traffic + transport

Transport Assessment

Planning Proposal

Mixed Use Development, 310 Terrigal Drive, Terrigal

for

LoftusLane Capital Partners

Document Control

Project No: 0233

Project: Terrigal Mixed Use Development

Client: LoftusLane Capital Partners

File Reference: P0233r2v5 Terrigal Mixed Use Development Transport Assessment

Revision History

Revision	Date	Details	Approved by
v1	30/08/2022	Draft 1	A. Reisch
v2	6/12/2022	Draft 2	A. Reisch
v3	29/05/2023	Final 1	A. Reisch
v4	20/06/2023	Final 2	A. Reisch
v5	23/06/2023	Final 3	A. Reisch
v6	4/07/2023	Final 4	A. Reisch

Table of Contents

1 Introduction

1.1 Overview

This Transport Assessment (**TA**) has been prepared by arc traffic + transport on behalf of Loftus Lane Capital Partners (the **Applicant**), in support of a Planning Proposal (the **Proposal**) relating to land identified as 310 Terrigal Drive, Terrigal, which is legally described as Lot 27 in DP 1223375 (the **Site**).

The Proposal seeks to amend the Central Coast LEP 2022 by increasing the maximum permissible height of buildings to 32m, and the maximum floor space ratio to 1.4:1. The Proposal will enable the Site to be redeveloped from a vacant land parcel to an eight-storey residential flat building, with a café activating the corner of Charles Kay Drive and Terrigal Drive at ground level. The **Concept Plans** prepared by CKDS Architects demonstrate the potential for the Site to accommodate 42 residential apartments and 75 car parking spaces across three basement levels.

1.2 Transport Assessment

This TA has been prepared to examine the access, traffic and parking characteristics of the Proposal, and specifically focuses on:

- The existing and future base operation of the local road network;
- Proposed Site access, and vehicle trip paths to/from the local road network;
- The peak trip generation of the Site further to the Proposal, and the potential impact of those trips on the local road network;
- Parking requirements with reference to Council and Roads & Maritime Services (**Roads & Maritime**) guidelines; and
- The design of access, parking and servicing infrastructure.

From the outset, it is important to note that as a Planning Proposal, this TA has been prepared to essentially provide a *proof of concept* assessment, i.e. to determine whether the Proposal has merit from a traffic and transport perspective. Further to a future approval of the Proposal by the Department of Planning & Environment (**DPE**), a detailed Development Application (**DA**) would necessarily be prepared for submission to Central Coast Council (**Council**) for assessment.

1.3 Reference Documents

1.3.1 Planning Controls and Strategies

The Site lies within the Central Coast Council (**Council**) LGA; key Council planning documents referenced in the preparation of this TA include:

- Central Coast Development Control (**CC DCP**); and
- Central Coast Local Environmental Plan (**CCC LEP**).

1.3.2 Traffic and Transport Guidelines

This TA also references general traffic and transport guidelines, including:

- Guide to Traffic Generating Developments 2002, Roads & Maritime Services (**RTA Guide**);
- Guide to Traffic Generating Developments – Updated Traffic Surveys 2013, Roads & Maritime Services (**RMS Guide**);
- Land Use Traffic Surveys: Medium Density Analysis Report, Roads & Maritime Services (**RMS Medium Density Report**);
- Austroads Guide to Road Design Part 3: Geometric Design (**GRD Part 3**);
- Austroads Guide to Road Design Part 4: Intersections & Crossings General (**GRD Part 4**);
- Austroads Guide to Traffic Management Part 6: Intersections, Interchanges and Crossings Management (**GTM Part 6**);
- Australian Standard 2890.1: Parking Facilities – Off-Street Car Parking 2009 (**AS 2890.1**);
- Australian Standard 2890.2: Parking Facilities – Off-Street Commercial Vehicle Facilities 2018 (**AS 2890.2**); and
- Australian Standard 2890.6: Parking Facilities – Off-Street Parking for People with a Disability 2009 (**AS 2890.6**).

The TA has also been prepared with reference to the transport assessment guidelines provided in:

- Transport for NSW Guide to Transport Impact Assessments; and
- Austroads Guide to Traffic Management Part 12: Integrated Transport Assessments for Developments.

1.4 Consultation

It is also important to state from the outset that the Proposal is significantly different in scope to a Concept Plan previously provided to Council and Transport for NSW (**TfNSW**) for review in July 2022; the Concept Plan provided for very significant Site development, including high-density residential, retail, commercial and child care floorspace.

As discussed in a meeting on 17 August 2022, Council and TfNSW raised a number of concerns with the scale of the Concept Plan development, many relating to the potential traffic generation of the Site and associated impacts. From the outset, it is again noted that the Proposal provides a significantly reduced scale of development of the Site, and in turn significant reduced traffic generation.

Further to these revisions, TfNSW sent correspondence dated 22 September 2022 (the **TfNSW 2022 Correspondence**) to Council outlining these discussions, and requested that the following be addressed in this TA:

- Access to public and active transport;
- Vehicular access;
- The trip generation of the Site;
- SIDRA intersection modelling of future traffic conditions; and

- A high-level review of parking and servicing provisions.

A revised TA (including consideration of the TfNSW 2022 Correspondence) was then provided to TfNSW in May 2023 (TA May 2023). Further to their review of TA May 2023, TfNSW provided a small number of additional comments (**TfNSW 2023 Correspondence**) relating to:

- The use of regional high density trip rates rather than the trip rates used in TA 2023 which were based on medium density dwellings in the Central Coast LGA;
- The use of a higher retail trip rate for application to the café;
- Revised SIDRA modelling reflecting these revised trip rates; and
- A more detailed assessment of Austroads warrants relating to the provision of auxiliary lane treatments at the Site driveway, and specifically warrants for a left turn lane into the Site.

All of the issues raised in the TfNSW 2022 Correspondence and TfNSW 2023 Correspondence has been addressed in this TA; a summary response to each of these issues is provided in the tables below, as well as reference to the relevant section of this TA providing a more detailed response in regard to each issue.

Finally, arc traffic + transport wishes to acknowledge the assistance provided by Council and TfNSW officers in identifying local issues requiring consideration in this TA.

Table 1: Summary Response to TfNSW 2022 Correspondence

TfNSW Information Request	Summary Response	TA Reference
TfNSW requests that the TIA for the final masterplan be prepared by a suitably qualified person/s in accordance with the Austroads Guide to Traffic Management Part 12, the complementary TfNSW Supplement and Roads and Maritime Guide to Traffic Generating Developments. In particular, it is recommended that the TIA be tailored to the scope of the proposed development and include, but not be limited to:		This TA
Traffic analysis of any major / relevant intersections impacted, using SIDRA or similar traffic model, including: • *Current traffic counts and 10-year traffic growth projections* • *With and without development scenarios* • *95th percentile back of queue lengths* • *Delays and level of service on all legs for the relevant intersections* • *Electronic data for TfNSW review.*	Traffic analysis using SIDRA has been undertaken at the intersections of Terrigal Drive & Charles Kay Drive, and Charles Kay Drive & Scenic Highway, as agreed in our discussions with TfNSW. The analysis includes: • 2022 traffic surveys; • 10 year growth projects based on TfNSW Count Station data; • With and without development scenarios; • 95%ile back of queue lengths; • Delays and Level of Service on all approaches at both intersections; and • Electronic SIDRA files are provided as an attachment to this TA.	Section 2.5 Section 2.6 Section 3.4 Appendix B
Any other impacts to the road network including consideration of active transport and public transport facilities.	The Site is provided with excellent access to public and active transport services and infrastructure, which will further assist in reducing private vehicle trips.	Section 2.8 Section 2.7

Table 1: Summary Response to TfNSW 2022 Correspondence (continued)

