Dorrigo Rainforest Centre Redevelopment

Transport Impact Assessment

PREPARED FOR ECO LOGICAL AUSTRALIA | 8 NOVEMBER 2024 | 300305515

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TRANSPORT IMPACT ASSESSMENT

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Acknowledgment of Country

In the spirit of reconciliation, Stantec acknowledges the Traditional Custodians of country throughout Australia and their connections to land, sea and community. We pay our respect to their Elders past and present, and extend that respect to all Aboriginal and Torres Strait Islander peoples.

1. Introduction

1.1 Background

NSW National Parks and Wildlife Service (NPWS) is planning to further develop the existing infrastructure at Dorrigo National Park. The proposed works include upgrades to the current infrastructure and amenities as well as providing increased parking capacity at the Dorrigo Rainforest Centre (RFC) and The Glade Precinct for visitors, and realigning a small segment of Dome Road near Lyrebird Lane.

During development consultation with NPWS, Bellingen Shire Council's Development Control Unit requested that NPWS have a Transport Impact Assessment (TIA) prepared as part of the project development, so that any transport impacts from the upgraded infrastructure on the adjacent road network could be understood.

In May 2024, Stantec was commissioned by Eco Logical Australia on behalf of NPWS to undertake a TIA to assess the suitability of the proposed upgrades to Dorrigo National Park from a parking and transport perspective.

1.2 Purpose of this Report

This report sets out an assessment of the anticipated transport implications of the proposed development, including consideration of the following:

- existing traffic and parking conditions surrounding the site
- suitability of the proposed parking in terms of supply (quantum) and layout
- service vehicle requirements
- pedestrian and bicycle requirements
- suitability of the proposed access arrangements for the site
- the traffic generating characteristics of the proposed development
- the transport impact of the development proposal on the surrounding road network.

1.3 References

In preparing this report, reference has been made to the following:

- Bellingen Shire Council Development Control Plan (DCP) 2017
- Australian/New Zealand Standard, Parking Facilities (AS 2890 series)
- traffic and car parking surveys undertaken by Traffic Information Specialist (TIS) as referenced in the context of this report
- *Visitor Dispersal Strategy Review for Dorrigo National Park (January 2024)*, NSW National Parks and Wildlife Service
- *Dorrigo Arc Rainforest Centre Vehicle Parking Assessment (24 August 2023)*, New England Surveying & Engineering
- plans for the proposed development prepared by New England Surveying & Engineering
- other documents and data as referenced in this report.

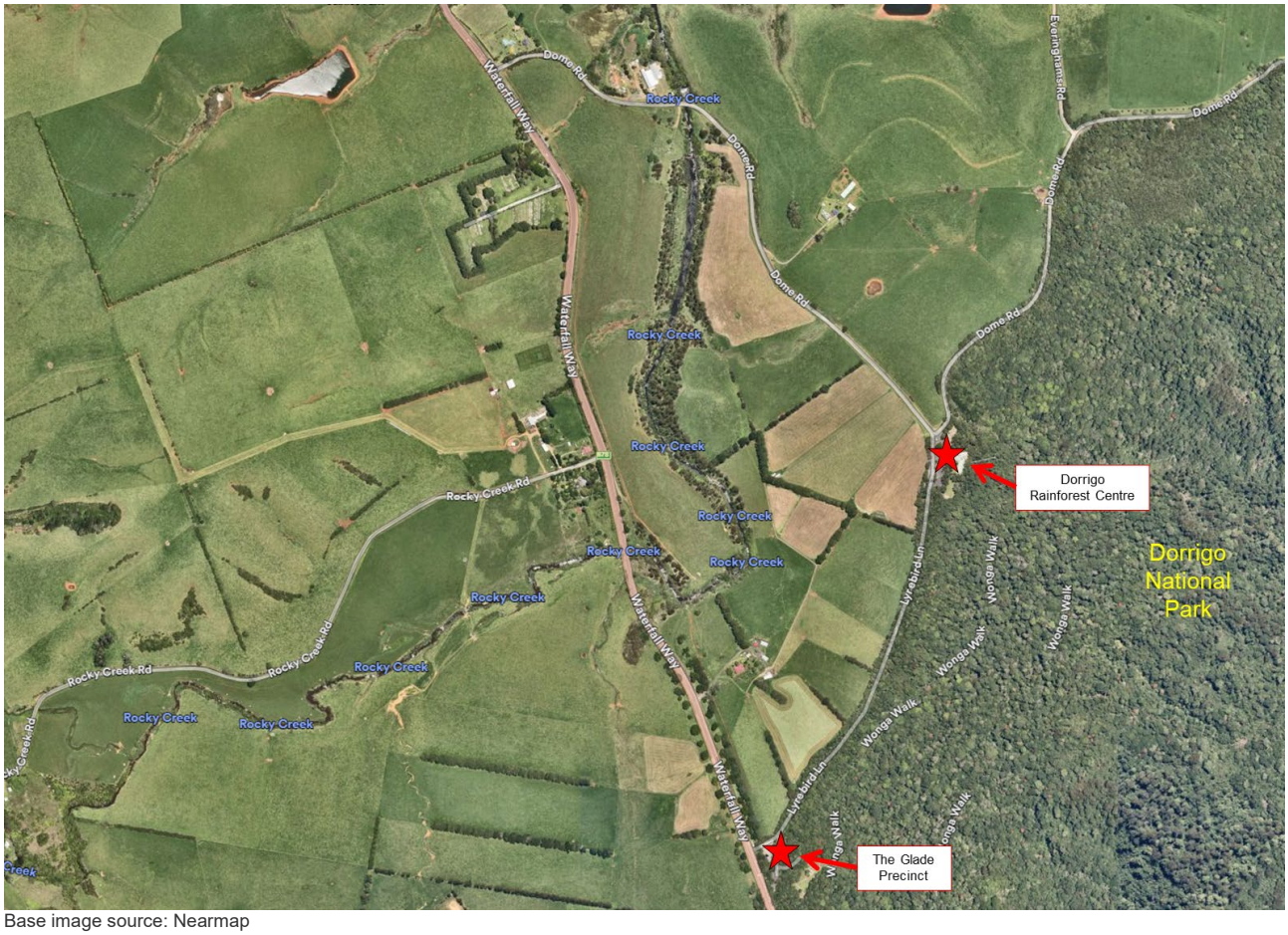
2. Existing Conditions

The subject site is located at Dorrigo National Park. The National Park has a site area of approximately 7,885 hectares and is located approximately four kilometres south-east of the nearest township of Dorrigo. The mid north-coast is within an hour's drive of the park and it is near key activity centres such as Coffs Harbour and Nambucca Heads.

Dorrigo National Park is one of the World Heritage listed Gondwana Rainforests and is zoned as C1 – National Parks and Nature Reserves. The surrounding area is predominantly occupied by rural landscapes and rainforests.

The location of the subject site and its surrounding environs is shown in Figure 2.1.

Figure 2.1: Subject Site and its Environs



Base image source: Nearmap

2.1 Road Network

The assessment in this report considers roads in the vicinity of Dorrigo National Park (such as Waterfall Way and Dome Road) that could potentially be impacted by the development proposal. It is noted that once vehicles are on Waterfall Way, they are categorised as being on the State Road Network which is under the jurisdiction of Transport for NSW (TfNSW). TfNSW has previously undertaken a review of the increase in traffic numbers arising from the development proposal and confirmed that upgrade works are not required on the State Road Network, including at the Waterfall Way/ Dome Road intersection. Notwithstanding, an assessment of this intersection is included in this report as discussed in future sections.

2.1.1 Adjoining Roads

Waterfall Way

Waterfall Way is classified as a State Road (No. 76) and in the vicinity of the site is aligned in a north-south direction. It is a two-way road configured with one lane in each direction, set within an approximate ten-metre-wide carriageway. The road connects to the New England Highway at Armidale and the Pacific Highway at Raleigh.

Kerbside parking is not permitted on either side of the road in the vicinity of the site. It has a posted speed limit of 100 kilometres per hour.

Dome Road

Dome Road is classified as a local road and in the vicinity of the site is aligned in a north-west to south-east direction. It is a two-way 5.5-metre-wide bitumen sealed road, with no road shoulders. The road provides a connection to Dorrigo National Park, with the north-western end connecting to Waterfall Way.

In the vicinity of the site, informal overflow parking occurs on both sides of the road on days with high visitation at the national park.

Lyrebird Lane

Lyrebird Lane is a private road within Dorrigo National Park (managed by NPWS) and in the vicinity of the site is aligned in a north-east to south-west direction. It has a land use classification of C3 – Environmental Management.

Lyrebird Lane is a two-way 4.2-metre-wide bitumen sealed road, with no road shoulders. The road provides a connection between the Dorrigo Rainforest Centre and The Glade Precinct and is signposted as a 10km/h Shared Zone for use by vehicles and pedestrians. It is a No Through Road with no public vehicle access from Lyrebird Lane to Waterfall Way (except for emergency vehicles).

Kerbside parking is not permitted on either side of the road.

2.2 Traffic Volumes

2.2.1 Non-Holiday Period

Stantec commissioned traffic movement counts at the Waterfall Way/ Dome Road priority-controlled intersection on Tuesday 21 May 2024 during the following weekday peak periods:

- 7am to 10am
- 3pm to 7pm

It is noted that the traffic movement count was not conducted during a holiday period and as such, represents a typical weekday of the year (i.e. to represent the typical 85th percentile performance of the intersection across the year). As per standard practice, intersections are generally not designed to accommodate peak hour volumes on the peak demand day of the year.

The road network weekday AM and PM peak hours were found to occur from 8.15am to 9.15am and 3:15pm to 4.15pm. The AM and PM peak hour traffic volumes are summarised in Figure 2.2 and Figure 2.3, with full results contained in Appendix A.

Figure 2.2: Existing AM Peak Hour Traffic Volumes

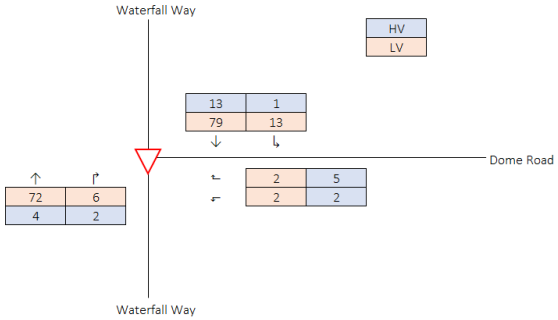
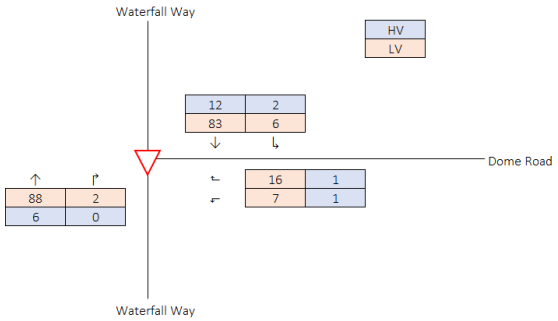


Figure 2.3: Existing PM Peak Hour Traffic Volumes

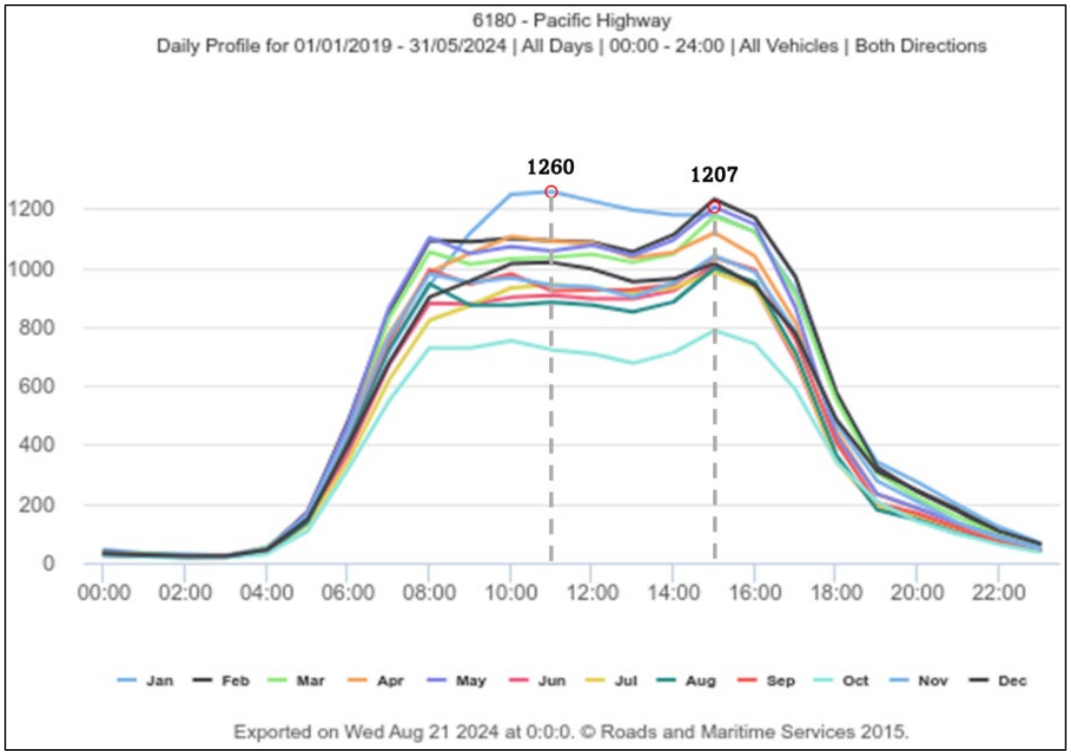


2.2.2 Holiday Period

To assess the approximate background traffic volumes at the Waterfall Way/ Dome Road intersection on the peak demand day of the year, an analysis of the nearest TfNSW permanent traffic counter has been undertaken.

