SURVEYING
TOWN PLANNING
PROJECT MANAGEMENT
MAPPING & GIS

brazier motti

APPLICATION FOR A DEVELOPMENT PERMIT

MATERIAL CHANGE OF USE
MULTIPLE DWELLING (AFFORDABLE HOUSING – 81 DWELLING UNITS)

on behalf of
Ross River Road Pty Ltd

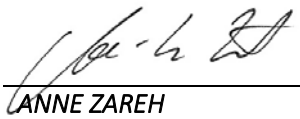
at
344-346 and 350 Ross River Road, Cranbrook

on
Lots 1 & 2 on RP721729 and Lot 3 on SP146326

Brazier Motti have prepared this report for the sole purposes of Ross River Road Pty Ltd for the specific purpose of a Development Application seeking a Development Permit for Material Change of Use (Multiple Dwelling) at 344-346 and 350 Ross River Road, Cranbrook.

In preparing this report we have assumed that all information and documents provided to us by others, such as the client, other consultants acting on the client's behalf or government agencies, to be complete, accurate and current.

Signed on behalf of Brazier Motti Pty Ltd



ANNE ZAREH
Senior Town Planner
Brazier Motti

CONTENTS

APPENDICES

1.0 INTRODUCTION

This town planning report has been prepared on behalf of the Applicant, Ross River Road Pty Ltd, in support of a development application seeking a Development Permit for a Material Change of Use for Multiple Dwelling (Affordable Housing – 81 Dwellings) at 344-346 and 350 Ross River Road, Cranbrook, being formally described as Lots 1 & 2 on RP721729 and Lot 3 on SP146326.

The proposal is for 81 x multiple dwelling units that will provide a much-needed affordable housing product at a strategic location, near a major centre and higher density living. The residential unit development is proposed to have two building, both of which are to be 5 levels. The ground level is to be car parking with levels 1 to 4 being a combination of 1, 2 and 3 bedroom units.

To assist in Council's determination of this development application, this planning report covers the following matters:

Section 2:- Subject site description.

Section 3:- A detailed description of the development proposal.

Section 4:- A review of relevant legislative requirements.

Section 5:- An assessment of the proposal against the relevant code provisions of the Townsville City Plan 2014.

Section 6:- Conclusion.

The development application is made in accordance with section 51 of the Planning Act 2016 and contains the mandatory supporting information specified in the applicable DA forms, included in ***Appendix A***. The application is subject to *impact* assessment and therefore public notification will be required.

2.0 THE SUBJECT SITE

The subject land is formally described as Lots 1 & 2 on RP721729 and Lot 3 on SP146326 and is located at 344-346 and 350 Ross River Road in the suburb of Cranbrook with direct access to established education and community facilities as well as commercial services and major shopping centre. Proximity to the Ross River corridor provides broader access to regional open space facilities and local bus routes run direct to the city centre and other commercial precincts.

The formal property description and associated ownership and land area is provided in *Table 1*. The certificates of title confirming ownership are included in ***Appendix B.*** The title also identifies that the site is not burdened by any encumbrances. A copy of the Smart Map is also included in ***Appendix B***.

Table 1 – Property Information

Address	Lot/Plan	Ownership	Area
344-346 Ross River Road	Lot 3 on SP146326	ROSS RIVER ROAD PTY LTD	2894m^2
350 Ross River Road	Lot 1 on RP721729	ROSS RIVER ROAD PTY LTD	1176m^2
350 Ross River Road	Lot 2 on RP721729	ROSS RIVER ROAD PTY LTD	1189m^2

Figure 1 below shows the extent of the subject land. It encompasses a total area of 5259m^2.

Figure 1: Aerial image of the Subject site

Source: Queensland Globe

Access to the subject site is currently provided by five (5) existing driveway crossovers. The western most crossover is located within the controlled area of the Acheron Avenue traffic signals, while the adjacent crossover is positioned at the intersection stop line.

The closest public transport stop for scheduled bus services is the Townsville Shopping Centre approximately 550m (8 minutes) walk to the east of the subject site.

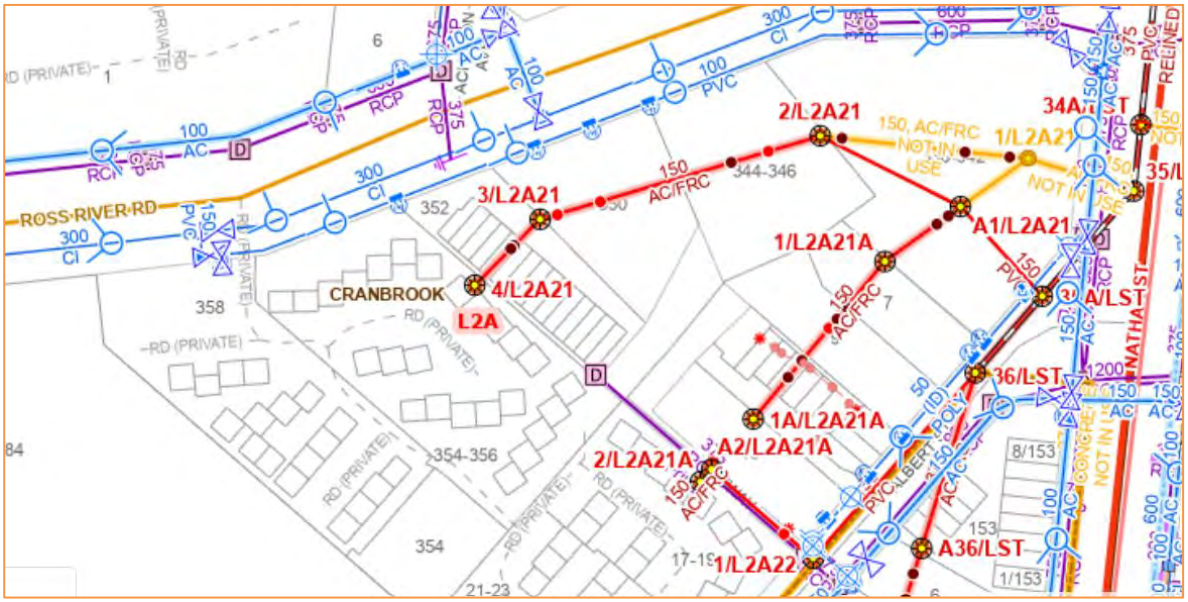
A 1.2-metre-wide concrete footpath is provided along the subject site frontage on Ross River Road, extending eastward to connect with footpaths on Nathan Street and westward to Hatchett Street. This footpath links directly to a pedestrian crossing on the Nathan Street slip lane, which in turn connects to signalised pedestrian crossings in both directions at the Ross River Road / Nathan Street intersection approximately 200 metres east of the site.

Along Albert Street, a 1.5-metre-wide concrete footpath provides further pedestrian access, supporting safe and convenient movement within the local street network. Complementing pedestrian infrastructure, a dedicated bicycle lane runs along Ross River Road in front of the subject site, facilitating safe and direct cycling access from the Aitkenvale Major Centre and surrounding community facilities.

The existing water infrastructure that services the site includes a 100 PVC water main along the southern footpath of Ross River Road. This water main extends to the intersection of Nathan Street where it connects to a DN150 AC water main that runs along Nathan Street. The other end of the DN100 PVC on Ross River Road connects to the DN300 CI trunk water main that runs along the southern side of Ross River Road. The existing DN300 CI and DN150 AC water mains connect to the existing DN600 AC trunk water main that is located on the eastern side of Nathan Street. This DN600 AC trunk water main continues to the south along Nathan Street.

The existing sewer infrastructure that services the subject site and immediate area include an existing DN150 sewer runs from MH 4/L2A21 to the east and south to connect to existing MH 35A/LST. This existing gravity sewer traverses the development site between MH 3/L2A21 and MH 2/L2A21. The existing DN375 sewer from MH 35A/LST is located near the intersection of Albert Street and Nathan Street. The DN375 trunk sewer continues to the north along Nathan Street with it increasing in size to become a DN750 sewer before discharging into PS L14A (Mather Street).

Figure 2: Infrastructure Services – Subject Site



Source: Extract of the Townsville City Plan 2014 – Services Map

With respect to planning scheme designations, the subject land is included within the Medium Density Residential zone (refer *Figure 2*). Land to the west and south is also zoned medium density residential and contains predominantly unit development. To the east, the site abuts major centre zoning containing the Nathan Business Centre. Generally, the immediate surrounding area is characterised by centre and medium density residential zoning with community facility zoning in the vicinity.

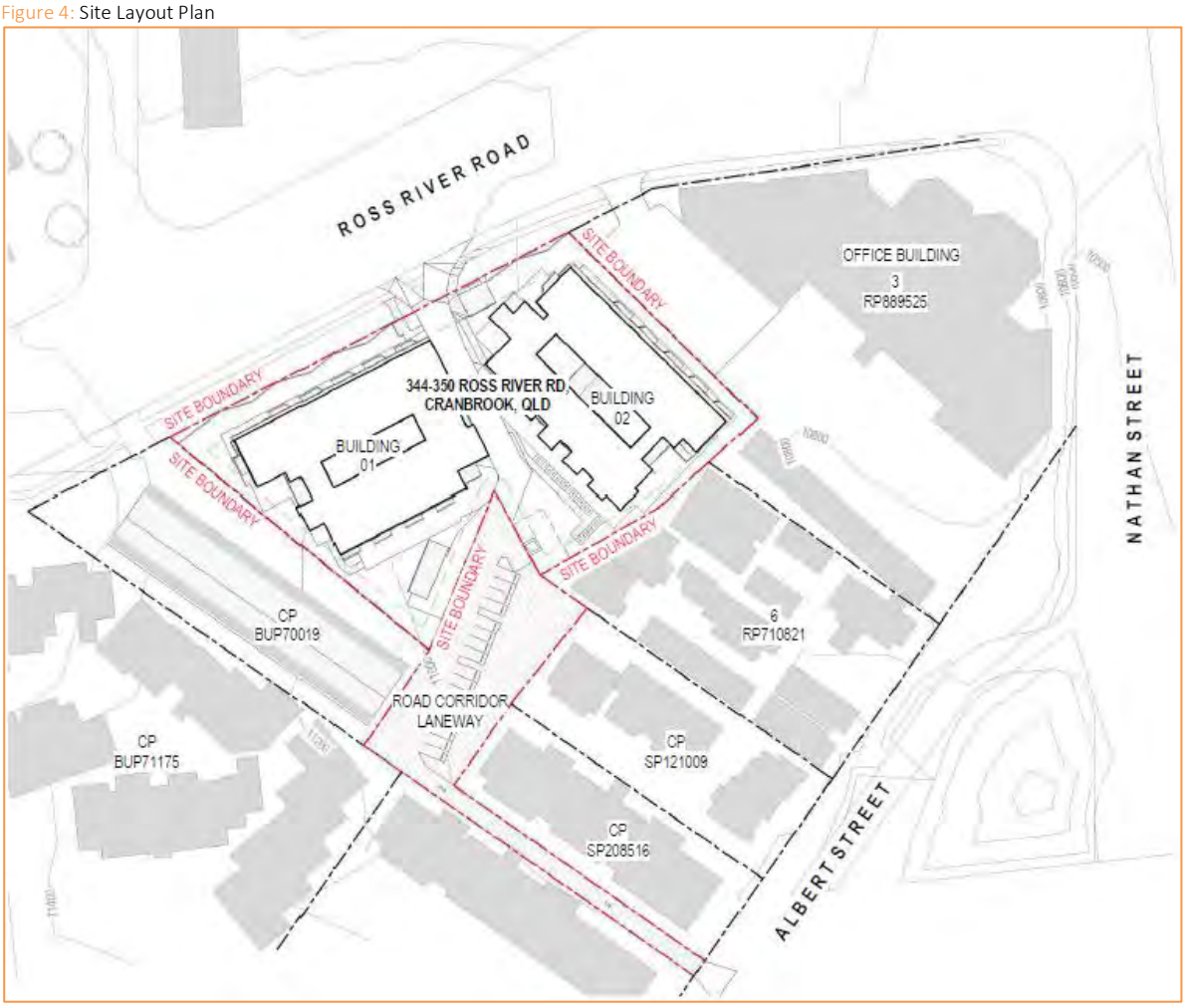
Figure 3: Zoning of the Subject Land

Source: Extract of the Townsville City Plan 2014 – Zoning Map

3.0 THE PROPOSAL

The applicant proposes to deliver an affordable housing product within the existing medium density residential area at Cranbrook as identified on *Figure 4* below. The development will include the establishment of two separate buildings incorporating 81 dwelling units over 4 levels and basement level for car parking. In total, the proposed development will incorporate 21 x one-bedroom dwellings, 42 x two-bedroom dwellings and 18 x three-bedroom dwellings. Further, the development proposal is illustrated in detail on the attached development plans which have been prepared by Counterpoint Architects, and are included in ***Appendix C***.

Figure 4: Site Layout Plan



Source: Counterpoint

The proposed use is defined as follows under the Townsville City Plan 2014:-

Multiple Dwelling *- Premises containing three or more dwellings for separate households.*

The table below shows an overview of the dwelling numbers and associated bedrooms for each building and level.

Table 2- Overview- Buildings and Number of dwelling units/bedrooms

	Building 1	Building 2
Level 1	1 x 3 Bedroom Units 9 x 2 Bedroom Units 1 x 1 Bedroom Units	1 x 3 Bedroom Units 5 x 2 Bedroom Units 5 x 1 Bedroom Units
Level 2	1 x 3 Bedroom Units 9 x 2 Bedroom Units 1 x 1 Bedroom Units	1 x 3 Bedroom Units 5 x 2 Bedroom Units 5 x 1 Bedroom Units
Level 3	1 x 3 Bedroom Units 9 x 2 Bedroom Units 1 x 1 Bedroom Units	1 x 3 Bedroom Units 5 x 2 Bedroom Units 5 x 1 Bedroom Units
Level 4	7 x 3 Bedroom Units	5 x 3 Bedroom Units 3 x 1 Bedroom Units
Total	**10 x 3 Bedroom Units** **27 x 2 Bedroom Units** **3 x 1 Bedroom Units**	**8 x 3 Bedroom Units** **15 x 2 Bedroom Units** **18 x Bedroom Units**

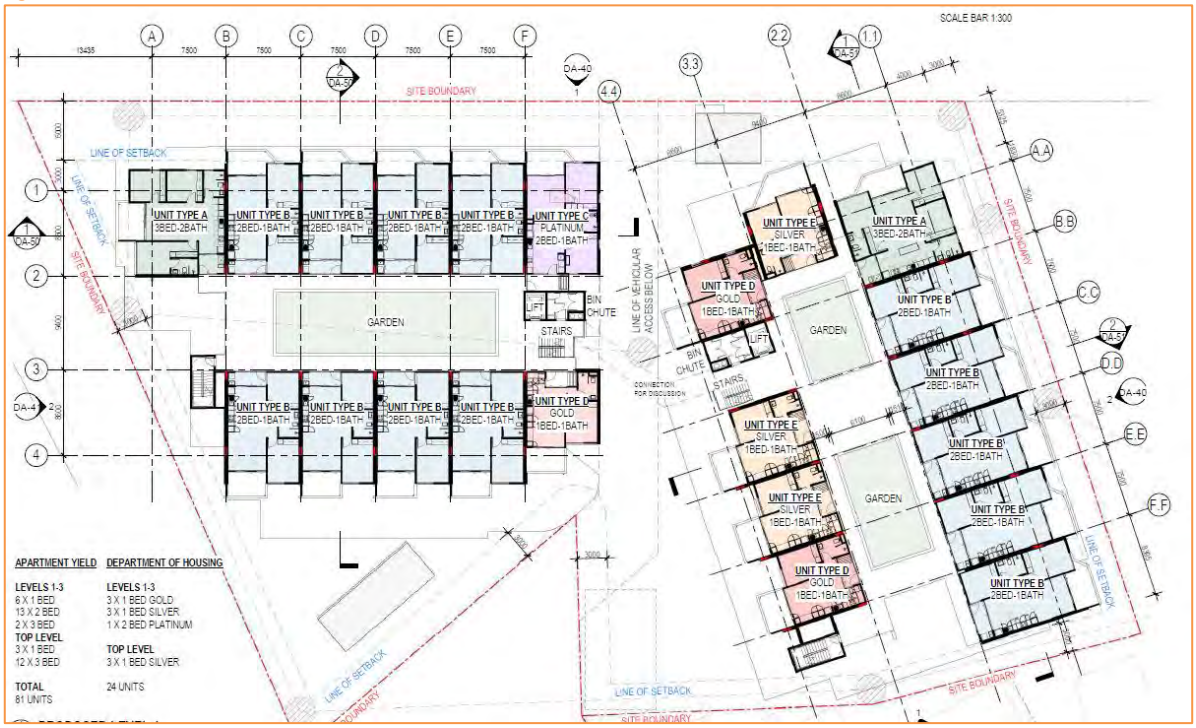
Ground/Podium Level

This level will contain residential car parking. Building 1 will accommodate 51 car parks at ground floor, whilst Building 2 will accommodate 60 car parks including 3 tandem car parks for units with higher car parking demand.

Residential Apartments

The number of typical units over 3 levels remains the same for each building. Thirty-three units will be provided on each level within buildings 1 and 2. A typical layout is shown in *Figure 5* below.

Figure 5: Level 1-3 Plan



Source: Counterpoint

Top Level

Level 4 will accommodate seven units in building 1 and eight units in building 2. *Figure 6* shows the floor plan of the proposed upper level.

Figure 6: Level 4 Floor Plan

Source: Counterpoint

The dwelling layouts have been carefully considered, with private spaces situated behind screening, and living spaces have direct access to patio/balcony areas. *Figure 7* shows the overall appearance from the Ross River Road view. Refer to floor plans in ***Appendix C*** for further details.

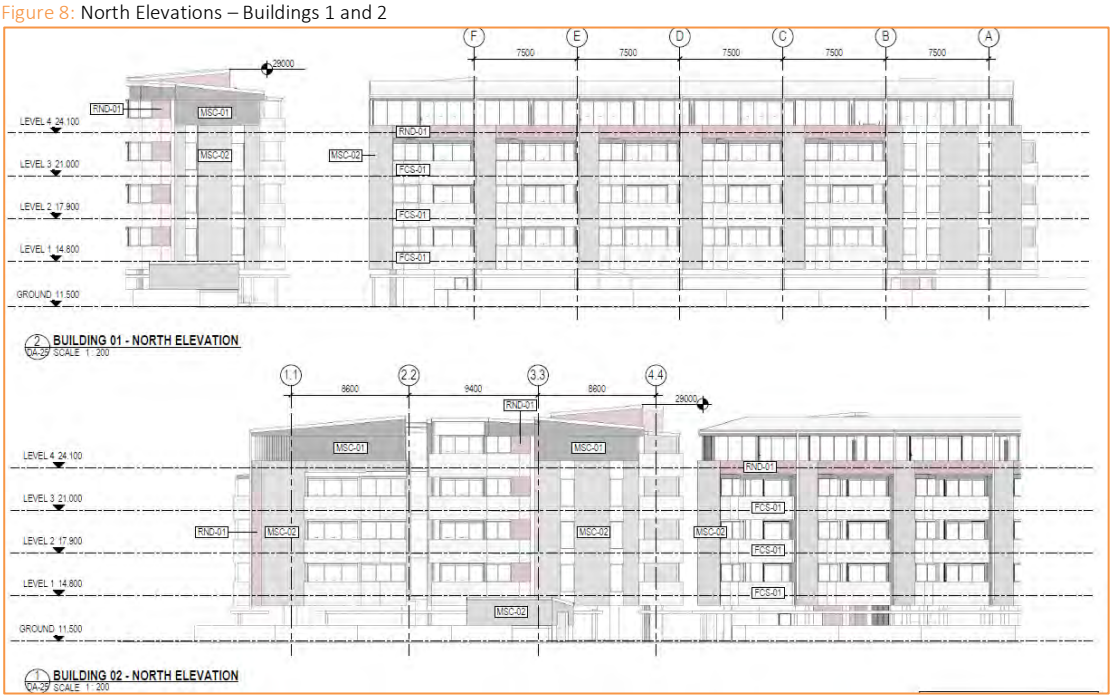
Figure 7: Perspective View from Ross River Road

Source: Counterpoint

Building Height and Appearance

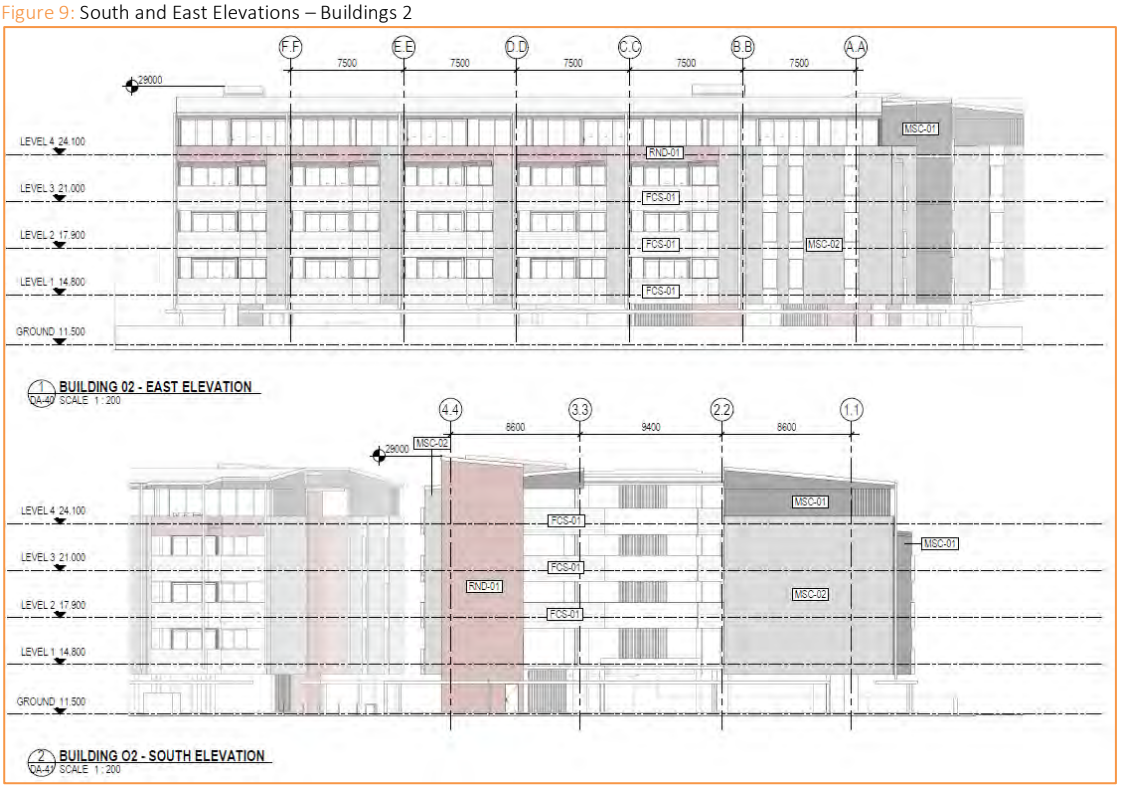
The proposed maximum building height is 29m for both buildings. The overall façade design incorporates a great deal of articulation and modulation, minimising the inclusion of blank walls. *Figures 8 to 10* show the elevations from different angles.

Figure 8: North Elevations – Buildings 1 and 2



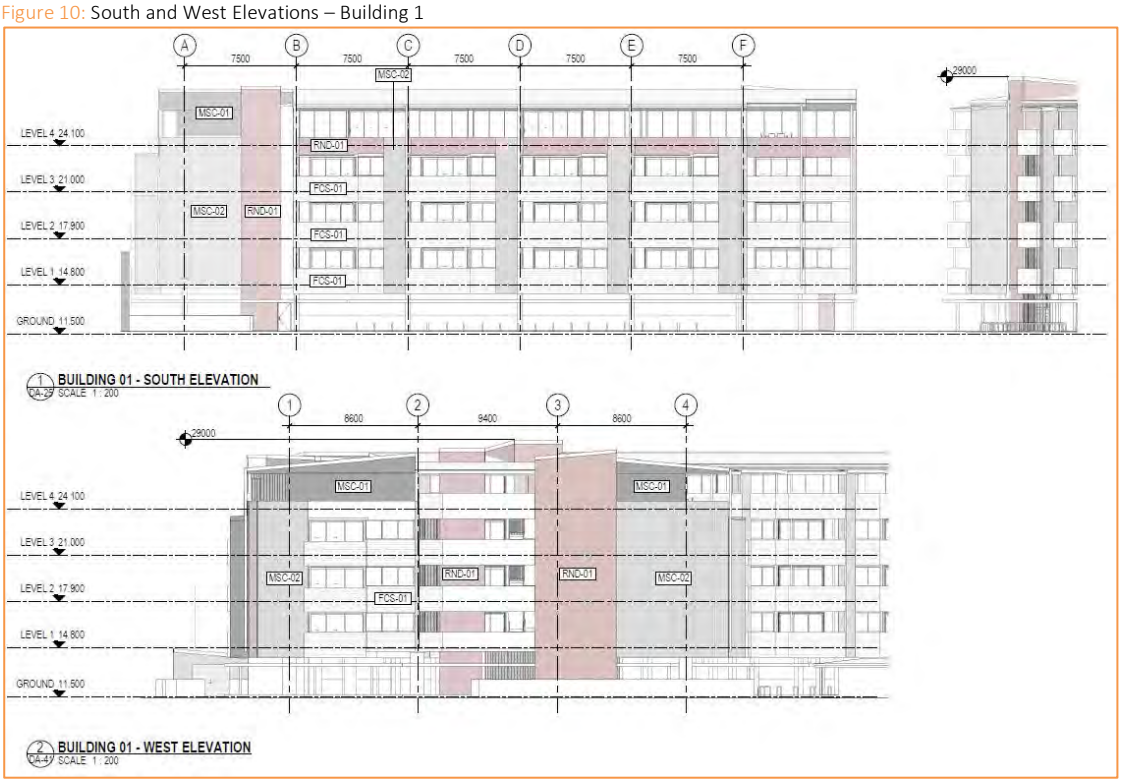
Source: Counterpoint

Figure 9: South and East Elevations – Buildings 2



Source: Counterpoint

Figure 10: South and West Elevations – Building 1



Source: Counterpoint

Building Material

Figure 11 shows the proposed external building material which has been included for visual variety and creating a synergy. Six different colour schemes have been applied to balcony soffits and walls to add visual variety. These colours alternate between units to create variation while maintain a consistent pattern across both buildings.

Figure 11: Building Material

Source: Counterpoint

4.0 RELEVANT LEGISLATION

4.1 COMMONWEALTH LEGISLATION

The application is not subject to assessment against Commonwealth legislation. It is not anticipated that development of this land will trigger assessment against the Environmental Protection and Biodiversity Conservation Act 1999 (EPBC), as it is not anticipated that the development will significantly impact upon a matter of national environmental significance.

4.2 THE PLANNING ACT 2016

The Planning Act 2016 provides the framework for coordinating local, regional and state planning. Given the nature of the development, the application requires assessment against this legislation.

4.3 STATE ASSESSMENT AND REFERRALS

The Development Assessment Rules (DA Rules) incorporate a referral process, established through the *Planning Regulation 2017*, enabling relevant State agencies to have input in the assessment process. Schedule 10 of the *Planning Regulation 2017* outlines the triggers for the referral of the development application to other agencies. The referral agencies for the development application are summarised in *Table 2*.

Table 3- State referral triggers

ISSUE	STATUATORY TRIGGER
State Transport Infrastructure	Schedule 10, Part 9, Division 4, Subdivision 2, Table 4, Item 1 Development application for a material change of use, other than an excluded material change of use, that is assessable development under a local categorising instrument, if all or part of the premises- **a) are within 25m of a State transport corridor; or** b) are a future State transport corridor….

4.4 STATE PLANNING POLICY

For the purposes of this development, we consider that separate assessment of the proposal against the provisions of the SPP is not required given that all relevant matters will be dealt with under the provisions of the planning scheme.

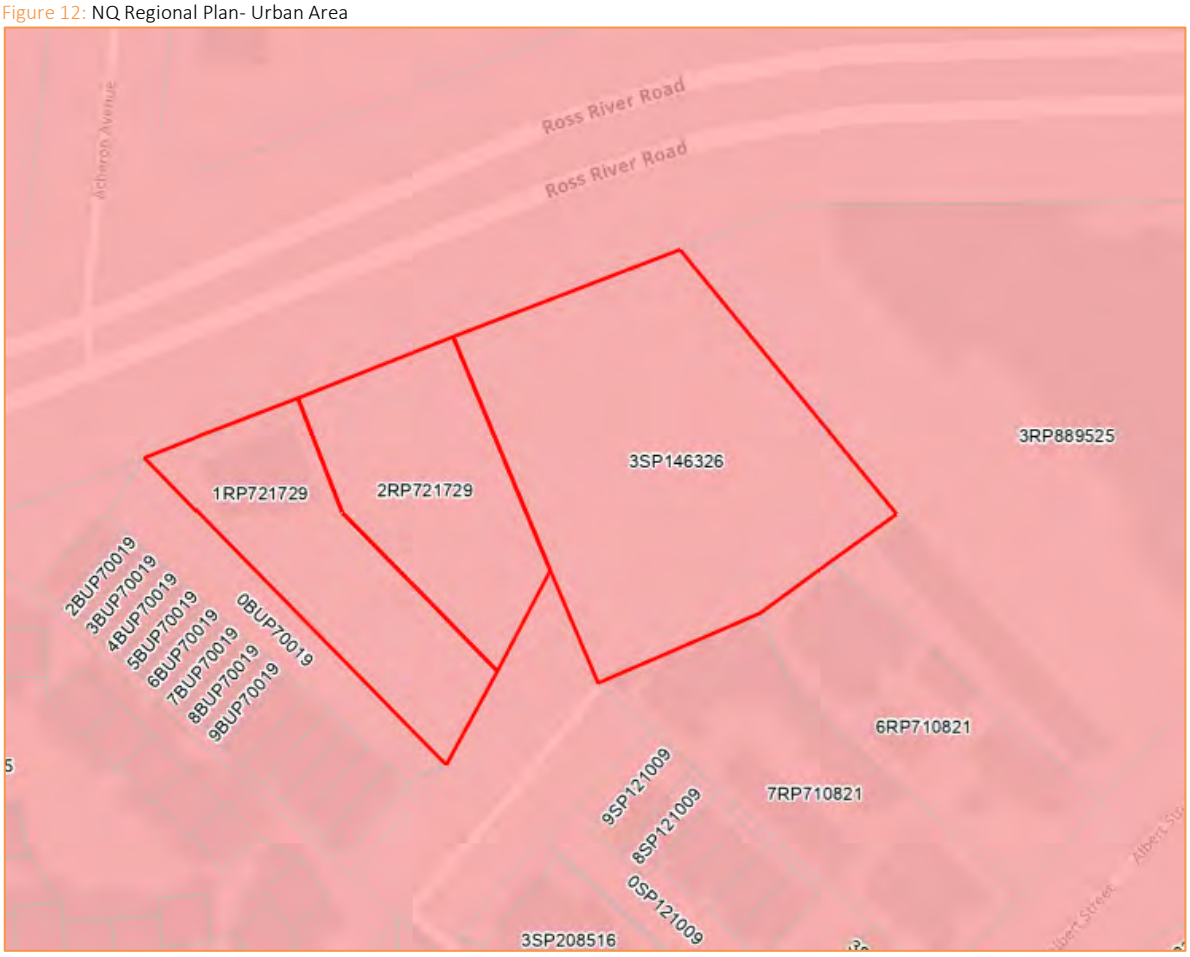
4.5 ASSESSMENT MANAGER AND PLANNING SCHEME

Townsville City Council is nominated as the assessment manager for the application. The applicable planning scheme is the City Plan 2014.

4.6 NORTH QUEENSLAND REGIONAL PLAN

The subject site is located within an urban area identified in the NQ Regional Plan, refer *Figure 12* below. The development is consistent with the outcomes of the NQ Regional Plan as it further strengthens the residential sector to support Townsville's growing community at a convenient location, with strong connections to public transport, principal roads, commercial and community facilities.

Figure 12: NQ Regional Plan- Urban Area



Source: DAMS Mapping

4.7 PUBLIC NOTIFICATION

The proposed development on the subject site requires public notification under the provisions of the Planning Act 2016.

5.0 THE PLANNING FRAMEWORK

5.1 THE TOWNSVILLE CITY COUNCIL PLANNING SCHEME – CITY PLAN 2014

The planning scheme seeks to achieve outcomes through the identification of a number of overall outcomes, performance outcomes and acceptable solutions. Land identified within the planning scheme is divided into a number of zones. Zones are further identified within individual precincts. The planning scheme further identifies numerous overlay codes.

5.2 PLANNING SCHEME DESIGNATIONS

In accordance with the Townsville City Plan 2014, the site is subject to the designations listed in *Table 4*. These designations will assist in determining which Tables of Assessment are applicable to the proposed development on the subject site and therefore assist in the determination of the Category of assessment and the codes applicable to the proposed development.

Table 4- Planning Scheme Designation

Type of Designation	*Designation*
Zone	Medium Density Residential Zone
Precinct	Not Applicable
Local Area	Not Applicable
Airport Environs Overlay	Identified within the Operational Airspace Overlay more than 45m above ground level.
Bushfire Hazard Overlay	Not applicable
Coastal Protection Overlay	Not Applicable
Cultural Heritage Overlay	Not Applicable
Extractive Resources Overlay	Not applicable
Flood Hazard Overlay	Identified within the low, and medium hazard area
Landslide Hazard Overlay	Not applicable
Natural Assets (Environmental Importance) Overlay	Not applicable
Natural Assets (Water Resource Catchment Overlay)	Not applicable

5.3 LEVEL OF ASSESSMENT, ASSESSABLE BENCHMARKS AND APPLICABLE CODES

The subject site is designated within the *Medium Density Residential Zone, Airport Environs Overlay* and *Flood Hazard Overlay.* The relevant table of assessment within the Townsville City Plan (2014) (Table 5.5.2) identifies the Material Change of Use for Multiple Dwelling as Impact Assessable Development if the building height of 3 storeys is exceeded.

Furthermore, the Assessment Tables identify that an application for impact assessable Material Change of Use requires assessment against the planning scheme and hence the following Codes:

- Strategic Framework;
- Medium Density Residential Zone Code;
- Healthy Waters Code;
- Landscape Code;
- Transport Impact, Access and Parking Code;
- Works Code;
- Airport Environs Overlay Code; and
- Flood Hazard Overlay Code.

A complete assessment of the proposal against the relevant provisions of the applicable Codes is discussed below:

5.4 STRATEGIC FRAMEWORK

The Framework relevantly contemplates four themes that represent the policy intent of the Scheme. The themes are:

1. Shaping Townsville;
2. Strong, connected community;
3. Environmentally sustainable future; and
4. Sustainable economic growth.

The themes, on balance, seek to create a vibrant and liveable City that is efficiently served and respectful of its built and natural environment.

The proposed development achieves this balance, located at a convenient and accessible location within a prominent area that is earmarked for infill housing. The project maximises utility of established infrastructure improving efficiencies and allows the activation of a strategically located site.

The proposed development is in direct response to the housing crisis. As identified in Council's Local Housing Action Plan over 4000 Townsville residents are in need of affordable housing, with 2,545 experiencing rental stress and 1570 experiencing homelessness or are marginally housed. Continual housing market pressure will continue to exacerbate the demand for affordable housing in the Townsville LGA.

It has been concluded that the proposed development advances the intent of the strategic frameworks as it:-

- Provides much needed medium-density housing at a strategic location with immediate connection to a major centre and community services;
- Provides much needed affordable housing in an infill area;
- Concentrates land use at a key location and offers affordable residential housing opportunities; and
- Supports the efficient provision of infrastructure.

In summary, the development will contribute to the diversity and choice of housing that is available across the City and will assist in supply at a time of recognised housing pressure. There is a demonstrated demand for affordable housing that is not otherwise currently available in the Townsville market.

Provision of this type of housing product will open supply to the market and it provides an alternate product to assist in responding to Council's Townsville Affordable Housing Action Plan which includes in its purpose to support options that seek to improve access to housing, retain and attract key workers as well as activate the city.

The development respects its setting and provides additional medium density housing at a location which is characterised by higher density housing. It represents infill development at a earmarked residential site, close to services.

The development is capable of accommodating required services without burden and it offers an improved density of development that will assist in optimising the efficient use of established infrastructure, leveraging investment already made by the State and Council in the locality.

5.5 ZONE CODE PROVISIONS

5.5.1 Medium Density Residential Zone Code

In accordance with the Townsville City Plan 2014 the subject site is contained within the Medium Density Residential zone, where Material Change of Use for Multiple Dwelling is considered Impact Assessable if the building height of three storeys is exceeded.

The purpose of the Medium density residential zone code is to provide for a range and mix of dwelling types including dwelling houses and multiple dwellings.

The particular purpose of the code is:

a) provide opportunities for medium density living close to centres and other community nodes in a generally low to medium-rise built form;
b) maintain a high level of residential amenity; and
c) achieve accessible, well-serviced and well-designed communities.

The purpose of the zone will be achieved through the following overall outcomes:

a) residential development consists primarily of low-rise (up to 3 storeys in building height) apartments or town house style dwellings, together with a mix of lot sizes or duplex housing types. Taller, more intensive built form will generally be limited to key infill locations near the city's major centres, as specifically intended in particular precincts;
b) built form creates an attractive and pedestrian oriented streetscape which integrates with nearby centres, public transport and community activities;
c) reconfiguration creates lots which facilitate the location of dwellings which address the street and allow for climate-responsive building orientation;
d) residential uses may also include residential care facilities, retirement facilities, rooming accommodation and short-term accommodation;
e) development maintains a high level of residential amenity on the site and in the neighbourhood;
f) residential development is protected from the impacts of nearby centres, industrial activities, transport corridors and infrastructure installations and major facilities such as the port, airport and Department of Defence landholdings;

g) *the design of development promotes accessibility by walking, cycling and public transport;*
h) *the design of development is responsive to the city's climate by taking into account prevailing breezes, slope and solar orientation, provision of awnings and promotes sustainable practices including energy efficiency and water conservation; and*
i) *non-residential uses only occur where they are specifically intended in particular precincts or where they primarily support the day-to-day needs of the immediate residential community, do not unreasonably detract from the residential amenity of the area and are not better located in nearby centres.*

Response

It is considered that the proposed Multiple Dwellings are strongly consistent with the purpose and strategic outcomes of the Medium Density Zone. The proposal is to establish multiple dwelling units to provide for housing choice and affordability. The proposal has focused strongly on providing a variety of dwelling types. The development is consistent with the zone intent, and although not in a particular precinct, it provides a taller, more intensive built form (4 storeys) in a key infill location, near a major centre. The units are provided in a strategic location that is within a convenient walkable distance to public transport and community activities.

The proposed development is consistent with the overall outcomes of this code, specifically noting that:-

- The proposed use is anticipated within the zone and locality and provides easily accessible and contemporary buildings;
- The new development meets the needs of community, and in particular the need of residential affordable housing;
- The development is considered infill development at a strategic location, near a major centre, and therefore a higher building height is acceptable;
- The new built integrates well into the existing amenity and connects to the external road network.

A detailed assessment against relevant benchmarks is provided below:-

Table 4- Low Density Residential Code Assessment

Performance outcomes	Acceptable outcomes	Assessment
Amenity		
PO4 Development minimises impacts on surrounding land and provides for an appropriate level of amenity within the site, having regard to: 1. noise; 2. hours of operation; 3. traffic; 4. visual impact; 5. odour and emissions; 6. lighting; 7. access to sunlight; 8. privacy; and 9. outlook.	No acceptable outcome is nominated.	Complies The proposed development is a logical extension within a medium density residential area, near a major centre. Specifically, this development will provide infill development in form of affordable housing providing a higher density product to address the housing shortage. The proposed infill development is located in an ideal location and is close to community facilities as well as a major centre. The proposed development complies with the relevant requirements to enable an appropriate level of amenity to be maintained upon neighbouring land. Traffic has been considered as part of this application and can be managed appropriately (refer to the Premise Traffic Impact Assessment in ***Appendix F***). Further, noise has also been considered by Stantec, refer to ***Appendix G***.

PO5 Landscaping is provided to enhance the appearance of the development, screen unsightly components, create an attractive on-site environment and provide shading.	No acceptable outcome is nominated.	**Complies** The indicative landscape intent is shown on the external works plans Part A and B prepared by Counterpoint, refer to ***Appendix C***. It is expected that landscaping can be conditioned as part of any development permit to form part of subsequent operational works applications.
Crime prevention through environmental design		
PO6 Development facilitates the security of people and property having regard to: 1. opportunities for casual surveillance and sight lines; 2. exterior building design that promotes safety; 3. adequate lighting; 4. appropriate signage and wayfinding; 5. minimisation of entrapment locations; and 6. building entrances, loading and storage areas that are well lit and lockable after hours.	No acceptable outcome is nominated.	**Complies** The development design allows for passive surveillance to occur within and external to the subject site. Appropriate lighting and signage will be provided throughout the development. Clear sightlines and open layouts in communal and parking areas have been designed to minimise visual obstructions as much as possible, enhancing natural surveillance and contributing to a secure atmosphere throughout the community. Well-lit pathways, especially around bicycle parking, bin storage areas, stairwells, mail and car parking areas will ensure visibility during evening hours, creating a safer environment for residents and encouraging the use of outdoor spaces after dark. Refer to ***Appendix C***.
PO7 Development promotes the safety of residents and visitors, particularly through casual surveillance of the street and public spaces.	**AO7.1** Buildings are designed to have balconies, windows and building openings overlooking streets and other areas which are accessible to the public. Figure 6.24 – Design for casual surveillance illustrates. **AO7.2** Fences or walls along a street frontage have a maximum height of 1.2m where solid, or 1.8m where that portion of the fence above 1.2m high at least 50% transparent.	**Complies** Both buildings have been orientated so that overlooking streets is maximised. Further a solid wall is proposed with a height of 1.2m.
Built Form		
PO8 Design elements contribute to an interesting and attractive streetscape and building through: 1. the provision of projections and recesses in the façade which reflect changes in internal functions of	No acceptable outcome is nominated.	**Complies** The design of the development provides direct streetscape interaction with the internal road network and connection into the wider external road network. Resident access is provided via a left-in-left-out access on Ross River Road and a one-way egress only at the rear of the subject site via a 4m wide unnamed laneway to Albert Street.

buildings including circulation; 2. variations in material and building form; 3. modulation in the façade, horizontally or vertically; 4. articulation of building entrances and openings; 5. corner treatments to address both street frontages for a premises on a corner; 6. elements which assist in wayfinding and legibility; and 7. elements which relates to the context including surrounding buildings, parks, streets and open spaces.		An internal footpath runs along both buildings which links into the external footpath network in Ross River Road. Both buildings have been orientated and designed to contribute to an attractive streetscape. The proposed external building material has been included for visual variety and creating a synergy between buildings. Six different colour schemes have been applied to balcony soffits and walls to add visual variety. These colours alternate between units to create variation while maintain a consistent pattern across both buildings. The overall façade design incorporates a great deal of articulation and modulation, minimising the inclusion of blank walls. The entry area to both buildings is visible and open. Refer to architectural plans in ***Appendix C***.
Parking and services		
PO10 Parking facilities are located to be concealed from public view to ensure an attractive streetscape.	AO10 Vehicle parking structures are located: 1. behind the building setback; or 2. behind the building; or 3. at basement level.	Complies Resident car parking will be provided underneath both buildings at basement level. Visitor carparking is provided at the rear of building 1 concealed from public view points.
PO11 Waste disposal and servicing areas are screened from public view and do not have adverse amenity impacts on adjoining properties.	No acceptable outcome is nominated.	Complies The development includes a dedicated refuse collection area where bins are stored. This area is located concealed from public view points. Swept path analysis has been undertaken for a front-loading refuse collection vehicle accessing the site from Ross River Road. The vehicle manoeuvres into the designated waste collection area to service bins and subsequently exits the site via the unnamed laneway, turning right onto Albert Street. The analysis confirms that the proposed access and internal circulation arrangements can accommodate the operational requirements of the waste collection vehicle. Refer to ***Appendix F***.
PO20 Building design creates an enjoyable pedestrian environment and experience through the use of: 1. design elements that promote a sense of human scale at the street level, including use of awnings where appropriate; 2. design that breaks up the ground floor elevation on the	No acceptable outcome is nominated.	Complies The two buildings are separated by an internal driveway and pedestrian pathways along each building perimeter. The internal pathways connect into the external road network.

principle street frontage into distinct elements; and 3. articulation of the built form above ground floor through use of balconies, recesses and changes in material.		
PO21 Building design and setbacks: 1. create an attractive, consistent and cohesive scale along the streetscape; 2. maintain appropriate levels of light and solar penetration, air circulation, privacy, landscaping and amenity for existing and future buildings; and 3. do not prejudice the development of adjoining land.	**AO24** The design meets the setback requirements outlined by Table 6.2.2.3(b) — Building setbacks Medium density residential zone. Figure 6.28 – Building setbacks illustrates. **AO21.2** A deep planting landscape area with a minimum width of 1.5m is provided along the full frontage of any road frontage (excluding crossover and pedestrian access). Figure 6.28 – Building setbacks illustrates. **AO21.3** A deep planting landscape area with a minimum width of 1.5m is provided along the rear site boundary. Figure 6.28 – Building setbacks illustrates.	**Alternate Outcome** Front and side setbacks are in excess of the minimum requirements. The rear setback is less than 6m given the orientation of the buildings and consideration of adjoining land uses. It is submitted that the adopted rear setback maintains appropriate levels of light and solar penetration, privacy and amenity for the proposed development and does not impact adversely on neighbouring land.
PO22 Roof forms assist in articulating the facade as a combination of distinct elements integrated with the facade design.	No acceptable outcome is nominated.	**Complies** The proposed roof form integrates with the façade design and provides an excellent synergy.
PO23 Roof top plant and equipment are contained within roof forms and are screened from the street and from adjoining buildings using a consistent range of non-reflective materials to provide a cohesive design element.	No acceptable outcome is nominated.	**Not applicable**
PO24 Development provides private open space that is: 1. well-proportioned, appealing and functional and easily accessible, and promotes outdoor living as an extension of the dwelling; 2. provides a high level of	**AO24.1** Balconies are provided with a minimum area of 9m² for a 1 bedroom unit or 16m² for 2 or more bedroom unit, with a minimum dimension of 4m and clear of any air conditioning unit or drying space. **AO24.2** Where clothes drying areas are provided on private balconies they are	**Complies** All units are provided with a spacious open space area in the form of a balcony that are easily accessible from living areas. The open space areas are in excess of the minimum requirements.

privacy for residents and neighbours; and 3. has sufficient size and shape to meet the needs of a diversity of potential residents.	screened from public view. **AO24.3** Private open space is located or screened so it does not directly overlook main living areas or private open space of adjoining dwellings.	
PO25 Sufficient communal open space is provided to create flexible spaces suitable for a range of activities.	No acceptable outcome is nominated.	**Alternate Solution** It is not proposed to include a great deal of communal activities within the development site as there are external opportunities within the immediate area. Existing open space areas allow residents to engage in activities such as picnics, casual sports and other recreational activities.
PO26 Communal open space provides facilities including seating, landscaping and shade. Treatments such as green roofs, green walls or community gardens contribute to the attractiveness of these spaces.	No acceptable outcome is nominated.	**Refer to above.**

5.6 DEVELOPMENT CODES

5.6.1 Healthy Waters Code

The purpose of the Healthy Waters Code is to ensure developments manages stormwater and wastewater as part of the integrated total water cycle and in ways that help protect the environmental values specified in the Environmental Protection (Water) Policy 2009.

Response

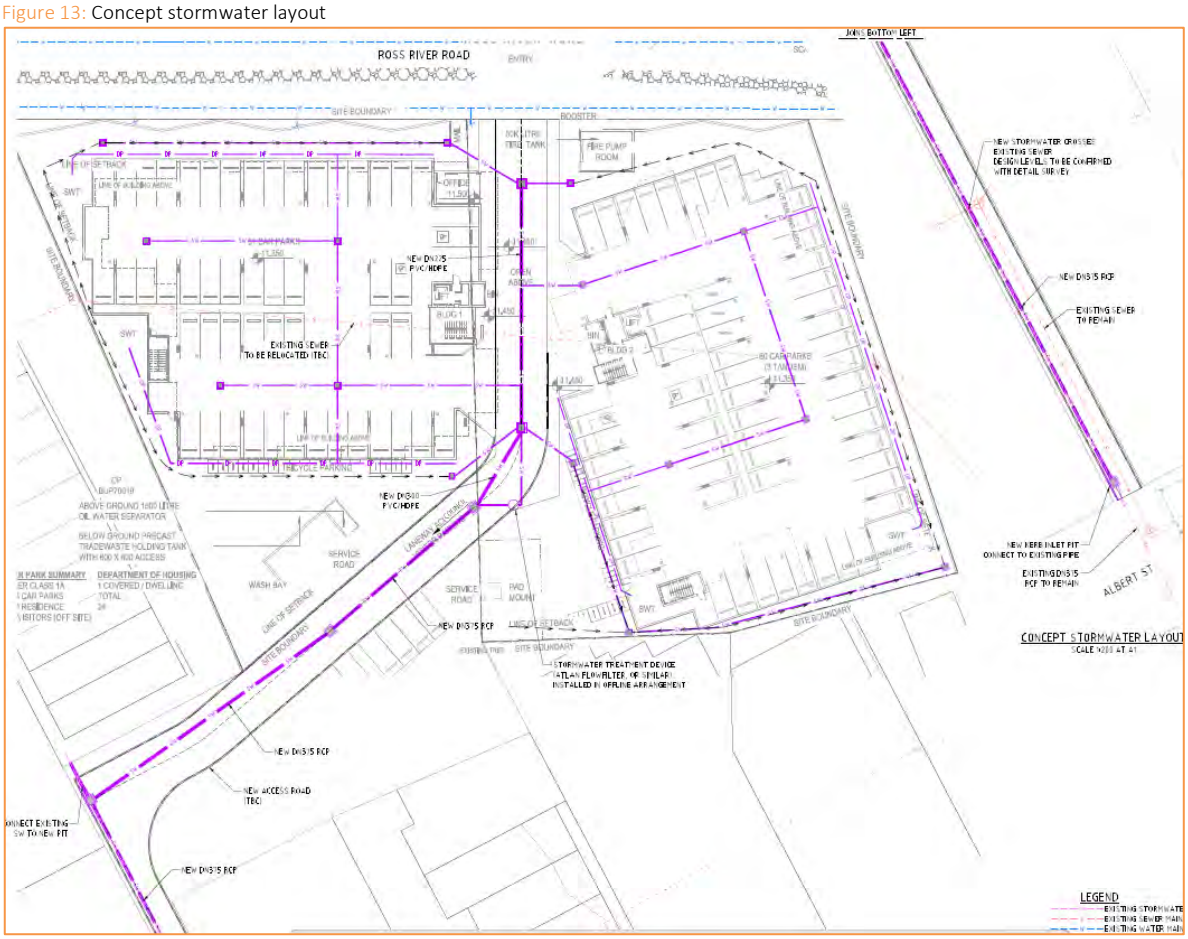
The Stormwater Quality Management Report included in ***Appendix H*** identifies the proposed treatment measures of stormwater in relation to the proposed development. The proposed stormwater strategy to manage stormwater quantity, quality and overland flow has been developed in accordance with the Townsville City Plan.

The SMP details the concept configuration of the proposed treatment train of water quality improvement measures that will be implemented. Generally, the proposed development will utilise stormwater quality measures including eight (8) x Atlan StormSacks and Atlan FlowFilter (or approved equivalent). Details of stormwater treatment devices and underground stormwater network will be
provided in the detailed design phase of the development.

A preliminary stormwater layout plan is shown in *Figure 13 and* ***Appendix H***.

It is anticipated that further details with respect to stormwater will be provided at future operational works stage. An approval condition is expected to safeguard this aspect. A detailed assessment against the code is not warranted.

Figure 13: Concept stormwater layout



Source: LCJ

5.6.2 Landscape Code

The purpose of the Landscape Code is to ensure landscaping in both the private and public domains is designed and constructed to a high standard, provides a strong contribution to the city image, is responsive to the local character, site and climatic conditions and remains fit for purpose over the long-term.

Response

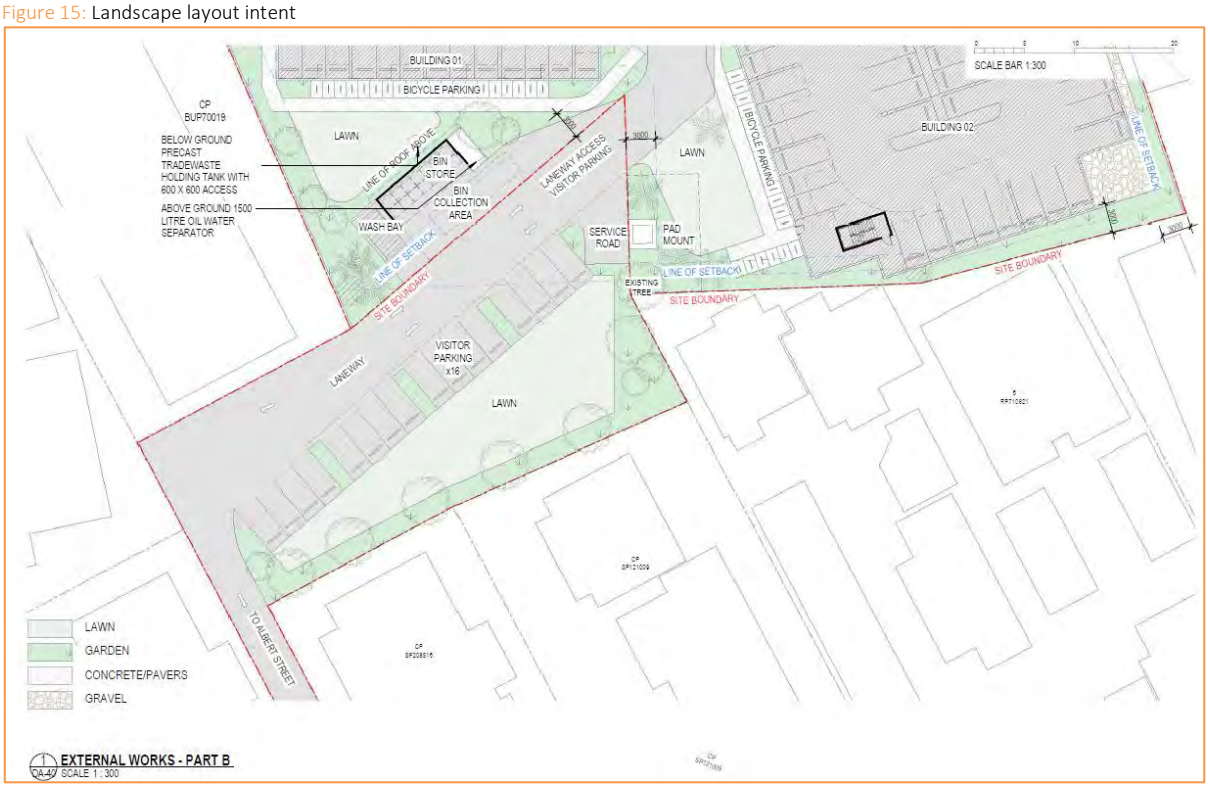
Extensive and well considered landscaping is proposed as part of the overall development. The overall landscape intent is shown on the architectural plans in ***Appendix C***. *Figures 14 and 15* show the ground plane strategy with landscaping focal points.

It is anticipated that details with respect to landscaping will be provided at future operational works stage. An approval condition is expected to safeguard this aspect. A detailed assessment against the code is not warranted.

Figure 14: Landscape layout intent

Source: Counterpoint

Figure 15: Landscape layout intent



Source: Counterpoint

5.6.3 Transport Impact, Access and Parking Code

The purpose of the Transport Impact, Access and Parking Code is to ensure appropriate provision for transport and end of trip facilities, and to facilitate, as far as practicable, an environmentally sustainable transport network.

Response

The proposal is consistent with the purpose and overall outcomes of the Transport Impact, Access and Parking Code. Premise have prepared a detailed Traffic Impact Assessment which is attached in ***Appendix F***.

The development access is proposed to consist of left-in-left-out access on Ross River Road and one-way egress only via the 4m wide laneway to Albert Street. The five (5) existing driveway crossovers will be removed as part of the proposed development.

111 on-site parking spaces including four spaces for people with disabilities and three in tandem spaces will be provided for residences at basement level. Additionally, 16 off-site visitor parking spaces within the unnamed road reserve to the south of the development site will be provided.

In terms of active transport, a 1.2-metre-wide concrete footpath is provided along the subject site frontage on Ross River Road, extending eastward to connect with footpaths on Nathan Street and westward to Hatchett Street. This footpath links directly to a pedestrian crossing on the Nathan Street slip lane, which in turn connects to signalised pedestrian crossings in both directions at the Ross River Road / Nathan Street intersection approximately 200 metres east of the site.

Along Albert Street, a 1.5-metre-wide concrete footpath provides further pedestrian access, supporting safe and convenient movement within the local street network. Complementing pedestrian infrastructure, a dedicated bicycle lane runs along Ross River Road in front of the subject site, facilitating safe and direct cycling access from the Aitkenvale Major Centre and surrounding community facilities.

Both Ross River Road and Nathan Street are identified as Priority A routes in the Principal Cycle Network Plan, as shown on the North Queensland Priority Route Map (2021). This designation reflects their importance within the regional cycling network and indicates that these corridors are priorities for government investment in high-quality cycling infrastructure over the 10-year period following the 2021 plan. These active transport facilities align with the objectives of the Medium Density Residential zone in the Townsville City Plan, which promotes walkability and cycling as key components of sustainable urban living and reduced car dependency.

A detailed assessment against the code has not been provided as all aspects have been addressed as part of the TIA, refer to ***Appendix F***.

6.6.4 Works Code

The purpose of the Works Code is to provide with a level of infrastructure which is appropriate to the intended character and function of the site and creating a high expectation for community health, safety and amenity. Development provides suitable access and does not detract from the desired character, amenity, integrity or quality of the locality.

Response

Water Reticulation

The DMP report in ***Appendix D*** details the network modelling and infrastructure sizing for the proposed 81 multiple dwelling development.

The theoretical water network modelling demonstrated in the DMP report shows that the proposed development is able to be serviced with a reticulated water supply that meets Council's standards with no upgrades required.

Sewer Reticulation

The DMP report in ***Appendix D*** details the network modelling and infrastructure sizing for the proposed 81 multiple dwelling development.

The assessment concludes the existing gravity sewer system, including the proposed DN225 replacement/diversion sewer has sufficient capacity to cater for the proposed residential unit development.

Electricity and Telecommunications Services

Design and negotiations with utility service providers for the supply of electricity and telecommunications will be undertaken.

Earthworks

Minor earthworks will be to shape the site for construction. Further details will be provided at future operational works stage.

5.7 OVERLAY CODES

5.7.1 Airport Environs Overlay

The proposed development is nominated for assessment against the Airport Environs Overlay Code.

The purpose of this code is to *ensure development does not negatively impact on the operations of the Townsville Airport, RAAF base or any other aviation facilities. Any development is to ensure that safety is maintained throughout the airport's operational airspace by reducing the effect of aircraft noise on people and minimising risk to public safety near airport runways.*

Response

The subject site is identified in Operational Airspace more than 45m above ground level and located 8km from the airport runway.

The development is considered consistent with the overall outcomes, performance outcomes and acceptable outcomes of the code. In particular, the proposed development anticipates a maximum height of 29m with no impact on the operational airspace. A detailed assessment against the code is not warranted.

6.7.2 Flood Hazard Overlay

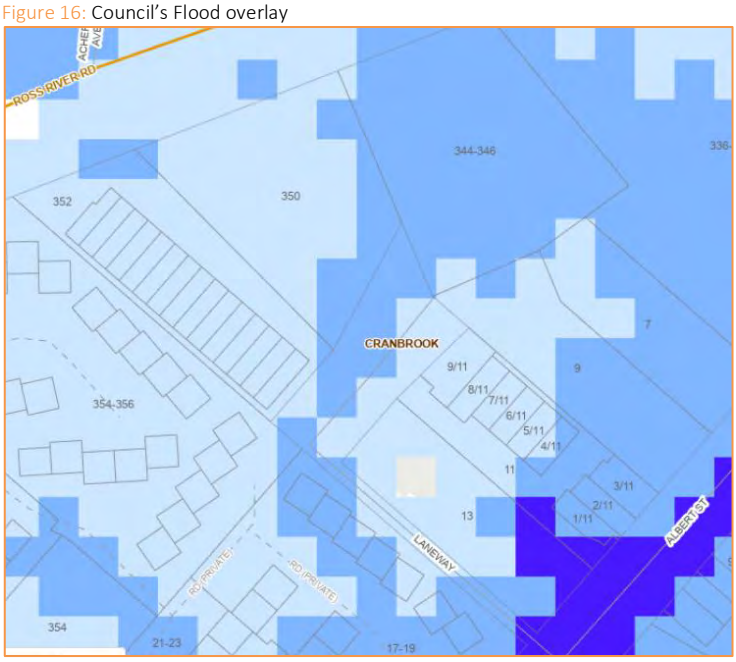
The proposed development is nominated for assessment against the Flood Hazard Overlay Code.

The purpose of this code is to *manage development outcomes in flood hazard areas so that risk to life, property, community, economic activity and the environment during future flood events is minimised, and to ensure that development does not increase the potential for flood damage on-site or to other property.*

Response

The subject site is identified in low and medium hazard flood areas, refer to *Figure 16* below.

Figure 16: Council's Flood overlay



Source: TCC Mapping

Flood Impact Assessment

A Flood Impact Assessment has been prepared by Imbris (***Appendix H)*** which assessed the impacts on flood events up to the TCC DFE and confirms no adverse impacts on flood levels, depths, flow velocities and time of inundation external to the site.

A detailed assessment against Council's policy (SC6.7.3.1.1) is presented within the Flood Impact Assessment.

6.0 CONCLUSION

The applicant proposes to deliver an affordable housing product within the existing medium density residential area at Cranbrook. The development will include the establishment of two separate buildings incorporating 81 dwelling units over 4 levels and basement level for car parking. The subject land is formally described as Lots 1 & 2 on RP721729 and Lot 3 on SP146326 and is located at 344-346 and 350 Ross River Road with direct access to established education and community facilities as well as commercial services and major shopping centre.

In summary, the proposed development is recommended for approval based on the following reasons:

- The development will contribute to the diversity and choice of housing that is available across the City and will assist in supply at a time of recognised housing pressure. There is a demonstrated demand for affordable housing that is not otherwise currently available in the Townsville market. Provision of this type of housing product will open supply to the market and it provides an alternate product to assist in responding to Council's Townsville Affordable Housing Action Plan which includes in its purpose to support options that seek to improve access to housing, retain and attract key workers as well as activate the city.
- The proposal complies with the codes nominated by the planning scheme as being relevant to the assessment of a proposal of this nature.
- The intended use is in character with the locality, ensuring amenity within the area will be maintained.
- The proposed development is located in an area appropriate for the nature of the use and traffic generated by it.
- Parking is considered to be adequate to meet the demand.
- The potential impacts on amenity have been addressed appropriately by relevant experts.

Given the above facts and circumstances presented in this report, we recommend that Council approve the development subject to reasonable and relevant conditions.

APPENDIX A

Development Application Form 1

Land Owners Consent

DA Form 1 – Development application details

Approved form (version 1.6 effective 2 August 2024) made under section 282 of the Planning Act 2016.

This form **must** be used to make a development application **involving code assessment or impact assessment**, except when applying for development involving only building work.

For a development application involving **building work only**, use *DA Form 2 – Building work details*.

For a development application involving **building work associated with any other type of assessable development (i.e. material change of use, operational work or reconfiguring a lot)**, use this form (*DA Form 1*) **and** parts 4 to 6 of *DA Form 2 – Building work details.*

Unless stated otherwise, all parts of this form **must** be completed in full and all required supporting information **must** accompany the development application.

One or more additional pages may be attached as a schedule to this development application if there is insufficient space on the form to include all the necessary information.

This form and any other form relevant to the development application must be used to make a development application relating to strategic port land and Brisbane core port land under the *Transport Infrastructure Act 1994*, and airport land under the *Airport Assets (Restructuring and Disposal) Act 2008.* For the purpose of assessing a development application relating to strategic port land and Brisbane core port land, any reference to a planning scheme is taken to mean a land use plan for the strategic port land, Brisbane port land use plan for Brisbane core port land, or a land use plan for airport land.

Note: *All terms used in this form have the meaning given under the Planning Act 2016, the Planning Regulation 2017, or the Development Assessment Rules (DA Rules).*

PART 1 – APPLICANT DETAILS

1) Applicant details	
Applicant name(s) (*individual or company full name*)	ROSS RIVER ROAD PTY LTD
Contact name *(only applicable for companies)*	Anne Zareh
Postal address *(P.O. Box or street address)*	595 Flinders Street c/- Brazier Motti Pty Ltd
Suburb	Townsville City
State	QLD
Postcode	4810
Country	Australia
Contact number	
Email address *(non-mandatory)*	anne.zareh@braziermotti.com.au
Mobile number *(non-mandatory)*	0416 486 309
Fax number *(non-mandatory)*	
Applicant's reference number(s) *(if applicable)*	44062-001-01

1.1) Home-based business
☐ Personal details to remain private in accordance with section 264(6) of *Planning Act 2016*

2) Owner's consent
2.1) Is written consent of the owner required for this development application?
☐ Yes – the written consent of the owner(s) is attached to this development application ☒ No – proceed to 3)

Queensland Government

PART 2 – LOCATION DETAILS

3) Location of the premises *(complete 3.1) or 3.2), and 3.3) as applicable)*

***Note**: Provide details below and attach a site plan for any or all premises part of the development application. For further information, see DA Forms Guide: Relevant plans.*

3.1) Street address and lot on plan

☒ Street address **AND** lot on plan (*all lots must be listed*), ***or***

☐ Street address **AND** lot on plan for an adjoining or adjacent property of the premises *(appropriate for development in water but adjoining or adjacent to land e.g. jetty, pontoon. All lots must be listed).*

a)	Unit No.	Street No.	Street Name and Type	Suburb
		344-346	Ross River Road	Cranbrook
	Postcode	Lot No.	Plan Type and Number *(e.g. RP, SP)*	Local Government Area(s)
	4814	1 & 2	RP721729	Townsville City Council
b)	Unit No.	Street No.	Street Name and Type	Suburb
		350	Ross River Road	Cranbrook
	Postcode	Lot No.	Plan Type and Number *(e.g. RP, SP)*	Local Government Area(s)
	4814	3	SP146326	Townsville City Council

3.2) Coordinates of premises *(appropriate for development in remote areas, over part of a lot or in water not adjoining or adjacent to land e.g. channel dredging in Moreton Bay)*

***Note**: Place each set of coordinates in a separate row.*

☐ Coordinates of premises by longitude and latitude

Longitude(s)	Latitude(s)	Datum	Local Government Area(s) *(if applicable)*
		☐ WGS84 ☐ GDA94 ☐ Other:	

☐ Coordinates of premises by easting and northing

Easting(s)	Northing(s)	Zone Ref.	Datum	Local Government Area(s) *(if applicable)*
		☐ 54 ☐ 55 ☐ 56	☐ WGS84 ☐ GDA94 ☐ Other:	

3.3) Additional premises

☐ Additional premises are relevant to this development application and the details of these premises have been attached in a schedule to this development application

☒ Not required

4) Identify any of the following that apply to the premises and provide any relevant details

☐ In or adjacent to a water body or watercourse or in or above an aquifer

Name of water body, watercourse or aquifer:

☐ On strategic port land under the *Transport Infrastructure Act 1994*

Lot on plan description of strategic port land:

Name of port authority for the lot:

☐ In a tidal area

Name of local government for the tidal area *(if applicable)*:

Name of port authority for tidal area *(if applicable)*

☐ On airport land under the *Airport Assets (Restructuring and Disposal) Act 2008*	
Name of airport:	
☐ Listed on the Environmental Management Register (EMR) under the *Environmental Protection Act 1994*	
EMR site identification:	
☐ Listed on the Contaminated Land Register (CLR) under the *Environmental Protection Act 1994*	
CLR site identification:	

5) Are there any existing easements over the premises?

Note: Easement uses vary throughout Queensland and are to be identified correctly and accurately. For further information on easements and how they may affect the proposed development, see DA Forms Guide.

☐ Yes – All easement locations, types and dimensions are included in plans submitted with this development application

☒ No

PART 3 – DEVELOPMENT DETAILS

Section 1 – Aspects of development

6.1) Provide details about the first development aspect

a) What is the type of development? *(tick only one box)*

☒ Material change of use ☐ Reconfiguring a lot ☐ Operational work ☐ Building work

b) What is the approval type? *(tick only one box)*

☒ Development permit ☐ Preliminary approval ☐ Preliminary approval that includes a variation approval

c) What is the level of assessment?

☐ Code assessment ☒ Impact assessment *(requires public notification)*

d) Provide a brief description of the proposal *(e.g. 6 unit apartment building defined as multi-unit dwelling, reconfiguration of 1 lot into 3 lots)*:

Material Change of Use for Multiple Dwelling (81 x Dwelling Units)

e) Relevant plans

***Note**: Relevant plans are required to be submitted for all aspects of this development application. For further information, see DA Forms guide: Relevant plans.*

☒ Relevant plans of the proposed development are attached to the development application

6.2) Provide details about the second development aspect

a) What is the type of development? *(tick only one box)*

☐ Material change of use ☐ Reconfiguring a lot ☐ Operational work ☐ Building work

b) What is the approval type? *(tick only one box)*

☐ Development permit ☐ Preliminary approval ☐ Preliminary approval that includes a variation approval

c) What is the level of assessment?

☐ Code assessment ☐ Impact assessment *(requires public notification)*

d) Provide a brief description of the proposal *(e.g. 6 unit apartment building defined as multi-unit dwelling, reconfiguration of 1 lot into 3 lots)*:

e) Relevant plans

***Note**: Relevant plans are required to be submitted for all aspects of this development application. For further information, see DA Forms Guide: Relevant plans.*

☐ Relevant plans of the proposed development are attached to the development application

Queensland Government

6.3) Additional aspects of development
☐ Additional aspects of development are relevant to this development application and the details for these aspects that would be required under Part 3 Section 1 of this form have been attached to this development application
☐ Not required
6.4) Is the application for State facilitated development?
☐ Yes - Has a notice of declaration been given by the Minister?
☐ No

Section 2 – Further development details

7) Does the proposed development application involve any of the following?	
Material change of use	☒ Yes – complete division 1 if assessable against a local planning instrument
Reconfiguring a lot	☐ Yes – complete division 2
Operational work	☐ Yes – complete division 3
Building work	☐ Yes – complete *DA Form 2 – Building work details*

Division 1 – Material change of use

***Note**: This division is only required to be completed if any part of the development application involves a material change of use assessable against a local planning instrument.*

8.1) Describe the proposed material change of use			
Provide a general description of the proposed use	Provide the planning scheme definition *(include each definition in a new row)*	Number of dwelling units *(if applicable)*	Gross floor area (m^2) *(if applicable)*
Multiple Dwellings	Multiple Dwelling *Premises containing three or more dwellings for separate households.*	81	

8.2) Does the proposed use involve the use of existing buildings on the premises?
☐ Yes
☒ No

8.3) Does the proposed development relate to temporary accepted development under the Planning Regulation?	
☐ Yes – provide details below or include details in a schedule to this development application	
☒ No	
Provide a general description of the temporary accepted development	Specify the stated period dates under the Planning Regulation

Division 2 – Reconfiguring a lot

***Note**: This division is only required to be completed if any part of the development application involves reconfiguring a lot.*

9.1) What is the total number of existing lots making up the premises?

9.2) What is the nature of the lot reconfiguration? *(tick all applicable boxes)*	
☐ Subdivision *(complete 10)*	☐ Dividing land into parts by agreement *(complete 11)*
☐ Boundary realignment *(complete 12)*	☐ Creating or changing an easement giving access to a lot from a constructed road *(complete 13)*

10) Subdivision				
10.1) For this development, how many lots are being created and what is the intended use of those lots:				
Intended use of lots created	Residential	Commercial	Industrial	Other, please specify:
Number of lots created				

10.2) Will the subdivision be staged?	
☐ Yes – provide additional details below ☐ No	
How many stages will the works include?	
What stage(s) will this development application apply to?	

11) Dividing land into parts by agreement – how many parts are being created and what is the intended use of the parts?				
Intended use of parts created	Residential	Commercial	Industrial	Other, please specify:
Number of parts created				

12) Boundary realignment			
12.1) What are the current and proposed areas for each lot comprising the premises?			
Current lot		Proposed lot	
Lot on plan description	Area (m^2)	Lot on plan description	Area (m^2)
12.2) What is the reason for the boundary realignment?			

13) What are the dimensions and nature of any existing easements being changed and/or any proposed easement? *(attach schedule if there are more than two easements)*				
Existing or proposed?	Width (m)	Length (m)	Purpose of the easement? *(e.g. pedestrian access)*	Identify the land/lot(s) benefitted by the easement

Division 3 – Operational work

***Note**: This division is only required to be completed if any part of the development application involves operational work.*

14.1) What is the nature of the operational work?		
☐ Road work	☐ Stormwater	☐ Water infrastructure
☐ Drainage work	☐ Earthworks	☐ Sewage infrastructure
☐ Landscaping	☐ Signage	☐ Clearing vegetation
☐ Other – please specify:		

14.2) Is the operational work necessary to facilitate the creation of new lots? *(e.g. subdivision)*	
☐ Yes – specify number of new lots:	
☐ No	

Queensland Government

14.3) What is the monetary value of the proposed operational work? *(include GST, materials and labour)*

$

PART 4 – ASSESSMENT MANAGER DETAILS

15) Identify the assessment manager(s) who will be assessing this development application

Townsville City Council

16) Has the local government agreed to apply a superseded planning scheme for this development application?

☐ Yes – a copy of the decision notice is attached to this development application
☐ The local government is taken to have agreed to the superseded planning scheme request – relevant documents attached
☒ No

PART 5 – REFERRAL DETAILS

17) Does this development application include any aspects that have any referral requirements?
***Note**: A development application will require referral if prescribed by the* Planning Regulation 2017.

☐ No, there are no referral requirements relevant to any development aspects identified in this development application – proceed to Part 6

Matters requiring referral to the **Chief Executive of the *Planning Act 2016***:

☐ Clearing native vegetation
☐ Contaminated land *(unexploded ordnance)*
☐ Environmentally relevant activities (ERA) *(only if the ERA has not been devolved to a local government)*
☐ Fisheries – aquaculture
☐ Fisheries – declared fish habitat area
☐ Fisheries – marine plants
☐ Fisheries – waterway barrier works
☐ Hazardous chemical facilities
☐ Heritage places – Queensland heritage place *(on or near a Queensland heritage place)*
☐ Infrastructure-related referrals – designated premises
☐ Infrastructure-related referrals – state transport infrastructure
☒ **Infrastructure-related referrals – State transport corridor and future State transport corridor**
☐ Infrastructure-related referrals – State-controlled transport tunnels and future state-controlled transport tunnels
☐ Infrastructure-related referrals – near a state-controlled road intersection
☐ Koala habitat in SEQ region – interfering with koala habitat in koala habitat areas outside koala priority areas
☐ Koala habitat in SEQ region – key resource areas
☐ Ports – Brisbane core port land – near a State transport corridor or future State transport corridor
☐ Ports – Brisbane core port land – environmentally relevant activity (ERA)
☐ Ports – Brisbane core port land – tidal works or work in a coastal management district
☐ Ports – Brisbane core port land – hazardous chemical facility
☐ Ports – Brisbane core port land – taking or interfering with water
☐ Ports – Brisbane core port land – referable dams
☐ Ports – Brisbane core port land – fisheries
☐ Ports – Land within Port of Brisbane's port limits *(below high-water mark)*
☐ SEQ development area
☐ SEQ regional landscape and rural production area or SEQ rural living area – tourist activity or sport and recreation activity
☐ SEQ regional landscape and rural production area or SEQ rural living area – community activity
☐ SEQ regional landscape and rural production area or SEQ rural living area – indoor recreation
☐ SEQ regional landscape and rural production area or SEQ rural living area – urban activity
☐ SEQ regional landscape and rural production area or SEQ rural living area – combined use

☐ SEQ northern inter-urban break – tourist activity or sport and recreation activity
☐ SEQ northern inter-urban break – community activity
☐ SEQ northern inter-urban break – indoor recreation
☐ SEQ northern inter-urban break – urban activity
☐ SEQ northern inter-urban break – combined use
☐ Tidal works or works in a coastal management district
☐ Reconfiguring a lot in a coastal management district or for a canal
☐ Erosion prone area in a coastal management district
☐ Urban design
☐ Water-related development – taking or interfering with water
☐ Water-related development – removing quarry material *(from a watercourse or lake)*
☐ Water-related development – referable dams
☐ Water-related development –levees *(category 3 levees only)*
☐ Wetland protection area

Matters requiring referral to the **local government:**
☐ Airport land
☐ Environmentally relevant activities (ERA) (*only if the ERA has been devolved to local government)*
☐ Heritage places – Local heritage places

Matters requiring referral to the **Chief Executive of the distribution entity or transmission entity:**
☐ Infrastructure-related referrals – Electricity infrastructure

Matters requiring referral to:
- The **Chief Executive of the holder of the licence**, if not an individual
- The **holder of the licence**, if the holder of the licence is an individual

☐ Infrastructure-related referrals – Oil and gas infrastructure

Matters requiring referral to the **Brisbane City Council:**
☐ Ports – Brisbane core port land

Matters requiring referral to the **Minister responsible for administering the *Transport Infrastructure Act 1994*:**
☐ Ports – Brisbane core port land *(where inconsistent with the Brisbane port LUP for transport reasons)*
☐ Ports – Strategic port land

Matters requiring referral to the **relevant port operator**, if applicant is not port operator**:**
☐ Ports – Land within Port of Brisbane's port limits *(below high-water mark)*

Matters requiring referral to the **Chief Executive of the relevant port authority:**
☐ Ports – Land within limits of another port *(below high-water mark)*

Matters requiring referral to the **Gold Coast Waterways Authority:**
☐ Tidal works or work in a coastal management district *(in Gold Coast waters)*

Matters requiring referral to the **Queensland Fire and Emergency Service:**
☐ Tidal works or work in a coastal management district *(involving a marina (more than six vessel berths))*

18) Has any referral agency provided a referral response for this development application?

☐ Yes – referral response(s) received and listed below are attached to this development application
☒ No

Referral requirement	Referral agency	Date of referral response

Identify and describe any changes made to the proposed development application that was the subject of the referral response and this development application, or include details in a schedule to this development application *(if applicable).*

PART 6 – INFORMATION REQUEST

19) Information request under the DA Rules

☒ I agree to receive an information request if determined necessary for this development application

☐ I do not agree to accept an information request for this development application

***Note**: By not agreeing to accept an information request I, the applicant, acknowledge:*

- *that this development application will be assessed and decided based on the information provided when making this development application and the assessment manager and any referral agencies relevant to the development application are not obligated under the DA Rules to accept any additional information provided by the applicant for the development application unless agreed to by the relevant parties*
- *Part 3 under Chapter 1 of the DA Rules will still apply if the application is an application listed under section 11.3 of the DA Rules or*
- *Part 2under Chapter 2 of the DA Rules will still apply if the application is for state facilitated development*

Further advice about information requests is contained in the DA Forms Guide.

PART 7 – FURTHER DETAILS

20) Are there any associated development applications or current approvals? *(e.g. a preliminary approval)*

☐ Yes – provide details below or include details in a schedule to this development application

☒ No

List of approval/development application references	Reference number	Date	Assessment manager
☐ Approval ☐ Development application			
☐ Approval ☐ Development application			

21) Has the portable long service leave levy been paid? *(only applicable to development applications involving building work or operational work)*

☐ Yes – a copy of the receipted QLeave form is attached to this development application

☐ No – I, the applicant will provide evidence that the portable long service leave levy has been paid before the assessment manager decides the development application. I acknowledge that the assessment manager may give a development approval only if I provide evidence that the portable long service leave levy has been paid

☒ Not applicable *(e.g. building and construction work is less than $150,000 excluding GST)*

Amount paid	Date paid (dd/mm/yy)	QLeave levy number (A, B or E)
$		

22) Is this development application in response to a show cause notice or required as a result of an enforcement notice?

☐ Yes – show cause or enforcement notice is attached

☒ No

23) Further legislative requirements

Environmentally relevant activities

23.1) Is this development application also taken to be an application for an environmental authority for an **Environmentally Relevant Activity (ERA)** under section 115 of the *Environmental Protection Act 1994*?

☐ Yes – the required attachment (form ESR/2015/1791) for an application for an environmental authority accompanies this development application, and details are provided in the table below

☒ No

***Note**: Application for an environmental authority can be found by searching "ESR/2015/1791" as a search term at www.qld.gov.au. An ERA requires an environmental authority to operate. See www.business.qld.gov.au for further information.*

Proposed ERA number:		Proposed ERA threshold:	
Proposed ERA name:			

☐ Multiple ERAs are applicable to this development application and the details have been attached in a schedule to this development application.

Hazardous chemical facilities

23.2) Is this development application for a **hazardous chemical facility**?

☐ Yes – *Form 536: Notification of a facility exceeding 10% of schedule 15 threshold* is attached to this development application

☒ No

***Note**: See www.business.qld.gov.au for further information about hazardous chemical notifications.*

Clearing native vegetation

23.3) Does this development application involve **clearing native vegetation** that requires written confirmation that the chief executive of the *Vegetation Management Act 1999* is satisfied the clearing is for a relevant purpose under section 22A of the *Vegetation Management Act 1999*?

☐ Yes – this development application includes written confirmation from the chief executive of the *Vegetation Management Act 1999* (s22A determination)

☒ No

***Note**: 1. Where a development application for operational work or material change of use requires a s22A determination and this is not included, the development application is prohibited development.*

2. See https://www.qld.gov.au/environment/land/vegetation/applying for further information on how to obtain a s22A determination.

Environmental offsets

23.4) Is this development application taken to be a prescribed activity that may have a significant residual impact on a **prescribed environmental matter** under the *Environmental Offsets Act 2014*?

☐ Yes – I acknowledge that an environmental offset must be provided for any prescribed activity assessed as having a significant residual impact on a prescribed environmental matter

☒ No

***Note**: The environmental offset section of the Queensland Government's website can be accessed at www.qld.gov.au for further information on environmental offsets.*

Koala habitat in SEQ Region

23.5) Does this development application involve a material change of use, reconfiguring a lot or operational work which is assessable development under Schedule 10, Part 10 of the Planning Regulation 2017?

☐ Yes – the development application involves premises in the koala habitat area in the koala priority area

☐ Yes – the development application involves premises in the koala habitat area outside the koala priority area

☒ No

***Note**: If a koala habitat area determination has been obtained for this premises and is current over the land, it should be provided as part of this development application. See koala habitat area guidance materials at www.desi.qld.gov.au for further information.*

Water resources

23.6) Does this development application involve **taking or interfering with underground water through an artesian or subartesian bore, taking or interfering with water in a watercourse, lake or spring, or taking overland flow water under the *Water Act 2000***?

☐ Yes – the relevant template is completed and attached to this development application and I acknowledge that a relevant authorisation or licence under the *Water Act 2000* may be required prior to commencing development

☒ No

***Note**: Contact the Department of Resources at www.resources.qld.gov.au for further information.*

*DA templates are available from planning.statedevelopment.qld.gov.au**.** If the development application involves:*

- *Taking or interfering with underground water through an artesian or subartesian bore: complete DA Form 1 Template 1*
- *Taking or interfering with water in a watercourse, lake or spring: complete DA Form1 Template 2*
- *Taking overland flow water: complete DA Form 1 Template 3.*

Waterway barrier works

23.7) Does this application involve **waterway barrier works?**

☐ Yes – the relevant template is completed and attached to this development application

☒ No

DA templates are available from planning.statedevelopment.qld.gov.au. For a development application involving waterway barrier works, complete DA Form 1 Template 4.

Marine activities

23.8) Does this development application involve **aquaculture, works within a declared fish habitat area or removal, disturbance or destruction of marine plants?**

☐ Yes – an associated *resource* allocation authority is attached to this development application, if required under the *Fisheries Act 1994*

☒ No

***Note**: See guidance materials at www.daf.qld.gov.au for further information.*

Quarry materials from a watercourse or lake

23.9) Does this development application involve the **removal of quarry materials from a watercourse or lake** under the *Water Act 2000?*

☐ Yes – I acknowledge that a quarry material allocation notice must be obtained prior to commencing development

☒ No

***Note**: Contact the Department of Resources at www.resources.qld.gov.au and www.business.qld.gov.au for further information.*

Quarry materials from land under tidal waters

23.10) Does this development application involve the **removal of quarry materials from land under tidal water** under the *Coastal Protection and Management Act 1995?*

☐ Yes – I acknowledge that a quarry material allocation notice must be obtained prior to commencing development

☒ No

***Note**: Contact the Department of Environment, Science and Innovation at www.desi.qld.gov.au for further information.*

Referable dams

23.11) Does this development application involve a **referable dam** required to be failure impact assessed under section 343 of the *Water Supply (Safety and Reliability) Act 2008* (the Water Supply Act)?

☐ Yes – the 'Notice Accepting a Failure Impact Assessment' from the chief executive administering the Water Supply Act is attached to this development application

☒ No

***Note**: See guidance materials at www.resources.qld.gov.au for further information.*

Tidal work or development within a coastal management district

23.12) Does this development application involve **tidal work or development in a coastal management district**?

☐ Yes – the following is included with this development application:

- ☐ Evidence the proposal meets the code for assessable development that is prescribed tidal work *(only required if application involves prescribed tidal work)*
- ☐ A certificate of title

☒ No

***Note**: See guidance materials at www.desi.qld.gov.au for further information.*

Queensland and local heritage places

23.13) Does this development application propose development on or adjoining a place entered in the **Queensland heritage register** or on a place entered in a local government's **Local Heritage Register**?

☐ Yes – details of the heritage place are provided in the table below

☒ No

***Note**: See guidance materials at www.desi.qld.gov.au for information requirements regarding development of Queensland heritage places.*

For a heritage place that has cultural heritage significance as a local heritage place and a Queensland heritage place, provisions are in place under the Planning Act 2016 that limit a local categorising instrument from including an assessment benchmark about the effect or impact of, development on the stated cultural heritage significance of that place. See guidance materials at www.planning.statedevelopment.qldgov.au for information regarding assessment of Queensland heritage places.

Name of the heritage place:		Place ID:	

Decision under section 62 of the *Transport Infrastructure Act 1994*

23.14) Does this development application involve new or changed access to a state-controlled road?

☐ Yes – this application will be taken to be an application for a decision under section 62 of the *Transport Infrastructure Act 1994* (subject to the conditions in section 75 of the *Transport Infrastructure Act 1994* being satisfied)

☒ No

Walkable neighbourhoods assessment benchmarks under Schedule 12A of the Planning Regulation

23.15) Does this development application involve reconfiguring a lot into 2 or more lots in certain residential zones (except rural residential zones), where at least one road is created or extended?

☐ Yes – Schedule 12A is applicable to the development application and the assessment benchmarks contained in schedule 12A have been considered

☒ No

***Note**: See guidance materials at www.planning.statedevelopment.qld.gov.au for further information.*

PART 8 – CHECKLIST AND APPLICANT DECLARATION

24) Development application checklist

I have identified the assessment manager in question 15 and all relevant referral requirement(s) in question 17 ***Note**: See the Planning Regulation 2017 for referral requirements*	☒ Yes
If building work is associated with the proposed development, Parts 4 to 6 of *DA Form 2 – Building work details* have been completed and attached to this development application	☐ Yes ☒ Not applicable
Supporting information addressing any applicable assessment benchmarks is with the development application ***Note**: This is a mandatory requirement and includes any relevant templates under question 23, a planning report and any technical reports required by the relevant categorising instruments (e.g. local government planning schemes, State Planning Policy, State Development Assessment Provisions). For further information, see DA Forms Guide: Planning Report Template.*	☒ Yes
Relevant plans of the development are attached to this development application ***Note**: Relevant plans are required to be submitted for all aspects of this development application. For further information, see DA Forms Guide: Relevant plans.*	☒ Yes
The portable long service leave levy for QLeave has been paid, or will be paid before a development permit is issued (*see 21*)	☐ Yes ☒ Not applicable

25) Applicant declaration

☒ By making this development application, I declare that all information in this development application is true and correct

☒ Where an email address is provided in Part 1 of this form, I consent to receive future electronic communications from the assessment manager and any referral agency for the development application where written information is required or permitted pursuant to sections 11 and 12 of the *Electronic Transactions Act 2001*

***Note**: It is unlawful to intentionally provide false or misleading information.*

Privacy – Personal information collected in this form will be used by the assessment manager and/or chosen assessment manager, any relevant referral agency and/or building certifier (including any professional advisers which may be engaged by those entities) while processing, assessing and deciding the development application. All information relating to this development application may be available for inspection and purchase, and/or published on the assessment manager's and/or referral agency's website.

Personal information will not be disclosed for a purpose unrelated to the *Planning Act 2016*, Planning Regulation 2017 and the DA Rules except where:

- such disclosure is in accordance with the provisions about public access to documents contained in the *Planning Act 2016* and the Planning Regulation 2017, and the access rules made under the *Planning Act 2016* and Planning Regulation 2017; or
- required by other legislation (including the *Right to Information Act 2009*); or
- otherwise required by law.

This information may be stored in relevant databases. The information collected will be retained as required by the *Public Records Act 2002.*

PART 9 – FOR COMPLETION OF THE ASSESSMENT MANAGER – FOR OFFICE USE ONLY

Date received: | Reference number(s):

Notification of engagement of alternative assessment manager	
Prescribed assessment manager	
Name of chosen assessment manager	
Date chosen assessment manager engaged	
Contact number of chosen assessment manager	
Relevant licence number(s) of chosen assessment manager	

QLeave notification and payment *Note: For completion by assessment manager if applicable*			
Description of the work			
QLeave project number			
Amount paid ($)		Date paid (dd/mm/yy)	
Date receipted form sighted by assessment manager			
Name of officer who sighted the form			

Owners consent to the making of a development application under the *Planning Act 2016*

I, Jarrod Hurst.

(Sole) Director of the company mentioned below.

and I, Jarrod Hurst

Director/Secretary of the company mentioned below.

of:

ROSS RIVER ROAD PTY LTD A.C.N. 683 554 716

as owner of the premises identified as follows:

344-346 and 350 Ross River Road, Cranbrook
Lots 1 & 2 on RP721729 and Lot 3 on SP146326

consent to the making of a development application under the *Planning Act 2016* by:

Brazier Motti Pty Ltd

on the premises described above for:

Development Application for Material Change of Use for Multiple Dwelling

Signature of (Sole) Director	Signature of Director/Secretary
15/10/2025	15/10/2025
Date	Date

APPENDIX B

Certificates of Title, Survey Plan and Smrt Map

brazier motti

Current Title Search

Queensland Titles Registry Pty Ltd
ABN 23 648 568 101

Title Reference:	**50643645**	**Search Date:**	14/10/2025 12:26
Date Title Created:	02/01/2007	**Request No:**	53707871
Previous Title:	20747131, 20747132		

ESTATE AND LAND

Estate in Fee Simple

LOT 1 REGISTERED PLAN 721729
Local Government: TOWNSVILLE

REGISTERED OWNER

Dealing No: 724348138 16/09/2025

ROSS RIVER ROAD PTY LTD A.C.N. 683 554 716

EASEMENTS, ENCUMBRANCES AND INTERESTS

1. Rights and interests reserved to the Crown by
Deed of Grant No. 10287009 (POR 38)
2. MORTGAGE No 724348139 16/09/2025 at 14:24
NATIONAL AUSTRALIA BANK LIMITED A.C.N. 004 044 937
3. MORTGAGE No 724407113 10/10/2025 at 15:18
THE STATE OF QUEENSLAND (REPRESENTED BY DEPARTMENT OF HOUSING AND PUBLIC WORKS)

ADMINISTRATIVE ADVICES

NIL

UNREGISTERED DEALINGS

NIL

Caution - Charges do not necessarily appear in order of priority

** End of Current Title Search **

Requested by: D-ENQ DYE & DURHAM (S)

Current Title Search

Queensland Titles Registry Pty Ltd
ABN 23 648 568 101

Title Reference:	**50306200**	**Search Date:**	14/10/2025 12:27
Date Title Created:	31/03/2000	**Request No:**	53707894
Previous Title:	20748102, 20748103		

ESTATE AND LAND

Estate in Fee Simple

LOT 2 REGISTERED PLAN 721729
Local Government: TOWNSVILLE

REGISTERED OWNER

Dealing No: 724348138 16/09/2025

ROSS RIVER ROAD PTY LTD A.C.N. 683 554 716

EASEMENTS, ENCUMBRANCES AND INTERESTS

1. Rights and interests reserved to the Crown by
Deed of Grant No. 10287009 (POR 38)
2. MORTGAGE No 724348139 16/09/2025 at 14:24
NATIONAL AUSTRALIA BANK LIMITED A.C.N. 004 044 937
3. MORTGAGE No 724407113 10/10/2025 at 15:18
THE STATE OF QUEENSLAND (REPRESENTED BY DEPARTMENT OF HOUSING AND PUBLIC WORKS)

ADMINISTRATIVE ADVICES

NIL

UNREGISTERED DEALINGS

NIL

Caution - Charges do not necessarily appear in order of priority

** End of Current Title Search **

Requested by: D-ENQ DYE & DURHAM (S)

Current Title Search

Queensland Titles Registry Pty Ltd
ABN 23 648 568 101

Title Reference:	**50385696**	**Search Date:**	14/10/2025 12:27
Date Title Created:	07/03/2002	**Request No:**	53707905
Previous Title:	21335185, 21335186		

ESTATE AND LAND

Estate in Fee Simple

LOT 3 SURVEY PLAN 146326
Local Government: TOWNSVILLE

REGISTERED OWNER

Dealing No: 724348123 16/09/2025

ROSS RIVER ROAD PTY LTD A.C.N. 683 554 716

EASEMENTS, ENCUMBRANCES AND INTERESTS

1. Rights and interests reserved to the Crown by
Deed of Grant No. 10287009 (POR 38)
2. MORTGAGE No 724348124 16/09/2025 at 14:24
NATIONAL AUSTRALIA BANK LIMITED A.C.N. 004 044 937
3. MORTGAGE No 724407113 10/10/2025 at 15:18
THE STATE OF QUEENSLAND (REPRESENTED BY DEPARTMENT OF HOUSING AND PUBLIC WORKS)

ADMINISTRATIVE ADVICES

NIL

UNREGISTERED DEALINGS

NIL

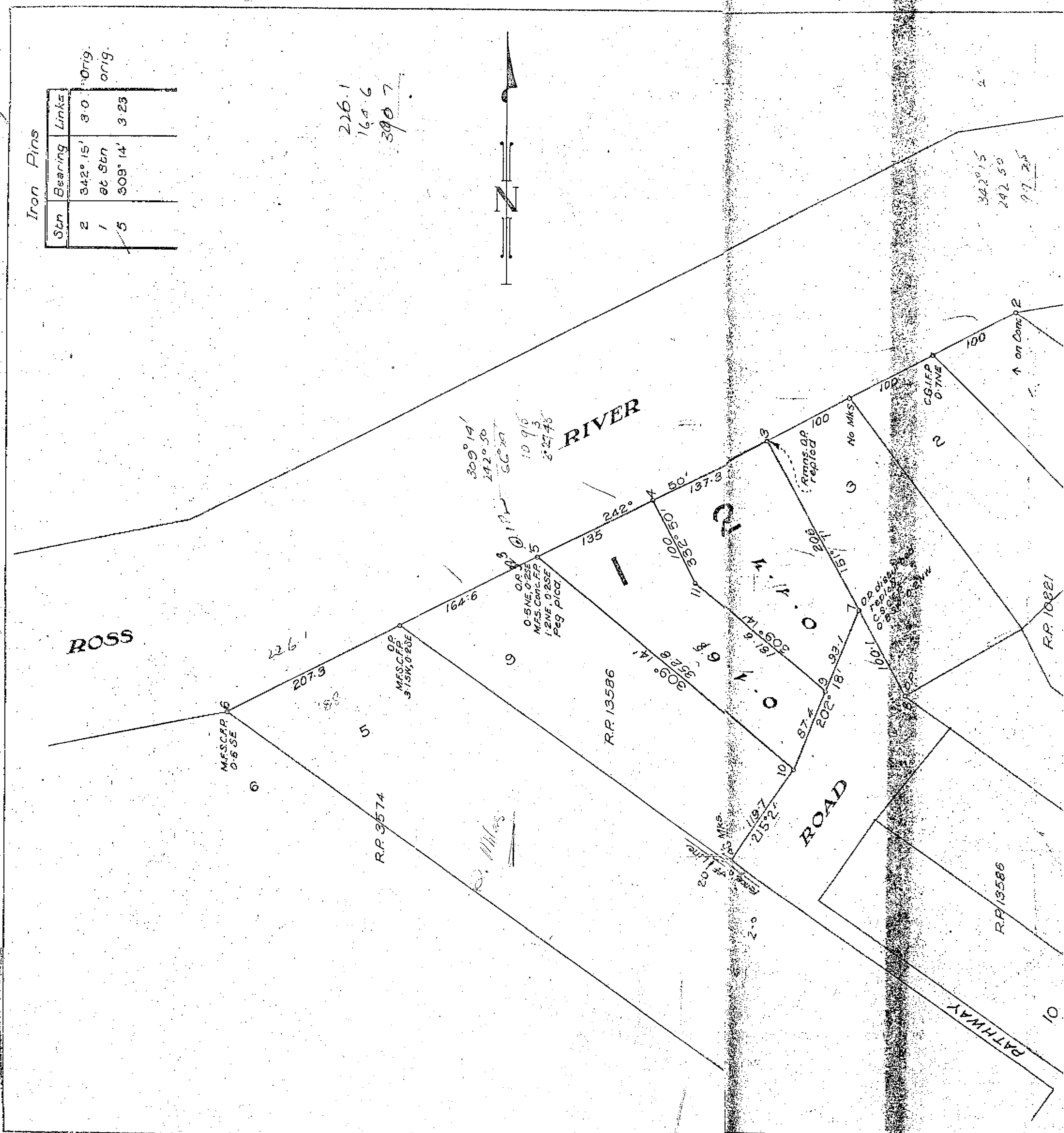
Caution - Charges do not necessarily appear in order of priority

** End of Current Title Search **

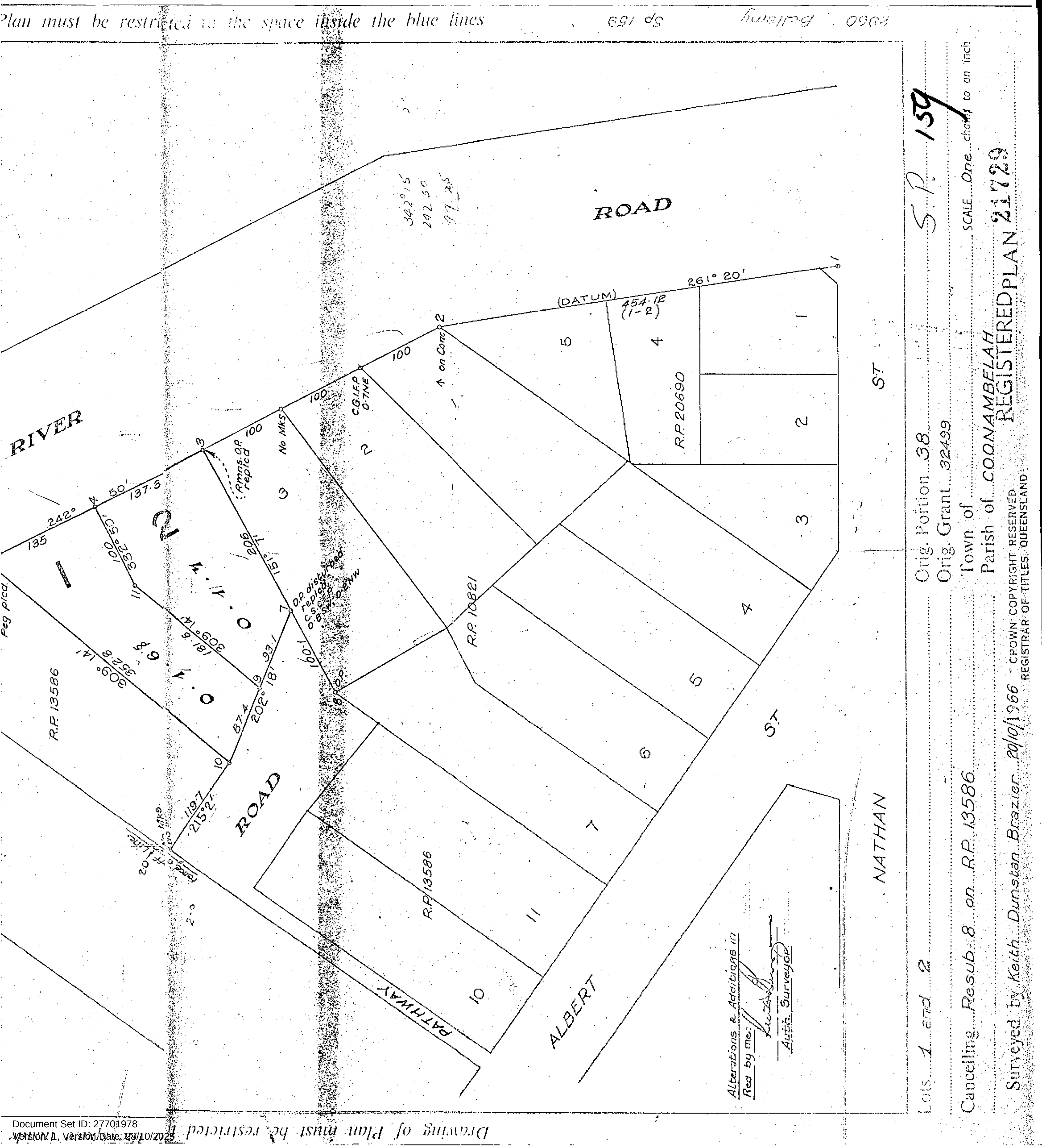
Requested by: D-ENQ DYE & DURHAM (S)

Drawing of Plan must be restricted to the space inside the blue lines

This plan MUST NOT BE FOLDED but may be rolled.



