

ROCKHAMPTON REGIONAL COUNCIL
AMENDED PLANS APPROVED
 23 March 2026
 DATE
 These plans are approved subject to the current conditions of approval associated with
 Development Permit No.: D/153-2023
 Dated: 19 August 2025

1 SITE PLAN - STAGE 4
 1:500

DA REVIEW ISSUE



NORMAN GARDENS RESIDENTIAL
 452-488 YAAMBA ROAD (BRUCE HIGHWAY), NORTH ROCKHAMPTON,
 QUEENSLAND

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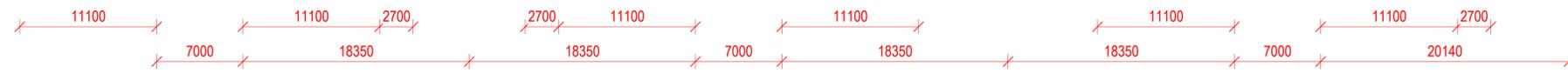
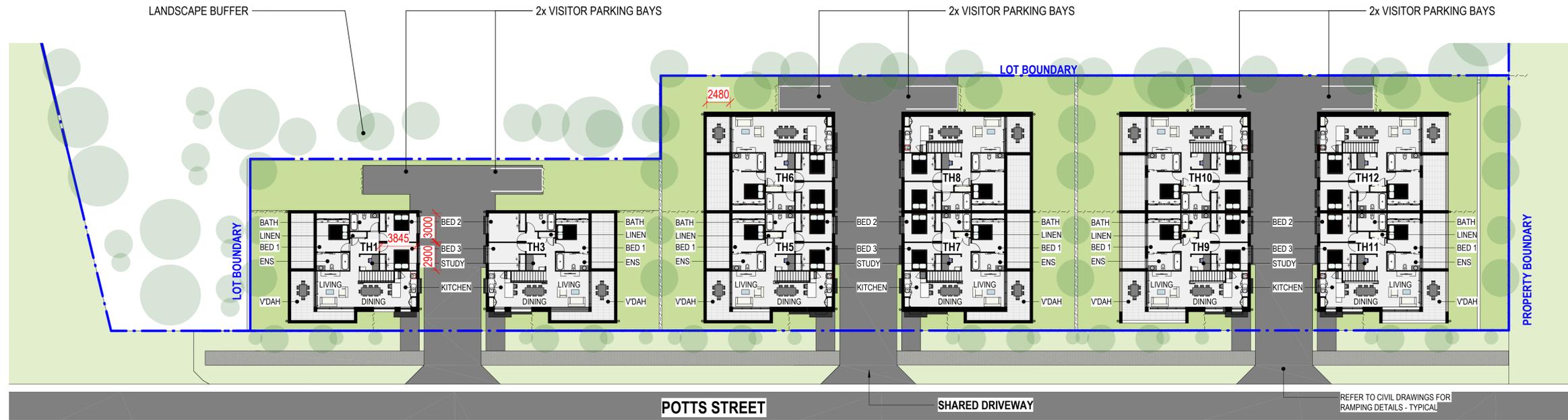
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TA # 21.0279.17

SITE PLAN - ROL APPLICATION

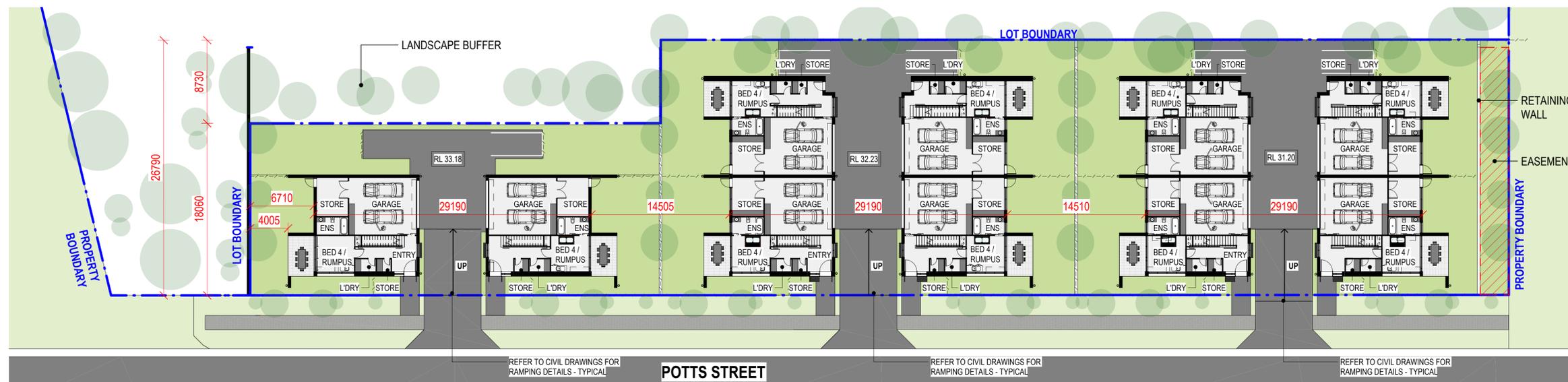
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A-ROL-020 rev. 6



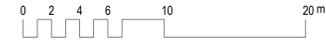
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1 DETAILED FLOOR PLAN - LEVEL 1 - ROL APPLICATION
 1: 250



2 DETAILED FLOOR PLAN - GROUND LEVEL - ROL APPLICATION
 1: 250

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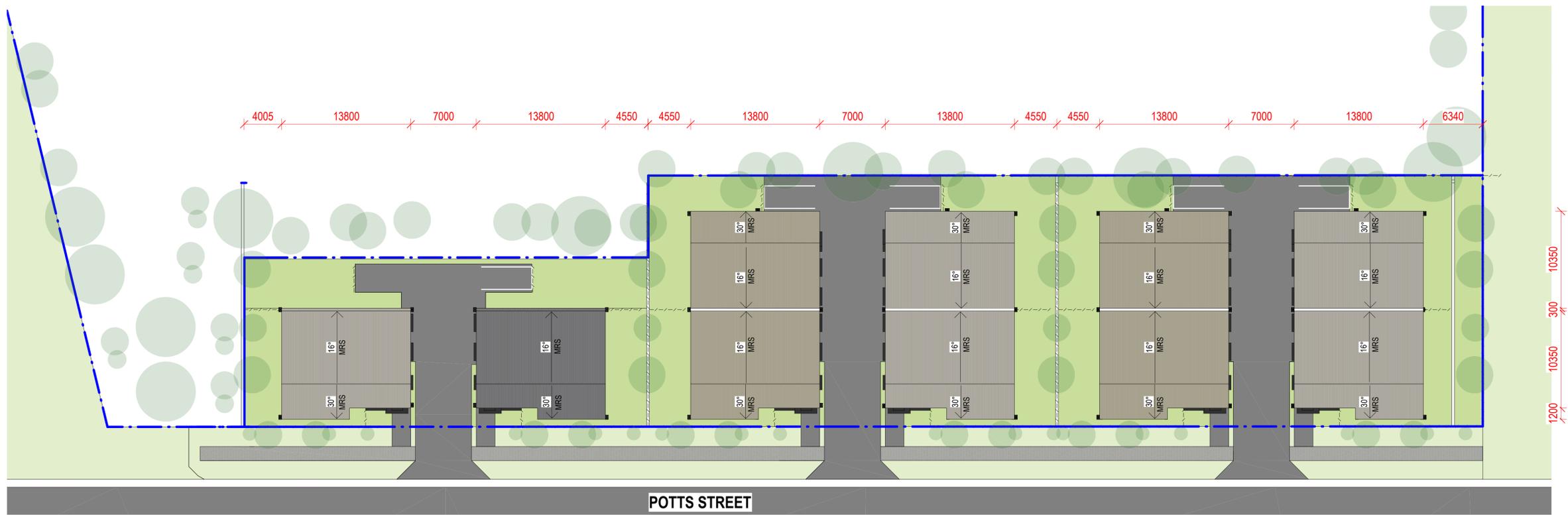
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FLOOR PLAN - ROL APPLICATION
 1: 250 @ A1
 2025-10-29
 A-ROL-100
 rev. 3

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1 DETAILED ROOF PLAN - ROL APPLICATION
 DA-420/ 1 : 250

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ROOF PLAN - ROL APPLICATION

1 : 250 @ A1

2025-10-29

A-ROL-110

rev. 3



1 FRONT ELEVATION - ROL APPLICATION
1:100



2 REAR ELEVATION - ROL APPLICATION
1:100

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MATERIAL SCHEDULE		
MARK	DESCRIPTION	IMAGE
1	PAINTED CONCRETE WALL - WHITE	
2	PAINTED CONCRETE WALL - DARK	
3	PAINTED CONCRETE WALL - RED	
4	VERTICAL METAL CLADDING - DARK	
5	VERTICAL METAL CLADDING - LIGHT	
6	BRICKWORK - WHITE	
7	BRICKWORK - LIGHT	
8	BRICKWORK - FEATURE RED	
9	PLYWOOD SHEETING	
10	FIBRE CEMENT SHEETING - EXPRESSED JOINTS - WHITE	
11	TIMBER FINISH - BLONDE	
12	ROLLER DOOR - LIGHT	
13	GLAZING - CLEAR	
14	FEATURE MESH - RED	
15	ALUMINIUM BATTENS POWDERCOAT FINISH - RED	
16	STEEL - PAINTED FINISH - DARK	
17	PARAPET CAPPING - DARK	
18	BOX GUTTER AND DOWN PIPE - PAINTED FINISH - DARK	
19	ROOF CLADDING - LIGHT	
20	SEATING - ARTIFICIAL TIMBER - BLONDE	
21	PLANTER BOX - WHITE	
22	VERTICAL METAL CLADDING - STANDING SEAM - DUNE	
23	VERTICAL METAL CLADDING - STANDING SEAM - BASALT	
24	VERTICAL METAL CLADDING - STANDING SEAM - COVE	

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ELEVATIONS - ROL APPLICATION - SHEET 1

1:100 @ A1

2025-10-29

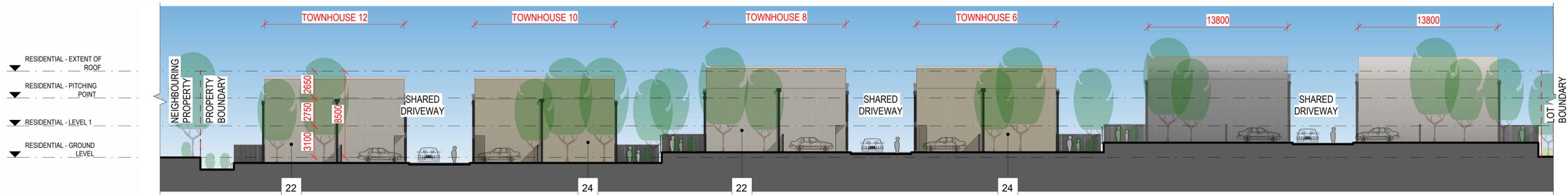
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rev. 3

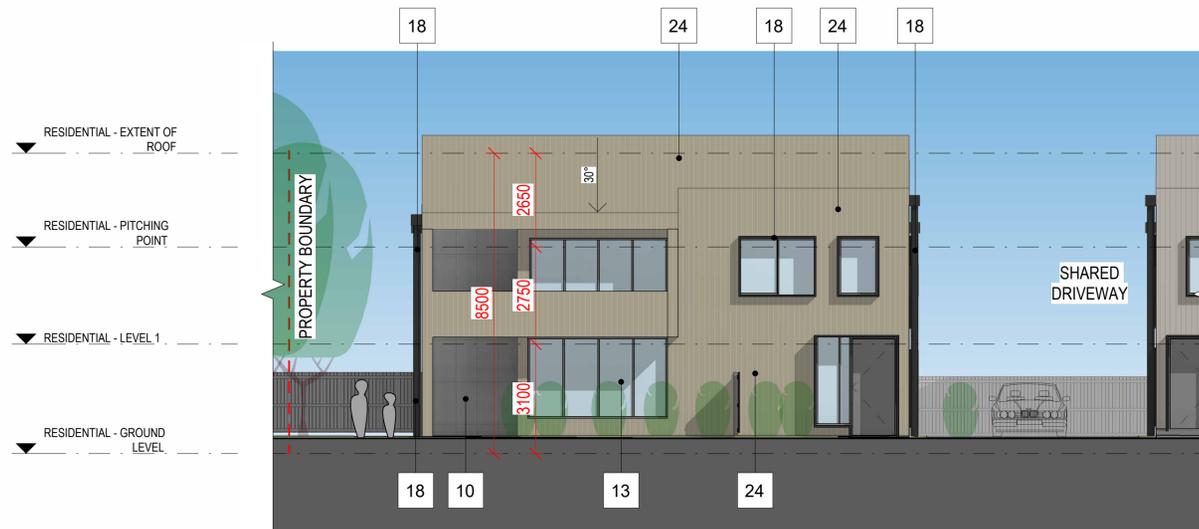


1 EAST ELEVATION (POTTS STREET) - OVERALL - ROL APPLICATION
1:200

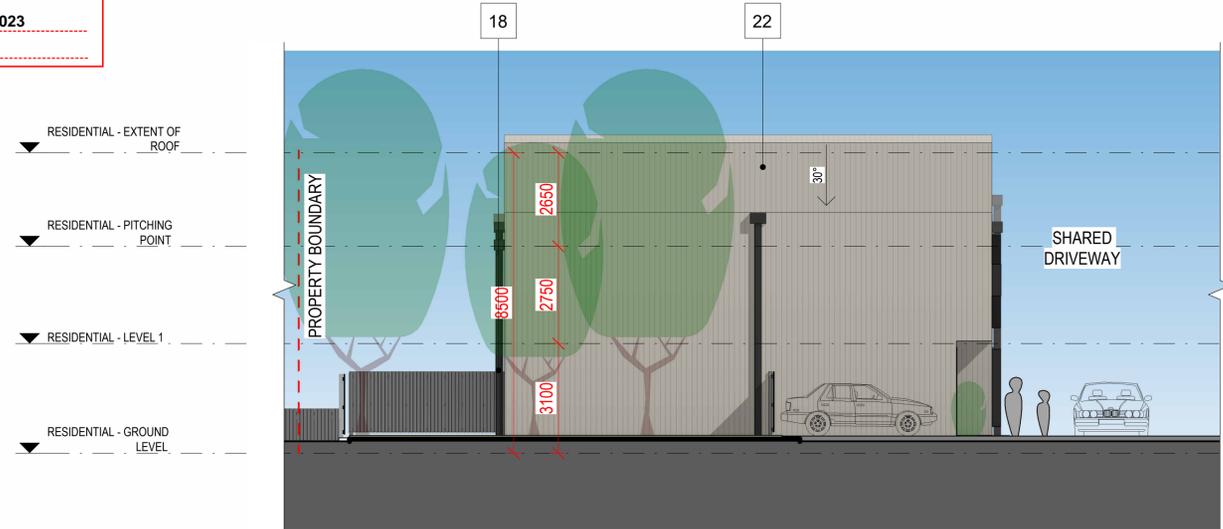


2 WEST ELEVATION - OVERALL - ROL APPLICATION 1
1:200

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3 EAST ELEVATION - OVERALL - ROL APPLICATION 1
1:100



4 WEST ELEVATION - OVERALL - ROL APPLICATION
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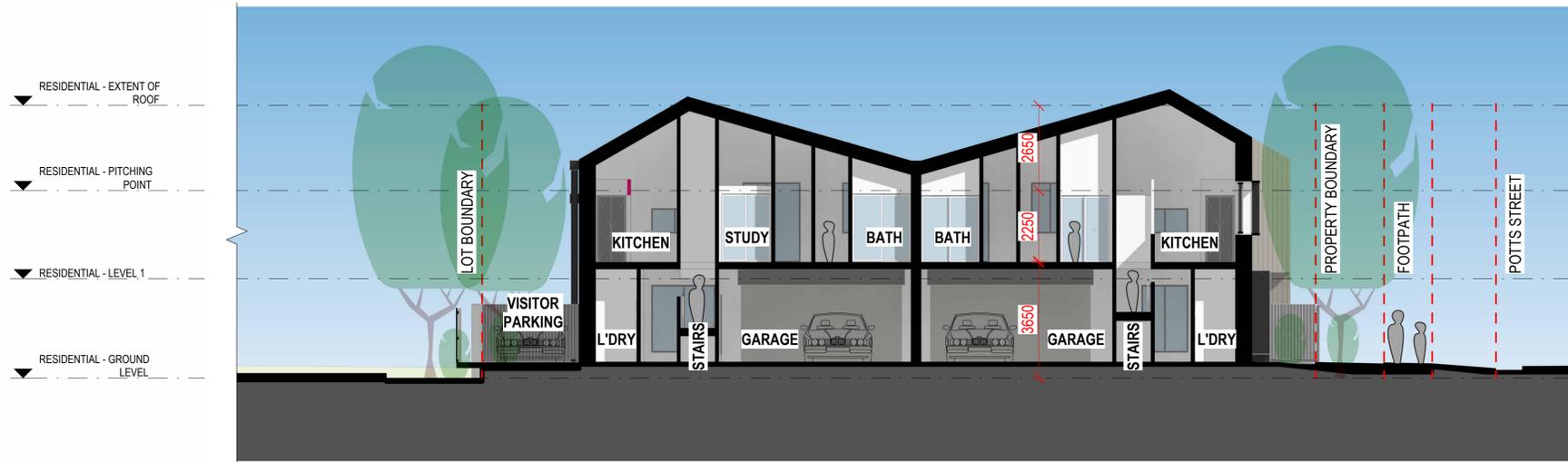
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ELEVATIONS - ROL APPLICATION - SHEET 2

As indicated @ A1 2025-10-29

A-ROL-121

rev. 3



1 BUILDING SECTION 1 - ROL APPLICATION
1:100

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2 BUILDING SECTION 2 - ROL APPLICATION
1:100

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SECTIONS - ROL APPLICATION - SHEET 1

1:100 @ A1

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2025-10-29

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RESIDENTIAL DEVELOPMENT

452-488 YAAMBA ROAD, NORMAN GARDENS

STORMWATER MANAGEMENT PLAN

ROCKHAMPTON REGIONAL COUNCIL

AMENDED PLANS APPROVED

23 March 2026

DATE

These plans are approved subject to the current conditions of approval associated with

Development Permit No.: D/153-2023

Dated: 19 August 2025

FOR: COLES GROUP PROPERTY DEVELOPMENTS PTY LTD

REPORT NUMBER: R001-G21097



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The information contained in this report has been prepared based on the information made available to Michael Bale and Associates at the time of preparation. This document, design parameters, and conclusions rely on external data sources, and the accuracy of this document is correct to the extent of the information provided to us.

This report has been prepared solely for the benefit of our client. We do not accept any liability for damage or loss resulting from reliance on this report, or any part of it, by any party other than the client (named on the front page of this report).

Document Control

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Reviewer	Ian Grieves		
Approver RPEQ	Michael Bale 15543		
Report Title	R001 – G21097 – Stormwater Management Plan		
Revision	03	Date	25/11/2025

Revision History

Revision	Date	Author	Approver	Description
01	12/10/2023	CH	CH	Original Issue
02	09/02/2024	CH	CH	Amended Engineering Drawings
03	25/11/2025	SC	MB	Amended for Minor Change Application

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1. Introduction

This report has been prepared to support the lodgement of a Minor Change (MIN) application to approve the construction of a new development, comprising a new residential townhouse development. The development is proposed to take place over the following parcel of land:

Property Address:	452-488 Yaamba Road, Norman Gardens
Property Description:	Lot 25 on RP610513
Client:	Coles Group Property Developments Pty Ltd
Council:	Rockhampton Regional Council
Development Site Area:	3,175m ²
Registered Site Area:	26,630m ²

The purpose of this report is to address the management of stormwater quantity and quality to ensure that the proposed development complies with all necessary state and local government policies.

This report intends to assess the likely impact of the proposed development in relation to stormwater quantity and quality, and the adequacy of the existing stormwater infrastructure to accommodate the proposed development.

1.1 Revision History

This version of the report is the third version and has been prepared for coordination and feedback from the project team.

1.2 Related Reports

This report is intended to be read in conjunction with the associated development submission documents current as of the date of this report.

1.3 Related Approvals

This development site forms part of a previously approved combined Material Change of Use (MCU) and Reconfiguration of Lot (ROL) application (DA Ref: D153-2023) and is to be referred to within this report.

The total registered site also forms part of a separate Material Change of Use (MCU) application (DA Ref: D/175-2025) supporting the lodgement of a new commercial development comprising a Coles Supermarket and Liquorland and is to be referred to within the report.

2. Property Description

2.1 Site Locality

The proposed development is situated at 452-488 Yaamba Road, Norman Gardens and is described as Lot 25 on RP610513.

The property is located within the Rockhampton Regional Council Local Government Area and is in close proximity to local commercial and residential centres.

The subject site is bounded by Yaamba Road to the west, Potts Street to the east and existing residential developments to the north and south. The total area of the existing allotment contained in this proposal is 26,630m².

The proposed site as a result of the previously approved ROL application is located along the eastern boundary of the site, fronting Potts Street. The total area of the new residential allotment assessed as part of this application is 3,175m².

Full details of the site topography and existing features are shown on the detailed site survey included in Appendix A. A general locality plan is presented in Figure 2.1 below:



Figure 2.1: Site Locality (Courtesy of Queensland Globe – Accessed 20/11/2025)

2.2 Land Usage

The subject site is presently occupied by an existing commercial development and associated carparking areas.

The site is accessible via two (2) existing vehicle crossovers to Yaamba Road.

2.3 Upstream Catchment

Investigation of regional contour data demonstrates that the overall development sites surface levels are generally higher than the adjacent properties. The development site is therefore not expected to be impacted by an external upstream catchment and no allowances for external upstream catchment flows have been considered in this report.

As the proposed residential allotment is to be separated from the existing commercial site during the Reconfiguration of Lot (ROL) process, the new residential lot will be impacted by an upstream catchment consisting of the newly separated commercial lot only.

A 3.0m wide drainage easement/ overland flow channel has been incorporated into the design to cater for all stormwater flows generated from the existing upstream commercial allotment. Refer to Section 5.6 of this report for details.

3. Proposed Development

The proposed development consists of:

- The demolition of the existing structures.
- The construction of a new development, comprising ten (10) residential townhouses.
- The construction of an overland flow channel/stormwater easement to facilitate the stormwater connection of the existing commercial development contained within the allotment.
- The construction of associated driveways, carparking areas and other hardstand surfaces associated with the proposed development.

Construction works for the site will consist of bulk earthworks and general lot shaping.

Additional works on site shall include the construction of water reticulation, sewer reticulation, electrical and telecommunications services and stormwater management works (quantity and quality).

External works for the development will comprise of verge works, the construction of the vehicle crossovers to Potts Street and service connections. No further external works are proposed as part of this development.

4. Lawful Point of Discharge

In the existing case, the site contains internal stormwater drainage infrastructure that captures runoff generated from the site and discharges these flows towards the Council stormwater infrastructure located within Potts Street via a Ø600 RCP outlet pipe. No existing stormwater detention or water quality treatment devices have been identified on site.

In the developed case, it is proposed that the existing stormwater infrastructure located within the subject site be maintained for the commercial site as this portion of site it to remain unchanged.

