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CEO
Douglas Shire Council

Attn: Neil Beck
Ref: CA 2021_4239/1 (1028000)

INFORMATION REQUEST
(Given under Section 12 of the Development Assessment Rules)

Property Details

Street Address:	5640 Captain Cook Highway MOWBRAY
Real Property Description:	LOT: 123 TYP: SR PLN: 687
Local Government Area:	Douglas Shire Council

Application Details

Application Number:	CA 2021_4239/1
Approval Sought:	Development Permit for Material Change of Use Development Permit for Reconfiguring a Lot Preliminary Approval for Operational Works (Advertising Devices)
Nature of Development Proposed:	Material Change of Use Reconfiguring a Lot Operational Works
Description of the Development Proposed:	Material Change of Use - Resort Complex (Outdoor Sport & Recreation, Short-term Accommodation, Food & Drink Outlet, Shop, Tourist Park, Helipads & Caretaker's Residence) Reconfiguring a Lot (1 Lot into 4 Lots) Operational Works (Advertising Devices)

Additional Information Requested

DRAWINGS

1. The Applicant to provide further detailed plans at an appropriate scale (and dimensioned where necessary) to allow an assessment to be undertaken. Items to be considered involve, but not limited to the following: -

   a) Access and parking arrangements in addition to detailing servicing requirements of the resort complex is required. Details should include dimensioned road widths; design vehicle being accommodated, and bus set down area to determine capacity and size of vehicles being accommodated. Introduction of landscaping elements in car parking areas to be incorporated.

   b) Areas surrounding resort complex and wave park.

   c) Proposed Tourist Park element.

   d) The area at the rear of the Wave Park i.e mechanical plant and workshop location.

   e) Aqua Park facility.

   f) VIP Room and amenities.

   The following plans have been added or revised to provide greater clarity and detail on the application:

   DA-01.11 RECONFIGURATION OF A LOT PROPOSAL

   DA-01.12 DROP OFF & LOADING BAYS

   DA-01.13 CARPARK_PART 01

   DA-01.14 CARPARK_PART 02

   DA-01.15 CAR PARK ROOF

   DA-01.16 HOTEL_SURROUNDINGS_PART 01

   DA-01.17 HOTEL_SURROUNDINGS_PART 02

   DA-01.18 WAVE PARK_SURROUNDINGS_PART 01

   DA-01.19 WAVE PARK_SURROUNDINGS_PART 02

   DA-01.20 CABIN PARK

   DA-01.21 ROAD BUFFER - LANDSCAPING

   DA-01.22 ROAD BUFFER - LANDSCAPING

   DA-01.23 ROAD BUFFER SECTIONS

   DA-03.1 – DA-3.29 REVISED HOTEL PLANS

   DA-04.1 KIOSK PLAN & ELEVATIONS

   DA-04.2 VIP PLAN & ELEVATIONS

   DA-04.3 BAR PLAN & ELEVATIONS

   DA-04.4 CABIN TYPE 1 - PLAN & ELEVATIONS

   DA-04.5 CABIN TYPE 2 - PLAN & ELEVATIONS

   DA-04.6 CABIN TYPE 3 (CARETAKER) - PLAN & ELEVATI…

   DA-04.7 CAMP KITCHEN PLANS

   DA-04.8 CAMP KITCHEN ELEVATIONS

   DA-04.9 CAR PARK ROOFING

CAR PARKING

2. Provide updated concept plans/master plans and specifications for the car parking. The plans are requested to identify:

a) the size of car parks proposed - having regard to the user class in AS2890.1 – Off Street Parking Code.

The development has been assessed as User Class 2 / C2 under AS2890.1. The minimum bay dimension for this assessment is 4.8m long, 2.5m wide with a 5.8m aisle.

CLASS 2 - Long-term city and town centre parking, sports facilities, entertainment centres, hotels, motels, airport visitors (generally medium-term parking).

Parking is designed as Bays at 90º.

The standard parking module provided, throughout the development, have been allocated at 6.0m Long by 2.75m wide with a 6m aisle. This exceeds the minimum standard and is more representative of the type of vehicle that is preferred for families and younger drivers who would be typical users of the development.

Refer to PLANS DA-01.13 CARPARK_PART 01 & DA-01.14 CARPARK_PART 02

b) proposed size of aggregated parking modules;

c) the number of car parks provided in each module;

Refer to PLANS DA-01.13 CARPARK_PART 01 & DA-01.14 CARPARK_PART 02

CARPARK Modules	No of SPACES
HOTEL SECURE ACCESS CARPARK 01	37 SPACES – ALL COVERED
HOTEL ECURE ACCESS CARPARK 02	72 SPACES – ALL COVERED
PUBLIC CARPARK 01	71 SPACES – 64 COVERED
PUBLIC CARPARK 02	33 SPACES – 30 COVERED
PUBLIC CARPARK 03	36 SPACES
PUBLIC CARPARK 04	20 SPACES
PUBLIC CARPARK 05	82 SPACES
OPERATIONS CARPARK	16 SPACES – ALL COVERED
CARETAKER	2 SPACES - COVERED
TOTAL	**369 SPACES**
Residences	180 SPACES
TOTAL	**549 SPACES**
LARGE VEHICLE PARKING	6 SPACES CARPARK
LARGE VEHICLE PARKING	2 SPACES OPERATIONS / CABIN PARK

d) bus set down areas to show capacity and design vehicle to determine the number of spaces to be provided.

Refer to PLAN DA-01.12 DROP OFF ZONE

The proposal allows for 2 full size buses (12m as per the NHVR Code) to be parked at the drop off zone. 36 m has been provided allowing buses to park to the kerb.

The drop off area also allows for standing room for Taxi & Ride sharing vehicles (4 Spaces) and Hotel Concierge (3 spaces).

Number of required accessible car spaces – 8 (calculation for 350 spaces)

Number of accessible car spaces provided – **10 spaces**

e) Dimensioned setback from road boundary and detail what spaces will be covered spaces

Carpark setbacks from the Front Boundary are shown on Carparking Plans DA-01.13 CARPARK_PART 01 & DA-01.14 CARPARK_PART 02

As can be clearly seen in the layout, the design of the carpark is a series of modules set at a diagonal to one another and the road reserve. This was a conscious decision to allow for extensive landscaping utilising native species to be located within and around the carparking modules. Full documentation of the Car Park landscaping will be completed during the design development phase. The Car Park landscaping will use trees and vines to transition from the native dense road barrier to the more tropical feel around the resort.

With varying densities of screening the appearance of the modules will be visually broken up such that there are not long, unbroken sightlines. Parked cars will be shielded from the highway – and Resort entry roads to protect the visual amenity of the whole project and underline the "Green" credentials of the development.

The Car Park roof structure has been designed using Gluelam Timber portal frames covered with Solar Panels. As well as generating power they will also provide desirable shade and a degree of rain protection to the benefit of patrons. With screening vegetation, the solar panel pergolas will have a very low visual signature. The Carpark roof design is shown on plan DA-04.09 CARPARK ROOF.

Performance Outcome
PO2 - Buildings and structures are setback to maintain the rural character of the area and achieve separation from buildings on adjoining properties.
(a) 40 metres from the property boundary and a State-controlled road;
(d) 6 metres from side and rear property boundaries.

In terms of the Performance Outcome, it is noted that there are NO adjoining properties. The current vista of the site is degraded canelands and low-level scrub visible from passing traffic. Whilst Rural in nature the site does not have a positive contribution to the scenic values of a Rural area. Sometime after completion of NorthBreak, once the native vegetation has had a chance to become established on the whole site, the visual appeal will be dramatically improved.

At its nearest corner, the Resort is setback more than 50 metres from the site boundary which is more than the performance outcome of 40 metres. The alignment of the Resort is such that the narrow end faces the road with the longer wings of the building perpendicular to the road. Most of the area within the building setback will provide a landscaped screen. It should also be noted that as the natural landform falls away from the Highway the projected height of the building is two storeys high.

The development conforms with the side setback requirements.

Consequently, it is strongly suggested that the result of the development will have a positive contribution to the Rural character of the area and remove one of the less attractive view lines visible from traffic travelling along the Cook Highway

The car parking demands as advised by the applicant requires revisiting. The Applicant is requested to provide a parking assessment on each element of the Resort Complex as required by the parking and access code. Parking arrangements for the Tourist Park is also to be clarified. It is noted the Planning Report advises vehicle access is available to Tourist Park, although the Master Plan Diagrams would suggest otherwise i.e footpath access only. Please clarify.

An updated Traffic Report has been provided by GHD. This report and an expanded Carparking study addressing each element in the development is provided as Appendix M.

Vehicle access to the Tourist Park (Surf Cabins) is via the Eastern Access Road that services the Short-Term Accommodation Precinct and the operational components of the Surf Park. It is envisaged that most guests utilising the Cabin Park will arrive via Bus as part of a School Group or Surf Camp Group. There is also an expectation that hikers and mountain bike riders will also arrive via the footpath

Vehicle access directly to the Tourist Park will be limited to Buses, Service Vehicles, Staff and Management. In the instance that a guest in the Cabins arrives independently by car they could be expected to park in the main carpark. However, this is seen to be a very low incidence.

Site deliveries is allowed for at two locations. A delivery dock at the southern end of the hotel and the second to the maintenance area to the rear of the Wave Pool. The hotel loading zone is designed to cater for 2 MRV – 8m standard design vehicles. An additional 2 MRV and 2 LRV – 12.5m standard design vehicle spaces are provided at the rear of the surf park in association with the Wave Pool Management. Gardens and Maintenance and Cabin Park service areas.

The largest Design Vehicle required from the table would be the Industrial collection vehicle.

Using the DSC Access-Parking-and-Servicing-Code the Minimum standard design service vehicle for each use is tabled below:

Land use	Minimum standard design service vehicle
Outdoor sport and recreation	RCV
Food and drink outlet 200 – 599sqm Gross Floor Area	1 x VAN 1 x MRV
Resort complex	RCV
Shop 200 – 599sqm Gross Floor Area	1 x VAN 1 x MRV
Short term Accommodation	SRV
Tourist park	LRV

Refer Plans

DA-01.12	DROP OFF ZONE
DA-01.18	WAVE PARK_SURROUNDINGS_PART 01
DA-01.19	WAVE PARK_SURROUNDINGS_PART 02
DA-04.11	OPERATIONS ELEVATIONS

LAND USE	REQUIRED FOR DEVELOPMENT		MINIMUM NO. REQUIRED	PATRONS – HOTEL, BIKE BUS[1]	PATRONS – CAR	REVISED CARPARK REQ.	NO. PROVIDED
OUTDOOR SPORT & RECREATTION	Swimming pool:[2] 15 spaces; plus 1 space per 100m2 of useable site area.[3]	18,500sqm Wave Park WaterPark Areas	200	50%	50%	**100**	243[7]
SHORT TERM ACCOMMODATION HOTEL	0.75 car spaces per unit + 3 spaces for visitors and 2 service/staff parking for the first 10 units and 0.5 additional service/staff space per 10 units, there-above.	164 x 0.75 = 123 3 10	136	NA	NA	**136**	98
SHORT TERM ACCOMMODATION SELF CONTAINED DWELLING UNITS	0.75 car spaces per unit + 3 spaces for visitors and 2 service/staff parking for the first 10 units and 0.5 additional service/staff space per 10 units, there-above.	90 x 0.75 = 68 3 6	77	NA	NA	**77**	180[6]
FOOR & DRINK OUTLETS			0			**0**	0
SITE Surf Deck Kiosk Deck VIP Functions 4 x Surf Lounges Wave Bar Cabana Areas	1 space per 25sqm GFA and outdoor dining area	3530 sqm	142	40%	60%	**86**[4]	0
HOTEL LEVEL 00 F&B	1 space per 25sqm GFA and outdoor dining area	1058 sqm	43	80%	20%	**9**	0
FUNCTION FACILITY - HOTEL	1 space per 15m2 GFA.	1280 sqm	52	80%	20%	**11**	0
OFFICE – CO-WORKER SPACE	1 space per 25m2 of GFA	180 sqm	8	50%	50%	**4**	0
RETAIL - SHOP	1 space per 25 sqm of GFA	550 sqm	22	50%	50%	**11**	0
TOURIST PARK	1 car space per caravan site, tent site or cabin; plus 1 visitor car space per 10 caravan sites, tent sites or cabins; plus 1 car space for an on-site manager.	35 Cabins	40	NA	NA	**40**[5]	0
CARETAKERS ACCOMMODATION	Part of Tourist Park		0	NA	NA	**0**	0
AIR SERVICES	1 car space per 20m2 of covered reception area	0	0	NA	NA	**0**	0
EXTRA PROVISIONS	Parking for Maintenance & Ground Staff						16
			720			**474**	**537**

1: Patrons staying at the Hotel, arriving by Bus, Shuttle, Ride Share or Bicycle
2: Swimming Pool is the closest use in the Table 9.4.1 Access, parking and servicing code.
3: Allowance per Sqm is more than actual due to the large water bodies and capacity cap per hour
4: These patrons may already be counted in the Outdoor Sport & Recreation
5: Surf Camp is proposed to have 20-24 Cabins utilised by Groups arriving by Bus – Bus Parking is Provided at the Surf Camp.
6: All Dwelling Units provided with Double Garages + Visitor Parking
7: Extra allowance of 5 large vehicles – Bus, Oversize, Car & Trailer

1: SURF PARK: Source Endless Surf Operational Forecasting

Operating Cycle	Forecasted Usage	# Days	Patrons per hour
Peak Season Week	80%	50	51
Peak Season Weekend	90%	20	58
Shoulder Season Week	60%	140	38
Shoulder Season Weekend	70%	56	45
Low Season Week	40%	70	26
Low Season Weekend	40%	28	26

Assumed Capacity	left Peak	Right Peak	Long Board Left	Long Board Right	Shore Break left	Shore Break Right
64	12	12	10	10	10	10

Seasons for Port Douglas

High	Easter 2 weeks	10 weeks total	20 weekend days
	Christmas 2 weeks		50 weekdays
	July School Hols 3 weeks		
	October School hols 3 weeks		
Low	4 weeks Nov/Dec	14 weeks total	28 weekend days
	10 weeks Jan-end March		70 weekdays
Shoulder	The rest	28 weeks total	56 weekend days
			140 weekdays

2: Estimated Parking requirement for Water Bodies by Patronage per Hour

Wave Park	Patrons per hour	50% Resort	1.5 Patrons per car	Est total 3 hr stay
Peak season WD	52	26	17	52
Peak season WE	53	27	18	**53***
Shoulder Season WD	40	20	13	40
Shoulder Season WE	45	22	15	45
Low Season WD	26	13	9	26
Low Season WE	26	13	9	26
Aquapark				
Peak season WD	80	40	11	34
Peak season WE	90	45	14	**41***
Shoulder Season WD	60	30	8	25
Shoulder Season WE	70	35	10	30
Low Season WD	40	20	6	17
Low Season WE	40	20	6	17

*Max Estimated Car Parking Requirement – **94**
Allowance is for 3 hours of Car Parking per 1 hour Usage of Wave Park & AquaPark
No Adjustment for cross utilisation.

HELIPAD

3. The proposal involves two helipads being located in the north eastern portion of the site. Please advise the purpose of the Helipads and whether these facilities will be used for commercial purposes.

The Helipads are proposed as short term stay and drop off services like that currently operating at Mirage Country Club in Port Douglas, allowing private and existing tour operators to be able to pick up and drop off from the development. Whilst highly desirable from the point of view of guests wishing to arrive by air, the helipads are not a critical component.

4. The location and proximity of the Helipads to the short-term residential component of the development is likely to generate noise impacts. Please investigate further and clarify. Noise issues may also arise from the mechanical plant associated with the Wave Park and the proposed Tourist Park. Please investigate further and clarify.

The Helipads will have limited use during daylight hours. The frequency is not expected to cause unacceptable noise impacts.

The location was deliberately sited to be downwind from the whole development such that helicopter movements are somewhat isolated from most of the site.

Experience in other locations has proven that daytime operations by helicopters will not have a deleterious impact on the amenity of the area. The nearest activities are the surf park itself which generates its own noise from breaking waves which will mask the helicopter operations to some extent.

The arrival and departure paths from the helipads avoid flying directly over the resort and accommodation precincts. The helipads have been relocated because of this RFI such that the nearest residence is now over 150 metres from the pads. As an added protection the closest residences will have suitable supplementary acoustic treatment including double glazing to the windows.

Endless Surf, the supplier of the Wave Technology, have proven noise mitigation calculations and methodologies to reduce the sound level that escapes the plant facility. By utilising simple acoustic louvres, Rockwool lining and lined ductwork, a target acoustic noise level being emitted from the equipment room is between 60 & 70dB – the level of a typical conversation.

It should also be noted that the machinery is located behind the wave lagoon which in fact will generate a higher level of noise than the plant. The nearest accommodation facility is the surf cabin precinct with the nearest cabin some 75 metres distant. Clearly the noise from the plant will have no impact on the amenity for patrons.

Table 1: Common noise sources and their typical sound levels - SAFE WORK AUSTRALIA

Typical sound level in ***dB***	Sound source
140	Jet engine at 30 m
130	Rivet hammer (pain can be felt at this threshold)
120	Rock drill
110	Chainsaw
100	Sheet metal workshop
90	Lawn mower
85	Front-end loader
80	Kerbside heavy traffic
	Lathe
70	Loud conversation
60	Normal conversation
40	Quiet radio music
30	Whispering
0	Hearing threshold

Reconfiguration of the Land

5. The application involves the reconfiguration of the land into 4 lots. Please provide a Plan of Subdivision that illustrates the 4 lots to be created including Lot numbers and areas / dimensions. Please illustrate areas of common property

that relates to each individual lot and common property that relates to all allotments. Please provide a description of the tiered body corporate arrangement and illustrate how the development is anticipated to be staged.

A new plan is provided in the Architectural Drawing set, DA-01.11 RECONFIGURATION OF A LOT PROPOSAL PLAN that shows lot details as proposed in the application including Lot numbers, size and lot dimensions.

The applicant has sought advice on the tiered body corporate structure. McAndrew Law has provided titling advice, and this is provided as Appendix U – TITLING ADVICE – NORTHBREAK PORT DOUGLAS.

WATER AND SEWER SYSTEMS

6. Provide water demands for the potable water requirements for each element of the development. The demands must be in accordance with FNQROC unless substantiated by appropriate detailed studies. Some of this work may be conditioned for later stages, however, appropriate clarity must be provided now to determine water demand.

H2O Consultants have provided water modelling for uses on the site and broken the demands down to extract projected Daily, Monthly and Yearly Flows. The response is provided as Appendix V.

7. Confirm the size of water reticulation mains proposed to connect the site to Council's water supply network having regard to the current constructed infrastructure and the proposed upgrades identified in the Local Government Infrastructure Plan (LGIP). Confirm the increased main sizes required to accommodate the water supply demands for the development and the impact of this on the water reticulation network. It is also noted that the water balance investigation assumed the water storages areas were full for the purpose of the water balance analysis.

SK01 MASTER PLAN – Sanitary Drainage & Water Supply proposes an incoming 225mm diameter main water line to the development. It is requested that further design work be conditioned as part of the permit.

Appendix X includes the following drawings:

SK01 MASTER PLAN – Sanitary Drainage & Water

SK02 MASTER PLAN – Sanitary Drainage & Pump Station

SK03 MASTER PLAN – Sewer Rising Main

The assumption that water storages are full in the water balance is derived from the construction program for the project. The water bodies and civil works are to be completed at the start of the program. This would allow for two wet seasons to have occurred prior to full load being required from the water storage. Catchment during the wet provides and excess of 58Ml which in the balance forms spillage. In the initial 2 wet seasons, this would fill the 50Ml water storage lagoon.

Enquiries have also been made to Council regarding the availability of Council supplied potable water for the initial fill of the Water bodies, which has come back as a possibility, conditional on a few things as noted in the below extract:

From: Peter Tonkes <peter.tonkes@douglas.qld.gov.au>
Sent: Tuesday, 2 March 2021 4:38 PM

Hi Pat,

Thanks for your inquiry.

To answer your questions, subject to connection to the DSC potable water network. The main that would service the water park currently terminates at the intersection of Boer St and Captain Cook Highway. It is a 300mm diameter main which we envisage would meet the demand requirements however this has not been confirmed in a network model. For the current subdivision development just south of Craiglie, the main extension to Andreassen Rd would be part of their works when the development reached a certain stage but this may be a number of years away. So depending of the timing of the requirement the main extension to the water park may be up to 2.5km and would form part of the development cost if required.

For the initial filling we would be able to supply the 126Ml however this would be conditional on a few things. It would have to occur in the wet season when the creek level is sufficiently high to allow the extraction required, this is effectively for 9 months of the year depending on duration between rainfall events in the catchment. We expect to be able to supply up to 4Ml per day though this number would also have to be confirmed against the network hydraulic model to ensure we didn't loose pressure in other parts of the network. The Crees Rd Reservoir is 20Ml and the Craiglie reservoir is 10Ml and enter Port via different mains to a point so we may need to manage how the water is supplied to Port during this initial fill stage.

For the daily make up water during operation, we believe 440kl is achievable however this may become more challenging during the dry season if water restrictions are required due to falling creek levels at the intake. We are working towards some longer term solutions which should alleviate this dry season supply challenge though they are a few years away from completion. I imagine the daily requirement for the water park will be a bit more than 440kl if there is a hotel and gardens though I do appreciate that you are also looking at alternate water sources which may supplement this.

Depending on the firefighting requirement we would recommend considering some storage reservoirs and booster pumps at this stage as this possible addition to the main network has not been assessed in a hydraulic model for fire flow.

The current commercial rate for potable water is $1.63/kl

I will give you a call tomorrow morning to discuss further if this suits.

Cheers,
Pete

Regards,

Peter Tonkes | *Manager Water & Wastewater*

8. Provide advice on how water supply requirements are proposed to achieve firefighting requirements for the development having regard to volume required, pressures and flowrate for this class of development.

Current requirements for a Fire Hydrant system would be 20 litres/second under a Town Watermain system. It would be highly unlikely that the town water supply pressures would be adequate to provide the performance requirements of Australian Standards, and an internal storage tank and fire pump system would be required.

This would reduce the performance down to 10 litres per second at a 4 hour demand. Additionally, a Fire Sprinkler System would be required for the Hotel component of the Development. Preliminary calculations show a requirement of 20 litres per second for a 1 hour demand.

A 50,000L water tank is provided at the rear of the Surf Park.

The response is provided as Appendix V.

9. Provide sewage demand calculations for the sewage loads generated from each element of the development. The demands must be in accordance with FNQROC unless substantiated by appropriate detailed studies. Some of this work may be conditioned for later stages, however, appropriate clarity must be provided now to determine how the development will be connected to Council's reticulated network and the additional demand placed on the sewerage treatment plant.

H2O Consultants have provided sewer modelling for uses on the site and broken the demands down to extract projected Daily, Monthly and Yearly Flows.

The response is provided as Appendix V.

10. Confirm the size of sewerage mains proposed to connect the site to Council's sewerage network having regard to the current constructed infrastructure and the proposed upgrades identified in the LGIP. Confirm the increased main sizes required to accommodate the sewerage generation loads for the development. Issues such as alignment and land tenure are to be explored.

The proposed sewer infrastructure internally of the Development is for a vacuum system, discharging to a Development Sewerage Pumping Station. Preliminary calculations indicate a 180mm poly (150mm UPVC) sewer rising main would run parallel to the Highway. The receiving manhole would require a 225mm Gravity Sewer connection. Further modelling would be required for the discharging sewer system. The Development Pump Station could be timed for the discharging into the council sewer network to happen outside peak times to alleviate any possible issues.

SK02 shows the proposed alignment however further design work is required and it is requested that his be conditioned as part of the permit.

SK02 MASTER PLAN – Sanitary Drainage & Pump Station

SK03 MASTER PLAN – Sewer Rising Main

Water Quality – Swimming Lagoon and Reservoir

11. Please confirm the specific uses that water from the water storage lagoon is intended to service along with advice as to how this water will be treated in order to comply with legislative requirements i.e Water Quality Guidelines for Public Aquatic Facilities.

The water storage lagoon is primarily intended to provide compensation for evaporation in the dry season. Further development and new technologies are being introduced by the engineers and a full design will be provided during the development stage. To comply with the Water Quality Guidelines, the intake to the reservoir will consist of overflow water from the water bodies during the wet season, coupled with roof harvested rainwater. The TURBID technical Memo outlines treatment and disinfection assessed against the WSAA Health Based Targets for Drinking Water Safety.

The developer has engaged Martin Aquatic Design & Engineers as lead consultant on the design, operation, and management of the water bodies. Martin Aquatic have crafted nearly 2,500 aquatic features world-wide, including Royal Caribbean's fleet of Ocean Liners, Seaworld Orlando, Marriott Aruba Surf Club in the Caribbean and Major resorts in Florida. New technologies and water handling principles are being investigated to reduce the evaporation and reliance on the storage lagoon. Water chillers and deep soil transfer pipes have been utilised in the Caribbean to lower water temperature, reducing the differential between the surface air and water temperatures to decrease the amount of evaporation.

Swimming Lagoon – The proposal references a freshwater swimming lagoon. If the purpose of the lagoon is to provide a recreational swimming area for visitors and guests, it will be considered as a swimming pool and as such the operation and management will need to comply with the Qld Health Water Quality Guidelines for Public Aquatic facilities. In addition, please provide advice on fencing requirements under the Building Act 1975 and how this relates to the proposed lagoon.

The Lagoon will be managed as an Aquatic Facility.

Compliance with Queensland Health's Water quality guidelines and the Public Health Act 2005 will be achieved by utilisation of a site-specific risk management plan.

Treatment of the water will consist of super fine filtration, separate from the water body as the first process of the water treatment. The first stage of disinfection will be using UV treatment with a log reduction of 4 for cryptosporidium and 3 for bacteria. The UV units will be the first stage to ensure the tubes are not coated with oxidised material from the addition of chlorine. The electrolytic generation of chlorine from salt (salt chlorination) system will provide the disinfection of the water. A residual chlorine monitoring system will be used to recirculate the water back through the disinfection system as required. This operation will ensure the continuous removal of micro-organisms in the water.

Site specific calculations will be used to calculate water turnover times. With the Swimming Lagoon being such a large water body, turnover times will differ through various sections of the water body. Areas with higher numbers of bathers will have greater water turnover than areas where few bathers will venture into the lagoon. Automated operational monitoring will be utilised for compliance and optimisation of the treatment process throughout the whole water body optimising the treatment that may be required in any discrete area of the Lagoon.

Under the Building Act 1975 the fencing is required to comply with that required for a Class 3 building. As such a Pool Safety Management plan will be instituted to comply with the Building Act. Under the Building Act a pool safety plan can be used in lieu of a pool barrier.

Surf Lifesavers, Camera monitoring and RFID wearable devices will be utilised as part of the safety plan throughout the complex.

12. What measures are in place for security of the reservoir, with reference to crocodiles and public safety (e.g.- fencing, locked gates, etc).

The Reservoir will be fenced in accordance with Section 6 of the Code of Practice for Crocodile Farming (Nature Conservation Act 1992), to prevent the entry of crocodiles.

A compliant fence and gates will be constructed to a minimum height of 1.8m

The perimeter fence is constructed appropriately in accordance with the Code consisting of:

a) line posts of pressure-treated pine, hardwood, metal or such other material of adequate strength and durability, which must be placed at a minimum depth of 600mm in the ground and a maximum spacing of 4m between line posts.

b) strainer posts of pressure-treated pine or hardwood of a minimum diameter size of 200mm, or of metal or such other material of equivalent adequate size, strength and durability, which must be placed at a minimum depth of 900mm in the ground and braced.

c) chain mesh, welded mesh, or such other wire of equivalent strength, which must be properly strained and affixed to the line posts to the side of the fence; and

d) concrete or galvanised wire mesh (or other approved material of equal resilience), footing wall, which extends at least 500mm into the earth to which the fence is attached or embedded along its length.

https://environment.des.qld.gov.au/__data/assets/pdf_file/0027/85491/p00065aa.pdf

Flood Studies

13. Provide advice on why the boundary condition used for the study is highest astronomical tide (HAT). Reference is made to studies for the Barron River that adopted higher downstream boundary conditions. Commentary on the boundary conditions and potential implications for flood levels within the site is required to enable the development to be assessed.

JBP Scientists and Engineers are the authors of the Port Douglas Wave park Flood Risk Assessment as referred above and provided the following Commentary (See Appendix for full response)

The JBP flood model utilised a dynamic time-varying tidal boundary representing a HAT estimated at 1.78mAHD for present day (2021)

This is in comparison to the information from the Cairns Regional Storm Tide Inundation Study (CRSTIS) which estimated extreme Storm Tide conditions at Port Douglas to be : 1% AEP at 1.82 AHD

14. Subject to the advice above, provide updated commentary on the implications of the proposed filling adjacent the Mowbray River.

As noted above the difference in the two modelling datums is only 40mm and accordingly the implication of the proposed filling is insignificant. It should also be noted as expressed in the JBP response the HAT downstream boundary is in fact a reasonable worst-case scenario.

15. Previous flood studies of the Mowbray River are known to exist including State government flood hazard studies, studies used in support of developments north of the river and from TMR's road and bridge design. Provide commentary on how the findings and flood levels predicted from these previous studies compare with the results from this project specific modelling.

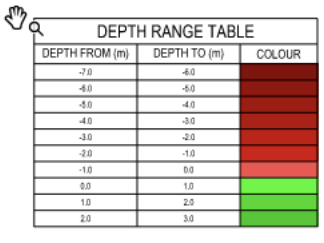
As noted above, and in the response from JBP, the flood modelling for the Port Douglas Wave Park has been based on a worst-case scenario and in adopting a HAT downstream boundary coinciding with the Q100 fluvial event the emergent results provide a firm basis upon which the implications on fill and flooding can be determined for this specific site. Note the previous comment that the CRSTIS study generated a better case scenario than the adopted HAT outcomes and in any case the differential of 40mm between the 2 datums would not impact on the design of the civil works or structures proposed on the site.

Engineering – Earth

Earthwork's advice in the engineering report and geotechnical report appear to adopt different parameters for topsoil stripping depth. The geotechnical report discusses unsuitable materials for depths down to 0.5m. It is also unclear how the compaction impacts on cut to fill have been factored into the volume calculations. Clarification of these items is required to understand the development scope and need for importation of fill to achieve the development earthworks profile and immunity levels.

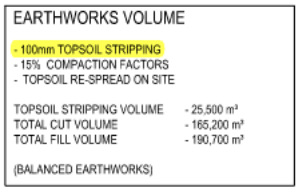
GHD has provided a response and this is included as an extra to Appendix I – 12544036-0-REP ENGINEERING REPORT SURF PD

Given the material is mainly sand or a sandy clay and given the volume of cut is in the order of 165,000 m3, GHD believe there is the strong possibility to blend approximately 50% of this "re-worked ground" material into the fill during earthworks operations, hence our earthworks volumes only allow for 100 mm stripping.



DEPTH RANGE TABLE

DEPTH FROM (m)	DEPTH TO (m)	COLOUR
-7.0	-6.0	
-6.0	-5.0	
-5.0	-4.0	
-4.0	-3.0	
-3.0	-2.0	
-2.0	-1.0	
-1.0	0.0	
0.0	1.0	
1.0	2.0	
2.0	3.0	



EARTHWORKS VOLUME

- 100mm TOPSOIL STRIPPING
- 15% COMPACTION FACTORS
- TOPSOIL RE-SPREAD ON SITE

TOPSOIL STRIPPING VOLUME	- 25,500 m³
TOTAL CUT VOLUME	- 165,200 m³
TOTAL FILL VOLUME	- 190,700 m³

(BALANCED EARTHWORKS)

GHD have been previously involved with large scale filling projects where the specification for organic materials within fill can be adjusted up to be as high as 7.5%, thus allowing for blending of this material throughout the fill. GHD intend to adopt this philosophy to reduce the possibility of imported fill to site. Further testing of this top "inferred re-worked ground" will be undertaken once the Development Approval is received to better inform the earthworks design and help achieve a balanced solution.

Should this topsoil be excessively high in organics (which is not expected) and be deemed not suitable for blending, then GHD would explore cutting more material from the lake areas and replacing this won material with the topsoils to again attempt to achieve a balanced solution.

16. As part of the response, the applicant is requested to confirm the intended earthwork's philosophy for the development and the expected imported fill volume. Advice on the potential sources of fill and the number of truck movements are required to understand potential traffic impacts.

No fill haulage is expected as part of this application.

GHD acknowledges, importing large quantities of fill material is undesirable in terms of cost and its effect of the amenity of the others and the environment and this is the design philosophy that will be adopted.

Should any fill be required, the weight and type of haul vehicle will be similar to a sugar cane haul vehicle, the haul vehicle use is not expected to cause excessive damage or wear to the state-controlled road. The 31-ton truck and dog configuration is similar in scale, weight and configuration to sugar cane haul vehicles that currently use the Captain Cook Highway at a significantly greater rate during the crushing season than any required fill haulage.

17. Clarification is required on the source for the clay lining nominated in the reports. Is this material intended to be imported to site or won from site materials? If won from site does this increase the volumes of materials to be moved on site?

GHD has provided a response and this is included as an extra to Appendix I – 12544036-0-REP ENGINEERING REPORT SURF PD

Douglas Shire

18. Having regard to the housing shortage Douglas Shire is currently experiencing and the wider region which is expected to continue as people relocate from capital cities, what measures is the Applicant taking, if any, to support its direct workforce with temporary accommodation during construction and / or once the development is operational.

As part of the proposal is the establishment of a Surf Cabins precinct. These cabins are designed to cater for school groups, budget travellers and Wangetti Trail users. The cabins are intended to be prefabricated off-site and transported to the property and hooked up to all services.