Drawing of Plan must be restricted to the space inside the blue lines



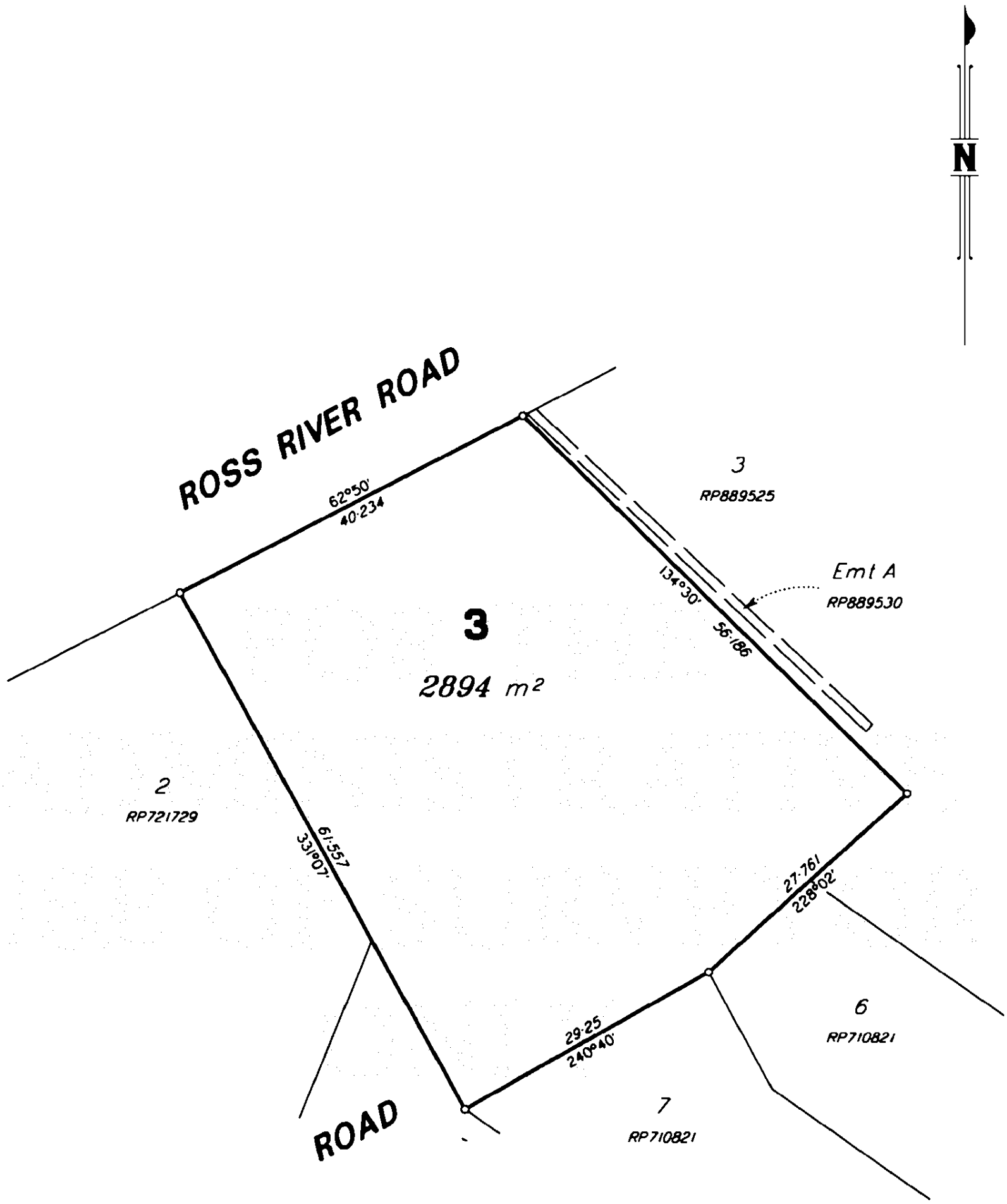
Plan must be restricted to the space inside the blue lines
Drawing of Plan must be restricted
Lots 1 and 2
Orig. Portion 38
Orig. Grant 32499
Town of
Parish of COONAMBELAH
REGISTERED PLAN 21729
S.P. 159
SCALE One chain to an inch
Cancelling Resub. 8 on R.P. 13586
Surveyed by Keith Dunstan Brazier 20/10/1966
CROWN COPYRIGHT RESERVED
REGISTRAR OF TITLES, QUEENSLAND
Alterations & Additions in Red by me:
Auth. Surveyor
RIVER
ROAD
NATHAN ST
ALBERT ST
PATHWAY
R.P. 13586
R.P. 10821
R.P. 20690
(DATUM)
261° 20'
454.12 (1-2)
242° 50'
137.3
135
100° 50'
332°
309° 14'
181.6
352.6
202° 18'
93.1
87.4
151° 1'
206
215° 2'
119.7
C.G.I.F.P. 0.7NE
No Mks
Rmns. O.P. replcd
O.P. disturbed replcd
on Conc
Peg plcd

81916_01/CMG

Land Title Act 1994 ; Land Act 1994
Form 21 Version 2

SURVEY PLAN

Sheet 1 of 1



Scale 1:500 – Lengths are in Metres.

5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70

0 50 mm 100 mm 150 mm

C&B CONSULTANTS PTY LTD ACN 055 931 096 hereby certify that the Company has made this plan pursuant to Section 25 of the Surveyors Regulation 1992, and that the plan is accurate, and compiled from RP710821 in the Department of Natural Resources.

C & B CONSULTANTS PTY LTD A.C.N. 055 931 096 THE COMMON SEAL OF

Stephen James REDGWELL
Director and Licensed Surveyor

Director

25.02.02
Date

Plan of

Lot 3

Cancelling Lots 2 & 3 on RP710821

PARISH: **COONAMBELAH** COUNTY: **Elphinstone**

Meridion: *RP710821*

F/N's: *No*

Scale: *1:500*

Format: STANDARD

SP146326

Plan Status:

705446769

$259.90
05/03/2002 11:01

TE 400 NT

**WARNING : Folded or Mutilated Plans will not be accepted.
Plans may be rolled.
Information may not be placed in the outer margins.**

Registered

5. Lodged by
H S Ferguson
34 Rood River Rd
Cranbrook

(Include address, phone number, reference, and Lodger Code)

1. Certificate of Registered Owners or Lessees.

I/We HAROLD STIRLING FERGUSON

(Names in full)

*as Registered Owners of this land agree to this plan and dedicate the Public Use Land as shown hereon in accordance with Section 50 of the Land Title Act 1994.

~~*as Lessees of this land agree to this plan.~~

H S Ferguson.

Signature of *Registered Owners ~~*Lessees~~

* Rule out whichever is inapplicable

2. Local Government Approval.

*

hereby approves this plan in accordance with the :

%

Dated this day of

#

#

* Insert the name of the Local Government. % Insert Integrated Planning Act 1997 or
# Insert designation of signatory or delegation Local Government (Planning & Environment) Act 1990

3. Plans with Community Management Statement :

CMS Number :

Name :

4. References :

Dept File :

Local Govt :

Surveyor : 81916

6. Existing			Created		
Title Reference	Lot	Plan	Lots	Emts	Road
21335186	2	RP710821	3	———	———
21335185	3	RP710821	3	———	———
POR 38			3		
Orig			Lots		

7. Portion Allocation :

8. Map Reference :
8259-24433

9. Locality :
Cranbrook

10. Local Government :
TOWNSVILLE C.C.

11. Passed & Endorsed :

By : C&B CONSULTANTS PTY LTD
Date : 27.02.02
Signed :
Designation : LICENSED SURVEYOR

12. Building Format Plans only.

I certify that :

* As far as it is practical to determine, no part of the building shown on this plan encroaches onto adjoining lots or road,

* Part of the building shown on this plan encroaches onto adjoining * lots and road

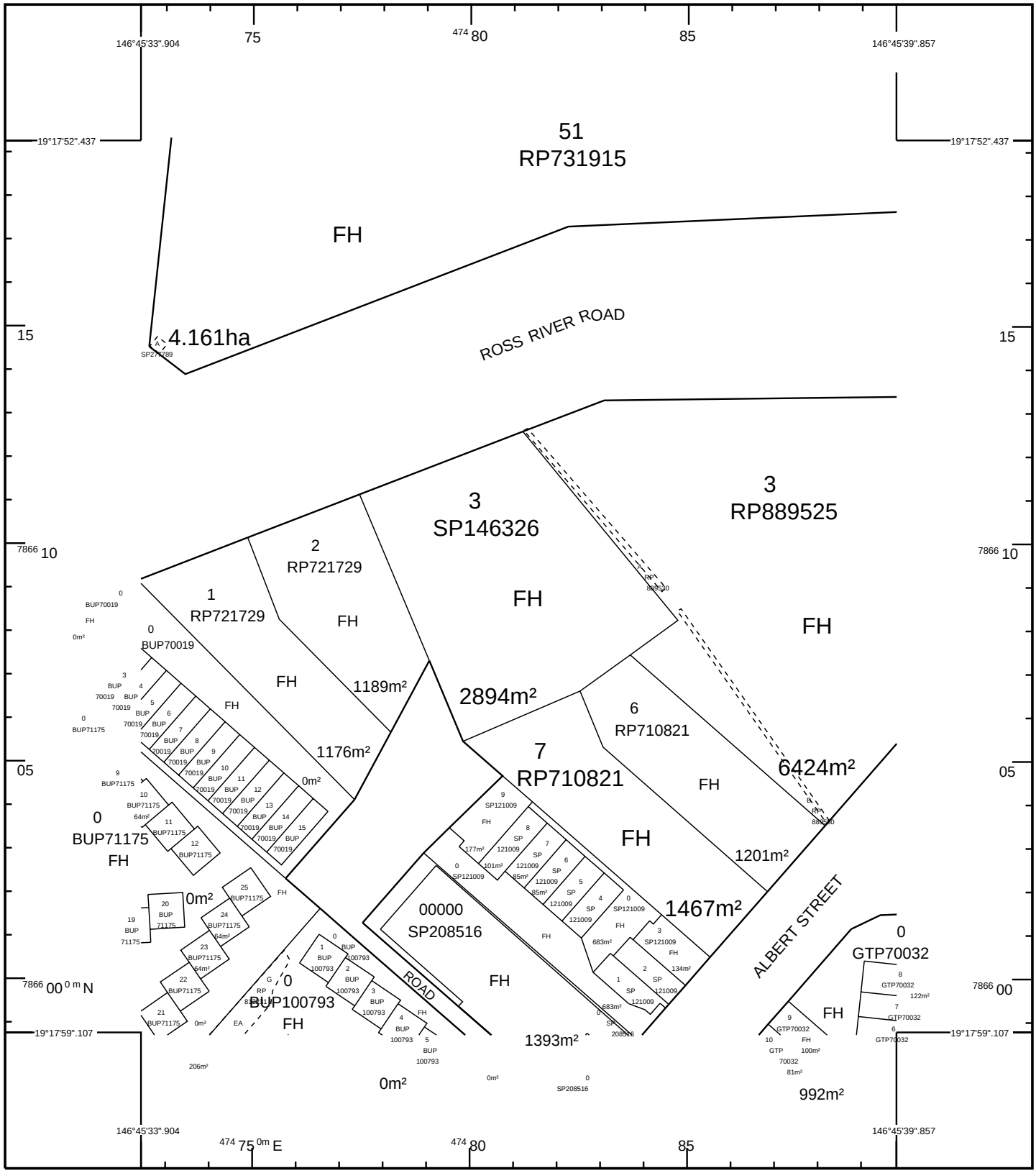
Licensed Surveyor/Director * Date

*delete words not required

13. Lodgement Fees :

Survey Deposit	$
Lodgement	$
New Titles	$
Photocopy	$
Postage	$
TOTAL	$

14. Insert Plan Number **SP146326**



STANDARD MAP NUMBER
8259-24433

0 25 50 75 100 125 m

HORIZONTAL DATUM:GDA94 ZONE:55 SCALE 1 : 1250

SmartMap

An External Product of
SmartMap Information Services

Based upon an extraction from the
Digital Cadastral Data Base

MAP WINDOW POSITION &
NEAREST LOCATION

146°45'36".881
19°17'55".772
HEATLEY
0.99 KM

SUBJECT PARCEL DESCRIPTION

DCDB

Lot/Plan	3/SP146326
Area/Volume	2894m²
Tenure	FREEHOLD
Local Government	TOWNSVILLE CITY
Locality	CRANBROOK
Segment/Parcel	50253/24

CLIENT SERVICE STANDARDS

PRINTED 14/10/2025

DCDB 13/10/2025

Users of the information recorded in this document (the Information) accept all responsibility and risk associated with the use of the Information and should seek independent professional advice in relation to dealings with property.

Despite Department of Resources best efforts, RESOURCES makes no representations or warranties in relation to the Information, and, to the extent permitted by law, exclude or limit all warranties relating to correctness, accuracy, reliability, completeness or currency and all liability for any direct, indirect and consequential costs, losses, damages and expenses incurred in any way (including but not limited to that arising from negligence) in connection with any use of or reliance on the Information

For further information on SmartMap products visit
https://www.qld.gov.au/housing/buying-owning-home/property-land-valuations/smartmaps

GDA

Queensland Government

APPENDIX C

Concept Design Plans prepared by Counterpoint

brazier motti

COUNTERPOINT

ROSS RIVER ROAD RESIDENTIAL

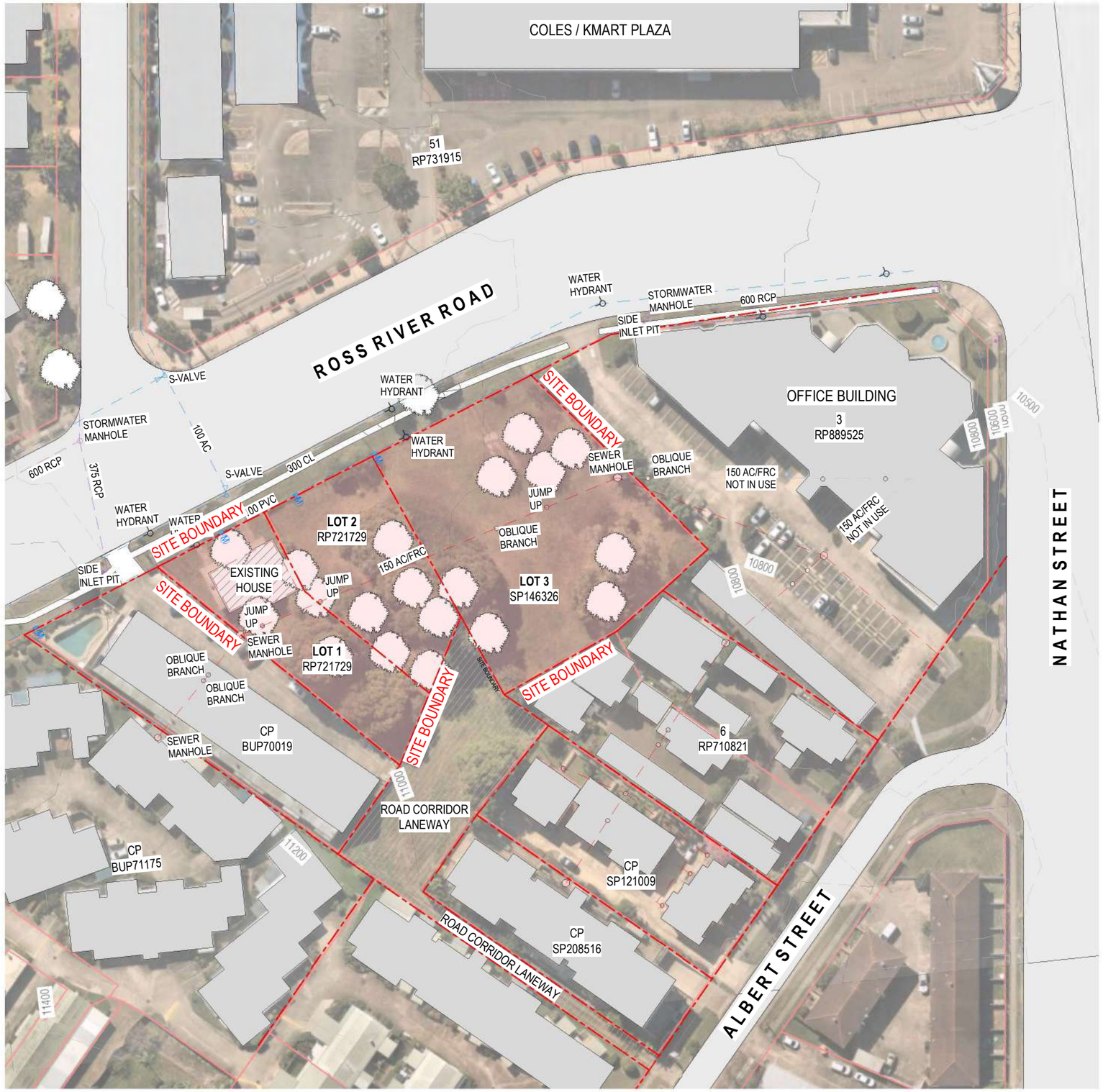
344/346 & 350 ROSS RIVER RD
CRANBROOK, QLD, 4814

VIEW FROM ROSS RIVER ROAD

DRAWING LIST		
SHEET NUMBER	SHEET NAME	REVISION
DA-00	COVER SHEET	P7
DA-10	EXISTING SITE PLAN	P7
DA-11	DEMOLITION SITE PLAN	P7
DA-15	PROPOSED SITE PLAN	P7
DA-20	PROPOSED FLOOR PLAN - GROUND	P7
DA-21	PROPOSED FLOOR PLAN -LEVEL 1	P7
DA-22	PROPOSED FLOOR PLAN - LEVEL 2	P7
DA-23	PROPOSED FLOOR PLAN - LEVEL 3	P7
DA-24	PROPOSED FLOOR PLAN - LEVEL 4	P7

DRAWING LIST		
SHEET NUMBER	SHEET NAME	REVISION
DA-25	PROPOSED ROOF PLAN	P7
DA-30	EXTERNAL WORKS - PART A	P7
DA-31	EXTERNAL WORKS - PART B	P7
DA-32	EXTERNAL WORKS - PART C	P7
DA-40	SITE ELEVATIONS - SHEET 01	P7
DA-41	SITE ELEVATIONS - SHEET 02	P7
DA-45	BUILDING ELEVATIONS - SHEET 01	P7
DA-46	BUILDING ELEVATIONS - SHEET 02	P7
DA-47	BUILDING ELEVATIONS - SHEET 03	P7

DRAWING LIST		
SHEET NUMBER	SHEET NAME	REVISION
DA-50	SECTION - SHEET 01	P7
DA-51	SECTION - SHEET 02	P7
DA-60	PERSPECTIVE - SHEET 01	P7
DA-61	PERSPECTIVE - SHEET 02	P7
DA-62	PERSPECTIVE - SHEET 03	P7
DA-63	PERSPECTIVE - SHEET 04	P7
DA-64	MATERIALITY	P7



1 **EXISTING SITE PLAN**
DA-40 SCALE 1 : 1000

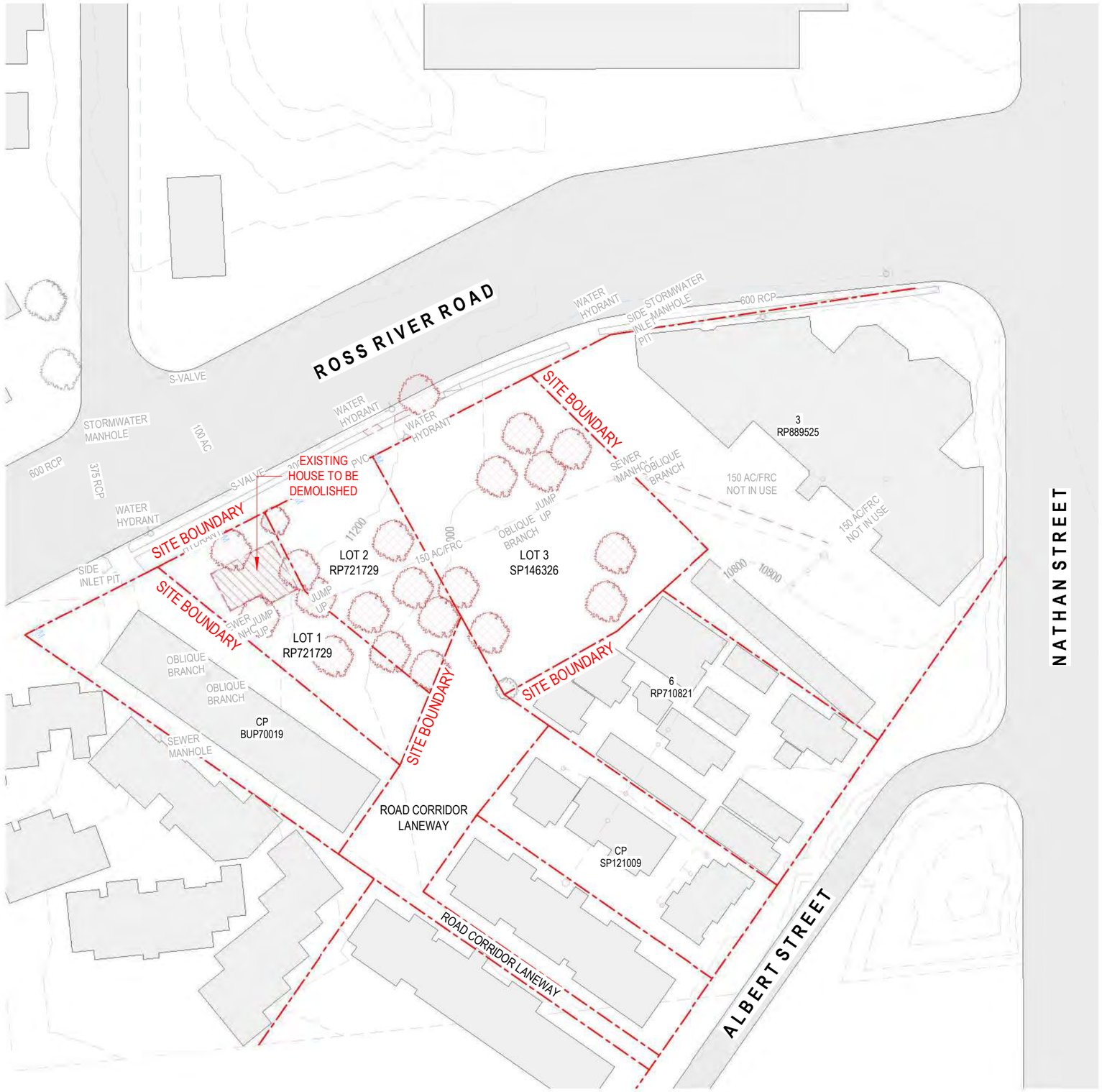
NOTE:
LOCATION OF LEVELS, BOUNDARIES, SERVICES TO BE CONFIRMED BY SURVEYOR

PROJECT	CLIENT DETAILS	TITLE	PROJECT NO.	DATE	DRAWING No.	ISSUE
ROSS RIVER ROAD RESIDENTIAL **344/346 & 350 ROSS RIVER RD** **CRANBROOK, QLD, 4814**	**HURST CONSTRUCTIONS**	**EXISTING SITE PLAN**	**25869**	**10.10.25**	**DA-10**	**P7**

N

COUNTERPOINT

10/10/2025 16:23:08



TO BE DEMOLISHED

1 **EXISTING/DEMO SITE PLAN**
DA-40 SCALE 1 : 1000

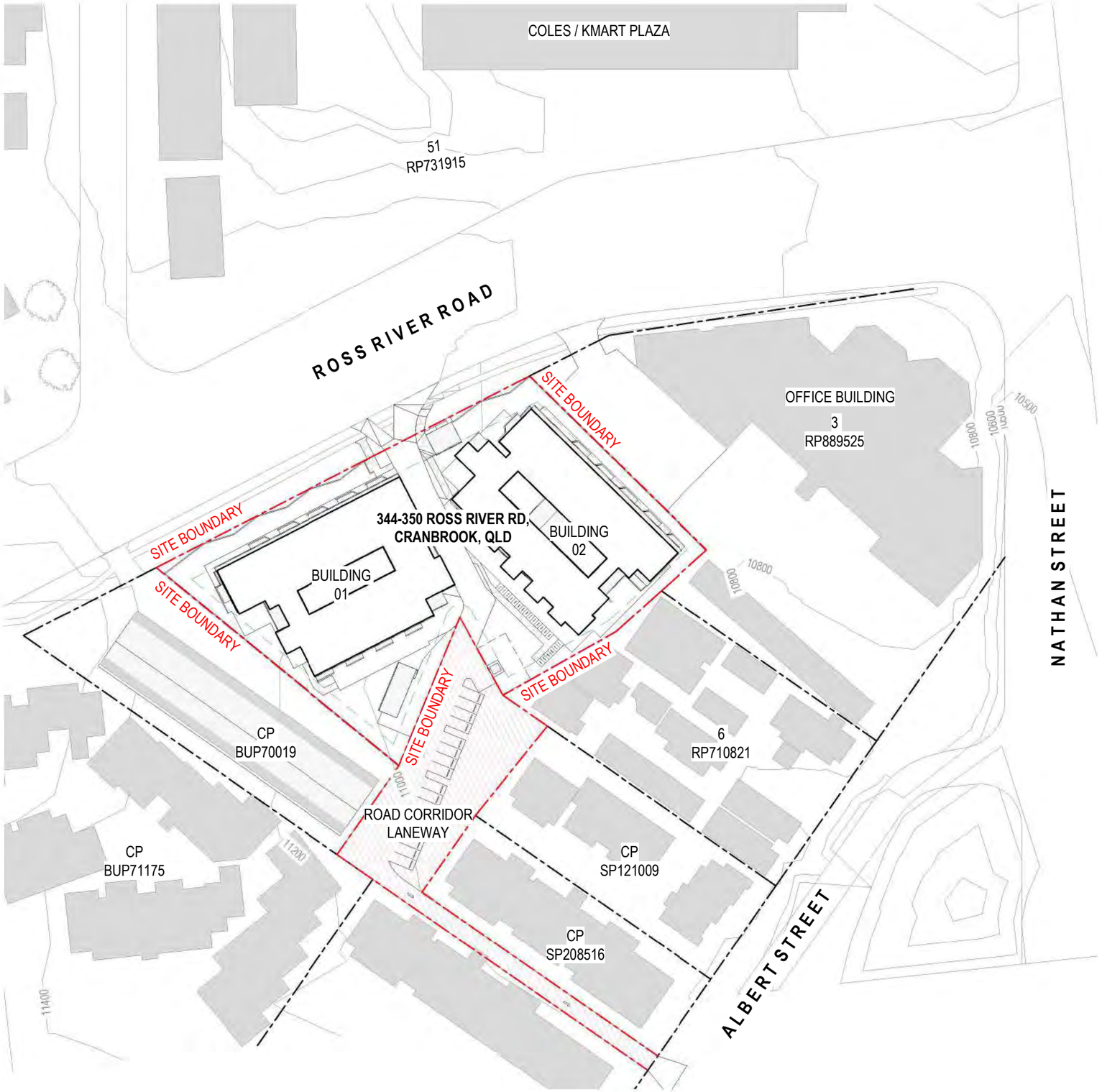
NOTE:
LOCATION OF LEVELS, BOUNDARIES, SERVICES, AND EXISTING BUILDING TO BE CONFIRMED BY SURVEYOR

PROJECT	CLIENT DETAILS	TITLE	PROJECT NO.	DATE	DRAWING No.	ISSUE
ROSS RIVER ROAD RESIDENTIAL **344/346 & 350 ROSS RIVER RD** **CRANBROOK, QLD, 4814**	**HURST CONSTRUCTIONS**	**DEMOLITION SITE PLAN**	**25869**	**10.10.25**	**DA-11**	**P7**

N

COUNTERPOINT

10/10/2025 16:23:22



BUILDING CLASS 2
TYPE A CONSTRUCTION

1 PROPOSED SITE PLAN
DA-40 SCALE 1 : 1000

NOTE:
LOCATION OF LEVELS, BOUNDARIES, SERVICES TO BE CONFIRMED BY SURVEYOR

PROJECT	CLIENT DETAILS	TITLE	PROJECT NO.	DATE	DRAWING No.	ISSUE
ROSS RIVER ROAD RESIDENTIAL **344/346 & 350 ROSS RIVER RD** **CRANBROOK, QLD, 4814**	**HURST CONSTRUCTIONS**	**PROPOSED SITE PLAN**	**25869**	**10.10.25**	**DA-15**	**P7**

N

COUNTERPOINT

10/10/2025 16:23:35

ROSS RIVER ROAD

ENTRY

SCALE BAR 1:300

KEYNOTE LEGEND	
SWT	STORMWATER DETENTION TANK

SITE BOUNDARY

LINE OF SETBACK

LINE OF BUILDING ABOVE

OFFICE 11.500

51 CAR PARKS 11.350

BIN

LIFT

BLDG 1 11.450

SWT

MAIL

BOOSTER

50K LITRE FIRE TANK

FIRE PUMP ROOM

OPEN ABOVE 11.450

BLDG 2

60 CAR PARKS (3 TANDEM) 11.350

TANDEM

LINE OF BUILDING ABOVE

BICYCLE PARKING

CP BUP70019

ABOVE GROUND 1500 LITRE OIL WATER SEPARATOR

BELOW GROUND PRECAST TRADEWASTE HOLDING TANK WITH 600 X 600 ACCESS

BIN STORE

BIN COLLECTION AREA

WASH BAY

LANEWAY ACCESS VISITOR PARKING

SERVICE ROAD

PAD MOUNT

CAR PARK SUMMARY	DEPARTMENT OF HOUSING
USER CLASS 1A	1 COVERED / DWELLING
126 CAR PARKS	TOTAL
110 RESIDENCE	24
16 VISITORS (OFF SITE)	

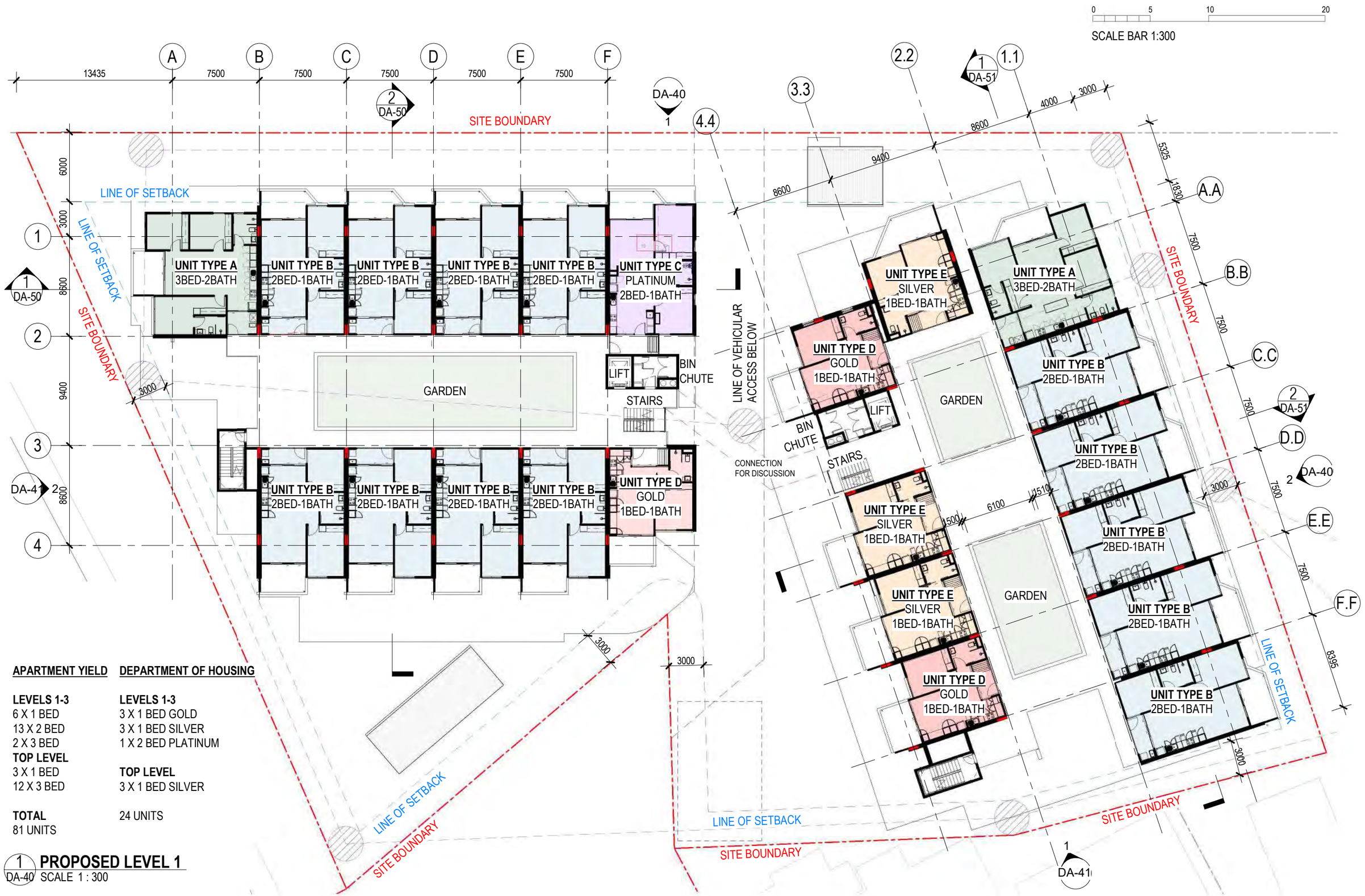
1 PROPOSED GROUND PLAN

DA-40 SCALE 1 : 300

PROJECT	CLIENT DETAILS	TITLE	PROJECT NO.	DATE	DRAWING No.	ISSUE
ROSS RIVER ROAD RESIDENTIAL **344/346 & 350 ROSS RIVER RD** **CRANBROOK, QLD, 4814**	**HURST CONSTRUCTIONS**	**PROPOSED FLOOR PLAN - GROUND**	**25869**	**10.10.25**	**DA-20**	**P7**

COUNTERPOINT

10/10/2025 16:23:41



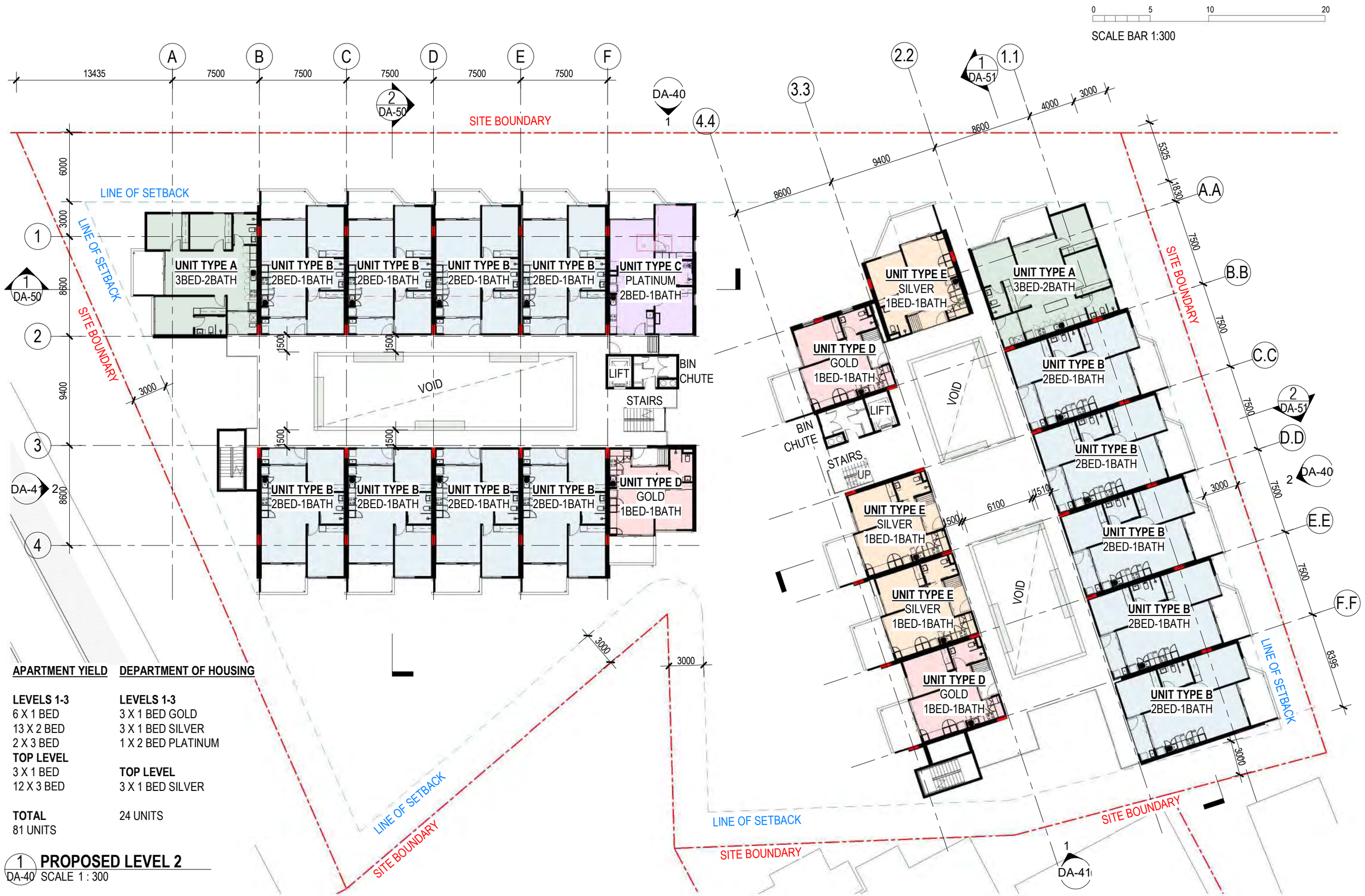
APARTMENT YIELD	DEPARTMENT OF HOUSING
LEVELS 1-3	**LEVELS 1-3**
6 X 1 BED	3 X 1 BED GOLD
13 X 2 BED	3 X 1 BED SILVER
2 X 3 BED	1 X 2 BED PLATINUM
TOP LEVEL	
3 X 1 BED	**TOP LEVEL**
12 X 3 BED	3 X 1 BED SILVER
TOTAL	24 UNITS
81 UNITS	

1 PROPOSED LEVEL 1
DA-40 SCALE 1 : 300

PROJECT	CLIENT DETAILS	TITLE	PROJECT NO.	DATE	DRAWING No.	ISSUE
ROSS RIVER ROAD RESIDENTIAL **344/346 & 350 ROSS RIVER RD** **CRANBROOK, QLD, 4814**	**HURST CONSTRUCTIONS**	**PROPOSED FLOOR PLAN -LEVEL 1**	**25869**	**10.10.25**	**DA-21**	**P7**

COUNTERPOINT

10/10/2025 16:24:08



APARTMENT YIELD	DEPARTMENT OF HOUSING
LEVELS 1-3	**LEVELS 1-3**
6 X 1 BED	3 X 1 BED GOLD
13 X 2 BED	3 X 1 BED SILVER
2 X 3 BED	1 X 2 BED PLATINUM
TOP LEVEL	
3 X 1 BED	**TOP LEVEL**
12 X 3 BED	3 X 1 BED SILVER
TOTAL	24 UNITS
81 UNITS	

1 PROPOSED LEVEL 2

DA-40 SCALE 1 : 300

PROJECT	CLIENT DETAILS	TITLE	PROJECT NO.	DATE	DRAWING No.	ISSUE
ROSS RIVER ROAD RESIDENTIAL **344/346 & 350 ROSS RIVER RD** **CRANBROOK, QLD, 4814**	**HURST CONSTRUCTIONS**	**PROPOSED FLOOR PLAN - LEVEL 2**	**25869**	**10.10.25**	**DA-22**	**P7**

COUNTERPOINT

10/10/2025 16:24:43

APARTMENT YIELD	DEPARTMENT OF HOUSING
LEVELS 1-3	**LEVELS 1-3**
6 X 1 BED	3 X 1 BED GOLD
13 X 2 BED	3 X 1 BED SILVER
2 X 3 BED	1 X 2 BED PLATINUM
TOP LEVEL	
3 X 1 BED	**TOP LEVEL**
12 X 3 BED	3 X 1 BED SILVER
TOTAL	24 UNITS
81 UNITS	

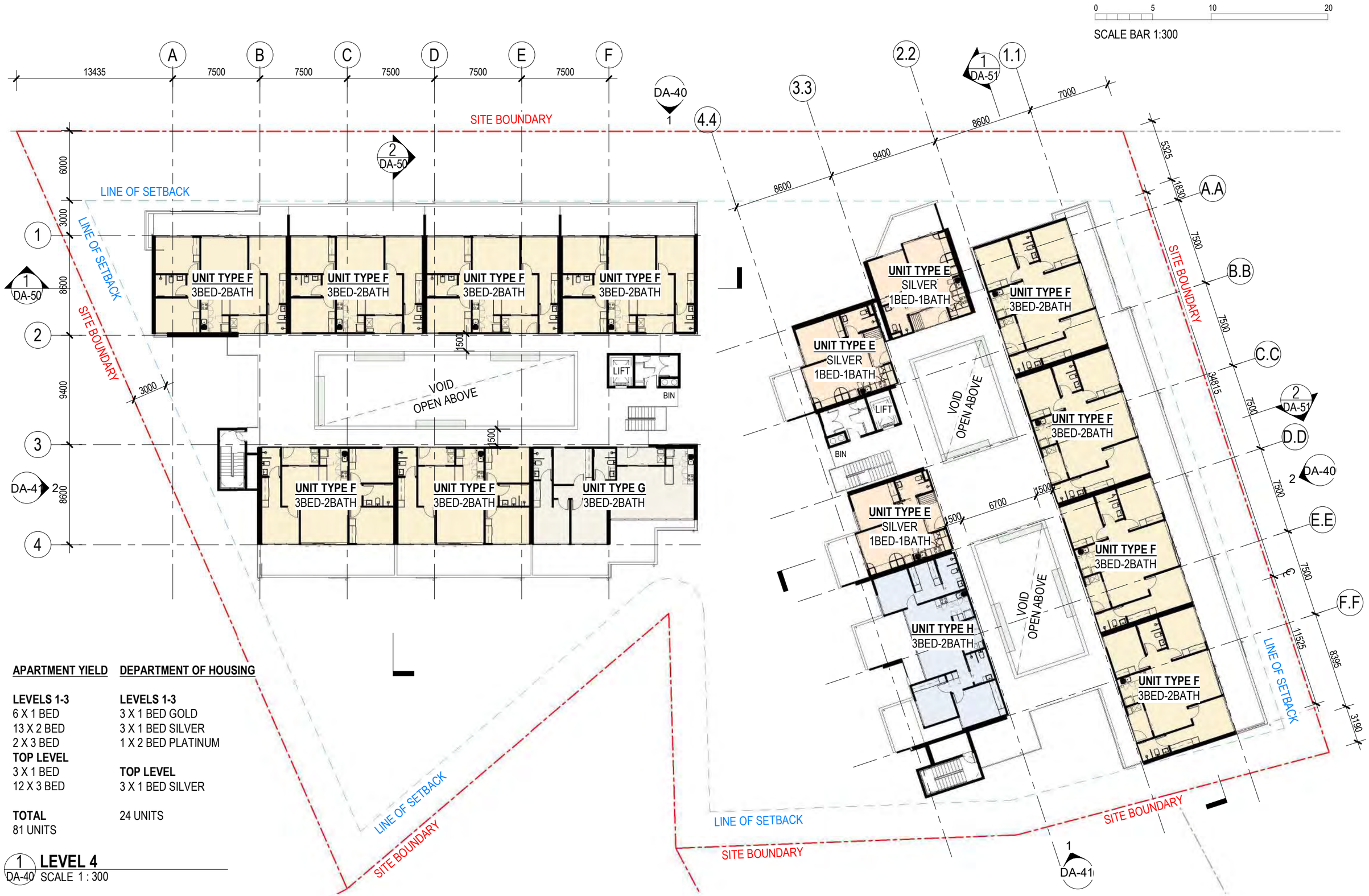
1 PROPOSED LEVEL 3

DA-40 SCALE 1 : 300

PROJECT	CLIENT DETAILS	TITLE	PROJECT NO.	DATE	DRAWING No.	ISSUE
ROSS RIVER ROAD RESIDENTIAL **344/346 & 350 ROSS RIVER RD** **CRANBROOK, QLD, 4814**	**HURST CONSTRUCTIONS**	**PROPOSED FLOOR PLAN - LEVEL 3**	**25869**	**10.10.25**	**DA-23**	**P7**

COUNTERPOINT

10/10/2025 16:25:06



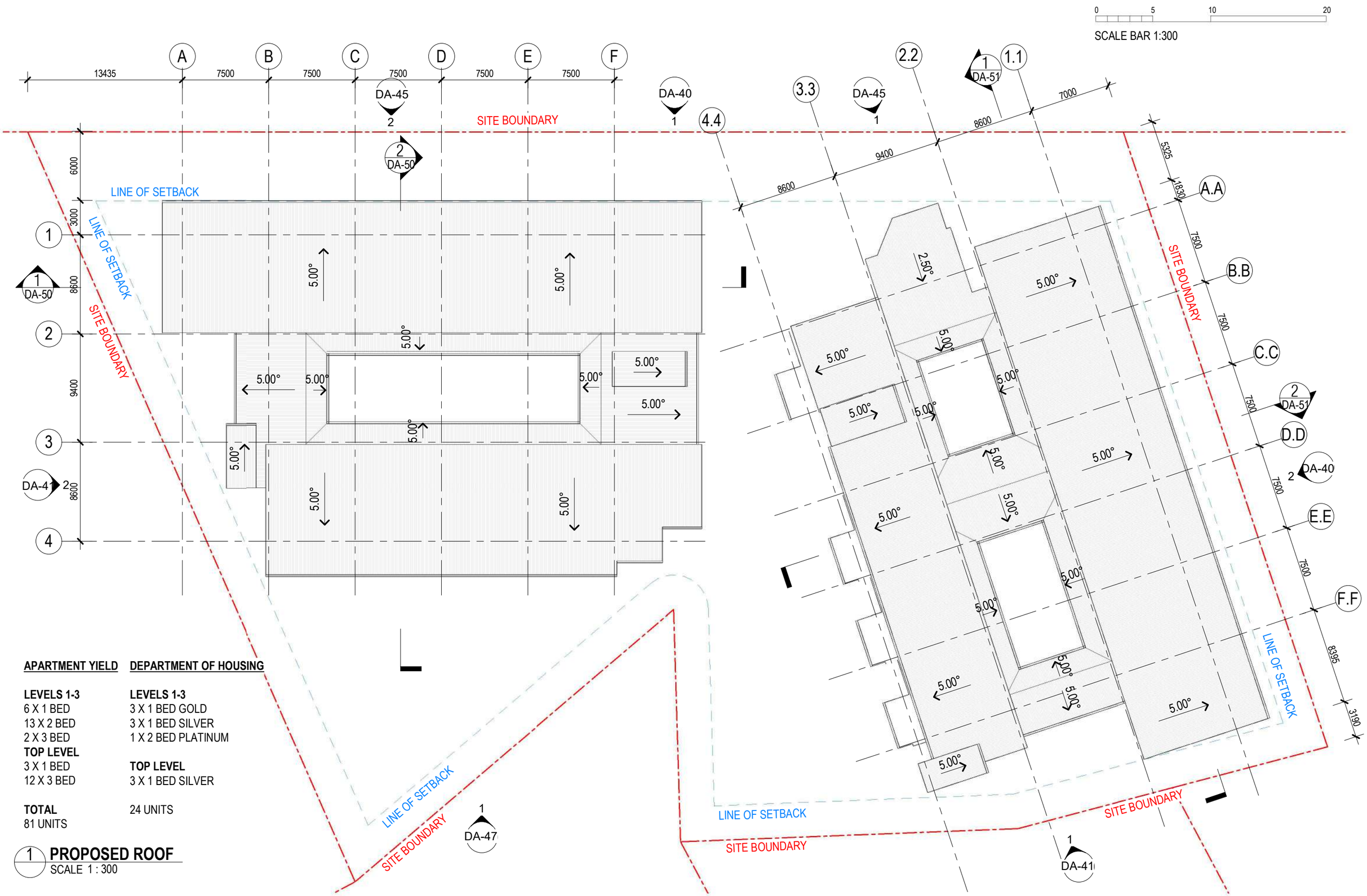
APARTMENT YIELD	DEPARTMENT OF HOUSING
LEVELS 1-3	**LEVELS 1-3**
6 X 1 BED	3 X 1 BED GOLD
13 X 2 BED	3 X 1 BED SILVER
2 X 3 BED	1 X 2 BED PLATINUM
TOP LEVEL	
3 X 1 BED	**TOP LEVEL**
12 X 3 BED	3 X 1 BED SILVER
TOTAL	24 UNITS
81 UNITS	

1 LEVEL 4
DA-40 SCALE 1 : 300

PROJECT	CLIENT DETAILS	TITLE	PROJECT NO.	DATE	DRAWING No.	ISSUE
ROSS RIVER ROAD RESIDENTIAL **344/346 & 350 ROSS RIVER RD** **CRANBROOK, QLD, 4814**	**HURST CONSTRUCTIONS**	**PROPOSED FLOOR PLAN - LEVEL 4**	**25869**	**10.10.25**	**DA-24**	**P7**

COUNTERPOINT

10/10/2025 16:25:41



APARTMENT YIELD

LEVELS 1-3
6 X 1 BED
13 X 2 BED
2 X 3 BED

TOP LEVEL
3 X 1 BED
12 X 3 BED

TOTAL
81 UNITS

DEPARTMENT OF HOUSING

LEVELS 1-3
3 X 1 BED GOLD
3 X 1 BED SILVER
1 X 2 BED PLATINUM

TOP LEVEL
3 X 1 BED SILVER

24 UNITS

1 PROPOSED ROOF
SCALE 1 : 300

PROJECT	CLIENT DETAILS	TITLE	PROJECT NO.	DATE	DRAWING No.	ISSUE
ROSS RIVER ROAD RESIDENTIAL **344/346 & 350 ROSS RIVER RD** **CRANBROOK, QLD, 4814**	**HURST CONSTRUCTIONS**	**PROPOSED ROOF PLAN**	**25869**	**10.10.25**	**DA-25**	**P7**

COUNTERPOINT

10/10/2025 16:26:01

ROSS RIVER ROAD

SCALE BAR 1:300 (0, 5, 10, 20)

KEYNOTE LEGEND	
SWT	STORMWATER DETENTION TANK

EXISTING PATH

NEW FRONT FENCE

SITE BOUNDARY

6000

LINE OF SETBACK

SWT

MAIL

STEP RAMP

BUILDING 01

LIFT

BIN CHUTE

STAIRS

BOOSTER FIRE PUMP ROOM

LAWN

5325

BUILDING 02

11.450

BICYCLE PARKING

CP BUP70019

BELOW GROUND PRECAST TRADEWASTE HOLDING TANK WITH 600 X 600 ACCESS

ABOVE GROUND 1500 LITRE OIL WATER SEPARATOR

BIN STORE

BIN COLLECTION AREA

WASH BAY

3000

LANEWAY ACCESS VISITOR PARKING

SERVICE ROAD

PAD MOUNT

EXISTING TREE

VISITOR PARKING

BICYCLE PARKING

LAWN	
GARDEN	
CONCRETE/PAVERS	
GRAVEL	ABOVE GROUND 1500 LITRE OIL WATER SEPARATOR

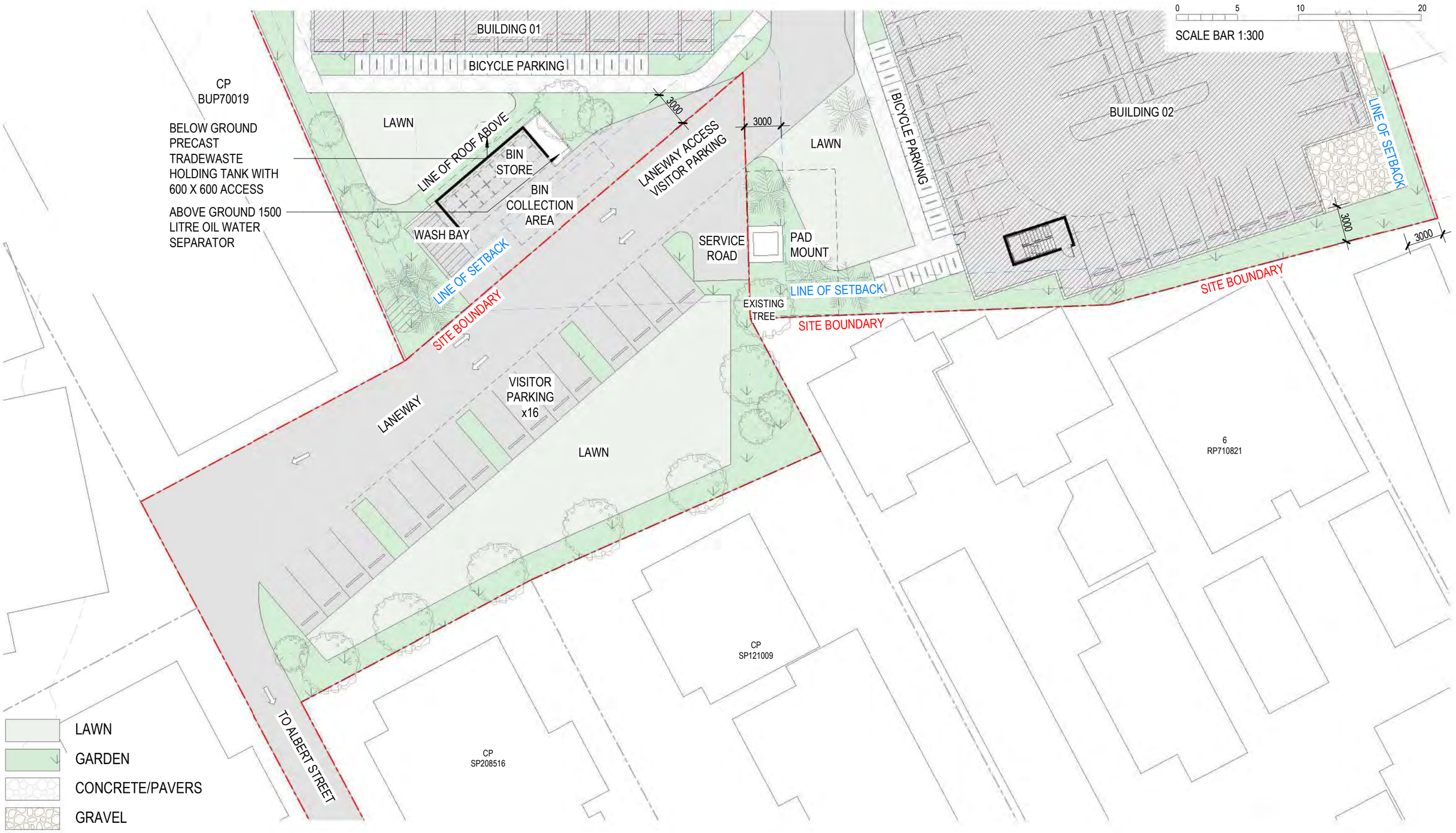
1 DA-40 **EXTERNAL WORKS - PART A**
SCALE 1 : 300

PROJECT	CLIENT DETAILS	TITLE	PROJECT NO.	DATE	DRAWING No.	ISSUE
ROSS RIVER ROAD RESIDENTIAL **344/346 & 350 ROSS RIVER RD** **CRANBROOK, QLD, 4814**	**HURST CONSTRUCTIONS**	**EXTERNAL WORKS - PART A**	**25869**	**10.10.25**	**DA-30**	**P7**

N

COUNTERPOINT

10/10/2025 16:26:09



1 **EXTERNAL WORKS - PART B**
DA-40 SCALE 1 : 300

CP
SP121009

PROJECT	CLIENT DETAILS	TITLE	PROJECT NO.	DATE	DRAWING No.	ISSUE
ROSS RIVER ROAD RESIDENTIAL **344/346 & 350 ROSS RIVER RD** **CRANBROOK, QLD, 4814**	**HURST CONSTRUCTIONS**	**EXTERNAL WORKS - PART B**	**25869**	**10.10.25**	**DA-31**	**P7**

N

COUNTERPOINT

10/10/2025 16:26:16

1 **EXTERNAL WORKS - PART C**
DA-40 SCALE 1 : 300

PROJECT	CLIENT DETAILS	TITLE	PROJECT NO.	DATE	DRAWING No.	ISSUE
ROSS RIVER ROAD RESIDENTIAL **344/346 & 350 ROSS RIVER RD** **CRANBROOK, QLD, 4814**	**HURST CONSTRUCTIONS**	**EXTERNAL WORKS - PART C**	**25869**	**10.10.25**	**DA-32**	**P7**

COUNTERPOINT

10/10/2025 16:26:18

1 DA-20 **SITE ELEVATION 01 - NORTH**
SCALE 1 : 500

2 DA-20 **SITE ELEVATION 02 - EAST**
SCALE 1 : 500

PROJECT	CLIENT DETAILS	TITLE	PROJECT NO.	DATE	DRAWING No.	ISSUE
ROSS RIVER ROAD RESIDENTIAL **344/346 & 350 ROSS RIVER RD** **CRANBROOK, QLD, 4814**	**HURST CONSTRUCTIONS**	**SITE ELEVATIONS - SHEET 01**	**25869**	**10.10.25**	**DA-40**	**P7**

COUNTERPOINT

10/10/2025 16:26:44

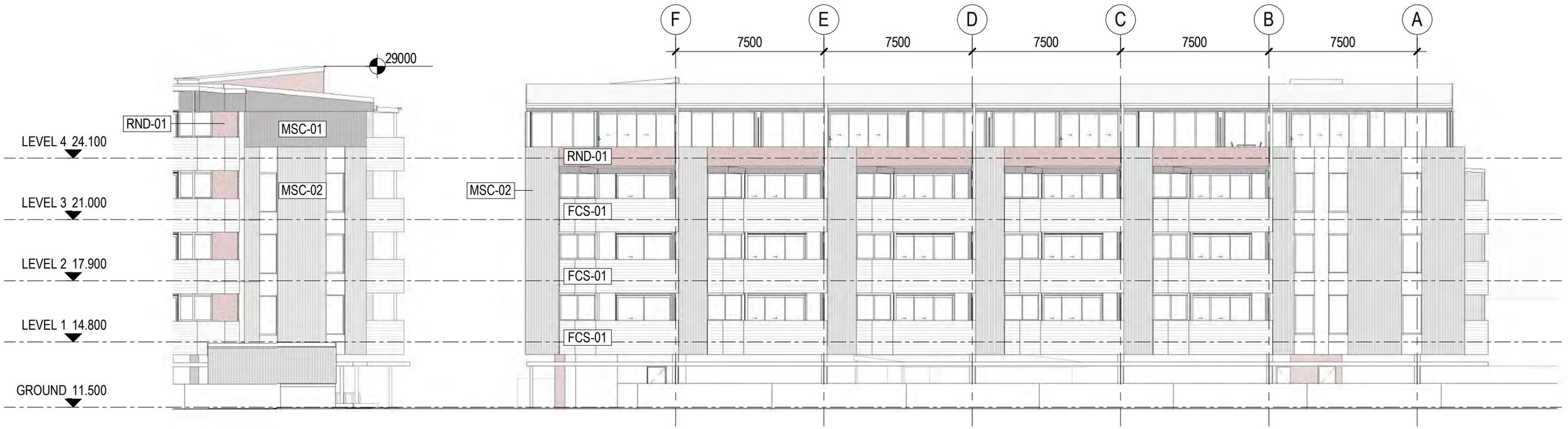
1 DA-20 **SITE ELEVATION 03 - SOUTH**
SCALE 1 : 500

2 DA-20 **SITE ELEVATION 04 - WEST**
SCALE 1 : 500

PROJECT	CLIENT DETAILS	TITLE	PROJECT NO.	DATE	DRAWING No.	ISSUE
ROSS RIVER ROAD RESIDENTIAL **344/346 & 350 ROSS RIVER RD** **CRANBROOK, QLD, 4814**	**HURST CONSTRUCTIONS**	**SITE ELEVATIONS - SHEET 02**	**25869**	**10.10.25**	**DA-41**	**P7**

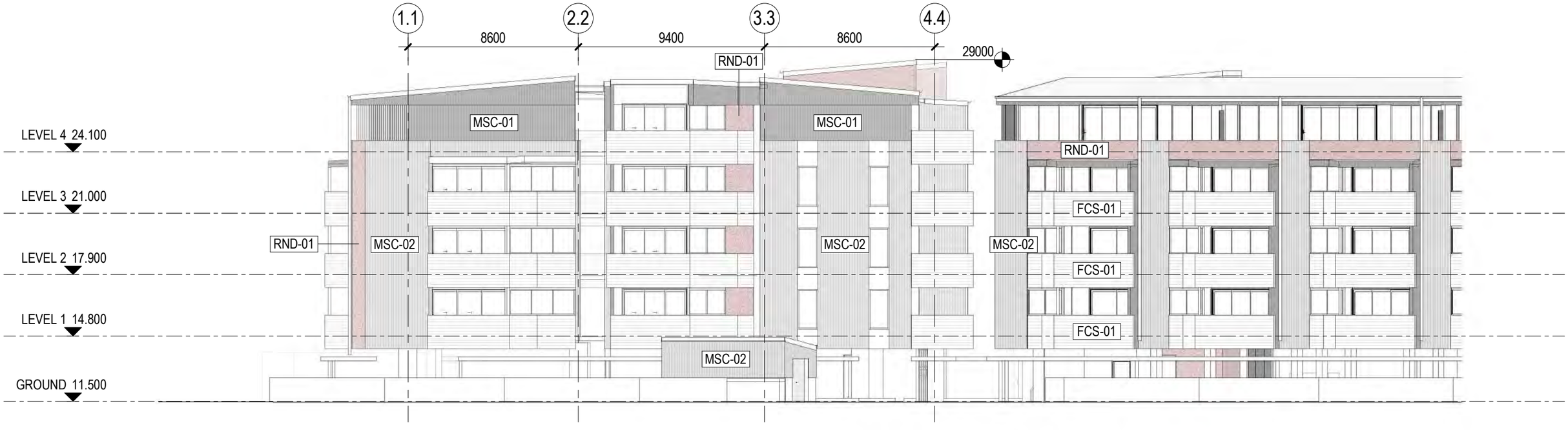
COUNTERPOINT

10/10/2025 16:27:12



2 BUILDING 01 - NORTH ELEVATION

DA-25 SCALE 1 : 200



1 BUILDING 02 - NORTH ELEVATION

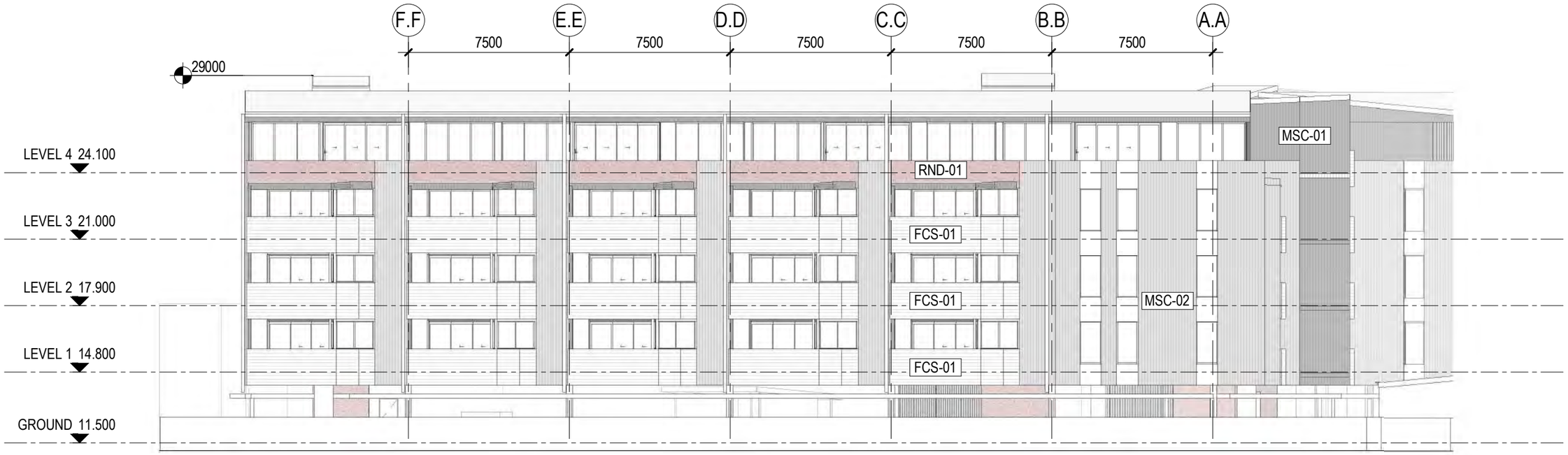
DA-25 SCALE 1 : 200

NOTE:
REFER TO MATERIALITY SHEET FOR DETAILS

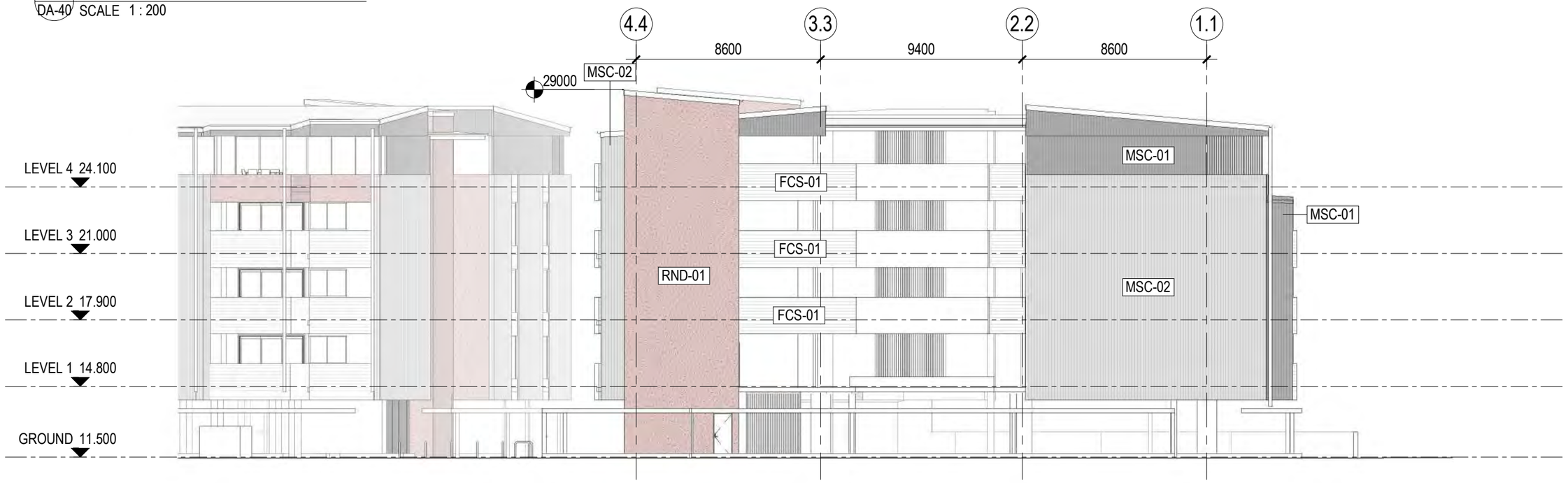
PROJECT	CLIENT DETAILS	TITLE	PROJECT NO.	DATE	DRAWING No.	ISSUE
ROSS RIVER ROAD RESIDENTIAL **344/346 & 350 ROSS RIVER RD** **CRANBROOK, QLD, 4814**	**HURST CONSTRUCTIONS**	**BUILDING ELEVATIONS - SHEET 01**	**25869**	**10.10.25**	**DA-45**	**P7**

COUNTERPOINT

10/10/2025 16:27:24



1 **BUILDING 02 - EAST ELEVATION**
DA-40 SCALE 1 : 200



2 **BUILDING O2 - SOUTH ELEVATION**
DA-41 SCALE 1 : 200

PROJECT	CLIENT DETAILS	TITLE	PROJECT NO.	DATE	DRAWING No.	ISSUE
ROSS RIVER ROAD RESIDENTIAL **344/346 & 350 ROSS RIVER RD** **CRANBROOK, QLD, 4814**	**HURST CONSTRUCTIONS**	**BUILDING ELEVATIONS - SHEET 02**	**25869**	**10.10.25**	**DA-46**	**P7**

COUNTERPOINT

10/10/2025 16:27:39

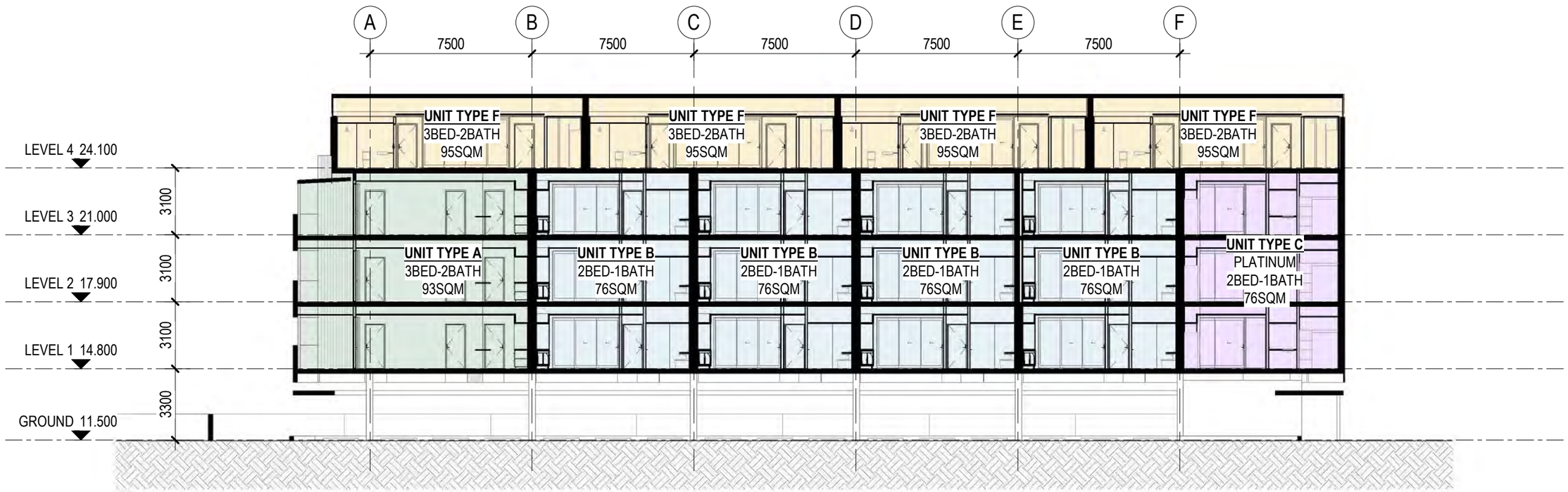
1 **BUILDING 01 - SOUTH ELEVATION**
DA-25 SCALE 1 : 200

2 **BUILDING 01 - WEST ELEVATION**
DA-41 SCALE 1 : 200

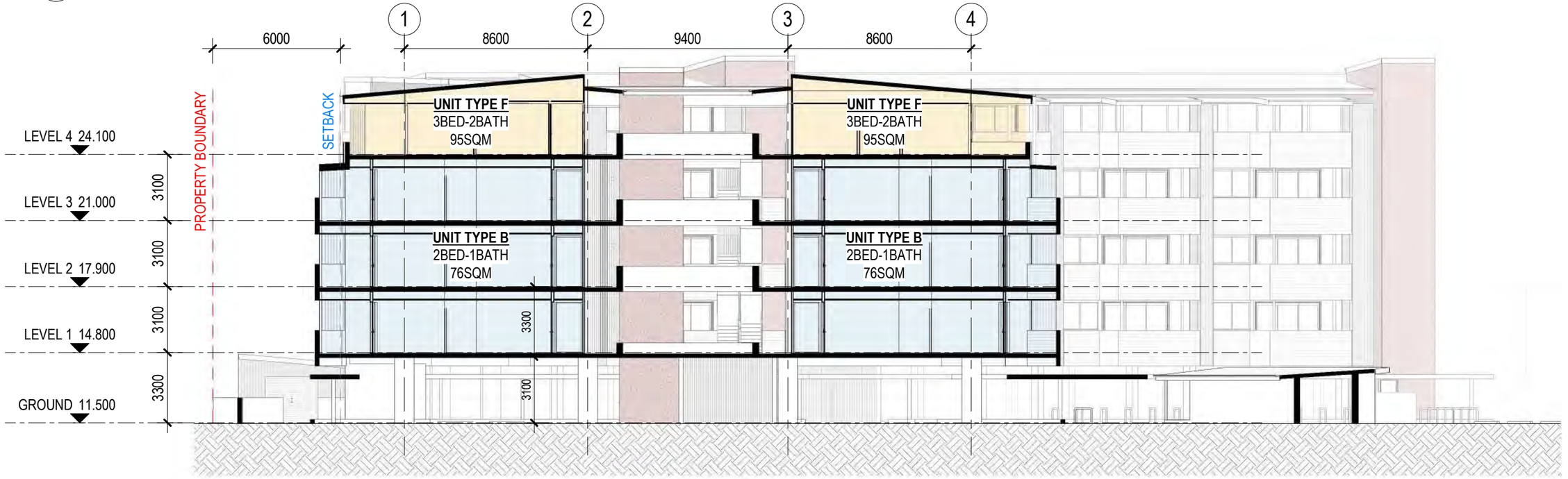
PROJECT	CLIENT DETAILS	TITLE	PROJECT NO.	DATE	DRAWING No.	ISSUE
ROSS RIVER ROAD RESIDENTIAL **344/346 & 350 ROSS RIVER RD** **CRANBROOK, QLD, 4814**	**HURST CONSTRUCTIONS**	**BUILDING ELEVATIONS - SHEET 03**	**25869**	**10.10.25**	**DA-47**	**P7**

COUNTERPOINT

10/10/2025 16:28:01



1 **BUILDING 01 - SECTION 01**
DA-20 SCALE 1 : 200

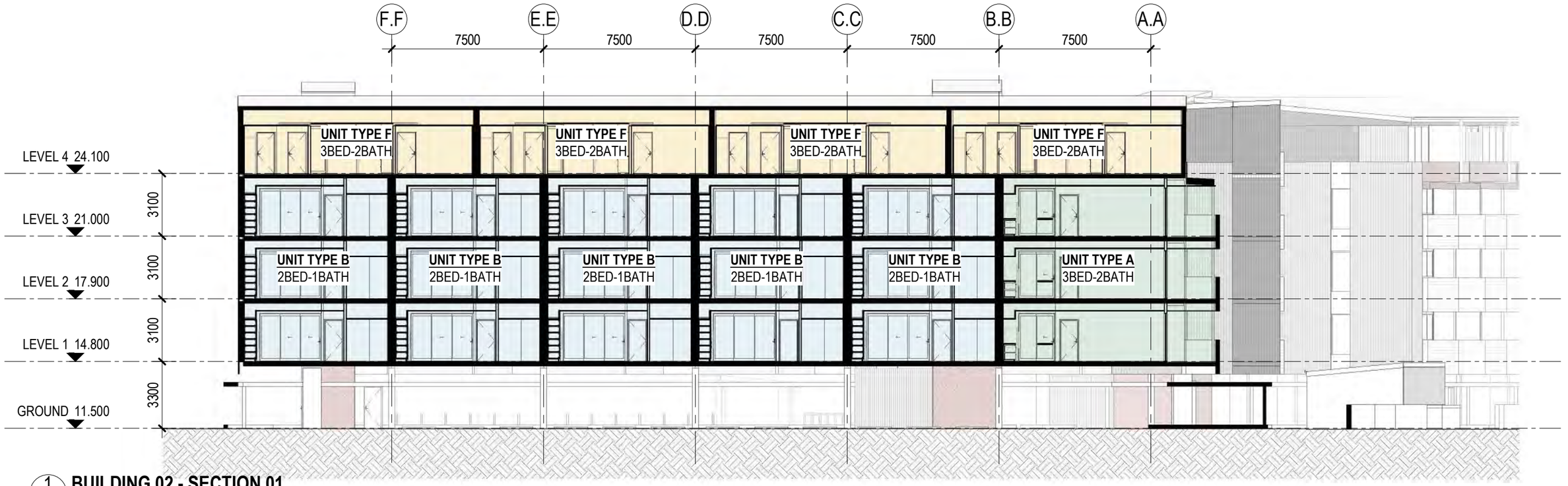


2 **BUILDING 01 - SECTION 02**
DA-20 SCALE 1 : 200

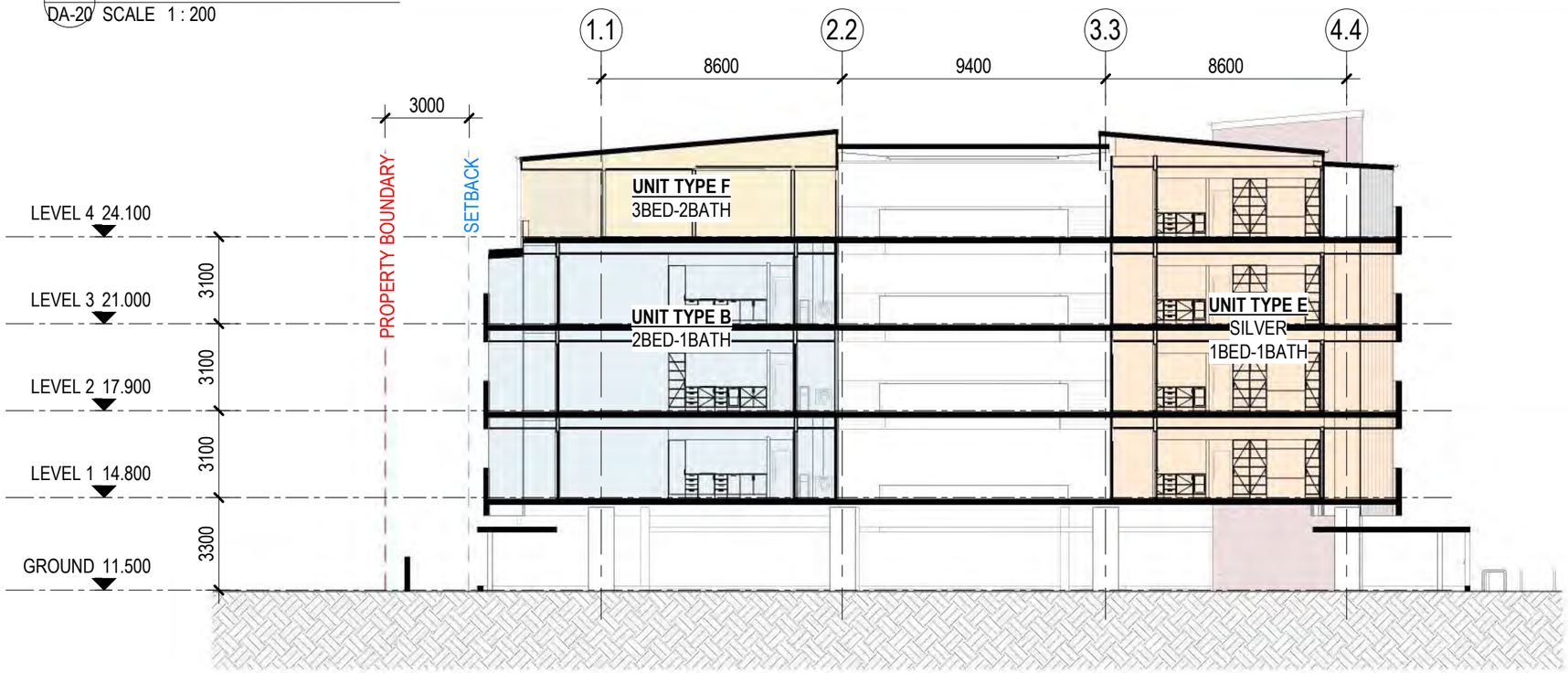
PROJECT	CLIENT DETAILS	TITLE	PROJECT NO.	DATE	DRAWING No.	ISSUE
ROSS RIVER ROAD RESIDENTIAL **344/346 & 350 ROSS RIVER RD** **CRANBROOK, QLD, 4814**	**HURST CONSTRUCTIONS**	**SECTION - SHEET 01**	**25869**	**10.10.25**	**DA-50**	**P7**

COUNTERPOINT

10/10/2025 16:26:14



1 **BUILDING 02 - SECTION 01**
DA-20 SCALE 1 : 200



2 **BUILDING 02 - SECTION 02**
DA-20 SCALE 1 : 200

PROJECT	CLIENT DETAILS	TITLE	PROJECT NO.	DATE	DRAWING No.	ISSUE
ROSS RIVER ROAD RESIDENTIAL **344/346 & 350 ROSS RIVER RD** **CRANBROOK, QLD, 4814**	**HURST CONSTRUCTIONS**	**SECTION - SHEET 02**	**25869**	**10.10.25**	**DA-51**	**P7**

COUNTERPOINT

10/10/2025 16:28:31

PROJECT	CLIENT DETAILS	TITLE	PROJECT NO.	DATE	DRAWING No.	ISSUE
ROSS RIVER ROAD RESIDENTIAL **344/346 & 350 ROSS RIVER RD** **CRANBROOK, QLD, 4814**	**HURST CONSTRUCTIONS**	**PERSPECTIVE - SHEET 01**	**25869**	**10.10.25**	**DA-60**	**P7**

COUNTERPOINT

10/10/2025 16:28:33

PROJECT	CLIENT DETAILS	TITLE	PROJECT NO.	DATE	DRAWING No.	ISSUE
ROSS RIVER ROAD RESIDENTIAL **344/346 & 350 ROSS RIVER RD** **CRANBROOK, QLD, 4814**	**HURST CONSTRUCTIONS**	**PERSPECTIVE - SHEET 02**	**25869**	**10.10.25**	**DA-61**	**P7**

COUNTERPOINT

10/10/2025 16:28:34

PROJECT	CLIENT DETAILS	TITLE	PROJECT NO.	DATE	DRAWING No.	ISSUE
ROSS RIVER ROAD RESIDENTIAL **344/346 & 350 ROSS RIVER RD** **CRANBROOK, QLD, 4814**	**HURST CONSTRUCTIONS**	**PERSPECTIVE - SHEET 03**	**25869**	**10.10.25**	**DA-62**	**P7**

COUNTERPOINT

10/10/2025 16:28:35

PROJECT	CLIENT DETAILS	TITLE	PROJECT NO.	DATE	DRAWING No.	ISSUE
ROSS RIVER ROAD RESIDENTIAL **344/346 & 350 ROSS RIVER RD** **CRANBROOK, QLD, 4814**	**HURST CONSTRUCTIONS**	**PERSPECTIVE - SHEET 04**	**25869**	**10.10.25**	**DA-63**	**P7**

COUNTERPOINT

10/10/2025 16:28:36

MSC-01
PROFILE METAL CLADDING WITH
VERTICAL PATTERN.
COLORBOND COLOUR 01

MSC-02
PROFILE METAL CLADDING WITH
VERTICAL PATTERN.
COLORBOND COLOUR 02

FCS-01
PAINTED FIBRE CEMENT CLADDING
WITH HORIZONTAL PATTERN

SFT-01
PRE-FINISHED FIBRE CEMENT SOFFIT

RND-01
PAINTED RENDER FINISH TO UPPER LEVEL
BALCONIES AND FACADE TO BOTH BUILDINGS

TROPICAL COLOUR PALETTE APPLIED TO
BALCONY SOFFITS AND WALLS. COLOURS
ALTERNATE BETWEEN UNITS TO CREATE
VARIATION WHILE MAINTAINING A CONSISTENT
PATTERN ACROSS BOTH BUILDINGS (REFER TO
PERSPECTIVE VIEWS)

NOTE:
REFER TO ELEVATIONS FOR FINISHES LOCATIONS

PROJECT	CLIENT DETAILS	TITLE	PROJECT NO.	DATE	DRAWING No.	ISSUE
ROSS RIVER ROAD RESIDENTIAL **344/346 & 350 ROSS RIVER RD** **CRANBROOK, QLD, 4814**	**HURST CONSTRUCTIONS**	**MATERIALITY**	**25869**	**10.10.25**	**DA-64**	**P7**

COUNTERPOINT

10/10/2025 16:28:37

APPENDIX D

Water and Sewer Infrastructure Report prepared by DPM Water

344/346 & 350 ROSS RIVER RD, CRANBROOK UNIT DEVELOPMENT

WATER SUPPLY & SEWERAGE PLANNING REPORT

Date: 10 October 2025
(Revision A)

TABLE OF CONTENTS

APPENDICES

REPORT AUTHORISATION				
Revision	**Revision Date**	**Details**	**Prepared by**	**Signature**
A	10/10/2025	Original Report	Desmond Moseley (RPEQ 7565)	

1 INTRODUCTION

A residential unit development is proposed at 344/346 & 350 Ross River Rd, Cranbrook. This site is located on the south-west corner of the Nathan St and Ross River Rd intersection. The proposed development will have a total of 81 residential units. The site is illustrated on the extract from the Townsville Council GIS below.

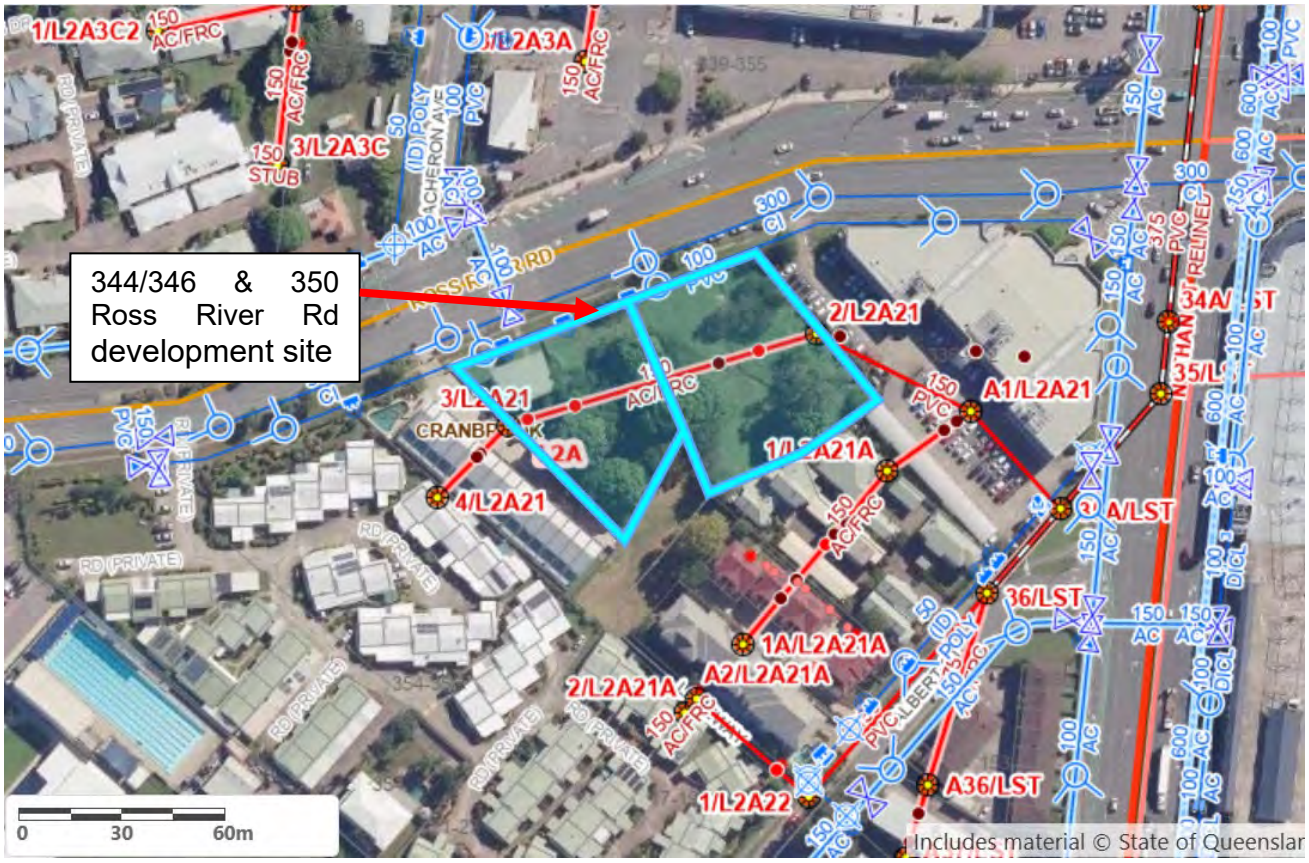


Figure 1.1 – Development Site Location

The residential unit development is proposed to have two building, both of which are to be 5 levels. The ground level is to be car parking with levels 1 to 4 being a combination of 1, 2 & 3 bedroom units. There is expected to be a total of 81 units. Figure 1.2 below illustrates the proposed layout of Level 1 to 3 of the development. The development plans are provided in Appendix A.

To ensure the residential unit development can be adequately serviced with a potable water supply and sewage system in accordance with Council standards, an assessment of the system capacities have been undertaken. This report summarises the assessment of the existing water and sewerage network with this illustrating:

- The water network modelling shows the existing DN100 PVC water main along the southern side of Ross River Rd and the frontage of the development site is adequately sized to service the development. This water main is connected to the existing DN300 CI trunk water main on Ross River Rd and an existing DN150 AC water main on Nathan St.
- There is an existing DN150 gravity sewer that traverses the development site. The sewer is located under the proposed residential units. The developer has proposed to replace and divert the existing DN150 sewer with a DN225 sewer. The sewer replacement/diversion plan is provided in Appendix C.
- The SewerGEMS network modelling illustrates that the proposed diversion sewer has sufficient capacity to service the development.

Figure 1.2 – Development Layout Plan (Level 1 to 3)

The water network modelling and sewer system capacity assessment undertaken for the proposed residential unit development is summarised in the following report sections.

2 POPULATION ASSESSMENT

The following section provides the equivalent population assessment for the proposed units development on 344/346 & 350 Ross River Rd. Two methods have been undertaken to determine the equivalent population for the proposed development. These methods are summarised in Table 2.1 and Table 2.2.

The equivalent population in Table 2.1 is based on applying a loading rate of 1.8 EP for the single bedroom units and a loading rate of 2.8 EP for the two & three bedroom units. This is an upper/conservative estimate of the equivalent population.

Table 2.1 – Water & Sewer Equivalent Population Assessment

Unit Type	Number	Rate	EP
1 Bed Unit	21	1.8	37.8 EP
2 Bed Unit	42	2.8	117.6 EP
3 Bed Unit	18	2.8	50.4 EP
Total			205.8 EP

The equivalent population in Table 2.2 below is based on applying 1.0 EP per room.

Table 2.2 – Water & Sewer Equivalent Population Assessment

Unit Type	Number	Rate	EP
1 Bed Unit	21	1.0	21 EP
2 Bed Unit	42	2.0	84 EP
3 Bed Unit	18	3.0	54 EP
Total			159 EP

The above assessment shows that a higher equivalent population is produced by applying the 1.8 EP for the single bedroom units and a loading rate of 2.8 EP for the two & three bedroom units. This higher equivalent population has been used for the water & sewer capacity assessment to ensure the existing network is able to service the proposed development.

3 WATER SUPPLY PLANNING

3.1 Water Demand

Water demands have been calculated in accordance with Townsville City Council planning scheme. The following table provides the “residential” water demand parameters for the Townsville Planning Scheme for each equivalent person (EP).

Table 3.1 - Water Supply Unit Demand Parameters

Parameter	Unit Demand	Peaking Factor
Average Day (AD)	600 L/day/EP	
Mean Day Max Month (MDMM)	900 L/day/EP	1.5 AD
Peak Day (PD)	1125 L/day/EP	1.25 MDMM
Peak Hour (PH)	0.033 L/s/EP	2.56 PD

The peak hour residential water demands have been applied to the proposed unit development, giving a peak water demand of 205.8 EP x 0.033 l/s/EP = 6.9 l/s.

In addition to the above, as the development is multi-story residential, a 30 l/s “Commercial” fire flow is considered applicable in accordance with Council’s planning and design guidelines. This fire flow has been used to assess the theoretical performance of the water network.

3.2 Water Supply Assessment & Network Modelling

The existing site for the proposed 2 x multi-story residential unit development buildings is on the south-west corner of the Nathan St and Ross River Rd intersection in Cranbrook. The existing water infrastructure that services the site includes:

- A 100 PVC water main along the southern footpath of Ross River Rd. This is along the frontage of the proposed development. The existing DN100 PVC water main extends to the intersection of Nathan St where it connects to a DN150 AC water main that runs along Nathan St.
- The other end of the DN100 PVC on Ross River Rd connects to the DN300 CI trunk water main that runs along the southern side of Ross River Rd.

- The existing DN300 CI and DN150 AC water mains connect to the existing DN600 AC trunk water main that is located on the eastern side of Nathan St. This DN600 AC trunk water main continues to the south along Nathan St.
- The DN600 AC trunk water main is supplied water from the 2 x 40 ML Douglas 1A/1B reservoirs.

The following extract from the Council GIS illustrates the existing water infrastructure that services the Ross River Rd and Nathan St area of Cranbrook.

Figure 3.1 – Council GIS Plot

Theoretical water network modelling has been performed to assess the capacity of the existing reticulation network. The modelling was undertaken using the Council's WaterGEMS network model for both the peak hour demands and fire flows.

The WaterGEMS network modelling results with the inclusion of the water demands from the proposed development shows:

- The existing DN100 PVC water main along Ross River Rd frontage of the development site is shown to be adequately sized to service the development with peak hour and fire flows.
- The peak hour pressures at 6:30 pm (ie the peak residential demand period) are reduced to 403 kPa. This meets the minimum pressure requirement of 220 kPa.
- The velocity along the DN100 PVC water main for peak hour demands is up to 0.79 m/s. This achieves the CTM Code standard of being less than 2.5 m/s. The headloss gradient along the existing DN100 PVC water main is up to 0.009 m/m. This exceeds the recommended headloss gradient of 0.005 m/m but since this is an existing water main that only services a couple of properties and has low velocities this is considered acceptable.

- With the inclusion of the 30 l/s “Commercial” fire flow the water pressures are reduced to 337 kPa within the water main. This is the pressure at 6:30 pm and is concurrent with the peak residential demand period and meets the minimum pressure requirement of 120 kPa.
- The velocity along the DN100 PVC reticulation main on the Ross River Rd frontage of the development site with the including of the 30 l/s commercial fire flow is up to 2.4 m/s. This velocity is well within the CTM Code standard of a maximum of 4.0 m/s for fire flows.
- The WaterGEMS figure and results table are provided in Appendix B.

The above theoretical water network modelling shows that the proposed development is able to be serviced with a reticulated water supply that meets Council’s standards with no upgrades required.

The following figure illustrates the peak hour demands and residual water pressure at the proposed residential unit development site.

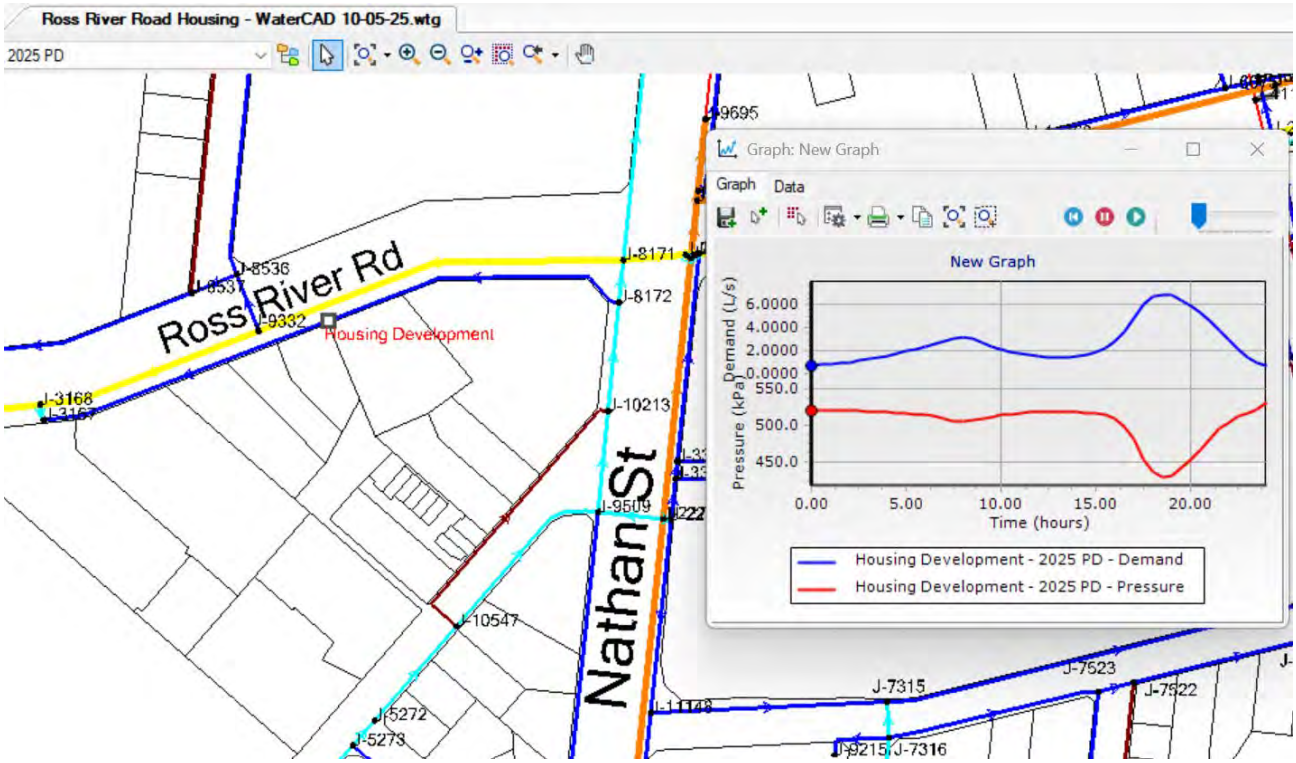


Figure 3.2 – Peak Hour Water Demand & Pressures

The following figure illustrates the water pressure at the development site with the inclusion of the 30 l/s “Commercial” fire flows.