TfNSW Information Request	Summary Response	TA Reference
Identification of necessary road upgrades that are required to mitigate the impact of the development. Preliminary concept drawings for any road upgrades shall be designed in accordance with Austroads Guidelines, Australian Standards and TfNSW Supplements.	The Proposal does not result in any requirement for road upgrades in the broader road network; the only new infrastructure will be the provision of a new access driveway at the northern boundary of the Site to Charles Kay Drive, which is the location identified for the driveway in the CC DCP.	Section 3.4 Section 3.2
An assessment of turn treatment warrants in accordance with the Austroads Guide to Traffic Management Part 6 and Austroads Guide to Road Design Part 4A for relevant intersections along the identified transport route/s, including connections to the classified (State) road network.	The Proposal does not result in any requirement for intersection upgrades. In full accordance with the CC DCP, the Site access driveway will provide for left in/left out movements only, and not provide any additional turn lane infrastructure, again in accordance with the CC DCP.	Section 3.2
The distribution on the road network of the trips generated by the proposed development. It is requested that the predicted traffic flows are shown diagrammatically to a level of detail sufficient for easy interpretation.	The distribution of trips to/from the Site has been determined with reference to the location of local and sub-regional employment, services, retail and social centres. The trip generation of the Site during both the AM and PM peak hour has been shown diagrammatically.	Section 3.4
Assessment of all relevant vehicular traffic routes and intersections for access to / from the subject properties.	Traffic analysis using SIDRA has been undertaken that the intersections of Terrigal Drive & Charles Kay Drive, and Charles Kay Drive & Scenic Highway, as agreed in our discussions with TfNSW.	Section 3.4
Current traffic counts for all relevant traffic routes and relevant intersections, including connections to the classified (State) road network.	Traffic surveys were undertaken in 2022 at the intersections of Terrigal Drive & Charles Kay Drive, and Charles Kay Drive & Scenic Highway, as agreed in our discussions with TfNSW.	Section 2.5

Table 2: Summary Response to TfNSW 2023 Correspondence

TfNSW Information Request	Summary Response	TA
It is recommended that a trip rate of 5 / 100m2 GFA is adopted for the proposed café as per RTA Guide and RMS Guide trip rates for restaurants and small retail premises.	As agreed, the traffic analysis has been revised to include a trip rate of 5 trips per 100m^2 GFA for the café component of the Proposal.	Section 3.4.1
According to RTA Guide, The proposed 42 residential apartments is considered a high density development. As such, it is advised that trip rates for regional high density development be adopted in accordance with RTA Guide and RMS Guide.	As agreed, the traffic analysis has been revised to include the average trip rate for regional high density sites for the residential component of the Proposal.	Section 3.4.1
The SIDRA model needs to be updated with the revised trip generation numbers, a copy of the SIDRA file should be submitted as part of the formal submission.	As agreed, the SIDRA modelling has been updated to account for the revised trip rates for the café and residential components of the Proposal as requested by TfNSW, and electronic copies of the SIDRA files are provided as an attachment to this TA.	Section 3.4.6
As previously advised, the TIA should include an assessment of turn treatment warrants in accordance with the Austroads Guide to Traffic Management Part 6 and Austroads Guide to Road Design Part 4A for relevant intersections along the identified transport route/s, including the site access to the classified (State) road network. The TIA should demonstrate that the expected number of the left turn movements into the subject site does not necessitate an auxiliary left turn lane on Charles Kay Drive, in accordance with Council's DCP	As agreed, a detailed assessment of the Austroads auxiliary treatment warrants has been prepared in relation to the Site driveway to Charles Kay Drive, which indicates that no auxiliary treatment - and specifically a left turn lane into the Site - is required.	Section 3.3

2 Existing Conditions

2.1 Site Location

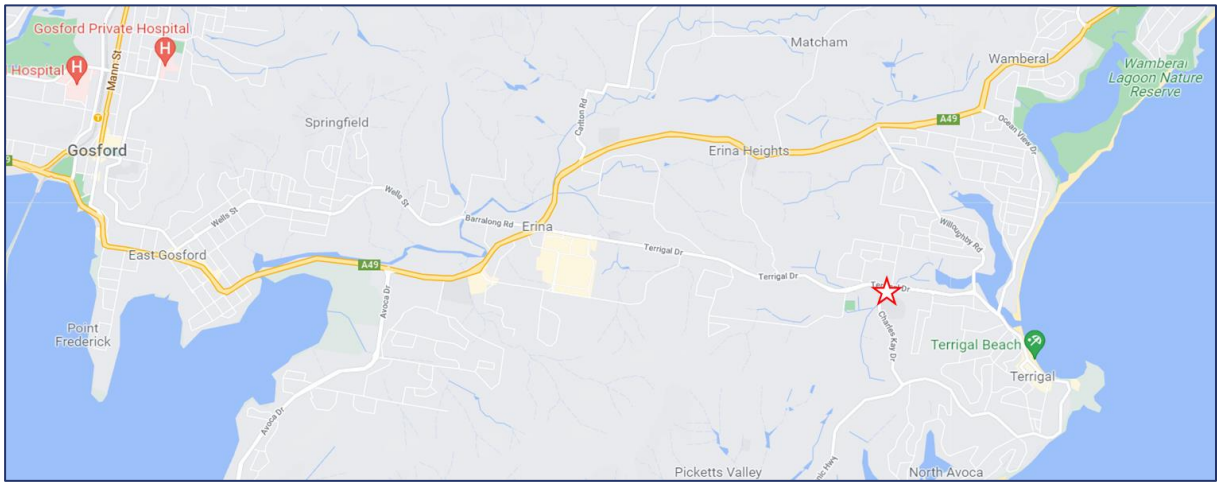
The Site is located at 310 Terrigal Drive, Terrigal. It is bordered by Terrigal Drive to the north, bushland and Terrigal High School to the south, bushland and residential dwellings to the east, and Charles Kay Drive to the west.

The Site is shown in its local context in Figure 1, and broader sub-regional context in Figure 2.

Figure 1: Site Location Local Context

Source: Google

Figure 2: Site Location Sub-Regional Context



Source: Google

2.2 Site Use

The Site is currently undeveloped; it is our understanding that it was formerly land set aside for potential road network infrastructure by TfNSW, but was considered not to be required for such, and in turn was recently sold by TfNSW to Loftus Lane.

2.3 Key Roads

2.3.1 Terrigal Drive

Terrigal Drive is a State Road which generally runs east-west between Terrigal Beach and Central Coast Highway. In the vicinity of the Site it provides 2 median separated traffic lanes in each direction, and significant auxiliary lane infrastructure at its intersection with Charles Kay Drive (see Section 2.4.1). Terrigal Drive in the vicinity of the Site has a posted speed limit of 60km/h, as well as School Zone 40km/h speed limits during school peak periods.

2.3.2 Charles Kay Road

Charles Kay Drive is a State Road that generally runs north-south between Terrigal Drive and Scenic Highway. In the vicinity of the Site it provides 2 median separate traffic lanes in each direction, and significant auxiliary lane infrastructure at its intersection with Terrigal Drive (see Section 2.4.1).

2.4 Key Intersections

2.4.1 Terrigal Drive & Charles Kay Drive

This intersection operates under signal control, and as discussed provides significant auxiliary turn lane infrastructure, but a signalised pedestrian crossing of Charles Kay Drive only. The intersection was upgraded in 2016 to address congestion at the intersection, with the upgrade including additional approach and turning lanes in both roads, and the relocation the Terrigal Drive pedestrian crossings to Brunswick Road (see below).

2.4.2 Terrigal Drive & Brunswick Road

This intersection operates under signal control with a dedicated right turn lane, Terrigal Drive to Brunswick Road, and pedestrian crossings of all approaches. It is noted that the pedestrian crossings at this intersection would accommodate the pedestrian demand for crossing Terrigal Road that is not provided at the intersection of Terrigal Drive & Charles Kay Road.

2.4.3 Charles Kay Drive & Scenic Highway

This intersection operates under roundabout control, with single lanes on all approaches and a single circulating lane.