Data has been sourced from Traffic Counter ID: 6180, located on the Pacific Highway at Valla, approximately 15km south of Waterfall Way. Figure 2.4 below shows the average daily traffic profile across all months of the year between 1 January 2019 to 31 May 2024.

Figure 2.4: Average Daily Traffic Profile



Source: TfNSW Traffic Volume Viewer, <Traffic Volume Viewer (nsw.gov.au)> accessed 21 August 2024

The graph shows that most months of the year (including May, when the surveys were conducted) follow a similar daily traffic profile, with traffic increasing up to the morning peak and then levelling out during the middle of the day, before slightly increasing up to the daily peak traffic volume which occurs mid-afternoon at approximately 3pm. January however, follows a different daily traffic profile, with morning traffic peaking at approximately 11am and then gradually decreasing throughout the day. This aligns with the expected daily profile of a typical holiday peak period.

It is noted that the peak hour traffic volume in January (at approximately 11am) is marginally higher than the peak hour traffic volume in May (at approximately 3pm). Table 2.1 below calculates the percentage increase in traffic from May to January based on the TfNSW Traffic Volume Viewer data.

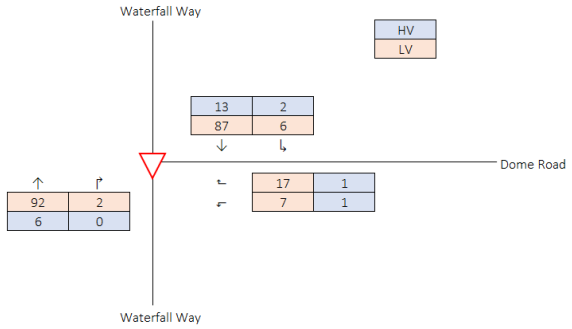
Table 2.1: Percentage Increase between May PM Peak (Survey data) and January Holiday Peak

Period	Time of Peak	Annual Average Traffic Volume (veh/h)	Average Traffic Growth (%)
May PM Peak	3:00 pm	1207	N/A (baseline)
January Holiday Peak	11:00 am	1260	+4%

This shows that a 4% increase in traffic between a typical May and a typical January should be used to factor up the background traffic volumes at the Waterfall Way/ Dome Road intersection.

As such, the holiday base peak hour traffic volumes are summarised in Figure 2.5.

Figure 2.5: Holiday Base Peak Hour Traffic Volumes



To estimate the directional distribution of holiday peak traffic, a high-level review into the populations of nearby towns and localities has been undertaken. It is broadly assumed that visitors are more likely to originate from larger towns, and larger towns are more likely to have a greater availability of tourist accommodation.

Table 2.2 summarises the total population of the largest towns near Dorrigo National Park based on data sourced from the Australian Bureau of Statistics from 2021. Based on the towns indicatively selected, there is a population of 105,820 people east of the site, which signifies an approximate traffic distribution of 78%. On the other hand, there is a population of 30,338 people west of the site, which signifies an approximate traffic distribution of 22%.

Table 2.2: Traffic Assignment based on nearby Towns and Localities

Towns east of Dome Road	Population (people)	Towns west of Dome Road	Population (people)
Coffs Harbour	78,759	Dorrigo	1,214
Urunga	2,731	Armidale Regional	29,124
Nambucca Valley	20,407		
Bellingen	3,923		
Total	**105,820 (78%)**	**Total**	**30,338 (22%)**

Source: ABS 2021 <https://www.abs.gov.au/census/find-census-data/quickstats/2021>, accessed August 2024

For the purposes of the SIDRA models, a holiday trip distribution of 80% east and 20% west has been used in the redistribution of visitation/ development traffic, as summarised in Table 2.3.

Table 2.3: Traffic distribution based on total population of nearby towns

Total Population (of surrounding towns)	East	West
136,158	80%	20%

2.3 Intersection Operation

The operation of the Waterfall Way/ Dome Road intersection has been assessed using SIDRA INTERSECTION[1], a modelling software package which calculates intersection performance.

The commonly used measure of intersection performance, as defined by TfNSW, is vehicle delay. SIDRA INTERSECTION determines the average delay that vehicles encounter and provides a measure of the level of service.

Table 2.4 shows the criteria that SIDRA INTERSECTION adopts in assessing the level of service.

Table 2.4: SIDRA INTERSECTION Level of Service Criteria

Level of Service (LOS)	Average Delay per vehicle (secs/veh)	Traffic Signals, Roundabout	Give Way & Stop Sign
A	Less than 14	Good operation	Good operation
B	15 to 28	Good with acceptable delays and spare capacity	Acceptable delays and spare capacity
C	29 to 42	Satisfactory	Satisfactory, but crash study required
D	43 to 56	Near capacity	Near capacity, crash study required
E	57 to 70	At capacity, at signals incidents will cause excessive delays	At capacity, requires other control mode
F	Greater than 70	Extra capacity required	Extreme delay, major treatment required

Table 2.5 presents a summary of the existing operation of the intersection for the typical weekday AM and PM peak hours as well as for the January holiday peak (HOL), with full results presented in Appendix B of this report.

[1] Program used under license from Akcelik & Associates Pty Ltd.

Table 2.5: Existing Operating Conditions

Intersection	Peak	Worst Performing Movement	Degree of Saturation (DOS)	Average Delay (sec)	95th Percentile Queue (m)	Level of Service (LOS)
Waterfall Way/ Dome Road	AM	Right turn out of Dome Road	0.017	10.8	0.7	A
	PM	Right turn out of Dome Road	0.030	8.5	0.8	A
	HOL	Right turn out of Dome Road	0.026	8.4	0.7	A

On the basis of the above assessment, it is clear that the existing Waterfall Way/ Dome Road intersection operates well at LOS A with no queues and minimal delays in all road network peak hours, including during peak holiday season.

2.4 Previous Transport Studies

2.4.1 Overview

Dorrigo Arc Rainforest Centre – Vehicle Parking Assessment (New England Surveying & Engineering, 2023)

As part of the proposed upgrade works, NPWS commissioned New England Surveying & Engineering to conduct a vehicle parking assessment in 2023. The report provides a review of the car parking arrangements, traffic counts and visitor numbers at the Dorrigo Rainforest Centre and The Glade Precinct picnic area. The report also provides an estimate of the parking requirements for the upgraded Dorrigo Rainforest Centre based on projected visitor numbers provided by NPWS.

Key findings from the report include:

- Average traffic counts during holiday periods can be more than double the average non-holiday traffic counts. Traffic is highest on weekends and public holidays with Saturday traffic counts representing 1.5 times the average daily traffic
- Daily traffic movements to the RFC are typically between 4 and 6 times the peak hourly count
- Visitation peaks during the months of January, April, July, September, October and December (i.e. school holiday periods)
- The composition of traffic is approximately 97.3% light vehicles, 1.4% motorcycles and 1.3% coaches, buses or other long vehicles, based on data from 28 April 2023
- The average vehicle occupancy is approximately 2.4 persons per vehicle
- Overflow parking is currently required at peak times of the day on approximately 16% of days every year (equating to one day per week on average), though generally only during school holidays.

2.4.2 Traffic Counts

Traffic counts were collected by Anson Group on behalf of NPWS at three locations on two separate occasions between Friday 7th and Monday 10th April 2023 (Easter Weekend), and between Monday 24th and Sunday 30th April 2023 (non-holiday period).

The locations of the surveys were:

- Dome Road between Waterfall Way and the RFC, approximately 530m north-west of the Dome Road/ Lyrebird Lane Intersection
- Dome Road, located approximately 30m north of the Dome Road/ Lyrebird Lane intersection
- Lyrebird Lane, approximately 125m south of the Dome Road/ Lyrebird Lane intersection.

The peak days were found to be Saturday 8 April 2023 during the holiday period and Saturday 29 April 2023 during the non-holiday period.

The hourly summaries for the peak holiday period (8 April 2023) and the peak non-holiday period (29 April 2023) on Dome Road, between Waterfall Way and the RFC, are shown below in Table 2.6.

Table 2.6: Hourly Traffic Summary on Dome Road, between Waterfall Way and the RFC

Time	Holiday period – 8 April 2023		Non-holiday period – 29 April 2023	
	Eastbound (veh/h)	Westbound (veh/h)	Eastbound (veh/h)	Westbound (veh/h)
5:00am – 6:00am	0	0	0	1
6:00am – 7:00am	4	4	3	2
7:00am – 8:00am	15	4	6	1
8:00am – 9:00am	31	9	15	8
9:00am – 10:00am	57	12	36	9
10:00am – 11:00am	114	30	54	20
11:00am – 12:00pm	127	53	56	26
12:00pm – 1:00pm	95	113	43	47
1:00pm – 2:00pm	92	110	61	50
2:00pm – 3:00pm	70	123	39	48
3:00pm – 4:00pm	36	83	11	77
4:00pm – 5:00pm	12	62	7	33
5:00pm – 6:00pm	5	46	1	7
6:00pm – 7:00pm	1	8	2	5
7:00pm – 8:00pm	1	3	0	1
8:00pm – 9:00pm	1	0	1	0
Daily Total	**661 veh/day**	**660 veh/day**	**335 veh/day**	**335 veh/day**

Source (modified): New England Surveying and Engineering, Dorrigo Arc Rainforest Centre Vehicle Parking Assessment, dated 24 August 2023

Table 2.6 indicates that during the holiday period, traffic peaked between 12:00pm to 1:00pm with a total of 208 vehicles per hour two-way on Dome Road.

During the non-holiday period, traffic peaked between 1:00pm and 2:00pm with a total of 111 vehicles per hour two-way on Dome Road.

2.5 Car Parking

2.5.1 Supply

The Dorrigo National Park is a large parkland area with three separate parking areas for staff, bus and public parking. The main parking area is located within the RFC car park which can be accessed off Dome Road. The RFC car park contains approximately 80 formalised car spaces including 18 staff parking spaces, two accessible spaces and four long vehicle/ bus spaces.

Informal (i.e. unsealed and not linemarked) overflow parking occurs along Dome Road when the RFC car park is full. There is an estimated overflow capacity of approximately 168 car spaces, which includes a combination of parallel and perpendicular parking spaces.

Parking is also available at The Glade Precinct's car park (approximately one kilometre south of the RFC car park) which contains 14 linemarked parking spaces and 17 informal parking spaces (i.e. not linemarked).

The RFC car park and sections of unsealed, overflow parking on Dome Road are shown indicatively in Figure 2.6, while The Glade Precinct's car park is shown indicatively in Figure 2.7.

Figure 2.6: Location of RFC Car Park and Overflow Parking

Base image source: Nearmap

Figure 2.7: Location of The Glade Precinct's Car Park

Base image source: Nearmap

2.5.2 Demand/ Occupancy

To estimate the parking occupancy at the site, reference has been made to the aforementioned Vehicle Parking Assessment report prepared by New England Surveying & Engineering. Based on two vehicle counts placed on Dome Road, between Waterfall Way and the RFC (presented in Table 2.6) and approximately 30 metres north of the Dome Road/ Lyrebird Lane intersection, the parking occupancy across the day between 7am and 5pm has been estimated to be as shown in Table 2.7. The data only considers vehicles that park in the RFC and The Glade Precinct car parks.

