC”) plans will be prepared during detailed design phase and implemented during construction.

4.1.2 POLLUTANTS

Typical pollutants generated during the construction phase of an urban development are shown in **Table 2**. These based on *Table C4.1 BCC’s Subdivision & Development Guidelines Part C Section 4.1.1* (2008).

Table 2 – Construction Phase Pollutants

Pollutant	Potential Source
Litter	Paper, construction packaging, food packaging, cement bags, off-cuts.
Sediment	Unprotected exposed soils and stockpiles during earthworks and building works.
Hydrocarbons	Fuel/oil spills, leaks from construction equipment, and temporary car park areas.
Toxic Materials	Cement Slurry, asphalt primer, solvents, cleaning agents, washwaters (eg. from tile works)
pH altering substances	Cement slurry, acid sulfate soils, and washwaters

4.1.3 WATER QUALITY OBJECTIVES

It is recommended that the amount of runoff crossing and leaving the site is kept to a minimum during the construction phase to restrict soil erosion and mobilisation of sediments and pollutants through and off the site. **Table 3** presents an extract from *Table A, Appendix 2 of the State Planning Policy* (2017) objectives for construction phase stormwater quality management.

Table 3 – Construction Phase Water Quality Objectives

Issue	Desired Outcomes
Erosion Control	<ol style="list-style-type: none"> 1. Stage clearing and construction works to minimise the area of exposed soil at any one time. 2. Effectively cover or stabilise exposed soils prior to predicted rainfall. Prior to completion of works for the development, and prior to removal of sediment controls, all site surfaces must be effectively stabilised using methods which will achieve effective short-term stabilisation.
Sediment Control	<ol style="list-style-type: none"> 1. Direct runoff from exposed site soils to sediment controls that are appropriate to the extent of disturbance and level of erosion risk. All exposed areas greater than 2500m² must be provided with sediment controls which are designed, implemented, and maintained to a standard which would achieve at least 80% of the average annual runoff volume of the contributing catchment treated (i.e., 80% hydrological effectiveness) to 50mg/L Total Suspended Solids (TSS) or less, and pH in the range (6.5–8.5).



4.1.4 STORMWATER QUALITY MANAGEMENT STRATEGY

An ESC plan that is endorsed by an CPESC or a RPEQ will be prepared and implemented during construction phase. ESC measures may include, but not limited to, devices such as:

- Sediment basin/s,
- diversion drains,
- silt fences, and
- construction entry/exit pads.

4.1.5 MONITORING & MAINTENANCE

The general requirement of monitoring during the construction phase will be:

- Work activities to be restricted to designated construction areas.
- Earthworks and site clearing to be undertaken in accordance with the ESC plans prepared during detailed design phase.
- ESC devices to be constructed in accordance with the ESC plans prepared during detailed design phase.
- Inspect sediment fences and ESC structures/devices on a weekly basis as well as after any rain event exceeding 25mm in 24hrs.
- Stormwater discharges from the site are not to have any adverse effect on the downstream environment.
- Monitor and record of the performance of the drainage control devices including water quality testing where required.
- Any failure in the stormwater system to be immediately rectified to prevent uncontrolled discharge from the site.
- Any failure to the stormwater system causing damage to surroundings should implement immediate remedial work to the damaged area.

4.1.6 RESPONSIBILITY & REPORTING

- The contractor shall be responsible for monitoring the performance of all drainage control and ESC devices.
- Records of any failures to devices should be kept and reported to the Construction Manager.
- Regular inspections of the devices shall be reported to the Construction Manager.
- Inspections of the devices after heavy rainfall shall be reported to the Construction Manager.



4.2 OPERATIONAL PHASE STORMWATER QUALITY MANAGEMENT

4.2.1 INTRODUCTION

The townhouse site is greater than 2,500m² and creates more than 6 new dwellings. Therefore, it is required to address the *State Planning Policy* (2017) for operational phase stormwater quality management and meeting required Water Quality Objectives (“WQO”).

Table 4 presents the WQOs required in accordance with the *State Planning Policy* (2017).

Table 4 –Operational Phase Water Quality Objectives

Pollutant	Load Based Pollutant Reduction WQO (%)
Total Suspended Solids (TSS)	80
Total Phosphorus (TP)	65
Total Nitrogen (TN)	40
Gross Pollutants (GP)	90

4.2.2 STORMWATER QUALITY MANAGEMENT STRATEGY

Proprietary devices are proposed within a storage vault for operational phase water quality treatment. This report presents the following SQIDEP verified *Atlan Stormwater* devices (<https://atlanstormwater.com/au/>). Other devices/manufacturers are also appropriate subject to Council acceptance.

- 7 x Atlan Stormsack litter baskets (or approved equivalent), and
- 11 x Atlan Full Height Filters (or approved equivalent).

4.2.3 MUSIC MODELLING

Modelling of the operational phase stormwater quality treatment in the townhouse site has been undertaken using the MUSICX version 1.40. The modelling is generally in accordance with Water by Design’s *MUSIC Modelling Guidelines V1.0* (2010) and *MUSIC Modelling Guidelines Draft V3.0* (2018).

4.2.3.1 RAINFALL PARAMETERS

- Rainfall Station: Townsville Aero (Station No. 32040)
- Modelling Period: 01/06/1997– 31/05/2006
- Modelling Time Step: 6-minute.
- Mean Evapo-Transpiration: per *Table A1.1* of the *MUSIC Modelling Guidelines Draft V3.0* (2018)



4.2.3.2 SOURCE NODES

Source Nodes have been used to set up catchment details in MUSIC using the split catchment approach. The following parameters and assumptions have been adopted:

- Refer to Drawing No. **B4818EA1_DA1_SK02** in **Appendix C** for MUSIC catchment plan for the townhouse site.
- The rainfall-runoff parameters as per *Table A1.2* of the *MUSIC Modelling Guidelines Draft V3.0* (2018) for “Urban Residential”.
- The base-flow and storm-flow parameters as per *Table B1.3* of the *MUSIC Modelling Guidelines Draft V3.0* (2018) for “Urban Residential” with stochastic flow generation.
- Roof and driveway/parking pavement areas have been measured from the layout (**Appendix C**).
- Stochastic generated pollutant estimation has been adopted.

The source node areas and fraction impervious are shown in **Table 5**.

Table 5 – MUSIC Source Node Data

MUSIC Catchment	MUSIC Node Name	Treatment	Area (ha)	Fi
Area A Treated	Roof	Filters only	0.181	100%
	Road	Litter baskets + filters	0.148	100%
	Ground	Filters only	0.133	30%
Area B Untreated	Ground	Nil	0.005	80%
Total	-	-	0.467	-

4.2.3.3 LINKS

The default setting with no routing has been adopted for the model links.

4.2.3.4 TREATMENT NODES

Table 6-8 present the treatment nodes modelled in MUSIC. Capture efficiencies have been set up by Atlan Stormwater. SQIDEP verification certificates are included in **Appendix D**.

Table 6 – Stormsack Litter Basket Treatment Devices

Treatment Node Name	Treatment Node Type	High Flow Bypass (m ³ /s)
Atlan Stormsacks (x7)	Generic Treatment Node	0.125

Table 7 – The Detention Area around Atlan Full Height Filter Treatment Devices

Treatment Node Name	Treatment Node Type	High Flow Bypass (m ³ /s)	Surface Area (m ²)	Ext. Det. Depth (m)	Low Flow Pipe Dia (mm)	Overflow Weir Width (m)
Atlan Vault (11.0m ²)	Storage Vault Treatment Node	100	11	0.85	131	0.5

Table 8 – Atlan Full Height Filter Treatment Devices

Treatment Node Name	Treatment Node Type	High Flow Bypass (m ³ /s)
Atlan Filters (x11)	Generic Treatment Node	0.033

4.2.3.5 MUSIC LAYOUT

Figure 4 shows the Music Modelling setup and pollutant removal rates.