2.5 Existing Traffic Conditions

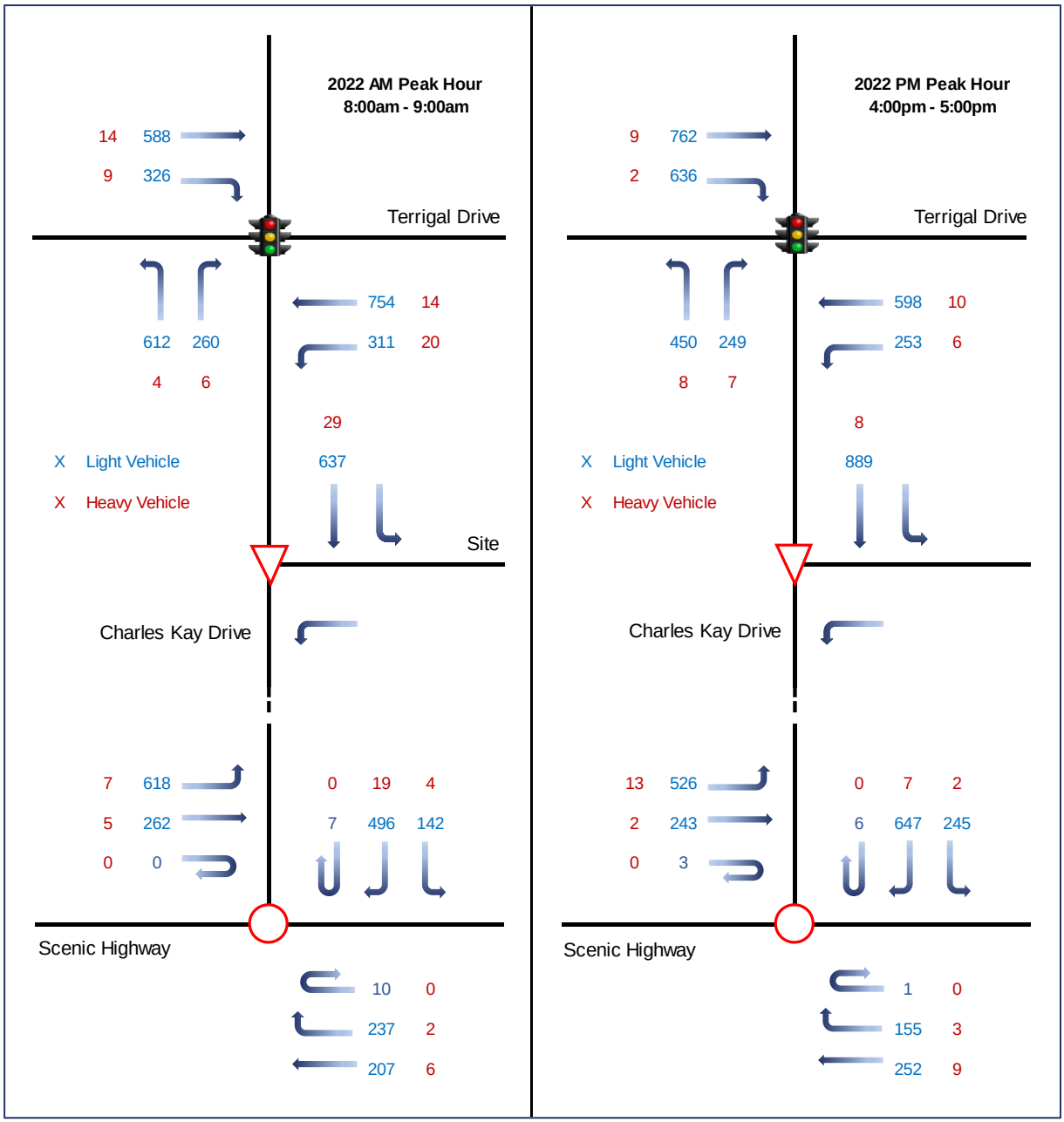
2.5.1 Traffic Surveys

Traffic surveys were undertaken by TIS Traffic on Thursday 4 August 2022; the full survey data set is provided in Appendix A.

2.5.2 Peak Period Traffic Volumes

With reference to the traffic surveys, the peak period traffic volumes at the key intersection are summarised in Figure 3.

Figure 3: 2022 Peak Hour Traffic Volumes



Source: TIS Traffic

2.5.3 Intersection Operations: SIDRA

The operation of the key intersections has been assessed using the SIDRA intersection model. SIDRA provides a number of key outputs by which to measure the performance of an intersection, including:

- **Average Vehicle Delay (AVD):** AVD (or average delay per vehicle in seconds) for intersections is used to determine an intersection's Level of Service (see below). For signalised intersections, the AVD reported relates to the average of all vehicle movements through the intersection.
- **Level of Service (LOS):** LOS is a comparative measure that provides an indication of the operating performance, based on AVD.
- **Degree of Saturation:** Degree of Saturation (**DOS**) is defined as the ratio of demand (arrival) flow to capacity. Degrees of Saturation above 1.0 represent over-saturated conditions (demand flows exceed capacity) and degrees of saturation below 1.0 represent under-saturated conditions (demand flows are below capacity).

With regard to LOS, Table 3 provides a summary of the SIDRA recommended criteria for the assessment of intersections.

Table 3: SIDRA Level of Service Criteria

Level of Service	Average Delay (seconds per vehicle)	Traffic Signals & Roundabouts
A	less than 14	Good operation
B	15 to 28	Good with acceptable delays & spare capacity
C	29 to 42	Satisfactory
D	43 to 56	Operating near capacity
E	57 to 70	At capacity; at signals, incidents will cause excessive delays Roundabouts require other control mode
F	More than 70	Unsatisfactory and requires additional capacity.

Source: SIDRA Systems

2.5.4 Existing Intersection Operations

Further to the SIDRA analysis, Table 4 provides a summary of the existing operation of the key intersections; SIDRA Movement Reports are provided in Appendix B, and electronic copies of the SIDRA files are provided as an attachment to this TA.

Table 4: Existing Intersection Operations

Intersection Operations 2022	Level of Service		Average Delay		Degree of Saturation	
	AM	PM	AM	PM	AM	PM
Terrigal Drive & Charles Kay Drive	B	B	22.9	23.0	0.449	0.518
Charles Kay Drive & Scenic Highway	A	A	12.9	12.8	0.860	0.851

With reference to Table 4, the SIDRA analysis shows that both intersections currently operate well, with low average delays and significant spare capacity at the intersection of Terrigal Drive & Charles Kay Drive.

With regard to the intersection of Charles Kay Drive, the analysis indicates that the intersection is operating neat capacity in both peak periods. However, it is noted that arc traffic + transport has adopted the default circulation flow factor in SIDRA for the analysis; based on our observations at the intersection, it would be more than appropriate to adopt an environmental factor and circulation flow adjustments given the local nature of the intersection, i.e. it is primarily used by the same motorists every day, who are accustomed to the operation of the intersection and as such travel through it more efficiently.

Moreover, our observation indicate that the queue lengths reported in SIDRA (see Appendix B) are well in excess of those observed.

2.6 Future Base Traffic Conditions

2.6.1 Traffic Growth Factors

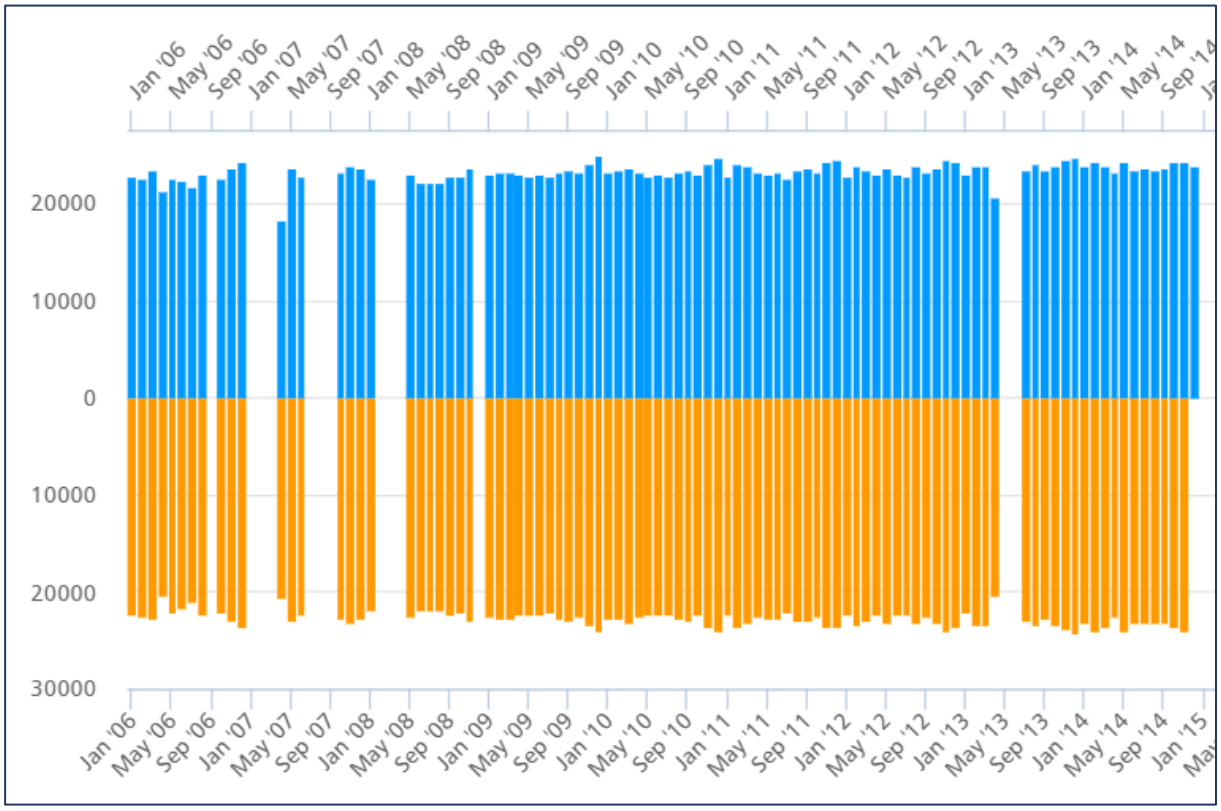
In accordance with TfNSW guidelines, an assessment of future base traffic conditions for a forecast year 2032 has been undertaken to ensure that the Proposal can be accommodated by the future road network.