The parking occupancy assessment has been undertaken for both the holiday and non-holiday periods, based on traffic volume data collected on 8 April 2023 (Easter Holiday) and 29 April 2023 (non-holiday) respectively.

Table 2.7: Existing Parking Occupancy (RFC and The Glade precincts)

Time	Parking Occupancy (veh) during holiday period – 8 April 2023	Parking Occupancy (veh) during non-holiday period – 29 April 2023
7:00am	0	0
8:00am	7	4
9:00am	20	12
10:00am	59	34
11:00am	141	70
12:00pm	**188**	**95**
1:00pm	171	86
2:00pm	152	71
3:00pm	115	58
4:00pm	77	25
5:00pm	34	8

Table 2.7 indicates that the parking occupancy peaks at approximately 12pm during both the holiday and non-holiday periods, with 188 and 95 parked vehicles respectively.

2.6 Public Transport

There are currently no public transport services that operate within the immediate vicinity of Dorrigo National Park. However, Dorrigo Transit offers a Waterfall Way shuttle service connecting Coffs Harbour, Dorrigo and Armidale. The shuttle stops in the Dorrigo CBD, which is approximately three kilometres from the park entrance. Upon specific request, the shuttle can also pass through Dorrigo National Park.

2.7 Pedestrian Infrastructure

Dorrigo National Park features well maintained pedestrian infrastructure equipped with walkways and walking tracks, ensuring convenient connectivity across the entire park. Currently, the RFC car park and The Glade Precinct parking area do not have any formal footpaths or pedestrian infrastructure.

2.8 Cycle Infrastructure

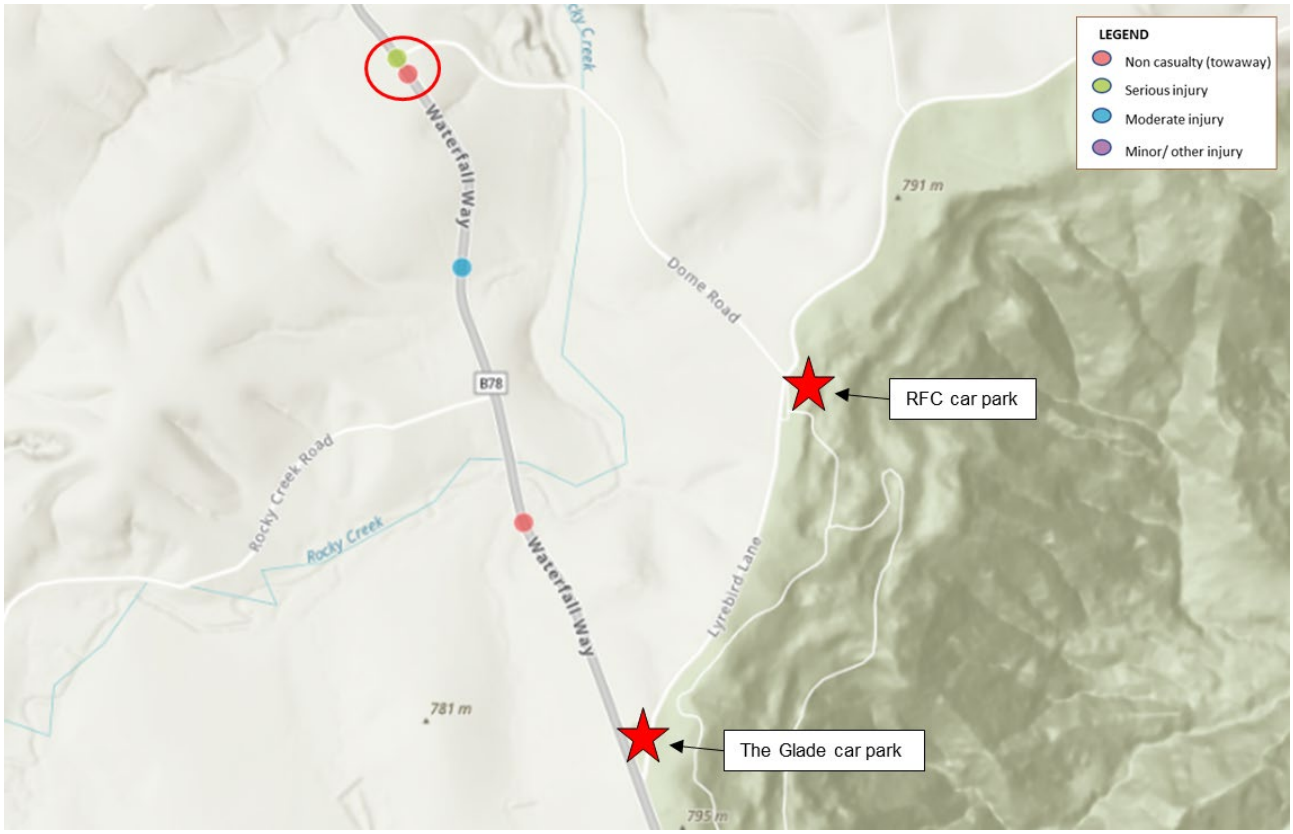
Dorrigo National Park does not offer cycling trails, however nearby parks such as the Bindarri National Park and Cascade National Park offer two trails known as the Plateau Circuit loop trail and the Muurlay Baamgala trail. Both trails offer bike friendly roads that allow visitors to cycle through the park.

Public roads such as Dome Road and Waterfall Way do not offer formalised cycling paths, however cyclists are able to cycle in a mixed traffic arrangement.

2.9 Crash History

An analysis of the most recent five-year period of available crash data (2018-2022) has been undertaken based on crash data obtained from the TfNSW Centre for Road Safety in the vicinity of the subject site. The locations and severity of the crashes for the five-year period recorded are summarised in Figure 2.8.

Figure 2.8: Bellingen LGA Crashes (2018 – 2022)



Base image source: Transport for NSW, LGA-VIEW Crashes Map, https://www.transport.nsw.gov.au/roadsafety/statistics/interactive-crash-statistics/lga-view-crashes-map

As seen in Figure 2.8, two crashes were reported near the Dome Road/ Waterfall Way intersection. One of these crashes resulted in a serious injury while the other was a non-casualty (towaway) crash. No crashes were reported within the direct vicinity of the RFC or The Glade Precinct car park sites, noting that The Glade Precinct's car park can only be accessed by the public via Lyrebird Lane, not Waterfall Way (except for emergency responders).

Given the low number of recorded incidents, there is no indication of a safety concern on the surrounding road network.

3. Development Proposal

3.1 Land Uses

The redevelopment of the Dorrigo Rainforest Centre will involve upgrades to the existing park to provide improved amenities and parking. Specifically, the upgrades to the existing park include:

- Upgraded amenities such as a new interpretation hall and retail space.
- Construction of a new car park adjacent to the existing RFC car park. The new sealed car park will contain 141 car spaces.
- Reconfiguration of the existing RFC car park to provide 123 formalised parking spaces.
- Unsealed, overflow parking capacity on Dome Road outside the new car park for 122 vehicles.
- Upgrades to The Glade Precinct's existing car park to provide 29 parking spaces.

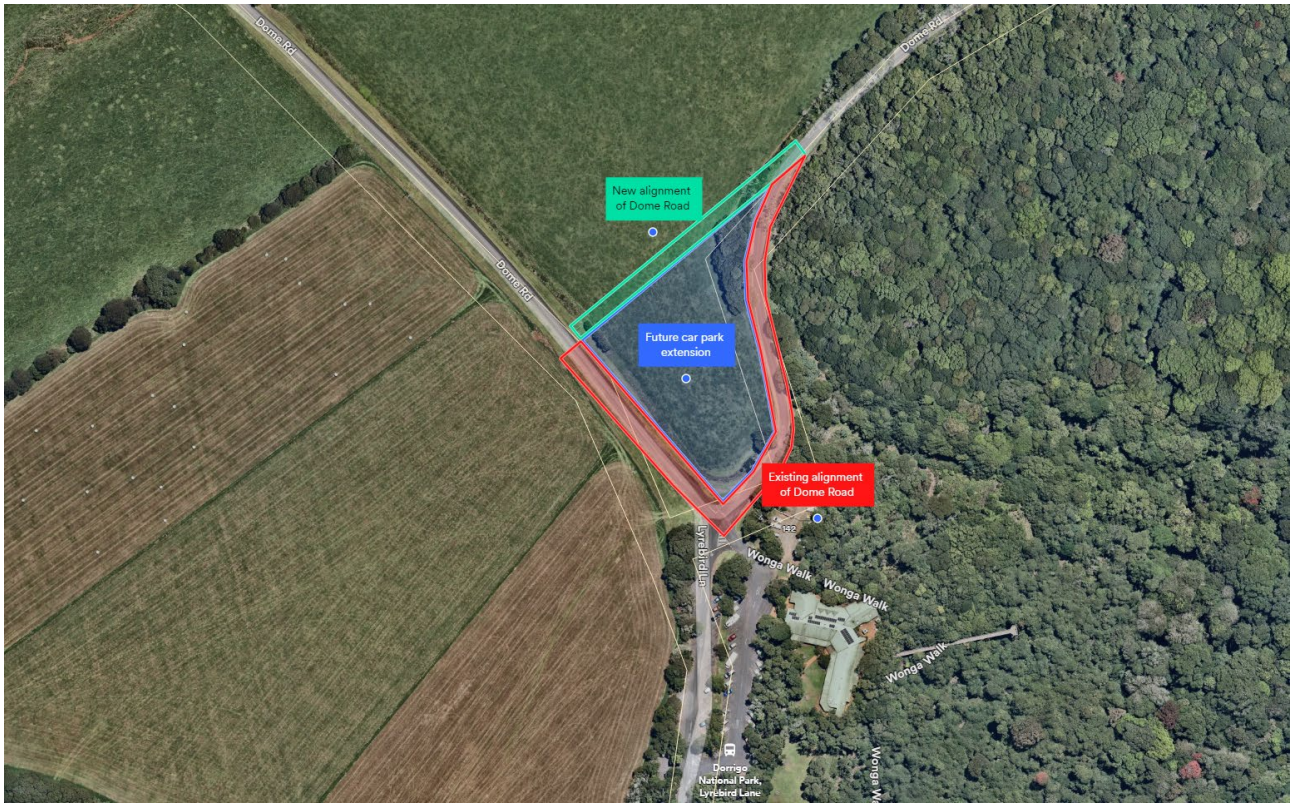
There are no sealed, on-street parking spaces proposed on the new alignment of Dome Road.

3.2 Vehicle Access

Dorrigo National Park can be accessed via Waterfall Way, which provides public access to key roads such as Dome Road and Lyrebird Lane (via Dome Road) within the vicinity of the site. As part of the proposal, a section of Dome Road north of Lyrebird Lane will be realigned, so that traffic bypassing the national park can continue onto destinations further north-east of the national park, without travelling through the national park car park areas.

The locations of the existing and proposed road alignments of Dome Road, relative to the future car park extension area, are shown in Figure 3.1.