The cabins have been configured to allow for 3 or 4 guests per cabin. Facilities are limited to ensuites and limited amenities such as TV and fridge but are not designed to incorporate cooking facilities. A " Long House / Beach Shack" is centred within the Surf Cabin site with a large covered area for cooking and eating in a communal facility. Laundry facilities are also located here.

There are 35 cabins, a Caretakers residence and the " Long House / Beach Shack "

There is also the ability to have several demountable "dongas "positioned in the same vicinity during the building stage to house workers if needed. As is often the case in Port Douglas when larger projects are being undertaken, tradesmen from Cairns and surrounding areas regularly commute to the township daily, therefore not needing overnight accommodation

Once the facilities are operational, preference will be given to local residents wishing to work in a new entrant to the local marketplace. As the project has a number of different components ranging from water-based activities, through Resort and accommodation facilities to extensive landscaped grounds the spectrum of types of workforce is vast and accordingly can tap into a diverse range of potential local staff.

19. Given the significant shortage of skilled workers available in Douglas and the Far North, what provisions it the applicant taking to ensure its commitment to deliver the project is not impacted by an inability to source an appropriately skilled labour force.

This is a moot point. Hunt Design have been involved in many projects valued above $100M and the reality is that if there is a localised trades and management shortage, experience has shown that often other parts of Australia are experiencing the opposite situation.

The construction industry is relatively mobile and recruitment from locations distant from this immediate region is commonplace. Examples like the 320 room Flynn Hotel in Cairns was populated by a management structure with most middle managers recruited Australia wide. Many large sub-contractors will import tradesmen from other locations if required.

Accordingly, we do not envision an inability to source an appropriately skilled workforce

Similarly, once operational as is the norm, specialised staff to manage the various facets of the project are likely to be brought in from within the organisations running the various facilities through direct staff transfer or focussed recruitment campaigns. Training programs will be instituted to upskill local residents to work in various capacities across all the differing types of required skills.

20. Douglas Shire Council supports the development of competitive local business and industry. What benchmarks are being set by the applicant to prioritise the procurement of goods and services during construction and operation from within the Douglas Shire Council Local Government Area? Council is specifically interested in the local supply of food and beverage once operational, the procurement of local artists for any onsite artwork (which would be appropriate having regard to the scale of the development) and the hiring of people from the Douglas community, including young people.

The proponent is a Local businessman with an entrenched desire to support the local community that supports his business. As an example, Graben engaged Hunt Design, a local Architectural practice, to provide the Vision for the project and act as lead Consultant, engaging with local and regional Consultants to undertake the preliminary work prior to construction.

This same consultancy team will continue with the documentation and construction processes if the project is approved by the Authorities.

Consultations with local construction companies have already taken place and it is the intention of the development team to engage the builder from a short list of appropriately resourced Contractors to build the various components of the project.

It is a fundamental aim to maximise the use of local tradesmen, suppliers, and the community at large to have a pivotal part in the project from its inception. right through to it being fully operational.

Furthermore, the wide gamut of new skill sets that will be required for the Surf Park and other associated activities, will open opportunities for local young people struggling to find employment in the Shire.

Provenance of local produce will be a key in designing menus to provide guests with an authentic culinary experience that will hinge on local flavours, fresh produce, and stunning presentation.

Hunt Design are determined to engage with local artists and craftsmen to ensure that the built form and surroundings are true to the roots of the Queensland vernacular and aid a confluence between art and architecture.

The test is that the end result closely identifies with Far North Queensland and provides visitors with an indelible memory of experiencing the culture and lifestyle of Port Douglas and its surrounds.

Furthermore, Graben is committed to showcasing the art and culture of the First Nations people through a spectrum of initiatives. This will include activities such as bush tucker walks around the environs, and an opportunity for guests to enjoy the tucker in a restored, natural landscape, including cultural displays of dance and traditional hunting. The incorporation of all forms of indigenous art, such as textiles, paintings, sculptures, totems and weaving will be a prime component in the aesthetic of the public areas.

At the same time non-indigenous artists will complement the marrying of art and architecture to reinforce the diversity of remarkable artists evident in the Douglas Shire.

21. As Australia's first ECO Destination Certified region, the Douglas Shire has demonstrated a strong, well-managed commitment to sustainable practices and provides high-quality nature-based tourism experiences within the region. What aspirations, if any, does the applicant have to become an ECO Certified tourism product or align itself with another affiliate program.

By its very nature a Surf Park is a celebration of nature. The surfing culture is founded upon a passion for living with nature, of loving the challenge of riding waves, in harmony of man and the wild.

This culture is embodied in every facet of the whole development. The location itself is a perfect example of being sited in a degraded cane farm with poor agricultural soil where 40% of the site is being rehabilitated to its natural state. Being somewhat remote from the urban footprint of the town meant that the natural setting is the hero. Supplemented with native plantings and expansive green spaces NorthBreak underlines the spirit of the Vision for the development to project a oneness with nature.

Furthermore, the whole project will be a poster child for sustainable development. Water harvesting, solar power generation, use of natural materials, low energy consumption building solutions and recycling waste are all examples of the many fundamental drivers in the design and operation of NorthBreak.

Graben is committed to ensuring that the project will be an exemplar of an ECO Certified tourism product. NorthBreak will become a beacon for future aspirants wishing to follow in the footsteps of proving how a premium nature-based experience is a viable and highly desirable attribute for visitors to the Shire. Equally importantly, NorthBreak will be a wonderful facility for the locals to enjoy wholesome outdoor activities in a natural setting. It plugs in to the Wangetti Trail for hikers and mountain bikers linking into the Port Douglas township. Walking trails within the site are planned to offer interpretive experiences, highlighting native plantings and ecosystems in a coastal environment complementing the already available reef and rainforest experiences.

The very essence of NorthBreak is a celebration of nature and offering a remarkable experience to enjoy the ability to surf every day in pristine conditions.

22. Can the applicant provide more information around capacity details for the conferencing and event facilities? This detail will also assist with informing parking spaces as identified above.

The final extent and nature of conferencing facilities will be determined once a Hotel Operator has been selected. The primary raison d'etre of the NorthBreak is focussed on the surfing experience and the facilities being provided are intended to support this activity. Preliminary studies have indicated that a likely scenario would support a range of possible venue users ranging from corporate incentive groups pivoting on the surfing experience, athletes in training camps…and of course weddings and other celebrations wishing to capitalise on the unique setting.

With such a diversity of uses and numbers of participants, the current design provides for 3 function spaces ranging from 30 to 140 person capacity that can be opened up as one space to cater for 240 guests. This would be a maximum possible requirement based upon the number of suites and industry standard occupancy and yield factors. A further 80 participants can be catered for in a separate space within the Hotel if there is a need to cater for separate groups which would mean less patrons in the subdividable space. There are also expansive outdoor spaces used as breakout areas. The expectation is that most of these patrons will be located within the range of accommodations options within the site. The site master plan also contemplates the possibility of outdoor marquees for special occasion functions.

23. Can the applicant provide more information about whether co working space will be accessible to external people for outside hire or in-house guests and residents only.

The intent of the co-working space is a by product of the seismic change in the way people now work remotely from their more traditional offices. Covid has demonstrated that people no longer need to be tethered to a desk at their employer's place. The concept of the co=workers space is to provide a backbone infrastructure with fast internet connections, printers and other office equipment and spaces where a small team could meet and work whilst on vacation, or part of a retreat or training program. The space is primarily intended for in-house guests, but provided there is capacity, special arrangements could be made for limited outside workers wishing to capitalise on the facilities and maybe have a surf at smoko!

Appendix U – **TITLING ADVICE – NORTHBREAK PORT DOUGLAS.**

Appendix V – **WATER AND SEWER SYSTEMS**

Appendix I – **12544036-0-REP ENGINEERING REPORT SURF PD**

Appendix I – **12544036-0-REP ENGINEERING REPORT SURF PD**

8th Floor, Cairns Corporate Tower, 15 Lake Street
Cairns, Queensland 4870
Australia
www.ghd.com

Your ref: CA 2021_4239/1 (1028000)
Our ref: 12544036

14 September 2021
Chief Executive Officer
Douglas Shire Council
64-66 Front Street
Mossman Qld 4873

Surf Port Douglas Response to Information Request

Attention: Neil Beck

Dear Neil,

We refer to Douglas Shire Council's (Council) Information Request (IR) dated 17th August 2021. GHD Pty Ltd (GHD) has been engaged to prepare and compile a response to Council's IR for the civil engineering related items.

The information requested is repeated below in the order in which it appeared in the IR.

1. Item 16 – Earthwork advice

Earthwork advice in the engineering report and geotechnical report appear to adopt different parameters for topsoil stripping depth. The geotechnical report discusses unsuitable materials for depths down to 0.5 m. It is also unclear how the compaction impacts on cut to fill have been factored into the volume calculations. Clarification of these items is required to understand the development scope and need for importation of fill to achieve the development earthworks profile and immunity levels.

As part of the response, the applicant is requested to confirm the intended earthworks philosophy for the development and the expected imported fill volume. Advice on the potential sources of fill and the number of truck movements are required to understand potential traffic impacts.

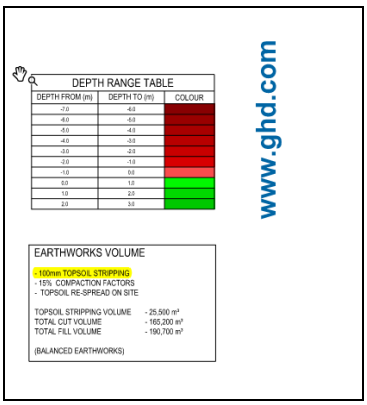
Unsuitable Materials and Earthwork Philosophy:

The bore logs for the top material in the geotechnical report are summarised below:

Test Pit No	Depth below (mm)	Material Description	Notes/Comments
TP1	500	Sandy Clay	Reworked ground
TP2	400	Clayey Sand	Reworked ground
TP3	200	Sandy Clay	Reworked ground
TP4	200	Clayey Sand	Reworked ground
TP5	500	Sand	Alluvial Soil
TP6	200	Sand	Reworked ground
TP7	200	Sand	Reworked ground
TP8	200	Sand	Reworked ground

The comment in section 5.3.4 of the geotechnical report refers to varying depths of "Inferred re-worked ground" based on the summary depths provided above. The majority of this "Inferred re-worked ground" is around 200 mm depth, not 500 mm depth as stated in the RFI and this material was considered when determine earthworks volumes and the cut/fill quantities.

Given the material is mainly sand or a sandy clay and given the volumes of cut are in the order of 165,000 m3, GHD believe there is the strong possibility to blend approximately 50% of this “re-worked ground” material into the fill during earthworks operations, hence our earthworks volumes only allow for 100 mm stripping.



GHD have been previously involved with large scale filling projects where the specification for organic materials within fill can be adjusted up to be as high as 7.5%, thus allowing for blending of this material throughout the fill. GHD intend to adopt this philosophy in an attempt to reduce the possibility of imported fill to site. Further testing of this top “inferred re-worked ground” will be undertaken once the Development Approval is received to better inform the earthworks design and help achieve a balanced solution.

Should this topsoil be excessively high in organics (which is not expected) and be deemed not suitable for blending, then GHD would explore cutting more material from the lake areas and replacing this won material with the topsoils to again attempt to achieve a balanced solution.

GHD acknowledges, importing large quantities of fill material is undesirable in terms of cost and its effect of the amenity of the others and the environment and this is the design philosophy that will be adopted.

Compaction Factors:

A compaction factor of 15% has been added to the fill quantity shown on the concept earthwork sketch

2. Item 17 – Clay lining

Clarification is required on the source for the clay lining nominated in the reports. Is this material intended to be imported to site or won from site materials? If won from site does this increase the volumes of materials to be moved on site?

The liner type will be determined during detailed design following further on-site geotechnical investigations. If the use of onsite clay is not feasible then a HDPE liner or similar (e.g., geosynthetic clay liner) is likely to be the solution.

Regards

Gregory Applin
Team Leader, Technical Director Urban Development

+61 7 40442261
greg.applin@ghd.com

App M - **12544036-0-REP Traffic Impact Assessment – Revised**

Graben Pty. Ltd.

Surf Port Douglas

Traffic Impact Assessment

October 2021

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1. Introduction

1.1 Project background

Hunt Design has engaged GHD to prepare a Traffic Impact Assessment (TIA) to accompany a future development application for a proposed Surf Park at Mowbray, just South of Port Douglas. The Surf Park is proposed to provide recreational water sports facilities, hotel accommodation, ancillary retail outlets, food and drink facilities, as well as villa-style and detached dwellings for short-term accommodation.

The proposed location as depicted in Figure 1 has frontage to and will be accessed via the Captain Cook Highway (20A), just south of the Mowbray River Bridge.

Figure 1 Extract from Hunt Design Preliminary Set - Site Location

1.2 Purpose of this report

This Traffic Impact Assessment (TIA) identifies the anticipated traffic volumes, assumptions, traffic modelling, results and analysis to determine the anticipated impacts on the safety and efficiency of the Captain Cook Highway (20A). It will also highlight any mitigation actions that may be required to offset the impact of the proposed development.

1.3 Assumptions

The assumptions made to determine the Traffic Impact Assessment were:

- The development traffic volumes are derived from client-provided data for the development traffic,
- Current traffic volumes were obtained from TMR-provided AADT data for the Captain Cook Highway at Craiglie (closest point) - Site No. 6257,
- No traffic counts were undertaken for this TIA,
- The traffic modelling considers traffic movement during the peak hours for AM and PM for the development peaks and local traffic on-peaks,

- The traffic modelling assesses future growth for local traffic for a 10-year (2033) planning horizon,
- The traffic volumes representing the peak hours are assumed to occur in the peak season for both the local and development traffic to demonstrate the peak traffic conditions and
- Peak day is assumed to be a weekday at the end of July.

1.4 Disclaimers

This report: has been prepared by GHD for Graben Pty. Ltd. and may only be used and relied on by Graben Pty. Ltd. for the purpose agreed between GHD and the Graben Pty. Ltd. as set out in this report.

GHD otherwise disclaims responsibility to any person other than Graben Pty. Ltd. arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible.

The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.

The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.

The opinions, conclusions and any recommendations in this report are based on assumptions made by GHD described in this report. GHD disclaims liability arising from any of the assumptions being incorrect.

GHD has prepared this report on the basis of information provided by Graben Pty. Ltd. and others who provided information to GHD (including Government authorities), which GHD has not independently verified or checked beyond the agreed scope of work. GHD does not accept liability in connection with such unverified information, including errors and omissions in the report which were caused by errors or omissions in that information.

2. Intersection concept design

2.1 Proposed concept layout

A concept design for the proposed intersection with the new road from the development, to the Captain Cook Highway (20A), has been developed. The intersection design is in accordance with AustRoads Guide to Road Design Part 4: Intersections and Crossings - General.

The design parameters used to determine the intersection geometry were as follows:

- 3.5 m lanes on Captain Cook Highway,
- 100 kph posted speed, 110 kph design speed
- Design to cater for a 14.5 m bus or 19 m semi, consistent with the design vehicles adopted for the Mowbray River Pedestrian Bridge intersection upgrade
- Intersection's purpose is to safely manage traffic in and out of the development

Based on the design parameters the following intersection layout was proposed:

- An unsignalised T-intersection,
- AUL
    - An Auxiliary Left Turn Lane (AUL), with high-angle entry, 135 m
    - Deceleration lane for southbound traffic entering into the development
    - Available traffic storage (excluding tapers) 135 m
    - High-angle entry allows traffic flow for northbound traffic entering the development
    - Dedicated lane allows development traffic to be stored away from through lane and allow safe and efficient traffic flow of the State-Controlled Road
- CHR(S)
    - Channelised right turn lane, short length (CHR(S)), with high-angle entry, 190 m
    - Deceleration lane for northbound traffic entering the development
    - Available traffic storage (excluding tapers) 190 m
    - Dedicated lane allows development traffic to be stored away from through lane and allow safe and efficient traffic flow of the State-Controlled Road
- High-angle left turnout of development allows traffic flow and no restriction by the right-turn movement
- Dedicated left and right-turn lanes out of development provide storage for vehicles exiting the development

This proposed intersection provides safety and functionality for CCH traffic and traffic entering and exiting the development. The concept intersection layout is shown in Figure 2 as extracted from the concept sketch.

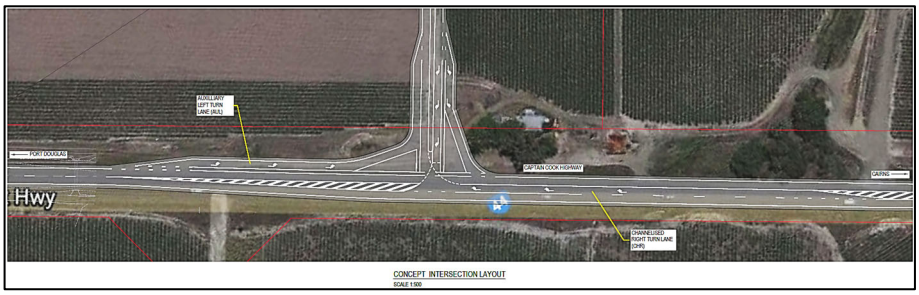


Figure 2 Proposed intersection upgrade concept layout

3. Traffic modelling

3.1 Traffic modelling approach

To demonstrate the impacts of the development on the Captain Cook Highway (20A), two (2) traffic scenarios were modelled for two (2) cases. These were a 'Base Case' and 'Future Case', which allowed a thorough understanding of the initial and future impact of the development as traffic volumes increase. The approach is detailed below in the proceeding sections 3.1.1 and 3.1.2.

3.1.1 Base case (2023) assessment

- Traffic data reflective of the year 2023 to align with the anticipated completion year of the development
- Scenario 1 – Captain Cook Highway (CCH) traffic coincident with the Development Peak Periods
- Scenario 2 – Development traffic coincident with Captain Cook Highway Peak Periods

3.1.2 Future case (2033) assessment

- Traffic data reflective of the year 2033 to align with a 10-year planning horizon.
- Scenario 1 – Captain Cook Highway traffic coincident with the Development peak periods
- Scenario 2 – Development traffic coincident with Captain Cook Highway peak periods

3.2 Peak period determination

The peak period for the traffic modelling analysis was determined based on local knowledge and client supplied information. Based on the Development being a predominantly tourist facility the peak traffic movements from the Development would occur off-peak of the Captain Cook Highway traffic. TMR supplied data shows the peak periods for CCH as 8:00 – 9:00 AM and 4:00-5:00 PM.

The periods adopted for the traffic modelling were 9:00-10:00 AM and 3:00 – 4:00 PM as these represent the peak departure and arrival times for tourist accommodation and day visitor activities.

3.3 Local traffic

3.3.1 Provided data review

TMR provided traffic information on the Captain Cook Highway (20A) at Site 110022 – Craiglie, 800 m South of Port Douglas Rd. A review of the data identified the following:

- 2019 bidirectional AADT is 6,257
- 10-year growth in AADT is 1.5%
- 2022 bidirectional AADT was calculated as 6,543
- The peak time of the year is the End of June to End of July
- Friday is the busiest day of the week in terms of traffic volumes
- Monday through to Thursday show consistent morning and afternoon peaks:
  - On peak AM: 8:00-9:00 AM

  - On peak PM: 4:00-5:00 PM
  - -Corresponding percentage of bidirectional AADT is 8% for both AM and PM peaks.
- The percentage of the daily bidirectional AADT for potential off-peak periods are:
  - 9:00 – 10:00 AM is 7.25% AADT
  - 3:00 – 4:00 PM is 7.4% AADT

3.3.2 Assumptions for traffic volumes

The following assumptions were made to determine the traffic volume inputs for the local traffic.

- Bi-directional AADT (2023) can be split 50/50 for the northbound and southbound through traffic on Captain Cook Highway due to a marginal difference in traffic of the gazettal and against gazettal lanes
- AADT was taken from a weekday AADT average to align with regular local traffic movements
- Development peaks to be 9:00-10:00 AM and 3:00 – 4:00 PM.

Table 1 Peak volumes for local traffic based on AADT (2023)

Peak	% AADT	Two-way	One-way
9:00-10:00 AM (Development Peak)	7.25% AADT	474	237
3:00-4:00 PM (Development Peak)	7.4% AADT	484	242
8:00-9:00 AM (CCH Peak)	8% AADT	523	262
4:00-5:00 PM (CCH Peak)	8% AADT	523	262

3.4 Development traffic

The client provided a detailed breakdown of the seasonal use of the development elements to determine the traffic generation, (Appendix D). In cases where more information was required to determine the traffic generation, the 'RTA Guide to Traffic Generating Development' was referred to, specifically, 'Section 3 – Land Use Traffic Generation'. This provided peak hour rates that were used in the traffic generation estimates.

The client provided data and corresponding movement assumptions have been detailed in the following tables and a further breakdown of the calculations and assumptions are provided in Appendix F.

In order to estimate the proposed resort traffic generation, the potential nature of movements of guests and corresponding local traffic movement were estimated as detailed in Appendix F. Examples are:

- For Hotel Guests
  - 8 x family rooms – assumed 100% rooms have own vehicle
  - 131 x single rooms – assumed 50% rooms have own vehicle, 40% rooms use taxi/uber, 10% rooms use bus/shuttle
- Assumed situations for guest check in and out times to determine directional movement in and out of the intersection including:
  - Vehicles are arriving to check in, occurs during Development PM Peak

- Vehicles are exiting for a day trip external to the development, occurs during the Development AM Peak
- Vehicles are exiting to check out, occurs during the Development AM Peak
- Vehicles are entering from day trip, occurs during Development PM

Table 2 Client provided data breakdown

User / Area and Assumptions	Total type	Peak Hr Rate (RTA or Assumed)	No. peak hour trips	Peak hour split assumptions	Percentage assumption	Movements	AM Peak Movement Distribution	PM Peak Movement Distribution
Hotel 8 x Family Room 131 Single Rooms 21 Other Rooms (JS, KS, PWD)	160	0.5	80	25% arrive to check in AM peak	0.25	20	80% right in 20% left in	
				25% exit to go on day trip in AM peak	0.25	20	70% right out 30% left out	
				25% exit to check out in PM peak	0.25	20		80% left out 20% right out
				25% arrive back from day trip in PM peak	0.25	20		70% left in 30% right in
Residential 30 x Detached dwellings Low-Med density	30	0.6	18	50% exit in AM peak	0.5	9	70% left out 30% right out	
				50% enter in PM peak	0.5	9		70% right in 30% left in
Villas 50 Villas	50	0.5	25	50% exit in AM peak	0.5	12.5	50% left out 50% right out	
				50% enter in PM peak	0.5	12.5		50% left in 50% right out

User / Area and Assumptions	Total type	Peak Hr Rate (RTA or Assumed)	No. peak hour trips	Peak hour split assumptions	Percentage assumption	Movements	AM Peak Movement Distribution	PM Peak Movement Distribution
Outdoor Recreation Facilities 160 visitor car parks (50 and 80 recreational patrons at maximum - 80% car park for recreational facilities) 130 car parks dedicated to rec. Assume 85% capacity of the car park in the middle of the day (off-peak)	130	0.5	65	50% enter in AM peak	0.5	32.5	40% left in 60% right in	
Assume 50% capacity of carpark in both peak hours				50% leave in PM peak	0.5	32.5		40% right out 60% left out
Retail Outlet 1 80 pax Casual visitors 60% Assume casual visitor peak hour rate 0.5	48	0.1	4.8	50% arrive in AM peak	0.5	2.4	70% left in 30% right in	
				50% exit in PM peak	0.5	2.4	70% right out 30% left out	
Outlet 2 200 pax Casual visitors 70% Assume casual visitor peak hour rate 0.5	140	0.1	14	60% arrive in AM peak	0.6	8.4	70% left in 30% right in	
				40% exit in PM pea	0.4	5.6		70% right out 30% left out
Staff								
Surf operations - 10 One shift/day Assume rate of 80% total in peak hour	10	0.8	8	50% arrive in AM peak 50% exit in PM peak	0.5	4	50% left in 50% right in	50% left in 50% right in

User / Area and Assumptions	Total type	Peak Hr Rate (RTA or Assumed)	No. peak hour trips	Peak hour split assumptions	Percentage assumption	Movements	AM Peak Movement Distribution	PM Peak Movement Distribution
Surf shop - 4 One shift/day Assume rate of 80% total in peak hour	4	0.8	3.2	50% arrive in AM peak 50% exit in PM peak	0.5	1.6	50% left in 50% right in	50% left in 50% right in
Other retail - 8 One shift/day Assume rate of 80% total in peak hour	8	0.8	6.4	50% arrive in AM peak 50% exit in PM peak	0.5	3.2	50% left in 50% right in	50% left in 50% right in
Hotel - 50 Two shifts / day Assume rate of 50% total in peak hour as half of staff will arrive/exit in off peak	100	0.5	50	50% arrive in AM peak 50% exit in PM peak	0.5	25	50% left in 50% right in	50% left in 50% right in
Restaurants - 20 Two shifts / day Assume rate of 50% total in peak hour as half of staff will arrive/exit in off peak	40	0.5	20	50% arrive in AM peak 50% exit in PM peak	0.5	10	50% left in 50% right in	50% left in 50% right in
Hotel Bar/Alfresco/Dining								
Hotel bar 67 pax 20% Casual visitor Assume 85% capacity for traffic modelling Assume casual visitor peak hour rate 0.4	11.39	0.4	5	100% arrive in PM peak	1	5	50% left out 50% right out	

User / Area and Assumptions	Total type	Peak Hr Rate (RTA or Assumed)	No. peak hour trips	Peak hour split assumptions	Percentage assumption	Movements	AM Peak Movement Distribution	PM Peak Movement Distribution
Hotel Alfresco 78 pax 20% Casual visitor Assume 85% capacity for traffic modelling Assume casual visitor peak hour rate 0.4	13.26	0.4	5	100% arrive in PM peak	1	5	50% left out 50% right out	
Hotel dining 97 pax 20% Casual visitor Assume 85% capacity for traffic modelling Assume casual visitor peak hour rate 0.4	16.49	0.4	7	100% arrive in PM peak	1	7	50% left out 50% right out	
Food and Beverages								
Surf Deck and Kiosk Deck 381 pax 60% Casual visitors Assume 85% capacity for traffic modelling Assume casual visitor peak hour rate 0.05	194.31	0.05	9	50% enter in PM peak	0.5	5		50% left in 50% right in
				50% exit in PM peak	0.5	5		50% left out 50% right out
VIP Lounge Areas 44 pax 50% Casual visitors Assume 85% capacity for traffic modelling Assume casual visitor peak hour rate 0.1	18.7	0.1	1.87	100% arrive in PM peak	1	1.87	70% left in 30% right in	

User / Area and Assumptions	Total type	Peak Hr Rate (RTA or Assumed)	No. peak hour trips	Peak hour split assumptions	Percentage assumption	Movements	AM Peak Movement Distribution	PM Peak Movement Distribution
Wave Bar 48 pax Assume 85% capacity for traffic modelling	32.64	0.5	16.32	50% enter in PM peak	0.5	8		50% left in 50% right in
80% Casual visitors Assume casual visitor peak hour rate 0.5				50% exit in PM peak	0.5	8		50% left out 50% right out
Event / Function Function spaces (incl. VIP func, Ext func, Func 1-4, Level 2 Func) 507 pax 20% Casual Visitor Assume 85% capacity for traffic modelling Assume 2 person per vehicle Assume casual visitor peak hour rate 0.1	43.095	0.1	4	100% arrive in PM peak	1	4	40% left in 60% right in	

3.4.1 Development traffic generation

Based on the above data and assumptions, the volumes outlined in Table 3, were determined as the traffic generated in the development peak. These volumes are considered to be conservative and likely reflect the ultimate case of traffic generation.

Table 3 Development traffic generation volumes

Development Traffic Generation Totals	AM	PM
Arriving into the Development		
Left in (Coming from North-Port)	58	32
Right in (Coming from South-Cairns)	49	28
Total IN	**107**	**61**
Departing the Development		
Left out (Going South-Cairns)	19	69
Right out (Going North-Port)	23	51
Total OUT	**42**	**120**

3.5 Growth rate and projected traffic

The TMR supplied AADT Segment Analysis Report for Craiglie (closest location) 6257 identified a 10-year growth of 1.5%. For this TIA, the 1.5% growth rate was applied to the 10-year projected traffic on the Captain Cook Highway. It is anticipated that no growth is to occur within the development and hence, no growth was applied to development traffic for the future case.

3.6 Volumes for modelling

Based on the review of data and assumptions for both the local traffic and the development generated traffic, the volumes were determined for each movement at the intersection which are shown in Table 4, which provides the volumes for the base case (2022) and Table 5, which provides the volumes for the future case (2032). This accounts for the 1.5% growth on the through traffic on the CCH. It is noted that the future case assumes all other traffic does not grow and so the same volumes for the base case are applied.

For the purposes of assessing the development traffic coincident with the CCH peak, a conservative estimate of 50% of the development daily volumes. The peak hour development traffic is 30% of the daily development traffic, therefore it was justified that 50% would be a reasonable estimate for the development traffic in the off-peak period.

Table 4 Traffic volumes for Base Case (2023)

Approach	Turn	Base Case (2033)			
		AM Movements		PM Movements	
		CCH Peak	Devel. Peak	Devel. Peak	CCH Peak
		8:00 - 9:00	9:00 - 10:00	3:00-4:00	4:00 - 5:00
CCH North (Coming from Port Douglas)	Left	29	58	32	16
	Through	262	237	242	262
New Road (Surf PD)	Right	11	23	51	26
	Left	9	19	69	34
CCH South (Coming from Cairns)	Right	24	49	28	14
	Through	262	237	242	262

Table 5 Traffic volumes for 10-year Future Case (2033)

Approach	Turn	Future Case (2033)			
		AM Movements		PM Movements	
		CCH Peak	Devel. Peak	Devel. Peak	CCH Peak
		8:00 - 9:00	9:00 - 10:00	3:00-4:00	4:00 - 5:00
CCH North (Coming from Port Douglas)	Left	29	58	32	16
	Through	304	275	281	304
New Road (Surf PD)	Right	11	23	51	26
	Left	9	19	69	34
CCH South (Coming from Cairns)	Right	24	49	28	14
	Through	304	275	281	304

3.7 SIDRA modelling overview

The traffic analysis was undertaken using SIDRA Intersection 9 by modelling the intersection with the two traffic scenarios. The intersection was modelled as an unsignalised two-way, give-way/yield intersection. Lane geometry for the intersection was determined from aerial imagery and the concept design. SIDRA input parameters were verified using local knowledge, an understanding of the existing local traffic and the proposed development functionality.

The intersection was analysed and evaluated in terms of the Level of Service (LoS), Degree of Saturation (DoS), Queuing Length and Delay. SIDRA provides two performance measures being the Network LoS, based on speed efficiency, travel time index and a congestion coefficient; and Lane LoS, based on queueing length and delays. Due to low traffic volumes and the basic layout of the intersections, the Lane LoS measure is more applicable as it considers parameters more

relevant to the context of the intersection and was used in determining the ‘network’ LoS as reported below.

It must also be noted that SIDRA outputs have a 5% increase buffer on all traffic volumes. This is an inert function of the program applied to all intersection analysis to ensure a factor of safety is accounted for.

4. Base case (2023)

4.1 Layout

As outlined in Section 2 of this report, a concept design was undertaken to determine intersection layout with the development's new access road and the CCH. The outcomes of this design were included as geometric parameters for SIDRA analysis to reflect the most accurate modelling situation. The layout of the intersection as modelled in SIDRA is shown in Figure 3 below.

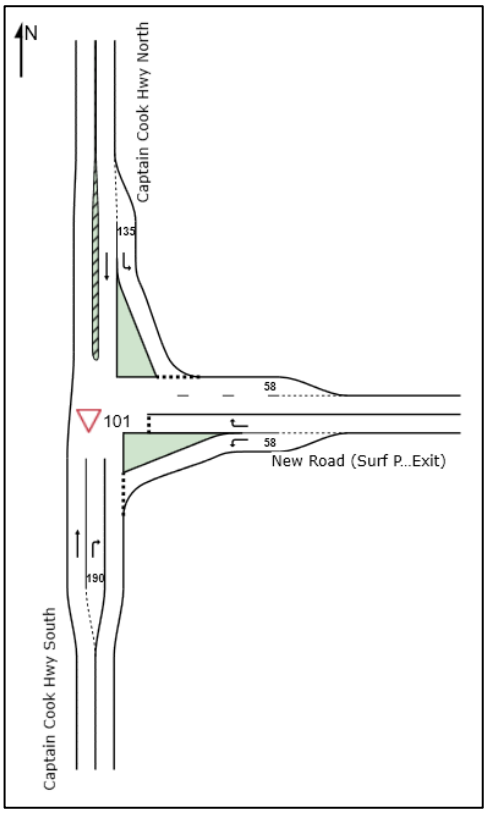
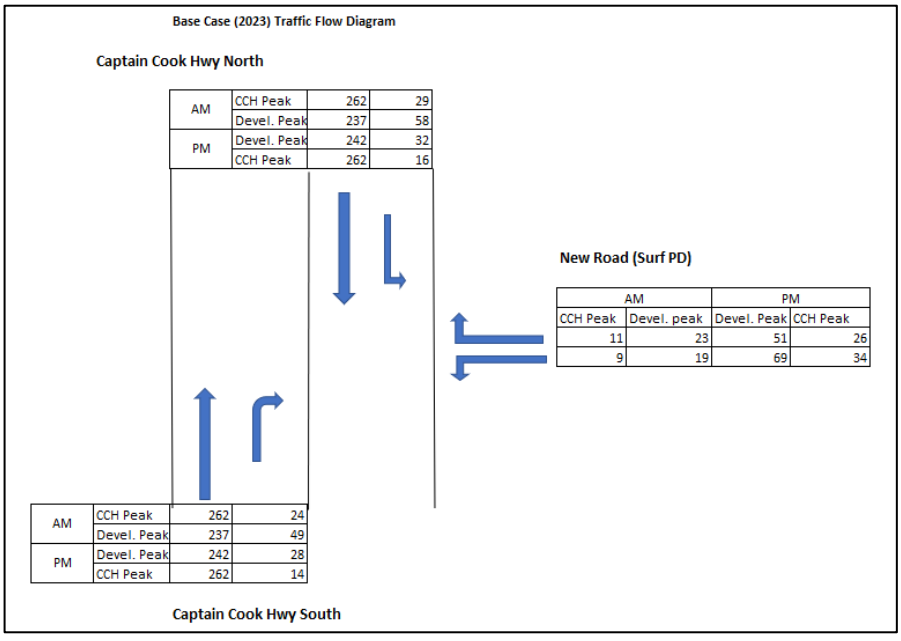


Figure 3 Proposed intersection layout extracted from SIDRA model

4.1.1 Traffic flow diagram for base case



4.2 Results and analysis

The SIDRA analysis identified that in the Base Case (2023), all lanes of the proposed intersection are achieving a Level of Service 'A', which is the best achievable outcome.