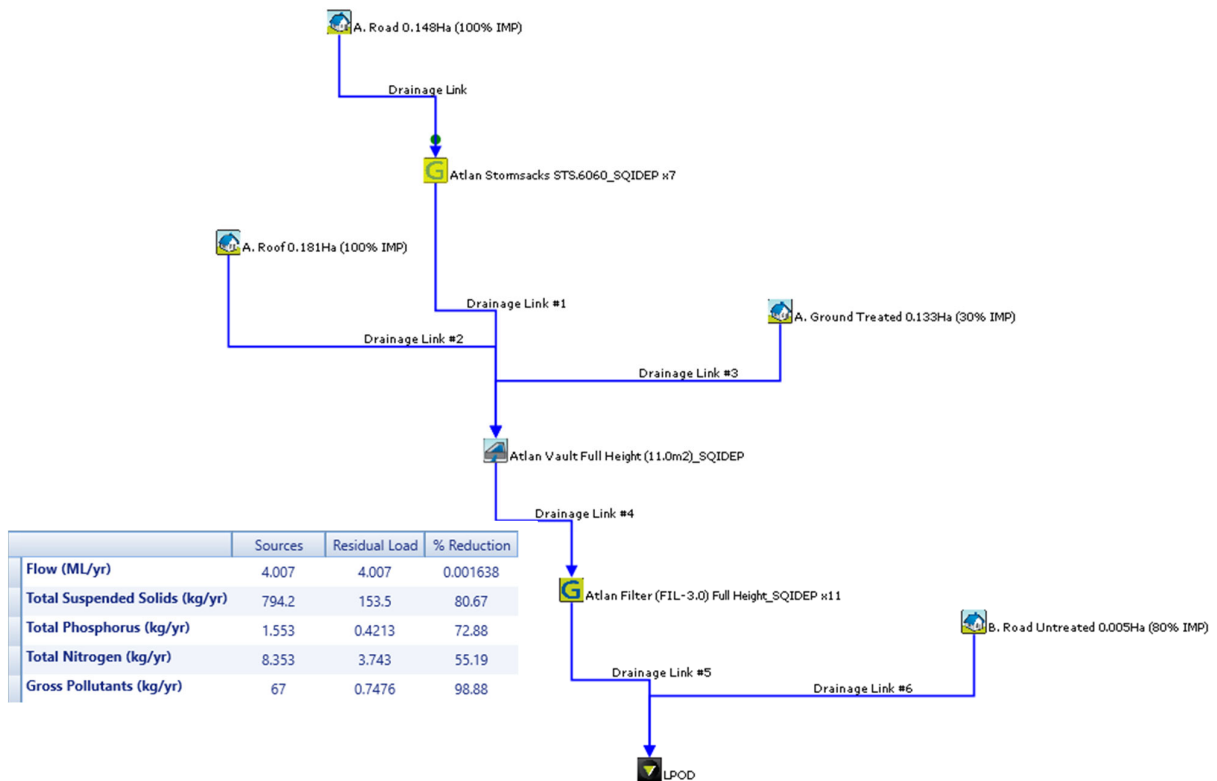


Figure 4 – MUSIC Layout

4.2.3.6 MUSIC RESULTS

Pollutant reduction results at “Receiving Node” are shown in Table 9.

Table 9 – MUSIC Results

Pollutant	WQO (%)	Reduction Achieved (%)	Reduction Achieved ≥ WQO?
TSS	80	80.67	Y
TP	65	72.88	Y
TN	40	55.19	Y
GP	90	98.88	Y

The results demonstrate that with the proposed treatment devices, the modelled catchments achieve the operational phase WQOs in accordance with the *State Planning Policy (2017)*.



5. CONCLUSION & RECOMMENDATIONS

JFP Urban Consultants Pty Ltd have prepared this SBSMP for the proposed townhouse development at 10 Poole Way, Bushland Beach. The outcomes of the analyses are as follows:

Stormwater Quantity

- LPD for the townhouse site is the existing drainage channel and headwall to the northeast of the site.
- In accordance with previous Engineering Reporting and Council pre-lodgement meeting minutes, on-site detention is not required as the proposed site impervious area is less than 90%.

Stormwater Quality

- The following proprietary devices are proposed for operational phase water quality treatment in the townhouse site. Other devices/manufacturers are also appropriate subject to Council acceptance:
 - 7 x Atlan stormsack litter baskets (or approved equivalent)
Note: litter basket required in every field inlet in driveway / car parking area. If the number of field inlets in the driveway increase in detail design, the number of litter baskets shall increase accordingly.
 - 11 x Atlan Full Height Filters (or approved equivalent) located within a storage vault.



6. DISCLAIMER

This report has been prepared for the purpose and exclusive use of BHAVIN GANDHI as an investigation into the stormwater management issues related to the proposed development of the land described in the report. The information presented in this report is not to be used for any other purpose or by any other person or corporation.

JFP Urban Consultants Pty Ltd accepts no responsibility for any loss or damage suffered howsoever arising to any person or corporation who may use or rely on this report without further input and/or advice from JFP Urban Consultants Pty Ltd.

The investigations, calculations, analysis and recommendations presented in this report rely on information sourced from third parties. JFP Urban Consultants Pty Ltd accepts no responsibility for the accuracy of the information sourced from third parties.



7. APPENDICES

- Appendix A – Site Layout
- Appendix B – Council Pre-lodgement Meeting Minutes
- Appendix C – Catchment Plans
- Appendix D – Proprietary Device SQIDEP Certification



APPENDIX A

SITE LAYOUT



02 SITE PLAN LEVEL 1
1:200

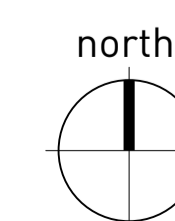
PROPOSED TOWNHOUSE DEVELOPMENT ,
10 POOLE WAY, BUSHLAND BEACH

POOLE WAY PTY LTD

SITE PLAN LEVEL 1

DRAFT
scale : 1:200 @A1 1:400 @A3
issue : 01 date : 21-07-25

7340-DA03



BLACKBURNE JACKSON
ARCHITECTURE | LANDSCAPE | INTERIOR | PROJECT MANAGEMENT

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APPENDIX B

COUNCIL PRE-LODGEMENT MEETING MINUTES



PRE-LODGEMENT MEETING MINUTES >>

PO BOX 1268, Townsville
Queensland 4810

COUNCIL REFERENCE >> PLM25/0071
ASSESSMENT NO >> 11127010
LEGAL DESCRIPTION >> Lot 4 SP 333154
PROPERTY ADDRESS >> 10 Poole Way BUSHLAND BEACH QLD 4818
PROPOSAL >> MCU - Multiple Dwelling Units (20 x 3 bed units)

13 48 10
enquiries@townsville.qld.gov.au
townsville.qld.gov.au

ABN: 44 741 992 072

DATE >> 30 April 2025
TIME >> 2:00pm

ATTENDEES >>

Taryn Pace Senior Planner - Planning and Development
Dale Armbrust Senior Development Engineer - Planning and Development
Charlotte Brine Planning Support Officer - Planning and Development

VIA MICROSOFT TEAMS/TELECONFERENCE >>

Timothy Balcombe JPP Urban Consultants
Haydn Watson JPP Urban Consultants

Description of the Proposal

- The proposal is for Multiple Dwelling Units (20 x 3 bed units)
- Two storey town house development each with single garage
- 18 onsite visitor carparking spaces and 1 car wash facility
- Development proposal plans - [attached](#)

Property Zoning and Overlays

Zone:

>> Low density residential zone

Precinct:

Not applicable

Sub precinct:

Not applicable

Plans of development or other plans:

Not applicable

Priority infrastructure plan:

>> This property is within a Local Government Infrastructure Plan Area.

Overlay(s):

>> Bushfire hazard Overlay Map OM-02 - Medium bushfire hazard area

>> Airport Environs Overlay Map OM-01.1 - Operational airspace - Airspace more than 90m above ground level

>> Airport Environs Overlay Map OM-01.2 - Wildlife hazard buffer zones and Public safety areas - Distance from airport runway - 13km

>> Development Constraints Overlay Map OM-06.1 to OM-06.2 - Flood hazard - High hazard area

>> Development Constraints Overlay Map OM-06.1 to OM-06.2 - Flood hazard - Low hazard area

>> Development Constraints Overlay Map OM-06.1 to OM-06.2 - Flood hazard - Medium hazard

area

>> Development Constraints Overlay Map OM-07.1 - Landslide hazard - Very low

Planning Scheme

The proposal is subject to assessment against the Townsville City Plan. The planning scheme can be viewed via the following link: [Current City Plan \(townsville.qld.gov.au\)](https://townsville.qld.gov.au)

Furthermore, Townsville Maps can be viewed via the following link: [TownsvilleMAPS Mapping Service - Townsville City Council](#)