Document Set ID: 27701978
Version: 1, Version Date: 28/10/2025

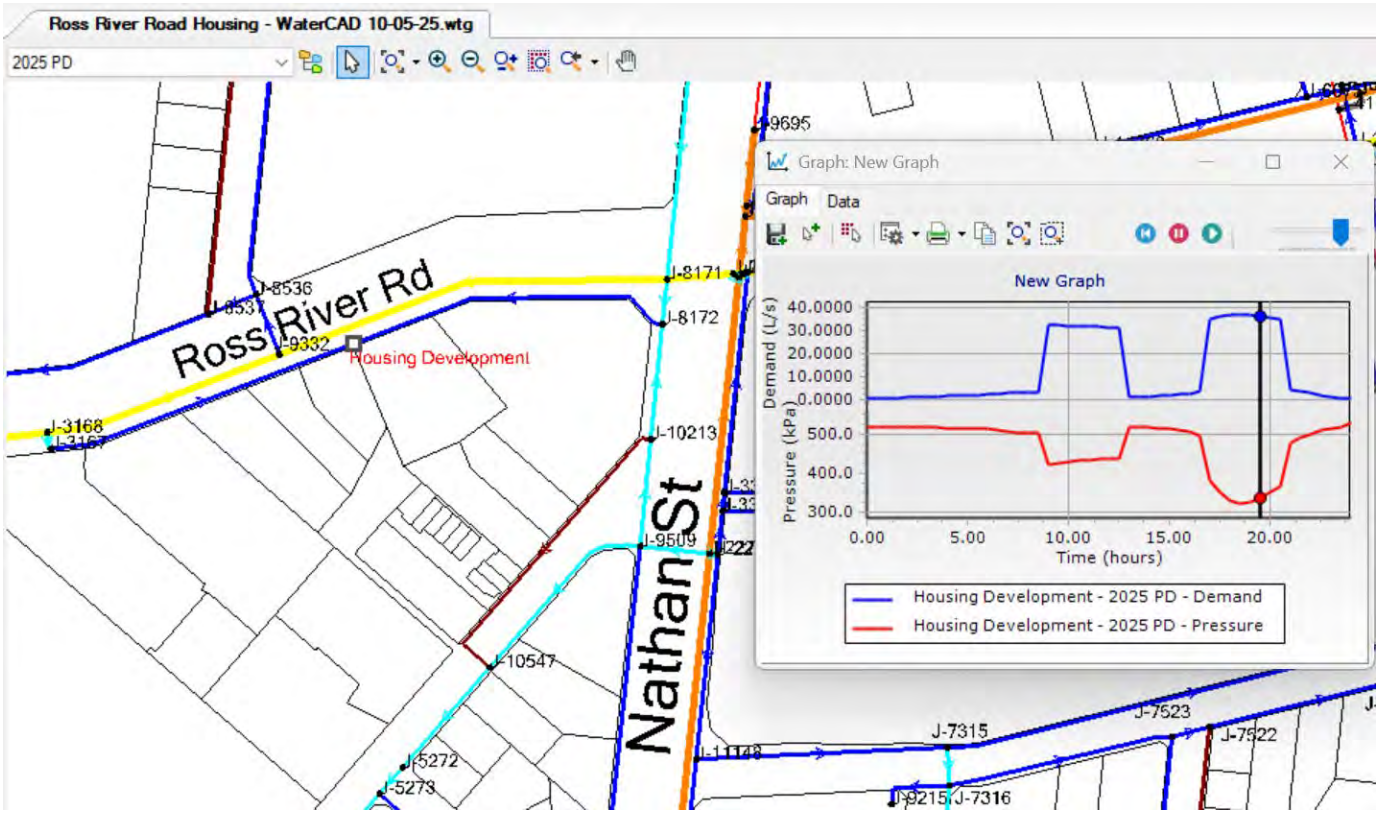


Figure 3.3 – 30 l/s Commercial Fire Flow Water Demand & Pressures

It is understood that due to the size of the proposed residential unit development a fire tank and booster pump system may be required to meet the requirements of the Building Code. The building code and fire assessment for the development is being undertaken separately and will detail the specific fire system requirements for the development.

4 SEWAGE SYSTEM PLANNING

The existing site for the proposed residential unit development currently has a DN150 gravity sewer running underneath the location for the proposed buildings. Works are proposed to build a replacement and diverted gravity sewer through the development site.

The following is the existing sewer infrastructure that services the developments area:

- An existing DN150 sewer runs from MH 4/L2A21 to the east and south to connect to existing MH 35A/LST. This existing gravity sewer traverses the development site between MH 3/L2A21 and MH 2/L2A21.
- The existing DN375 sewer from MH 35A/LST is located near the intersection of Albert St and Nathan St. The DN375 trunk sewer continues to the north along Nathan St with it increasing in size to become a DN750 sewer before discharging into PS L14A (Mather St).

Figure 4.1 below is a plot from the Council GIS that illustrates the existing DN150 reticulation sewer and DN375 trunk sewer system that services the development site.

Document Set ID: 27701978
Version: 1, Version Date: 28/10/2025

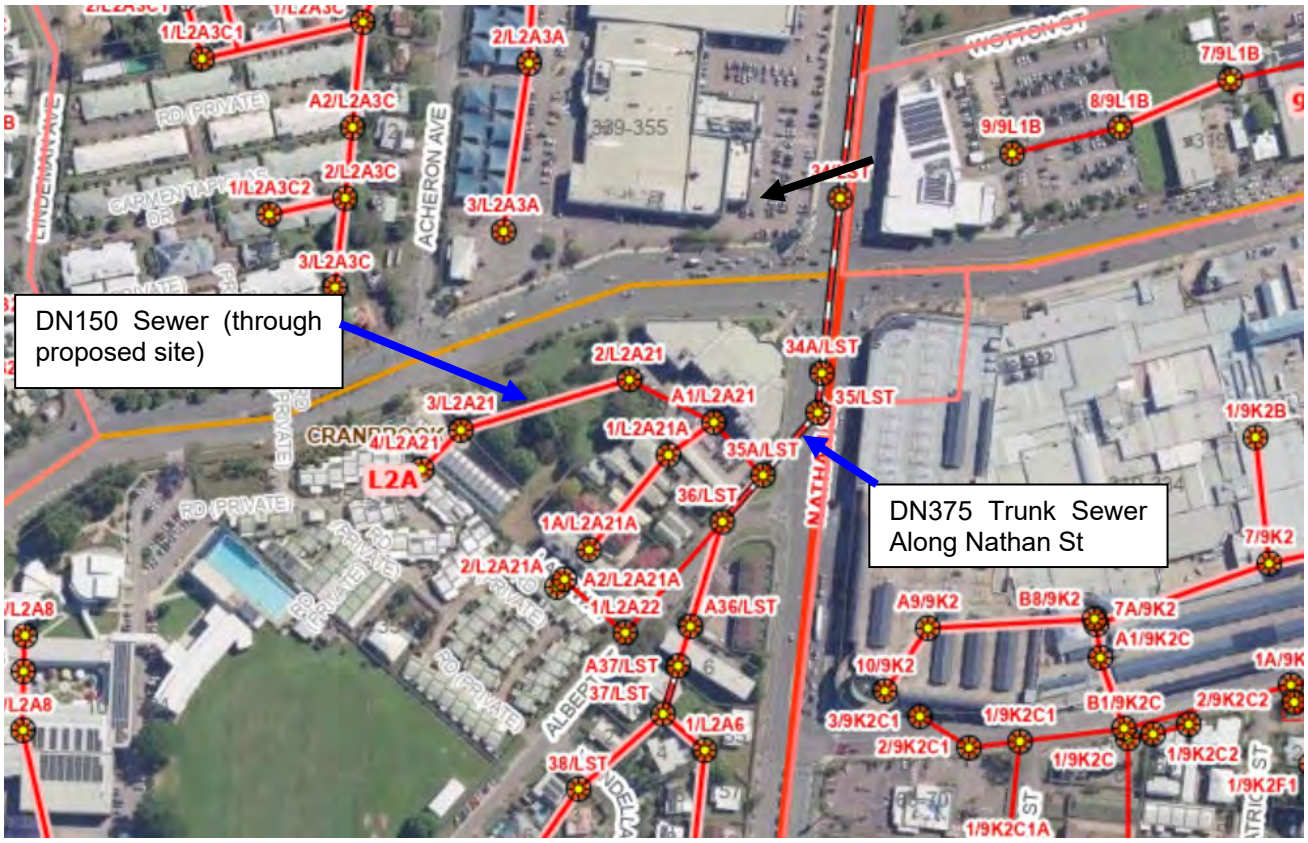


Figure 4.1 – GIS Plot of Existing Sewer System

The existing DN150 AC gravity sewer that is located through the development site is from MH 3/L2A21 and MH 2/L2A21. This is an old DN150 AC sewer so TCC will not allow a high rise building to be constructed over it. The developer is proposing the following sewer upgrade/diversion works:

- A new DN225 PVC sewer to be constructed on the same alignment as the existing DN150 sewer from MH 3/L2A21 to the east. This section of proposed replacement sewer will be around 50m long. This section of replacement sewer will be located under one of the proposed buildings.
- A new maintenance hole will be constructed on the DN225 sewer line. This MH will be located between the two proposed residential unit buildings.
- The DN225 diversion sewer will then extend to the north east and onto the eastern boundary of the development site to a new MH. The final section of diversion DN225 sewer will then extend to the south (along the eastern boundary of the development site) to existing MH 2/L2A21.
- This proposed DN225 replacement and diverted sewer line will be graded at around 1 in 250. This grade meets the CTM Code standards for DN225 sewers (minimum grade of 1 in 290) and is required to allow for the longer length of the replacement and diverted sewer to be constructed from MH 3/L2A21 and MH 2/L2A21.

A screenshot of the DN225 sewer replacement and diversion works is shown on Figure 4.2 below. The preliminary diversion sewer drawing is provided in Appendix C.

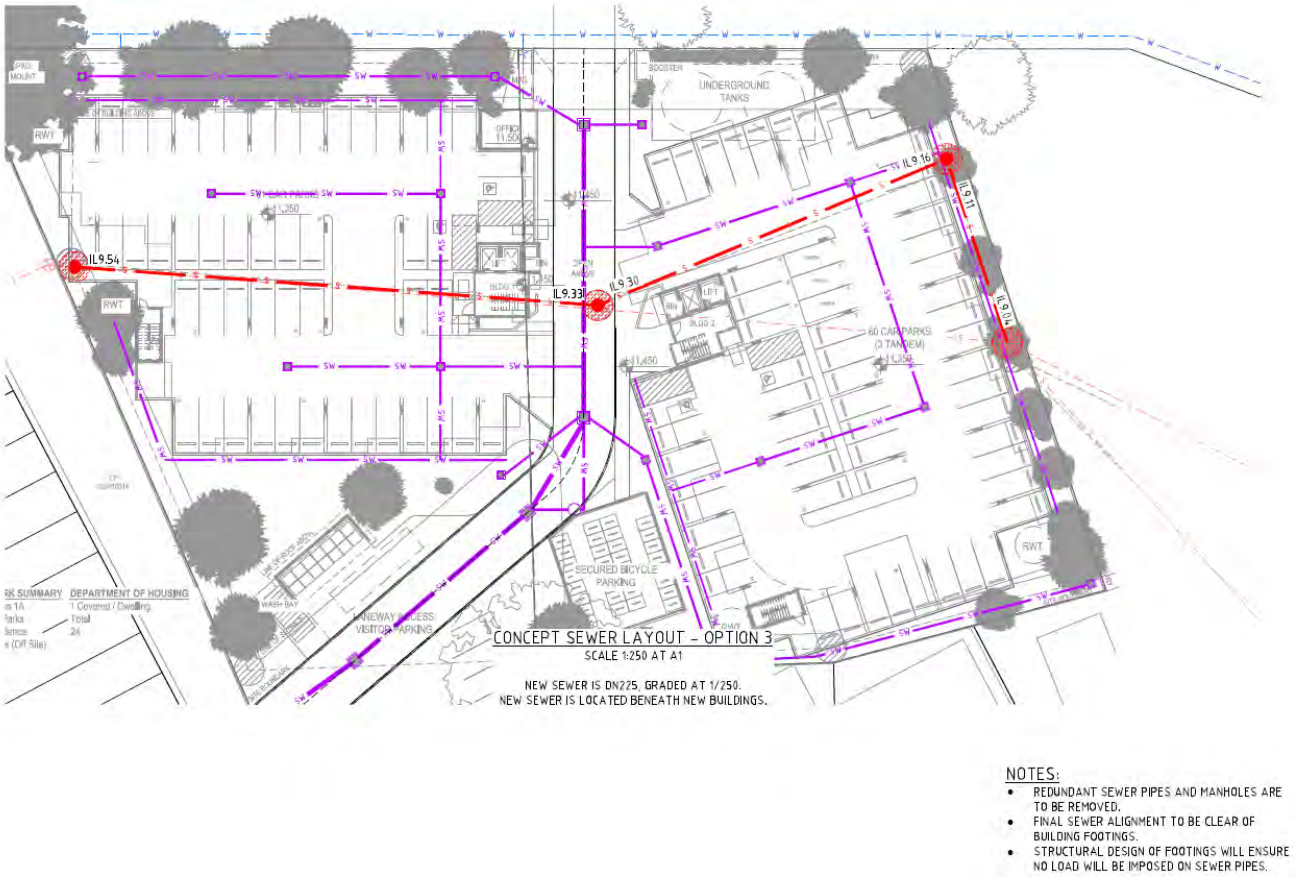


Figure 4.2 – Proposed DN225 Diversion Sewer

The capacity and performance of the existing gravity sewer system and the proposed replacement and diverted DN225 sewer is provided in the following section.

4.1 Sewage Infrastructure Capacity

The capacity of the existing gravity sewer system and the proposed DN225 sewer diversion/replacement works to cater for the proposed residential unit development was assessed using the SewerGEMS model developed for the Louisa suburbs of Townsville.

The SewerGEMS model includes the existing reticulation and trunk gravity sewer system from the development site through to PS L14A (Woolcock St). The additional residential equivalent population has been added to the future proposed sewer MH (being MH 5/L2A21 in the SewerGEMS model) that will be located along the proposed DN225 diversion sewer through the development site.

Figure 4.3 below illustrates the additional equivalent population loading onto the proposed DN225 diversion sewer through the development site.

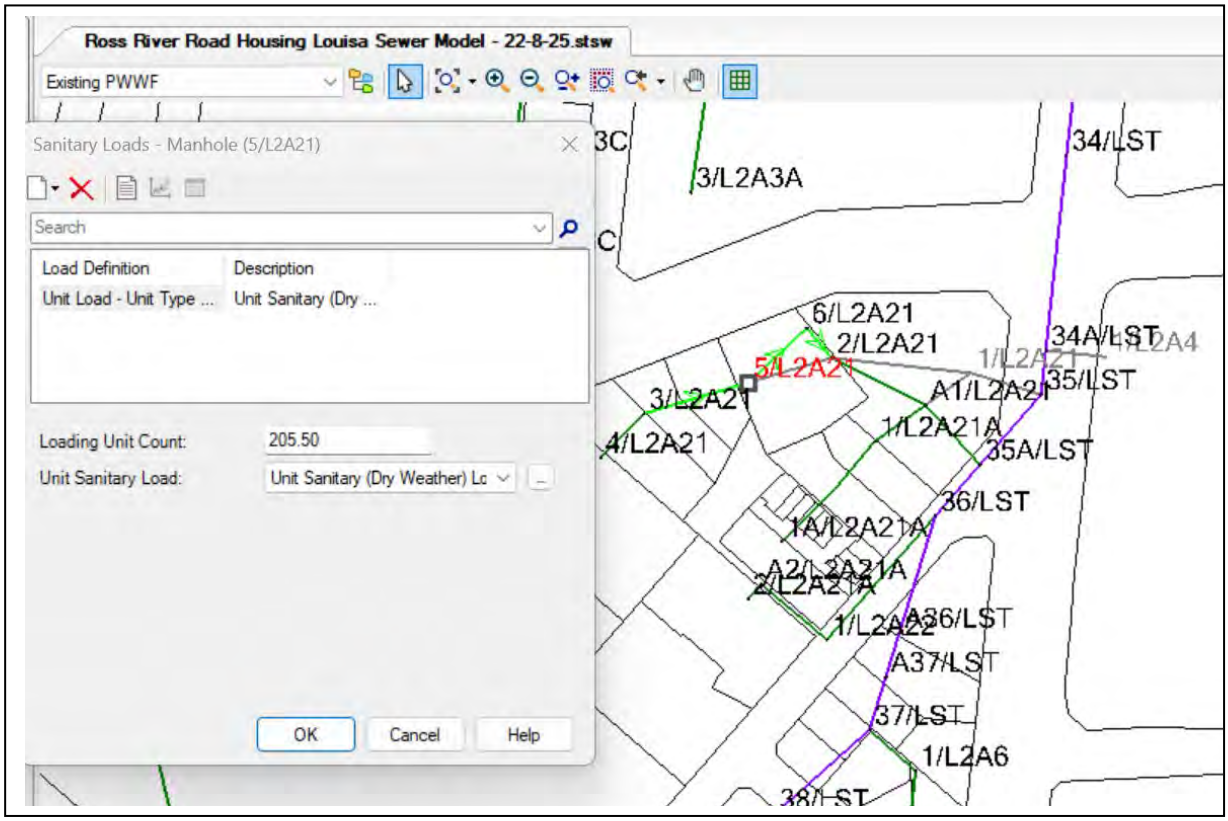
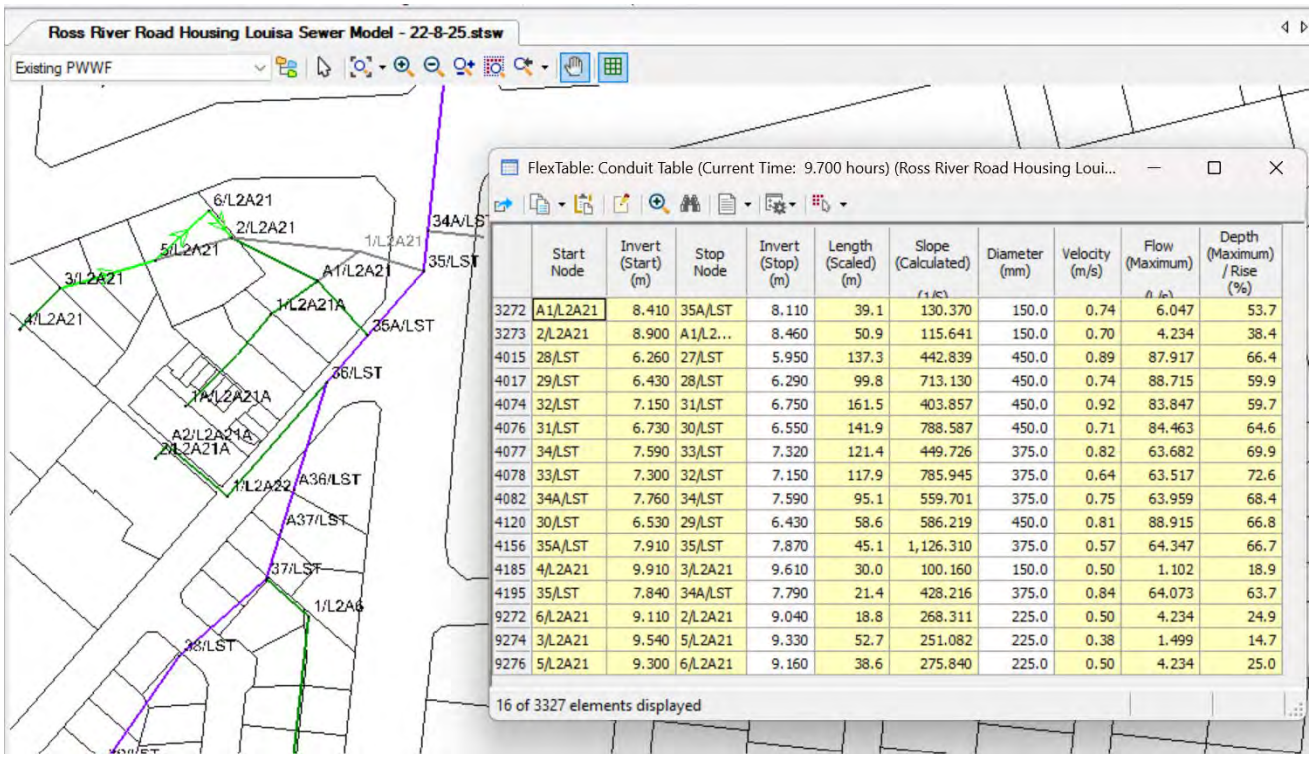


Figure 4.3 – Additional Residential Loading on Proposed MH 5/L2A21

With the inclusion of the additional equivalent population loading on the existing gravity sewer system, the SewerGEMS model has illustrated:

- The existing sections of DN150 AC sewer from MH 2/L2A21 to MH 35A/LST flows up to 54% full for the peak wet weather flows with the inclusion of the additional residential unit development EP.
- The proposed DN225 replacement and diversion gravity sewer through the development site (from MH 3/L2A21 to MH 2/L2A21) flows up to 25% full for the peak wet weather flows.
- The existing and proposed replacement/diversion DN150 and DN225 reticulation gravity sewers therefore flow less than the CTM Code requirement of 75% full for peak wet weather flows.
- The existing DN375 AC and DN450 AC sewer from MH 35A/LST to the north along Nathan St flows up to 73% full for the 5 x ADWF flows. It is noted that during large wet weather events this trunk gravity sewer has some capacity issues which is understood to be due to excessive infiltration and inflow into the sewer system in excess of 5 x ADWF. It is understood that TCC is investigating the source of the I/I and has future trunk sewer infrastructure strategies to improve the capacity and performance of the existing trunk gravity sewer system. The SewerGEMS network modelling however shows that the existing trunk gravity sewer system has sufficient capacity for the 5 x ADWF flows.
- All the existing sewers flow less than 75% full for the 5 x ADWF flows so meets the requirements of the CTM code.

The following Figure 4.4 provides the flows and performance of the existing gravity sewer system with the inclusion of the additional loading from the proposed development. A larger version of the modelling results is provided in Appendix C.



	Start Node	Invert (Start) (m)	Stop Node	Invert (Stop) (m)	Length (Scaled) (m)	Slope (Calculated)	Diameter (mm)	Velocity (m/s)	Flow (Maximum)	Depth (Maximum) / Rise (%)
3272	A1/L2A21	8.410	35A/LST	8.110	39.1	130.370	150.0	0.74	6.047	53.7
3273	2/L2A21	8.900	A1/L2...	8.460	50.9	115.641	150.0	0.70	4.234	38.4
4015	28/LST	6.260	27/LST	5.950	137.3	442.839	450.0	0.89	87.917	66.4
4017	29/LST	6.430	28/LST	6.290	99.8	713.130	450.0	0.74	88.715	59.9
4074	32/LST	7.150	31/LST	6.750	161.5	403.857	450.0	0.92	83.847	59.7
4076	31/LST	6.730	30/LST	6.550	141.9	788.587	450.0	0.71	84.463	64.6
4077	34/LST	7.590	33/LST	7.320	121.4	449.726	375.0	0.82	63.682	69.9
4078	33/LST	7.300	32/LST	7.150	117.9	785.945	375.0	0.64	63.517	72.6
4082	34A/LST	7.760	34/LST	7.590	95.1	559.701	375.0	0.75	63.959	68.4
4120	30/LST	6.530	29/LST	6.430	58.6	586.219	450.0	0.81	88.915	66.8
4156	35A/LST	7.910	35/LST	7.870	45.1	1,126.310	375.0	0.57	64.347	66.7
4185	4/L2A21	9.910	3/L2A21	9.610	30.0	100.160	150.0	0.50	1.102	18.9
4195	35/LST	7.840	34A/LST	7.790	21.4	428.216	375.0	0.84	64.073	63.7
9272	6/L2A21	9.110	2/L2A21	9.040	18.8	268.311	225.0	0.50	4.234	24.9
9274	3/L2A21	9.540	5/L2A21	9.330	52.7	251.082	225.0	0.38	1.499	14.7
9276	5/L2A21	9.300	6/L2A21	9.160	38.6	275.840	225.0	0.50	4.234	25.0

Figure 4.4 – SewerGEMS Modelling Results

The above assessment illustrates the existing gravity sewer system, including the proposed DN225 replacement/diversion sewer has sufficient capacity to cater for the proposed residential unit development at 344/346 & 350 Ross River Rd, Cranbrook.

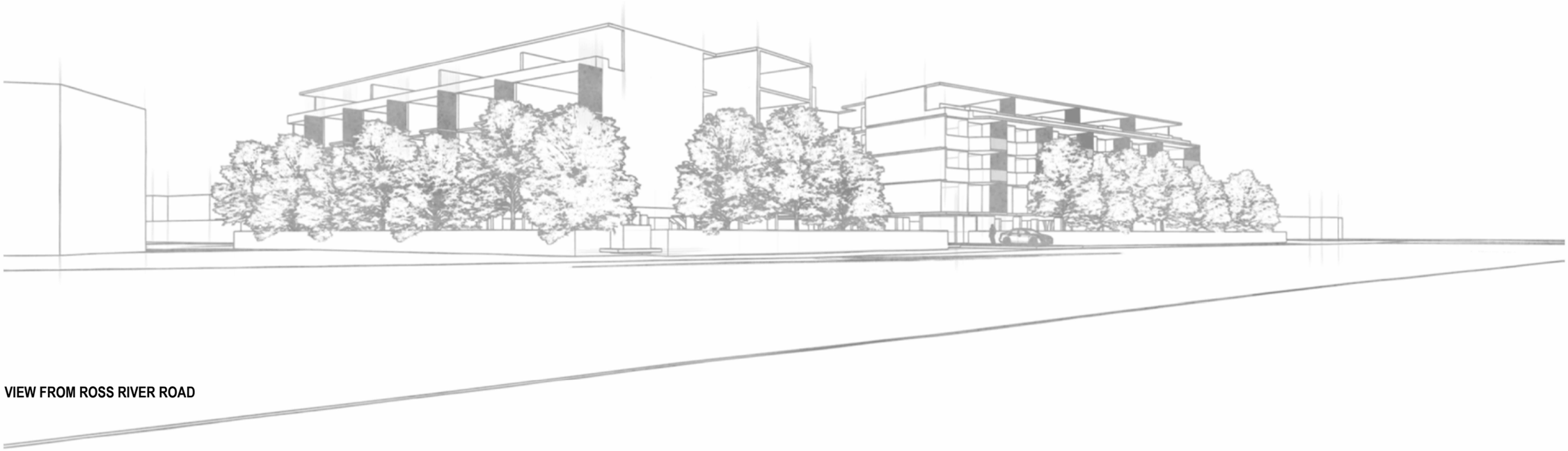
APPENDIX A
RESIDENTIAL ROOMING DEVELOPMENT PLANS

COUNTERPOINT

ROSS RIVER ROAD RESIDENTIAL

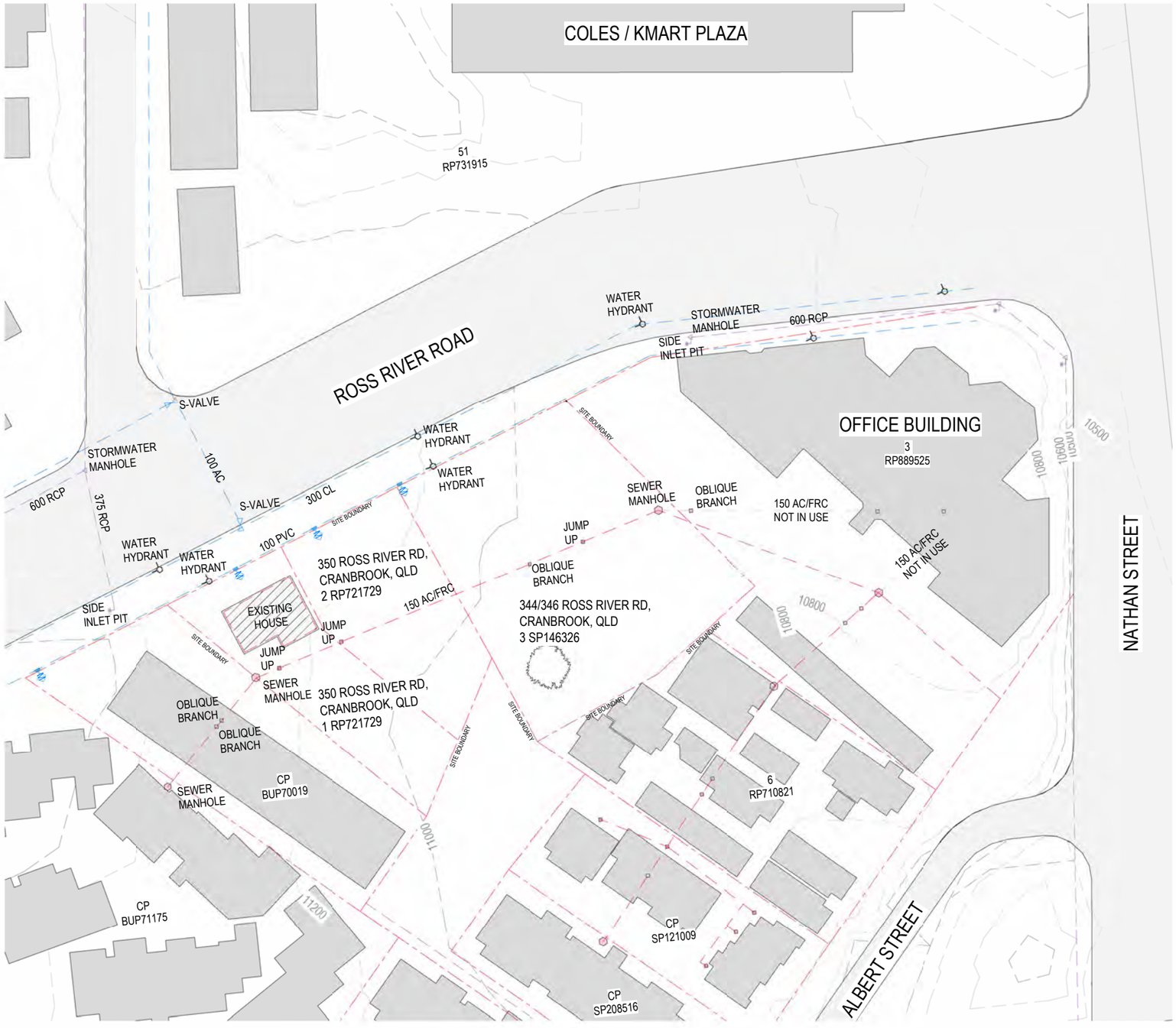
344/346 & 350 ROSS RIVER RD
CRANBROOK, QLD, 4814

	REV	
SK-00	P2	COVER SHEET
SK-10	P2	EXISTING SITE PLAN
SK-12	P2	EXISTING - DIAGRAM - FLOODING & VEGETATION
SK-20	P2	PROPOSED SITE PLAN
SK-21	P2	PROPOSED FLOOR PLAN - GROUND
SK-29	P2	PROPOSED FLOOR PLAN - FIRST LEVEL
SK-30	P2	PROPOSED FLOOR PLAN - LEVEL 4



VIEW FROM ROSS RIVER ROAD

COUNTERPOINT ARCHITECTURE 487 FLINDERS STREET, TOWNSVILLE PO BOX 1604 Townsville QLD 4810 P: (07) 4724 0990 E: ADMIN@CPOINT.COM.AU



1 EXISTING SITE PLAN

SK-31 SCALE 1 : 1000

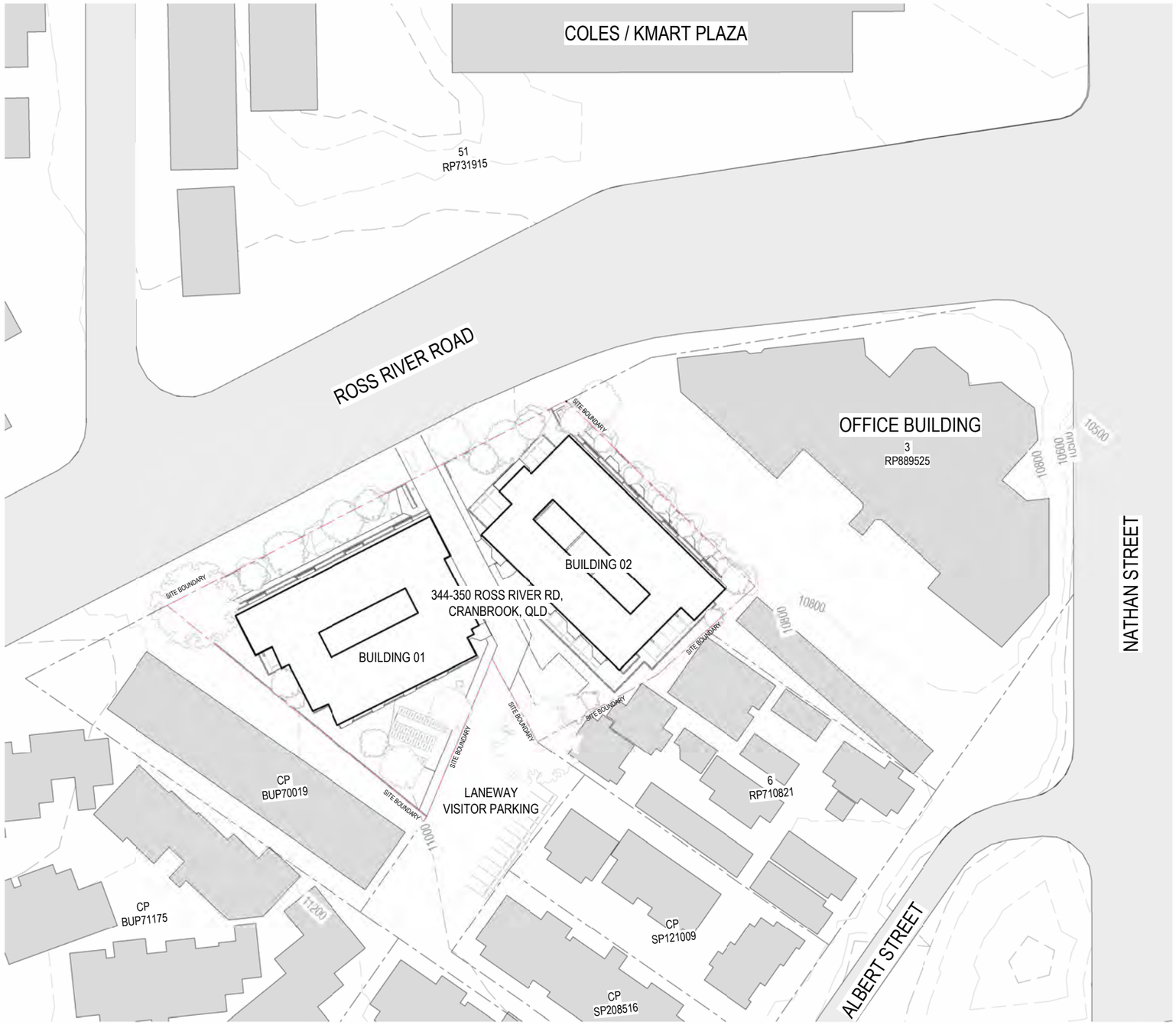
NOTE:
LOCATION OF LEVELS, BOUNDARIES, SERVICES TO BE CONFIRMED BY SURVEYOR

PROJECT	CLIENT DETAILS	TITLE	PROJECT NO.	DATE	DRAWING No.	ISSUE
ROSS RIVER ROAD RESIDENTIAL **344/346 & 350 ROSS RIVER RD** **CRANBROOK, QLD, 4814**		**EXISTING SITE PLAN**	**25869**	**19.06.25**	**SK-10**	**P2**

N

COUNTERPOINT

19/06/2025 12:46:08 PM



1 **PROPOSED SITE PLAN**
SK-31 SCALE 1 : 1000

NOTE:
LOCATION OF LEVELS, BOUNDARIES, SERVICES TO BE CONFIRMED BY SURVEYOR

PROJECT	CLIENT DETAILS	TITLE	PROJECT NO.	DATE	DRAWING No.	ISSUE
ROSS RIVER ROAD RESIDENTIAL **344/346 & 350 ROSS RIVER RD** **CRANBROOK, QLD, 4814**		**PROPOSED SITE PLAN**	**25869**	**19.06.25**	**SK-20**	**P2**

N

COUNTERPOINT

19/06/2025 12:46:12 PM

ROSS RIVER ROAD

SCALE BAR 1:300

ENTRY

SITE BOUNDARY

LINE OF SETBACK

MAIL

OFFICE

51 CAR PARKS

LIFT

BIN

BUILDING 1 ENTRY

OPEN ABOVE

POTENTIAL LINE OF SECURITY

CP BUP70019

SECURED BICYCLE PARKING

LANEWAY ACCESS VISITOR PARKING

WASH BAY

REFUSE & COLLECTION

BOOSTER

PAD MOUNT

POTENTIAL LINE OF SECURITY

BUILDING 2 ENTRY

60 CAR PARKS (3 TANDEM)

TANDEM

EXISTING TREE

CAR PARK SUMMARY
User Class 1A
126 Car Parks
111 Residence
16 Visitors (Off Site)

DEPARTMENT OF HOUSING
1 Covered / Dwelling
Total
24

1 PROPOSED GROUND PLAN

SK-31 SCALE 1 : 300

PROJECT	CLIENT DETAILS	TITLE	PROJECT NO.	DATE	DRAWING No.	ISSUE
ROSS RIVER ROAD RESIDENTIAL **344/346 & 350 ROSS RIVER RD** **CRANBROOK, QLD, 4814**		**PROPOSED FLOOR PLAN - GROUND**	**25869**	**19.06.25**	**SK-21**	**P2**

COUNTERPOINT

19/06/2025 12:46:20 PM

ROSS RIVER ROAD

SCALE BAR 1:300

APARTMENT TYPOLOGY

- 1 Bed
- 2 Bed
- 3 Bed

APARTMENT YIELD

Levels 1-3
6 x 1 Bed
14 x 2 Bed
2 x 3 Bed

Top Level
3 x 1 Bed
0 x 2 Bed
12 x 3 Bed

DEPARTMENT OF HOUSING

Levels 1-3
3 x 1 Bed Gold
3 x 1 Bed Silver
1 x 2 Bed Platinum

Top Level
3 x 1 Bed Silver

Total
24 Units

1 PROPOSED TYPICAL

SK-31 SCALE 1 : 300

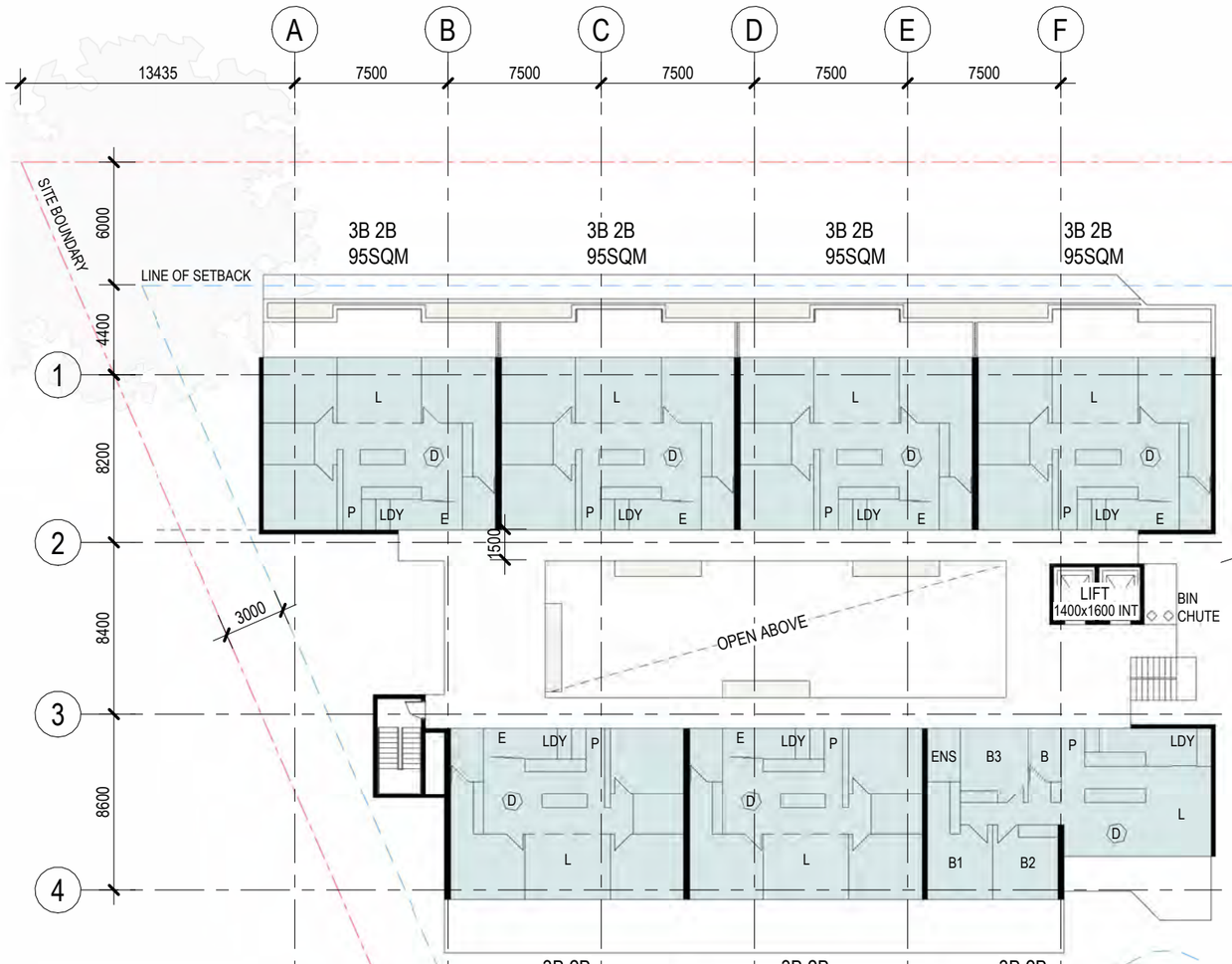
PROJECT	CLIENT DETAILS	TITLE	PROJECT NO.	DATE	DRAWING No.	ISSUE
ROSS RIVER ROAD RESIDENTIAL **344/346 & 350 ROSS RIVER RD** **CRANBROOK, QLD, 4814**		**PROPOSED FLOOR PLAN - FIRST LEVEL**	**25869**	**19.06.25**	**SK-29**	**P2**

COUNTERPOINT

19/06/2025 12:46:31 PM

ROSS RIVER ROAD

SCALE BAR 1:300



APARTMENT TYPOLOGY

- 1 Bed
- 2 Bed
- 3 Bed

APARTMENT YIELD

Levels 1-3
6 x 1 Bed
14 x 2 Bed
2 x 3 Bed

Top Level
3 x 1 Bed
0 x 2 Bed
12 x 3 Bed

DEPARTMENT OF HOUSING

Levels 1-3
3 x 1 Bed Gold
3 x 1 Bed Silver
1 x 2 Bed Platinum

Top Level
3 x 1 Bed Silver

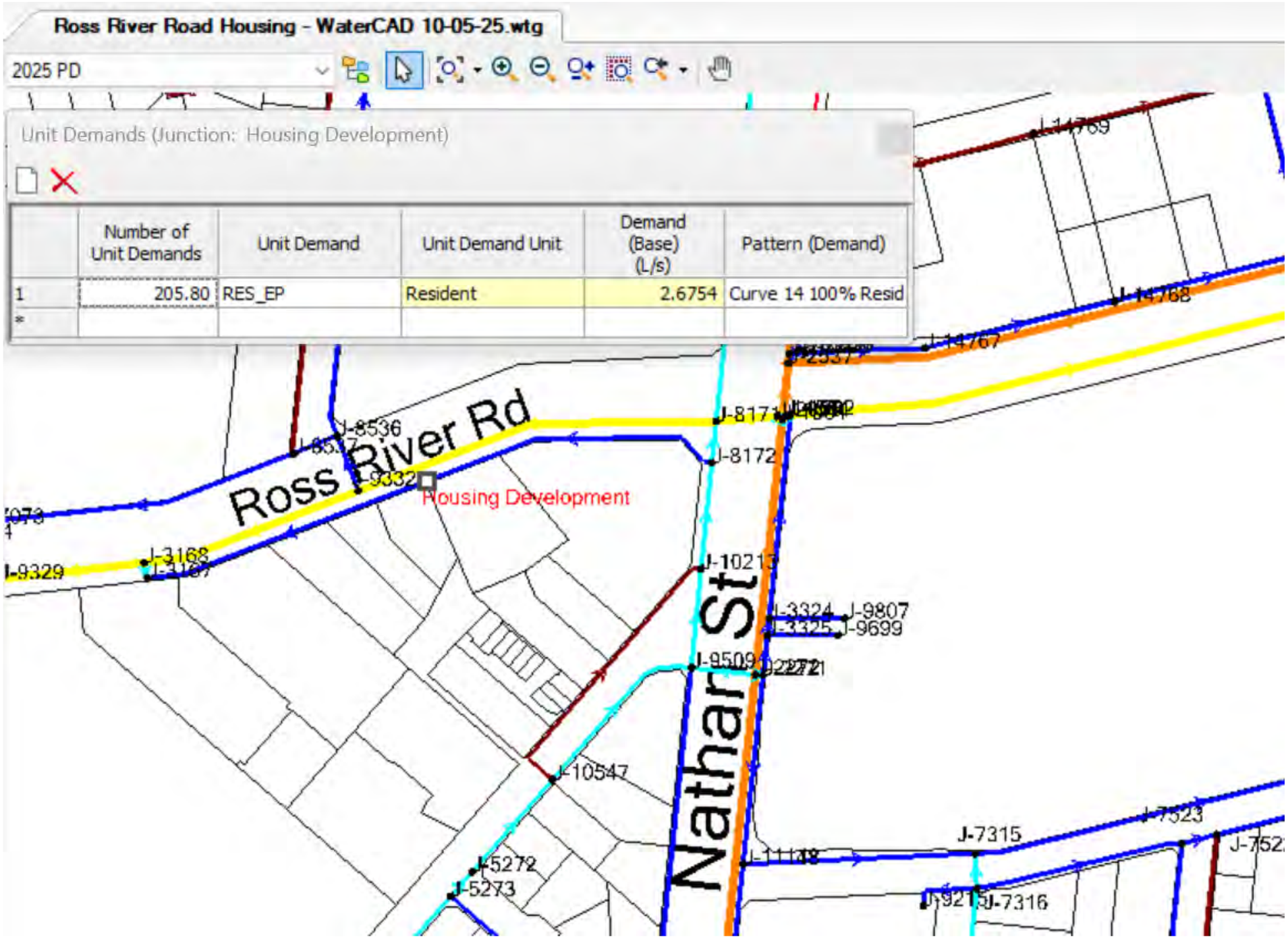
Total
24 Units

PROJECT	CLIENT DETAILS	TITLE	PROJECT NO.	DATE	DRAWING No.	ISSUE
ROSS RIVER ROAD RESIDENTIAL **344/346 & 350 ROSS RIVER RD** **CRANBROOK, QLD, 4814**		**PROPOSED FLOOR PLAN - LEVEL 4**	**25869**	**19.06.25**	**SK-30**	**P2**

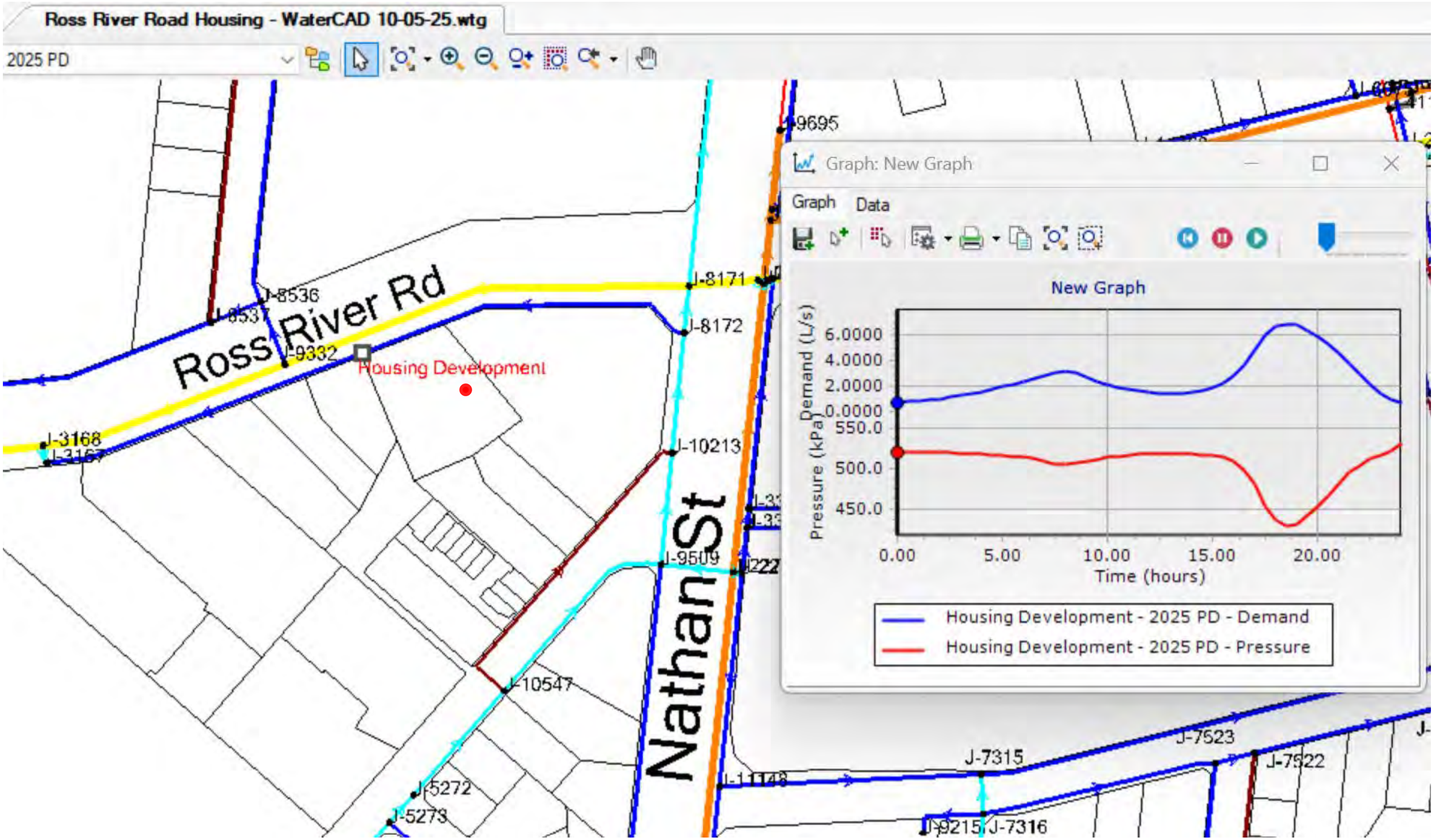
COUNTERPOINT

19/06/2025 12:46:36 PM

APPENDIX B
WATERGEMS MODELLING RESULTS



WATERGEMS Model With 81 Residential Units - Water Demand Added



Peak Hour Pressure at Unit Development Node

Ross River Road Housing - WaterCAD 10-05-25.wtg

2025 PD

Ross River Rd

Housing Development

Nathan St

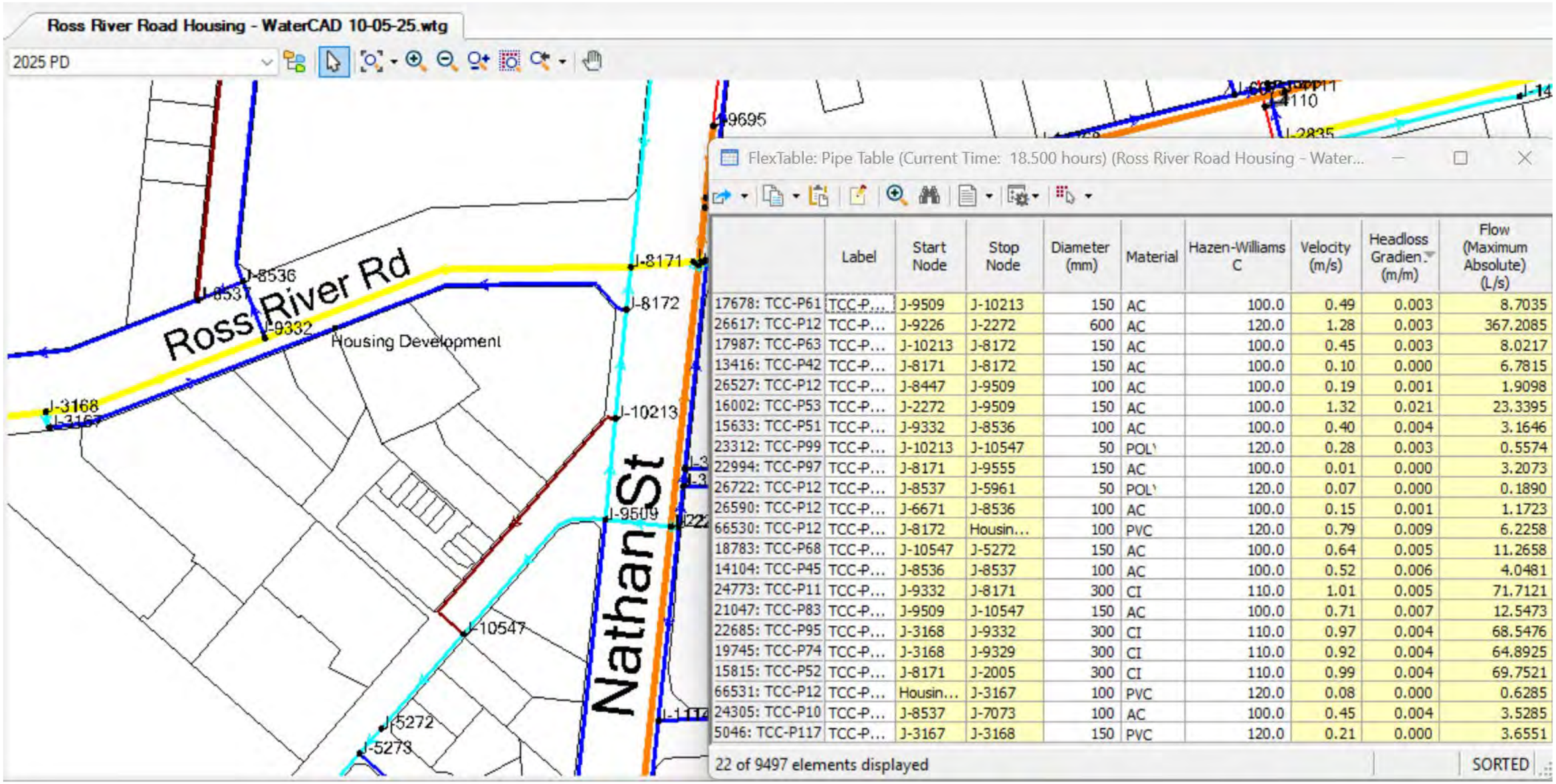
J-8536
J-8537
J-9332
J-3168
J-3167
J-8171
J-8172
J-10213
J-9509
J-10547
J-5272
J-5273
J-3324
J-3325
J-7315
J-7523
J-7522
J-9215
J-7316
J-9695
J-14768
J-14767

FlexTable: Junction Table (Current Time: 1...

	Label	Elevation (m)	Demand (L/s)	Pressure (kPa)
66529: Housing	Housing De...	11.27	6.8490	429.1
17679: J-10213	J-10213	10.43	0.1301	453.0
16003: J-9509	J-9509	10.72	0.5800	451.8
5047: J-3167	J-3167	11.92	3.0319	423.0
14105: J-8536	J-8536	11.26	0.2888	433.4
18784: J-10547	J-10547	10.72	1.8389	445.6
14106: J-8537	J-8537	11.30	0.6591	431.6
5048: J-3168	J-3168	11.52	0.0000	426.9
13417: J-8171	J-8171	10.78	0.0000	448.0
13418: J-8172	J-8172	10.60	0.0000	449.8
15634: J-9332	J-9332	11.20	0.0000	435.0

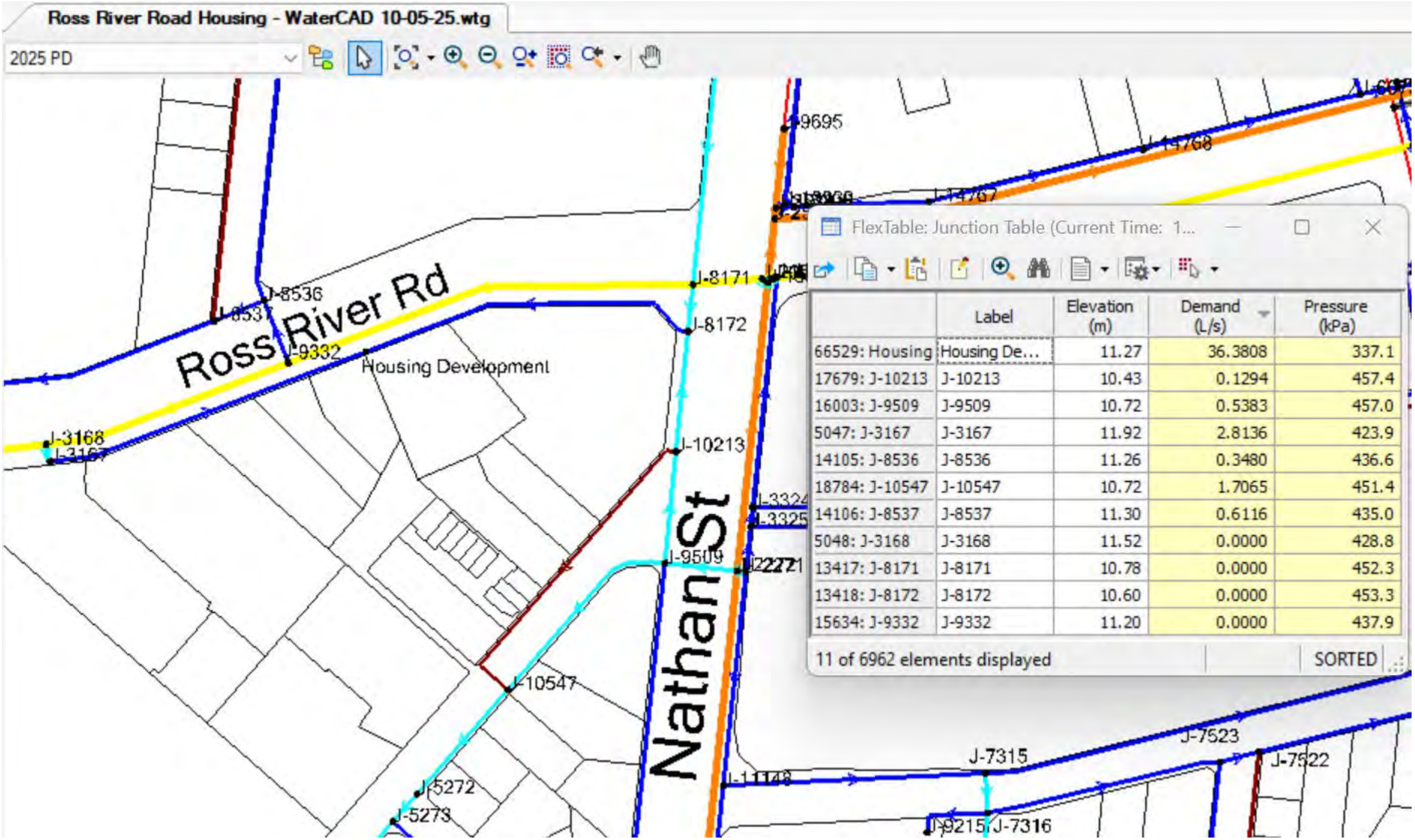
11 of 6962 elements displayed | SORTED

Peak Hour Node Modelling Results – 6:30 pm



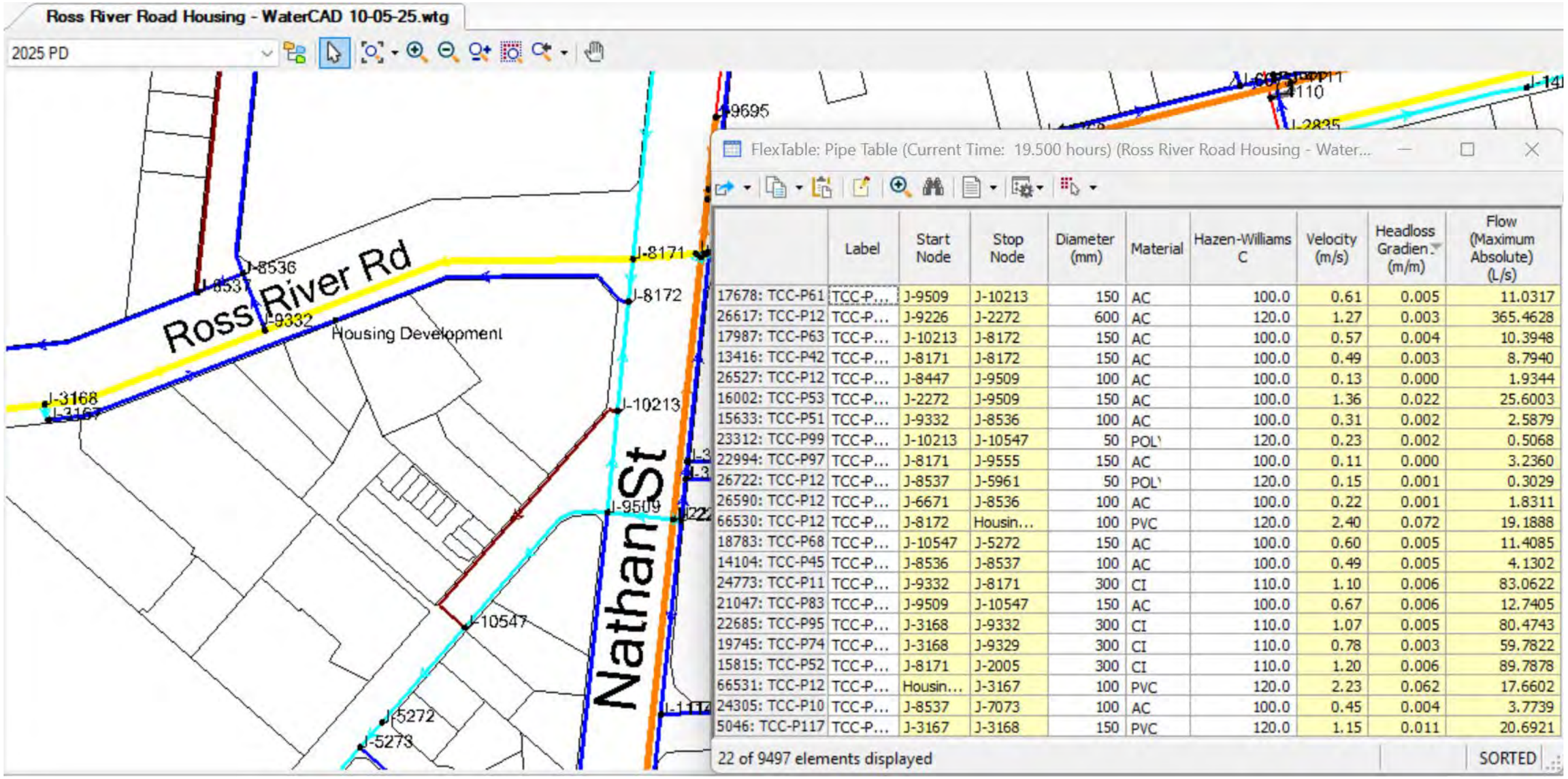
	Label	Start Node	Stop Node	Diameter (mm)	Material	Hazen-Williams C	Velocity (m/s)	Headloss Gradien... (m/m)	Flow (Maximum Absolute) (L/s)
17678: TCC-P61	TCC-P...	J-9509	J-10213	150	AC	100.0	0.49	0.003	8.7035
26617: TCC-P12	TCC-P...	J-9226	J-2272	600	AC	120.0	1.28	0.003	367.2085
17987: TCC-P63	TCC-P...	J-10213	J-8172	150	AC	100.0	0.45	0.003	8.0217
13416: TCC-P42	TCC-P...	J-8171	J-8172	150	AC	100.0	0.10	0.000	6.7815
26527: TCC-P12	TCC-P...	J-8447	J-9509	100	AC	100.0	0.19	0.001	1.9098
16002: TCC-P53	TCC-P...	J-2272	J-9509	150	AC	100.0	1.32	0.021	23.3395
15633: TCC-P51	TCC-P...	J-9332	J-8536	100	AC	100.0	0.40	0.004	3.1646
23312: TCC-P99	TCC-P...	J-10213	J-10547	50	POL'	120.0	0.28	0.003	0.5574
22994: TCC-P97	TCC-P...	J-8171	J-9555	150	AC	100.0	0.01	0.000	3.2073
26722: TCC-P12	TCC-P...	J-8537	J-5961	50	POL'	120.0	0.07	0.000	0.1890
26590: TCC-P12	TCC-P...	J-6671	J-8536	100	AC	100.0	0.15	0.001	1.1723
66530: TCC-P12	TCC-P...	J-8172	Housin...	100	PVC	120.0	0.79	0.009	6.2258
18783: TCC-P68	TCC-P...	J-10547	J-5272	150	AC	100.0	0.64	0.005	11.2658
14104: TCC-P45	TCC-P...	J-8536	J-8537	100	AC	100.0	0.52	0.006	4.0481
24773: TCC-P11	TCC-P...	J-9332	J-8171	300	CI	110.0	1.01	0.005	71.7121
21047: TCC-P83	TCC-P...	J-9509	J-10547	150	AC	100.0	0.71	0.007	12.5473
22685: TCC-P95	TCC-P...	J-3168	J-9332	300	CI	110.0	0.97	0.004	68.5476
19745: TCC-P74	TCC-P...	J-3168	J-9329	300	CI	110.0	0.92	0.004	64.8925
15815: TCC-P52	TCC-P...	J-8171	J-2005	300	CI	110.0	0.99	0.004	69.7521
66531: TCC-P12	TCC-P...	Housin...	J-3167	100	PVC	120.0	0.08	0.000	0.6285
24305: TCC-P10	TCC-P...	J-8537	J-7073	100	AC	100.0	0.45	0.004	3.5285
5046: TCC-P117	TCC-P...	J-3167	J-3168	150	PVC	120.0	0.21	0.000	3.6551

Peak Hour Pipes Modelling Results – 6:30 pm



	Label	Elevation (m)	Demand (L/s)	Pressure (kPa)
66529: Housing	Housing De...	11.27	36.3808	337.1
17679: J-10213	J-10213	10.43	0.1294	457.4
16003: J-9509	J-9509	10.72	0.5383	457.0
5047: J-3167	J-3167	11.92	2.8136	423.9
14105: J-8536	J-8536	11.26	0.3480	436.6
18784: J-10547	J-10547	10.72	1.7065	451.4
14106: J-8537	J-8537	11.30	0.6116	435.0
5048: J-3168	J-3168	11.52	0.0000	428.8
13417: J-8171	J-8171	10.78	0.0000	452.3
13418: J-8172	J-8172	10.60	0.0000	453.3
15634: J-9332	J-9332	11.20	0.0000	437.9

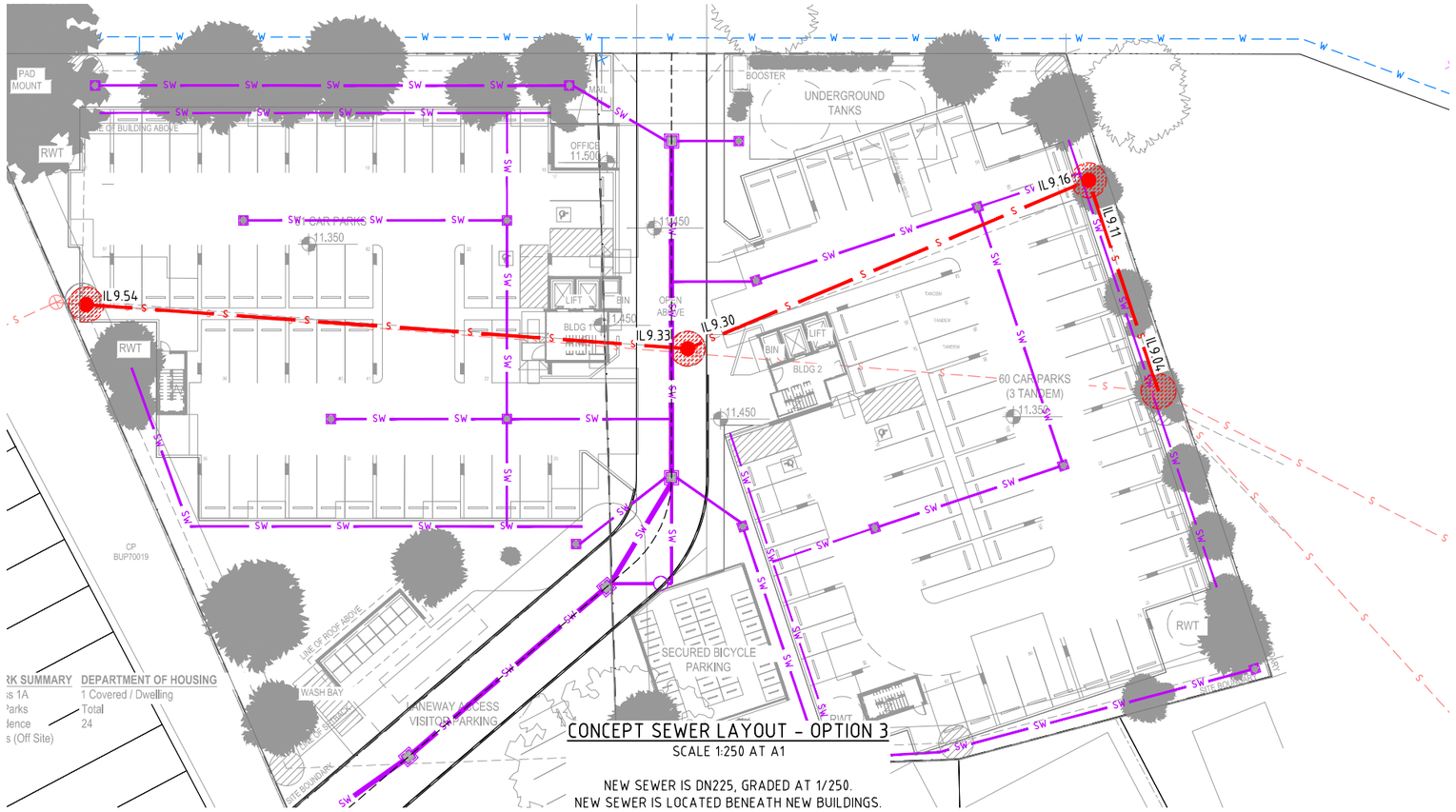
Peak Hour Node + 30 l/s Commercial Fire Flow Results – 6:30 pm



	Label	Start Node	Stop Node	Diameter (mm)	Material	Hazen-Williams C	Velocity (m/s)	Headloss Gradien (m/m)	Flow (Maximum Absolute) (L/s)
17678: TCC-P61	TCC-P...	J-9509	J-10213	150	AC	100.0	0.61	0.005	11.0317
26617: TCC-P12	TCC-P...	J-9226	J-2272	600	AC	120.0	1.27	0.003	365.4628
17987: TCC-P63	TCC-P...	J-10213	J-8172	150	AC	100.0	0.57	0.004	10.3948
13416: TCC-P42	TCC-P...	J-8171	J-8172	150	AC	100.0	0.49	0.003	8.7940
26527: TCC-P12	TCC-P...	J-8447	J-9509	100	AC	100.0	0.13	0.000	1.9344
16002: TCC-P53	TCC-P...	J-2272	J-9509	150	AC	100.0	1.36	0.022	25.6003
15633: TCC-P51	TCC-P...	J-9332	J-8536	100	AC	100.0	0.31	0.002	2.5879
23312: TCC-P99	TCC-P...	J-10213	J-10547	50	POL'	120.0	0.23	0.002	0.5068
22994: TCC-P97	TCC-P...	J-8171	J-9555	150	AC	100.0	0.11	0.000	3.2360
26722: TCC-P12	TCC-P...	J-8537	J-5961	50	POL'	120.0	0.15	0.001	0.3029
26590: TCC-P12	TCC-P...	J-6671	J-8536	100	AC	100.0	0.22	0.001	1.8311
66530: TCC-P12	TCC-P...	J-8172	Housin...	100	PVC	120.0	2.40	0.072	19.1888
18783: TCC-P68	TCC-P...	J-10547	J-5272	150	AC	100.0	0.60	0.005	11.4085
14104: TCC-P45	TCC-P...	J-8536	J-8537	100	AC	100.0	0.49	0.005	4.1302
24773: TCC-P11	TCC-P...	J-9332	J-8171	300	CI	110.0	1.10	0.006	83.0622
21047: TCC-P83	TCC-P...	J-9509	J-10547	150	AC	100.0	0.67	0.006	12.7405
22685: TCC-P95	TCC-P...	J-3168	J-9332	300	CI	110.0	1.07	0.005	80.4743
19745: TCC-P74	TCC-P...	J-3168	J-9329	300	CI	110.0	0.78	0.003	59.7822
15815: TCC-P52	TCC-P...	J-8171	J-2005	300	CI	110.0	1.20	0.006	89.7878
66531: TCC-P12	TCC-P...	Housin...	J-3167	100	PVC	120.0	2.23	0.062	17.6602
24305: TCC-P10	TCC-P...	J-8537	J-7073	100	AC	100.0	0.45	0.004	3.7739
5046: TCC-P117	TCC-P...	J-3167	J-3168	150	PVC	120.0	1.15	0.011	20.6921

Peak Hour Pipes + 30 l/s Commercial Fire Flow Modelling Results – 6:30 pm

APPENDIX C
SEWERGEMS MODELLING RESULTS & FIGURES



CONCEPT SEWER LAYOUT - OPTION 3

SCALE 1:250 AT A1

NEW SEWER IS DN225, GRADED AT 1/250.
NEW SEWER IS LOCATED BENEATH NEW BUILDINGS.

RK SUMMARY — DEPARTMENT OF HOUSING
is 1A — 1 Covered / Dwelling
Parks — Total
dence — 24
s (Off Site)

NOTES:

- REDUNDANT SEWER PIPES AND MANHOLES ARE TO BE REMOVED.
- FINAL SEWER ALIGNMENT TO BE CLEAR OF BUILDING FOOTINGS.
- STRUCTURAL DESIGN OF FOOTINGS WILL ENSURE NO LOAD WILL BE IMPOSED ON SEWER PIPES.

LEGEND

- EXISTING STORMWATER
- EXISTING SEWER MAIN
- EXISTING WATER MAIN
- NEW STORMWATER
- NEW SEWER
- 3m DIAMETER CLEARANCE

-5 0 5 10

SCALE OF METRES 1:250 AT A1 & 1:500 AT A3

B	CONCEPT	AC	2/10/25
A	CONCEPT	AC	9/9/25
REVISION		APP'D	DATE

CONCEPT

JAS-ANZ — WWW.JAS-ANZ.ORG/REGISTER — QSERC ISO 9001

LCJ ENGINEERS
LCJ Engineers Pty Ltd
ABN 54 131 516 446
601 Flinders Street, Townsville QLD 4810
PO Box 1498, Aitkenvale QLD 4814
Tel: (07) 4721 5800
townsville@lcjengineers.com.au
www.lcjengineers.com.au

DRAWN	DESIGNED
AC	
APPROVED	DATE
RPEQ:	

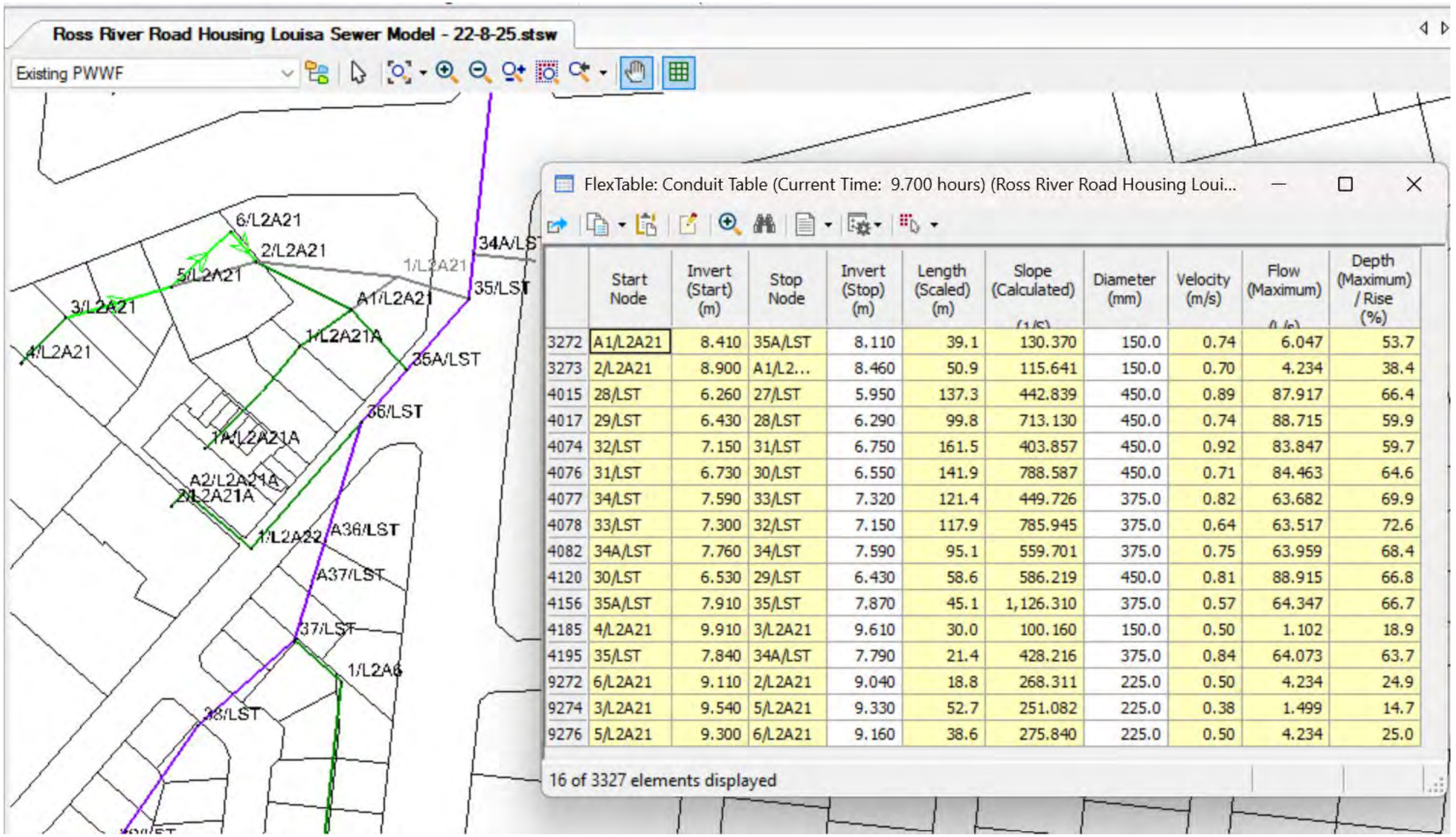
CLIENT
HURST CONSTRUCTIONS

PROJECT
ROSS RIVER RESIDENTIAL

344-350 ROSS RIVER RD
AITKENVALE

DRAWING
CONCEPT SEWER - OPT 3

NUMBER	SHEET NO.	REVISION
HURA018	SK05	B



	Start Node	Invert (Start) (m)	Stop Node	Invert (Stop) (m)	Length (Scaled) (m)	Slope (Calculated) (1/s)	Diameter (mm)	Velocity (m/s)	Flow (Maximum) (l/s)	Depth (Maximum) / Rise (%)
3272	A1/L2A21	8.410	35A/LST	8.110	39.1	130.370	150.0	0.74	6.047	53.7
3273	2/L2A21	8.900	A1/L2...	8.460	50.9	115.641	150.0	0.70	4.234	38.4
4015	28/LST	6.260	27/LST	5.950	137.3	442.839	450.0	0.89	87.917	66.4
4017	29/LST	6.430	28/LST	6.290	99.8	713.130	450.0	0.74	88.715	59.9
4074	32/LST	7.150	31/LST	6.750	161.5	403.857	450.0	0.92	83.847	59.7
4076	31/LST	6.730	30/LST	6.550	141.9	788.587	450.0	0.71	84.463	64.6
4077	34/LST	7.590	33/LST	7.320	121.4	449.726	375.0	0.82	63.682	69.9
4078	33/LST	7.300	32/LST	7.150	117.9	785.945	375.0	0.64	63.517	72.6
4082	34A/LST	7.760	34/LST	7.590	95.1	559.701	375.0	0.75	63.959	68.4
4120	30/LST	6.530	29/LST	6.430	58.6	586.219	450.0	0.81	88.915	66.8
4156	35A/LST	7.910	35/LST	7.870	45.1	1,126.310	375.0	0.57	64.347	66.7
4185	4/L2A21	9.910	3/L2A21	9.610	30.0	100.160	150.0	0.50	1.102	18.9
4195	35/LST	7.840	34A/LST	7.790	21.4	428.216	375.0	0.84	64.073	63.7
9272	6/L2A21	9.110	2/L2A21	9.040	18.8	268.311	225.0	0.50	4.234	24.9
9274	3/L2A21	9.540	5/L2A21	9.330	52.7	251.082	225.0	0.38	1.499	14.7
9276	5/L2A21	9.300	6/L2A21	9.160	38.6	275.840	225.0	0.50	4.234	25.0

PWWF Sewer Capacity Assessment Results

APPENDIX E

Stormwater Management Plan prepared by LCJ Engineers

LCJ Engineers Pty Ltd
Consulting Engineers
ABN 54 131 516 446
601 Flinders Street Townsville QLD 4810
PO Box 1498 Aitkenvale QLD 4814
Tel: (07) 4721 5800
townsville@lcjengineers.com.au
www.lcjengineers.com.au

HURA018/AC/DN

14 October 2025

Hurst Constructions Qld
446 Ingham Road
GARBUTT Qld 4814

ATTENTION: Mr Jarrod Hurst

Dear Jarrod

AFFORDABLE HOUSING
344-350 ROSS RIVER ROAD, CRANBROOK
STORMWATER MANAGEMENT PLAN

LCJ Engineers (LCJ) has been commissioned to provide a Stormwater Management Plan in support of the abovementioned development. The proposed development involves a Development Permit for a Material Change of Use (multiple dwelling) and the site is located at the listed properties below:

- 344-346 Ross River Road (lot 3/SP146326); and
- 350 Ross River Road (lots 1/RP721729 and 2/RP721729).

The proposed development consists of buildings, carpark and landscaping areas. A concept architectural layout plan is attached to this report. The proposed development will also include external roadworks for rear access and carparking, as per Council agreement during the pre-lodgement meeting.

The site is currently composed of two (2) residential properties, is generally on flat ground, and is located within the Medium Density Residential zone in Cranbrook. The site is adjacent to the Aitkenvale Major Centre Precinct.

This report is aimed at addressing the site stormwater management, including the pre and post-development flows, and the stormwater quality. A separate report will address the site flooding issue (by others).

Stormwater Management Plan

Lawful point of discharge

The site is bordered by Ross River Road to the northwest, existing properties to the east and west, and Council road reserve to the south. The site is currently falling towards the south and discharging towards an existing lot (office carpark of a special precinct centre). In general, the lawful point of discharge is towards the Council road reserve.

It is to be noted that generally, DTMR preference is to have minimal discharge onto their State-Controlled road. Therefore, the proposed development is to have the majority of the site runoff to discharge onto the Council road reserve and along the laneway towards Albert Street.

Development stormwater flows

The pre-existing site condition has been adopted as the base for determining pre-development stormwater flows (i.e. residential lands with houses built). The pre-development site condition breakdown is shown in Table 1 and Figure 1.

It is to be noted that the minimum fraction of non-zero fraction of impervious from QUDM Table 4.53 is 0.2. Therefore, the adopted fraction of impervious for the predevelopment is 0.2.

Table 1 – Post-development Site characteristics

Area type	Area (m^2)
Roof	549
Total lot area	5254.4
Fraction Impervious (f_i)	0.10 (adopted 0.2)

The pre-development flows are summarised in Table 2.

Figure 1 – Pre-development site characteristics. Source: TownsvilleMAPS

The stormwater drainage flows were calculated using the rational method for the purposes of determining onsite detention. The time of concentration was determined to be 50 minutes based on Friend's equation for 65m long flow path along short grass paddock.

$Q_y = C_y.{}^tI_y.A/360$ *(QUDM - Equation 4.2)*

Where:

Q_y	=	Peak flow rate (m^3/s) for annual exceedance probability (AEP) of 1 in '*y*' years
y	=	Average recurrence Interval (ARI) in years
C_y	=	Coefficient of discharge (dimensionless) for AEP of 1 in '*y*' years
F_y	=	Frequency Factor – As per QUDM Table 4.5.2
C_{10}	=	10-year discharge coefficient – As per QUDM Table 4.5.3
${}^1I_{10}$	=	1-hour rainfall intensity for the 10-year ARI (10% AEP)
	=	74.9 mm/hr for Aitkenvale
A	=	Area of catchment (ha)
	=	0.525
${}^tI_y$	=	Average rainfall intensity (mm/hr) for a design duration of 't' hours/minutes and an AEP of 1 in 'y' years
t	=	The nominal design storm defined by the time of concentration
	=	50 minutes
f_i	=	Fraction impervious (adopted)
	=	0.20

Table 2 – Pre-developed flows

Hydrology event	Pre-developed case *i.e. f_i = 0.20, t_c = 50 mins, C_{10} = 0.74*		
	C_y	${}^tI_y$ (mm/hr)	Q (L/s)
63% AEP (1-year ARI)	0.59	44	38.4
39% AEP (2-year ARI)	0.63	51	46.6
18% AEP (5-year ARI)	0.70	70	71.6
10% AEP (10-year ARI)	0.74	82	88.9
5% AEP (20-year ARI)	0.78	94	106.9
2% AEP (50-year ARI)	0.85	110	136.1
1% AEP (100-year ARI)	0.89	121	156.7

The breakdown of the developed site area adopted in our stormwater calculations is shown in Table 3. The post-development flows are summarised in Table 4.

Table 3 – Post-development site characteristics

Area type	Area (m^2)
Building footprint / roof	2698.4
Driveway and footpath (beyond roof)	882.2
Total impervious	3580.6
Total lot area	5254.4
Fraction Impervious (f_i)	0.68

Table 4 – Post-developed flows

Hydrology event	Post-developed case f_i = 0.68, t_c = 5 mins, C_{10} = 0.84		
	C_y	^tI_y (mm/hr)	Q (L/s)
63% AEP (1-year ARI)	0.67	111	108.3
39% AEP (2-year ARI)	0.71	127	131.3
18% AEP (5-year ARI)	0.79	174	201.8
10% AEP (10-year ARI)	0.84	205	250.1
5% AEP (20-year ARI)	0.88	234	300.1
2% AEP (50-year ARI)	0.96	271	380.9
1% AEP (100-year ARI)	1.00	299	436.34

'Simplistic' guidance on initial sizing of detention basins is not provided in QUDM 2016 but is provided in Section 5.05.1 of QUDM 2007. The formulae to determine the initial basin sizing are as follows:

V_s/V_i	=	r(1+2r)/3	*Culp – 1948*	*Equation 5.01*
V_s/V_i	=	r	*Boyd – 1989*	*Equation 5.02*
V_s/V_i	=	r(3+5r)/8	*Carroll – 1990*	*Equation 5.03*
V_s/V_i	=	r(2+r)/3	*Basha – 1994*	*Equation 5.04*

Where:

V_s	=	Initial Basin Sizing
r	=	Reduction Ratio
	=	$(Q_i-Q_o)/Q_i$
Q_i	=	Post development flow
Q_o	=	Predevelopment flow
V_i	=	Initial estimate of the inflow volume
	=	$4t_cQ_i/3$ – if rational method used to determine Q_i

For a reduction ratio of greater than 0.6, the recommended formula for initial basin sizing is the Culp Equation.

Table 5 –Pre versus post-development stormwater flows

Hydrology event	Pre-development Flow, Q_o (L/sec)	Post-development Flow, Q_i (L/sec)	Reduction Ratio (r)	V_i (m^3)	V_s (m^3)
63% AEP (1-year ARI)	38.4	108.3	0.65	43.3	21.3
39% AEP (2-year ARI)	46.6	131.3	0.65	52.5	25.9
18% AEP (5-year ARI)	71.6	201.8	0.65	80.7	39.8
10% AEP (10-year ARI)	88.9	250.1	0.64	100.1	49.2
5% AEP (20-year ARI)	106.9	300.1	0.64	120.0	58.9
2% AEP (50-year ARI)	136.1	380.9	0.64	152.4	74.6
1% AEP (100-year ARI)	156.7	436.34	0.64	174.54	85.1

The proposed development therefore will increase the post-development storm flows. Using initial sizing methods (Culp Equation) the required additional flood storage for the increase in impervious area is 85.1kL for a 1% AEP event.

The required flood storage can be achieved by installing four (4) above ground rainwater tanks (23.65kL each), with a total storage of 94.6kL. The rainwater tanks will be used to detain the excess discharge from the proposed development. To be effective as stormwater detention, the storage tank must fully discharge over a period of around 12 to 24 hours. To achieve the necessary decant rate for the detention tank, the tank is required to be fitted with a 15mm diameter outlet orifice.

Stormwater Quality Management Plan

Water quality modelling has been undertaken of the post-development (mitigated) scenario using the Model for Urban Stormwater Improvement Conceptualisation (MUSIC) software (Version 6.3.0) to calculate the target reduction criteria as specified in the TCC City Plan, Section SC6.4.10 - *Stormwater Quality*. A stormwater treatment train has been developed and modelled for the site to determine the effectiveness of the proposed system in achieving the relevant water quality objectives.

The Environmental Values (EVs) of the receiving environment and the Water Quality Objective (WQOs) for stormwater discharges from the site have been identified for the development using the TCC City Plan as listed on Table 6.

The Stormwater Quality Management Plan uses split catchment land use pollutant export parameters based on the “MUSIC Modelling Guidelines, Version 3.0 - 2018” for the current proposed development.

Table 6 – Environmental values and water quality objective

Environmental Value (EV)	Water Quality Objective (WQO) TCC City Plan - Minimum load reduction
Total Suspended Solids (TSS)	80%
Total Phosphorus (TP)	65%
Total Nitrogen (TN)	40%
Gross Pollutants (GP)	90%

Reference TCC City Plan Clause SC6.4.10.2 (3)

The rainfall parameters used in the design of the SQMP have been sourced from the Bureau of Meteorology (BOM) and are summarised in Table 7.

The MUSIC guidelines are included with the MUSIC modelling software and were prepared by Water by Design MUSIC Modelling. Where these guidelines have recommended using locally derived catchment parameters, the following guides listed in order of precedence, have been used:

- Townsville City Council document, Townsville City Plan February 2022 (TCC City Plan);
- Water by Design, “MUSIC Modelling Guidelines November 2018”.
- Mackay Regional Council publication, “Mackay Regional Council Music Guidelines – Version 1.1 (September 2008)”; and
- Brisbane City Council publication, “Guidelines for Pollutant Export Modelling in Brisbane Version 7”.

Table 7 – Runoff parameters

Input parameter	Data used in modelling
Rainfall station	032040 TOWNSVILLE AERO
Time step	6 minutes
Modelling period	1970-1983
Mean annual rainfall (mm)	1031mm
Evapotranspiration	1143mm
Rainfall runoff parameters	Commercial and industrial
Pollutant export parameters	Commercial

The Mackay Regional Council MUSIC Guidelines Version 1.1 (September 2008) defines the soil categories set out in Table 8.

Table 8 – Soil categories

Soil category to be adopted for selecting MUSIC rainfall runoff parameters	Description
Upland	Soils of uplands derived from acid crystalline tuffs on 1-4% slope. Soils of uplands derived from acid to intermediate intrusive and dykes. Soils of uplands derived from basic to intermediate volcanoes on 2-8% slopes. Soils of uplands derived from sedimentary rocks on 2-8% slopes.
Lowland	Soils types not covered by other two (2) soil categories.
Sandy	Soils of the beach ridges and coastal dunes.

The site is not in an ‘upland’ and is not a beach ridge or coastal dune. This site has been assumed to have a ‘Lowland’ soil category.

Developed site with stormwater treatment measures

A schematic of the post-developed site with treatment measures is shown in Figure 2. The schematic details the concept configuration of the proposed treatment train of water quality improvement measures that will be implemented. Generally, the proposed development will utilise stormwater quality measures including eight (8) x Atlan StormSacks and Atlan FlowFilter (or approved equivalent). Refer also attached sketch **SK03** for the concept stormwater layout.

Details of stormwater treatment devices and underground stormwater network will be provided in the detailed design phase of the development.

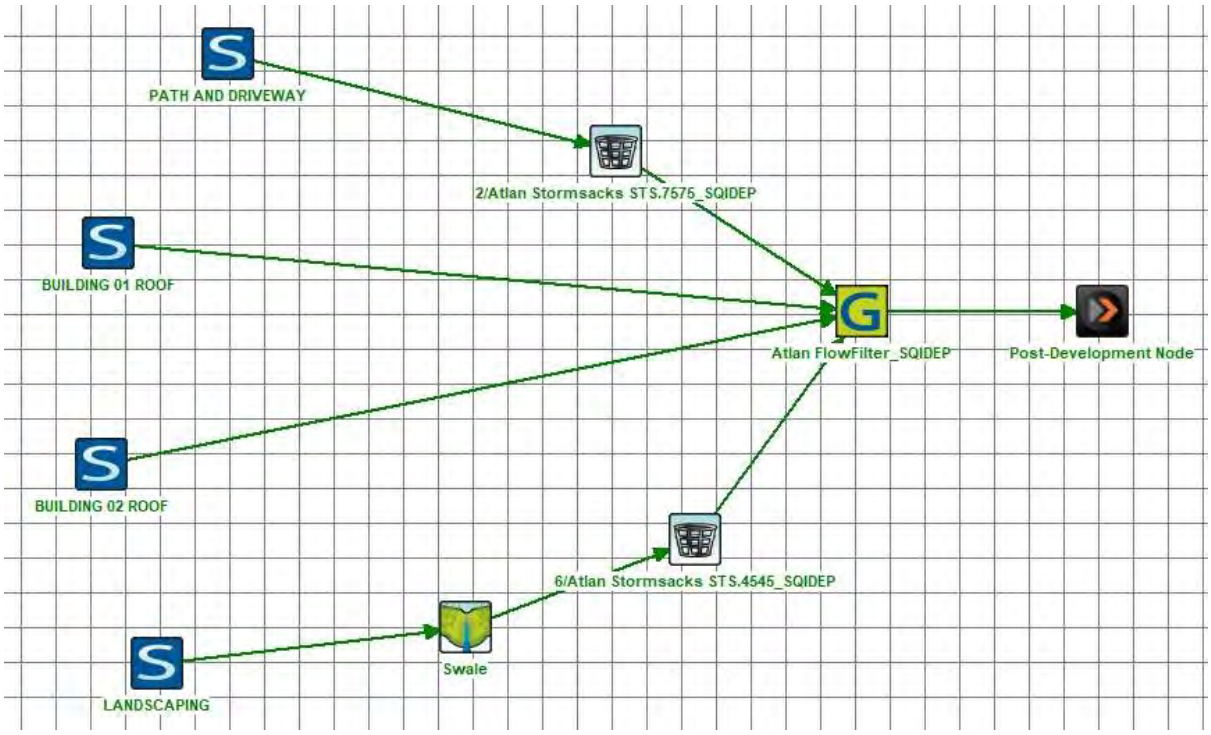


Figure 2 - MUSIC treatment train model of post-developed site with treatment measures installed

The results of the MUSIC modelling for the proposed development with our proposed treatment train at “Outlet” node are shown in Figure 3.

	Sources	Residual Load	% Reduction
Flow (ML/yr)	4.05	4.01	1
Total Suspended Solids (kg/yr)	394	62.4	84.2
Total Phosphorus (kg/yr)	1.05	0.231	78.1
Total Nitrogen (kg/yr)	8.45	5.04	40.4
Gross Pollutants (kg/yr)	66	6.46	90.2

Figure 3 - MUSIC modelling results of post-developed site with treatment measures installed – using treatment devices as outlined in Table 4

As shown in Figure 3, the proposed stormwater treatment measures generally comply with TCC City Plan, Section SC6.4.10.2 (3). Therefore, the proposed development is not expected to have an adverse impact on the existing stormwater runoff quality.

Table 9 summarises our recommendation for stormwater treatment train solutions:

Table 9 – Proposed treatment train solutions

Catchment	Device 1	Device 2	Device 3	Outlet
Driveway and footpath	2 x Atlan StormSacks	-	Atlan FlowFilter FLF.1200 *(3 cartridges)*	Outlet node
Building 01	-	-		
Building 02				
Landscaped area	Grassed swales	6 x Atlan StormSacks		

In summary, if the proposed measures are implemented, the development site is not expected to have an adverse impact on the stormwater quality.

If we can be of further assistance, please advise Arry Charrismanagara of this office at your earliest convenience.