As identified in Figure 4, the Captain Cook Highway in both the inbound and outbound lanes is demonstrating a Level of Service 'A' for all traffic scenarios. Due to the intersection being modelled as an unsignalised two-way give way/yield intersection, giving the priority movement the major road which in this case is the CCH. As a result, it is expected that there will be a high LoS for the CCH lanes in each traffic scenario, as there is no opportunity to cause delay or queuing as the analysis favours this movement.

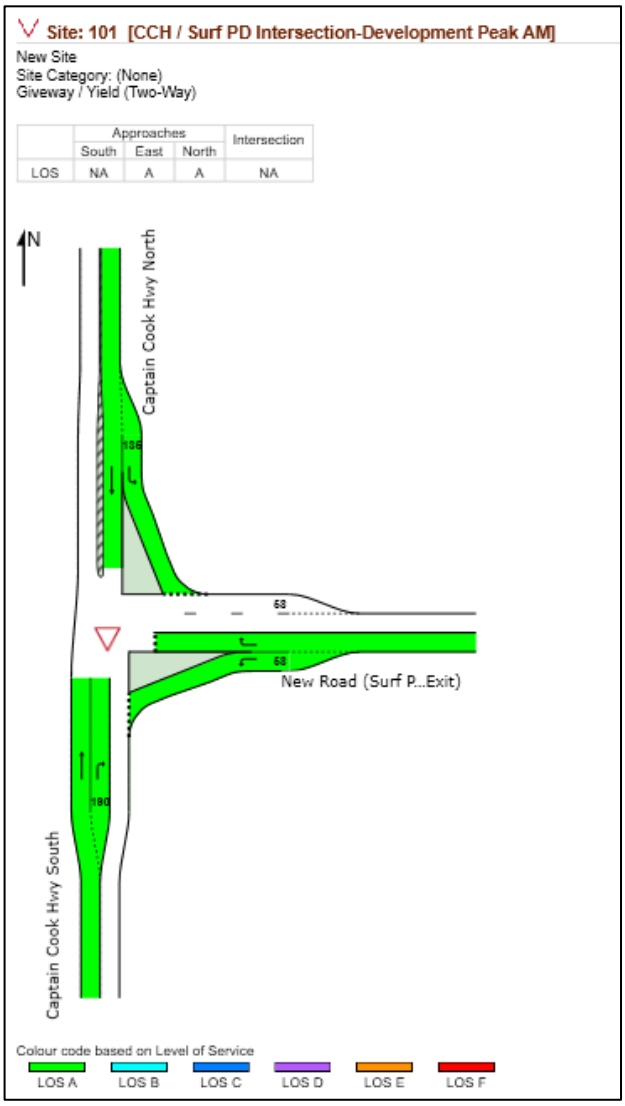


Figure 4 Lane Level of Service Display for the Development Peak AM

Despite the traffic scenarios demonstrating a high level of functionality, it is worth identifying results from performance-based criteria including queuing and lane delay to demonstrate the high functionality of the intersection and the extents to which it can operate.

4.2.1 Relevant performance-based criteria results

The relevant performance criteria are as follows:

- Queue (average): This performance criterion gives the average back of queue distance in 'metres' for any lane

- Queue (percentile): This performance criterion gives the largest 95% back of queue distance in 'number of vehicles' for any lane
    - Note: In the context of this analysis, the only lane that is impacted is the Apron Drive, noted in SIDRA as the South lane. This is the only lane referenced in the table below.
- Delay (control): This performance criterion determines the average control delay per vehicle in 'seconds'.

Table 6 Queues for worst lane for traffic scenarios

Scenario	Queue Distance (average) (metres)	Queue Distance (%) (vehicles)	Worst lane
Development Peak - AM	1.1	0.2	Left turn and right turn from CCH into Development
CCH Peak - AM	0.5	0.1	Right turn from Development onto CCH
Development Peak - PM	2.3	0.3	Right turn from Development onto CCH
CCH Peak - PM	1.2	0.2	Right turn from Development onto CCH

Table 7 Delay control results for traffic scenarios (seconds)

Scenario	CCH South (Right Turn)	Surf New Road (Right Turn)	Surf New Road (Left Turn)	CCH North (Left Turn)
Development Peak - AM	5.4	8.3	5.0	4.6
Development Peak - PM	5.3	8.5	5.3	4.6
CCH Peak - AM	5.4	8.0	5.0	4.5
CCH Peak - PM	5.4	8.6	5.4	4.5

As can be seen in Table 6 and

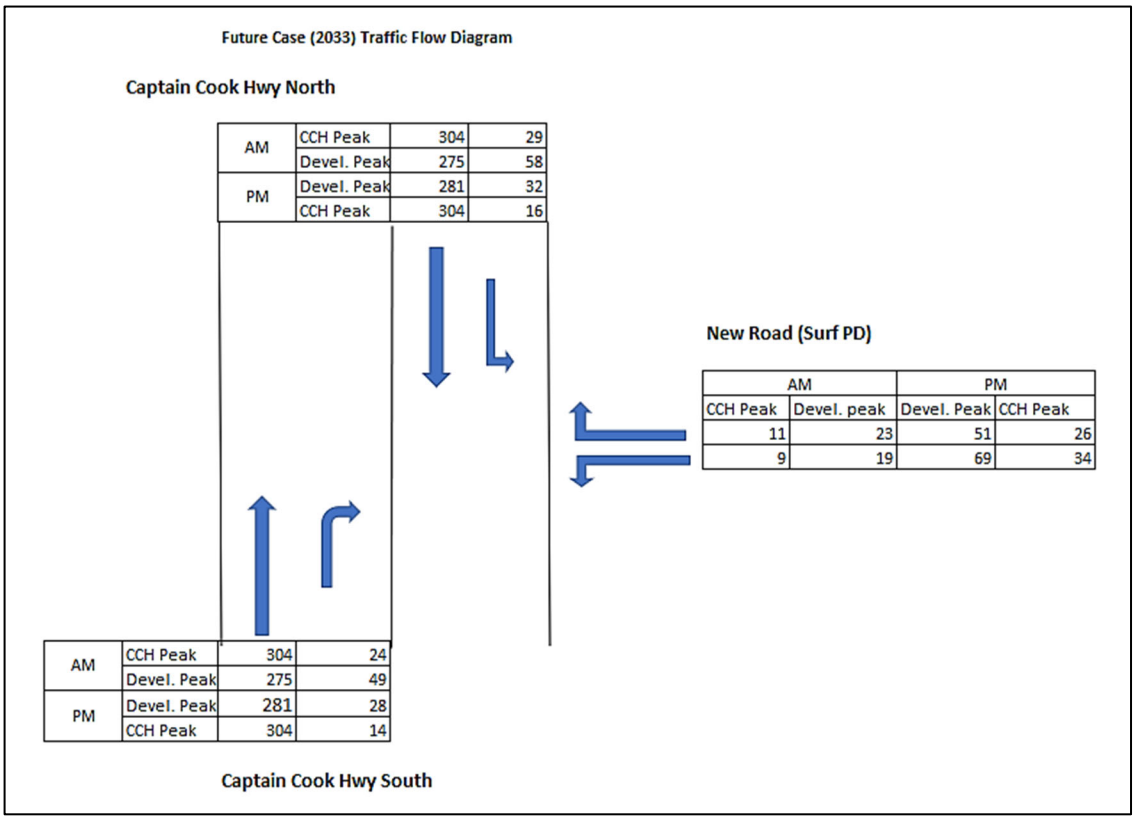
Table 7, very low queueing and delays are occurring. It is expected that the Surf New Road is experiencing the highest delay and queuing as it is not the priority movement. In the context of safe and efficient traffic operation, the levels of queuing delay at the intersection are considered immaterial to the performance of the intersection, and therefore are acceptable.

5. Future case (2033)

5.1 Layout

No changes were made to the geometrical layout of the intersection as part of the future case assessment. The traffic flow diagram in the figure below is showing the movements for the future case scenario.

5.1.1 Traffic flow diagram for future case



5.2 Results and analysis

The SIDRA analysis identified that in the Base Case (2022) all lanes of the Apron Drive and Hunter Street intersection are achieving a Level of Service ‘A’.

As identified in Figure 5 (which is showing the Development Peak Scenario – AM as an example), the Captain Cook Highway inbound and outbound lanes are demonstrating a Level of Service ‘A’ for all traffic scenarios. The same as the Base Case scenario, the intersection has been modelled as an unsignalised two-way give way/yield intersection, giving the priority movement to the major road which in this case is the CCH. Hence, the expected result of a high LoS for the CCH lanes in each traffic scenario.

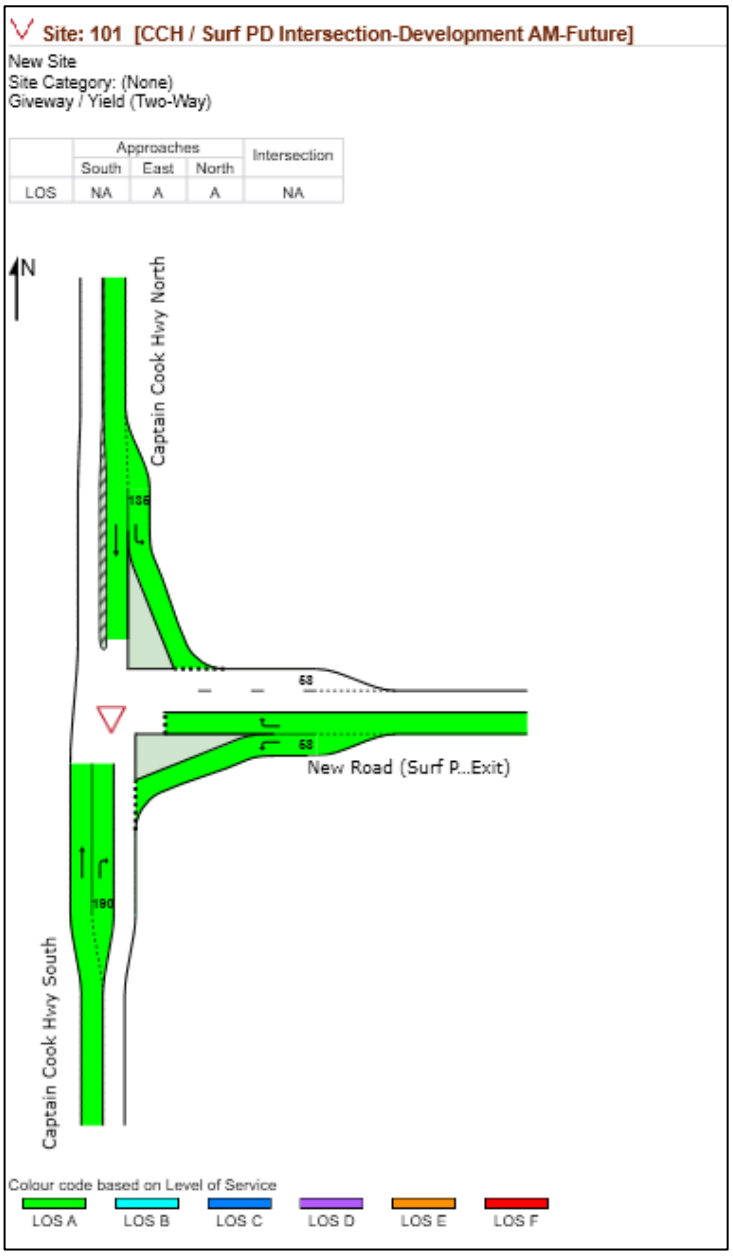


Figure 5 Lane Level of Service Display for the Development Peak AM

Similarly to the base case, the traffic scenarios are demonstrating a high level of functionality however it is worth identifying any change in results from performance-based criteria to identify any potential impacts of increased traffic volumes.

5.2.1 Relevant performance-based criteria results

The relevant performance criteria are as follows:

- Queue (average): This performance criterion gives the average back of queue distance in 'metres' for any lane
- Queue (percentile): This performance criterion gives the largest 95% back of queue distance in 'number of vehicles' for any lane
    - Note: In the context of this analysis, the only lane that is impacted is the Apron Drive, noted in SIDRA as the South lane. This is the only lane referenced in the table below.
- Delay (control): This performance criterion determines the average control delay per vehicle in' seconds'.

Table 8 Queues for worst lane for traffic scenarios

Scenario	Queue Distance (average) (metres)	Queue Distance (%) (vehicles)	Worst lane
Development Peak - AM	1.1	0.2	Right turn from Development onto CCH
CCH Peak - AM	0.6	0.1	Right turn from Development into CCH
Development Peak - PM	2.5	0.4	Right turn from Development onto CCH
CCH Peak - PM	1.3	0.2	Right turn from Development onto CCH

Table 9 Delay control results for traffic scenarios (seconds)

Scenario	CCH South (Right Turn)	Surf New Road (Right Turn)	Surf New Road (Left Turn)	CCH North (Left Turn)
Development Peak - AM	5.5	9.2	5.1	4.7
Development Peak - PM	5.5	9.5	5.5	4.6
CCH Peak - AM	5.6	9.6	5.5	4.6
CCH Peak - PM	5.6	9.6	5.5	4.5

As can be seen in Table 8 and Table 9, the traffic volumes have increased with the 1.5% growth rate on the Captain Cook Highway volumes, and the queuing, as well as delays, have only slightly increased in most cases only by 0.1-0.3 seconds. This is suggesting the low growth over a 10-year horizon will have no further impact on the proposed new development. It is also expected to continue to see the Surf New Road demonstrating the highest of delay and queuing as it is not the priority movement.

It could be assumed that if the traffic volume was projected for a high growth scenario, the LoS and criteria performance will still be at operating at a high level. This is assumed based on the geometric design requirements providing ample storage length in the AUL and CHR lanes.

6. Impact on Existing

A high-level review of the impact of the Development on the existing transport infrastructure (Captain Cook Highway) has been undertaken but will need to be further detailed in the design phases.

The transport route for the Development site is the Captain Cook Highway as the only entry and exit point from the North and the South.

6.1 Impacts during ongoing use of the Development

The Captain Cook Highway is a major transport link on the state-controlled road network in Far North Queensland, and has an average annual heavy vehicle percentage of 9 %. The Captain Cook Highway existing infrastructure accommodates for the loading and geometrical requirements associated with regular use of larger vehicles.

It is assumed the additional heavy vehicle traffic movement required to transport the fill material will have a low impact on the existing traffic and pavement during the construction phase. Additionally, the impact of the Development in use would have a low to none impact as the influx of typically light vehicles (i.e. not heavy vehicles) will have negligible impact on the pavement deterioration.

Further mitigation and investigation can be provided as part of the detailed design.

6.2 Impacts during Construction

The construction of the external intersection will be undertaken in parallel with site preparation and bulk earthworks activities such that the intersection will be functional for deliveries of labour plant and materials during the building works phase of the project. The conduct of the construction of the works with the CCH road reserve and the provision of access to the site during earthworks and site preparation will be undertaken in accordance with a DTMR approved Construction phase Traffic Management Plan.

Although preliminary earthworks design indicated a shortfall of fill material, this material can be won on site through the over excavation of water storage lagoons leading to a balanced earthworks solution with no requirement for the import of fill material or requirements for haulage on the CCH to import from external sources

Any unsuitable material or contaminated soils identified during site preparation and bulk earthworks will be neutralised on site and placed in the over excavated water storage lagoons or buried on site such that there will be no need for such material to be transported off site.

7. Conclusions

The traffic impact assessment undertaken has identified that the proposed intersection of the Captain Cook Highway (20A) and the new development will function at a high level for the forecasted 2033 traffic demands and with the anticipated development generated traffic impact.

Therefore, it can be concluded that the proposed development for the Surf Park, South of the Mowbray River, will have a negligible negative impact on the current and future safety and efficiency of the existing State Controlled Road Network.

Appendices

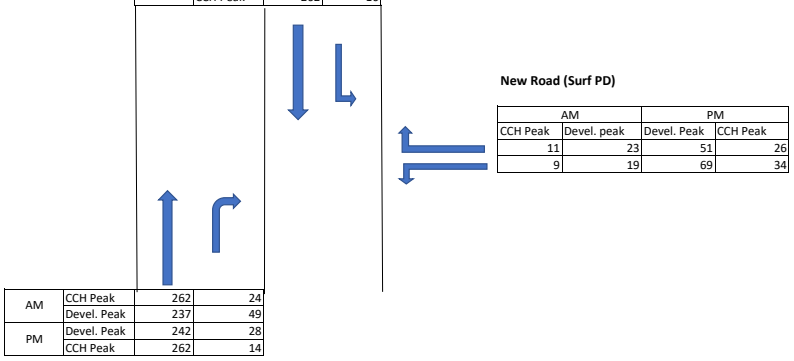
Appendix A – Traffic volumes

Traffic Volumes

Base Case (2023) Traffic Flow Diagram

Captain Cook Hwy North

AM	CCH Peak	262	29
	Devel. Peak	237	58
PM	Devel. Peak	242	32
	CCH Peak	262	16



AM	CCH Peak	262	24
	Devel. Peak	237	49
PM	Devel. Peak	242	28
	CCH Peak	262	14

Captain Cook Hwy South

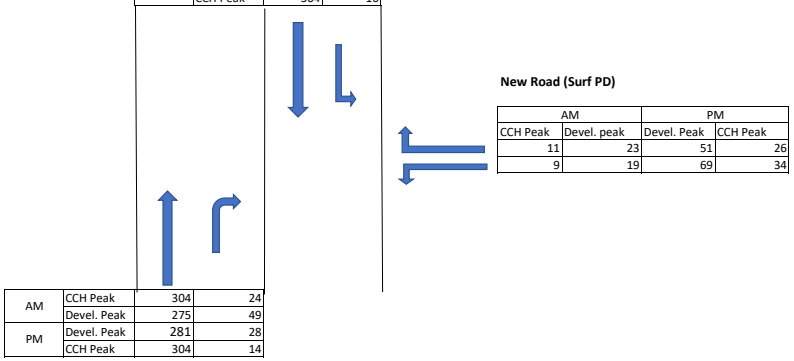
New Road (Surf PD)

AM		PM	
CCH Peak	Devel. peak	Devel. Peak	CCH Peak
11	23	51	26
9	19	69	34

Future Case (2033) Traffic Flow Diagram

Captain Cook Hwy North

AM	CCH Peak	304	29
	Devel. Peak	275	58
PM	Devel. Peak	281	32
	CCH Peak	304	16



AM	CCH Peak	304	24
	Devel. Peak	275	49
PM	Devel. Peak	281	28
	CCH Peak	304	14

Captain Cook Hwy South

New Road (Surf PD)

AM		PM	
CCH Peak	Devel. peak	Devel. Peak	CCH Peak
11	23	51	26
9	19	69	34

		Base Case (2023)				Future Case (2033)			
		AM Movements		PM Movements		AM Movements		PM Movements	
		CCH Peak	Devel. Peak	Devel. Peak	CCH Peak	CCH Peak	Devel. Peak	Devel. Peak	CCH Peak
Approach	**Turn**	**8:00 - 9:00**	**9:00 - 10:00**	**3:00-4:00**	**4:00 - 5:00**	**8:00 - 9:00**	**9:00 - 10:00**	**3:00-4:00**	**4:00 - 5:00**
CCH North (Coming from Port Douglas)	Left	29	58	32	16	29	58	32	16
	Through	262	237	242	262	304	275	281	304
New Road (Surf PD)	Right	11	23	51	26	11	23	51	26
	Left	9	19	69	34	9	19	69	34
CCH South (Coming from Cairns)	Right	24	49	28	14	24	49	28	14
	Through	262	237	242	262	304	275	281	304

Assumptions for overall traffic movement determination

50% of development peak traffic is the amount of traffic in the CCH peak	50%
Through traffic on CCH is 50/50 split for Northbound and Southbound traffic	
1.5% growth factor only applied to through traffic (local traffic on CCH)	1.50%

Appendix B – Base case results (2023)

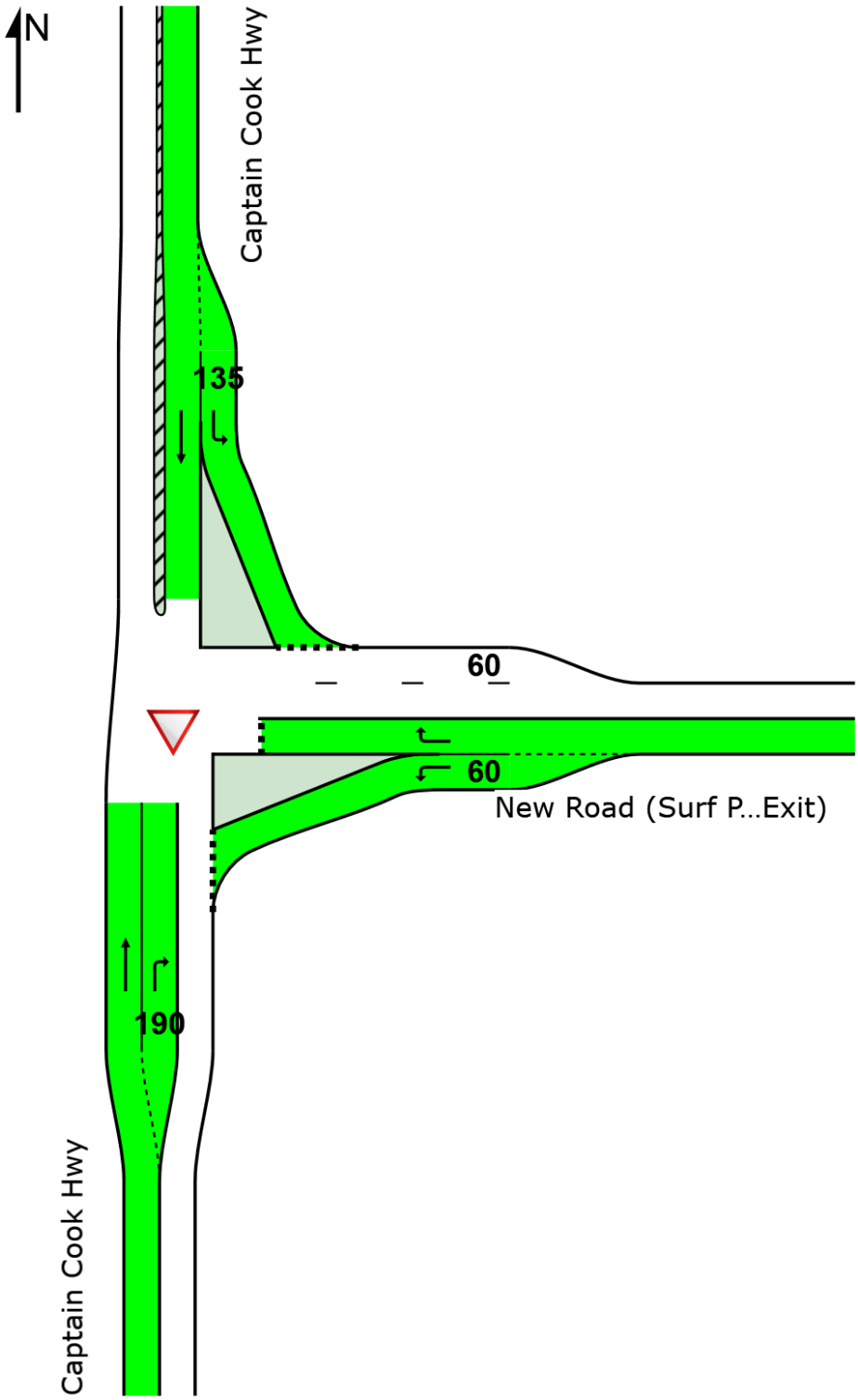
LEVEL OF SERVICE

Lane Level of Service

Site: 101 [CCH / Surf PD Intersection-CCH Peak PM (Site Folder: General)]

New Site
Site Category: (None)
Give-Way (Two-Way)

	Approaches			Intersection
	South	East	North	
LOS	NA	A	A	NA



Colour code based on Level of Service

LOS A	LOS B	LOS C	LOS D	LOS E	LOS F

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
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).
Delay Model: SIDRA Standard (Geometric Delay is included).

MOVEMENT SUMMARY

Site: 101 [CCH / Surf PD Intersection-Development Peak PM (Site Folder: General)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Captain Cook Hwy														
2	T1	242	0.0	255	0.0	0.131	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	50.0
3	R2	28	0.0	29	0.0	0.021	5.3	LOS A	0.1	0.6	0.34	0.53	0.34	45.7
Approach		270	0.0	284	0.0	0.131	0.6	NA	0.1	0.6	0.04	0.06	0.04	49.5
East: New Road (Surf PD Entry/Exit)														
4	L2	69	0.0	73	0.0	0.056	5.3	LOS A	0.2	1.5	0.33	0.53	0.33	46.4
6	R2	51	0.0	54	0.0	0.087	8.5	LOS A	0.3	2.3	0.55	0.73	0.55	44.4
Approach		120	0.0	126	0.0	0.087	6.7	LOS A	0.3	2.3	0.42	0.61	0.42	45.5
North: Captain Cook Hwy														
7	L2	32	0.0	34	0.0	0.021	4.6	LOS A	0.1	0.6	0.09	0.47	0.09	47.0
8	T1	242	0.0	255	0.0	0.131	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	50.0
Approach		274	0.0	288	0.0	0.131	0.6	LOS A	0.1	0.6	0.01	0.05	0.01	49.6
All Vehicles		664	0.0	699	0.0	0.131	1.7	NA	0.3	2.3	0.09	0.16	0.09	48.7

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site 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: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [CCH / Surf PD Intersection-Development Peak AM (Site Folder: General)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Captain Cook Hwy South														
2	T1	237	0.0	249	0.0	0.129	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	50.0
3	R2	49	0.0	52	0.0	0.036	5.4	LOS A	0.2	1.1	0.34	0.54	0.34	42.0
Approach		286	0.0	301	0.0	0.129	0.9	NA	0.2	1.1	0.06	0.09	0.06	49.0
East: New Road (Surf PD Entry/Exit)														
4	L2	19	0.0	20	0.0	0.015	5.0	LOS A	0.1	0.4	0.32	0.50	0.32	44.3
6	R2	23	0.0	24	0.0	0.041	8.3	LOS A	0.1	1.0	0.54	0.70	0.54	41.0
Approach		42	0.0	44	0.0	0.041	6.8	LOS A	0.1	1.0	0.44	0.61	0.44	42.5
North: Captain Cook Hwy North														
7	L2	58	0.0	61	0.0	0.039	4.7	LOS A	0.2	1.1	0.13	0.47	0.13	43.2
8	T1	237	0.0	249	0.0	0.128	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	50.0
Approach		295	0.0	311	0.0	0.128	0.9	LOS A	0.2	1.1	0.03	0.09	0.03	49.0
All Vehicles		623	0.0	656	0.0	0.129	1.3	NA	0.2	1.1	0.07	0.13	0.07	48.7

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site 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: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [CCH / Surf PD Intersection-CCH Peak AM (Site Folder: General)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Captain Cook Hwy														
2	T1	262	0.0	276	0.0	0.141	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	49.9
3	R2	24	0.0	25	0.0	0.018	5.4	LOS A	0.1	0.5	0.36	0.54	0.36	41.9
Approach		286	0.0	301	0.0	0.141	0.5	NA	0.1	0.5	0.03	0.05	0.03	49.5
East: New Road (Surf PD Entry/Exit)														
4	L2	9	0.0	9	0.0	0.007	5.0	LOS A	0.0	0.2	0.33	0.50	0.33	44.3
6	R2	11	0.0	12	0.0	0.020	8.3	LOS A	0.1	0.5	0.54	0.67	0.54	41.0
Approach		20	0.0	21	0.0	0.020	6.9	LOS A	0.1	0.5	0.45	0.59	0.45	42.4
North: Captain Cook Hwy														
7	L2	29	0.0	31	0.0	0.019	4.6	LOS A	0.1	0.5	0.08	0.47	0.08	43.4
8	T1	262	0.0	276	0.0	0.141	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	49.9
Approach		291	0.0	306	0.0	0.141	0.5	LOS A	0.1	0.5	0.01	0.05	0.01	49.5
All Vehicles		597	0.0	628	0.0	0.141	0.7	NA	0.1	0.5	0.03	0.06	0.03	49.3

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site 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: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [CCH / Surf PD Intersection-CCH Peak PM (Site Folder: General)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Captain Cook Hwy														
2	T1	262	0.0	276	0.0	0.141	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	49.9
3	R2	14	0.0	15	0.0	0.011	5.4	LOS A	0.0	0.3	0.36	0.53	0.36	45.6
Approach		276	0.0	291	0.0	0.141	0.3	NA	0.0	0.3	0.02	0.03	0.02	49.7
East: New Road (Surf PD Entry/Exit)														
4	L2	34	0.0	36	0.0	0.028	5.4	LOS A	0.1	0.8	0.34	0.52	0.34	46.3
6	R2	26	0.0	27	0.0	0.046	8.6	LOS A	0.2	1.2	0.54	0.71	0.54	44.3
Approach		60	0.0	63	0.0	0.046	6.8	LOS A	0.2	1.2	0.43	0.60	0.43	45.5
North: Captain Cook Hwy														
7	L2	16	0.0	17	0.0	0.010	4.5	LOS A	0.0	0.3	0.06	0.47	0.06	47.1
8	T1	262	0.0	276	0.0	0.141	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	49.9
Approach		278	0.0	293	0.0	0.141	0.3	LOS A	0.0	0.3	0.00	0.03	0.00	49.8
All Vehicles		614	0.0	646	0.0	0.141	0.9	NA	0.2	1.2	0.05	0.08	0.05	49.3

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site 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: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

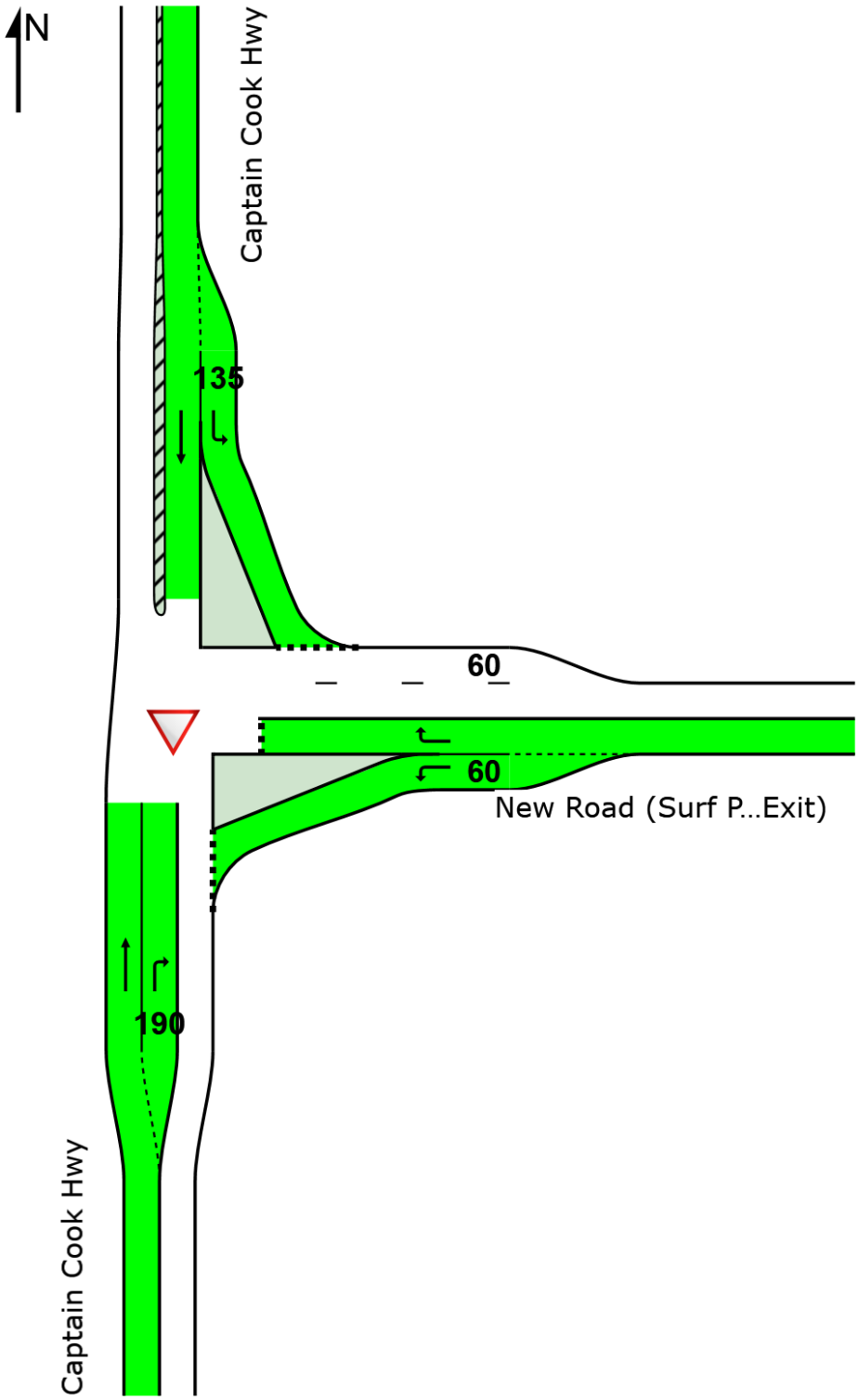
LEVEL OF SERVICE

Lane Level of Service

Site: 101 [CCH / Surf PD Intersection-Development Peak PM (Site Folder: General)]

New Site
Site Category: (None)
Give-Way (Two-Way)

	Approaches			Intersection
	South	East	North	
LOS	NA	A	A	NA



Colour code based on Level of Service

LOS A	LOS B	LOS C	LOS D	LOS E	LOS F

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
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).
Delay Model: SIDRA Standard (Geometric Delay is included).