Meeting Discussion

- Defined Use - Multiple Dwelling
- Level of assessment - Impact assessable
- Application would be subject to Public Notification
- The development application will be assessed on its merits, however there is no guarantee of approval.
- Strategic Framework
- Low density residential zone code
 - The purpose of the Low density residential zone code is to provide for predominately dwelling houses
 - Low-rise multiple dwellings, may be acceptable within this zone where provided in locations that are within a convenient walkable distance to centres, public transport and community activities, and where of a scale that is consistent with the local character.
 - The subject site is located in close proximity to established centres, community facilities, open space and public transport networks.
 - Detailed assessment against the relevant elements of the Low density residential zone code would be required.
 - Consideration to design should be given to ensure the use maintains appropriate scale and amenity consistent with the established local character.
 - Consideration also to be given to ensure all units maintain appropriate amenity for residents of the multiple dwelling.
 - The adjoining site (2 Poole Way) is benefited by a Development Permit for a Child Care Centre. The design of this centre should be reviewed (e.g location of outdoor play areas, refuse storage/collection, etc). Consideration to be given to the interface between the proposed Multiple Dwelling and centre to ensure appropriate onsite amenity is achieved.
 - Similar consideration to be given to the existing supermarket (6 Lionel Turner Drive). Units to be designed to minimise noise impacts that may be generated, particularly those that are presenting to the existing loading dock/ refuse collection area for the supermarket.
 - A Noise impact assessment confirming the proposed residences maintain appropriate noise levels (internal and external) may be required.
- Transport impact, access and parking code
 - The development application must be supported by a traffic impact assessment certified by an RPEQ and prepared in accordance with *SC6.4.5.2 Traffic impact assessments (TIA)* of the Townsville City Plan.
- Works code
 - Water and sewerage - Please refer to the attached Water Supply and Sewerage Planning report by DPM Water which was approved as part of RAL21/0061. This report had assessed the capacity of Council's water and sewerage networks when the subject lot was first created. If the proposed multiple dwelling development will increase demands over that which was assumed for the subject site in this report, a revised water and sewer assessment report may be required.

- It is noted that Unit 14 shown on the concept plan appears to be close to an existing Council sewer line. A future Building over Services application to Council may be required.
- Healthy waters code
 - Stormwater quantity - Please refer to the attached Engineering Report by Northern Consulting Engineers. Per this report, it was identified that the lots can be developed to a fraction impervious of 90% without requiring any mitigation (other than creek re-profiling which has already occurred). If a greater fraction impervious is proposed for this development, some runoff mitigation / detention may be required.
 - Stormwater quality - The above-mentioned Engineering Report had assumed that future developments on the lots created as part of RAL21/0061 would implement their own stormwater treatment systems to achieve the pollutant reduction targets specified by the State Planning Policy 2017. As such, the development application must be accompanied by a stormwater quality management plan identifying such a treatment system. Any treatment devices proposed to service the proposed multiple dwelling development would remain private assets to be operated and maintained by the site operator i.e. they would not be handed over to Council.
- Landscape code
 - Concept landscape plans preferred
- Airport environs overlay code
- Flood hazard overlay code
 - Please refer to the attached as-constructed drawings which show that the finished surface levels on the subject lot are above the 1% AEP flood levels reported by Council's latest flood modelling¹. Based on this, a flood impact assessment is not warranted for this development.
- Bushfire hazard overlay code
- Further Pre-lodgement discussion to discuss design detail, siting, etc. encouraged once further plans and details available.

Community title scheme

- The applicant further seeks Council feedback on a Community Title Scheme to create freehold lots as opposed to a Multiple Dwelling.
- Community Title Scheme is not Council's preference.
- Lots smaller than the minimum lot size (400m²) would be required to be appropriate serviced and built form outcomes demonstrated.
- Further discussion on the requirements for the common property, servicing requirements and access arrangements would be required if this is the applicant's preference.

Other Applicable Information

Upon lodgement of your development application, you will be required to pay assessment fees in accordance with Council's Planning Services Fees and Charges Schedule. For the most current schedule, please refer to: [Fees & Charges - Townsville City Council](#)

Furthermore, the development proposal will be subject to Infrastructure Charges. For a comprehensive review of Council's Infrastructure Charge Resolution, please view the following link: [Infrastructure Charges - Townsville City Council](#)

Post Meeting Feedback

¹ Link to Council's latest flood modelling: <https://flood.townsville.qld.gov.au/>

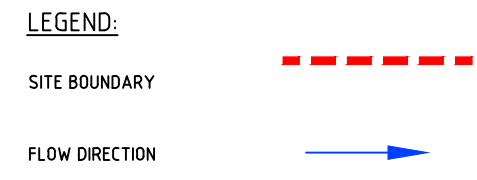
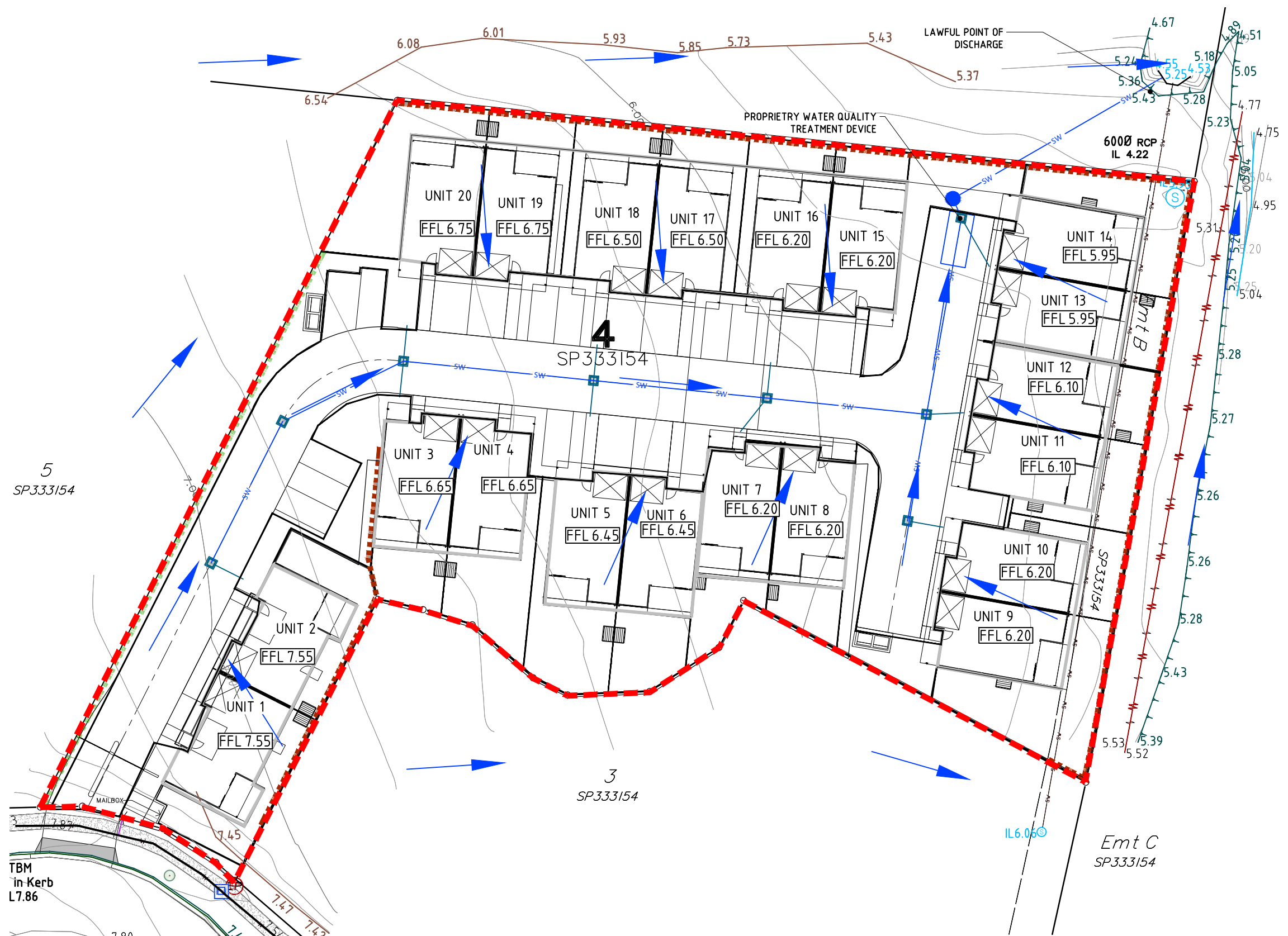
Meeting Closed >> 2:17pm

Note: This pre-lodgement advice has been prepared based on the information provided in the meeting. A full assessment of the proposal against the planning scheme has not been carried out and this advice may be subject to change at the time of lodgement of a formal development application. An application may be subject to requests for further information not identified in the pre-lodgement meeting following a full assessment.