In this regard, arc traffic + transport had initially sourced TfNSW data from Count Station 05125, located in Terrigal Drive at Serpentine Road; however, this Count Station provides only a single year of data, and as such no indication of growth in Terrigal Drive.

As such, and as agreed with TfNSW arc traffic + transport has review data from Count Station 05008, located in The Entrance Road west of Avoca Drive, which provides the only reasonable data set spanning numerous years. It is anticipated that growth at Count Station 05008 would be greater than in Terrigal Drive and Charles Kay Drive given that The Entrance Road provides key access for a significantly larger number of new developments within the LGA, but in turn provides what we would consider a worst case growth scenario.

Yearly data at Count Station 05008 is available for all years between 2006 and 2015, and is summarised in Table 5.

Table 5: Count Station 05008 (The Entrance Road) AADT Volumes 2006 - 2014



Source: TfNSW

With reference to Table 5 and the broader Count Station 05008 data set, average annual growth in The Entrance Road was 0.91% per annum between 2006 and 2014.

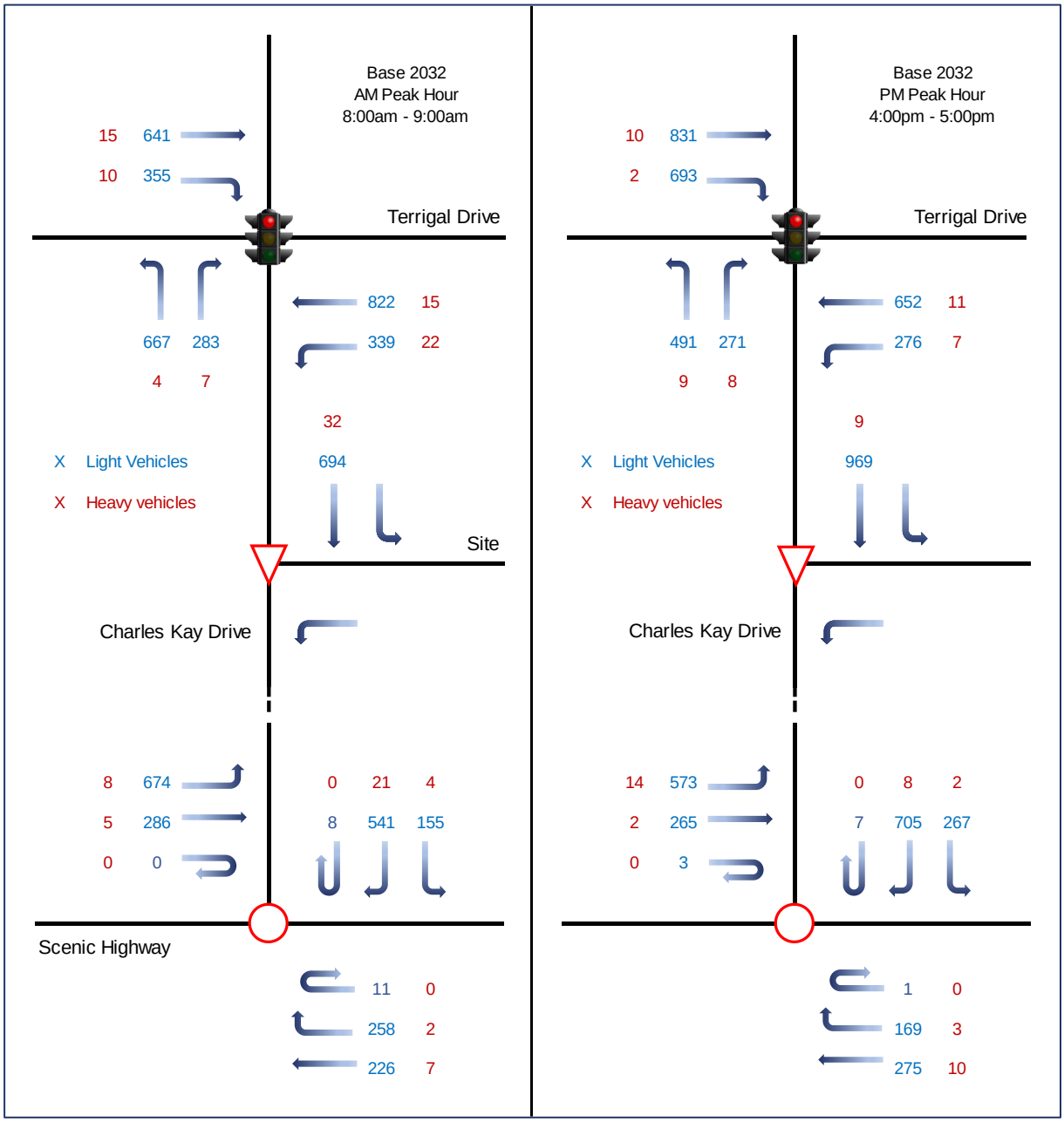
We note that Count Station 05008 data is also available for 2017 for eastbound traffic only. Referencing this 2017 eastbound data and 2006 eastbound data indicates average annual growth of -0.02% per annum. Notwithstanding, arc traffic + transport has applied the positive growth percentage as shown in the 2006 to 2014 two-way volumes for the assessment of future base conditions.

Finally, arc traffic + transport notes that it was agreed with TfNSW that should additional forecast data become available prior to the Planning Proposal being assessed, or a future Development Application being assessed, the calculation of the Base 2032 traffic volumes could be revised.

2.6.2 Base 2032 Traffic Volumes

Further to the above, Base 2032 traffic volumes at the key intersections have been determined further to the application of the identified annual growth rates to the 2022 traffic surveys; the resulting Base 2032 traffic volumes are shown in Figure 4.

Figure 4: Base 2032 Peak Hour Traffic Volumes



2.6.3 Base 2032 Intersection Operations

The operation of the key intersections under Base 2032 conditions has been assessed using SIDRA; the results of the analysis are summarised in Table 6; SIDRA Movement Reports are provided in Appendix C, and electronic copies of the SIDRA files are provided as an attachment to this TA.

Table 6: Base 2032 Intersection Operations

Intersection Operations Base 2032	Level of Service		Average Delay		Degree of Saturation	
	AM	PM	AM	PM	AM	PM
Terrigal Drive & Charles Kay Drive	B	B	23.2	23.4	0.523	0.565
Charles Kay Drive & Scenic Highway	B	B	20.4	20.7	0.961	0.944

With reference to Table 6, the intersection of Terrigal Drive & Charles Kay Drive continues to operate with only moderate delays and significant spare capacity.

The intersection of Charles Kay Drive & Scenic Highway also continues to operate with moderate delays, but is near capacity further to the introduction of background traffic growth by 2032. As discussed in Section 2.5.4, consideration of the actual operation of the intersection (i.e. including an environmental factor and circulating flow adjustments) sees the DOS significantly reduced under Base 2032.