Yours faithfully

DE JOHNSTONE
MANAGER
BE (Hons), MIE Aust., CP Eng

ROSS RIVER ROAD

ENTRY

SITE BOUNDARY

BOOSTER

50K LITRE FIRE TANK

FIRE PUMP ROOM

LINE OF SETBACK

LINE OF BUILDING ABOVE

SWT

OFFICE 11.500

51 CAR PARKS

11.350

NEW DN225 PVC/HDPE

OPEN ABOVE

LIFT

BIN

BLDG 1

11.450

EXISTING SEWER TO BE RELOCATED (TBC)

BICYCLE PARKING

BLDG 2

60 CAR PARKS (3 TANDEM)

TANDEM

CP BUP70019

ABOVE GROUND 1500 LITRE OIL WATER SEPARATOR

BELOW GROUND PRECAST TRADEWASTE HOLDING TANK WITH 600 X 600 ACCESS

R PARK SUMMARY	DEPARTMENT OF HOUSING
ER CLASS 1A	1 COVERED / DWELLING
S CAR PARKS	TOTAL
) RESIDENCE	24
VISITORS (OFF SITE)	

NEW DN300 PVC/HDPE

LANEWAY ACCESS COUNCIL VEGETATED BUFFER

SERVICE ROAD

WASH BAY

PAD MOUNT

NEW DN375 RCP

EXISTING TREE

STORMWATER TREATMENT DEVICE (ATLAN FLOWFILTER, OR SIMILAR) INSTALLED IN OFFLINE ARRANGEMENT

NEW ACCESS ROAD (TBC)

CONNECT EXISTING SW TO NEW PIT

JOINS TOP RIGHT

JOINS BOTTOM LEFT

NEW STORMWATER CROSSES EXISTING SEWER DESIGN LEVELS TO BE CONFIRMED WITH DETAIL SURVEY

NEW DN375 RCP

EXISTING SEWER TO REMAIN

NEW KERB INLET PIT CONNECT TO EXISTING PIPE

EXISTING DN375 RCP TO REMAIN

ALBERT ST

CONCEPT STORMWATER LAYOUT
SCALE 1:200 AT A1

CONCEPT STORMWATER LAYOUT
SCALE 1:200 AT A1

LEGEND

- EXISTING STORMWATER
- EXISTING SEWER MAIN
- EXISTING WATER MAIN
- NEW STORMWATER
- GRASSED SWALE/GARDEN BED OVERLAND FLOW PATH

-4 0 4 8

SCALE OF METRES 1:200 AT A1 & 1:400 AT A3

REVISION		APP'D	DATE
C	CONCEPT	AC	10/10/25
B	CONCEPT	AC	03/10/25
A	CONCEPT	AC	09/09/25

CONCEPT

JAS-ANZ

LCJ ENGINEERS

LCJ Engineers Pty Ltd
ABN 54 131 516 446
601 Flinders Street, Townsville QLD 4810
PO Box 1498, Aitkenvale QLD 4814
Tel: (07) 4721 5800
townsville@lcjengineers.com.au
www.lcjengineers.com.au

DRAWN	DESIGNED
AC	AC
APPROVED	DATE
RPEQ:	

CLIENT
HURST CONSTRUCTIONS

PROJECT
ROSS RIVER RESIDENTIAL

344-350 ROSS RIVER RD
AITKENVALE

DRAWING
CONCEPT STORMWATER

NUMBER	SHEET NO.	REVISION
HURA018	SK03	C

Plot Date:10/10/2025 4:39 PM User: ACharrismanagara File Name: J:\HURA\HURA018 344-350 Ross River Rd, Aitkenvale\CAD\Civil\HURA018-CONCEPT

COUNTERPOINT

ROSS RIVER ROAD RESIDENTIAL

344/346 & 350 ROSS RIVER RD
CRANBROOK, QLD, 4814

REV

VIEW FROM ROSS RIVER ROAD

DRAWING LIST		
SHEET NUMBER	SHEET NAME	REVISION
DA-00	COVER SHEET	P5
DA-10	EXISTING SITE PLAN	P2
DA-11	DEMOLITION SITE PLAN	
DA-15	PROPOSED SITE PLAN	P5
DA-20	PROPOSED FLOOR PLAN - GROUND	P5
DA-21	PROPOSED FLOOR PLAN -LEVEL 1	P5
DA-22	PROPOSED FLOOR PLAN - LEVEL 2	P5
DA-23	PROPOSED FLOOR PLAN - LEVEL 3	P5
DA-24	PROPOSED FLOOR PLAN - LEVEL 4	P5
DA-25	PROPOSED ROOF PLAN	P5
DA-30	EXTERNAL WORKS - PART A	P5

DRAWING LIST		
SHEET NUMBER	SHEET NAME	REVISION
DA-31	EXTERNAL WORKS - PART B	P5
DA-32	EXTERNAL WORKS - PART C	P5
DA-40	SITE ELEVATIONS - SHEET 01	P5
DA-41	SITE ELEVATIONS - SHEET 02	P5
DA-45	BUILDING ELEVATIONS - SHEET 01	P5
DA-46	BUILDING ELEVATIONS - SHEET 02	P5
DA-47	BUILDING ELEVATIONS - SHEET 03	P5
DA-50	SECTION - SHEET 01	
DA-51	SECTION - SHEET 02	
DA-60	PERSPECTIVE - SHEET 01	
DA-61	PERSPECTIVE - SHEET 02	

DRAWING LIST		
SHEET NUMBER	SHEET NAME	REVISION
DA-62	PERSPECTIVE - SHEET 03	
DA-63	PERSPECTIVE - SHEET 04	
DA-70	DETAIL UNIT TYPE - SHEET 01	
DA-71	DETAIL UNIT TYPE - SHEET 02	
DA-72	DETAIL UNIT TYPE - SHEET 03	
DA-73	DETAIL UNIT TYPE - SHEET 04	

COUNTERPOINT ARCHITECTURE 487 FLINDERS STREET, TOWNSVILLE PO BOX 1604 Townsville QLD 4810 P: (07) 4724 0990 E: ADMIN@CPOINT.COM.AU

1 **EXISTING SITE PLAN**
DA-40 SCALE 1 : 1000

NOTE:
LOCATION OF LEVELS, BOUNDARIES, SERVICES TO BE CONFIRMED BY SURVEYOR

PROJECT	CLIENT DETAILS	TITLE	PROJECT NO.	DATE	DRAWING No.	ISSUE
ROSS RIVER ROAD RESIDENTIAL **344/346 & 350 ROSS RIVER RD** **CRANBROOK, QLD, 4814**		**EXISTING SITE PLAN**	**25869**	**19.06.25**	**DA-10**	**P2**

N

COUNTERPOINT

3/10/2025 11:21:13 AM

TO BE DEMOLISHED

1 **EXISTING/DEMO SITE PLAN**
DA-40 SCALE 1 : 1000

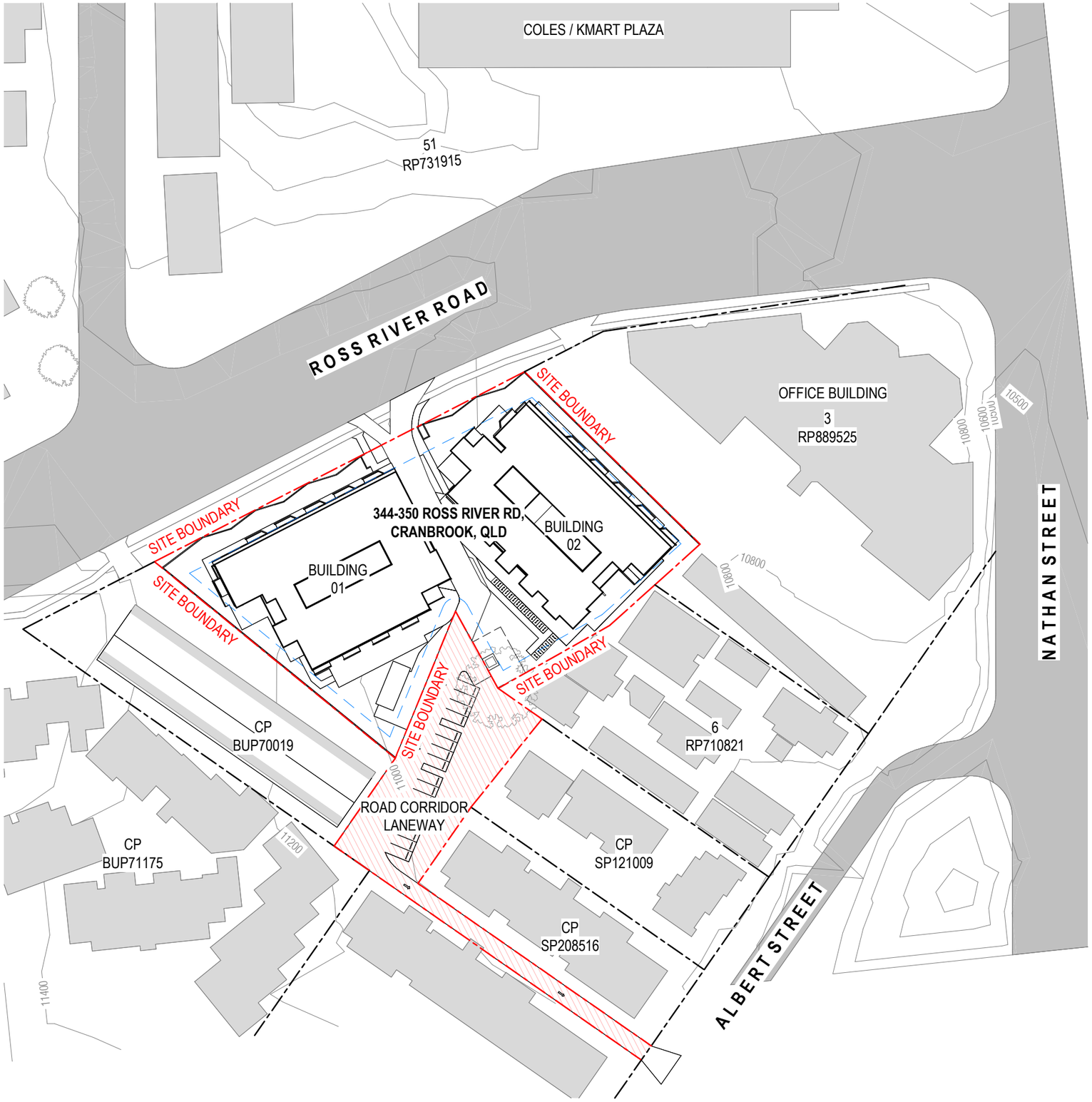
NOTE:
LOCATION OF LEVELS, BOUNDARIES, SERVICES, AND EXISTING BUILDING TO BE CONFIRMED BY SURVEYOR

PROJECT	CLIENT DETAILS	TITLE	PROJECT NO.	DATE	DRAWING No.	ISSUE
ROSS RIVER ROAD RESIDENTIAL **344/346 & 350 ROSS RIVER RD** **CRANBROOK, QLD, 4814**		**DEMOLITION SITE PLAN**	**25869**		**DA-11**	

N

COUNTERPOINT

3/10/2025 11:21:17 AM



BUILDING CLASS 2
TYPE A CONSTRUCTION

1 PROPOSED SITE PLAN
DA-40 SCALE 1 : 1000

NOTE:
LOCATION OF LEVELS, BOUNDARIES, SERVICES TO BE CONFIRMED BY SURVEYOR

PROJECT	CLIENT DETAILS	TITLE	PROJECT NO.	DATE	DRAWING No.	ISSUE
ROSS RIVER ROAD RESIDENTIAL **344/346 & 350 ROSS RIVER RD** **CRANBROOK, QLD, 4814**		**PROPOSED SITE PLAN**	**25869**	**12.09.25**	**DA-15**	**P5**

N

COUNTERPOINT

3/10/2025 11:21:24 AM

ROSS RIVER ROAD

ENTRY

SCALE BAR 1:300

SITE BOUNDARY

LINE OF SETBACK

LINE OF BUILDING ABOVE

RWT

OFFICE
11.500

51 CAR PARKS
11.350

OPEN
ABOVE

LIFT

BIN

BLDG 1
11.450

MAIL

BOOSTER

UNDERGROUND
TANKS

BLDG 2

60 CAR PARKS
(3 TANDEM)
11.350

TANDEM

BICYCLE PARKING

CP
BUP70019

WASH BAY

SERVICE
ROAD

LANEWAY ACCESS
VISITOR PARKING

PAD
MOUNT

EXISTING TREE

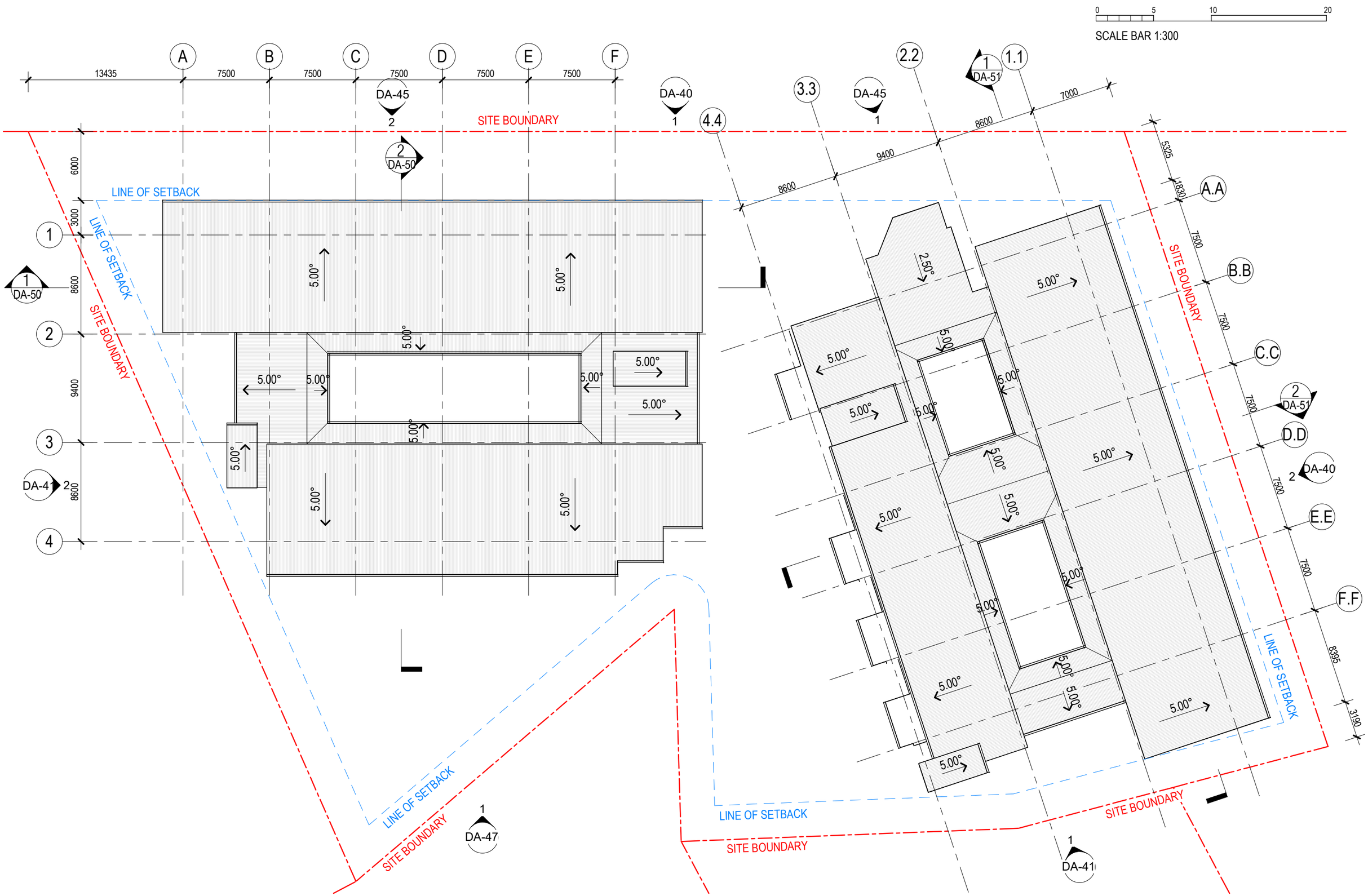
CAR PARK SUMMARY	DEPARTMENT OF HOUSING
USER CLASS 1A	1 COVERED / DWELLING
126 CAR PARKS	TOTAL
110 RESIDENCE	24
16 VISITORS (OFF SITE)	

1 PROPOSED GROUND PLAN
DA-40 SCALE 1 : 300

PROJECT	CLIENT DETAILS	TITLE	PROJECT NO.	DATE	DRAWING No.	ISSUE
ROSS RIVER ROAD RESIDENTIAL **344/346 & 350 ROSS RIVER RD** **CRANBROOK, QLD, 4814**		**PROPOSED FLOOR PLAN - GROUND**	**25869**	**12.09.25**	**DA-20**	**P5**

COUNTERPOINT

3/10/2025 11:21:28 AM



PROJECT	CLIENT DETAILS	TITLE	PROJECT NO.	DATE	DRAWING No.	ISSUE
ROSS RIVER ROAD RESIDENTIAL **344/346 & 350 ROSS RIVER RD** **CRANBROOK, QLD, 4814**		**PROPOSED ROOF PLAN**	**25869**	**12.09.25**	**DA-25**	**P5**

COUNTERPOINT

3/10/2025 11:21:48 AM

ROSS RIVER ROAD

0 5 10 20

SCALE BAR 1:300

EXISTING PATH

SITE BOUNDARY

6000

MAIL

STEP RAMP

LINE OF SETBACK

RWT

LINE OF SETBACK

SITE BOUNDARY

BUILDING 01

LIFT

BIN CHUTE

STAIRS

RWT

BICYCLE PARKING

CP BUP70019

BOOSTER

UNDERGROUND TANKS

LAWN

5325

SITE BOUNDARY

LIFT

BIN CHUTE

STAIRS

11.450

BUILDING 02

BICYCLE PARKING

LINE OF SETBACK

RWT

3000

3000

LAWN

3000

3000

LANEWAY ACCESS VISITOR PARKING

SERVICE ROAD

WASH BAY

SERVICE ROAD

PAD MOUNT

LAWN

RWT

LINE OF SETBACK

SITE BOUNDARY

EXISTING TREE

SITE BOUNDARY

VISITOR PARKING

LINE OF SETBACK

SITE BOUNDARY

LAWN

GARDEN

CONCRETE/PAVERS

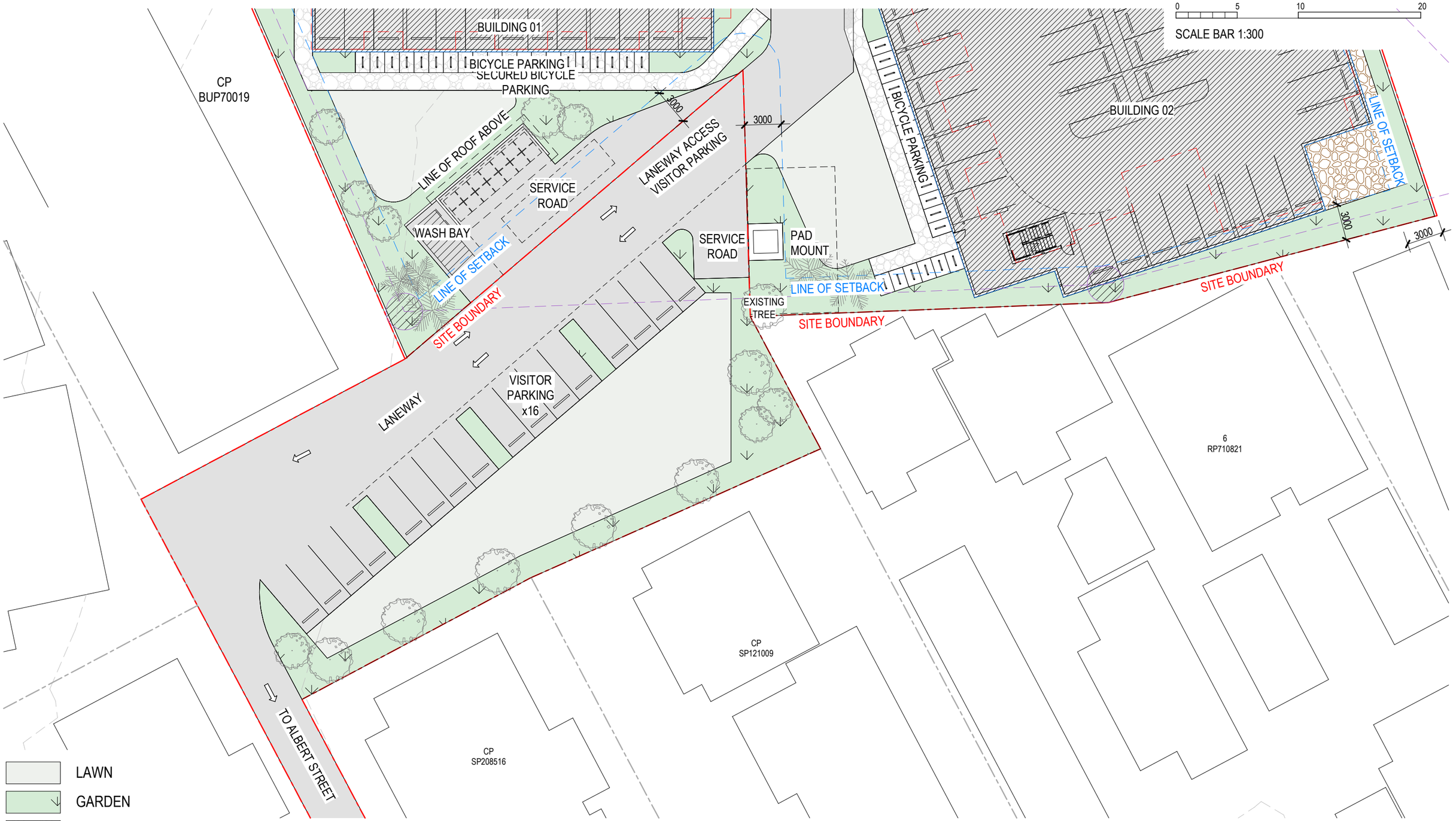
GRAVEL

PROJECT	CLIENT DETAILS	TITLE	PROJECT NO.	DATE	DRAWING No.	ISSUE
ROSS RIVER ROAD RESIDENTIAL **344/346 & 350 ROSS RIVER RD** **CRANBROOK, QLD, 4814**		**EXTERNAL WORKS - PART A**	**25869**	**12.09.25**	**DA-30**	**P5**

N

COUNTERPOINT

3/10/2025 11:21:52 AM



1 EXTERNAL WORKS - PART B

DA-40 SCALE 1 : 300

PROJECT	CLIENT DETAILS	TITLE	PROJECT NO.	DATE	DRAWING No.	ISSUE
ROSS RIVER ROAD RESIDENTIAL **344/346 & 350 ROSS RIVER RD** **CRANBROOK, QLD, 4814**		**EXTERNAL WORKS - PART B**	**25869**	**12.09.25**	**DA-31**	**P5**

COUNTERPOINT

3/10/2025 11:21:56 AM

1 DA-40 **EXTERNAL WORKS - PART C**
SCALE 1 : 300

PROJECT	CLIENT DETAILS	TITLE	PROJECT NO.	DATE	DRAWING No.	ISSUE
ROSS RIVER ROAD RESIDENTIAL **344/346 & 350 ROSS RIVER RD** **CRANBROOK, QLD, 4814**		**EXTERNAL WORKS - PART C**	**25869**	**12.09.25**	**DA-32**	**P5**

COUNTERPOINT

3/10/2025 11:21:59 AM

APPENDIX F

Traffic Impact Assessment prepared by Premise

brazier motti

Ross River Road Residential

Hurst Constructions Queensland Pty Ltd

TRAFFIC IMPACT ASSESSMENT

P003620 -R01 TIA

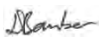
Rev: A

13 October 2025

Premise

PART OF THE Amey GROUP

Document Reference: P003620 R01 TIA

Document Authorisation					
Revision	**Revision Date**	**Report Details**			
A	13/10/2025	For submission			
Prepared by		**Reviewed by**		**Authorised by**	
Danielle Bamber		Bradley Jones		Bradley Jones	

CONTENTS

FIGURES

TABLES

APPENDICES

EXECUTIVE SUMMARY

The Ross River Road Residential development proposed for the subject site comprises 81 residential units to offer affordable housing. The proposed access arrangement includes a left-in-left-out access on Ross River Road and a one-way egress only at the rear of the subject site via a 4m wide unnamed laneway to Albert Street.

In the normal design domain (NDD), an auxiliary left turn treatment with a short turn slot (AUL(S)) is warranted at the site entry on Ross River Road. Keeping the left turn deceleration lane clear of driveway at 340 Ross River Road requires limiting the length of the left turn deceleration lane to 32m which

> Complies with minimum NDD requirements for a design speed of 67km/h (more than 10% above the posted speed limit); and
> Exceeds minimum extended design domain (EDD) requirements for a design speed of 70km/h (10km/h above the posted speed limit).

Planning supplied by TMR proposed that westbound traffic on Ross River Road will merge from three (3) lanes to two (2) lanes on the development site frontage. To avoid the diverge associated with the development site access overlapping with the merge of westbound through traffic it is recommended that the existing arrangement of westbound lanes on the development site frontage is retained with the merge from three (3) lanes to two (2) lanes occurring west of Acheron Avenue.

During an inspection of the site on 17 September 2025 it was observed that the site complies with minimum requirements for approach sight distance (ASD) and minimum gap sight distance (MGSD). This exceeds minimum sight distance requirements for a property access.

Risk assessments were undertaken for the 1.2m wide path on Ross River Road at the proposed left-in-left-out access and the 1.5m wide path on Albert Street at the unnamed laneway. The recommended treatments to provide acceptable safety at both pathways are:

> At the Ross River Road left-in-left-out:
    - Install a road hump across the exit driveway at the property boundary; and
    - Maximise the gradient of the entering driveway.
> At the Unnamed Laneway exit to Albert Street:
    - Install road humps or cushions at both ends of the laneway, designed in accordance with relevant standards and with consideration for stormwater management and cyclist movement.
    - Install shared zone signage at the northern (entry) end of the laneway to formalise low-speed, mixed-use operation and clearly communicate pedestrian and cyclist priority.
    - Install 'No Entry' signage at the Albert Street end of the laneway to reinforce the one-way operation and prevent unauthorised access.

With the above recommendations and planned safety improvements by TMR, the development is not expected to worsen the risk score of any existing road safety issues.

Intersection analysis confirmed that development accesses and intersections which are expected to be significantly impacted by the development will continue operating well below their practical capacity with acceptable delays and queues.

1. INTRODUCTION

Premise Australia Pty Ltd (Premise) has been engaged by Hurst Constructions Queensland Pty Ltd to undertake a Traffic Impact Assessment (TIA) for the Ross River Road Residential development located at 344-350 Ross River Road, Cranbrook, QLD, in accordance with the Department of Transport and Main Roads' (TMR's) "Guide to Traffic Impact Assessment" (GTIA) and Townsville City Plan SC6.4.5.2 Traffic Impact Assessment.

1.1 Background

The Ross River Road Residential development proposed for the subject site comprises 81 residential units to offer affordable housing. The proposed access arrangement includes a left-in-left-out access on Ross River Road and a one-way egress only at the rear of the subject site via a 4m wide unnamed laneway to Albert Street.

The subject site was previously granted Development Approval MC09/0005, which has recently lapsed. The approved development under that application consisted of:

- 100 motel rooms and 70 dwelling units.
- left-in-left-out access at the eastern end of 348 Ross River Road and one-way egress via the 4m wide unnamed laneway to Albert Street.

The current proposal adopts the same access arrangements as the previously approved development but reflects a reduced development yield. This access configuration is considered suitable for the site context, noting:

- The proposed left-in-left-out access on Ross River Road will consolidate and replace five (5) existing domestic driveways, including one located within the controlled area of the Acheron Avenue signalised intersection; and
- The unnamed laneway, being 4 m wide, is not suitable for two-way traffic and is therefore proposed to operate as a one-way exit only.

1.2 Level of Assessment

The level of Traffic Impact Assessment is determined in accordance with Townsville City Plan SC6.4.5.2(2). Relevant development details are:

- Location in an urban area;
- Generation of 40.2 vph during the peak hour;
- Direct access to an arterial road;
- Residential development where the primary commercial vehicle generation is expected to be weekly refuse collection; and
- Replacement of three (3) dwelling houses, nominally providing a total of six (6) onsite parking spaces, with 111 proposed on-site parking spaces.

Table 1 – Townsville City Plan Table SC6.4.5.2 'Urban Area TIA Impact Level Assessment Criteria'

Criteria	Impact		
	Low	Moderate	High
Trip Generation	New or additional trip generation in a peak hour of less than 20 trips directly accessing a street.	New or additional trip generation in a peak hour of 20 to 300 trips directly accessing a street. New or additional trip generation directly accessing a sub arterial, arterial, or highway.	New or additional trip generation in a peak hour of more than 300 trips.
Commercial Vehicles	5 or less new or additional commercial vehicles per day in a residential area. Less than 10 new or additional commercial vehicles per day in a non-residential area.	More than 5 and up to 300 new or additional commercial vehicles per day in a residential area.	More than 300 new or additional commercial vehicles per day.
Car Parking	An increase or decrease of 9 or less onsite car park spaces. Loss of 2 or less line marked on-street carparks or loading zones.	An increase or decrease of 10 or more on-site car park spaces. Loss of between 3 or more line-marked on street carparks or loading zones.	
Public Transport	Relocation of any bus zone or taxi rank.	Impacts on the bus interchange or bus routes.	
Transport System	No change to existing transport network operation.	Changes to the connectivity between local streets and collector roads.	Changes to the connectivity between arterial and sub-arterial roads.

Using the criteria of the Townsville City Plan provided in Table 1, it is determined that a MODERATE level traffic impact assessment is adequate for this proposed development.

1.3 Scope and Study Area

Figure 1 shows the impact assessment area which consists of Ross River Road between Nathan Street and Acheron Avenue, the unnamed laneway, and Albert Street between the unnamed laneway and Narthan Street.

Figure 1 - Impact Assessment Area

1.4 Pre-lodgement Meeting

A pre-lodgement meeting with Townsville City Council (TCC) was held on 25th June 2025, the minutes of this meeting are included in Appendix A.

2. EXISTING CONDITIONS

2.1 Land Use Zoning

The subject site forms part of an existing parcel of land described as Lots 1 -2/RP721729 and Lot 3/SP146326 which is currently zoned Medium Density Residential in the Townsville City Planning Scheme as shown by Figure 2. Each of the three (3) lots have most recently been occupied by a detached dwelling, but the dwelling was removed from lot 2 in 2017/2018 and lot 3 in 2020. Therefore Lot 2/RP721729 and Lot 3/SP146326 are currently vacant (undeveloped), and Lot 1 on RP721729 is most recently occupied by one (1) detached dwelling.

2.2 Adjacent land Uses / Approval

As shown in Figure 2, the land directly north and east of the subject site at 344–350 Ross River Road, Cranbrook is within the Aitkenvale Major Centre Precinct, which is designated for a mix of retail, commercial, community, and residential uses under the Townsville City Plan. This precinct is intended to function as a vibrant focal point for the community.

Surrounding the Major Centre is land zoned Medium Density Residential, which supports medium-rise residential development close to the Major Centre. The subject site is situated within this Medium Density Residential zone, which aims to:

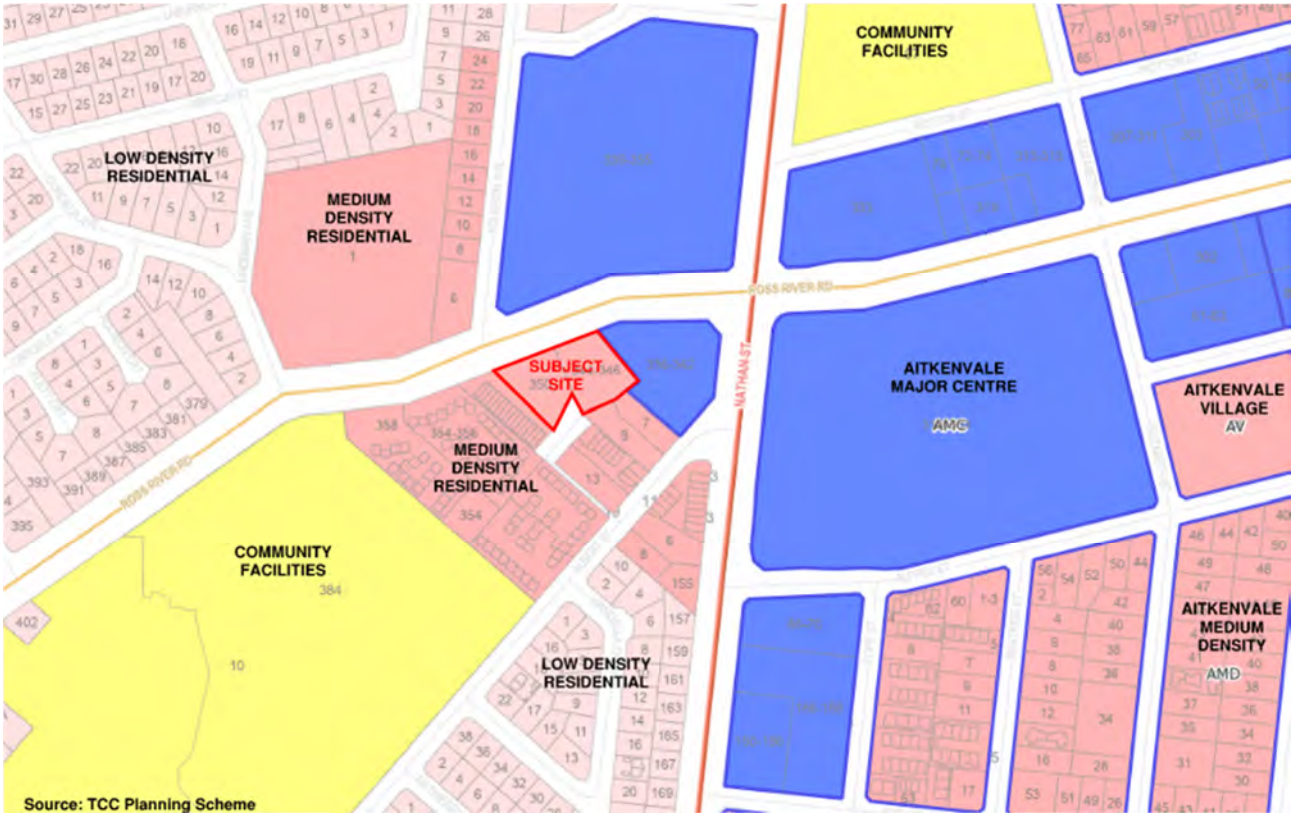
- Provide opportunities for medium density living in proximity to key centres;
- Support residential development that complements nearby commercial and community activities.

The site is also highly accessible to community infrastructure, being within a 15-minute walk of six parks, four schools, the local library, and three childcare centres (Source: Healthy Active by Design – Interactive Map). Community Facilities zones are shown in Figure 2, and include Ignatius Park College and Holy Spirit Catholic Primary School to the southwest, and Aitkenvale State Primary School to the northeast.

Beyond the Aitkenvale Medium Density Precinct lies Low Density Residential zoning, providing a gradual transition in land use intensity.

The subject site's location within the Medium Density Residential zone adjacent to the Aitkenvale Major Centre aligns with the Townsville City Plan's framework for land use and supports the ongoing development of the Major Centre as a key community hub.

Figure 2 - Surrounding Area Land Use



2.3 Surrounding Road Network Details

The surrounding road network is shown by Figure 1 and Figure 2.

2.3.1 ROAD LINKS

2.3.1.1 Frontage Road

2.3.1.1.1 Ross River Road

The subject site has frontage to Ross River Road. Ross River Road is under the jurisdiction of the Department of Transport and Main Roads (TMR) and is classified as an Arterial Road under the Townsville Road Hierarchy. The sign posted speed limit is 60km/h. As shown by Figure 3 below, Ross River Road on the subject site frontage has a five (5) lane, divided cross section (two (2) lanes eastbound and three (3) lanes westbound) with marked bicycle lanes. On the subject site frontage, the bicycle lane varies in width from 1.5m in the eastern site extent to 1.0m toward the west. The verge width increases from 6.4m in the east to 7.4m in the west. There is a 1.2m wide pedestrian footpath along the subject site frontage providing pedestrian connectivity to the Aitkenvale Major Centre.

Figure 3 - Site Frontage to Ross River Road

2.3.1.1.2 Unnamed Laneway

The subject site also has frontage to an unnamed laneway to the south which is under the jurisdiction of Townsville City Council (TCC). The laneway consists of an approximately 50m by 20m area at the rear of the subject site and surrounding lots which has a 4m wide, 65m long connection to Albert Street as shown in Figure 4. This 4m wide laneway passes between Cranbrae Village Retirement community on the western side of the laneway, and Precinct Apartments- a 19-unit apartment complex on the eastern side. No formal vehicle accesses are currently provided on the laneway.

Figure 4 - Unnamed Laneway

2.3.1.2 Other Roads

2.3.1.2.1 Albert Street

Albert Street is a 7-metre-wide Access Street under the jurisdiction of TCC. Albert Street features a 1.5-metre-wide pedestrian footpath, ensuring safe pedestrian linkage to Nathan Street. Additionally, recessed street parking is provided along the northern side of Albert Street, immediately west of the subject site. The speed limit on Albert Street is 50km/h.

Figure 5 - Albert Street facing west

2.3.1.2.2 Nathan Street

Nathan Street is under the jurisdiction of TMR and is classified as an Arterial Road under the Townsville Road Hierarchy. The sign posted speed limit on Nathan Street is 60km/h. As shown by Figure 6 and Figure 7 below, at the intersection of Albert Street, Nathan Street has a seven (7) lane, divided cross section which provides four (4) lanes northbound, including two (2) right turn lanes into Ross River Road, and three (3) lanes southbound. Bicycle lanes are marked on Nathan Street.

Figure 6 - Nathan Street facing South

Figure 7 - Nathan Street facing North

2.3.2 INTERSECTIONS

The intersections relevant to this assessment include:

- Ross River Road and Nathan Street
- Ross River Road and Acheron Avenue
- Albert Street and unnamed laneway
- Albert Street and Nathan Street.

2.3.2.1 Ross River Road / Nathan Street Signalised Crossroad

The subject site is located approximately 200 metres west of the signalised, four-leg intersection of Nathan Street and Ross River Road shown in Figure 8 below. A detailed intersection layout plan, incorporating signal phasing diagrams, is included in Appendix B. All intersection approaches provide three (3) through lanes, double right turn lanes and un-staged pedestrian crossings. Left turn treatments are:

- South approach (Nathan Street): Continuous (low angle) left turn slip lane with pedestrian (zebra) crossing and 100m long acceleration lane ending approximately 15m east of the subject site;
- East approach (Ross River Road): High angle left turn slip lane with two (2) aspect signal control and signalised pedestrian crossing.
- North approach (Nathan Street): Exclusive left turn lane through the primary signalised intersection area with expanded storage area for bicycles.
- West approach (Ross River Road): Shared through-and-left lane.

Figure 8 - Ross River Road / Nathan Street Signalised Crossroad

2.3.2.2 Ross River Road / Acheron Avenue Signalised Intersection

Acheron Avenue forms a T-intersection with Ross River Road directly in front of Lot 1/RP721729 as shown by Figure 9. This is a signalised intersection with a 30m (excluding taper) channelised right turn lane from Ross River Road into Acheron Avenue. A detailed intersection layout plan, incorporating signal phasing diagrams, is included in Appendix B. A pedestrian crossing is provided on the Acheron Avenue leg of the intersection, but no pedestrian crossings are provided on Ross River Road.

Figure 9 - Ross River Road / Acheron Avenue T-intersection

2.3.2.3 Albert Street / Unnamed Laneway Intersection

The unnamed laneway intersects with Albert Street as a driveway crossover as shown by Figure 4

2.3.2.4 Albert Street / Nathan Street Priority Controlled Intersection

Albert Street forms a T-intersection with Nathan Street approximately 110m northwest of the laneway egress from the subject site. As shown by Figure 10, the T-intersection is controlled by a give-way sign on the Albert Street (terminating approach). On Nathan Street, a 60m long (including taper) channelised left (CHL) turn treatment is provided.

Figure 10 - Albert Street / Nathan Street Priority Controlled Intersection

2.3.3 FUTURE ROAD NETWORK PLANNING

TMR are current undertaking safety improvement works at various locations along Ross River Road to provide proactive safety treatments for all road users, including pedestrians, bicycle riders and motorists.

In particular, the project *Ross River Road, Mabin Street to Rolfe Street, improve safety* – includes the following works that will impact upon the study area for this Traffic Impact Assessment:

- Removal of the left slip lanes from Nathan Street to Ross River Road, resulting in dedicated and signalised left turn lanes.
  - This intersection upgrade is currently in planning stage with TMR, who have provided design drawings which are included in Appendix E. The intersection modification involves:
    - removing the left turn slip lane from Nathan Street to Ross River Road westbound and replacing with a signalised left turn lane.
    - addition of a dedicated left turn lane into the driveway of the property at 340 Ross River Road, immediately to the east of the subject site.
    - merging three lanes to two lanes, associated realignment of the bicycle lane, and installation of chevron markings immediately in front of the subject site.
- Installation of pedestrian fencing near the Ross River Road and Nathan Street intersection.
- Signalisation of Lindeman Avenue and associated works. This upgrade includes:
  - installation of 3 pedestrian crossings; and
  - removal of signalised midblock pedestrian crossing.

Replacing the existing mid-block crossing on Ross River Road with a pedestrian crossing at Lindeman Avenue will bring the crossing facility approximately 100m closer to the subject site.

2.4 Traffic Volumes

2.4.1 QUEENSLAND GOVERNMENT TRAFFIC CENSUS DATA

Traffic census data for Queensland State Declared Roads 2014-2024 was reviewed for the following locations:

- Ross River Road – segment west of Nathan Street, traffic count site 90073, directly in front of Ignatius Park College
- Ross River Road – segment east of Nathan Street traffic count at site 90025, directly in front of the Cathedral School.
- Nathan Street – segment south of Ross River Road, traffic count site 92188, 150m south of Ross River
- Nathan Street – segment north of Ross River Road, traffic count site 92202, 180m south of Pixley Crescent.

The traffic census data is summarised in Table 2 below.

Table 2 - Traffic Volumes from 2024 QLD Government Census Data

Road	AADT (vpd)	%HV
Ross River Road *(segment west of Nathan St)*	18,421	4.6%
Ross River Road *(segment east of Nathan St)*	22,467	6.3%
Nathan Street *(south of Ross River Road)*	32,617	9.4%
Nathan Street *(north of Ross River Road)*	26,793	12.0%

2.4.2 TOWNSVILLE AIMSUN INTEGRATED MODEL

Annual Average Daily Traffic (AADT) volumes and annual average peak hour traffic volumes from 2025 were obtained from the Townsville Aimsum Integrated Model (TAIMS) for all four road segments leading into the Ross River Road and Nathan Street intersection, in addition to Albert Street. These volumes are summarised in Table 3 below.

Table 3 - Summary of Average AM and PM Traffic Volumes from 2025 TAIM Data

Road	Period	Direction	Peak Hour Traffic Volumes (vph)	AADT (vpd)
Ross River Road (segment west of Nathan St)	AM	Eastbound	1,098	20,547
		Westbound	1,124	
	PM	Eastbound	554	
		Westbound	1,299	
Ross River Road (segment east of Nathan St)	AM	Eastbound	1,439	16,831
		Westbound	890	
	PM	Eastbound	668	
		Westbound	1,098	
Nathan Street (south of Ross River Road)	AM	Southbound	1,145	30,244
		Northbound	1,660[1]	
	PM	Southbound	1,166	
		Northbound	1,601[2]	
Nathan Street (north of Ross River Road)	AM	Southbound	1,024	21,578
		Northbound	963	
	PM	Southbound	892	
		Northbound	1,011	
Albert Street (east of Wandella Crescent)	AM	Eastbound	115	1,447
		Westbound	8	
	PM	Eastbound	97	
		Westbound	6	

[1]This number includes the AM peak hour volume for the left turn slip into Ross Rover Road of 336 vph.
[2]This number includes the PM peak hour volume for the left turn slip into Ross Rover Road of 524 vph.

2.5 Intersection and Network Performance

Based on STREAMS signal timing data provided by TMR on 25 August, the signalised intersections along Ross River Road, from Alice Street in the west to Charlotte Street in the east, are coordinated in one (1) intersection group, with a cycle time of 140 seconds during peak periods.

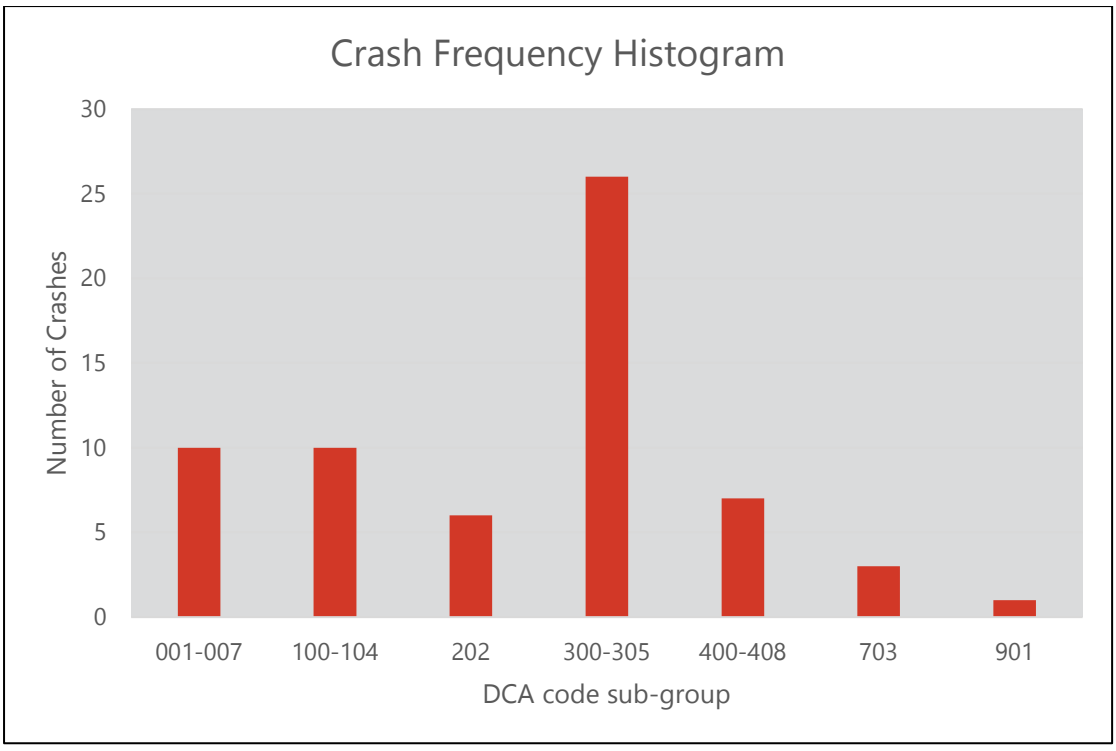
2.6 Road Safety Issues

Existing road safety issues in the study area were identified through crash rate analysis. The analysis was conducted on data supplied by TMR. The analysis was undertaken for Ross River Road from Acheron Avenue to Nathan Street including the functional area of associated intersections, from 2008 to 2024 inclusive. The information provided for each crash includes the crash type, location, year, number/type of vehicles involved, vehicle direction, and conditions. There was a total of sixty-three (63) crashes recorded in the study area for this period including fifty-two (52) crashes at the Ross River Road / Nathan Street signals, eleven (11) crashes at the Ross River Road / Acheron Avenue signals and no reported crashes on Albert Street.

Analysis of crash data was conducted through use of a crash factor matrix which can be found in Appendix C. The crash factor matrix groups data according to the TMR Definitions for Coding Accidents (DCAs) which can also be found in Appendix C.

As can be seen in Figure 11 below, the most frequent type of crashes occurs in the subgroup 300-305 which describes collisions between vehicles travelling in the same direction. The next most frequent DCA categories are 001-007 which describes collisions involving pedestrians, and 100-104 which are crashes at intersections involving vehicles from adjacent approaches.

Figure 11 - Crash Frequency Histogram



The most frequent type of crash occurred between vehicles travelling in the same direction. In the Ross River Road /Nathan Street intersection, most of these vehicles were travelling Southbound, and in the Ross River Road / Acheron Street intersection, the majority of these vehicles were travelling Eastbound.

Analysis of the crash factor matrix indicates:

- The majority of crashes occurred between 7:00 am and 5:00 pm.
- Approximately 80% of crashes took place in dry weather conditions.
- Around 13% of crashes involved vulnerable road users, specifically cyclists and pedestrians. Of these:
  - Eight (8) pedestrian crashes involved road crossings by pedestrians (DCA 001 to 003) at the Ross River Road / Nathan Street intersection with six (6) resulting in hospitalisation and two (2) resulting in medical treatment.
  - Two (2) pedestrian crashes involved pedestrians being struck as they crossed a driveway (DCA 007), resulting in medical treatment. Based on the locations indicated in the TMR supplied crash data it appears that one (1) of these involved a vehicle exiting 340 Ross River Road and the other involved a vehicle reversing out of the eastern driveway of lot 1 on RP721729 (refer Section 2.7).
  - Seven (7) crashes involving bicycles were all manoeuvring crashes (DCA 400 series). Three (3) hospitalisation and one (1) medical treatment bicycle crash involved bicyclists exiting a footway (DCA 408). One (1) hospitalisation and two (2) medical treatment bicycle crashes were defined as other manoeuvring crashes (DCA 400).
- One (1) crash involved a heavy vehicle.
- There has been no discernible change in crash frequency over time.

There were no fatalities in the study area over the time interval analysed. Twenty-four (24) crashes required hospitalisation. Of these more severe crashes:

- Eight (8) crashes involved vehicles travelling in the same direction (DCA 300 series).
- Six (6) crashes involved collisions with pedestrians (DCA 000 series).
- Five (5) crashes involving vehicles travelling from opposite directions with a through – right collision (DCA 202).
- Three (3) crashes involving bicyclists exiting a footway (DCA 408). These crash locations were as follows:
  - Acheron Avenue mid-block - a cyclist entering the roadway collided with a stationary vehicle.
  - Ross River Road / Nathan Street intersection – between the vehicle travelling eastbound and the cyclist travelling northbound.
  - Ross River Road / Nathan Street intersection – between the vehicle travelling northbound and the cyclist travelling westbound.

2.7 Site Access

The subject site forms part of an existing parcel of land which currently contains three (3) lots. Access to these three (3) lots is currently provided by five (5) existing driveway crossovers. The western most crossover is located within the controlled area of the Acheron Avenue traffic signals, while the adjacent crossover is positioned at the intersection stop line. The locations of these five (5) crossovers are shown in Figure 12 below.

Figure 12 - Existing Site Access

2.8 Public Transport

The closest public transport stop for scheduled bus services is the Townsville Shopping Centre (SC) approximately 550m (8 minutes) walk to the east of the subject site. This is a major public transport interchange and is served by:

- Route 200 Breakwater ferry terminal to Kelso via Townsville City bus hub, Townsville SC and Willows every 20 minutes.
- Route 201 Breakwater ferry terminal to JCU via Townsville City bus hub Townsville SC and hospital every 25 minutes.
- Route 202 Townsville City bus hub to Townsville University Hospital (TUH), James Cook University (JCU) every hour.
- Route 203 Townsville City bus hub to Kirwan via Mater Hospital, Townsville SC and Willows every half hour.
- Route 204 Townsville City bus hub to Townsville SC via Mt Louisa every hour.
- Route 205 Townsville City bus hub to Townsville SC via Garbutt every hour.
- Route 208 Townsville City bus hub to Willows via Railway Estate and TUH/JCU every hour.
- Route 209 Townsville City bus hub to TUH/JCU/Townsville SC via Wulguru every hour.
- Route 215 Townsville City bus hub to Townsville SC via Garbutt and Domain every hour.
- Route 232 Townsville SC to Burdell every hour.
- Route 233 Townsville SC to Bushland Beach via Deeragun and Jensen every hour.

2.9 Active Transport

A 1.2-metre-wide concrete footpath is provided along the subject site frontage on Ross River Road, extending eastward to connect with footpaths on Nathan Street and westward to Hatchett Street. This footpath links directly to a pedestrian crossing on the Nathan Street slip lane, which in turn connects to signalised pedestrian crossings in both directions at the Ross River Road / Nathan Street intersection approximately 200 metres east of the site. Additionally, a staggered (offset) signalised pedestrian crossing is located mid-block approximately 300 metres west of the subject site, enhancing pedestrian connectivity across Ross River Road.

Along Albert Street, a 1.5-metre-wide concrete footpath provides further pedestrian access, supporting safe and convenient movement within the local street network.

Complementing pedestrian infrastructure, a dedicated bicycle lane runs along Ross River Road in front of the subject site, facilitating safe and direct cycling access from the Aitkenvale Major Centre and surrounding community facilities. Both Ross River Road and Nathan Street are identified as Priority A routes in the Principal Cycle Network Plan, as shown on the North Queensland Priority Route Map (2021). This designation reflects their importance within the regional cycling network and indicates that these corridors are priorities for government investment in high-quality cycling infrastructure over the 10-year period following the 2021 plan.

These active transport facilities align with the objectives of the Medium Density Residential zone in the Townsville City Plan, which promotes walkability and cycling as key components of sustainable urban living and reduced car dependency.

3. PROPOSED DEVELOPMENT DETAILS

3.1 Development Site Plan

The proposed development is a five (5) storey residential development on Lots 1 – 2/RP721729 and Lot 3/SP146326. The proposed development includes two (2) buildings separated by an internal roadway. The development also includes provision for secured bicycle parking, a dedicated refuse collection area and wash bay. Development site plans are enclosed in Appendix D.

3.2 Operational Details

The proposed development is to consist of 81 residential units including:

- 21 single bedroom units for the Department of Housing (DoH);
- 42 two-bedroom units including three (3) for the DoH; and
- 18 three-bedroom units.

3.3 Proposed Access and Parking

The development access is proposed to consist of left-in-left-out access on Ross River Road and one-way egress only via the 4m wide laneway to Albert Street.

The five (5) existing driveway crossovers will be removed as part of the proposed development.

Onsite parking is proposed to include:

- 111 on-site parking spaces including:
  - Four (4) spaces for people with disabilities; and
  - Three (3) pairs of spaces in tandem configurations.
- 16 off-site visitor parking spaces within the unnamed road reserve to the south of the development site.

4. DEVELOPMENT TRAFFIC

4.1 Traffic Generation

The "Guide to Traffic Generating Developments" (RTA 2002) reports traffic generation rates indicated in Table 4 for medium density residential flat buildings.

Table 4 – Medium Density Residential Flat Building Traffic Generation

Dwelling Type	Daily Vehicle Trips	Weekday Peak Hour Vehicle Trips
Smaller units and flats Up to two (2) bedrooms	4-5 per dwelling	0.4-0.5 per dwelling
Larger units and townhouses Three (3) or more bedrooms	5.0-6.5 per dwelling	0.5-0.65 per dwelling

Therefore, the proposed housing development is expected to generate 402 trips per day with 40.2 trips during weekday peak hours based on:

- Single bedroom units generating 4 trips per day and 0.4 trips during weekday peak hours; and
- Two-bedroom units will each generate 5 trips per day and 0.5 trips during weekday peak hours.
- Three-bedroom units will each generate 6 trips per day and 0.6 trips during weekday peak hours

In accordance with the TCC TIA guidelines, the adopted directional splits for this development traffic are:

- 80% outbound: 20% inbound during the morning (AM) peak hour (32 vehicles per hour outbound, 8 vehicles per hour inbound).
- 30% outbound: 70% inbound during the evening (PM) peak hour (12 vehicles per hour outbound, 28 vehicles per hour inbound).

4.2 Trip Distribution

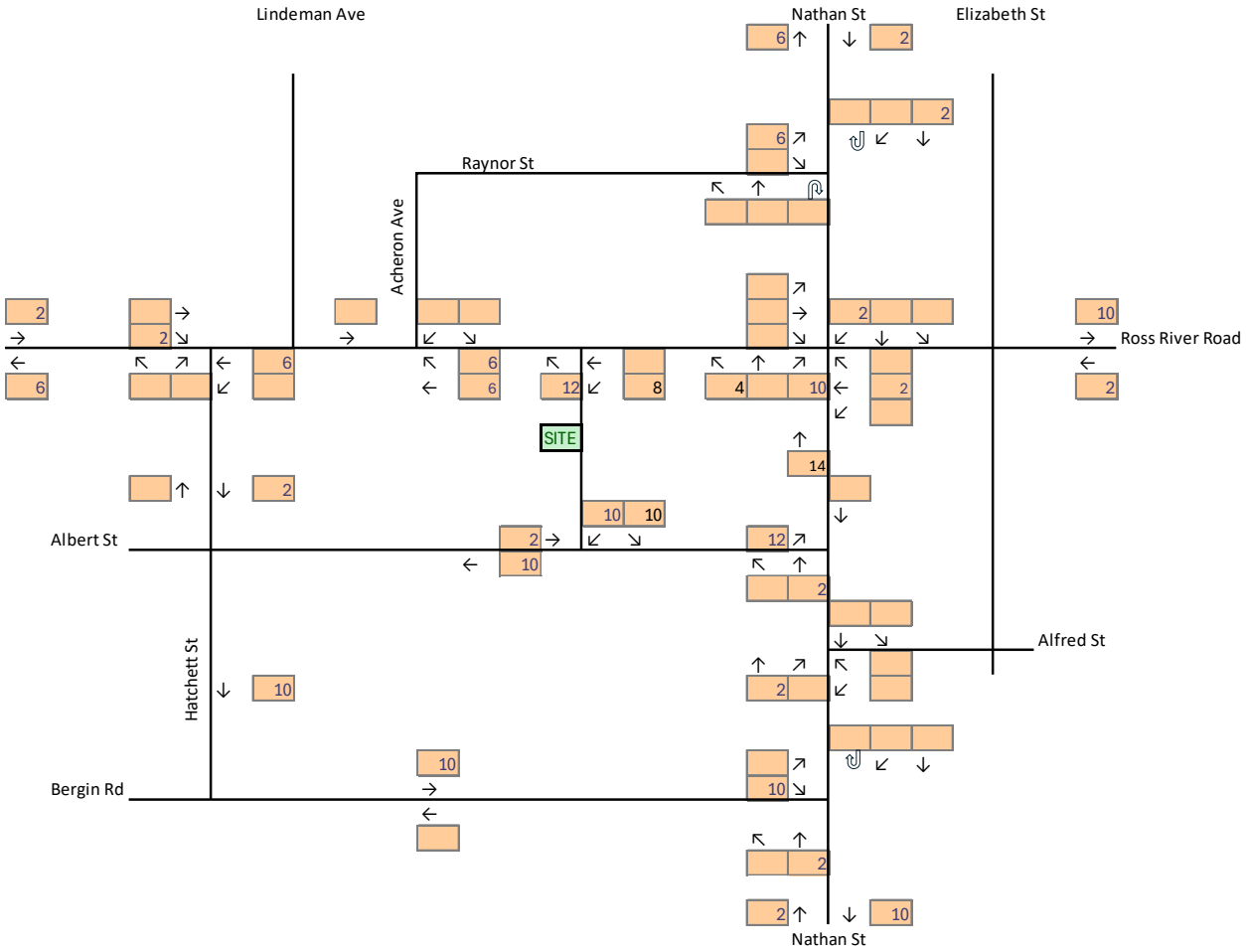
Based on the TCC TAIM Projected Traffic Flows using the *2036 Forecast Model (with LGIP Works)*, the adopted trip distribution is:

- to/from South (JCU, TUH, Lavarack Barracks) = 30% (12 vph).
- to/from East (Townsville Principal Centre) = 30% (12 vph)
- to/from North (Garbutt, Mt St John, Bohle Industrial Precincts) = 20% (8 vph).
- to/from West (Thuringowa Central) = 20% (8 vph).

4.3 Development Traffic Volumes on the Network

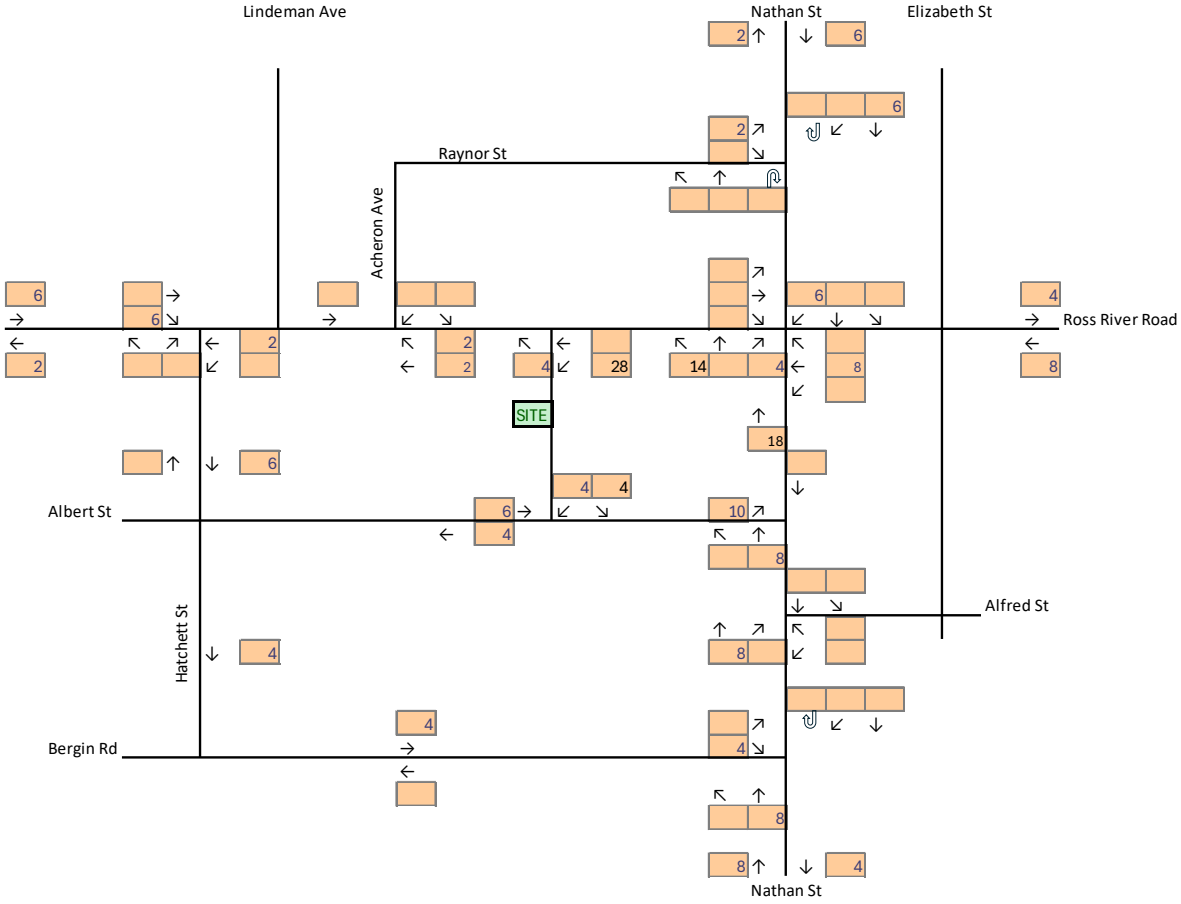
As a result of the LILO access arrangements the development will generate the peak hour movements shown by Figure 13 and Figure 14.

Figure 13 - Development AM Peak Hour Traffic Volume



Development Peak Traffic Volume AM

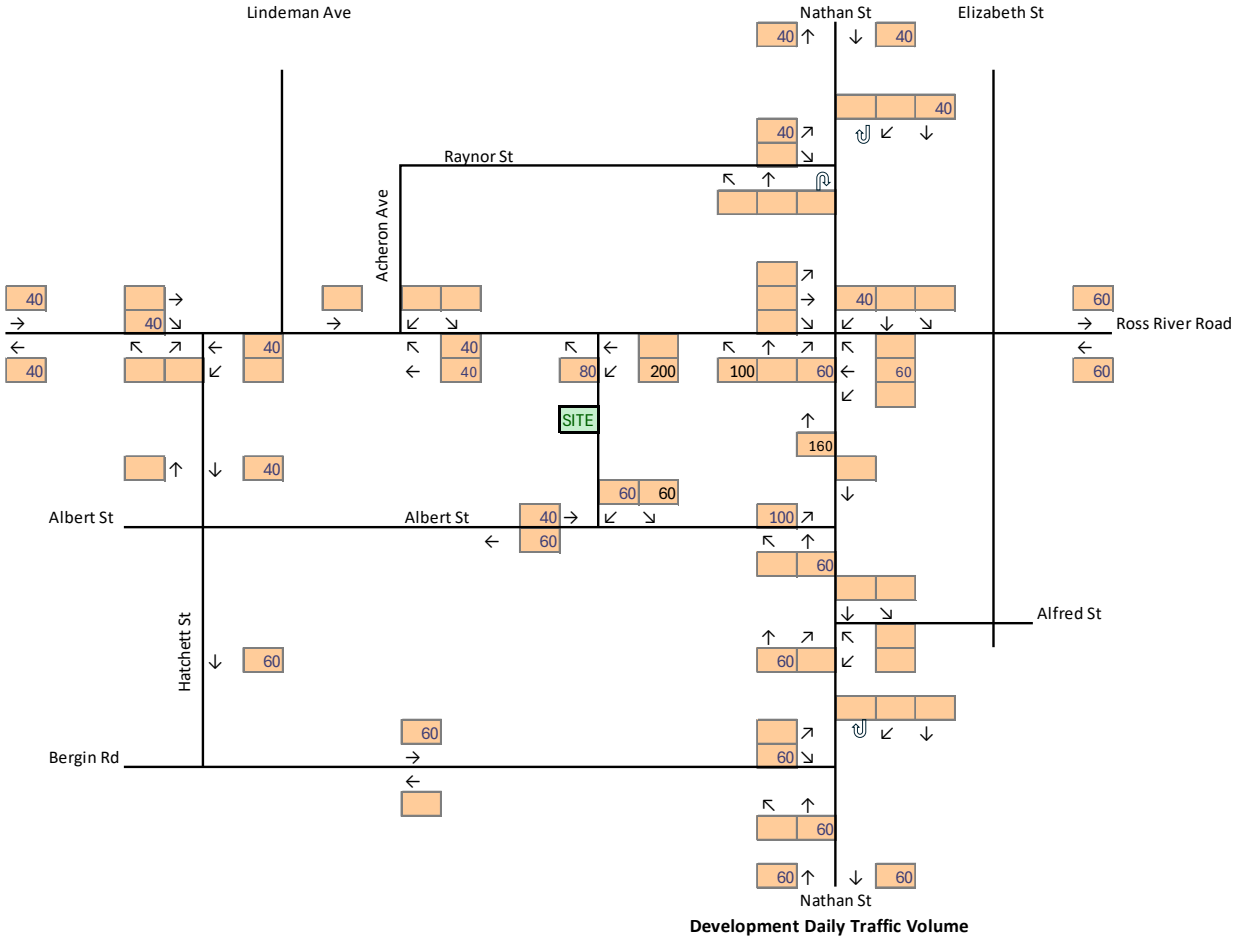
Figure 14 - Development PM Peak Hour Traffic Volume



Development Peak Traffic Volume PM

The daily traffic is shown in Figure 15 below.

Figure 15 - Development Daily Traffic



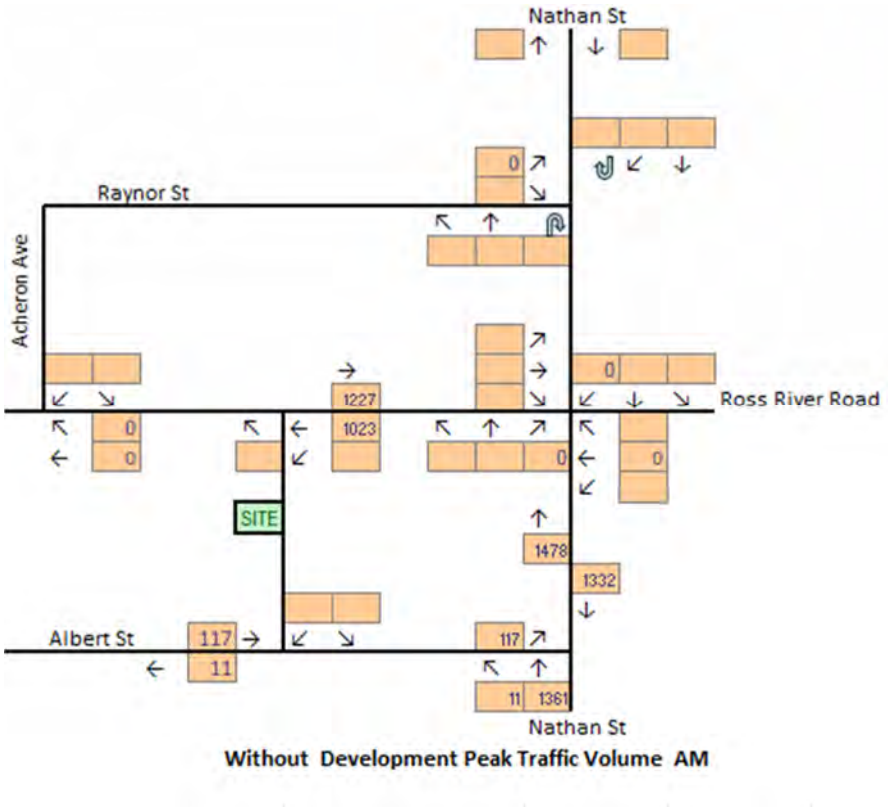
5. IMPACT ASSESSMENT AND MITIGATION

5.1 With and Without Development Traffic Volumes

5.1.1 WITHOUT DEVELOPMENT TRAFFIC

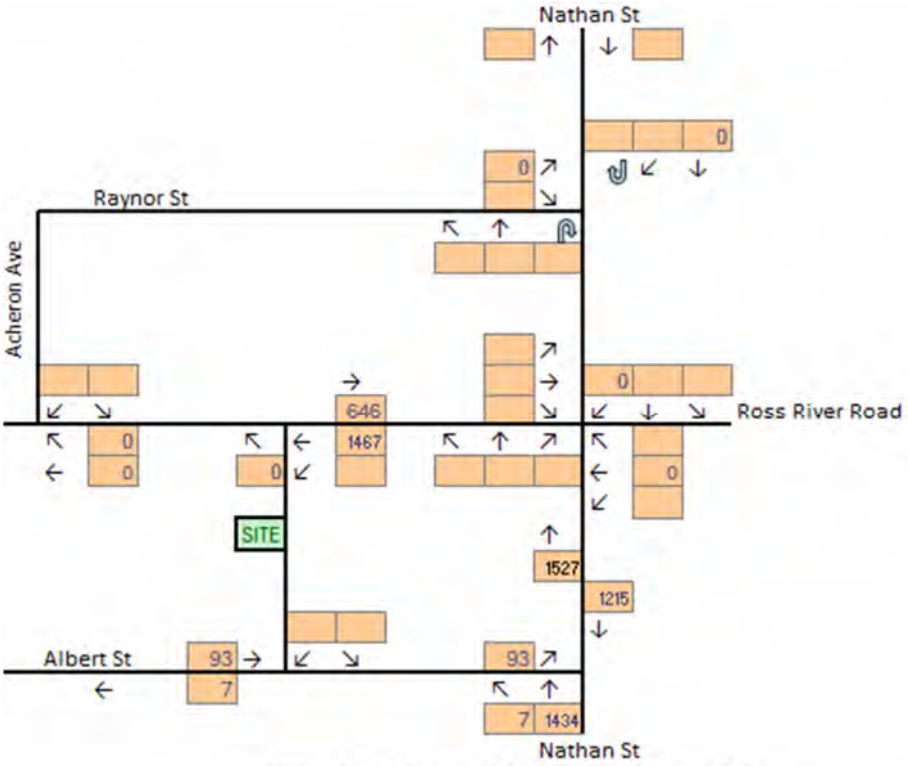
Figure 16 and Figure 17 below summarise the 'without development' traffic for AM and PM Peak hours for the year 2036 as forecast in the TAIMS 2036 Forecast Model (with LGIP works).

Figure 16 - Without Development AM Peak Traffic Volume 2036



Without Development Peak Traffic Volume AM

Figure 17 - Without Development PM Peak Traffic Volume 2036

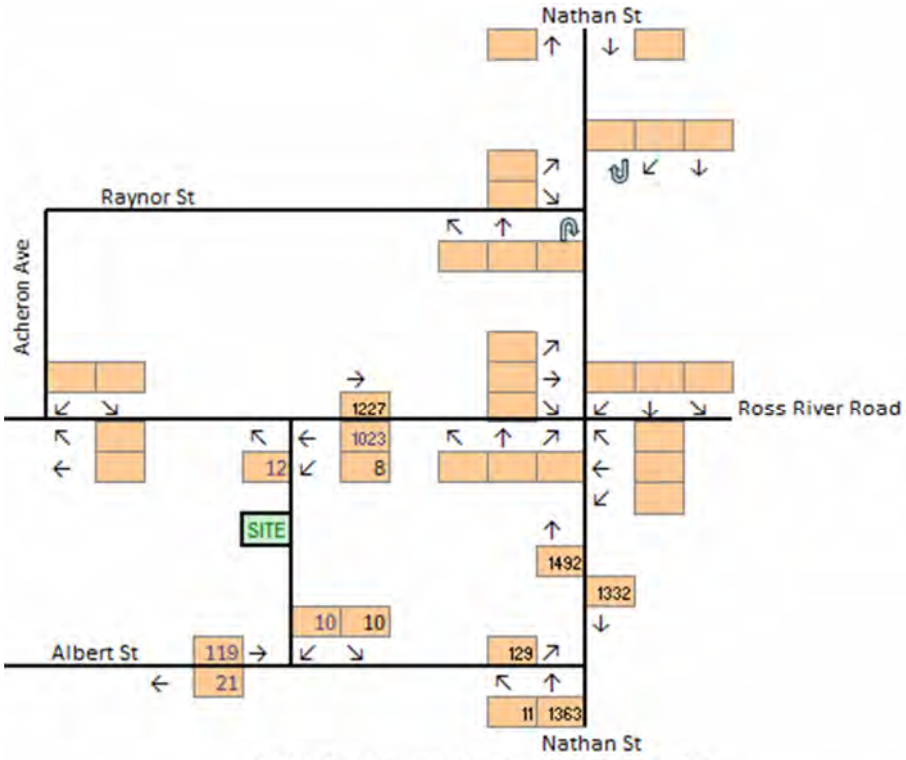


Without Development Peak Traffic Volume PM

5.1.2 WITH DEVELOPMENT

The 'with development' morning peak hour traffic is shown in Figure 18. It is the sum of the development traffic shown in Figure 13 and 'without development' traffic shown in Figure 16.

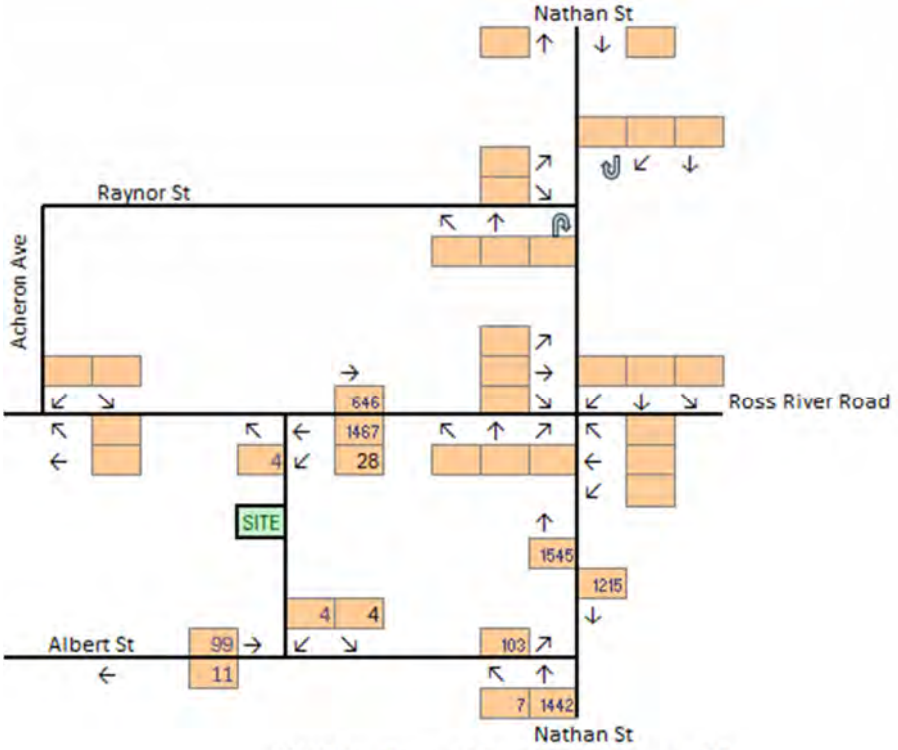
Figure 18 - With Development AM Peak Traffic Volume 2036



With Development Peak Traffic Volume AM

The 'with development' afternoon peak hour traffic is shown in Figure 18. It is the sum of the development traffic shown in Figure 14 and 'without development' traffic shown in Figure 17.

Figure 19 - With Development PM Peak Traffic Volume 2036



With Development Peak Traffic Volume PM

5.2 Road Safety Impact Assessment and Mitigation

The GTIA specifies the following two stage process for assessment of road safety impacts:

1. Road Safety Risk Assessment to determine the change in risk profile associated with existing road safety issues as a result of the development; and
2. Road Environment Safety Assessment to determine if changes to infrastructure require either a road safety audit by an accredited road safety auditor (RSA) or a road safety assessment by either an RSA or a Registered Professional Engineer of Queensland (RPEQ).

5.2.1 ROAD SAFETY RISK ASSESSMENT

A road safety risk assessment was conducted in accordance with the risk assessment process specified by the GTIA. The risk assessment process involves the following steps for each risk item:

- Evaluate potential consequences based on accident severity from 1, property damage only, to 5, fatality;
- Evaluate potential likelihood from 1, rare, to 5, almost certain; and
- Sum the potential consequence and likelihood values to determine the risk score with scores up to and including 4 considered low risk, 5 to 7 medium risk, and 8 or greater high risk, in accordance with Figure 9.3.2(a) *Safety risk score matrix* from the GTIA.

Table 5 summarises the road safety risk assessment with further detail provided in the following sections. Hazards were identified through a crash factor matrix (included as Appendix C) utilising crash data from TMR in the vicinity of Ross River Road from Acheron Avenue to Nathan Street including the functional area of associated intersections. Also see Section 2.6 of this TIA for a summary of the crash data.

Table 5 - Road Safety Risk Assessment

		Severity					Without development			With development				With development & mitigation				With development & mitigation		
Crash Description	DCA Code	(1)	(2)	(3)	(4)	(5)	Likelihood	Consequence	Risk Score	Likelihood	Consequence	Risk Score	Mitigation Measures by TMR	Likelihood	Consequence	Risk Score	Mitigation Measures by Developer	Likelihood	Consequence	Risk Score
Pedestrian crossing road	001 & 003	0	0	1	6	0	3	4	M	4	4	H	Install pedestrian fencing	3	4	M				
Pedestrian Emerging from parked car	002	0	0	1	0	0	1	3	L	2	3	M	Install pedestrian fencing; ban parking on development's Ross River Road site frontage	1	3	L				
Pedestrian crossing driveway	007	0	0	2	0	0	2	3	M	3	3	M								
Vehicles travelling in same direction	300-305	0	3	15	8	0	4	4	H	5	4	H	Modify left turn slip lane	4	4	H	Construct deceleration lane	3	4	M
Bicycle Crashes	400-408	0	0	3	4	0	3	4	M	4	4	H					Improve on-road cycle infrastructure, bicycle parking, direct cyclists to Albert St	3	4	M
Off path on straight	703-708	0	1	0	2	0	2	4	M	3	4	M								

5.2.1.1 Without Development Road Safety Risk Assessment

To provide an objective assessment of the potential likelihood, Premise uses the average recurrence interval/frequency criteria listed in Table 6. These criteria are more conservative than those suggested by TMR's *Guide to Traffic Impact Assessment: Frequently Asked Questions* (December 2017) but are consistent with other TMR guidelines that three (3) fatal or serious injury (potential consequence 4) accidents in five (5) years (potential likelihood 4) is high risk and should be mitigated. It was found that the highest risk scores generally resulted from consideration of the highest consequence/most severe accidents.

Table 6 - Potential Likelihood Evaluation Criteria

Potential Likelihood	Average Recurrence Interval	Accidents over 16 years
Almost Certain (5)	≤1 year	16 or more
Likely (4)	≤ 2 years	8 to 15
Moderate (3)	≤ 4 years	4 to 7
Unlikely (2)	≤ 8 years	2 or 3
Rare (1)	> 8 years	1

- Seven (7) crashes resulted from pedestrians crossing the roadway and being struck on either the near side or the far side of the carriageway. This resulted in six (6) occurrences (Moderate (3) likelihood rating) of hospitalisation, equivalent to a level 4 consequence rating.
- One (1) crash resulted from a pedestrian being hit while trying to cross a carriageway after emerging from behind a parked vehicle. It resulted in medical treatment, equivalent to a level 3 consequence rating. As it is the only crash identified of this nature and location, the average recurrence interval is >8 years, produce a Rare (1) likelihood rating.
- Two (2) crashes resulted from a pedestrian being hit by a vehicle while entering or leaving a driveway. These resulted in medical treatment, equivalent to a level 3 consequence rating. Two (2) crashes identified with this nature and location, gives an average recurrence interval is ≤8 years, producing an Unlikely (2) likelihood rating.
- Twenty-six (26) crashes were attributed to collisions between vehicles travelling in the same direction. Eight (8) of the crashes resulted in hospitalisation, equivalent to a level 4 consequence rating. The average recurrence interval of hospitalisation is less than 2 years, producing a Likely (4) likelihood rating.
- Seven (7) crashes involved bicycles. Four (4) of the crashes resulted in hospitalisation, equivalent to a level 4 consequence rating. The average recurrence interval of hospitalisation is less than 4 years, producing a Moderate (3) likelihood rating.
- Three (3) crashes resulted from vehicles veering off the carriageway, two (2) of these required hospitalisations, equivalent to a level 4 consequence rating. The average recurrence interval of hospitalisation is less than 8 years, producing an Unlikely (2) likelihood rating.

5.2.1.2 With Development Road Safety Risk Assessment

To provide an objective assessment of the potential likelihood increase, Premise uses the volume ratio of "with development" traffic and "without development" traffic ("with development" traffic divided by "without development" traffic) listed in Table 7.

Table 7 - Potential Likelihood Increase Criteria

Potential Likelihood Increase	Volume Ratio (R)
+4 bands	8 < R
+3 bands	4 < R ≤ 8
+2 bands	2< R ≤ 4
+1 band	1.05 < R ≤ 2
No increase	R ≤ 1.05

The proposed development has a small traffic generation relative to existing traffic on the surrounding road network but may significantly increase some individual movements during peak periods. Therefore, the proposed development is assumed to increase the likelihood rating of each hazard by one (1) band.

5.2.1.3 Mitigation

Where the 'with development' risk assessment resulted in an increase in the risk score, a mitigation measure was identified and applied for the given hazard.

Appendix E of Austroads' *Guide to Road Safety Part 2: Safe Roads* (AGRS02-2021) provides Crash Modification Factors, CMF, of various mitigation measures. In addition to these modification factors, Crash Reduction Factors CRF, from the TMR Safe Systems Assessment Guidelines, were also used. These factors were determined from the template *SSA eLite+ v4.xls*. The Crash Reduction Factor (CRF) is the complement of the Crash Modification Factor (CMF). These factors provide an objective assessment of the potential likelihood decrease due to proposed mitigation measures as listed in Table 8.

Table 8 - Potential Likelihood Decrease Criteria

Potential Likelihood Decrease	Crash Modification Factor, CMF
-1 band	0.5 < CMF < 1
-2 bands	0.25 < CMF ≤ 0.5
-3 bands	0.125 < CMF ≤ 0.25
-4 bands	CMF ≤ 0.125

The mitigation measures described in the Road Safety Risk Assessment in Table 5 have been divided into two categories; mitigation measures by TMR, and mitigation measures by the developer.

5.2.1.3.1 Mitigation Measures by TMR

As outlined in Section 2.3.3: the TMR project *Ross River Road, Mabin Street to Rolfe Street, improve safety* – includes installation of pedestrian fencing near the Ross River Road and Nathan Street intersection; and removal of the left slip lane from Nathan Street to Ross River Road, resulting in a dedicated and signalised left turn lane, and updating the associated pedestrian crossing to a signalised pedestrian crossing. Both of these proactive safety treatments decrease the likelihood of hazards occurring as described below:

- **Installation of pedestrian fencing**: the implementation of this risk mitigation measure, described as treatment 6.10 (Fencing a median – either with direct pedestrian fencing or with guardrail) in spreadsheet *SSA eLite+ v4.xls* results in a Crash Reduction Factor CRF=0.25, equivalent to CMF=0.75 which results in a potential likelihood decrease of 1 band.
- **Modify left turn slip lane**: the implementation of this risk mitigation measure described treatment 3.13 (Changing slip lane from low entry angle to high entry angle) in spreadsheet *SSA eLite+ v4.xls* results in a Crash Reduction Factor CRF=0.5, equivalent to CMF=0.5 which results in a potential likelihood decrease of 1 band.

5.2.1.3.2 Mitigation Measures by Developer

- **Construct deceleration lane**: the implementation of this risk mitigation measure described as Protected left turn lane in AGRS02-2021 results in a CMF of 0.9 which results in a potential likelihood decrease of 1 band.
- **Improve on-road cycle infrastructure:** the implementation of this risk mitigation measure, described as treatment 6.16 (Treatment of auxiliary left turn lanes with TC1769 where applicable) in spreadsheet *SSA eLite+ v4.xls* results in a Crash Reduction Factor CRF=0.10, equivalent to CMF=0.90 which results in a potential likelihood decrease of 1 band. Note, treatment TC1769 has been superseded by MUTCD Q-Series W6-Q05, which is the treatment outlined in Section 5.3.3 and is the treatment shown by TMR planning enclosed in Appendix E for changes to access at 340 Ross River Road.

5.2.2 ROAD ENVIRONMENT SAFETY ASSESSMENT

In accordance with the Section 9.3.3 of the GTIA, Ross River Road is assessed as having a medium road environment risk rating based on having a posted speed limit of 60 km/h and an AADT of more than 8,000 vpd. Albert Street is assessed as having a low road environment risk rating based on having a posted speed limit of 60 km/h and an AADT of less than 8000 vpd.

As a Planning Act Development any changes to the road environment would not require a road safety audit but should be subject to a road safety assessment. A road safety assessment may be conducted by either an RSA or RPEQ. This requirement would be satisfied by safety reports prepared in accordance with Section 295 of the Work Health and Safety Regulation 2011 as part of the design process.

5.3 Access and frontage impact assessment

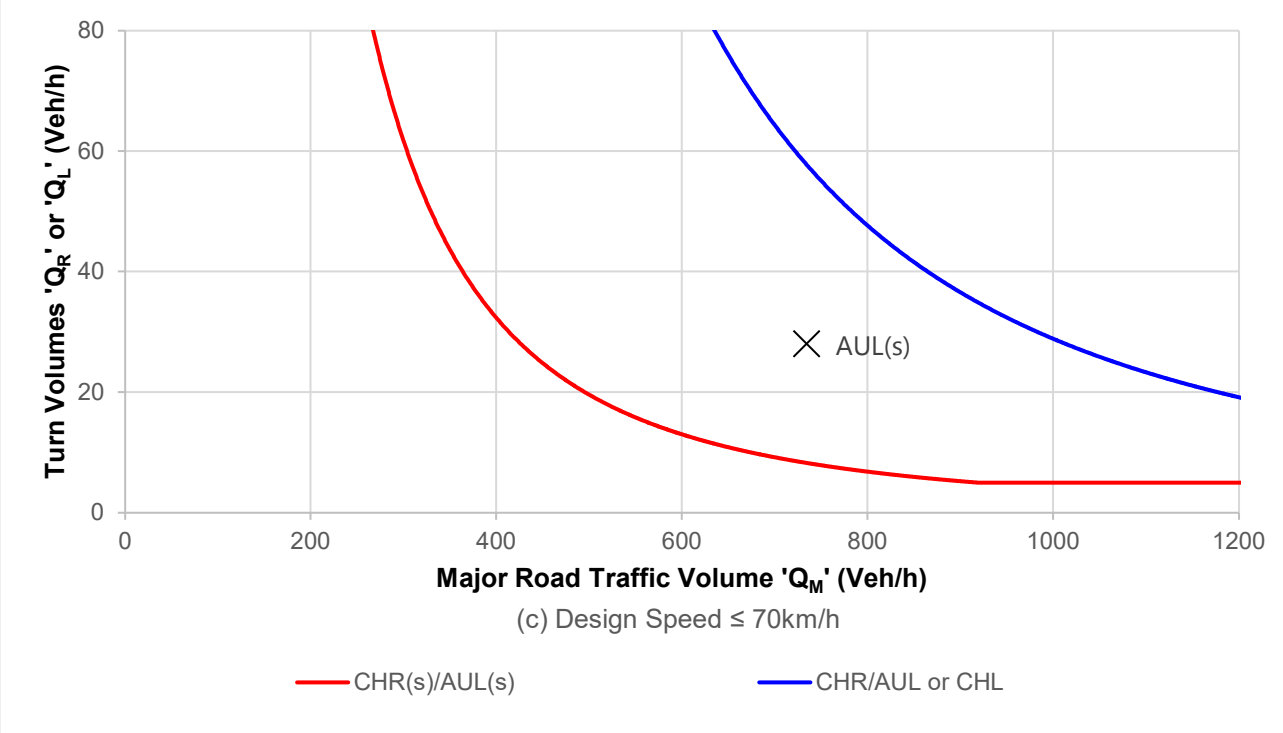
5.3.1 TURN WARRANT ASSESSMENT

A turn warrant assessment was undertaken for the proposed access based on warrants contained in Austroads' "Guide to Traffic Management Part 6: Intersections, Interchanges and Crossings" (AGTM06-20). The proposed access for the development is via a single left in entry from Ross River Road. The assessment is based on:

- A design speed, V, of 70 km/h, being 10km/h above the posted speed limit.
- Normal Design Domain (NDD) warrants shown by Figure 20.
- Four (4) lane, two (2) way major road, that is, two (2) lanes on westbound side of Ross River Road in accordance with planning by TMR enclosed in Appendix E. This provides a conservative assessment of turn warrant requirements for the current Ross River Road configuration on the development site frontage which consists of three (3) westbound lanes.
- Design year (2036) "with development" traffic volumes during the PM peak hour as shown by Figure 19. Note that for the left in entry only westbound traffic volumes in Section 5.1.1 are relevant and these are multiplied by 50% to account for the four (4) lane, two (2) way major road cross section.

As shown by Figure 20, the turn treatment warranted on Ross River Road at the site access is an Auxiliary Left-turn Treatment – Short Turn Lane AUL(s).

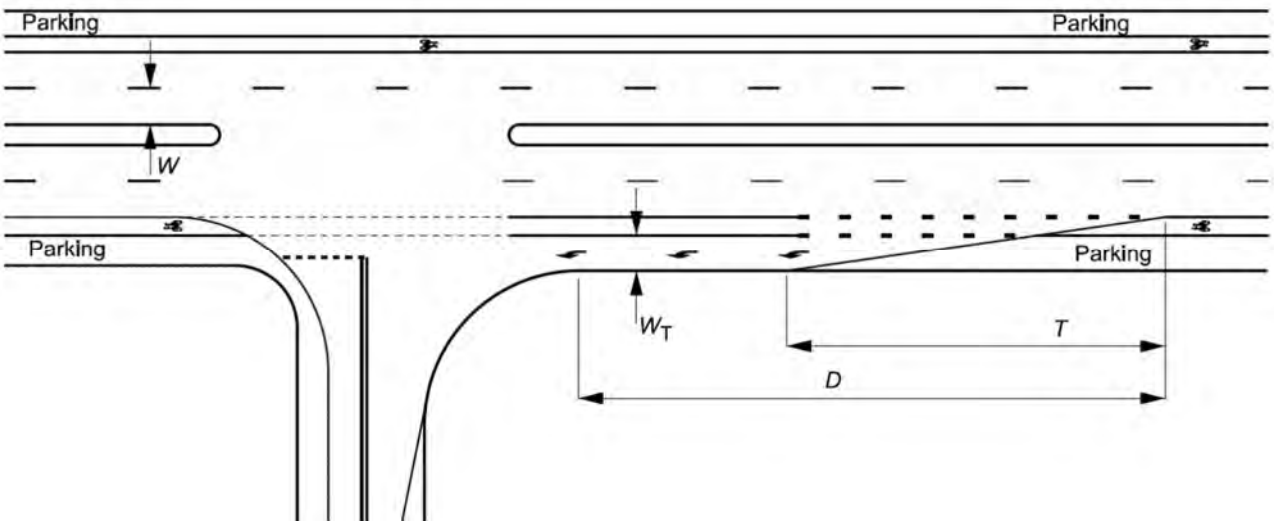
Figure 20 - Warrant for turn treatment on major roads at unsignalised intersections (AGTM06-20)



Austroads "Guide to Road Design Part 4A: Unsignalised and Signalised Intersections (AGRD04A-23) indicates that the length of the AUL(S) turn treatment is that the length of turn slot is based on a left turning vehicle slowing to 80% of the design speed on the approach (i.e. a speed reduction of 20% in the through lane), prior to moving into the turn lane and decelerating. Figure 21 reproduced from AGRD04A-23 shows the layout of an AUL(S) on an urban road. Based on a design speed, V, of 70 km/h, being 10km/h above the posted speed limit the following dimensions were determined:

- Divergence/deceleration length, D, is 35m.
- Taper length, T, is 30m.

Figure 21 – Urban auxiliary left-turn treatment – short turn lane AUL(S) (



5.3.2 INTERSECTION ANALYSIS

Intersection delay impacts were assessed for the site access on Ross River Road and the Nathan Street and Albert Street intersection based on 'with development' traffic volumes (Figure 18 and Figure 19).

Intersection performance has been assessed using SIDRA Intersection 10 (SIDRA). SIDRA is an advanced analytical traffic tool for the evaluation of intersection performance, including delays, queue lengths, and Level of Service. The SIDRA network model was used to assess the impact of the development on intersection performance.

SIDRA reports intersection performance in terms of a range of parameters including:

- **Demand Volumes (V):** The modelled number of vehicles arriving at the intersection during the assessment hour. Demand volumes are calculated by dividing the peak hour volume by the peak flow factor (PFF). SIDRA's default PFF of 95% has been adopted for the purposes of this traffic impact assessment.
- **Degree of Saturation (DoS):** The ratio of the demand volume, V, to the theoretical capacity. A priority control intersection is considered to be operating at its practical capacity when the DoS reaches 0.80.
- **Average Delay (D):** The mean control delay, including both queuing and geometric delays, for all vehicles arriving during the assessment period. This also accounts for any delay experienced after the end of the flow period until the departure of the last vehicle that arrived during that period. Townsville City Plan Table SC6.4.5.6 specifies desirable control delays of less than 35 seconds per vehicle for priority intersections. The GTIA states that where average peak-hour delays at priority-controlled intersections exceed 42 seconds, the intersection should be upgraded for safety reasons.
- **Level of Service (LoS):** An index of the operational performance of traffic. This provides a quantitative stratification of delay that represents quality of service, measured on an A to F scale, with LoS A representing the best operating conditions from the traveller's perspective and LoS F the worst.
- **95th Percentile Back of Queue Length (Q):** The maximum backward extent of the queue relative to the stop line or give-way / yield line during a signal cycle or gap acceptance cycle below which 95% of all queue lengths fall. The 95th percentile back of queue length is generally accepted as the maximum queue length for design purpose.

The SIDRA models are based the assumption that heavy vehicles make up 5% of all movements which is consistent with 2024 traffic census data for Ross River Road (refer Table 2) and conservative for the peak hour traffic generation of a residential development.

5.3.2.1 Ross River Road Access

The site access on Ross River Road was modelled as a left-in-left out access with Auxiliary Left-turn Treatment – Short Turn Lane AUL(s) as recommended in Section 5.3.1 and 'with development' traffic as shown by Figure 18 and Figure 19. Consistent with Figure 13 and Figure 14 it was assumed that 50% of traffic turning left out of the development will give way to all westbound traffic on Ross River Road as it accesses the right turn lane into Acheron Avenue. Associated SIDRA outputs are enclosed in Appendix H. Key findings are:

- The access is operating well below capacity, with maximum DoS being 0.273 (<<0.8).
- The maximum average delay to any movement is 21.7sec for vehicles exiting the site on to Ross River Road during the evening peak hour. This corresponds to a LoS C which is acceptable.
- 95th percentile back of queue lengths are calculated as 0.8 vehicles for the exit to Ross River Road during the morning peak hour which is ideal.

5.3.2.2 Albert Street and Laneway Intersection

An intersection capacity analysis is not required for the intersection of the Laneway and Albert Street, as traffic volumes of 20 vph on the Laneway and 140 vph on Albert Street, combined with relatively low turning movements, are not expected to result in capacity constraints or operational issues. This conclusion is consistent with the guidance provided in Table 6.1 of the 2009 edition of Austroads Guide to Traffic Management Part 3: Traffic Studies and Analysis (AGTM03/09) which is reproduced as Table 9 below.

Table 9 – Intersection Volumes Below Which Capacity Analysis is Unnecessary

Type of road	Light cross and turning volumes maximum design hour volumes vehicles per hour (two way)		
Two-lane major road	400	500	650
Cross road	250	200	100
Four-lane major road	1000	1500	2000
Cross road	100	50	25

5.3.2.3 Albert Street and Nathan Street Intersection

The intersection of Albert Street and Nathan Street was modelled as a left-in-left-out intersection with 'with development' traffic as shown by Figure 18 and Figure 19. As with the Ross River Road access it was assumed that 50% of vehicles turning left out of Albert Street will give way to all northbound traffic on Nathan Street in order to access right turn lanes into Ross River Road. Associated SIDRA outputs are enclosed in Appendix H. Key findings are:

- The intersection is operating well below capacity, with maximum DoS being 0.361 (<<0.8) for vehicles turning left out of Albert Street during the morning peak hour.
- The maximum average delay to any movement is 17.1sec for vehicles turning left out of Albert Street during the evening peak hour. This corresponds to LoS C which is acceptable.
- 95th percentile back of queue lengths are calculated as 1.4 vehicles for the left turn out of Albert Street during the morning peak hour and 1.2 vehicles for vehicles for the left turn out of Albert Street during the evening peak hour which is not expected to impact on the operation of adjacent intersections or accesses.

5.3.3 INTERSECTION LAYOUT

Appendix G shows the proposed layout for the Ross River Road access. Keeping the left turn deceleration lane clear of driveway at 340 Ross River Road requires limiting the length of the left turn deceleration lane to 32m. Based on a deceleration rate of 3.5m/s^2 the length of turn slot allows a vehicle to decelerate from 54km/h to 0km/h between the start of the taper and edge of the driveway.

As indicated in Section 5.3.1, the minimum length of an AUL(S) treatment in the NDD allows a 20% speed reduction in the through lane before the start of the auxiliary lane taper. However, Appendix A of AGRD04A-23ed3.2 indicates that in the extended design domain (EDD) a 30% speed reduction in through road speed at the start of the taper is accepted. Therefore, the proposed 32m long AUL(S):

- Complies with minimum NDD requirements for a design speed of 67km/h (more than 10% above the posted speed limit); and
- Exceeds minimum EDD requirements for a design speed of 70km/h (10km/h above the posted speed limit).

To avoid the diverge associated with the development site access overlapping with the merge of westbound through traffic on Ross River Road from three (3) lanes to two (2) lanes as shown by the Ross River Road Safety Upgrade Project Drawings (refer Appendix E), recommended that the existing arrangement of westbound lanes on the development site frontage should be retained with the merge from three (3) lanes to two (2) lanes occurring west of Acheron Avenue. This will have the adverse impact that when the bus stop on Ross River Road at Cambrae Village is relocated to provide for a left turn deceleration lane into Ignatius Park College the relocated bus stop will be within the merge area and buses loading / unloading at the stop will block the adjacent cycle lane. The safety benefits of keeping the merge area clear of the deceleration lane into the proposed development and providing the deceleration lane into Ignatius Park College are considered greater than the risks associated with relocating the bus stop into the merge area.

5.3.3.1 Swept Path Analyses

Swept path analysis has been undertaken for a front-loading refuse collection vehicle accessing the site from Ross River Road. The vehicle manoeuvres into the designated waste collection area to service bins and subsequently exits the site via the unnamed laneway, turning right onto Albert Street.

The analysis confirms that the proposed access and internal circulation arrangements can accommodate the operational requirements of the waste collection vehicle. Swept path diagrams illustrating these movements are provided in Appendix I.

5.3.4 SIGHT DISTANCES

With respect to sight distance standards Appendix A11 of the GTIA states that:

> *Approach sight distance (ASD) should be provided at every proposed intersection or driveway access. Public road intersection should have safe intersection sight distances (SISD) unless the characteristics of the road or the site totally preclude it. In those circumstances, minimum gap sight distance (MGSD) should be provided.*

The GTIA goes on to recommend adoption of a design speed (for state-controlled roads) which is 10km/h in excess of the posted speed limit. In section 9.1.1 of the TCC TIA Guidelines (TIAG) it is recommended that ASD and SISD should be achieved for a 2.0 sec reaction time:

Design Speed $V = 70km/h$

Reaction Time $R_T = 2.0s$

Based on the above parameters, recommended sight distances in the normal design domain (NDD) for the proposed Ross River Road Residential Development access on Ross River Road are:

- Approach Sight Distance ASD = 92m
- Safe Intersection Sight Distance SISD = 151m
- Minimum Gap Sight Distance MGSD = 97m

A site inspection was undertaken on 17 September 2025. Visibility from the proposed site access point, looking east toward the Ross River Road/Nathan Street intersection, was measured at approximately 90 metres along the edge of the adjacent cycle lane. Noting that the proposed AUL(S) turn treatment at the site access provides visual cues which assist drivers in identifying and locating the access, minimum requirements for ASD are satisfied.