APPENDIX C

CATCHMENT PLANS



JFOP
 BRISBANE - SUNSHINE COAST - CENTRAL QLD
 BRISBANE
 JFP House - 76 Ernest Street,
 South Brisbane Qld 4101
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CATCHMENT PLAN
 10 POOLE WAY, BUSHLAND BEACH
 BHAVIN GANDHI

JOB NO:	PLAN:	ISSUE:
B4818EA1_DA1	SK01	A
SCALE:	1:1500 @ A1	
DATE:	15/10/2025	
DRAFTED BY:	DK	
FILE NAME:	B4818EA1_DA7_SK01.DWG	

15/10/2025 11:48:18 AM D:\STORMWATER MANAGEMENT\REV\ACAD\B4818EA1_DA7_SK01



- LEGEND:**
- SITE BOUNDARY
 - FLOW DIRECTION
 - STORMWATER FILTER VAULT
 - STORM SACKS
 - ROOF AREAS
 - SEALED AREAS
 - GROUND AREAS
 - UNTREATED AREAS

5
P333154

3
SP333154

EMT C
SP333154

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in Kerb
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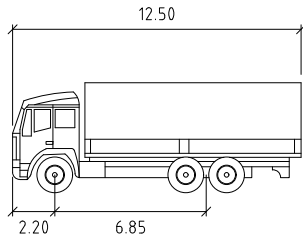
PLANNERS
URBAN DESIGNERS
SURVEYORS
ENGINEERS
LANDSCAPE ARCHITECTS

MUSIC CATCHMENT PLAN

10 POOLE WAY, BUSHLAND BEACH BHAVIN GANDHI

JOB NO:	PLAN:	ISSUE:
B4818EA1_DA1	SK02	A
SCALE:	1:1500 @ A1	
DATE:	15/10/2025	
DRAFTED BY:	DK	
FILE NAME:	B4818EA1_DA7_SK02.DWG	

16/10/2025 11:48:18 AM STORMWATER MANAGEMENT REV A CADWATERB4818EA1_SK02



SU TRUCK

	meters
Width	: 2.50
Track	: 2.50
Lock to Lock Time	: 6.0
Steering Angle	: 36.6

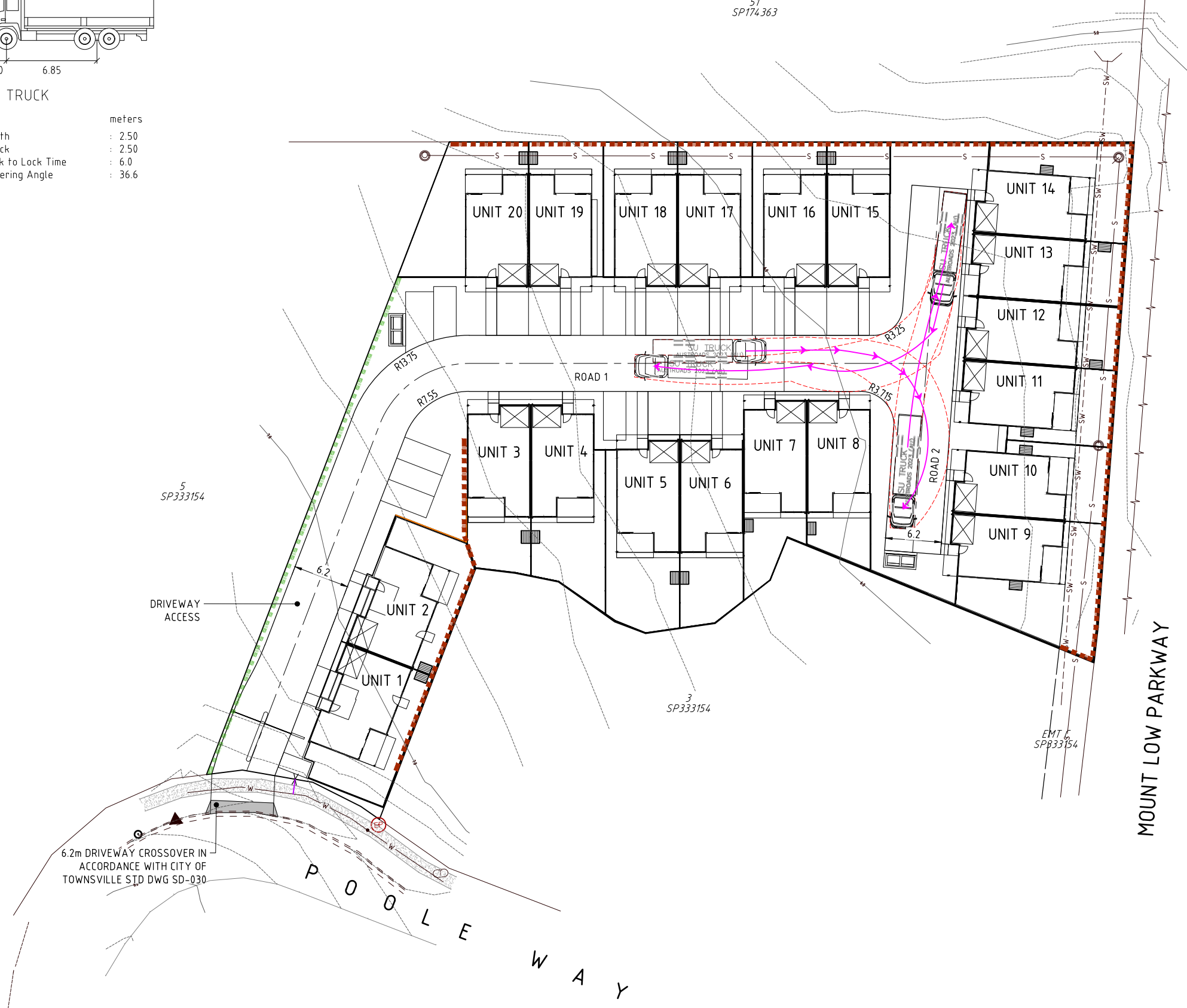
LEGEND:

EXISTING CONTOURS	——— 32 ———
EXISTING KERB & CHANNEL	=====
EXISTING EDGE OF BITUMEN	- - - - -
PROPOSED KERB & CHANNEL	=====
PROPOSED RETAINING WALL	-----
PRELIMINARY RETAINING WALL (BY BUILDING CONTRACTOR)	-----

TREE LEGEND

TREES PROPOSED TO BE RETAINED AND PROTECTED.	○
TREES PROPOSED TO BE RETAINED AND REQUIRE ARBORIST (AQF5) DIRECTION & SUPERVISION FOR TPZ WORKS.	⊗

TREE PROTECTION ZONE (TPZ)
 TPZ to be protected in accordance with Protection of trees on Development Sites (AS4970-2009) guidelines & any approval conditions.



6.2m DRIVEWAY CROSSOVER IN ACCORDANCE WITH CITY OF TOWNSVILLE STD DWG SD-030

ENGINEERING CONCEPT - FUNCTIONAL TRAFFIC LAYOUT

**10 POOLE WAY, BUSHLAND BEACH
 BHAVIN GANDHI GROUP**







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JOB NO:	PLAN:	ISSUE:
B4818EA1_DA1	CT01	A
SCALE:	1:250 @ A1	
DATE:	15/10/2025	
DRAFTED BY:	CDV	
FILE NAME:	B4818EA1_DA1.DWG	

14/10/2025 14:48:13 (A) DESIGN WORKING DRAWINGS (B4818EA1_DA1)



