ROCKHAMPTON REGIONAL COUNCIL

APPROVED PLANS

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

Development Permit No.: D99-2019

Dated: 29 June 2020

Engineering Infrastructure Report

Proposed Development, 1014-1016 Yaamba Rd, Parkhurst

PREPARED FOR G & M DEMEDIO

Calibre Professional Services Pty Ltd
55 070 683 037

18-002864 | 10 October 2019

DOCUMENT CONTROL

ISSUE	DATE	ISSUE DETAILS	AUTHOR	CHECKED	APPROVED
A	10/10/19	For DA Approval	PL	CWS	Chris Shields RPEQ 9347

Contents

Tables

Figures

Appendices

1 Introduction

Calibre Professional Services (Qld) Pty Ltd has prepared this Engineering Infrastructure Report in support of the Material Change of Use (MCU) Application on behalf of our Client, G & M Demedio. This report relates to works associated with the proposed short-term accommodation & relocatable home park development at 1014-1016 Yaamba Rd, as an extension of the existing short-term accommodation located at the western end of the site (currently referred to as the Casa Nostra Motel).

1014-1016 Yaamba Rd (Lot 80 on SP307745) currently has short-term accommodation villas (18 Motel Units), a Managers Residence / Reception / Restaurant / Commercial Kitchen building, and a swimming pool and BBQ hut for recreational use, at the front of the site. The balance of the site is largely cleared and vacant, with the exception of a single residential house with a pool and garage in the rear north-eastern corner. The site is 84,060m^2 in size, is currently zoned as Low Density Residential under the Rockhampton Region Planning Scheme 2015, and generally grades from east at ~RL46.00m to west at ~RL28.00m.

The development proposal is to build on the existing short-term accommodate use, by creating a further twenty (20) Motel Units in the same style as the existing Villas, and fifty-five (55) Relocatable Home sites of approx. 400m^2 each, all with 2-3 bedrooms. The existing and proposed development will use the existing common concrete access driveway for access and egress from the adjacent Yaamba Rd (Bruce Highway) to the east, and off-street parking for residents, the Manager, guests and visitors will be provided.

The Department of Transport and Main Roads (TMR) is currently constructing the Rockhampton Northern Access Upgrade (RNAU) project on Yaamba Rd (from Nuttall St on the southern end to Terra Nova Drv on the northern end), which includes the frontage of the subject site. This project will effectively duplicate the existing Yaamba Rd (Bruce Highway) form to provide 2 northbound lanes, 2 southbound lanes, raised median separation, bicycle lanes, footpaths and dedicated service roads to commercial / industrial uses on the western side of this road link. In its completed state, the RNAU project will continue to provide access / egress for the subject site in the form of left-in / left-out with the addition of a second southbound lane. This is discussed further in the Traffic Management section of the report.

This report intends to address the Civil Engineering Infrastructure for the proposed development including sewer reticulation, water reticulation, access and parking for the project. The report will demonstrate that the development will not negatively impact on existing services, buildings and infrastructure surrounding the subject site through engineered solutions.

The locality of the subject site can be seen in the following figure:

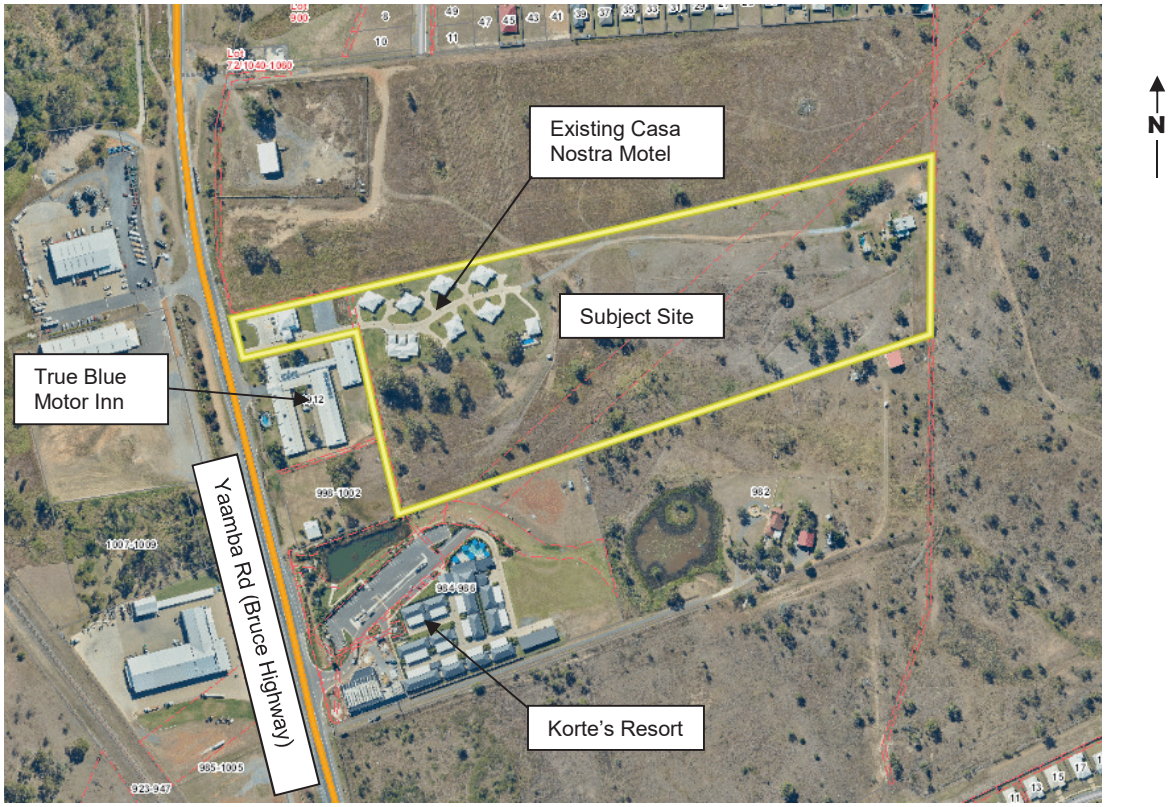


Figure 1.1 Locality Image

2 Sewer Reticulation

An existing gravity sewer system currently services the site and traverses the site in north-south direction through the western portion of the site. According to the Rockhampton Regional Council (RRC) Geographical Information System (GIS), this gravity sewer main is a 225mm diameter uPVC main and is approx. 3.0m deep through the subject site. The existing 18 Motel Units are serviced by a private internal 150dia. uPVC gravity sewer reticulation system which currently connects to the northern-most existing Council sewer manhole within the site (see Figure 2.1).

The following snapshot from RRC's GIS system show the existing sewer network in and around the subject site:

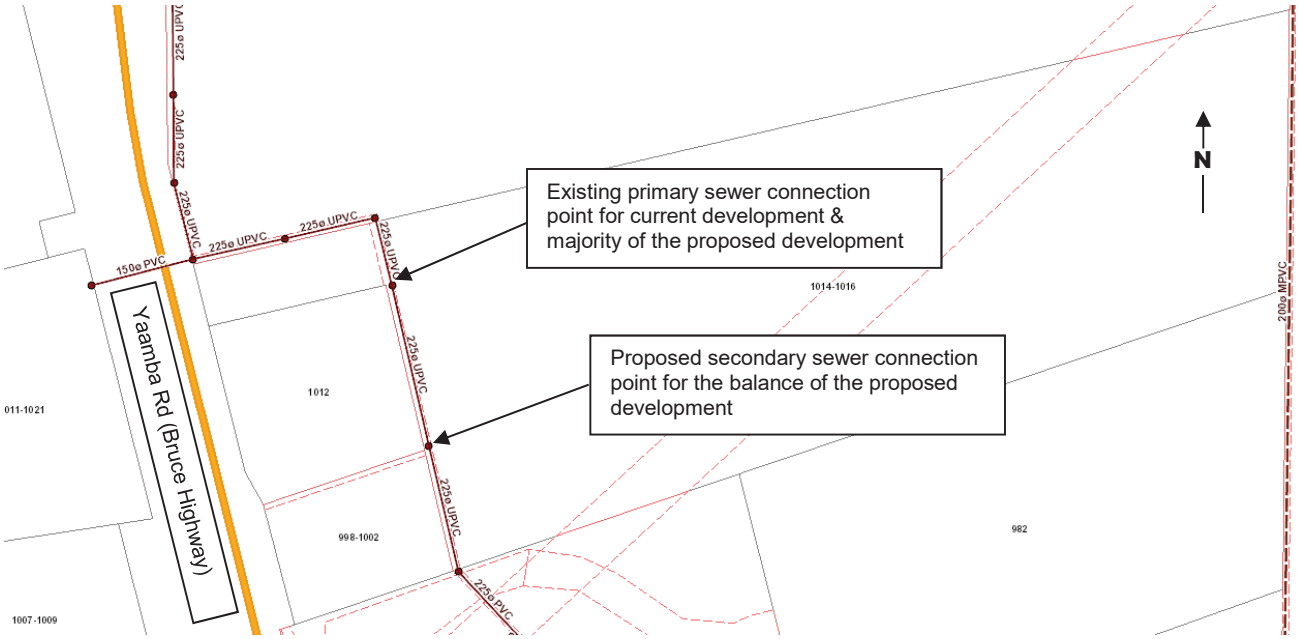


Figure 2.1 Existing Sewer Infrastructure Layout

The subject site in its developed state, is proposed to connect to Council's existing gravity sewer network in two (2) locations:

- the majority of the site (20 Motel Units and 49 Relocatable Home sites), is proposed to connect to the existing internal 150dia. uPVC reticulation network, which then connects to the existing 225dia. Council main via the northern-most existing manhole on the site; and

- the remainder of the site (6 Relocatable Home sites) cannot practically connect to the existing internal 150dia. uPVC reticulation network, and therefore requires a new connection to the existing 225dia. Council main via the southern-most existing manhole on the site.

Refer to the Engineering Sketches in **Appendix B** for further information.

To understand the net increase in sewer loading from the proposed development, the existing motel rooms, reception and restaurant have also been assessed. The sewer loads for the existing scenario and the proposed 20 Unit and 55 Relocatable Home development have been calculated in accordance with the Capricorn Municipal Development Guidelines (CMDG) - Design Specifications - D12 Sewerage Reticulation. As per table D12.C.01 - *(Design EP's per development type)* from the aforementioned design specifications, the equivalent persons (EP's) were calculated based on the rates within this table. The design Average Dry Weather Flow (ADWF) of 540L/ET/d from the CMDG design specification D12 has been utilised based on an EP per ET of 2.7.

In accordance with CMDG specification D12, the Peak Dry Weather Flow (PDWF) is 2.5 times the ADWF. The data in the following table has been calculated to determine the sewer loadings from the development:

Table 1 Sewer Demands - Existing and Proposed

Scenario	Sewer Catchment	Unit	No of Units	ET/unit	ET	ADWF (540L/ET/d x ET)	PDWF (2.5 x ADWF)	WWF (5 x ADWF)
Existing	Existing Motel	room	18	0.6	10.8	5.83kL/d	14.58kL/d	29.16kL/d
	Existing Reception & Restaurant	100m2 GFA	4	1.6	6.4	3.46kL/d	8.64kL/d	17.28kL/d
	Existing Total	**-**	**-**	**-**	**17.2**	**9.29kL/d 0.11L/s**	**23.22kL/d 0.27L/s**	**46.44kL/d 0.54L/s**
Proposed	Proposed Motel	room	20	0.6	12	6.48kL/d	16.20kL/d	32.40kL/d
	Manufactured RV Home Sites (2 bed)	Site	28	0.9	25.2	13.61kL/d	34.02kL/d	68.04kL/d
	Manufactured RV Home Sites (3 bed)	Site	27	1.3	35.1	18.95 kL/d	47.39kL/d	94.77kL/d
	Community Building	100m2 GFA	4	0.8	3.2	1.73kL/d	4.32kL/d	8.64kL/d
	Proposed Total	**-**	**-**	**-**	**92.7**	**50.06kL/d 0.58L/s**	**125.15kL/d 1.45L/s**	**250.29kL/d 2.9L/s**
Increase	-	-	-	-	75.5	40.77kL/d 0.47L/s	101.93kL/d 1.18L/s	203.85kL/d 2.36L/s

Investigation into the existing sewer infrastructure servicing the site has identified that the grade of the sewer main downstream of the site is conservatively 0.3% based off Council's GIS information. Based on a maximum 60% depth of flow of the 225mm diameter main, the partial maximum (PWDF) pipe flow at capacity for this uPVC main is approximately 21.48L/s. Given the proposed minimal increase in sewer loadings, the increase has been calculated to be 5.5% of the existing pipes available capacity. This percentage is expected to have a negligible effect upon the Council's existing infrastructure sewer network, and therefore no upgrades will be required.

RRC has suggested that consideration be given to providing a sewage waste dump point within the subject site, however this is not deemed necessary for the intended use. RRC has also suggested that a Trade Waste Permit may be required for the vehicle washdown bay, however this will be considered and investigated more closely in the next phase of the design development in conjunction with Council officers.

All proposed internal sanitary drainage will be documented during the detailed design phase by a suitably qualified person (Hydraulic Engineer), and all appropriate approvals sought from RRC. All internal sewer services are proposed to be privately owned and maintained.

3 Water Reticulation

An existing water reticulation system currently services the site, and traverses across the frontage of the site in north-south direction on the eastern side of the Yaamba Rd (Bruce Highway) road reserve. According to the RRC GIS, this water main is a 150mm diameter uPVC main which we understand is pumped to quite a high pressure to meet the demand of users in this area. The existing 18 Motel Units and Managers Residence / Reception / Restaurant / Commercial Kitchen building are serviced by a private internal 100dia. PVC water reticulation system which connects to this existing 150mm uPVC main on Yaamba Rd at the front of the site.

There is also a 600mm diameter DICL trunk main on the western side of the Yaamba Rd (Bruce Highway) road reserve, which has recently been constructed (replacing the previous 660dia. MSCL above-ground trunk main) as part of the RNAU currently under construction by TMR. The existing water mains on both side of Yaamba Rd (Bruce Highway) are inter-connected approx. 260m to the south of the existing mains connection via a 150dia. MDPE main beneath the highway, at the frontage of 984-986 Yaamba Rd (currently Korte's Resort).

The following snapshot from RRC's GIS system show the existing water network adjacent to the subject site:

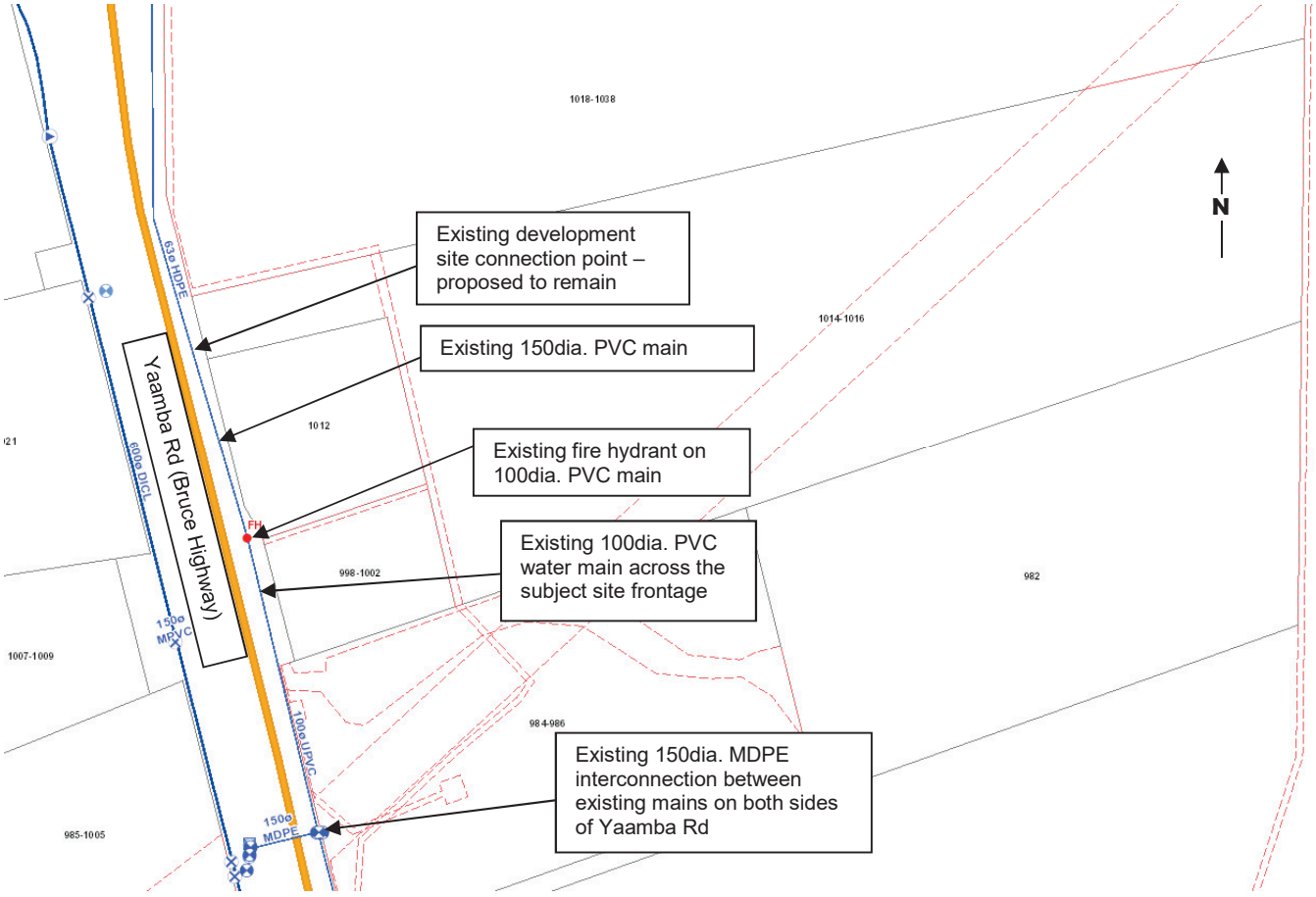


Figure 3.1 Existing Water Infrastructure Layout

It should be noted that RRC online mapping shows the water service across the frontage of the subject site as a 63dia. HDPE however information from the previous cabin development and from RRC's advice, suggest this section is now a 150dia. PVC main.