It is proposed that the stormwater runoff generated from the residential allotment is to be detained and treated internally and discharged towards the overland flow channel located within the 3.0m wide drainage easement located to the north of the site. Flows later discharge towards Potts Street via the existing Ø600 RCP outlet pipe. This arrangement is outlined in the Engineering Drawings attached as Appendix B.

The proposed discharge arrangement is considered to comply with the requirements of a lawful point of discharge and will be maintained following the development of the site. It is not anticipated that any stormwater will be directed towards any adjacent properties.

QUDM (2017) provides a three-part framework for the identification of a lawful point of discharge for a development site. The first assessment item is to consider if the proposed development will alter the site's stormwater discharge characteristics in a manner that may substantially damage a third-party property. As the proposed development is not considered likely to worsen the flows received by the existing stormwater infrastructure surrounding the development site, the proposed point of discharge is considered to satisfy the requirements set out in Section 3.9.1 – Lawful Point of Discharge Test.

This compliance is further demonstrated in the following pages where it is shown that the proposed development will result in no worsening of peak flows from the development site.

5. Site Specific Hydrology

5.1 Introduction

The proposed development will involve the construction of a residential townhouse development, new access driveways and other associated hardstand surfaces. This will result in an increase to the coefficient of discharge, and the peak stormwater discharge rates of the developed site.

This section of the report addresses peak stormwater discharge resulting from the site, identifies whether attenuation measures are necessary to ensure “no-worsening” of the peak flows from the site and provides sizing information for any required attenuation measures.

5.2 Methodology

The methodology of the hydrologic analysis involves the use of both the Rational Method and DRAINS runoff-routing software.

The Rational Method, as described by the Queensland Urban Drainage Manual (QUDM 2017), provides a simple means for the assessment of the peak discharge rate for design storms. The rational method does not provide a reliable basis for the determination of runoff volume or hydrograph shape.

DRAINS software (by Watercom) is a computer-based model that incorporates time-area routing processes to more accurately determine the volume and shape of the hydrograph during a storm event. DRAINS also includes storage-routing processes that can simulate the effect of stormwater detention systems.

The Rational Method is used in the hydrologic analysis to calibrate and verify the results of the DRAINS software modelling, in lieu of the availability of gauged information.

Once calibrated and verified, the DRAINS software modelling is used to calculate all the pre and post development hydrographs that are used in the assessment, and for the design of the proposed stormwater detention system.

5.3 Catchment Definition

In the existing case, the site has been modelled as a single catchment with the fraction impervious measured from the detailed survey provided for the site.

In the developed case, the development site is represented as one (1) catchment with a fraction impervious reflective of the proposed architectural arrangement. Table 5.1 below summarises the catchment properties used for the Rational Method calculations.

Table 5.1: Catchment Parameters

Catchment	Catchment Area	Fraction Impervious
Pre-Development	3,175m ²	50%
Post-Development	3,175m ²	68%

5.4 Site Specific Rational Method Calculations

Time of Concentration

The time of concentration for the pre- and post-development catchments have been calculated in accordance with QUDM. The Friends sheet flow equation has been used to determine the time of concentration (t_c) for the ground catchments. The time of concentration for the roof catchments have been estimated using standard inlet times in combination with expected length of piped flows. A time of concentration of 6-minutes was adopted for both the pre- and post-developed scenarios respectively.

C_{10} Value

The C_{10} values for the existing site conditions and developed site conditions have been calculated in accordance with QUDM (2017) Table 4.5.3. A summary of the C_{10} values adopted for the site are presented in Table 5.2 below.

Table 5.2: C_{10} Values

Catchment	Rainfall Intensity, I_{10} / Fraction Impervious	C_{10}
Pre-Development	65.70mm/hr / 50%	0.780
Post-Development	65.70mm/hr / 68%	0.820

Summary of Flow – Rational Method

The Rational Method was used to calculate runoff from the site in the pre-developed and post developed scenario. The anticipated peak discharge is detailed in Table 5.3 below.

Table 5.3: Development Runoff Calculations

AEP	39% (m ³ /s)	18% (m ³ /s)	10% (m ³ /s)	5% (m ³ /s)	2% (m ³ /s)	1% (m ³ /s)
Pre-development	0.073	0.108	0.134	0.161	0.208	0.242
Post-development	0.076	0.114	0.141	0.169	0.218	0.254
Difference	+0.004	+0.006	+0.007	+0.008	+0.011	+0.012

Table 5.3 demonstrates that the proposed development will result in an increase in stormwater flows towards the LPOD. Therefore, it will be necessary to provide the development with on-site stormwater detention systems or mitigation methods to reduce the peak discharge of local storm events.

5.5 Detention Design Process

DRAINS hydrologic software has been utilised to undertake the assessment of pre-development and post-development stormwater discharge for the purposes of the on-site detention specification process.

DRAINS version 2025.01 has been utilised in this assessment.

DRAINS Parameters

Modifiable Inputs

The DRAINS software package has several inputs that can be used to manipulate the hydraulic behaviour of the model. The values adopted in this model are all default values and are presented in Table 5.4 below.

Table 5.4: DRAINS Modifiable Inputs

Input	Modelled Value
Antecedent Moisture Condition	3
Paved Depression Storage (mm)	1
Supplementary Depression Storage (mm)	1
Grassed (Pervious) Depression Storage (mm)	5
Soil Type	3

Depression Storage values of 1mm for paved/supplementary and 5mm for grassed (pervious) areas respectively are recommended values in the DRAINS user manual.

An Antecedent Moisture Condition (AMC) of 3.0 has been adopted as a default value for this site. A soil type classification type of 3 is the default value adopted in DRAINS and is representative of soil with slow infiltration rates (may have layers that impede downward movement of water).

DRAINS Model Calibration

Table 5.5 below provides a summary of the process of calibration of the DRAINS model against Rational Method calculations.

The results indicate that the DRAINS model is programmed with a satisfactory level of accuracy for the purposes of this exercise.

Table 5.5: DRAINS Calibration – Existing Case

AEP	39% (m ³ /s)	18% (m ³ /s)	10% (m ³ /s)	5% (m ³ /s)	2% (m ³ /s)	1% (m ³ /s)
Rational Method	0.073	0.108	0.134	0.161	0.208	0.242
DRAINS	0.090	0.115	0.137	0.163	0.195	0.221

Detention Design Parameters

Figure 5.1 below shows a screenshot of the DRAINS model used to represent the stormwater runoff from the subject site.

Pre-Developed

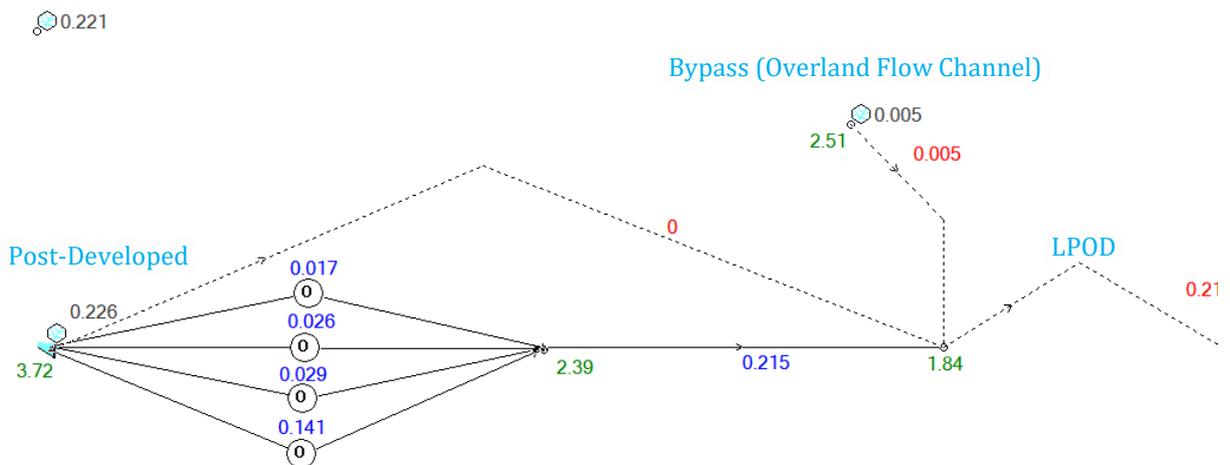


Figure 5.1: DRAINS Model Screenshot (1% AEP Storm Event)

A process of iteration using a combination of detention system height, storage and outlet pipework arrangements have been used to determine the optimal design for the detention system. Table 5.6 below provides the final dimensions of the detention systems adopted in the model for the purpose of determining a volume of detention.

Detention for the site is proposed to be contained within a singular detention tank. The detention tank is to be located under the northern internal driveway and will receive flows generated from majority of the subject site. A small catchment consisting of the 3.0m wide overland flow easement will bypass the detention tank. For further information on the location and details of the proposed detention area, refer to the Engineering Drawings attached as Appendix B.

Table 5.6: Detention System Design Parameters

Detention Tank Parameters	
Detention Base	12.0m ²
Detention Depth	1.7m
Total Detention Volume	20.4m ³
Low Flow Orifice	Ø240mm @ Base
High Flow Orifice	Ø120mm @ 0.8m from base of tank Ø130mm @ 1.2m from base of tank Ø120mm @ 1.4m from base of tank
Outlet Pipe	Ø375mm @ Base
Emergency Surge Weir (Not Engaged in Design Storms)	900x900 Emergency Grated Surge Pit

DRAINS Hydrologic Modelling Results

The on-site stormwater detention arrangement described in Table 5.6 has been designed to demonstrate that the proposed on-site detention strategy is effective in reducing developed case peak stormwater discharge to a rate that is less than the existing, pre-development case scenario.

The results of the assessment and confirmation of the achievement of the on-site detention objectives is displayed in Table 5.7 below.

Table 5.7: Development Runoff Calculations with Detention – DRAINS Model

Development Site Discharge						
AEP	39%	18%	10%	5%	2%	1%
Q Pre-developed (m³/s)	0.090	0.115	0.137	0.163	0.195	0.221
Q Detention Outlet (m³/s)	0.089	0.115	0.134	0.161	0.193	0.218
Peak Flow Reduction (m³/s)	-0.001	0.000	-0.003	-0.002	-0.002	-0.003

The comparison of pre-developed and attenuated post-developed with detention conditions show that no-worsening of peak discharges in the 39, 18, 10, 5, 2 and 1 percent AEP storm events is achievable with the detention system described in previous sections. For further information on the location and details of the proposed detention area, refer to the Engineering Drawings attached as Appendix B.

5.6 Drainage Easement / Overland Flow Path Capacity

A 3.0m wide stormwater drainage easement along the northern boundary has been incorporated in design of the proposed residential development to direct flows generated from both development sites to the existing Council Infrastructure within Potts Street.

The stormwater drainage easement contains a Ø600mm stormwater pipe that conveys runoff generated from the commercial development towards the LPOD in Potts Street. It is proposed that the existing stormwater discharge arrangement be realigned within the easement as part of commercial development site’s application (DA Ref: D/175-2025). Refer to the Engineering Drawing DA03-G21097-Stormwater Layout Plan attached within Appendix B for details of the internal stormwater diversion.

The stormwater drainage easement has also been designed as an overland flow channel to convey surcharged flows towards the LPOD.

The DRAINS modelling software has been utilised to calculate the stormwater runoff expected to be discharged via overland sheet flow from the commercial development to the LPOD via the drainage easement, ensuring the easement is designed with adequate capacity.

The proposed drainage easement / overland flow path is to consist of a 3.0m turf lined swale with a depth of 0.20m.

Figure 5.2 below shows a depiction of the DRAINS model used to represent the stormwater runoff from the overall subject site.

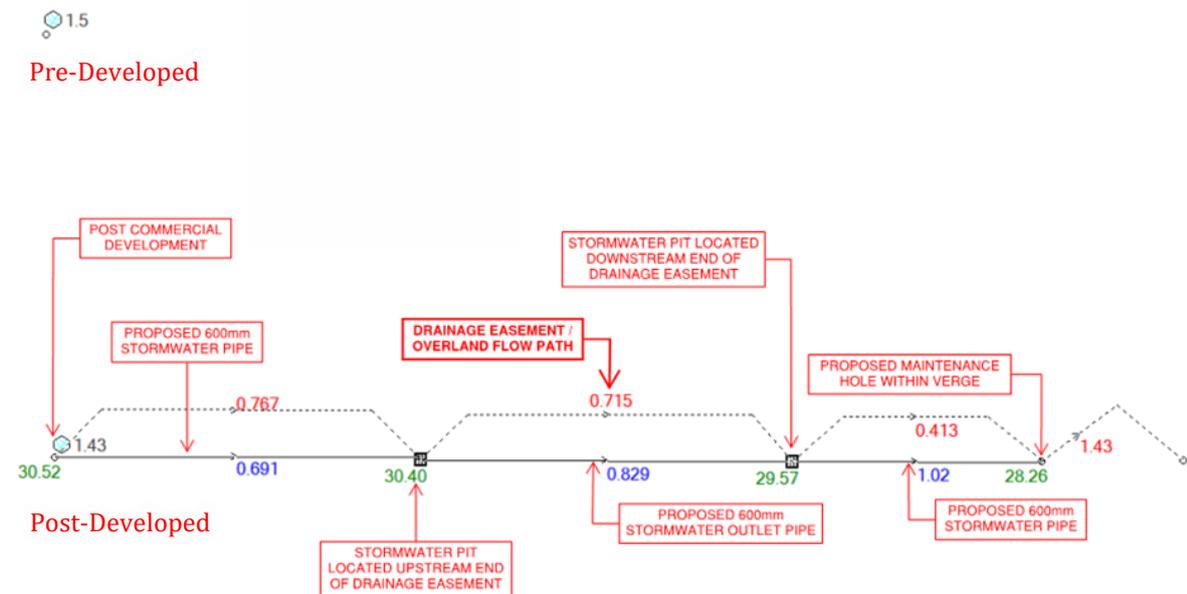


Figure 5.2: DRAINS Model Screenshot (Commercial Development Site - 1% AEP Storm Event)

Table 5.8 below demonstrates that the proposed overland flow channel has a maximum water depth of 0.2m, d*V product of 0.284m²/s and has sufficient capacity to cater for flows up to an AEP 1% Design Storm.

Table 5.8: Development Runoff Calculations Overland Flow Path – DRAINS Model

Overland Flow Channel Design Parameters						
Channel Dimensions	Depth (m)	Base (m)	Left Side Slope (1:x)	Right Side Slope (1:x)	Manning’s ‘n’	Slope (%)
	0.2	3.0	0	0	0.035	2.5%
Channel Properties	Flow Width	A	P	R	D*V (m ² /s)	
	3.00m	0.60	3.40	0.18	0.284	
Channel Velocity, V (m/s)				1.421 m/s		
Channel Capacity, Q (m ³ /s)				0.853 m ³ /s		

6. Stormwater Quality

6.1 Introduction

This section of the report aims to identify the requirements for stormwater quality management resulting from the proposed development and identifies suitable stormwater treatment devices to comply with relevant requirements of the State Planning Policy and Rockhampton Regional Council Land Development Guidelines.

6.2 State Planning Policy Assessment

An assessment has been undertaken to determine whether the development proposal necessitates compliance with the State Planning Policy (SPP) objectives. The following trigger questions are used to determine whether SPP compliance is required. If all trigger questions are answered “No”, then SPP compliance is not required, and the development is subject to Local Authority Assessment only.

Table 6.1: State Planning Policy Trigger Questions

Trigger Question	Development Response
Material Change of Use for Urban Purposes with a land area greater than 2,500m ² and:	Yes
a. Will result in an impervious area greater than 25% of the net developable area; or	Yes
b. Will result in 6 or more dwellings.	Yes
Reconfiguration of Lot for Urban Purposes that involves a land area greater than 2,500m ² , and will result in 6 or more lots.	Yes

As the above trigger questions are applicable to this development, the site is required to achieve the design objectives of the State Planning Policy.

6.3 Water Quality Objectives and Methodology

Table 6.1 indicates that the proposed development triggers the requirement for the development to achieve the Water Quality Objectives outlined in the State Planning Policy. As such, the development must demonstrate the following minimum reductions in mean annual pollutant loads from the unmitigated development:

Table 6.2: Water Quality Objectives

Pollutant	Minimum Reduction in Mean Load (%)
Total Suspended Solids (kg/yr)	85
Total Phosphorus (kg/yr)	60
Total Nitrogen (kg/yr)	45
Gross Pollutants (kg/yr)	90

To design and assess the achievement of these stormwater quality objectives the Model for Urban Stormwater Improvement Conceptualisation (MUSIC) Version 6.5.0 has been utilised to size suitable stormwater quality improvement devices as described in the following sections.

6.4 Catchment Areas & Source Nodes

The catchment areas used in the MUSIC model for the site are limited to the net developable area of the development site and are outlined in Table 6.3 below:

Table 6.3: Pollutant Export Parameters

Catchment Type	Area
Roof Area (100% Impervious)	1,531m ²
Hardstand Area (100% Impervious)	18m ²
Landscape Area (100% Pervious)	952m ²
Driveway Area (100% Impervious)	595m ²
Bypass Area (100% Pervious)	79m ²

6.5 Recorded Rainfall Data – Rockhampton Regional Council

Rainfall data for the site was taken from the Rockhampton Rainfall Station (ID 39083) using the dates 1/1/1939 – 31/03/2010 in accordance with the Water By Design – MUSIC Modelling Guidelines (2010) using a 6 minute time step.

Rainfall over this time period was modelled using MUSIC to calculate the pollutant generation and treatment effectiveness of the proposed systems.

6.6 Rainfall-Runoff Parameters

Rainfall-runoff parameters were taken in accordance with the Water By Design – MUSIC Modelling Guidelines (2010) using *Urban Residential* land use, as tabulated in Table 6.4 below:

Table 6.4: MUSIC Modelling Parameters

Parameter	Value
Rainfall threshold (mm)	1.00
Soil storage capacity (mm)	500
Initial storage (%)	10
Field capacity (mm)	200
Infiltration capacity coefficient a	211
Infiltration capacity exponent b	5.0
Initial depth (mm)	50
Daily recharge rate (%)	28
Daily baseflow rate (%)	27
Daily deep seepage rate	0

6.7 Pollutant Export Parameters

Pollutant export parameters were taken in accordance with Water By Design – MUSIC Modelling Guidelines (2010) using *Urban Residential* land use.

The split catchment approach was utilised for each surface type, with the input parameters shown in Table 6.5 below:

Table 6.5: Pollutant Export Parameters – Residential

Flow Type	Surface Type	TSS log ¹⁰ values		TP log ¹⁰ values		TN log ¹⁰ values	
Baseflow	Roof	N/A	N/A	N/A	N/A	N/A	N/A
	Roads	1.00	0.34	-0.97	0.31	0.20	0.20
	Ground	1.00	0.34	-0.97	0.31	0.20	0.20
Stormflow	Roof	1.30	0.39	-0.89	0.31	0.26	0.23
	Roads	2.43	0.39	-0.30	0.31	0.26	0.23
	Ground	2.18	0.39	-0.47	0.31	0.26	0.23

6.8 Proposed Treatment Device Details

The proposed stormwater quality treatment train includes an ATLAN Environmental cartridge system to treat stormwater flows from the building. This system is to provide primary treatment of stormwater flows. The proposed development will contain a single treatment chamber, flows from the entirety of the site are to be directed towards the treatment tank. The treatment devices are to be located within the treatment chamber located under the northern internal driveway, as shown on the engineering drawings attached as Appendix B.

Proprietary Treatment Device (ATLAN Environmental Products)

The ATLAN treatment train is a compact implementation of multiple stormwater treatment elements. It is comprised of ATLAN Stormsack gully pit inserts which act as a pre-treatment device and ATLAN Filter cartridge filters which provide primary treatment for the site. The ATLAN treatment train is typically designed to provide stormwater treatment in ultra-urban environment by meeting water quality standard whilst increasing yield and hence cost effectiveness for developers.

ATLAN StormSack filtration solutions are water quality devices that are installed within stormwater inlet pits to capture contaminants close to the surface for ease of maintenance. ATLAN StormSack filtration offers a decentralized approach to stormwater treatment which assists in achieving site water quality goals.

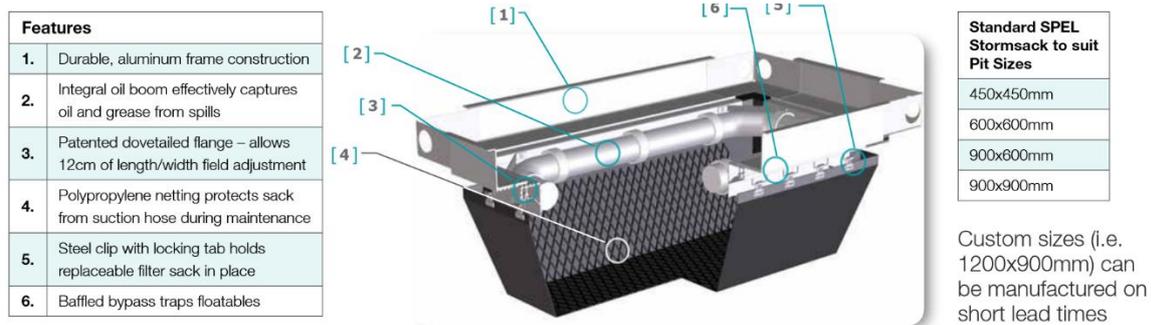


Figure 6.1: ATLAN Stormsack Gully Insert Pre-Treatment Filters

The ATLANFilter cartridge system provides a significantly greater surface contact area to footprint ratio than other filters. With a flow rate of 3.00L/s per cartridge and underground installation, the ATLANFilter provides excellent removal efficiency whilst maintaining site surface yield.

The high flow capacity and modular cartridge design means the ATLANFilter system can be effectively deployed in a variety of structures including manholes, precast vaults, or cast-in-place structures.



Figure 6.2: ATLANFilter cartridge filter

The ATLAN Treatment Train system has proven compliance with the South-East Queensland Water by Design Music Modelling Guidelines requirements (2010) and has been accepted for use by the Rockhampton Regional Council. The total requirement for treatment devices for the subject site is presented in 6.6 below:

Table 6.6: Site Specific ATLAN Treatment Train Requirements

Device Type	Residential Site
ATLANFilter Cartridges	4
Stormsack Inserts	2

The ATLANFilter cartridges are to be located within underground treatment tank that is to be constructed under the northern internal driveway of the proposed development.