Figure 3.1: Proposed Road Alignment Change to Dome Road

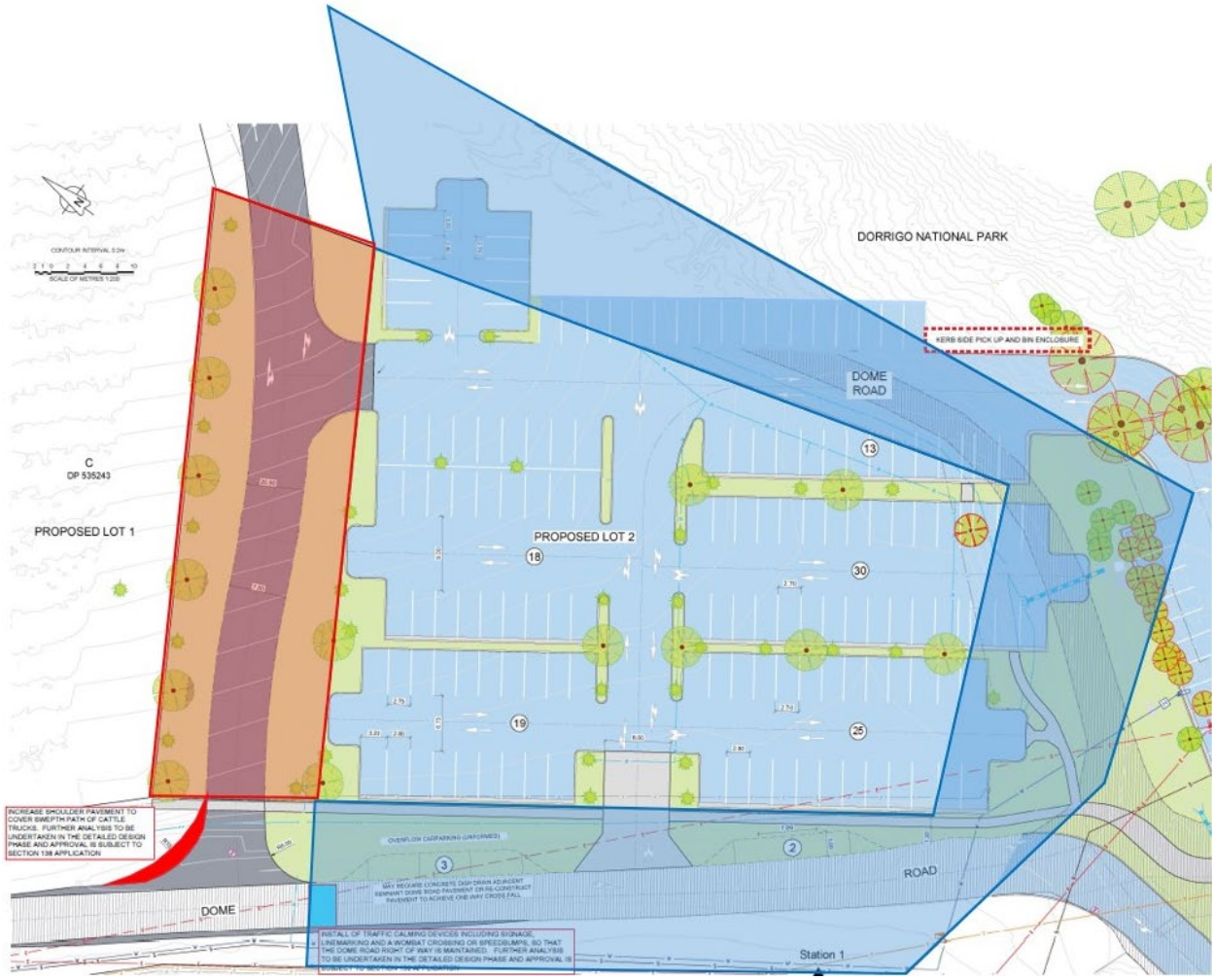


Base image source: Nearmap

As part of the road realignment process, there will be changes in land ownership between Council and NPWS. In summary, the new alignment of Dome Road will become Council-owned, in addition to the existing Council-owned Dome Road alignment located north-west of the new alignment. This is highlighted below in red in Figure 3.2.

Ownership of the areas highlighted below in blue will be transferred from Council to NPWS (i.e. road reserve areas south of the new Dome Road alignment).

Figure 3.2: Proposed Changes to Land Ownership



Source: Eco Logical Australia (2024)

There will be multiple vehicle access points to the various car park areas of Dorrigo National Park. The future car park extension area will be able to be accessed via two-way vehicular crossovers located on both the existing and new sections of Dome Road.

As noted on the figure above, the following design measures will also be considered as part of the future detailed design phase for the development, with approval to be subject to a section 138 application:

- Shoulder pavement to be increased at the new Dome Road connection to accommodate the swept path of cattle trucks.
- Installation of traffic calming devices, including signage, linemarking, and a wombat crossing or speed hump is proposed to maintain the Dome Road right of way.

As discussed, The Glade Precinct's car park is accessed by travelling south on Lyrebird Lane from the RFC precinct. The proposal does not plan to alter how this car park is accessed.

3.3 Car Parking

The proposed redevelopment will provide a total of 415 parking spaces (293 sealed, 122 unsealed) across three formal parking areas plus Dome Road. The breakdown of these car parking spaces is as follows:

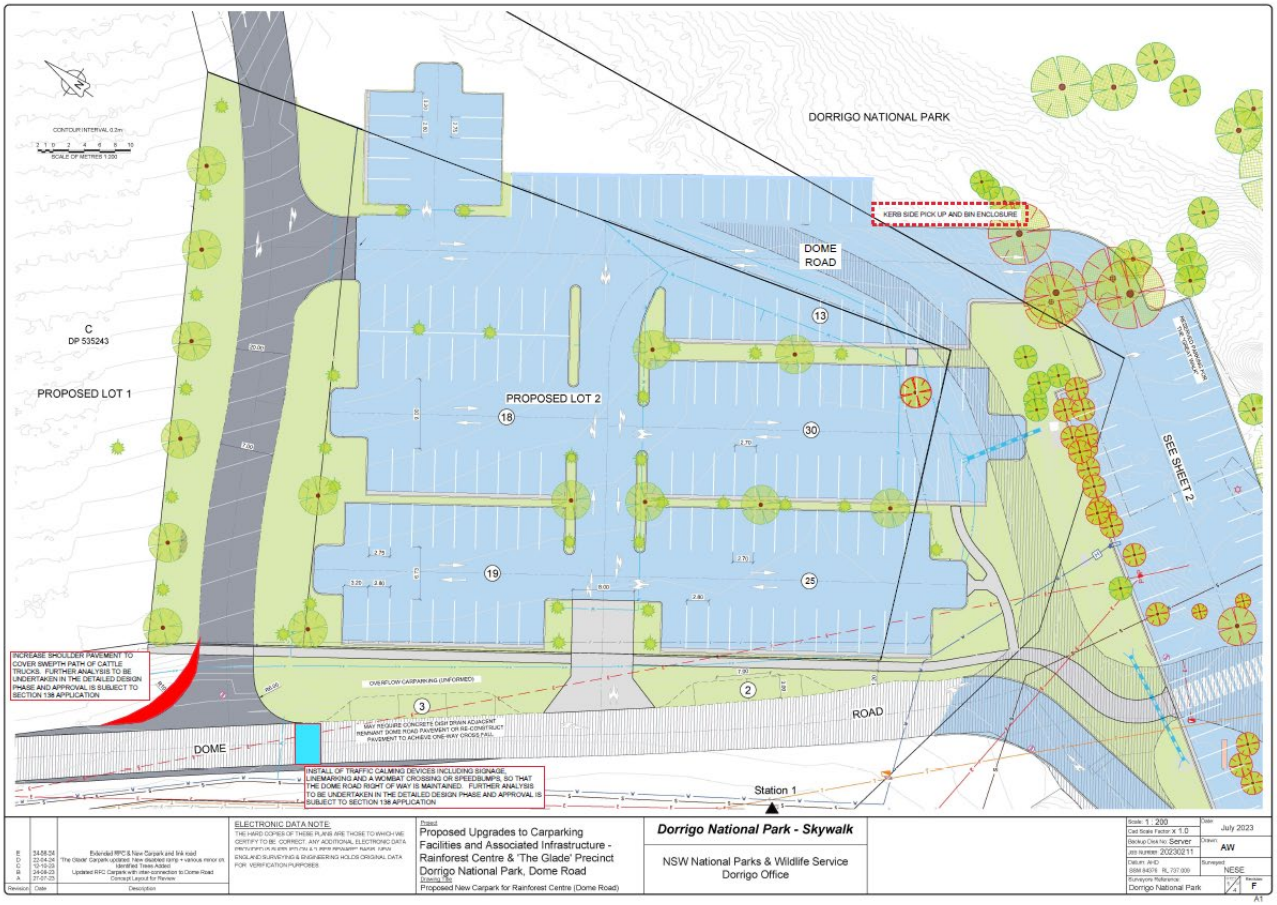
- 123 parking spaces located within the reconfigured RFC car park (where the existing RFC car park is located)
- 141 parking spaces located within the future RFC car park extension area
- 95 unsealed, overflow parking spaces on Dome Road, north of the new alignment of Dome Road (to be maintained by Council)

- 27 unsealed, overflow parking spaces (5 on the eastern side, 22 on the western side) on Dome Road, south of the new alignment of Dome Road (to be maintained by NPWS)
- 29 parking spaces at The Glade Precinct.

The suitability of the car parking provision and layout is discussed in Section 4 of this report.

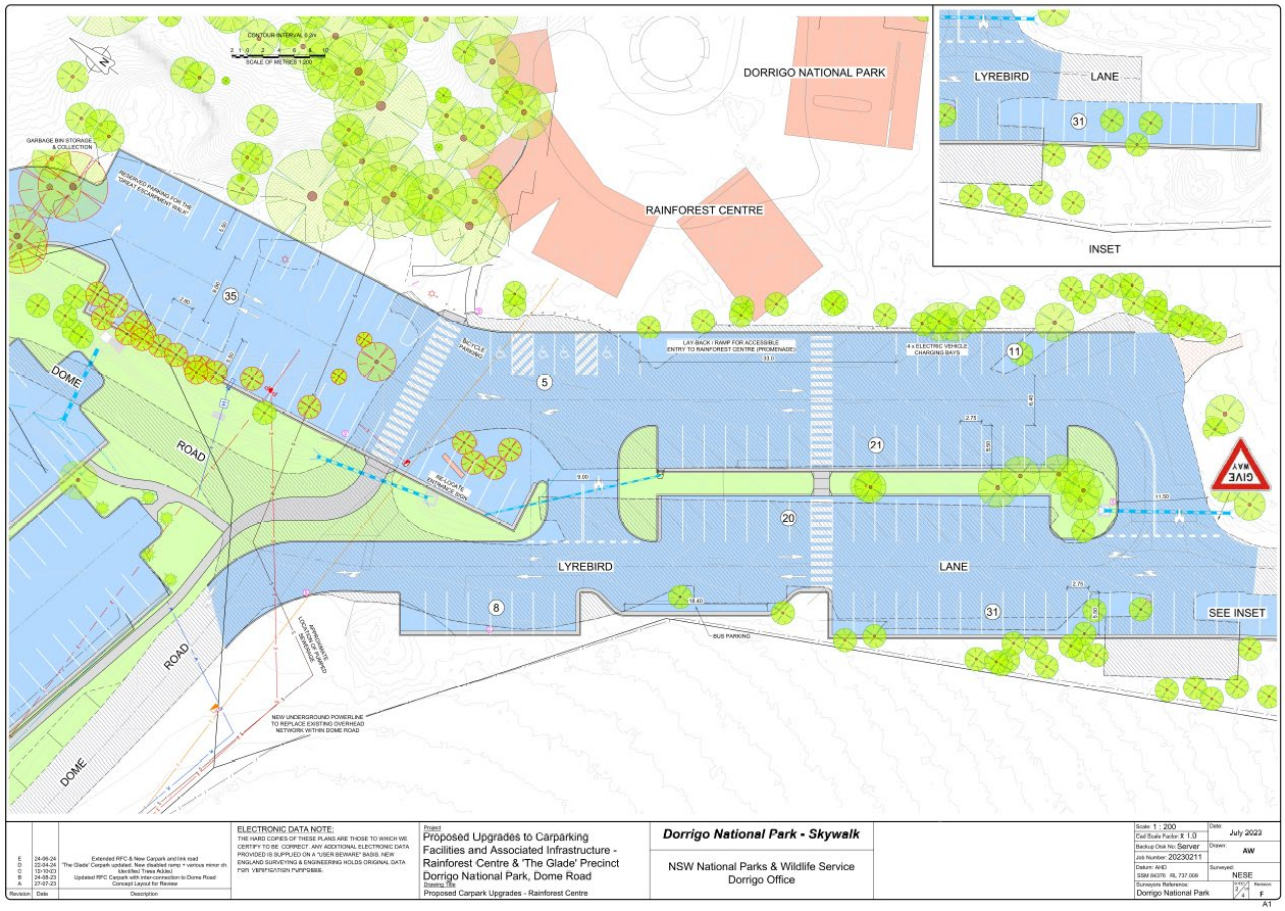
The proposed layouts of the future RFC car park extension area and the reconfigured existing RFC car park are shown indicatively in Figure 3.3 and Figure 3.4, while The Glade Precinct's car park area is shown in Figure 3.5.