2.7 Public Transport

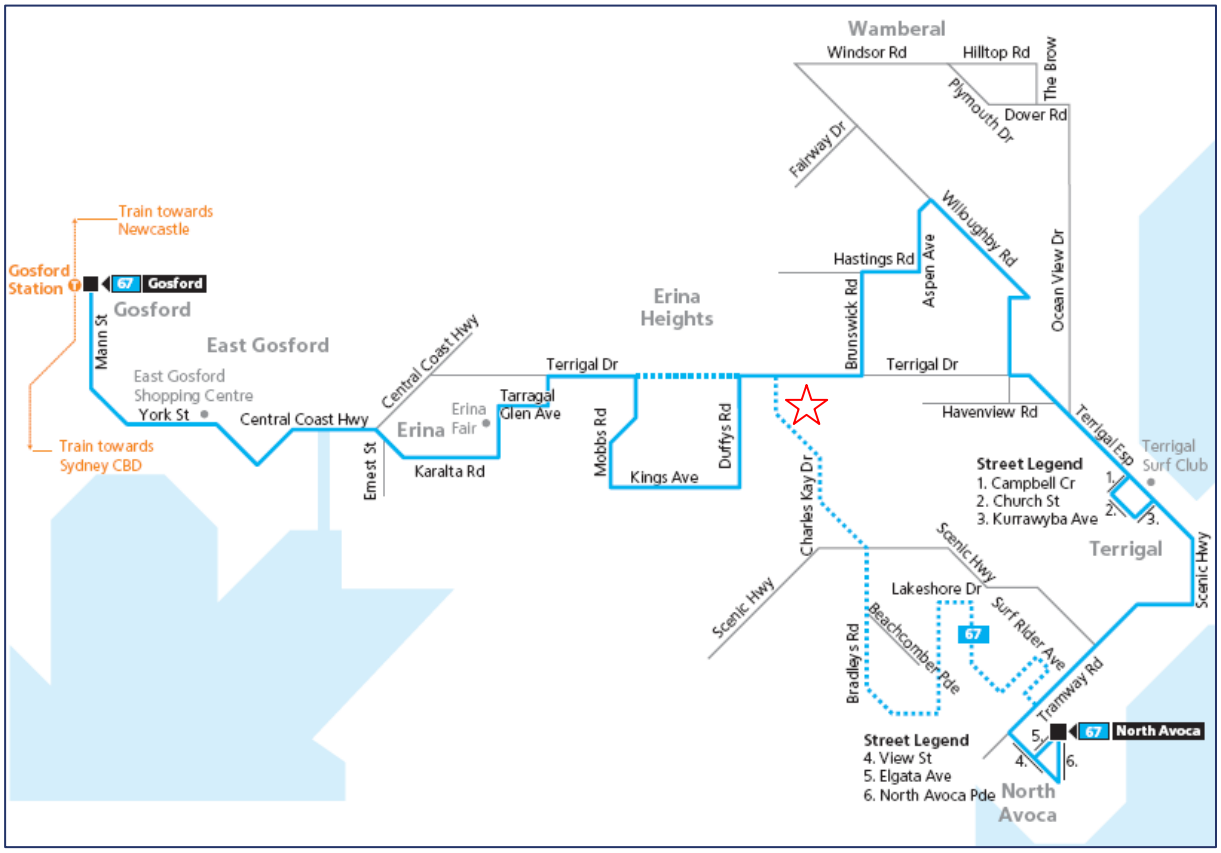
2.7.1 Bus Services

The Site is provided with good access to bus services, with bus stops immediately adjacent to the Site in both Terrigal Drive and Charles Kay Drive. These bus stops are serviced by two Busways Central Coast routes, including:

- **Bus Route 67** provides a loop service between Gosford, North Avoca and Terrigal. These services operate with a 30 minute headway on weekdays during the AM peak periods, and then every 60 minutes across the rest of the weekday, and hourly between 7:00am and 7:00pm on weekends.
- **Bus Route 68** provides a loop service between Gosford, Wamberal and Terrigal. These services operate with a 30 minute headway on weekdays during the AM peak periods, and then every 60 minutes across the rest of the weekday, and hourly between 7:00am and 7:00pm on weekends.

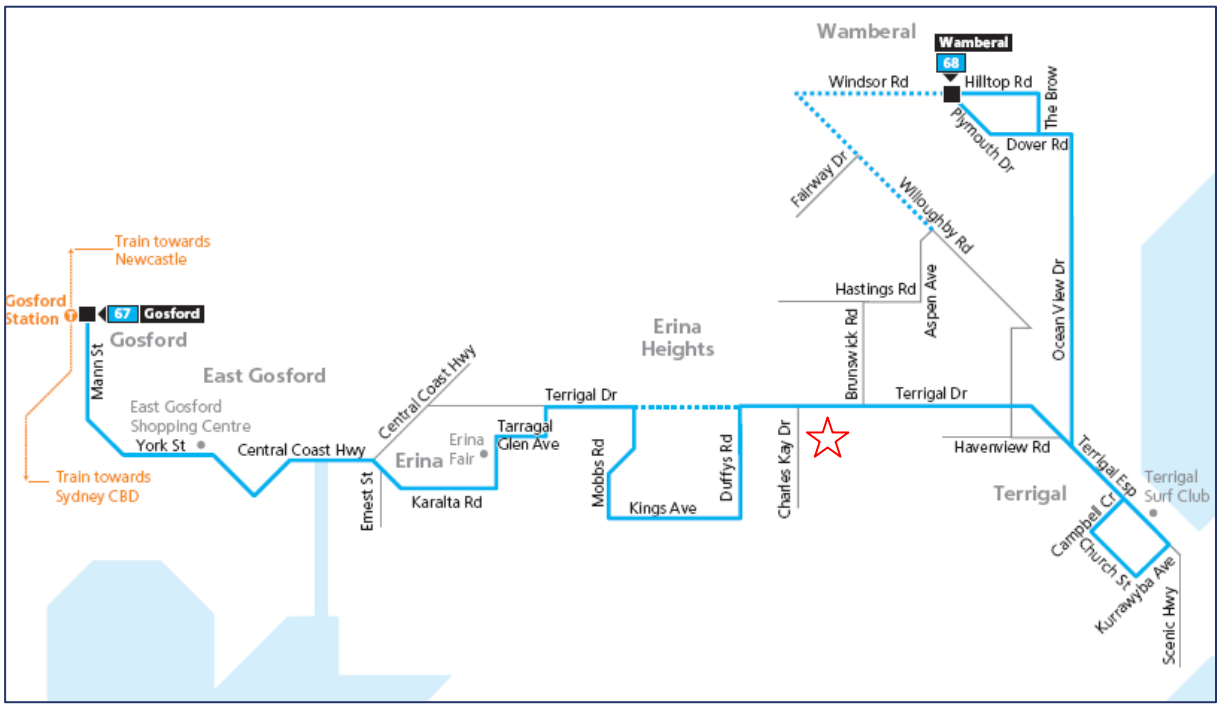
These bus routes are shown in the figures below.

Figure 5: Bus Route 67



Source: TfNSW

Figure 6: Bus Route 68



Source: TfNSW

2.7.2 Rail Services

Gosford Railway Station is located approximately 8km west of the Site. Gosford Station lies on the Central Coast and Newcastle Line, and provides high frequency train services between Gosford and Sydney and Newcastle. It also provides interchange services with local and regional bus services, and a large commuter car park.

The trip between the Site and Gosford Station by bus is approximately 20 minutes; the drive time to Gosford Station from the Site is approximately 20 minutes in the AM peak hour, and the drive time from Gosford Station to the Site approximately 15 minutes in the PM peak hour.

2.8 Active Transport

The Site is provided with excellent access to the local active transport network, with shared paths along the length of Terrigal Drive and north from Terrigal High School on the eastern side of Charles Kay Drive. Footpaths are also provided on both sides of Charles Kay Drive adjacent to the Site.

As noted previously, a signalised pedestrian crossing of Charles Kay Drive at its intersection with Terrigal Drive also provides immediate access to bus stops and recreational facilities to the west of the Site (including Duffy's Road Oval, Breakers Sports Stadium and Terrigal Tennis Club); and a signalised crossing of Terrigal Drive immediately north of the Site provides access to bus stops and residential areas to the north of Terrigal Drive.