These water services are likely to be further augmented as part of the Rockhampton Northern Access Upgrade (RNAU) project currently under construction along this section of Yaamba Rd, however connection to the existing short-term accommodation and Managers Residence / Reception / Restaurant / Commercial Kitchen building, as well as the proposed development, will be maintained.

An existing main spring fire hydrant is currently located in the road reserve of Yaamba Rd (Bruce Highway) near the common boundary of 998-1002 Yaamba Rd and 1012 Yaamba Rd, however the coverage from this hydrant alone will not be adequate for the proposed development.

The subject site in its developed state, is proposed to connect to Council's existing water network via the existing private internal 100dia. mPVC water reticulation system, which connects to this existing 150mm PVC main on Yaamba Rd at the front of the site. An internal reticulation network is proposed within the site to service all Motel Units and Relocatable Home sites, with above-ground pillar hydrants provided at max. 80m spacing in accordance with Capricorn Municipal Development Guidelines (CMDG). Refer to the Engineering Sketches in **Appendix B** for further information.

To assess whether the existing Council water network has adequate capacity to meets the demands of the proposed development, including the requirement for fire-fighting pressures and flows on the most disadvantaged Relocatable Home site, Peter Wheelhouse (Network Systems Engineer in the Infrastructure Planning department of RRC) was engaged to undertake appropriate network modelling and analysis. Peter also has intimate knowledge of how the existing water network in the vicinity of the subject site has been, or will be, augmented as part of the RNAU project, and is best placed to provide comprehensive site-specific advice. Peter's internal water network analysis for the proposed development can be seen in **Appendix C**. A summary of this network analysis is as follows:

- All internal water network shall be 100mm diameter mains;
- The analysis results assume no augmentation of the external water supply network;
- The minimum residual service pressure is in the order of 490kPa;
- The potential maximum fire-fighting capacity when partially developed, is in the order of 15L/s at 200kPa;
- The potential maximum fire-fighting capacity when fully developed (and looped), is in the order of 20L/s at 200kPa.

From this analysis it is shown that adequate pressure and fire-fighting flows can be achieved in the fully developed scenario and that no augmentation of the existing external network is required. The internal water reticulation network for the proposed development will be detailed by a suitably qualified person during the detailed design phase, and all appropriate approvals sought from RRC.

4 Traffic Management

4.1 Existing Access, Parking & Refuse Collection

The site currently has frontage and access to Yaamba Rd (Bruce Highway) via 5.4m wide concrete driveway. The access configuration is a combined diverge / deceleration lane for both the subject site and the neighbouring True Blue Motor Inn to the south, with linemarking restricting the legal access / egress to left-in left-out for the subject site. Table drains and piped culverts control and convey stormwater runoff through this area, to the existing RCBC structure to the south of the subject site frontage. Refer to the figure below for an aerial image of the existing access / egress configuration:

Figure 4.1 Existing Access / Egress Arrangement

In the existing scenario, there are four (4) visitor concrete car parking spaces, and one (1) disabled parking bays located adjacent to the Managers Residence / Reception / Restaurant / Commercial Kitchen building as well as a drive through drop-off area. Each of the existing 18 Motel Units also has one (1) undercover garage space and allowance for one (1) visitor in the driveway area.

The existing refuse collection arrangement is that private wheelie bins from each of the 18 Motel Units are brought to a common commercial bin area adjacent to the Managers Residence / Reception / Restaurant / Commercial Kitchen building, which is periodically collected by a private refuse collection contractor. The intent is for this arrangement to continue to be used for the fully developed site.

4.2 Existing Traffic on Yaamba Rd (Bruce Highway)

2018 DTMR segment count data collected on Yaamba Road (200m South of Mason Ave – DTMR site 60926) shows that the AADT on Yaamba Road is 12,750 with 11.44% heavy vehicles.

4.3 Development Traffic

In order to assess the impact that the proposed development will likely have on the adjacent road network, an understanding of the expected traffic generation must be established. In this assessment trip generation shall be reviewed only in the ultimately developed scenario without consideration to the potential development staging.

4.3.1 Trip Generation

The hierarchy of data sources noted in the *Guide to Traffic Impact Assessment* from Transport and Main Roads (TMR) dated December 2018 for trip generation estimation, has been adopted, and is summarised below from most preferred to least preferred:

- traffic generation survey of an existing development similar to the proposed development in terms of its land use, scale, location and so on;
- traffic generation data – 2006–2017 (Queensland) Open Data;
- Guide to Traffic Generating Developments Updated Traffic Surveys, RMS (2013);
- Guide to Traffic Generating Developments, RTA (2002);
- NZ Trips Database Bureau, 2010 – contains survey data and characteristics of each site providing detailed trip information and characteristics for over 700 sites from 1983 to 2011;
- first principles assessment preferably based on forecast usage data; and then
- Trip Generation Manual, 9th edition, ITE 2012 – US database and may need to be modified to suit Australian conditions.

Table 2 Development Trip Generation Rates

Development Type	Units	Daily Generation	Peak Generation	Source
Hotels	Per Room	3.0	0.2	Traffic generation data – 2006–2017 (Queensland) Open Data - Average of Motel/Hotel
Manufactured RV Home Sites	Per Site	6.0	0.6	Traffic generation data – 2006–2017 (Queensland) Open Data - Average of Residential
Reception & Restaurant	100m^2 GFA	10.6	1.6	Traffic generation data – 2006–2017 (Queensland) Open Data - Average of Office and Commercial

Table 3 Development Trip Generation

Scenario	Land Use	Total No.	Unit	Daily Generation: vehicles per day (vpd)	Peak Generation: vehicles per hour (vph)	Daily Generated Traffic (vpd)	Peak Generation (vph)
Existing	Motel	18	Room	3.0	0.2	54	4
	Reception & Restaurant	400m^2	100m^2 GFA	10.6	1.6	42	6
	Existing Total	**-**	**-**	**-**	**-**	**96**	**10**
Proposed	Motel	20	Room	3.0	0.2	60	4
	Manufactured RV Home Sites	55	Site	6.0	0.6	330	33
	Proposed Total	**-**	**-**	**-**	**-**	**486**	**47**
Increase	-	-	-	-	-	390	37

As evident in the table above, the proposed development based on the generation rates suggested by the Guide to Traffic Impact Assessment – December 2018 will increase the traffic generation by 37 vehicles in the peak hour or 390 vehicles per day. These suggested numbers are considered to be a conservative approach, and the increase is considered minor relative to the capacity of Yaamba Rd (Bruce Highway) following completion of the RNAU project (2 lanes southbound).

4.4 Proposed Access, Parking & Refuse Collection

The Department of Transport and Main Roads (TMR) is currently constructing the Rockhampton Northern Access Upgrade (RNAU) project on Yaamba Rd (from Nuttall St on the southern end to Terra Nova Drv on the northern end), which includes the frontage of the subject site. This project will effectively duplicate the existing Yaamba Rd (Bruce Highway) form to provide 2 northbound lanes, 2 southbound lanes, raised median separation, bicycle lanes, footpaths and dedicated service roads to commercial / industrial uses on the western side of this road link. In its completed state, the RNAU project will leave the existing left-in and left-out access/egress arrangement unchanged, but will of course add a second southbound lane.

This additional southbound lane will result in an increased access and egress capacity and allow for a much safer access arrangement due to the increased gaps in traffic flow on Yaamba Road. Vehicles travelling southbound past the subject site will also have an option to change lanes and pass slower vehicles approaching the subject site access.

All off-street car parks will be designed to cater for a B99 standard vehicle in accordance with AS2890.1, Australian Standard for Off Street Car Parking facilities. Swept paths for a B99 vehicle and 8.8m 'MRV' type vehicle are included in the Engineering Sketches in **Appendix B.**

Please see Figure 4.2 below of the proposed access arrangement, as captured in the TMR's RNAU documentation as of August 2018. The RNAU project includes lengthening of the existing combined diverge/deceleration lane (existing approx. 60m) to achieve approximately 85m including a 35m taper to the centre of the existing subject site access. Based on an assumed posted speed limit of 60km/h (post-RNAU completion) and design speed of 70km/h, the required length of the diverge / deceleration lane (including taper) is 70m with an exit design speed of 20km/h (Austroads – Part 4A – Table 5.2).

It should be noted that if the posted speed limit post-RNAU completion is 70km/h or higher, the required diverge / deceleration lane (including taper) is 95m and means that the RNAU design is falling 10m short of the required minimum. TMR are expected to confirm that the currently designed diverge / deceleration lane and access to the subject site is suitable and complies with the relevant minimum standard requirements, as part of the Development Application process.

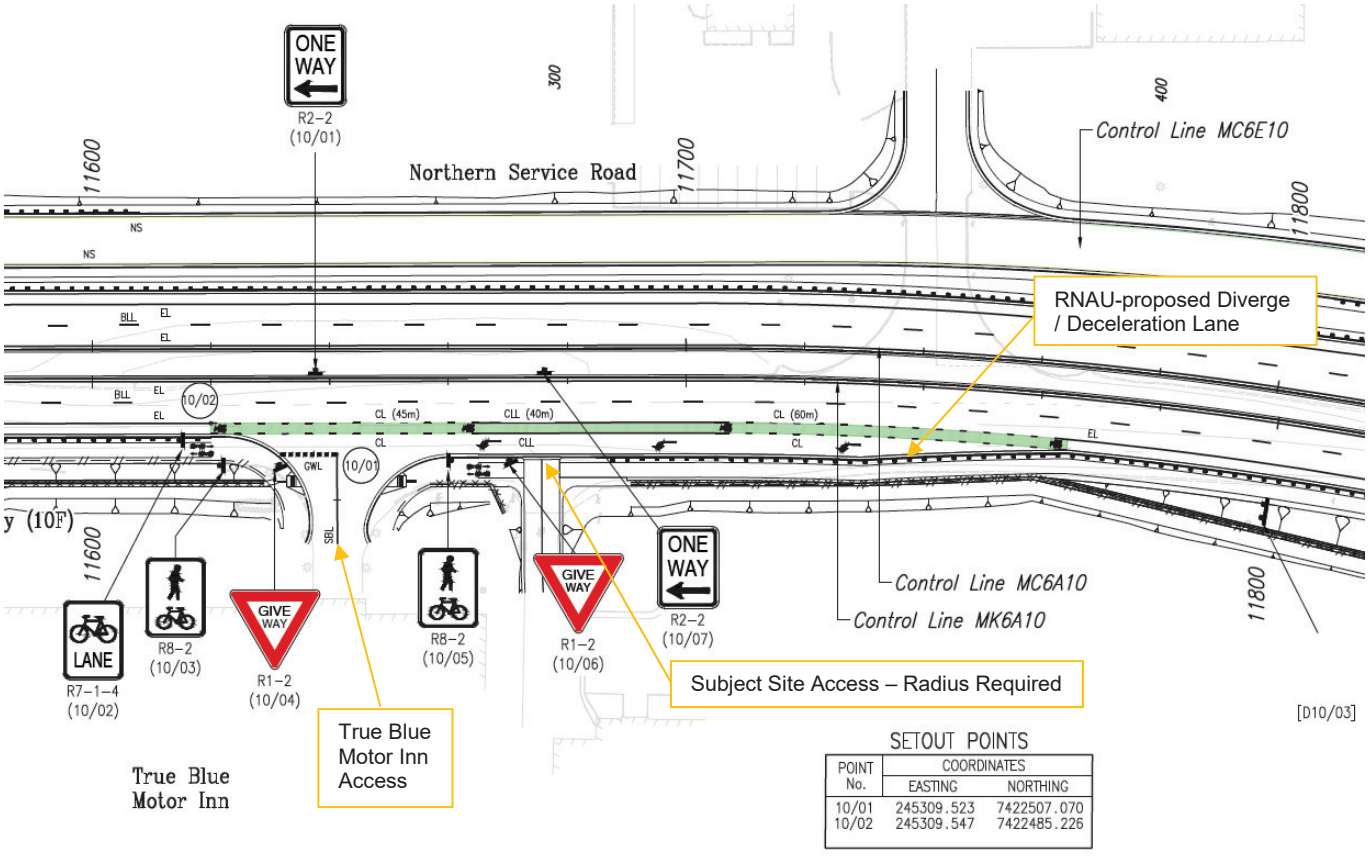


Figure 4.2 Access Arrangement Proposed in RNAU Documentation (from August 2018)

The proposed access arranagement shown in the RNAU drawings received from TMR, currently shows the existing driveway connection to the Yaamba Road (Bruce Highway) corridor without any radius onto the proposed deceleration lane. In order to provide safe access / egress to the subject site from the deceleration lane for a 8.8m MRV, swept paths have been completed and show widening at the throat of the driveway by 1m, as well as an appropriate raduis will be required (see Figure 4.3 below).

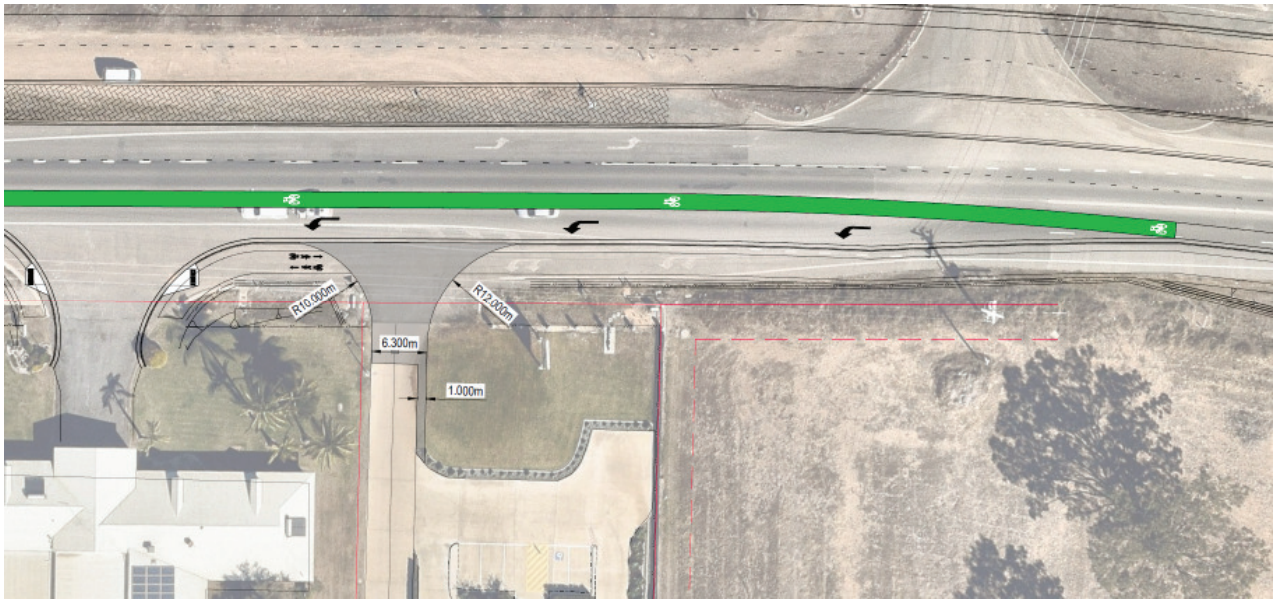


Figure 4.3 Proposed Access Driveway Widening

4.5 Intersection Sight Distance

With the existing driveway location being in close proximity to a large radius horizontal curve on Yaamba Road (Bruce Highway) to the north, an assessment of the safe intersection sight distance (SISD) has been undertaken. Yaamba Road (Bruce Highway) is currently signposted at 70km/h and therefore a design speed of 80km/h has been adopted for the appropriate sight distance assessment. It is not yet clear if the proposed RNAU project will change the posted speed across the frontage of the subject site, but regardless the proposed roundabout located approximately 400m north shall also act as a friction point to slow southbound vehicles travelling to and past the subject site.

In accordance with *Austroads – Safe Intersection Sight Distance (SISD) and corresponding minimum crest vertical curve size for sealed roads (S<L),* for a design speed of 80km/h and a reaction time of 2.0s, the required SISD is 181m. Based on LIDAR information Yaamba Road (Bruce Highway) is currently grading longitudinally at less than 0.5% and therefore grade correction has not been included in this calculation.