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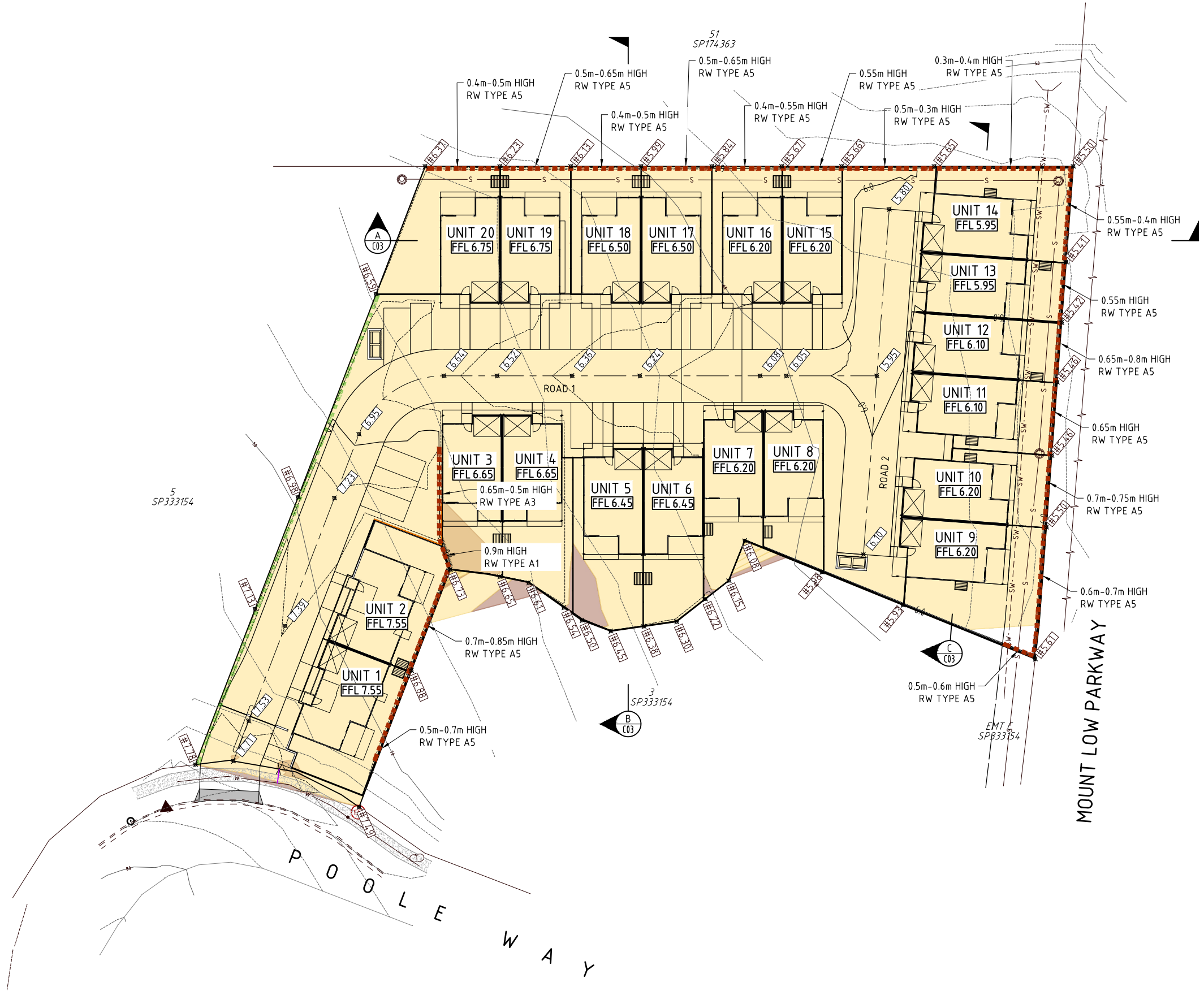
EXISTING CONTOURS	— 32 —
FINISHED CONTOURS	— 32 —
PRELIMINARY PAD LEVEL (PL)	PL40.65
PRELIMINARY FILLING	
PRELIMINARY EXCAVATION	
PRELIMINARY RETAINING WALL	
PRELIMINARY RETAINING WALL (BY BUILDING CONTRACTOR)	

NOTES:

- BATTERS BETWEEN ALLOTMENTS TO BE 1 IN 2 MAXIMUM.
- PAD AND EARTHWORKS LEVELS ARE PRELIMINARY ONLY AND ARE SUBJECT TO DETAILED ENGINEERING DESIGN.
- RETAINING WALL HEIGHTS ARE INDICATIVE ONLY AND ARE SUBJECT TO DETAILED ENGINEERING DESIGN.
- PLEASE REFER TO THE TREE RETENTION PLAN (TRP) FOR DETAILS PERTAINING TREE RETENTION &/OR REMOVAL

TREE LEGEND

- TREES PROPOSED TO BE RETAINED AND PROTECTED. 
 - TREES PROPOSED TO BE RETAINED AND REQUIRE ARBORIST (AQF5) DIRECTION & SUPERVISION FOR TPZ WORKS. 
- TREE PROTECTION ZONE (TPZ)
TPZ to be protected in accordance with Protection of Trees on Development Sites (AS4970-2009) guidelines & any approval conditions.



ENGINEERING CONCEPT - EARTHWORKS LAYOUT PLAN

10 POOLE WAY, BUSHLAND BEACH
BHAVIN GANDHI GROUP

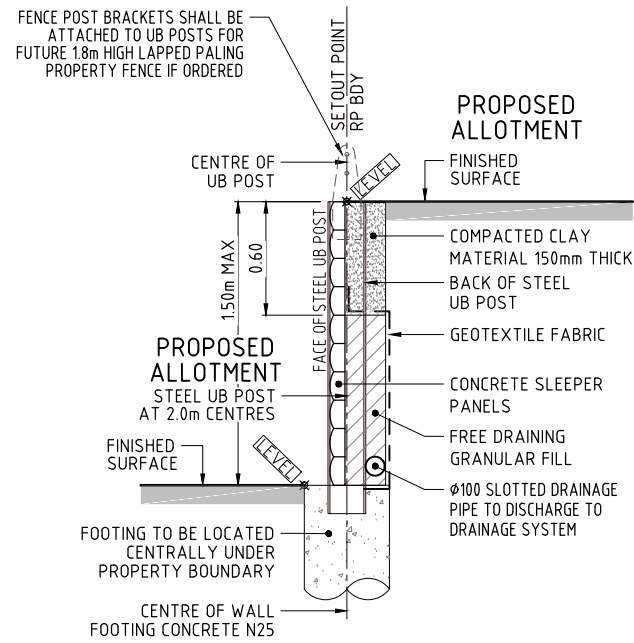


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LANDSCAPE ARCHITECTS

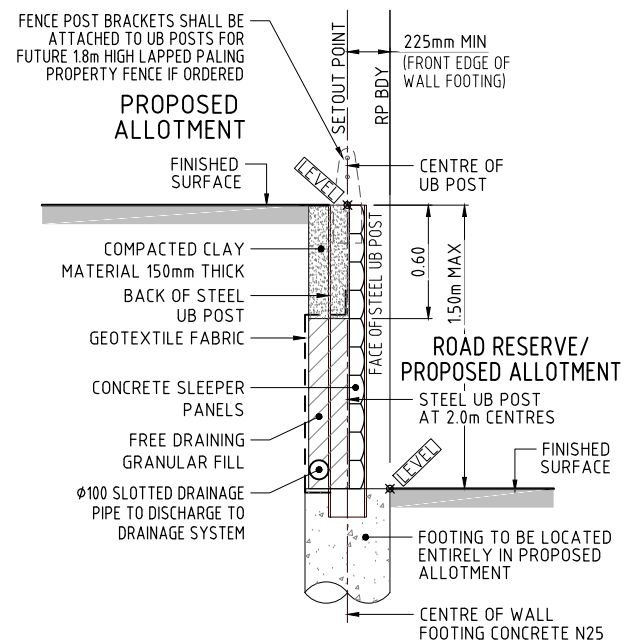
JOB NO:	PLAN:	ISSUE:
B4818EA1_DA1	CE01	A
SCALE:	1:250 @ A1	
DATE:	15/10/2025	
DRAFTED BY:	CDV	
FILE NAME:	B4818EA1_DA1.DWG	

14/10/2025 14:48:34\B4818EA1\DESIGNING DRAWINGS\B4818EA1.DWG



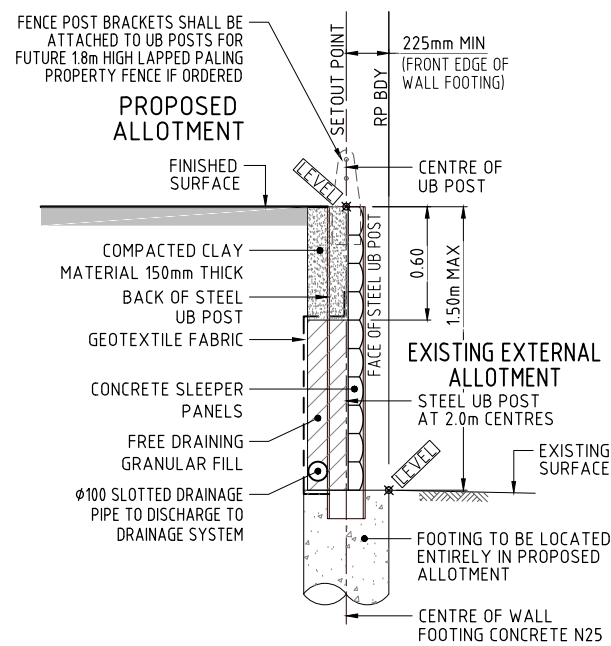
TYPICAL SECTION - TYPE A1
CONCRETE SLEEPER/UB POST RETAINING WALL
SCALE 1:20

NOTE: RETAINING WALL DESIGN (INCLUDING FENCE POST BRACKETS AND FITTINGS) AND CONSTRUCTION CERTIFICATION TO INCORPORATE LOADING FROM FUTURE 1.8m HIGH LAPPED PALING PROPERTY FENCE