3 The Proposal

3.1 The Proposal

As discussed in the Introduction, the Proposal will provide:

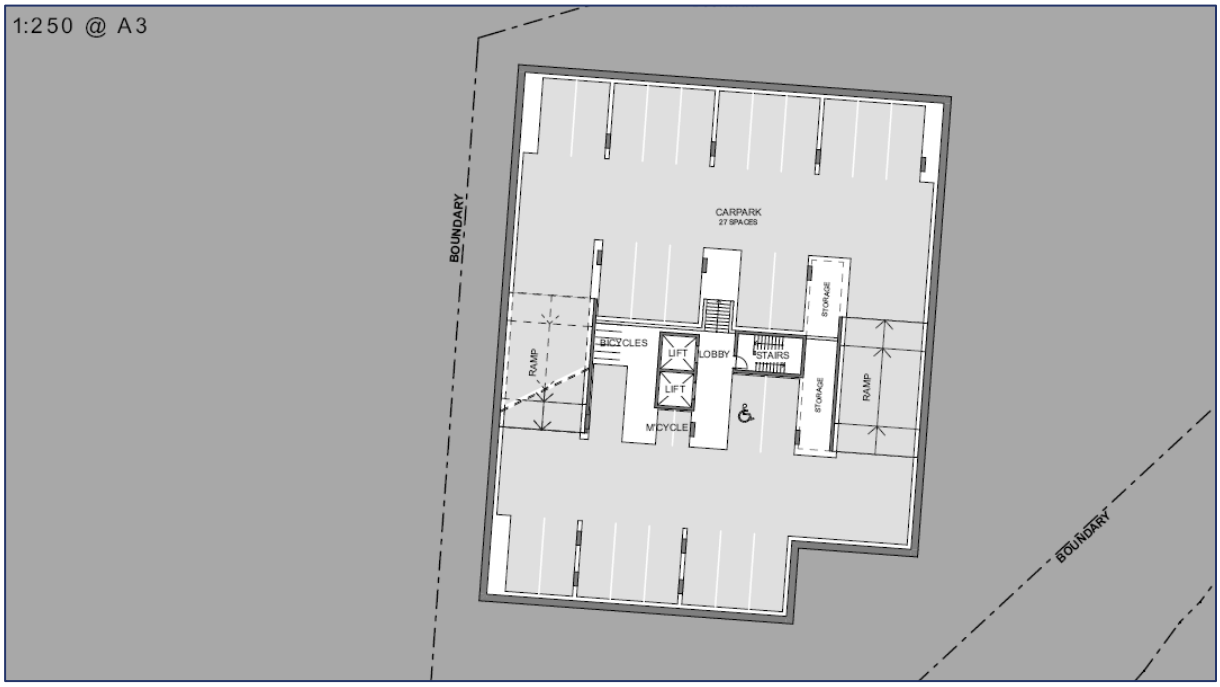
- 42 residential apartments;
- Retail (café) GFA of 64m^2;
- Access to the Site via a new left in/left out intersection to Charles Kay Drive; and
- Ancillary on-site access, parking and servicing infrastructure.

Full details of the Proposal, including plans, are provided in the broader Planning Proposal submission that this TA accompanies; the Ground Level and typical Basement Level plans are provided below for reference.

Figure 7: Ground Level Site Plan

Source: CKDS

Figure 8: Typical Basement Level Plan



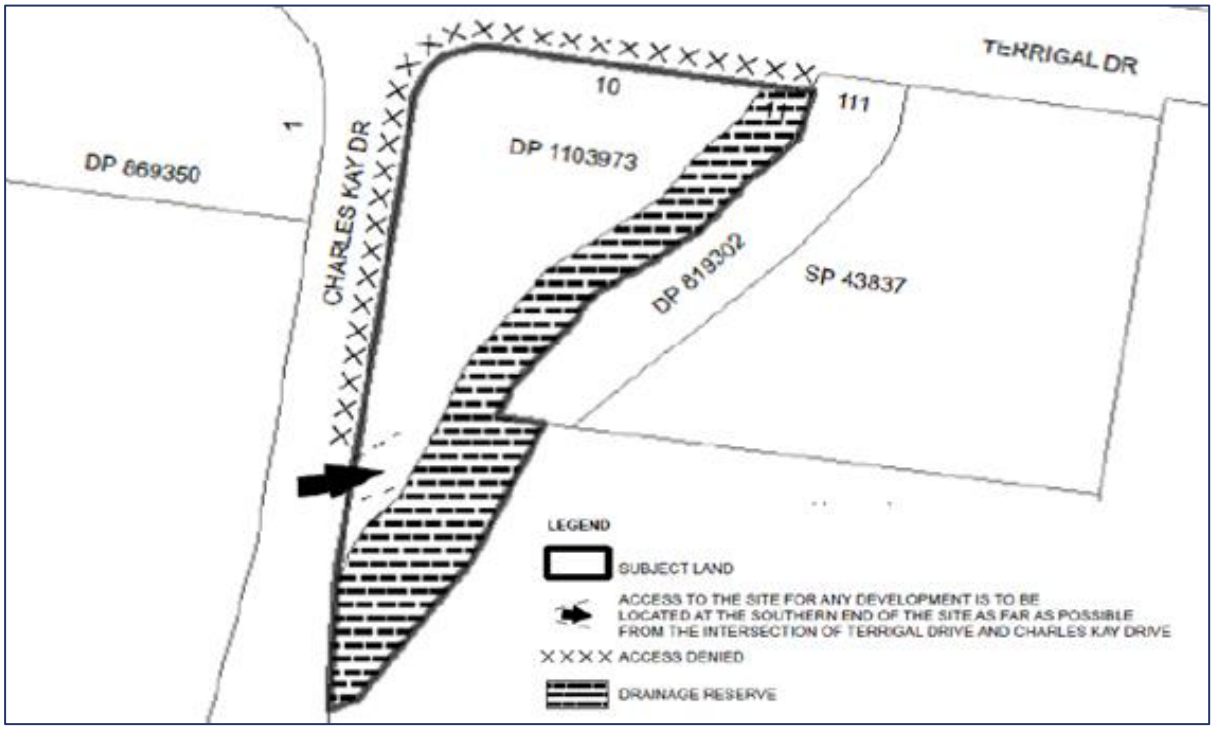
Source: CKDS

3.2 Access

3.2.1 Access Point Location

Access to/from the Site will be provided by a new driveway towards the southern boundary of the Site to Charles Kay Drive, which is compliant with the driveway location shown in Figure 1 of Section 5.11 of the CC DCP, which is reproduced below.

Figure 9: Site Access Location



Source: DCP

With reference to Figure 9, the DCP states that the access point location should be *as far as possible from the intersection of Terrigal Drive and Charles Kay Drive*. Based on our discussions with Loftus Lane, the proposed access driveway location is provided at the location of the existing driveway, which is as far south as possible further to necessary consideration of ecological and hydrological constraints in the southern portion of the Site.

3.2.2 Direct Access to Terrigal Drive

With reference to Section 5.11 of the CC DCP, no access is proposed to the Terrigal Drive.

3.2.3 Access Point Movements

As agreed with TfNSW, given the median in Charles Kay Drive adjacent to the access driveway, and moreover as a function of the safety and operational impacts that might arise from right turn movements to or from the Site at this location, all vehicle access will be restricted to left in and left out only (see also Section 3.4.4).

3.3 Auxiliary Treatments

3.3.1 Overview

With reference again to Section 5.11 of the CC DCP, *no auxiliary lanes would be available for any proposed development*; arc traffic + transport would interpret this restriction as most likely relating to the provision of right lane to/from Charles Kay Drive, but in our opinion, it should also apply to a requirement for an auxiliary left turn lane into the Site. Notwithstanding, a review of the GTM Part 6 warrants is provided in sections below.

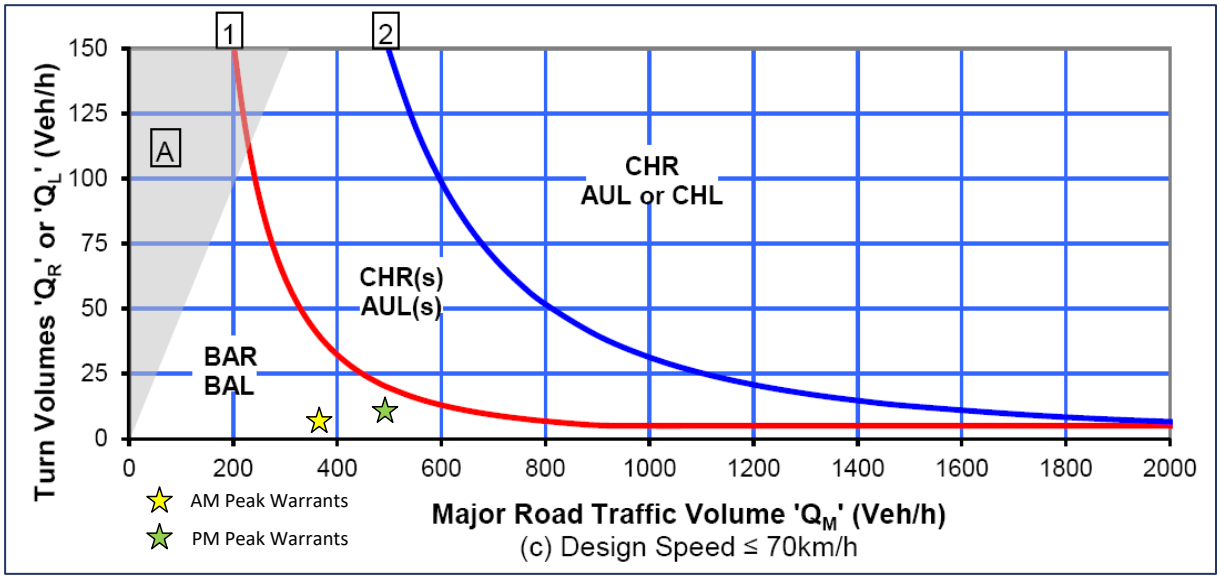
3.3.2 Auxiliary Treatment Warrants

Warrants for the assessment of auxiliary lane treatment are provided in Section 3.3.6 of the GTM Part 6, and – for left turn treatments - are based on the traffic volume in the major road (i.e. Charles Kay Drive southbound volumes) and the traffic volume turning to the Site. These volumes – which are detailed in Section 3.4 below – can then be plotted using Figure 3.25 of the GTM Part 6, which provides warrants where the major road speed limit is 70km/h or lower.