This SISD (181m) can be achieved to the north, with an existing available sight distance of approximately 185m. This sight distance is based on an obstruction on the northern neighbouring property boundary such as a fence. In the existing scenario the neighbouring boundary is unobstructed providing approximately 240m sight distance to the north.

Figure 4.4 Sight Distance Looking North from the Existing Access

Appropriate Give Way signage and linemarking in accordance with MUTCD and TMR specifications will be required on the access driveway, and documented in a future stage of design.

5 Stormwater Management

A separate Concept Stormwater Management Plan (CMP) has been prepared by Calibre Professional Services (Qld) Pty Ltd for the proposed development. This report was produced to provide specific additional details to inform the MCU application sought for this development, by addressing all relevant stormwater quantity and quality requirements.

The intent of the CSMP is to provide guidelines and recommendations to incorporate into the detailed design and Operational Works application, to minimise the potential impact of the proposed development on the surrounding environment, infrastructure, and property owners. A Stormwater Quantity analysis has been completed to ensure that the increase in site runoff as a result of the proposed development will be mitigated at the boundaries of the site and cause no adverse impact downstream. In addition to this, a Stormwater Quality assessment has been completed to provide a strategy to ensure that reductions in the export of pollutants from the development meets the required Water Quality Objectives of the State Planning Policy.

6 Electricity and Telecommunications

Existing electrical and telecommunications infrastructure is located within the vicinity of the subject site in the road reserve of Yaamba Rd (Bruce Highway). These services are likely to be augmented as part of the Rockhampton Northern Access Upgrade (RNAU) project currently under construction along this section of Yaamba Rd, however connection to the existing short-term accommodation and Managers Residence / Reception / Restaurant / Commercial Kitchen building, as well as the proposed development, will be maintained. Any electrical reticulation design for the proposed internal works will be completed by a qualified Electrical Engineer. Refer to the Engineering Sketches in **Appendix B** for further information.

All proposed works will be designed and constructed in accordance with the RRC requirements and the specification of the relevant authorities, and all connections to live electrical and telecommunications will be carried out at the Developer's expense.

7 Site Works & Erosion Control

Site works for the development will generally consist of the following stages:

- Clearing and grubbing;
- Earthworks;
- Underground services installation;
- Roadworks and stormwater drainage works;
- Final detailed works; and
- Vegetation establishment, landscaping, and erosion and sediment control measures.

All stockpiles are to be segregated into topsoil, pavements, sands and protected with appropriate silt traps and fences. Access to stockpiles is to be from the upstream side to reduce erosion and maintain consistency throughout the project construction phase. Erosion control measures are to be implemented during construction in accordance with the CMDG requirements. All erosion control measures are to be closely monitored by the Principal Contractor and re-established after all rain events or vandalism, for the duration of the maintenance period.

A Construction Environmental Management Plan (CEMP) will be prepared to accompany the Operational Works phases of the development. The intent of the CEMP will be to provide practical and achievable plans for the management of the project, to ensure that environmental requirements are complied with throughout the construction of the development.

8 Conclusion

There appears to be no insurmountable engineering infrastructure difficulties with the proposed short-term accommodation & relocatable home park development at 1014-1016 Yaamba Rd, Parkhurst. A review of the services proposed for this development and their impact on surrounding services, indicates that there is no impediment to development.

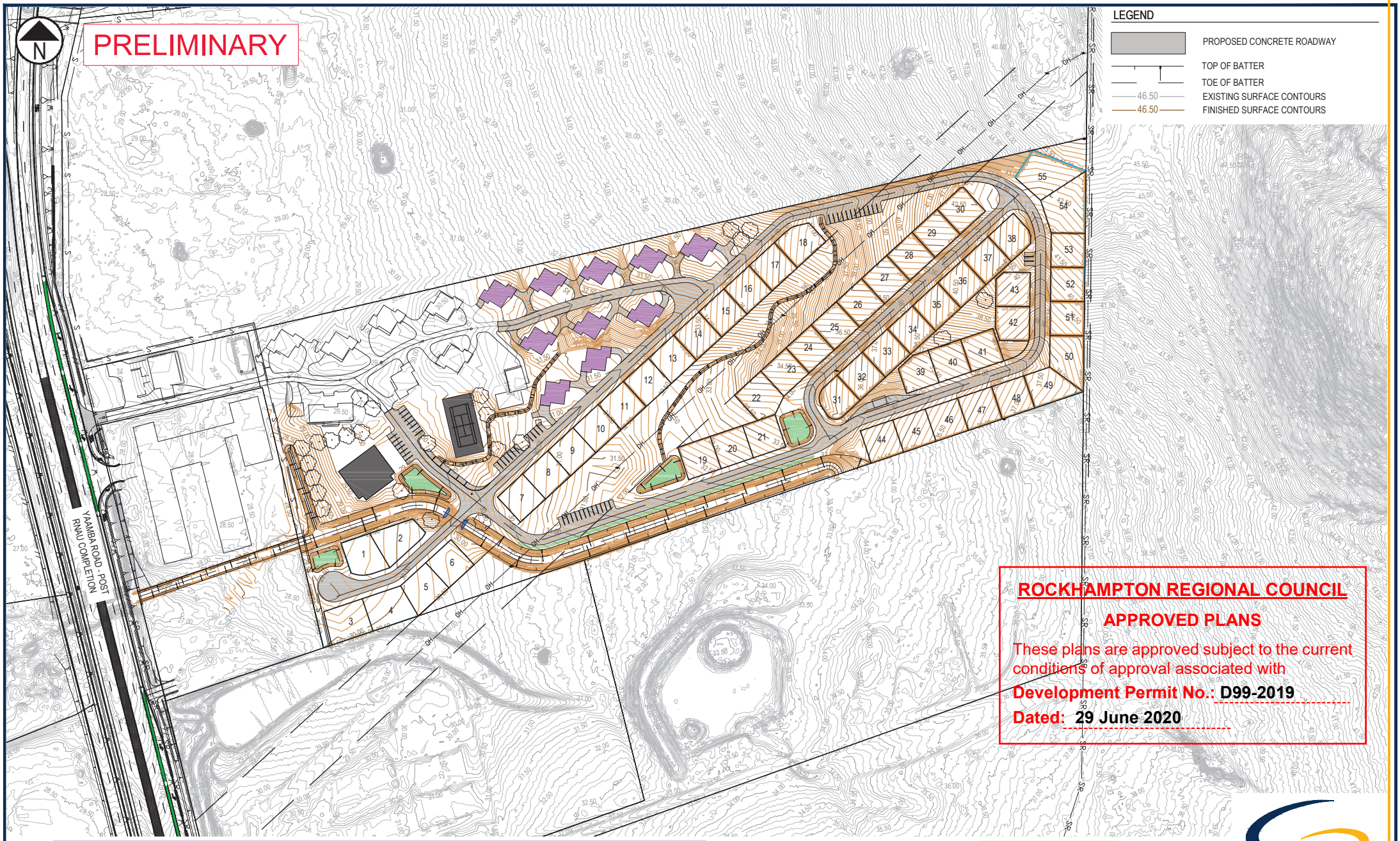
The development can be adequately serviced by the existing Council water and sewer networks without augmentation, and electrical and telecommunication services are also available within the vicinity of the site.

Stormwater Management (quantity and quality) for the proposed development has been considered and detailed separately in a comprehensive Concept Stormwater Management Plan (CSMP) prepared by Calibre Professional Services (Qld) Pty Ltd.

Site access will be gained via the existing common driveway to the road corridor of Yaamba Rd (Bruce Highway), with some minor alterations proposed. TMR is currently constructing the RNAU project on Yaamba Rd (from Nuttall St on the southern end to Terra Nova Drv on the northern end), which includes the frontage of the subject site. This project aims to effectively duplicate the existing Yaamba Rd (Bruce Highway) form to provide 2 northbound lanes, 2 southbound lanes, median separation, cycleway, footpaths and service roads to commercial / industrial uses on the western side of this road link. The RNAU project we ensure that Yaamba Rd (Bruce Highway) has ample capacity to handle the development traffic from the subject site.

Minor alterations in the design may eventuate from future applications, however the fundamentals of the design strategy ensure that service provisions will not pose a serious constraint to development.

If you should have any questions regarding this report, please do not hesitate to contact the Calibre Office in Rockhampton on (07) 4961 4200.



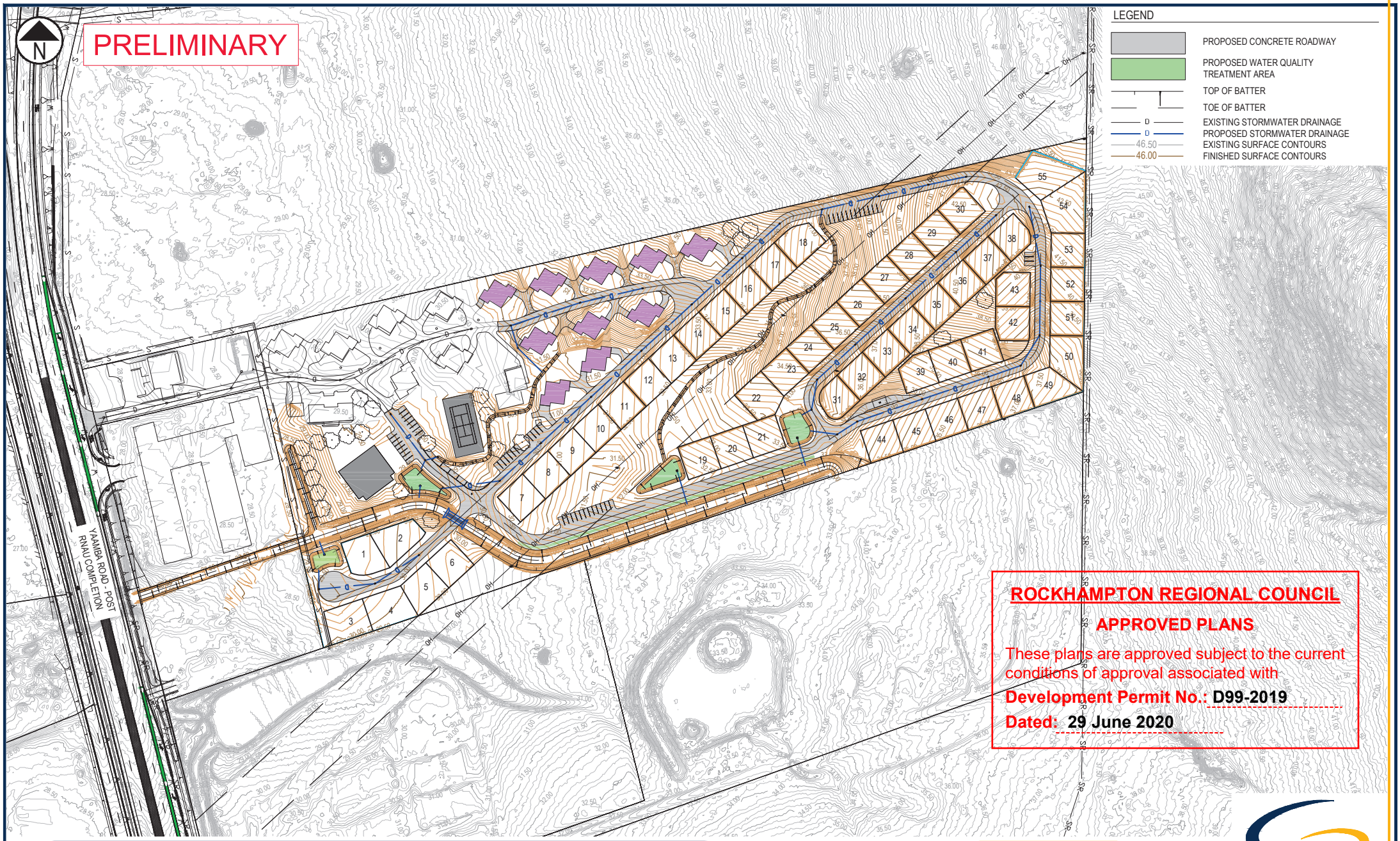
18-002864 - PROPOSED MOTEL EXTENSION - 1014-1016 YAAMBA RD, PARKHURST

SK002 - PROPOSED SITE PLAN

0 5.0 20.0m
0 10.0 40.0m
1:1000 (A1)
1:2000 (A3)

calibre

ROCKHAMPTON BRANCH
REFERENCE: 19-002864
REV: 2 (09.10.19)
DRAWN: AB



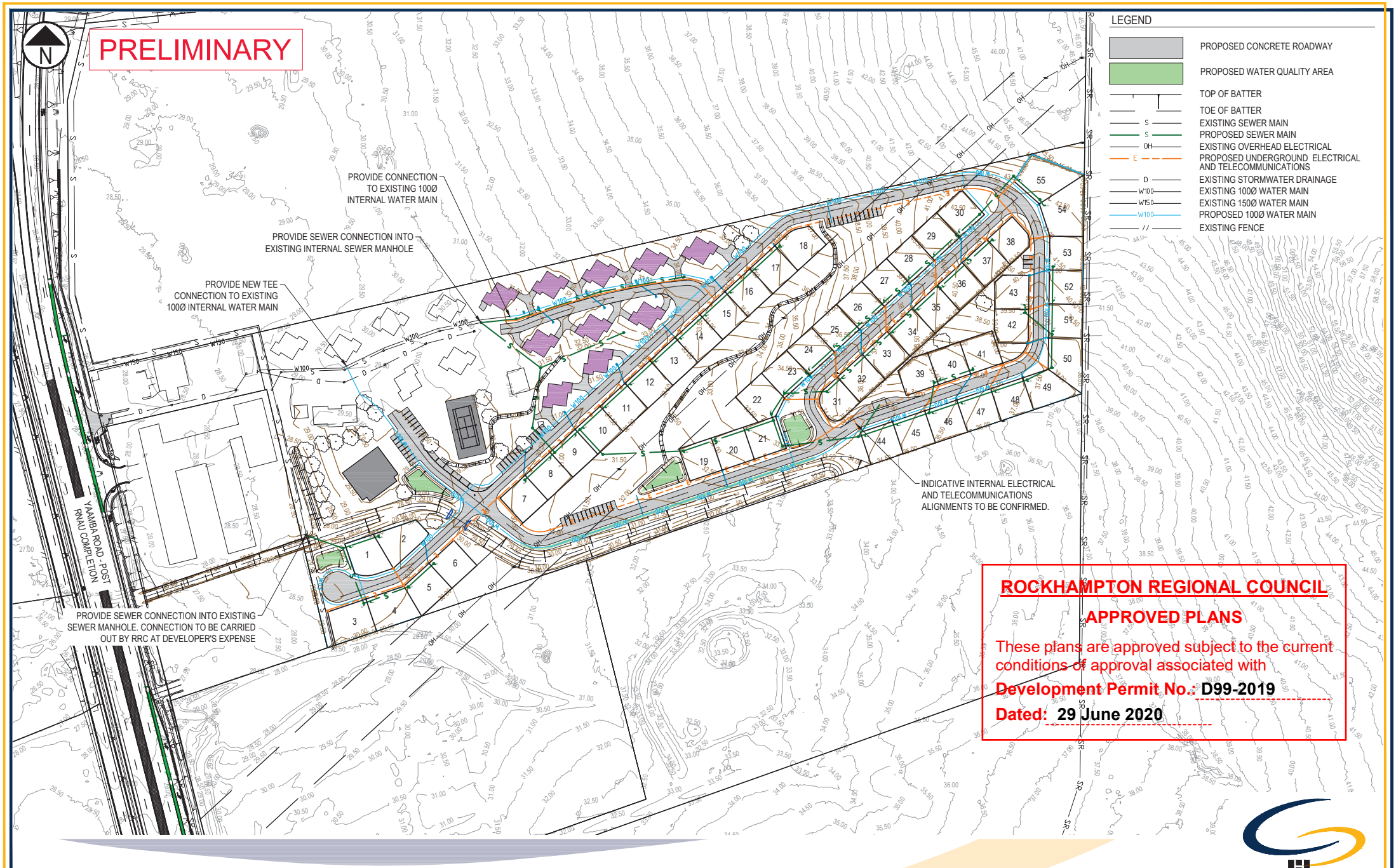
18-002864 - PROPOSED MOTEL EXTENSION - 1014-1016 YAAMBA RD, PARKHURST