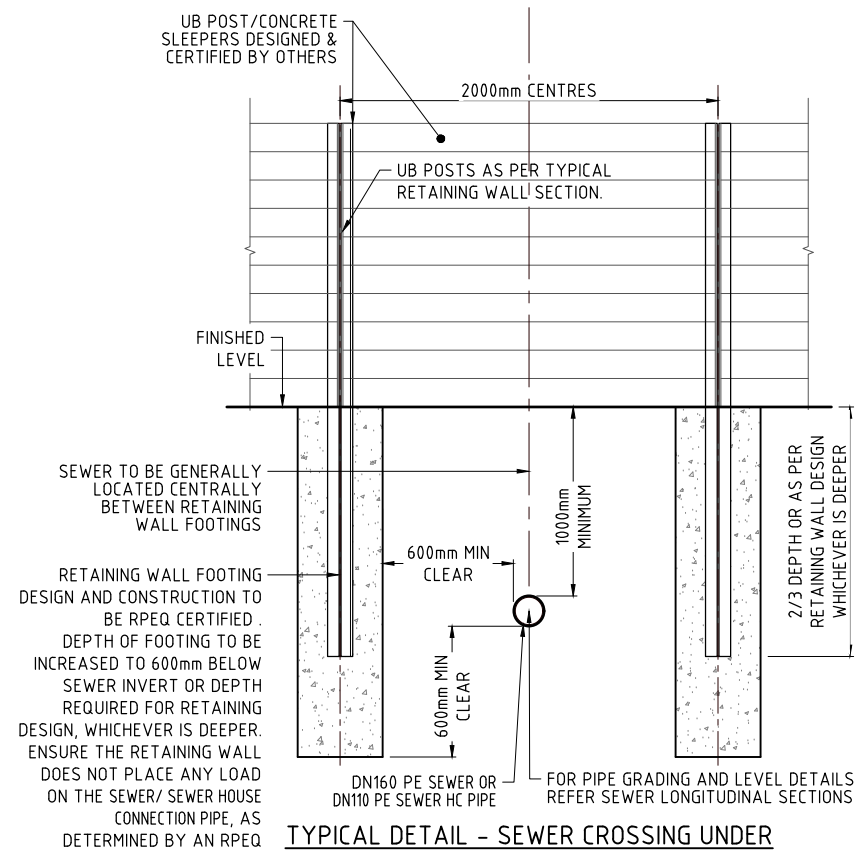
TYPICAL SECTION - TYPE A3
CONCRETE SLEEPER/UB POST RETAINING WALL
SCALE 1:20

NOTE: RETAINING WALL DESIGN (INCLUDING FENCE POST BRACKETS AND FITTINGS) AND CONSTRUCTION CERTIFICATION TO INCORPORATE LOADING FROM FUTURE 1.8m HIGH LAPPED PALING PROPERTY FENCE



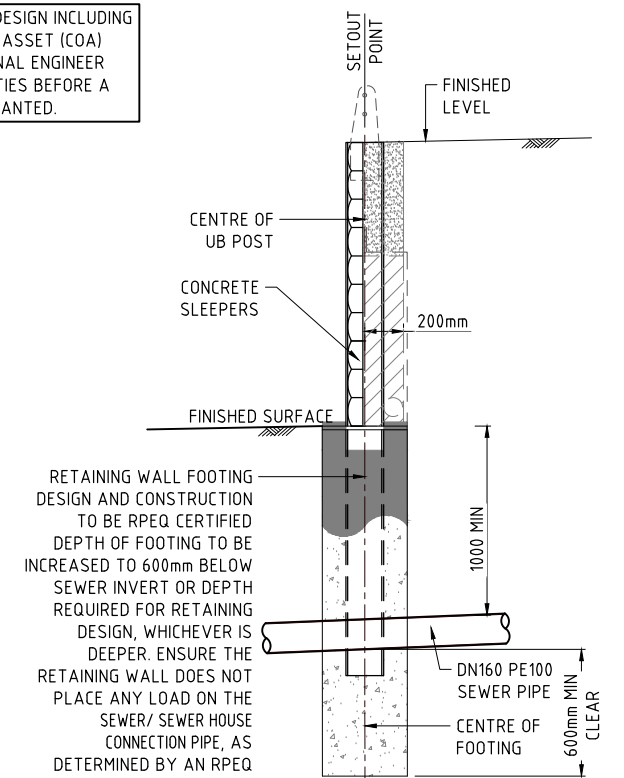
TYPICAL SECTION - TYPE A5
CONCRETE SLEEPER/UB POST RETAINING WALL
SCALE 1:20

NOTE: RETAINING WALL DESIGN (INCLUDING FENCE POST BRACKETS AND FITTINGS) AND CONSTRUCTION CERTIFICATION TO INCORPORATE LOADING FROM FUTURE 1.8m HIGH LAPPED PALING PROPERTY FENCE



TYPICAL DETAIL - SEWER CROSSING UNDER
CONCRETE SLEEPER RETAINING WALL
SCALE 1:20

APPROVED RETAINING WALL STRUCTURAL DESIGN INCLUDING A FORM 15 AND A SIGNED CONSTRUCT OVER ASSET (COA) FORM ISSUED BY A REGISTERED PROFESSIONAL ENGINEER (RPEQ) AND APPROVED BY TO URBAN UTILITIES BEFORE A NETWORK ACCESS PERMIT (NAP) MAY BE GRANTED.



SECTION A-A
SCALE 1:20



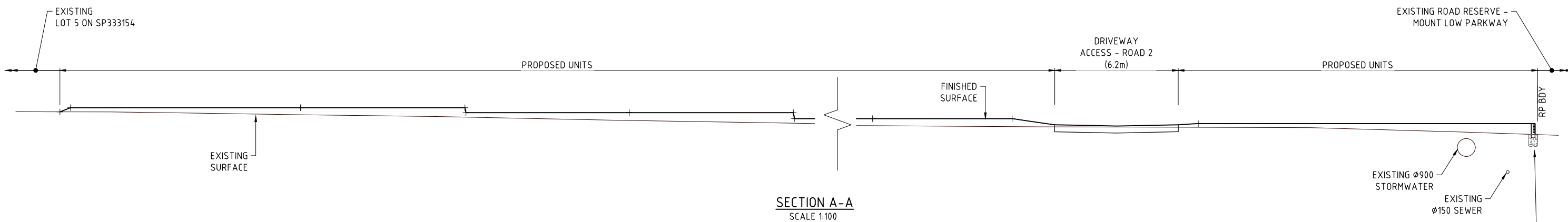
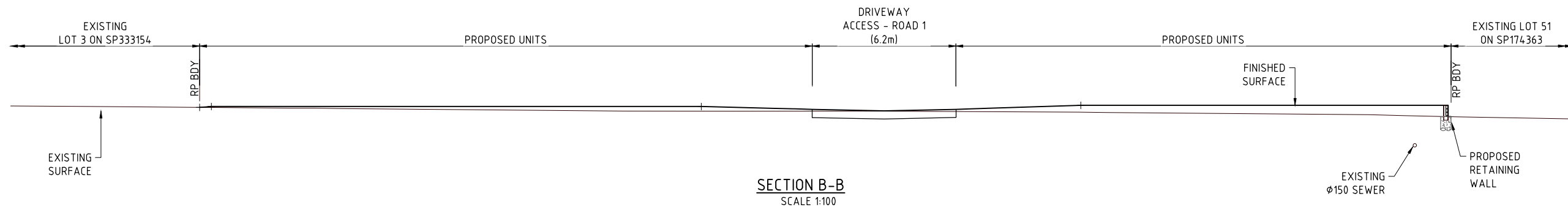
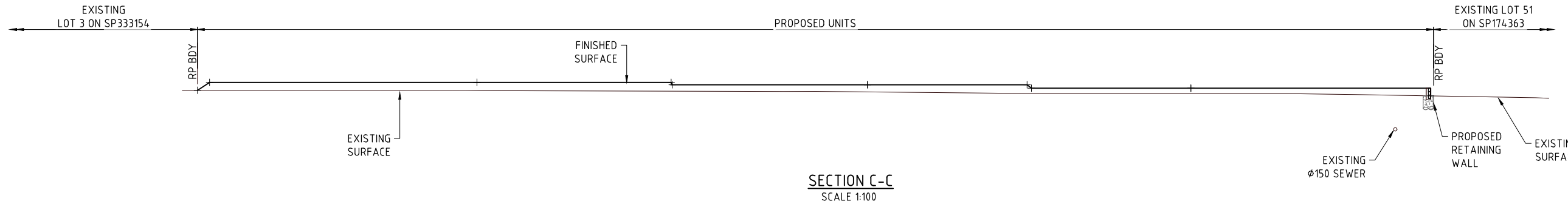
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ENGINEERING CONCEPT - EARTHWORKS DETAILS PLAN