Figure 3.3: Proposed Layout of Future Car Park Extension



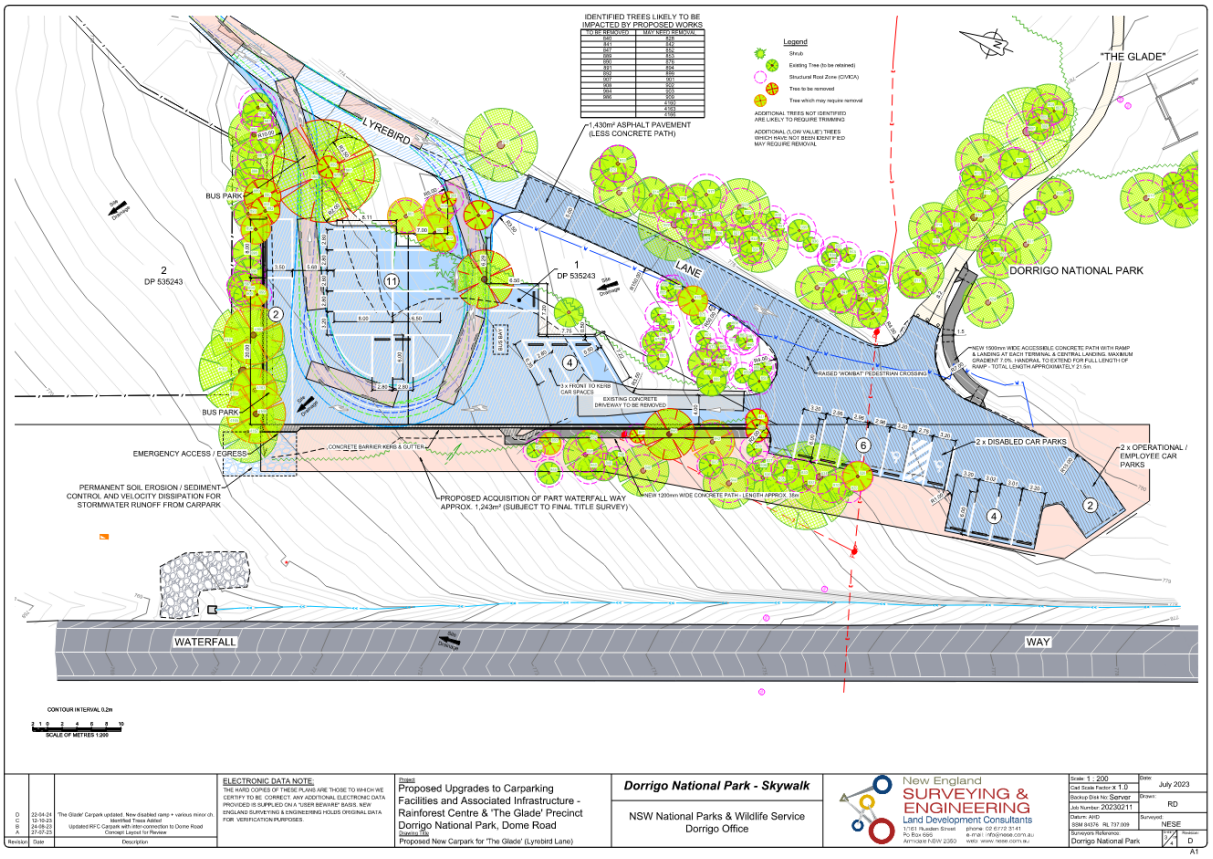
Source: Proposed New Carpark for Rainforest Centre (Dome Road), Rev F, New England Surveying & Engineering, received 08/11/2024

Figure 3.4: Proposed Car Park Layout at the Location of the Existing RFC Car Park



Source: Proposed Carpark Upgrades – Rainforest Centre, Rev F, New England Surveying & Engineering, received 08/11/2024

Figure 3.5: Proposed Car Park Layout at The Glade Precinct



Source: Proposed New Carpark for 'The Glade' (Lyrebird Lane), Rev D, New England Surveying & Engineering, dated 22/04/2024

3.4 Pedestrian and Bicycle Facilities

Internal pedestrian access to the reconfigured existing RFC car park is proposed via pedestrian footpaths located adjacent to Dome Road. Marked zebra crossings will provide pedestrians with safe access between the existing RFC car park and the newly proposed RFC car park extension area. Minor sections of additional footpath are proposed at The Glade Precinct's car park.

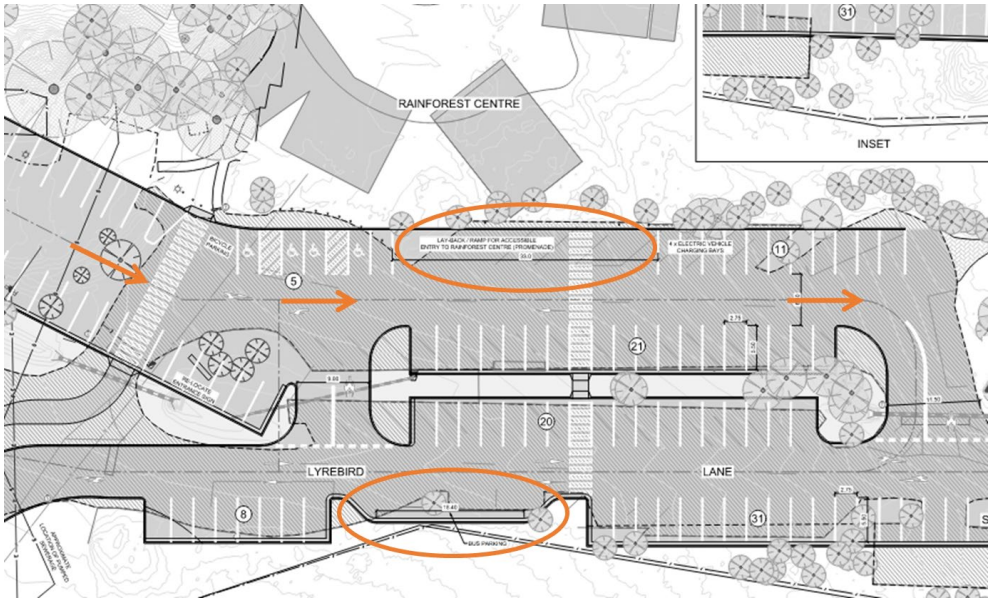
A small area has been allocated for bicycle parking near the Rainforest Centre entrance, which is expected to be adequate to meet the low demand for bicycle parking (if any).

3.5 Bus and Loading Areas

As per the arrangements shown in Figure 3.6, the proposed bus drop-off/pick-up location is located directly in front of the Rainforest Centre entrance, within the existing RFC car park. Buses would enter the car park via the new alignment of Dome Road at the northern end of the car park extension area to reach the drop-off/pick-up location.

Bus parking opportunities can be reached by looping around the RFC car park in a clockwise direction, or by travelling further south to The Glade Precinct's car park via Lyrebird Lane.

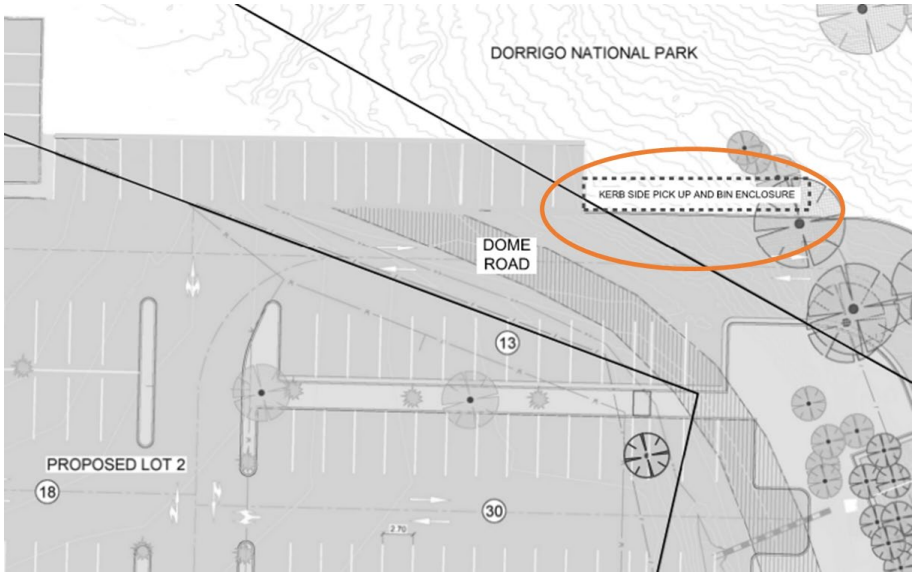
Figure 3.6: Proposed Bus Drop-Off/Pick-Up and Parking



Base image source: Proposed Carpark Upgrades – Rainforest Centre, Rev F, New England Surveying & Engineering, received 08/11/2024

As shown in Figure 3.7, the refuse storage and bin collection area is located within the future RFC car park extension area. Refuse collection vehicles would stop temporarily adjacent to the bins whilst waste is collected.

Figure 3.7: Proposed Waste Collection Location



Base image source: Proposed New Carpark for Rainforest Centre (Dome Road), Rev F, New England Surveying & Engineering, received 08/11/2024

4. Car Parking

4.1 Empirical Assessment of Car Parking Demand

NPWS has conducted an assessment of the car parking demand based on the Vehicle Parking Assessment Report prepared by New England Surveying & Engineering. Using the findings from that report, the car parking demand was determined in the NPWS Visitor Dispersal Review for Dorrigo National Park (NPWS Paper).

The NPWS assessment adopted the following methodology to determine the car parking demand:

- The daily number of visitors across the year was broken down into four distinct groups to capture the spread in visitation numbers that currently occurs across a typical year. This was done to allow for a better understanding of the relationship between visitor numbers and the proposed number of car parks. The four groupings are as follows:
  - Group 1 (equates to 340 days per year, i.e. the 93.4th percentile): 200-500 visitors per day
  - Group 2 (equates to the next busiest 8 days of the year): 500-800 visitors per day
  - Group 3 (equates to the next busiest 9 days of the year): 900-1,000 visitors per day
  - Group 4 (equates to the 7 busiest days of the year[2]): 1,200-1,300 visitors per day.
- The Vehicle Parking Assessment Report indicates that the existing visitor numbers are 150,000 per annum and that these are forecast to increase to 450,000 visitors per annum by 2032, equating to a threefold increase in the number of visitors in the future.
- Applying this increase (factor of three) will result in the following forecast daily visitation numbers:
  - Group 1: 600-1,500 visitors per day
  - Group 2: 1,500-2,400 visitors per day
  - Group 3: 2,700-3,000 visitors per day
  - Group 4: 3,600-3,900 visitors per day.
- The car parking demand was then determined by comparing the forecast number of visitors to the peak car parking demand. To find the forecast parking demand, the existing peak parking demand was multiplied by a factor of three.

This high-level extrapolation to forecast parking demand is considered a worst-case scenario. In practice, the future peak parking demand is expected to be much lower than this, as a result of current and future NPWS visitor dispersal strategies which aim to spread visitation numbers out over the year (to reduce excessive visitation peaks during school holidays).

An outline of some of the proposed dispersal strategies are:

- Improved infrastructure which can be used during wet weather and in winter, and by school groups during school terms
- Improved travel times with the anticipated completion of the Coffs Harbour Bypass (therefore less delays on the road due to construction)
- Bus tour groups to reduce overall parking demand and to manage particular days on which visitors visit the park
- Advertising when the busier periods are and promoting the off-peak times (via tour operators, social media, webpages etc.) for visitation
- Smart technology and signage which can notify potential visitors when the car parks are full before travelling to the national park from nearby towns such as Coffs Harbour and Armidale.

A worst-case parking demand analysis (i.e. not taking into account the above dispersal strategies) is presented below in Table 4.1, where the groupings have been based on percentiles (with the 100th percentile representing the busiest day of the year). The full results and analysis are presented within the NPWS Paper.

[2] Based on 364 days per year, with the Dorrigo Rainforest Centre assumed to be closed on Christmas Day

Table 4.1: Parking Demand Summary Based on 2032 Peak Annual Forecast

Grouping	Percentile	Existing number of visitors (per day)	Existing peak parking demand	Forecast number of visitors (per day)	Future estimated peak parking demand
1	93.4th	200-500 visitors	95 spaces	600-1,500 visitors	285 spaces
2	95.6th	500-800 visitors	115 spaces	1,500-2,400 visitors	345 spaces
3	98.1st	900-1,000 visitors	142 spaces	2,700-3,000 visitors	426 spaces
4	100th	1,200-1,300 visitors	188 spaces	3,600-3,900 visitors	564 spaces

Based on the above, the future peak parking demand on the 93.4th percentile day of the year is estimated to be 285 vehicles, whilst the future peak parking demand on the busiest day of the year is estimated to be 564 vehicles.