SK004 - STORMWATER LAYOUT PLAN

0 5.0 20.0m
0 10.0 40.0m
1:1000 (A1)
1:2000 (A3)

calibre

ROCKHAMPTON BRANCH
REFERENCE: 19-002864
REV: 2 (09.10.19)
DRAWN: AB



ROCKHAMPTON REGIONAL COUNCIL

APPROVED PLANS

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

Development Permit No.: D99-2019

Dated: 29 June 2020

18-002864 - PROPOSED MOTEL EXTENSION - 1014-1016 YAAMBA RD, PARKHURST

SK006 - SERVICES LAYOUT

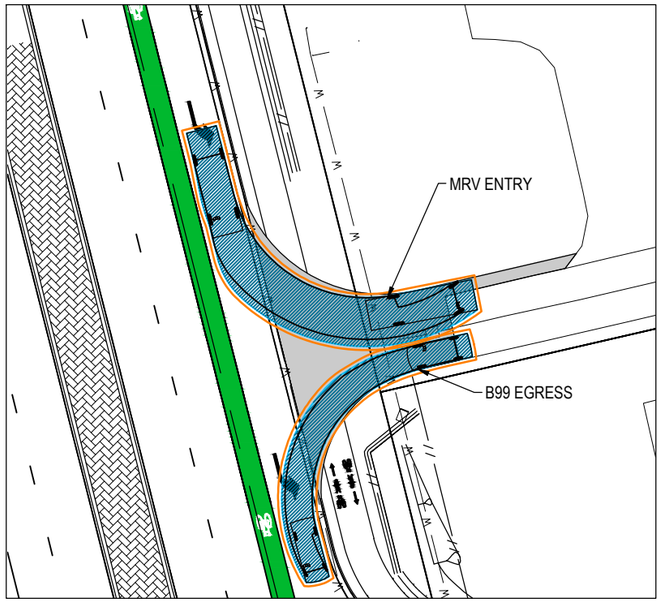
0 5.0 20.0m
0 10.0 40.0m

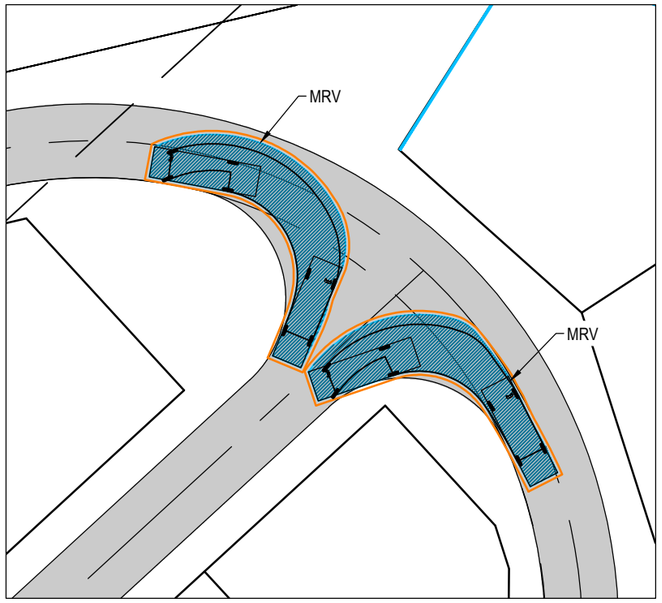
1:1000 (A1)
1:2000 (A3)

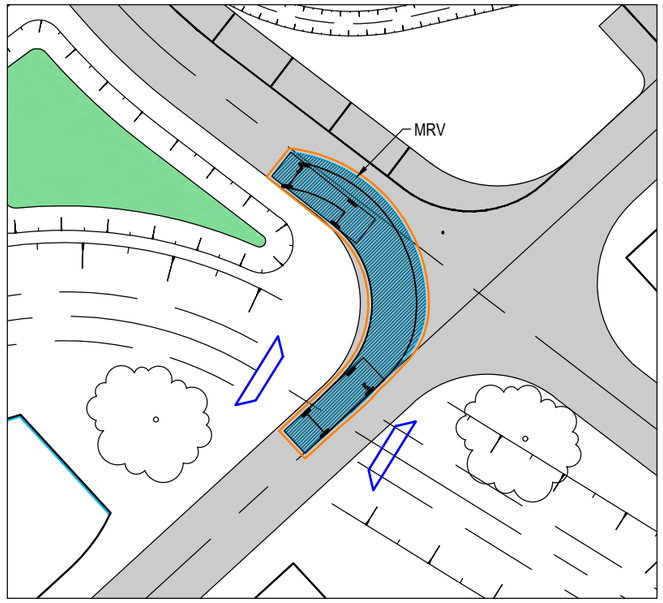
calibre

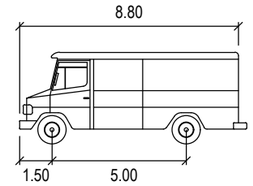
ROCKHAMPTON BRANCH
REFERENCE: 19-002864
REV: 2 (09.10.19)
DRAWN: AB

PRELIMINARY



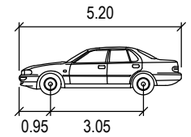






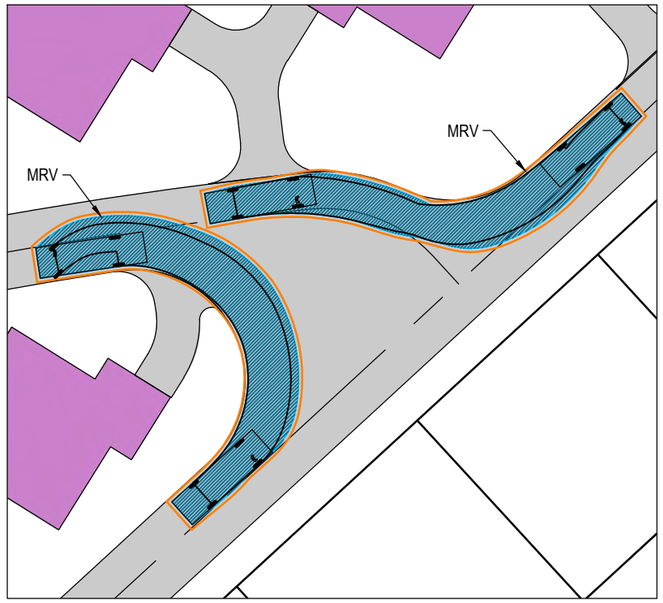
MRV
N.T.S

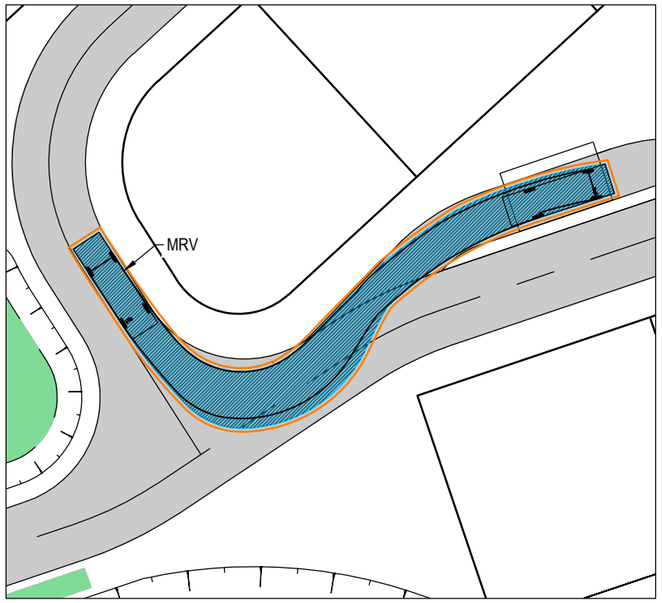
Width	:	2.50
Track	:	2.50
Lock to Lock Time	:	6.0
Steering Angle	:	38.2

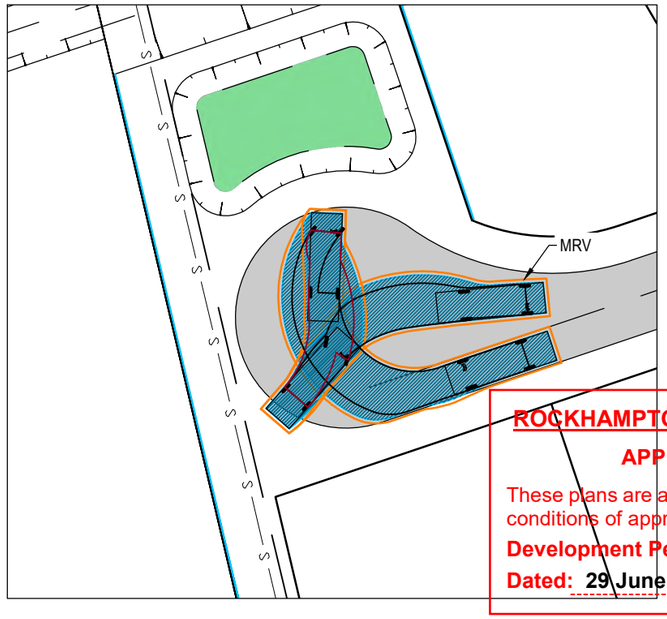


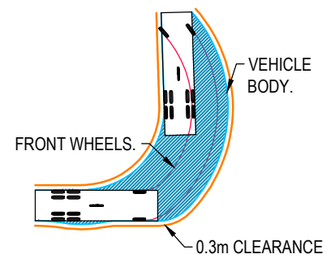
CAR B99
N.T.S

Width	:	1.94
Track	:	1.84
Lock to Lock Time	:	6.0
Steering Angle	:	33.5









TURNPATH LEGEND
N.T.S

ROCKHAMPTON REGIONAL COUNCIL

APPROVED PLANS

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

Development Permit No.: D99-2019

Dated: 29 June 2020

18-002864 - PROPOSED MOTEL EXTENSION - 1014-1016 YAAMBA RD, PARKHURST

SK007 - VEHICLE SWEPT PATHS - SHEET 1 OF 2

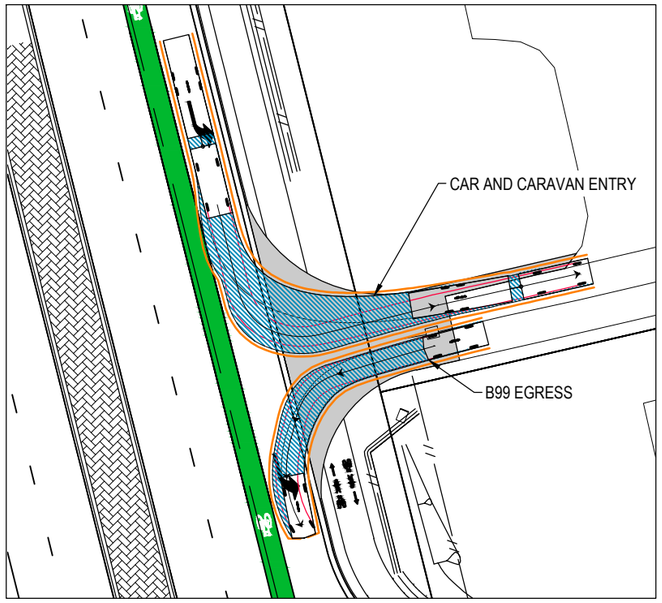
0 1.25 5.0m
0 2.5 10.0m

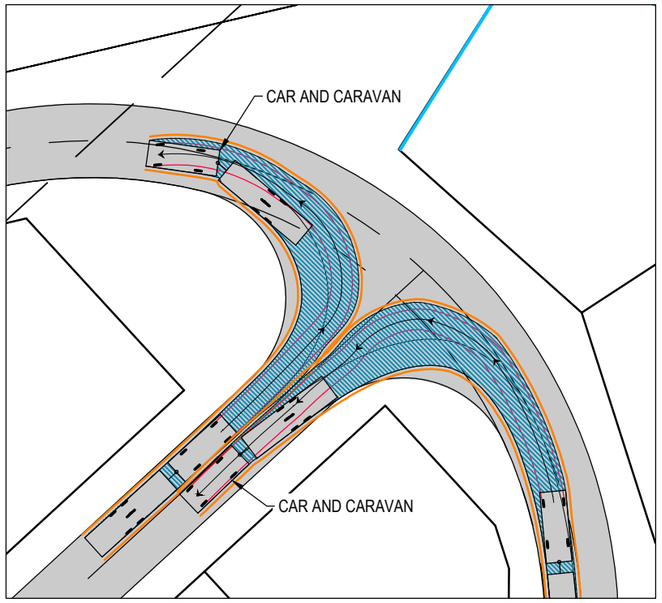
1:250 (A1)
1:500 (A3)

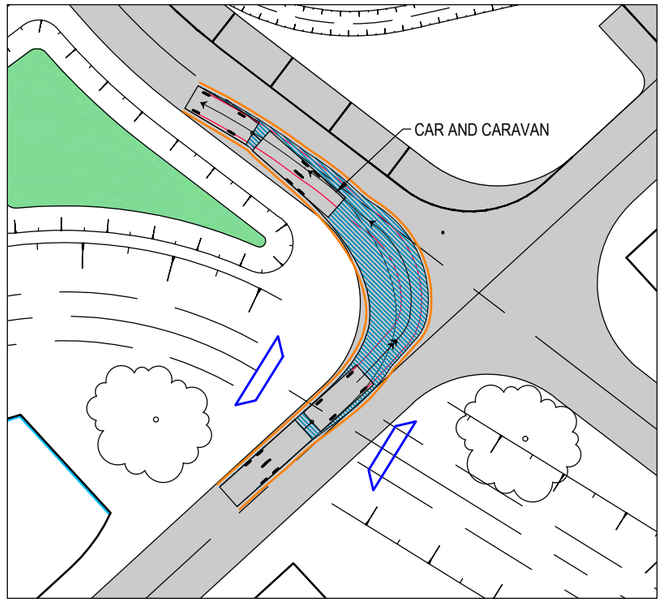
calibre

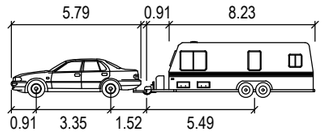
ROCKHAMPTON BRANCH
REFERENCE: 19-002864
REV: 3 (25.11.19)
DRAWN: PL

PRELIMINARY



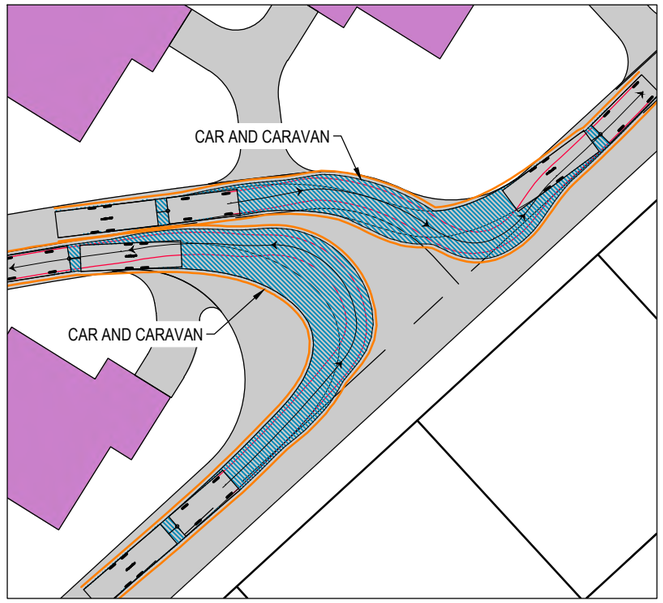


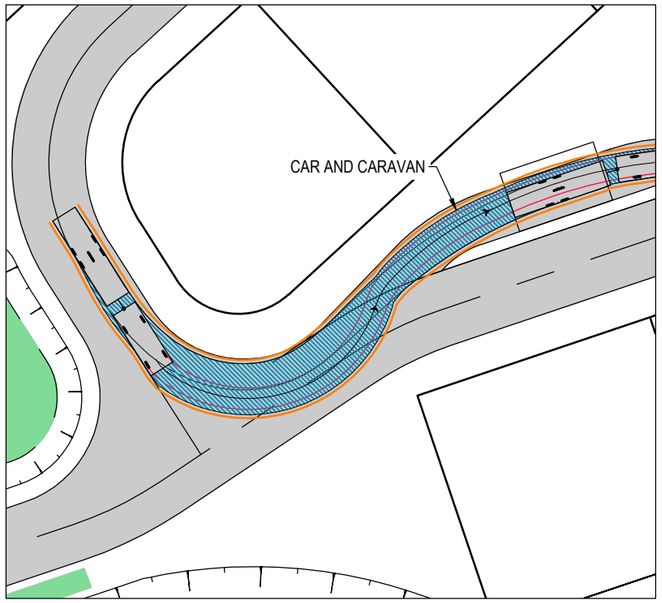


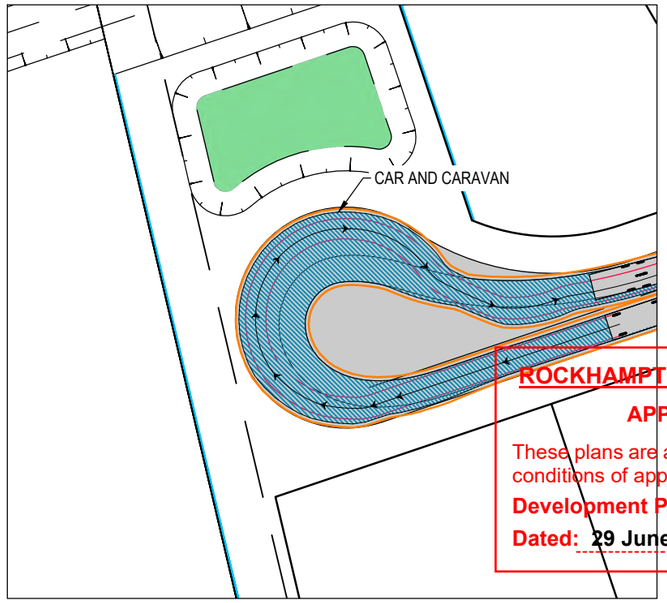


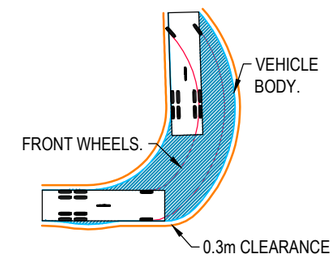
CAR AND CARAVAN

Car Width	: 2.13
Trailer Width	: 2.13
Car Track	: 1.83
Trailer Track	: 2.13
Lock to Lock Time	: 6.0
Steering Angle	: 31.2
Articulating Angle	: 70.0