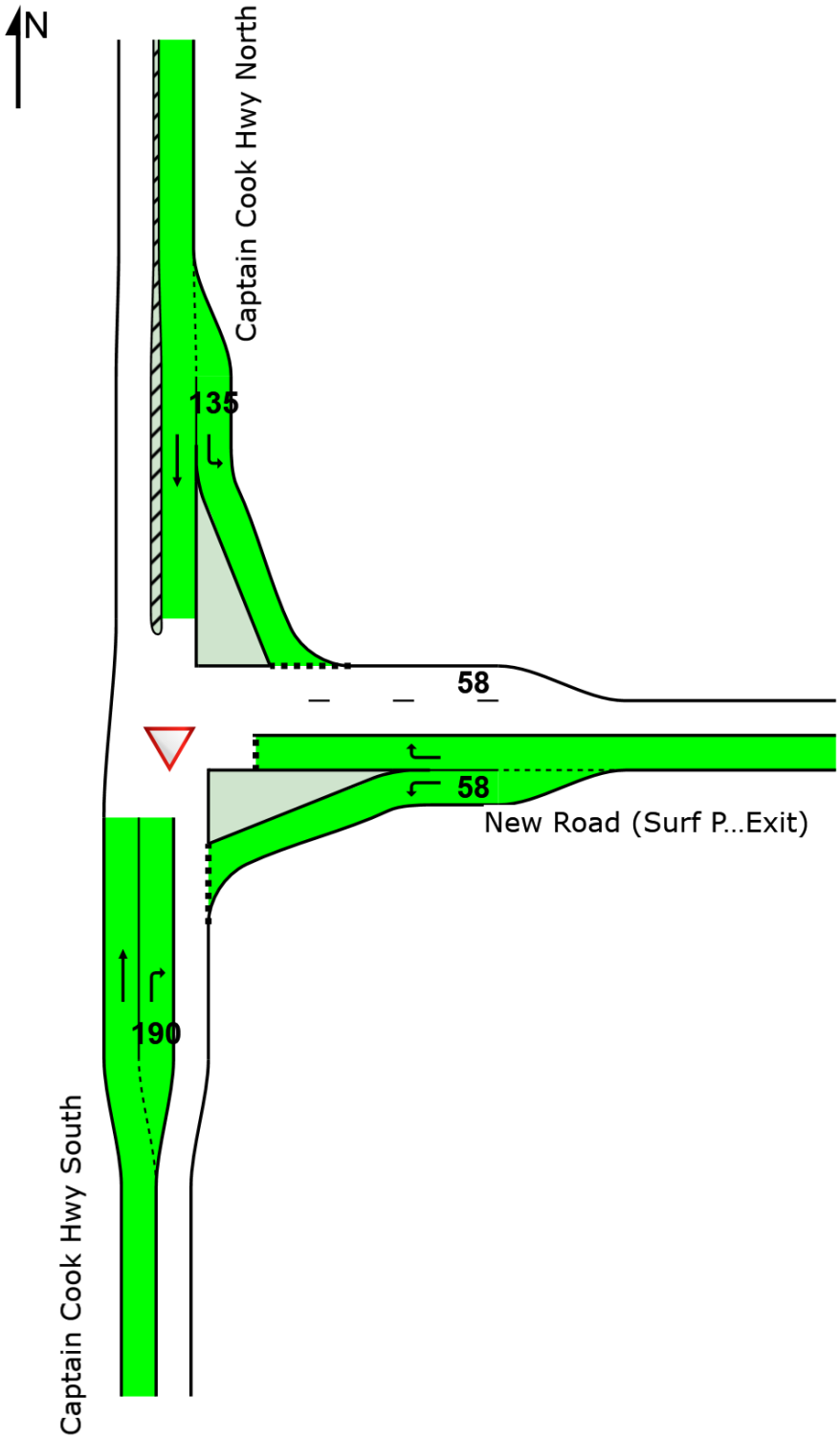
LEVEL OF SERVICE

Lane Level of Service

Site: 101 [CCH / Surf PD Intersection-Development Peak AM (Site Folder: General)]

New Site
Site Category: (None)
Give-Way (Two-Way)

	Approaches			Intersection
	South	East	North	
LOS	NA	A	A	NA



Colour code based on Level of Service

LOS A	LOS B	LOS C	LOS D	LOS E	LOS F

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
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).
Delay Model: SIDRA Standard (Geometric Delay is included).

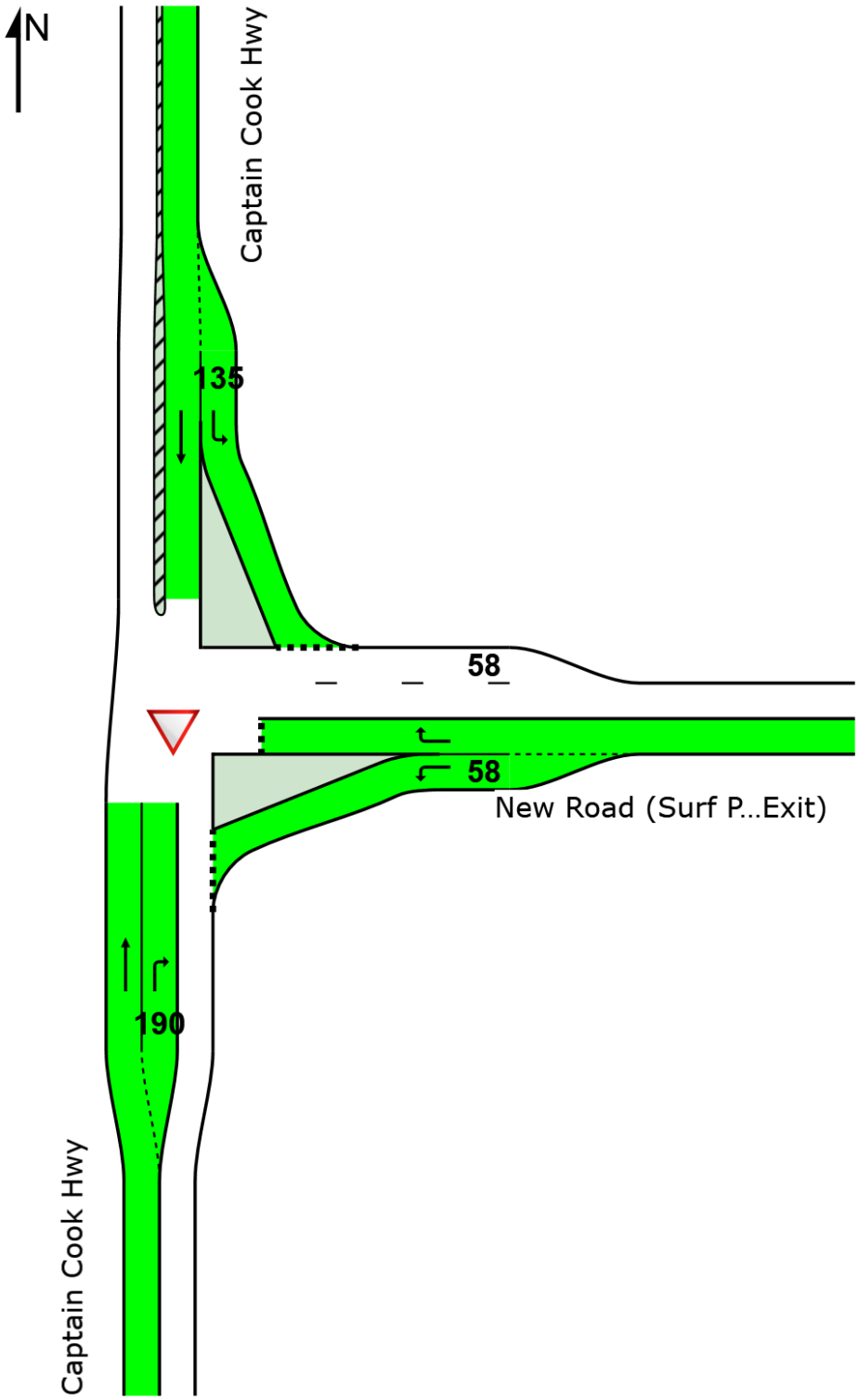
LEVEL OF SERVICE

Lane Level of Service

Site: 101 [CCH / Surf PD Intersection-CCH Peak AM (Site Folder: General)]

New Site
Site Category: (None)
Give-Way (Two-Way)

	Approaches			Intersection
	South	East	North	
LOS	NA	A	A	NA



Colour code based on Level of Service

LOS A	LOS B	LOS C	LOS D	LOS E	LOS F

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
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).
Delay Model: SIDRA Standard (Geometric Delay is included).

Appendix C – Future case results (2033)

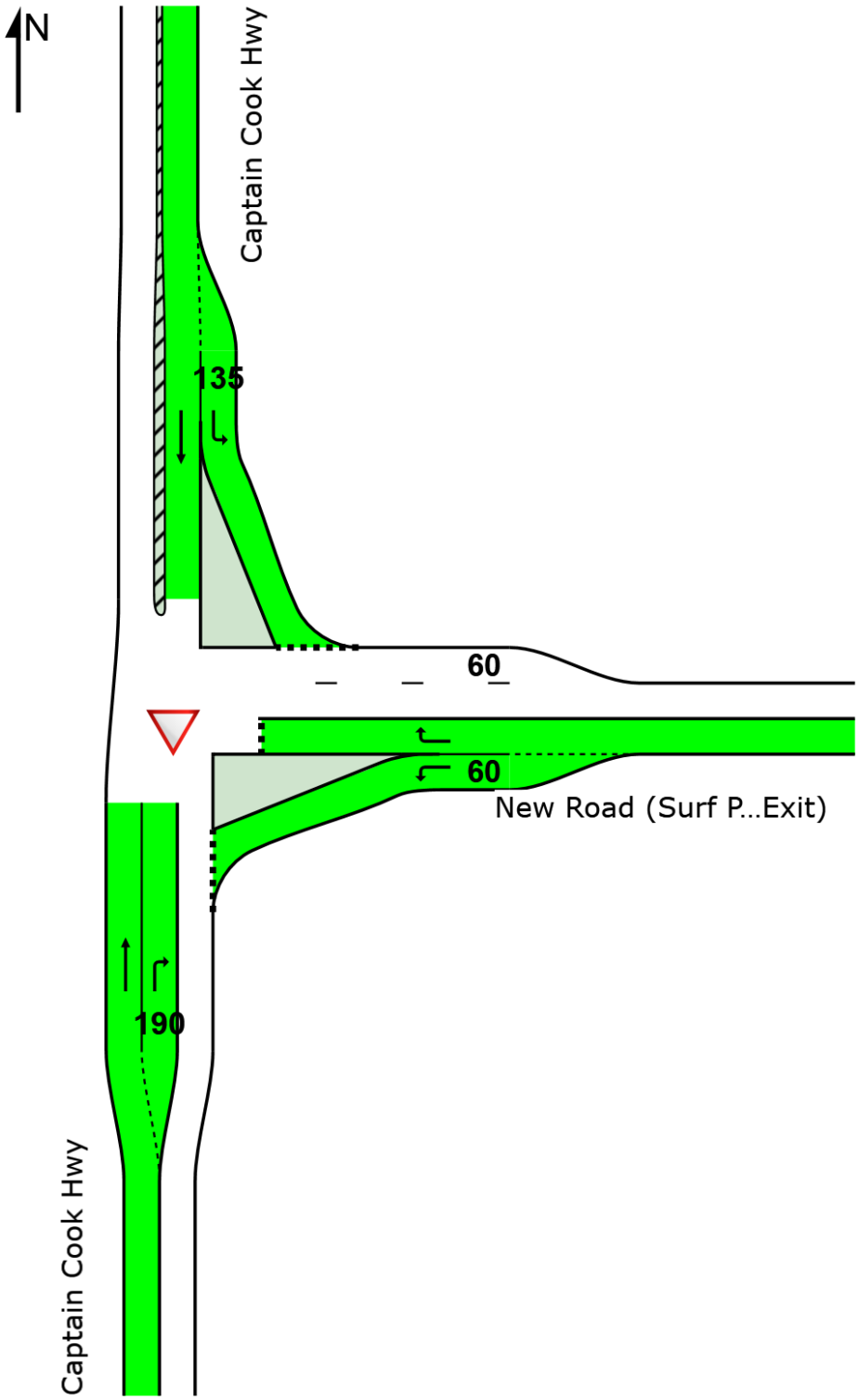
LEVEL OF SERVICE

Lane Level of Service

Site: 101 [CCH / Surf PD Intersection-CCH Peak AM-Future (Site Folder: General)]

New Site
Site Category: (None)
Give-Way (Two-Way)

	Approaches			Intersection
	South	East	North	
LOS	NA	A	A	NA



Colour code based on Level of Service

LOS A	LOS B	LOS C	LOS D	LOS E	LOS F

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
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).
Delay Model: SIDRA Standard (Geometric Delay is included).

MOVEMENT SUMMARY

Site: 101 [CCH / Surf PD Intersection-CCH Peak PM-Future (Site Folder: General)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Captain Cook Hwy														
2	T1	304	0.0	320	0.0	0.164	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	49.9
3	R2	14	0.0	15	0.0	0.011	5.6	LOS A	0.0	0.3	0.39	0.54	0.39	45.6
Approach		318	0.0	335	0.0	0.164	0.3	NA	0.0	0.3	0.02	0.02	0.02	49.7
East: New Road (Surf PD Entry/Exit)														
4	L2	34	0.0	36	0.0	0.029	5.5	LOS A	0.1	0.8	0.37	0.54	0.37	46.2
6	R2	26	0.0	27	0.0	0.052	9.6	LOS A	0.2	1.3	0.58	0.75	0.58	43.8
Approach		60	0.0	63	0.0	0.052	7.3	LOS A	0.2	1.3	0.46	0.63	0.46	45.2
North: Captain Cook Hwy														
7	L2	16	0.0	17	0.0	0.010	4.5	LOS A	0.0	0.3	0.06	0.47	0.06	47.1
8	T1	304	0.0	320	0.0	0.164	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	49.9
Approach		320	0.0	337	0.0	0.164	0.3	LOS A	0.0	0.3	0.00	0.02	0.00	49.8
All Vehicles		698	0.0	735	0.0	0.164	0.9	NA	0.2	1.3	0.05	0.08	0.05	49.3

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site 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: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [CCH / Surf PD Intersection-Development AM-Future (Site Folder: General)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Captain Cook Hwy South														
2	T1	275	0.0	289	0.0	0.149	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	49.9
3	R2	49	0.0	52	0.0	0.038	5.5	LOS A	0.2	1.1	0.37	0.56	0.37	41.9
Approach		324	0.0	341	0.0	0.149	0.9	NA	0.2	1.1	0.06	0.08	0.06	49.1
East: New Road (Surf PD Entry/Exit)														
4	L2	19	0.0	20	0.0	0.016	5.1	LOS A	0.1	0.4	0.34	0.51	0.34	44.2
6	R2	23	0.0	24	0.0	0.046	9.2	LOS A	0.2	1.1	0.57	0.74	0.57	40.3
Approach		42	0.0	44	0.0	0.046	7.4	LOS A	0.2	1.1	0.47	0.64	0.47	42.0
North: Captain Cook Hwy North														
7	L2	58	0.0	61	0.0	0.039	4.7	LOS A	0.2	1.1	0.13	0.47	0.13	43.2
8	T1	275	0.0	289	0.0	0.148	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	49.9
Approach		333	0.0	351	0.0	0.148	0.8	LOS A	0.2	1.1	0.02	0.08	0.02	49.1
All Vehicles		699	0.0	736	0.0	0.149	1.2	NA	0.2	1.1	0.06	0.12	0.06	48.8

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site 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: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [CCH / Surf PD Intersection-Development PM-Future (Site Folder: General)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Captain Cook Hwy														
2	T1	281	0.0	296	0.0	0.152	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	49.9
3	R2	28	0.0	29	0.0	0.022	5.5	LOS A	0.1	0.6	0.37	0.55	0.37	45.6
Approach		309	0.0	325	0.0	0.152	0.5	NA	0.1	0.6	0.03	0.05	0.03	49.5
East: New Road (Surf PD Entry/Exit)														
4	L2	69	0.0	73	0.0	0.058	5.5	LOS A	0.2	1.6	0.36	0.54	0.36	46.3
6	R2	51	0.0	54	0.0	0.098	9.5	LOS A	0.4	2.5	0.58	0.78	0.58	43.9
Approach		120	0.0	126	0.0	0.098	7.2	LOS A	0.4	2.5	0.45	0.64	0.45	45.2
North: Captain Cook Hwy														
7	L2	32	0.0	34	0.0	0.021	4.6	LOS A	0.1	0.6	0.09	0.47	0.09	47.0
8	T1	281	0.0	296	0.0	0.152	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	49.9
Approach		313	0.0	329	0.0	0.152	0.5	LOS A	0.1	0.6	0.01	0.05	0.01	49.6
All Vehicles		742	0.0	781	0.0	0.152	1.6	NA	0.4	2.5	0.09	0.14	0.09	48.8

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site 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: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [CCH / Surf PD Intersection-CCH Peak AM-Future (Site Folder: General)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Captain Cook Hwy														
2	T1	304	0.0	320	0.0	0.164	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	49.9
3	R2	24	0.0	25	0.0	0.019	5.6	LOS A	0.1	0.6	0.39	0.55	0.39	45.6
Approach		328	0.0	345	0.0	0.164	0.5	NA	0.1	0.6	0.03	0.04	0.03	49.6
East: New Road (Surf PD Entry/Exit)														
4	L2	9	0.0	9	0.0	0.008	5.5	LOS A	0.0	0.2	0.36	0.51	0.36	46.3
6	R2	11	0.0	12	0.0	0.022	9.6	LOS A	0.1	0.6	0.58	0.71	0.58	43.8
Approach		20	0.0	21	0.0	0.022	7.8	LOS A	0.1	0.6	0.48	0.62	0.48	44.9
North: Captain Cook Hwy														
7	L2	29	0.0	31	0.0	0.019	4.6	LOS A	0.1	0.5	0.08	0.47	0.08	47.0
8	T1	304	0.0	320	0.0	0.164	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	49.9
Approach		333	0.0	351	0.0	0.164	0.4	LOS A	0.1	0.5	0.01	0.04	0.01	49.7
All Vehicles		681	0.0	717	0.0	0.164	0.7	NA	0.1	0.6	0.03	0.06	0.03	49.5

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site 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: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

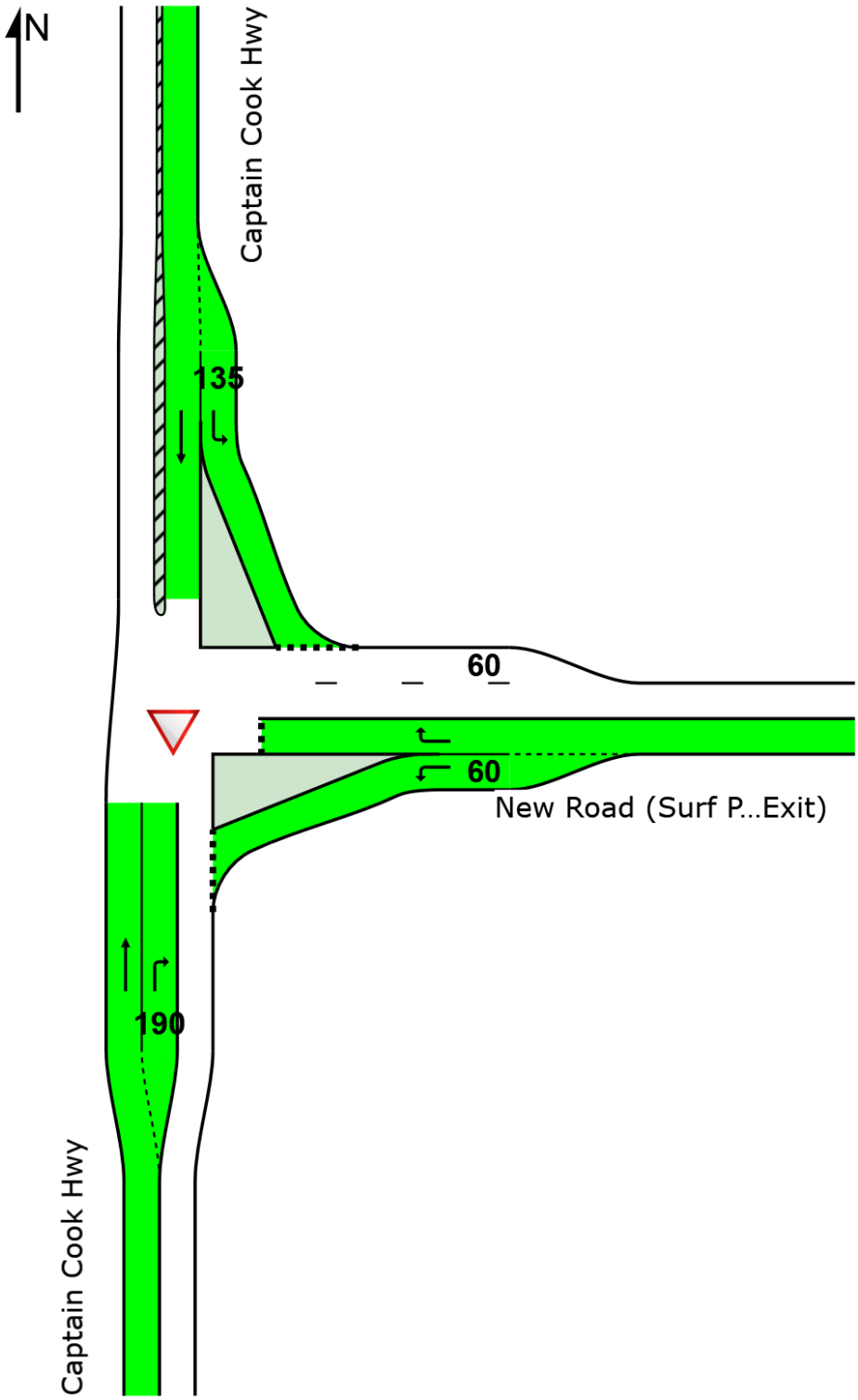
LEVEL OF SERVICE

Lane Level of Service

Site: 101 [CCH / Surf PD Intersection-CCH Peak PM-Future (Site Folder: General)]

New Site
Site Category: (None)
Give-Way (Two-Way)

	Approaches			Intersection
	South	East	North	
LOS	NA	A	A	NA



Colour code based on Level of Service

LOS A	LOS B	LOS C	LOS D	LOS E	LOS F

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
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).
Delay Model: SIDRA Standard (Geometric Delay is included).

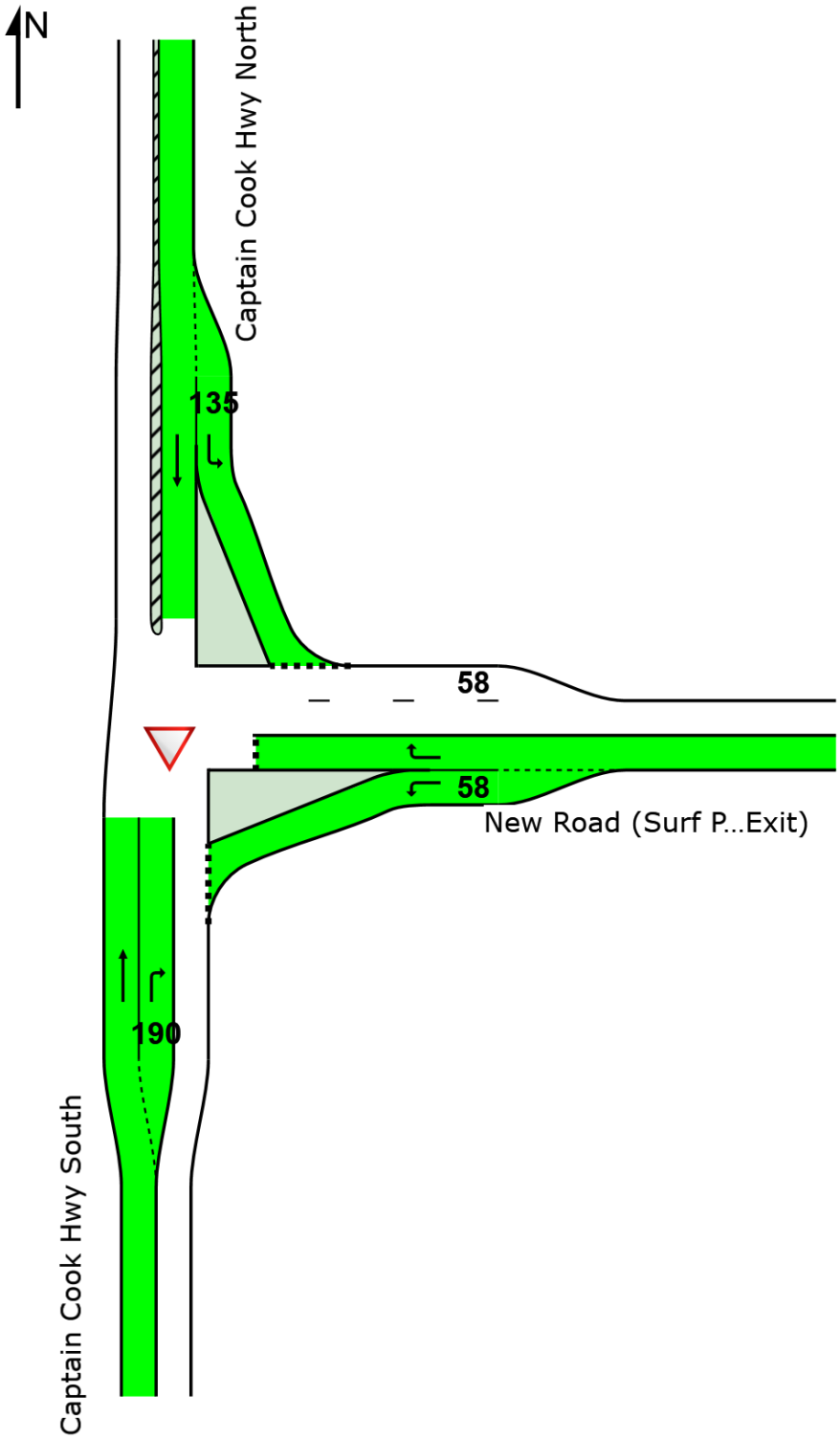
LEVEL OF SERVICE

Lane Level of Service

Site: 101 [CCH / Surf PD Intersection-Development AM-Future (Site Folder: General)]

New Site
Site Category: (None)
Give-Way (Two-Way)

	Approaches			Intersection
	South	East	North	
LOS	NA	A	A	NA



Colour code based on Level of Service

LOS A	LOS B	LOS C	LOS D	LOS E	LOS F

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
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).
Delay Model: SIDRA Standard (Geometric Delay is included).

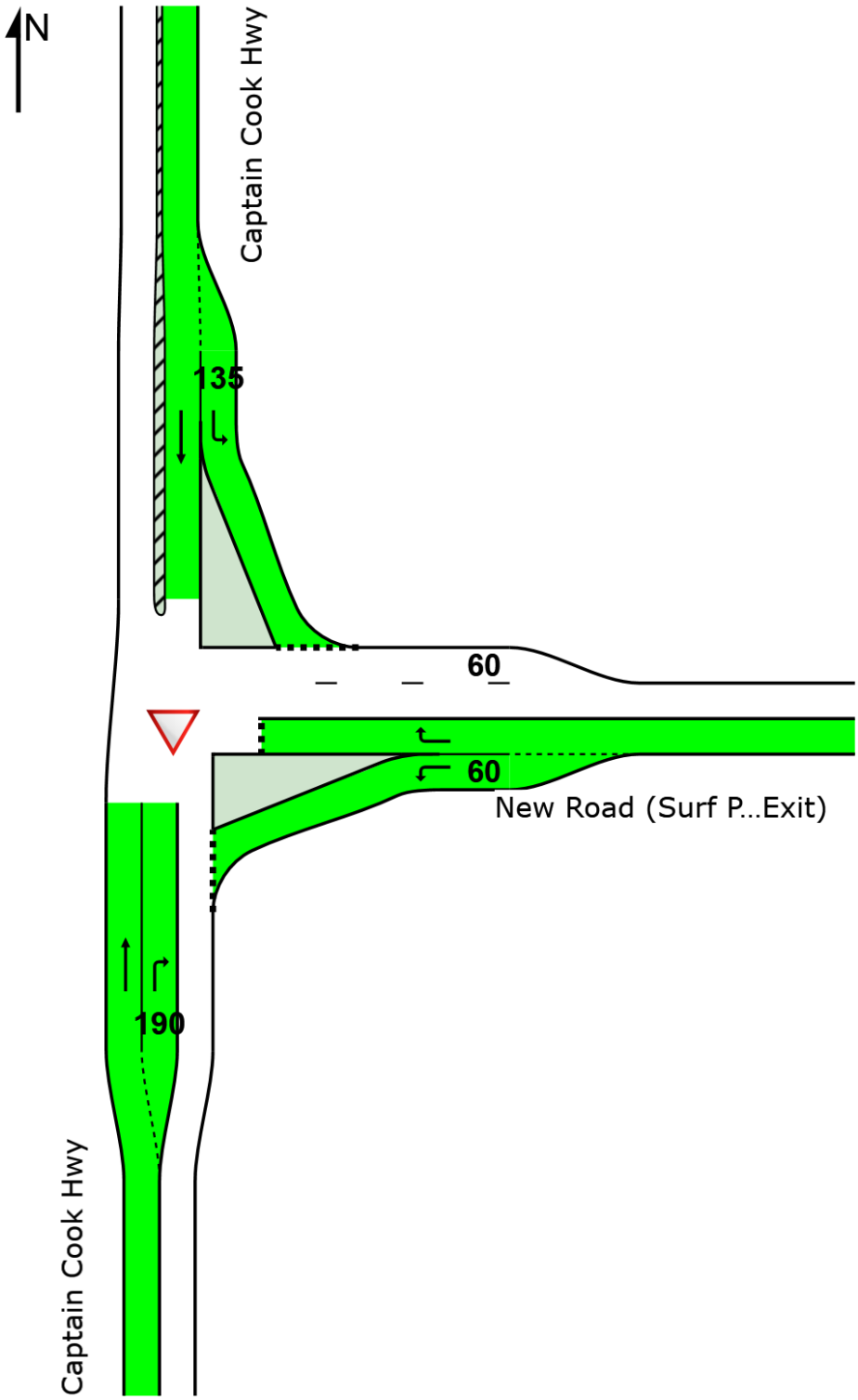
LEVEL OF SERVICE

Lane Level of Service

Site: 101 [CCH / Surf PD Intersection-Development PM-Future (Site Folder: General)]

New Site
Site Category: (None)
Give-Way (Two-Way)

	Approaches			Intersection
	South	East	North	
LOS	NA	A	A	NA



Colour code based on Level of Service

LOS A	LOS B	LOS C	LOS D	LOS E	LOS F

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
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).
Delay Model: SIDRA Standard (Geometric Delay is included).