During the site inspection, it was observed that vehicles travelling in the kerbside lane—including those using the left-turn acceleration lane—were visible for approximately 7 seconds prior to reaching the proposed access location. This meets the critical acceptance gap of 5s for a left turn movement in accordance with Table 3.5 of AGRD04A-23ed3.2.

Based on observations made during the site inspection the proposed access on Ross River Road, a state-controlled road:

- Exceeds minimum sight distance requirements specified in TMR's GTIA for a property access; but
- Does not comply with conservative sight distance requirements specified in TCC's TIAG. These sight distance requirements are considered highly conservative for the assessment of the proposed access on Ross River Road where frequent traffic signals and property accesses result in alert driving conditions, and no right turns are proposed.

5.3.5 FRONTAGE ASSESSMENT

A frontage assessment was undertaken to evaluate the interface between the development and the adjoining road network. This included a risk assessment of proposed accesses and the identification of recommended design treatments to improve safety for all path users. The assessment was conducted in accordance with the TMR 2021 guidelines, *Treatment Options to Improve Safety of Pedestrians, Bicycle Riders and Other Path Users at Driveways*.

The frontage risk assessment comprises two key components — a geometric assessment and an exposure assessment. The geometric assessment evaluates the driveway layout to rate the level of warning and vehicle speed environment at each access, considering factors such as driveway width, alignment, gradient and available sight distance between path users and drivers. The exposure assessment considers the interaction potential between vehicles and path users based on observed and anticipated volumes, path classification and surrounding land use activity. Together, these components provide a structured method for determining the relative safety risk of each driveway and identifying appropriate mitigation treatments to improve visibility, reduce vehicle speeds and enhance safety for all path users.

The assessment is to ensure that driveway arrangements minimise potential conflicts between vehicles and vulnerable road users, while aligning with best-practice safety standards for pedestrians, cyclists, and other shared path users. Recommendations reflect the site-specific conditions and anticipated levels of activity along the frontage.

5.3.5.1 Ross River Road Access

A frontage assessment was undertaken for the Ross River Road entrance to the subject site. This proposed access is left-in-left-out access. The frontage risk assessment is included Table 10 below.

Table 10 - Frontage Risk Assessment Ross River Road

Adequate Warning (W)	1. Desirable	Path users travelling at comfortable speeds on principal paths: 20km/h.
Safe Vehicle Speed (S)	3. Deficient	No explicit treatments to ensure low vehicle speed at pathway
		Ramps between path and road that may not achieve desirable vertical deflection.
Geometric Assessment Score (G)	**4 = 1 + 3**	**G = W + S**
Exposure Factor - Vehicle Volumes (EV)	4. Very high Exposure	20+ carparking spaces
Exposure Factor - Path Users (EP)	3. High Exposure	Principal cycle route with moderate demand
Exposure Factor - Driver Compliance (EC)	1. Desirable	Visual cues provided to reinforce path priority combined with good speed control treatment
Exposure Score	**8 = 4 + 3 + 1**	**E = EV + EP + EC**
Total Risk	**Tolerable**	**Recommend supplementary treatments or redesign to address issue**
	High Exposure	

The frontage risk assessment indicates that supplementary treatments or redesign are recommended to address the identified issue, which is that safe vehicle speeds may not be achieved for vehicles entering and exiting the driveway. The treatments recommended to address this issue are to install a road hump across the exit driveway at the property boundary, and to maximise the gradient of the entering driveway. These treatments are both considered to have strong treatment effectiveness when used to address safe vehicle speeds as outlined in Table 6(a) and 6(b) of the TMR 2021 guidelines, *Treatment Options to Improve Safety of Pedestrians, Bicycle Riders and Other Path Users at Driveways*.

5.3.5.2 Albert Street Site Exit

A frontage assessment was undertaken at the Albert Street exit, which serves as an exit-only connection from the 4 m wide unnamed laneway. The laneway is flanked by the Cranbrae Village Retirement Community to the west and the Precinct Apartment Complex to the east, as can be seen in Figure 4.

Sight distance along the laneway is restricted by existing fencing: the eastern side has a solid fence extending to the property boundary, while the western side currently has a chain-link fence that may be replaced in the future with a solid acoustic fence, which would further limit visibility.

Sight triangles, available in Appendix H, have been prepared for this frontage and indicate that sight lines are assessed as highly deficient. The frontage risk assessment in include in Table 11 below:

Table 11 - Frontage Risk Assessment Albert Street

Adequate Warning (W)	4. Highly Deficient	Sight lines do not provide adequate warning for drivers or path users to avoid a crash, when path users travel at minimum speeds.
		General use paths <10km/h
Safe Vehicle Speed (S)	4. Highly Deficient	long driveway (>20m) without speed control treatment allows vehicles to reach speeds significantly higher than 10km/h.
		Ramp does not provide adequate speed control.
		Driveway slopes up at constant gradient to path, path is level, driveway slopes up to property boundary.
Geometric Assessment Score (G)	**8 = 4 + 4**	**G = W + S**
Exposure Factor - Vehicle Volumes (EV)	4. Very high Exposure	20+ carparking spaces
Exposure Factor - Path Users (EP)	3. High Exposure	path servicing retirement village
Exposure Factor - Driver Compliance (EC)	3. Deficient	driveway attributes do not meet tolerable due to very high EV factor, do not meet highly deficient due to narrow driveway
Exposure Score	**10 = 4 + 3 + 3**	**E = EV + EP + EC**
Total Risk	**Highly Deficient Geometry**	**Require supplementary treatments or redesign to address issue.**
	High Exposure	

Based on the findings of the frontage risk assessment, the Albert Street frontage requires treatments that reinforce pedestrian and cyclist priority while moderating vehicle speeds at the site egress. The following measures are recommended to enhance safety and operational performance:

- Install road humps or cushions at both ends of the laneway, designed in accordance with relevant standards and with consideration for stormwater management and cyclist movement.
- Delineate a shared zone at the northern (entry) end of the laneway to formalise low-speed, mixed-use operation and clearly communicate pedestrian and cyclist priority.
- Provide 'No Entry' signage at the Albert Street end of the laneway to reinforce the one-way operation and prevent unauthorised access.

Following commencement of site operations, the laneway and the Albert Street egress should be periodically monitored to confirm that they function safely and as intended. Should operational monitoring indicate unacceptable residual safety risks, additional measures may be considered, including:

- Repeat signs using pavement markings on the laneway surface
- Additional road hump midway along the laneway or regularly spaced rumble strips installed for the length of the laneway.

5.4 Parking

To confirm the functionality of internal access arrangements, swept path analysis was undertaken using a B99 design vehicle. The analysis demonstrates that vehicles can safely manoeuvre into and out of each ground floor car park without encroaching on adjacent bays or circulation areas. These movements include entry from and exit to both the north, Ross River Road left-in-left-out, and south, parking within the unnamed laneway.

The swept path diagrams supporting this assessment are included in Appendix I.

6. CONCLUSIONS AND RECOMMENDATIONS

6.1 Summary of Impacts and Mitigation Measures

Based on the preceding discussion and analysis the following conclusions are made:

- The proposed development has the potential to exacerbate existing road safety issues associated with rear end collisions and vulnerable road user, pedestrian and bicycle, crashes in the study area. The design of the development entry and exits has been undertaken to minimise these risks and, in combination with planned safety improvements by TMR, the development is not expected to worsen the risk score of any existing road safety issues.
- A road environment safety assessment concluded that changes to the road environment, that is construction of accesses do not require a road safety audit. Nonetheless, these changes should be subject to a road safety assessment. The road safety assessment may be conducted by either an accredited road safety auditor (RSA) or a registered professional engineer of Queensland (RPEQ). The requirement for a road safety assessment would be satisfied by safety reports prepared in accordance with Section 295 of the Work Health and Safety Regulation 2011 as part of the design process.
- The TMR 2021 guidelines, *Treatment Options to Improve Safety of Pedestrians, Bicycle Riders and Other Path Users at Driveways* were used to assess risk for the 1.2m wide path on Ross River Road at the proposed left-in-left-out access and the 1.5m wide path on Albert Street at the unnamed laneway. The recommended treatments to provide acceptable safety at both pathways are:
  - At the Ross River Road left-in-left-out:
    - Install a road hump across the exit driveway at the property boundary; and
    - Maximise the gradient of the entering driveway.
  - At the Unnamed Laneway exit to Albert Street:
    - Install road humps or cushions at both ends of the laneway, designed in accordance with relevant standards and with consideration for stormwater management and cyclist movement.
    - Install shared zone signage at the northern (entry) end of the laneway to formalise low-speed, mixed-use operation and clearly communicate pedestrian and cyclist priority.
    - Install 'No Entry' signage at the Albert Street end of the laneway to reinforce the one-way operation and prevent unauthorised access.
- Even with full development of the subject site, traffic volumes at the intersection of Albert Street and the unnamed laneway which will provide a second exit from the site will be very low and further analysis is not required.
- Intersection analysis was undertaken using SIDRA Intersection Version 10 (SIDRA) software for the left-in-left-out intersections associated with the proposed development's Ross River Road access and the existing Nathan Street / Albert Street intersection. It was found that even with 50% of left out movement giving way to 100% of opposing traffic to access right turn lanes at downstream traffic signals both intersections would operate well below their practical capacity with acceptable delays and queues.

- In the normal design domain (NDD), an auxiliary left turn treatment with a short turn slot (AUL(S)) is warranted at the site entry on Ross River Road. Keeping the left turn deceleration lane clear of driveway at 340 Ross River Road requires limiting the length of the left turn deceleration lane to 32m which
  - Complies with minimum NDD requirements for a design speed of 67km/h (more than 10% above the posted speed limit); and
  - Exceeds minimum extended design domain (EDD) requirements for a design speed of 70km/h (10km/h above the posted speed limit).
- Planning supplied by TMR proposed that westbound traffic on Ross River Road will merge from three (3) lanes to two (2) lanes on the development site frontage. To avoid the diverge associated with the development site access overlapping with the merge of westbound through traffic it is recommended that the existing arrangement of westbound lanes on the development site frontage is retained with the merge from three (3) lanes to two (2) lanes occurring west of Acheron Avenue.
- During an inspection of the site on 17 September 2025 it was observed that the site complies with minimum requirements for approach sight distance (ASD) and minimum gap sight distance (MGSD). This exceeds minimum sight distance requirements for a property access specified in TMR's "Guide to Traffic Impact Assessment" (GTIA); but does not comply with sight distance requirements specified in TCC's "TIA Guideline" (TIAG). The sight distance requirements specified in TIAG are highly conservative for the assessment of the proposed access on Ross River Road where frequent traffic signals and property accesses result in alert driving conditions, and no right turns are proposed. As Ross River Road is a state-controlled road and noting the conservatism of TCC's TIAG, compliance with TMR's GTIA is considered acceptable.

6.2 Certification State and Authorisation

This report was prepared in accordance with the Department of Transport and Main Roads' (TMR's) "Guide to Traffic Impact Assessment" (GTIA) and Townsville City Plan SC6.4.5.2 Traffic Impact Assessment by Danielle Bamber under the direct supervision of Bradley Jones (RPEQ 19986). RPEQ certification in accordance with the GTIA is enclosed in Appendix J.

APPENDIX A

PRE-LODGEMENT MEETING MINUTES

PRE-LODGEMENT MEETING MINUTES >>

PO BOX 1268, Townsville
Queensland 4810

13 48 10

enquiries@townsville.qld.gov.au
townsville.qld.gov.au

ABN: 44 741 992 072

COUNCIL REFERENCE >>	PLM25/0120
ASSESSMENT NO >>	2636134
LEGAL DESCRIPTION >>	Lot 3 SP 146326
PROPERTY ADDRESS >>	344-346 Ross River Road CRANBROOK QLD 4814 350 Ross River Road CRANBROOK QLD 4814
PROPOSAL >>	Multiple dwelling

DATE >> 25 June 2025
TIME >> 9.00am

ATTENDEES >>

Stephen Motti	Brazier Motti
Jarod Hurst	Hurst Qld
Kieran Dee	Hurst Qld
Estelle Trueman	Senior Planner – Planning and Development
Shelly Sharma	Development Engineer – Planning and Development
Naomi White	Planning Support Officer - Planning and Development

MS Teams

Alex Zafiriadis	Good House Partners
Kris Robinson	Regional Housing

Description of the Proposal

- The proposal is for Multiple dwelling 81 units- Affordable Social Housing.
- 2 buildings, 5 storeys.
- Mix of dwelling types, including 1, 2 & 3 bedroom units, in response to housing needs.
- Applicant understands that the proposal can be assessed under Ministerial designation, but their preference to work with council.
- Will be engaging with Main Roads for access.
- Site is adjacent to major centres, close to traffic network, hospital and university.
- Improve density around centres
- End of trip facilities to be provided and bike storage.
- 120 parks currently proposed, may reduce to 1 per unit.
- Proposing bridge between two buildings, level 1 to level 4, for access.
- Development meets the criteria of the Residential Activation Fund. This can be developer reimbursement after fact or council gets reimbursement after.
- To meet the Housing Australia Future Fund requirements, 12mth timeframe on development application approval.
- Development proposal plans – attached (work in progress plans).

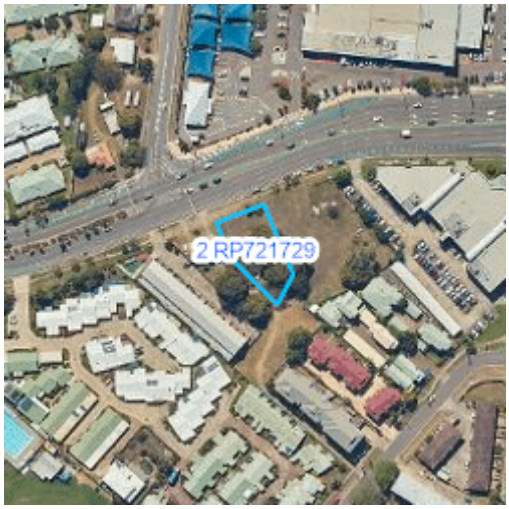
Property Zoning and Overlays

344 - 346 Ross River Road CRANBROOK QLD 4814

Lot 3 SP 146326

Zone:
>> Medium density residential zone
Priority infrastructure plan:
>> This property is within a Local Government Infrastructure Plan Area.
Overlay(s):
>> Airport Environs Overlay Map OM-01.1 - Operational airspace - Airspace more than 45m above ground level
>> Airport Environs Overlay Map OM-01.2 - Wildlife hazard buffer zones and Public safety areas - Distance from airport runway - 8km
>> Airport Environs Overlay Map OM-01.5 - Light intensity - 6km radius
>> Development Constraints Overlay Map OM-06.1 to OM-06.2 - Flood hazard - Low hazard area
>> Development Constraints Overlay Map OM-06.1 to OM-06.2 - Flood hazard - Medium hazard area
Information Purposes:
>> This site may be within 5m of an overhead powerline owned by Ergon Energy. There are strict legal and safety requirements for any buildings near an overhead powerline. Please contact Ergon Energy for safety advice on 13 74 66 or search for "safety advice" on the Ergon Energy website and make an application if structures or works are proposed or if any person, plant or equipment will come within 5m of an existing line. To avoid building delays Ergon Energy strongly advises you get in contact early.
>> Acid sulphate soils Figure 9.2 - 5-20 metres AHD
>> Infrastructure Overlay Map OM-10 - Road noise corridors - Category 2
>> Infrastructure Overlay Map OM-10 - Road noise corridors - Category 3

350 Ross River Road CRANBROOK QLD 4814
Lot 2 RP 721729



Zone:
>> Medium density residential zone
Priority infrastructure plan:
>> This property is within a Local Government Infrastructure Plan Area.
Overlay(s):
>> Airport Environs Overlay Map OM-01.1 - Operational airspace - Airspace more than 45m above ground level
>> Airport Environs Overlay Map OM-01.2 - Wildlife hazard buffer zones and Public safety areas - Distance from airport runway - 8km
>> Airport Environs Overlay Map OM-01.5 - Light intensity - 6km radius
>> Development Constraints Overlay Map OM-06.1 to OM-06.2 - Flood hazard - Low hazard area
>> Development Constraints Overlay Map OM-06.1 to OM-06.2 - Flood hazard - Medium hazard area

Lot 1 RP 721729

Zone:
>> Medium density residential zone
Priority infrastructure plan:
>> This property is within a Local Government Infrastructure Plan Area.
Overlay(s):
>> Airport Environs Overlay Map OM-01.1 - Operational airspace - Airspace more than 45m above ground level
>> Airport Environs Overlay Map OM-01.2 - Wildlife hazard buffer zones and Public safety areas - Distance from airport runway - 8km
>> Airport Environs Overlay Map OM-01.5 - Light intensity - 6km radius
>> Development Constraints Overlay Map OM-06.1 to OM-06.2 - Flood hazard - Low hazard area
>> Development Constraints Overlay Map OM-06.1 to OM-06.2 - Flood hazard - Medium hazard area
Information Purposes:
>> This site may be within 5m of an overhead powerline owned by Ergon Energy. There are strict legal and safety requirements for any buildings near an overhead powerline. Please contact Ergon Energy for safety advice on 13 74 66 or search for "safety advice" on the Ergon Energy website and make an application if structures or works are proposed or if any person, plant or equipment will come within 5m of an existing line. To avoid building delays Ergon Energy strongly advises you get in contact early.
>> Acid sulphate soils Figure 9.2 - 5-20 metres AHD
>> Infrastructure Overlay Map OM-10 - Road noise corridors - Category 2
>> Infrastructure Overlay Map OM-10 - Road noise corridors - Category 3

Planning Scheme

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

Furthermore, Townsville Maps can be viewed via the following link: TownsvilleMAPS Mapping Service - Townsville City Council

Meeting Discussion

- Defined Use -Multiple dwelling
- Level of assessment – Code assessable 3 storeys or less, impact assessment for more than 3 storeys
- Strategic Framework
- Medium density residential zone code
    - Well-connected site
    - Scheme encourages improving density around major centres, and council would like to see development of this site.
    - 5 storeys can be considered in response to code requirements and with good design.
    - Council will condition amalgamation of the lots.
- Transport impact, access and parking code
        - Traffic Impact assessment (TIA) required.
        - TIA to ensure sight lines are achievable (specifically proposed booter at the entry).
        - TIA to consider vehicles accessing site for waste management.
    - Parking –
        - Council will consider 120 carparks proposed. Encouraged not to consider less than 1 car park per unit.
        - Council has supported less than 1 carpark per unit where the tenure was build to rent and included onsite managers. In these situations the car park itself is managed separately to the lease of units and a car park management scheme is in place.
        - Tandem car parks may be supported where tied to a single unit and supported by a car park management plan. Justification as to the workability and appropriateness of this proposal would be required.
        - Design could consider additional parking to laneway with access and service vehicles considered in the design.
        - Design preference is units facing the street at ground level and car parking at behind, with no parking addressing the street. Where this is not possible, screening of carparks required.
    - Access –
        - Proposed Left in, left out access to Ross River Road need discussions with DTMR. Recommend engaging with main roads early for referral.
        - Use of laneway at rear was approved under previous application, where council agreed to use of laneway for access, conditioned not for exclusive use.
        - Entry way to be clearly defined for safety of pedestrians and visitors. Office to street, create sense of arrival, pedestrian friendly to create passive overlooking.
- Works code
    - Water –
        - TCC does not allow direct pumping from water mains for firefighting purposes. Design to consider location for break tanks, if required.

- Sewerage –
  - Existing sewer main through the site requires to be replaced and a condition will be included.

- Healthy waters code
  - Stormwater management plan addressing both quantity and quality is required.
  - Information for funding purposes only, as applicable – TCC does not have any ***trunk*** stormwater infrastructure (drainage).
- Landscape code
- Airport environs overlay code
- Flood hazard overlay code
  - A Flood impact assessment (FIA) is required to be submitted with the application.

- Council can attend pre-lodgement meeting with Main Roads or happy feedback to be provided following the meeting.

Other Applicable Information

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

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

In addition, the subject site is within the City Activation and Jobs Policy Incentive Package area, as such, please refer to Council's website for further information.

Can lodge request for incentives with Ben Smith prior to lodging an application with council. Applicant is encouraged to engage with the Economic Attraction team in relation to incentives. The new policy deliberately excludes development which receives/d funding from the State or Federal Government.

Post Meeting Feedback

- Water and sewer planning is required to demonstrate that the development can be appropriately serviced.
- Stormwater management plan is to include both quality and quantity.
- The applicant sought to understand Council's assessment of the proposed design. The following comments are provided as post-meeting feedback:
  - Activating Ross River Road with units on the ground floor addressing and engaging with the street would be recommended. This would include clearly identifiable individual house entries and a main pedestrian entry to the main lobby from Ross River Road. Several of the Medium Density Residential Code PO's and AO's cover this requirement highlighted below. P07, (PO8(d+f)), (PO10) covered in Figure 6.24 and 6.25 and 6.26
  - In addition, materials or textures are required to articulate and provide variation to the builtform – please demonstrate in the application materials. (PO8(b+c))
  - Roof overhangs should be included all the way around the built form. This is to respond to Townsville's tropical climate and provide additional weather protection.

- Sunshade devices should be provided to exposed windows, specifically eastern and western elevations.
- Is air conditioning going to be provided? If so where are the condenser units to be located?
- Are clothes lines proposed, if on verandahs they need to be screened. Are security screen doors proposed, to the entry doors, to ensure the opportunity for natural cross ventilation can be realised, specifically if no air conditioning is provided.
- Communal open space needs to be provided that provides amenity for the entire proposal. This may include BBQ areas, seating, shade structures, maybe a play component i.e. basketball hoop

Meeting Closed >> 9.40am

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

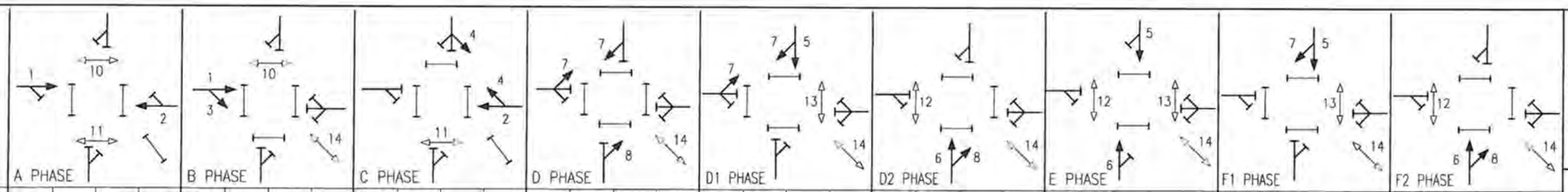
APPENDIX B

INTERSECTION LAYOUT PLANS

Intersection Drawing Site Number 3203 Ross River Road and Nathan Street

Intersection Drawing Site Number 3274 Ross River Road and Acheron Avenue

PHASE DIAGRAMS

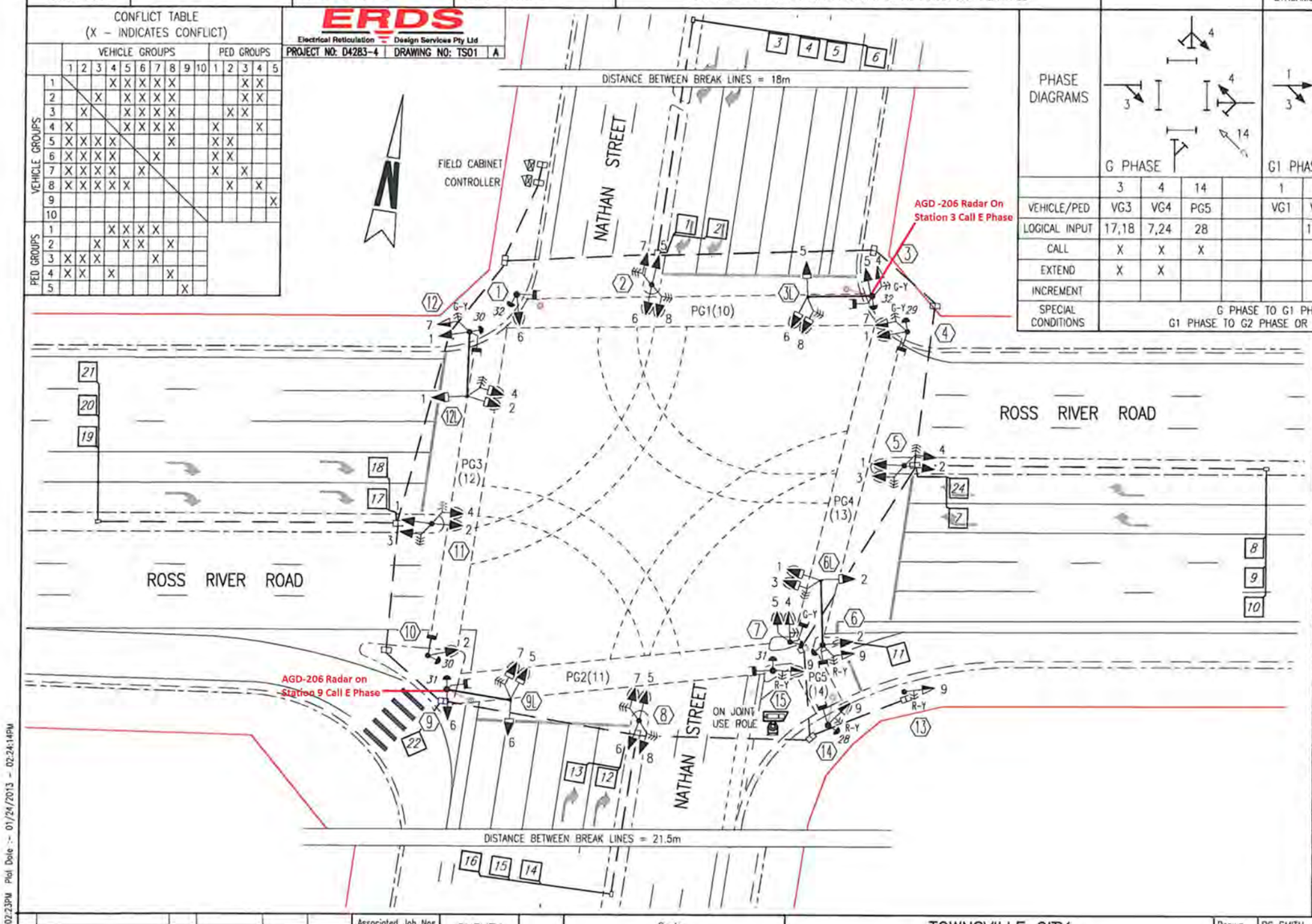


	A PHASE				B PHASE				C PHASE				D PHASE				D1 PHASE				D2 PHASE				E PHASE				F1 PHASE				F2 PHASE			
SIGNAL GROUPS	1	2	10	11	1	3	10	14	2	4	11		7	8	14		5	7	13	14	6	8	12	14	5	6	12	13	14	5	7	13	14	6	8	12	14
VEHICLE/PED	VG1	VG2	PG1	PG2	VG1	VG3	PG1	PG5	VG2	VG4	PG2		VG7	VG8	PG5		VG5	VG7	PG4	PG5	VG6	VG8	PG3	PG5	VG5	VG6	PG3	PG4	PG5	VG5	VG7	PG4	PG5	VG6	VG8	PG3	PG5
LOGICAL INPUT	19,20,21	8,9,10	32	31		17,18		28		7,24			1,2	12,13				1,2		28		12,13		28	3,4,5,6	14,15,16	30	29	28		1,2				12,13		28
CALL	X	X	X	X				X					X	X				X		Y		X		X	X	X	X	X	X								X
EXTEND	X	X				X				X			X	X				X				X			X	X					X				X		
INCREMENT	X	X																																			
SPECIAL CONDITIONS					INTRODUCE B PHASE ON STREAMS SIGNAL				INTRODUCE C PHASE ON STREAMS SIGNAL				D PHASE TO D1 PHASE OR D2 PHASE PERMITTED. D1 PHASE TO D2 PHASE OR D2 PHASE TO D1 PHASE NOT PERMITTED.																	INTRODUCE F1 PHASE ON STREAMS SIGNAL					INTRODUCE F2 PHASE ON STREAMS SIGNAL			

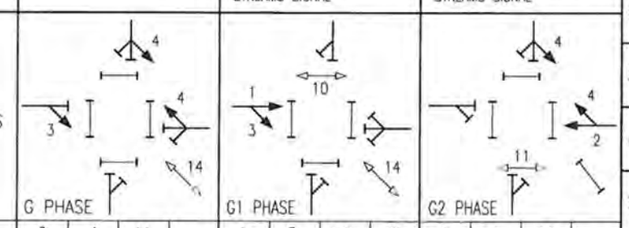
CONFLICT TABLE
(X – INDICATES CONFLICT)

		VEHICLE GROUPS										PED GROUPS				
		1	2	3	4	5	6	7	8	9	10	1	2	3	4	5
VEHICLE GROUPS	1					X	X	X	X					X	X	
	2			X			X	X	X					X	X	
	3		X				X	X	X				X	X		
	4	X					X	X	X			X			X	
	5	X	X	X	X				X			X	X			
	6	X	X	X	X			X				X	X			
	7	X	X	X	X		X					X		X		
	8	X	X	X	X	X							X		X	
	9															X
	10															
PED GROUPS	1					X	X	X	X							
	2			X			X	X		X						
	3	X	X	X					X							
	4	X	X		X					X						
	5										X					

ERDS
Electrical Reticulation Design Services Pty Ltd
PROJECT NO: D4283-4 | DRAWING NO: TS01 | A



PHASE DIAGRAMS



	G PHASE				G1 PHASE				G2 PHASE		
	3	4	14		1	3	10	14	2	4	11
VEHICLE/PED	VG3	VG4	PG5		VG1	VG3	PG1	PG5	VG2	VG4	PG2
LOGICAL INPUT	17,18	7,24	28			17,18		28		7,24	
CALL	X	X	X			X		X		X	
EXTEND	X	X				X				X	
INCREMENT											
SPECIAL CONDITIONS	G PHASE TO G1 PHASE OR G2 PHASE PERMITTED. G1 PHASE TO G2 PHASE OR G2 PHASE TO G1 PHASE NOT PERMITTED.										

PD216 DETECTOR TABLE

PHYSICAL LABEL	CONTROLLER TERMINAL	LOGICAL INPUT	LOOP/PB CONFIGURATION	DIST TO STOP LINE
LOOP 1	P1	1	STOP LINE	4m
LOOP 2	P2	2	STOP LINE	4m
LOOP 3	P3	3	ADVANCE	35m
LOOP 4	P4	4	ADVANCE	35m
LOOP 5	P5	5	ADVANCE	35m
LOOP 6	P6	6	ADVANCE	35m
LOOP 7	P7	7	STOP LINE	4m
LOOP 8	P8	8	ADVANCE	35m
LOOP 9	Q9	9	ADVANCE	35m
LOOP 10	Q10	10	ADVANCE	35m
LOOP 11	Q11	11	STOP LINE	4m
LOOP 12	Q12	12	STOP LINE	4m
LOOP 13	Q13	13	STOP LINE	4m
LOOP 14	Q14	14	ADVANCE	35m
LOOP 15	Q15	15	ADVANCE	35m
LOOP 16	Q16	16	ADVANCE	35m
LOOP 17	R17	17	STOP LINE	4m
LOOP 18	R18	18	STOP LINE	4m
LOOP 19	R19	19	ADVANCE	35m
LOOP 20	R20	20	ADVANCE	35m
LOOP 21	R21	21	ADVANCE	35m
LOOP 22	R22	22	COUNT	—
		23		
LOOP 24	R24	24	STOP LINE	4m
EXT6	E10	27	BIKE RADARS	
EXT5	E9	28	Pb5–AUDIO	
EXT4	E8	29	Pb4–AUDIO	
EXT3	E7	30	Pb3–AUDIO	
EXT2	E6	31	Pb2–AUDIO	
EXT1	E5	32	Pb1–AUDIO	

SIGNAL GROUPS	FUNCTION	CONTROLLER TERMINALS	RUN 1 FINAL TERMINALS	RUN 1 CONNECTS (CORES USED)	RUN 2 FINAL TERMINALS	RUN 2 CONNECTS (CORES USED)	RUN 3 FINAL TERMINALS	RUN 3 CONNECTS (CORES)	RUN 4 FINAL TERMINALS	RUN 4 CONNECTS (CORES)
1	RED	A5	1	1 1	1	1 1				
	YELLOW	A4	2	2 2	2	2 2				
	GREEN	A3	3	3 3	3	3 3				
2	RED	A8	4	4 4	4	4 4				
	YELLOW	A7	5	5 5	5	5 5				
	GREEN	A6	6	6 6	6	6 6				
3	RED	A11	19	19 7	19	19				
	YELLOW	A10	20	20 8	20	20				
	GREEN	A9	21	21 9	21	21				
4	RED	A14	22	22	22	22 7				
	YELLOW	A13	23	23	23	23 8				
	GREEN	A12	24	24	24	24 9				
5	RED	B5	7	7 7 7	7	7 7				
	YELLOW	B4	8	8 8 8	8	8 8				
	GREEN	B3	9	9 9	9	9 9				
6	RED	B8	10	10 10	10	10 10				
	YELLOW	B7	11	11 11	11	11 11				
	GREEN	B6	12	12 12	12	12 12				
7	RED	B11	13	13	13	13 13				
	YELLOW	B10	14	14	14	14 14				
	GREEN	B9	15	15	15	15 15				
8	RED	B14	16	16 1	16	16				
	YELLOW	B13	17	17 2	17	17				
	GREEN	B12	18	18 3	18	18				
9	RED	C5					39	13		
	YELLOW	C4					40	14		
10	RED DW	C8					25	1		
	PED1									
	GREEN W	C6					26	2		
11	RED DW	C11					27	3	25	1
	PED2									
	GREEN W	C9					28	4	26	2
12	RED DW	C14							27	3
	PED3									
	GREEN W	C12							28	4
13	RED DW	D5					29	5		
	PED4									
	GREEN W	D3					30	6		
14	RED DW	D8					37	11		
	PED5									
	GREEN W	D6					38	12		
15										
16										
EXT6 DET 27		E10						16		8
EXT5 DET 28		E9					41	15		
EXT4 DET 29		E8					34	10		
EXT3 DET 30		E7							31	7
EXT2 DET 31		E6					33	9	30	6
EXT1 DET 32		E5					32	8		
230V		A2					31	7	29	5
DET COMMON		E3					36	GY	36	GY
NEUTRAL		A1,B1 C1,D1	NL	BK BK BK	NL	BK BK BK	NL	BK	NL	BK
SPARE CORES TO EARTH				25,26 GY		25,26 GY		16		9 8 16
CABLE SIZE				29 19 19		29 19 19		19		19

CONTROLLER TYPE: EC1–62–16 LANTERN TYPE: LED

A	Original Issue A3					
	Revisions/Descriptions	Ref	Certification	Date	Microfiled	

Associated Job Nos | SURVEY DATA
Auxiliary Drg Nos | Horiz. Grid | Height Origin | Survey Books

Scales 0 2 4 6 8 10m
Dimensions shown in metres except where shown otherwise

TOWNSVILLE CITY
ROSS RIVER ROAD
ROSS RIVER RD & NATHAN ST
Reference Points

Preceding RP	Dist. to start of job (km)	From start to end of job	From end to Following RP	Following RP

Through Chainage from

Drawn	RG SMITH
Checked	MJ REMME
Designed	RG SMITH
Verified	MJ REMME
Design Reviews (RPEQ)	L DAVIS No. 3652 Date / /

TRAFFIC SIGNAL INSTALLATION
OPERATIONS & ELECTRICAL

ENGINEERING CERTIFICATION (RPEQ)

ENG. AREA	NAME	SIGNATURE	NO.	DATE
ELECTRICAL	L DAVIS		3652	

Site Number 3203

For scheme approval status refer Drg. No. (of)

Queensland Government

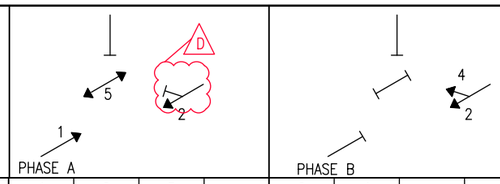
Job No.	
Contract. No.	
Drawing No.	625641 A
Series Number	1 of 1

MRT_Detail (02/11)

CAD FILES P:\Traffic Signal Projects\Consultants\D4283-4 – Nathan St & Ross River Rd (3203)\Drawings\Working\D4283-4 3203_625641_A.dwg

Last Modified :- Oct 01, 2013 - 02:23PM Piel Dole :- 01/24/2013 - 02:24:14PM

PHASE DIAGRAMS

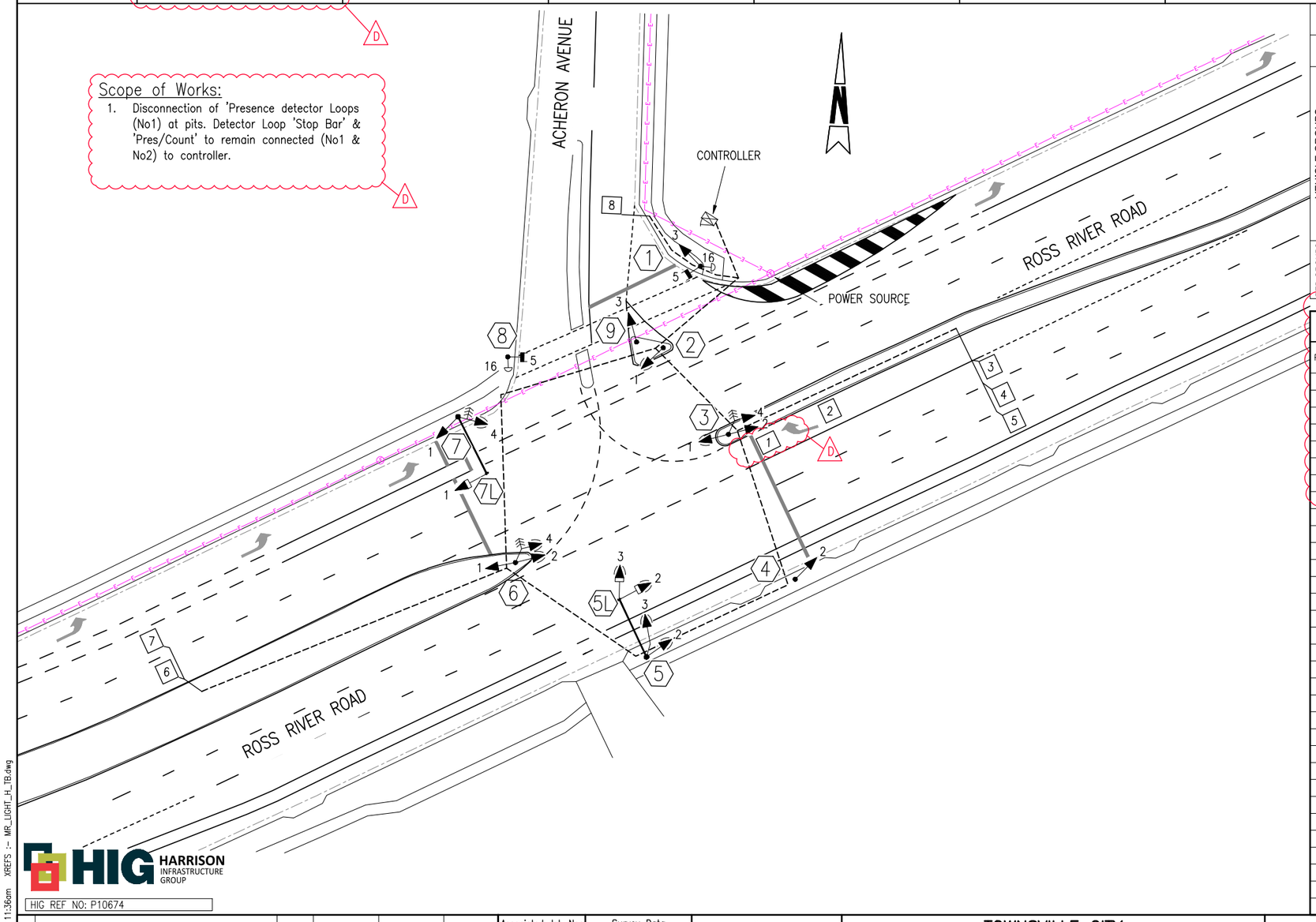


SIGNAL GROUPS	1	2	5		2	4			3														
VEHICLE/PED	VG1	VG2	PG1		VG1	VG4			VG3														
LOGICAL INPUT	6,7	3,4,5	16		5,6,7	1			8														
CALL	X	X	X			PRES			X														
EXTEND	X	X				X			X														
INCREMENT	X	X																					
SPECIAL CONDITIONS																							

Scope of Works:

1. Disconnection of 'Presence detector Loops (No1) at pits. Detector Loop 'Stop Bar' & 'Pres/Count' to remain connected (No1 & No2) to controller.

D



CONFLICT TABLE (X INDICATES CONFLICT)

VEHICLE GROUPS	1	2	3	4	5	6	7	8	9	10	11	12	PED GROUPS 1	2	3	4
1			X	X												
2			X													
3	X	X			X								X			
4	X		X										X			
5																
6																
7																
8																
9																
10																
11																
12																
PED GROUPS 1			X	X												
2																
3																
4																

DETECTOR TABLE – PSC PD200 SERIES INTEGRATED DETECTOR SYSTEM

PHYSICAL LABEL	CONTROLLER TERMINAL	LOGICAL INPUT	LOOP/PB CONFIGURATION	DIST TO STOP LINE
LOOP 1	P1	1	STOP LINE	4m
LOOP 2	P2	2	PRES/COUNT	STD DRG
LOOP 3	P3	3	ADVANCE	25m
LOOP 4	P4	4	ADVANCE	25m
LOOP 5	P5	5	ADVANCE	25m
LOOP 6	P6	6	ADVANCE	35m
LOOP 7	P7	7	ADVANCE	35m
LOOP 8	P8	8	ADVANCE	7.5m
		9		
		10		
		11		
		12		
		13		
		14		
		15		
EXT 1	E5	16	PB1–STD	
		17		
		18		
		19		
		20		
		21		
		22		
		23		
		24		
		25		
		26		
		27		
		28		
		29		
		30		
		31		
		32		

SIGNAL GROUPS	FUNCTION	CONTROLLER TERMINALS	FINAL TERMINALS	RUN 1 CONNECTS	CORES USED	FINAL TERMINALS	RUN 2 CONNECTS	CORES USED	FINAL TERMINALS	RUN 3 CONNECTS	CORES USED
1	RED	A5	1	1		1	1	1			
	YELLOW	A4	2	2		2	2	2			
	GREEN	A3	3	3		3	3	3			
2	RED	A8	4	4	4	4	4				
	YELLOW	A7	5	5	5	5	5				
	GREEN	A6	6	6	6	6	6				
3	RED	A11	7	7	7	7	7				
	YELLOW	A10	8	8	8	8	8				
	GREEN	A9	9	9	9	9	9				
4	RED	A14	10	10		10	10				
	YELLOW	A13	11	11		11	11				
	GREEN	A12	12	12		12	12				
5	RED D/WALK	B5	16	16		16	16				
	PED 1										
	GREEN WALK	B3	17	17		17	17				
6											
7											
8											
9											
10											
11											
12											
15											
16											
	EXT 1 DET 16	E5	25	25		25	25				
	240V	A2	26	26		26	26				
	DET COMMON	E3	27	GY		27	GY				
	NEUTRAL	A1,B1 C1,D1	NL	BK	BK	NL	BK	BK			
	SPARE CORES TO EARTH			13–15 18–24			13–15 18–24				
	CABLE SIZE			29	19		29	19			

CONTROLLER TYPE: TYCO PSC–ID

LANTERN TYPE: LED

HIG HARRISON INFRASTRUCTURE GROUP

HIG REF NO: P10674

D	REMOVE FILTERING FROM SG4	JWR	D Suter 11567		25/05/2021
C	DRAWN TO LATEST STANDARDS AND CHANGED PEDESTRIAN CROSSING				8/07
B	PEDESTRIAN SIGNAL GROUP CAHNGED TO SG5		J Chuong		07/09/98
A	Original Issue A1/A3				
	Revisions/Descriptions	Drawn	Checked	Signed	Date

CAD FILES C:\12dS\data\TWB-DM01\P10674 – Townsville 45_1748\4.0 Drawings\4.1_Dwg\272602 OPERATION & ELECTRICAL 3274.dwg

Last Modified :- Jun 17, 2021 – 11:36am XREFS :- MR_LIGHT_H_TB.dwg

Associated Job Nos

Auxiliary Drg Nos

272601 – 272602

Survey Data: Horiz. Datum; Horiz. Grid; Height Datum; Survey Books

Scales 0 2 4 6 8 10m

ORIGINAL SIZE A3

Dimensions shown in metres except where shown otherwise

TOWNSVILLE CITY

ROSS RIVER ROAD

ROSS RIVER RD & ACHERON AVENUE

Reference Points

Preceding RP	Dist. to start of job (km)	From start to end of job	From end to Following RP	Following RP
612/2	0.18	0.10	2.73	612/3A

Through Chainage from Start of Gazettal 4.01km to 4.11km

TRAFFIC SIGNAL INSTALLATION
ITS DESIGN

Site Number 3274

Drawn

Designed

Checked

ENGINEERING CERTIFICATION (RPEQ)

ENG. AREA	NAME	SIGNATURE	No.	DATE

Queensland Government

Job No.

Contract No.

Drawing No. 272602 D

Series Number 2 of 2

APPENDIX C

CRASH FACTOR MATRIX

Crash Factor Matrix

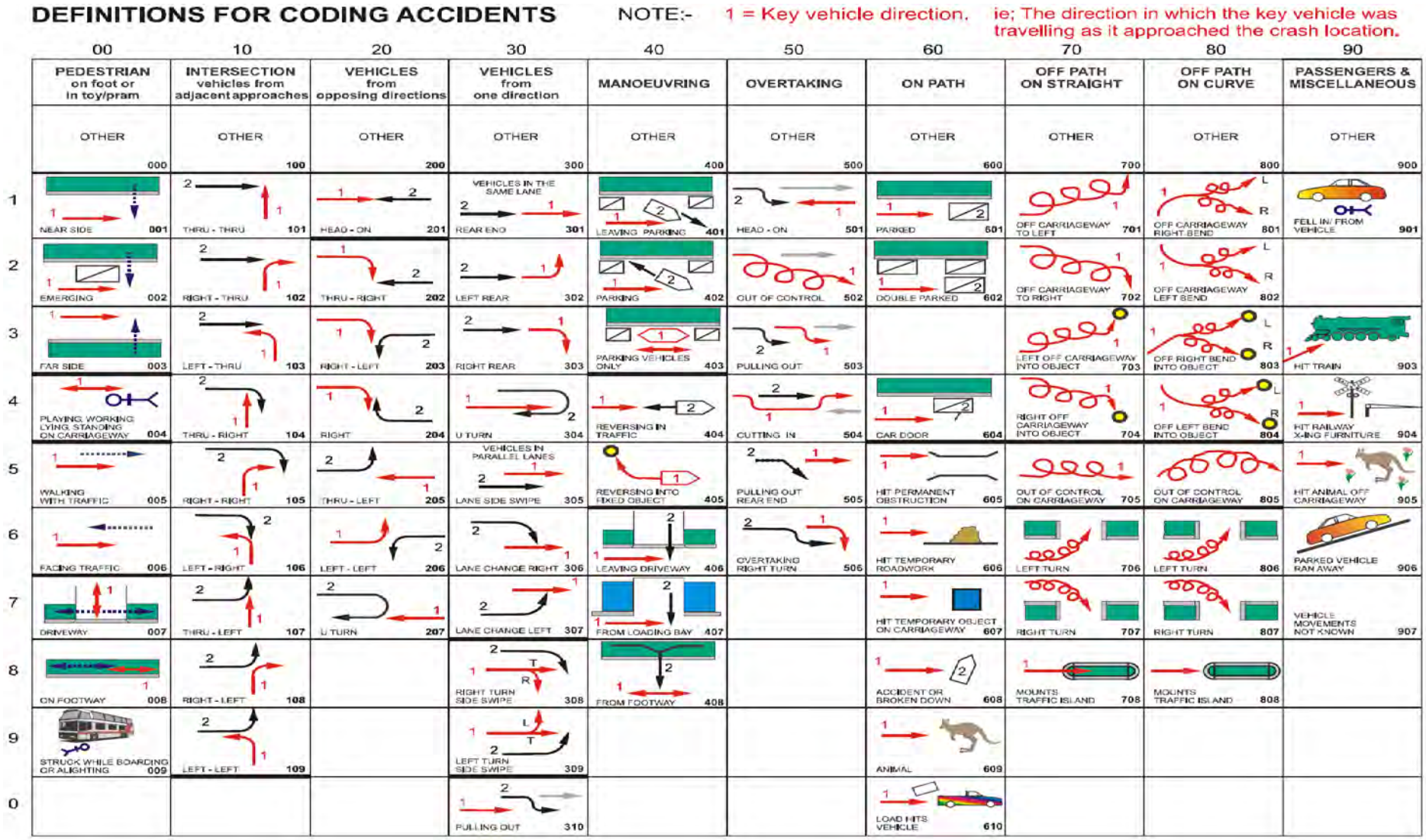
TMR Definitions for Coding Accidents

DCA Code	Direction of key vehicle	Total	Crash Refs	Number of crashes each year																
				2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Acheron Avenue Signals																				
7	West	1	#7			1														
104	East	2	#28, 136					1									1			
	East	3	#48, 123, 133							1					1	1				
	West	1	#9			1														
301	**SUM**	**4**		**0**	**0**	**1**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**1**	**1**	**0**	**0**	**0**	**0**
	East	1	#35					1												
	South	1	#5			1														
408	**SUM**	**2**		**0**	**0**	**1**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
708	East	2	#14, 205		1	1														
Total				**0**	**1**	**4**	**0**	**2**	**0**	**1**	**0**	**0**	**0**	**0**	**1**	**1**	**1**	**0**	**0**	**0**
Nathan Street Signals																				
	South	1	#161															1		
	West	2	#21, 60				1				1									
1	**SUM**	**3**		**0**	**0**	**0**	**1**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**
2	South	1	#101										1							
	North	1	#98										1							
	South	1	#118												1					
	West	2	#134, 192	1												1				
3	**SUM**	**4**		**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**1**	**1**	**0**	**0**	**0**	**0**
7	North	1	#6			1														
100	West	1	#77									1								
	North	3	#79, 170, 174									1							1	1
	South	1	#138														1			
	West	2	#73, 117									1			1					
101	**SUM**	**6**		**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**1**	**0**	**1**	**0**	**1**	**1**
104	West	1	#150															1		
	East	2	#29, 148					1									1			
	North	2	#22, 206		1		1													
	South	2	#71, 152								1							1		
202	**SUM**	**6**		**0**	**1**	**0**	**1**	**1**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**1**	**1**	**0**	**0**
300	South	1	#10			1														
	East	2	#32, 139					1						1						
	North	6	#52, 84, 87, 103, 144, 146							1		2		1			2			
	South	7	#66, 78, 83, 10		1						2	1		1				2		
	West	3	#51, 76, 200		1					1		1								
301	**SUM**	**18**		**0**	**2**	**0**	**0**	**1**	**0**	**2**	**2**	**4**	**0**	**3**	**0**	**0**	**2**	**2**	**0**	**0**
302	West	1	#55							1										
303	North	1	#164															1		
305	East	1	#58								1									
	North	1	#111											1						
	South	2	#86, 107									1		1						
400	**SUM**	**3**		**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**0**
408	North	2	#166, 172																2	
703	North	1	#121												1					
901	West	1	#149														1			
Total				**1**	**3**	**2**	**2**	**2**	**0**	**3**	**5**	**8**	**2**	**5**	**3**	**1**	**5**	**6**	**3**	**1**

DCA Code	Direction of key vehicle	Direction of opposing vehicles					Type of road users																Surface conditions			
		North	East	South	West	No Primary	Animal - other	Animal - stock	Pedestrian	Bicycle	Bus/Coach	Moped	Motorcycle	Car/Station wagon	Utility/Panel van	Rigid truck	Articulated truck	Road train/B-double/Triple	Special Purpose Vehicle	Railway stock	Towed device	Other	Sealed - Dry	Unsealed - Dry	Sealed - Wet	Unsealed - Wet
Acheron Avenue Signals																										
7	West	1	1			1			1					1									1			
104	East			2	1									3	2								1		1	
	East		3								1			5									3			
	West				1									1	1								1			
301	**SUM**	**0**	**3**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**6**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**4**	**0**	**0**	**0**
	East		1							1				1									1			
	South		1							1							1						1			
408	**SUM**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**1**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**0**
708	East													2									1		1	
Total		**1**	**6**	**2**	**2**	**1**	**0**	**0**	**1**	**2**	**1**	**0**	**0**	**13**	**3**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**9**	**0**	**2**	**0**
Nathan Street Signals																										
	South			1					1					1									1			
	West	1	1						2					1	1								2			
1	**SUM**	**1**	**1**	**1**	**0**	**0**	**0**	**0**	**3**	**0**	**0**	**0**	**0**	**2**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**3**	**0**	**0**	**0**
2	South				1				1					1									1			
	North				1				1						1								1			
	South		1						1					1									1			
	West	1		1					2					2									2			
3	**SUM**	**1**	**1**	**1**	**1**	**0**	**0**	**0**	**4**	**0**	**0**	**0**	**0**	**3**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**4**	**0**	**0**	**0**
7	North				1				1					1											1	
100	West			1										2									1			
	North		2		2									7									3			
	South				1									2									1			
	West	2	1		1									4	2								2			
101	**SUM**	**2**	**3**	**0**	**4**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**13**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**6**	**0**	**0**	**0**
104	West	1												2									1			
	East				2									3	1								2			
	North			2									1	2	1								2			
	South	2	1											4	1								2			
202	**SUM**	**2**	**1**	**2**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**9**	**3**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**6**	**0**	**0**	**0**
300	South			1										2									1			
	East		2											3	1								2			
	North	9												12	3								6			
	South			11										16	2								7			
	West			2	2	1								5	1								3			
301	**SUM**	**9**	**2**	**13**	**2**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**36**	**7**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**18**	**0**	**0**	**0**
302	West				1									1	1								1			
303	North	2												3									1			
305	East		1										1	1									1			
	North									1												1	1			
	South				2					2				2									2			
400	**SUM**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**3**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**3**	**0**	**0**	**0**
408	North		1		1					2				1	1								1		1	
703	North													1									1			
901	West										1												1			
Total		**18**	**10**	**19**	**15**	**1**	**0**	**0**	**9**	**5**	**1**	**0**	**2**	**80**	**16**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**50**	**0**	**2**	**0**

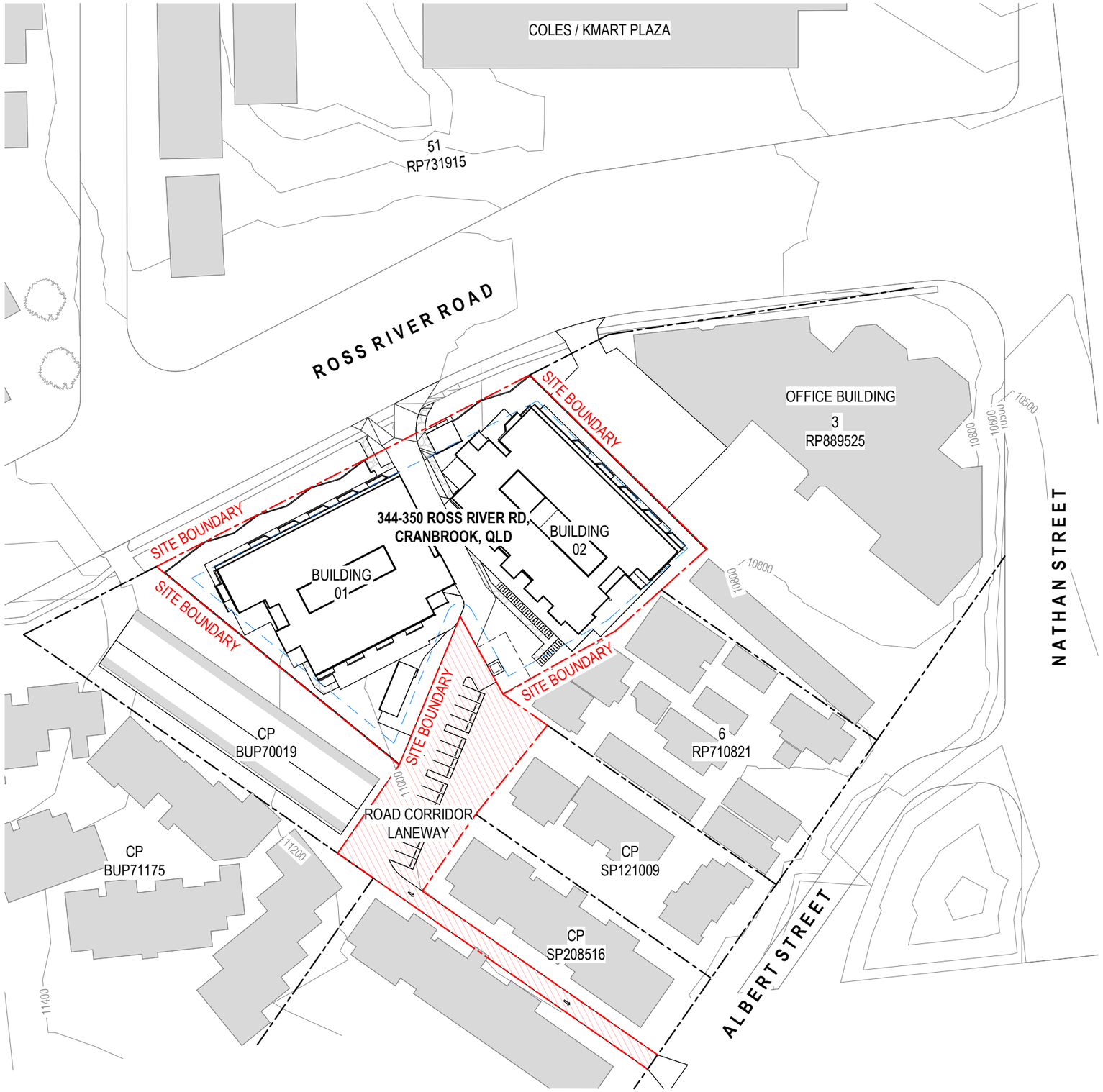
DCA Code	Direction of key vehicle	Light conditions					Time-of-day																								Severity				
		Dawn/Dusk	Daylight	Darkness - Lighted	Darkness - Not lighted	Unknown	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	Property damage only	Minor injury	Medical treatment	Hospitalisation	Fatal
Acheron Avenue Signals																																			
7	West		1												1																		1		
104	East		1	1																			1				1						2		
	East		2	1											1		1											1					1	2	
	West		1															1															1		
301	**SUM**	**0**	**3**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**1**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**2**	**2**	**0**
	East		1													1																	1		
	South		1											1																				1	
408	**SUM**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**1**	**0**
708	East			2				1			1																					1		1	
Total		**0**	**7**	**4**	**0**	**0**	**0**	**1**	**0**	**0**	**1**	**0**	**0**	**1**	**2**	**1**	**1**	**1**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**1**	**1**	**0**	**0**	**0**	**1**	**6**	**4**	**0**
Nathan Street Signals																																			
	South		1													1																		1	
	West	1	1																			1		1										2	
1	**SUM**	**1**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**3**	**0**
2	South		1																			1											1		
	North			1																								1						1	
	South			1				1																										1	
	West		2											1											1								1	1	
3	**SUM**	**0**	**2**	**2**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**1**	**3**	**0**
7	North		1																					1									1		
100	West		1																	1													1		
	North			3							1														1				1			1	2		
	South		1											1																				1	
	West		2																1				1										1	1	
101	**SUM**	**0**	**3**	**3**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**1**	**0**	**1**	**0**	**0**	**0**	**1**	**0**	**0**	**1**	**3**	**2**	**0**
104	West		1																	1												1			
	East			2																						1	1							2	
	North		2									1								1														2	
	South		1	1																	1						1						1	1	
202	**SUM**	**0**	**3**	**3**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**1**	**0**	**0**	**0**	**0**	**1**	**2**	**0**	**0**	**0**	**0**	**0**	**1**	**5**	**0**
300	South		1													1																		1	
	East		2												1		1																2		
	North		6											1			2			1	1		1										3	3	
	South		5	2													1	2	1			1						2				2	4	1	
	West		3												1	1							1									1	2		
301	**SUM**	**0**	**16**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**2**	**1**	**4**	**2**	**1**	**1**	**1**	**1**	**2**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**3**	**11**	**4**	**0**
302	West		1																					1									1		
303	North		1																		1													1	
305	East			1																							1						1		
	North		1												1																		1		
	South		2												1							1											1	1	
400	**SUM**	**0**	**3**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**1**	**0**
408	North		2															1		1														2	
703	North			1																										1				1	
901	West		1														1																	1	
Total		**1**	**39**	**12**	**0**	**0**	**0**	**1**	**0**	**0**	**1**	**1**	**0**	**3**	**4**	**3**	**5**	**3**	**2**	**5**	**3**	**4**	**3**	**3**	**2**	**1**	**3**	**3**	**1**	**1**	**0**	**5**	**23**	**24**	**0**

Figure B 3: Department of Transport and Main Roads Queensland



APPENDIX D

DEVELOPMENT SITE PLAN



BUILDING CLASS 2
TYPE A CONSTRUCTION

1 PROPOSED SITE PLAN
DA-40 SCALE 1 : 1000

NOTE:
LOCATION OF LEVELS, BOUNDARIES, SERVICES TO BE CONFIRMED BY SURVEYOR

PROJECT	CLIENT DETAILS	TITLE	PROJECT NO.	DATE	DRAWING No.	ISSUE
ROSS RIVER ROAD RESIDENTIAL **344/346 & 350 ROSS RIVER RD** **CRANBROOK, QLD, 4814**	**HURST CONSTRUCTIONS**	**PROPOSED SITE PLAN**	**25869**	**10.10.25**	**DA-15**	**P7**

N

COUNTERPOINT

13/10/2025 8:50:56 AM

ROSS RIVER ROAD

ENTRY

SCALE BAR 1:300

KEYNOTE LEGEND	
SWT	STORMWATER DETENTION TANK

SITE BOUNDARY

LINE OF SETBACK

LINE OF BUILDING ABOVE

SWT

OFFICE 11.500

51 CAR PARKS 11.350

LIFT

BIN

BLDG 1 11.450

OPEN ABOVE

50K LITRE FIRE TANK

MAIL

BOOSTER

FIRE PUMP ROOM

BLDG 2

LIFT

BIN

60 CAR PARKS (3 TANDEM) 11.350

TANDEM

BICYCLE PARKING

LANEWAY ACCESS VISITOR PARKING

BIN STORE

BIN COLLECTION AREA

WASH BAY

SERVICE ROAD

PAD MOUNT

CP
BUP70019

ABOVE GROUND 1500 LITRE OIL WATER SEPARATOR

BELOW GROUND PRECAST TRADEWASTE HOLDING TANK WITH 600 X 600 ACCESS

CAR PARK SUMMARY
USER CLASS 1A
126 CAR PARKS
110 RESIDENCE
16 VISITORS (OFF SITE)

DEPARTMENT OF HOUSING
1 COVERED / DWELLING
TOTAL
24

1 PROPOSED GROUND PLAN
DA-40 SCALE 1 : 300

PROJECT	CLIENT DETAILS	TITLE	PROJECT NO.	DATE	DRAWING No.	ISSUE
ROSS RIVER ROAD RESIDENTIAL **344/346 & 350 ROSS RIVER RD** **CRANBROOK, QLD, 4814**	**HURST CONSTRUCTIONS**	**PROPOSED FLOOR PLAN - GROUND**	**25869**	**10.10.25**	**DA-20**	**P7**

COUNTERPOINT

13/10/2025 8:50:59 AM

APPENDIX E

ROSS RIVER ROAD SAFETY UPGRADE PROJECT DRAWINGS

DWG 965857

DWG 965859

DWG 965860

Stantec

NATHAN STREET PAVEMENT MARKING SETOUT TABLES ON FOLLOWING PLAN

INSERT A

Hook turn storage area as per AS1742.9 part 2.3

NATHAN STREET

ROSS RIVER ROAD

CONTROL LINE MC01

HERVEY RANGE

JOIN LINE

JOINS DRAWING 965859

CITY

Existing guide signs to remain

R5-35L-R_STD Existing remain

R2-3LB KEEP LEFT

Existing relocate to new signal post

300mm wide directional TGSI

600mm wide warning TGSI

New bicycle symbol and green paint

SL 2m advanced of adjoining SL

Install over existing

LL4=12m

Install new turn arrows

Hook turn storage area

Insert A

R7-1-4B LANE

600mm wide directional TGSI

Existing remain

Install over existing

Existing sign to be relocated

Existing advertising street sign to remain

W4-9B LEFT LANE ENDS

W6-15B MERGE RIGHT

Install new sign

W6-Q05-1 SHARE BICYCLE LANE FOR LEFT TURN

Install new turn arrows at 35m spacing

NS1

GENERAL NOTES

1. Refer to drawings 965593 to 965600 for, type sections, details, notes and legends
2. Refer demolition drawings 965700 to 965735 for pavement marking and sign removal

A	Issued For Construction		
	Revisions/Descriptions	Signatory: – RPEQ Full Name, Eng. Area and RPEQ No. or – Full Name and Position Title	Date

Associated Job Nos

Auxiliary Drg Nos 965590 to 965947 965957 & 965958

Survey Data	
Horiz. Datum	GDA2020
Horiz. Grid	MGA2020 Z55
Height Datum	AHD DERIVED
Survey Books	104354

Scales 0 2 4 6 8m

Dimensions shown in meters except where shown otherwise

TOWNSVILLE CITY

ROSS RIVER ROAD (612)

CTL CHGE 3761 – 3913

Reference Points

Preceding RP	Dist. to start of job (km)	From start to end of job	From end to Following RP	Following RP
612/1	0.233	7.69	0.182	612/4

Through Chainage from INT 612/830 & QUEENS RD

PAVEMENT MARKING AND SIGNS
NATHAN STREET INTERSECTION
SHEET 17 OF 39

ENGINEERING CERTIFICATION (RPEQ)

ENG. AREA	SIGNATORY FULL NAME	No.	DATE
Civil	Brendan Melita	24432	5/04/2025

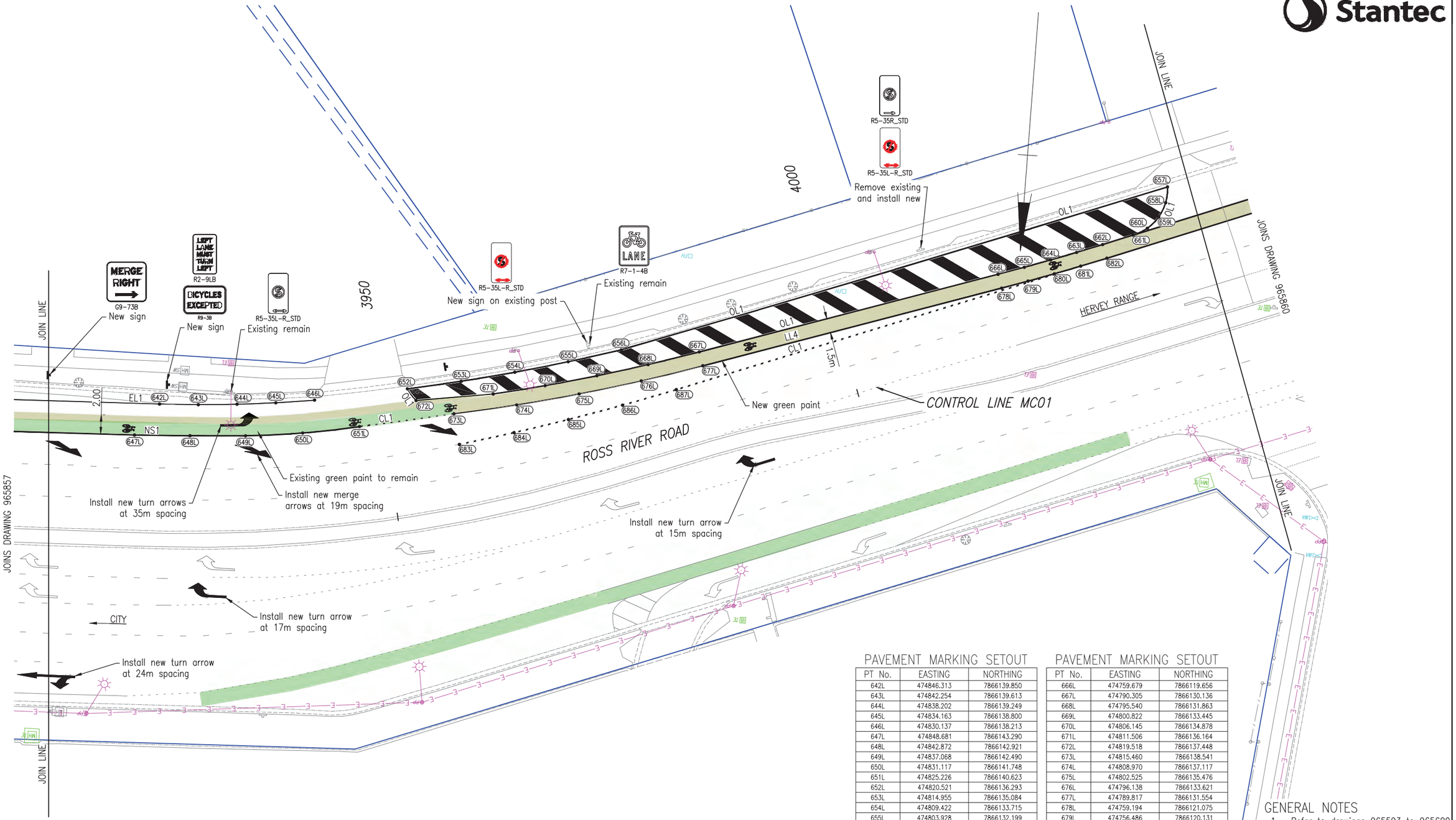
Queensland Government

Job No.	268/612/2682871
Contract No.	CN-21447
Drawing No.	965857 A
Series Number	SL-17 of 39

CAD FILES U:\304701552\100_xxx\drawings\working\965857-965866.dwg

Last Modified :- May 20, 2025 – 11:05am XREFS :- X-S-EXTRA.dwg ; X-D.dwg ; X-S.dwg ; X-S-PUP.dwg ; X-D-CL.dwg ; X-S-BNDY.dwg ; X-D-Sigs.dwg ; X-BC-Prelim.dwg ; X-TB-HATCH.dwg ; X-A-STAMP.dwg

Stantec



PAVEMENT MARKING SETOUT

PT No.	EASTING	NORTHING
642L	474846.313	7866139.850
643L	474842.254	7866139.613
644L	474838.202	7866139.249
645L	474834.163	7866138.800
646L	474830.137	7866138.213
647L	474848.681	7866143.290
648L	474842.872	7866142.921
649L	474837.068	7866142.490
650L	474831.117	7866141.748
651L	474825.226	7866140.623
652L	474820.521	7866136.293
653L	474814.955	7866135.084
654L	474809.422	7866133.715
655L	474803.928	7866132.199
656L	474798.475	7866130.538
657L	474742.654	7866109.180
658L	474742.725	7866110.848
659L	474743.341	7866112.399
660L	474744.434	7866113.661
661L	474745.881	7866114.494
662L	474748.981	7866115.719
663L	474751.639	7866116.749
664L	474754.308	7866117.748
665L	474756.988	7866118.718

PAVEMENT MARKING SETOUT

PT No.	EASTING	NORTHING
666L	474759.679	7866119.656
667L	474790.305	7866130.136
668L	474795.540	7866131.863
669L	474800.822	7866133.445
670L	474806.145	7866134.878
671L	474811.506	7866136.164
672L	474819.518	7866137.448
673L	474815.460	7866138.541
674L	474808.970	7866137.117
675L	474802.525	7866135.476
676L	474796.138	7866133.621
677L	474789.817	7866131.554
678L	474759.194	7866121.075
679L	474756.486	7866120.131
680L	474753.790	7866119.156
681L	474751.105	7866118.150
682L	474748.431	7866117.114
683L	474814.647	7866141.699
684L	474809.022	7866140.031
685L	474803.437	7866138.234
686L	474797.894	7866136.308
687L	474792.398	7866134.254

GENERAL NOTES

1. Refer to drawings 965593 to 965600 for, type sections, details, notes and legends
2. Refer demolition drawings 965700 to 965735 for pavement marking and sign removal

A	Issued For Construction		
	Revisions/Descriptions	Signatory: – RPEQ Full Name, Eng. Area and RPEQ No. or – Full Name and Position Title	Date

Last Modified :- May 20, 2025 – 11:05am XREFS :- X-S-EXTRA.dwg ; X-D.dwg ; X-S.dwg ; X-S-PUP.dwg ; X-D-CL.dwg ; X-S-BNDY.dwg ; X-D-Sigs.dwg ; X-BC-Prelim.dwg ; X-TB-HATCH.dwg ; X-A-STAMP.dwg

CAD FILES: U:\304701557\100_xxx\drawings\working\965857-965866.dwg

Associated Job Nos	268/612/1846367
Auxiliary Drg Nos	965590 to 965947 965957 & 965958

Survey Data	
Horiz. Datum	GDA2020
Horiz. Grid	MGA2020 Z55
Height Datum	AHD DERIVED
Survey Books	104354

Scales

0 2 4 6 8m

Dimensions shown in meters except where shown otherwise

TOWNSVILLE CITY

ROSS RIVER ROAD (612)

CTL CHGE *3913 – 4039*

Reference Points

Preceding RP	Dist. to start of job (km)	From start to end of job	From end to Following RP	Following RP
612/1	0.233	7.69	0.182	612/4

Through Chainage from INT 612/830 & QUEENS RD

PAVEMENT MARKING AND SIGNS
NATHAN ST TO ACHERON AVE
SHEET 19 OF 39

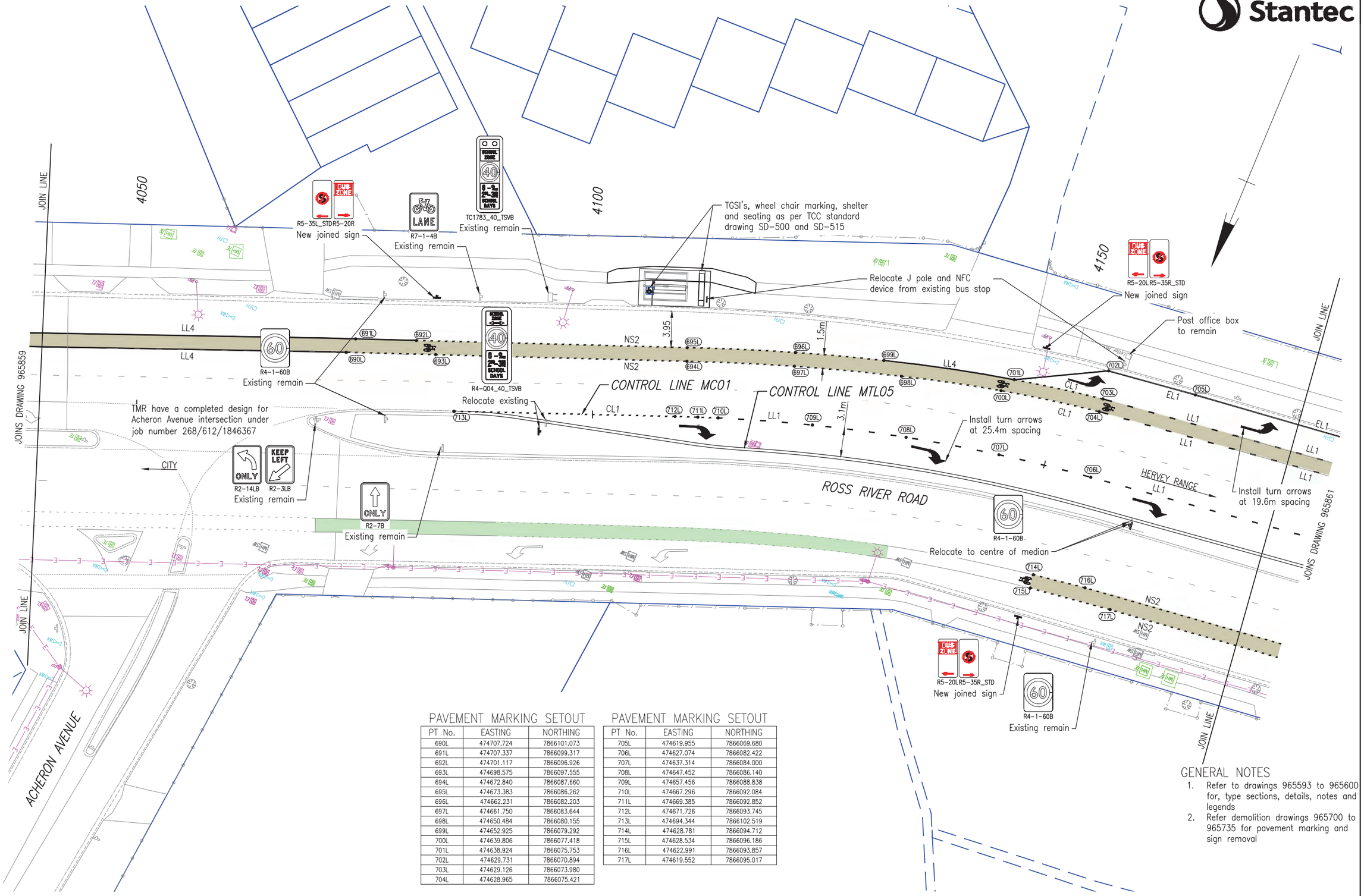
ENGINEERING CERTIFICATION (RPEQ)

ENG. AREA	SIGNATORY FULL NAME	No.	DATE
Civil	Brendan Melita	24432	5/04/2025

Queensland Government

Job No.	268/612/2682871
Contract No.	CN-21447
Drawing No.	965859 A
Series Number	SL-19 of 39

Stantec



PAVEMENT MARKING SETOUT

PT No.	EASTING	NORTHING
690L	474707.724	7866101.073
691L	474707.337	7866099.317
692L	474701.117	7866096.926
693L	474698.575	7866097.555
694L	474672.840	7866087.660
695L	474673.383	7866086.262
696L	474662.231	7866082.203
697L	474661.750	7866083.644
698L	474650.484	7866080.155
699L	474652.925	7866079.292
700L	474639.806	7866077.418
701L	474638.924	7866075.753
702L	474629.731	7866070.894
703L	474629.126	7866073.980
704L	474628.965	7866075.421

PAVEMENT MARKING SETOUT

PT No.	EASTING	NORTHING
705L	474619.955	7866069.680
706L	474627.074	7866082.422
707L	474637.314	7866084.000
708L	474647.452	7866086.140
709L	474657.456	7866088.838
710L	474667.296	7866092.084
711L	474669.385	7866092.852
712L	474671.726	7866093.745
713L	474694.344	7866102.519
714L	474628.781	7866094.712
715L	474628.534	7866096.186
716L	474622.991	7866093.857
717L	474619.552	7866095.017

GENERAL NOTES

1. Refer to drawings 965593 to 965600 for, type sections, details, notes and legends
2. Refer demolition drawings 965700 to 965735 for pavement marking and sign removal

A	Issued For Construction		
	Revisions/Descriptions	Signatory: – RPEQ Full Name, Eng. Area and RPEQ No. or – Full Name and Position Title	Date

CAD FILES: U:\304701552\100_xxx\drawings\working\965857-965866.dwg

Last Modified :- May 20, 2025 – 11:06am XREFS :- X-S-EXTRA.dwg ; X-D.dwg ; X-S.dwg ; X-S-PUP.dwg ; X-D-CL.dwg ; X-S-BNDY.dwg ; X-D-Sigs.dwg ; X-GC-Prelim.dwg ; X-TB-HATCH.dwg ; X-A-STAMP.dwg

Associated Job Nos	268/612/1846367
Auxiliary Drg Nos	965590 to 965947 965957 & 965958

Survey Data	
Horiz. Datum	GDA2020
Horiz. Grid	MGA2020 Z55
Height Datum	AHD DERIVED
Survey Books	104354

Scales: 0 2 4 6 8m

Dimensions shown in meters except where shown otherwise

TOWNSVILLE CITY
ROSS RIVER ROAD (612)
CTL CHGE 4039 – 4176

Reference Points

Preceding RP	Dist. to start of job (km)	From start to end of job	From end to Following RP	Following RP
612/1	0.233	7.69	0.182	612/4

Through Chainage from INT 612/830 & QUEENS RD

PAVEMENT MARKING AND SIGNS
LINDEMAN AVE INTERSECTION
SHEET 20 OF 39

ENGINEERING CERTIFICATION (RPEQ)

ENG. AREA	SIGNATORY FULL NAME	No.	DATE
Civil	Brendan Melita	24432	5/04/2025

Queensland Government

Job No.	268/612/2682871
Contract No.	CN-21447
Drawing No.	965860 A
Series Number	SL-20 of 39

APPENDIX F

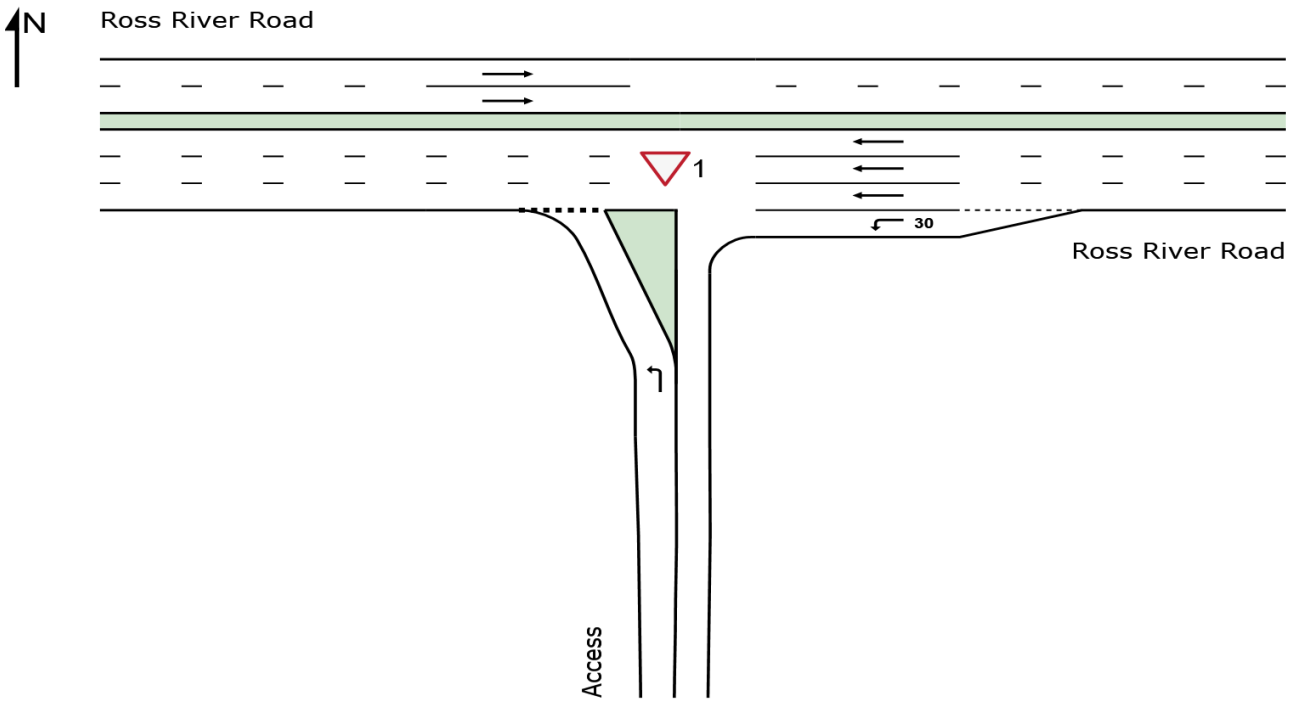
SIDRA OUTPUTS

SITE LAYOUT

Site: [1] Ross River (Folder1)

Ross River Rd Access
Left in Left out
Site Category: (None)
Give-Way (Two-Way)
Site Scenario: 1 | AM Peak Hour

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



Organisation: PREMISE GROUP SERVICES PTY LTD | Licence: NETWORK / 1PC | Created: Friday, 26 September 2025 10:43:27 AM
Project: C:\Users\danielle.bamber\OneDrive - Premise\Documents\Fee Proposal Notes\Affordable Housing\P003620R01.sipx

MOVEMENT SUMMARY

Site: [1] Ross River (Folder1)

Output produced by SIDRA INTERSECTION Version: 10.0.6.236

Ross River Rd Access
Left in Left out
Site Category: (None)
Give-Way (Two-Way)
Site Scenario: 1 | AM Peak Hour

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Qued	Eff. Stop Rate	Number of Cycles to Depart	Aver. Speed km/h
South: Access															
1	L2	All MCs	13	5.0	13	5.0	0.034	11.1	LOS B	0.1	0.8	0.71	0.85	0.71	15.5
Approach			13	5.0	13	5.0	0.034	11.1	LOS B	0.1	0.8	0.71	0.85	0.71	15.5
East: Ross River Road															
4	L2	All MCs	8	5.0	8	5.0	0.005	5.6	LOS A	0.0	0.0	0.00	0.58	0.00	36.8
5	T1	All MCs	1077	5.0	1077	5.0	0.190	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
Approach			1085	5.0	1085	5.0	0.190	0.1	NA	0.0	0.0	0.00	0.00	0.00	59.6
West: Ross River Road															
11	T1	All MCs	1	5.0	1	5.0	0.000	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
Approach			1	5.0	1	5.0	0.000	0.0	NA	0.0	0.0	0.00	0.00	0.00	60.0
All Vehicles			1099	5.0	1099	5.0	0.190	0.2	NA	0.1	0.8	0.01	0.01	0.01	58.9

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Organisation: PREMISE GROUP SERVICES PTY LTD | Licence: NETWORK / 1PC | Processed: Friday, 26 September 2025 10:42:05 AM
Project: C:\Users\danielle.bamber\OneDrive - Premise\Documents\Fee Proposal Notes\Affordable Housing\P003620R01.sipx

LANE SUMMARY

Site: [1] Ross River (Folder1)
Output produced by SIDRA INTERSECTION Version: 10.0.6.236

Ross River Rd Access
Left in Left out
Site Category: (None)
Give-Way (Two-Way)
Site Scenario: 1 | AM Peak Hour

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Access															
Lane 1	13	5.0	13	5.0	370	0.034	100	11.1	LOS B	0.1	0.8	Full	20	0.0	0.0
Approach	13	5.0	13	5.0		0.034		11.1	LOS B	0.1	0.8				
East: Ross River Road															
Lane 1	8	5.0	8	5.0	1793	0.005	100	5.6	LOS A	0.0	0.0	Short	30	0.0	NA
Lane 2	359	5.0	359	5.0	1889	0.190	100	0.0	LOS A	0.0	0.0	Full	150	0.0	0.0
Lane 3	359	5.0	359	5.0	1889	0.190	100	0.0	LOS A	0.0	0.0	Full	150	0.0	0.0
Lane 4	359	5.0	359	5.0	1889	0.190	100	0.0	LOS A	0.0	0.0	Full	150	0.0	0.0
Approach	1085	5.0	1085	5.0		0.190		0.1	NA	0.0	0.0				
West: Ross River Road															
Lane 1	1	5.0	1	5.0	1889	0.000	100	0.0	LOS A	0.0	0.0	Full	500	0.0	0.0
Lane 2	1	5.0	1	5.0	1889	0.000	100	0.0	LOS A	0.0	0.0	Full	500	0.0	0.0
Approach	1	5.0	1	5.0		0.000		0.0	NA	0.0	0.0				
All Vehicles	1099	5.0	1099	5.0		0.190		0.2	NA	0.1	0.8				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Approach Lane Flows (veh/h)

South: Access

Mov. From S To Exit:	L2 W	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	13	13	5.0	370	0.034	100	NA	NA
Approach	13	13	5.0		0.034			

East: Ross River Road

Mov. From E	L2	T1	Total	%HV	Cap. veh/h	Deg. Satn	Lane Util.	Prob. SL Ov.	Ov. Lane

To Exit:	S	W				v/c	%	%	No.
Lane 1	8	-	8	5.0	1793	0.005	100	0.0	2
Lane 2	-	359	359	5.0	1889	0.190	100	NA	NA
Lane 3	-	359	359	5.0	1889	0.190	100	NA	NA
Lane 4	-	359	359	5.0	1889	0.190	100	NA	NA
Approach	8	1077	1085	5.0		0.190			

West: Ross River Road

Mov. From W To Exit:	T1 E	Total	%HV		Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	1	1	5.0		1889	0.000	100	NA	NA
Lane 2	1	1	5.0		1889	0.000	100	NA	NA
Approach	1	1	5.0			0.000			

	Total	%HV	Deg.Satn (v/c)
All Vehicles	1099	5.0	0.190

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis

	Exit Lane Number	Short Lane Length m	Percent Opng in Lane %	Opposing Flow Rate veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec	Merge [Veh	Queue Dist] m

There are no Exit Short Lanes for Merge Analysis at this Site.

Variable Demand Analysis

	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: Access				
Lane 1	0.0	0.0	0.0	0.0
East: Ross River Road				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
Lane 3	0.0	0.0	0.0	0.0
Lane 4	0.0	0.0	0.0	0.0
West: Ross River Road				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0

MOVEMENT SUMMARY

Site: [1] Ross River (Folder1)

Output produced by SIDRA INTERSECTION Version: 10.0.6.236

Ross River Rd Access
Left in Left out
Site Category: (None)
Give-Way (Two-Way)
Site Scenario: 2 | PM Peak Hour

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Qued	Eff. Stop Rate	Number of Cycles to Depart	Aver. Speed km/h
South: Access															
1	L2	All MCs	4	5.0	4	5.0	0.024	21.7	LOS C	0.1	0.5	0.86	0.93	0.86	9.5
Approach			4	5.0	4	5.0	0.024	21.7	LOS C	0.1	0.5	0.86	0.93	0.86	9.5
East: Ross River Road															
4	L2	All MCs	29	5.0	29	5.0	0.016	5.6	LOS A	0.0	0.0	0.00	0.58	0.00	36.8
5	T1	All MCs	1544	5.0	1544	5.0	0.273	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.8
Approach			1574	5.0	1574	5.0	0.273	0.1	NA	0.0	0.0	0.00	0.01	0.00	59.2
West: Ross River Road															
11	T1	All MCs	1	5.0	1	5.0	0.000	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
Approach			1	5.0	1	5.0	0.000	0.0	NA	0.0	0.0	0.00	0.00	0.00	60.0
All Vehicles			1579	5.0	1579	5.0	0.273	0.2	NA	0.1	0.5	0.00	0.01	0.00	58.8

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Organisation: PREMISE GROUP SERVICES PTY LTD | Licence: NETWORK / 1PC | Processed: Friday, 26 September 2025 10:40:47 AM
Project: C:\Users\danielle.bamber\OneDrive - Premise\Documents\Fee Proposal Notes\Affordable Housing\P003620R01.sipx

LANE SUMMARY

Site: [1] Ross River (Folder1)
Output produced by SIDRA INTERSECTION Version: 10.0.6.236

Ross River Rd Access
Left in Left out
Site Category: (None)
Give-Way (Two-Way)
Site Scenario: 2 | PM Peak Hour

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Access															
Lane 1	4	5.0	4	5.0	174	0.024	100	21.7	LOS C	0.1	0.5	Full	20	0.0	0.0
Approach	4	5.0	4	5.0		0.024		21.7	LOS C	0.1	0.5				
East: Ross River Road															
Lane 1	29	5.0	29	5.0	1793	0.016	100	5.6	LOS A	0.0	0.0	Short	30	0.0	NA
Lane 2	515	5.0	515	5.0	1889	0.273	100	0.0	LOS A	0.0	0.0	Full	150	0.0	0.0
Lane 3	515	5.0	515	5.0	1889	0.273	100	0.0	LOS A	0.0	0.0	Full	150	0.0	0.0
Lane 4	515	5.0	515	5.0	1889	0.273	100	0.0	LOS A	0.0	0.0	Full	150	0.0	0.0
Approach	1574	5.0	1574	5.0		0.273		0.1	NA	0.0	0.0				
West: Ross River Road															
Lane 1	1	5.0	1	5.0	1889	0.000	100	0.0	LOS A	0.0	0.0	Full	500	0.0	0.0
Lane 2	1	5.0	1	5.0	1889	0.000	100	0.0	LOS A	0.0	0.0	Full	500	0.0	0.0
Approach	1	5.0	1	5.0		0.000		0.0	NA	0.0	0.0				
All Vehicles	1579	5.0	1579	5.0		0.273		0.2	NA	0.1	0.5				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Approach Lane Flows (veh/h)

South: Access

Mov. From S To Exit:	L2 W	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	4	4	5.0	174	0.024	100	NA	NA
Approach	4	4	5.0		0.024			

East: Ross River Road

Mov. From E	L2	T1	Total	%HV	Cap. veh/h	Deg. Satn	Lane Util.	Prob. SL Ov.	Ov. Lane

To Exit:	S	W				v/c	%	%	No.
Lane 1	29	-	29	5.0	1793	0.016	100	0.0	2
Lane 2	-	515	515	5.0	1889	0.273	100	NA	NA
Lane 3	-	515	515	5.0	1889	0.273	100	NA	NA
Lane 4	-	515	515	5.0	1889	0.273	100	NA	NA
Approach	29	1544	1574	5.0		0.273			

West: Ross River Road

Mov. From W To Exit:	T1 E	Total	%HV		Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	1	1	5.0		1889	0.000	100	NA	NA
Lane 2	1	1	5.0		1889	0.000	100	NA	NA
Approach	1	1	5.0			0.000			

	Total	%HV	Deg.Satn (v/c)
All Vehicles	1579	5.0	0.273

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis

	Exit Lane Number	Short Lane Length m	Percent Opng in Lane %	Opposing Flow Rate veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec	Merge Queue [Veh	Queue Dist] m

There are no Exit Short Lanes for Merge Analysis at this Site.

Variable Demand Analysis

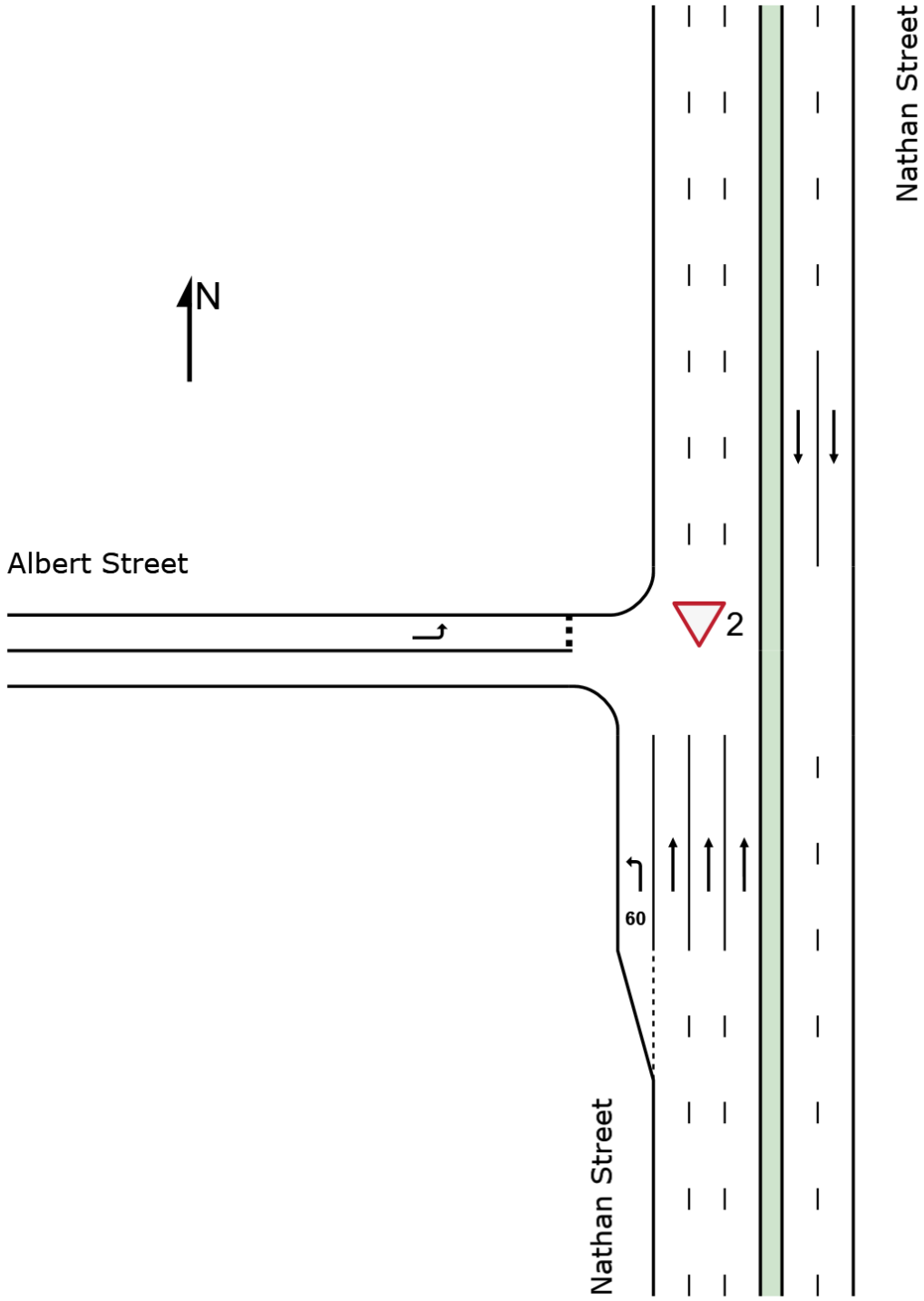
	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: Access				
Lane 1	0.0	0.0	0.0	0.0
East: Ross River Road				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
Lane 3	0.0	0.0	0.0	0.0
Lane 4	0.0	0.0	0.0	0.0
West: Ross River Road				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0

SITE LAYOUT

Site: [2] Nathan St / Albert St (Folder1)

Nathan St/Albert St Intersection
Left in Left out
Site Category: (None)
Give-Way (Two-Way)
Site Scenario: 1 | AM Peak Hour

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



Organisation: PREMISE GROUP SERVICES PTY LTD | Licence: NETWORK / 1PC | Created: Friday, 26 September 2025 10:43:21 AM
Project: C:\Users\danielle.bamber\OneDrive - Premise\Documents\Fee Proposal Notes\Affordable Housing\P003620R01.sipx

MOVEMENT SUMMARY

Site: [2] Nathan St / Albert St (Folder1)

Output produced by SIDRA INTERSECTION Version: 10.0.6.236

Nathan St/Albert St Intersection
Left in Left out
Site Category: (None)
Give-Way (Two-Way)
Site Scenario: 1 | AM Peak Hour

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Qued	Eff. Stop Rate	Number of Cycles to Depart	Aver. Speed km/h
South: Nathan Street															
1	L2	All MCs	12	5.0	12	5.0	0.006	5.6	LOS A	0.0	0.0	0.00	0.58	0.00	47.4
2	T1	All MCs	1435	5.0	1435	5.0	0.253	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
Approach			1446	5.0	1446	5.0	0.253	0.1	NA	0.0	0.0	0.00	0.00	0.00	59.7
North: Nathan Street															
8	T1	All MCs	1402	0.0	1402	0.0	0.360	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.8
Approach			1402	0.0	1402	0.0	0.360	0.0	NA	0.0	0.0	0.00	0.00	0.00	59.8
West: Albert Street															
10	L2	All MCs	136	5.0	136	5.0	0.361	16.4	LOS C	1.4	10.3	0.79	0.97	1.00	29.6
Approach			136	5.0	136	5.0	0.361	16.4	LOS C	1.4	10.3	0.79	0.97	1.00	29.6
All Vehicles			2984	2.7	2984	2.7	0.361	0.8	NA	1.4	10.3	0.04	0.05	0.05	58.0

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Organisation: PREMISE GROUP SERVICES PTY LTD | Licence: NETWORK / 1PC | Processed: Friday, 26 September 2025 10:42:14 AM
Project: C:\Users\danielle.bamber\OneDrive - Premise\Documents\Fee Proposal Notes\Affordable Housing\P003620R01.sipx

LANE SUMMARY

Site: [2] Nathan St / Albert St (Folder1)

Output produced by SIDRA INTERSECTION Version: 10.0.6.236

Nathan St/Albert St Intersection
Left in Left out
Site Category: (None)
Give-Way (Two-Way)
Site Scenario: 1 | AM Peak Hour

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Nathan Street															
Lane 1	12	5.0	12	5.0	1793	0.006	100	5.6	LOS A	0.0	0.0	Short	60	0.0	NA
Lane 2	478	5.0	478	5.0	1889	0.253	100	0.1	LOS A	0.0	0.0	Full	350	0.0	0.0
Lane 3	478	5.0	478	5.0	1889	0.253	100	0.1	LOS A	0.0	0.0	Full	350	0.0	0.0
Lane 4	478	5.0	478	5.0	1889	0.253	100	0.1	LOS A	0.0	0.0	Full	350	0.0	0.0
Approach	1446	5.0	1446	5.0		0.253		0.1	NA	0.0	0.0				
North: Nathan Street															
Lane 1	701	0.0	701	0.0	1950	0.360	100	0.0	LOS A	0.0	0.0	Full	115	0.0	0.0
Lane 2	701	0.0	701	0.0	1950	0.360	100	0.0	LOS A	0.0	0.0	Full	115	0.0	0.0
Approach	1402	0.0	1402	0.0		0.360		0.0	NA	0.0	0.0				
West: Albert Street															
Lane 1	136	5.0	136	5.0	376	0.361	100	16.4	LOS C	1.4	10.3	Full	180	0.0	0.0
Approach	136	5.0	136	5.0		0.361		16.4	LOS C	1.4	10.3				
All Vehicles	2984	2.7	2984	2.7		0.361		0.8	NA	1.4	10.3				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Approach Lane Flows (veh/h)

South: Nathan Street

Mov. From S To Exit:	L2 W	T1 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	12	-	12	5.0	1793	0.006	100	0.0	2
Lane 2	-	478	478	5.0	1889	0.253	100	NA	NA
Lane 3	-	478	478	5.0	1889	0.253	100	NA	NA
Lane 4	-	478	478	5.0	1889	0.253	100	NA	NA
Approach	12	1435	1446	5.0		0.253			
North: Nathan Street									

Mov. From N To Exit:	T1 S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	701	701	0.0	1950	0.360	100	NA	NA
Lane 2	701	701	0.0	1950	0.360	100	NA	NA
Approach	1402	1402	0.0		0.360			
West: Albert Street								
Mov. From W To Exit:	L2 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	136	136	5.0	376	0.361	100	NA	NA
Approach	136	136	5.0		0.361			

	Total	%HV	Deg.Satn (v/c)
All Vehicles	2984	2.7	0.361

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis

	Exit Lane Number	Short Lane Length m	Percent Opng in Lane %	Opposing Flow Rate veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec	Merge Queue [Veh	Queue Dist] m
There are no Exit Short Lanes for Merge Analysis at this Site.														