TURNPATH LEGEND
N.T.S

ROCKHAMPTON REGIONAL COUNCIL

APPROVED PLANS

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

Development Permit No.: D99-2019

Dated: 29 June 2020

18-002864 - PROPOSED MOTEL EXTENSION - 1014-1016 YAAMBA RD, PARKHURST

SK008 - VEHICLE SWEPT PATHS - SHEET 2 OF 2

0 1.25 5.0m
0 2.5 10.0m

1:250 (A1)
1:500 (A3)

calibre

ROCKHAMPTON BRANCH
REFERENCE: 19-002864
REV: 1 (25.11.19)
DRAWN: PL

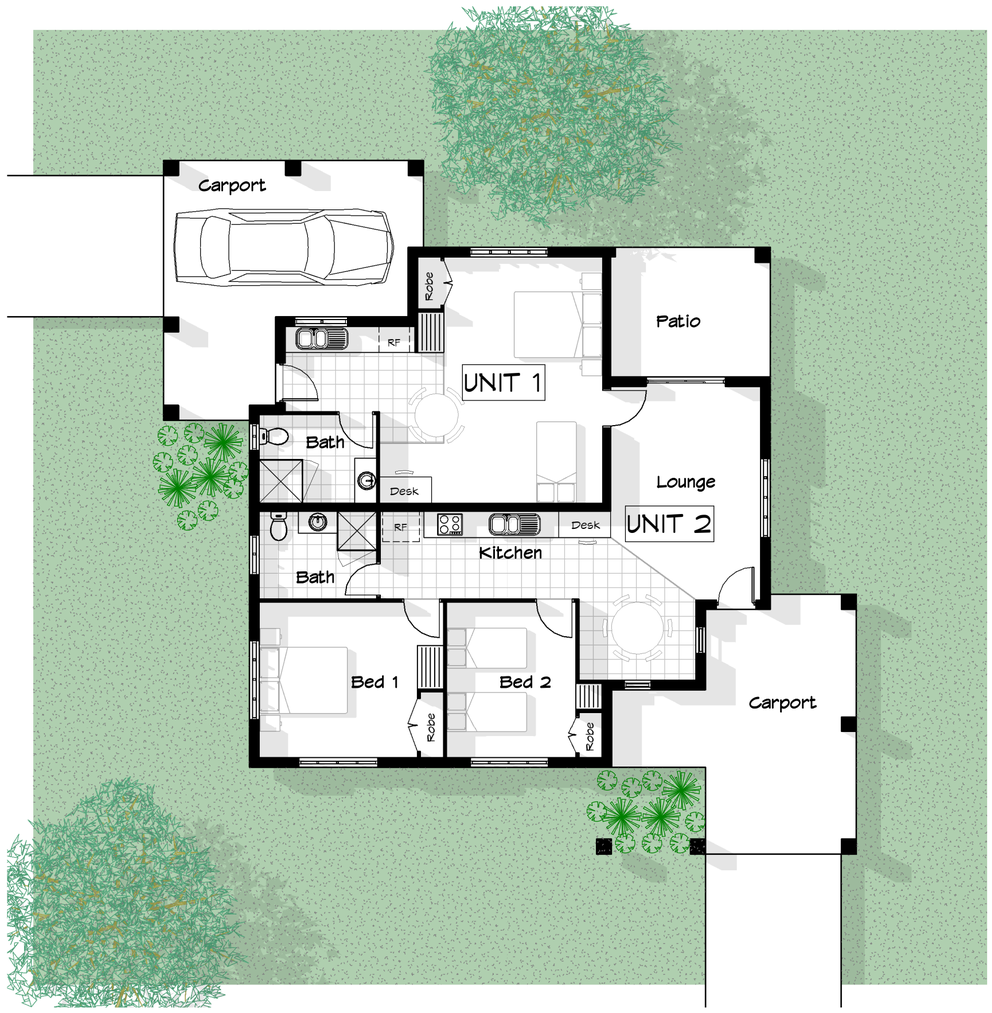
ROCKHAMPTON REGIONAL COUNCIL

APPROVED PLANS

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

Development Permit No.: D99-2019

Dated: 29 June 2020



1 Motel Unit Floor Plan - Type A

1 : 100

Floor Areas	
Unit 1 Carport	27.1 m²
Unit 1 Enclosed Area	42.9 m²
Unit 2 Carport	24.3 m²
Unit 2 Enclosed Area	73.7 m²
Unit 2 Patio	11.0 m²
Grand total	179.0 m²

2 Front Elevation

1 : 100

3 Right Side Elevation

1 : 100

4 Rear Elevation

1 : 100

5 Left Side Elevation

1 : 100

MCU APPLICATION
date: 04/10/19

REVISION 01

REVISIONS			
	No.	DESCRIPTION	DATE

PROPOSED MOTEL CABINS
FOR G. & M. DEMEDIO
AT 1014 - 1016 YAAMBA ROAD, PARKHURST

this drawing
Floor Plan & Elevations

Rufus Design Group
STYLE • QUALITY • INNOVATION
MEMBER BUILDING DESIGNERS ASSOC. OF QLD INC.
Licenced under the QBSA Act Lic No. 1180286
Telephone 61 7 49288011
Facsimile 61 7 49266579
E-mail mailbox@rufusdesigngroup.com

PROJECT MANAGER : DJW
DRAWN :
CHKD :
WIND SPEED C2
PLAN SIZE: A2
PROJECT NUMBER 181015 - 02
SHEET 02 OF 07 SHEETS
REV.

PRINT DATE : 4/10/2019 4:01:04 PM

ROCKHAMPTON REGIONAL COUNCIL

APPROVED PLANS

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

Development Permit No.: D99-2019

Dated: 29 June 2020

1 Motel Unit Floor Plan - Type B

1 : 100

Floor Areas	
Unit 1 Carport	27.1 m²
Unit 1 Enclosed Area	42.9 m²
Unit 2 Carport	21.4 m²
Unit 2 Enclosed Area	78.6 m²
Unit 2 Patio	11.0 m²
Grand total	181.0 m²

2 Front Elevation

1 : 100

3 Right Side Elevation

1 : 100

4 Rear Elevation

1 : 100

5 Left Side Elevation

1 : 100

MCU APPLICATION
date: 04/10/19

REVISION 01

REVISIONS

No.	DESCRIPTION	DATE

PROPOSED MOTEL CABINS
FOR G. & M. DEMEDIO
AT 1014 - 1016 YAAMBA ROAD, PARKHURST

this drawing
Floor Plan & Elevations

Rufus Design Group
STYLE • QUALITY • INNOVATION

MEMBER BUILDING DESIGNERS ASSOC. OF QLD INC.
Licenced under the QBSA Act Lic No. 1180286

Telephone 61 7 49288011
Facsimile 61 7 49266579
E-mail mailbox@rufusdesigngroup.com

PROJECT MANAGER : T.J.R.
DRAWN : J.P.
CHKD :
WIND SPEED C2
PLAN SIZE: A2
PROJECT NUMBER 181015 - 03
SHEET 03 OF 07 SHEETS
REV.

PRINT DATE : 4/10/2019 3:57:57 PM

ROCKHAMPTON REGIONAL COUNCIL

APPROVED PLANS

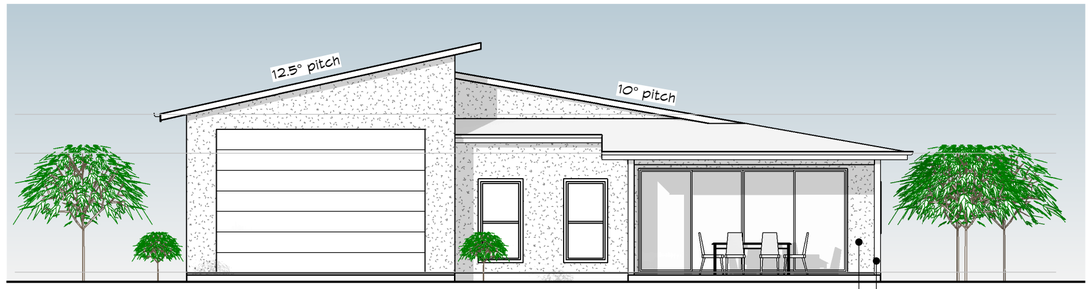
These plans are approved subject to the current conditions of approval associated with

Development Permit No.: D99-2019

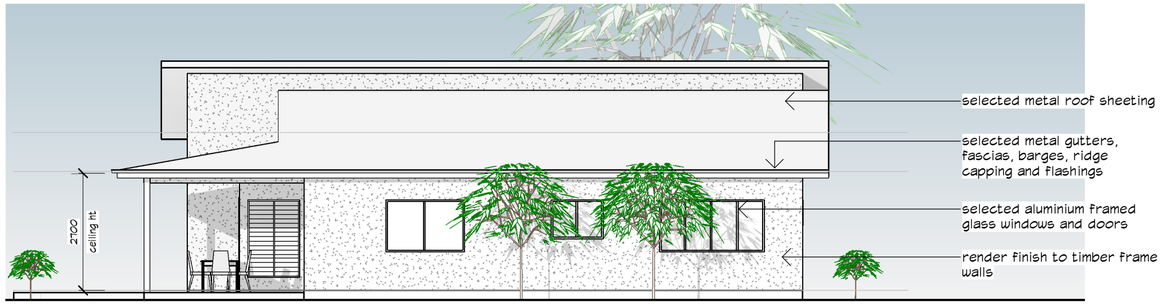
Dated: 29 June 2020

1 Floor Plan
1 : 100

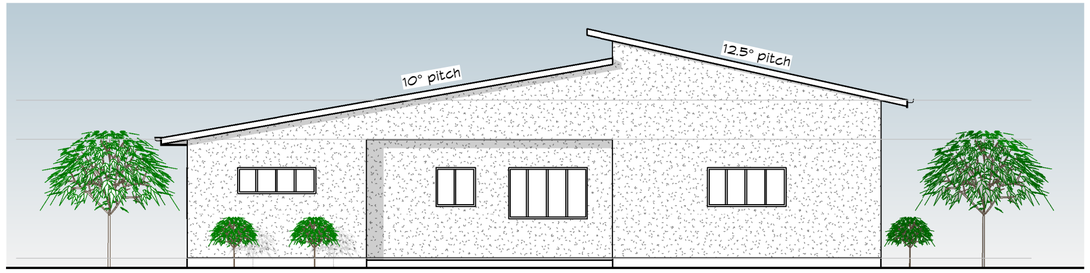
Floor Areas	
Habitable	112.6 m²
Garage	87.6 m²
Patio	21.3 m²
Drying	6.2 m²
Grand total	227.7 m²



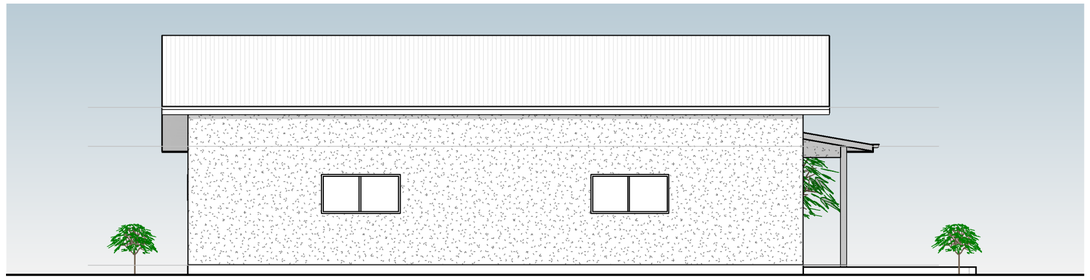
2 Elevation 1
1 : 100



3 Elevation 2
1 : 100



4 Elevation 3
1 : 100



5 Elevation 4
1 : 100

MCU APPLICATION
date: 04/10/19

REVISION 01

REVISIONS

No.	DESCRIPTION	DATE

RV RESIDENCE TYPE A
FOR G. & M. DEMEDIO
AT 1014 - 1016 YAAMBA ROAD, PARKHURST

this drawing
Floor Plan & Elevations

Rufus Design Group
STYLE • QUALITY • INNOVATION
MEMBER BUILDING DESIGNERS ASSOC. OF QLD INC.
Licenced under the QBSA Act Lic No. 1180286
Telephone 61 7 49288011
Facsimile 61 7 49266579
E-mail mailbox@rufusdesigngroup.com

PROJECT MANAGER : T.J.R.
DRAWN : J.P.
CHKD :
WIND SPEED C2
PLAN SIZE: A2
PROJECT NUMBER 181015 - 04
SHEET 04 OF 07 SHEETS
REVISION

PRINT DATE : 4/10/2019 5:18:50 PM

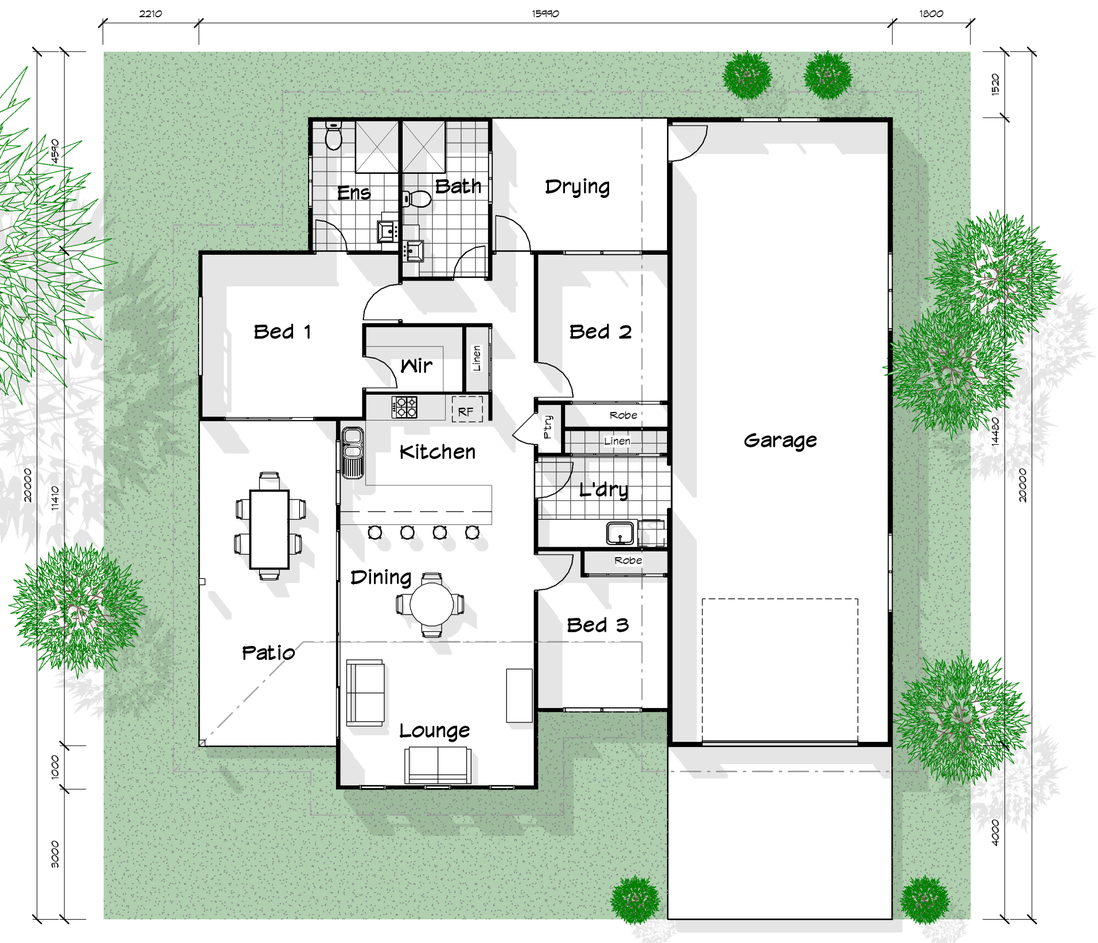
ROCKHAMPTON REGIONAL COUNCIL

APPROVED PLANS

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

Development Permit No.: D99-2019

Dated: 29 June 2020



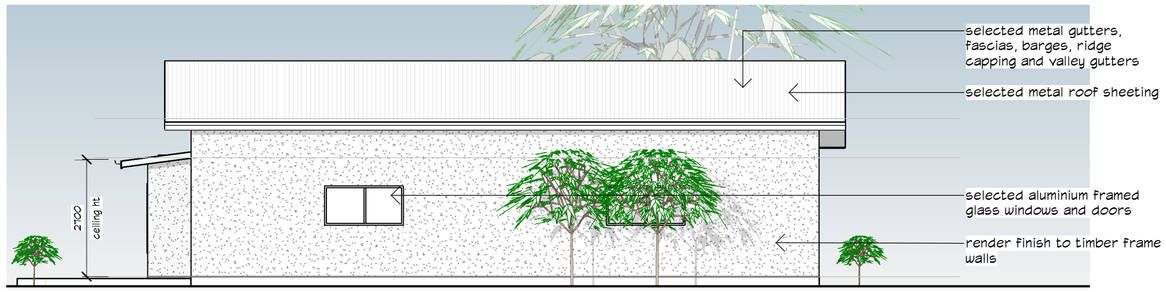
1 Floor Plan

1 : 100

Floor Areas	
Drying	12.5 m²
Patio	23.8 m²
Garage	75.0 m²
Habitable	114.7 m²
Grand total	226.0 m²