Appendix D – Client Provided Traffic Information

LAND USE	REQUIRED FOR DEVELOPMENT		MINIMUM NO. REQUIRED	PATRONS – HOTEL, BIKE BUS[1]	PATRONS – CAR	REVISED CARPARK REQ.	NO. PROVIDED
OUTDOOR SPORT & RECREATTION	Swimming pool:[2] 15 spaces; plus 1 space per 100m2 of useable site area.[3]	18,500sqm Wave Park WaterPark Areas	200	50%	50%	**100**	243[7]
SHORT TERM ACCOMMODATION HOTEL	0.75 car spaces per unit + 3 spaces for visitors and 2 service/staff parking for the first 10 units and 0.5 additional service/staff space per 10 units, there-above.	164 x 0.75 = 123 3 10	136	NA	NA	**136**	98
SHORT TERM ACCOMMODATION SELF CONTAINED DWELLING UNITS	0.75 car spaces per unit + 3 spaces for visitors and 2 service/staff parking for the first 10 units and 0.5 additional service/staff space per 10 units, there-above.	90 x 0.75 = 68 3 6	77	NA	NA	**77**	180[6]
FOOR & DRINK OUTLETS			0			**0**	0
SITE Surf Deck Kiosk Deck VIP Functions 4 x Surf Lounges Wave Bar Cabana Areas	1 space per 25sqm GFA and outdoor dining area	3530 sqm	142	40%	60%	**86**[4]	0
HOTEL LEVEL 00 F&B	1 space per 25sqm GFA and outdoor dining area	1058 sqm	43	80%	20%	**9**	0
FUNCTION FACILITY - HOTEL	1 space per 15m2 GFA.	1280 sqm	52	80%	20%	**11**	0
OFFICE – CO-WORKER SPACE	1 space per 25m2 of GFA	180 sqm	8	50%	50%	**4**	0
RETAIL - SHOP	1 space per 25 sqm of GFA	550 sqm	22	50%	50%	**11**	0
TOURIST PARK	1 car space per caravan site, tent site or cabin; plus 1 visitor car space per 10 caravan sites, tent sites or cabins; plus 1 car space for an on-site manager.	35 Cabins	40	NA	NA	**40**[5]	0
CARETAKERS ACCOMMODATION	Part of Tourist Park		0	NA	NA	**0**	0
AIR SERVICES	1 car space per 20m2 of covered reception area	0	0	NA	NA	**0**	0
EXTRA PROVISIONS	Parking for Maintenance & Ground Staff						16
			720			**474**	**537**

1: Patrons staying at the Hotel, arriving by Bus, Shuttle, Ride Share or Bicycle
2: Swimming Pool is the closest use in the Table 9.4.1 Access, parking and servicing code.
3: Allowance per Sqm is more than actual due to the large water bodies and capacity cap per hour
4: These patrons may already be counted in the Outdoor Sport & Recreation
5: Surf Camp is proposed to have 20-24 Cabins utilised by Groups arriving by Bus – Bus Parking is Provided at the Surf Camp.
6: All Dwelling Units provided with Double Garages + Visitor Parking
7: Extra allowance of 5 large vehicles – Bus, Oversize, Car & Trailer

1: SURF PARK: Source Endless Surf Operational Forecasting

Operating Cycle	Forecasted Usage	# Days	Patrons per hour
Peak Season Week	80%	50	51
Peak Season Weekend	90%	20	58
Shoulder Season Week	60%	140	38
Shoulder Season Weekend	70%	56	45
Low Season Week	40%	70	26
Low Season Weekend	40%	28	26

Assumed Capacity	left Peak	Right Peak	Long Board Left	Long Board Right	Shore Break left	Shore Break Right
64	12	12	10	10	10	10

Seasons for Port Douglas

High	Easter 2 weeks	10 weeks total	20 weekend days
	Christmas 2 weeks		50 weekdays
	July School Hols 3 weeks		
	October School hols 3 weeks		
Low	4 weeks Nov/Dec	14 weeks total	28 weekend days
	10 weeks Jan-end March		70 weekdays
Shoulder	The rest	28 weeks total	56 weekend days
			140 weekdays

2: Estimated Parking requirement for Water Bodies by Patronage per Hour

Wave Park	Patrons per hour	50% Resort	1.5 Patrons per car	Est total 3 hr stay
Peak season WD	52	26	17	52
Peak season WE	53	27	18	**53***
Shoulder Season WD	40	20	13	40
Shoulder Season WE	45	22	15	45
Low Season WD	26	13	9	26
Low Season WE	26	13	9	26
Aquapark				
Peak season WD	80	40	11	34
Peak season WE	90	45	14	**41***
Shoulder Season WD	60	30	8	25
Shoulder Season WE	70	35	10	30
Low Season WD	40	20	6	17
Low Season WE	40	20	6	17

*Max Estimated Car Parking Requirement – **94**
Allowance is for 3 hours of Car Parking per 1 hour Usage of Wave Park & AquaPark
No Adjustment for cross utilisation.

Appendix E – TMR Provided Traffic Information

Traffic Analysis and Reporting System

AADT Segment Analysis Report (Complete)

Road Section 20A - CAPTAIN COOK HIGHWAY (CAIRNS - MOSSMAN)

Traffic Year 2019

Road Segments Summary - All Vehicles

Region	Segment Start Tdist	Segment End Tdist	Site	Site Tdist	Description	AADT			VKT (Millions)			Data Year	Page
						G	A	B	G	A	B		
403	0.000 km	0.480 km	111587	0.100 km	100m north of Florence St	11,860	12,684	24,544	2.07787	2.22224	4.30011	2019	3
403	0.480 km	1.680 km	111677	1.285 km	100m south of James Street	13,751	17,548	31,299	6.02294	7.68602	13.70896	2014	4
403	1.680 km	2.430 km	111596	2.330 km	100M EAST OF ARTHUR ST	18,643	17,362	36,005	5.10352	4.75285	9.85637	2019	5
403	2.430 km	3.700 km	110013	3.500 km	Southern Abutment of Saltwater Ck Bridge	20,475	20,691	41,166	9.49119	9.59131	19.08250	2019	6
403	3.700 km	8.320 km	111601	6.690 km	Sth abut Barron River Bridge	16,576	17,024	33,600	27.95211	28.70757	56.65968	2019	7
403	8.320 km	11.463 km	111597	9.530 km	Thomatis Creek	15,265	15,813	31,078	17.51193	18.14059	35.65253	2019	8
403	11.463 km	12.970 km	110045	12.230 km	Avondale Ck, 700m sth of Kennedy Hwy	22,490	22,977	45,467	12.37074	12.63861	25.00935	2019	9
403	12.970 km	16.170 km	110721	15.580 km	500m south of Reed Rd	17,345	17,698	35,043	20.25896	20.67126	40.93022	2019	10
403	16.170 km	21.311 km	110021	19.470 km	100m South of Deep Creek, Kewarra	9,786	9,710	19,496	18.36309	18.22048	36.58356	2019	11
403	21.311 km	24.397 km	111579	23.091 km	Delaneys Creek	7,372	7,237	14,609	8.30375	8.15168	16.45543	2019	12
403	24.397 km	60.876 km	110022	60.220 km	Craiglie, 800m South of Port Douglas Rd	3,138	3,119	6,257	41.78195	41.52897	83.31092	2019	13
403	60.876 km	71.021 km	111610	67.650 km	WiM Site Mossman South	2,763	2,756	5,519	10.23118	10.20526	20.43644	2011	14
403	71.021 km	75.168 km	111623	74.220 km	Parker Ck	4,096	4,028	8,124	6.19993	6.09700	12.29693	2019	15
								Totals	185.66915	188.61386	374.28301		

Road Segments Summary - Heavy Vehicles only

VKT totals are calculated only if traffic class data is available for all sites.

Region	Segment Start Tdist	Segment End Tdist	Site	Site Tdist	Description	HV AADT						HV VKT (Millions)			Data Year	Page
						G		A		B						
						AADT	HV %	AADT	HV %	AADT	HV %	G	A	B		
403	0.000 km	0.480 km	111587	0.100 km	100m north of Florence St										2019	3
403	0.480 km	1.680 km	111677	1.285 km	100m south of James Street	492	3.58%	1,320	7.52%	1,812	5.79%	0.21550	0.57816	0.79366	2014	4
403	1.680 km	2.430 km	111596	2.330 km	100M EAST OF ARTHUR ST	928	4.98%	854	4.92%	1,782	4.95%	0.25404	0.23378	0.48782	2019	5
403	2.430 km	3.700 km	110013	3.500 km	Southern Abutment of Saltwater Ck Bridge										2019	6
403	3.700 km	8.320 km	111601	6.690 km	Sth abut Barron River Bridge	896	5.41%	863	5.07%	1,759	5.24%	1.51092	1.45528	2.96620	2019	7
403	8.320 km	11.463 km	111597	9.530 km	Thomatis Creek	842	5.52%	882	5.58%	1,724	5.55%	0.96594	1.01183	1.97776	2019	8
403	11.463 km	12.970 km	110045	12.230 km	Avondale Ck, 700m sth of Kennedy Hwy	1,271	5.65%	1,284	5.59%	2,555	5.62%	0.69912	0.70627	1.40539	2019	9
403	12.970 km	16.170 km	110721	15.580 km	500m south of Reed Rd										2019	10
403	16.170 km	21.311 km	110021	19.470 km	100m South of Deep Creek, Kewarra	598	6.11%	579	5.96%	1,177	6.04%	1.12213	1.08647	2.20860	2019	11
403	21.311 km	24.397 km	111579	23.091 km	Delaneys Creek	494	6.70%	501	6.92%	995	6.81%	0.55644	0.56432	1.12076	2019	12
403	24.397 km	60.876 km	110022	60.220 km	Craiglie, 800m South of Port Douglas Rd	282	8.99%	281	9.01%	563	9.00%	3.75478	3.74147	7.49625	2019	13
403	60.876 km	71.021 km	111610	67.650 km	WiM Site Mossman South	215	7.78%	210	7.62%	425	7.70%	0.79613	0.77761	1.57374	2011	14
403	71.021 km	75.168 km	111623	74.220 km	Parker Ck	307	7.50%	300	7.45%	607	7.47%	0.46469	0.45410	0.91879	2019	15
											Totals					

Site 111587. Point 310000933.
100m north of Florence St.
0.10 km

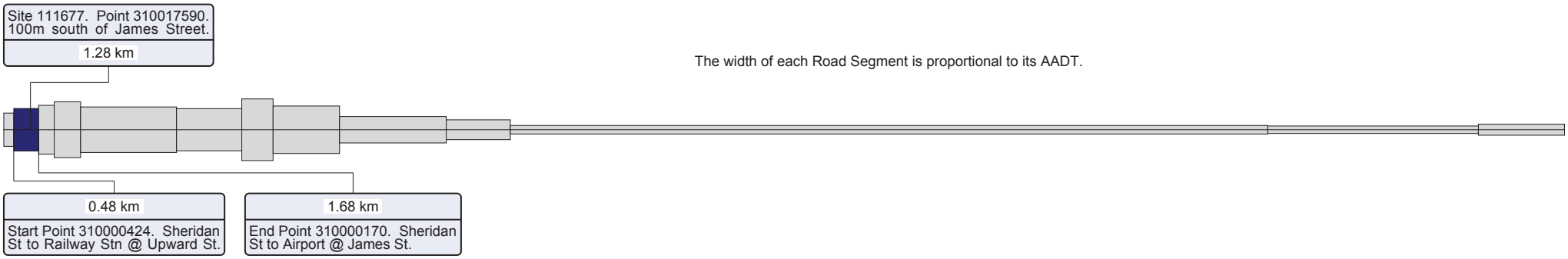
The width of each Road Segment is proportional to its AADT.

0.00 km
Start Point 310000167. Sheridan St to Airport @ Florence St.

0.48 km
End Point 310000424. Sheridan St to Railway Stn @ Upward St.

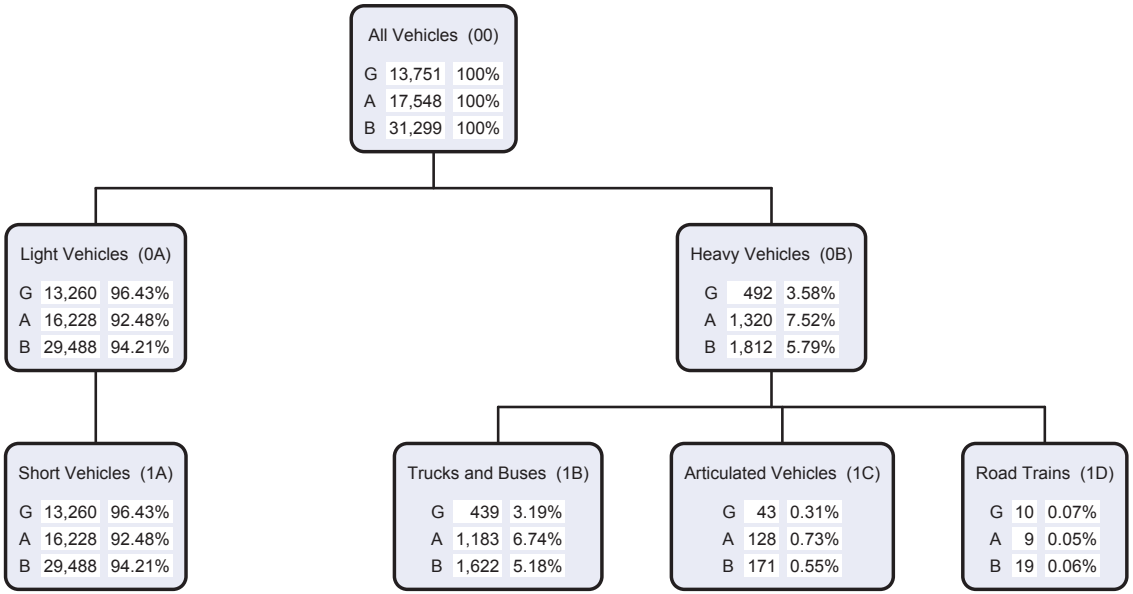
All Vehicles (00)		
G	11,860	100%
A	12,684	100%
B	24,544	100%

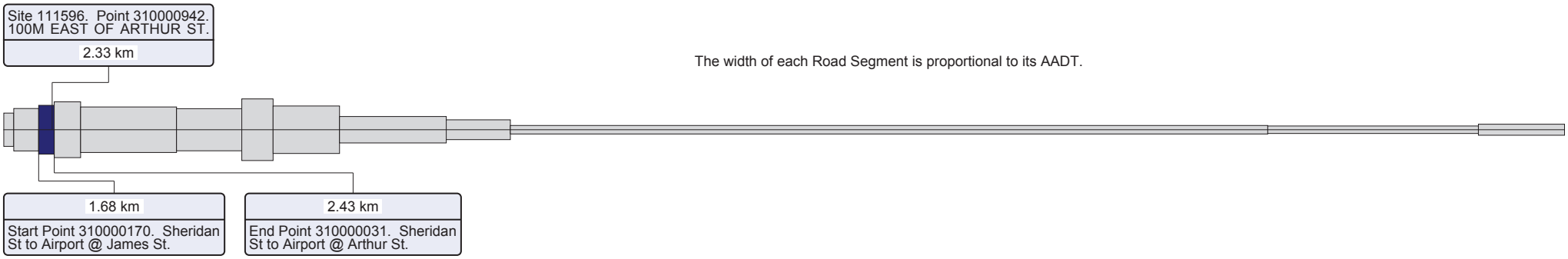
No Traffic Class data found.



The width of each Road Segment is proportional to its AADT.

This report shows Annual Average Daily Traffic values (AADTs). Because the AADT values are converted to whole numbers, there will be occasional inaccuracies due to rounding. These inaccuracies are statistically insignificant.





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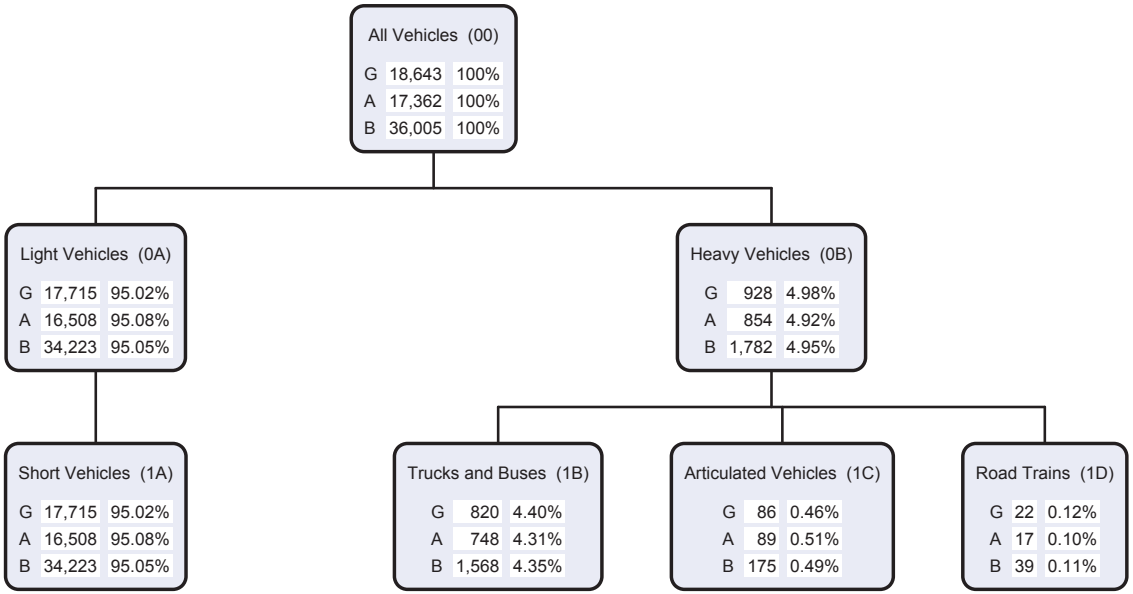
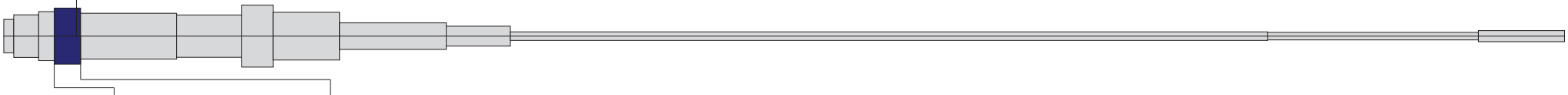


Site 110013. Point 310000030. Southern Abutment of Saltwater Ck Bridge.

3.50 km

The width of each Road Segment is proportional to its AADT.



2.43 km

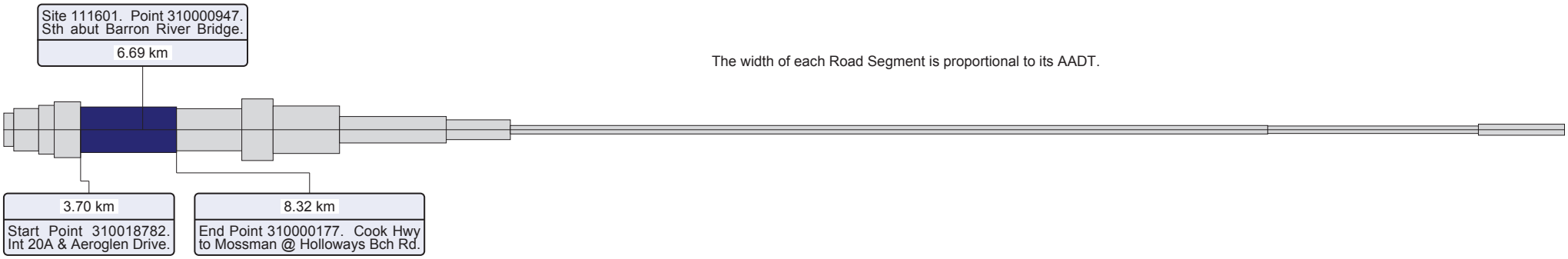
Start Point 310000031. Sheridan St to Airport @ Arthur St.

3.70 km

End Point 310018782. Int 20A & Aeroglen Drive.

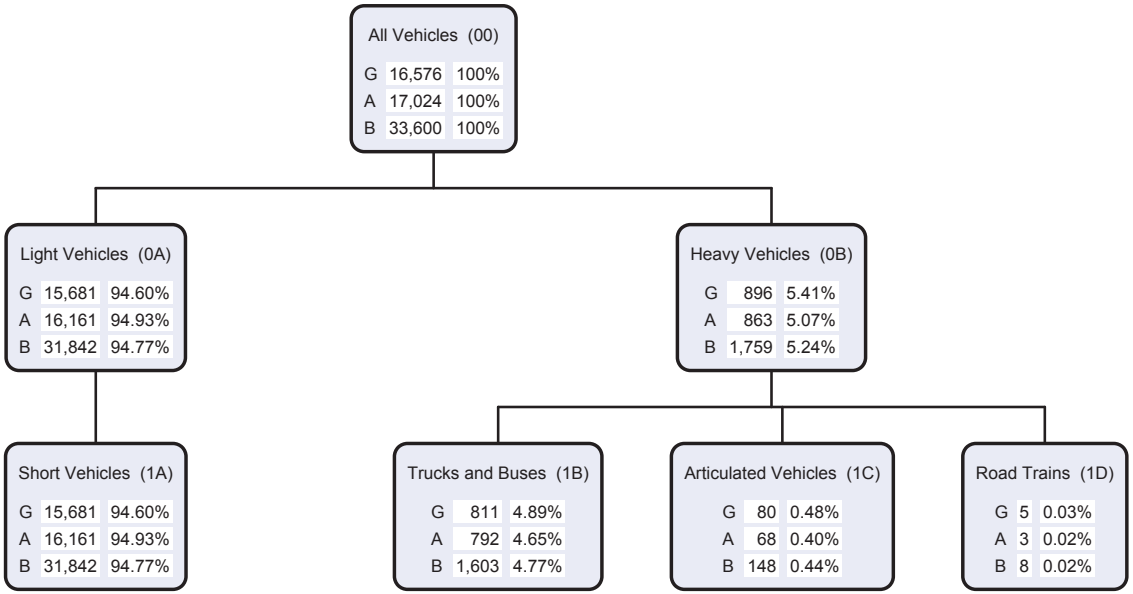
All Vehicles (00)		
G	20,475	100%
A	20,691	100%
B	41,166	100%

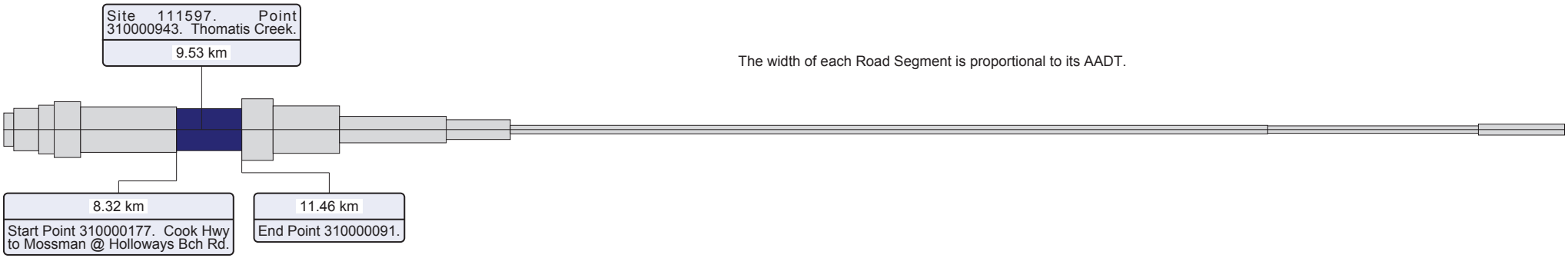
No Traffic Class data found.



The width of each Road Segment is proportional to its AADT.

This report shows Annual Average Daily Traffic values (AADTs). Because the AADT values are converted to whole numbers, there will be occasional inaccuracies due to rounding. These inaccuracies are statistically insignificant.





The width of each Road Segment is proportional to its AADT.

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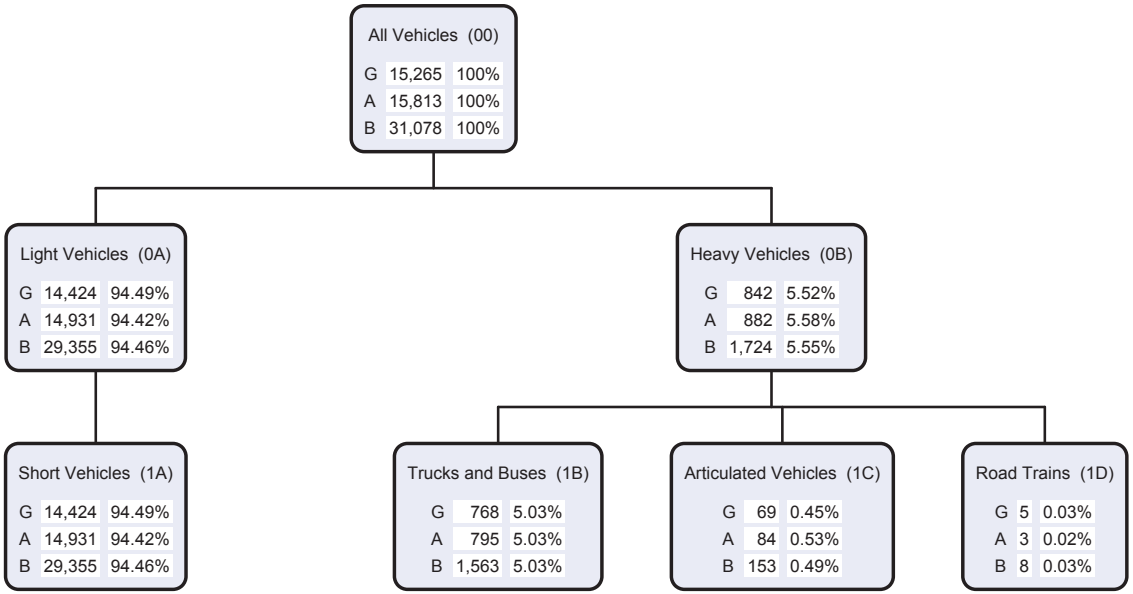
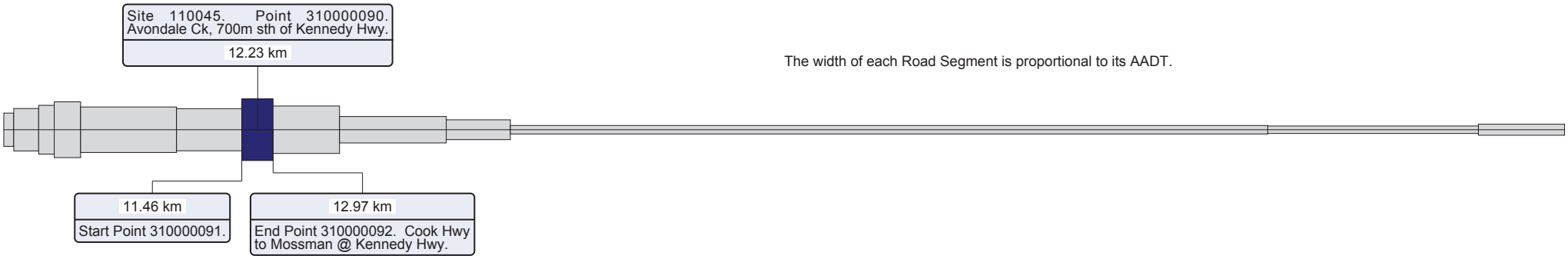
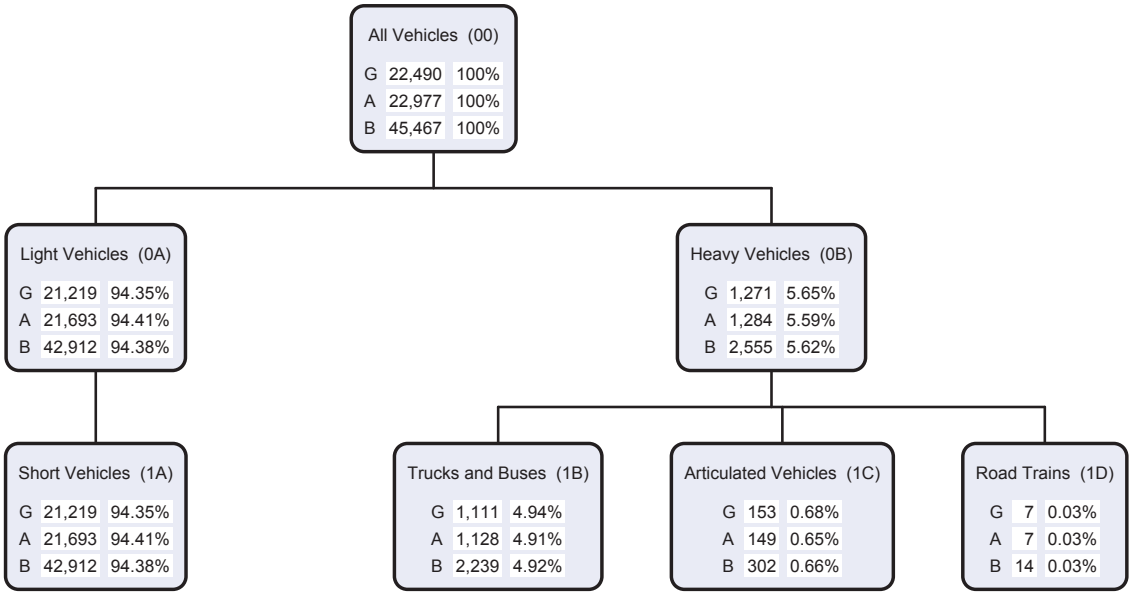
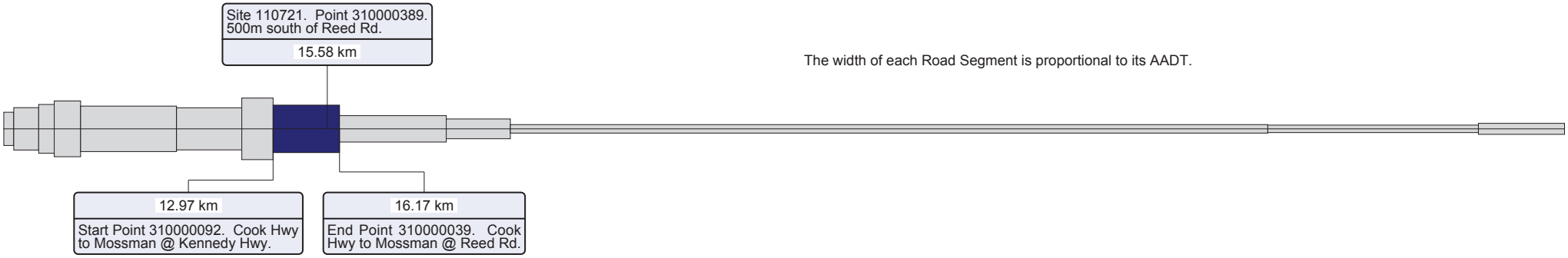




The width of each Road Segment is proportional to its AADT.

This report shows Annual Average Daily Traffic values (AADTs). Because the AADT values are converted to whole numbers, there will be occasional inaccuracies due to rounding. These inaccuracies are statistically insignificant.

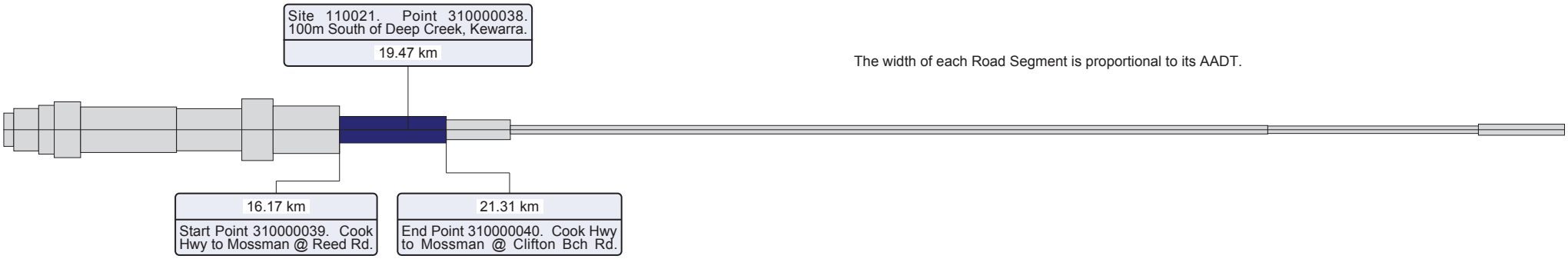




The width of each Road Segment is proportional to its AADT.

All Vehicles (00)		
G	17,345	100%
A	17,698	100%
B	35,043	100%

No Traffic Class data found.