On the 93.4th percentile day of the year, this represents an estimated increase of 190 vehicles at the peak time of day (i.e. 285 – 95). On the busiest day of the year (100th percentile), there is estimated to be an additional 376 vehicles at the peak time of day (i.e. 564 – 188).

The above increases in peak parking demand on the busiest day of the year and the 93.4th percentile day of the year have been applied proportionately to the existing hourly parking profiles previously presented in Table 2.7 for the holiday and non-holiday periods respectively. The resulting forecast increase in parking occupancies on these days is shown below in Table 4.2.

Table 4.2: Forecast Difference in Parking Occupancy (i.e. Between Existing and Future) Based on 2032 Peak Annual Forecast

Time	Forecast difference in Parking Occupancy on busiest day of the year (i.e. Group 4)	Forecast difference in Parking Occupancy on a 93.4th percentile day of the year (i.e. Group 1)
7:00am	+0 vehicles	+0 vehicles
8:00am	+14 vehicles	+8 vehicles
9:00am	+40 vehicles	+24 vehicles
10:00am	+118 vehicles	+68 vehicles
11:00am	+282 vehicles	+140 vehicles
12:00pm	**+376 vehicles**	**+190 vehicles**
1:00pm	+342 vehicles	+172 vehicles
2:00pm	+304 vehicles	+142 vehicles
3:00pm	+230 vehicles	+116 vehicles
4:00pm	+154 vehicles	+50 vehicles
5:00pm	+68 vehicles	+16 vehicles

4.2 Adequacy of Parking Supply

The development proposes a total of 415 car parking spaces (320 to be within NPWS land and 95 vehicles parked informally on the Dome Road verge) and provides three formal parking areas, including the reconfigured RFC car park, the new extension to the RFC car park and The Glade Precinct's car park. Based on the parking demand presented within Table 4.1 and the NPWS Paper, the excess or shortfall in parking has been calculated as summarised in Table 4.3. It is reiterated that this represents a worst-case scenario, given that the visitor dispersal strategies discussed previously are expected to lower the forecast peak parking demands in practice.

Table 4.3: Worst-Case Scenario for Parking Capacity

Grouping	Percentile	Forecast peak parking demand	Excess or Shortfall in Parking [1]
1	93.4th	285 spaces	-130
2	95.6th	345 spaces	-70
3	98.1st	426 spaces	11
4	100 (highest peak day of the year)	564 spaces	149

[1] Negative value indicates spare capacity within the car parks

Table 4.3 indicates that the overall car parking provision is capable of accommodating the forecast peak parking demand on approximately 96-97% of days in any given calendar year. Furthermore, on 94-95% of the days in a year, the forecast peak parking demand is able to be accommodated within parking spaces on NPWS land (i.e. 320 spaces).

On approximately 3-4% of the days per year (i.e. Groupings 3 and 4), there is a shortfall in the car parking spaces available to accommodate the forecast demand, although the estimated shortfall of 11 spaces for Grouping 3 is considered to be minor (only approx. 2.6% of the forecast peak parking demand). It should be noted that as per standard practice, car parks are generally not designed to accommodate for the peak demand days of the year.

The visitor dispersal strategies previously mentioned are expected to allow the visitor numbers to be effectively managed by NPWS on the busiest days of the year, thereby lowering the forecast peak parking demand on those days and allowing the available parking supply to accommodate the resulting parking demand. Ensuring that the park is not overcrowded with visitors (which would result in a poor visitor experience) is one of NPWS's core objectives.

NPWS has implemented similar types of visitor dispersal strategies elsewhere in NSW, including at the Royal National Park (RNP) in Sydney. The following points below summarise advice given by NPWS RNP on the effectiveness of their dispersal strategies:

- Improving infrastructure has allowed visitation numbers to be dispersed across a broader range of weather conditions and reduce visitor numbers on more popular days.
- Partnerships and licence agreements with tour operators has allowed NPWS RNP to schedule/ pre-book large groups. This has been effective in ensuring that large groups occupy less parking spaces, particularly during holiday periods.
- NPWS RNP has observed that advertising a different experience that can only be seen during the off-peak months (in this instance, whale watching) has attracted more visitors to the park during the off-peak (i.e. winter months).
- NPWS RNP uses messages on Variable Message Signs (VMS) on key routes (both within close proximity to the site and on major highways) to alert drivers that the RNP is full and already at capacity. It is recognised that the effectiveness of this strategy is difficult to measure, as NPWS cannot track who doesn't come to RNP.
- On peak days, NPWS RNP deploy staff across the site to direct traffic to the nearest available parking. This is currently viewed as the most effective tool by NPWS RNP.

5. Traffic Impact Assessment

5.1 Traffic Generation

To calculate the increase in traffic volumes on Dome Road on the 93.4th and 100th percentile days of the year arising from the projected increase in visitation to the area, the existing traffic volumes on Dome Road (Table 2.6) have been proportionately increased by the same factor used for the parking occupancy increases in Table 4.2. The increase in traffic volumes is consistent with NPWS's anticipated changes in parking demand.

The forecast traffic volume increases on Dome Road are shown in Table 5.1 for the 93.4th and 100th percentile days of the year.

Table 5.1: Forecast Increase in Traffic Volumes on Dome Road (i.e. Between Existing and Future)

Time	100th percentile day of the year		93.4th percentile day of the year	
	Eastbound (veh/h)	Westbound (veh/h)	Eastbound (veh/h)	Westbound (veh/h)
6:00am – 7:00am	+8	+8	+6	+4
7:00am – 8:00am	+30	+8	+12	+2
8:00am – 9:00am	**+62**	**+18**	**+30**	**+16**
9:00am – 10:00am	+114	+24	+72	+18
10:00am – 11:00am	+228	+60	+108	+40
11:00am – 12:00pm	+254	+106	+112	+52
12:00pm – 1:00pm	+190	+226	+86	+94
1:00pm – 2:00pm	+184	+220	+122	+100
2:00pm – 3:00pm	+140	+246	+78	+96
3:00pm – 4:00pm	**+72**	**+166**	**+22**	**+154**
4:00pm – 5:00pm	+24	+124	+14	+66

Based on Table 5.1, the 93.4th percentile day of the year is expected to generate an additional 30 eastbound and 16 westbound movements in the AM peak and 22 eastbound and 154 westbound movements in the PM peak period.

For the 100th percentile day of the year, an additional 62 eastbound and 18 westbound movements in the AM peak and 72 eastbound and 166 westbound movements in the PM peak period are anticipated.

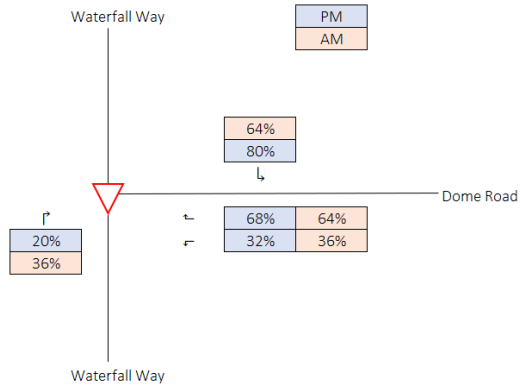
5.2 Traffic Distribution and Assignment

5.2.1 Non-Holiday Period

For the purposes of estimating the assignment of vehicle movements during the non-holiday AM and PM peak hours, the future traffic distributions at the intersection of Waterfall Way/ Dome Road have been estimated based on the existing distributions from the traffic survey undertaken.

These distributions are presented in Figure 5.1.

Figure 5.1: Traffic Distribution Percentages



5.3 Traffic Impact

Given the existing Waterfall Way/ Dome Road intersection operates at LOS A with plenty of spare capacity, the additional traffic generated by the projected increase in visitation to the Dorrigo Rainforest Centre is not expected to compromise the safety or function of the intersection or surrounding road network. Notwithstanding, the traffic impact associated with the increased visitation has been assessed using SIDRA INTERSECTION with the outcomes detailed in this section.

To assess the future traffic conditions, a background growth rate of one per cent per annum has been conservatively applied to the existing scenario. The conservative assumption of one per cent background growth is based on a 2015 traffic count on Waterfall Way, 4.4 kilometres east of Maynards Plains Road, which indicates an average growth rate of 0.65% per annum since 2015 (Waterfall Way Draft Corridor Strategy, TfNSW, 2017).

The background growth was applied in conjunction with the additional traffic generation detailed in Section 5.1 (distributed in accordance with the distribution presented in Section 5.2) to estimate the future traffic volumes in the AM and PM peak periods. These forecast volumes were used to assess the performance of the Waterfall Way/ Dome Road intersection in 2024 and 2034 (10 year horizon).

The holiday peak hour has been indicatively represented using the results of the seasonality analysis and holiday peak directional distribution detailed in Sections 2.2.2. Based on Table 5.1, this is assumed to be between 12:00pm – 1:00pm on the peak day of the year (in the month of January), with a peak two-way traffic generation of 416 vehicles (190 inbound and 226 outbound).

Table 5.2 provides a summary of the operating conditions assessed using SIDRA INTERSECTION for the typical weekday AM and PM peak hours, as well as for the indicative holiday peak period (HOL), for the existing (2024) and 10 year horizon (2034) scenarios with the additional visitation traffic included.

Table 5.2: Existing and Future Operating Conditions of Waterfall Way/ Dome Road Intersection

Scenario	Percentile	Peak	Worst Performing Movement	Degree of Saturation (DOS)	Average Delay (sec)	95th Percentile Queue (m)	Level of Service (LOS)
Existing (2024)	N/A	AM	Right turn out of Dome Road	0.017	10.8	0.7	A
		PM		0.030	8.5	0.8	A
		HOL		0.026	8.4	0.7	A
Existing (2024) with additional visitation traffic	93.4th	AM		0.036	9.5	1.1	A
		PM		0.207	8.8	6.3	A
	100th	AM		0.039	9.7	1.2	A
		PM		0.227	9.2	7.0	A
		HOL		0.259	11.0	8.0	A
2034 (10-year horizon) with additional visitation traffic	93.4th	AM		0.037	9.7	1.2	A
		PM		0.215	9.0	6.5	A
	100th	AM		0.040	10.0	1.2	A
		PM		0.236	9.4	7.3	A
		HOL		0.267	11.3	8.3	A

As shown above, the Waterfall Way/ Dome Road priority controlled intersection will continue to operate well, with LOS A and plenty of spare capacity predicted to occur in all peak periods, including during peak holiday season. The above assessment confirms that the additional traffic generated as a result of the increased visitation is not expected to compromise the safety or function of the subject intersection or the surrounding road network, even on the busiest holiday day.

In addition, the SIDRA results from all scenarios show a 95th percentile queue length of less than one vehicle for the right turn movement on the southern leg of Waterfall Way. The existing right turn lane is approximately 30 metres long, which can accommodate approximately 4-5 queued vehicles.

6. Conclusion

Based on the analysis and discussions presented within this report, the following conclusions are made:

- Bellingen Shire Council's Development Control Unit requested that NPWS have a Transport Impact Assessment (TIA) prepared as part of the proposed infrastructure upgrades and associated increases in visitation to the Dorrigo National Park, so that any transport impacts on the adjacent road network could be understood.
- Based on a worst-case analysis, future peak parking demand for the Dorrigo National Park is estimated to vary from approximately 285 parking spaces on the 93.4th percentile day of the year, to up to 564 spaces on the busiest day of the year (i.e. 100th percentile day of the year).
- In practice, the future peak parking demand is expected to be much lower as a result of current and future NPWS visitor dispersal strategies which aim to spread visitation numbers out over the year (to reduce excessive visitation peaks during school holidays). Some of the proposed dispersal strategies include:
  - Improved infrastructure which can be used during wet weather and in winter, and by school groups during school terms
  - Improved travel times with the anticipated completion of the Coffs Harbour Bypass (therefore less delays on the road due to construction)
  - Bus tour groups to reduce overall parking demand and to manage particular days on which visitors visit the park
  - Advertising when the busier periods are and promoting the off-peak times (via tour operators, social media, webpages etc.) for visitation
  - Smart technology and signage which can notify potential visitors when the car parks are full before travelling to the national park from nearby towns such as Coffs Harbour and Armidale.
- It is proposed that a total of 415 car parking spaces will be provided throughout all car parking areas including the reconfigured RFC car park and its proposed extension and The Glade Precinct's car park. The provision of parking spaces is considered acceptable on the basis that the car parks can accommodate the forecast (worst-case) peak parking demand on approximately 96-97% of days in any given calendar year. This ignores the visitor dispersal strategies which in practice are expected to reduce the peak demands on the busiest days of the year.
- The parking supply of 320 car spaces within NPWS-managed land can accommodate the forecast (worst-case) peak parking demand on approximately 94-95% of days in the year (with the same comment as above in respect of the expected impact of the visitor dispersal strategies).
- Bicycle parking, bus parking and waste collection zones have all been provided within the redesigned RFC car park (including the proposed extension).
- The 93.4th percentile day of the year is expected to generate an additional 46 movements (30 eastbound, 16 westbound) in the AM peak and 176 movements (22 eastbound, 154 westbound) in the PM peak. For the 100th percentile day of the year, an additional 80 movements (62 eastbound, 18 westbound) are anticipated in the AM peak and 238 movements (72 eastbound, 166 westbound movements) in the PM peak, while 416 movements (190 eastbound, 226 westbound) are expected in the overall holiday peak hour between 12-1pm.
- Intersection modelling indicates that the Waterfall Way/ Dome Road intersection will continue to operate well in all scenarios (including the holiday peak) at LOS A with minimal delays and queuing.
- Overall, the proposed development at Dorrigo National Park can be supported from a traffic and transport perspective.