When considering the Site driveway, the opposing southbound traffic volume is only that travelling in the kerbside lane; as such, and as agreed with TfNSW, the warrants calculation estimates that 50% of the total southbound traffic volumes would be travelling in the kerbside, which is likely more traffic than anticipated given the merge (from the kerbside lane) to a single lane south of the Site.

Further to the above, Figure 10 shows the warrants identified in Figure 3.25 of GMT Part 6, and the required treatment at the Site driveway in the AM and PM peak hours.

Figure 10: GTM Part 6 Left Turn Treatment Warrants



Source: GTM Part 6

As shown in Figure 10, a higher order auxiliary lane treatment is not required for left turn access to the Site driveway.

3.3.3 General Considerations

Notwithstanding that the warrants assessment provided in Section 3.3.2 shows that no auxiliary lane treatments are required, it is important to review the safety of the Site driveway in accordance with the general considerations that the warrants are based on. In this regard, Section 3.3.5 of the GTM Part 6 states the following in regard to *deceleration turn lanes*:

> *The layouts of many intersections include turning lanes to ensure that deceleration and storage of turning vehicles occur clear of the through traffic lanes. The need for deceleration turn lanes cannot be stated definitively in all instances because of the many factors to be considered, such as speeds, traffic volumes, capacity, type of road, service provided, traffic control and crash history.*
>
> *However, the need is usually established on the basis of ensuring that turning traffic does not impede through traffic to the extent that:*
>
> - *the operational efficiency of an intersection or intersection approach is compromised*
> - *an unacceptable level of safety would result due to turning traffic slowing or stopping in a through lane.*
>
> *The need for auxiliary lanes and the type of treatment should consider:*
>
> - *the function of the road and its strategic significance*
> - *the volume of heavy vehicles using the road*
> - *operating speeds at the intersection*
> - *available sight distance to drivers of turning vehicles*
> - *consistency of treatment along a corridor to meet driver expectations*
> - *traffic volumes*.

Addressing these considerations, we note the following:

- The number of vehicles turning left into the Site driveway would average 1 vehicle per 10 minutes in the AM peak and 1 vehicle every 5 minutes in the PM peak, i.e. *the operational efficiency of an intersection or intersection approach* would not be *compromised*.
- Traffic approaching the Site driveway will have a reduced speed as vehicles will have had to turn from Terrigal Drive to Charles Kay Drive, and sight distance to the Site driveway exceeds Austroads requirements.
- A review of TfNSW crash data for the area indicates not a single crash resulting from a vehicle turning left into a Site (Road User Movement Code 31) from Terrigal Drive, Charles Kay Drive or Scenic Highway in the reporting period 2017 to 2021. Moreover, only a small number of crashes, primarily resulting in no or only minor injury, are reported in Charles Kay Drive for the same reporting period. As such, there will not be an *unacceptable level of safety* resulting due to turning traffic slowing or stopping in a through lane.

- Charles Kay Drive is a State Road, but as discussed provides access to a large number of sites directly and intersections to minor roads, none of which provide additional approach lane infrastructure (i.e. an auxiliary left lane). It also has a low speed limit of 60km/h (and 40km/h in school peaks), and speeds are further reduced by the uphill gradient that commences in the vicinity of the Site.

  As such, *the function of the road and its strategic significance* would not be compromised by vehicles accessing the Site.

- Heavy vehicles constitute less than 4% of traffic volumes in the AM peak, and less than 1% of traffic volumes in the PM peak, i.e. the volume of heavy vehicles using the road does not indicate a higher order treatment is required.
- With regard to the consistency of treatments along a corridor *to meet driver expectations*, as discussed there are no other sites in Terrigal Drive or Charles Kay Drive that provide auxiliary left turn treatments, and as such the *consistent treatment* is a simple driveway crossing as proposed.

3.4 Traffic

3.4.1 Trip Rates

As agreed with TfNSW, the trip generation rates for the key components of the Site are based on trip rates in the RMS Guide; in this regard:

- Residential Trip Rates

  As agreed with TfNSW, the traffic analysis adopts the average trip rates for regional high density development provided in the RMS Guide; these rates are:

  - 0.53 trips per dwelling in the AM peak hour; and
  - 0.32 trips per dwelling in the PM peak hour.

- Retail Floorspace

  The retail floorspace is anticipated to provide for a small cafe, and as such be largely ancillary to the development, i.e. it is anticipated to primary serve future residents and residents in the immediate local area. In turn, the majority of trips generated by the retail floorspace are anticipated to be active transport trips rather than vehicle trips.

  Notwithstanding, and as agreed with TfNSW, a trip rate of 5 trips per 100m^2 GFA has been adopted for both peak periods.

3.4.2 Trip Generation

With reference to sections above, the trip generation of the Site further to the Proposal is summarised in Table 7.

Table 7: Trip Generation

Land Use	Dwellings GFA (m^2)	AM Peak Hour		PM Peak Hour	
		Trip Rate	Trips	Trip Rate	Trips
Residential	42	0.530	22	0.320	13
Retail	64	0.05	3	0.05	3
Total			**25**		**17**

3.4.3 Arrival & Departure Profile

The arrival and departure profile of trips for the different components of the Proposal are based on RMS surveys and our extensive background in the assessment of residential and retail developments, and summarised in Table 8.

Table 8: Arrival & Departure Profile

Land Use	AM Peak Hour			PM Peak Hour		
	Trips	In	Out	Trips	In	Out
Residential	22	6	17	13	10	3
Retail	3	2	1	3	1	2
Total	**25**	**7**	**18**	**17**	**11**	**5**