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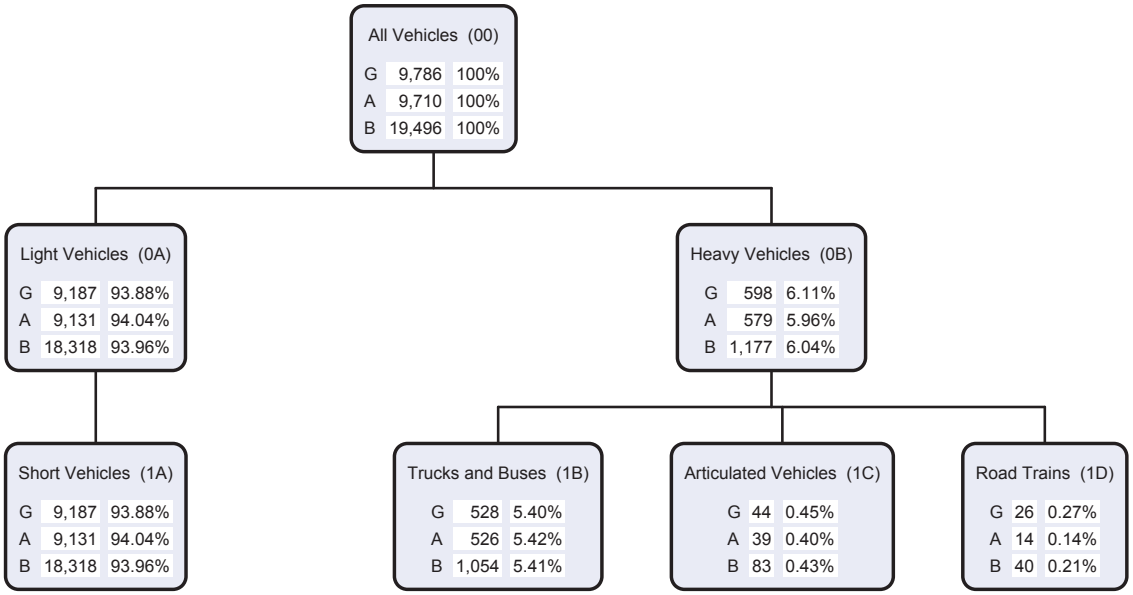
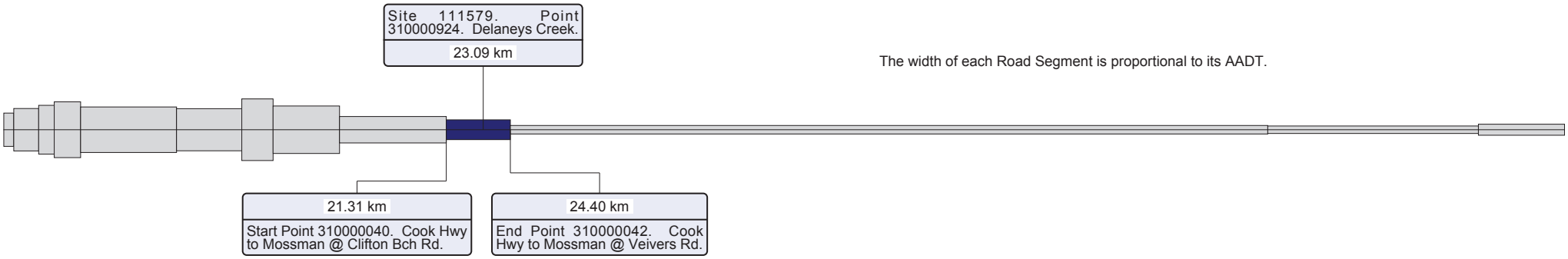
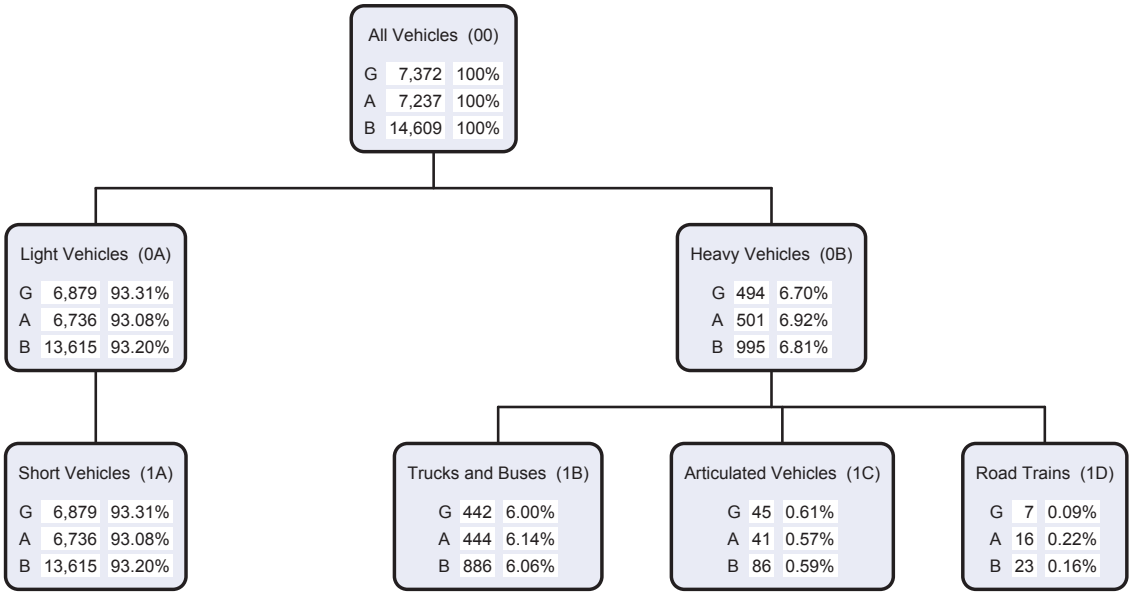


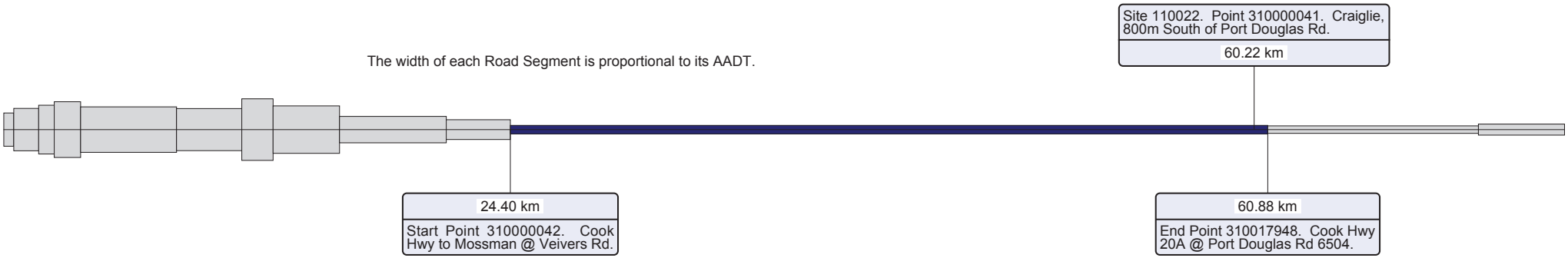


The width of each Road Segment is proportional to its AADT.

This report shows Annual Average Daily Traffic values (AADTs). Because the AADT values are converted to whole numbers, there will be occasional inaccuracies due to rounding. These inaccuracies are statistically insignificant.



The width of each Road Segment is proportional to its AADT.



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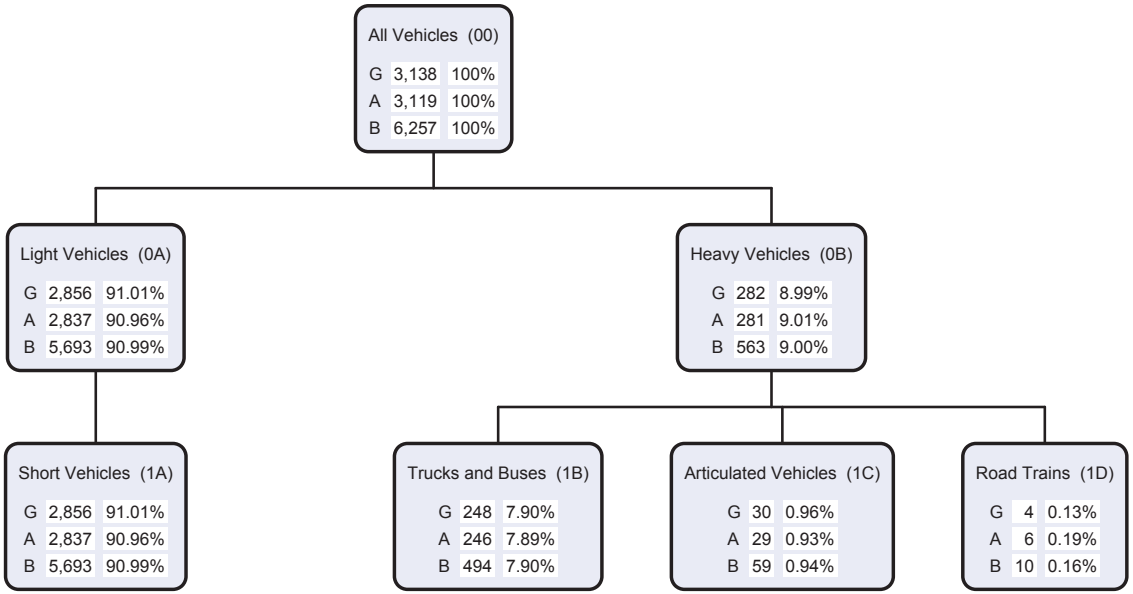
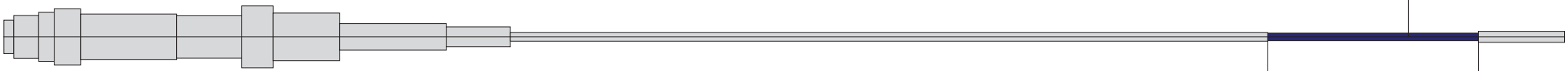


The width of each Road Segment is proportional to its AADT.



Site 111610. Point 310000956. WiM Site Mossman South.
67.65 km

60.88 km
Start Point 310017948. Cook Hwy 20A @ Port Douglas Rd 6504.

71.02 km
End Point 310000917.

This report shows Annual Average Daily Traffic values (AADTs). Because the AADT values are converted to whole numbers, there will be occasional inaccuracies due to rounding. These inaccuracies are statistically insignificant.

All Vehicles (00)		
G	2,763	100%
A	2,756	100%
B	5,519	100%

Light Vehicles (0A)		
G	2,548	92.22%
A	2,548	92.45%
B	5,096	92.34%

Heavy Vehicles (0B)		
G	215	7.78%
A	210	7.62%
B	425	7.70%

Short Vehicles (1A)		
G	2,548	92.22%
A	2,548	92.45%
B	5,096	92.34%

Trucks and Buses (1B)		
G	169	6.12%
A	162	5.88%
B	331	6.00%

Articulated Vehicles (1C)		
G	34	1.23%
A	36	1.31%
B	70	1.27%

Road Trains (1D)		
G	12	0.43%
A	12	0.44%
B	24	0.43%

Short 2-Axle Vehicles (2A)		
G	2,470	89.40%
A	2,466	89.48%
B	4,936	89.44%

Short Vehicles Towing (2B)		
G	78	2.82%
A	82	2.98%
B	160	2.90%

2-Axle Trucks and Buses (2C)		
G	147	5.32%
A	141	5.12%
B	288	5.22%

3-Axle Trucks and Buses (2D)		
G	20	0.72%
A	19	0.69%
B	39	0.71%

4-Axle Trucks (2E)		
G	2	0.07%
A	2	0.07%
B	4	0.07%

3-Axle Articulated (2F)		
G	18	0.65%
A	17	0.62%
B	35	0.63%

4-Axle Articulated (2G)		
G	2	0.07%
A	3	0.11%
B	5	0.09%

5-Axle Articulated (2H)		
G	1	0.04%
A	2	0.07%
B	3	0.05%

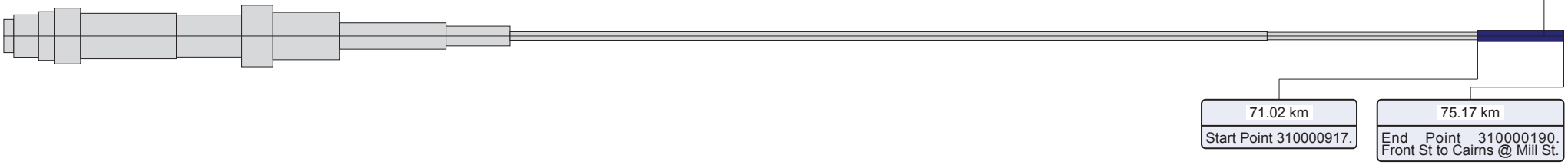
6-Axle Articulated (2I)		
G	13	0.47%
A	14	0.51%
B	27	0.49%

B Double (2J)		
G	12	0.43%
A	10	0.36%
B	22	0.40%

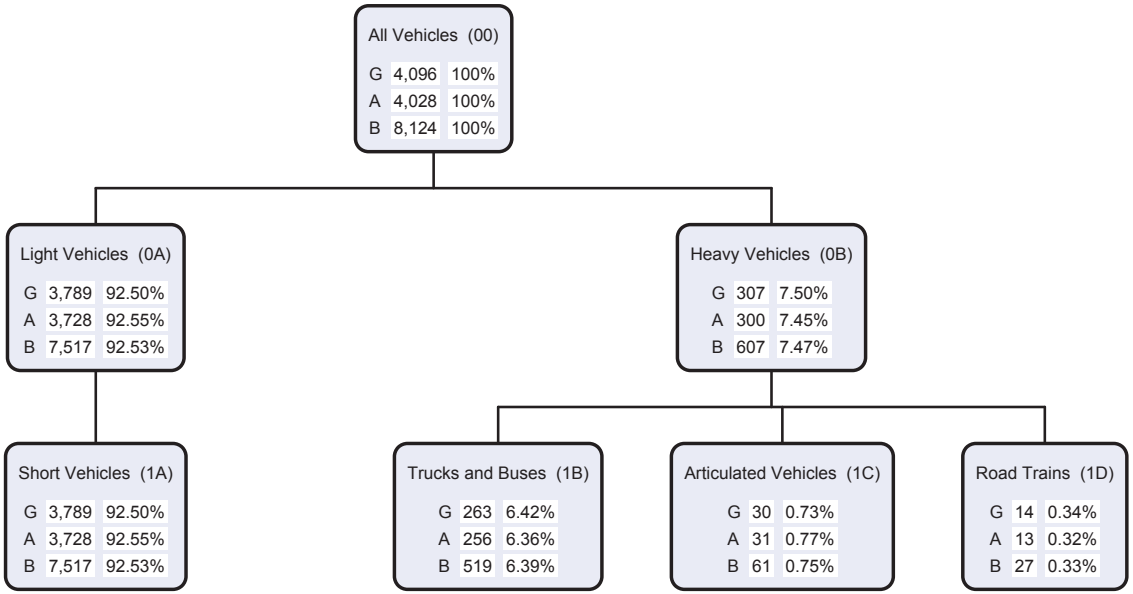
Double Road Trains (2K)		
G	0	0.00%
A	2	0.07%
B	2	0.04%

Triple Road Trains (2L)		
G	0	0%
A	0	0%
B	0	0%

The width of each Road Segment is proportional to its AADT.



This report shows Annual Average Daily Traffic values (AADTs). Because the AADT values are converted to whole numbers, there will be occasional inaccuracies due to rounding. These inaccuracies are statistically insignificant.



Report Notes for AADT Segment Analysis Report (Complete)

AADT Segment Report
Provides AADT Segment details for a Road Section together with the traffic flow data collected at the related Site. Traffic data is reported by the start and end Through Distance of the AADT Segments on each section of road. The road segments are represented diagrammatically with AADT data including:

AADT	by direction of traffic flow
VKT	Vehicle Kilometres Travelled
%VC	Percentage Vehicle Class as per the Austroads vehicle classification scheme

Annual Average Daily Traffic (AADT)
Annual Average Daily Traffic (AADT) is the number of vehicles passing a point on a road in a 24 hour period, averaged over a calendar year.

AADT Segment
Is a subdivision of a Road Section. The boundaries of an AADT Segment are it's Start Point and End Point (or Start and End Through Distance (TDist)) within the Road Section. These distances are measured in kilometres from the begining of the Road Section in Gazettal Direction. AADT Segments are determined by the traffic volume, collected at a count Site, located within the limits of each AADT Segment.

Annual Segment Growth (when displayed)
A percentage that represents the increase or decrease in AADT for the AADT Segment,using an exponential fit, calculated over a 1, 5 or 10 year period.

Area
For administration purposes the Department of Transport and Main Roads has divided Queensland into 12 Districts. The Area field in TSDM reports displays the District Name and Number.

District Name	District
Central West District	401
Darling Downs District	402
Far North District	403
Fitzroy District	404
Mackay/Whitsunday District	405
Metropolitian District	406
North Coast District	407
North West District	409
Northern District	408
South Coast District	410
South West District	411
Wide Bay/Burnett District	412

Data Year
The most recent year the traffic data was collected for this AADT Segment.

Gazettal Direction
The Gazettal Direction is the direction of the traffic flow. It can be easily recognised by referring to the name of the road eg. Road Section: 10A Brisbane - Gympie denotes that the gazettal direction is from Brisbane to Gympie.

G	Traffic flowing in Gazettal Direction
A	Traffic flowing against Gazettal Direction
B	The combined traffic flow in both Directions

Road Section
Is the Gazetted road from which the traffic data is collected. Each Road Section is given a code, allocated sequentially in Gazettal Direction. Larger roads are broken down into sections and identified by an ID code with a suffix for easier data collection and reporting (eg. 10A, 10B, 10C). Road Sections are then broken into AADT Segments which are determined by traffic volume.

Site
The physical location of a traffic counting device. Sites are located at a specified Through Distance along a Road Section.

Site TDist
The Through Distance in gazettal direction from the start of the Road Section at which the site is located.

Site Description
The description of the physical location of the traffic counting device.

Start and End Point
The unique identifier for the Through Distance along a Road Section.

Through Distance
The distance, in kilometres, from the beginning of the Road Section in Gazettal Direction.

Traffic Class
Is the 12 Austroads vehicle categories or classes into which vehicles are placed or binned. Traffic classes are formed in a hierarchical format.

Volume or All Vehicles
00 = 0A + 0B

Light Vehicles
0A = 1A
1A = 2A + 2B

Heavy Vehicles
0B = 1B + 1C + 1D
1B = 2C + 2D + 2E
1C = 2F + 2G + 2H + 2I
1D = 2J + 2K + 2L

The following classes are the categories for which data can be captured:

Volume
00 All vehicles.

2-Bin
0A Light vehicles
0B Heavy vehicles

4-Bin
1A Short vehicles
1B Truck or bus
1C Articulated vehicles
1D Road train

12-Bin
2A Short 2 axle vehicles
2B Short vehicles towing
2C 2 axle truck or bus
2D 3 axle truck or bus
2E 4 axle truck
2F 3 axle articulated vehicle
2G 4 axle articulated vehicle
2H 5 axle articulated vehicle
2I 6 axle articulated vehicle
2J B double
2K Double road train
2L Triple road train

Vehicle Kilometres Travelled (VKT)
Daily VKT is a measure of the traffic demand. It is calculated by the length of an AADT Segment in kilometres multiplied by its AADT. The yearly VKT is the daily VKT multiplied by 365 days.

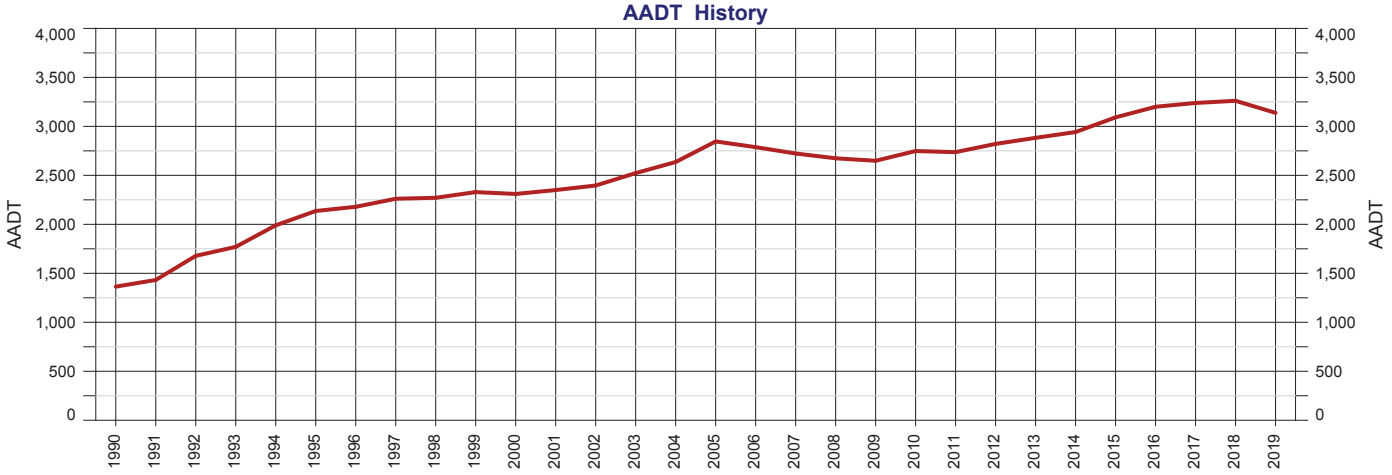
AADT Segment Summary - All Vehicles
The Total VKT can be used to gauge the demand on an entire Road Section.

AADT Segment Summary - Heavy Vehicles only
A blank field indicates that vehicle classification data was not collected for this AADT Segment.

Area	403 - Far North District
Road Section	20A - CAPTAIN COOK HIGHWAY (CAIRNS - MOSSMAN)
Site	110022 - Craiglie, 800m South of Port Douglas Rd
Thru Dist	60.22
Type	P - Permanent
Stream	T1 - Thru traffic in Lane 1 -in gazettal dirn

Year	2019	Growth last Year	-3.77%
AADT	3,138	Growth last 5 Yrs	0.40%
Avg Week Day	3,169	Growth last 10 Yrs	1.43%
Avg Weekend Day	3,012		

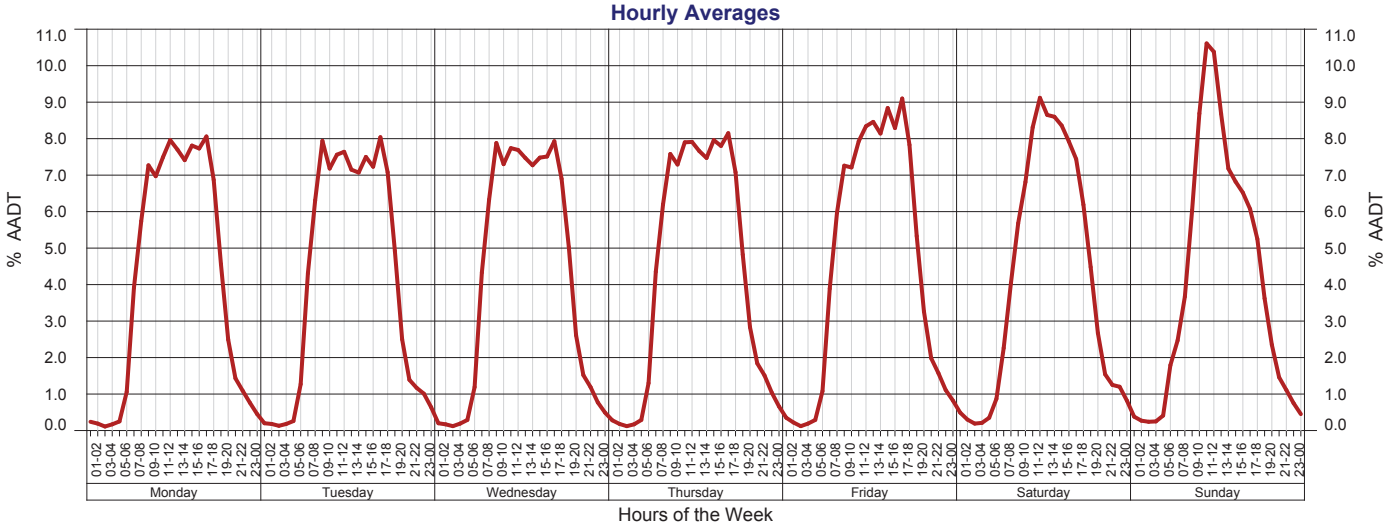
AADT History



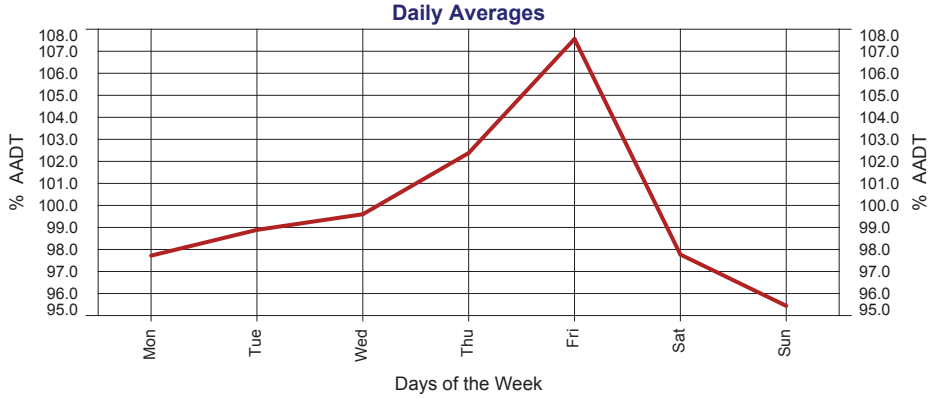
Year	AADT	1-Year Growth	5-Year Growth	10-Year Growth
2019	3,138	-3.77%	0.40%	1.43%
2018	3,261	0.68%	2.27%	2.25%
2017	3,239	1.22%	2.86%	2.31%
2016	3,200	3.49%	3.33%	2.18%
2015	3,092	5.10%	2.84%	1.64%
2014	2,942	2.05%	2.05%	1.06%
2013	2,883	2.20%	1.81%	0.99%
2012	2,821	3.07%	1.21%	1.01%
2011	2,737	-0.40%	0.11%	0.90%
2010	2,748	3.74%	-0.21%	1.30%
2009	2,649	-0.93%	-0.87%	1.04%
2008	2,674	-1.80%	0.11%	1.48%
2007	2,723	-2.33%	1.71%	2.02%
2006	2,788	-2.04%	3.42%	2.69%
2005	2,846	7.97%	4.92%	3.31%

Year	AADT	1-Year Growth	5-Year Growth	10-Year Growth
2004	2,636	4.48%	3.19%	2.61%
2003	2,523	5.30%	2.40%	2.63%
2002	2,396	1.96%	1.25%	2.59%
2001	2,350	1.73%	1.23%	3.34%
2000	2,310	-0.82%	1.31%	4.14%
1999	2,329	2.55%	2.61%	4.71%
1998	2,271	0.44%	3.79%	4.87%
1997	2,261	3.76%	5.61%	5.46%
1996	2,179	2.01%	7.48%	6.15%
1995	2,136	7.34%	9.54%	7.35%
1994	1,990	12.43%	7.54%	7.72%
1993	1,770	5.48%	4.48%	7.43%
1992	1,678	17.18%	3.80%	8.23%
1991	1,432	4.99%	2.25%	7.66%
1990	1,364	-15.59%	4.79%	8.56%

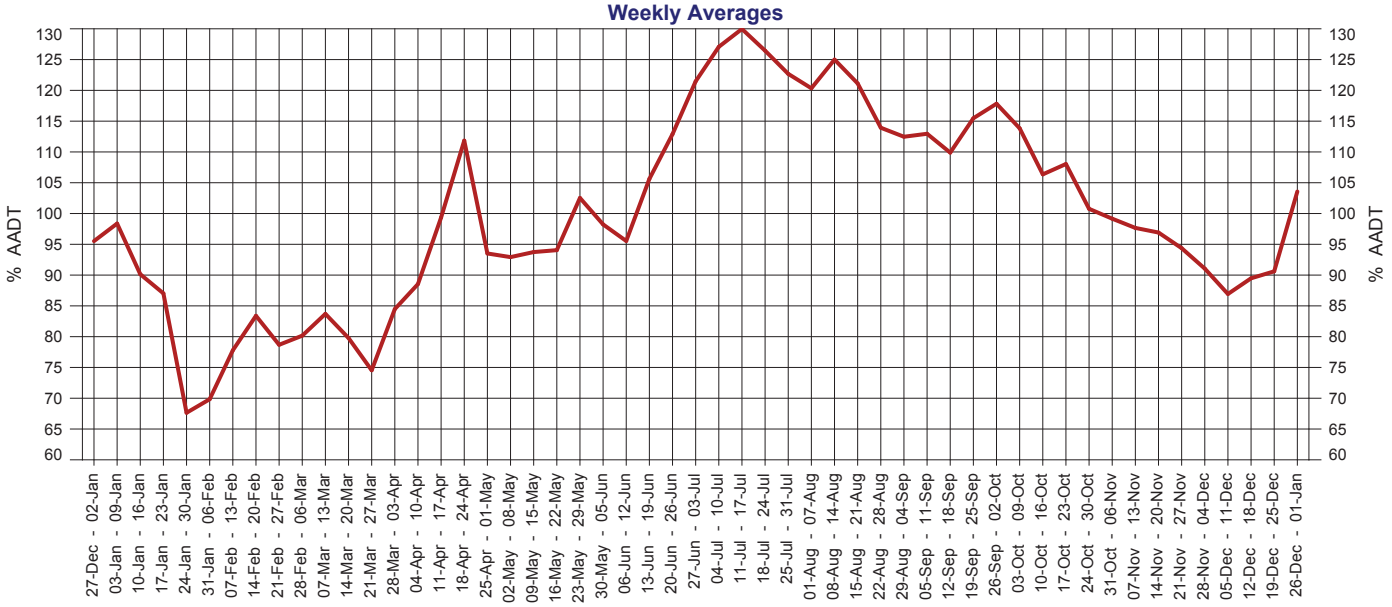
Hourly Averages



Daily Averages



Weekly Averages



2019 Calendar

January

M	T	W	T	F	S	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

February

M	T	W	T	F	S	S
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28			

March

M	T	W	T	F	S	S
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

April

M	T	W	T	F	S	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30					

May

M	T	W	T	F	S	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

June

M	T	W	T	F	S	S
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

July

M	T	W	T	F	S	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

August

M	T	W	T	F	S	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

September

M	T	W	T	F	S	S
30						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29

October

M	T	W	T	F	S	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

November

M	T	W	T	F	S	S
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	

December

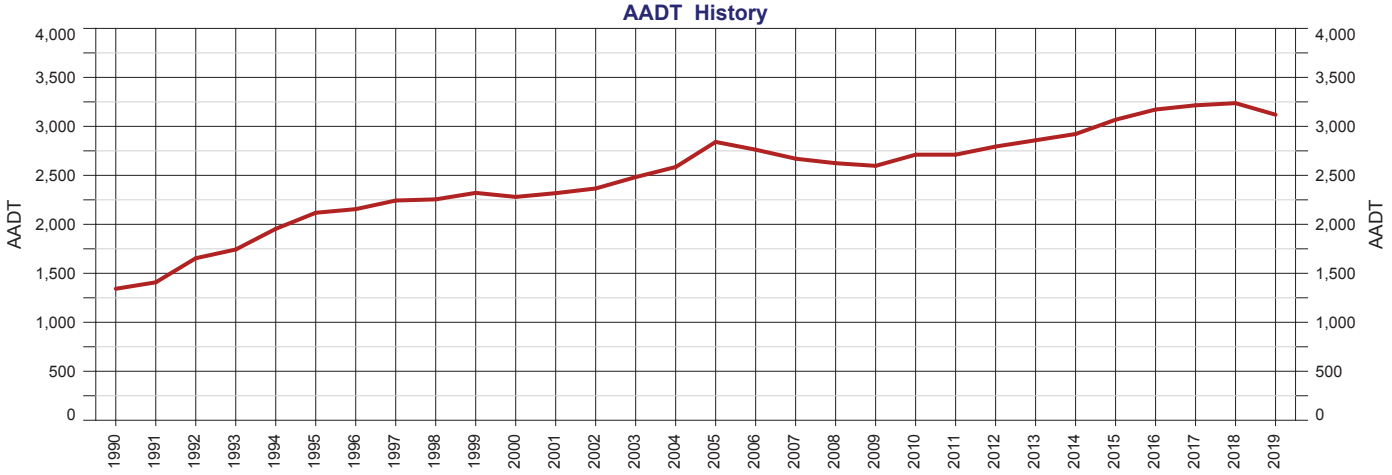
M	T	W	T	F	S	S
30	31					1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29

Days on which traffic data was collected.