Variable Demand Analysis

	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: Nathan Street				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
Lane 3	0.0	0.0	0.0	0.0
Lane 4	0.0	0.0	0.0	0.0
North: Nathan Street				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
West: Albert Street				
Lane 1	0.0	0.0	0.0	0.0

MOVEMENT SUMMARY

Site: [2] Nathan St / Albert St (Folder1)

Output produced by SIDRA INTERSECTION Version: 10.0.6.236

Nathan St/Albert St Intersection
Left in Left out
Site Category: (None)
Give-Way (Two-Way)
Site Scenario: 2 | PM Peak Hour

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Qued	Eff. Stop Rate	Number of Cycles to Depart	Aver. Speed km/h
South: Nathan Street															
1	L2	All MCs	7	0.0	7	0.0	0.004	5.5	LOS A	0.0	0.0	0.00	0.58	0.00	48.0
2	T1	All MCs	1518	5.0	1518	5.0	0.268	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	59.8
Approach			1525	5.0	1525	5.0	0.268	0.1	NA	0.0	0.0	0.00	0.00	0.00	59.8
North: Nathan Street															
8	T1	All MCs	1279	5.0	1279	5.0	0.339	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.8
Approach			1279	5.0	1279	5.0	0.339	0.0	NA	0.0	0.0	0.00	0.00	0.00	59.8
West: Albert Street															
10	L2	All MCs	108	5.0	108	5.0	0.318	17.1	LOS C	1.2	8.5	0.80	0.96	0.97	29.0
Approach			108	5.0	108	5.0	0.318	17.1	LOS C	1.2	8.5	0.80	0.96	0.97	29.0
All Vehicles			2913	5.0	2913	5.0	0.339	0.7	NA	1.2	8.5	0.03	0.04	0.04	58.3

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Organisation: PREMISE GROUP SERVICES PTY LTD | Licence: NETWORK / 1PC | Processed: Friday, 26 September 2025 10:40:58 AM
Project: C:\Users\danielle.bamber\OneDrive - Premise\Documents\Fee Proposal Notes\Affordable Housing\P003620R01.sipx

LANE SUMMARY

Site: [2] Nathan St / Albert St (Folder1)

Output produced by SIDRA INTERSECTION Version: 10.0.6.236

Nathan St/Albert St Intersection
Left in Left out
Site Category: (None)
Give-Way (Two-Way)
Site Scenario: 2 | PM Peak Hour

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Nathan Street															
Lane 1	7	0.0	7	0.0	1857	0.004	100	5.5	LOS A	0.0	0.0	Short	60	0.0	NA
Lane 2	506	5.0	506	5.0	1889	0.268	100	0.1	LOS A	0.0	0.0	Full	350	0.0	0.0
Lane 3	506	5.0	506	5.0	1889	0.268	100	0.1	LOS A	0.0	0.0	Full	350	0.0	0.0
Lane 4	506	5.0	506	5.0	1889	0.268	100	0.1	LOS A	0.0	0.0	Full	350	0.0	0.0
Approach	1525	5.0	1525	5.0		0.268		0.1	NA	0.0	0.0				
North: Nathan Street															
Lane 1	639	5.0	639	5.0	1889	0.339	100	0.0	LOS A	0.0	0.0	Full	115	0.0	0.0
Lane 2	639	5.0	639	5.0	1889	0.339	100	0.0	LOS A	0.0	0.0	Full	115	0.0	0.0
Approach	1279	5.0	1279	5.0		0.339		0.0	NA	0.0	0.0				
West: Albert Street															
Lane 1	108	5.0	108	5.0	341	0.318	100	17.1	LOS C	1.2	8.5	Full	180	0.0	0.0
Approach	108	5.0	108	5.0		0.318		17.1	LOS C	1.2	8.5				
All Vehicles	2913	5.0	2913	5.0		0.339		0.7	NA	1.2	8.5				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Approach Lane Flows (veh/h)

South: Nathan Street

Mov. From S To Exit:	L2 W	T1 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	7	-	7	0.0	1857	0.004	100	0.0	2
Lane 2	-	506	506	5.0	1889	0.268	100	NA	NA
Lane 3	-	506	506	5.0	1889	0.268	100	NA	NA
Lane 4	-	506	506	5.0	1889	0.268	100	NA	NA
Approach	7	1518	1525	5.0		0.268			

North: Nathan Street

Mov. From N To Exit:	T1 S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	639	639	5.0	1889	0.339	100	NA	NA
Lane 2	639	639	5.0	1889	0.339	100	NA	NA
Approach	1279	1279	5.0		0.339			
West: Albert Street								
Mov. From W To Exit:	L2 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	108	108	5.0	341	0.318	100	NA	NA
Approach	108	108	5.0		0.318			

	Total	%HV	Deg.Satn (v/c)
All Vehicles	2913	5.0	0.339

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis

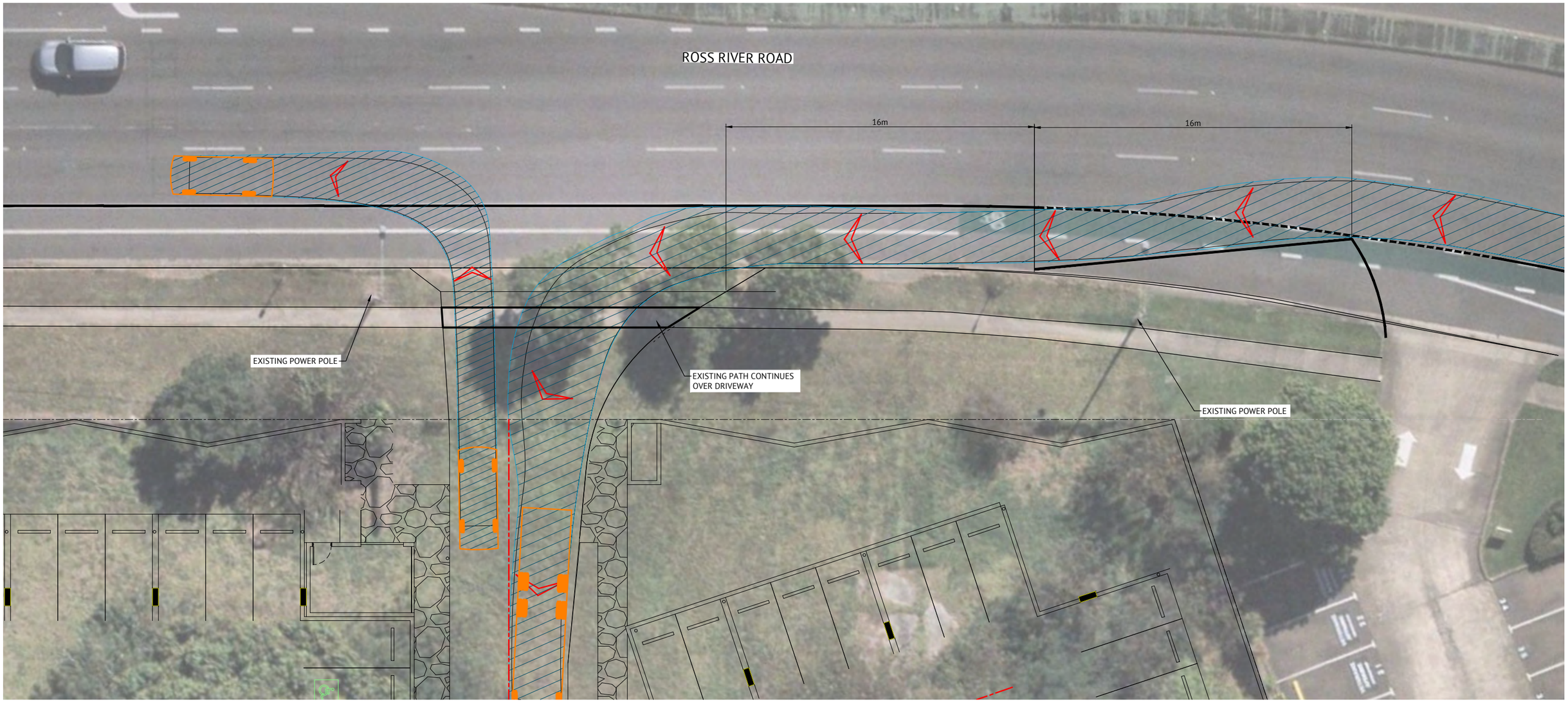
	Exit Lane Number	Short Lane Length m	Percent Opng in Lane %	Opposing Flow Rate veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec	Merge [Veh	Queue Dist] m
There are no Exit Short Lanes for Merge Analysis at this Site.														

Variable Demand Analysis

	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: Nathan Street				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
Lane 3	0.0	0.0	0.0	0.0
Lane 4	0.0	0.0	0.0	0.0
North: Nathan Street				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
West: Albert Street				
Lane 1	0.0	0.0	0.0	0.0

APPENDIX G

PROPOSED ROSS RIVER ROAD ACCESS LAYOUT



PRELIMINARY - NOT FOR CONSTRUCTION

DATE	REV	DESCRIPTION	REC	APP
	1	PRELIMINARY - NOT FOR CONSTRUCTION	RD	BJ

REVISIONS

Premise

TOWNSVILLE OFFICE
84 DENHAM STREET
PO BOX 1110
TOWNSVILLE, QLD 4810
PH: (07) 4772 0666
WEB: www.premise.com.au

DESIGNED Z.RUDMAN
CHECKED C.CLARK
PROJECT MANAGER BJONES
ENGINEERING CERTIFICATION
BJONES RPEQ 19986

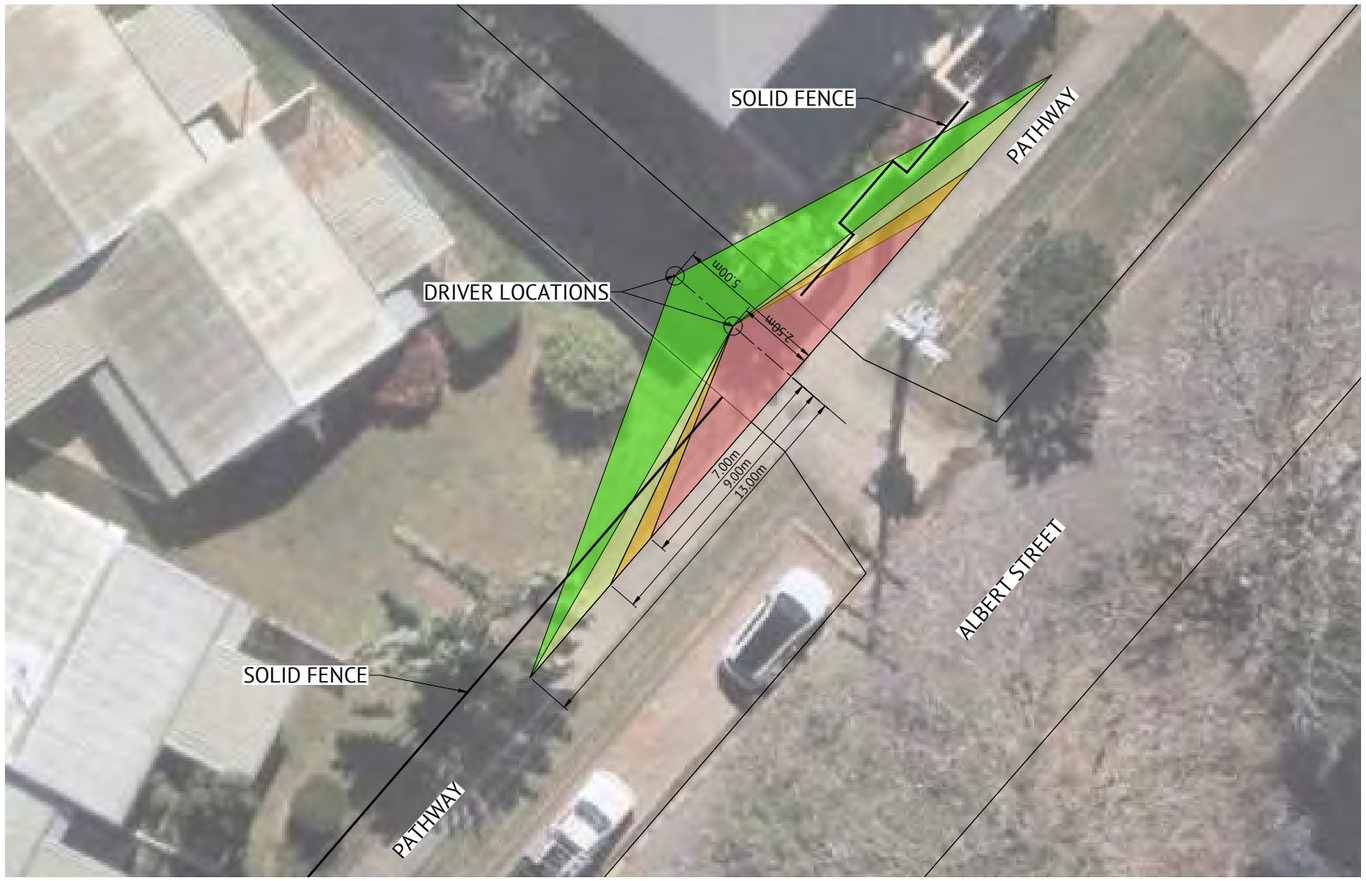
SCALE
0 2 4 6m
SCALE 1:100 (A1)
ORIGINAL SHEET SIZE A1

CLIENT HURST CONSTRUCTIONS
PROJECT ROSS RIVER ROAD RESIDENTIAL
LOCATION 344-350 ROSS RIVER ROAD, CRANBROOK
SHEET TITLE PROPOSED ROSS RIVER ROAD ACCESS LAYOUT

JOB CODE P003620
SHEET NUMBER SKC051
REV 1

APPENDIX H

FRONTAGE ASSESSMENT – SIGHT TRIANGLES



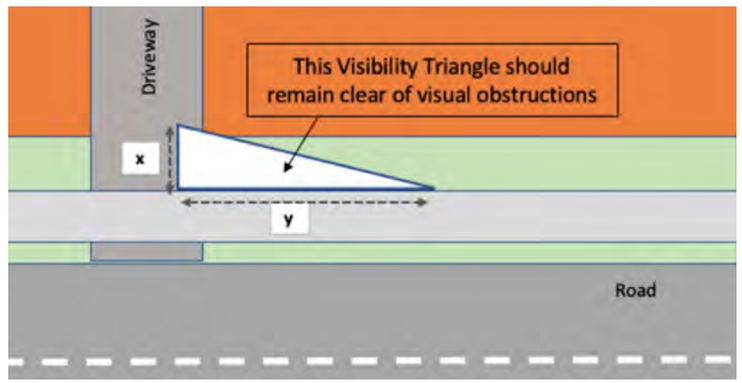
N

SIGHT LINE DIMENSIONS

ASSESMENT	DIRECTION	GENERAL USE PATHS WITH EVEN TERRAIN[1]	PRINCIPAL PATHS / PATHS WHERE GRADES >8%
1. DESIRABLE PATH USERS TRAVELING AT COMFORTABLE SPEEDS • GENERAL USE PATHS: 15 km/h • PRINCIPAL PATHS: 20 km/h[2] VEHICLE SPEED <5 km/h MINIMUM STANDARD IF REGULAR HEAVY VEHICLES USE	X (m)	≥5	≥5
	Y (m)	≥9	≥13
2. TOLERABLE PATH USERS TRAVELLING AT REDUCED SPEEDS. • GENERAL USE PATHS: 12–15 km/h • PRINCIPAL PATHS: 15–20 km/h VEHICLES MUST COME TO A COMPLETE STOP	X (m)	≥2.5	≥2.5
	Y (m)	7 ≤ Y < 9	9 ≤ Y < 13
3. DEFICIENT SIGHT LINES PROVIDE ADEQUATE WARNING FOR DRIVERS OR PATH USERS TO AVOID A CRASH, WHEN PATH USERS TRAVEL AT MINIMUM SPEEDS. • GENERAL USE PATHS: 10–12 km/h • PRINCIPAL PATHS: 12–15 km/h VEHICLES MUST COME TO A COMPLETE STOP	X (m)	≥2.5	≥2.5
	Y (m)	5 ≤ Y < 7	7 ≤ Y < 9
4. HIGHLY DEFICIENT SIGHT LINES DO NOT PROVIDE ADEQUATE WARNING FOR DRIVERS OR PATH USERS TO AVOID A CRASH, WHEN PATH USERS TRAVEL AT MINIMUM SPEEDS. • GENERAL USE PATHS: <10 km/h • PRINCIPAL PATHS: <12 km/h SIGHT LINES DO NOT PROVIDE ADEQUATE WARNING FOR DRIVERS TO AVOID A CRASH	X (m)	<2.5	<2.5
	Y (m)	<5	<7

[1]TABLE ASSUMES PATH APPROACH GRADIENTS (LONGITUDINAL) OF 0%
[2]WHERE DESIRABLE SPEEDS EXCEED 20 KM/H, SEE TABLE 3.2.3 OF 'Guideline: Treatment options to improve safety of pedestrians, bicycle riders and other path users at driveways February 2021' FOR STOPPING DISTANCES.

GUIDELINE: TREATMENT OPTIONS TO IMPROVE SAFETY OF PEDESTRIANS, BICYCLE RIDERS AND OTHER PATH USERS AT DRIVEWAYS FEBRUARY 2021



PRELIMINARY - NOT FOR CONSTRUCTION

DATE	REV	DESCRIPTION	REC	APP
24/09/2025	1	PRELIMINARY - NOT FOR CONSTRUCTION	CC	BJ

REVISIONS

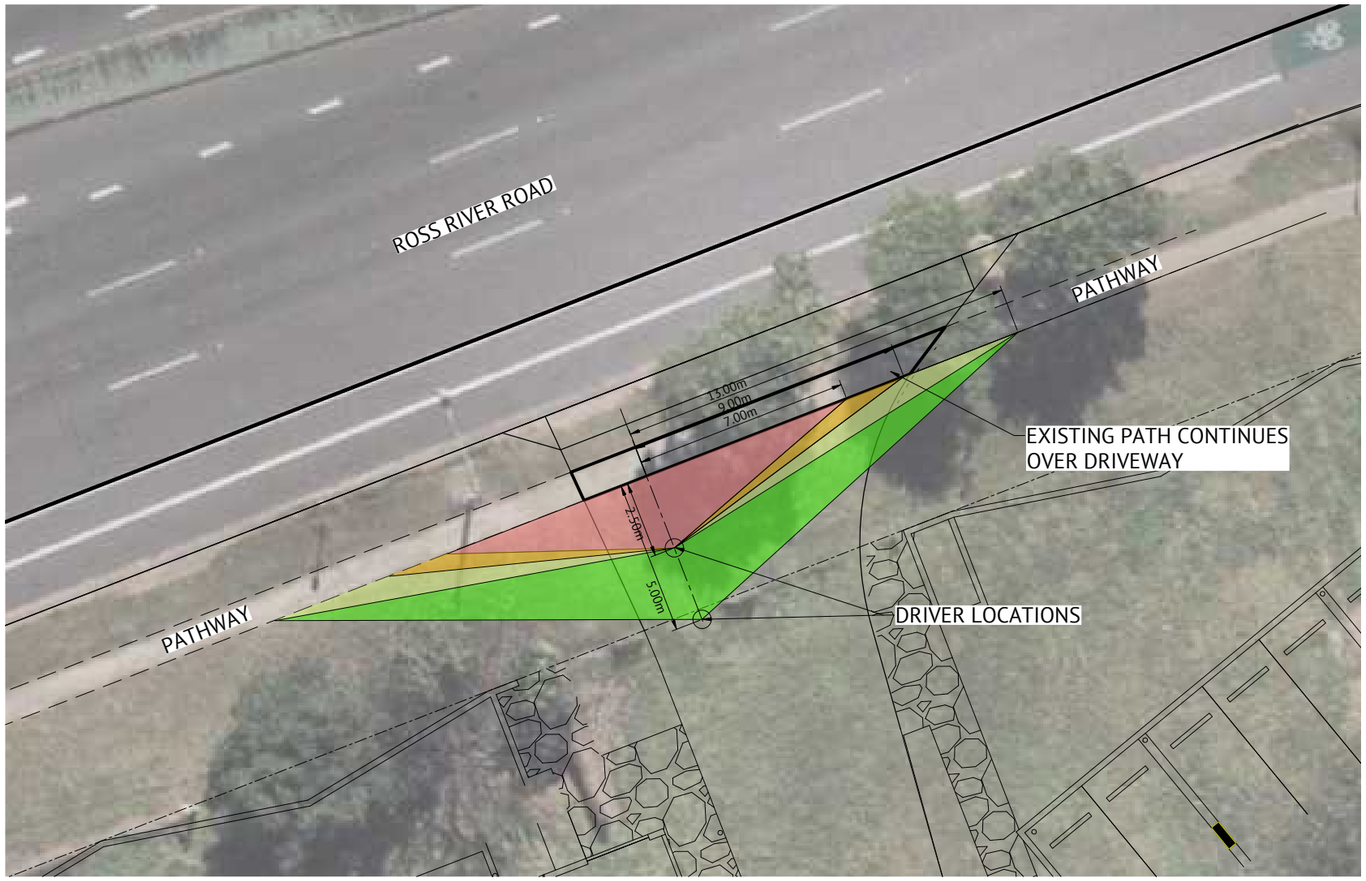
Premise
TOWNSVILLE OFFICE
84 DENHAM STREET
PO BOX 1110
TOWNSVILLE, QLD 4810
PH: (07) 4772 0666
WEB: www.premise.com.au

DESIGNED Z.RUDMAN
CHECKED C.CLARK
PROJECT MANAGER BJONES
ENGINEERING CERTIFICATION
BJONES RPEQ 19986

SCALE
0 2.5 5 7.5m
SCALE 1:125 (A1)
0 2 4 6m
SCALE 1:100 (A1)
ORIGINAL SHEET SIZE A1

CLIENT HURST CONSTRUCTIONS
PROJECT ROSS RIVER ROAD RESIDENTIAL
LOCATION 344-350 ROSS RIVER ROAD, CRANBROOK
SHEET TITLE PEDESTRIAN SIGHT LINES - ALBERT STREET

JOB CODE P003620
SHEET NUMBER SKC101
REV 1



N

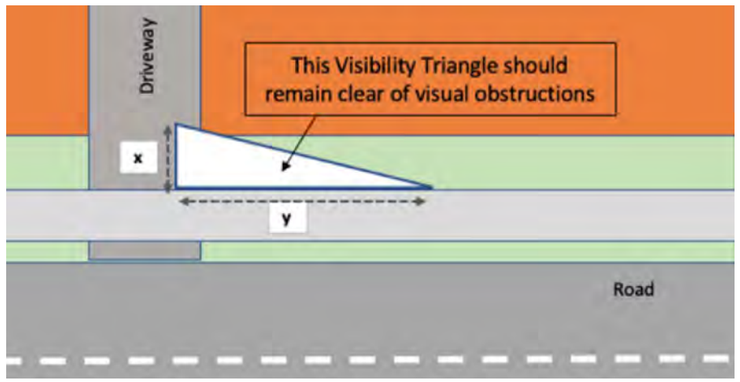
SIGHT LINE DIMENSIONS

ASSESMENT	DIRECTION	GENERAL USE PATHS WITH EVEN TERRAIN[1]	PRINCIPAL PATHS / PATHS WHERE GRADES >8%
1. DESIRABLE PATH USERS TRAVELING AT COMFORTABLE SPEEDS • GENERAL USE PATHS: 15 km/h • PRINCIPAL PATHS: 20 km/h[2] VEHICLE SPEED <5 km/h MINIMUM STANDARD IF REGULAR HEAVY VEHICLES USE	X (m)	≥5	≥5
	Y (m)	≥9	≥13
2. TOLERABLE PATH USERS TRAVELLING AT REDUCED SPEEDS. • GENERAL USE PATHS: 12–15 km/h • PRINCIPAL PATHS: 15–20 km/h VEHICLES MUST COME TO A COMPLETE STOP	X (m)	≥2.5	≥2.5
	Y (m)	7 ≤ Y < 9	9 ≤ Y < 13
3. DEFICIENT SIGHT LINES PROVIDE ADEQUATE WARNING FOR DRIVERS OR PATH USERS TO AVOID A CRASH, WHEN PATH USERS TRAVEL AT MINIMUM SPEEDS. • GENERAL USE PATHS: 10–12 km/h • PRINCIPAL PATHS: 12–15 km/h VEHICLES MUST COME TO A COMPLETE STOP	X (m)	≥2.5	≥2.5
	Y (m)	5 ≤ Y < 7	7 ≤ Y < 9
4. HIGHLY DEFICIENT SIGHT LINES DO NOT PROVIDE ADEQUATE WARNING FOR DRIVERS OR PATH USERS TO AVOID A CRASH, WHEN PATH USERS TRAVEL AT MINIMUM SPEEDS. • GENERAL USE PATHS: <10 km/h • PRINCIPAL PATHS: <12 km/h SIGHT LINES DO NOT PROVIDE ADEQUATE WARNING FOR DRIVERS TO AVOID A CRASH	X (m)	<2.5	<2.5
	Y (m)	<5	<7

[1]TABLE ASSUMES PATH APPROACH GRADIENTS (LONGITUDINAL) OF 0%

[2]WHERE DESIRABLE SPEEDS EXCEED 20 KM/H, SEE TABLE 3.2.3 OF 'Guideline: Treatment options to improve safety of pedestrians, bicycle riders and other path users at driveways February 2021' FOR STOPPING DISTANCES.

GUIDELINE: TREATMENT OPTIONS TO IMPROVE SAFETY OF PEDESTRIANS, BICYCLE RIDERS AND OTHER PATH USERS AT DRIVEWAYS FEBRUARY 2021



PRELIMINARY - NOT FOR CONSTRUCTION

DATE	REV	DESCRIPTION	REC	APP
13/10/2025	1	PRELIMINARY - NOT FOR CONSTRUCTION	CC	BJ

REVISIONS

Premise
TOWNSVILLE OFFICE
84 DENHAM STREET
PO BOX 1110
TOWNSVILLE, QLD 4810
PH: (07) 4772 0666
WEB: www.premise.com.au

DESIGNED Z.RUDMAN
CHECKED C.CLARK
PROJECT MANAGER BJONES
ENGINEERING CERTIFICATION
BJONES RPEQ 19986

SCALE
0 2.5 5 7.5m
SCALE 1:125 (A1)
0 2 4 6m
SCALE 1:100 (A1)
ORIGINAL SHEET SIZE A1

CLIENT HURST CONSTRUCTIONS
PROJECT ROSS RIVER ROAD RESIDENTIAL
LOCATION 344-350 ROSS RIVER ROAD, CRANBROOK
SHEET TITLE PEDESTRIAN SIGHT LINES - ROSS RIVER ROAD

JOB CODE P003620
SHEET NUMBER SKC102
REV 1

APPENDIX I

SWEPT PATH ANALYSES

ROSS RIVER ROAD

B99 Vehicle (Realistic min radius) (2004)

Overall Length	5.200m
Overall Width	1.940m
Overall Body Height	1.878m
Min Body Ground Clearance	0.272m
Track Width	1.840m
Lock-to-lock time	4.00s
Curb to Curb Turning Radius	6.250m

PRELIMINARY - NOT FOR CONSTRUCTION

DATE	REV	DESCRIPTION	CC REC	BJ APP
13/10/2025	1	PRELIMINARY - NOT FOR CONSTRUCTION		

REVISIONS

Premise

TOWNSVILLE OFFICE
84 DENHAM STREET
PO BOX 1110
TOWNSVILLE, QLD 4810
PH: (07) 4772 0666
WEB: www.premise.com.au

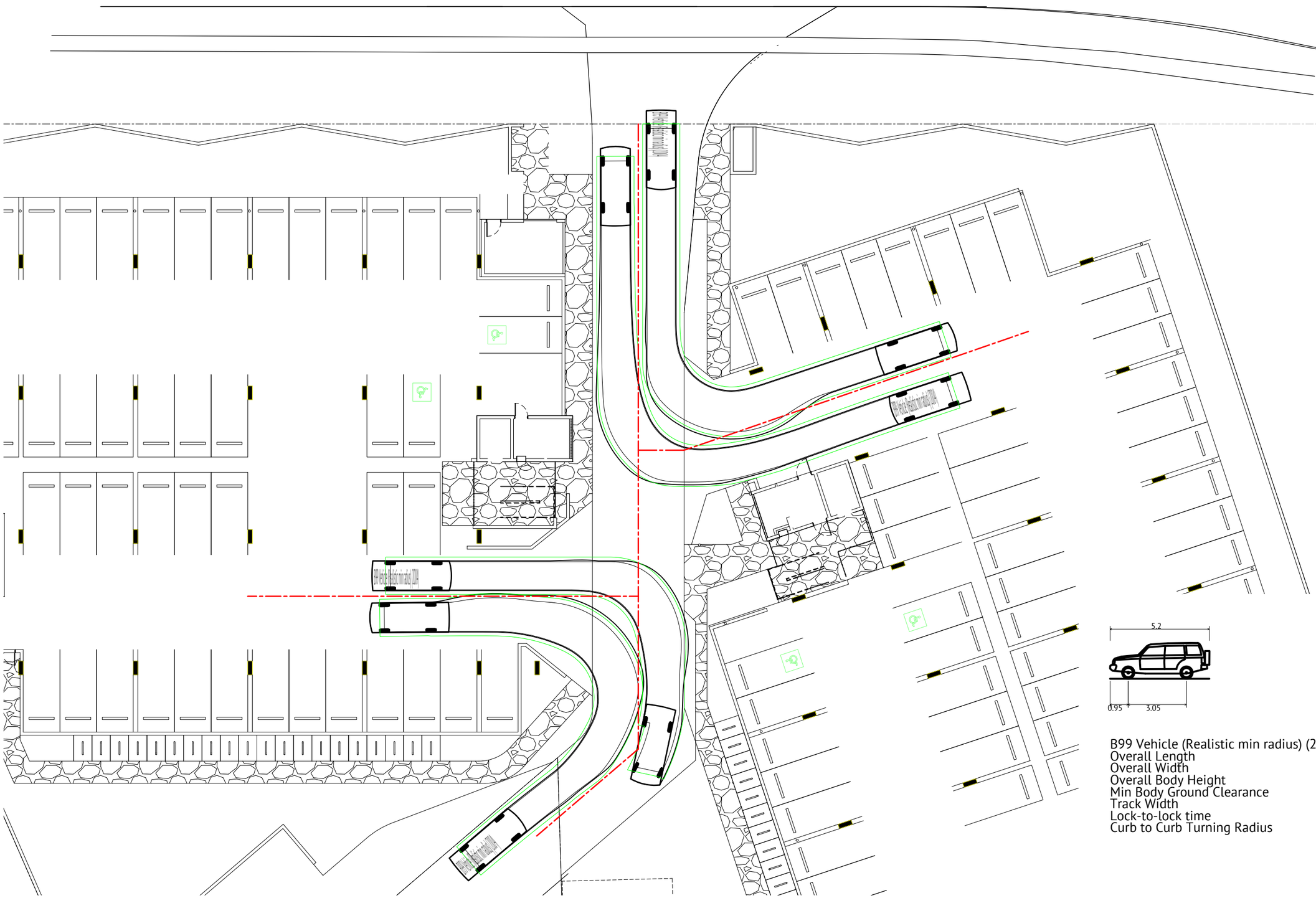
DESIGNED Z.RUDMAN
CHECKED C.CLARK
PROJECT MANAGER BJONES
ENGINEERING CERTIFICATION
BJONES RPEQ 19986

SCALE
0 2.5 5 7.5m
SCALE 1:125 (A1)
0 2 4 6m
SCALE 1:100 (A1)
ORIGINAL SHEET SIZE A1

CLIENT HURST CONSTRUCTIONS
PROJECT ROSS RIVER ROAD RESIDENTIAL
LOCATION 344-350 ROSS RIVER ROAD, CRANBROOK
SHEET TITLE INTERNAL ROADWAY DRAWINGS SHEET 1 OF 8

JOB CODE P003620
SHEET NUMBER SKC001
REV 1

ROSS RIVER ROAD



B99 Vehicle (Realistic min radius) (2004)

Overall Length	5.200m
Overall Width	1.940m
Overall Body Height	1.878m
Min Body Ground Clearance	0.272m
Track Width	1.840m
Lock-to-lock time	4.00s
Curb to Curb Turning Radius	6.250m

PRELIMINARY - NOT FOR CONSTRUCTION

DATE	REV	DESCRIPTION	REC	APP
13/10/2025	1	PRELIMINARY - NOT FOR CONSTRUCTION	CC	BJ

REVISIONS

Premise

TOWNSVILLE OFFICE
84 DENHAM STREET
PO BOX 1110
TOWNSVILLE, QLD 4810
PH: (07) 4772 0666
WEB: www.premise.com.au

DESIGNED Z.RUDMAN
CHECKED C.CLARK
PROJECT MANAGER BJONES
ENGINEERING CERTIFICATION
BJONES RPEQ 19986

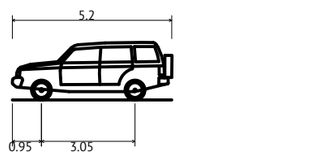
SCALE
0 2.5 5 7.5m
SCALE 1:125 (A1)
0 2 4 6m
SCALE 1:100 (A1)
ORIGINAL SHEET SIZE A1

CLIENT HURST CONSTRUCTIONS
PROJECT ROSS RIVER ROAD RESIDENTIAL
LOCATION 344-350 ROSS RIVER ROAD, CRANBROOK
SHEET TITLE INTERNAL ROADWAY DRAWINGS SHEET 2 OF 8

JOB CODE P003620
SHEET NUMBER SKC002
REV 1

ROSS RIVER ROAD

N



B99 Vehicle (Realistic min radius) (2004)

Overall Length	5.200m
Overall Width	1.940m
Overall Body Height	1.878m
Min Body Ground Clearance	0.272m
Track Width	1.840m
Lock-to-lock time	4.00s
Curb to Curb Turning Radius	6.250m

PRELIMINARY - NOT FOR CONSTRUCTION

DATE	REV	DESCRIPTION	CC REC	BI APP
13/10/2025	1	PRELIMINARY - NOT FOR CONSTRUCTION		

REVISIONS

Premise

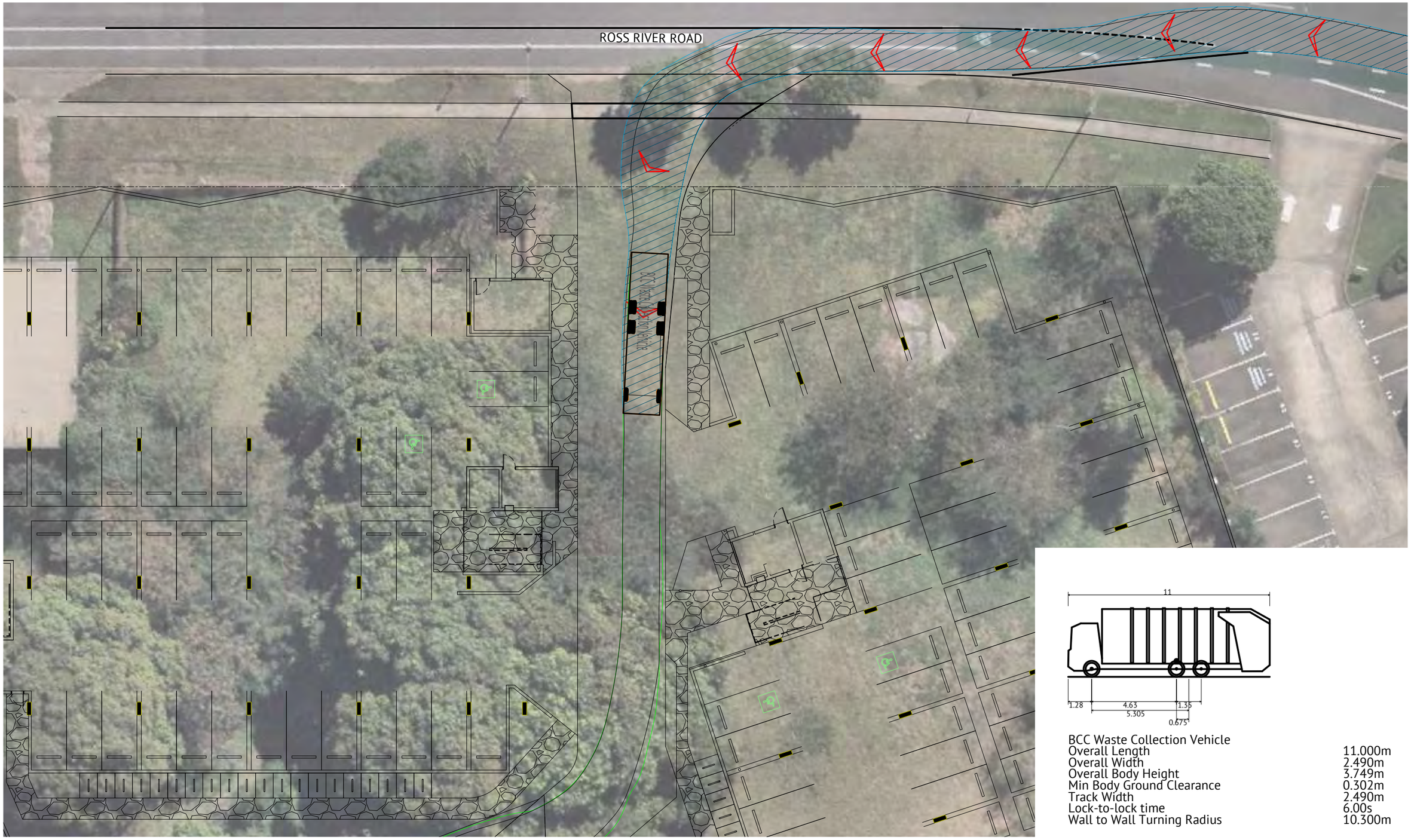
TOWNSVILLE OFFICE
84 DENHAM STREET
PO BOX 1110
TOWNSVILLE, QLD 4810
PH: (07) 4772 0666
WEB: www.premise.com.au

DESIGNED Z.RUDMAN
CHECKED C.CLARK
PROJECT MANAGER BJONES
ENGINEERING CERTIFICATION
BJONES RPEQ 19986

SCALE
0 2.5 5 7.5m
SCALE 1:125 (A1)
0 2 4 6m
SCALE 1:100 (A1)
ORIGINAL SHEET SIZE A1

CLIENT HURST CONSTRUCTIONS
PROJECT ROSS RIVER ROAD RESIDENTIAL
LOCATION 344-350 ROSS RIVER ROAD, CRANBROOK
SHEET TITLE INTERNAL ROADWAY DRAWINGS SHEET 3 OF 8

JOB CODE P003620
SHEET NUMBER SKC003
REV 1



BCC Waste Collection Vehicle	
Overall Length	11.000m
Overall Width	2.490m
Overall Body Height	3.749m
Min Body Ground Clearance	0.302m
Track Width	2.490m
Lock-to-lock time	6.00s
Wall to Wall Turning Radius	10.300m

PRELIMINARY - NOT FOR CONSTRUCTION

DATE	REV	DESCRIPTION	REC	APP
13/10/2025	1	PRELIMINARY - NOT FOR CONSTRUCTION	CC	BJ

REVISIONS

Premise

TOWNSVILLE OFFICE
84 DENHAM STREET
PO BOX 1110
TOWNSVILLE, QLD 4810
PH: (07) 4772 0666
WEB: www.premise.com.au

DESIGNED Z.RUDMAN
CHECKED C.CLARK
PROJECT MANAGER BJONES
ENGINEERING CERTIFICATION
BJONES RPEQ 19986

SCALE
0 2.5 5 7.5m
SCALE 1:125 (A1)
0 2 4 6m
SCALE 1:100 (A1)
ORIGINAL SHEET SIZE A1

CLIENT HURST CONSTRUCTIONS
PROJECT ROSS RIVER ROAD RESIDENTIAL
LOCATION 344-350 ROSS RIVER ROAD, CRANBROOK
SHEET TITLE INTERNAL ROADWAY DRAWINGS SHEET 4 OF 8

JOB CODE P003620
SHEET NUMBER SKC004
REV 1

BCC Waste Collection Vehicle	
Overall Length	11.000m
Overall Width	2.490m
Overall Body Height	3.749m
Min Body Ground Clearance	0.302m
Track Width	2.490m
Lock-to-lock time	6.00s
Wall to Wall Turning Radius	10.300m

PRELIMINARY - NOT FOR CONSTRUCTION

DATE	REV	DESCRIPTION	REC	APP
13/10/2025	1	PRELIMINARY - NOT FOR CONSTRUCTION	CC	BJ

REVISIONS

Premise

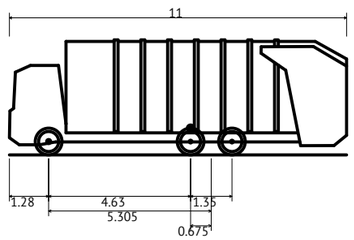
TOWNSVILLE OFFICE
84 DENHAM STREET
PO BOX 1110
TOWNSVILLE, QLD 4810
PH: (07) 4772 0666
WEB: www.premise.com.au

DESIGNED Z.RUDMAN
CHECKED C.CLARK
PROJECT MANAGER BJONES
ENGINEERING CERTIFICATION
BJONES RPEQ 19986

SCALE
0 2.5 5 7.5m
SCALE 1:125 (A1)
0 2 4 6m
SCALE 1:100 (A1)
ORIGINAL SHEET SIZE A1

CLIENT HURST CONSTRUCTIONS
PROJECT ROSS RIVER ROAD RESIDENTIAL
LOCATION 344-350 ROSS RIVER ROAD, CRANBROOK
SHEET TITLE INTERNAL ROADWAY DRAWINGS SHEET 5 OF 8

JOB CODE P003620
SHEET NUMBER SKC005
REV 1



BCC Waste Collection Vehicle	
Overall Length	11.000m
Overall Width	2.490m
Overall Body Height	3.749m
Min Body Ground Clearance	0.302m
Track Width	2.490m
Lock-to-lock time	6.00s
Wall to Wall Turning Radius	10.300m

PRELIMINARY - NOT FOR CONSTRUCTION

DATE	REV	DESCRIPTION	REC	APP
13/10/2025	1	PRELIMINARY - NOT FOR CONSTRUCTION	CC	BJ

REVISIONS

Premise

TOWNSVILLE OFFICE
84 DENHAM STREET
PO BOX 1110
TOWNSVILLE, QLD 4810
PH: (07) 4772 0666
WEB: www.premise.com.au

DESIGNED Z.RUDMAN
CHECKED C.CLARK
PROJECT MANAGER B.JONES
ENGINEERING CERTIFICATION
B.JONES RPEQ 19986

SCALE
0 2.5 5 7.5m
SCALE 1:125 (A1)
0 2 4 6m
SCALE 1:100 (A1)
ORIGINAL SHEET SIZE A1

CLIENT HURST CONSTRUCTIONS
PROJECT ROSS RIVER ROAD RESIDENTIAL
LOCATION 344-350 ROSS RIVER ROAD, CRANBROOK
SHEET TITLE INTERNAL ROADWAY DRAWINGS SHEET 6 OF 8

JOB CODE P003620
SHEET NUMBER SKC006
REV 1

BCC Waste Collection Vehicle	
Overall Length	11.000m
Overall Width	2.490m
Overall Body Height	3.749m
Min Body Ground Clearance	0.302m
Track Width	2.490m
Lock-to-lock time	6.00s
Wall to Wall Turning Radius	10.300m

PRELIMINARY - NOT FOR CONSTRUCTION

DATE	REV	DESCRIPTION	REC	APP
13/10/2025	1	PRELIMINARY - NOT FOR CONSTRUCTION	CC	BJ

REVISIONS

Premise

TOWNSVILLE OFFICE
84 DENHAM STREET
PO BOX 1110
TOWNSVILLE, QLD 4810
PH: (07) 4772 0666
WEB: www.premise.com.au

DESIGNED Z.RUDMAN
CHECKED C.CLARK
PROJECT MANAGER BJONES
ENGINEERING CERTIFICATION
BJONES RPEQ 19986

SCALE
0 2.5 5 7.5m
SCALE 1:125 (A1)
0 2 4 6m
SCALE 1:100 (A1)
ORIGINAL SHEET SIZE A1

CLIENT HURST CONSTRUCTIONS
PROJECT ROSS RIVER ROAD RESIDENTIAL
LOCATION 344-350 ROSS RIVER ROAD, CRANBROOK
SHEET TITLE INTERNAL ROADWAY DRAWINGS SHEET 7 OF 8

JOB CODE P003620
SHEET NUMBER SKC007
REV 1

BCC Waste Collection Vehicle	
Overall Length	11.000m
Overall Width	2.490m
Overall Body Height	3.749m
Min Body Ground Clearance	0.302m
Track Width	2.490m
Lock-to-lock time	6.00s
Wall to Wall Turning Radius	10.300m

PRELIMINARY - NOT FOR CONSTRUCTION

DATE	REV	DESCRIPTION	REC	APP
13/10/2025	1	PRELIMINARY - NOT FOR CONSTRUCTION	CC	BJ

REVISIONS

Premise
TOWNSVILLE OFFICE
84 DENHAM STREET
PO BOX 1110
TOWNSVILLE, QLD 4810
PH: (07) 4772 0666
WEB: www.premise.com.au

DESIGNED Z.RUDMAN
CHECKED C.CLARK
PROJECT MANAGER BJONES
ENGINEERING CERTIFICATION
BJONES RPEQ 19986

SCALE
0 2.5 5 7.5m
SCALE 1:125 (A1)
0 2 4 6m
SCALE 1:100 (A1)
ORIGINAL SHEET SIZE A1

CLIENT HURST CONSTRUCTIONS
PROJECT ROSS RIVER ROAD RESIDENTIAL
LOCATION 344-350 ROSS RIVER ROAD, CRANBROOK
SHEET TITLE INTERNAL ROADWAY DRAWINGS SHEET 8 OF 8

JOB CODE P003620
SHEET NUMBER SKC008
REV 1

APPENDIX J

TRAFFIC IMPACT ASSESSMENT CERTIFICATION

TRAFFIC IMPACT ASSESSMENT CERTIFICATION

CERTIFICATION OF TRAFFIC IMPACT ASSESSMENT REPORT REGISTERED PROFESSIONAL ENGINEER QUEENSLAND

FOR

Project Title	Ross River Road Residential: Traffic Impact Assessment

As a professional engineer registered by the Board of Professional Engineers of Queensland pursuant to the *Professional Engineers Act 2002* as competent in my areas of nominated expertise, I understand and recognise:

- The significant role of engineering as a profession; and that
- The community has a legitimate expectation that my certification affixed to this engineering work can be trusted; and that
- I am responsible for ensuring its preparation has satisfied all necessary standards, conduct and contemporary practice.

As the responsible RPEQ, I certify:

i. I am satisfied that all submitted components comprising this traffic impact assessment, listed in the following table, have been completed in accordance with the Guide to Traffic Impact Assessment published by the Queensland Department of Transport and Main Roads and using sound engineering principles; and

ii. Where specialised areas of work have not been under my direct supervision, I have reviewed the outcomes of the work and consider the work and its outcomes as suitable for the purposes of this traffic impact assessment; and that

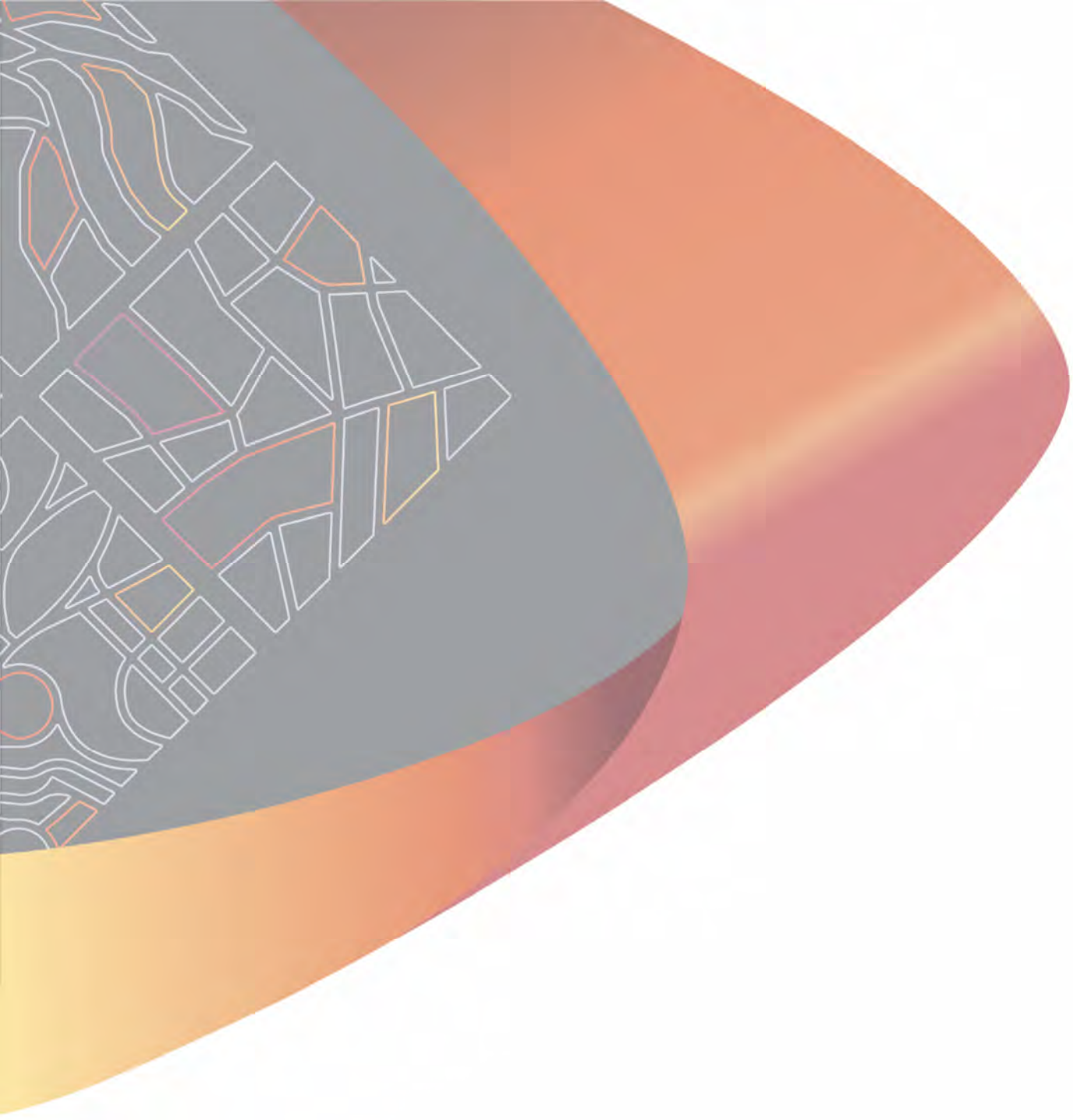
iii. The outcomes of this traffic impact assessment are a true reflection of results of assessment; and that

iv. I believe the strategies recommended for mitigating impacts by this traffic impact assessment, embrace contemporary practice initiatives and will deliver the desired outcomes.

Name	**Bradley Jones**	**RPEQ No.**	**19986**
RPEQ Competencies		Civil	
Signature		**Date**	13 October 2025
Postal Address	PO Box 1110, Townsville QLD 4810		
Email	Bradley.Jones@premise.com.au		

Premise
PART OF THE Amey GROUP

Traffic impact assessment components to which this certification applies	☒
1. Introduction	
Background	☒
Scope and study area	☒
Pre-lodgement meeting notes	☒
2. Existing Conditions	
Land use and zoning	☒
Adjacent land uses / approvals	☒
Surrounding road network details	☒
Traffic volumes	☒
Intersection and network performance	☒
Road safety issues	☒
Site access	☒
Public transport (if applicable)	☒
Active transport (if applicable)	☒
Parking (if applicable)	☐
Pavement (if applicable)	☐
Transport infrastructure (if applicable)	☐
3. Proposed Development Details	
Development site plan	☒
Operational details (including year of opening each stage and any relevant catchment / market analysis)	☒
Proposed access and parking	☒
4. Development Traffic	
Traffic generation (by development stage if relevant and considering light and heavy vehicle trips)	☐
Trip distribution	☐
Development traffic volumes on the network	☐
5. Impact Assessment and Mitigation	
With and without development traffic volumes	☒
Construction traffic impact assessment and mitigation (if applicable)	☐
Road safety impact assessment and mitigation	☒
Access and frontage impact assessment and mitigation	☒
Intersection delay impact assessment and mitigation	☐
Road link capacity assessment and mitigation	☐
Pavement impact assessment and mitigation	☐
Transport infrastructure impact assessment and mitigation	☐
Other impacts assessment relevant to the specific development type / location (if applicable) - Parking	☒
6. Conclusions and Recommendations	
Summary of impacts and mitigation measures proposed	☒
Certification statement and authorisation	☒



Premise

— PART OF THE Amey GROUP —

APPENDIX G

Noise Impact Assessment prepared by Stantec

344 – 350 Ross River Road, Cranbrook

Noise Impact Assessment

10/10/2025

Ref: 301051166

PREPARED FOR:

Hurst Constructions QLD
Attention: Kieran Dee

PREPARED BY:

Marcus Kamppi

Stantec

Revision Schedule

Revision No.	Date	Description	Prepared by	Quality Reviewer
P01	08/09/2025	Draft – For review and comment	MK	CE
C01	10/10/2025	Final	MK	CE

Disclaimer

The conclusions in the report are Stantec's professional opinion, as of the time of the report, and concerning the scope described in the report. The opinions in the document are based on conditions and information existing at the time the document was published and do not take into account any subsequent changes. The report relates solely to the specific project for which Stantec was retained and the stated purpose for which the report was prepared. The report is not to be used or relied on for any variation or extension of the project, or for any other project or purpose, and any unauthorized use or reliance is at the recipient's own risk.

Stantec has assumed all information received from the client and third parties in the preparation of the report to be correct. While Stantec has exercised a customary level of judgment or due diligence in the use of such information, Stantec assumes no responsibility for the consequences of any error or omission contained therein.

This report is intended solely for use by the client in accordance with Stantec's contract with the client. While the report may be provided to applicable authorities having jurisdiction and others for whom the client is responsible, Stantec does not warrant the services to any third party. The report may not be relied upon by any other party without the express written consent of Stantec, which may be withheld at Stantec's discretion.

Contents

List of Appendices

1. Introduction

Stantec Australia Pty Ltd (Stantec) have been engaged by Hurst Constructions QLD (Hurst) to undertake a noise impact assessment for the development application stage (DA) of a residential apartment project. The project site is located at 344 – 350 Ross River Road, Cranbrook QLD 4814 (Lot 1 & 2 RP721729 and Lot 3 SP146326) and is within the City of Townsville (CoT) local government area.

This acoustic services report:

- defines understanding of the existing site and proposed uses of the buildings;
- details noise monitoring and attended measurements undertaken for the project;
- defines acoustic quality standards for the project;
- outlines the acoustic design parameters and goals for various acoustic parameters, including:
    - road traffic noise intrusion; and
    - environmental noise emissions.
- Recommend the design values for the abovementioned parameters for the various spaces, based on the applicable design guidelines discussed in this report.

Each of the acoustical aspects identified have been addressed in this report and recommendations are made to provide a consistent acoustical outcome for the project.

A glossary of terms used in this report is provided in **Appendix A**.

The recommendations made in this report are specific to the building design at the date of issue of this report. The building design is subject to change during the following stages. Where this occurs, the assumptions made to inform the recommendations in the report may no longer be valid; therefore, further advice should be sought to ensure that the acoustic outcomes presented in this report are achieved.

The performance of products referred to in this report are made to meet the acoustic requirements only. It does not consider other aspects, including but not limited to thermal, wind, impact, structural, mechanical, national construction code, security and fire requirements. Relevant discipline reports, drawings and specifications should be referred to for conformance.

This report relates to this specific project and must not be applied to any other project without prior consultation with Stantec. Designs and conditions can vary between projects causing significant variations in acoustic performance and relevant subsequent advice to one project may not apply to another.

This report shall not be relied upon as providing any warranties or guarantees of construction quality regarding acoustics.

2. Background

2.1 Regulations, Policies, Standards and Guidelines

The following documents detailed in **Table 1** are relevant to the project and are referred to throughout this report.

Table 1: Applicable Regulations, Policies, Standards and Guidelines referenced in this report

Title	Abbreviation
STATE LEGISLATION AND LOCAL COUNCIL POLICIES	
Queensland Environmental Protection Act 1994	EPA 1994
Queensland Environmental Protection (Noise) Policy 2019	EPP 2019
Townsville City Plan 2014 (Version 2024/01)	TCC 2014
Queensland Government State Development Assessment Provisions SDAP v3.3 – *State Code 1– Development in a state-controlled road environment*	SDAP SC1
Queensland Development Code Mandatory Part 4.4 – *Buildings in a Transport Noise Corridor* Version 1.1 (published 17 August 2015 from Department of Housing and Public Works)	QDC MP4.4
AUSTRALIAN AND INTERNATIONAL STANDARDS	
Australian Standard AS 1055:2018 *Acoustics – Description and measurement of environmental noise*	AS 1055
International Standards Organization 9613-2:2014 *Attenuation of sound during propagation outdoors – Part 2: General method of calculation*	ISO 9613
GUIDELINES	
Department of Transport and Main Roads (TMR) – Transport Noise Management Code of Practice 2013 Volume 1 – Road Traffic Noise	TMR CoP
UK Department of Transport Welsh Office *Calculation of Road Traffic Noise* 1988	CoRTN

2.2 Study Inputs

Acoustic assessment and the preparation of this report have been conducted based on the received documentation detailed in **Table 2**.

Table 2: Received documentation

Date Received	Detail	Revision / Date Prepared	Prepared By	Format
05/10/2025	Architectural drawings package: • *251003_344-350 ROSS RIVER ROAD_DA WIP SET*	Various / 12/09/2025	Counterpoint Architecture	pdf

3. Project Overview

3.1 Site Description

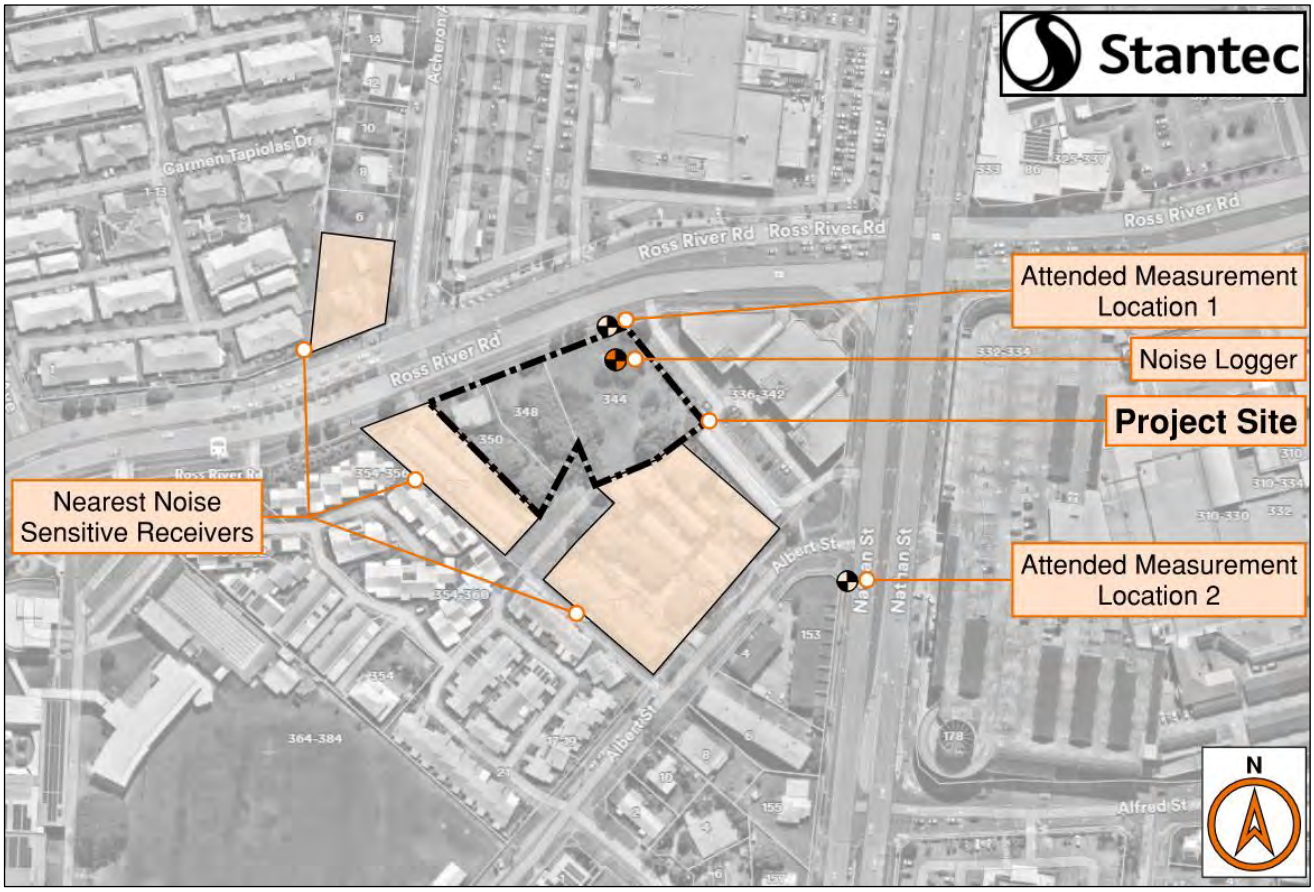
3.1.1 Project Location

The project site is located at 344 – 350 Ross River Road, Cranbrook QLD 4814 (Lot 1 & 2 RP721729 and Lot 3 SP146326) and is within the City of Townsville. The site is bound by:

- **NORTH:** Ross River Road which separates the site from a mix of residential and commercial uses.
- **EAST:** Commercial offices.
- **SOUTH / WEST:** Existing residential uses including townhouses and apartments.

The project site, surrounding areas and noise measurement locations are detailed in **Figure 1**.

Figure 1: Project site, surrounding land uses and noise measurement locations



Source: Nearmap (image dated 12/07/2025 – link) | Annotations by Stantec

3.1.2 Surrounding Land Uses / Zoning

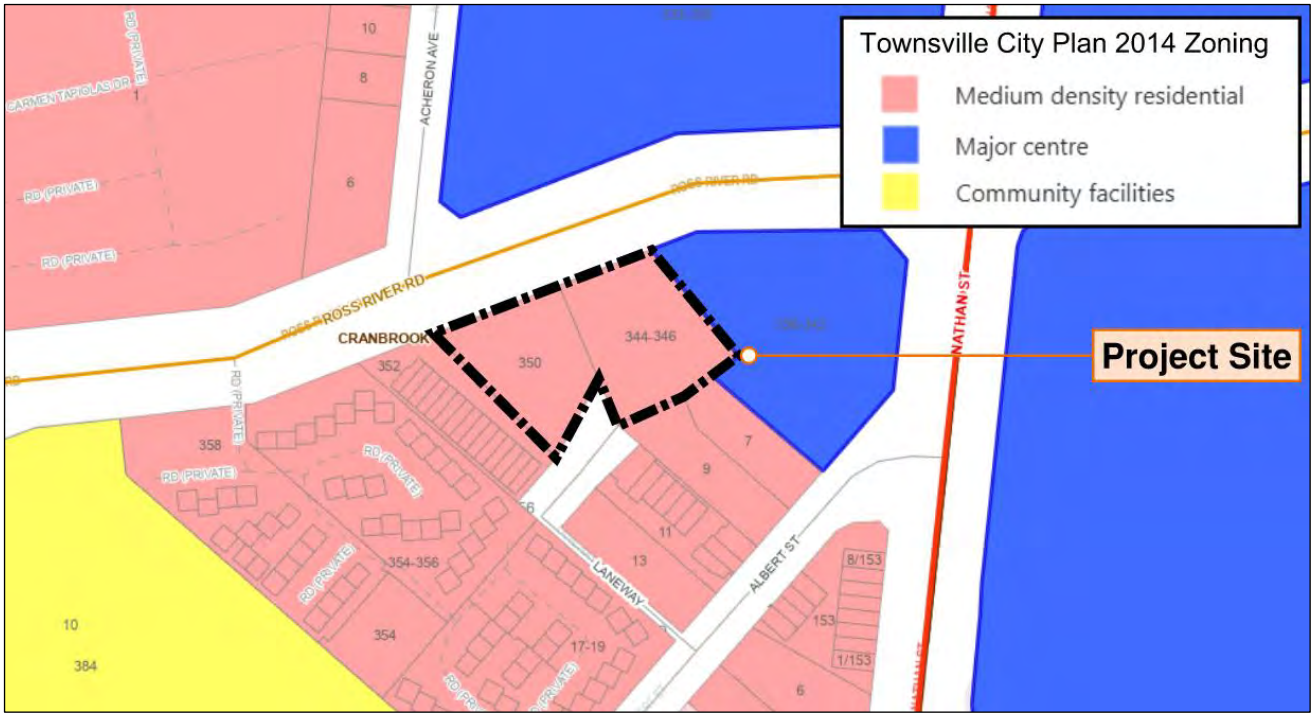
The Townsville City Plan interactive mapping (link) was reviewed to determine zoning of the site and surrounding lots (see **Figure 2**). The following was identified:

- The project site is zoned Medium density residential;
- Existing land uses surrounding the project site generally consist of the following zoning;

- Medium density residential;
- Major centre; and
- Community facilities.

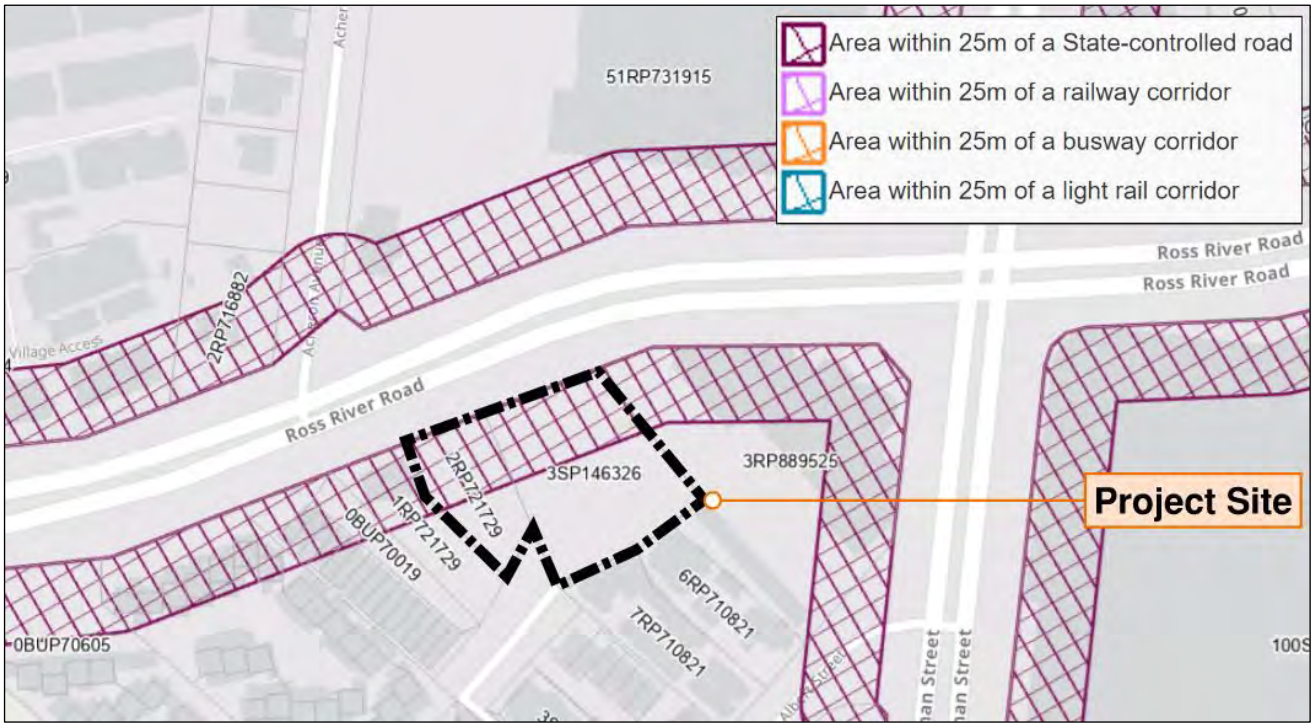
- The nearest noise sensitive receptors to the project site are located at:
  - North: 357 Ross River Road, Cranbrook 4814;
  - South: 7 – 13 Albert Street, Cranbrook 4814; and
  - West: 352 Ross River Road, Cranbrook 4814.
- The proposed development is located within;
  - 25 m of a State Transport Corridor and Transport Noise Corridor – State-controlled Roads (mandatory) contours up to Category 3: 68 dB(A) ≤ 73 dB(A) (see **Figure 3** and **Figure 4**, respectively).
- The proposed development is not located within;
  - Aircraft Noise Exposure Forecast (ANEF) contours;
  - Transport Noise Corridors – Rail contours; or
  - Transport Noise Corridors – State-controlled Roads (voluntary) contours.

Figure 2: Land use / zoning surrounding the project site



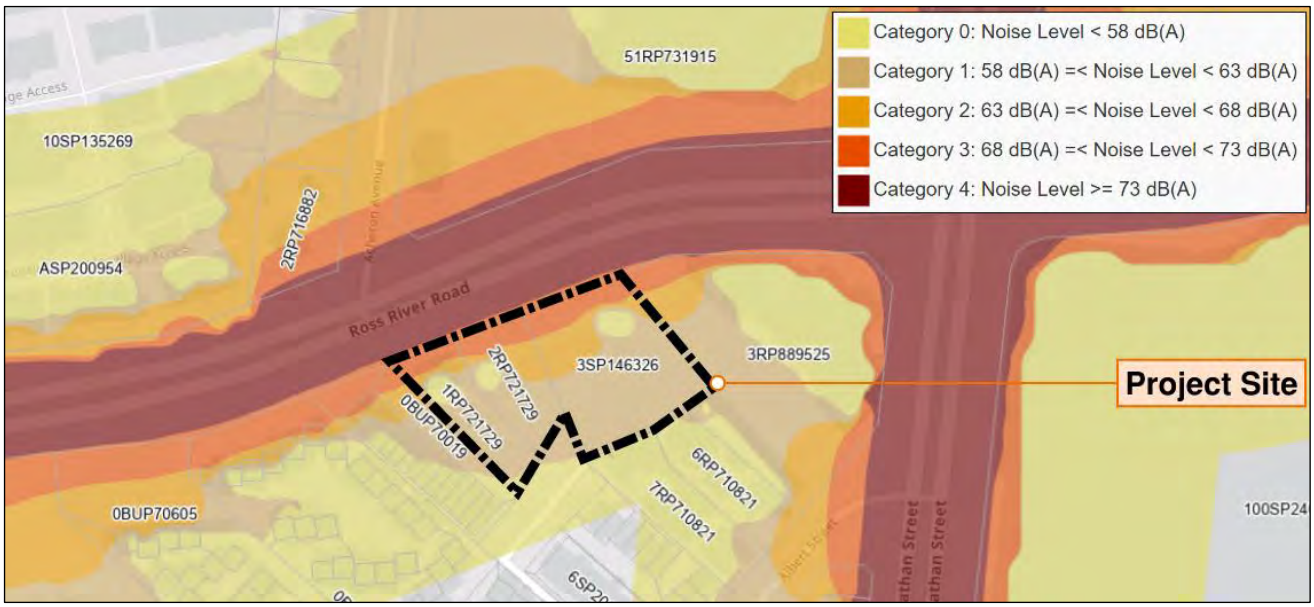
Source: TownsvilleMAPS (link) (accessed 27/08/2025) | Annotations by Stantec

Figure 3: Project location shown within 25 m of a state-controlled road



Source: QLD Government Development Assessment Mapping System (accessed 27/08/2025) | Image compiled by Stantec

Figure 4: Project location shown in context with Transport noise corridors – State-controlled road (mandatory)



Source: QLD Government State Planning Policy Interactive Mapping System (accessed 27/08/2025) | Image compiled by Stantec

3.2 Proposed Development

Based on the architectural documentation received (refer to **Table 2**) the project site will include two (2) residential apartment buildings which will yield 81 apartments across levels 1 - 4. The ground level is reserved for an office, carparking, secure bicycle parking, wash bay and a refuse storage / collection area.

A road corridor laneway that exits to Albert Street is proposed adjacent to the site boundary. An acoustic assessment of car and waste vehicle movements along this laneway was completed despite not being within the site boundary.

3.3 Existing Acoustic Environment

To quantify the existing noise environment on site and specify noise limits, unattended noise monitoring (noise logging) was conducted from 25th August 2025 to 1st September 2025 (inclusive).

The location of the noise monitoring location has been shown in **Figure 1**.

Noise measurements were conducted following guidance from Australian Standard AS 1055:2018 – *Acoustics – Description and measurement of environmental noise* (AS 1055), and the instruments were configured as follows:

- A-weighting frequency response;
- FAST time response; and
- 15-minute intervals.

The sound level meter was calibrated before and after the measurement period. The instrument showed a drift less than ±1 dB during the course of monitoring; therefore, measurements are considered valid according to AS 1055.

A summary of the average unattended noise levels recorded are presented in **Table 3**. For further details and full measured results, refer to **Appendix B**.

Table 3: Summary of relevant noise descriptors used to determine noise limits and inform acoustic assessment

Monitoring Location	Rating Background Level, dB(A)			Background Noise Level, $L_{90,T}$ dB(A)			Equivalent Continuous Noise Level, L_{eq} dB(A)			Road Traffic Noise Levels		
	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night	$L_{10,18h}$ (6am-12am)	$L_{90,18h}$ (6am-12am)	$L_{90,8h}$ (10pm-6am)
See Figure 1	51	49	44	53	50	47	61	60	56	62	52	46

NOTES:

1) *Day – 7 AM-6 PM | Evening – 6 PM-10 PM | Night – 10 PM-7 AM*

3.3.1 Attended Noise Measurements

Attended noise measurements conducted at the project site on the 25/08/2025 (see location in **Figure 1**). Measurements were conducted between 10:00 AM and 1:30 PM with the primary intent being to provide additional reference points to assist in troubleshooting potential issues with model validation.

Measurements were conducted in accordance with the "*Shortened measurement procedure*" as outlined by the UK Department of Transport Welsh Office *Calculation of Road Traffic Noise* 1988 (CoRTN). CoRTN states;

> *Measurements of L_{10} are made over any three consecutive hours between 1000 and 1700 hours. Using L_{10} (3-hour) as the arithmetic mean of the three consecutive values of hourly L_{10}, the current value of L_{10} (18-hour) can be calculated from the relation:*
>
> $$L_{10}\ (18\text{-hour}) = L_{10}\ (3\ \text{hour}) - 1\ dB(A)$$

The data obtained from the measurements has been provided in **Table 4**. These measurements were used as a reference only with model verification based on long term noise measurements provided by the logger.

Table 4: Average traffic count and measured noise level data

ID	Road	Time Period	Vehicle Counts Recorded (both directions)			Measured $L_{10,1hr}$ dB(A)	Calculated	
			Cars	Trucks	% HV		$L_{10,3hr}$ dB(A)	$L_{10,18hr}$ dB(A)
000	Ross River Road	10:15 AM – 10:30 AM	355	14	3.8	67	66.8	65.8
002		11:30 AM – 11:45 AM	380	11	2.8	67		
004		12:45 PM – 1:00 PM	320	12	3.6	67		
001	Nathan Street	11:00 AM – 11:15 AM	533	34	6.0	75	73.8	72.8
003		12:15 PM – 12:30 PM	497	29	5.5	73		
005		1:15 PM – 1:30 PM	498	29	5.5	74		

3.4 Acoustic Design Issues and Considerations

Based on the review of initial design documentation, noise measurement data and site observations, the following acoustic design issues have been identified:

- The project site is exposed to transport generated noise associated with Ross River Road and Nathan Street. Given the level of noise measured, the proposed development will require significant treatments to the building envelope in order to comply with Queensland Development Code Mandatory Part 4.4 (QDC MP4.4). To minimise costs it is recommended that glazing and other openable elements along the northern façade of the development are minimised as far as practicable.
- Noise emissions from onsite activities (carparking, waste collection etc.) and mechanical plant will need to comply with the criteria outlined by the Townsville City Plan (where applicable), EPA 1994 and EPP 2019.
- The Nathan Business Centre is located at 340 Ross Rover Road adjacent to the site. Noise emissions from this site are not expected to require additional acoustic treatment for onsite receivers as:
    - Businesses in this building generally operate during the daytime hours when background noise levels are elevated due to Ross River Road and Nathan Street.
    - The minimum QDC MP4.4 façade treatments required to address road traffic noise intrusion are expected to be sufficient to attenuate carpark noise emissions from the business centre.

4. Acoustic Criteria

4.1 Environmental Noise Emissions

4.1.1 Townsville City Plan 2014

The Townsville City Plan 2014 (TCC 2014) requires developments to be designed to maintain the expected level of amenity for the area where they are constructed.

The applicable assessment codes for the proposed multiple dwelling development are stated in Table 5.5.2 – Medium density residential zone and are proved below:

- 6.2.2 Medium density residential zone code
- 9.3.2 Healthy waters code
- 9.3.3 Landscape code
- 9.3.5 Transport impact, access and parking code
- 9.3.6 Works code

A summary of the acoustic-related performance and acceptable outcomes defined under the above codes and applicable to the development are provided in **Table 5**.

Table 5: Acoustic related performance and acceptable outcomes (TCC 2014)

6.2.2 Medium density residential zone code - Table 6.2.2.3(a)	
Performance outcomes	**Acceptable outcomes**
PO4 Development minimises impacts on surrounding land and provides for an appropriate level of amenity within the site, having regard to: a. Noise.	No acceptable outcome is nominated.
P09 Air conditioning units are insulated so that adjoining properties are not affected by the noise source and are not significantly visible from the street.	No acceptable outcome is nominated.
9.3.5 Transport impact, access and parking code - Table 9.5.5.3	
Performance outcomes	**Acceptable outcomes**
PO28 Servicing arrangements minimise any adverse impact on the amenity of premises in the vicinity, having regard to operating hours, noise generation, proximity to sensitive uses, odour generation and dust.	No acceptable outcome is nominated.
9.3.6 Works code – Table 9.3.6.3	
Performance outcomes	**Acceptable outcomes**
PO28 Earthworks do not cause significant impacts through truck movements, dust or noise on the amenity of the locality in which the works are undertaken or along routes taken to transport the material and the transportation of materials minimises adverse impacts on the road network	**AO28** Earthworks are undertaken in accordance with the Development manual planning scheme policy no. SC6.4 - SC6.4.7.4 Earthworks Construction and SC6.4.23.1 Construction Management.
PO34 Construction work is undertaken in a manner which does not cause unacceptable impacts on surrounding areas as a result of dust, odour, noise or lighting.	No acceptable outcome is nominated. **Editor's note**—Applicants should refer to the Development manual planning scheme policy no.SC6.4 for assistance in complying with this outcome.

As no criteria is provided for development acceptable outcomes, it is deemed suitable to apply State policies (EPA 1994 and EPP 2019).

4.1.2 Queensland Environmental Protection Act 1994

The objective of the Queensland Environmental Protection Act 1994 (EPA 1994) is *"to protect Queensland's environment while allowing for development that improves the total quality of life, both now and in the future, in a way that maintains the ecological processes on which life depends."*

To uphold this intent, and of relevance to acoustic assessment for the project, the EPA 1994 defines a series of noise-related standards in Chapter 8, Part 3B Offences relating to noise standards. The following sections are considered applicable:

Section 440R Building work

(1) A person must not carry out building work in a way that makes an audible noise—
- *(a) on a business day or Saturday, before 6.30a.m. or after 6.30p.m; or*
- *(b) on any other day, at any time.*

(2) The reference in subsection (1) to a person carrying out building work—
- *(a) includes a person carrying out building work under an owner-builder permit; and*
- *(b) otherwise does not include a person carrying out building work at premises used by the person only for residential purposes.*

Section 440U Air-conditioning equipment

(1) This section applies to premises at or for which there is air-conditioning equipment.

(2) An occupier of the premises must not use, or permit the use of, the equipment on any day:
- *(a) before 7am, if it makes a noise of more than 3dB(A) above the background level [1]; or*
- *(b) from 7am to 10pm, if it makes a noise of more than 5dB(A) above the background level; or*
- *(c) after 10pm, if it makes a noise of more than 3dB(A) above the background level.*

4.1.3 Environmental Protection (Noise) Policy 2019

The Queensland Environmental Protection (Noise) Policy 2019 (EPP 2019) identifies environmental values to be enhanced or protected, states acoustic quality objectives, and provides a framework for making decisions about the acoustic environment.

Schedule 1 Acoustic Quality Objectives

The acoustic quality objectives are stated in Section 7 of Schedule 1 of the EPP 2019. In accordance with EPP 2019, the acoustic quality objectives are stated for a defined type of noise sensitive use and specified period of the day (reproduced in **Table 6**). The environmental values which EPP 2019 aims to enhance or protect are also stated. It is intended that the acoustic quality objectives be progressively achieved as part of achieving the purpose of EPP 2019 over the long term.

Table 6: Acoustic quality objectives as defined in Schedule 1 of the EPP 2019

Sensitive Receptor	Time of Day	Acoustic Quality Objectives [1)] (measured at the receptor) dB(A)			Environmental Value
		$L_{Aeq,adj,1hr}$	$L_{A10,adj,1hr}$	$L_{A1,adj,1hr}$	
residence (for outdoors)	daytime and evening	50	55	65	health and wellbeing
residence (for indoors)	daytime and evening	35	40	45	health and wellbeing
	night-time	30	35	40	health and wellbeing, in relation to the ability to sleep

NOTES:

1) The $L_{Aeq,Adj,T}$ noise limits apply to all noise sources, whilst the $L_{A10,Adj,1hr}$ and $L_{A1,Adj,1hr}$ only apply to intermittent noise sources (i.e. excludes air conditioning).

[1] *NOTE: According to the EPA 1994:*
- *Background level means the background A-weighted sound pressure level under the prescribed standard measured as $L_{A90,T}$.*
- *$L_{A90,T}$ means the A-weighted sound pressure level obtained using time weighting 'F' that is exceeded for 90% of the measuring period (T).*

Controlling Background Creep

The Acoustic Quality Objectives provided in EPP 2019 do not consider the existing background noise levels when prescribing the criteria. Since the measured background noise levels are considered high enough to exceed the indoor Acoustic Quality Objectives criteria (i.e., 35 dB(A) day/evening, 30 dB(A) night) after applying a 5 dB(A) façade reduction), Stantec refer to the background creep criteria specified in Schedule 10 of EPP 2008. The Environmental Protection (Noise) Policy 2008 states the following;

(1) To the extent that it is reasonable to do so, noise from an activity must not be—

(a) for noise that is continuous noise measured by $L_{A90,T}$— more than nil dB(A) greater than the existing acoustic environment measured by $L_{A90,T}$; or

(b) for noise that varies over time measured by $L_{Aeq,adj,T}$— more than 5dB(A) greater than the existing acoustic environment measured by $L_{A90,T}$.

Table 7: Intrusive noise limits (for controlling background creep)

Receptor	Background Descriptor (time period)	Intrusive Descriptor	Measured L_{90} dB(A)			$L_{Aeq,adj\ 1hr}$ dB(A)		
			Daytime	Evening	Night	Daytime	Evening	Night
Sensitive Receiver Facade	L_{A90}	$L_{Aeq,adj\ 1hr}$	53	50	47	58	55	52

4.2 External Noise Intrusion

4.2.1 QLD State Development Assessment Provisions – State Code 1

As indicated in **Figure 3**, the proposed development site is within 25 m of a state-controlled road; therefore, the provisions of the QLD SDAP State Code 1: *Development in a state-controlled road environment* (SDAP SC1) apply. SDAP SC1 also references the following documents which are of relevance to this acoustic assessment:

- Queensland Development Code Mandatory Part 4.4 – *Buildings in a transport noise corridor* (QDC MP4.4); and
- Department of Transport and Main Roads (TMR) – Transport Noise Management Code of Practice 2013 Volume 1 – Road Traffic Noise (TMR CoP);

The applicable performance outcomes and acceptable outcomes are defined in Table 1.5 of SDAP SC1 and are reproduced in **Table 8** below. Noise barriers are suitable to attenuate noise at ground floor communal areas, but given the project consists of a multistorey accommodation building, they are considered impractical for the reduction of façade noise levels. Therefore, acoustic treatment of the building will be based on the requirements of QDC MP4.4.

Table 8: SDAP SC1 applicable Performance and Acceptable Outcomes

Performance Outcomes	Acceptable Outcomes
Material change of use (accommodation activity)	
Above ground floor level requirements (accommodation activity) adjacent to a state-controlled road or type 1 multi-modal corridor	
PO42 Balconies, podiums, and roof decks include: 1. a continuous solid gap-free structure or balustrade (excluding gaps required for drainage purposes to comply with the Building Code of Australia); 2. highly acoustically absorbent material treatment for the total area of the soffit above balconies, podiums, and roof decks.	No acceptable outcome is provided.
PO43 Habitable rooms (excluding a relevant residential building or relocated building) are designed and constructed using materials to achieve the maximum internal acoustic level in reference table 3 (item 3.1 (see **Table 11** below)).	No acceptable outcome is provided.

Table 9: Maximum building facade acoustic levels (Table 1 – SDAP SC1)

Applicable use	Acoustic levels
1.1: Accommodation activity	a. ≤ 60 dB(A) L_{10} (18 hour) façade corrected (measured L_{90} (8 hour) free field between 10pm and 6am ≤40 dB(A)) OR b. **≤ 63 dB(A) L_{10} (18 hour) façade corrected (measured L_{90} (8 hour) free field between 10pm and 6am > 40 dB(A))**

Table 10: Maximum free field acoustic levels (Table 2 – SDAP SC1)

Applicable use	Acoustic levels
2.2: Private open space for an accommodation activity (including lots created for a future accommodation activity)	a. ≤ 57 dB(A) L_{10} (18 hour) free field (measured L_{90} (18 hour) free field between 6am and 12 midnight ≤45 dB(A)) OR b. **≤ 60 dB(A) L_{10} (18 hour) free field (measured L_{90} (18 hour) free field between 6am and 12 midnight >45 dB(A))**

Table 11: Maximum internal acoustic levels (Table 3 – SDAP SC1)

Applicable use	Acoustic levels
3.1: Habitable rooms in an accommodation activity (excluding uses addressed in QDC MP4.4)	a. ≤ 35 dB(A) L_{eq} (1 hour) (maximum hour over 24 hours)

4.2.2 Queensland Development Code Mandatory Part 4.4

Queensland Development Code Mandatory Part 4.4 (QDC MP4.4) was introduced 31st August 2010 and updated 17th August 2015 in conjunction with planning policy requirements which define planning overlay areas affected by transportation noise as "Transport Noise Corridors".

The purpose of the Code is to ensure habitable rooms of particular residential buildings located in transport noise corridors are designed and constructed to reduce the extent to which transport noise intrudes into those rooms. The Code applies to any building work on certain residential buildings which are subject to a building development application.

The Code applies to residential buildings if it:

i. is class 1, 2, 3 or 4 building; and

ii. is located in a transport noise corridor; and

iii. is not a relocated building; and

iv. building application is made after release of the Code

The Code requires that each external facade of a habitable room be assigned a noise category:

i. which is dependent upon the future noise exposure at the façade presented in mapping of Transport Noise Corridor; or

ii. as defined by a detailed transportation noise assessment (undertaken in accordance with the requirements of Schedule 3 of the Code). The objective of the noise assessment is to clearly demonstrate the noise category that is applicable to a particular part of a building, or site.

The applicable criteria for determining the relevant noise category are reproduced from the Code and provided in **Table 12**.

Table 12: MP 4.4 Noise Category levels

Noise Category	Level of transport noise ($L_{10,18hr}$) for State-controlled roads and designated local government roads[1)]
Category 4	≥ 73 dB(A)
Category 3	68 - 72 dB(A)
Category 2	63 - 67 dB(A)
Category 1	58 - 62 dB(A)
Category 0	≤ 57 dB(A)

NOTES:

1) Measured at 1 m from the façade of the proposed building.

5. Noise Impact Assessment

5.1 Road Traffic Noise Intrusion

5.1.1 Overview

As the project site is located within 25 m of a State controlled road (see **Figure 3**), a road traffic noise impact assessment is required in order to address the acoustic requirements applicable under SDAP SC1 (see **Section 4.2.1**). The following sections describe the assessment methodology adopted to project future noise impacts across the project area.

5.1.2 Road Traffic Noise Modelling and Calculation Methodology

To predict noise impacts, calculations were made using a three-dimensional computer model of the site created within SoundPLAN 9.0. The computer model included a representation of the existing and future site and incorporated the following inputs:

- Calculation algorithms – SoundPLAN implementation of accepted noise prediction standards;
- Terrain elevation – A 3D representation of the existing terrain and at completion of construction;
- Ground surface corrections – Areas of soft (absorptive) and hard (reflective) ground;
- Roads sources – The placement of each road source as a source line and the input of traffic flow parameter;
- Buildings – Detailed implementation of the proposed building from drawings (i.e., layout, height, floors), and
- Sensitive receptors – Locations where the noise limits are to be assessed.

Noise calculations used the CoRTN algorithm, widely accepted in Australia, and recommended by the TMR CoP. For more details, refer to **Appendix C.1**.

5.1.3 Verification of Road Traffic Noise Model

According to TMR CoP, a road traffic noise model is deemed to be verified if the average difference between the measured and calculated values of the relevant noise descriptors is no more than ± 2 dB. Further, this document states that:

> *"If the average difference between existing measured and calculated noise descriptors values is positive (i.e. average measured values exceed the calculated values), then the calculated values shall be adjusted upwards by this average difference before determining the predicted values."*

> *"If the average difference between existing measured and calculated noise descriptors values is negative (i.e. average calculated values exceed the measured values), then no adjustment shall be made to the calculated values before determining the predicted values."*

Results of the road traffic model verification at unattended monitor, in accordance with TMR CoP, are presented in **Table 13**. The predicted $L_{A10,18hr}$ was 0.3 dB greater than the measured value; therefore, within the acceptable TMR CoP 2013 tolerance. Thus, the road traffic noise model is considered validated and was used to predict noise levels using 2038 (estimated 10-year planning horizon after development is completed – assumed 2028) traffic volumes.

Table 13: Road traffic noise model verification

Measured $L_{10,18hr}$ dB(A)	Predicted $L_{10,18hr}$ dB(A)	Difference
62.3	62.6	+0.3 dB(A)

5.1.4 Façade Noise Level Predictions and QDC MP4.4 Category (Residential)

Noise predictions were conducted to estimate road traffic noise impacts onto the proposed development. Details regarding road traffic volume predictions and inputs, as well as other noise modelling parameters, have been provided in **Appendix C**.

A markup of associated QDC noise categories for the proposed development and unit numbers applied are presented in **Appendix D** with a results summary provided in **Appendix E**.

5.1.5 Building Envelope Performance Requirements

Based on the assessment conducted, noise predictions showed that road transportation noise levels will be between QDC MP4.4 Noise Categories 0 – 3. With reference to the applicable categories QDC noise categories determined in **Appendix D**, the minimum laboratory tested airborne sound isolation performance (R_w) of building components presented in **Table 14** are required in accordance with Schedule 1 of QDC MP4.4. Recommendations for the performance and construction of façade elements have been provided in **Table 15**.

NOTES:

- Other forms of construction may be applied, provided these meet the R_w values required.
- Where a R_w rating applies to a window, this applies to the glass, frame and window seal system. An acoustic test certificate will be required from the window supplier for Category 2 glazing and higher. It is noted that in order to achieve the internal design sound levels, windows must remain closed.

Table 14: Minimum R_w required for the building component (reproduced from QDC MP4.4)

Noise Category	Minimum transport noise reduction required for habitable rooms, dB(A)	Component of building's external envelope	Minimum R_w required for each component
3	35	Glazing	38 (total area of glazing for a *habitable* room is greater than 1.8m^2)
			35 (total area of glazing for a *habitable* room is less than or equal to 1.8 m^2)
		External walls	47
		Roof	41
		Floors	45
		Entry doors	33
2	30	Glazing	35 (total area of glazing for a *habitable* room is greater than 1.8m2)
			32 (total area of glazing for a *habitable* room is less than or equal to 1.8 m^2)
		External walls	41
		Roof	38
		Floors	45
		Entry doors	33
1	25	Glazing	27 (total area of glazing for a *habitable* room is greater than 1.8 m^2)
			24 (total area of glazing for a *habitable* room is less than or equal to 1.8 m^2)
		External walls	35
		Roof	35
		Entry doors	28
0	No additional acoustic treatment required – standard building assessment provisions apply.		

Table 15: Construction recommendations (reproduced from QDC MP4.4)

Component of building's external envelope	Minimum R_w	Component of building's external envelope
Glazing	38	Minimum 14.38 mm thick laminated glass, with full perimeter *acoustically rated seals*; OR Double glazing consisting of one pane of minimum 5 mm thick glass and one pane of minimum 6 mm thick glass with at least 44 mm air gap, and full perimeter *acoustically rated seals*
	35	Minimum 10.38 mm thick laminated glass, with full perimeter *acoustically rated seals*.
	32	Minimum 6.38 mm thick laminated glass with full perimeter *acoustically rated seals*.
	27	Minimum 4 mm thick glass with full perimeter *acoustically rated seals*
	24	Minimum 4 mm thick glass with standard weather seals
External Walls	47	Two leaves of clay brick masonry at least 110 mm thick with: (i) cavity not less than 50 mm between leaves; and (ii) 50 mm thick mineral insulation or 50 mm thick glass wool insulation with a density of 11kg/m^3 or 50 mm thick polyester insulation with a density of 20kg/m^3 in the cavity. OR Two leaves of clay brick masonry at last 110 mm thick with: (i) cavity not less than 50 mm between leaves; and (ii) at least 13 mm thick cement render on each face OR Single leaf of clay brick masonry at least 110 mm thick with: (i) a row of at least 70 mm x 35 mm timber studs or 64 mm steel studs at 600 mm centres, spaced at least 20 mm from the masonry wall; and (ii) Mineral insulation or glass wool insulation at least 50 mm thick with a density of at least 11 kg/m^3 positioned between studs; and (iii) One layer of plasterboard at least 13 mm thick fixed to outside face of studs. OR Single leaf of minimum 150 mm thick masonry of hollow, dense concrete blocks, with mortar joints laid to prevent moisture bridging.
External Walls (cont.)	41	Two leaves of clay brick masonry at least 110 mm thick with cavity not less than 50 mm between leaves OR Single leaf of clay brick masonry at last 110 mm thick with: (i) a row of at least 70 mm x 35 mm timber studs or 64 mm steel studs at 600 mm centres, spaced at least 20 mm from the masonry wall; and (ii) mineral insulation or glass wool insulation at least 50 mm thick with a density of at least 11 kg/m^3 positioned between studs; and (iii) One layer of plasterboard at least 10 mm thick fixed to outside face of studs OR Single leaf of brick masonry at least 110 mm thick with at least 13 mm thick render on each face OR Concrete brickwork at least 110 mm thick OR In-situ concrete at least 100 mm thick OR

Component of building's external envelope	Minimum R_w	Component of building's external envelope
		Precast concrete at least 100 mm thick and without joints.
	35	Single leaf of clay brick masonry at least 110 mm thick with: (i) a row of at least 70 mm x 35 mm timber studs or 64 mm steel studs at 600 mm centres, spaced at least 20 mm from the masonry wall; and (ii) One layer of plasterboard at least 10 mm thick fixed to outside face of studs OR Minimum 6 mm thick fibre cement sheeting or weatherboards or plank cladding externally, minimum 90 mm deep timber stud or 92 mm metal stud, standard plasterboard at least 13 mm thick internally.
Roof	41	Concrete or terracotta tile or metal sheet roof with sarking, plasterboard ceiling at least 10 mm thick fixed to ceiling joists, glass wool insulation at least 50 mm thick with a density of at least 11 kg/m^3 or polyester insulation at least 50 mm thick with a density of at least 20 kg/m^3 in the cavity. OR Concrete suspended slab at least 100 mm thick.
	38	Concrete or terracotta tile or metal sheet roof with sarking, plasterboard ceiling at least 10 mm thick fixed to ceiling cavity, mineral insulation or glass wool insulation at least 50 mm thick with a density of at least 11 kg/m^3.
	35	Concrete or terracotta tile or metal sheet roof with sarking, plasterboard ceiling at least 10 mm thick fixed to ceiling cavity.
Floors	45	Concrete slab at least 100 mm thick OR Tongued and grooved boards at least 19 mm thick with: (i) timber joists not less than 175 mm x 50 mm; and (ii) mineral insulation or glass wool insulation at least 75 mm thick with a density of at least 11 kg/m^3 positioned between joists and laid on plasterboard at least 10 mm thick fixed to underside of joists; and (iii) mineral insulation or glass wool insulation at least 25 mm thick with a density of at least 11 kg/m^3 laid over entire floor, including tops of joists before flooring is laid; and (iv) secured to battens at least 75 mm x 50 mm; and (v) the assembled flooring laid over the joists, but not fixed to them, with battens lying between the joists.
Entry Doors	33	Fixed so as to overlap the frame or rebate of the frame by not less than 10 mm, fitted with full perimeter acoustically rated seals and constructed of - (i) solid core, wood, particleboard or blockboard not less than 45 mm thick; and/or (ii) acoustically laminated glass not less than 10.38 mm thick.
	28	Fixed so as to overlap the frame or rebate of the frame, constructed of - (i) Wood, particleboard or blockboard not less than 33 mm thick; or (ii) Compressed fibre reinforced sheeting not less than 9 mm thick; or (iii) Other suitable material with a mass per unit area not less than 24.4 kg/m^2; or (iv) Solid core timber door not less than 35 mm thick fitted with full perimeter *acoustically rated seals*.