6.9 MUSIC Model Diagrams

A diagrammatic layout of the MUSIC model interface used to model the proposed development with the proposed treatment devices incorporated for the site is presented in Figure 6.3 below:

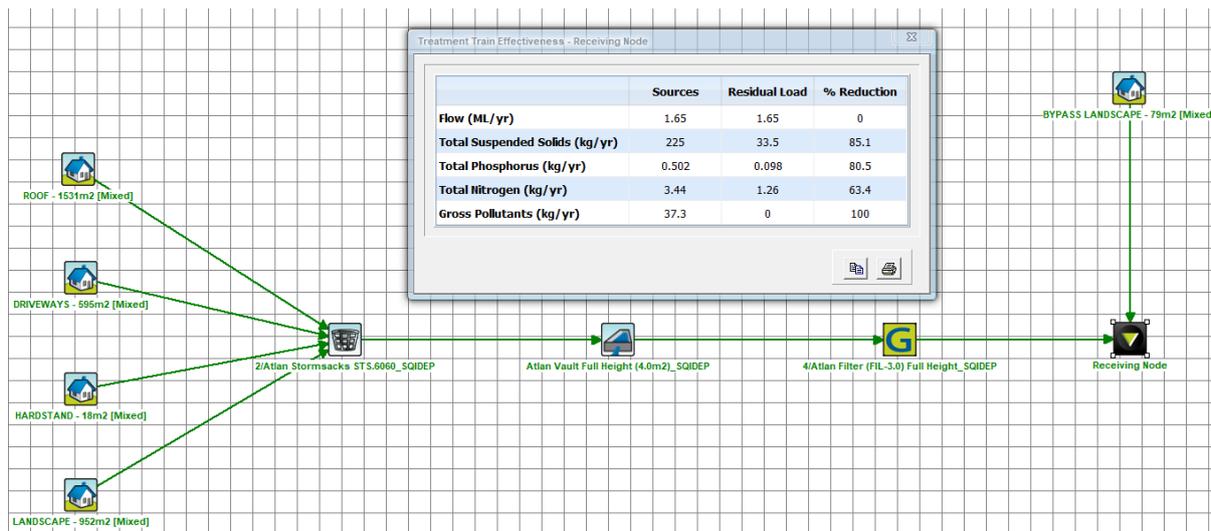


Figure 6.3: MUSIC Model Results

6.10 MUSIC Modelling Results

MUSIC was used to model the treatment train effectiveness in terms of the percentage of pollutants being removed from the system using the proposed treatment devices.

The results of the MUSIC modelling compared to the stated Water Quality Objectives (WQO's) are presented below:

Table 6.7: MUSIC Modelling Results

Potential Pollutant	Target WQO's	Music Results
Total Suspended Solids (kg/yr)	85%	85.1%
Total Phosphorus (kg/yr)	60%	80.5%
Total Nitrogen (kg/yr)	45%	63.4%
Gross Pollutants (kg/yr)	90%	100%

The results indicate that the proposed treatment devices are efficient in achieving the water quality objectives and exceeds the minimum required pollutant reduction targets.

7. Conceptual Erosion and Sediment Control Plan

7.1 Introduction

During construction, it shall be the responsibility of the Principal Contractor to ensure that the development complies with the relevant erosion and sediment control objectives, as outlined in the State Planning Policy and the Rockhampton Regional Council Planning Scheme.

This section of the report provides suggested inclusions in an erosion and sediment control plan for the proposed development site. This plan includes recommendations for monitoring & reporting responsibilities and the construction of site-specific sedimentation and erosion control measures. Detailed drawings specifying the proposed erosion and sediment control measures are to be provided at the Operational Works stage of the development.

7.2 General Erosion and Sediment Control Measures

It shall be the responsibility of the Principal Contractor to ensure the following erosion and sediment control measures are implemented on site:

- Clean stormwater runoff from upstream allotments is to be directed away from the development site using earth bunds or cut-off drains, as deemed appropriate by a suitable supervisor;
- The prevention of sediment runoff towards other allotments via the effective implementation of silt fences, sediment basins or other mitigation devices as deemed appropriate by a suitable supervisor;
- Sediment runoff shall also be prevented from entering the Council stormwater drainage system via the implementation of control measures such as gully pit sediment barriers;
- Erosion shakedown points shall be established at all vehicular access points, with shakedown areas regularly swept clean and sediment removed; and
- Erosion and sediment control measures are not to be removed from the development site until the site is completely rehabilitated and the surface is capable of resisting erosion.

7.3 Spoil and Stockpile Management Measures

It shall be the responsibility of the Principal Contractor to ensure the following spoil and stockpile management measures are implemented on site:

- Where the stockpiling of spoil and excess earthworks is necessary on the development site, stockpiles shall be established as far away as possible from stormwater inlets and pipelines to reduce the likelihood of sediment runoff; and
- Stockpiles are to be established within a designated zone of fill material and should be surrounded with appropriate erosion and sediment control measures.

7.4 Training Requirements

It shall be the responsibility of the Principal Contractor to ensure the following training protocols are implemented on the development site:

- Site induction courses shall include details of an environmental management reporting system, through which personnel will be able to report perceived erosion and sediment control issues on site.

8. Engineering Constraints

8.1 Earthworks

The development will involve earthworks filling, excavation and the construction of retaining walls to reshape the current surface, and provide infrastructure trenches, and facilitate the construction of the residential dwellings and shared access driveways.

The development site is shown as not being potentially affected by Acid Sulfate Soils on Rockhampton Regional Council's Online Mapping service, as shown in Figure 8.1 below: of the Rockhampton Regional Council Planning Scheme Interactive Mapping below:

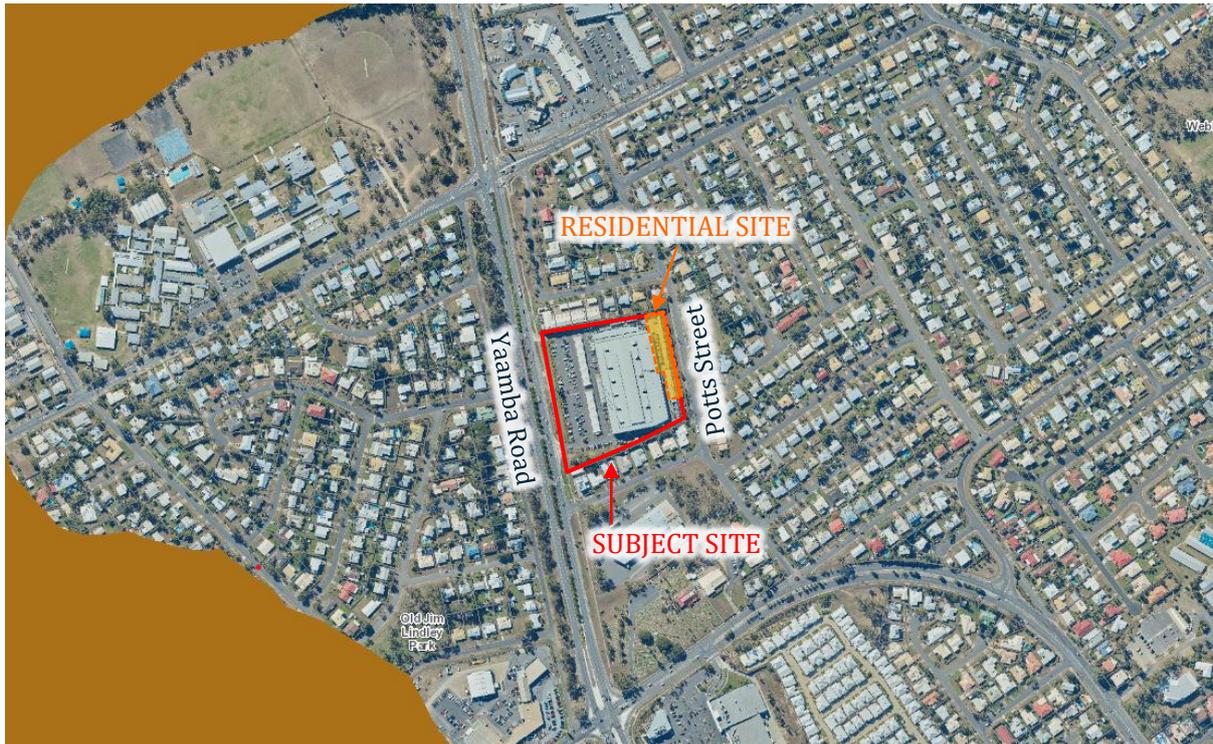


Figure 8.1: Excerpt from Rockhampton Regional Council's Online Mapping Portal – Acid Sulfate Soils

Given that the proposed development is located outside the extent of Acid Sulphate Soils areas, a full Acid Sulphate Assessment is not required for the proposed development, pending detailed geotechnical investigation of the site.

8.2 Erosion and Sediment Control

During earthworks, there will be inevitable areas of exposed earth, stripped areas and stockpiles. Appropriate methods to manage this process and ensure minimal impacts to surrounding properties, infrastructure and receiving waters will therefore be required.

The development will therefore require the preparation of a comprehensive Erosion and Sediment Control Plan with supporting documentation, certified by a Registered Professional Engineer and Certified Professional in Erosion and Sediment Control. It is anticipated that the development conditions will reflect these requirements and require compliance with State Policy 2017 and Rockhampton Regional Council's Guidelines prior to the commencement of construction.

8.3 Vehicular Access and External Verge Works

External works will be required within the Council verge to permit vehicular access to the proposed development and to upgrade the existing verge where necessary.

Three (3) new Vehicle Crossovers (VXO) are proposed for access to the development from Potts Street, all VXOs to be in accordance with the relevant requirements of Rockhampton Region Planning Scheme and AS2890:2009 – Parking Facilities.

Internal driveways and parking facilities will be required to comply with AS2890.1:2004 with relevant private certification included as part of the building works.

Verge upgrades will be the subject of detailed design by a qualified landscape architect with RPEQ certification of as-constructed drawings provided to Council at the completion works.

8.4 Flooding

The development site is outside the extent of flood affected areas, as shown from the screen shot of the Rockhampton Regional Plan Interactive Mapping below:



Figure 8.2: Excerpt from Rockhampton Regional Council's Online Mapping Portal

The proposed development is located outside of the flood hazard zone as shown by the Rockhampton Regional Council Flood Hazard Overlay Map. Therefore, a Flood Impact Assessment report is not required for this development.

8.5 Water Connection

Existing Connection

The site survey by Vison Surveys Queensland has been reviewed to assess the presence of water services available for the proposed development. It is confirmed that in the existing case the overall site is serviced by an existing Ø63mm water property connection, connecting into the existing Ø200mm water main located within Yaamba Road.

Proposed Connection

It is proposed that the residential development be serviced via a new Ø100mm water property connection and Ø100mm water meter, connecting directly into the existing Ø100mm watermain located within Potts Street. Refer to the Engineering Drawings attached within Appendix B of this report for the location of the proposed water connection.

The final size and location of the water connection and water meter is to be confirmed by the Hydraulic Engineer at the detailed design stage.

8.6 Sewer Connection

Existing Services

The site survey by Vison Surveys Queensland has been reviewed to assess the presence of sewer services available for the proposed development. The overall site is currently serviced via an existing Ø150mm sewer property connection that connects directly into an existing Ø1050mm sewer manhole located along the southern boundary of the site. The sewer main then travels south between 7 and 9 MacArtney Street, ultimately connecting into the Ø150mm sewer main located within the MacArtney Street road reserve.

Proposed Services

It is proposed that the commercial development be serviced via the existing sewer property connection, connecting directly into the existing sewer manhole located within the development site.

It is proposed that a new Ø150mm sewer main be constructed within the commercial development site traversing the southern boundary as part of this development application and is to service the proposed residential development.

Refer to the Engineering Drawings attached within Appendix B of this report for the location of the proposed internal sewer diversion sewer connections.

Further detailing of the sewer connection is to be demonstrated during the detailed design stage. Internal connection details are also to be demonstrated during the plumbing and drainage application phase by the hydraulic engineer.

8.7 Electrical

According to the DBYD information, there is no existing Underground Assets within the Road reserves fronting the development.

Above ground Ergon assets have been identified to Yaamba Road and Potts Street frontage.

An existing PMT and electrical easement have been identified along the southern boundary of the development site. No works are proposed at the existing PMT or the electrical easement. Therefore, no changes or alterations are anticipated to the existing PMT and easement as result of the development.

Further investigation will need to be carried out by the Electrical Consultant and Ergon during design development to determine the extent of any upgrade works that may be required for the proposed development.

8.8 Telecommunications

According to the survey information, several Telstra pits have been identified within the verge of Yaamba Road and Potts Street fronting the development site.

Further investigation will need to be carried out by the Electrical Consultant and NBN during Design Development to determine the extent of any upgrade works that may be required for the proposed development.

8.9 Gas

According to the DBYD and survey information, there is existing medium pressure gas main along the full length of Potts Street frontage.

Further investigation will need to be carried out by the Consultant and APA during Design Development to determine the extent of any upgrade works that may be required for the proposed development.

9. Conclusion

This report has been prepared to support the lodgement of a Minor Change (MIN) application to approve the construction of a new development, comprising a new residential townhouse development. The development is proposed to take place over the following parcel of land:

Property Address:	452-488 Yaamba Road, Norman Gardens
Property Description:	Lot 25 on RP610513
Client:	Coles Group Property Developments Pty Ltd
Council:	Rockhampton Regional Council
Development Site Area:	3,175m ²
Registered Site Area:	26,630m ²

This report has addressed the management of stormwater quantity and quality to ensure that the proposed development complies with all necessary state and local government policies.

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

- Stormwater detention for the proposed development,
 - The construction of a 12m² underground detention tank (refer to Section 5 of this report for outlet arrangements).
- Stormwater quality treatment for the proposed development,
 - The installation of a four (4) ATLAN Filter cartridge system to be located within a 4m² (Min.) stormwater treatment tank to treat flows generated from the majority of the proposed residential development site.
 - Two (2) ATLAN Stormsack Inserts are to be constructed directly upstream of the treatment filtration system.

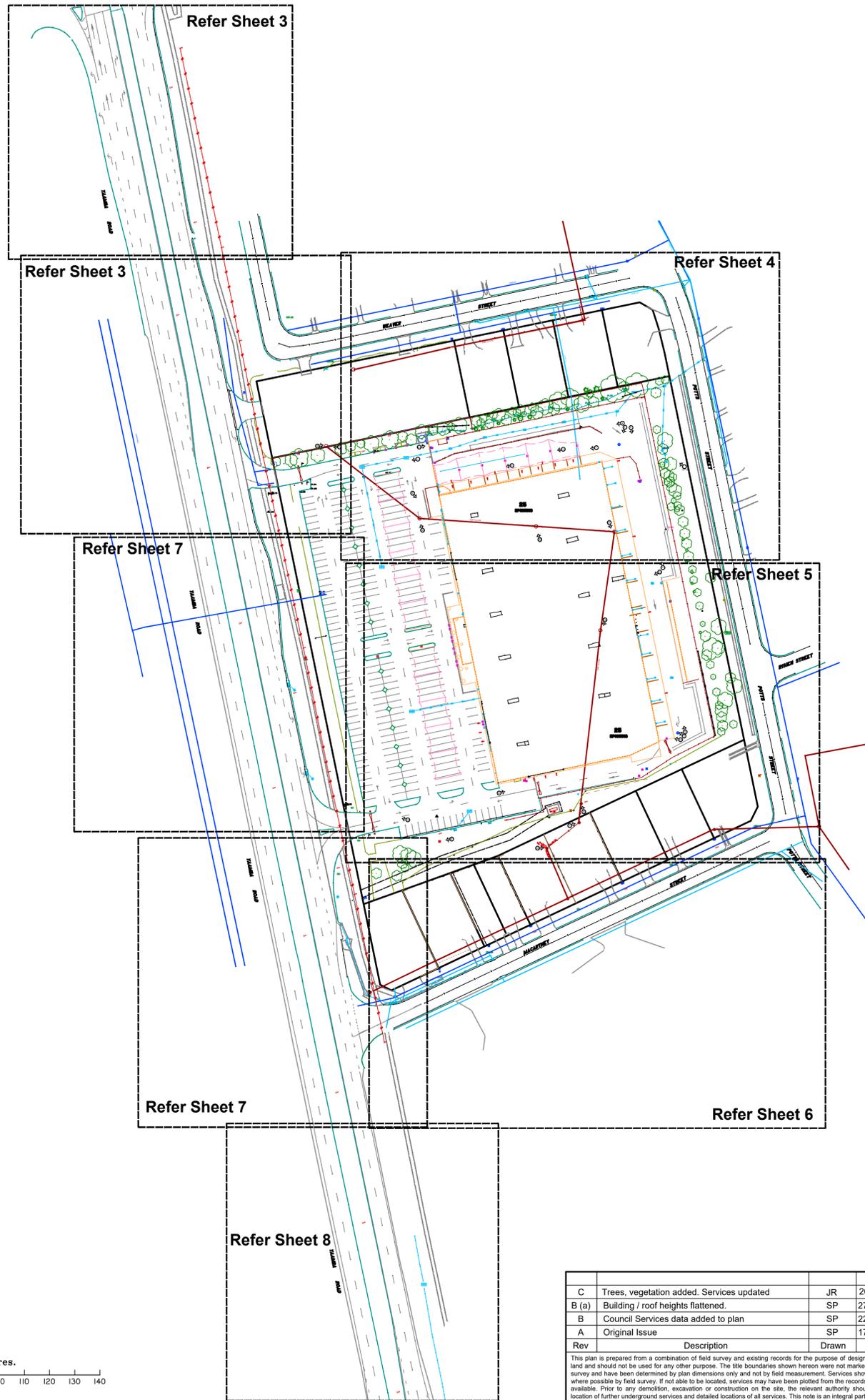
This report has addressed the management of stormwater quantity and quality and demonstrated that no additional works are required to ensure that the proposed development complies with all necessary state and local government policies.

It is the opinion of this report that the proposed stormwater quantity and quality management systems are suitable for a development of this scale and potential impacts.



Appendix A

Site Survey & Architectural Drawings



DENOTES PHOTO N° & DIRECTION

Scale 1:1000 - Lengths are in Metres.

Rev	Description	Drawn	Date	Checked
C	Trees, vegetation added. Services updated	JR	20/12/2021	JS
B (a)	Building / roof heights flattened.	SP	27/07/2015	-
B	Council Services data added to plan	SP	22/06/2015	WE
A	Original Issue	SP	17/06/2015	WE

This plan is prepared from a combination of field survey and existing records for the purpose of designing new constructions on the land and should not be used for any other purpose. The title boundaries shown hereon were not marked by the author at the time of survey and have been determined by plan dimensions only and not by field measurement. Services shown hereon have been located where possible by field survey. If not able to be located, services may have been plotted from the records of relevant authorities where available. Prior to any demolition, excavation or construction on the site, the relevant authority should be contacted for possible location of further underground services and detailed locations of all services. This note is an integral part of this plan.

CONTOUR & DETAIL PLAN	
PROJECT: Survey - Bunnings Rockhampton LOCATION: 452-488 Yaamba Road, Norman Gardens Real Property Description: Lot 25 on RP610513	
CLIENT: Bunnings Group Limited	
Parish: Murchison	Horiz. Datum: MGA
County: Livingstone	Vert. Datum: AHD
Local Authority: Rockhampton Regional	Contour Interval: 0.25 metres

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Scale: 1:1000 @ A1	Drawing No: 15245-CD1
Drawn: SP/JR	Sheet: 1 of 8
Surveyor: W. Elliott	Revision: Rev C



Photo 1



Photo 2

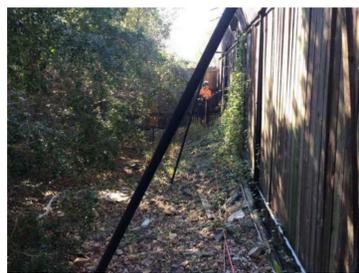


Photo 3



Photo 4



Photo 5



Photo 6



Photo 7



Photo 8



Photo 9



Photo 10



Photo 11



Photo 12



Photo 13



Photo 14



Photo 15



Photo 16



Photo 17



Photo 18



Photo 19



Photo 20



Photo 21



Photo 22



Photo 23



Photo 24



Photo 25



Photo 26



Photo 27



Photo 28



Photo 29



Photo 30

Rev	Description	Drawn	Date	Checked
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Drawn: SP/JR		Sheet: 2 of 8		
Surveyor: W. Elliott		Revision: Rev C		