Area	403 - Far North District
Road Section	20A - CAPTAIN COOK HIGHWAY (CAIRNS - MOSSMAN)
Site	110022 - Craiglie, 800m South of Port Douglas Rd
Thru Dist	60.22
Type	P - Permanent
Stream	T2 - Thru traffic in Lane 2 -against gazettal

Year	2019	Growth last Year	-3.65%
AADT	3,119	Growth last 5 Yrs	0.44%
Avg Week Day	3,119	Growth last 10 Yrs	1.51%
Avg Weekend Day	3,025		

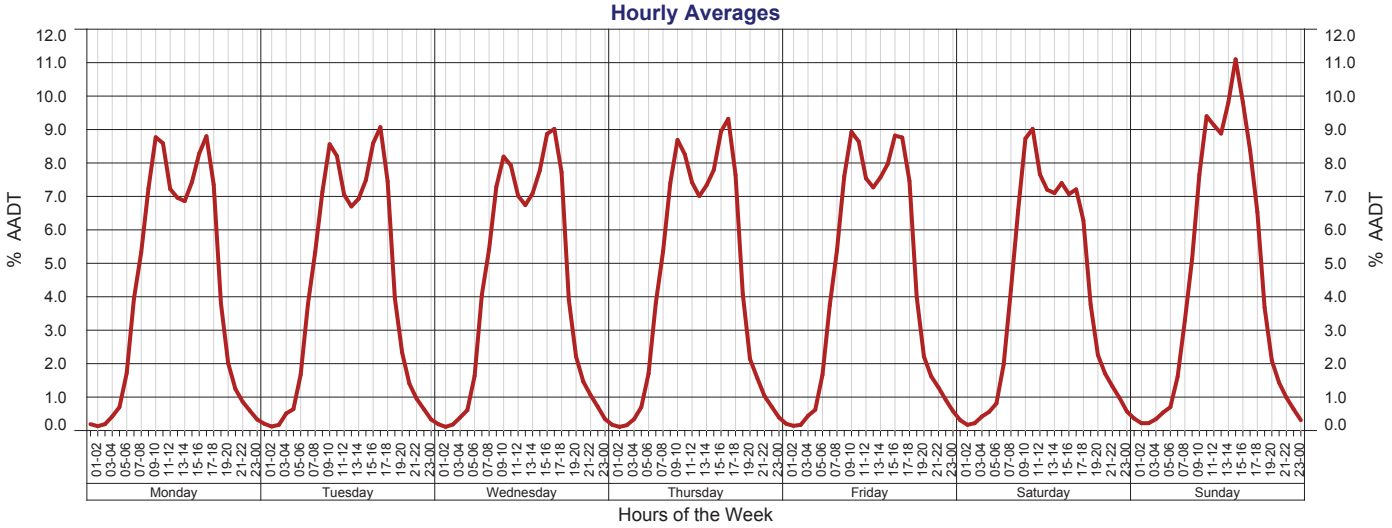
AADT History



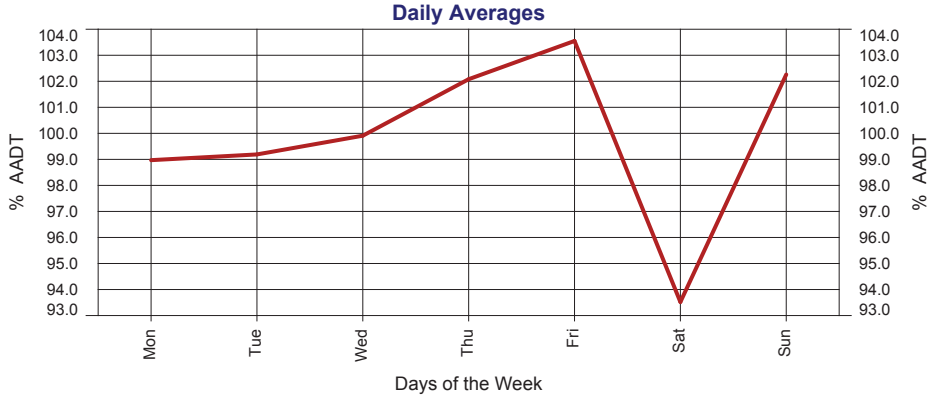
Year	AADT	1-Year Growth	5-Year Growth	10-Year Growth
2019	3,119	-3.65%	0.44%	1.51%
2018	3,237	0.68%	2.28%	2.33%
2017	3,215	1.36%	2.89%	2.41%
2016	3,172	3.39%	3.33%	2.26%
2015	3,068	5.00%	2.92%	1.70%
2014	2,922	2.24%	2.25%	1.16%
2013	2,858	2.29%	2.01%	1.07%
2012	2,794	3.06%	1.44%	1.07%
2011	2,711	0.00%	0.28%	0.97%
2010	2,711	4.39%	-0.28%	1.30%
2009	2,597	-1.03%	-1.06%	0.92%
2008	2,624	-1.72%	-0.04%	1.36%
2007	2,670	-3.33%	1.53%	1.88%
2006	2,762	-2.78%	3.55%	2.70%
2005	2,841	9.90%	5.27%	3.43%

Year	AADT	1-Year Growth	5-Year Growth	10-Year Growth
2004	2,585	4.15%	2.92%	2.48%
2003	2,482	4.90%	2.18%	2.56%
2002	2,366	2.07%	1.12%	2.58%
2001	2,318	1.67%	1.08%	3.34%
2000	2,280	-1.77%	1.18%	4.15%
1999	2,321	2.93%	2.85%	4.84%
1998	2,255	0.53%	3.98%	4.91%
1997	2,243	4.08%	5.80%	5.46%
1996	2,155	1.75%	7.61%	6.07%
1995	2,118	8.39%	9.77%	7.29%
1994	1,954	12.11%	7.32%	7.49%
1993	1,743	5.38%	4.23%	7.22%
1992	1,654	17.47%	3.49%	8.02%
1991	1,408	4.92%	1.81%	7.41%
1990	1,342	-16.96%	4.32%	8.31%

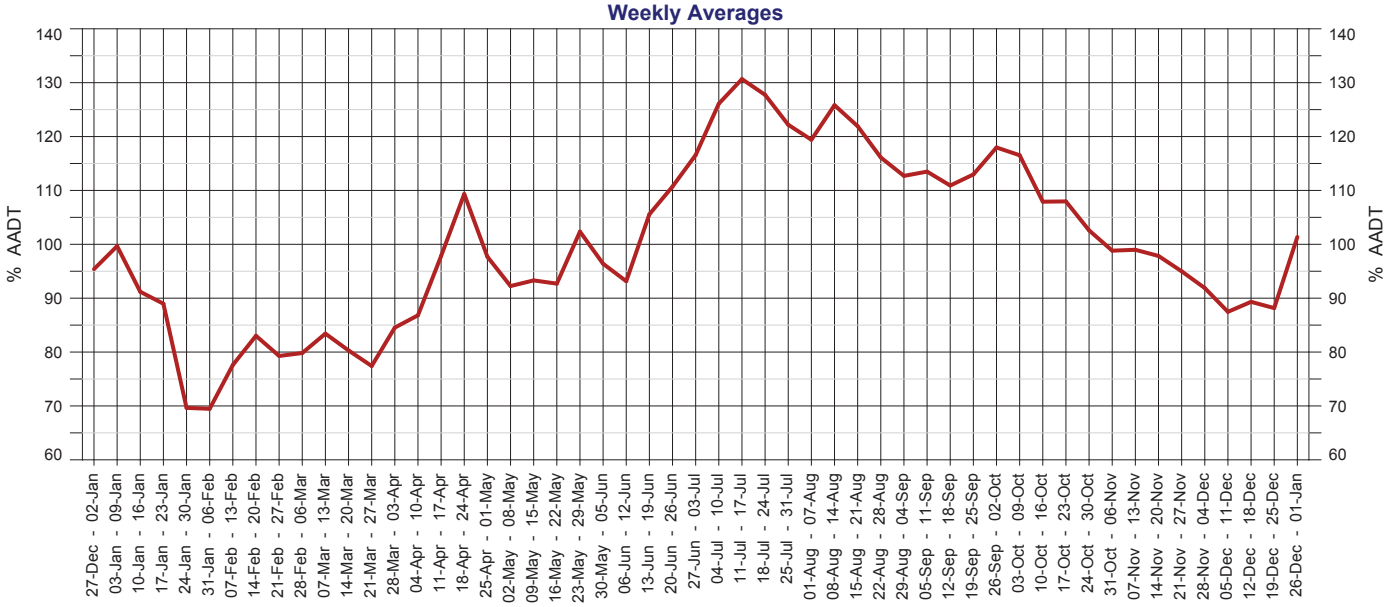
Hourly Averages



Daily Averages



Weekly Averages



2019 Calendar

January

M	T	W	T	F	S	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

February

M	T	W	T	F	S	S
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28			

March

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				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

April

M	T	W	T	F	S	S
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8	9	10	11	12	13	14
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22	23	24	25	26	27	28
29	30					

May

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6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

June

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					1	2
3	4	5	6	7	8	9
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17	18	19	20	21	22	23
24	25	26	27	28	29	30

July

M	T	W	T	F	S	S
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8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

August

M	T	W	T	F	S	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

September

M	T	W	T	F	S	S
30						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29

October

M	T	W	T	F	S	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

November

M	T	W	T	F	S	S
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	

December

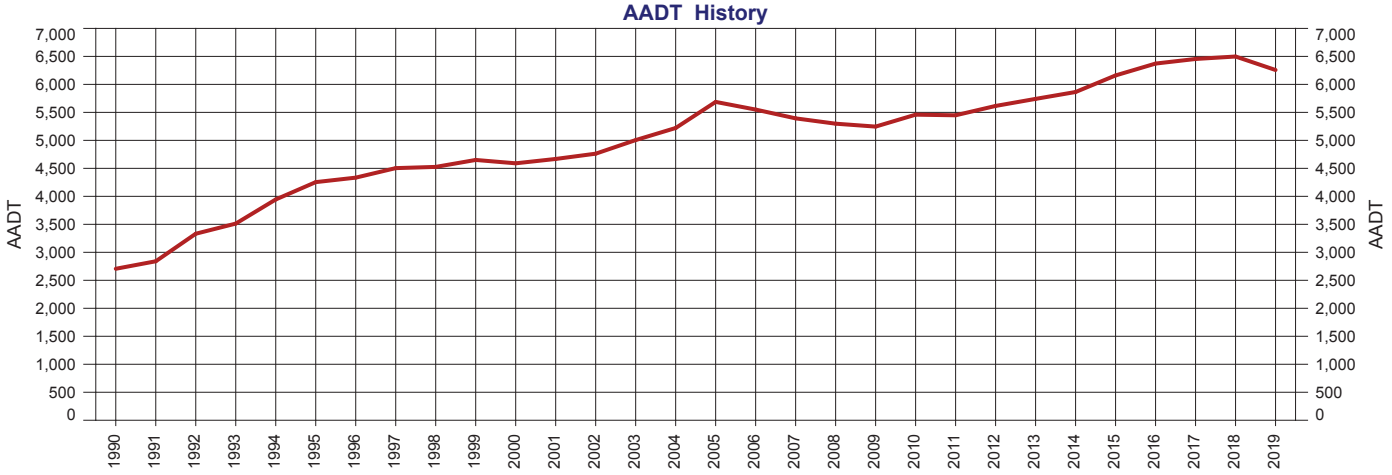
M	T	W	T	F	S	S
30	31					1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29

Days on which traffic data was collected.

Area	403 - Far North District
Road Section	20A - CAPTAIN COOK HIGHWAY (CAIRNS - MOSSMAN)
Site	110022 - Craiglie, 800m South of Port Douglas Rd
Thru Dist	60.22
Type	P - Permanent
Stream	TB - Bi-directional traffic flow

Year	2019	Growth last Year	-3.71%
AADT	6,257	Growth last 5 Yrs	0.42%
Avg Week Day	6,257	Growth last 10 Yrs	1.47%
Avg Weekend Day	6,069		

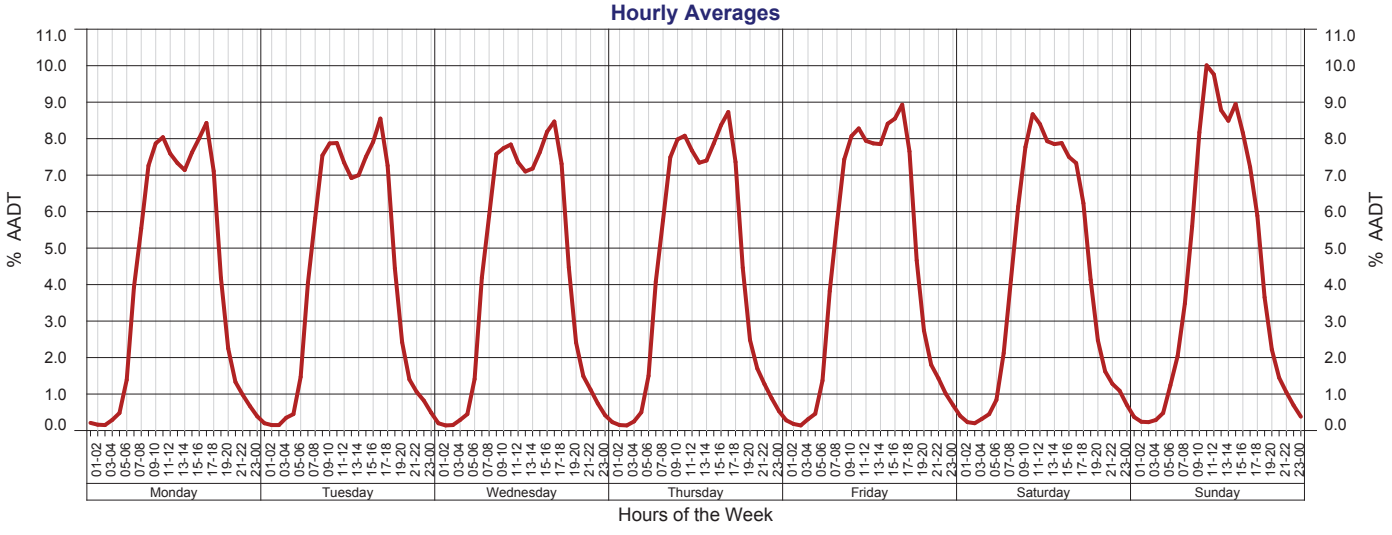
AADT History



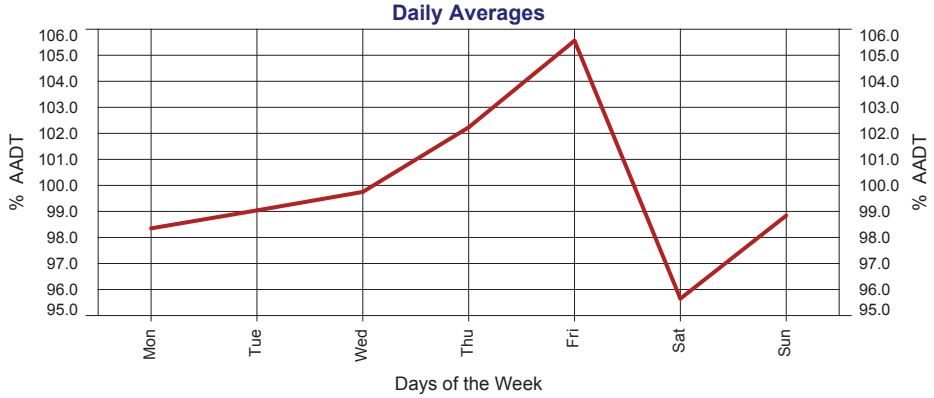
Year	AADT	1-Year Growth	5-Year Growth	10-Year Growth
2019	6,257	-3.71%	0.42%	1.47%
2018	6,498	0.68%	2.27%	2.29%
2017	6,454	1.29%	2.87%	2.36%
2016	6,372	3.44%	3.33%	2.22%
2015	6,160	5.05%	2.88%	1.67%
2014	5,864	2.14%	2.15%	1.11%
2013	5,741	2.24%	1.91%	1.03%
2012	5,615	3.07%	1.33%	1.04%
2011	5,448	-0.20%	0.19%	0.93%
2010	5,459	4.06%	-0.24%	1.30%
2009	5,246	-0.98%	-0.96%	0.98%
2008	5,298	-1.76%	0.04%	1.42%
2007	5,393	-2.83%	1.62%	1.95%
2006	5,550	-2.41%	3.49%	2.70%
2005	5,687	8.93%	5.10%	3.37%

Year	AADT	1-Year Growth	5-Year Growth	10-Year Growth
2004	5,221	4.32%	3.06%	2.55%
2003	5,005	5.10%	2.29%	2.60%
2002	4,762	2.01%	1.18%	2.58%
2001	4,668	1.70%	1.15%	3.34%
2000	4,590	-1.29%	1.25%	4.14%
1999	4,650	2.74%	2.73%	4.77%
1998	4,526	0.49%	3.88%	4.89%
1997	4,504	3.92%	5.71%	5.46%
1996	4,334	1.88%	7.55%	6.11%
1995	4,254	7.86%	9.66%	7.32%
1994	3,944	12.27%	7.43%	7.61%
1993	3,513	5.43%	4.35%	7.32%
1992	3,332	17.32%	3.64%	8.13%
1991	2,840	4.95%	2.03%	7.54%
1990	2,706	-16.27%	4.56%	8.44%

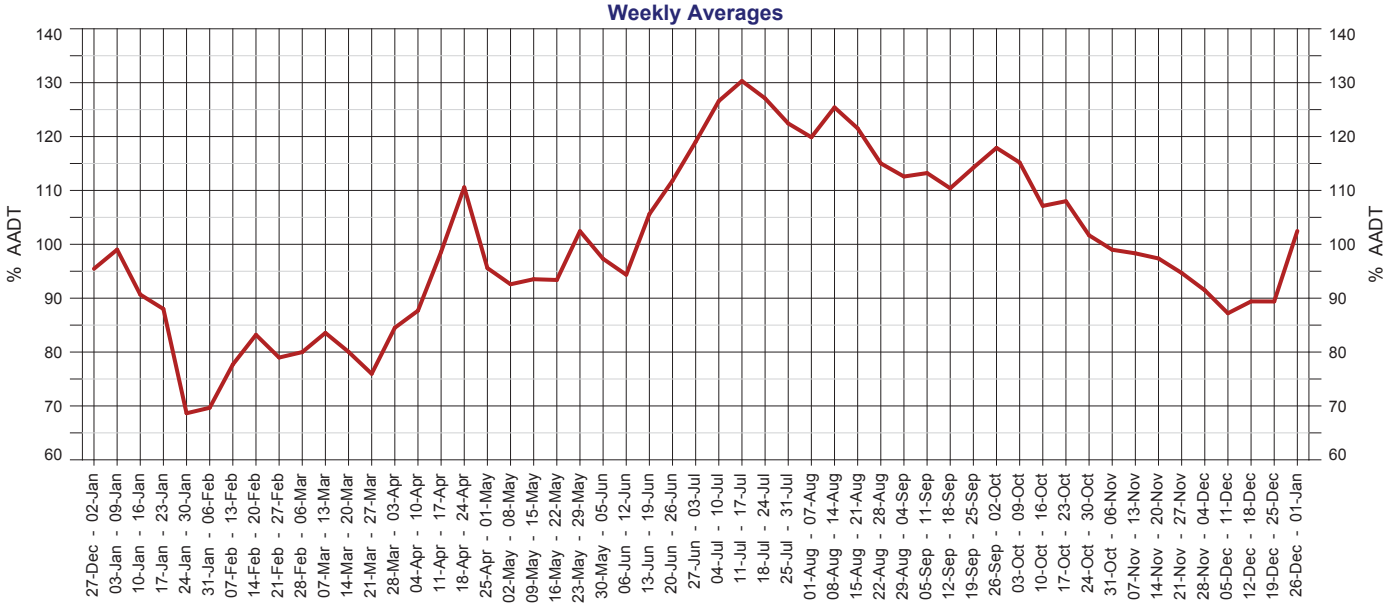
Hourly Averages



Daily Averages



Weekly Averages



2019 Calendar

January

M	T	W	T	F	S	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

February

M	T	W	T	F	S	S
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28			

March

M	T	W	T	F	S	S
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

April

M	T	W	T	F	S	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30					

May

M	T	W	T	F	S	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

June

M	T	W	T	F	S	S
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

July

M	T	W	T	F	S	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

August

M	T	W	T	F	S	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

September

M	T	W	T	F	S	S
30						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29

October

M	T	W	T	F	S	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

November

M	T	W	T	F	S	S
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	

December

M	T	W	T	F	S	S
30	31					1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29

Days on which traffic data was collected.

Annual Volume Report
Displays AADT history with hourly, daily and weekly patterns by Stream in addition to annual data for AADT figures with 1 year, 5 year and 10 year growth rates.

Annual Average Daily Traffic (AADT)
Annual Average Daily Traffic (AADT) is the number of vehicles passing a point on a road in a 24 hour period, averaged over a calendar year.

AADT History
Displays the years when traffic data was collected at this count site.

Area
For administration purposes the Department of Transport and Main Roads has divided Queensland into 12 Districts. The Area field in TSDM reports displays the District Name and Number.

District Name	District
Central West District	401
Darling Downs District	402
Far North District	403
Fitzroy District	404
Mackay/Whitsunday District	405
Metropolitian District	406
North Coast District	407
North West District	409
Northern District	408
South Coast District	410
South West District	411
Wide Bay/Burnett District	412

Avg Week Day
Average daily traffic volume during the week days, Monday to Friday.

Avg Weekend Day
Average daily traffic volume during the weekend.

Calendar
Days on which traffic data was collected are highlighted in green.

Gazettal Direction
Is the direction of the traffic flow. It can be easily recognised by referring to the name of the road eg. Road Section: 10A Brisbane - Gympie denotes that the gazettal direction is from Brisbane to Gympie.

Growth Percentage
Represents the increase or decrease in AADT, using a exponential fit over the previous 1, 5 or 10 year period.

Hour, Day & Week Averages
The amount of traffic on the road network varies depending on the time of day, the day of the week and the week of the year. The ebb and flow of the volume of traffic travelling through a site over a period of time forms a pattern. The Hour, Day and Week Averages are used in the calculation of AADT.

Road Section
Is the Gazetted road from which the traffic data is collected. Each Road Section is given a code, allocated sequentially in Gazettal Direction. Larger roads are broken down into sections and identified by an ID code with a suffix for easier data collection and reporting (eg. 10A, 10B, 10C). Road Sections are then broken into AADT Segments which are determined by traffic volume.

Site
The physical location of a traffic counting device. Sites are located at a specified Through Distance along a Road Section.

Stream or Site Stream
The lane number in which the vehicles are travelling.

TB	Traffic flow in both directions
TG	Traffic flow in gazettal direction
TA	Traffic flow against gazettal direction
T1, T3, T5, T7...	Traffic flow in gazettal direction at lane level
T2, T4, T6, T8...	Traffic flow against gazettal direction at lane level

Thru Dist or TDist
The distance from the beginning of the Road Section, in kilometres.

Type
There are two types of traffic counting sites, Permanent and Coverage. Permanent means the traffic counting device is in place 24/7. Coverage means the traffic counting device is in place for a specified period of time.

Year
Current year or years chosen. A separate report will be produced for each year selected.

Appendix F – Detailed Breakdown of Traffic Volume Generation

	Movement assumptions								AM Peak								PM Peak							
User / Area and Assumptions	Total type	Peak Hr Rate (RTA or Assumed)	No. peak hour trips	Peak hour split assumptions	Percentage assumption	Movements	AM Peak Movement Distribution	PM Peak Movement Distribution	IN				Out				IN				Out			
									Left		Right		Left		Right		Left		Right		Left		Right	
									%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.
Hotel 8 x Family Room 131 Single Rooms 21 Other Rooms (JS, KS, PWD)	160	0.5	80	25% arrive to check in AM peak	25%	20	80% right in 20% left in		80%	16	20%	4												
				25% exit to go on day trip in AM peak	25%	20	70% right out 30% left out						30%	6	70%	14								
				25% exit to check out in PM peak	25%	20		80% left out 20% right out													80%	16	20%	4
				25% arrive back from day trip in PM peak	25%	20		70% left in 30% right in									70%	14	30%	6				
Hotel TOTAL										16		4		6		14		14		6		16		4
Residential 30 x Detached dwellings Low-Med density	30	0.6	18	50% exit in AM peak	50%	9	70% left out 30% right out						70%	6	30%	3								
				50% enter in PM peak	50%	9		70% right in 30% left in									30%	3	70%	6				
Residential TOTAL										0		0		6.3		2.7		2.7		6.3		0		0
Villas 50 Villas	50	0.5	25	50% exit in AM peak	50%	12.5	50% left out 50% right out						50%	6	50%	6								
				50% enter in PM peak	50%	12.5		50% left in 50% right out									50%	6	50%	6				
Villas TOTAL										0		0		6.25		6.25		6.25		6.25		0		0
Outdoor Recreation Facilities																								
160 visitor carparks (50 and 80 recreational patrons at maximum - 80% carpark for recreational facilities) 130 carparks dedicated to rec. Assume 85% capacity of carpark at middle of the day (off peak) Assume 50% capacity of carpark in both peak hours	130	0.5	65	50% enter in AM peak	50%	32.5	40% left in 60% right in		40%	13	60%	20												
				50% leave in PM peak	50%	32.5		40% right out 60% left out													60%	20	40%	13
Outdoor Recreation Facilities TOTAL										13		20		0		0		0		0		20		13
Retail																								
Outlet 1 80 pax Casual visitors 60% Assume casual visitor peak hour rate 0.5	48	0.1	4.8	50% arrive in AM peak	50%	2	70% left in 30% right in		70%	2	30%	1												
				50% exit in PM peak	50%	2	70% right out 30% left out														30%	1	70%	2
Outlet 2 200 pax Casual visitors 70% Assume casual visitor peak hour rate 0.5	140	0.1	14	60% arrive in AM peak	60%	8.4	70% left in 30% right in		70%	6	30%	3												
				40% exit in PM peak	40%	5.6		70% right out 30% left out													30%	2	70%	4
Retail TOTAL										8		3		0		0		0		0		1		2
Staff - assume one staff member per vehicle																								
Surf operations - 10 One shift/day Assume rate of 80% total in peak hour	10	0.8	8	50% arrive in AM peak 50% exit in PM peak	50%	4	50% left in 50% right in	50% left in 50% right in	50%	2	50%	2									50%	2	50%	2

Surf shop - 4 One shift/day Assume rate of 80% total in peak hour	4	0.8	3.2	50% arrive in AM peak 50% exit in PM peak	50%	2	50% left in 50% right in	50% left in 50% right in	50%	1	50%	1								50%	1	50%	1
Other retail - 8 One shift/day Assume rate of 80% total in peak hour	8	0.8	6.4	50% arrive in AM peak 50% exit in PM peak	50%	3	50% left in 50% right in	50% left in 50% right in	50%	2	50%	2								50%	2	50%	2
Hotel - 50 Two shifts / day Assume rate of 50% total in peak hour as half of staff will arrive/exit in off peak	100	0.5	50	50% arrive in AM peak 50% exit in PM peak	50%	25	50% left in 50% right in	50% left in 50% right in	50%	13	50%	13								50%	13	50%	13
Restaurants - 20 Two shifts / day Assume rate of 50% total in peak hour as half of staff will arrive/exit in off peak	40	0.5	20	50% arrive in AM peak 50% exit in PM peak	50%	10	50% left in 50% right in	50% left in 50% right in	50%	5	50%	5								50%	5	50%	5
Staff TOTAL										22		22		0		0		0			22		22
Hotel Bar/Alfresco/Dining																							
Hotel bar 67 pax 20% Casual visitor Assume 85% capacity for traffic modelling Assume casual visitor peak hour rate 0.4	11.39	0.40	4.556	100% arrive in PM peak	100%	5	50% left out 50% right out													50%	2	50%	2
Hotel Alfesco 78 pax 20% Casual visitor Assume 85% capacity for traffic modelling Assume casual visitor peak hour rate 0.4	13.26	0.40	5.304	100% arrive in PM peak	100%	5	50% left out 50% right out													50%	3	50%	3
Hotel dining 97 pax 20% Casual visitor Assume 85% capacity for traffic modelling Assume casual visitor peak hour rate 0.4	16.49	0.40	6.596	100% arrive in PM peak	100%	7	50% left out 50% right out													50%	3	50%	3
Hotel Bar/Alfresco/Dining TOTAL										0		0		0		0		0			8.228		8.228
Food and Beverages																							
Surf Deck and Kiosk Deck 381 pax 60% Casual visitors Assume 85% capacity for traffic modelling Assume casual visitor peak hour rate 0.05	194.31	0.05	9.7155	50% enter in PM peak	50%	5		50% left in 50% right in									50%	2	50%	2			
				50% exit in PM peak	50%	5		50% left out 50% right out												50%	2	50%	2
VIP Lounge Areas 44 pax 50% Casual visitors Assume 85% capacity for traffic modelling Assume casual visitor peak hour rate 0.1	18.7	0.1	1.87	100% arrive in PM peak	100%	2	70% left in 30% right in										70%	1	30%	1			
Wave Bar 48 pax Assume 85% capacity for traffic modelling 80% Casual visitors Assume casual visitor peak hour rate 0.5	32.64	0.5	16.32	50% enter in PM peak	50%	8		50% left in 50% right in									50%	4	50%	4			
				50% exit in PM peak	50%	8		50% left out 50% right out												50%	4	50%	4
Food and Beverages TOTAL										0		0		0		0		8		7	1	2	1	2
Event / Function																							

Function spaces (incl. VIP func, Ext func, Func 1-4, Level 2 Func) 507 pax 20% Casual Visitor Assume 85% capacity for traffic modelling Assume 2 person per vehicle Assume casual visitor peak hour rate 0.1	43.095	0.1	4.3095	100% arrive in PM peak	100%	4	40% left in 60% right in										40%	1.72	60%	2.59				
Event/Function TOTAL										0		0		0		0		1.7238		2.5857		0		0
OVERALL TOTAL	1049.885		343.071							**58.4600**		**48.6400**		**18.5500**		**22.9500**		**32.4917**		**28.2056**		**68.7769**		**51.2369**

Movement Assumptions											
User/Area	**Room/Type** **Trips per day**	**No. rooms** **No. trips**	**Assumption**	**Percentage assumption**	**No. movements**	**Assumption about movement**	**Percentage assumption**	**Total movements**	**AM Peak movement**	**PM Peak movement**	**Additional assumptions to determine movements**
Residential											
30 x detached dwellings Mix of residential houses and townhouses	4 trips per dwelling	120	50% of total trips on max day	50%	60	40% exit in AM peak	40%	24	70% left out 30% right out		-Residents likely being older/retired therefore less movement -Also likely less movement due to remoteness -Residents are going South to Cairns for work (higher proportion)
						40% enter in PM peak	40%	24		70% right in 30% left in	
Villas											
50 Villas Minimum 1 x week stay	1 trip per Villa	50	50% trips occur in peak	40%	20	50% exit in AM peak	50%	10	50% left out 50% right out		Assume both movements in development peak time
						50% enter in PM peak	50%	10		50% left in 50% right out	
Outdoor Recreation Facilities											
50 Patrons - Surf park 80 Patrons - Waterpark Typically 3 hour stay	1 x vehicle per patron	130	50% arrive in morning	50%	65	40% enter in AM peak	40%	26	40% left in 60% right in		
			50% arrive in afternoon	50%	65	40% leave in PM peak	40%	26		40% right out 60% left out	

Movement Assumptions								
User/Area	**Trips per day**	**No. trips/movements**	**Assumption about movement**	**Percentage assumption**	**Total movements**	**AM Peak movement assumption**	**PM Peak movement assumption**	**Additional assumptions to determine movements**
Retail								
Outlet 1 80 pax Casual visitors 60%	1 x vehicle per patron	48	5% arrive in AM peak	5%	2	70% left in 30% right in	NA	- Casual visitors outside of development guests/residents using facilities other than water facilities
Outlet 2 200 pax Casual visitors 70%	1 x vehicle per patron	140	5% arrive in AM peak	5%	7	70% left in 30% right in	NA	-All shoppers in own vehicle 5 % arrive in AM peak as most retail /shopping done in the morning or otherwise accounted for in daily visitors using recreational faciltiies - South shoppers utilise shopping in south, long way to go, less likely - North shoppers have less shopping facilities, shorter way to go, more likely
Staff								
Surf operations - 10 One shift/day	1 x vehicle per patron	10	50% arrive in AM and 50% exit in PM	50%	0	50% left in 50% right in	50% left in 50% right in	
Surf shop - 4 One shift/day	1 x vehicle per patron	4	50% arrive in AM peak and 50% exit in PM	20%	0	50% left in 50% right in	50% left in 50% right in	
Other retail - 8 One shift/day	1 x vehicle per patron	8	50% arrive in AM peak and 50% exit in PM	40%	0	50% left in 50% right in	50% left in 50% right in	
Hotel - 50 Two shifts / day	1 x vehicle per patron	100	30% arrive in AM peak and 30% exit in PM peak	25%	0	50% left in 50% right in	50% left in 50% right in	
Restaurants - 20 Two shifts / day	1 x vehicle per patron	40	30% arrive in AM peak and 30% exit in PM peak	30%	0	50% left in 50% right in	50% left in 50% right in	
Food and Beverages								
Surf Deck and Kiosk Deck 381 pax 60% Casual visitors	1 x vehicle per 2 casual visitor	114	5% arrive in AM Peak and PM Peak	5%	0	70% left in 30% right in	70% left in 30% right in	- People travelling from the South utilise dining/entertainment facilities in the South and won't travel a long way to go to dinner so are less likely to go. - People travelling from the North have less dining/entertainment facilities and it's a shorter way to go so more likely.
VIP Lounge Areas 44 pax 50% Casual visitors	1 x vehicle per 2 casual visitor	11	20 % arrive in PM peak	20%	0	70% left in 30% right in	NA	
Wave Bar 48 pax 80% Casual visitors	1 x vehicle per 2 casual visitor	19	10% arrive in PM peak	10%	0	70% left in 30% right in	NA	
Event / Function								
Function spaces (incl. VIP func, Ext func, Func 1-4, Level 2 Func) 507 pax 20% Casual Visitor	1 x vehicle per 2 casual visitor	51	10% arrive in PM peak	10%	0		40% left in 60% right in	Assuming South will have less draw as planned functions more likely to be made from south

Movement Assumptions								
User/Area	**Room/Type** **Trips per day**	**No. rooms** **No. trips**	**Total**	**Assumption about movement**	**Percentage assumption**	**Total movements**	**Peak Movement Distribution**	**Additional assumptions to determine movements**
Hotel Bar/Alfresco/Dining								
Hotel bar 67 pax 20% Casual visitor	1 x vehicle per 2 casual visitor	7		10% exit in PM peak	10%	2	50% left out 50% right out	Assume all arrive via own vehicle but at least 2 people per vehicle
Hotel Alfesco 78 pax 20% Casual visitor	1 x vehicle per 2 casual visitor	8	24	50% arrive in PM peak	50%	12	50% left out 50% right out	
Hotel dining 97 pax 20% Casual visitor	1 x vehicle per 2 casual visitor	10		10% exit in PM peak	10%	2	50% left out 50% right out	
				50% arrive in PM peak	50%	12	50% left out 50% right out	

Movement Assumptions												
User/Area	**Room/Type** **Trips per day**	**No. rooms** **No. trips**	**Assumption**	**Percentage assumption**	**No. movements**	**Total**	**Assumption about movement**	**Percentage assumption**	**Total movements**	**AM Peak movement**	**PM Peak movement**	**Additional assumptions to determine movements**
Hotel	Family	8	100% rooms have own vehicle	100%	8	160	40% arrive to check in AM peak	30%	48	80% right in 20% left in		- Vehicles are arriving to check in in development AM Peak - Vehicles are exiting for a day trip outside of development in development - Vehicles are exiting to check out - in development PM Peak - Vehicles are entering from day trip or other in development PM Peak
	Single Room 61 x Level 01 70 x Level 02	131	50% rooms have own vehicle	50%	66		20% exit to go on day trip in AM peak	20%	32	70% right out 30% left out		
			40% rooms use taxi/uber	40%	52		40% exit to check out in PM peak	30%	48		80% left out 20% right out	
			10% rooms use bus/shuttle	10%	13		20% arrive back from day trip in PM peak	20%	32		70% left in 30% right in	
	Other rooms (JS, KS, PWD) 10 x Level 01 11 x Level 02	21	50% rooms use own vehicle	50%	11							
			50% rooms use uber/taxi	50%	11							

GHD

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12544036-25165-5/\\ghdnet\ghd\AU\Cairns\Projects\42\12544036\Tech\Design\Traffic\TIA Report and Appendices\12544036-0-REP_Traffic Impact Assessment.1.docx

Document Status

Revision	Author	Reviewer		Approved for Issue		
		Name	Signature	Name	Signature	Date
0	G Whittaker	D.Trotter P.Flannagan	D.Trotter* P.Flannagan*	P.Flannagan	P.Flannagan*	16/03/2021
1	G Whittaker	P.Flannagan	P.Flannagan*	P.Flannagan	P.Flannagan*	20/10//2021

www.ghd.com

Appendix U – **TITLING ADVICE – NORTHBREAK PORT DOUGLAS.**

McAndrew
LAW

Our Ref: JDM:2021/1467

18 October 2021

Graben Pty Ltd
5640 Captain Cook Highway
CRAIGLIE QLD 4877

Dear David

Titling advice - NorthBreak Port Douglas

You have requested advice on the ideal titling structure for the NorthBreak Port Douglas development. The purpose of the advice is to establish the structure for your existing development application in response to Council's request for information.