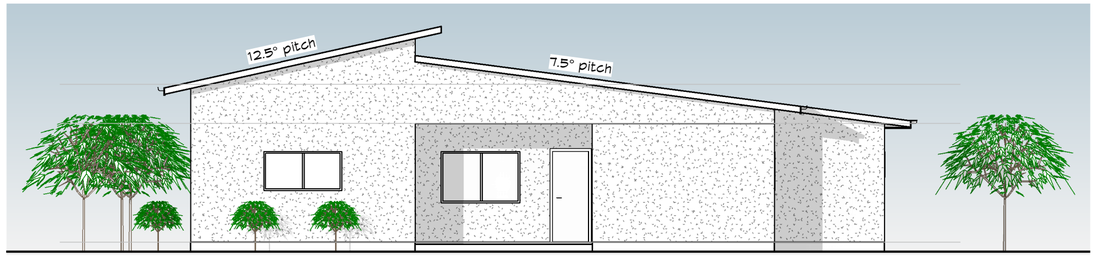
2 Elevation 1

1 : 100



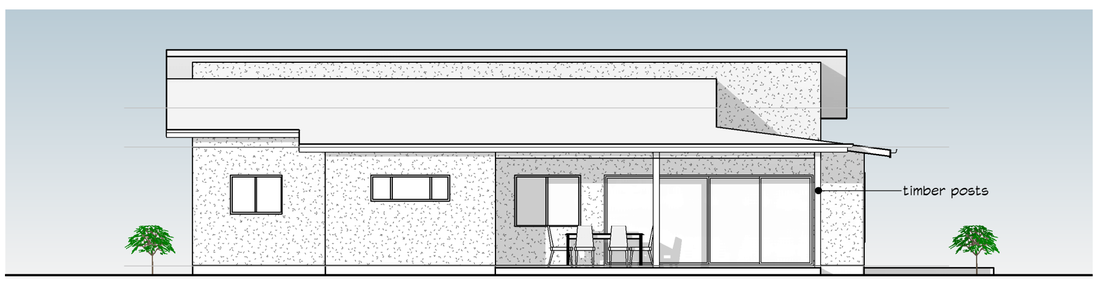
3 Elevation 2

1 : 100



4 Elevation 3

1 : 100



5 Elevation 4

1 : 100

MCU APPLICATION

date: 04/10/19

REVISION 01

REVISIONS

No.	DESCRIPTION	DATE

RV RESIDENCE TYPE B

FOR G. & M. DEMEDIO

AT 1014 - 1016 YAAMBA ROAD, PARKHURST

this drawing: Floor Plan

Rufus Design Group

STYLE • QUALITY • INNOVATION

MEMBER BUILDING DESIGNERS ASSOC. OF QLD INC.

Licenced under the QBSA Act Lic No. 1180286

Telephone 61 7 49288011

Facsimile 61 7 49266579

E-mail mailbox@rufusdesigngroup.com

PROJECT MANAGER : T.J.R.

DRAWN : J.P.

CHKD :

WIND SPEED C2

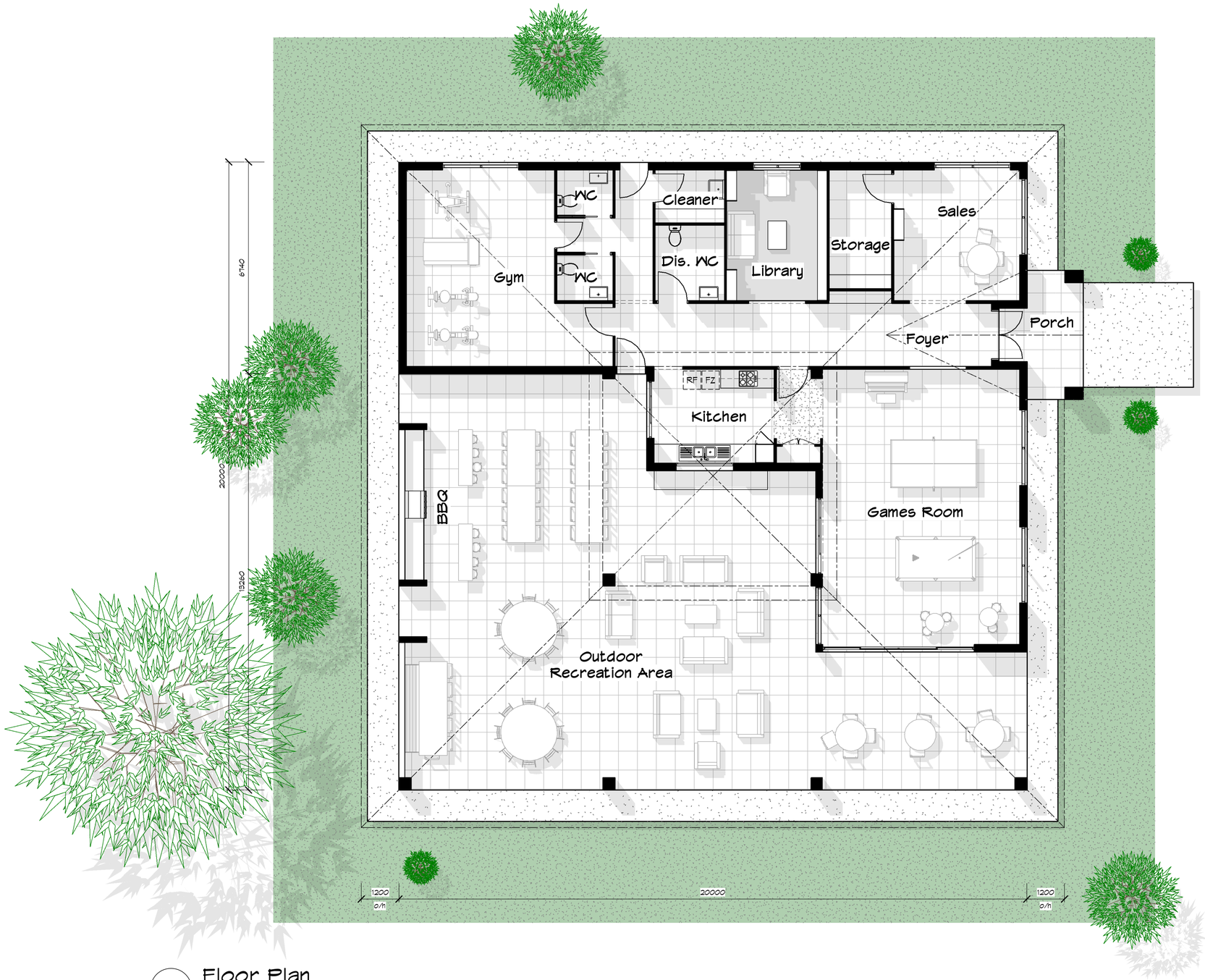
PLAN SIZE: A2

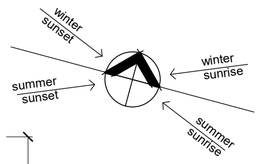
PROJECT NUMBER 181015 - 05

SHEET 05 OF 07 SHEETS

REVISION

PRINT DATE : 4/10/2019 6:22:44 PM





ROCKHAMPTON REGIONAL COUNCIL

APPROVED PLANS

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

Development Permit No.: D99-2019

Dated: 29 June 2020

1 Floor Plan

1 : 100

Floor Areas	
Enclosed	209.7 m²
Outdoor Recreation	188.8 m²
Porch	8.9 m²
Grand total	407.4 m²

MCU APPLICATION

date: 04/10/19

REVISION 01

REVISIONS

No.	DESCRIPTION	DATE

PROPOSED COMMUNITY BUILDING
FOR G. & M. DEMEDIO
AT 1014 - 1016 YAAMBA ROAD, PARKHURST

this drawing: Floor Plan

Rufus Design Group
STYLE • QUALITY • INNOVATION
MEMBER BUILDING DESIGNERS ASSOC. OF QLD INC.
Licenced under the QBSA Act Lic No. 1180286
Telephone 61 7 49288011
Facsimile 61 7 49266579
E-mail mailbox@rufusdesigngroup.com

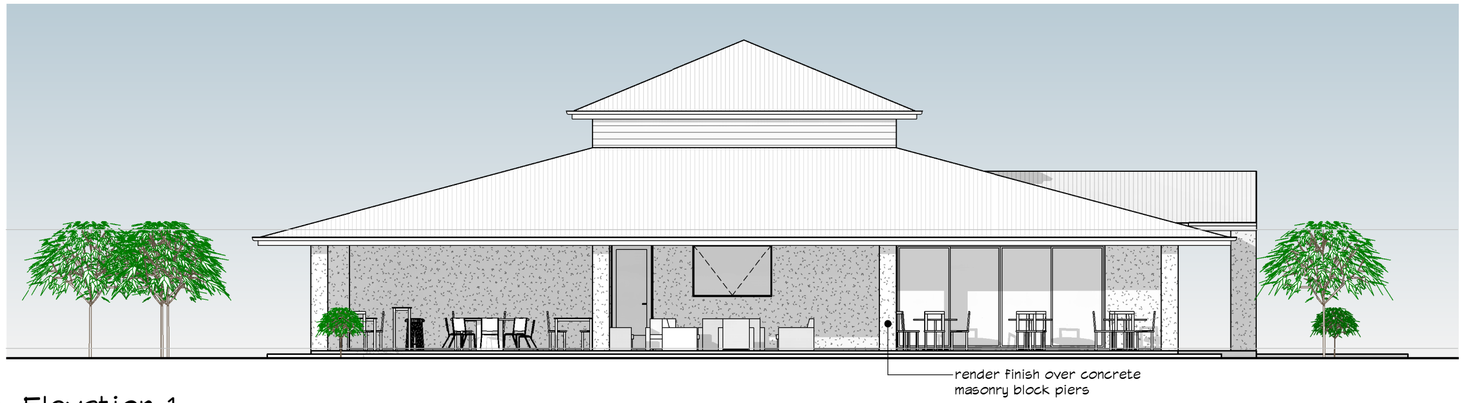
PROJECT MANAGER : T.J.R.
DRAWN : J.P.
CHKD :
WIND SPEED C2
PLAN SIZE: A2
PROJECT NUMBER 181015 - 06
SHEET 06 OF 07 SHEETS
REVISION

PRINT DATE : 4/10/2019 3:50:32 PM

REVISIONS			
	No.	DESCRIPTION	DATE

MCU APPLICATION
date: 04/10/19

REVISION 01



1 Elevation 1
1 : 100

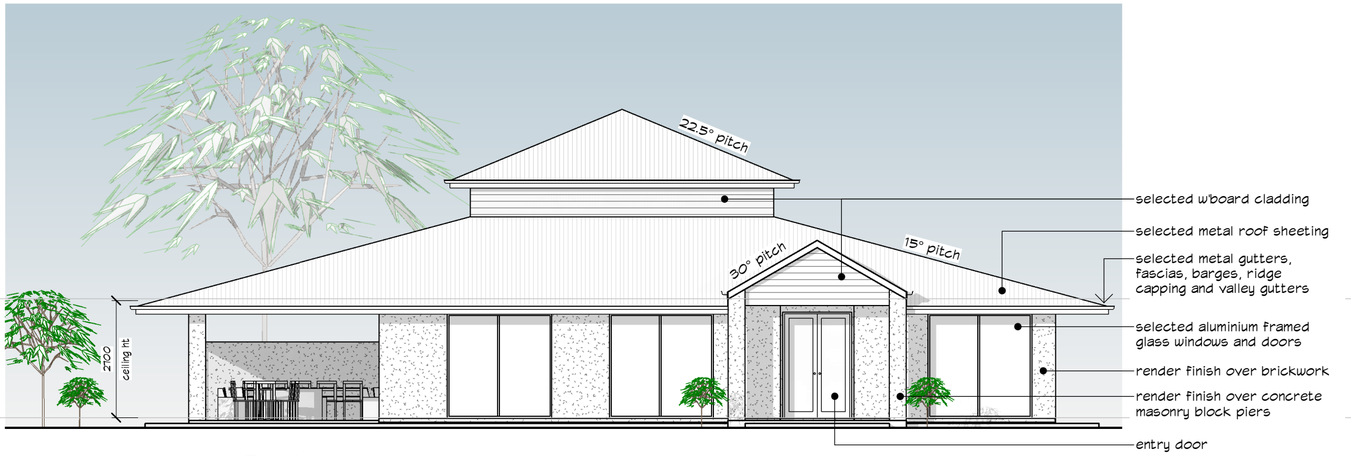
ROCKHAMPTON REGIONAL COUNCIL

APPROVED PLANS

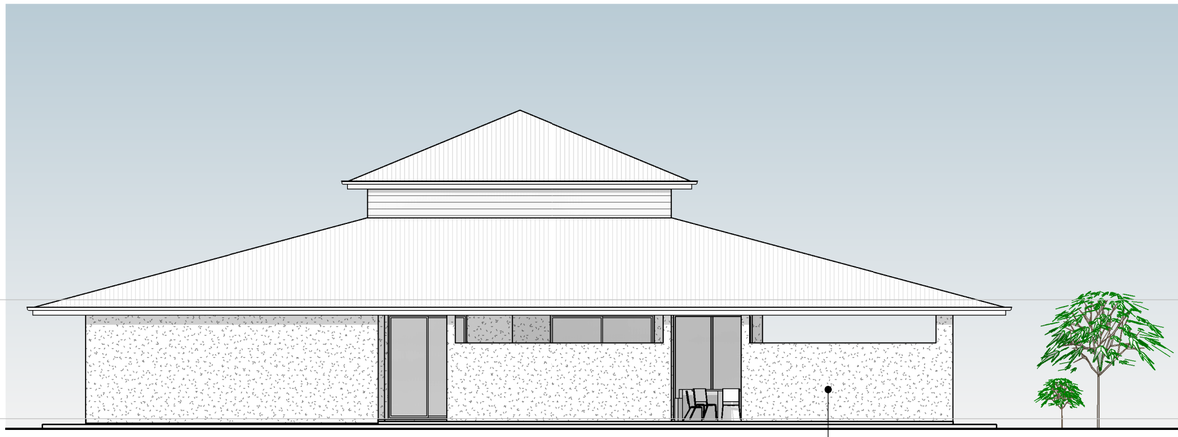
These plans are approved subject to the current conditions of approval associated with

Development Permit No.: D99-2019

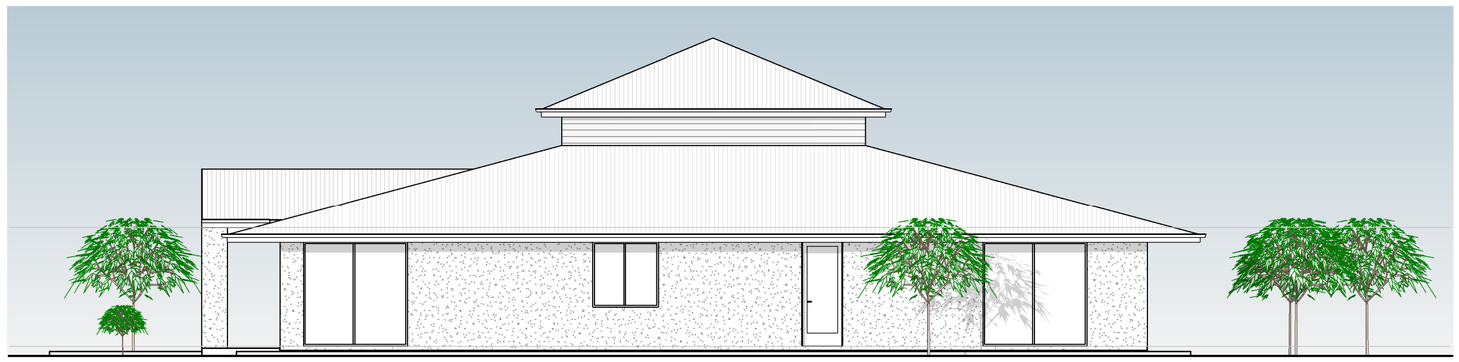
Dated: 29 June 2020



2 Elevation 2
1 : 100



4 Elevation 4
1 : 100



3 Elevation 3
1 : 100

PROPOSED COMMUNITY BUILDING

FOR G. & M. DEMEDIO
AT 1014 - 1016 YAAMBA ROAD,
PARKHURST

Rufus Design Group
STYLE • QUALITY • INNOVATION

bdi MEMBER BUILDING DESIGNERS ASSOC. OF QLD INC.