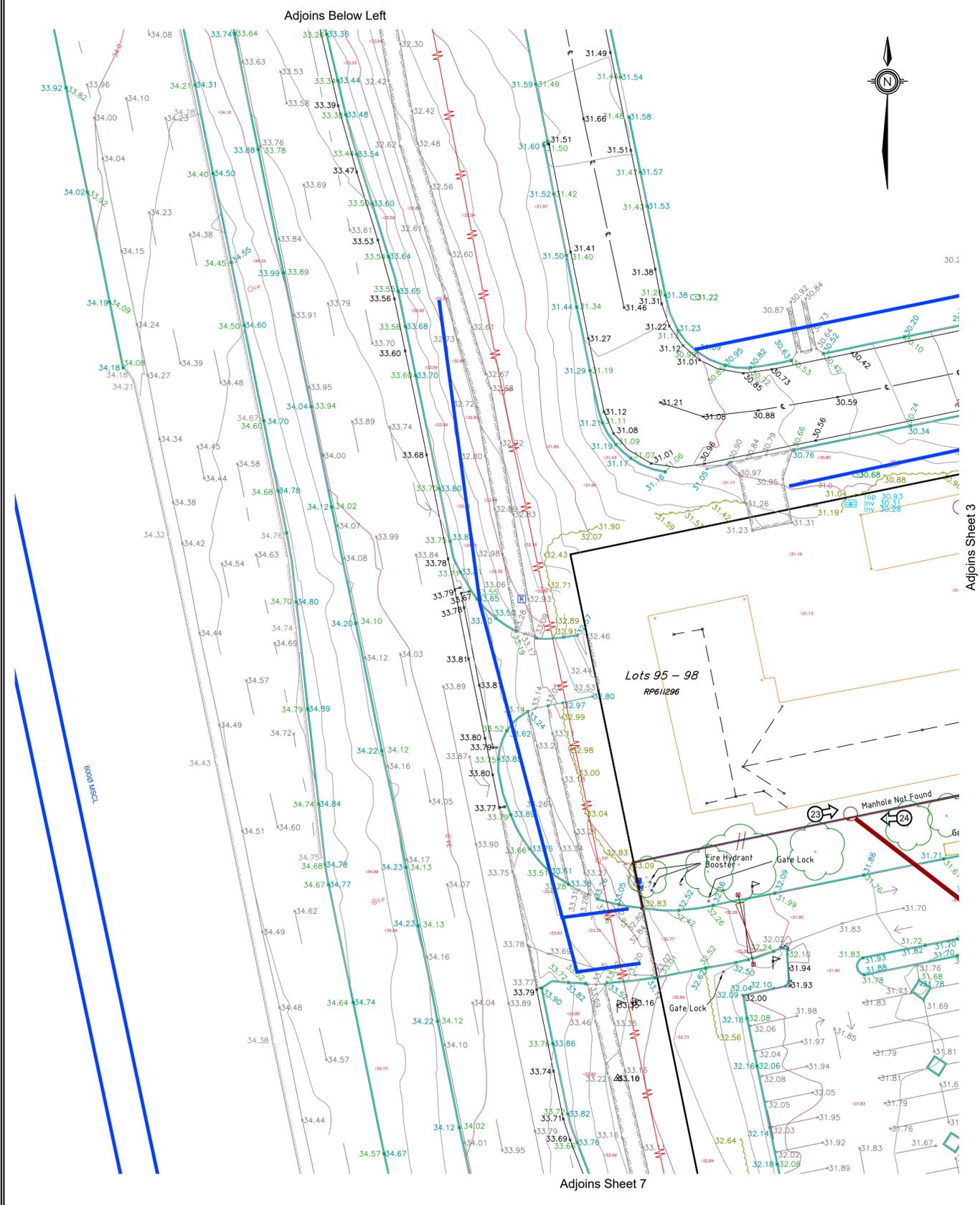
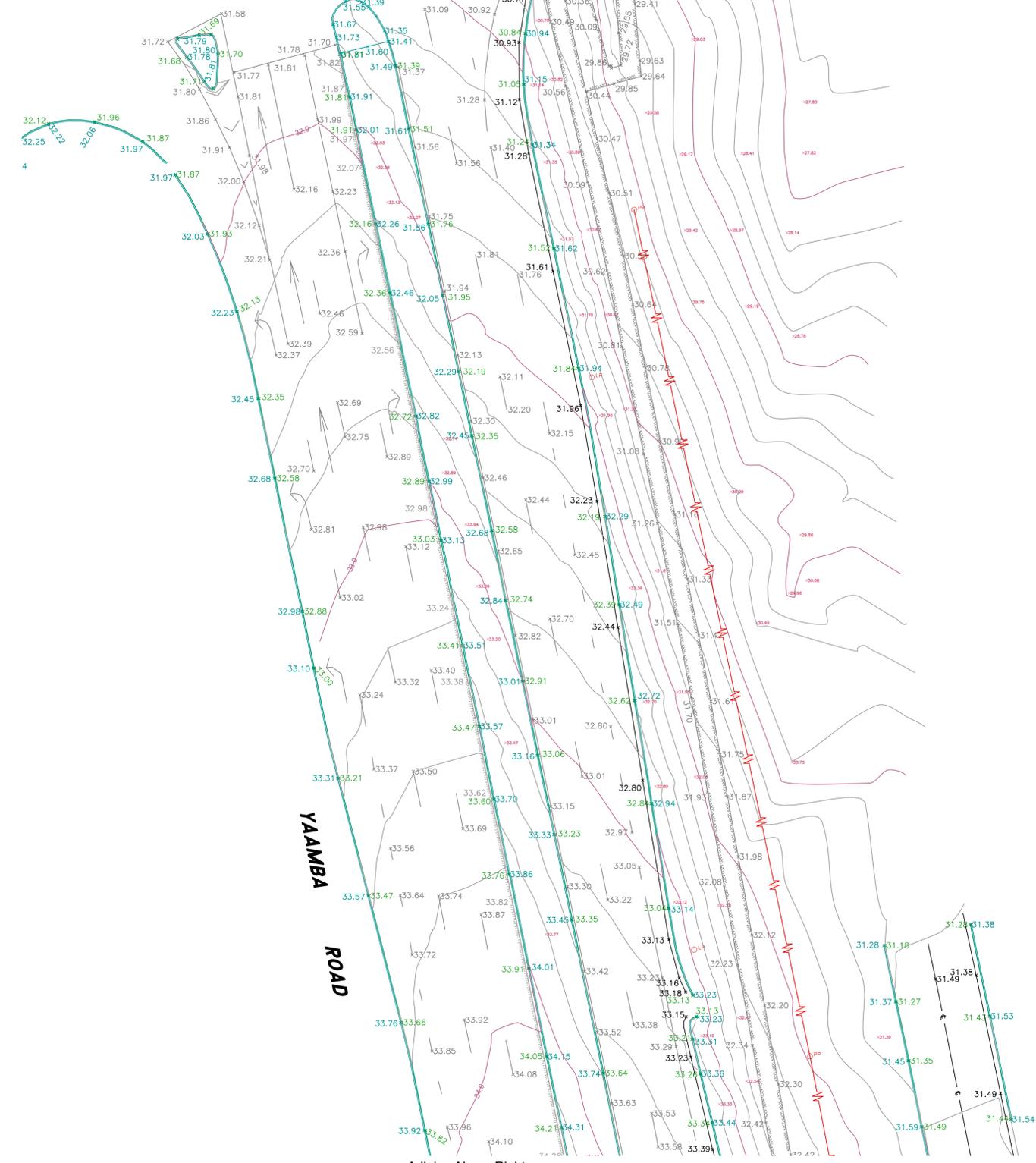
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LEGEND

- LP LIGHT POLE
- PP POWER POLE
- ▲ TEMPORARY BENCH MARK
- ⊙ WATER TAG
- ⊕ FIRE HYDRANT
- ⊕ WATER METER
- ⊕ SEWER MANHOLE
- ⊕ STOP VALVE
- ⊕ POWER BOX
- ⊕ TELSTRA PIT
- ⊕ GULLY GRATE
- ⊕ STORMWATER MANHOLE
- ⊕ DOWNPIPE LOCATION UNDER EAVE
- ⊕ SIGN (AS SHOWN)
- ⊕ GAS SUPPLY
- ⊕ ROOF LIGHTS
- ⊕ IRRIGATION CONTROL
- ⊕ BOLLARD
- ⊕ ELECTRICAL TAG

- FENCE
- BOTTOM OF BANK
- TOP OF BANK
- SW STORMWATER LINE
- S SEWER LINE
- E ELECTRICAL LINE
- W WATER LINE
- 19.00 CONTOUR LINE
- EDGE OF VEGETATION
- DRAINAGE FLOW LINE
- EXISTING DWELLING
- EDGE OF BITUMEN
- EDGE OF CONCRETE
- AWNING (LEVELS INDICATED ARE TOP)
- STRUCTURAL BEAM UNDER EAVE
- COUNCIL SERVICE DATA - WATER
- COUNCIL SERVICE DATA - STORMWATER
- COUNCIL SERVICE DATA - SEWER

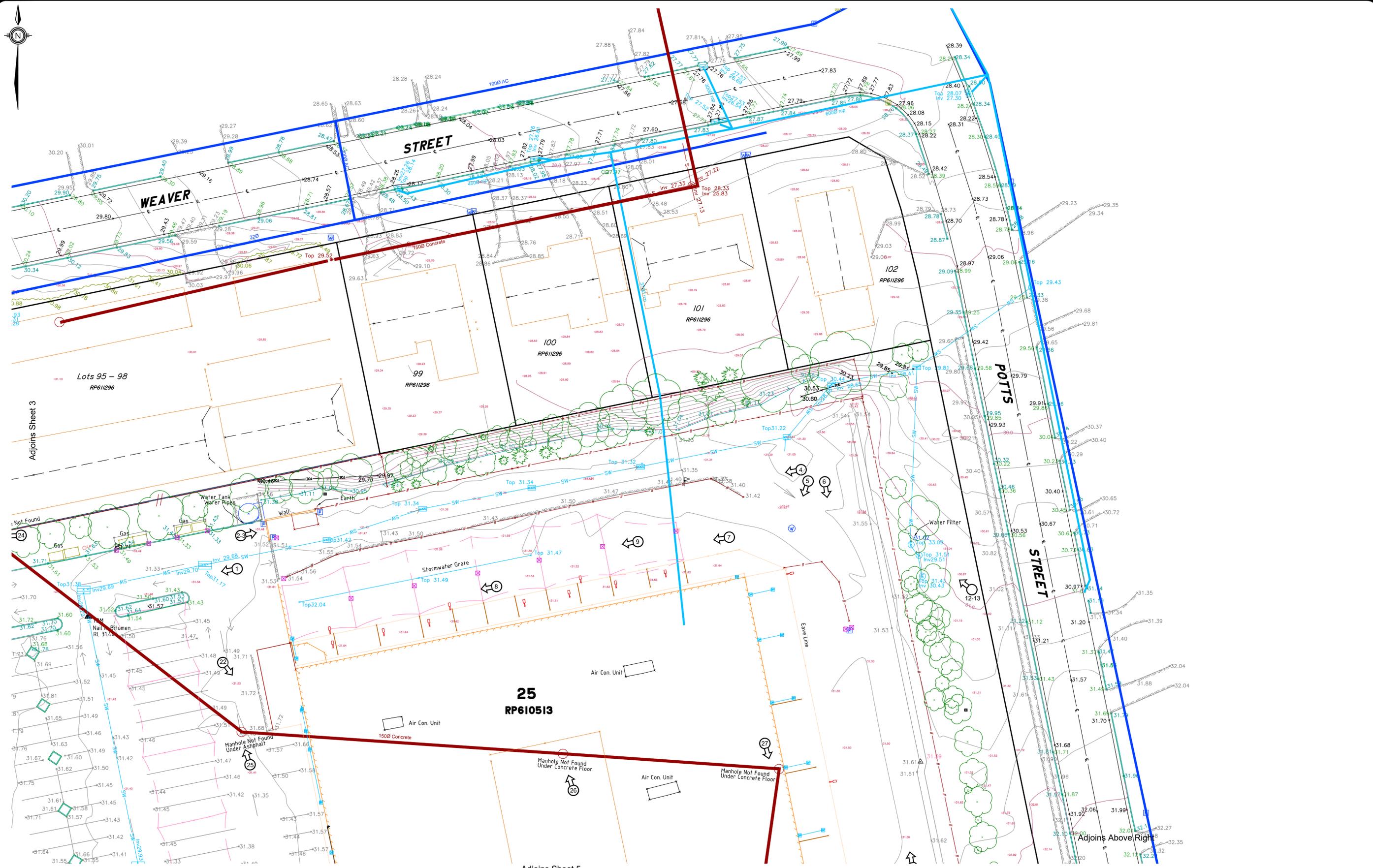


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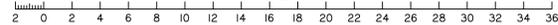
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Local Authority: Rockhampton Regional	Contour Interval: 0.25 metres	Surveyor: W. Elliott	Revision: Rev C

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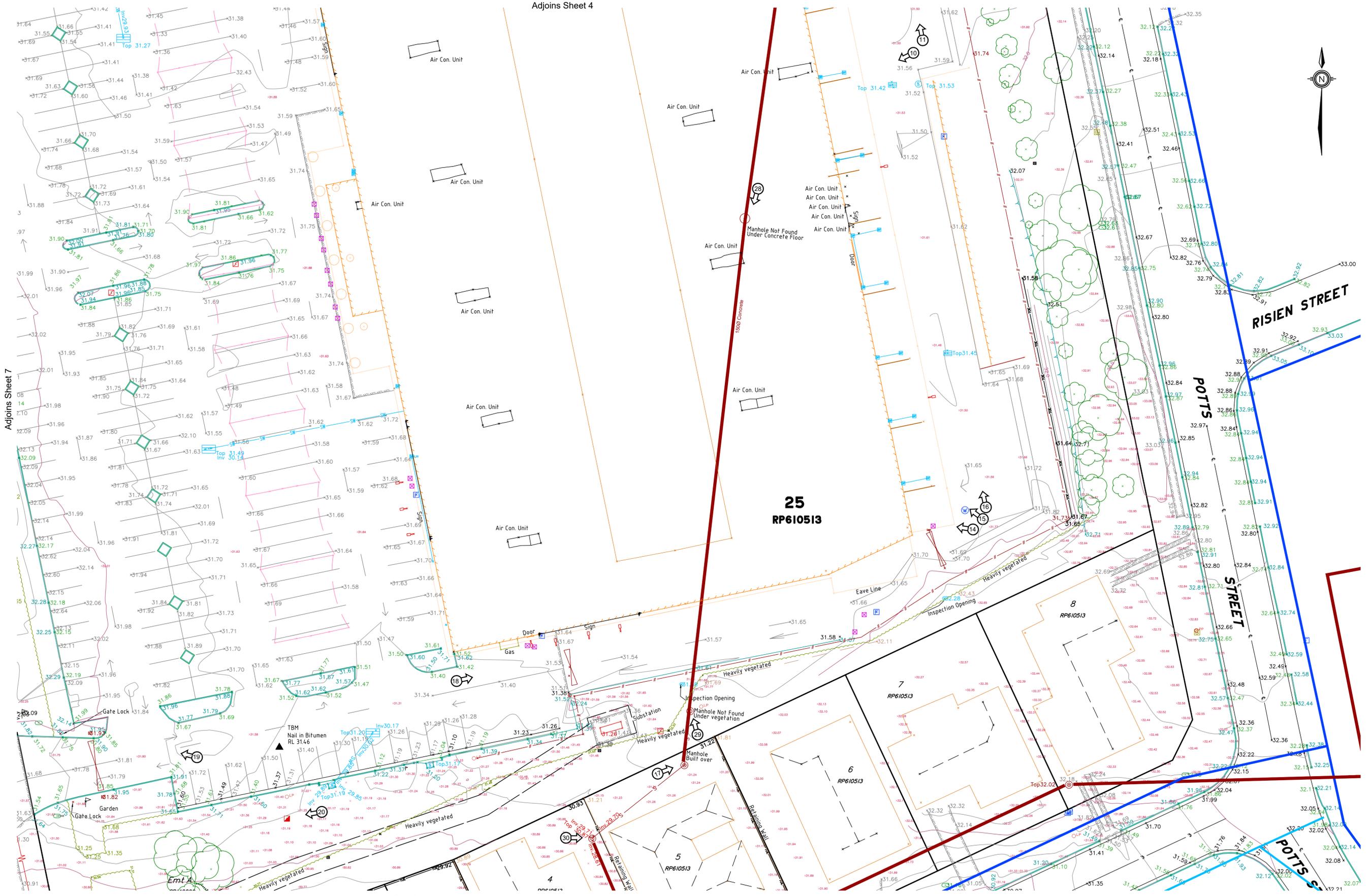
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Rev	Description	Drawn	Date	Checked
C	Trees, vegetation added. Services updated	JR	20/12/2021	JS
B (a)	Building / roof heights flattened.	SP	27/07/2015	-
B	Council Services data added to plan	SP	22/06/2015	WE
A	Original Issue	SP	17/06/2015	WE

CONTOUR & DETAIL PLAN			
PROJECT: Survey - Bunnings Rockhampton			
LOCATION: 452-488 Yaamba Road, Norman Gardens			
Real Property Description: Lot 25 on RP610513			
CLIENT: Bunnings Group Limited			
Parish: Murchison	Horiz. Datum: MGA	Scale: 1:250 @ A1	Drawing No: 15245-CD1
County: Livingstone	Vert. Datum: AHD	Drawn: SP/JR	Sheet: 4 of 8
Local Authority: Rockhampton Regional	Contour Interval: 0.25 metres	Surveyor: W. Elliott	Revision: Rev C

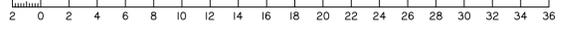
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 Airlie Beach | Mackay | Townsville | Rockhampton | Moranbah
 07 4948 3781 | 07 4951 0768 | 07 4721 0410 | 07 4927 1744 | 07 4941 9069
 Email: admin@visionsurveysqld.com.au



Adjoins Sheet 7

Adjoins Sheet 6

Scale 1:250 - Lengths are in Metres.



Rev	Description	Drawn	Date	Checked
C	Trees, vegetation added. Services updated	JR	20/12/2021	JS
B(a)	Building / roof heights flattened.	SP	27/07/2015	-
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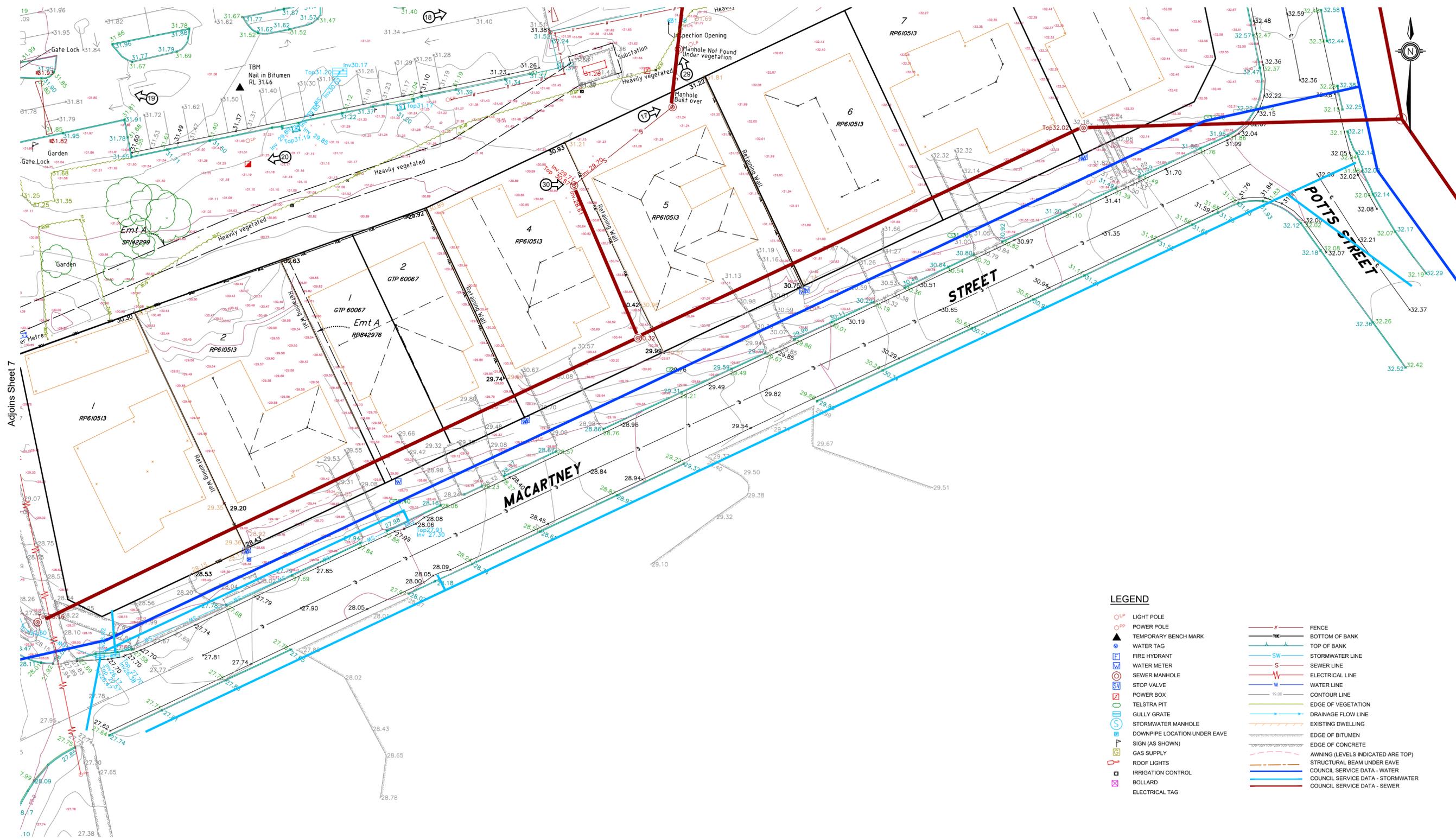
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PROJECT:	Survey - Bunnings Rockhampton
LOCATION:	452-488 Yaamba Road, Norman Gardens
Real Property Description:	Lot 25 on RP610513
CLIENT:	Bunnings Group Limited
Parish:	Murchison
County:	Livingstone
Local Authority:	Rockhampton Regional
Horiz. Datum:	MGA
Vert. Datum:	AHD
Contour Interval:	0.25 metres

VISION SURVEYS QUEENSLAND

Airlie Beach | Mackay | Townsville | Rockhampton | Moranbah
 07 4948 3781 | 07 4951 0768 | 07 4721 9410 | 07 4927 1744 | 07 4941 9669
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Scale: 1:250 @ A1
 Drawing No: 15245-CD1
 Drawn: SP/JR
 Sheet: 5 of 8
 Surveyor: W. Elliott
 Revision: Rev C

Adjoins Sheet 5



LEGEND

- LP LIGHT POLE
- PP POWER POLE
- ▲ TEMPORARY BENCH MARK
- ◆ WATER TAG
- ⊠ FIRE HYDRANT
- ⊠ WATER METER
- ⊠ SEWER MANHOLE
- ⊠ STOP VALVE
- ⊠ POWER BOX
- ⊠ TELSTRAP PIT
- ⊠ GULLY GRATE
- ⊠ STORMWATER MANHOLE
- ⊠ DOWNPIPE LOCATION UNDER EAVE
- ⊠ SIGN (AS SHOWN)
- ⊠ GAS SUPPLY
- ⊠ ROOF LIGHTS
- ⊠ IRRIGATION CONTROL
- ⊠ BOLLARD
- ⊠ ELECTRICAL TAG
- FENCE
- BOTTOM OF BANK
- TOP OF BANK
- SW STORMWATER LINE
- S SEWER LINE
- E ELECTRICAL LINE
- W WATER LINE
- 19.00 CONTOUR LINE
- TELSTRAP PIT
- EDGE OF VEGETATION
- DRAINAGE FLOW LINE
- EXISTING DWELLING
- EDGE OF BITUMEN
- EDGE OF CONCRETE
- AWNING (LEVELS INDICATED ARE TOP)
- STRUCTURAL BEAM UNDER EAVE
- COUNCIL SERVICE DATA - WATER
- COUNCIL SERVICE DATA - STORMWATER
- COUNCIL SERVICE DATA - SEWER

Rev	Description	Drawn	Date	Checked
C	Trees, vegetation added. Services updated	JR	20/12/2021	JS
B (a)	Building / roof heights flattened.	SP	27/07/2015	-
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CONTOUR & DETAIL PLAN

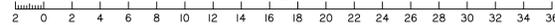
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LOCATION: 452-488 Yaamba Road, Norman Gardens	
Real Property Description: Lot 25 on RP610513	
CLIENT: Bunnings Group Limited	
Parish: Murchison	Horiz. Datum: MGA
County: Livingstone	Vert. Datum: AHD
Local Authority: Rockhampton Regional	Contour Interval: 0.25 metres

VISION SURVEYS QUEENSLAND

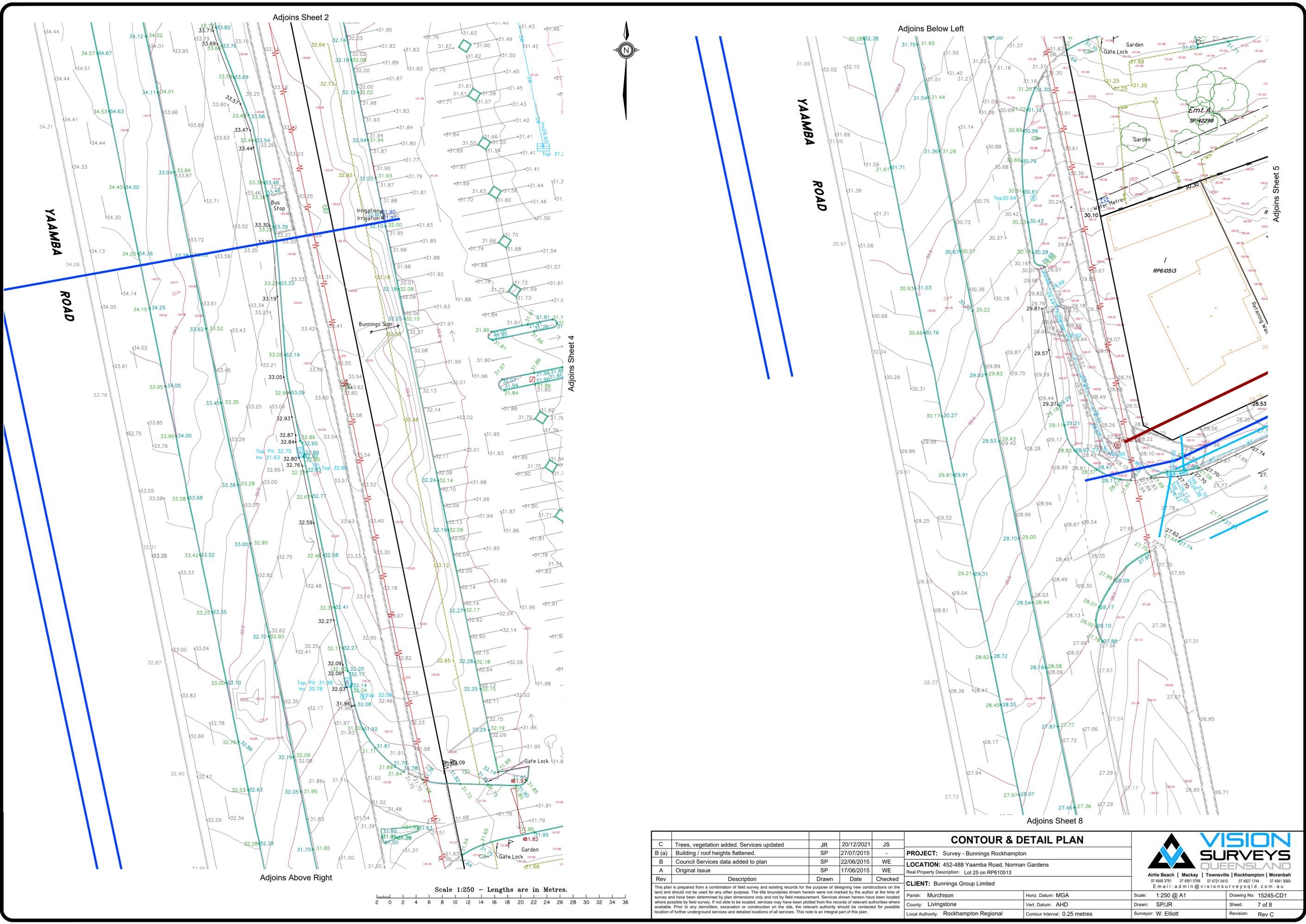
Airlie Beach | Mackay | Townsville | Rockhampton | Moranbah
 07 4948 3781 | 07 4951 0768 | 07 4721 9410 | 07 4927 1744 | 07 4941 9069
 Email: admin@visionsurveysqld.com.au

Scale: 1:250 @ A1 | Drawing No: 15245-CD1
 Drawn: SP/JR | Sheet: 6 of 8
 Surveyor: W. Elliott | Revision: Rev C

Scale 1:250 - Lengths are in Metres.