10 POOLE WAY, BUSHLAND BEACH
BHAVIN GANDHI GROUP

JOB NO: B4818EA1_DA1 PLAN: CE02 ISSUE: A
SCALE: 1:20 @ A1
DATE: 15/10/2025
DRAFTED BY: CDV
FILE NAME: B4818EA1_DA1.DWG



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ENGINEERING CONCEPT - EARTHWORKS SECTIONS PLAN

10 POOLE WAY, BUSHLAND BEACH
 BHAVIN GANDHI GROUP

JOB NO:	PLAN:	ISSUE:
B4818EA1_DA1	CE03	A
SCALE:	1:100 @ A1	
DATE:	15/10/2025	
DRAFTED BY:	CDV	
FILE NAME:	B4818EA1_DA1.DWG	

PRELIMINARY SERVICES LEGEND:

FINISHED CONTOURS	— 32 —
EXISTING WATER	— W —
EXISTING SEWERAGE	— S —
EXISTING DRAINAGE	— SW —
EXISTING ROOFWATER	— RW —
EXISTING COMMUNICATIONS	— T —
EXISTING ELECTRICAL (U/GROUND)	— E —
PRELIMINARY DRAINAGE	— SW —
PRELIMINARY ROOFWATER	— RW —
PRELIMINARY SEWERAGE	— S —
PRELIMINARY WATER	— W —
PRELIMINARY SLEEPER WALL	— [Dashed Line] —
PRELIMINARY RETAINING WALL (BY BUILDING CONTRACTOR)	— [Dashed Line] —
PROPOSED EASEMENT	— [Hatched Area] —
Q100 FLOOD LINE	— [Thick Line] —
ROOFWATER SWALE	— [Green Line] —

TREE LEGEND

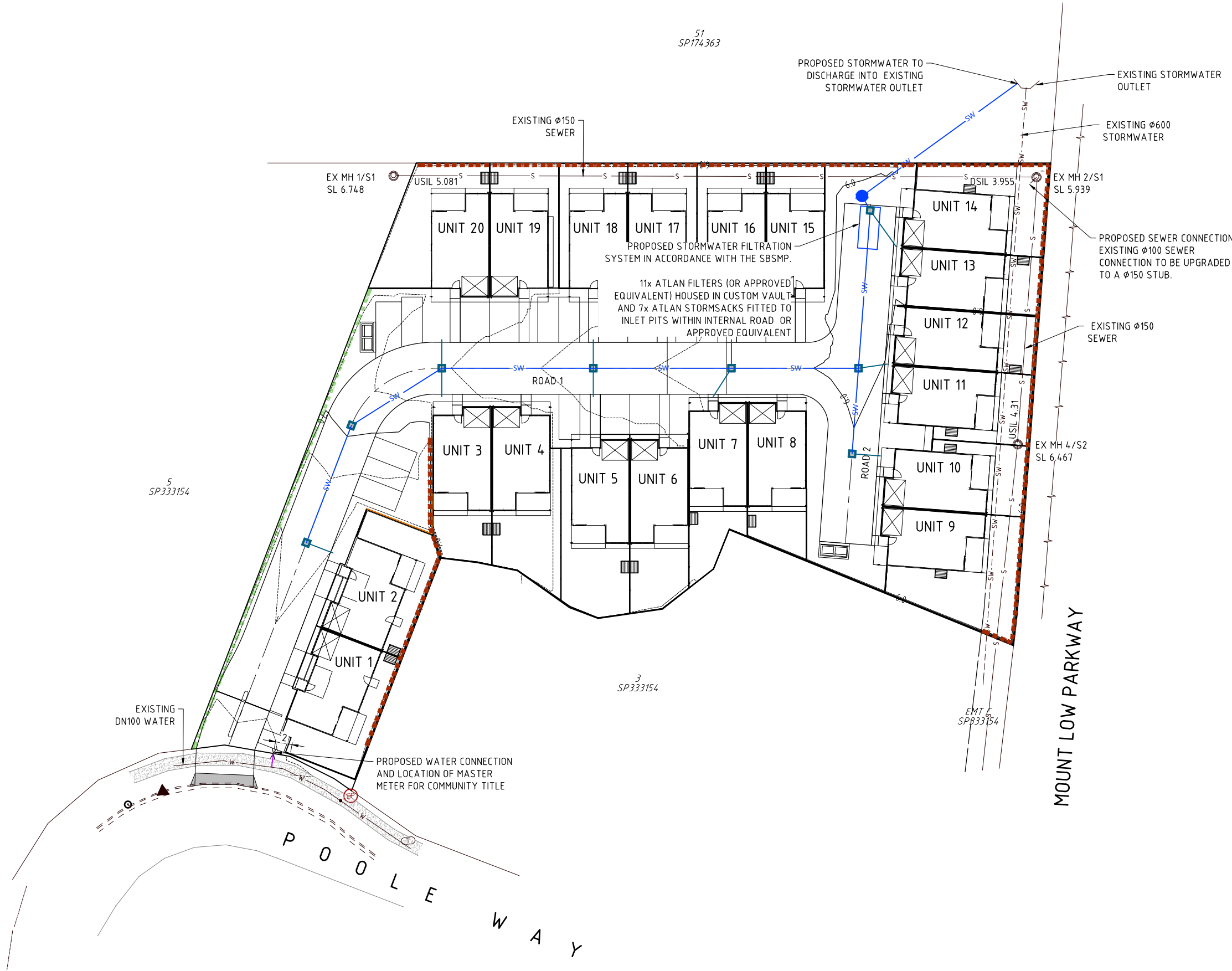
TREES PROPOSED TO BE RETAINED AND PROTECTED.



TREES PROPOSED TO BE RETAINED AND REQUIRE ARBORIST (AQFS) DIRECTION & SUPERVISION FOR TPZ WORKS.



TREE PROTECTION ZONE (TPZ)
TPZ to be protected in accordance with Protection of Trees on Development Sites (AS4970-2009) guidelines & any approval conditions.



ENGINEERING CONCEPT - SERVICES LAYOUT PLAN

**10 POOLE WAY, BUSHLAND BEACH
BHAVIN GANDHI GROUP**



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PLANNERS
URBAN DESIGNERS
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LANDSCAPE ARCHITECTS

JOB NO:	PLAN:	ISSUE:
B4818EA1_DA1	CS01	A
SCALE:	1:250 @ A1	
DATE:	15/10/2025	
DRAFTED BY:	CDV	
FILE NAME:	B4818EA1_DA1.DWG	



APPENDIX D

PROPRIETARY
CERTIFICATION

DEVICE

SQIDEP



Stormwater Quality Improvement Device Evaluation Protocol (SQIDEP)

VERIFICATION CERTIFICATE

Applicant Information

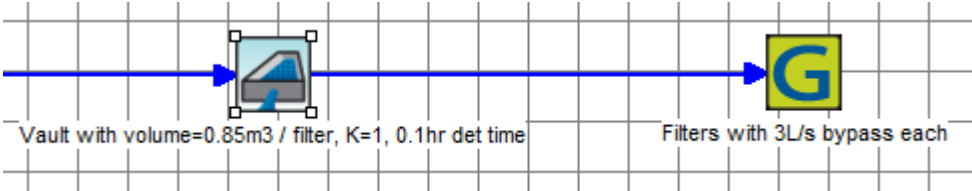
Applicant Name	SPEL Stormwater Pty Ltd
Applicant Address	130 Sandstone Pl, Parkinson QLD 4115
Phone Number	+61 1300 773 500
Email	sales@spel.com.au
Website	www.spel.com.au

Verified Technology	SPELFilter
Issue Date	23 December 2022
Reviewed Documents	<ul style="list-style-type: none"> • SPEL Body of Evidence application submission (Prepared by Drapper Environmental Consultants) • Statutory Declaration by Drapper Environmental Consultants • Hydrographs of compliant and partially compliant events at the Hilton Foods site showing inflow, outflow, rainfall and samples collected (42 items) • Sample collection and/or reset emails/site records at the Hilton Foods site (50 items) • Laboratory Chain of Custody forms, Quality Control reports, QC Compliance Reviews & Certificates of Analysis • Subsequent hydrograph plots for Hilton Foods site that included monitored outflow rates (and summary table of results) – (37 items), 17 October 2022.