5.1.6 Outdoor Spaces for Passive Recreation – Private Balconies

Balconies of units that exceed the free field acoustic levels (60 dB(A)) can demonstrate compliance with the code by providing continuous solid gap-free balustrades and absorbent soffit linings as per PO42 (see **Table 8**).

Table 16 provides locations where solid gap-free balustrades and absorbent soffit lining are required to comply with SDAP SC1 PO42. Refer to **Appendix D** for unit numbering applied for the assessment.

Table 16: Unit balconies requiring a continuous solid gap-free balustrades

Level	Building	Units	Orientation	Continuous solid gap-free balustrades required?
Level 1 - 2	1	1 – 6	N, W	Yes
	1	7 – 11	S	No
	2	1 -7	NE, NW	Yes
	2	8 – 11	SE, SW	No
Level 3	1	1 – 6	N	Yes
	1	7 – 11	S	No
	2	1 -7 and 11	NE, NW, SW	Yes
	2	8 – 10	SE	No
Level 4	1	1 – 4	N	Yes
	1	5 – 7	S	No
	2	1 – 5 and 8	NE, NW, SW	Yes
	2	6 and 7	SE	No

To comply with SDAP SC1 PO42; noise affected balconies shall include:

1. a continuous solid gap-free structure or balustrade (excluding gaps required for drainage purposes to comply with the Building Code of Australia); and

2. highly acoustically absorbent material treatment for the total area of the soffit above balconies, podiums, and roof decks.

To address Item 2 above, soffits / ceilings to all balconies may install:

- perforated fibre cement (≥ 16% open area with 50 mm 14 kg/m^3 insulation over recommended); or
- Stramit Corrugated or Stramit Longspan perforated sheet with 50 mm Insulation Solutions Sonobatt type 1 glass wool insulation (min. density 32 kg/m^3) encapsulated in 25 micron Mylar; or
- Any other preferred highly sound absorptive finish.

5.2 Environmental Noise Emissions

5.2.1 Assessment Methodology

5.2.1.1 Carparking Areas

Noise emissions from carparking vehicle movements have the potential to influence the general acoustic amenity of surrounding noise sensitive uses. Noise emissions from such sources are required to comply with all relevant environmental noise limits at the nearest noise sensitive receivers outlined in **Section 4.1** of this report.

The complexity of associated noise events can be difficult to accurately simulate as individual noise sources (i.e., vehicle parking bay turnover rates, location of noise event such as motion (acceleration, deceleration), idling, ignition, door slams etc.). Therefore, acoustic assessment has been based on the technical research paper *"Prediction of parking area noise in Australian conditions"* from the Australian Acoustical Society Conference (Nicol and Johnson, 2011) and parking lot study *"Recommendations for the Calculation of Sound Emissions of Parking Areas, Motorcar Centers and Bus Stations as well as of Multi-Storey Car Parks and Underground Car Parks"* (Bavarian Landesamt für Umwelt, 2007, 6th edn, BayLfU).

Correction factors described by Nicol and Johnson (in section *"Application of BAYLFU to Australian Conditions"*) were applied carpark noise emissions in the acoustic simulation model.

Refer to **Appendix C.2.3** for additional assessment input parameters.

5.2.1.2 Road Corridor Laneway (Albert Street Exit)

Noise from vehicles along the road corridor laneway were input as line sources. The model includes car and waste truck movements exiting via the laneway.

Calculations were conducted using the SoundPLAN implementation of ISO 9613. Refer to **Appendix C.2.4** for car movement input parameters and **Appendix C.2.5** for waste collection vehicles.

5.2.1.3 Waste Collection Vehicles

Noise emissions from waste collection vehicles can contribute to the general acoustic environment at surrounding noise sensitive receptors and is required to be assessed against environmental noise limits established in this report.

Noise emissions from heavy vehicle types are typically formed by a combination of successive, often transient, noise events. Events include engine noise (ignition, idle, acceleration, deceleration), reversing alarms (beepers), brake squeals, compression / venting brake release.

Calculations were conducted using the SoundPLAN implementation of ISO 9613. Refer to **Appendix C.2.5** for additional assessment input parameters.

5.2.2 Assessment Inputs and Assumptions

5.2.2.1 Carparking

The proposed development was generated in the acoustic model based on the architectural drawings (refer **Table 2**). The drawings show 111 parking spaces on the ground level.

Site specific carparking movements included in acoustic modelling were determined based on the following assumptions:

- The worst case one-hour peak vehicle movements are expected to occur;
    - Day: Turnover of 50% (56 carparks).
    - Evening: Turnover of 50% (56 carparks).
    - Night: Turnover of 20% (23 carparks).

5.2.2.2 Road Corridor Laneway (Albert Street Exit)

Car volumes along the road corridor laneway were modelled based on 20 vehicles per hour for all time periods. These traffic volumes are conservatively based on the worst-case peak volumes (AM peak) provided by the traffic engineer.

5.2.2.3 Waste Collection Vehicles

The following assumptions have been made in relation waste collection operations:

- Waste collection will occur during day hours only (i.e., 7 AM – 6 PM).
- Medium rigid vehicles (MRV) ≤ 12.5 m will be used for waste collection.
- Waste collection vehicles will arrive to site and will idle for 10-minutes total whilst picking up waste.
- After waste collection the vehicles will exit via the road corridor laneway to Albert Street.

Typical noise levels associated with waste collection activities are provided in **Appendix C.2.5**.

5.2.3 Predicted Noise Levels

A noise emissions assessment was conducted based on the assessment parameters, inputs and assumptions detailed in the preceding sections of this report.

A summary of predicted noise levels at each receptor has been presented in **Table 17**. Detailed results, including contribution from source groups have been presented in **Appendix F**.

Table 17: Summary of highest predicted noise levels – no acoustic treatments

Noise Sensitive Receptor	Fl.	Outdoor Noise Limit, dB(A)			Predicted Outdoor Noise Level, dB(A)		
		L_{eq}			L_{eq}		
		D [1)]	E [1)]	N [1)]	D	E	N
7 Albert Street	GF	58	55	52	55	47	44
	L1				56	47	44
11 Albert Street	GF				54	43	41
	L1				55	43	42
13 Albert Street	GF				54	44	43
	L1				54	44	43
	L2				54	44	43
17 – 19 Albert Street	GF				56	49	49
352 Ross River Road	L1				57	47	46
357 Ross River Road	GF				40	37	33

NOTES:

1) Day (D) = 7 AM – 6 PM | Evening (E) = 6 PM – 10 PM | Night (N) = 6 AM – 7 AM

Based on the predicted noise levels, no additional acoustic treatment is necessary to comply with the noise limits on the basis that waste collection occurs during the day period only (7 AM – 6 PM).

5.3 Mechanical Plant Noise Emissions

Given the current stage of the project, location and type of building services plant have not been proposed; therefore, detailed calculations of proposed equipment selections could not be conducted. In general, the noise emission of mechanical plant associated with the development should be controlled so that the operation of such plant does not adversely impact nearby sensitive receivers. Compliance with the environmental noise limits stated in **Section 4.1** is mandatory.

It is envisaged that the building services plant noise sources will be controllable by common engineering methods that may consist of:

- Judicious location of plant
- Barriers
- Silencers

The selected mechanical equipment should be reviewed and assessed for conformance with the established criteria at the subsequent design stage of the project when specific plant selection is known and appropriate noise control measures can be determined, noting that the cumulative noise emissions from all site noise sources should be considered when determining appropriate mitigation options.

6. Summary of Recommendations

Road Noise Intrusion - Façade

- Units within the development require acoustic façade upgrades up to QDC MP4.4 noise category 3. A summary of these locations is provided in **Appendix E** with markups and unit numbering presented in **Appendix D**.

Road Noise Intrusion – Private Open Spaces

- To comply with SDAP SC1 PO42 it is recommended that units that exceed the free field acoustic limit are provided with solid gap-free balustrades and have soffits over treated with absorptive material. **Table 16** provides unit balconies that require treatment with markups and unit numbering presented in **Appendix D**.

Environmental Noise Emissions

- It is recommended that waste collection from the site is limited to the day period (7 AM – 6 PM).

Mechanical Services Emissions

- Emissions from mechanical plant services are required to be designed to comply with EPA 1994. When equipment selection noise levels are known, these shall be assessed against the relevant environmental noise limit.

7. Conclusion

Stantec have been engaged by Hurst Constructions QLD to undertake acoustic assessment and provide design advice for the proposed residential apartments at 344 - 350 Ross River Road, Cranbrook QLD 4814.

This acoustic services report has:

- outlined the acoustic services scope of works for the project;
- established relevant acoustic criteria in accordance with current Legislation, Regulations, Council Policies, Australian Standards and Design Guidelines;
- identified key acoustic issues that are to be addressed by the project; and
- provided design advice and construction recommendations pertinent to this project and conducive to the current design stage.

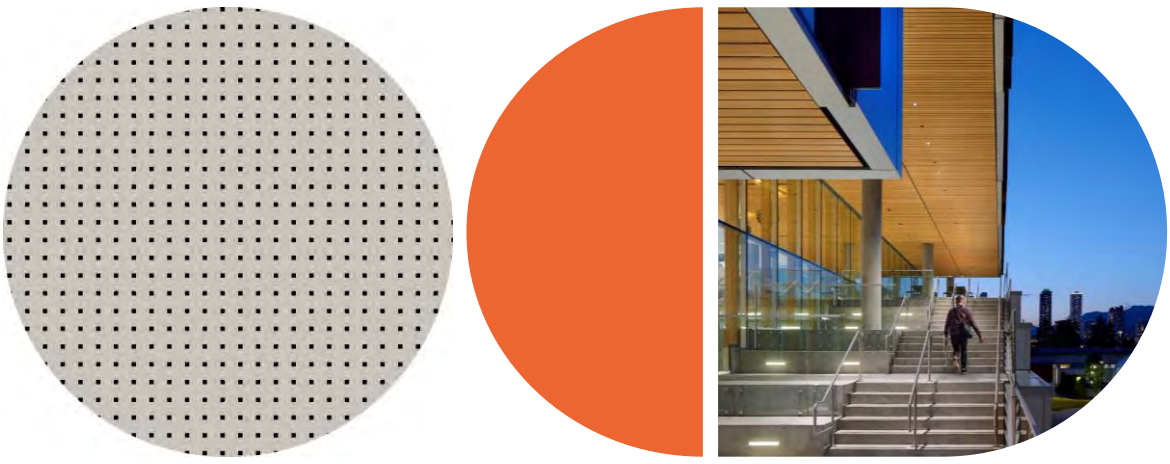
We trust that this report to be sufficient for your current requirements; however, should you have any queries, please do not hesitate to contact the undersigned on (07) 3811 4500.

Regards,

Marcus Kamppi (Author)
Senior Acoustic Engineer for **Stantec**

Carl Edser (Reviewer)
Acoustics Project Technical Lead (QLD) for **Stantec**

Appendices



Appendix A Glossary of Acoustic Terms

TERM	DEFINITION
Adverse Weather	Weather conditions that affect noise (wind and temperature inversions) that occur at a particular site for a significant period of time. The previous conditions are for wind occurring more than 30% of the time in any assessment period in any season and/or for temperature inversions occurring more than 30% of the nights in winter).
Assessment Location	The position at which noise measurements are undertaken or estimated.
Assessment Period	The period in a day over which assessments are made.
Attenuation	A reduction in the magnitude of sound.
A-weighting	A frequency dependent filter applied to an instrument-measured noise. In its simplest form, the filter is designed to replicate the relative sensitivity to loudness perceived by the human ear.
Background Noise	Background noise is the term used to describe the underlying level of noise present in the ambient noise, measured in the absence of the noise under investigation. It is described as the average of the minimum noise levels measured on a sound level meter and is measured statistically as the A-weighted noise level exceeded for ninety percent of a sample period. This is represented as the LA90 noise level.
Barrier	Solid walls or partitions, solid fences, earth mounds, earth berms, buildings, etc. used to reduce noise.
dB	The abbreviation for decibel.
dB(A)	A-weighted sound level in decibels.
Dw	A single number value that represents a field measurement of the weighted level difference between two adjacent spaces separated by a partition. Dw = L1 – L2 where, L1 is the average sound pressure level in the source room; and L2 is the average sound pressure level in the receiver room.
Free Field	An environment in which there are no acoustic reflective surfaces. Free field noise measurements are carried out outdoors at least 3.5 m from any acoustic reflecting structures other than the ground.
Frequency	Frequency is synonymous to pitch. Frequency or pitch can be measured on a scale in units of Hertz (Hz). Most noise sources typically comprise of a vast, and often complex, range of frequencies.
Frequency Response	This is a characteristic of a system which has a measured response resulting from a known applied input. In a mechanical structure, the frequency response function (FRF) is the spectrum of the vibration of a structure divided by the spectrum of the input force to the system. To measure the frequency response of a mechanical system, one must measure the spectra of both the input force to the system and the vibration response.
Intermittent Noise	Level that drops to the background noise level several times during the period of observation.
LA1	The A-weighted sound pressure level exceeded for 1 % of the measurement time period.
LA10	The A-weighted sound pressure level exceeded for 10 % of the measurement time period.
LA90	The A-weighted sound pressure level exceeded for 90 % of the measurement time period. Typically represents the background noise level of an environment.
LAeq	The equivalent continuous sound pressure level in dB(A). It is often accompanied by an additional suffix “T”, which is indicative of the measurement time period. (e.g. LAeq,15min, symbolising the measurement is evaluated over 15-minutes).
LAmax	The maximum A-weighted sound pressure level recorded over the measurement period.
Reflection	Sound wave changed in direction of propagation due to a solid object met on its path.
Reverberation	The persistence of a sound within a space, which will naturally decay over time. Most apparent once the source signal has ceased emitting. Reverberation may have effects on speech intelligibility if not adequately controlled. Reverberation time, represented in seconds, can vary depending on the volume and surface finishes of the space.
Rw	Weighted sound reduction index. A single number value which represents the airborne sound insulation performance of a partition or building element that has been determined under laboratory testing conditions.
Sound Level Meter	An instrument consisting of a microphone, amplifier and indicating device, having a declared performance and designed to measure sound pressure levels.
Sound Power Level	The total sound energy radiated by a source, expressed in Watts. The sound power level is ten times the logarithm to the base 10 of the ratio of the sound power of the source to the reference sound power.
Sound Pressure Level	The measured acoustic wave strength in a given environment and at a particular point of interest where the total sound level expressed is relative to a reference pressure, i.e. the threshold of human hearing. Sound pressure level is typically measured using a standard sound level meter with a microphone, expressed in decibels (dB).

Appendix B Noise Monitoring Details

Unattended noise logging was conducted from 25th August 2025 to 1st September 2025 (inclusive) at the location shown in **Figure 1** (coordinates in **Table 18**). This location was considered representative of the noise environment at and around the project site.

Table 18: Noise monitoring coordinates

Latitude	Longitude
-19° 17' 55"	146° 45' 37"

The following instrumentation was used:

- NTi XL2 Class 1 sound level meter (A2A-11555-E0), and Pulsar 105 Class 1 acoustic calibrator (S/N 72913). The instrument had a current calibration certificate by a certified National Association of Testing Authorities (NATA) acoustics laboratory at the time of measurements.

Noise measurements were conducted in accordance with Australian Standard AS 1055:2018 – *Acoustics – Description and measurement of environmental noise*, and the instruments were configured as follows:

- A-weighting frequency response;
- FAST time response;
- 15-minute intervals;

The sound level meter was calibrated before and checked at the end of the measurement period. The instrument showed a drift less than ±1 dB during the course of monitoring; therefore, measurements are considered valid according to AS1055:2018.

Noise Monitoring Results

The raw sound level meter files were post-processed to determine relevant long-term noise descriptors, some of which were used to determine the applicable noise limits.

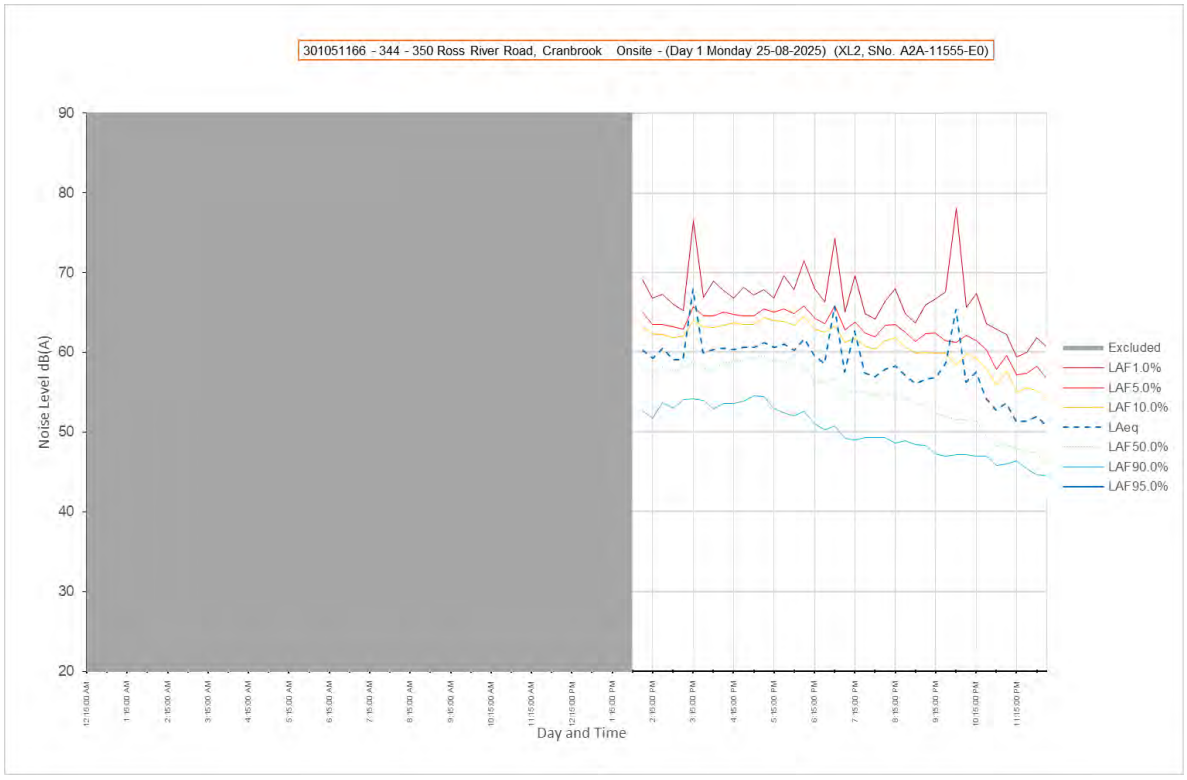
Results and time trace plots of relevant noise descriptors are provided below (see **Table 19** and **Figure 5**). Where data was not measured for a full period (i.e., at the start and end of measurement), the cells are shown dashed in the table. In addition, the noise descriptor averages are presented.

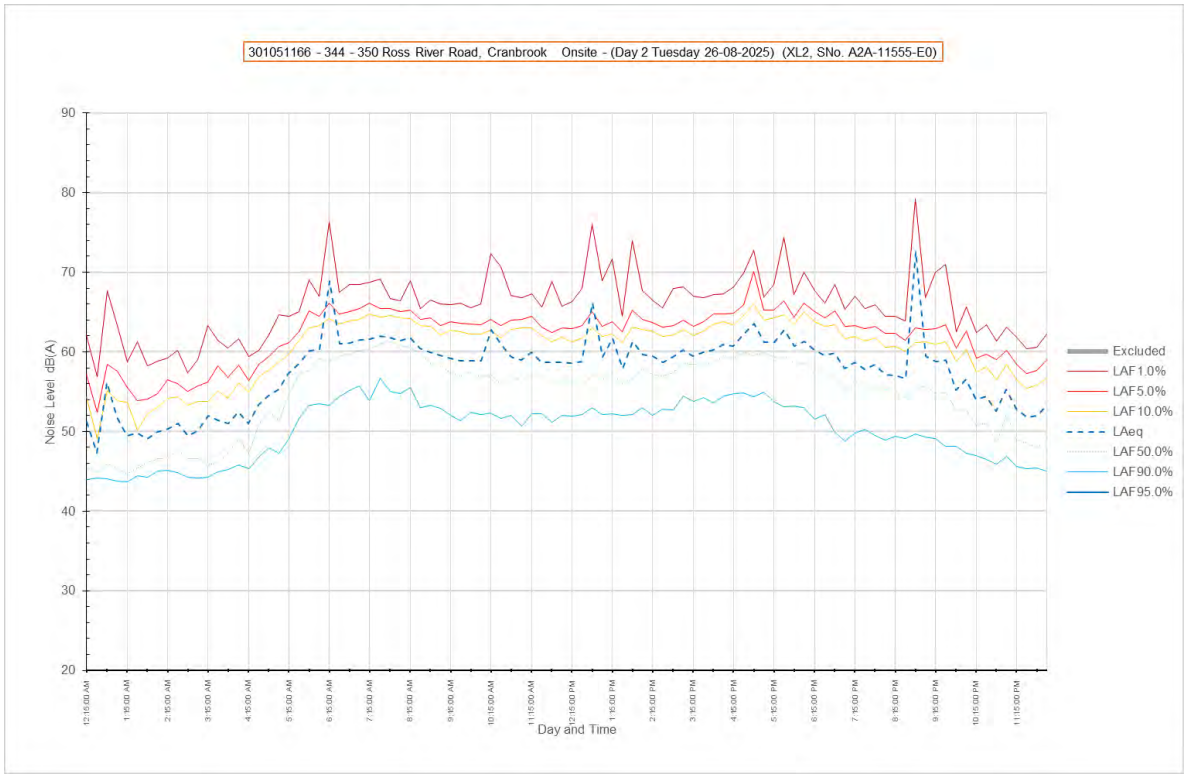
A summary of weather observations by the Bureau of Meteorology (BoM) during the monitoring period is presented in **Table 20** and **Table 21**.

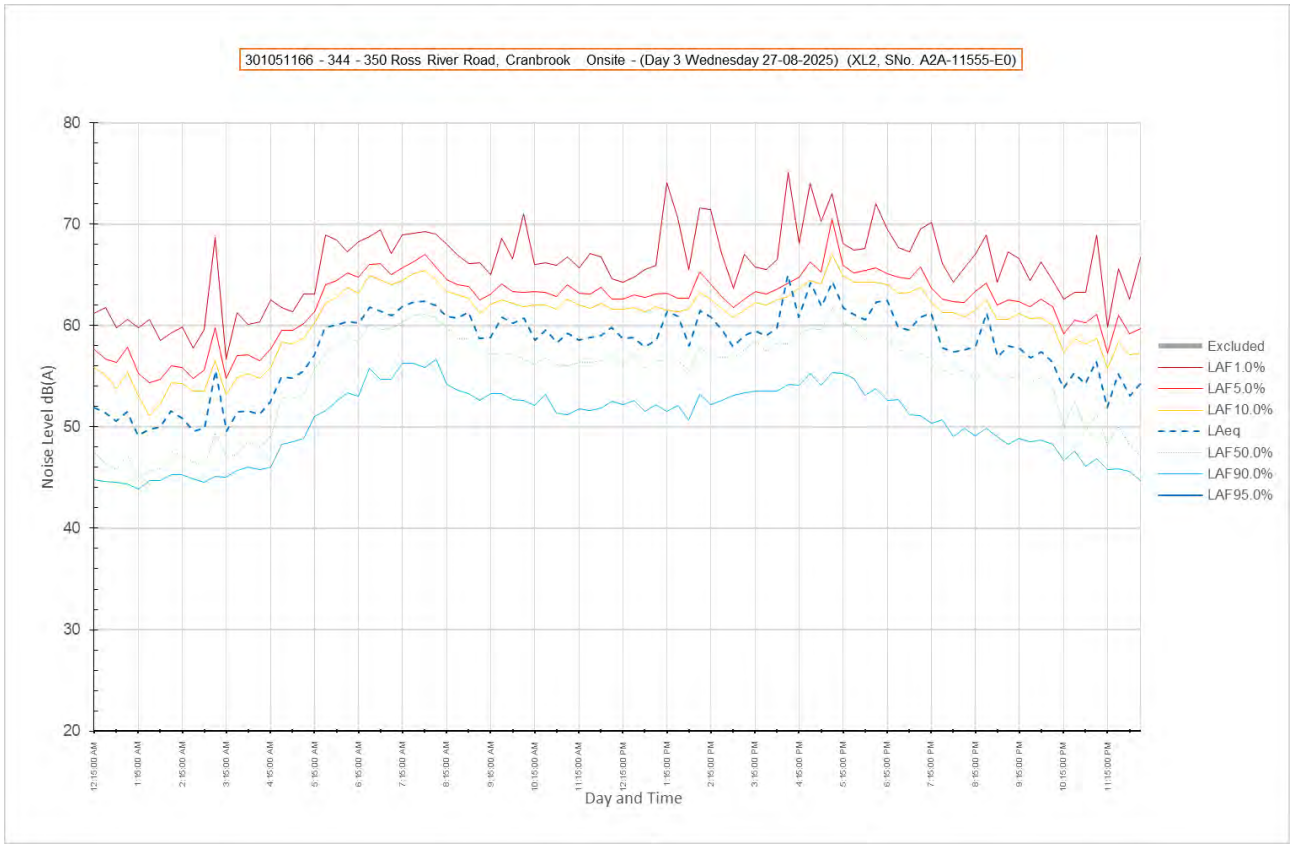
Table 19: Summary of measured noise levels (rounded) – Noise Monitor

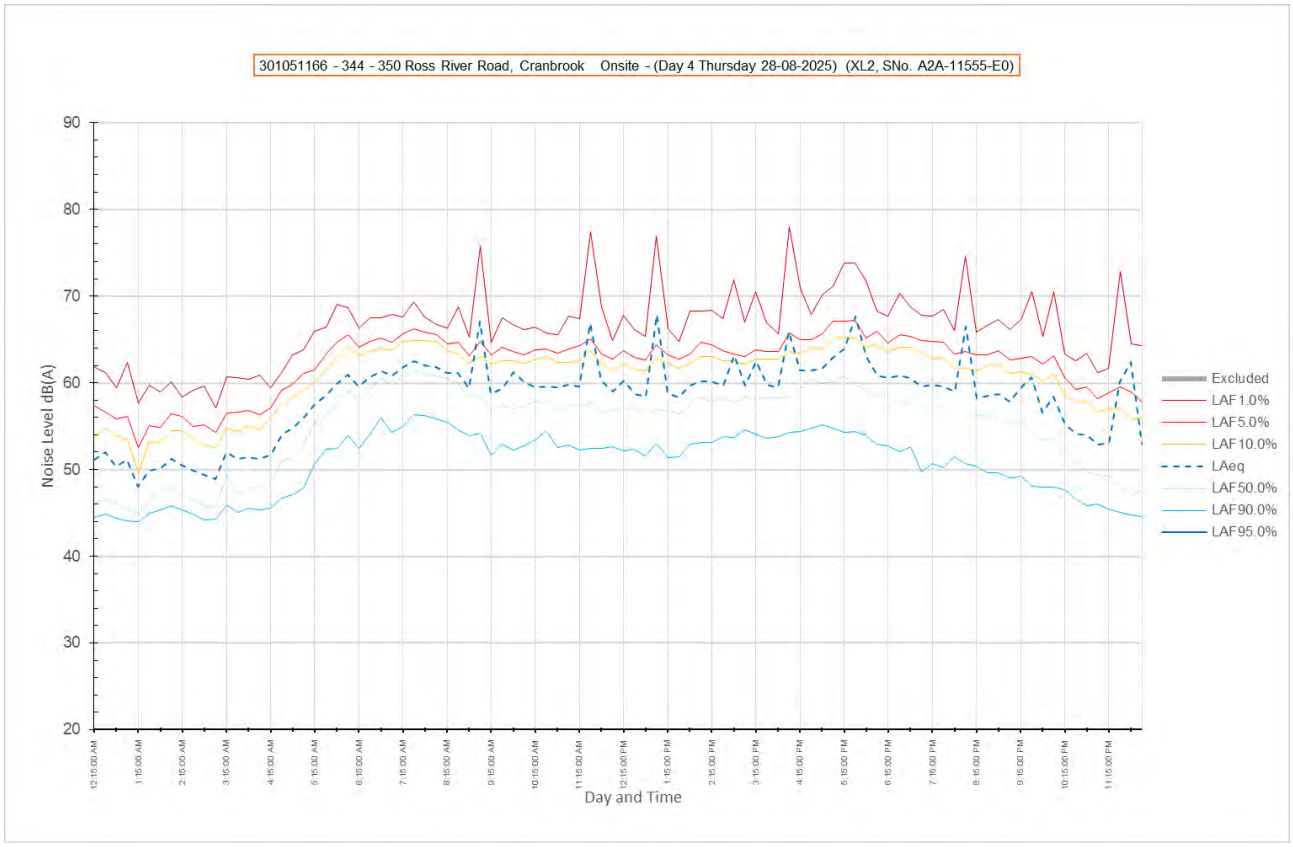
Noise descriptor	Average	25/08/25	26/08/25	27/08/25	28/08/25	29/08/25	30/08/25	31/08/25	1/09/25
$L_{A10,18h\ (6am-12am)}$	62	61	62	62	62	63	62	62	63
$L_{A90,18h\ (6am-12am)}$	52	50	52	52	52	52	51	50	53
$L_{A90,8h\ (10pm-6am)}$	46	46	46	46	46	47	46	46	46
$L_{Aeq,7am-6pm}$	61	61	61	61	62	61	62	61	60
$L_{Aeq,6pm-10pm}$	60	60	63	60	60	59	59	59	—
$L_{Aeq,10pm-7am}$	56	54	57	56	56	57	56	55	57
$L_{A90,7am-6pm}$	53	53	53	53	54	54	52	51	53
$L_{A90,6pm-10pm}$	50	49	50	50	50	51	50	49	—
$L_{A90,10pm-7am}$	47	46	47	47	47	47	47	46	47
$RBL_{,7am-6pm}$	51	53	52	52	52	52	51	49	52
$RBL_{,6pm-10pm}$	49	48	49	49	49	50	49	47	—
$RBL_{,10pm-7am}$	44	46	44	45	45	45	45	45	44

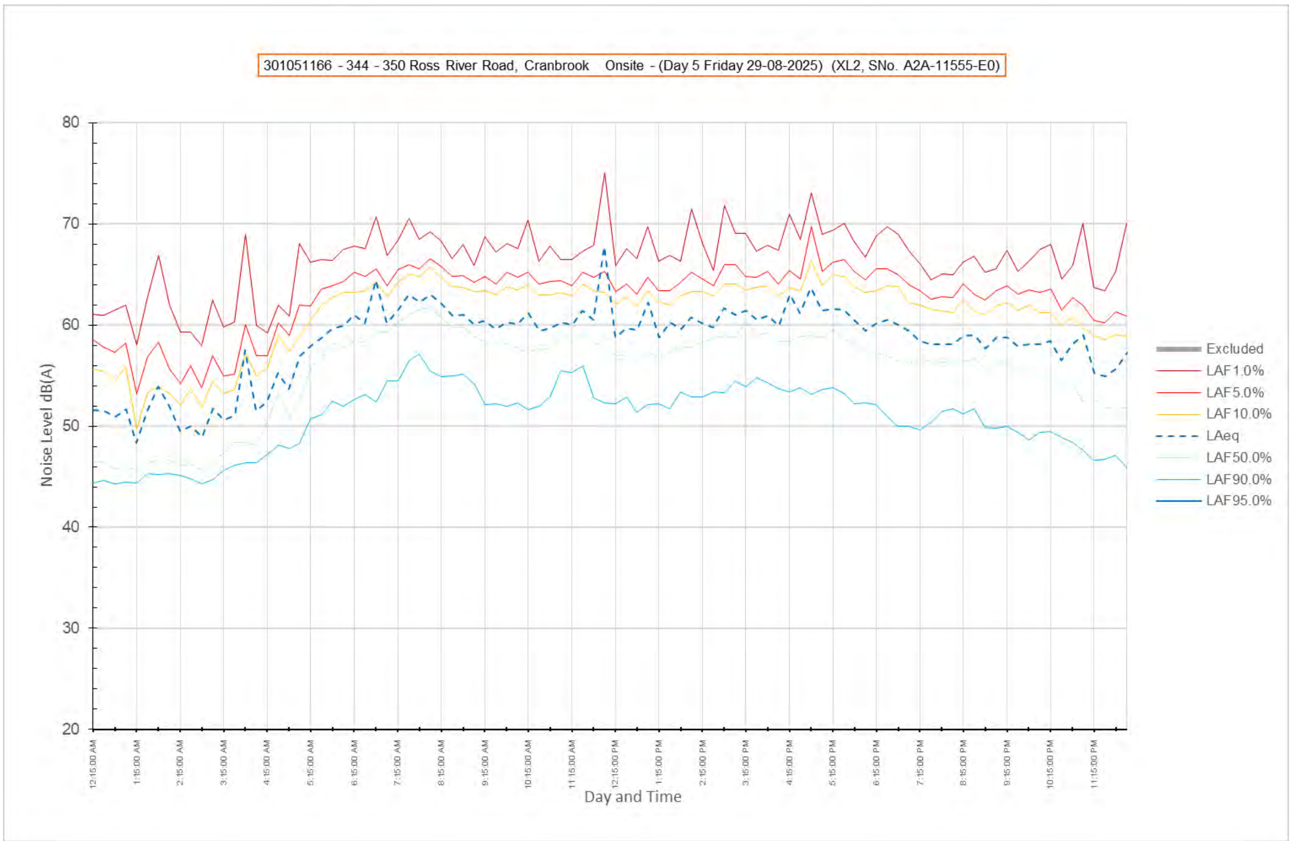
Figure 5: Time trace of relevant noise descriptors

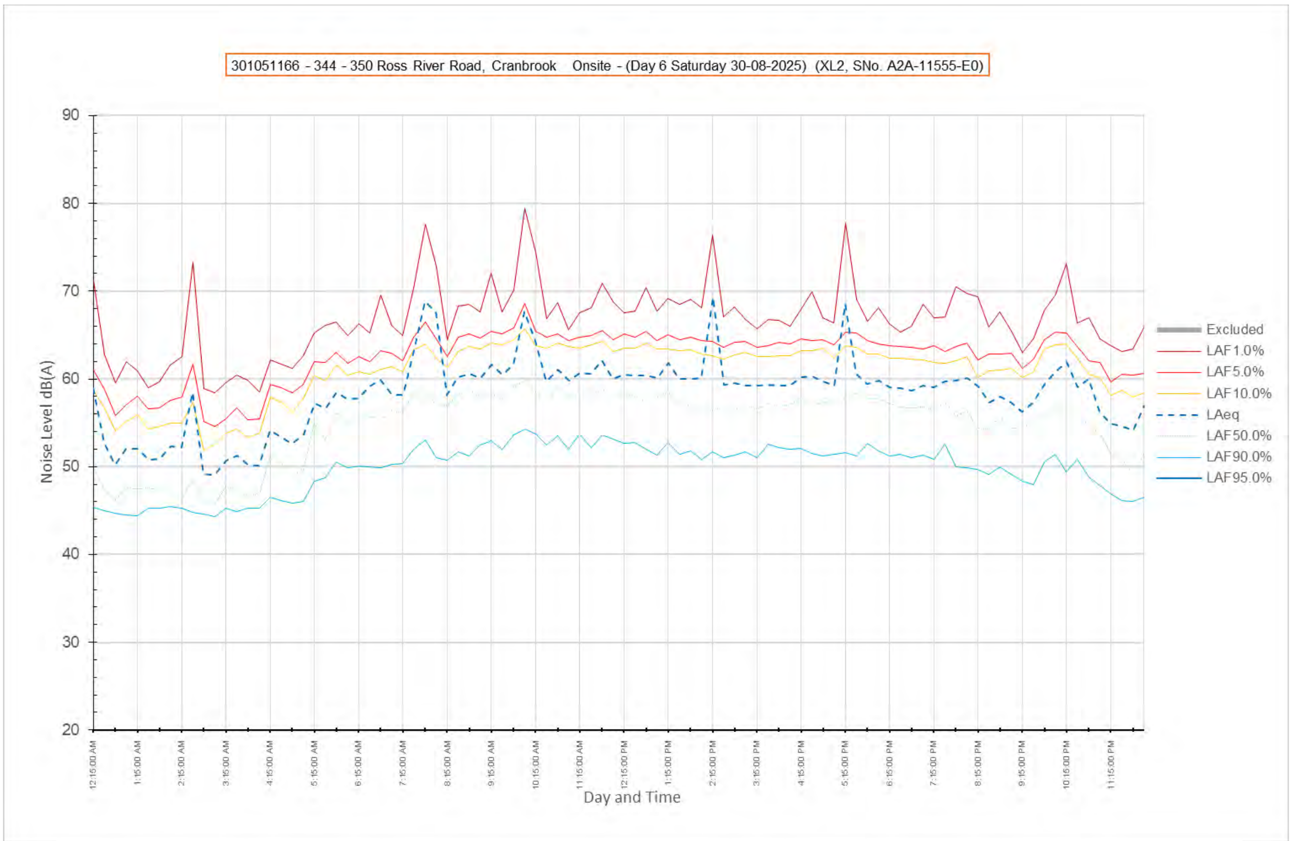












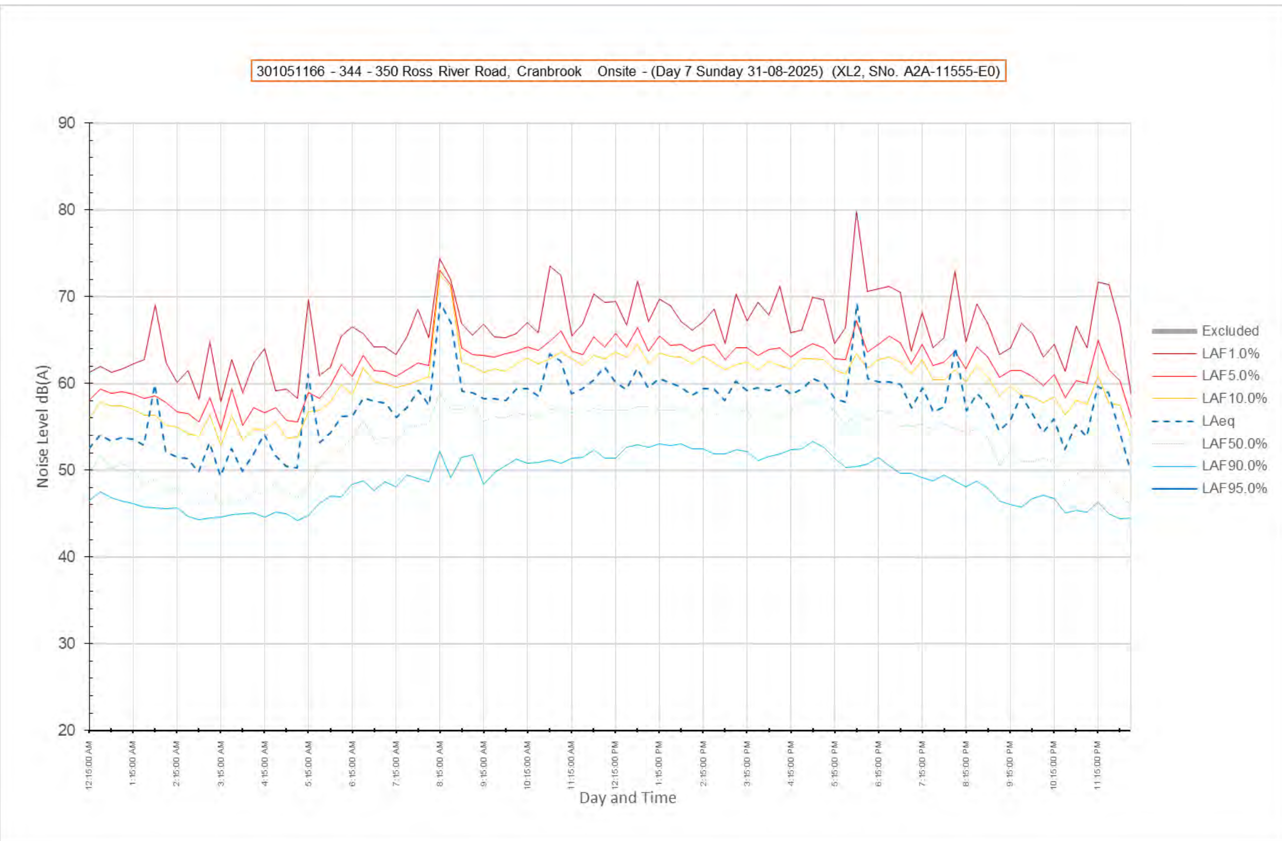


Table 20: Summary of BoM weather observations during unattended monitoring (August)

Townsville, Queensland
August 2025 Daily Weather Observations

Australian Government
Bureau of Meteorology

Date	Day	Temps		Rain	Evap	Sun	Max wind gust			9am						3pm					
		Min	Max				Dirn	Spd	Time	Temp	RH	Cld	Dirn	Spd	MSLP	Temp	RH	Cld	Dirn	Spd	MSLP
		°C	°C	mm	mm	hours		km/h	local	°C	%	eighths		km/h	hPa	°C	%	eighths		km/h	hPa
1	Fr	15.5	20.7	0			SSW	33	01:06	17.2	71	7	E	7	1019.3	19.9	66	8	NE	13	1015.8
2	Sa	15.4	24.6	0			SSW	52	08:38	17.7	37		SSW	31	1020.7	23.5	19		SW	22	1015.6
3	Su	12.8	24.9	0			SSW	52	10:02	17.3	42		SSW	30	1020.7	24.0	20		SW	19	1015.9
4	Mo	8.7	25.9	0			ENE	30	11:30	19.8	47		NNE	2	1018.3	23.9	45		NE	22	1015.3
5	Tu	11.5	26.3	0			ENE	28	10:10	20.1	74			Calm	1018.8	25.0	51		NE	19	1015.0
6	We	13.5	27.0	0			NE	35	14:29	21.3	76		S	7	1018.5	25.0	50		ENE	26	1015.1
7	Th	13.6	28.4	0			ENE	43	13:25	22.5	67	1	ESE	9	1018.6	25.2	51		ENE	31	1016.4
8	Fr	14.8	26.7	0			ESE	50	10:48	22.5	60		SSE	15	1020.0	25.1	57		ENE	30	1016.4
9	Sa	16.4	28.8	0			SSW	33	11:10	22.7	65	1	SSW	19	1018.4	26.0	52	4	ENE	15	1013.8
10	Su	17.9	26.2	0			NE	35	15:12	21.9	62	4	SSE	11	1018.2	24.2	61		ENE	30	1014.7
11	Mo	15.3	26.6	0			ENE	43	13:30	22.4	65		SE	17	1018.2	24.6	62		ENE	30	1015.4
12	Tu	18.9	25.9	0			ESE	43	15:28	22.8	62	8	SSE	20	1018.9	24.0	61	8	ESE	24	1016.6
13	We	19.2	27.0	0			ENE	39	11:26	22.6	59	8	SE	15	1021.2	24.7	60	8	ENE	26	1018.0
14	Th	13.9	26.7	0			ENE	43	15:20	21.7	57		SSE	9	1020.9	24.7	52		ENE	33	1016.0
15	Fr	11.0	25.7	0			ENE	33	14:07	20.5	69			Calm	1018.7	24.1	47		NE	28	1015.4
16	Sa	11.8	25.7	0			NE	33	13:38	21.1	61		SSE	9	1018.8	24.9	43		ENE	22	1015.2
17	Su	11.0	27.3	0			NNE	31	12:09	21.4	58		WSW	6	1019.0	26.1	42		NE	17	1015.9
18	Mo	12.3	28.4	0			ENE	33	15:32	21.5	33		SW	19	1020.4	25.7	37		NE	24	1016.8
19	Tu	12.9	27.2	0			ENE	35	13:38	21.2	70	8	SW	7	1020.8	25.5	49		ENE	28	1017.1
20	We	14.1	28.5	0			ESE	35	10:55	22.6	74	8	SSE	13	1019.9	26.0	58	8	ENE	22	1016.5
21	Th	16.3	27.7	0			ENE	35	15:50	23.7	72	3	ESE	11	1020.1	25.6	68		ENE	28	1016.5
22	Fr	16.6	28.2	0			ENE	39	10:40	24.4	68		SE	15	1019.4	25.3	68		NE	30	1015.3
23	Sa	15.7	28.7	0			NE	31	14:10	23.0	72		SE	7	1018.2	27.5	30		ENE	22	1013.7
24	Su	14.6	29.5	0			E	39	12:43	23.7	69		SE	11	1017.9	26.7	51		ENE	30	1013.6
25	Mo	15.4	27.7	0			ENE	28	12:06	24.7	69	2	SE	13	1017.5	26.2	47		ENE	20	1013.6
26	Tu	14.7	28.2	0			NE	31	14:25	23.7	69		SE	9	1016.1	27.1	28		NE	22	1012.8
27	We	13.9	27.6	0			NNE	31	13:14	24.3	65	1	SE	6	1015.4	26.2	51		NNE	15	1010.6
28	Th	17.6	29.2	0			NNW	28	09:47	25.0	67		NNW	13	1014.6	27.0	61		NNW	17	1010.1
29	Fr	16.2	32.0	0			ENE	33	15:02	26.5	30		SSW	9	1016.8	30.8	29		ENE	26	1012.2
30	Sa	14.5	30.7	0			SSW	41	10:55	25.8	22		SSW	15	1020.8	30.1	16		S	13	1016.7
31	Su	15.3	26.3	0			ESE	43	10:17	21.6	25		ESE	13	1021.9	24.4	50		ENE	31	1016.1

Table 21: Summary of BoM weather observations during unattended monitoring (September)

Townsville, Queensland
September 2025 Daily Weather Observations

Australian Government
Bureau of Meteorology

Date	Day	Temps		Rain	Evap	Sun	Max wind gust			9am						3pm					
		Min	Max				Dirn	Spd	Time	Temp	RH	Cld	Dirn	Spd	MSLP	Temp	RH	Cld	Dirn	Spd	MSLP
		°C	°C	mm	mm	hours		km/h	local	°C	%	eighths		km/h	hPa	°C	%	eighths		km/h	hPa
1	Mo	15.3	26.5	0			NE	35	14:05	22.1	60		SE	17	1019.3	24.7	50		ENE	28	1015.1
2	Tu	16.5	27.2	0			ENE	35	14:27	24.3	62		SE	19	1019.6	24.0	67	3	ENE	28	1016.5
3	We	16.3		0						23.6	68	1	SE	19	1020.3						

Appendix C Noise Modelling Details

C.1 Road Traffic Assessment Inputs

A three-dimensional computer model of the study area was created within SoundPLAN 9.0. The following inputs were utilised:

- **Building receptors** – These were digitised at the location of the most exposed facades to the relevant noise sources. Single point receptors were modelled at 1.5 m above each finished floor level of each building digitised in the model and 1 m from the façade.
- **Road traffic noise** - Calculated using the SoundPLAN implementation of the UK Department of Transport Welsh Office *Calculation of Road Traffic Noise* 1988 (CoRTN), which is accepted by TMR CoP.
- **Ground surface corrections** – 50% ground absorption in accordance with the TMR CoP
- **Sound reflections –** A reflection order of 3 was used.
- **Terrain:** A 1 metre Digital Elevation Model (DEM) derived from LiDAR obtained from an Australian Government website and was used to calculate 3D contours at 0.5 m elevation intervals. The data was used 'as is', and it is considered of sufficient resolution for assessment purposes.
- **Calibration factors:** CoRTN calibration factors of -0.7 dB(A) free field and -1.7 dB(A) façade corrected applied to all calculated noise levels in accordance with Table 4.3.2.1 of the TMR CoP.
- **Road alignments:** Roads were digitised following the alignment shown on georeferenced photography imported into SoundPLAN.
- **Road surface type:** road surface correction of:
    - o - 2.0 dB for Open Graded Asphalt (OGA) was applied to Ross River Road;
    - o - 0.0 dB for Dense Graded Asphalt (DGA) was applied to Nathan Street.
- **Road traffic parameters:** Road traffic volumes were obtained from the TMR 2014 - 2024 traffic survey data. Traffic growth rates were calculated based on increases in observed vehicle volumes over a 5 – 10 year period. A minimum annual increase of 1.5% was applied where a lower growth was determined. Projected traffic volumes for 2025 and 2038 were calculated based on these growth rates.

The road traffic volumes digitised in the model are presented in **Table 22.**

Table 22: Road traffic volumes for noise modelling

Road	Direction	Source: TMR				Traffic Estimates (2038)		
		2024 AADT	HV %	Growth %	Speed, km/h	94% AADT	HV % [1)]	Speed, km/h
Ross River Road Site ID: 90025	Both	22,467	6.3	1.5	60	26,013	6.3	60
	Against Gazettal (E)	11,534	7.7	1.5	60	13,355	7.7	60
	With Gazettal (W)	11,097	4.9	1.5	60	12,659	4.9	60
Ross River Road Site ID: 90083	Both	18,421	4.7	1.5	60	21,329	4.7	60
	Against Gazettal (E)	9,312	4.4	1.5	60	10,782	4.4	60
	With Gazettal (W)	9,109	4.9	1.5	60	10,547	4.9	60
	Both	26,793	11.9	1.7	70	31,889	11.9	70

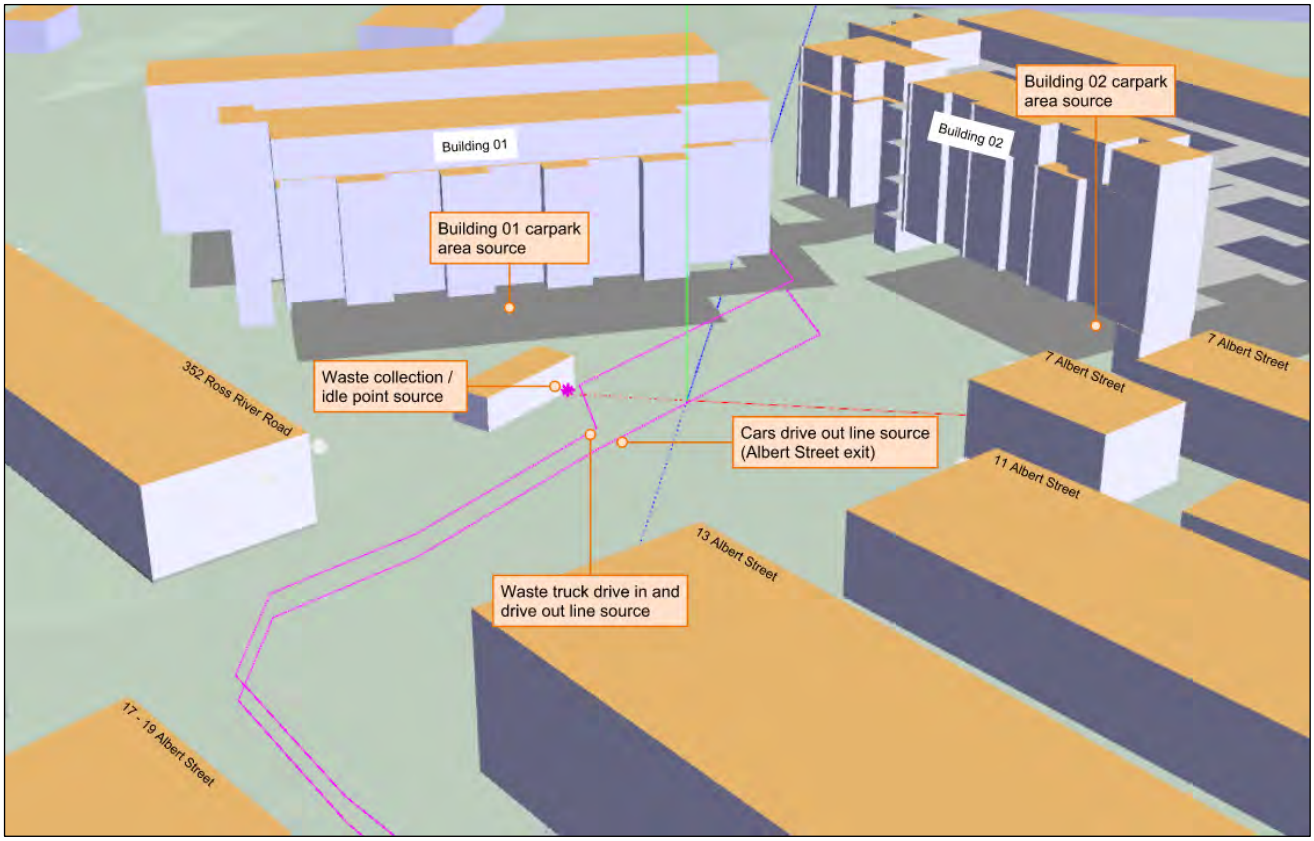
Road	Direction	Source: TMR				Traffic Estimates (2038)		
		2024 AADT	HV %	Growth %	Speed, km/h	94% AADT	HV % [1)]	Speed, km/h
Nathan Street Site ID: 92202	Against Gazettal (S)	12,019	11.5	1.7	70	14,305	11.5	70
	With Gazettal (N)	14,774	12.4	1.7	70	17,584	12.4	70
Nathan Street Site ID: 92188	Both	32,617	9.4	1.5	60	37,766	9.4	60
	Against Gazettal (S)	16,016	9.3	1.5	60	18,544	9.3	60
	With Gazettal (N)	16,601	9.5	1.5	60	19,221	9.5	60

C.2 Environmental Noise Assessment Inputs

C.2.1 Noise Model Layout

The general layout of the noise model generated in SoundPlan has been presented in **Figure 6**.

Figure 6: Noise model layout



C.2.2 Base Model Parameters

A summary of the modelling conditions is presented in **Table 23**.

Table 23: Noise modelling parameters

Item	Inputs and Assumptions
General Assessment Input Parameters	
Calculation Algorithms	Calculations were conducting using the SoundPLAN implementation of ISO 9613-2:1996 - Acoustics — Attenuation of sound during propagation outdoors — Part 2: General method of calculation. The following atmospheric parameters were used: • Temperature: 10°C • Relative humidity: 70 % • Atmospheric pressure: 1013.3 mbar For carpark assessments, noise emissions were calculated using the SoundPLAN implementation of the *"Recommendations for the Calculation of Sound Emissions of Parking Areas, Motorcar Centers and Bus Stations as well as of Multi-Storey Car Parks and Underground Car Parks"* (Bavarian Landesamt für Umwelt, 2007, 6th edn).
Ground Topography	A 1 metre Digital Elevation Model (DEM) derived from LiDAR obtained from an Australian Government website and was used to calculate 3D contours at 0.5 m elevation intervals which is considered of sufficient resolution for assessment purposes.
Ground Absorption	50% ground absorption was used for predominately concrete / asphalt type ground surfaces.
Receptor Locations	These were digitised at the location of the most exposed facades to the relevant noise sources. Single point receptors were modelled at 1.5 m above each finished floor level of each building digitised in the model and 1 m from the façade.

C.2.3 Carpark Noise Modelling Inputs

Carpark modelling parameters implemented are provided in **Table 24**.

Table 24: Acoustic simulation model carpark assumptions and inputs

Parameter	Model Input
Parking lot type (K_{PA})	Housing Estate (+0 dB)
Base unit (B0)	1 parking bay
Base B (total parking bays)	Total: 111
Road surface (K_{Stro})	Asphaltic driving lanes (+0 dB)
Passaging traffic	Combined
Impulsive surcharge (K_I)	2 dB
$L_{max,adj}$ – Door slam / Closing tail gate / boot lid	L_w 91 dB(A)
Single vehicle noise level	Ref. L_w 64 dB(A)
Vehicle spectrum	Car, no-load / ground run (to simulate flat carpark)
Source height	RL 0.5 m above terrain

C.2.4 Road Corridor Laneway (Albert Street Exit)

Car movement inputs along the road corridor laneway are provided in **Table 25**.

Table 25: Input parameters for road corridor laneway car movements

Parameter	Model Input
Single vehicle noise level	Cars exiting via laneway driveway – L_w 47 dB/m, m^2 (L_w 87 dB(A) @ 10 km/h)
Vehicle spectrum	Car, driving on asphalt < 30km/h
Source height	0.5 m above terrain

C.2.5 Waste Truck Modelling Inputs

Truck movement parameters implemented for waste collection are provided in **Table 26**.

Table 26: Input parameters for waste collection vehicle

Parameter	Model Input
Single vehicle noise level	Waste collection vehicle travelling (line source) – L_w 63 dB/m, m^2 (L_w 100 dB(A) @ 5 km/h) Waste pickup / idle (point source) - L_w 100 dB(A) for 10 minutes
Vehicle spectrum	SoundPLAN spectrum - C8.18 Refuse wagon
Source height	2.0 m above terrain

Appendix D Building Envelope Performance Requirements (QDC MP4.4)

Stantec

SKETCH TITLE — ***Prepared By: MK***

344 - 350 Ross River Road Cranbrook
QDC MP4.4 Building Envelope Requirements

PROJECT No.	SKETCH No.	DATE	REV
301051166	AC-SK-001	03/09/2025	001

Treatment of exposed floor to Level 1 units

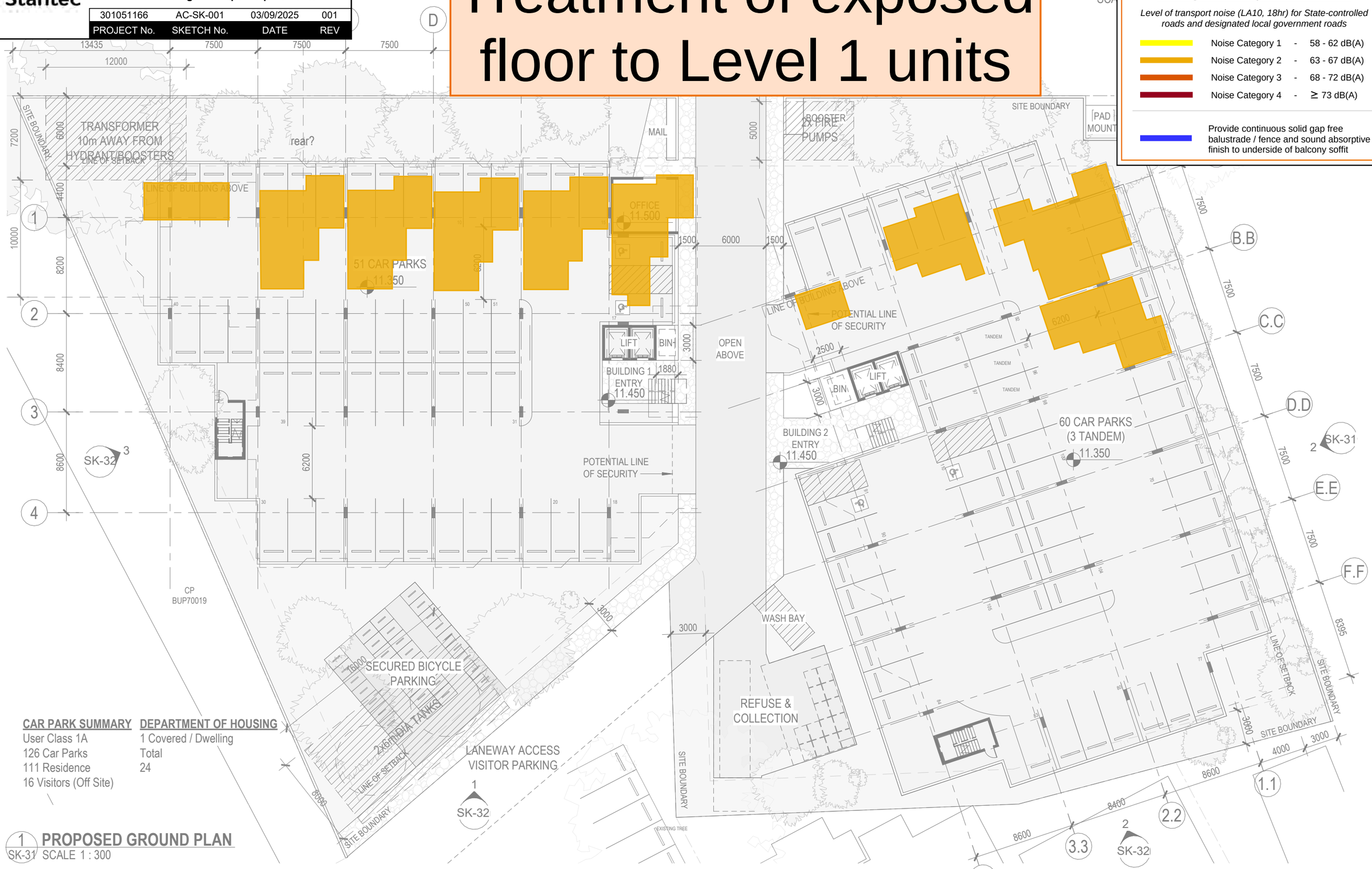
Queensland Development Code MP 4.4

Buildings in a Transport Noise Corridor

Level of transport noise (LA10, 18hr) for State-controlled roads and designated local government roads

- Noise Category 1 - 58 - 62 dB(A)
- Noise Category 2 - 63 - 67 dB(A)
- Noise Category 3 - 68 - 72 dB(A)
- Noise Category 4 - ≥ 73 dB(A)

Provide continuous solid gap free balustrade / fence and sound absorptive finish to underside of balcony soffit



CAR PARK SUMMARY	DEPARTMENT OF HOUSING
User Class 1A	1 Covered / Dwelling
126 Car Parks	Total
111 Residence	24
16 Visitors (Off Site)	

1 PROPOSED GROUND PLAN

SK-31 SCALE 1 : 300

PROJECT	CLIENT DETAILS	TITLE	PROJECT NO.	DATE	DRAWING No.	ISSUE
ROSS RIVER ROAD RESIDENTIAL **344/346 & 350 ROSS RIVER RD** **CRANBROOK, QLD, 4814**		**PROPOSED FLOOR PLAN - GROUND**	**25869**	**27.08.25**	**SK-21**	**P3**

28/08/2025 2:14:26 PM

Stantec

SKETCH TITLE — *Prepared By: MK*

344 - 350 Ross River Road Cranbrook
QDC MP4.4 Building Envelope Requirements

PROJECT No.	SKETCH No.	DATE	REV
301051166	AC-SK-001	03/09/2025	001

Level 1

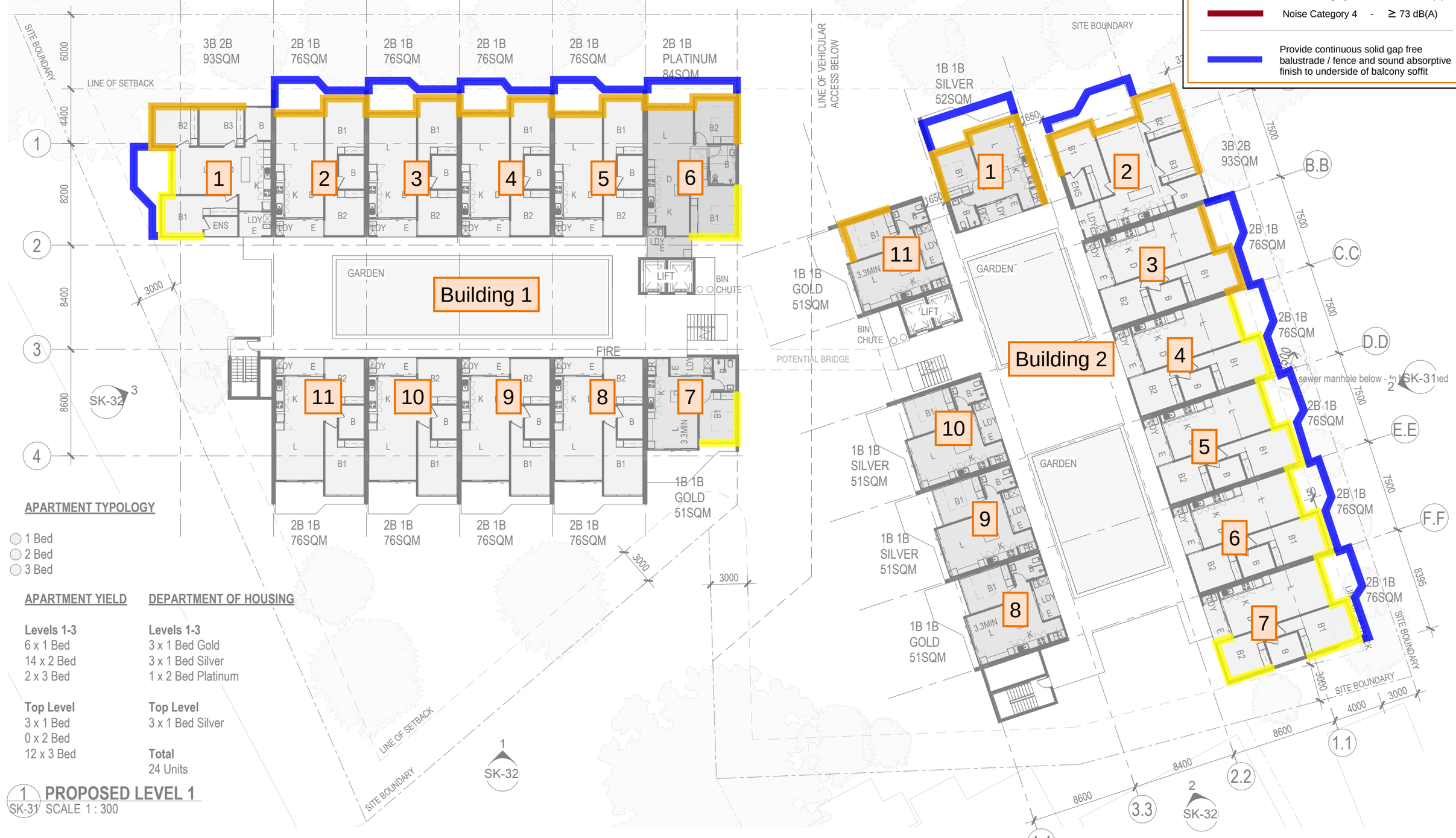
Queensland Development Code MP 4.4

Buildings in a Transport Noise Corridor

Level of transport noise (LA10, 18hr) for State-controlled roads and designated local government roads

- Noise Category 1 - 58 - 62 dB(A)
- Noise Category 2 - 63 - 67 dB(A)
- Noise Category 3 - 68 - 72 dB(A)
- Noise Category 4 - ≥ 73 dB(A)

Provide continuous solid gap free balustrade / fence and sound absorptive finish to underside of balcony soffit



APARTMENT TYPOLOGY

- 1 Bed
- 2 Bed
- 3 Bed

APARTMENT YIELD

Levels 1-3
6 x 1 Bed
14 x 2 Bed
2 x 3 Bed

Top Level
3 x 1 Bed
0 x 2 Bed
12 x 3 Bed

DEPARTMENT OF HOUSING

Levels 1-3
3 x 1 Bed Gold
3 x 1 Bed Silver
1 x 2 Bed Platinum

Top Level
3 x 1 Bed Silver

Total
24 Units

1 PROPOSED LEVEL 1
SK-31 SCALE 1 : 300

PROJECT	CLIENT DETAILS	TITLE	PROJECT NO.	DATE	DRAWING No.	ISSUE
ROSS RIVER ROAD RESIDENTIAL 344/346 & 350 ROSS RIVER RD CRANBROOK, QLD, 4814		PROPOSED FLOOR PLAN -LEVEL 1	25869	28.08.25	SK-22	P4

COUNTERPOINT

28/08/2025 2:14:26 PM

Stantec

SKETCH TITLE *Prepared By: MK*

344 - 350 Ross River Road Cranbrook
QDC MP4.4 Building Envelope Requirements

PROJECT No.	SKETCH No.	DATE	REV
301051166	AC-SK-001	03/09/2025	001

Level 2

Queensland Development Code MP 4.4

Buildings in a Transport Noise Corridor

Level of transport noise (LA10, 18hr) for State-controlled roads and designated local government roads

- Noise Category 1 - 58 - 62 dB(A)
- Noise Category 2 - 63 - 67 dB(A)
- Noise Category 3 - 68 - 72 dB(A)
- Noise Category 4 - ≥ 73 dB(A)

Provide continuous solid gap free balustrade / fence and sound absorptive finish to underside of balcony soffit

Building 1

Building 2

SK-31

SK-32

SK-31

SK-32

SK-32

1 **PROPOSED LEVEL 2 & 3**
SK-31 SCALE 1 : 300

PROJECT	CLIENT DETAILS	TITLE	PROJECT NO.	DATE	DRAWING No.	ISSUE
ROSS RIVER ROAD RESIDENTIAL 344/346 & 350 ROSS RIVER RD CRANBROOK, QLD, 4814		PROPOSED FLOOR PLAN - LEVEL 2 & 3	25869	28.08.25	SK-23	P4

COUNTERPOINT

28/08/2025 2:14:29 PM

Stantec

SKETCH TITLE *Prepared By: MK*

344 - 350 Ross River Road Cranbrook
QDC MP4.4 Building Envelope Requirements

PROJECT No.	SKETCH No.	DATE	REV
301051166	AC-SK-001	03/09/2025	001

Level 3

Queensland Development Code MP 4.4

Buildings in a Transport Noise Corridor

Level of transport noise (LA10, 18hr) for State-controlled roads and designated local government roads

- Noise Category 1 - 58 - 62 dB(A)
- Noise Category 2 - 63 - 67 dB(A)
- Noise Category 3 - 68 - 72 dB(A)
- Noise Category 4 - ≥ 73 dB(A)

Provide continuous solid gap free balustrade / fence and sound absorptive finish to underside of balcony soffit

Building 1

Building 2

SK-31

SK-32

1 PROPOSED LEVEL 2 & 3

SK-31 SCALE 1 : 300

PROJECT	CLIENT DETAILS	TITLE	PROJECT NO.	DATE	DRAWING No.	ISSUE
ROSS RIVER ROAD RESIDENTIAL 344/346 & 350 ROSS RIVER RD CRANBROOK, QLD, 4814		PROPOSED FLOOR PLAN - LEVEL 2 & 3	25869	28.08.25	SK-23	P4

COUNTERPOINT

28/08/2025 2:14:29 PM

Stantec

SKETCH TITLE — *Prepared By: MK*

344 - 350 Ross River Road Cranbrook
QDC MP4.4 Building Envelope Requirements

PROJECT No.	SKETCH No.	DATE	REV
301051166	AC-SK-001	03/09/2025	001

Level 4

Exposed roof areas of Level 3 units below

Exposed roof areas of Level 3 units below

Queensland Development Code MP 4.4

Buildings in a Transport Noise Corridor

Level of transport noise (LA10, 18hr) for State-controlled roads and designated local government roads

- Noise Category 1 - 58 - 62 dB(A)
- Noise Category 2 - 63 - 67 dB(A)
- Noise Category 3 - 68 - 72 dB(A)
- Noise Category 4 - ≥ 73 dB(A)

Provide continuous solid gap free balustrade / fence and sound absorptive finish to underside of balcony soffit

Building 1

Building 2

SK-31

SK-32

SITE BOUNDARY

LINE OF SETBACK

OPEN ABOVE

LIFT 1400x1600 INT

BIN CHUTE

3B 2B 95SQM

3B 2B 100SQM

1B 1B SILVER 51SQM

3B 2B 98SQM

APARTMENT TYPOLOGY

- 1 Bed
- 2 Bed
- 3 Bed

APARTMENT YIELD

Levels 1-3
6 x 1 Bed
14 x 2 Bed
2 x 3 Bed

Top Level
3 x 1 Bed
0 x 2 Bed
12 x 3 Bed

DEPARTMENT OF HOUSING

Levels 1-3
3 x 1 Bed Gold
3 x 1 Bed Silver
1 x 2 Bed Platinum

Top Level
3 x 1 Bed Silver

Total
24 Units

PROJECT	CLIENT DETAILS	TITLE	PROJECT NO.	DATE	DRAWING No.	ISSUE
ROSS RIVER ROAD RESIDENTIAL 344/346 & 350 ROSS RIVER RD CRANBROOK, QLD, 4814		PROPOSED FLOOR PLAN - LEVEL 4	25869	28.08.25	SK-30	P4

COUNTERPOINT

28/08/2025 2:14:31 PM

Treatment of Level 4 unit roof

Stantec

SKETCH TITLE — *Prepared By: MK*

344 - 350 Ross River Road Cranbrook
QDC MP4.4 Building Envelope Requirements

PROJECT No.	SKETCH No.	DATE	REV
301051166	AC-SK-001	03/09/2025	001

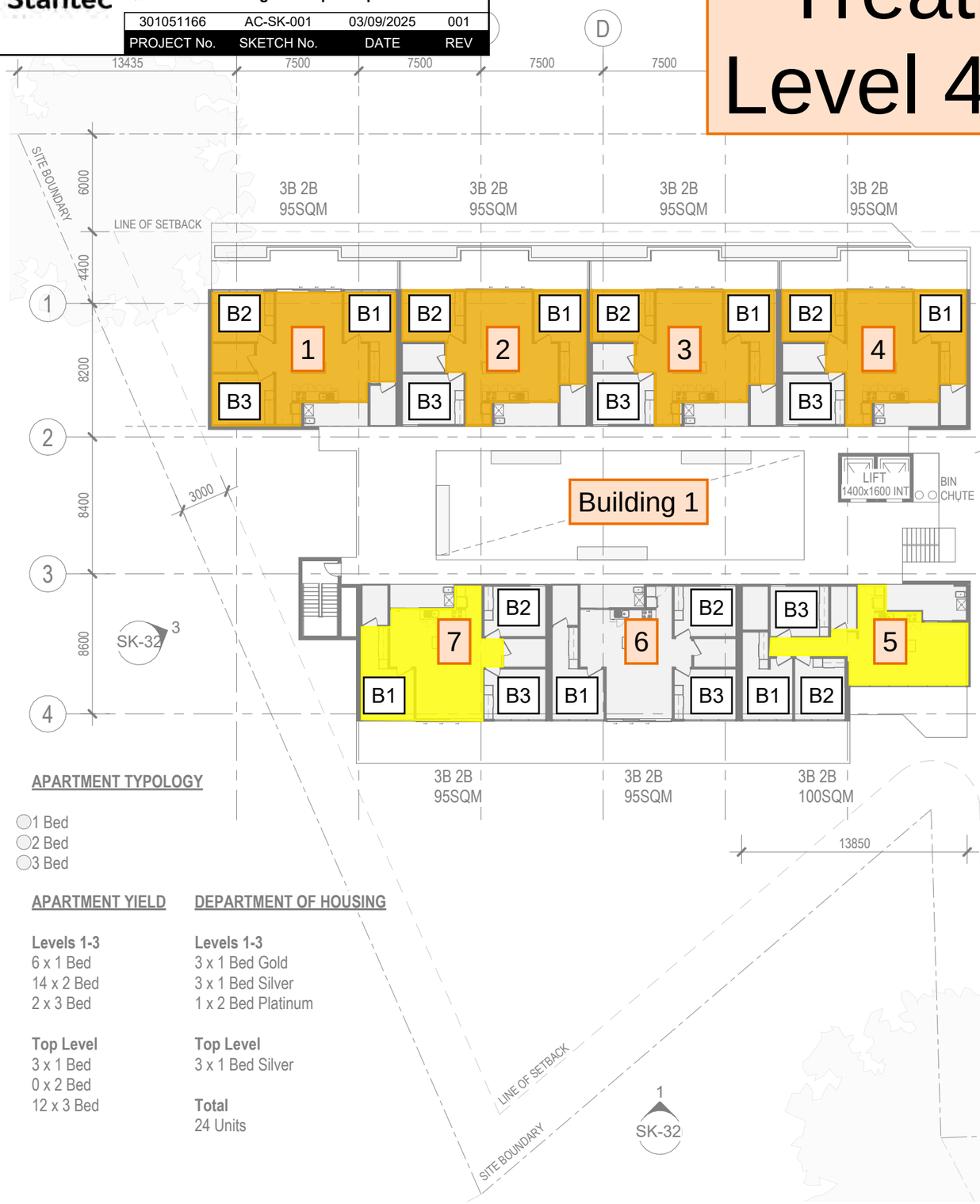
Queensland Development Code MP 4.4

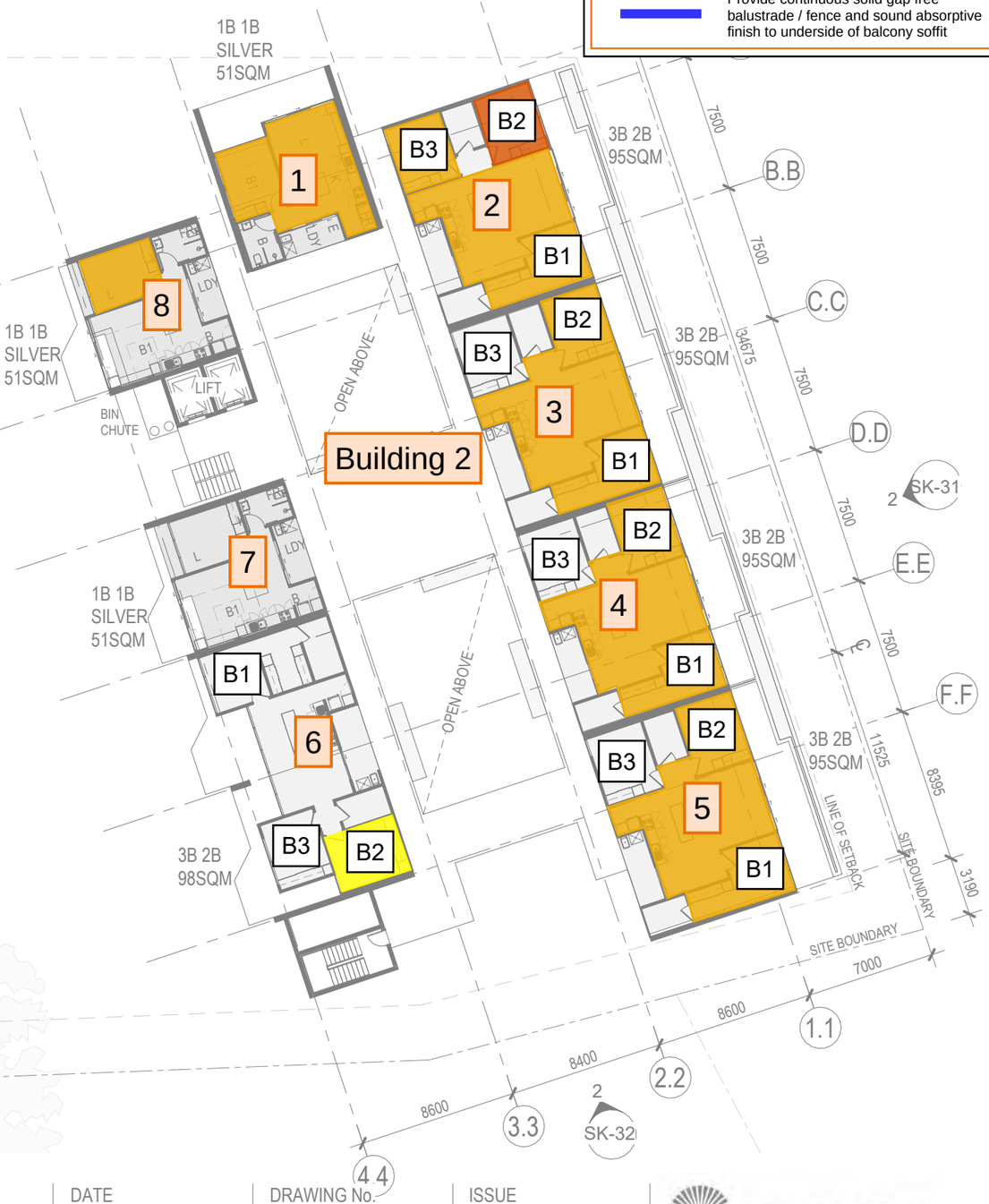
Buildings in a Transport Noise Corridor

Level of transport noise (LA10, 18hr) for State-controlled roads and designated local government roads

- Noise Category 1 - 58 - 62 dB(A)
- Noise Category 2 - 63 - 67 dB(A)
- Noise Category 3 - 68 - 72 dB(A)
- Noise Category 4 - ≥ 73 dB(A)

Provide continuous solid gap free balustrade / fence and sound absorptive finish to underside of balcony soffit





APARTMENT TYPOLOGY

- 1 Bed
- 2 Bed
- 3 Bed

APARTMENT YIELD

Levels 1-3
6 x 1 Bed
14 x 2 Bed
2 x 3 Bed

Top Level
3 x 1 Bed
0 x 2 Bed
12 x 3 Bed

DEPARTMENT OF HOUSING

Levels 1-3
3 x 1 Bed Gold
3 x 1 Bed Silver
1 x 2 Bed Platinum

Top Level
3 x 1 Bed Silver

Total
24 Units

PROJECT	CLIENT DETAILS	TITLE	PROJECT NO.	DATE	DRAWING No.	ISSUE
ROSS RIVER ROAD RESIDENTIAL 344/346 & 350 ROSS RIVER RD CRANBROOK, QLD, 4814		PROPOSED FLOOR PLAN - LEVEL 4	25869	28.08.25	SK-30	P4

COUNTERPOINT

28/08/2025 2:14:31 PM

Appendix E Road Noise Modelling Results

Building	Unit	Room	Fl	L10(18h) dB(A)	Category
1	Unit 1	Bed 1	F 1	62	Category 1
1	Unit 1	Bed 2	F 1	67	Category 2
1	Unit 1	Bed 3	F 1	67	Category 2
1	Unit 1	Living	F 1	62	Category 1
1	Unit 1	Bed 1	F 2	63	Category 2
1	Unit 1	Bed 2	F 2	67	Category 2
1	Unit 1	Bed 3	F 2	67	Category 2
1	Unit 1	Living	F 2	62	Category 1
1	Unit 1	Bed 1	F 3	63	Category 2
1	Unit 1	Bed 2	F 3	67	Category 2
1	Unit 1	Bed 3	F 3	67	Category 2
1	Unit 1	Living	F 3	62	Category 1
1	Unit 1	Bed 1	F 4	66	Category 2
1	Unit 1	Bed 2	F 4	66	Category 2
1	Unit 1	Bed 3	F 4	63	Category 2
1	Unit 1	Living	F 4	66	Category 2
1	Unit 2	Bed 1	F 1	67	Category 2
1	Unit 2	Living	F 1	67	Category 2
1	Unit 2	Bed 1	F 2	67	Category 2
1	Unit 2	Living	F 2	67	Category 2
1	Unit 2	Bed 1	F 3	67	Category 2
1	Unit 2	Living	F 3	67	Category 2
1	Unit 2	Bed 1	F 4	66	Category 2
1	Unit 2	Bed 2	F 4	66	Category 2
1	Unit 2	Living	F 4	66	Category 2
1	Unit 3	Bed 1	F 1	67	Category 2
1	Unit 3	Living	F 1	67	Category 2
1	Unit 3	Bed 1	F 2	67	Category 2
1	Unit 3	Living	F 2	67	Category 2
1	Unit 3	Bed 1	F 3	67	Category 2
1	Unit 3	Living	F 3	67	Category 2
1	Unit 3	Bed 1	F 4	66	Category 2
1	Unit 3	Bed 2	F 4	66	Category 2
1	Unit 3	Living	F 4	66	Category 2
1	Unit 4	Bed 1	F 1	67	Category 2
1	Unit 4	Living	F 1	67	Category 2
1	Unit 4	Bed 1	F 2	67	Category 2
1	Unit 4	Living	F 2	67	Category 2
1	Unit 4	Bed 1	F 3	67	Category 2
1	Unit 4	Living	F 3	67	Category 2
1	Unit 4	Bed 1	F 4	66	Category 2
1	Unit 4	Bed 2	F 4	66	Category 2

Building	Unit	Room	Fl	L10(18h) dB(A)	Category
1	Unit 4	Living	F 4	66	Category 2
1	Unit 5	Bed 1	F 1	67	Category 2
1	Unit 5	Living	F 1	67	Category 2
1	Unit 5	Bed 1	F 2	67	Category 2
1	Unit 5	Living	F 2	67	Category 2
1	Unit 5	Bed 1	F 3	67	Category 2
1	Unit 5	Living	F 3	67	Category 2
1	Unit 5	Living	F 4	59	Category 1
1	Unit 6	Bed 1	F 1	62	Category 1
1	Unit 6	Bed 2	F 1	67	Category 2
1	Unit 6	Living	F 1	67	Category 2
1	Unit 6	Bed 1	F 2	62	Category 1
1	Unit 6	Bed 2	F 2	67	Category 2
1	Unit 6	Living	F 2	67	Category 2
1	Unit 6	Bed 1	F 3	62	Category 1
1	Unit 6	Bed 2	F 3	67	Category 2
1	Unit 6	Living	F 3	67	Category 2
1	Unit 7	Bed 1	F 1	58	Category 1
1	Unit 7	Bed 1	F 2	58	Category 1
1	Unit 7	Bed 1	F 3	58	Category 1
1	Unit 7	Bed 1	F 4	60	Category 1
1	Unit 7	Entry	F 4	58	Category 1
1	Unit 11	Living	F 3	58	Category 1
1	Unit 11	Living	F 3	59	Category 1
2	Unit 1	Bed 1	F 1	64	Category 2
2	Unit 1	Living	F 1	65	Category 2
2	Unit 1	Bed 1	F 2	64	Category 2
2	Unit 1	Living	F 2	65	Category 2
2	Unit 1	Bed 1	F 3	64	Category 2
2	Unit 1	Living	F 3	65	Category 2
2	Unit 1	Bed 1	F 4	64	Category 2
2	Unit 1	Living	F 4	65	Category 2
2	Unit 2	Bed 1	F 1	66	Category 2
2	Unit 2	Bed 2	F 1	67	Category 2
2	Unit 2	Bed 3	F 1	64	Category 2
2	Unit 2	Living	F 1	66	Category 2
2	Unit 2	Bed 1	F 2	66	Category 2
2	Unit 2	Bed 2	F 2	68	Category 3
2	Unit 2	Bed 3	F 2	65	Category 2
2	Unit 2	Living	F 2	66	Category 2
2	Unit 2	Bed 1	F 3	66	Category 2
2	Unit 2	Bed 2	F 3	68	Category 3
2	Unit 2	Bed 3	F 3	66	Category 2
2	Unit 2	Living	F 3	66	Category 2
2	Unit 2	Bed 1	F 4	65	Category 2

Building	Unit	Room	Fl	L10(18h) dB(A)	Category
2	Unit 2	Bed 2	F 4	68	Category 3
2	Unit 2	Bed 3	F 4	66	Category 2
2	Unit 2	Living	F 4	65	Category 2
2	Unit 3	Bed 1	F 1	63	Category 2
2	Unit 3	Living	F 1	63	Category 2
2	Unit 3	Bed 1	F 2	64	Category 2
2	Unit 3	Living	F 2	64	Category 2
2	Unit 3	Bed 1	F 3	65	Category 2
2	Unit 3	Living	F 3	65	Category 2
2	Unit 3	Bed 1	F 4	64	Category 2
2	Unit 3	Bed 2	F 4	65	Category 2
2	Unit 3	Living	F 4	65	Category 2
2	Unit 4	Bed 1	F 1	62	Category 1
2	Unit 4	Living	F 1	61	Category 1
2	Unit 4	Bed 1	F 2	63	Category 2
2	Unit 4	Living	F 2	63	Category 2
2	Unit 4	Bed 1	F 3	64	Category 2
2	Unit 4	Living	F 3	64	Category 2
2	Unit 4	Bed 1	F 4	64	Category 2
2	Unit 4	Bed 2	F 4	64	Category 2
2	Unit 4	Living	F 4	64	Category 2
2	Unit 5	Bed 1	F 1	61	Category 1
2	Unit 5	Living	F 1	61	Category 1
2	Unit 5	Bed 1	F 2	62	Category 1
2	Unit 5	Living	F 2	62	Category 1
2	Unit 5	Bed 1	F 3	64	Category 2
2	Unit 5	Living	F 3	64	Category 2
2	Unit 5	Bed 1	F 4	65	Category 2
2	Unit 5	Bed 2	F 4	64	Category 2
2	Unit 5	Entry	F 4	58	Category 1
2	Unit 5	Living	F 4	64	Category 2
2	Unit 6	Bed 1	F 1	61	Category 1
2	Unit 6	Living	F 1	60	Category 1
2	Unit 6	Bed 1	F 2	62	Category 1
2	Unit 6	Living	F 2	61	Category 1
2	Unit 6	Bed 1	F 3	64	Category 2
2	Unit 6	Living	F 3	63	Category 2
2	Unit 6	Bed 2	F 4	61	Category 1
2	Unit 7	Bed 1	F 1	61	Category 1
2	Unit 7	Living	F 1	60	Category 1
2	Unit 7	Bed 1	F 2	62	Category 1
2	Unit 7	Bed 2	F 2	60	Category 1
2	Unit 7	Living	F 2	61	Category 1
2	Unit 7	Bed 1	F 3	64	Category 2
2	Unit 7	Bed 2	F 3	62	Category 1

Building	Unit	Room	Fl	L10(18h) dB(A)	Category
2	Unit 7	Living	F 3	63	Category 2
2	Unit 8	Entry	F 2	58	Category 1
2	Unit 8	Entry	F 3	60	Category 1
2	Unit 8	Living	F 4	63	Category 2
2	Unit 9	Entry	F 3	58	Category 1
2	Unit 11	Bed 1	F 1	63	Category 2
2	Unit 11	Bed 1	F 2	63	Category 2
2	Unit 11	Bed 1	F 3	63	Category 2

Appendix F Environment Emissions – Source Group Contributions

Noise Sensitive Receptor	Fl.	Outdoor Noise Limit, dB(A)			Predicted Outdoor Noise Level, dB(A)			Source	Group Source Contribution dB(A)		
		L_{eq}			L_{eq}				L_{eq}		
		D [1)]	E [1)]	N [1)]	D	E	N		D	E	N
7 Albert Street	GF	58	55	52	55	47	44	GF Carparks	46	46	42
								Cars – Albert St Exit	39	39	39
								Waste Truck Drive In / Out	43	—	—
								Waste Idle / Pickup	54	—	—
	L1	58	55	52	56	47	44	GF Carparks	46	46	42
								Cars – Albert St Exit	40	40	40
								Waste Truck Drive In / Out	43	—	—
								Waste Idle / Pickup	55	—	—
11 Albert Street	GF	58	55	52	54	43	41	GF Carparks	41	41	37
								Cars – Albert St Exit	39	39	39
								Waste Truck Drive In / Out	43	—	—
								Waste Idle / Pickup	54	—	—
	L1	58	55	52	55	43	42	GF Carparks	41	41	37
								Cars – Albert St Exit	40	40	40
								Waste Truck Drive In / Out	44	—	—
								Waste Idle / Pickup	54	—	—
13 Albert Street	GF	58	55	52	54	44	43	GF Carparks	40	40	40
								Cars – Albert St Exit	42	42	42
								Waste Truck Drive In / Out	45	—	—
								Waste Idle / Pickup	53	—	—
	L1	58	55	52	54	44	43	GF Carparks	40	40	40
								Cars – Albert St Exit	42	42	42
								Waste Truck Drive In / Out	46	—	—
								Waste Idle / Pickup	53	—	—
	L2	58	55	52	54	44	43	GF Carparks	41	41	41

Noise Sensitive Receptor	Fl.	Outdoor Noise Limit, dB(A)			Predicted Outdoor Noise Level, dB(A)			Source	Group Source Contribution dB(A)		
		L_{eq}			L_{eq}				L_{eq}		
		D [1)]	E [1)]	N [1)]	D	E	N		D	E	N
13 Albert Street								Cars – Albert St Exit	40	40	40
								Waste Truck Drive In / Out	45	—	—
								Waste Idle / Pickup	53	—	—
17 – 19 Albert Steet	GF	58	55	52	56	49	49	GF Carparks	35	35	31
								Cars – Albert St Exit	49	49	49
								Waste Truck Drive In / Out	53	—	—
								Waste Idle / Pickup	49	—	—
352 Ross River Road	L1	58	55	52	57	47	46	GF Carparks	43	43	43
								Cars – Albert St Exit	45	45	45
								Waste Truck Drive In / Out	49	—	—
								Waste Idle / Pickup	56	—	—
357 Ross River Road	GF	58	55	52	40	37	33	GF Carparks	37	37	37
								Cars – Albert St Exit	25	25	25
								Waste Truck Drive In / Out	31	—	—
								Waste Idle / Pickup	36	—	—

NOTES:

1) Day (D) = 7 AM – 6 PM | Evening (E) = 6 PM – 10 PM | Night (N) = 6 AM – 7 AM

Stantec is a global leader in sustainable architecture, engineering, and environmental consulting. The diverse perspectives of our partners and interested parties drive us to think beyond what's previously been done on critical issues like climate change, digital transformation, and future-proofing our cities and infrastructure. We innovate at the intersection of community, creativity, and client relationships to advance communities everywhere, so that together we can redefine what's possible.

Level 3,
52 Merivale Street
South Brisbane QLD 4101
Tel +61 7 3811 4500

stantec.com/au

APPENDIX H

Flood Impact Assessment prepared by Imbris

brazier motti

imbris

350 Ross River Road Development

Flood Impact Assessment

Reference No. HUR001-350RRR-001

Prepared for Hurst Constructions Qld Pty Ltd

Document Control

Document	Flood Impact Assessment
Project Name:	344-350 Ross River Road Hammond Way FIA
Project Number:	HUR001

Issue Register

Distribution List	Date Issued	Revision No.
Hurst Constructions Qld Pty Ltd	10/10/25	Draft

Company Details

Name	Imbris Australia Pty Ltd
ACN/ABN	73 663 798 436
Project Manager	Sally Williams (RPEQ # 19353)
Contact	enquiries@imbris.com.au

This Report is provided for the exclusive use of the Client (Hurst Constructions Qld Pty Ltd) pursuant to the Scope of Works which requires Imbris Australia Pty Ltd (IMBRIS) to provide Services relating to preparing a preliminary flood impact assessment for a proposed subdivision at 344-350 Ross River Road, Cranbrook, 4814. The development designs studied herein are conceptual in nature, this work is not a detailed design nor intended for construction. Further, more detailed assessments supported by detailed survey collection are expected.

IMBRIS undertakes no duty, nor accepts any responsibility, to any third party who may rely upon or use this document. This document has been prepared based on the Client's description of its requirements and IMBRIS's experience, having regard to assumptions that IMBRIS can reasonably be expected to make in accordance with sound professional principles. IMBRIS may also have relied upon information provided by the Client and other third parties to prepare this document, some of which may not have been verified. Subject to the above conditions, this document may be transmitted, reproduced or disseminated only in its entirety. We derive data in this Report from information (or confirmation of the absence thereof) sourced from the Client and designated partners, and/or information that has been made available in the public domain at the time or times outlined in this Report.

The passage of time, manifestation of latent conditions or impacts of future events may require further model calibration or re-examination of this preliminary flood impact assessment and subsequent data analysis, and re-evaluation of the data, findings, observations and conclusions expressed in this Report. This Report should be read in full and no excerpts are to be taken as representative of the findings. No responsibility is accepted by Imbris Pty Ltd for use of any part of this Report in any other context. Reporting of this flood impact assessment is based on a desktop assessment of data that has been measured by other third parties. Imbris Pty Ltd does not accept any Liability whatsoever for, or in respect of, any use of, or reliance upon this Report by any person contrary to the above or our Standard Terms.

Table of Contents

List of Figures

Executive Summary

A flood impact assessment has been completed in relation to the development of Lot 3 on SP146326 (344-346 Ross River Road) and Lots 1 and 2 on RP721729 (348 and 350 Ross River Road, respectively). It is proposed that these adjoining residential lots will be developed into an affordable housing complex comprising of two buildings, car parking and landscaped areas. The lots are located in the suburb of Cranbrook within the Townsville City Council (TCC) Local Government Area.

Townsville City Plan 2014 (Version 2024/01) Part 8.2.6.3 and Schedule 6.7 provide the local government planning scheme policy in relation to flood hazard. Under the assumptions described within this report, the outcomes from the flood impact assessment in relation to TCC planning scheme policy performance outcomes are summarised in Table 1.

Table 1 – TCC Planning Scheme Policy (SC6.7.3.1.1) Performance Outcomes & Response.

	Performance Outcome	Response
1	Development in medium and high hazard areas is designed and located to minimise susceptibility to and potential impacts of flooding.	No development is proposed within the high flood hazard area. The site is within the very low, low and medium flood hazard areas on the TCC flood hazard overlay. The proposed subdivision has been designed to incorporate raised building pads where required and ensure property access to all lots remains within the low flood hazard risk up to the defined flood event.
2	Development in high hazard areas does not significantly impede the flow of flood waters through the site or worsen flood flows external to the site.	No development is proposed in the high hazard area.
3	Development does not intensify use in high hazard areas, in order to avoid risks to people and property.	No development is proposed in the high hazard area.
4	Siting and layout of development maintains the safety of people and property in medium hazard areas.	Flood modelling of the developed case flood hazard area shows that the proposed building pads and driveway accesses are within the “Generally safe for vehicles, people and buildings” hazard category, based on Australian Emergency Management Institute definitions.
5	Signage is provided within high and medium flood hazard areas to alert residents and visitors to the flood hazard.	Signage to be confirmed as part of wider development application.
6	Development within high and medium flood hazard areas ensures any changes to the depth, duration, velocity of flood waters are contained within the site.	No development is proposed in the high flood hazard area. Based on 2D modelling of the predicted developed case flood hazard, no significant change in flood level or flow velocity is expected outside of the subject development lot up to the Defined Flood Event.
7	Development within high and medium flood hazard does not directly, indirectly or cumulatively worsen flood characteristics outside the development site, having regard to: 1. increased scour and erosion; or 2. loss of flood storage; or 3. loss of or changes to flow paths; or 4. flow acceleration or retardation; or reduction in flood warning times.	No development is proposed in the high hazard area. Based on 2D modelling of the predicted developed case flood hazard, no significant change in flood level or flow velocity is expected outside of the subject development lot up to the Defined Flood Event.
8	Facilities with a role in emergency management and vulnerable community services are able to function effectively during and immediately after flood events.	N/A.
9	Public safety and the environment are not adversely affected by the detrimental impacts of flooding on hazardous materials manufactured or stored in bulk.	N/A

1.0 Introduction

1.1 Background

A flood impact assessment has been completed for Hurst Constructions Qld Pty Ltd in relation to the proposed reconfiguration of Lot 3 on SP146326 at 344-346 Ross River Road and Lots 1 & 2 on RP721729 at 348 and 350 Ross River Road, Cranbrook, Queensland (4814) in the Townsville City Council (TCC) Local Government Area (LGA).

This report describes the assumptions and outcomes of the flood impact assessment in relation to TCC Planning Scheme requirements.

1.2 Subject Property

Lot 3 on SP146326 and Lots 1 & 2 on RP721729 are adjoining residential lots in the suburb of Cranbrook (4814) comprising a total area of approximately 5,255m^2. Figure 1 shows the proposed development plan for the combined lots (344-350 Ross River Road) involving two residential buildings with a central driveway access connecting to Ross River Road and to the council road reserve leading to Albert Street ("the Laneway").