This plan is prepared from a combination of field survey and existing records for the purpose of designing new constructions on the land and should not be used for any other purpose. The title boundaries shown hereon were not marked by the author at the time of survey and have been determined by plan dimensions only and not by field measurement. Services shown hereon have been located where possible by field survey. If not able to be located, services may have been plotted from the records of relevant authorities where available. Prior to any demolition, excavation or construction on the site, the relevant authority should be contacted for possible location of further underground services and detailed locations of all services. This note is an integral part of this plan.



Scale 1:250 - Lengths are in Metres.

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LOCATION: 452-488 Yaamba Road, Norman Gardens	
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Parish: Murchison	Horiz. Datum: MGA
County: Livingstone	Vert. Datum: AHD
Local Authority: Rockhampton Regional	Contour Interval: 0.25 metres

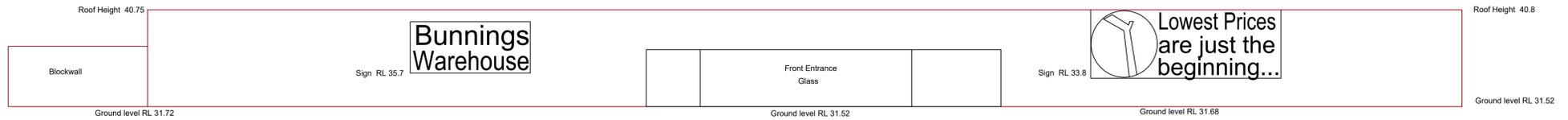
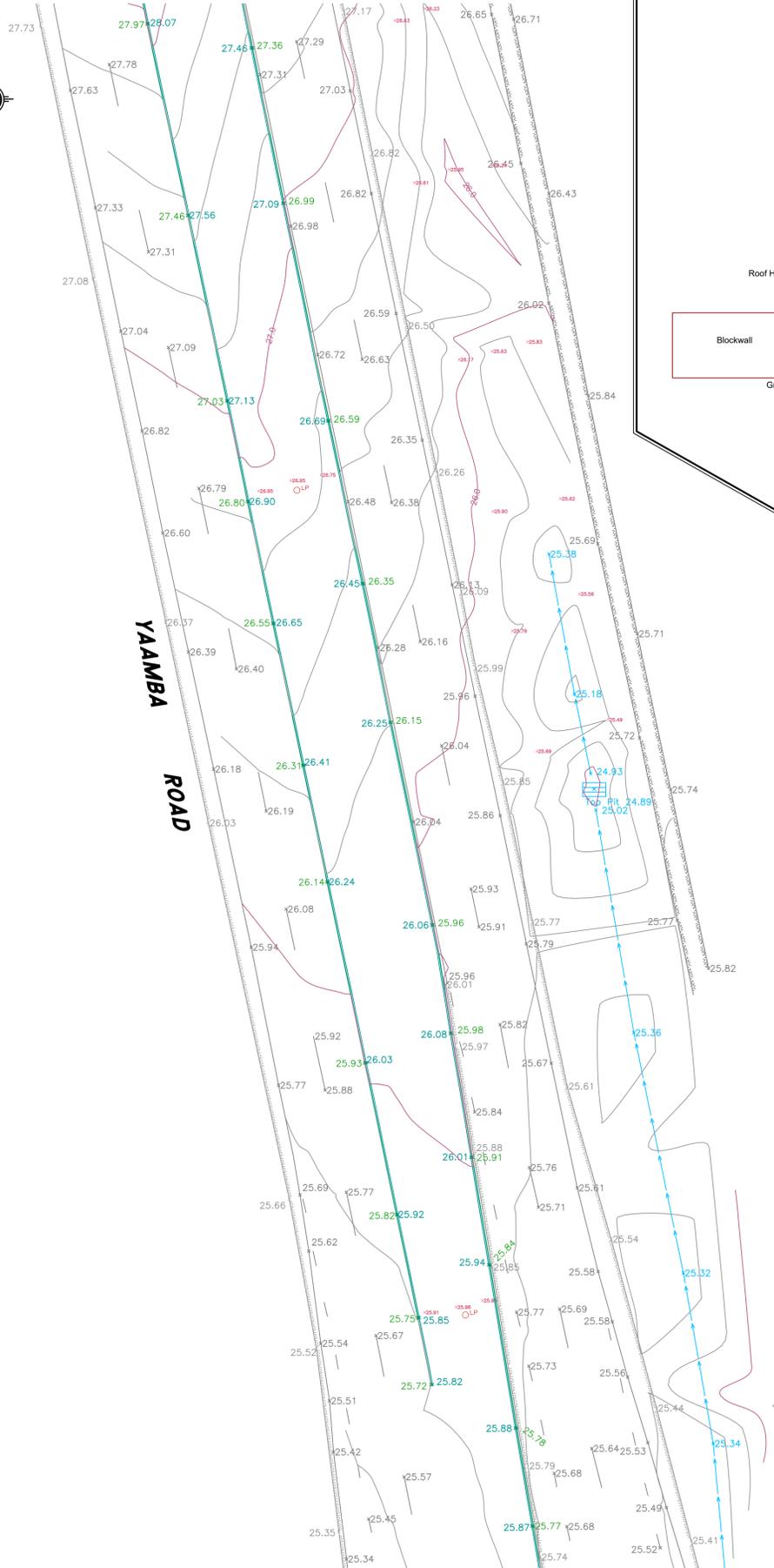


VISION SURVEYS QUEENSLAND

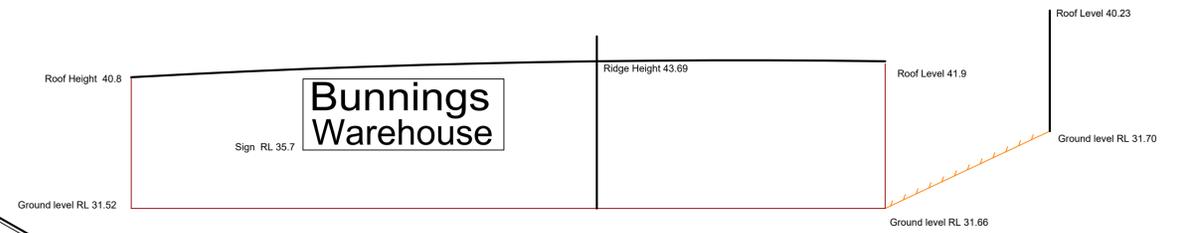
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Surveyor: W. Elliott	Revision: Rev C

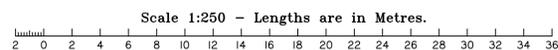
Adjoins Sheet 6



Front Section



South Wall



Rev	Description	Drawn	Date	Checked	CONTOUR & DETAIL PLAN					
C	Trees, vegetation added. Services updated	JR	20/12/2021	JS	PROJECT: Survey - Bunnings Rockhampton LOCATION: 452-488 Yaamba Road, Norman Gardens Real Property Description: Lot 25 on RP610513 CLIENT: Bunnings Group Limited Parish: Murchison Horiz. Datum: MGA County: Livingstone Vert. Datum: AHD Local Authority: Rockhampton Regional Contour Interval: 0.25 metres					
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					County:	Livingstone	Drawn:	SP/JR	Sheet:	8 of 8
					Local Authority:	Rockhampton Regional	Surveyor:	W. Elliott	Revision:	Rev C

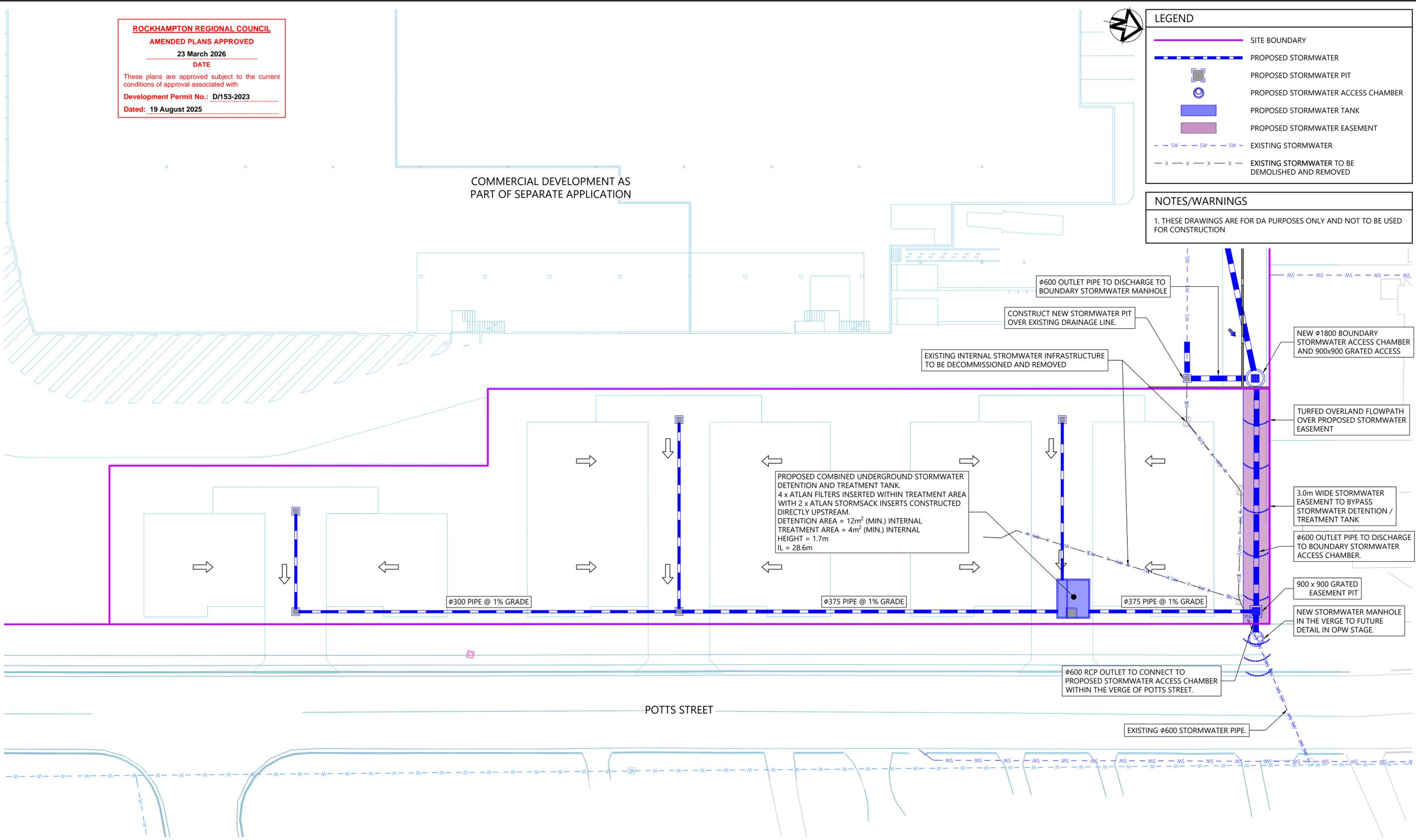


ROCKHAMPTON REGIONAL COUNCIL
AMENDED PLANS APPROVED
23 March 2026
DATE
 These plans are approved subject to the current conditions of approval associated with
Development Permit No.: D/153-2023
Dated: 19 August 2025



LEGEND	
	SITE BOUNDARY
	PROPOSED STORMWATER
	PROPOSED STORMWATER PIT
	PROPOSED STORMWATER ACCESS CHAMBER
	PROPOSED STORMWATER TANK
	PROPOSED STORMWATER EASEMENT
	EXISTING STORMWATER
	EXISTING STORMWATER TO BE DEMOLISHED AND REMOVED

NOTES/WARNINGS
 1. THESE DRAWINGS ARE FOR DA PURPOSES ONLY AND NOT TO BE USED FOR CONSTRUCTION



STORMWATER LAYOUT PLAN
 SCALE 1:200

ISSUE	DESCRIPTION	AUTHOR	DATE
03	AMENDED PER MINOR CHANGE APPLICATION	SC	20.11.25
02	AMENDED FOR RFI	DB	09.02.24
01	ORIGINAL ISSUE	CH	03.10.23

STATUS			
FOR DA APPROVAL NOT FOR CONSTRUCTION			
R.P.E.Q No.:	CERTIFIED	DESIGNER	SC
HEIGHT DATUM	AHD	CHECKER	IG
GRID	LOCAL	APPROVER	MB
ORIGINAL SIZE	A1		

SURVEYOR

 76 Denham Street
 Rockhampton, QLD, 4700
 (07) 4927 1744

SCALE
 SCALE 1:200

CLIENT

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 Rockhampton, QLD, 4701
 (07) 4930 8400

ARCHITECT

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 Brisbane, QLD, 4000
 +61 7 3370 4600

MICHAEL BALE & ASSOCIATES
 Structural and Civil Engineering Consultancy
 Level 3, 18 Orchid Avenue,
 Surfers Paradise
 PO BOX 1715, Surfers Paradise 4217
 Ph: 07 5538 0431
 mail@michaelbale.com.au

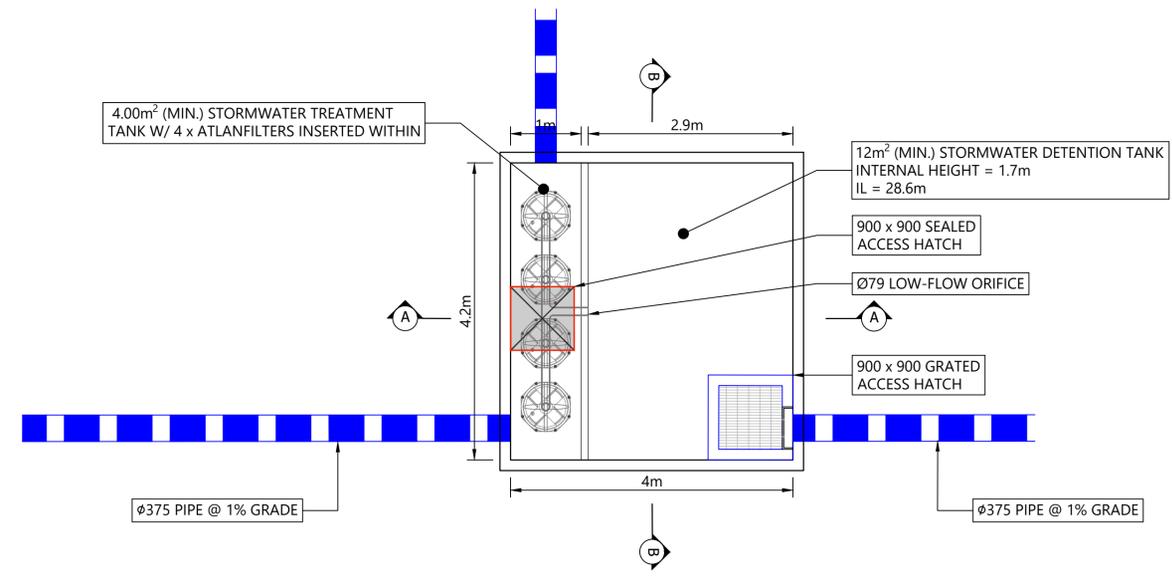
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 RESIDENTIAL
 ROCKHAMPTON NORTH, QLD

DRAWING TITLE:
 STORMWATER
 LAYOUT PLAN

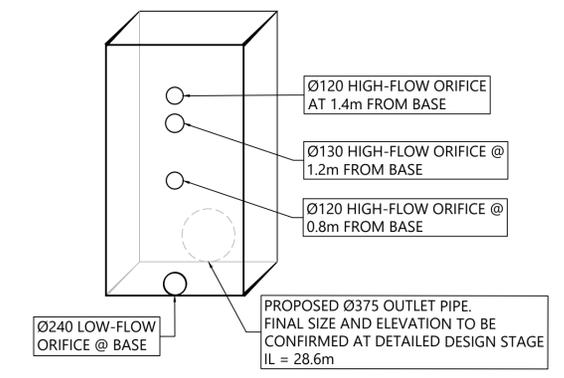
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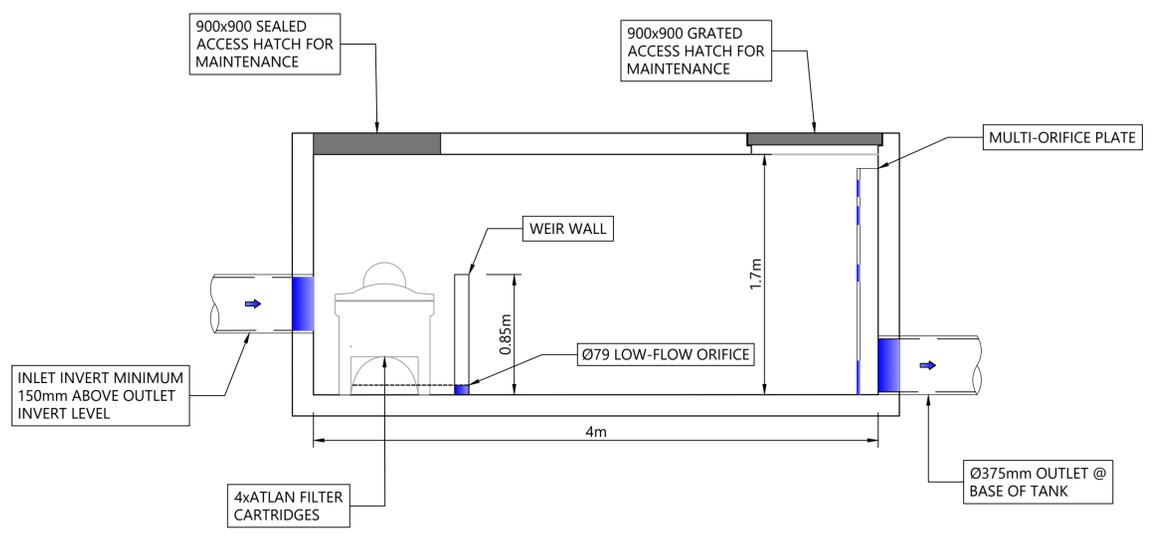
ROCKHAMPTON REGIONAL COUNCIL
AMENDED PLANS APPROVED
23 March 2026
DATE
 These plans are approved subject to the current conditions of approval associated with
Development Permit No.: D/153-2023
Dated: 19 August 2025



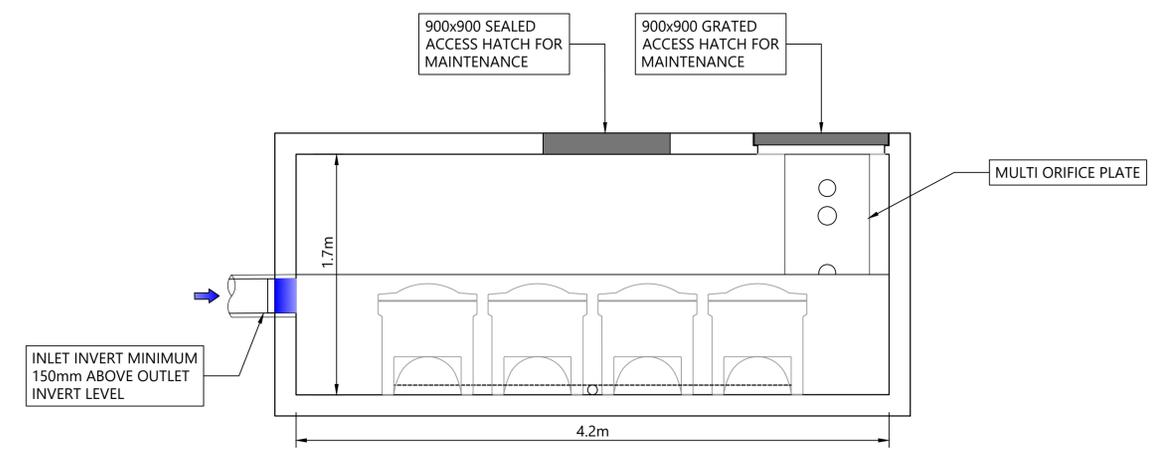
STORMWATER TANK PLAN
 SCALE 1:50



OUTLET DETAIL
 SCALE NTS



SECTION A - A
 SCALE 1:25



SECTION B - B
 SCALE 1:25

STORMWATER DETENTION/TREATMENT TANK DETAIL
 SCALE 1:25

NOTES : STORMWATER TANKS

- THE STORMWATER DETENTION AND TREATMENT TANKS SHOWN CAN BE CAST IN-SITU OR SUPPLIED FROM ATLAN (ATLAN PRECAST VAULTS) OR EQUIVALENT.
- IF TANK DEPTH AND/OR AREA IS TO CHANGE, NOTIFY ENGINEER FOR ORIFICE/OUTLET PIPES ADJUSTMENT.