Technology Information

Applicant's Verified Performance Claims	Treatable flow rate = 3 L/s per filter cartridge
	Total Suspended Solids (TSS) 85 %
	Total Phosphorus (TP) 74 %
	Total Nitrogen (TN) 59 %
	Total Petroleum Hydrocarbons 0 %
	Gross Pollutants 0 %

Maintenance performed during monitoring	None over 13 months
--	---------------------

Verified method to model in MUSIC	<p>Modelling a SPELFilter in MUSIC is as follows:</p> <ol style="list-style-type: none"> 1. Use a detention basin node to represent the vault (with modified 'K' values and nominal detention time set to the treatment flow rate of the cartridges) 2. Use a generic node with the monitored pollutant reduction values and have a high flow bypass of 3 L/s per cartridge.  <p>● The input criteria for the node is;</p> <ol style="list-style-type: none"> 1. Use a detention basin node to represent the vault <ul style="list-style-type: none"> ● with modified 'K' values with K=1 ● use size of 1m² per cartridge and 0.85m extended detention depth ● adopt a nominal detention time of 0.1 hours (plus or minus 10%). 2. Use a generic node with: <ul style="list-style-type: none"> ● a high flow bypass of 3 L/s per cartridge ● pollutant reductions of 85% for TSS ● pollutant reductions of 74% for TP ● pollutant reductions of 59% for TN. <p>When entering the data into MUSIC the detention basin surface area and high flow bypass rate of the generic node is factored up depending on the number of filter cartridges proposed. All other values listed above remain the same (note: the <i>Notional Detention Time</i> is adjusted by changing the <i>Low Flow Pipe Diameter</i>).</p>
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Conditions	<p>The limitations of the acceptance of these claims include:</p> <ul style="list-style-type: none"> ● Pit insert "Stormsacks" (for coarse material capture) are used for inlets upstream of the SPELFilter installation to ensure longevity of the filters ● Regular inspection & maintenance should be performed in accordance with the Manufacturer's Maintenance Plans.
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Independent Reviewers	Dr Robin Allison Dr Ricky Kwan
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Accepted by Governance Panel	22 December 2022
Accepted by Stormwater Australia Board	23 December 2022



STORMWATER AUSTRALIA

Stormwater Quality Improvement Device Evaluation Protocol (SQIDEP)

VERIFICATION CERTIFICATE

Applicant Information

Applicant Name	Atlan Stormwater
Applicant Address	130 Sandstone Place, Parkinson, QLD 4115
Website	www.atlan.com.au
Contact Email	Andy.hornbuckle@atlan.com.au

Verified Technology

Product Title	Atlan Stormsack
SQIDEP Pathway	Field Evaluation via reviewed QAPP
Reviewed Documents	<p>The following documents form the basis of this independent evaluation:</p> <ol style="list-style-type: none">Stormsack detailed performance report (Stormsack DPR) (Issue 2) Drapper, D., Waldron, S., & Nyakas, L. (2024). SQIDEP Detailed Performance Report – Stormsack (Issue 2), Drapper Environmental Consultants, Crestmead, Queensland, AustraliaHydraulic Performance (Treatable Flowrate) Lab Testing report (Issue 1), 5 July 2024 Drapper, D., Nyakas, L. (2024). Hydraulic Performance (Treatable Flowrate) Lab Testing report (Issue 1), Drapper Environmental Consultants, Crestmead, Queensland, AustraliaATLAN Stormsack Device Lab Testing Report (Issue 3), 5 July 2024 Drapper, D.; Nyakas, L. ATLAN Stormsack Device Lab Testing Report (Issue 3); Drapper Environmental Consultants: Crestmead, Queensland, Australia, 2024.StormSack Performance Assessment, Report Number: MHL2325, Manly Hydraulics Laboratory, November 2014.

Technology Information

<p>Applicant's Verified Performance Claims (ER)</p>	<table border="1" data-bbox="480 136 1121 360"> <thead> <tr> <th colspan="2">Parameter</th> </tr> </thead> <tbody> <tr> <td>Total suspended solids</td> <td>45%</td> </tr> <tr> <td>Total phosphorus</td> <td>47%</td> </tr> <tr> <td>Total nitrogen</td> <td>25%</td> </tr> <tr> <td>Total petroleum hydrocarbons</td> <td>Not claimed</td> </tr> <tr> <td>Gross pollutants</td> <td>100 %</td> </tr> </tbody> </table> <p>IEP's comments: Nil.</p> <p>IEP's recommendations: All performance claims are considered compliant up to the treatment flow rate for the applicable device. Verified flow rates are included in the table below:</p> <table border="1" data-bbox="480 539 1235 792"> <thead> <tr> <th>Size of Stormsack (Pit dimensions) (mm)</th> <th>TFR for MUSIC modelling – high flow bypass in litres per second</th> </tr> </thead> <tbody> <tr> <td>450 x 450</td> <td>10</td> </tr> <tr> <td>600 x 600</td> <td>25</td> </tr> <tr> <td>600 x 900</td> <td>32</td> </tr> <tr> <td>900 x 900</td> <td>39</td> </tr> <tr> <td>1200 x 900</td> <td>50</td> </tr> <tr> <td>1200 x 1200</td> <td>65</td> </tr> </tbody> </table>	Parameter		Total suspended solids	45%	Total phosphorus	47%	Total nitrogen	25%	Total petroleum hydrocarbons	Not claimed	Gross pollutants	100 %	Size of Stormsack (Pit dimensions) (mm)	TFR for MUSIC modelling – high flow bypass in litres per second	450 x 450	10	600 x 600	25	600 x 900	32	900 x 900	39	1200 x 900	50	1200 x 1200	65
Parameter																											
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600 x 900	32																										
900 x 900	39																										
1200 x 900	50																										
1200 x 1200	65																										
<p>Test Stormwater Runoff</p>	<p>21 compliant stormwater events. Water chemistry was compliant with Table 1 in SQIDEP v1.3. Minimum number of aliquots collected, and samples were representative.</p>																										
<p>Test Catchment</p>	<ul style="list-style-type: none"> - The field testing for the ATLAN Stormsack (200) was carried out at Griffith University, Carpark H, Parkland Campus, Griffith Way, Southport, QLD, 4215. - The catchment area draining to the device was reported to be 1,181 m² directly connected to the Stormsack. The catchment was reported to be 66% impervious with the remainder including a eucalyptus forested area which drains to the Stormsack. 																										
<p>Maintenance Performed during monitoring</p>	<p>The Stormsack should be cleaned/maintained when accumulated pollutants reach the trigger level of 150mm depth in the bag, or 50% capacity by volume.</p> <p>The monitored Stormsack was maintained twice during the SQIDEP monitoring program due to construction loads received from earthworks undertaken in the upstream catchment. Regular inspection of the Stormsack is recommended, as per the manufacturer's O&M manual.</p>																										



Verified method:



The Reviewers have verified that the method undertaken complies with the intent and specifics of SQIDEP v1.3.

A more detailed Independent Evaluatores Report is available to get an understanding of what was checked and how the claim was verified.

Conditions/Notes	MUSIC modelling shall be carried out as follows:	
	A generic node is to be used in MUSIC with a high flow bypass set to the applicable TFR (see table below) for the size of the Atlan Stormsack proposed and with inlet and outlet concentrations as follows:	
	Pollutant	Inlet concentration
	TSS	100
	TP	100
TN	10	
		Outlet Concentration
		55
		53
		7.5
	Size of Stormsack (Pit dimensions) (mm)	TFR for MUSIC modelling – high flow bypass in litres per second
	450 x 450	10
	600 x 600	25
	600 x 900	32
	900 x 900	39
	1200 x 900	50
	1200 x 1200	65



Independent Reviewers

Evaluator Name	Evaluator Signature
Mark Liebman	
Baden Myers	

Issue of Verification Certificate

Acceptance by SQIDEP Governance Panel	
Acceptance by Stormwater Australia Board of Directors	
Verification Issued	
Stormwater Australia Verification Certificate Number Reference	SA-2024/12-VC

Verified under SQIDEP Version 1.3

Body of Evidence Pathway