Background on titling options

Any titling structure is a balance between various competing factors, including:

1. simplicity and market acceptance;

2. flexibility of development timing and staging;

3. appropriate sharing of costs and facilities; and

4. maximising the value and market appeal of each component of the development.

Our recommended titling structure focuses on simplicity/value maximisation, while still ensuring the other aspects are appropriately dealt with. That is to say, there are other structure we could recommend if you were primarily driven by another factor, such as ensuring more control over cost sharing. Let us know if this is the case.

Separation of residential and non-residential components

The development has a large focus on the non-residential components. This means it is important to ensure an appropriate titling structure that accounts for this. For this reason, we believe it is appropriate that the residential and non-residential components do not form part of a common principal body corporate. A building management statement would be the most appropriate mechanism to link any facility, access and cost sharing between these precincts.

Another benefit of this structure is that it allows more flexibility for the balance residential lot before it is developed. This is preferably over it forming part of a principal body corporate or being a lot outside the scheme with a temporary access arrangement in place.

Car parking

We understand that the car parking to the South of the site will be shared between certain non-residential lots. The simplest structure to deal with the car parking if this is the case is by way of exclusive use allocations (if certain car parks are allocated to certain parts of the development) or simply having them as common property in a principal body corporate (if they are to be shared amongst all lots in the body corporate).

Structure of non-residential components

In the interests of keeping the structure simple and easily understood by the market, a layered body corporate scheme is likely the best structure for the non-residential components of the development. This structure allows for the sharing of facilities, access and cost without the complexity of a second (or more) building management statement.

While further building management statements would potentially allow lots that are not in a body corporate at all, we believe the complexity of the building management statement/s would outweigh the benefits of the lots not being in a body corporate.

It will be extremely important to properly consider the lot entitlements if a layered body corporate is chosen for the non-residential components as they influence the cost sharing. Your body corporate advisor will be able to assist with this at the appropriate time.

Under a layered scheme, you would then have the flexibility to decide whether each building has a subsidiary body corporate of its own or potentially some volumetric lots that do not form part of a subsidiary body corporate.

Hotel precinct

Where the hotel precinct forms part of a subsidiary body corporate, we expect this would be a staged scheme. This would allow for the construction of one tower before the other if desired.

Alternatively, the two hotel towers could form their own lots (with or without body corporates). This will depend on the structure of the hotel and whether it is owner-operated or not. A subsidiary body corporate allows for both options, where no body corporate does not.

Wave park precinct

We expect the wave park precinct would be a lot within the principal body corporate. We do not expect the need for a further subsidiary body corporate.

Surf camp precinct

Further information is required to determine the best structure for the surf camp precinct. Depending on the level of sharing of amenities with the hotel and wave park precincts, it may be an option for this lot to be outside of a body corporate and only part of the master building management statement, similar to the short-term accommodation precinct.

Short term accommodation precinct

It is expected that this will be a balance development lot following the development contemplated by the current application. Based on your instructions, a further development approval will be required for the development of this component. Given this, we do not believe further titling advice is required for this precinct, however we do comment that it could likely be further developed by way of a staged body corporate or alternatively, a number of stand-alone body corporate. Further advice can be given on this at the appropriate time.

White lots

There are areas shown as white on the master plan. These will need to be included within one of the precincts lots or alternatively, be their own lot/s linked in by way of a body corporate or building management statement.

Balance land

As a starting point, we expect that all of the balance land (including helipads, tidal protection area, water reservoir etc) forms part of the principal body corporate common property. Where balance land is to be used in its own right or exclusively by one precinct, then another structure may be appropriate. Let us know if this is the case.

Structure diagram

The proposed structure is shown in a diagram annexed to this letter.

Moving forward

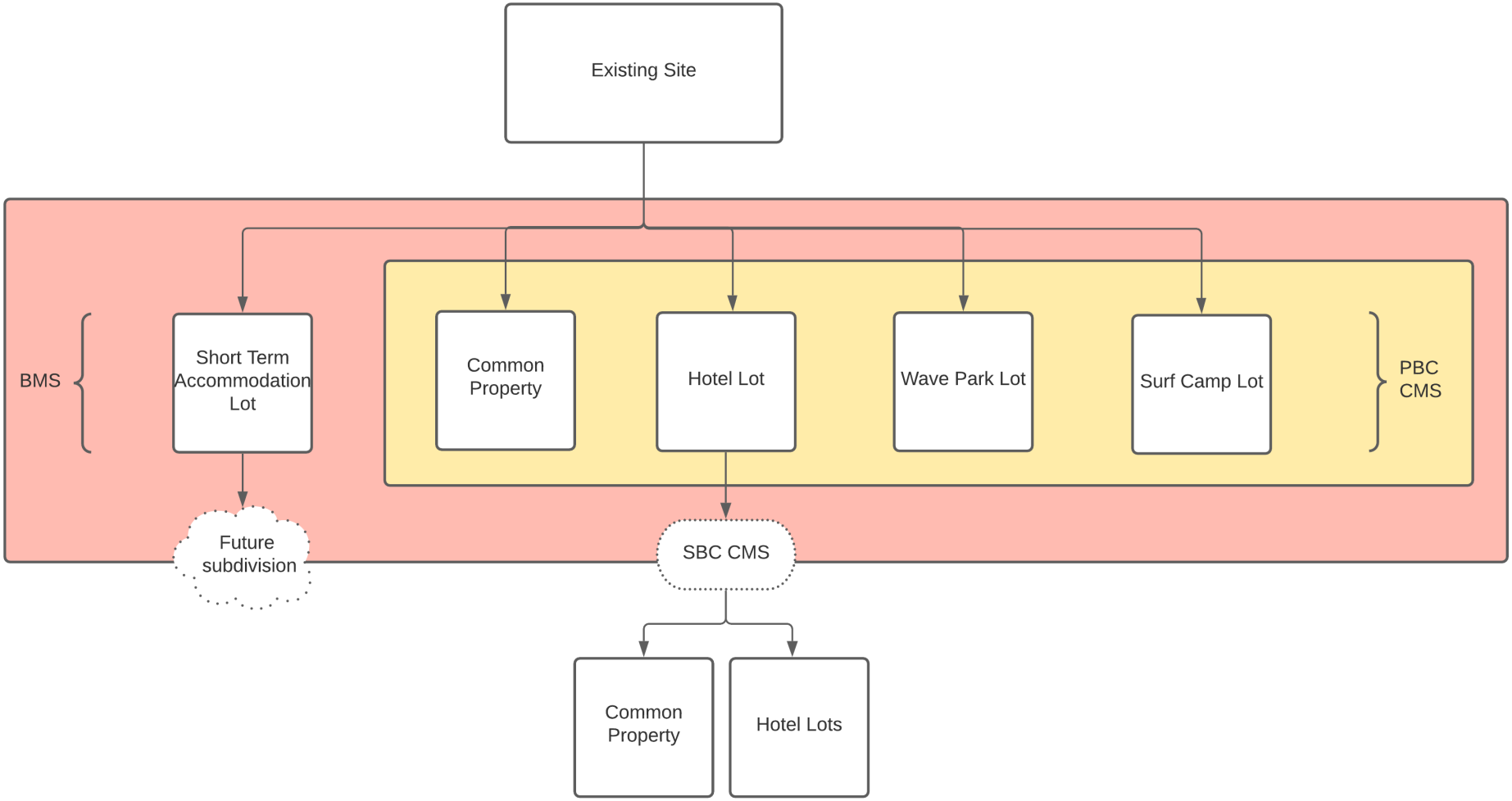
Let us know if you have any further feedback on the proposed titling structure. Also let us know if Council would like anything further in this regard.

Yours faithfully
McAndrew Law Pty Ltd

Joel McAndrew

McAndrew
LAW

Annexure
Structure Diagram



Appendix V – **WATER AND SEWER SYSTEMS**

H2O consultants

Cairns: 07 4032 1468 | 15/38-42 Pease Street, Cairns, Qld 4870
Townsville: 07 4426 1826 | 4/1 Kalynda Parade, Townsville, Qld 4817
Email: admin@h2oconsultants.com.au
www.h2oconsultants.com.au

24th August 2021

Hunt Design
Po Box 170
Port Douglas Qld 4873

Att: Jarrod Ryan
Re: Northbreak Wave Park
Council DA RFI's

In response to the RFI's issued by Council as part of the Development Approval, please find below our answers.

6. Provide water demands for the potable water requirements for each element of the development. The demands must be in accordance with FNQROC unless substantiated by appropriate detailed studies. Some of this work may be conditioned for later stages, however, appropriate clarity must be provided now to determine water demand.

Our current water modelling for the various facilities within the Development is,

ESTIMATED POTABLE WATER FLOWS			
		Litres	
HOTEL	QTY	Rate per Day	Quantity
150 HOTEL ROOMS	290	240	69,600
STAFF	50	50	2,500
BAR TRADE	700	45	31,500
LAUNDRY	1	6000	6,000
WAVE POOL/RECREATION	1200	40	48,000
59 RESIDENTIAL LOTS (5 PERSONS PER LOT)	295	300	88,500
CAMP - 30 CABINS	90	200	18,000
DAILY ESTIMATED FLOW			264,100
MONTHLY ESTIMATED FLOW	30	264,100	7,923,000
YEARLY ESTIMATED FLOW	365	264,100	96,396,500

And Seasonal Flows,

PORT DOUGLAS WAVE PARK - EXPECTED WATER POTABLE FLOWS - SEASONAL						
	daily flow		month rate	season	adjusted daily flow	adjusted month flow
January	264100	31	8,187,100	50%	132,050	4,093,550
February	264100	28	7,394,800	50%	132,050	3,697,400
March	264100	31	8,187,100	50%	132,050	4,093,550
April Low	264100	15	3,961,500	80%	211,280	3,169,200
April Peak	264100	15	3,961,500	100%	264,100	3,961,500
May	264100	31	8,187,100	80%	211,280	6,549,680
June Low	264100	24	6,338,400	80%	211,280	5,070,720
June Peak	264100	6	1,584,600	100%	264,100	1,584,600
July Low	264100	16	4,225,600	80%	211,280	3,380,480
July Peak	264100	15	3,961,500	100%	264,100	3,961,500
August	264100	31	8,187,100	80%	211,280	6,549,680
September Low	264100	24	6,338,400	80%	211,280	5,070,720
September Peak	264100	7	1,848,700	100%	264,100	1,848,700
October Low	264100	16	4,225,600	80%	211,280	3,380,480
October Peak	264100	14	3,697,400	100%	264,100	3,697,400
November Low	264100	15	3,961,500	50%	132,050	1,980,750
November Peak	264100	15	3,961,500	80%	211,280	3,169,200
December Low	264100	15	3,961,500	50%	132,050	1,980,750
December Peak	264100	16	4,225,600	100%	264,100	4,225,600
					YEAR	71,465,460

7. Confirm the size of water reticulation mains proposed to connect the site to Council's water supply network having regard to the current constructed infrastructure and the proposed upgrades identified in the Local Government Infrastructure Plan (LGIP). Confirm the increased main sizes required to accommodate the water supply demands for the development and the impact of this on the water reticulation network. It is also noted that the water balance investigation assumed the water storages areas were full for the purpose of the water balance analysis.

It is proposed to run a 225mm watermain adjacent to the Captain Cook Highway and a 150mm Internal Ring Main within the Development. The watermain would be used for both Potable Water and Fire Systems as required. The watermain could be reduced from the Council connection and an internal storage system and pump system to be utilised.

8. Provide advice on how water supply requirements are proposed to achieve firefighting requirements for the development having regard to volume required, pressures and flowrate for this class of development.

Current requirements for a Fire Hydrant system would be 20 litres/second under a Town Watermain system. It would be highly unlikely that the town water supply pressures would be adequate to provide the performance requirements of Australian Standards, and an internal storage tank and fire pump system would be required.

This would reduce the performance down to 10 litres per second at a 4 hour demand.

Additionally, a Fire Sprinkler System would be required for the Hotel component of the Development. Preliminary calculations show a requirement of 20 litres per second for a 1 hour demand.

11. Provide sewage demand calculations for the sewage loads generated from each element of the development. The demands must be in accordance with FNQROC unless substantiated by appropriate detailed studies. Some of this work may be conditioned for later stages, however, appropriate clarity must be provided now to determine how the development will be connected to Council's reticulated network and the additional demand placed on the sewerage treatment plant.

It is proposed to connect the Development to the Council sewer infrastructure at the new proposed Development on the corner of the Captain Cook Highway and Andreassen Road.

Our current sewer modelling for the various facilities within the Development is,

PORT DOUGLAS WAVE PARK - EXPECTED WASTE WATER FLOWS

HOTEL	QTY	Litres Rate per Day	Quantity
150 HOTEL ROOMS	290	180	52,200
STAFF	50	40	2,000
BAR TRADE	700	35	24,500
LAUNDRY	1	5000	5,000
WAVE POOL/RECREATION	1200	38	45,600
59 RESIDENTIAL LOTS (5 PERSONS PER LOT)	295	10	2,950
CAMP - 30 CABINS	90	110	9,900
DAILY PEAK ESTIMATED FLOW			**142,150**
MONTHLY PEAK ESTIMATED FLOW	**30**	**142,150**	**4,264,500**
YEARLY PEAK ESTIMATED FLOW	**365**	**142,150**	**51,884,750**

And Seasonal Flows,

PORT DOUGLAS WAVE PARK - EXPECTED WASTE WATER FLOWS - SEASONAL						
	daily flow		month rate	season	adjusted daily flow	adjusted month flow
January	142150	31	4,406,650	50%	71,075	2,203,325
February	142150	28	3,980,200	50%	71,075	1,990,100
March	142150	31	4,406,650	50%	71,075	2,203,325
April Low	142150	15	2,132,250	80%	113,720	1,705,800
April Peak	142150	15	2,132,250	100%	142,150	2,132,250
May	142150	31	4,406,650	80%	113,720	3,525,320
June Low	142150	24	3,411,600	80%	113,720	2,729,280
June Peak	142150	6	852,900	100%	142,150	852,900
July Low	142150	16	2,274,400	80%	113,720	1,819,520
July Peak	142150	15	2,132,250	100%	142,150	2,132,250
August	142150	31	4,406,650	80%	113,720	3,525,320
September Low	142150	24	3,411,600	80%	113,720	2,729,280
September Peak	142150	7	995,050	100%	142,150	995,050
October Low	142150	16	2,274,400	80%	113,720	1,819,520
October Peak	142150	14	1,990,100	100%	142,150	1,990,100
November Low	142150	15	2,132,250	50%	71,075	1,066,125
November Peak	142150	15	2,132,250	80%	113,720	1,705,800
December Low	142150	15	2,132,250	50%	71,075	1,066,125
December Peak	142150	16	2,274,400	100%	142,150	2,274,400
					YEAR	38,465,790

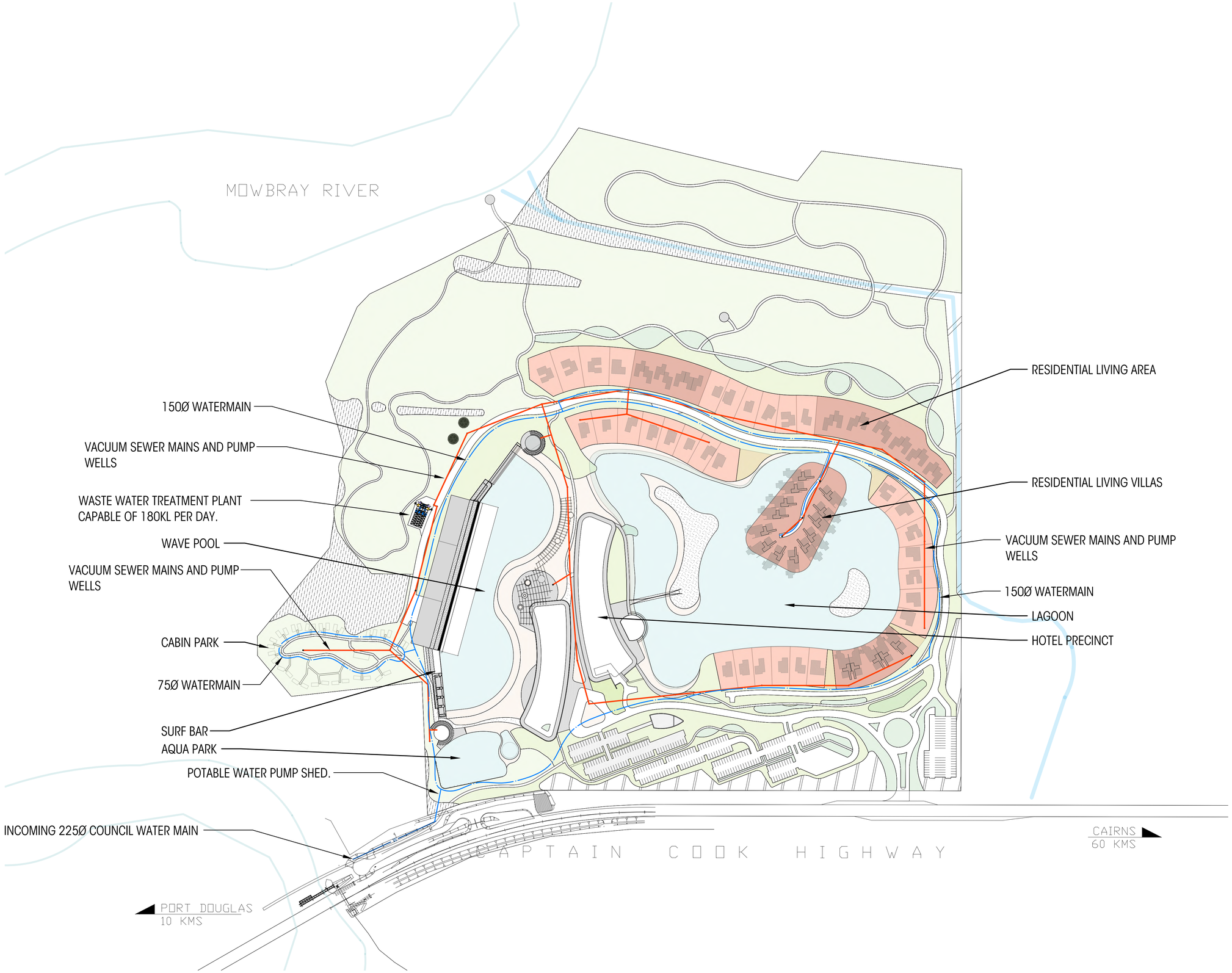
12. Confirm the size of sewerage mains proposed to connect the site to Council's sewerage network having regard to the current constructed infrastructure and the proposed upgrades identified in the LGIP. Confirm the increased main sizes required to accommodate the sewerage generation loads for the development. Issues such as alignment and land tenure are to be explored.

The proposed sewer infrastructure internally of the Development is for a vacuum system, discharging to a Development Sewerage Pumping Station. Preliminary calculations indicate a 180mm poly (150mm UPVC) sewer rising main would run parallel to the Highway. The receiving manhole would require a 225mm Gravity Sewer connection. Further modelling would be required for the discharging sewer system. The Development Pump Station could be timed for the discharging into the council sewer network to happen outside peak times to alleviate any possible issues.

For further information or clarification on the above, please do not hesitate to contact the under signed on 40321468.

Yours Faithfully

Shane Barnes
Principal



SKETCH DESIGN

DATE	REV	AMENDMENT	CHKD
25.02.2021	P1	PRELIMINARY ISSUE	

REFERENCE COORDINATION DRAWINGS			
DESCRIPTION	DRAWING NO.	REV	CHKD
ARCHITECTURAL DRAWING	X	.	SB

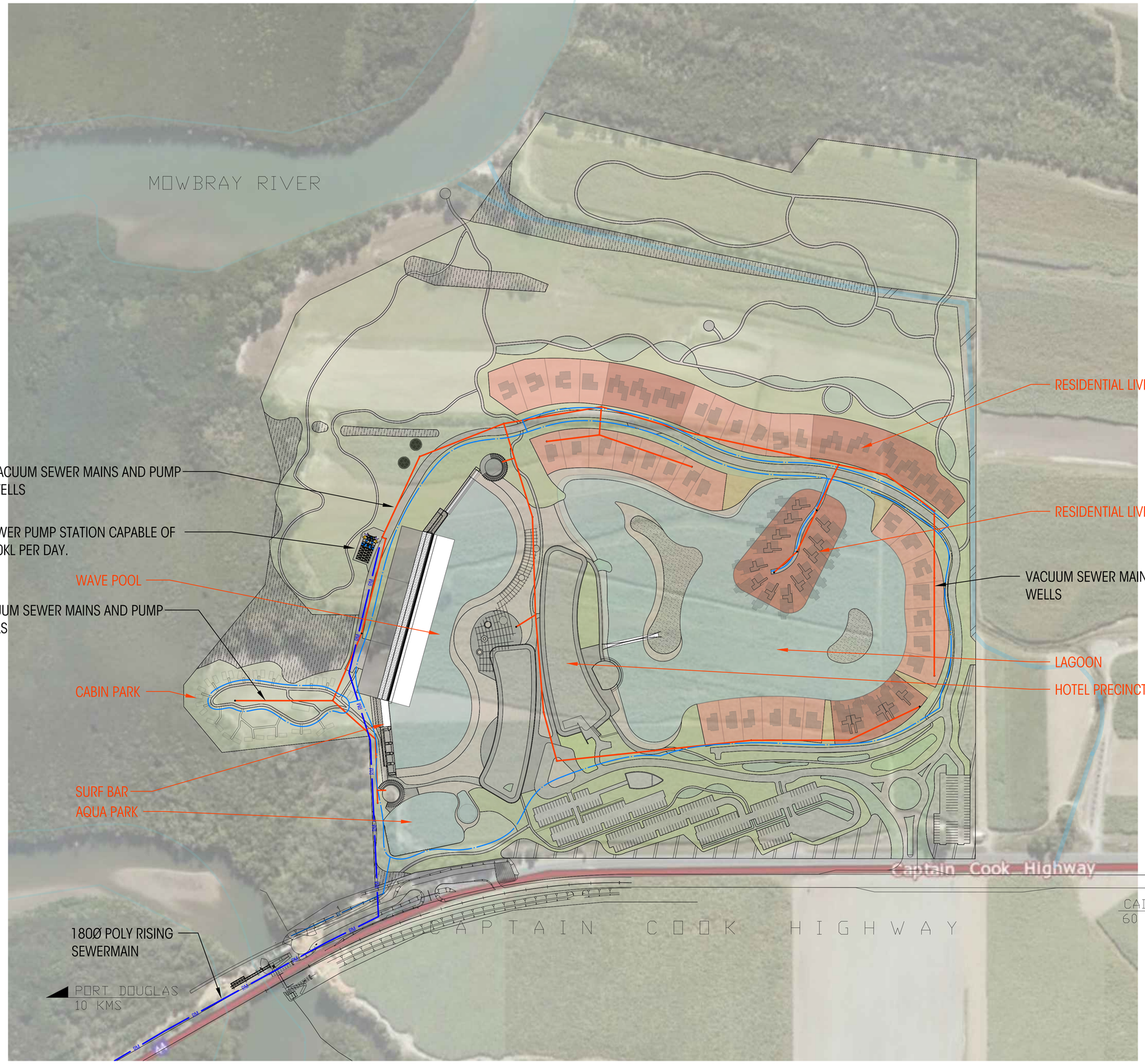
HYDRAULIC ENGINEER
H2O consultants

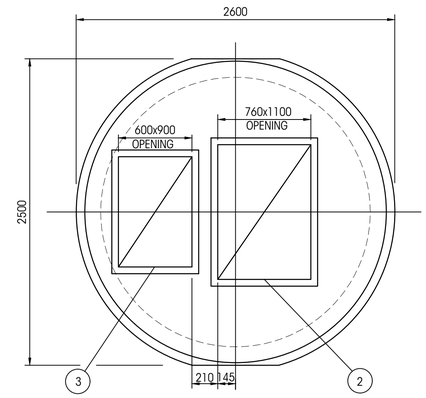
PROJECT
PROPOSED WAVE PARK
CAPTAIN COOK HIGHWAY
MOWBRAY
CLIENT
DAVID INGRABEN

DATE	JAN 2021	DRAWN	SR
SCALE	1:2000	CHECKED	SB
SHEET SIZE	A1	APPROVED	SB
CAD FILE	1Drive\Projects\20124 - PD Wave Park		

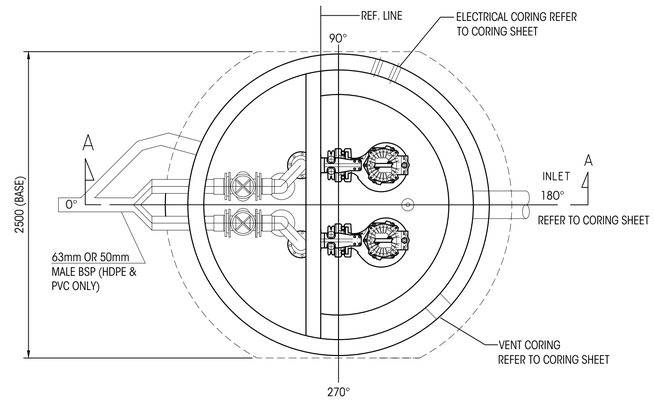
TITLE
HYDRAULIC SERVICES
MASTER PLAN
SANITARY DRAINAGE & WATER SUPPLY

PROJECT NO.	DRAWING NO.	REVISION
20124	SK01	1

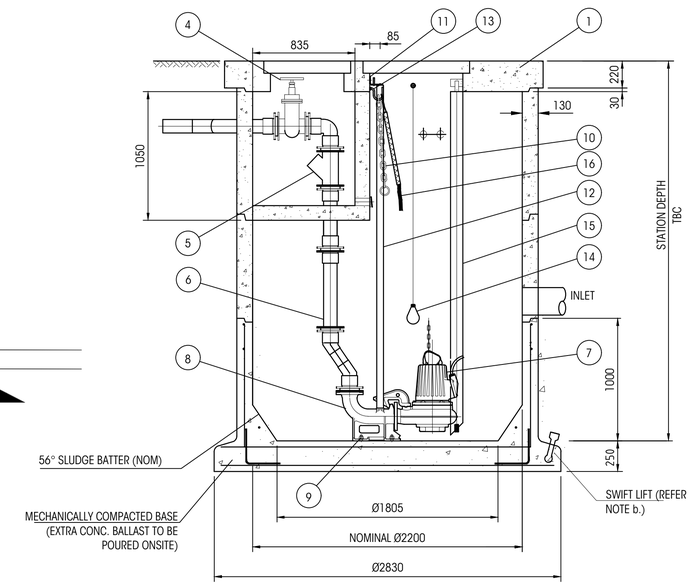




PLAN - COVER SLAB



PLAN



SECTION

SKETCH DESIGN

DATE	REV	AMENDMENT	CHKD
25.02.2021	P1	PRELIMINARY ISSUE	

REFERENCE COORDINATION DRAWINGS

DESCRIPTION	DRAWING NO.	REV	CHKD
ARCHITECTURAL DRAWING	X	-	SB

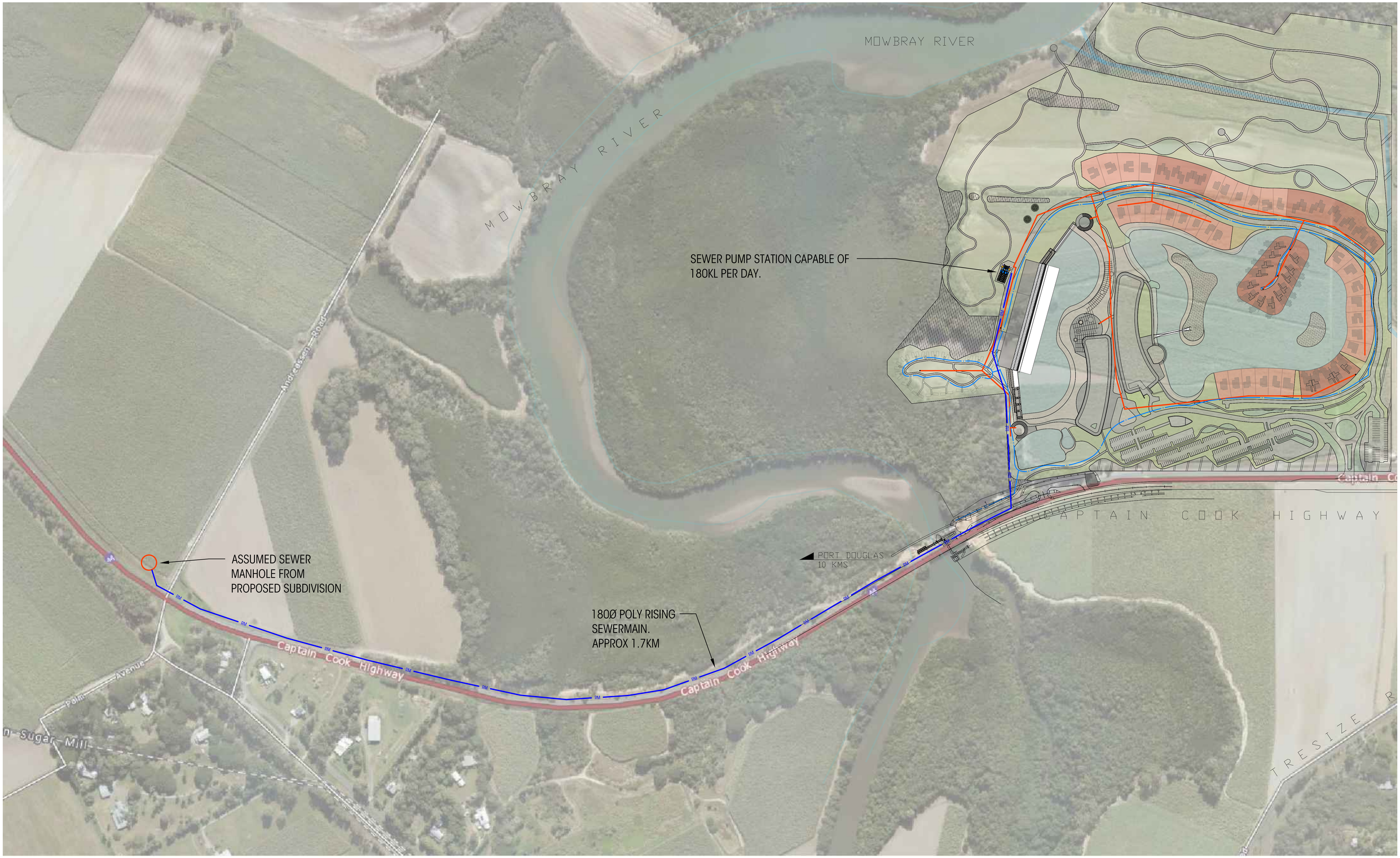
HYDRAULIC ENGINEER
H2O consultants

PROJECT
PROPOSED WAVE PARK
CAPTAIN COOK HIGHWAY
MOWBRAY
CLIENT
DAVID INGRABEN

DATE	JAN 2021	DRAWN	SR
SCALE	1:2000	CHECKED	SB
SHEET SIZE	A1	APPROVED	SB
CAD FILE	1Drive\Projects\20124 - PD Wave Park		

TITLE
HYDRAULIC SERVICES
MASTER PLAN
SANITARY DRAINAGE & PUMP STATION

PROJECT NO.	DRAWING NO.	REVISION
20124	SK02	1



SKETCH DESIGN

DATE	REV	AMENDMENT	CHKD
25.02.2021	P1	PRELIMINARY ISSUE	

REFERENCE COORDINATION DRAWINGS

DESCRIPTION	DRAWING NO.	REV	CHKD
ARCHITECTURAL DRAWING	X	-	SB

HYDRAULIC ENGINEER
H2O consultants

PROJECT
PROPOSED WAVE PARK
CAPTAIN COOK HIGHWAY
MOWBRAY
CLIENT
DAVID INGRABEN

DATE	JAN 2021	DRAWN	SR
SCALE	1:2500	CHECKED	SB
SHEET SIZE	A1	APPROVED	SB
CAD FILE	1Drive\Projects\20124 - PD Wave Park		

TITLE
HYDRAULIC SERVICES
MASTER PLAN
SEWER RISING MAIN

PROJECT NO.	DRAWING NO.	REVISION
20124	SK03	1