NOTES / WARNINGS

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ISSUE	DESCRIPTION	AUTHOR	DATE
02	AMENDED PER MINOR CHANGE APPLICATION	SC	18.11.25
01	ORIGINAL ISSUE	DB	10.10.23

STATUS			
FOR DA APPROVAL NOT FOR CONSTRUCTION			
R.P.E.Q No.:	CERTIFIED	DESIGNER	SC
GRID	LOCAL	CHECKER	IG
ORIGINAL SIZE	A1	APPROVER	MB

SURVEYOR
 VISION SURVEYS
 76 Denham Street
 Rockhampton, QLD, 4700
 (07) 4927 1744

SCALE
 SCALE 1:25
 0.5 0 0.5 1.0
 1:25 (A1) - 1:50 (A3)

CLIENT
 coles
 Value the Australian way
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 Rockhampton, QLD, 4701
 (07) 4930 8400

ARCHITECT
 Hames Sharley
 Level 2, 235 Edward Street
 Brisbane, QLD, 4000
 +61 7 3370 4600

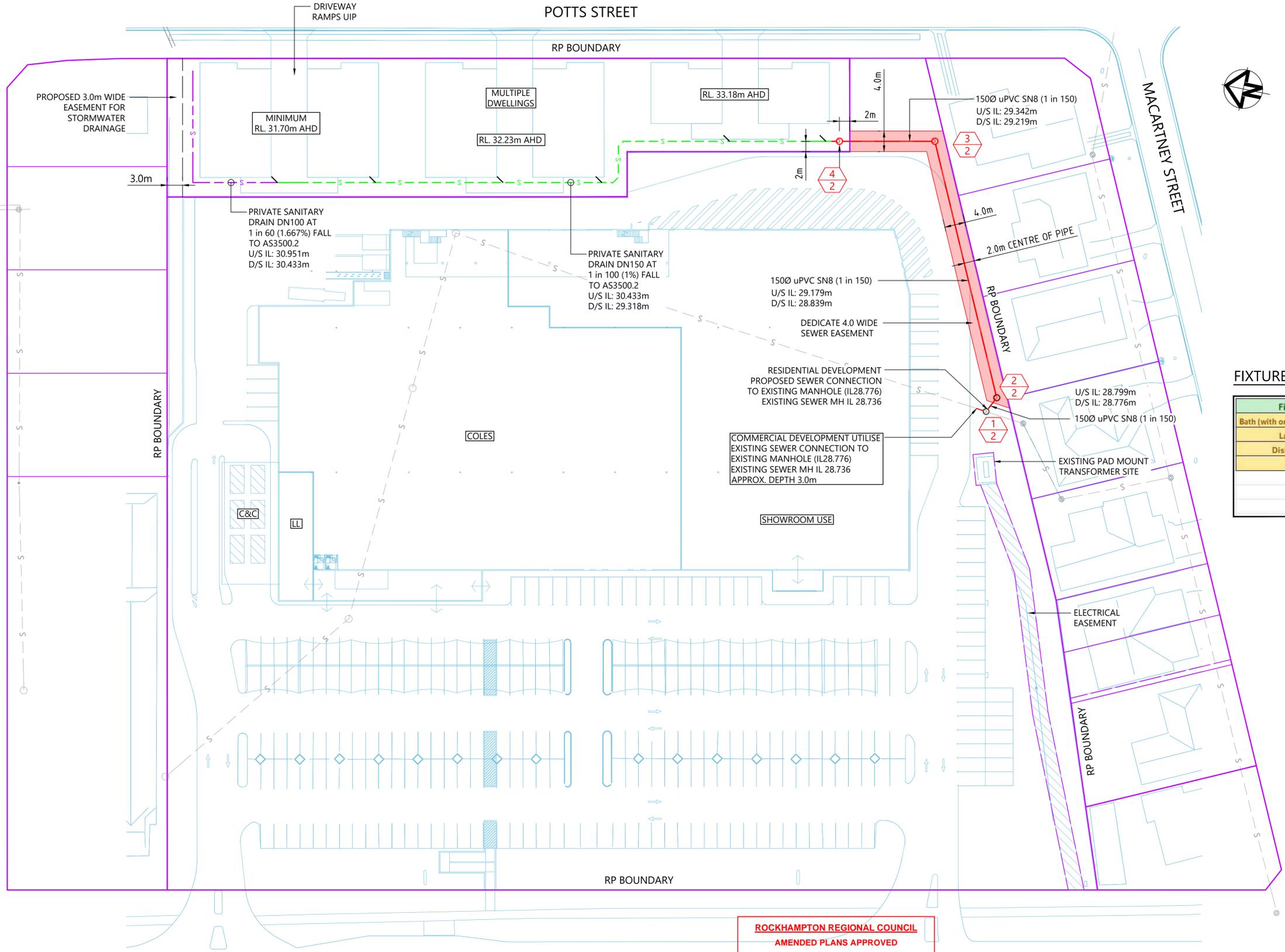
MICHAEL BALE & ASSOCIATES
 Structural and Civil Engineering Consultancy
 Level 3, 18 Orchid Avenue,
 Surfers Paradise
 PO BOX 1715, Surfers Paradise 4217
 Ph: 07 5538 0431
 mail@michaelbale.com.au

PROJECT TITLE:
 NORMAN GARDENS RESIDENTIAL ROCKHAMPTON NORTH, QLD

DRAWING TITLE:
 STORMWATER DETENTION / TREATMENT TANK DETAIL

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DRAWING No.	PROJECT No.	REVISION
DA04	G21097	02



LEGEND

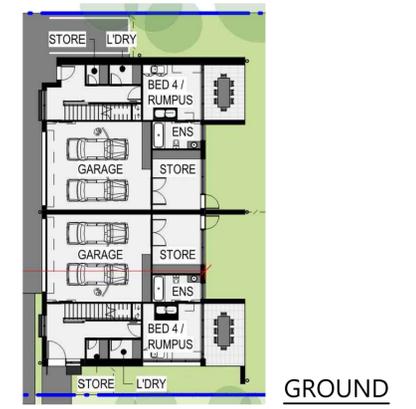
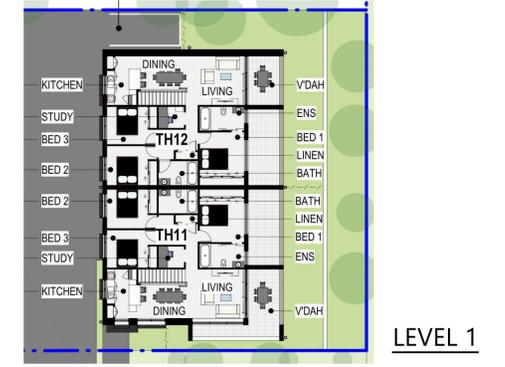
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- EASEMENT BOUNDARY EXISTING
- EASEMENT BOUNDARY PROPOSED
- 1500 PROPOSED DN150 SEWER MAINTENANCE HOLE & PC
- 1000
- 1
2 STRUCTURE LABEL
- EXISTING SEWER PLOTTED
- (1 in 60)
- PRIVATE SANITARY DRAIN DN100 TO AS3500.2
- (1 in 100)
- PRIVATE SANITARY DRAIN DN150 TO AS3500.2

1. UNDERGROUND SERVICES EXISTING IN THIS AREA.
2. CONTRACTOR IS RESPONSIBLE FOR THE LOCATION AND PROTECTION OF ALL UNDERGROUND SERVICES PRIOR TO COMMENCEMENT OF WORKS.

FIXTURE UNIT CALCULATIONS TO AS 3500.2

Fixtures	Fixture Unit Ratings	Quantity	Fixture Units
Bath (with or without shower)	6	6	36
Laundry	5	2	10
Dishwasher	3	2	6
Sink	1	2	2
Total per block of 2 TH			54
Total per block of 1 TH			27
Total			270

TYPICAL 'BLOCK OF 2' TOWNHOUSES



SEWER LAYOUT PLAN
SCALE 1:400

ROCKHAMPTON REGIONAL COUNCIL
AMENDED PLANS APPROVED
23 March 2026
DATE
These plans are approved subject to the current conditions of approval associated with
Development Permit No.: D/153-2023
Dated: 19 August 2025

ISSUE	DESCRIPTION	AUTHOR	DATE
01	ORIGINAL ISSUE	DB	15.10.25

STATUS			
FOR DA APPROVAL NOT FOR CONSTRUCTION			
R.P.E.Q No.:	CERTIFIED	DESIGNER	SB
HEIGHT DATUM	AHD	CHECKER	IG
GRID	LOCAL	APPROVER	MB
ORIGINAL SIZE	A1		

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Rockhampton, QLD, 4700
(07) 4927 1744

SCALE
SCALE 1:400
4 2 0 4 8 12 16 20
1:400 (A1) - 1:800 (A3)

CLIENT
coles
Value the Australian way
249 Musgrave Street
Rockhampton, QLD, 4701
(07) 4930 8400

ARCHITECT
Hames Sharley
Level 3, 235 Edward Street
Brisbane, QLD, 4000
+61 7 3370 4600

MICHAEL BALE & ASSOCIATES
Structural and Civil Engineering Consultancy
Level 3, 18 Orchard Avenue,
Surfers Paradise
PO BOX 1715, Surfers Paradise 4217
Ph: 07 5538 0431
mail@michaelbale.com.au

PROJECT TITLE:
COLES NORMAN GARDENS ROCKHAMPTON NORTH, QLD

DRAWING TITLE:
SEWER LAYOUT PLAN

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DRAWING No.	PROJECT No.	REVISION
DA07	G21097	01

ROCKHAMPTON REGIONAL COUNCIL

AMENDED PLANS APPROVED

23 March 2026

DATE

These plans are approved subject to the current conditions of approval associated with

Development Permit No.: **D/153-2023**

Dated: **19 August 2025**

**Environmental Noise Level Impact Assessment for Proposed Residential
Development, 452-488 Yaamba Road, Norman Gardens**

conducted for

Coles Group Property Developments Ltd

Report No: R25100/D3992/Rev.0/24.11.2025

Revision No.	Date	Comment
Draft	21.11.2025	Draft report.
0	24.11.2025	Final report.

Report prepared for: Coles Group Property Developments Ltd
Level 1, 96 Mount Gravatt Capalaba Road
UPPER MOUNT GRAVATT QLD 4122

Authorised by: Mr James Hood
Development Manager
Coles Group Property Developments Ltd

Telephone: -
Mobile: 0412 655 649

Dates of assessment: Thursday 04 to Thursday 11 April 2019

Consultants: David Moore & Associates Pty Ltd
7 Eleanor Drive
SILVAN QLD 3795

Telephone: -
Mobile: 0417 717 506



.....
David Moore, B App Sc, MAAS

Our reference: R25100/D3992/Rev.0/24.11.2025

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Page No.

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CLOSEST RESIDENCE TO NORTH	10
CLOSEST RESIDENCES TO EAST	10
CLOSEST RESIDENCE TO SOUTH.....	10
NOISE CONTROL.....	11
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INTRODUCTION

The existing (not in use) Bunnings warehouse at 452 to 488 Yaamba Road, Norman Gardens (Lot 25 on RP610513) is to be re-developed with a Coles supermarket, Liquorland and Showroom use, as well as residential units on the eastern side of the site. These residential units will need to be designed and constructed to adequately control noise impact from the Coles supermarket, Liquorland and Showroom use. Noise from this residential development, such as vehicle movements and plant and equipment (air-conditioning units) also needs to be considered to ensure that it does not adversely impact on the existing residential uses.

It should be noted that Yaamba Road is a State controlled road and approximately 50% of the subject site is within the associated transport noise corridor. However, no part of the proposed residential development is included in the transport noise corridor and, therefore, traffic noise from Yaamba Road does not require consideration.

To assess current ambient noise levels relative to the closest existing residential to the subject site a noise logger was located on the subject site at monitoring location A, adjacent to the southern boundary of the subject site with the microphone elevated 1.6 metres above ground level.

This report detailed the results of this ambient noise level assessment, background sound levels, noise limits, potential source noise levels, source noise levels calculated to the closest residential premises, state of compliance with noise limits and any required noise control measures.

In preparing this report the following drawings prepared by Thomson Adsett, number TA # 21.0279.17 were referenced:

- A-ROL-020, rev.5: Site Plan;
- A-ROL-100, rev.3: Floor Plan;
- A-ROL-110, rev.3: Roof Plan;
- A-ROL-120, rev.3: Elevations 1;
- A-ROL-121, rev.3: Elevations 2;
- A-ROL-130, rev.3: Sections.

Refer Figure 1 for locality plan, closest residences and monitoring location A, Figure 2 for the proposed site plan and Figure 3 for the proposed floor plan.



Figure 1
Locality Plan and Monitoring Location A (Top of the Page is North)

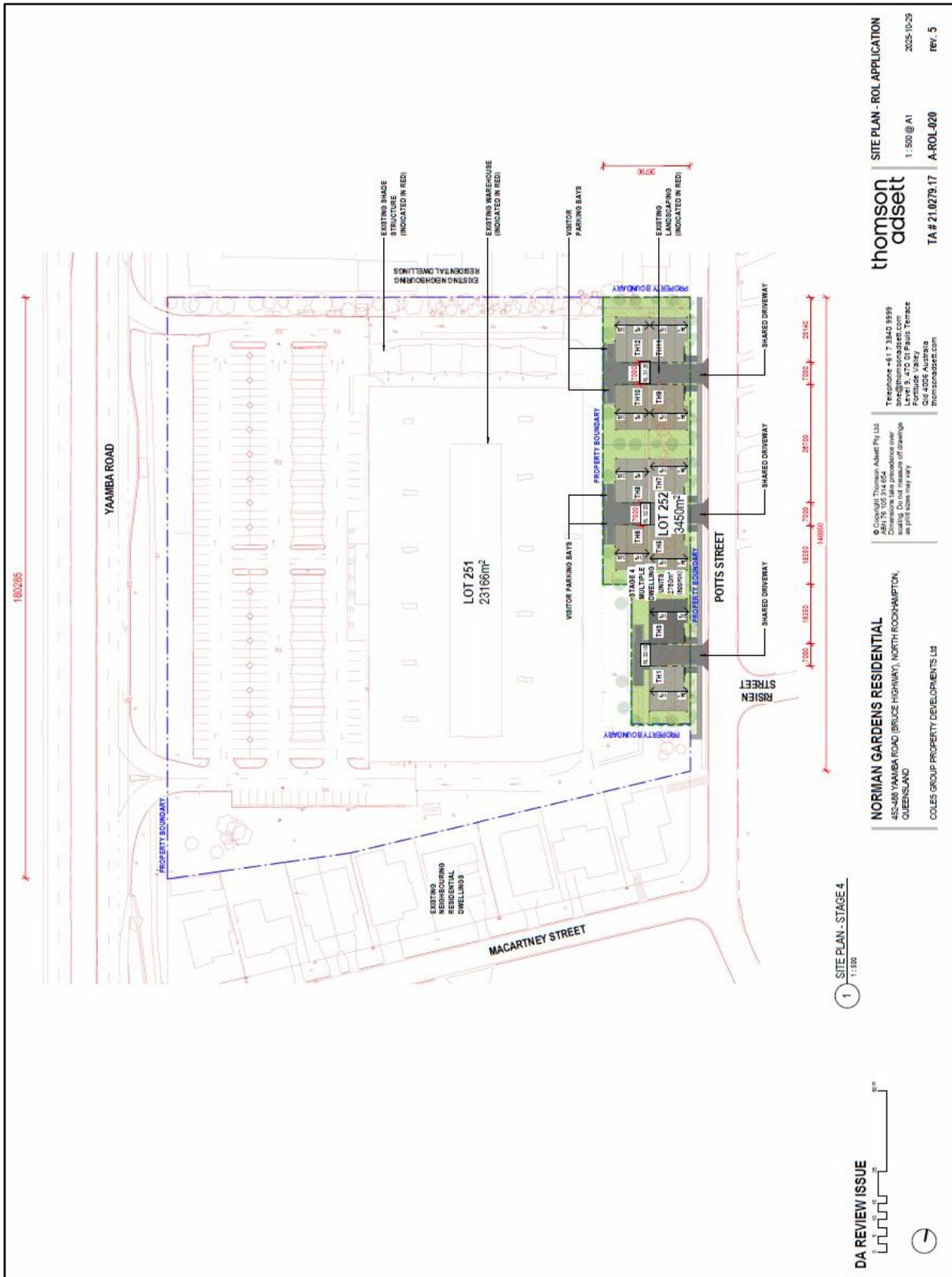


Figure 2
Proposed Site Plan



Figure 3
Proposed Floor Plans

CRITERIA

Measurements and Calculations

All noise level measurements were conducted in accordance with the following:

- general requirements of the Queensland environmental protection legislation;
- Environmental Protection (Noise) Policy 2019;
- *Noise Measurement Manual*, Queensland Government – Environmental Protection Agency, Version 4, August 2013; and
- Australian Standard AS 1055-2018, *Acoustics – Description and Measurement of Environmental Noise*.

Noise Limits – Rockhampton Regional Council

The Rockhampton Regional Planning Scheme 2015 requires protection of amenity of residential areas and makes mention of the Environmental Protection (Noise) Policy (EPP Noise). Noise limits, therefore, have been defined in accordance with the EPP Noise 2019, which only contains the Acoustic Quality Objectives. Reference is also made to the Default Noise Standards of the Environmental Protection Act 1994 for air-conditioning unit noise limits.

The adopted noise limits are as follows:

- air-conditioning:
 - daytime (0700 to 1800 hours): background + 5 dB(A);
 - evening (1800 to 2200 hours): background + 5 dB(A);
 - night-time (2200 to 0700 hours): background + 3 dB(A);
- all other noise sources – Acoustic Quality Objectives:
 - Acoustic quality objectives, daytime and evening, external to dwelling:
 - 50 dB(A) $L_{Aeq,adj,1H}$;
 - 55 dB(A) $L_{A10,adj,1H}$; and
 - 65 dB(A) $L_{A1,adj,1H}$;
 - Acoustic quality objectives, daytime and evening, inside dwelling:
 - 35 dB(A) $L_{Aeq,adj,1H}$;
 - 40 dB(A) $L_{A10,adj,1H}$; and
 - 45 dB(A) $L_{A1,adj,1H}$;
 - Acoustic quality objectives, night-time, inside dwelling:
 - 30 dB(A) $L_{Aeq,adj,1H}$;
 - 35 dB(A) $L_{A10,adj,1H}$; and
 - 40 dB(A) $L_{A1,adj,1H}$;

For the night-time period the internal noise criteria needs to be converted to be equivalent to outside the closest residences. Allowing a 7 dB(A) noise level reduction from outside to inside (based on windows partially closed and in accordance with the Queensland Environmental Protection Agency Ecoaccess Guideline *Planning for Noise Control*) the internal criteria would be equivalent to the following levels external to the dwelling:

- 37 dB(A) $L_{Aeq,adj,1H}$;
- 42 dB(A) $L_{A10,adj,1H}$; and
- 47 dB(A) $L_{A1,adj,1H}$.

AMBIENT NOISE LEVELS

Table 1 details the results of the ambient noise level measurements conducted from monitoring location A, from the subject site side of the rear boundary of 5 Macartney Street, with the microphone elevated 1.6 metres. For details of noise measurement equipment, equipment settings, calibration and atmospheric conditions, refer Appendix A. For all of the results of the ambient noise assessment refer Appendix B.

With respect to noise the following should be noted:

- daytime: 0700 to 1800 hours;
- evening: 1800 to 2200 hours;
- night-time: 2200 to 0700 hours;
- 'A' weighted: adjustment made by the sound level meter to the measured noise to correspond to the response of the human ear. This adjustment is standardised by international noise standards;
- $L_{Aeq,T}$: the equivalent continuous (or approximately the 'average') 'A' weighted sound pressure level for the measurement period 'T';
- $L_{A1,T}$: the 'A' weighted sound pressure level exceeded for 1% of the measurement period 'T';
- $L_{A10,T}$: the 'A' weighted sound pressure level exceeded for 10% of the measurement period 'T', which is an approximation of the 'average of the maximum noise levels';
- $L_{A90,T}$: the 'A' weighted sound pressure level exceeded for 90% of the measurement period 'T', which is an approximation of the 'average of the minimum noise levels', which is also known as the 'background' noise level.

Day	Date	Time Period	Ambient Noise Level, dB(A)							
			L_{Aeq}		L_{A1}		L_{A10}		L_{A90}	
			Range	Av.	Range	Av.	Range	Av.	Range	Av.
Thursday	4/4/19	Evening	53.7-58.8	56.1	63.2-67.5	65.7	55.8-61.3	58.9	42.9-50.0	46.9
		Night	45.9-57.1	52.7	58.5-67.0	64.1	46.6-61.2	55.8	30.9-47.1	40.7
Friday	5/4/19	Daytime	55.7-59.3	57.4	63.1-68.4	65.7	58.8-61.4	60.4	46.3-51.3	49.2
		Evening	53.4-57.5	55.3	63.0-68.6	65.6	57.0-60.5	58.6	40.4-46.4	43.6
		Night	45.8-56.3	51.8	58.3-67.1	63.2	47.4-58.3	54.6	31.6-45.2	39.9
Saturday	6/4/19	Daytime	53.7-64.5	56.8	61.1-70.4	65.3	57.3-60.8	59.4	43.1-48.9	46.6
		Evening	53.3-56.6	55.2	61.4-66.9	65.1	57.4-59.9	58.6	41.4-47.2	44.6
		Night	43.8-55.9	50.6	56.2-65.6	61.5	45.2-58.8	53.9	29.3-47.5	39.2
Sunday	7/4/19	Daytime	53.1-58.6	55.7	61.0-70.5	65.4	57.3-61.6	59.0	39.1-46.7	44.0
		Evening	49.9-55.3	53.2	59.9-66.6	64.0	54.0-58.8	57.1	34.0-44.1	39.3
		Night	43.4-57.7	51.9	57.1-67.8	62.6	41.8-61.5	55.0	29.2-46.2	39.2
Monday	8/4/19	Daytime	55.4-62.1	57.3	62.3-73.8	66.9	58.8-62.8	60.3	43.8-48.9	46.7
		Evening	51.9-56.3	54.3	62.5-66.1	64.5	55.7-59.8	57.8	36.9-45.2	41.2
		Night	44.5-58.6	52.9	57.8-68.3	64.0	45.4-62.2	56.1	31.4-48.2	40.7

Table 1 Results of Ambient Noise Level Measurements, Monitoring Location A										
Day	Date	Time Period	Ambient Noise Level, dB(A)							
			L _{Aeq}		L _{A1}		L _{A10}		L _{A90}	
			Range	Av.	Range	Av.	Range	Av.	Range	Av.
Tuesday	9/4/19	Daytime	54.9-64.7	57.5	63.8-76.7	67.2	58.0-61.5	60.1	43.7-48.6	46.9
		Evening	52.0-57.7	55.0	62.1-67.6	65.4	52.2-61.2	58.5	34.5-46.7	41.7
		Night	45.1-58.4	53.4	58.2-68.0	64.6	46.1-62.6	56.9	32.5-47.8	40.0
Wednesday	10/4/19	Daytime	55.4-59.5	57.5	64.2-71.2	66.6	58.7-61.8	60.6	42.7-48.8	46.1
		Evening	52.1-65.1	56.9	61.1-69.1	65.7	55.7-60.6	58.6	36.4-44.8	41.6
		Night	46.1-59.7	52.9	58.1-67.9	63.9	45.9-60.9	55.7	27.9-47.1	39.5
Thursday	11/4/19	Daytime	57.2-70.1	61.9	63.2-80.2	71.4	59.3-74.5	65.4	47.7-60.1	53.0

From Table 1, the following average ambient noise levels should be noted:

- L_{Aeq,T}:
 - daytime: 57.4, 56.8, 55.7, 57.3, 57.5, 57.5, 61.9* Average = 57.0 dB(A);
 - evening: 56.1, 55.3, 55.2, 53.2, 54.3, 55.0, 56.9 Average = 55.1 dB(A);
 - night-time: 52.7, 51.8, 50.6, 51.9, 52.9, 53.4, 52.9 Average = 52.3 dB(A);
- L_{A1,T}:
 - daytime: 65.7, 65.3, 65.4, 66.9, 67.2, 66.6, 71.4* Average = 66.2 dB(A);
 - evening: 65.7, 65.6, 65.1, 64.0, 64.5, 65.4, 65.7 Average = 65.1 dB(A);
 - night-time: 64.1, 63.2, 61.5, 62.6, 64.0, 64.6, 63.9 Average = 63.4 dB(A);
- L_{A10,T}:
 - daytime: 60.4, 59.4, 59.0, 60.3, 60.1, 60.6, 65.4* Average = 60.0 dB(A);
 - evening: 58.9, 58.6, 58.6, 57.1, 57.8, 58.5, 58.6 Average = 58.3 dB(A);
 - night-time: 55.8, 54.6, 53.9, 55.0, 56.1, 56.9, 55.7 Average = 55.4 dB(A);
- L_{A90,T}:
 - daytime: 49.2, 46.6, 44.0, 46.7, 46.9, 46.1, 53.0* Average = 46.6 dB(A);
 - evening: 46.9, 43.6, 44.6, 39.3, 41.2, 41.7, 41.6 Average = 42.7 dB(A);
 - night-time: 40.7, 39.9, 39.2, 39.2, 40.7, 40.0, 39.5 Average = 39.9 dB(A).
- Excluded from average due to rainfall.