The properties are zoned as medium-density residential and have previously been significantly modified from a natural condition. Concrete building pads remain from two demolished dwellings on 344-346 and 348 Ross River Road. A derelict dwelling is located at 350 Ross River Road.

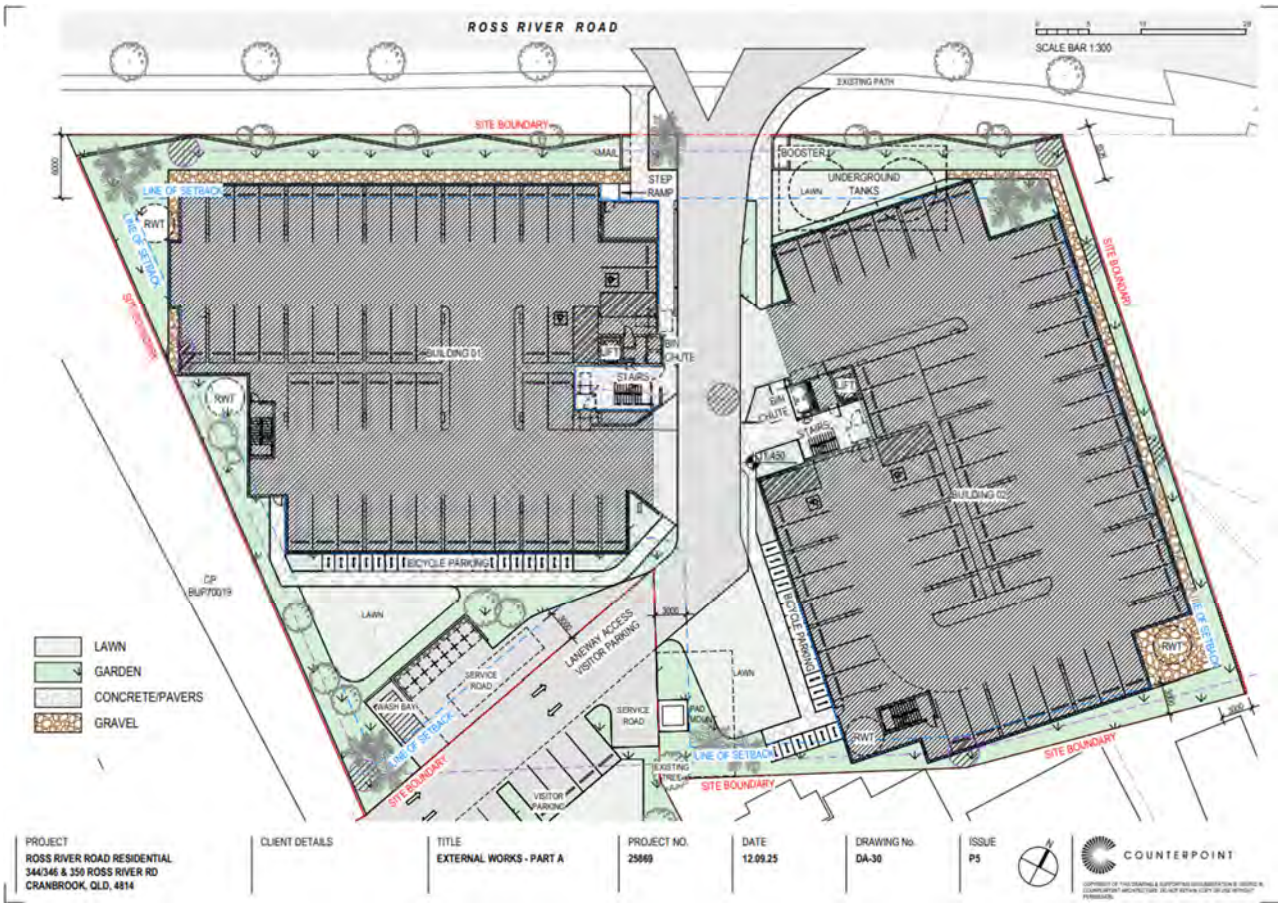


Figure 1 Subject property layout and residential development plan

1.3 Scope of Works

The scope of works for this flood impact assessment included:

- Review of the available background data including publicly available mapping data, reports and the previous flood modelling for the site
- Undertake a site visit to confirm existing conditions at the site and the location/dimensions of existing drainage infrastructure in the vicinity of the site (where accessible)
- Confirm the existing case water surface elevation, flow velocity, water depth and flood hazard for the subject site and immediate surrounds for standard Annual Exceedance Probability (AEP) events up to the TCC Planning Scheme Defined Flood Event (DFE)
- Determine the developed case water surface elevation, flow velocity, water depth and flood hazard for the subject site and immediate surrounds for standard Annual Exceedance Probability (AEP) events up to the DFE
- Determine the potential flood impact (developed case minus existing case flood depths) of the proposed development up to the DFE
- Consider the performance outcomes of the proposed lot reconfiguration in relation to TCC assessment benchmarks.

1.4 Data and Information Provided

The following data and documents were sourced to support this study:

- Preferred site subdivision layout (Counterpoint Architects Pty Ltd)
- 344-350 Ross River Road Development Stormwater Management Plan (LCJ Engineers Pty Ltd, 3rd October 2025)
- Aerial LiDAR Survey at a 1 m horizontal resolution. Aerial survey data used to develop the topography for the hydraulic model has a vertical accuracy of ± 0.15 m on clear, hard surfaces and a horizontal accuracy of ± 0.45m
- Previous flood modelling and accompanying reports for the Ross River catchment provided by TCC, which was undertaken as part of the *TCC Townsville Recalibrated Flood Modelling and Mapping Project – Ross River Flood Study* (AECOM, 2021)

2.0 Flood Impact Assessment

2.1 Approach

The 2014 Townsville City Plan provides the applicable local government planning scheme policy in relation to flood hazard (Part 8.2.6.3 and Schedule 6.7).

TCC commissioned the development and calibration of a 2D TUFLOW flood model in 2021 for the Ross River catchment. The development of the TUFLOW flood model is documented in detail within the Townsville Recalibrated Flood Modelling and Mapping – Ross River (Rev V02, August 2021) report and these details are not repeated herein.

TCC has developed a Temporary Local Planning Instrument (TLPI) for City Wide Flood Hazard Regulation which provides some updated administrative definitions, flood hazard overlay code assessment provisions, and planning scheme policies. TCC endorsed the submission to the minister in April 2025. If approved by the Minister and formally adopted by TCC this TLPI will suspend and override Part 8.2.6.3 and Schedule 6.7 of the 2014 Townsville City Plan and formally align the TCC Planning Scheme with the Queensland Building Regulation 2021, Queensland State Flood Risk Management Framework (2021) and Australian Rainfall and Runoff (ARR) Engineering Guidelines (October 2024).

Since the ARR Engineering Guidelines and Queensland State Regulations already supersede the 2014 Townsville City Plan and formal adoption of the TLPI by TCC is expected soon, the approach undertaken for this study aims to meet the requirements of the Townsville City Plan 2014 and the TLPI. The adopted flood risk design events and TCC supplied flood model data used in this study are provided in Table 2.

Table 2 – Model Scenarios adopted (TCC TLPI 01/2025 SC6.7.4.3.4)

Adopted Flood Risk Design Event	Flood Model Data Used
50% AEP	20% AEP Present Day
20% AEP	10% AEP Present Day
10% AEP	5% AEP Present Day
5% AEP	2% AEP Present Day
2% AEP	2% AEP with Climate Change
1% AEP (DFE)	1% AEP with Climate Change

2.2 Existing Flood Hazard

The subject property is located in the upper reaches of the Ross Creek catchment and drains to the Aitkenvale drain network upstream of the Stockland shopping centre. The entire lot area is flat, with no distinct formal or informal watercourse channels through the property.

Figure 3 shows the project site catchment delineation with the approximate overland flowpaths and subsurface pipe drainage network identified.

There is minimal drainage catchment area upstream of the subject site. There is no formal outflow drainage path from the property. The site generally drains to the south-east, through the car park of an adjacent commercial property and around to a low point on Albert Street close to the end of the Laneway. Ponding of water occurs at a low point on lot 3/SP146326 during all flood events. Outflows occur overland via the car park once the ponded water on the property reaches the level of the car park to the south-east.

Existing adjacent developments to the west of the subject site at 352 Ross River Road (Nathan Court) and 354 Ross River Road (Cranbrae Village) drain to Albert Street via existing pit and pipe networks. In rare and extreme flood events, some overflows from these properties are expected to enter the TCC road reserve ('the laneway") once the capacity of the pipe networks is exceeded.

Figure 2 Catchments and flowpaths (solid blue lines indicate existing pipe network, dashed blue lines indicate overland drainage flowpaths).

The latest TCC flood risk mapping shows that the southern portion of the subject property is within the Medium Flood Risk area (Figure 3). No part of the site is within the High or Very High Flood Risk area. The designation of a medium flood hazard is primarily due to water ponding, with water depths being up to 200 mm in the DFE. Flow velocities across the property site are close to zero.

Figure 3 Flood Hazard Risk at 344-350 Ross River Road, Cranbrook. (Source: TCC Flood Information Portal, retrieved 05/09/25)

The TCC supplied hydraulic model was updated to run in the latest TUFLOW software version (2025.0.2) and to include building pads and an existing private stormwater pipe which runs underneath the Laneway, connecting a low point to the rear of 352 Ross River Road with the Albert Street pipe network.

The hydraulic model was run for standard design flood scenarios up to the DFE using the supplied model data as defined in Table 2. The baseline flood events were simulated for the catchment-wide critical duration and temporal patterns as defined in Volume 2 of the Townsville Recalibrated Flood Modelling and Mapping – Ross River (August 2021). These were the 120-minute-hour and the 180-minute storms. The catchment hydrology is modelled entirely within the 2D TUFLOW model using the rain-on-grid approach.

Maps of the existing flood depths and extents for all events up to the 1% AEP are provided in Appendix A. Due to the lack of any formal drainage channel immediately upstream of 350 Ross River Road, flooding across the site is characterised as shallow overland flow with ponding at low points ranging 0.1 - 0.3 m depth across southern section of the subject site and in the adjacent laneway.

2.3 Developed Case Flood Impact Assessment

A site stormwater management plan has been completed for the proposed development (refer to Figure 4 for layout, LCJ Engineers Pty Ltd 03/10/2025). As outlined in the stormwater management plan, it is proposed that rainfall up to the 1% AEP will be captured via the building roof and gutter system and detained on-site across 4 storage tanks, each with a 15 mm diameter orifice outflow connecting to the underground pipe network which leads to Albert Street. Stormwater will be released into the proposed pipe system over a 12-24 hour period.

The existing case flood model was updated to reflect the proposed subdivision layout and stormwater network with building footprints as shown in Figure 5. The building pads are proposed to be filled to a minimum level of 11.35 m AHD (1% AEP + 300 mm freeboard). It is noted that the lower floor of the proposed buildings is designated for car parking and the proposed habitable floor levels are much higher.

The hydraulic model surface roughness was also updated to include the proposed building footprints.

In addition to the filling associated with the proposed raised buildings pads and driveways, it was assumed that the exterior landscaped lawn areas are lower than the building pads in order to detain excess stormwater prior to its release via the underground pipe network.

Since it is also proposed to modify the Laneway as part of the development, this was upgrade was also included in the hydraulic model. It is assumed that generally no raising of current laneway level occurs except in the vicinity of the subject property access and that shallow overflow paths into the laneway from Nathan Court and Cranbrae Residential are not blocked by solid fencing.

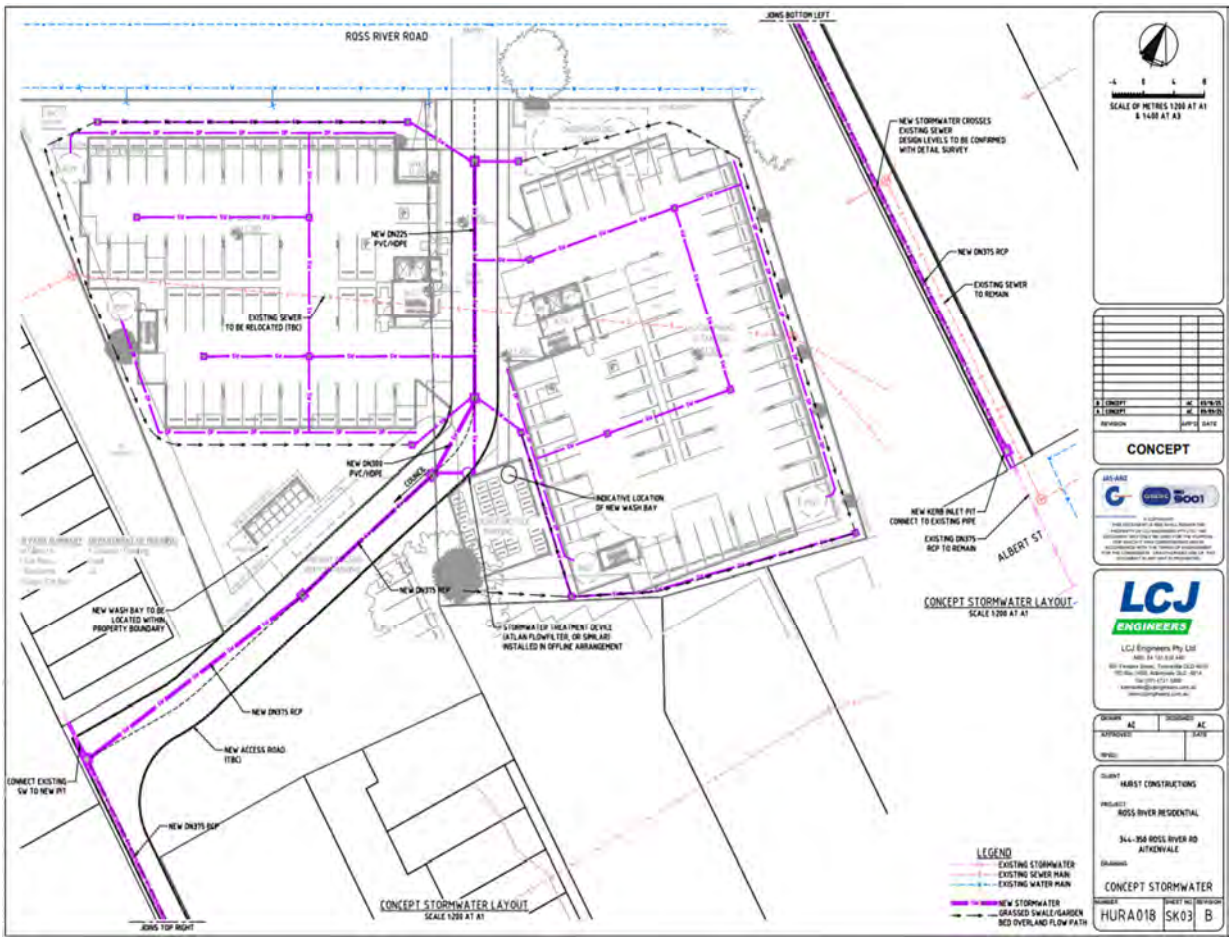


Figure 4 Concept Stormwater Layout from the Stormwater Management Plan (LCJ, 03/10/25)

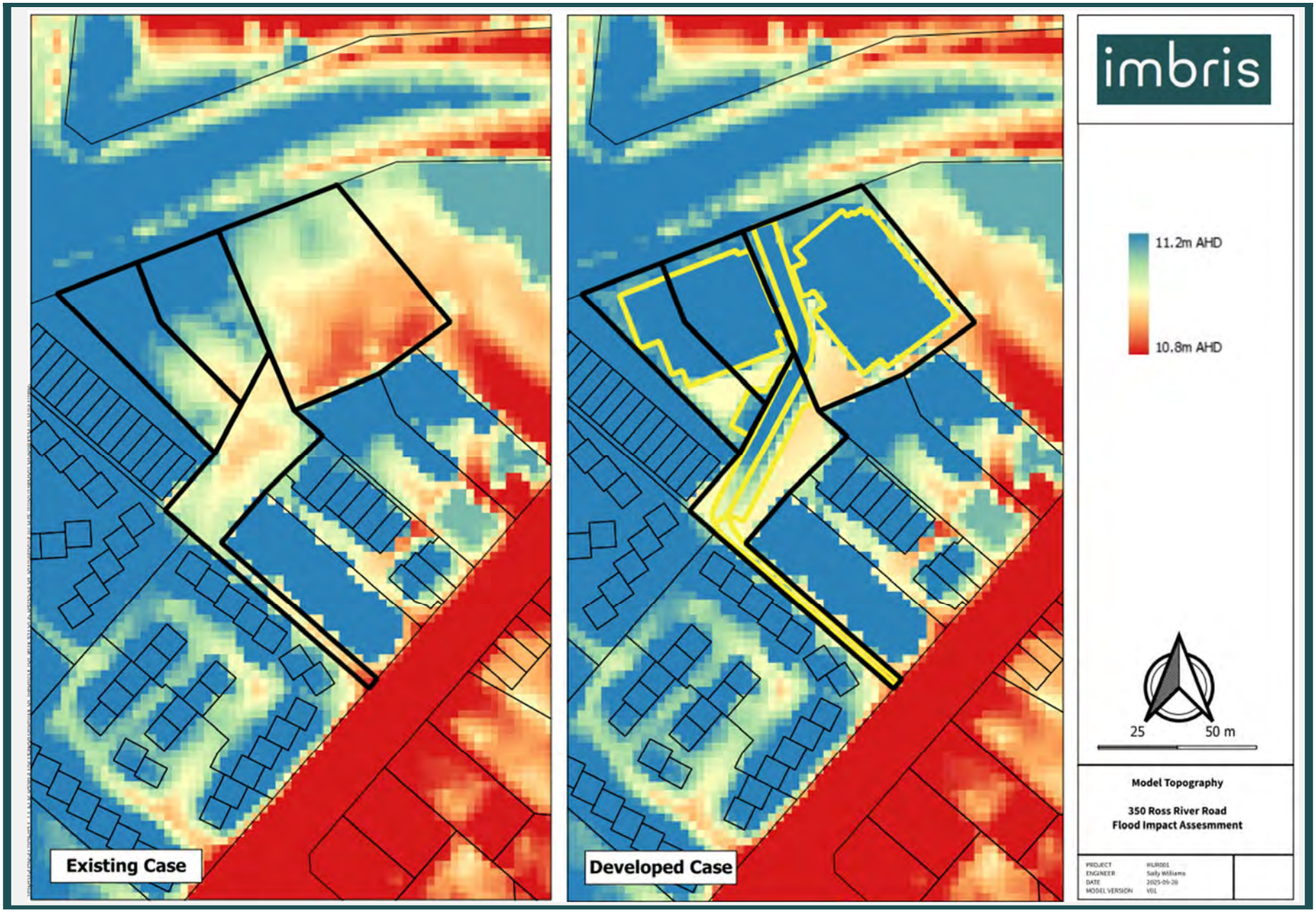


Figure 5 Hydraulic Model Topography (Existing and Developed)

2.4 Results and Discussion

The developed case model was run for the same critical durations and for all AEPs as the existing case. Maps of the maximum water depth and flow velocity, and the difference in water surface level (afflux) between the developed case and the existing case are provided in Appendix A.

Key outcomes of the developed case flood impact assessment include:

- Up to the DFE, peak water depths in lawn areas surrounding the building pads are in the order of 0.1-0.25 m (Maps A1-A6).
- No significant increases (i.e. < 10 mm) in peak flood levels are predicted outside of the proposed development lot up to the DFE (Maps A7-A12).
- Overland flow velocities across the site remain below 0.25 m/s up to the DFE (Map A13).
- Although inundated in some parts, the access road via the rear laneway is expected to remain trafficable up to the DFE.
- Figure 6 shows the flood hazard map for the developed case. Hazard categories are defined according to the "Technical flood risk management guideline: Flood hazard - Supporting document for the implementation of Australian Emergency Management Handbook 7, Managing the floodplain: Best practice in flood risk management in Australia" by the Australian Emergency Management Institute.
- Figure 6 shows that for the developed-case scenario the subject lot remains within the "H1: No restrictions" category.

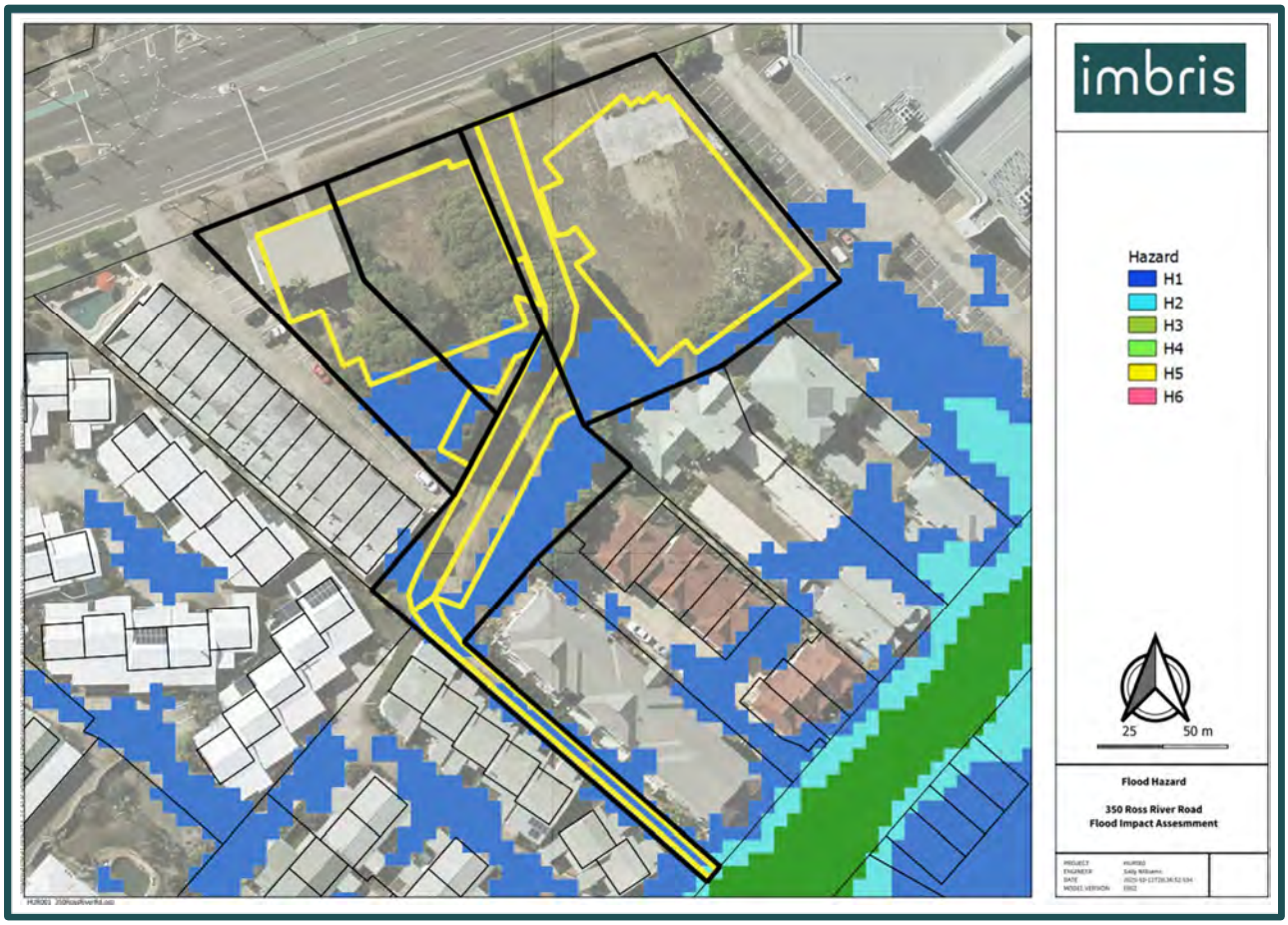


Figure 6 Developed Case 1% AEP Flood Hazard Mapping

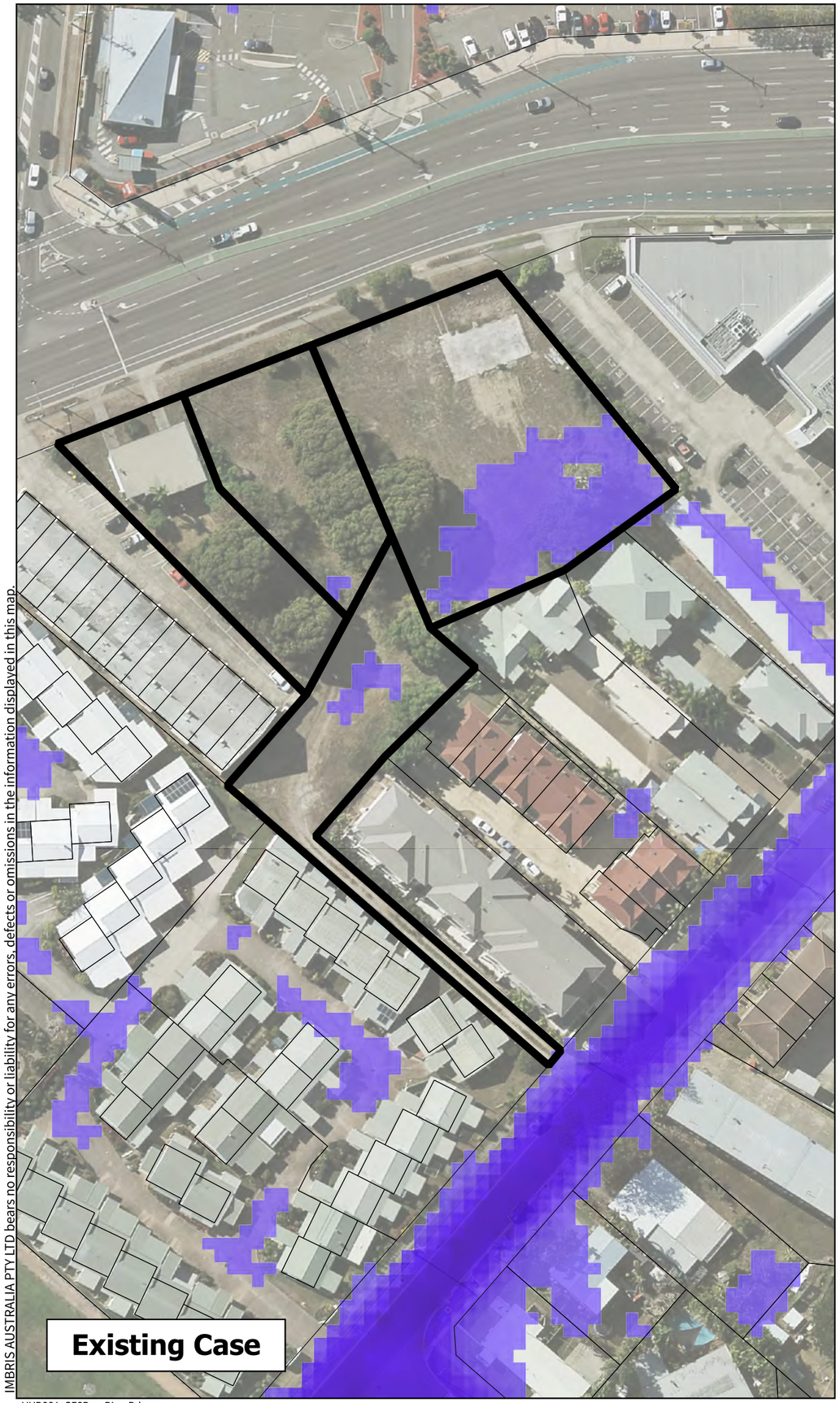
3.0 Conclusion

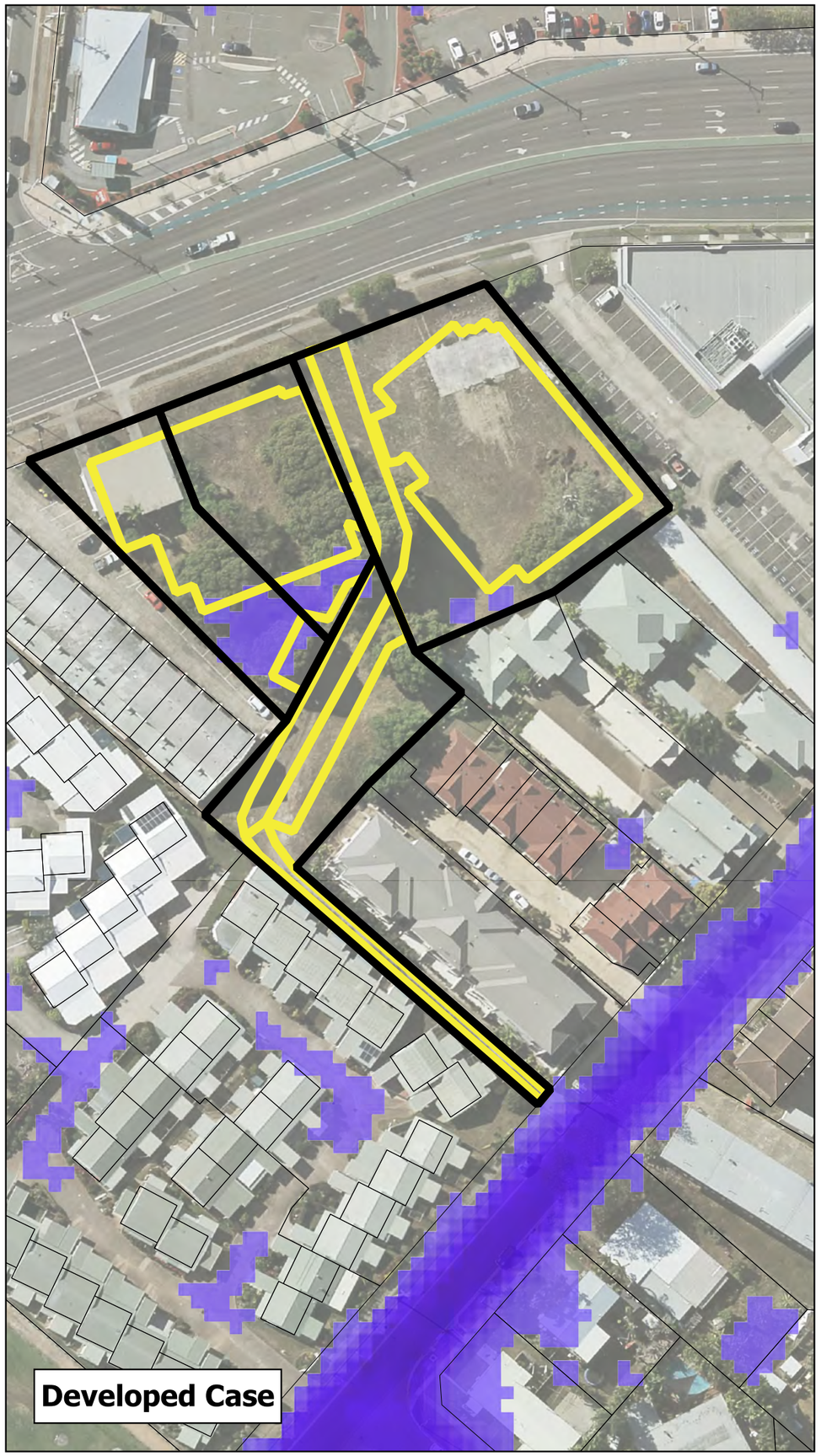
A flood impact assessment has been undertaken in relation to the proposed development of Lot 3 on SP146326 (344-346 Ross River Road) and Lots 1 and 2 on RP721729 (348 and 350 Ross River Road, respectively).

Under the assumptions described within this report, the impacts on flood events up to the TCC DFE have been evaluated to confirm no adverse impacts on flood levels, depths, flow velocities and time of inundation external to the site.

Townsville City Council (TCC) Flood Hazard Planning Scheme Policy (Part 8.2.6.3 and Schedule 6.7.3.1.1) outlines several assessment benchmarks associated for proposed developments. The development outcomes in relation to these benchmarks are summarised in Table 1.

Appendix A - Mapping





HUR001_350RossRiverRd.qgz

imbris

Water Depth (m)
- >0.1
- 0.3
- 0.5
- 0.75
- 1
- 1.5
- 2
- >3

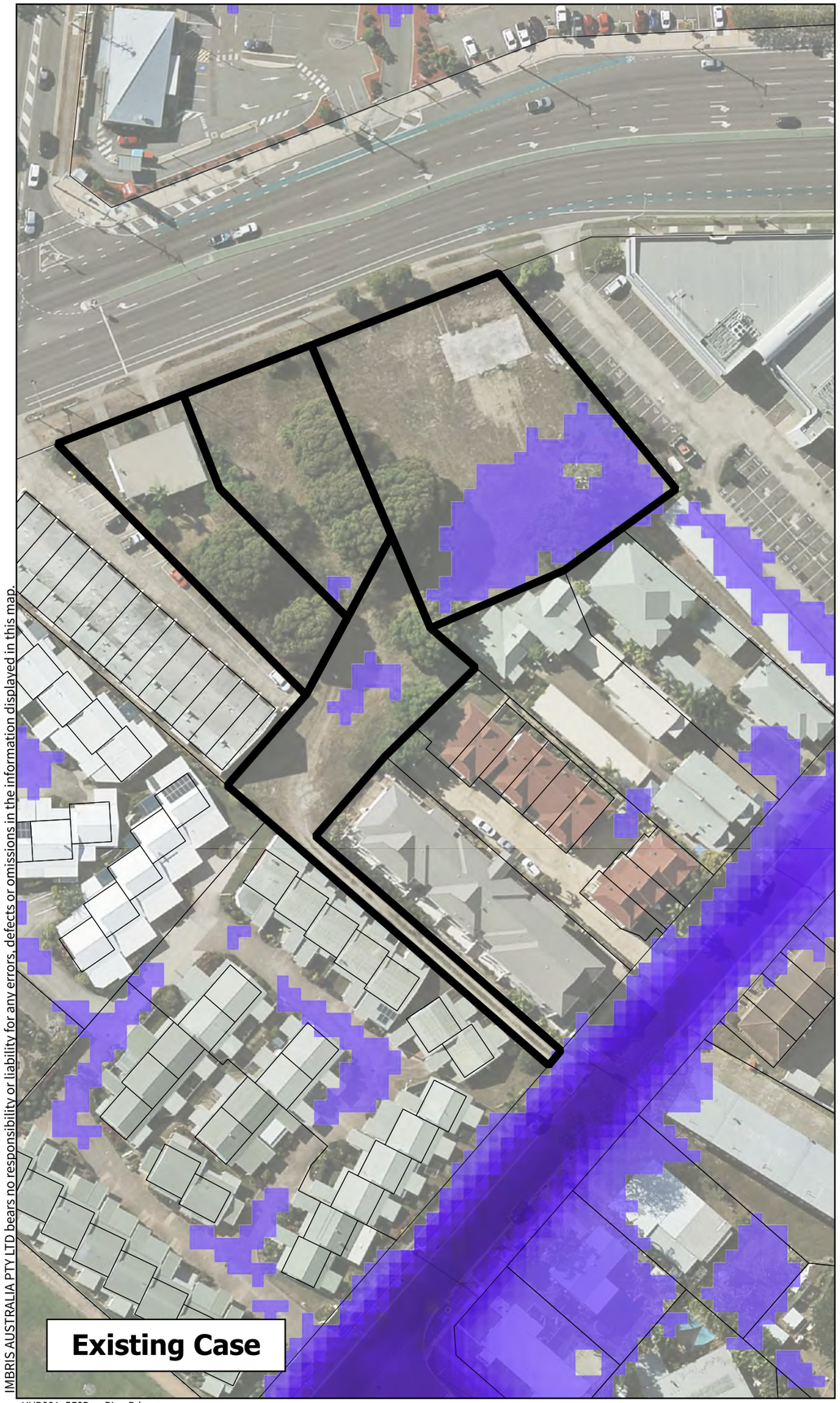
25 50 m

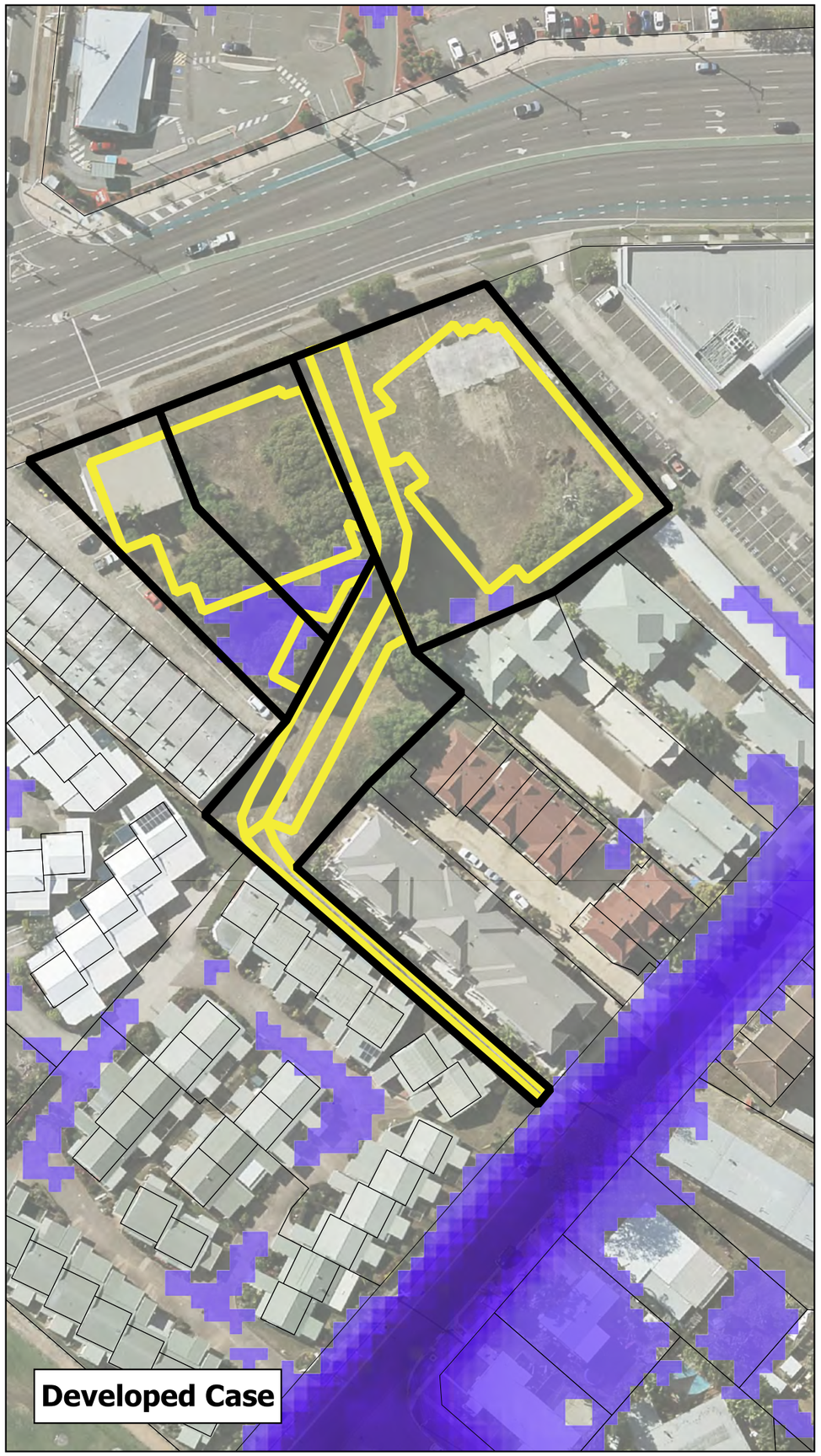
50% AEP - Maximum Water Depth

350 Ross River Road
Flood Impact Assesmment

PROJECT	HUR001
ENGINEER	Sally Williams
DATE	2025-09-28
MODEL VERSION	V01

Map A1





HUR001_350RossRiverRd.qgz

imbris

Water Depth (m)
- >0.1
- 0.3
- 0.5
- 0.75
- 1
- 1.5
- 2
- >3

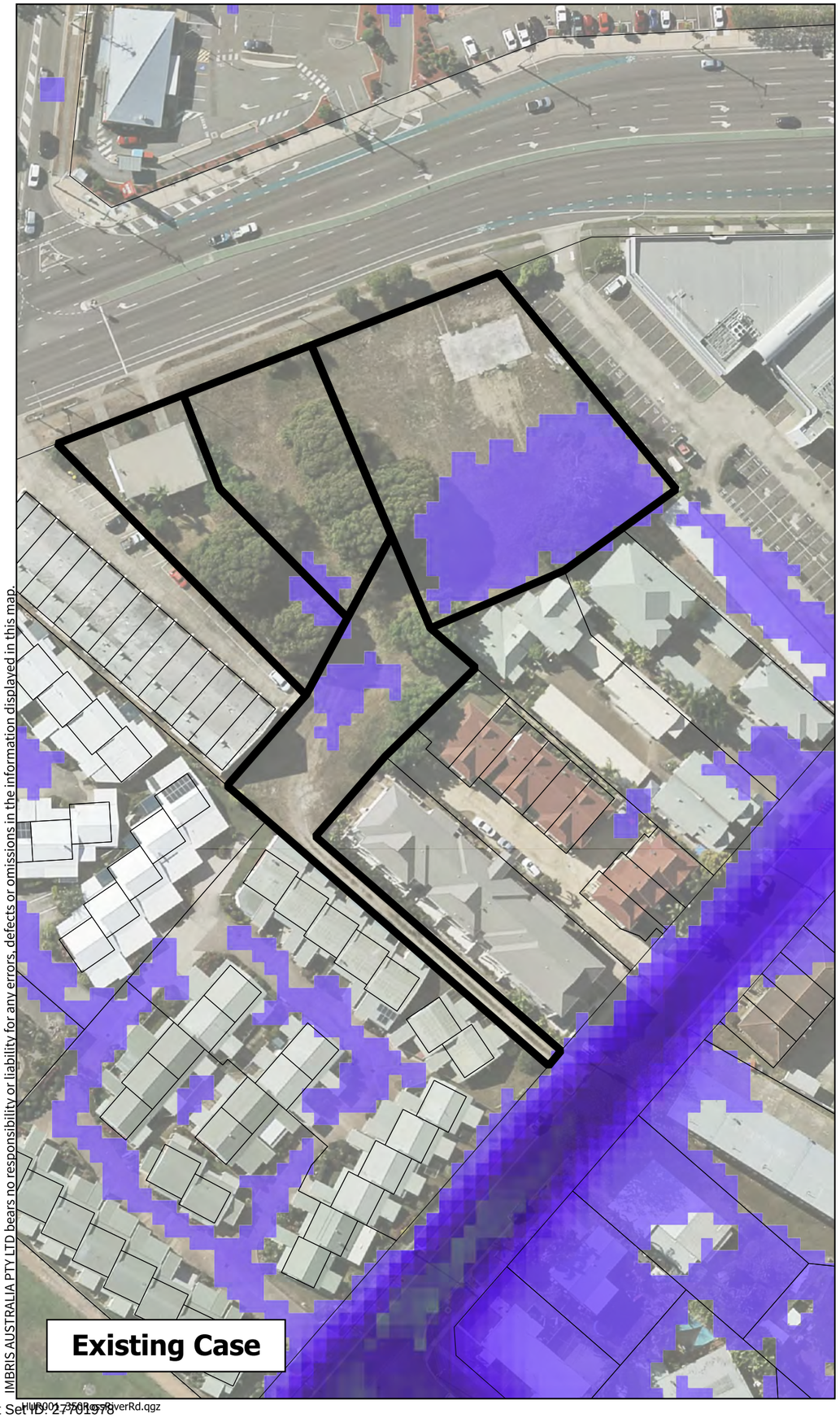
25 50 m

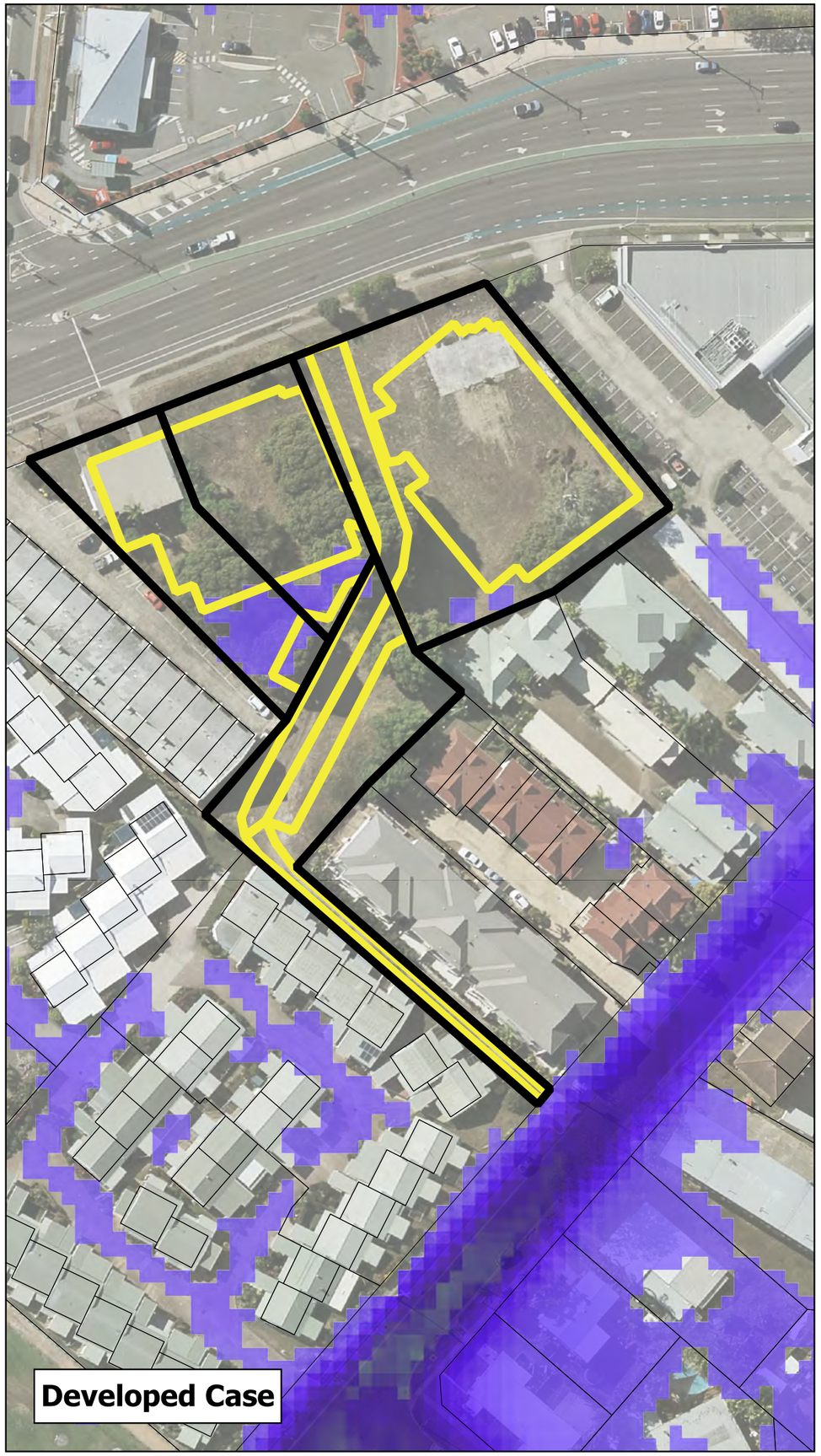
20% AEP - Maximum Water Depth

350 Ross River Road
Flood Impact Assesmment

PROJECT	HUR001
ENGINEER	Sally Williams
DATE	2025-09-28
MODEL VERSION	V01

Map A2





HUR001_350RossRiverRd.qgz

imbris

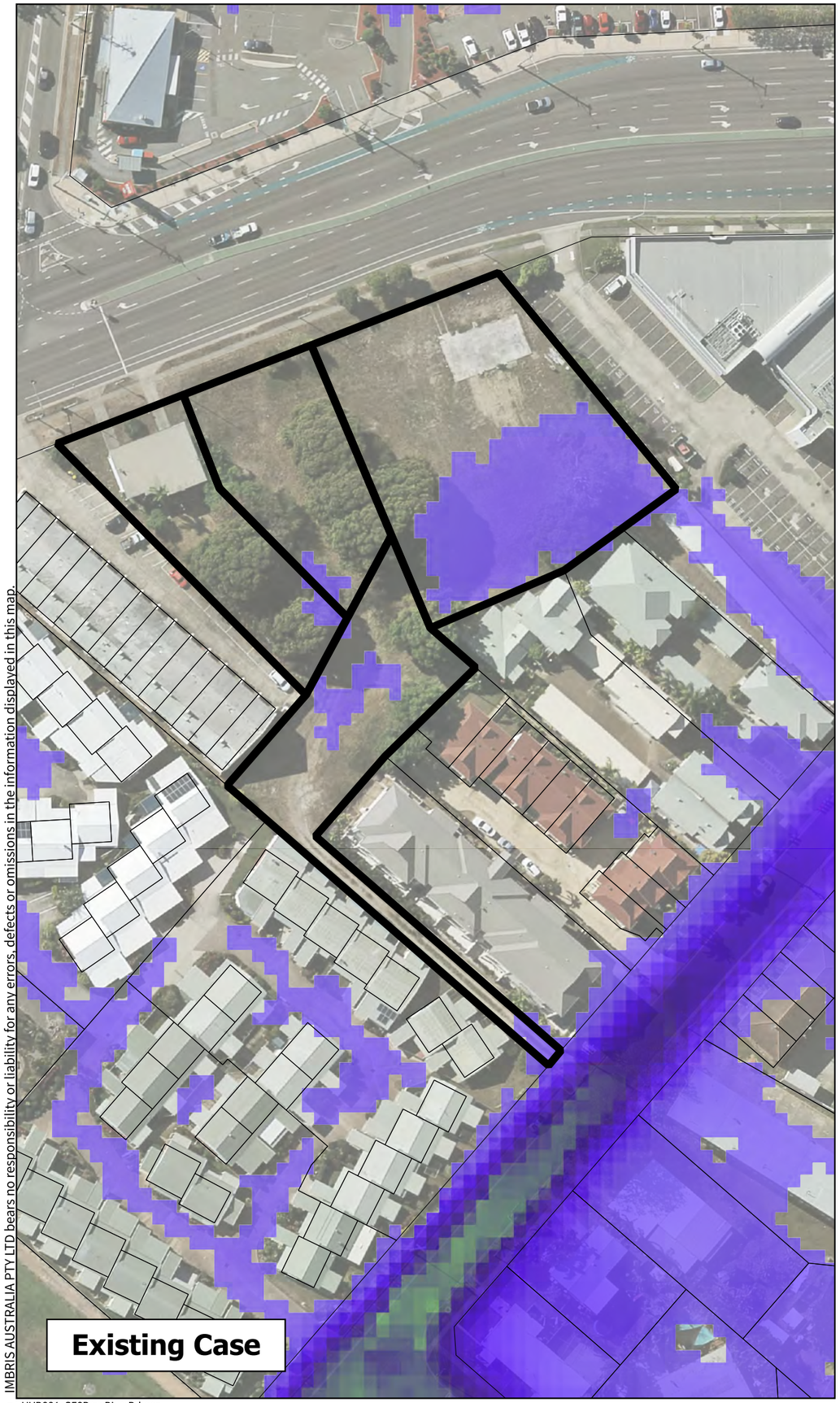
Water Depth (m)
- >0.1
- 0.3
- 0.5
- 0.75
- 1
- 1.5
- 2
- >3

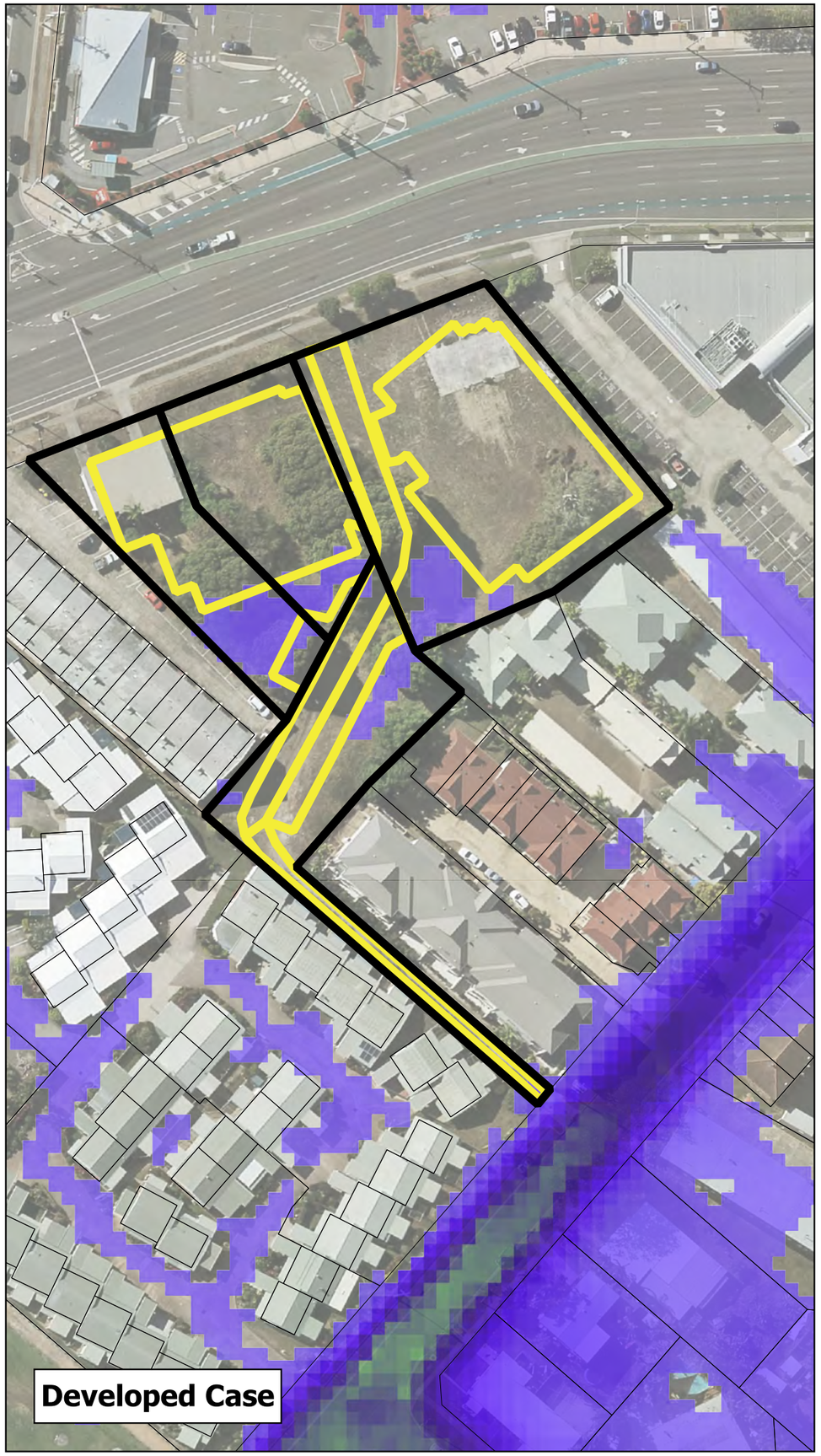
25 50 m

10% AEP - Maximum Water Depth

350 Ross River Road
Flood Impact Assesmment

PROJECT	HUR001	**Map A3**
ENGINEER	Sally Williams	
DATE	2025-09-28	
MODEL VERSION	V01	





HUR001_350RossRiverRd.qgz

imbris

Water Depth (m)
- >0.1
- 0.3
- 0.5
- 0.75
- 1
- 1.5
- 2
- >3

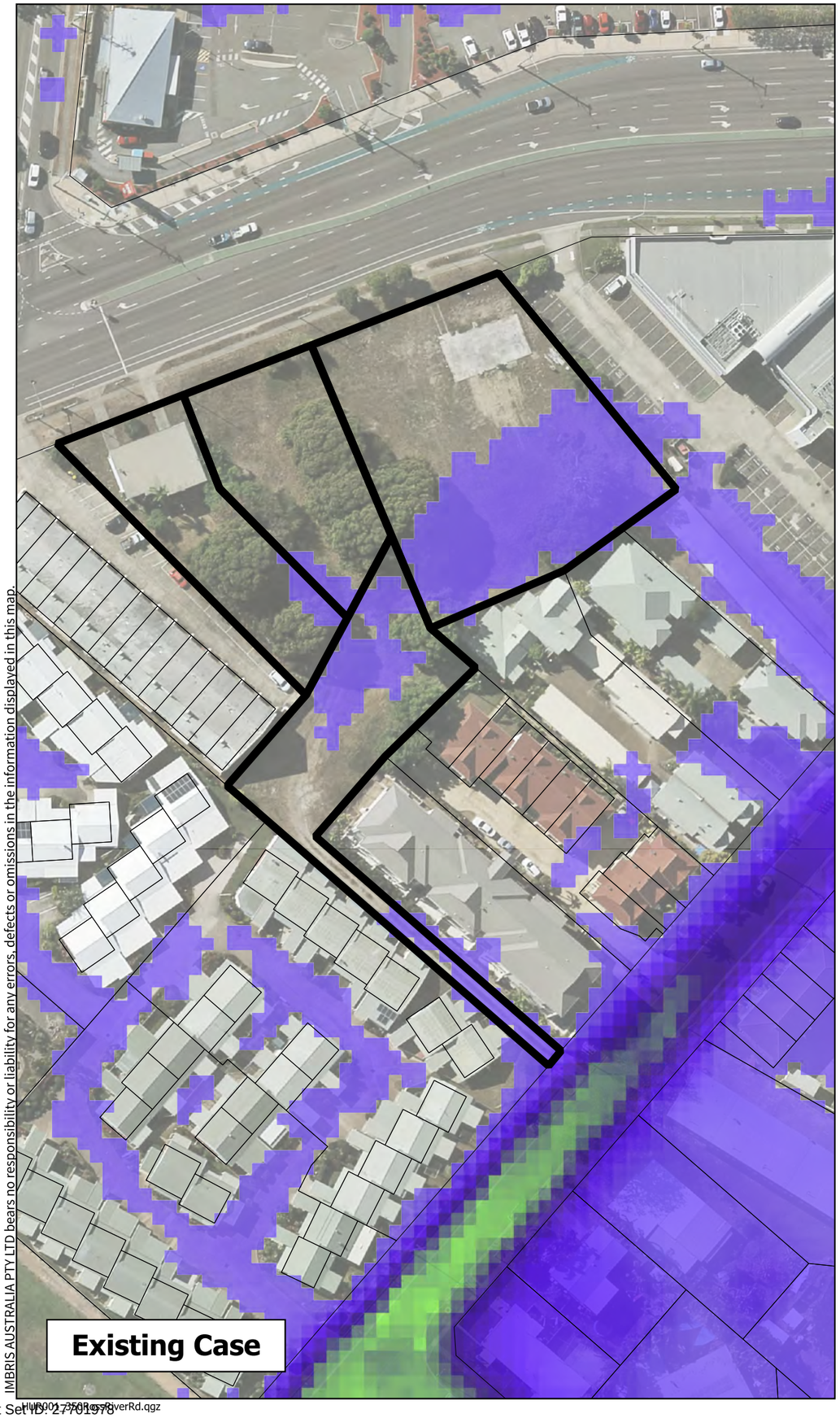
25 50 m

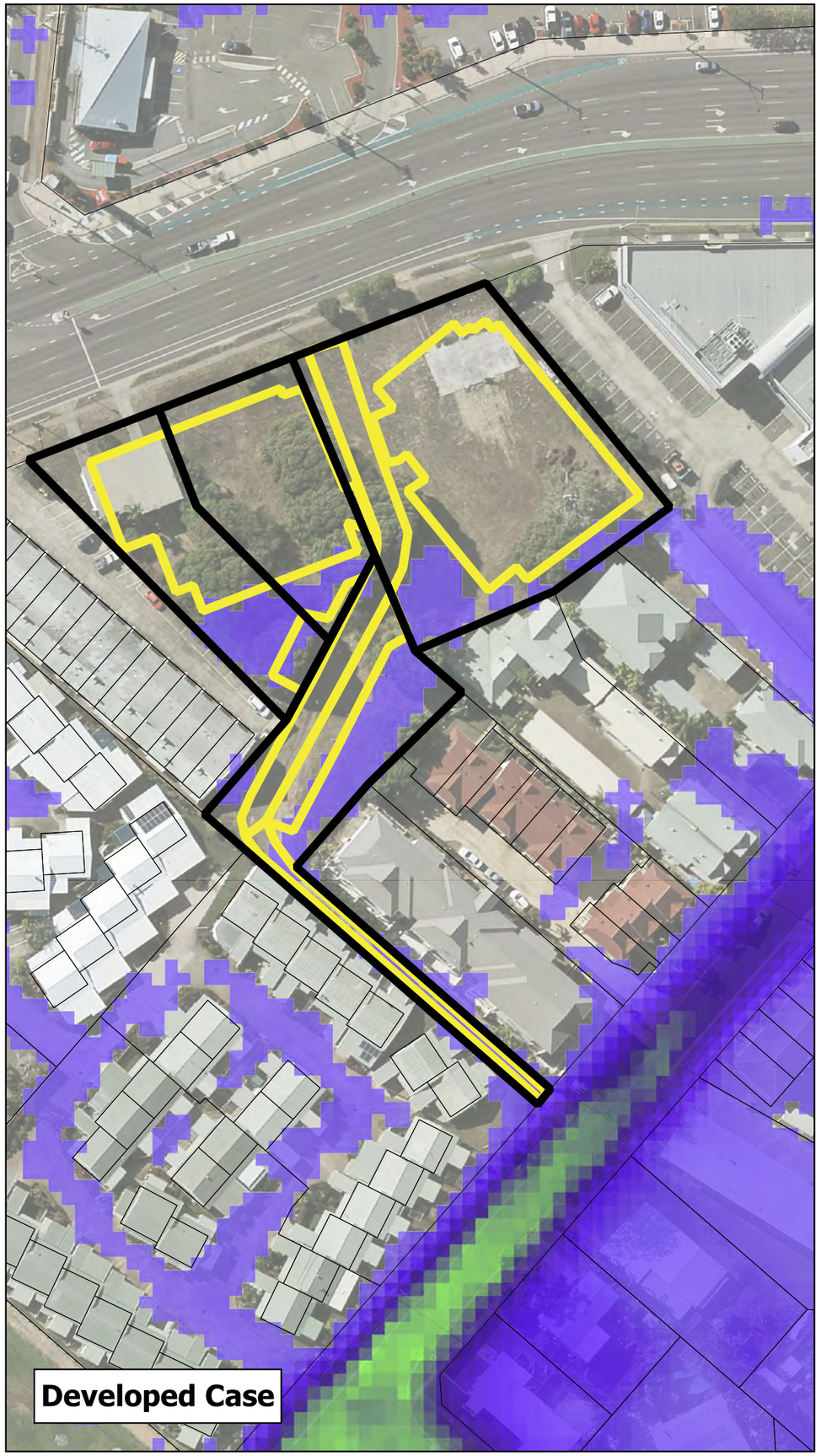
5% AEP - Maximum Water Depth

350 Ross River Road
Flood Impact Assesmment

PROJECT	HUR001
ENGINEER	Sally Williams
DATE	2025-09-28
MODEL VERSION	V01

Map A4





imbris

Water Depth (m)
- >0.1
- 0.3
- 0.5
- 0.75
- 1
- 1.5
- 2
- >3

25 50 m

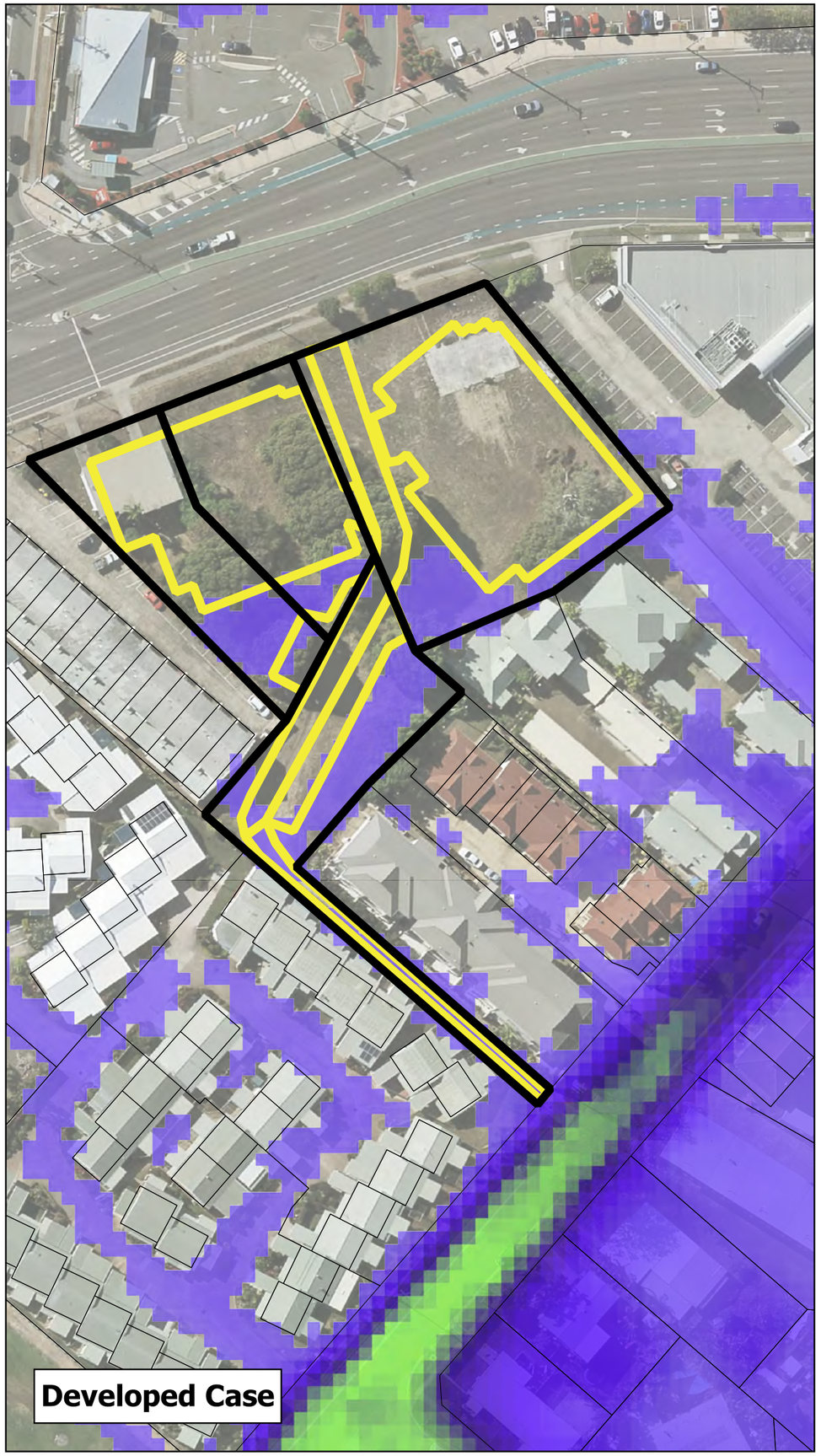
2% AEP - Maximum Water Depth

350 Ross River Road
Flood Impact Assesmment

PROJECT	HUR001
ENGINEER	Sally Williams
DATE	2025-09-28
MODEL VERSION	V01

Map A5

HUR001_350RossRiverRd.qgz



HUR001_350RossRiverRd.qgz

imbris

Water Depth (m)
- >0.1
- 0.3
- 0.5
- 0.75
- 1
- 1.5
- 2
- >3

25 50 m

1% AEP - Maximum Water Depth

350 Ross River Road
Flood Impact Assesmment

PROJECT	HUR001
ENGINEER	Sally Williams
DATE	2025-09-28
MODEL VERSION	V01

Map A6

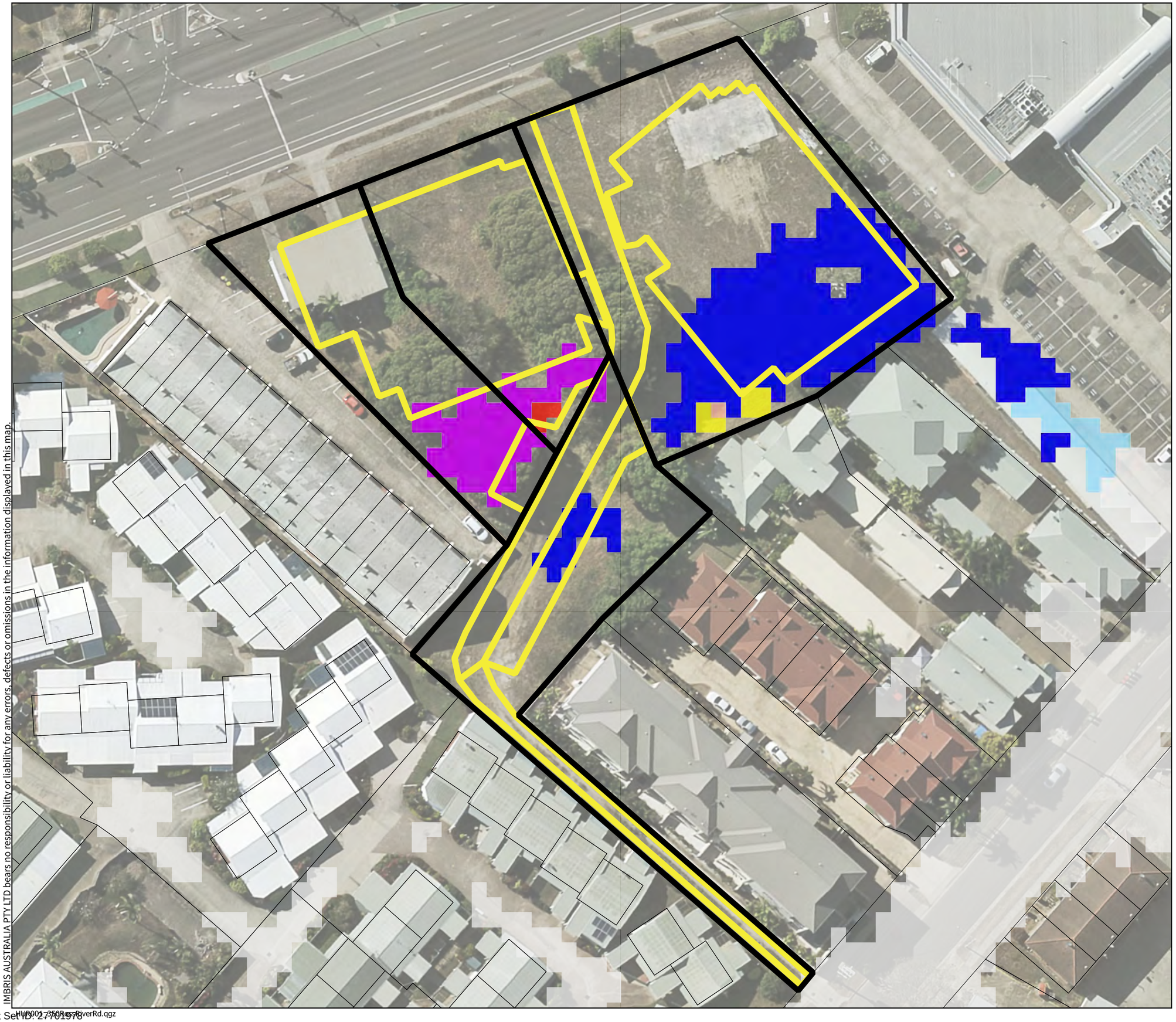
HUR001_350RossRiverRd.qgz

50% AEP - Afflux

350 Ross River Road
Flood Impact Assesmment

PROJECT	HUR001
ENGINEER	Sally Williams
DATE	2025-10-12T20:45:18.705
MODEL VERSION	E002

Map A7



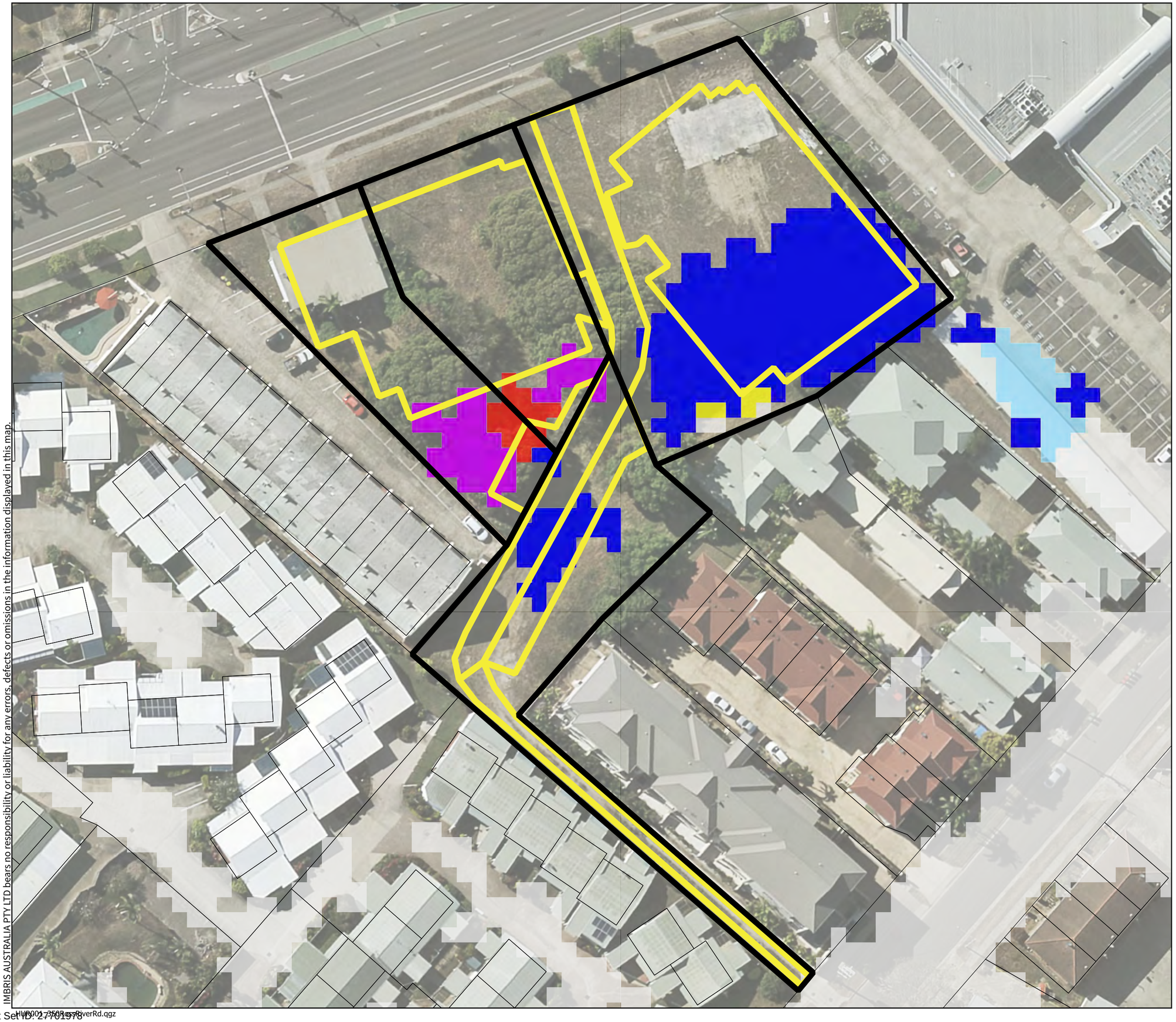
imbris

20% AEP - Afflux

350 Ross River Road
Flood Impact Assesmment

PROJECT	HUR001	**Map A8**
ENGINEER	Sally Williams	
DATE	2025-10-12T20:47:50.289	
MODEL VERSION	E002	

HUR001_350RossRiverRd.qgz



imbris

10% AEP - Afflux

350 Ross River Road
Flood Impact Assesmment

PROJECT	HUR001	**Map A9**
ENGINEER	Sally Williams	
DATE	2025-10-12T20:48:27.130	
MODEL VERSION	E002	

HUR001_350RossRiverRd.qgz

imbris

Water Level Difference (m)

- <-0.01
- -0.01 - 0.01
- 0.01 - 0.025
- 0.025 - 0.05
- 0.05 - 0.10
- 0.10 - 0.20
- >0.2
- Was Wet Now Dry
- Was Dry Now Wet

25 50 m

5% AEP - Afflux

350 Ross River Road
Flood Impact Assesmment

PROJECT	HUR001
ENGINEER	Sally Williams
DATE	2025-10-12T20:50:08.188
MODEL VERSION	E002

Map A10

HUR001_350RossRiverRd.qgz

HUR001_350RossRiverRd.qgz

imbris

2% AEP - Afflux

350 Ross River Road
Flood Impact Assesmment

PROJECT	HUR001
ENGINEER	Sally Williams
DATE	2025-10-13T07:20:57.759
MODEL VERSION	E002

Map A11

imbris

1% AEP - Afflux

350 Ross River Road
Flood Impact Assesmment

PROJECT	HUR001
ENGINEER	Sally Williams
DATE	2025-10-13T07:19:46.233
MODEL VERSION	E002

Map A12

HUR001_350RossRiverRd.qgz

Velocity (m/s)
- < 0.25
- 0.25 - 0.50
- 0.50 - 0.75
- 0.75 - 1.00
- 1.00 - 1.25
- 1.25 - 1.50
- 1.50 - 2.00
- 2.00 - 2.50
- 2.50 - 3.00
- > 3.00

25 50 m

HUR001_250RossRiverRd.qgz

1% AEP - Maximum Flow Velocity

350 Ross River Road
Flood Impact Assesmment

PROJECT	HUR001
ENGINEER	Sally Williams
DATE	2025-10-12T20:54:46.456
MODEL VERSION	E002

Map A13

APPENDIX I

State Code 1 Assessment

brazier motti

State code 1: Development in a state-controlled road environment

State Development Assessment Provisions guideline - State Code 1: Development in a state-controlled road environment. This guideline provides direction on how to address State Code 1.

Table 1.1 Development in general

Performance outcomes	Acceptable outcomes	Response
Buildings, structures, infrastructure, services and utilities		
PO1 The location of the development does not create a safety hazard for users of the **state-controlled road.**	**AO1.1** Development is not located in a **state-controlled road**. AND **AO1.2** Development can be maintained without requiring access to a **state-controlled road**.	**Complies** Refer to the Traffic Impact Assessment prepared by Premise (***Appendix F***).
PO2 The design and construction of the development does not adversely impact the **structural integrity** or physical condition of the **state-controlled road** or **road transport infrastructure**.	No acceptable outcome is prescribed.	**Complies** Refer to the Traffic Impact Assessment prepared by Premise (***Appendix F***).
PO3 The location of the development does not obstruct **road transport infrastructure** or adversely impact the operating performance of the **state-controlled road**.	No acceptable outcome is prescribed.	**Complies** Refer to the Traffic Impact Assessment prepared by Premise (***Appendix F***).
PO4 The location, placement, design and operation of advertising devices, visible from the **state-controlled road**, do not create a safety hazard for users of the **state-controlled road**.	No acceptable outcome is prescribed.	**Not applicable.**

Performance outcomes	Acceptable outcomes	Response
PO5 The design and construction of buildings and **structures** does not create a safety hazard by distracting users of the **state-controlled road**.	**AO5.1** Facades of buildings and **structures** fronting the **state-controlled road** are made of non-reflective materials. AND **AO5.2** Facades of buildings and **structures** do not direct or reflect point light sources into the face of oncoming traffic on the **state-controlled road**. AND **AO5.3** External lighting of buildings and **structures** is not directed into the face of oncoming traffic on the **state-controlled road**. AND **AO5.4** External lighting of buildings and **structures** does not involve flashing or laser lights.	**Complies** Refer to concept design plans showing external material. These aspects can be conditioned. External lighting will be as per Australian Standard.
PO6 Road, pedestrian and bikeway bridges over a **state-controlled road** are designed and constructed to prevent projectiles from being thrown onto the **state-controlled road**.	**AO6.1** Road, pedestrian and bikeway bridges over the **state-controlled road** include throw protection screens in accordance with section 4.11 of the Design Criteria for Bridges and Other Structures Manual, Department of Transport and Main Roads, 2020.	**Not applicable.**
Landscaping		
PO7 The location of landscaping does not create a safety hazard for users of the **state-controlled road**.	**AO7.1** Landscaping is not located in a **state-controlled road**. AND **AO7.2** Landscaping can be maintained without requiring access to a **state-controlled road**.	**Complies** Landscaping is proposed internal to the site.

Performance outcomes	Acceptable outcomes	Response
	AND **AO7.3** Landscaping does not block or obscure the sight lines for vehicular access to a **state-controlled road**.	
Stormwater and overland flow		
PO8 Stormwater run-off or overland flow from the development site does not create or exacerbate a safety hazard for users of the **state-controlled road**.	No acceptable outcome is prescribed.	**Complies** Refer to Stormwater Management Plan prepared by LCJ Engineers (***Appendix E***).
PO9 Stormwater run-off or overland flow from the development site does not result in a material worsening of the operating performance of the **state-controlled road** or **road transport infrastructure**.	No acceptable outcome is prescribed.	**Complies** Refer to Stormwater Management Plan prepared by LCJ Engineers (***Appendix E***).
PO10 Stormwater run-off or overland flow from the development site does not adversely impact the **structural integrity** or physical condition of the **state-controlled road** or **road transport infrastructure**.	No acceptable outcome is prescribed.	**Complies** Refer to Stormwater Management Plan prepared by LCJ Engineers (***Appendix E***).
PO11 Development ensures that stormwater is lawfully discharged.	**AO11.1** Development does not create any new points of discharge to a **state-controlled road.** AND **AO11.2** Development does not concentrate flows to a **state-controlled road**. AND **AO11.3** Stormwater run-off is discharged to a **lawful point of discharge**. AND	**Complies** Refer to Stormwater Management Plan prepared by LCJ Engineers (***Appendix E***).

Performance outcomes	Acceptable outcomes	Response
	AO11.4 Development does not worsen the condition of an existing **lawful point of discharge** to the **state-controlled road**.	
Flooding		
PO12 Development does not result in a material worsening of flooding impacts within a **state-controlled road**.	**AO12.1** For all flood events up to 1% **annual exceedance probability**, development results in negligible impacts (within +/- 10mm) to existing flood levels within a **state-controlled road**. AND **AO12.2** For all flood events up to 1% **annual exceedance probability**, development results in negligible impacts (up to a 10% increase) to existing peak velocities within a **state-controlled road**. AND **AO12.3** For all flood events up to 1% **annual exceedance probability**, development results in negligible impacts (up to a 10% increase) to existing time of submergence of a **state-controlled road**.	**Complies** Refer to the Flood Impact Assessment prepared by Imbris (***Appendix H***).
Drainage Infrastructure		
PO13 Drainage infrastructure does not create a safety hazard for users in the **state-controlled road**.	**AO13.1** Drainage infrastructure is wholly contained within the development site, except at the **lawful point of discharge**. AND	**Complies** Refer to Stormwater Management Plan prepared by LCJ Engineers (***Appendix E***).

Performance outcomes	Acceptable outcomes	Response
	AO13.2 Drainage infrastructure can be maintained without requiring access to a **state-controlled road**.	
PO14 Drainage infrastructure associated with, or within, a **state-controlled road** is constructed, and designed to ensure the **structural integrity** and physical condition of existing drainage infrastructure and the surrounding drainage network.	No acceptable outcome is prescribed.	**Complies** Refer to Stormwater Management Plan prepared by LCJ Engineers (***Appendix E***).

Table 1.2 Vehicular access, road layout and local roads

Performance outcomes	Acceptable outcomes	Response
Vehicular access to a state-controlled road or within 100 metres of a state-controlled road intersection		
PO15 The location, design and operation of a **new or changed access** to a **state-controlled road** does not compromise the safety of users of the **state-controlled road**.	No acceptable outcome is prescribed.	**Not applicable**
PO16 The location, design and operation of a **new or changed access** does not adversely impact the **functional requirements** of the **state-controlled road**.	No acceptable outcome is prescribed.	**Not applicable**
PO17 The location, design and operation of a **new or changed access** is consistent with the **future intent** of the **state-controlled road**.	No acceptable outcome is prescribed.	**Not applicable**
PO18 New or changed access is consistent with the access for the relevant **limited access road policy**: 1. **LAR 1** where direct access is prohibited; or 2. **LAR 2** where access may be permitted, subject to assessment.	No acceptable outcome is prescribed.	**Not applicable**
PO19 New or changed access to a **local road** within 100 metres of an intersection with a **state-controlled road** does not compromise the safety of users of the **state-controlled road**.	No acceptable outcome is prescribed.	**Not applicable**

Performance outcomes	Acceptable outcomes	Response
PO20 New or changed access to a **local road** within 100 metres of an intersection with a **state-controlled road** does not adversely impact on the operating performance of the intersection.	No acceptable outcome is prescribed.	**Not applicable**
Public passenger transport and active transport		
PO21 Development does not compromise the safety of users of **public passenger transport infrastructure**, **public passenger services** and **active transport infrastructure**.	No acceptable outcome is prescribed.	**Complies** Refer to the Traffic Impact Assessment prepared by Premise (***Appendix F***).
PO22 Development maintains the ability for people to access **public passenger transport infrastructure, public passenger services** and **active transport infrastructure**.	No acceptable outcome is prescribed.	**Complies** Refer to the Traffic Impact Assessment prepared by Premise (***Appendix F***).
PO23 Development does not adversely impact the operating performance of **public passenger transport infrastructure, public passenger services** and **active transport infrastructure**.	No acceptable outcome is prescribed.	**Complies** Refer to the Traffic Impact Assessment prepared by Premise (***Appendix F***).
PO24 Development does not adversely impact the **structural integrity** or physical condition of **public passenger transport infrastructure** and **active transport infrastructure**.	No acceptable outcome is prescribed.	**Complies** Refer to the Traffic Impact Assessment prepared by Premise (***Appendix F***).

Table 1.3 Network impacts

Performance outcomes	Acceptable outcomes	Response
PO25 Development does not compromise the safety of users of the **state-controlled road** network.	No acceptable outcome is prescribed.	**Complies** Refer to the Traffic Impact Assessment prepared by Premise (***Appendix F***).
PO26 Development ensures **no net worsening** of the operating performance of the **state-controlled road** network.	No acceptable outcome is prescribed.	**Complies** Refer to the Traffic Impact Assessment prepared by Premise (***Appendix F***).
PO27 Traffic movements are not directed onto a **state-controlled road** where they can be accommodated on the **local road** network.	No acceptable outcome is prescribed.	**Complies** Refer to the Traffic Impact Assessment prepared by Premise (***Appendix F***).

Performance outcomes	Acceptable outcomes	Response
PO28 Development involving haulage exceeding 10,000 tonnes per year does not adversely impact the pavement of a **state-controlled road**.	No acceptable outcome is prescribed.	Not applicable.
PO29 Development does not impede delivery of **planned upgrades** of **state-controlled roads**.	No acceptable outcome is prescribed.	Not applicable.
PO30 Development does not impede delivery of **corridor improvements** located entirely within the **state-controlled road corridor**.	No acceptable outcome is prescribed.	Not applicable

Table 1.4 Filling, excavation, building foundations and retaining structures

Performance outcomes	Acceptable outcomes	Response
PO31 Development does not create a safety hazard for users of the **state-controlled road** or **road transport infrastructure**.	No acceptable outcome is prescribed.	**Complies** To be conditioned.
PO32 Development does not adversely impact the operating performance of the **state-controlled road**.	No acceptable outcome is prescribed.	**Complies** Refer to the Traffic Impact Assessment prepared by Premise (***Appendix F***).
PO33 Development does not undermine, damage or cause subsidence of a **state-controlled road**.	No acceptable outcome is prescribed.	**Complies** To be conditioned.
PO34 Development does not cause ground water disturbance in a **state-controlled road**.	No acceptable outcome is prescribed.	**Complies** To be conditioned.
PO35 Excavation, boring, piling, blasting and fill compaction do not adversely impact the physical condition or **structural integrity** of a **state-controlled road** or **road transport infrastructure**.	No acceptable outcome is prescribed.	**Complies** To be conditioned.
PO36 Filling and excavation associated with the construction of **new or changed access** do not compromise the operation or capacity of existing drainage infrastructure for a **state-controlled road.**	No acceptable outcome is prescribed.	**Complies** To be conditioned.

Table 1.5 Environmental emissions

Statutory note: Where a **state-controlled road** is co-located in the same transport corridor as a railway, the development should instead comply with Environmental emissions in State code 2: Development in a railway environment.

Performance outcomes	Acceptable outcomes	Response
Reconfiguring a lot		
Involving the creation of 5 or fewer new residential lots adjacent to a state-controlled road or type 1 multi-modal corridor		
PO37 Development minimises free field noise intrusion from a **state-controlled road.**	**AO37.1** Development provides a noise barrier or earth mound which is designed, sited and constructed: 1. to achieve the maximum free field acoustic levels in reference table 2 (item 2.1); 2. in accordance with: a. Chapter 7 integrated noise barrier design of the Transport Noise Management Code of Practice: Volume 1 (Road Traffic Noise), Department of Transport and Main Roads, 2013; b. Technical Specification-MRTS15 Noise Fences, Transport and Main Roads, 2019; c. Technical Specification-MRTS04 General Earthworks, Transport and Main Roads, 2020. OR **AO37.2** Development achieves the maximum free field acoustic levels in reference table 2 (item 2.1) by **alternative noise attenuation measures** where it is not practical to provide a noise barrier or earth mound. OR **AO37.3** Development provides a **solid gap-free fence** or other **solid gap-free structure** along the full extent of the boundary closest to the **state-controlled road**.	Not applicable
Involving the creation of 6 or more new residential lots adjacent to a state-controlled road or type 1 multi-modal corridor		

Performance outcomes	Acceptable outcomes	Response
PO38 Reconfiguring a lot minimises free field noise intrusion from a **state-controlled road.**	**AO38.1** Development provides noise barrier or earth mound which is designed, sited and constructed: 1. to achieve the maximum free field acoustic levels in reference table 2 (item 2.1); 2. in accordance with: a. Chapter 7 integrated noise barrier design of the Transport Noise Management Code of Practice: Volume 1 (Road Traffic Noise), Department of Transport and Main Roads, 2013; b. Technical Specification-MRTS15 Noise Fences, Transport and Main Roads, 2019; c. Technical Specification-MRTS04 General Earthworks, Transport and Main Roads, 2020. OR **AO38.2** Development achieves the maximum free field acoustic levels in reference table 2 (item 2.1) by **alternative noise attenuation measures** where it is not practical to provide a noise barrier or earth mound.	**Not applicable**
Material change of use (accommodation activity)		
Ground floor level requirements adjacent to a state-controlled road or type 1 multi-modal corridor		
PO39 Development minimises noise intrusion from a **state-controlled road** in **private open space**.	**AO39.1** Development provides a noise barrier or earth mound which is designed, sited and constructed: 1. to achieve the maximum free field acoustic levels in reference table 2 (item 2.2) for **private open space** at the ground floor level; 2. in accordance with:	**Complies** Refer to the Noise Impact Assessment prepared by Stantec (***Appendix G***).

Performance outcomes	Acceptable outcomes	Response
	a. Chapter 7 integrated noise barrier design of the Transport Noise Management Code of Practice: Volume 1 (Road Traffic Noise), Department of Transport and Main Roads, 2013; b. Technical Specification-MRTS15 Noise Fences, Transport and Main Roads, 2019; c. Technical Specification-MRTS04 General Earthworks, Transport and Main Roads, 2020. OR **AO39.2** Development achieves the maximum free field acoustic level in reference table 2 (item 2.2) for **private open space** by **alternative noise attenuation measures** where it is not practical to provide a noise barrier or earth mound.	
PO40 Development (excluding a **relevant residential building** or **relocated building)** minimises noise intrusion from a **state-controlled road** in **habitable rooms** at the facade.	**AO40.1** Development (excluding a **relevant residential building** or **relocated building**) provides a noise barrier or earth mound which is designed, sited and constructed: 1. to achieve the maximum building façade acoustic level in reference table 1 (item 1.1) for **habitable rooms**; 2. in accordance with: a. Chapter 7 integrated noise barrier design of the Transport Noise Management Code of Practice: Volume 1 (Road Traffic Noise), Department of Transport and Main Roads, 2013; b. Technical Specification-MRTS15 Noise Fences, Transport and Main Roads, 2019;	**Complies** Refer to the Noise Impact Assessment prepared by Stantec (***Appendix G***).

Performance outcomes	Acceptable outcomes	Response
	c. Technical Specification-MRTS04 General Earthworks, Transport and Main Roads, 2020. OR **AO40.2** Development (excluding a **relevant residential building** or **relocated building**) achieves the maximum building façade acoustic level in reference table 1 (item 1.1) for **habitable rooms** by **alternative noise attenuation measures** where it is not practical to provide a noise barrier or earth mound.	
PO41 Habitable rooms (excluding a **relevant residential building** or **relocated building**) are designed and constructed using materials to achieve the maximum internal acoustic level in reference table 3 (item 3.1).	No acceptable outcome is provided.	**Complies** Refer to the Noise Impact Assessment prepared by Stantec (***Appendix G***).
Above ground floor level requirements (accommodation activity) adjacent to a state-controlled road or type 1 multi-modal corridor		
PO42 Balconies, podiums, and roof decks include: 1. a continuous **solid gap-free structure** or balustrade (excluding gaps required for drainage purposes to comply with the Building Code of Australia); 2. highly acoustically absorbent material treatment for the total area of the soffit above balconies, podiums, and roof decks.	No acceptable outcome is provided.	**Complies** Refer to the Noise Impact Assessment prepared by Stantec (***Appendix G***).
PO43 Habitable rooms (excluding a **relevant residential building** or **relocated building**) are designed and constructed using materials to achieve the maximum internal acoustic level in reference table 3 (item 3.1).	No acceptable outcome is provided.	**Complies** Refer to the Noise Impact Assessment prepared by Stantec (***Appendix G***).
Material change of use (other uses)		
Ground floor level requirements (childcare centre, educational establishment, hospital) adjacent to a state-controlled road or type 1 multi-modal corridor		
PO44 Development:	No acceptable outcome is provided.	**Not applicable**

Performance outcomes	Acceptable outcomes	Response
1. provides a noise barrier or earth mound that is designed, sited and constructed: a. to achieve the maximum free field acoustic level in reference table 2 (item 2.3) for all **outdoor education areas** and **outdoor play areas**; b. in accordance with: i. Chapter 7 integrated noise barrier design of the Transport Noise Management Code of Practice: Volume 1 (Road Traffic Noise), Department of Transport and Main Roads, 2013; ii. Technical Specification-MRTS15 Noise Fences, Transport and Main Roads, 2019; iii. Technical Specification-MRTS04 General Earthworks, Transport and Main Roads, 2020; or 2. achieves the maximum free field acoustic level in reference table 2 (item 2.3) for all **outdoor education areas** and **outdoor play areas** by **alternative noise attenuation measures** where it is not practical to provide a noise barrier or earth mound.		
PO45 Development involving a **childcare centre** or **educational establishment**: 1. provides a noise barrier or earth mound that is designed, sited and constructed: 2. to achieve the maximum building facade acoustic level in reference table 1 (item 1.2); 3. in accordance with: a. Chapter 7 integrated noise barrier design of the Transport Noise Management	No acceptable outcome is provided.	**Not applicable**

Performance outcomes	Acceptable outcomes	Response
Code of Practice: Volume 1 (Road Traffic Noise), Department of Transport and Main Roads, 2013; b. Technical Specification-MRTS15 Noise Fences, Transport and Main Roads, 2019; c. Technical Specification-MRTS04 General Earthworks, Transport and Main Roads, 2020; or 4. achieves the maximum building facade acoustic level in reference table 1 (item 1.2) by **alternative noise attenuation measures** where it is not practical to provide a noise barrier or earth mound.		
PO46 Development involving: 1. **indoor education areas** and **indoor play areas**; or 2. sleeping rooms in a **childcare centre**; or 3. **patient care areas** in a **hospital** achieves the maximum internal acoustic level in reference table 3 (items 3.2-3.4).	No acceptable outcome is provided.	**Not applicable**
Above ground floor level requirements (childcare centre, educational establishment, hospital) adjacent to a state-controlled road or type 1 multi-modal corridor		
PO47 Development involving a **childcare centre** or **educational establishment** which have balconies, podiums or elevated **outdoor play areas** predicted to exceed the maximum free field acoustic level in reference table 2 (item 2.3) due to noise from a **state-controlled road** are provided with: 1. a continuous **solid gap-free structure** or balustrade (excluding gaps required for drainage purposes to comply with the Building Code of Australia);	No acceptable outcome is provided.	**Not applicable**

Performance outcomes	Acceptable outcomes	Response
2. highly acoustically absorbent material treatment for the total area of the soffit above balconies or elevated **outdoor play areas**.		
PO48 Development including: 1. **indoor education areas** and **indoor play areas** in a **childcare centre** or **educational establishment**; or 2. sleeping rooms in a **childcare centre**; or 3. **patient care areas** in a **hospital** located above ground level, is designed and constructed to achieve the maximum internal acoustic level in reference table 3 (items 3.2-3.4).	No acceptable outcome is provided.	**Not applicable**
Air, light and vibration		
PO49 Private open space, **outdoor education areas** and **outdoor play areas** are protected from air quality impacts from a **state-controlled road**.	**AO49.1** Each dwelling or unit has access to a **private open space** which is shielded from a **state-controlled road** by a building, **solid gap-free fence**, or other **solid gap-free structure**. OR **AO49.2** Each **outdoor education area** and **outdoor play area** is shielded from a **state-controlled road** by a building, **solid gap-free fence,** or other **solid gap-free structure**.	**Not applicable**

Performance outcomes	Acceptable outcomes	Response
PO50 Patient care areas within **hospitals** are protected from vibration impacts from a **state-controlled road** or **type 1 multi-modal corridor**.	**AO50.1 Hospitals** are designed and constructed to ensure vibration in the patient treatment area does not exceed a vibration dose value of $0.1m/s^{1.75}$. AND **AO50.2 Hospitals** are designed and constructed to ensure vibration in the ward of a **patient care area** does not exceed a vibration dose value of $0.4m/s^{1.75}$.	**Not applicable**
PO51 Development is designed and sited to ensure light from infrastructure within, and from users of, a **state-controlled road** or **type 1 multi-modal corridor**, does not: 1. intrude into buildings during night hours (10pm to 6am); 2. create unreasonable disturbance during evening hours (6pm to 10pm).	No acceptable outcomes are prescribed.	**Not applicable**

Table 1.6: Development in a future state-controlled road environment

Performance outcomes	Acceptable outcomes	Response
PO52 Development does not impede delivery of a **future state-controlled road**.	**AO52.1** Development is not located in a **future state-controlled road**. OR ALL OF THE FOLLOWING APPLY: **AO52.2** Development does not involve filling and excavation of, or material changes to, a **future state-controlled road**. AND	**Not applicable**

Performance outcomes	Acceptable outcomes	Response
	AO52.3 The intensification of lots does not occur within a **future state-controlled road**. AND **AO52.4** Development does not result in the landlocking of parcels once a **future state-controlled road** is delivered.	
PO53 The location and design of **new or changed access** does not create a safety hazard for users of a **future state-controlled road**.	**AO53.1** Development does not include **new or changed access** to a **future state-controlled road**.	**Not applicable**
PO54 Filling, excavation, building foundations and **retaining structures** do not undermine, damage or cause subsidence of a **future state-controlled road**.	No acceptable outcome is prescribed.	**Not applicable**
PO55 Development does not result in a material worsening of stormwater, flooding, overland flow or drainage impacts in a **future state-controlled road** or **road transport infrastructure**.	No acceptable outcome is prescribed.	**Not applicable**
PO56 Development ensures that stormwater is lawfully discharged.	**AO56.1** Development does not create any new points of discharge to a **future state-controlled road**. AND **AO56.2** Development does not concentrate flows to a **future state-controlled road**. AND **AO56.3** Stormwater run-off is discharged to a **lawful point of discharge**. AND	**Not applicable**

Performance outcomes	Acceptable outcomes	Response
	AO56.4 Development does not worsen the condition of an existing **lawful point of discharge** to the **future state-controlled road**.	