Appendix A. Traffic Survey Data

Traffic Information Specialist

Location	Waterfall Way		Duration	7:00 -	10:00
	Dome Road			-	
	Waterfall Way			15:00 -	19:00
	-		Date	Tuesday, 21 May 2024	
Suburb	DORRIGO		Weather	-	

All Vehicles Time Per Hour	NORTH 0											EAST 0											
	L			T			R			TOTAL	PEDS	L			T			R			TOTAL	PEDS	TOTAL
	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ			LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ			LIGHT HEAVY TOTAL
7:00 - 8:00	2	1	3	59	10	69				72	0	1	0	1				2	0	2	3	0	128 25 153
7:15 - 8:15	3	3	6	64	13	77				83	0	2	0	2				2	0	2	4	0	122 29 151
7:30 - 8:30	6	3	9	65	16	81				90	0	3	0	3				2	3	5	8	0	145 35 180
7:45 - 8:45	8	2	10	62	17	79				89	0	4	1	5				1	3	4	9	0	146 32 178
8:00 - 9:00	12	3	15	79	14	93				108	0	3	2	5				1	4	5	10	0	163 32 195
8:15 - 9:15	13	1	14	79	13	92				106	0	2	2	4				2	5	7	11	0	174 27 201
8:30 - 9:30	13	1	14	74	9	83				97	0	1	2	3				3	2	5	8	0	156 19 175
8:45 - 9:45	13	2	15	81	10	91				106	0	0	1	1				6	2	8	9	0	168 23 191
9:00 - 10:00	10	2	12	74	10	84				96	0	2	1	3				9	1	10	13	0	164 25 189
Period End																							
15:00 - 16:00	2	2	4	77	14	91				95	0	7	1	8				15	1	16	24	0	189 24 213
15:15 - 16:15	6	2	8	83	12	95				103	0	7	1	8				16	1	17	25	0	202 22 224
15:30 - 16:30	8	1	9	73	7	80				89	0	10	1	11				16	1	17	28	0	198 15 213
15:45 - 16:45	9	1	10	76	4	80				90	0	11	0	11				14	1	15	26	0	202 10 212
16:00 - 17:00	10	0	10	73	2	75				85	1	11	0	11				13	2	15	26	0	195 11 206
16:15 - 17:15	6	0	6	65	2	67				73	1	8	0	8				12	1	13	21	0	169 9 178
16:30 - 17:30	4	0	4	59	2	61				65	1	4	0	4				9	1	10	14	0	156 9 165
16:45 - 17:45	4	0	4	45	2	47				51	1	3	0	3				7	1	8	11	0	132 8 140
17:00 - 18:00	2	0	2	43	2	45				47	0	1	0	1				6	0	6	7	0	118 3 121
17:15 - 18:15	2	0	2	37	1	38				40	0	1	0	1				3	0	3	4	0	106 2 108
17:30 - 18:30	2	0	2	36	0	36				38	0	0	0	0				2	0	2	2	0	91 1 92
17:45 - 18:45	1	0	1	30	1	31				32	0	0	0	0				1	0	1	1	0	78 3 81
18:00 - 19:00	3	0	3	24	1	25				28	0	0	0	0				1	0	1	1	0	65 4 69
Period End																							

All Vehicles Time Per Hour	SOUTH 0											WEST 0											
	L			T			R			TOTAL	PEDS	L			T			R			TOTAL	PEDS	TOTAL
	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ			LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ			LIGHT HEAVY TOTAL
7:00 - 8:00				63	14	77	1	0	1	78	0												128 25 153
7:15 - 8:15				51	12	63	0	1	1	64	0												122 29 151
7:30 - 8:30				67	10	77	2	3	5	82	0												145 35 180
7:45 - 8:45				68	6	74	3	3	6	80	0												146 32 178
8:00 - 9:00				64	6	70	4	3	7	77	0												163 32 195
8:15 - 9:15				72	4	76	6	2	8	84	0												174 27 201
8:30 - 9:30				61	4	65	4	1	5	70	0												156 19 175
8:45 - 9:45				62	7	69	6	1	7	76	0												168 23 191
9:00 - 10:00				63	10	73	6	1	7	80	0												164 25 189
Period End																							
15:00 - 16:00				85	6	91	3	0	3	94	0												189 24 213
15:15 - 16:15				88	6	94	2	0	2	96	0												202 22 224
15:30 - 16:30				89	5	94	2	0	2	96	0												198 15 213
15:45 - 16:45				91	4	95	1	0	1	96	0												202 10 212
16:00 - 17:00				88	7	95	0	0	0	95	1												195 11 206
16:15 - 17:15				78	6	84	0	0	0	84	1												169 9 178
16:30 - 17:30				79	6	85	1	0	1	86	1												156 9 165
16:45 - 17:45				72	5	77	1	0	1	78	1												132 8 140
17:00 - 18:00				65	1	66	1	0	1	67	0												118 3 121
17:15 - 18:15				62	1	63	1	0	1	64	0												106 2 108
17:30 - 18:30				50	1	51	1	0	1	52	0												91 1 92
17:45 - 18:45				45	2	47	1	0	1	48	0												78 3 81
18:00 - 19:00				36	3	39	1	0	1	40	0												65 4 69
Period End																							

Appendix B. SIDRA Results

MOVEMENT SUMMARY

Site: 101 [Waterfall Way/ Dome Road_ AM (Site Folder: Existing)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

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

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Waterfall Way															
2	T1	All MCs	80	5.3	80	5.3	0.042	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	100.0
3	R2	All MCs	8	25.0	8	25.0	0.007	8.6	LOS A	0.0	0.2	0.23	0.61	0.23	59.7
Approach			88	7.1	88	7.1	0.042	0.8	NA	0.0	0.2	0.02	0.06	0.02	93.9
East: Dome Road															
4	L2	All MCs	4	50.0	4	50.0	0.017	8.5	LOS A	0.1	0.7	0.32	0.60	0.32	54.0
6	R2	All MCs	7	71.4	7	71.4	0.017	10.8	LOS A	0.1	0.7	0.32	0.60	0.32	50.0
Approach			12	63.6	12	63.6	0.017	9.9	LOS A	0.1	0.7	0.32	0.60	0.32	51.4
North: Waterfall Way															
7	L2	All MCs	15	7.1	15	7.1	0.009	8.0	LOS A	0.0	0.0	0.00	0.66	0.00	71.1
8	T1	All MCs	97	14.1	97	14.1	0.054	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	100.0
Approach			112	13.2	112	13.2	0.054	1.1	NA	0.0	0.0	0.00	0.09	0.00	94.9
All Vehicles			212	13.4	212	13.4	0.054	1.4	NA	0.1	0.7	0.03	0.10	0.03	90.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 101 [Waterfall Way/ Dome Road_ PM (Site Folder: Existing)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

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

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Waterfall Way															
2	T1	All MCs	99	6.4	99	6.4	0.052	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	100.0
3	R2	All MCs	2	0.0	2	0.0	0.002	7.8	LOS A	0.0	0.0	0.21	0.60	0.21	68.4
Approach			101	6.3	101	6.3	0.052	0.2	NA	0.0	0.0	0.00	0.01	0.00	99.0
East: Dome Road															
4	L2	All MCs	8	12.5	8	12.5	0.030	7.6	LOS A	0.1	0.8	0.30	0.60	0.30	63.3
6	R2	All MCs	18	5.9	18	5.9	0.030	8.5	LOS A	0.1	0.8	0.30	0.60	0.30	65.2
Approach			26	8.0	26	8.0	0.030	8.2	LOS A	0.1	0.8	0.30	0.60	0.30	64.6
North: Waterfall Way															
7	L2	All MCs	8	25.0	8	25.0	0.005	8.5	LOS A	0.0	0.0	0.00	0.66	0.00	65.4
8	T1	All MCs	100	12.6	100	12.6	0.055	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	100.0
Approach			108	13.6	108	13.6	0.055	0.7	NA	0.0	0.0	0.00	0.05	0.00	96.0
All Vehicles			236	9.8	236	9.8	0.055	1.3	NA	0.1	0.8	0.04	0.10	0.04	92.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 101 [Waterfall Way/ Dome Road_ HOL (Site Folder: Existing)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

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

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Waterfall Way															
2	T1	All MCs	103	6.1	103	6.1	0.054	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	100.0
3	R2	All MCs	9	22.2	9	22.2	0.008	8.5	LOS A	0.0	0.3	0.22	0.61	0.22	60.6
Approach			113	7.5	113	7.5	0.054	0.7	NA	0.0	0.3	0.02	0.05	0.02	94.8
East: Dome Road															
4	L2	All MCs	22	9.5	22	9.5	0.026	7.6	LOS A	0.1	0.7	0.23	0.59	0.23	64.5
6	R2	All MCs	5	0.0	5	0.0	0.026	8.4	LOS A	0.1	0.7	0.23	0.59	0.23	67.3
Approach			27	7.7	27	7.7	0.026	7.7	LOS A	0.1	0.7	0.23	0.59	0.23	65.0
North: Waterfall Way															
7	L2	All MCs	1	0.0	1	0.0	0.001	7.8	LOS A	0.0	0.0	0.00	0.66	0.00	74.4
8	T1	All MCs	105	13.0	105	13.0	0.059	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	100.0
Approach			106	12.9	106	12.9	0.059	0.1	NA	0.0	0.0	0.00	0.01	0.00	99.6
All Vehicles			246	9.8	246	9.8	0.059	1.2	NA	0.1	0.7	0.03	0.09	0.03	92.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 101 [Waterfall Way/ Dome Road_ AM_group_1 (Site Folder: Existing+Dev)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

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

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Waterfall Way															
2	T1	All MCs	80	5.3	80	5.3	0.042	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	100.0
3	R2	All MCs	20	10.5	20	10.5	0.017	8.2	LOS A	0.1	0.5	0.25	0.62	0.25	64.3
Approach			100	6.3	100	6.3	0.042	1.7	NA	0.1	0.5	0.05	0.12	0.05	90.0
East: Dome Road															
4	L2	All MCs	11	20.0	11	20.0	0.036	7.8	LOS A	0.1	1.1	0.31	0.60	0.31	61.1
6	R2	All MCs	18	29.4	18	29.4	0.036	9.5	LOS A	0.1	1.1	0.31	0.60	0.31	58.8
Approach			28	25.9	28	25.9	0.036	8.9	LOS A	0.1	1.1	0.31	0.60	0.31	59.6
North: Waterfall Way															
7	L2	All MCs	35	3.0	35	3.0	0.020	7.9	LOS A	0.0	0.0	0.00	0.66	0.00	72.6
8	T1	All MCs	97	14.1	97	14.1	0.054	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	100.0
Approach			132	11.2	132	11.2	0.054	2.1	NA	0.0	0.0	0.00	0.17	0.00	90.9
All Vehicles			260	10.9	260	10.9	0.054	2.7	NA	0.1	1.1	0.05	0.20	0.05	85.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 101 [Waterfall Way/ Dome Road_ PM_group_1 (Site Folder: Existing+Dev)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