Based on the above the noise limits for air-conditioning unit noise are:

- daytime (0700 to 1800 hours): 47 dB(A) L_{A90,T} + 5 = 52 dB(A) L_{Aeq,adj,T};
- evening (1800 to 2200 hours): 43 dB(A) L_{A90,T} + 5 = 48 dB(A) L_{Aeq,adj,T};
- night-time (2200 to 0700 hours): 40 dB(A) L_{A90,T} + 5 = 45 dB(A) L_{Aeq,adj,T}.

For all other noise sources the noise limits are:

- daytime and evening, external to dwelling:
 - 50 dB(A) L_{Aeq,adj,1H};
 - 55 dB(A) L_{A10,adj,1H}; and
 - 65 dB(A) L_{A1,adj,1H};
- night-time, external to dwelling:
 - 37 dB(A) L_{Aeq,adj,1H};
 - 42 dB(A) L_{A10,adj,1H}; and
 - 47 dB(A) L_{A1,adj,1H}.

The anticipated trading hours for the Coles supermarket, Liquorland and Showroom use are:

- supermarket: daytime and evening;
- Liquorland: daytime and evening;
- Showroom use: daytime and some evening.

It is envisaged that the supermarket loading dock would be accessible 24 hours per day and the Showroom use loading/unloading would be accessible from 0700 to 2200 hours per day.

NOISE IMPACT FROM SUPERMARKET, LIQUORLAND AND SHOWROOM

In accordance with the report prepared by David Moore & Associates Pty Ltd for the above, *Environmental Noise Level Impact Assessment for Proposed Coles Supermarket, Liquorland, Showroom Use and Residential, 452-488 Yaamba Road, Norman Gardens conducted for Coles Group Property Developments Limited, Report No. R25079/D3621/Rev.0/6.11.2025*, noise from the Coles supermarket, Liquorland and Showroom use could include:

- carpark activity;
- delivery trucks, including SRV, MRV, HRV and semi-trailers, some with refrigerated trailers;
- waste collection;
- truck air brakes;
- rooftop air-conditioning and refrigeration plant;
- exhaust and inlet fans;
- shopping trolley tractor and trailer to collect shopping trolleys.

All of these potential noise sources were calculated to the proposed residential relative to inside and compared to the noise limits. To comply with the noise limits detailed in the above report (ground floor and Level 1) an acoustic barrier is required (refer to Noise Control section of this report) and all of the residential units must be air-conditioned to enable the achievement of the internal noise limits. Inside these residential units the living area noise criteria would be 35 to 40 dB(A) $L_{Aeq,T}$ and the bedroom criteria 30 to 35 dB(A) $L_{Aeq,T}$. The loading dock noise level at the upper floor of the closest on-site residential would be 60 dB(A) $L_{Aeq,T}$ (combined loading dock noise sources), less 35 dB(A) target internal noise level = 25 dB(A) reduction required. In accordance with the Queensland Development Code Mandatory Part 4.4 this 25 dB(A) reduction in noise level from outside to inside is equivalent to Noise Category 1 and requires the following acoustic treatments:

Noise Category 1

- Glazing: Rw 27 where total area of glazing for a habitable room is greater than 1.8m²
Rw 24 where total area of glazing for a habitable room is less than or equal to 1.8m²
- External walls: Rw 35
- Roof: Rw 35
- Entry doors: Rw 28.

For Noise Category 1, to achieve the nominated minimum Rw values, the following examples from MP4.4 should be noted:

- **Noise Category 1:**
 - Glazing Rw 27:
 - minimum 4mm thick glass with full perimeter *acoustically rated seals*;
 - Glazing Rw 24:
 - minimum 4mm thick glass with standard weather seals;
 - external walls Rw 35:
 - single leaf of clay brick masonry at least 110mm thick with:
 - (i) a row of at least 70mm x 35mm timber studs or 64mm steel studs at 600mm centres, spaced at least 20mm from the masonry wall; and

- (ii) One layer of plasterboard at least 10mm thick fixed to outside face of studs
- OR
 - minimum 6mm thick fibre cement sheeting or weatherboards or plank cladding externally, minimum 90mm deep timber stud or 92mm metal stud, standard plasterboard at least 13mm thick internally.
- Roof Rw 35:
 - Concrete or terracotta tile or metal sheet roof with sarking, plasterboard ceiling at least 10mm thick fixed to ceiling cavity.
- Entry doors Rw 28:
 - fixed so as to overlap the frame or rebate of the frame, constructed of -
 - (i) Wood, particleboard or blockboard not less than 33mm thick; or
 - (ii) Compressed fibre reinforced sheeting not less than 9mm thick; or
 - (iii) Other suitable material with a mass per unit area not less than 24.4kg/m²; or
 - (iv) Solid core timber door not less than 35mm thick fitted with full perimeter *acoustically rated seals*.

NOISE FROM THE RESIDENTIAL DEVELOPMENT

The only potential noise sources associated with this proposed residential development are vehicle movements and plant and equipment – air-conditioning units. The adopted noise limits for these closest adjoining residences are:

- Acoustic quality objectives, daytime and evening, external to dwelling:
 - 50 dB(A) $L_{Aeq,adj,1H}$;
 - 55 dB(A) $L_{A10,adj,1H}$; and
 - 65 dB(A) $L_{A1,adj,1H}$;
- Acoustic quality objectives, night-time, external to dwelling:
 - 37 dB(A) $L_{Aeq,adj,1H}$;
 - 42 dB(A) $L_{A10,adj,1H}$; and
 - 47 dB(A) $L_{A1,adj,1H}$;

The closest adjoining residences to this proposed residential development are:

- north on the southern side of Weaver Street;
- to the east on the opposite side of Potts Street; and
- to the south on the northern side of Macartney Street.

Typical source noise levels are:

- car driving: 45 dB(A) $L_{Aeq,adj,1h}$, 50 dB(A) $L_{A1,adj,1h}$ and 47 dB(A) $L_{A10,adj,1h}$ @ 8 m;
- car door closing: 42 dB(A) $L_{Aeq,adj,1h}$, 48 dB(A) $L_{A1,adj,1h}$ and 45 dB(A) $L_{A10,adj,1h}$ @ 30 m;
- car engine starting: 42 dB(A) $L_{Aeq,adj,1h}$, 50 dB(A) $L_{A1,adj,1h}$ and 45 dB(A) $L_{A10,adj,1h}$ @ 30 m;
- air-conditioning unit: 40 dB(A) $L_{Aeq,adj,1h}$, 42 dB(A) $L_{A1,adj,1h}$ and 41 dB(A) $L_{A10,adj,1h}$ @ 8 m.

Detailed below are the calculated source noise levels to the closest adjoining residences. Compliance with the L_{Aeq} noise limits will also result in compliance with the L_{A1} and L_{A10} noise limits, so the following calculations are only with respect to L_{Aeq} . The assumed location for the air-conditioning unit is on the external wall of the store.

Closest Residence to North

The closest adjoining residence to the north is on the corner of Weaver and Potts Streets, at 35 Potts Street. At this residence the above source noise levels will be:

- car driving: 45 @ 8m – 10 (26m distance) – 6 (barrier effect of the northern wall of the residential units) = 29 dB(A) $L_{Aeq,adj,1h}$;
- car door closing: 42 @ 30m + 1 (26m distance) – 6 (barrier effect of the northern wall of the residential units) = 37 dB(A) $L_{Aeq,adj,1h}$;
- car engine starting: 42 @ 30m + 1 (26m distance) – 6 (barrier effect of the northern wall of the residential units) = 37 dB(A) $L_{Aeq,adj,1h}$;
- air-conditioning unit: 40 @ 8m – 8 (19m distance) + 3 (two units facing this adjoining residence) = 35 dB(A) $L_{Aeq,adj,1h}$.

At the closest residence to the north potential noise sources associated with the residential development comply with the noise limits for the complete 24-hour day. This compliance is achieved with no additional noise control measures in place.

Closest Residences to East

The closest adjoining residences to the east are on the opposite side of Potts Street. At these residences the above source noise levels will be:

- car driving: 45 @ 8m – 12 (30m distance) = 32 dB(A) $L_{Aeq,adj,1h}$;
- car door closing: 42 @ 30m – 4 (48m distance) – 5 (barrier effect of the residential units) = 33 dB(A) $L_{Aeq,adj,1h}$;
- car engine starting: 42 @ 30m – 4 (48m distance) – 5 (barrier effect of the residential units) = 33 dB(A) $L_{Aeq,adj,1h}$;
- air-conditioning unit:
 - two closest units = 40 @ 8m + 3 (two A/C units) – 13 (35m distance) = 30 dB(A) $L_{Aeq,adj,1h}$;
 - next closest units = 40 @ 8m + 3 (two A/C units) – 14 (40m distance) = 29 dB(A) $L_{Aeq,adj,1h}$;
 - combined = 30 + 29 = 33 dB(A) $L_{Aeq,adj,1h}$.

At the closest residences to the east potential noise sources associated with the residential development comply with the noise limits for the complete 24-hour day. This compliance is achieved with no additional noise control measures in place.

Closest Residence to South

The closest adjoining residence to the north is on the corner of Weaver and Potts Streets, at 35 Potts Street. There is a proposed 2m high acoustic barrier for the Coles supermarket, Liquorland and Showroom use which will be between the closest residence to the south and the proposed residential units, and this has been taken into account in the following calculations.

At this residence the above source noise levels will be:

- car driving: 45 @ 8m – 13 (34m distance) – 10 (2m high acoustic barrier) = 22 dB(A) $L_{Aeq,adj,1h}$;
- car door closing: 42 @ 30m – 1 (34m distance) – 10 (2m high acoustic barrier) = 31 dB(A) $L_{Aeq,adj,1h}$;
- car engine starting: 42 @ 30m – 1 (34m distance) – 10 (2m high acoustic barrier) = 31 dB(A) $L_{Aeq,adj,1h}$;
- air-conditioning unit: 40 @ 8m – 10 (24m distance) – 10 (2m high acoustic barrier) = 20 dB(A) $L_{Aeq,adj,1h}$.

At the closest residence to the south, with the Coles supermarket, Liquorland and Showroom use 2m high acoustic barrier in place, potential noise sources associated with the residential development comply with the noise limits for the complete 24-hour day. This compliance is achieved with no additional noise control measures in place.

NOISE CONTROL

For the proposed Coles supermarket, Liquorland and Showroom use acoustic barriers are proposed, and some of these acoustic barriers adjoin the residential unit site, as per Figure below. For the residential development to comply with the noise limits these acoustic barriers must be constructed.

The only other noise control required for the proposed residential units is that all habitable rooms are air-conditioned and that they are designed and constructed to achieve the internal noise limits with respect to noise from the Coles supermarket, Liquorland and Showroom use. This can be achieved by the residential units being constructed from materials with a noise level reduction from outside to inside of a minimum 25 dB(A). In accordance with the Queensland Development Code Mandatory Part MP4.4, the following are required as a minimum to achieve the 25 dB(A) noise reduction:

- Glazing: Rw 27 where total area of glazing for a habitable room is greater than 1.8m²
 Rw 24 where total area of glazing for a habitable room is less than or equal to 1.8m²
- External walls: Rw 35
- Roof: Rw 35
- Entry doors: Rw 28.

Once the precise location and orientation of the air-conditioning units has been determined, as well as the manufacturer's source noise levels for these air-conditioning units, noise impact should be re-calculated to confirm (or otherwise) the adequacy of the nominated noise control measures.

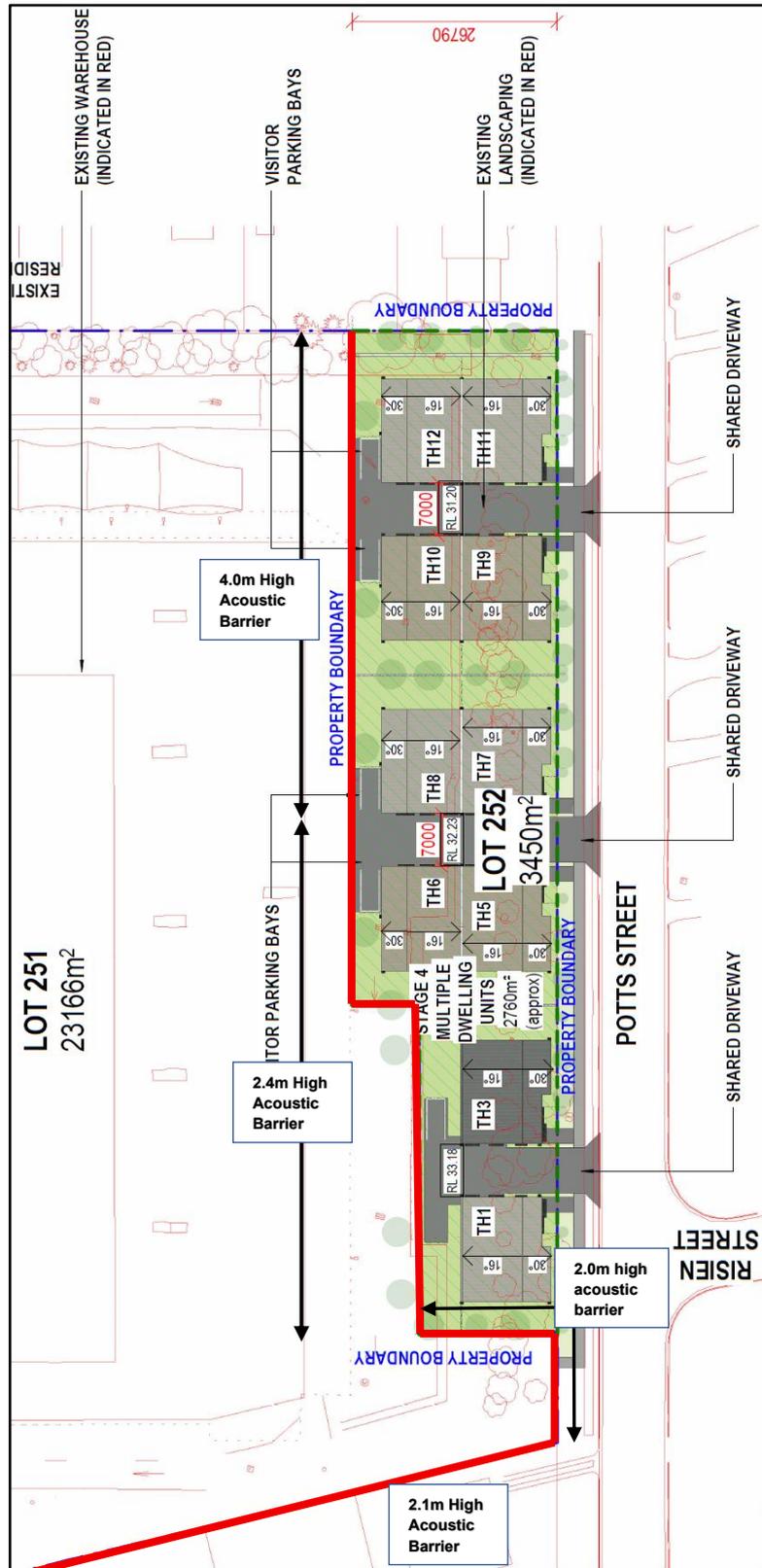


Figure 4
Location of Coles Supermarket, Liquorland and Showroom Use Acoustic Barriers Relative to Residential Development

CONCLUSIONS

The existing (not in use) Bunnings warehouse at 452 to 488 Yaamba Road, Norman Gardens (Lot 25 on RP610513) is to be re-developed with a Coles supermarket, Liquorland and Showroom use, as well as residential units on the eastern side of the site. These residential units will need to be designed and constructed to adequately control noise impact from the Coles supermarket, Liquorland and Showroom use. Noise from this residential development, such as vehicle movements and plant and equipment (air-conditioning units) also needs to be considered to ensure that it does not adversely impact on the existing residential uses.

It should be noted that Yaamba Road is a State controlled road and approximately 50% of the subject site is within the associated transport noise corridor. However, no part of the proposed residential development is included in the transport noise corridor and, therefore, traffic noise from Yaamba Road does not require consideration.

To assess current ambient noise levels relative to the closest existing residential to the subject site a noise logger was located on the subject site at monitoring location A, adjacent to the southern boundary of the subject site with the microphone elevated 1.6 metres above ground level. This noise logger was on site for a 7-day period. From the ambient noise assessment the background sound levels were determined (with days of adverse weather conditions (rainfall) excluded from the average) and the steady state noise limits calculated. The Acoustic Quality Objectives were used to define the noise limits for the 24-hour period for the time varying noise sources.

Coles supermarket, Liquorland and Showroom use noise level impact and noise control to the proposed residential units is detailed in the noise report prepared by David Moore & Associates Pty Ltd for the above, *Environmental Noise Level Impact Assessment for Proposed Coles Supermarket, Liquorland, Showroom Use and Residential, 452-488 Yaamba Road, Norman Gardens conducted for Coles Group Property Developments Limited, Report No. R25079/D3621/Rev.0/6.11.2025*. The required noise control measures are acoustic barriers as per Figure 4 of this report and residential unit materials of construction to provide a minimum 25 dB(A) reduction from outside to inside and that all habitable rooms are air-conditioned.

Source noise levels for the proposed residential units would include vehicle movements and air-conditioning units. Noise levels for these sources were based on data already held by the consultant for other residential developments. These were calculated to the closest adjoining residences to the north, east and west and compared to the noise limits. With the Coles supermarket, Liquorland and Showroom use acoustic barriers in place, no additional noise control measures are required with respect to noise from the residential units to the closest adjoining residences.

For all potential steady state noise sources compliance with the noise limits was achieved at the closest residences to the south with no additional noise control measures in place. However, for the closest residences to the north and east an acoustic barrier providing a 10 dB(A) reduction is required, and this barrier must be 2.5 metres high relative to the level of the plant platform, on the northern and eastern sides of the supermarket rooftop plant deck, with 5 metre long returns on the western and southern ends.

Once the precise location and orientation of the air-conditioning units has been determined, as well as the manufacturer's source noise levels for these air-conditioning units, noise impact should be re-calculated to confirm (or otherwise) the adequacy of the nominated noise control measures.

RECOMMENDATION

It is recommended that, from an environmental noise perspective, the proposed residential development be approved, provided that the noise control measures detailed in this report are incorporated into this development.

APPENDIX A: AMBIENT NOISE LEVEL MEASUREMENTS

Measurement Equipment

The following equipment was used to conduct the ambient noise level study at Monitoring Location A:

- Bruel and Kjaer Type 2250 L Hand Held Analyzer – Serial No. 3004242, with Type BZ 7131, BZ 7132 and BZ 7133 Software and Prepolarised free-field ½” microphone, Type 4189, Serial No. 2879996;
- Bruel and Kjaer Type 3592 outdoor microphone kit, including Type UA1404 outdoor microphone;
- Bruel and Kjaer Type AO 0442 ten metre microphone extension cable; and
- Bruel and Kjaer Type 4231 Sound Level Calibrator, Serial No. 2292747.

All of the above equipment is Type 1 in accordance with the requirements of Australian Standard AS 1259-1990, *Acoustics – Sound Level Meters*, as required by Australian Standard AS 1055-2018.

Measurement Equipment Settings

The above equipment was used with the following settings:

- Detector: RMS
- Time Weighting: FAST
- Frequency Weighting: A
- Sound Incidence: FRONTAL
- Microphone sensitivity: 35.443 mV/Pa

Calibration

The sound level meter was calibrated to the required value of 93.8 dB at 1000 Hz immediately before and after the noise level measurements were conducted. At no time was an adjustment of more than ±0.5 dB required. This complies with the requirements of the Australian Standard.

Monitoring Location

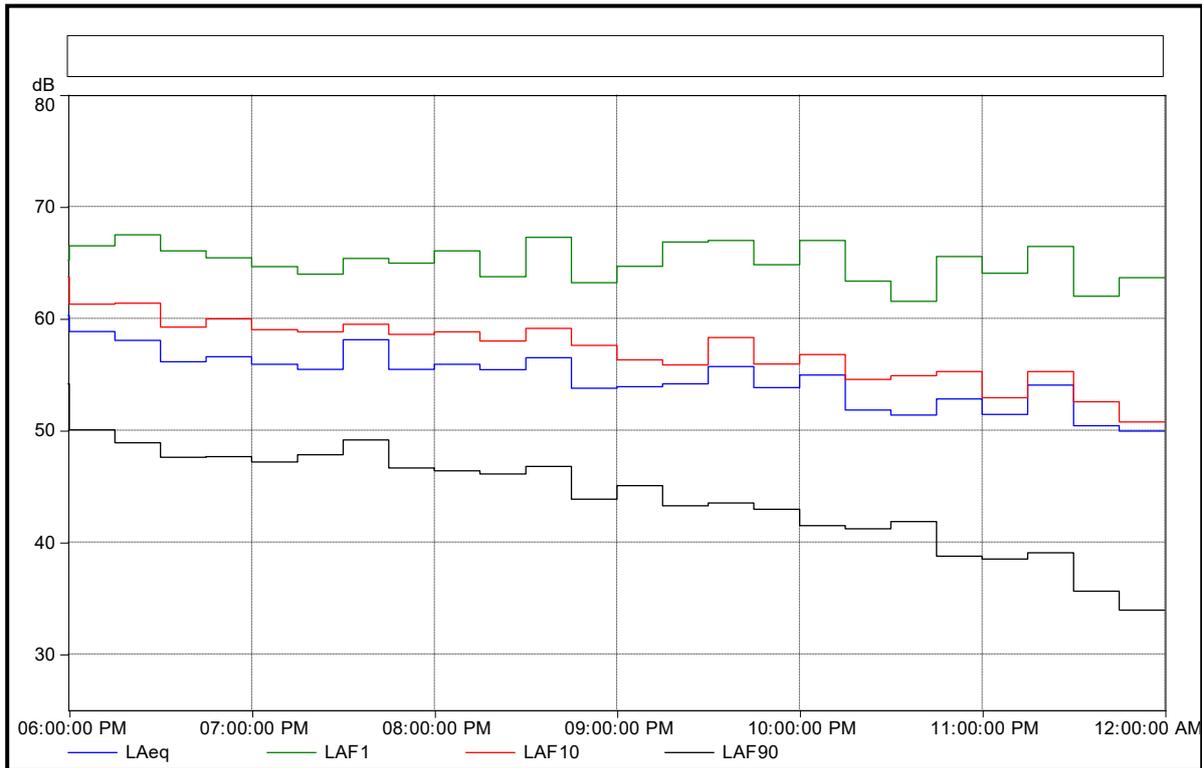
Monitoring Location A was on the subject site side of the common boundary fence between the subject site and the residential to the south, at the rear of 5 Macartney Street, with the microphone elevated 1.6 metres above ground level. Refer Figures 1 and 2 for further details of Monitoring Location A.