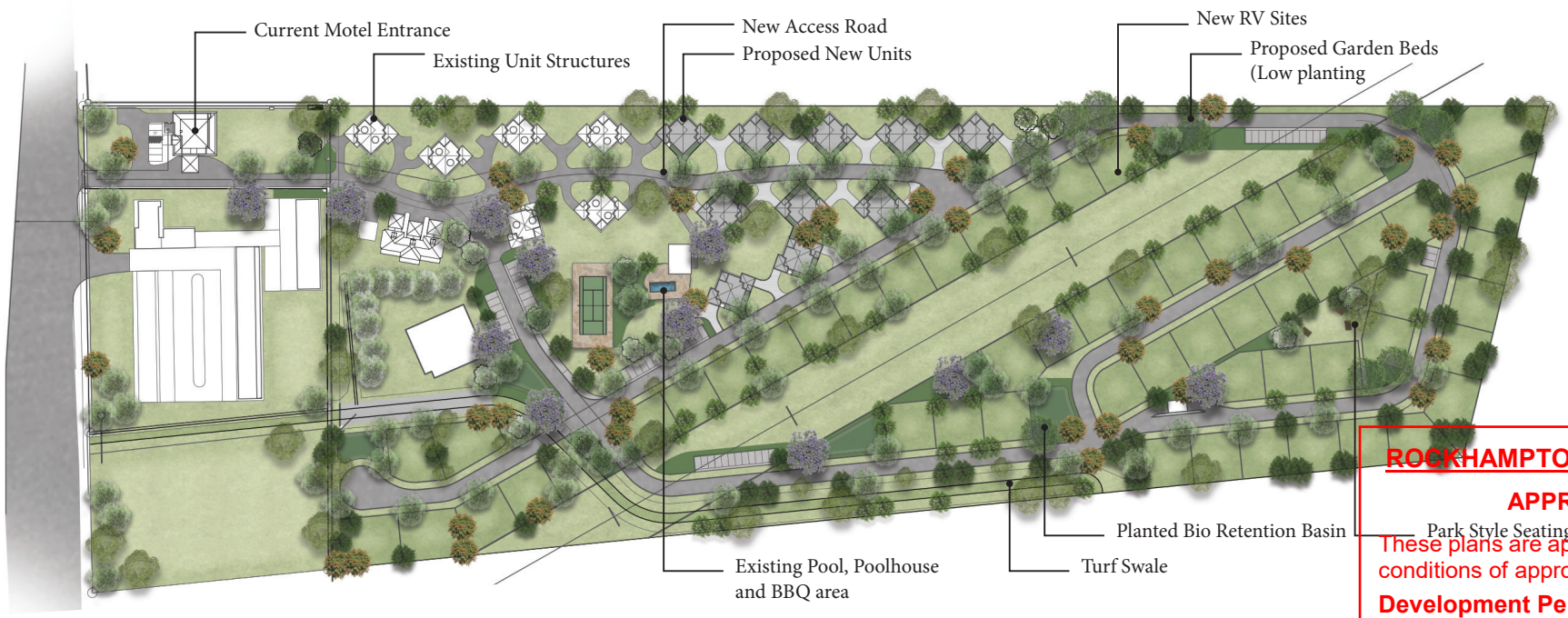
Licenced under the QBCC Lic No. 1180286

Telephone 61 7 49288011
E-mail mailbox@rufusdesigngroup.com

this drawing
Elevations

PROJECT MANAGER : T.J.R.	WIND SPEED C2	PROJECT NUMBER 181015 - 07	
DRAWN : J.P.	PLAN SIZE: A2	SHEET 01 OF 07 SHEETS	
CHKD :		REVISION	

PRINT DATE : 4/10/2019 3:50:35 PM



LANDSCAPE PLAN
1:2000 at A3

ROCKHAMPTON REGIONAL COUNCIL
APPROVED PLANS
These plans are approved subject to the current conditions of approval associated with
Development Permit No.: D99-2019
Dated: 29 June 2020

TYPICAL LANDSCAPE PLANTING SECTION
1:50 at A3

Code	Common Name	Scientific Name	Spacing/Rates
ANG cos	Smooth Barked Apple	Angophora costata	1/10m2
BUC cel	Ivory Curl	Buckinghamia Celsissima	1/5m2
CAE fer	Leopard Tree	Caesalpinia ferrea	1/8m2
CUP ana	Tuckeroo	Cupaniopsis anacardioides	1//5m2
DEL reg	Poinciana	Delonix regia	1/10m2
EUC cit	Lemon Scented Gum	Eucalyptus citriodora	1/5m2
EUC rav	Black ironbox	Eucalyptus raveretiana	1/10m2
FIC hil	Fig Tree	Ficus Hilli	1/15m2
HAR pen	Tulipwood	Harpulia pendula	1/5m2
JAC mim	Jacaranda	Jacaranda mimosifolia	1/15m2
LOP con	Queensland Brush Box	Lophostemon confertus	1/10m2
MEL qui	Broad Leaf Paperbark	Melaleuca quinquenervia	1/5m2
TAB arg	Crepe Myrtle	Tabebuia argenta	1/5m2
TRI lus	WaterGum	Tristaniopsis Luscious	1/5m2
WAT flo	Weeping Lilly Pilly	Waterhousea Floribunda	1/5m2

LANDSCAPE MASTER PLAN

Prepared by Alex Woodward
Registered Landscape Architect
008554

FOR DEVELOPMENT APPROVAL
G. Demedio
Revision A | 19 September 2019

RV DEVELOPMENT
1016 Yaamba Rd, Rohampton,
QLD 4702

5 Stormwater Quality

To improve the stormwater quality leaving the proposed development, a treatment train comprised of Stormwater Quality Improvement Devices (SQIDs) is proposed. The SQIDs will intercept and capture pollutants so that potential stormwater quality impacts are reduced and WQOs are achieved.

The scope of works for the stormwater quality analysis was to:

- Identify key stormwater pollutants associated with the proposed development;
- Identify the WQOs applicable for the site;
- Propose SQIDs for stormwater quality management; and
- Model the proposed SQIDs to asses if they achieve the required WQOs.

5.1 Pollutants of Concern

Typical key pollutants expected to be generated during the operational (post-construction) phase of the development are listed below. The capitalised pollutants are the key pollutants to be targeted for treatment.

- LITTER
- SEDIMENT
- Oxygen demanding substances (possibly present)
- NUTRIENTS (N & P)
- Pathogens / Faecal coliforms
- Hydrocarbons
- HEAVY METALS (associated with fine sediments)
- Surfactants
- Organochlorines & organophosphates
- Thermal pollution
- pH altering substances

Only the capitalised key pollutants are further addressed in this report. However, the treatment train developed will also mitigate other pollutants. As heavy metals are predominately associated with fine sediments, the controls proposed to reduce total suspended solids will also reduce heavy metal loads.

5.2 Water Quality Objectives

The load reduction WQOs for the site are shown in **Table 5-1** and have been adopted from *Appendix 3* of the *SPP* (2017).

Table 5-1: WQOs for the Site (Central Queensland, South)

	Total Suspended Solids (TSS)	Total Phosphorus (TP)	Total Nitrogen (TN)	Gross Pollutants (GP)
Load Reduction Target	85%	60%	45%	90%

5.3 Stormwater Quality Management Strategy

To improve the stormwater quality discharging from the site, bioretention basins and swales are proposed. Refer to Drawing No. **18-002772-SK03** in **Appendix D** for the proposed treatment train configuration.

Bioretention systems utilise sandy loam soil based media to filter runoff. Sediment particle and suspended solids are trapped within vegetation and on the surface of the filter media while micro-organisms and vegetation remove dissolved nutrients (Nitrogen and Phosphorus) through biological uptake processes. Subsoil drainage provided below the filter media allows for the treated runoff to discharge from the bioretention systems.

Five conceptual bioretention basins are proposed to treat runoff flows before leaving the site. Refer to Quality Catchment Plan Drawing No. **18-002772-SK03** in **Appendix D** for location of the bioretentions and related catchment areas.

5.4 MUSIC Modelling Methodology

Water quality modelling was undertaken using MUSIC modelling software. MUSIC was developed by the Cooperative Research Centre for Catchment Hydrology. It conceptualises the transfer of pollutants through a stormwater drainage system and quantifies the effectiveness of the proposed stormwater quality treatment trains. MUSIC only provides quantitative modelling for total suspended solids (TSS), total Phosphorous (TP), total Nitrogen (TN) and gross pollutants (GP). The MUSIC model was setup in accordance with Mackay Regional Council's *MUSIC Guidelines – Version 1.1* (2008) and Water by Design *MUSIC Modelling Guidelines* (2010).

5.4.1 Meteorological Data

Six (6) minute pluviographic data was sourced from the Bureau of Meteorology (BOM) for Rockhampton Aero (Station No. 39083). The 10 year rainfall period from 31 March 2000 to 31 March 2010 was adopted for analysis. Mean potential evapotranspiration (PET) values were sourced from the BOM.

5.4.2 Source Nodes

Source nodes represent the catchment areas modelled. The catchment delineation is shown on Drawing No. **18-002772-SK03** in **Appendix D.** The split catchment approach has been adopted with roof, road and ground areas being measured from the development layout. Roof areas include all impervious surface areas on individual lots. Percentage impervious assumptions for the required node types are detailed below in **Table 5-2**.

Table 5-2: Adopted Surface Type Percentage Impervious (%)

Surface Type	Adopted Percentage Impervious
Roof	100%
Road	100%
Ground	0%

The area of the source nodes for each catchments, and the area of each of the bioretention basins, is presented below in **Table 5-3**. MUSIC modelling has been undertaken adopting the above noted percentage impervious for each of the listed source nodes. The area for each of the bioretention basins has been excluded from the source nodes in the MUSIC model.

Table 5-3: Source Node Catchment Areas

	1	2	3	4	5	6
Total Area (ha)	2.093	0.353	0.893	2.050	0.445	1.199
Road Area (ha)	0.284	0.133	0.095	0.505	0.064	0.038
Roof Area (ha)	0.734	0.068	0.023	0.454	0.131	0.058
Ground (ha)	1.055	0.148	0.758	1.074	0.238	0.660
Basin (ha)	0.019	0.005	0.017	0.017	0.011	na

Base and storm flow pollutant concentrations and soil properties have been adopted from *Table 8* and *Table 9* of *Mackay Regional Council MUSIC Guidelines – Version 1.1 (2008)*. Stochastic generation estimation and serial autocorrelation set to zero has also been adopted.

5.4.3 Treatment Nodes

Bioretention Basins

Five (5) conceptual bioretention basins were modelled as part of the development. The minimum filter areas required to achieve the SPP (2017) WQO's are presented in **Table 5-4**. Refer to concept stormwater management drawing attached in **Appendix D** for further details of the basin's locations and concept formations.

Table 5-4: Bioretention Basin Areas

Catchment	Filter Area (m2)
1	192
2	50
3	168
4	170
5	109

The following parameters were applied across bioretention basins 1, 3, 4 and 5:

- 300mm Extended detention depth;
- 500mm filter media depth;
- Overflow weir was modelled as 10% of the filter area;
- 30mg/kg filter media Orthophosphate content;
- 400mg/kg filter media TN content; and
- 180mm/hr filter media saturated hydraulic conductivity.

Basin 2 is identical in all respects excepting its extended detention depth, which is 100mm. The Orthophosphate and TN content in the filter media were adopted from Healthy Waterways (2016).

Swales

A swale is a vegetated channel that can be used to filter coarse and medium sediments from stormwater flows. Catchment 6, which is the area of the site adjacent to the constructed drain running through the site, has utilised the drain as a treatment swale. This drain will in fact provide additional treatment for the entire site but has only been utilised for the treatment of Catchment 6 in the music modelling. Half the length of the drain has been used to calculate the area of filtration for the purposes of modelling.

Table 5-5: Swale Surface Area

Catchment	Area (m2)
6	660

5.5 MUSIC Modelling Results

Table 5-6 to **Table 5-11** below present the results from each of the water quality treatment devices for each of the catchments.

Table 5-12 presents the combined MUSIC results for the entire site.

Table 5-6: MUSIC Results - Bioretention 1

Pollutant	TSS	TP	TN	GP
Source Loads (kg/year)	868	1.93	13.3	151
Residential Load (kg/year)	140	0.51	6.69	0
Reduction Required for WQO	85%	60%	45%	90%
Reduction Achieved	83.9%	73.8%	49.6%	100
Reduction Achieved > Reduction required	NO	YES	YES	YES

Table 5-7: MUSIC Results - Bioretention 2

Pollutant	TSS	TP	TN	GP
Source Loads (kg/year)	332	0.593	2.55	29.9
Residential Load (kg/year)	46.6	0.138	1.35	0
Reduction Required for WQO	85%	60%	45%	90%
Reduction Achieved	86%	76.8%	47%	100%
Reduction Achieved > Reduction required	YES	YES	YES	YES

Table 5-8: MUSIC Results - Bioretention 3

Pollutant	TSS	TP	TN	GP
Source Loads (kg/year)	275	0.473	1.97	17.6
Residential Load (kg/year)	20.3	0.042	0.615	0
Reduction Required for WQO	85%	60%	45%	90%
Reduction Achieved	92.6%	91.2%	68.7%	100
Reduction Achieved > Reduction required	YES	YES	YES	YES

Table 5-9: MUSIC Results - Bioretention 4

Pollutant	TSS	TP	TN	GP
Source Loads (kg/year)	1340	2.51	12.5	143
Residential Load (kg/year)	221	0.592	6.53	0
Reduction Required for WQO	85%	60%	45%	90%
Reduction Achieved	83.5%	76.4%	48%	100%
Reduction Achieved > Reduction required	NO	YES	YES	YES

Table 5-10: MUSIC Results - Bioretention 5

Pollutant	TSS	TP	TN	GP
Source Loads (kg/year)	189	0.391	2.53	29
Residential Load (kg/year)	9.89	0.049	0.889	0
Reduction Required for WQO	85%	60%	45%	90%
Reduction Achieved	94.8%	87.6%	64.9%	100
Reduction Achieved > Reduction required	YES	YES	YES	YES

Table 5-11: MUSIC Results - Swale 6

Pollutant	TSS	TP	TN	GP
Source Loads (kg/year)	144	0.275	1.57	14.3
Residential Load (kg/year)	12.9	0.102	1.13	0
Reduction Required for WQO	85%	60%	45%	90%
Reduction Achieved	91.1%	63%	27.9%	100
Reduction Achieved > Reduction required	YES	YES	NO	YES

Table 5-12: MUSIC Results – Entire Site

Pollutant	TSS	TP	TN	GP
Source Loads (kg/year)	3150	6.17	34.4	385
Residential Load (kg/year)	451	1.43	17.2	0
Reduction Required for WQO	85%	60%	45%	90%
Reduction Achieved	86%	77%	50%	100
Reduction Achieved > Reduction required	YES	YES	YES	YES

Results in **Table 5-12** demonstrates that WQO's have been achieved for the entire site. The above results demonstrate that the proposed stormwater quality management strategy achieves the WQOs required under the *SPP* (2017).

5.6 Construction, Establishment & Maintenance of SQIDs

Outlined below are the proposed procedures and methodology for the construction and operational management as well as the maintenance of the bioretention basins proposed as part of the development. The following methodology will be followed through the construction, establishment, and operational phases of each bioretention basin. Details provided in this section will be incorporated into the detailed design of the development.

5.6.1 Construction & Establishment Phases

Construction of the development and building works has the potential to mobilise large quantities of sediment in runoff. For bioretention systems to perform as designed there is a need to protect filter media and basin vegetation during this phase of the development. Therefore a staged construction and establishment method for construction of the bioretention systems will be followed.

It is proposed to follow an installation procedure for each bioretention system generally in accordance with *Option 1* of the *Staged Construction and Establishment Methodology* as outlined in *Table 3.6* and *Section 3.8.1* of the Water by Design *Construction and Establishment Guidelines* (2011). A summary of this methodology is presented below.

1. Civil Works (Functional Installation) – Initially the bioretention systems will be used as a sediment basins. Once the majority of the civil construction works are complete, earthworks and shaping to create the layout and functional elements of the bioretention system will be undertaken. The installation of functional elements (e.g. inlets, outlet structures, subsoil drainage, transition layers and filter media) shall be undertaken as per the methodology detailed in Section 3.9.1 in the Water by Design Construction and Establishment Guidelines (2011). Prior to the commencement of the Building Phase, sediment fences will be erected around the perimeter of the basins to avoid the entry of sediment. Laying a temporary filter cloth (or 25mm thick layer of course sand and 25mm of topsoil) over each basin shall protect the system during both the Civil Works and the Building Phase.

2. Building Phase (Building Construction) – During this phase the bioretention systems shall continue to operate as temporary sediment basins. Sediment fences shall remain around the perimeter of each basin (both around the filter media and the top of batter) to restrict sediment inflow. Clear indications of the restriction of traffic to each bioretention system shall also be displayed.