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

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Waterfall Way															
2	T1	All MCs	99	6.4	99	6.4	0.052	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	100.0
3	R2	All MCs	6	0.0	6	0.0	0.005	7.9	LOS A	0.0	0.1	0.23	0.60	0.23	68.3
Approach			105	6.0	105	6.0	0.052	0.5	NA	0.0	0.1	0.01	0.04	0.01	97.3
East: Dome Road															
4	L2	All MCs	60	1.8	60	1.8	0.207	7.5	LOS A	0.9	6.3	0.35	0.63	0.35	66.2
6	R2	All MCs	128	0.8	128	0.8	0.207	8.8	LOS A	0.9	6.3	0.35	0.63	0.35	66.5
Approach			188	1.1	188	1.1	0.207	8.4	LOS A	0.9	6.3	0.35	0.63	0.35	66.4
North: Waterfall Way															
7	L2	All MCs	27	7.7	27	7.7	0.016	8.0	LOS A	0.0	0.0	0.00	0.66	0.00	70.9
8	T1	All MCs	100	12.6	100	12.6	0.055	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	100.0
Approach			127	11.6	127	11.6	0.055	1.7	NA	0.0	0.0	0.00	0.14	0.00	91.8
All Vehicles			421	5.5	421	5.5	0.207	4.4	NA	0.9	6.3	0.16	0.33	0.16	79.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 101 [Waterfall Way/ Dome Road_ AM_group_4 (Site Folder: Existing+Dev)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

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

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Waterfall Way															
2	T1	All MCs	80	5.3	80	5.3	0.042	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	100.0
3	R2	All MCs	33	6.5	33	6.5	0.027	8.2	LOS A	0.1	0.8	0.27	0.62	0.27	65.7
Approach			113	5.6	113	5.6	0.042	2.4	NA	0.1	0.8	0.08	0.18	0.08	86.9
East: Dome Road															
4	L2	All MCs	12	18.2	12	18.2	0.039	7.7	LOS A	0.1	1.2	0.32	0.61	0.32	61.4
6	R2	All MCs	19	27.8	19	27.8	0.039	9.7	LOS A	0.1	1.2	0.32	0.61	0.32	59.0
Approach			31	24.1	31	24.1	0.039	9.0	LOS A	0.1	1.2	0.32	0.61	0.32	59.9
North: Waterfall Way															
7	L2	All MCs	56	1.9	56	1.9	0.031	7.9	LOS A	0.0	0.0	0.00	0.66	0.00	73.0
8	T1	All MCs	97	14.1	97	14.1	0.054	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	100.0
Approach			153	9.7	153	9.7	0.054	2.9	NA	0.0	0.0	0.00	0.24	0.00	88.0
All Vehicles			296	9.6	296	9.6	0.054	3.3	NA	0.1	1.2	0.06	0.26	0.06	83.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 101 [Waterfall Way/ Dome Road_ PM_group_4 (Site Folder: Existing+Dev)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

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

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Waterfall Way															
2	T1	All MCs	99	6.4	99	6.4	0.052	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	100.0
3	R2	All MCs	17	0.0	17	0.0	0.014	8.0	LOS A	0.1	0.4	0.27	0.61	0.27	68.1
Approach			116	5.5	116	5.5	0.052	1.2	NA	0.1	0.4	0.04	0.09	0.04	93.6
East: Dome Road															
4	L2	All MCs	64	1.6	64	1.6	0.227	7.5	LOS A	1.0	7.0	0.37	0.63	0.37	65.9
6	R2	All MCs	137	0.8	137	0.8	0.227	9.2	LOS A	1.0	7.0	0.37	0.63	0.37	66.2
Approach			201	1.0	201	1.0	0.227	8.6	LOS A	1.0	7.0	0.37	0.63	0.37	66.1
North: Waterfall Way															
7	L2	All MCs	69	3.0	69	3.0	0.039	7.9	LOS A	0.0	0.0	0.00	0.66	0.00	72.5
8	T1	All MCs	100	12.6	100	12.6	0.055	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	100.0
Approach			169	8.7	169	8.7	0.055	3.2	NA	0.0	0.0	0.00	0.27	0.00	86.5
All Vehicles			486	4.8	486	4.8	0.227	5.0	NA	1.0	7.0	0.16	0.38	0.16	78.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 101 [Waterfall Way/ Dome Road_ HOL_group_4 (Site Folder: Existing+Dev)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

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

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Waterfall Way															
2	T1	All MCs	103	6.1	103	6.1	0.054	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	100.0
3	R2	All MCs	169	1.2	169	1.2	0.137	8.1	LOS A	0.6	4.1	0.28	0.64	0.28	67.6
Approach			273	3.1	273	3.1	0.137	5.0	NA	0.6	4.1	0.17	0.40	0.17	77.0
East: Dome Road															
4	L2	All MCs	213	1.0	213	1.0	0.259	7.5	LOS A	1.1	8.0	0.30	0.61	0.30	66.6
6	R2	All MCs	53	0.0	53	0.0	0.259	11.0	LOS A	1.1	8.0	0.30	0.61	0.30	66.9
Approach			265	0.8	265	0.8	0.259	8.2	LOS A	1.1	8.0	0.30	0.61	0.30	66.7
North: Waterfall Way															
7	L2	All MCs	41	0.0	41	0.0	0.023	7.8	LOS A	0.0	0.0	0.00	0.66	0.00	74.4
8	T1	All MCs	105	13.0	105	13.0	0.059	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	100.0
Approach			146	9.4	146	9.4	0.059	2.2	NA	0.0	0.0	0.00	0.18	0.00	91.2
All Vehicles			684	3.5	684	3.5	0.259	5.7	NA	1.1	8.0	0.19	0.43	0.19	75.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 101 [Waterfall Way/ Dome Road_ AM_group_1 (Site Folder: 2034+Dev)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

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

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Waterfall Way															
2	T1	All MCs	88	4.8	88	4.8	0.046	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	100.0
3	R2	All MCs	21	10.0	21	10.0	0.018	8.3	LOS A	0.1	0.5	0.25	0.62	0.25	64.5
Approach			109	5.8	109	5.8	0.046	1.6	NA	0.1	0.5	0.05	0.12	0.05	90.4
East: Dome Road															
4	L2	All MCs	11	20.0	11	20.0	0.037	7.8	LOS A	0.1	1.2	0.32	0.61	0.32	60.9
6	R2	All MCs	18	29.4	18	29.4	0.037	9.7	LOS A	0.1	1.2	0.32	0.61	0.32	58.6
Approach			28	25.9	28	25.9	0.037	9.0	LOS A	0.1	1.2	0.32	0.61	0.32	59.4
North: Waterfall Way															
7	L2	All MCs	36	2.9	36	2.9	0.020	7.9	LOS A	0.0	0.0	0.00	0.66	0.00	72.6
8	T1	All MCs	105	13.0	105	13.0	0.059	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	100.0
Approach			141	10.4	141	10.4	0.059	2.0	NA	0.0	0.0	0.00	0.17	0.00	91.2
All Vehicles			279	10.2	279	10.2	0.059	2.6	NA	0.1	1.2	0.05	0.19	0.05	86.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 101 [Waterfall Way/ Dome Road_ PM_group_1 (Site Folder: 2034+Dev)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

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

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Waterfall Way															
2	T1	All MCs	108	5.8	108	5.8	0.057	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	100.0
3	R2	All MCs	6	0.0	6	0.0	0.005	7.9	LOS A	0.0	0.1	0.24	0.60	0.24	68.3
Approach			115	5.5	115	5.5	0.057	0.4	NA	0.0	0.1	0.01	0.03	0.01	97.5
East: Dome Road															
4	L2	All MCs	61	1.7	61	1.7	0.215	7.5	LOS A	0.9	6.5	0.36	0.63	0.36	66.0
6	R2	All MCs	131	0.8	131	0.8	0.215	9.0	LOS A	0.9	6.5	0.36	0.63	0.36	66.3
Approach			192	1.1	192	1.1	0.215	8.5	LOS A	0.9	6.5	0.36	0.63	0.36	66.2
North: Waterfall Way															
7	L2	All MCs	28	7.4	28	7.4	0.017	8.0	LOS A	0.0	0.0	0.00	0.66	0.00	71.0
8	T1	All MCs	109	11.5	109	11.5	0.060	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	100.0
Approach			138	10.7	138	10.7	0.060	1.7	NA	0.0	0.0	0.00	0.14	0.00	92.2
All Vehicles			444	5.2	444	5.2	0.215	4.3	NA	0.9	6.5	0.16	0.32	0.16	79.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 101 [Waterfall Way/ Dome Road_ AM_group_4 (Site Folder: 2034+Dev)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

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

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Waterfall Way															
2	T1	All MCs	88	4.8	88	4.8	0.046	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	100.0
3	R2	All MCs	34	6.3	34	6.3	0.029	8.2	LOS A	0.1	0.8	0.27	0.63	0.27	65.7
Approach			122	5.2	122	5.2	0.046	2.3	NA	0.1	0.8	0.08	0.17	0.08	87.4
East: Dome Road															
4	L2	All MCs	12	18.2	12	18.2	0.040	7.8	LOS A	0.1	1.2	0.33	0.61	0.33	61.3
6	R2	All MCs	19	27.8	19	27.8	0.040	10.0	LOS A	0.1	1.2	0.33	0.61	0.33	58.9
Approach			31	24.1	31	24.1	0.040	9.1	LOS A	0.1	1.2	0.33	0.61	0.33	59.8
North: Waterfall Way															
7	L2	All MCs	57	1.9	57	1.9	0.032	7.9	LOS A	0.0	0.0	0.00	0.66	0.00	73.0
8	T1	All MCs	105	13.0	105	13.0	0.059	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	100.0
Approach			162	9.1	162	9.1	0.059	2.8	NA	0.0	0.0	0.00	0.23	0.00	88.5
All Vehicles			315	9.0	315	9.0	0.059	3.2	NA	0.1	1.2	0.06	0.25	0.06	84.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 101 [Waterfall Way/ Dome Road_ PM_group_4 (Site Folder: 2034+Dev)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

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

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Waterfall Way															
2	T1	All MCs	108	5.8	108	5.8	0.057	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	100.0
3	R2	All MCs	17	0.0	17	0.0	0.014	8.1	LOS A	0.1	0.4	0.28	0.62	0.28	68.1
Approach			125	5.0	125	5.0	0.057	1.1	NA	0.1	0.4	0.04	0.08	0.04	94.0
East: Dome Road															
4	L2	All MCs	65	1.6	65	1.6	0.236	7.5	LOS A	1.0	7.3	0.39	0.64	0.39	65.8
6	R2	All MCs	139	0.8	139	0.8	0.236	9.4	LOS A	1.0	7.3	0.39	0.64	0.39	66.0
Approach			204	1.0	204	1.0	0.236	8.8	LOS A	1.0	7.3	0.39	0.64	0.39	65.9
North: Waterfall Way															
7	L2	All MCs	71	3.0	71	3.0	0.040	7.9	LOS A	0.0	0.0	0.00	0.66	0.00	72.6
8	T1	All MCs	109	11.5	109	11.5	0.060	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	100.0
Approach			180	8.2	180	8.2	0.060	3.1	NA	0.0	0.0	0.00	0.26	0.00	87.0
All Vehicles			509	4.5	509	4.5	0.236	4.9	NA	1.0	7.3	0.16	0.37	0.16	78.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 101 [Waterfall Way/ Dome Road_ HOL_group_4 (Site Folder: 2034+Dev)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

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

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Waterfall Way															
2	T1	All MCs	114	6.5	114	6.5	0.060	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	100.0
3	R2	All MCs	171	1.2	171	1.2	0.139	8.1	LOS A	0.6	4.2	0.29	0.64	0.29	67.6
Approach			284	3.3	284	3.3	0.139	4.9	NA	0.6	4.2	0.17	0.39	0.17	77.6
East: Dome Road															
4	L2	All MCs	215	1.0	215	1.0	0.267	7.6	LOS A	1.2	8.3	0.32	0.61	0.32	66.5
6	R2	All MCs	54	0.0	54	0.0	0.267	11.3	LOS A	1.2	8.3	0.32	0.61	0.32	66.8
Approach			268	0.8	268	0.8	0.267	8.3	LOS A	1.2	8.3	0.32	0.61	0.32	66.5
North: Waterfall Way															
7	L2	All MCs	41	0.0	41	0.0	0.023	7.8	LOS A	0.0	0.0	0.00	0.66	0.00	74.4
8	T1	All MCs	116	12.7	116	12.7	0.064	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	100.0
Approach			157	9.4	157	9.4	0.064	2.1	NA	0.0	0.0	0.00	0.17	0.00	91.7
All Vehicles			709	3.7	709	3.7	0.267	5.6	NA	1.2	8.3	0.19	0.42	0.19	75.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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