Atmospheric Conditions

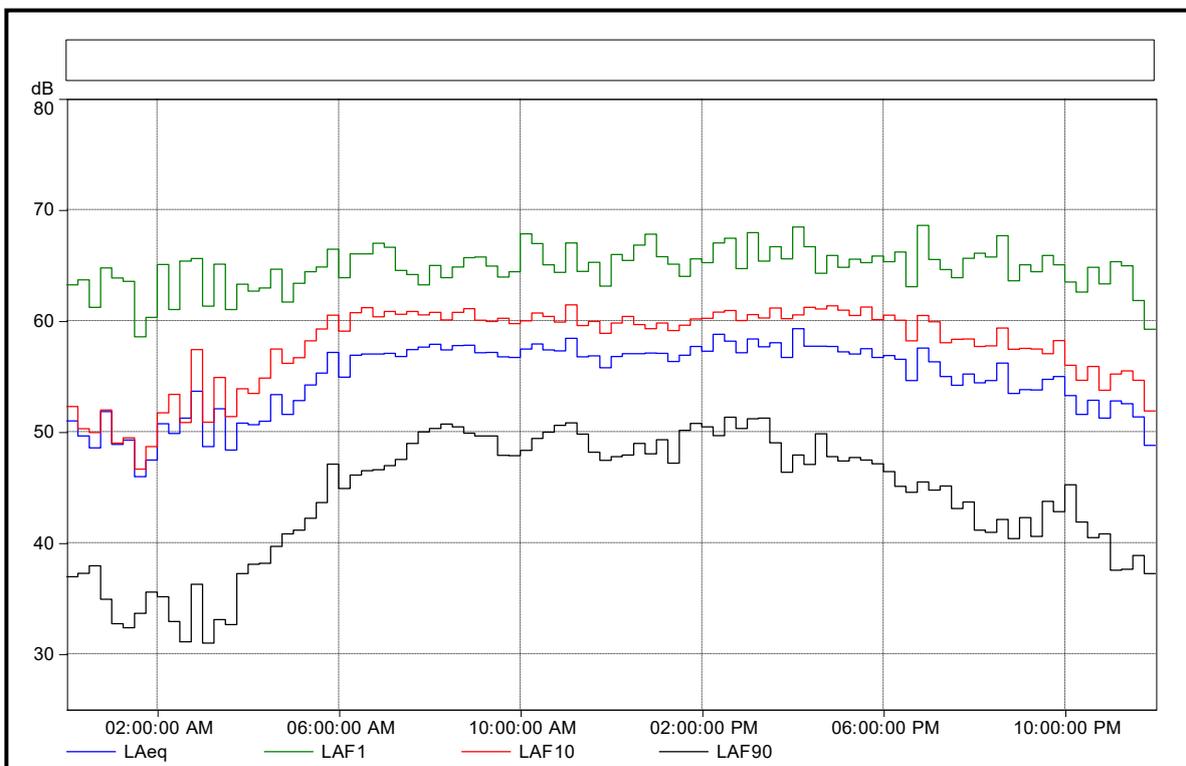
Throughout the 7-day ambient noise assessment atmospheric conditions generally complied with the requirements of the Australian Standard. However, on the final day (Thursday 11th April) there was rain and consequently this data was excluded from the averaging.

APPENDIX B: RESULTS OF AMBIENT NOISE MEASUREMENTS

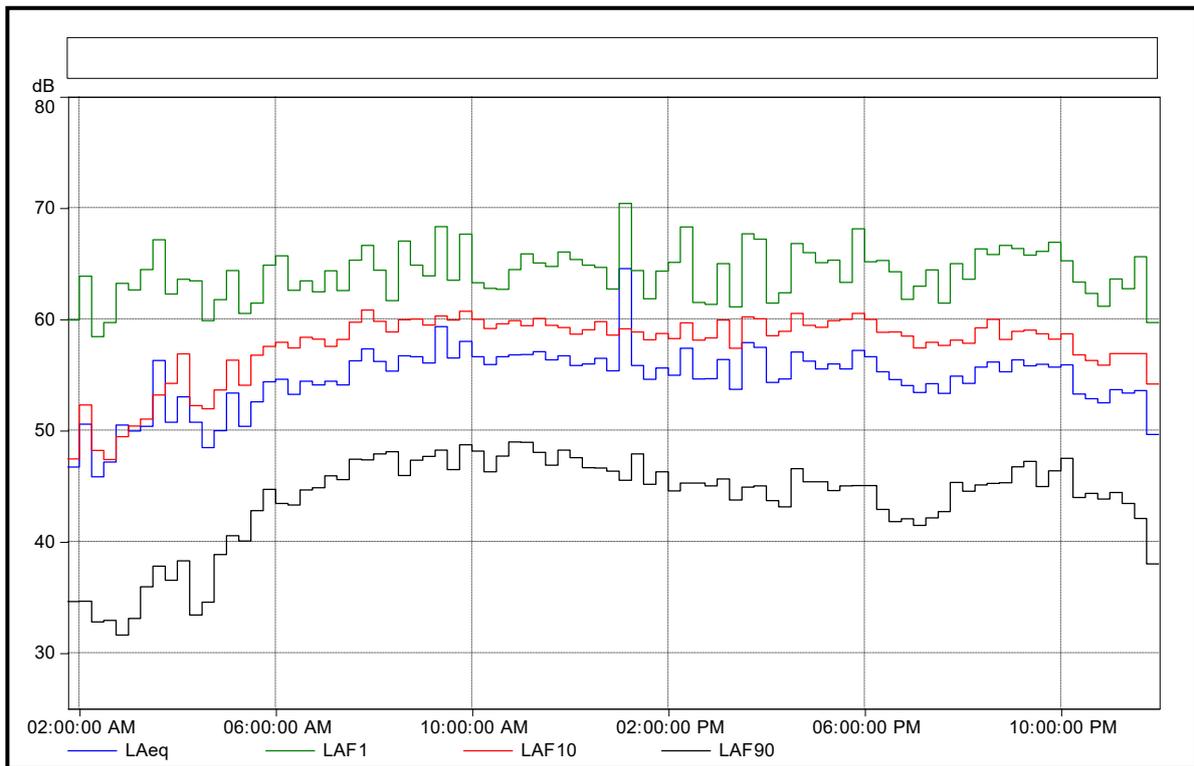
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Application:		BZ7133 Version 4.7.5
Start Time:		04/04/2019 17:59:30
End Time:		04/06/2019 01:03:27
Elapsed Time:		1.07:03:57
Bandwidth:		1/3-octave
Max Input Level:		143.92
	Time	Frequency
Broadband (excl. Peak):	FSI	AC
Broadband Peak:		C
Spectrum:	FS	Z
Instrument Serial Number:		3004242
Microphone Serial Number:		2879996
Input:		
Windscreen Correction:		None
Sound Field Correction:		Free-field
Calibration Time:		04/04/2019 17:53:03
Calibration Type:		External reference
Sensitivity:		35.4429632425308 mV/Pa



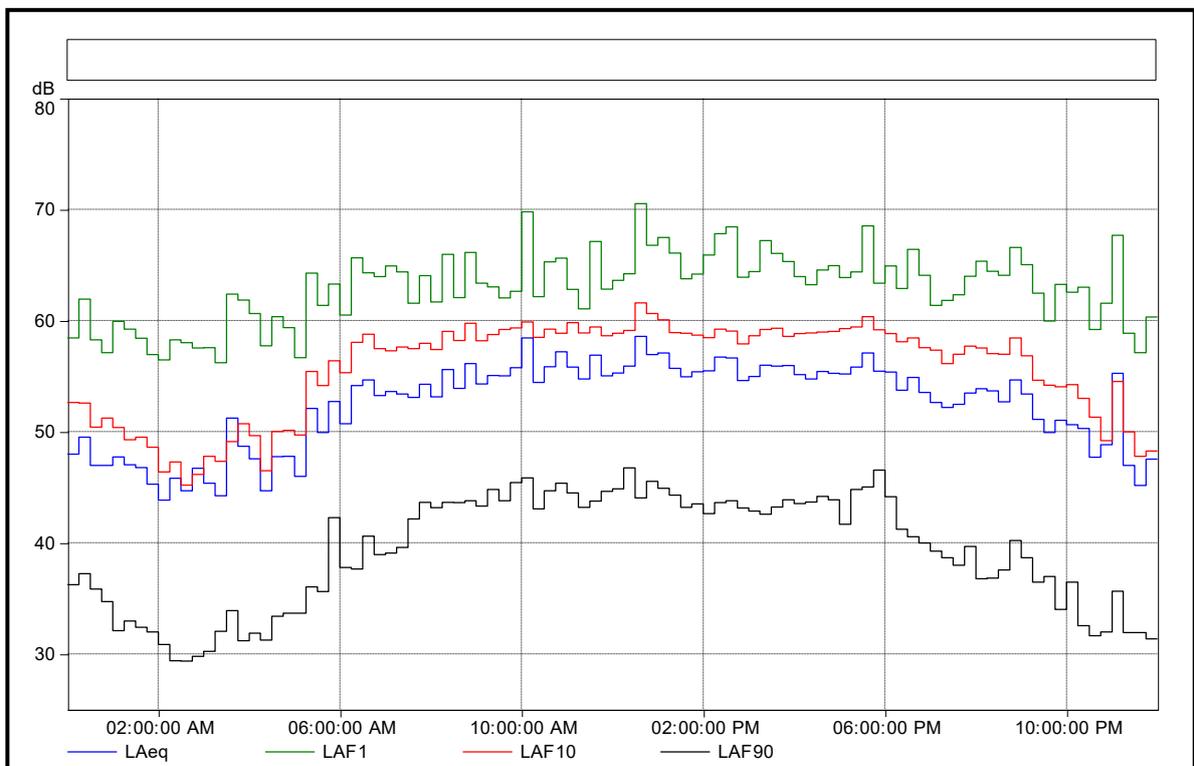
Day 1
Day 1, Thursday 4 April 2019, from 1800 hours



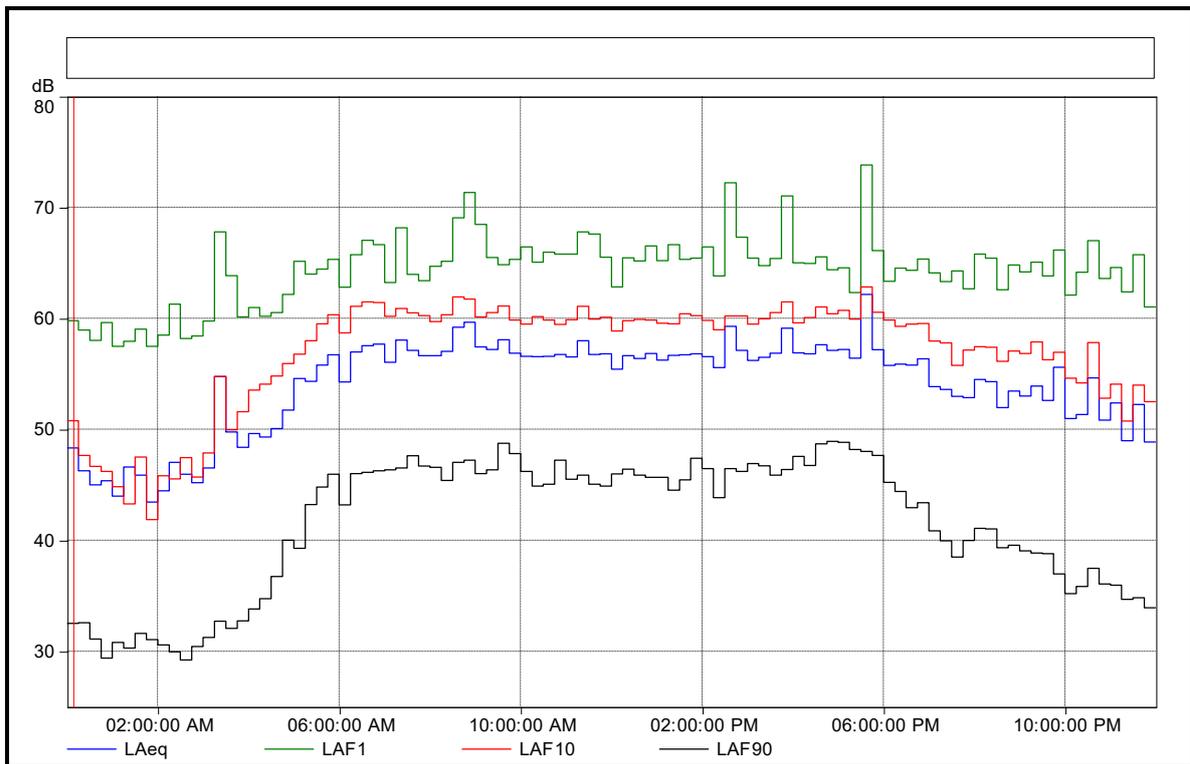
Day 2
Friday 5 April 2019



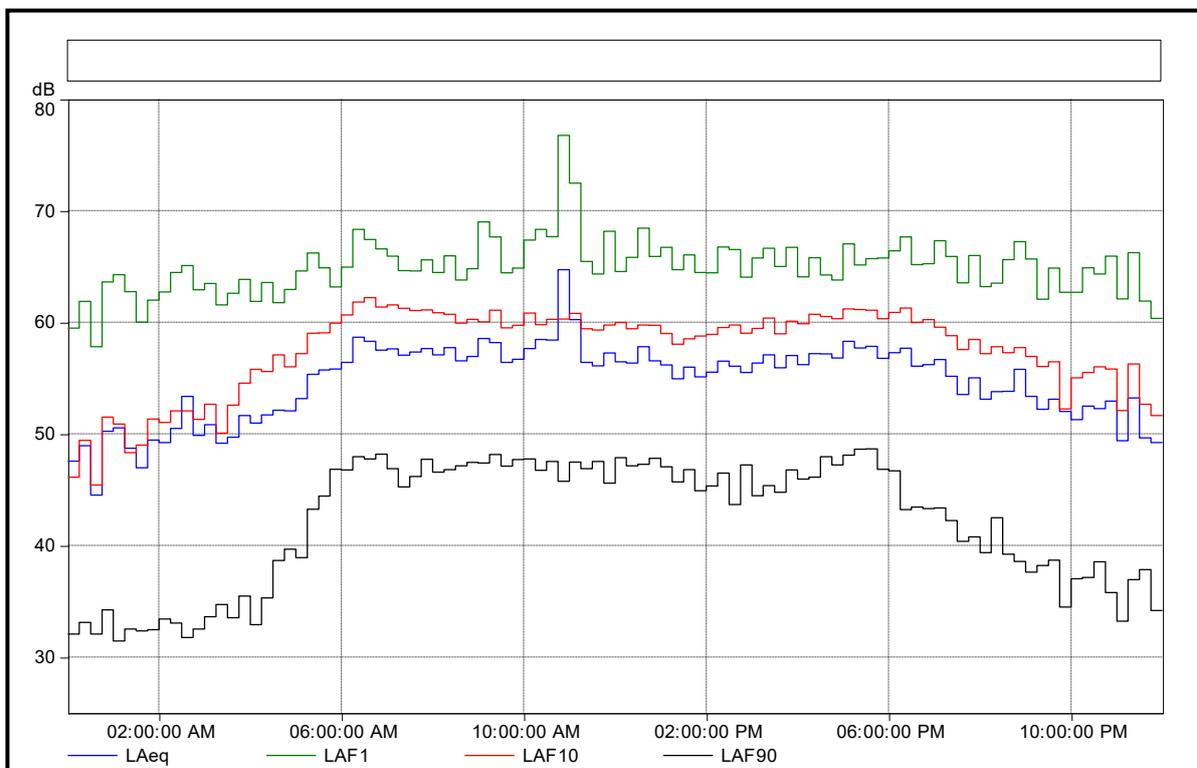
Day 3
Saturday 6 April 2019



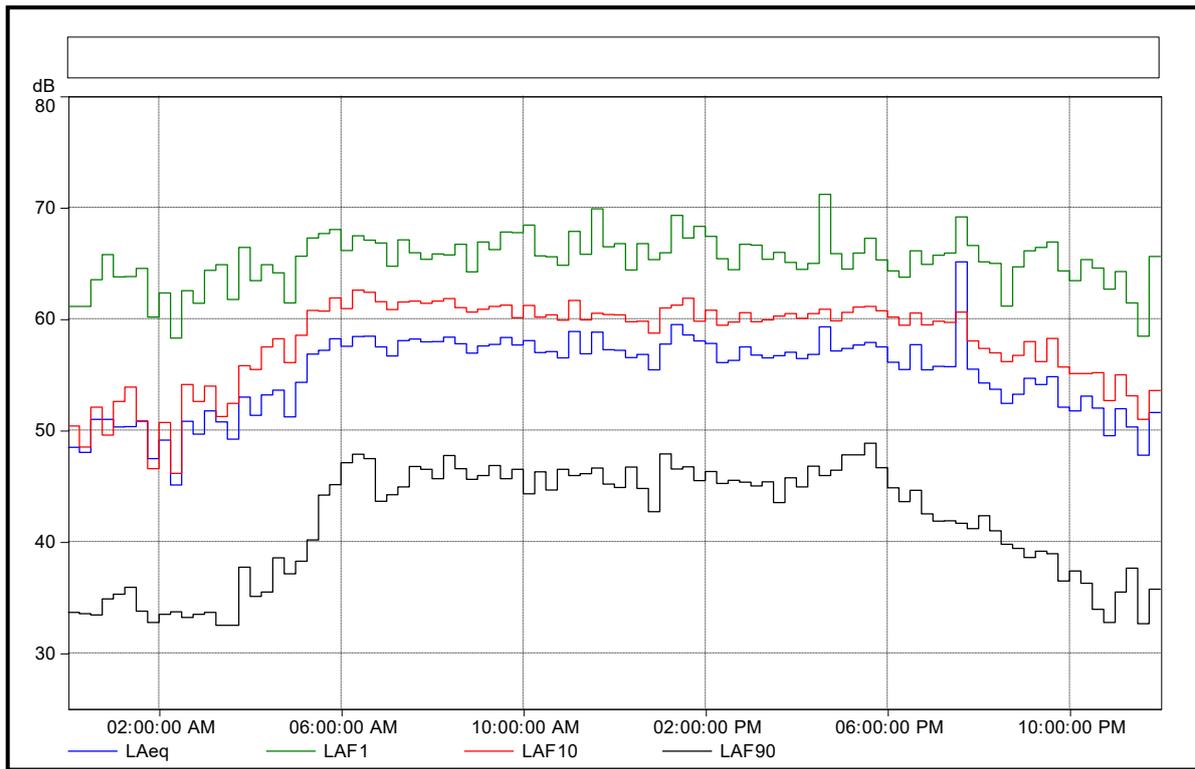
Day 4
Sunday 7 April 2019



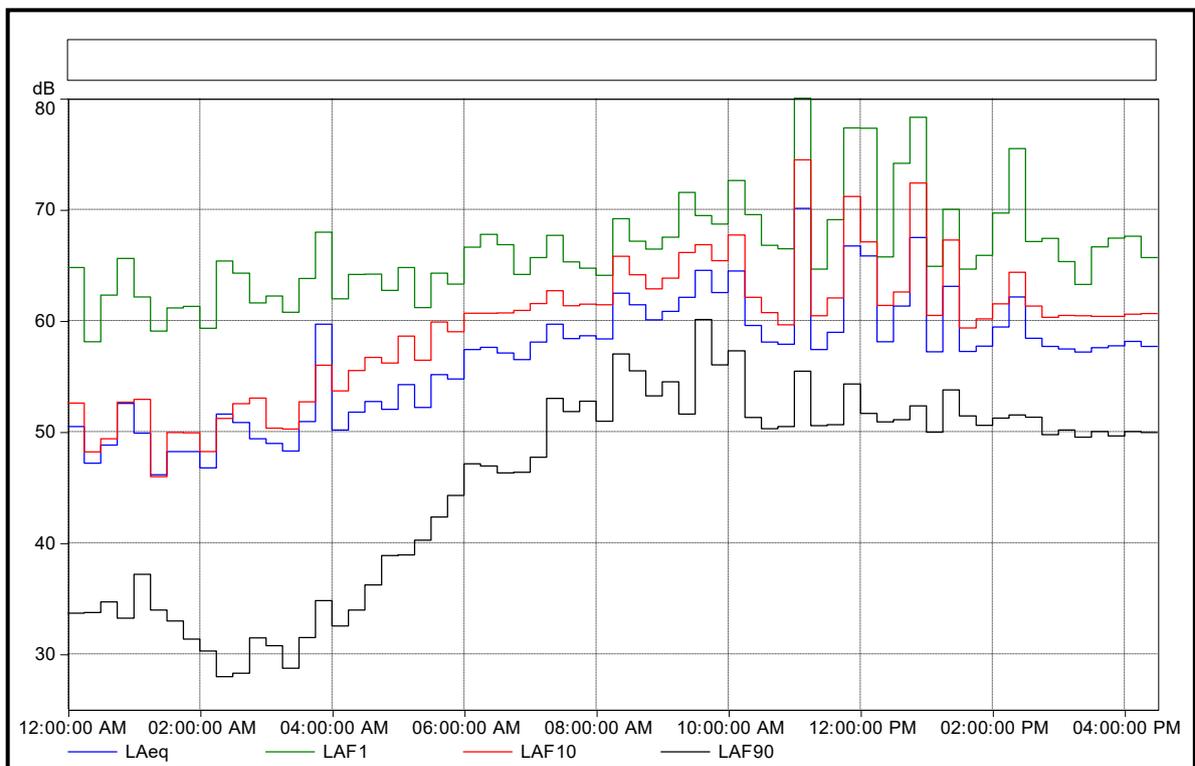
Day 5
Monday 8 April 2019



Day 6
Tuesday 9 April 2019



Day 7
Wednesday 10 April 2019



Day 8
Thursday 11 April 2019 until 1630 hours