3. Landscape Establishment (Operational Establishment) – when the Building Phase is 80-90% complete, the temporary protective measures and accumulated sediments within the basin will be removed. The basin shall be planted with vegetation and landscaping as proposed. Sufficient watering and removal of weeds following planting shall be undertaken in accordance with Section 3.9.3 of the Water by Design Construction and Establishment Guidelines (2011).

5.6.2 Operational Phase

During Operational Phase, regular inspections of the bioretention systems is required to ensure vegetation establishes and the properties of the filter media remain effective.

Inspection Requirements

Checklists have been developed for the bioretention systems. The condition and maintenance carried out will be recorded on the checklist at the time the inspection and/or maintenance is undertaken. A copy of the checklist is presented in **Appendix E.**

Maintenance personnel should also be encouraged to report and document changes in vegetation type within the bioretention systems. Photographic documentation and mapping of vegetation types are to be recorded annually to determine changes in vegetation over time. Photographs of each device are to be taken at the same location annually.

Through these procedures a reliable maintenance database can be developed and used to determine if the maintenance undertaken is ensuring the SQID is functioning as intended.

Except for periods of extended wet weather, mosquitoes are unlikely to be an issue as surface water within the bioretention systems is not expected to remain for more than two days.

Weed Removal

Maintenance personnel will need to identify species of both terrestrial and semi-aquatic weeds common to the area. As the bioretention system are “dry” SQIDs, aquatic weed infestation is unlikely. When weeds have been identified they are to be removed by hand immediately or eradication methods scheduled before the infestation becomes larger and more difficult to control. It should be noted that herbicides should not be used in the removal of invasive weeds as this has negative impacts on downstream water quality.

Replanting

Replanting of vegetation is to be carried out to replace dead or damaged vegetation, vegetation that has been removed by scour or erosion, or vegetation that is being re-planted following tilling or the replacement of filter media. Removed vegetation should be replaced by plants of similar size and species, or as indicated on the appropriate Landscaping Plans.

Filter Inspection and Replacement

Fine sediment and silt may accumulate within the filter media of the bioretention systems over time. Removal of sediment and silt trapped within the filter media is expected to be the most costly maintenance requirement for bioretention systems.

It is recommended that a visual inspection of the infiltration properties be undertaken at least three times per year with more frequent inspections no greater than three months apart between October and May. This is to determine whether built-up fine sediment and silt has reached a point where the filter media has become clogged.

The infiltration properties of the filter media within the bioretention systems needs to be checked after a period of significant rainfall event, which is defined as a 24 hour period with rainfall greater than 200mm, or a shorter period with an average rainfall intensity greater than 50mm/hr. This is an ideal period to assess the infiltration properties as water should not pond for an extended period. Therefore inspections should occur 24 to 72 hours after an appropriate rainfall event.

In the event that isolated boggy patches occur within the bioretention systems then the subsoil drainage pipes could be blocked. If this is not the case and no other blockages have been observed then surface of the media is to be tilled (raked and aerated) to a depth of 150mm. This will require temporarily removing and storing the surface vegetation prior to tilling the surface. Should the infiltration properties be improved then the removed vegetation and coarse aggregate layer can be replanted. Should tilling prove unsuccessful or if an infiltration check indicates filter media to be clogged, then the top portion of the filter media is to be replaced as follows:

1. Removal of surface vegetation and coarse aggregate layer and store for re-establishment;
2. Remove the top 150mm of filter media and dispose of in an approved manner;
3. Till the remaining filter media to a further depth of 300mm;
4. Place a new layer of appropriate filter media as per the specification (refer to **Appendix C**), free from organic matter, clay and silt; and
5. Replant the removed vegetation.

If blockages occur frequently, a filter media with a higher saturated hydraulic conductivity should be considered. Reassessing the species and planting density of vegetation is also an option.

Unless changes to the filter media specification are made through a review of the SQID performance, the filter media to be used for the bioretention systems is to be a Sandy Loam as per the FAWB *Guidelines for Filter Media in Biofiltration Systems* (*Version 3.01,* 2009).

Subsoil Drainage Inspection & Cleanout

The build-up of fine sediment and silt within the subsoil drainage pipes is unlikely as it will be trapped by the filter media. However the subsoil drainage is to be checked annually for blockages that may be caused by foreign matter entering through cleanout inspection openings or by small fauna. This can be done by either:

- Observing the condition of the subsoil drain through the cleanout and inspection openings located towards the downstream end of a subsoil drainage pipe.
- Observing the amount of sediment and silt flushed into the downstream field inlet when water is pumped into the upstream end of the subsoil drainage line (through a cleanout and inspection opening).

If a considerable amount of sediment and silt is observed or carried into the downstream inlet, then each subsoil drainage line must be flushed out with high pressure water.

Water is to be pumped into each subsoil drainage pipe through the upstream cleanout inspection opening until all sediment has been ejected from the pipe. To collect the water and ejected sediment within the downstream pit a temporary barrier is to be placed over the downstream pipe opening (such as sand bags) and a pump used to draw the water, sediment and silt out of the pit and irrigated onto areas of open space away from each basin. This will ensure the sediment and silt does not enter the downstream waterway.

If frequent issues occur with the subsoil drainage system, CCTV checking could be undertaken to identify any damage subsoil drainage.

Monitoring

Visual monitoring of bioretention devices is proposed as part of the inspection and maintenance requirements for the devices. Visual inspections will occur at least three times per year with more frequent inspections to occur no more than three months apart between October and May. Inspection should be made not less than 24 hours and not more than 72 hours after the cessation of rainfall if the total rainfall on any day exceeds 30mm.

5.7 General Requirements

5.7.1 Yearly Review of Maintenance Management Plan

Each year a review is to be carried out to determine if the programmed inspection and maintenance (including checklists) is ensuring SQIDs are functioning as intended. The review should include an assessment of the maintenance database to determine whether the programmed inspections and maintenance is effective. Information on the database should be assessed to determine whether any noticeable changes are evident in vegetation, presence of fauna and operational efficiency of any structures or features of the device. This will further provide indicators as to whether sufficient information is being recorded for management purposes.

5.7.2 Maintenance Personnel Safety (OH&S)

The Workplace Safety Regulation 2011 requires that all reasonably practicable steps be taken to protect an employee's health in a workplace. Organisations involved in the inspection and maintenance of the SQIDs should therefore:

- Have a documented occupational health and safety policy in place;
- Ensure all staff and maintenance personnel are aware of and abide by the policy; and
- The policy provides a mechanism for review and improvement.

As part of the policy personnel involved in the maintenance of the SQIDs are to have sufficient resources (such as personnel protective equipment, training etc.) to carry out the task in a safe manner.

5.7.3 General Public Safety

The safety of the general public in the area of the SQID being maintained also needs to be ensured. Notices to inform the staff and public accessing the site regarding the SQID maintenance needs to be circulated prior to the scheduled date. Temporary signage and safety barriers need to be erected around maintenance work areas prior to the works commencing and are not to be removed until all works have finished.

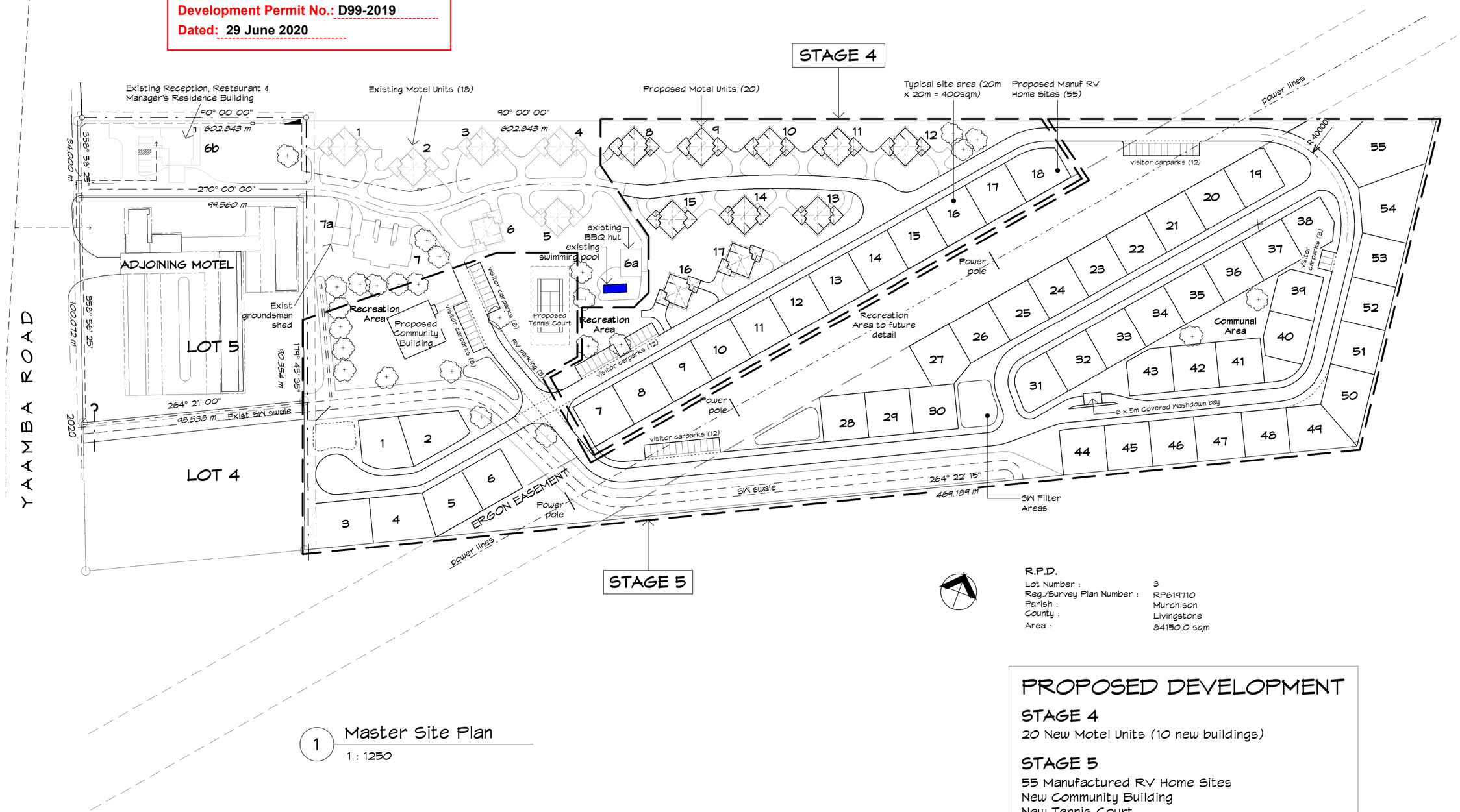
ROCKHAMPTON REGIONAL COUNCIL

APPROVED PLANS

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

Development Permit No.: D99-2019

Dated: 29 June 2020



1 Master Site Plan

1 : 1250

R.P.D.

Lot Number :	3
Reg./Survey Plan Number :	RP619710
Parish :	Murchison
County :	Livingstone
Area :	84150.0 sqm

PROPOSED DEVELOPMENT

STAGE 4

20 New Motel Units (10 new buildings)

STAGE 5

55 Manufactured RV Home Sites
New Community Building
New Tennis Court
55 Car Parking Bays
3 RV Parking Bays
Covered Vehicle washdown bay

REVISIONS			
07	Preliminary plan	20/05/20
No.	DESCRIPTION	DATE

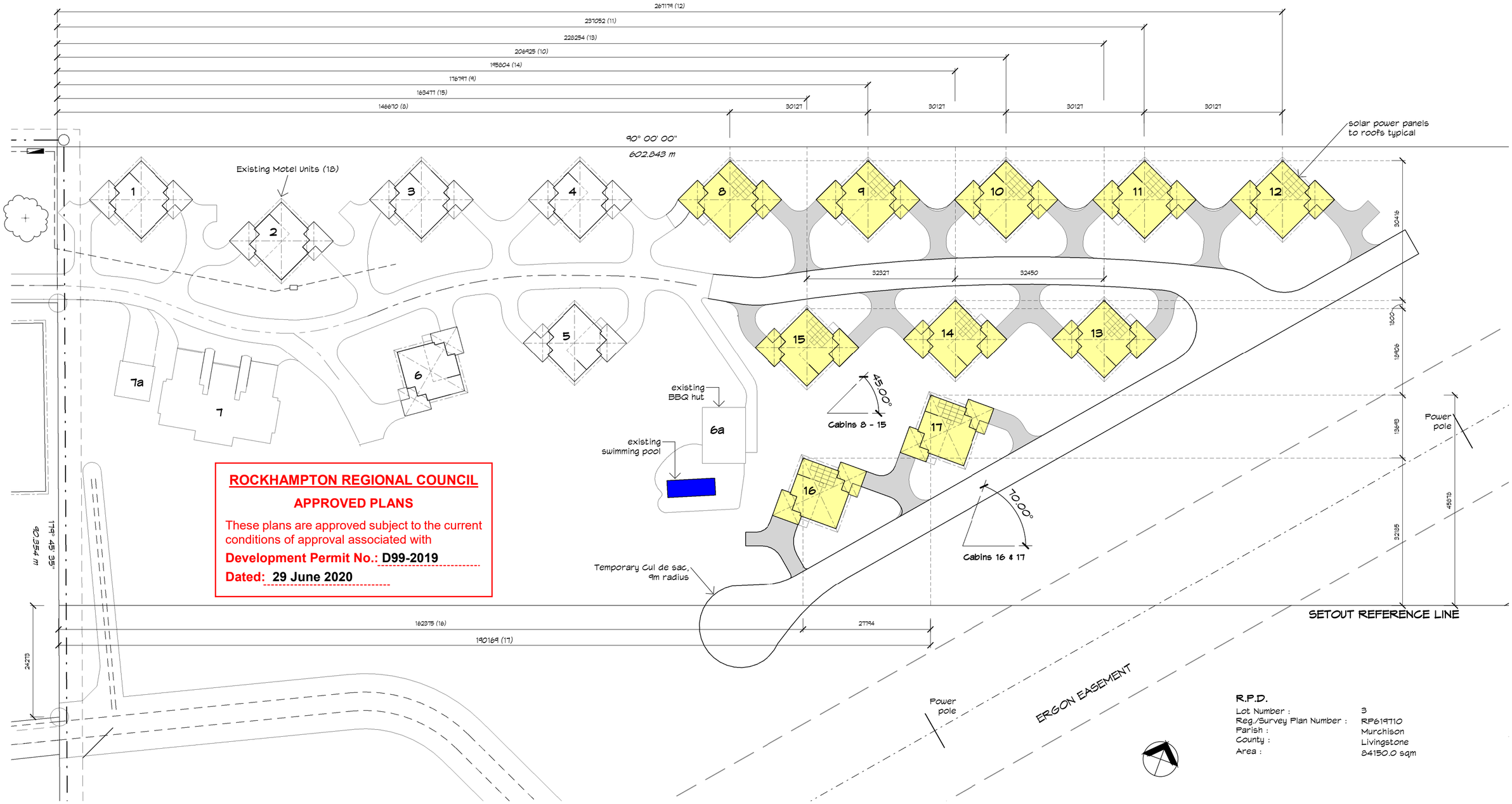
PROPOSED MOTEL CABINS
FOR G. & M. DEMEDIO
AT 1014 - 1016 YAAMBA ROAD, PARKHURST

this drawing
Master Site Plan

Rufus Design Group
STYLE • QUALITY • INNOVATION
MEMBER BUILDING DESIGNERS ASSOC. OF QLD INC.
Licenced under the QBSA Act Lic No. 1180286
Telephone 61 7 49288011
Facsimile 61 7 49266579
E-mail mailbox@rufusdesigngroup.com

PROJECT MANAGER : T.J.R.
DRAWN : J.P.
CHKD :
WIND SPEED C2
PLAN SIZE: A2
PROJECT NUMBER 181015 - 02
SHEET 02 OF 16 SHEETS
REVISION 07

PRINT DATE : 20/05/2020 2:54:56 PM



ROCKHAMPTON REGIONAL COUNCIL

APPROVED PLANS

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

Development Permit No.: D99-2019

Dated: 29 June 2020

R.P.D.

Lot Number :	3
Reg./Survey Plan Number :	RP619710
Parish :	Murchison
County :	Livingstone
Area :	84150.0 sqm

1 Cabins Setout Plan

1 : 600

REVISIONS			
07	Preliminary plan	20/05/20	
No.	DESCRIPTION	DATE	

PROPOSED MOTEL CABINS
FOR G. & M. DEMEDIO
AT 1014 - 1016 YAAMBA ROAD, PARKHURST

this drawing
Cabins Setout Plan

Rufus Design Group
STYLE • QUALITY • INNOVATION
MEMBER BUILDING DESIGNERS ASSOC. OF QLD INC.
Licenced under the QBSA Act Lic No. 1180286
Telephone 61 7 49288011
Facsimile 61 7 49266579
E-mail mailbox@rufusdesigngroup.com

PROJECT MANAGER : T.J.R.
DRAWN : J.P.
CHKD :
WIND SPEED C2
PLAN SIZE: A2

PROJECT NUMBER 181015 - 03
SHEET 03 OF 16 SHEETS
REVISION 07

PRINT DATE : 20/05/2020 2:54:57 PM