3.4.4 Trip Distribution

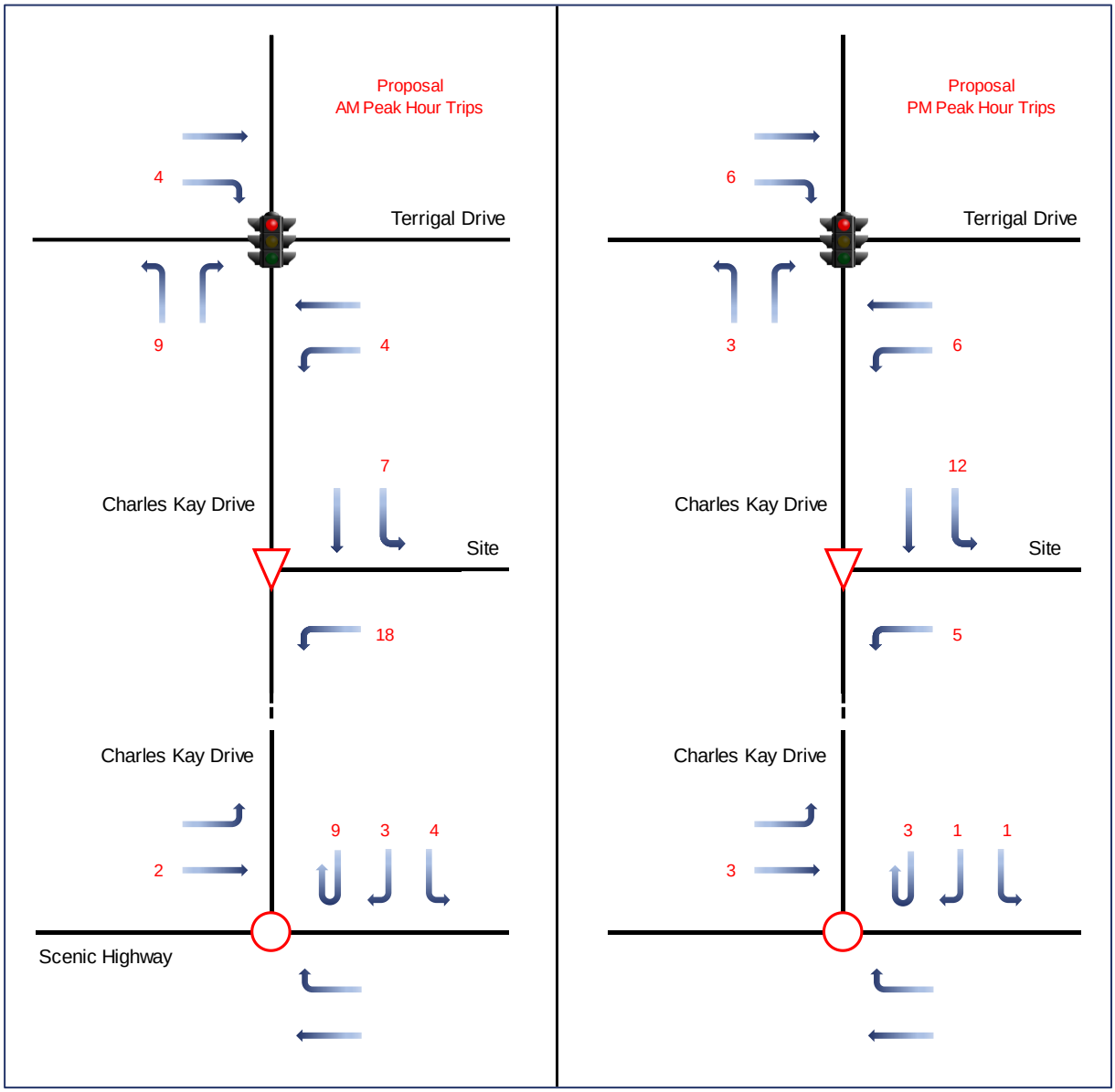
It is anticipated that a majority of residential trips will be to/from Gosford (and beyond to Sydney or Newcastle), with the remaining trips generated to/from the east (Terrigal, Avoca and Wamberal) and the south (Woy Woy and Kincumber). The analysis has adopted the following distribution profile:

- 50% of trips to/from Gosford (Terrigal Drive);
- 25% of trips to/from the east; and
- 25% of trips to/from the south.

3.4.5 Trip Assignment

With reference to sections above, the resulting trips have been assigned to the key intersections, and are shown in Figure 11.

Figure 11: Site Trip Assignment



3.4.6 Traffic Impacts

With reference to the Site trips shown in Figure 11, it is immediately apparent that the Proposal would have not significant impact on the local road network simply as a factor of the very low trip generation of the Proposal.

Notwithstanding, the operation of the key intersections has again been assessed using SIDRA for the scenario Base 2032 + Proposal, with the results summarised in Table 9; SIDRA Movement Reports are provided in Appendix B, and electronic copies of the SIDRA files are provided as an attachment to this TA.

Table 9: Future Intersection Operations Base 2032 + Proposal

Intersection Operations Base 2032 + Proposal	Level of Service		Average Delay		Degree of Saturation	
	AM	PM	AM	PM	AM	PM
Terrigal Drive & Charles Kay Drive	B	B	23.3	23.4	0.523	0.5690
Charles Kay Drive & Scenic Highway	B	B	22.2	21.4	0.970	0.949

With reference to Table 9, the Proposal would have no significant impact on the operation of the intersection of Terrigal Drive & Charles Kay Drive, with no change in any of the key operational parameters.

At the intersection of Charles Kay Drive & Scenic Highway, there are no significant increases in AVD, DOS or queue lengths, and as discussed in Section 2.5.4 and Section 2.6.3, increasing capacity further to adjustments to an environmental factor and circulation capacity to match observed conditions reduces delays and queues, and provides additional capacity.

While the Proposal therefore has no significant impact on the operation of the roundabout, it is apparent that an upgrade of the intersection will be required at some time in the future if growth forecasts are accurate. At this time, there is no information available in regard to whether an upgrade of the roundabout is proposed by TfNSW or Council; however, in a press release dated 12 April 2017 relating to the Stage 2 upgrade of Scenic Highway west of Charles Kay Drive (since completed), Council alludes to the potential for an upgrade of the roundabout, stating the following:

> *In addition, a review of the Scenic Highway, from Charles Kay Drive to The Terrigal Esplanade has also been undertaken and Council is considering the recommendations, amidst wider traffic management planning*.

While more information in regard to the *review* is not available, the intersection of Charles Kay Drive & Scenic Highway will require an upgrade at some time in the future to accommodate existing and future base traffic volumes; however, any such upgrade would be required regardless of the Proposal, which will generate an extremely minor number of trips to the intersection.

3.4.7 Road Safety Audit

As discussed in sections above, the Proposal will generate very minimal traffic and as such not require any road network upgrades. The only new piece of new infrastructure is the new crossover/driveway, which will be provided towards the southern boundary of the Site in accordance with the CC DCP.

This crossover/driveway will be constructed in full accordance with relevant Council and Austroads guidelines, and as arc traffic + transport considers that there is no requirement for a road safety audit or the like to be prepared at this time, noting that TfNSW did not raise this as a requirements in the 2022 TfNSW Correspondence or 2023 TfNSW Correspondence.

3.5 Parking

3.5.1 Parking Rates

The amount of parking required for the Proposal has been assessed using the CC DCP parking rates; these rates, and the resulting parking requirement, are detailed below.

Table 10: DCP Parking Rates and Requirements

Land Use	Dwellings/GFA m^2	DCP Rate per Dwelling/GFA m^2	DCP Spaces
Residential	42	1.5	63
Residential Visitor	42	0.2	8
Retail	64	0.03	3.0
Total			**74**

3.5.2 Parking Provision

The Concept Plan provides a total of 75 parking spaces. At this time, it is anticipated that 2 parking spaces will be allocated to each dwellings, and 10 or more spaces to residential and retail visitors. The potential exists to provide additional accessible spaces, which would reduce the number of overall spaces.

Regardless, on-site parking will be provided in full compliance with the requirements of the DCP.

3.5.3 Accessible Parking

While the DCP does not provide specific guidance in regard to the provision of accessible spaces, it is anticipated that accessible spaces will be provided in accordance with the Building Code of Australia (**BCA**) requirements, and also consider any requirement for a percentage of the dwellings to be provided as accessible dwellings.

The final allocation of accessible (and standard) parking spaces will be determined in the future DA, and will necessarily provide compliance with the DCP and BCA.

3.5.4 Motorcycle Parking

With reference to Section 2.13.3.9 of the DCP, motorcycle parking is required at a rate of 1 space per 50 standard parking spaces; as such, 2 motorcycle spaces are provided. The Concept Plan provides for a minimum of 2 motorcycle spaces.

3.5.5 Bicycle Parking

While bicycle parking for residents is anticipated to be provided in individual storage areas, the DCP requires the provision of 1 bicycle space per 12 dwelling for residential visitors, and 1 space per 150m² GFA, and a minimum of 2 spaces, for retail floorspace. The Concept Plan provides for a minimum of 5 bicycle spaces.

3.6 Service & Emergency Vehicle Access

3.6.1 Service Vehicle Requirements

Section 2.13.3.5 of the DCP provides the following in regard to the provision of service and emergency vehicle access:

a) *Requirements for delivery/service vehicles and other vehicles unless identified in this chapter, are to be based generally on the Roads and Traffic Authority "Guide to Traffic Generating Developments", as amended, and the Australian Standards relating to the specific needs of each development. Regard needs to be given to the type and scale of the development.*

b) *Manoeuvring and reversing areas for delivery/service vehicles are not to conflict with general parking and pedestrian requirements.*

c) *Provision should also be made for appropriate access for emergency vehicles.*

Reference to Section 5.4.3 of the RTA Guide in turn states the following requirements for high density developments (which we note are essentially the same as in Section 5.4.2 of the RTA Guide for medium density developments):

> ***Provision for delivery and service vehicles.***
>
> *The provision of at least one loading dock for residential use is desirable, although a dock intended for commercial uses may be sufficient.*

It is also important to reference Council's Waste Control Guidelines, Section 5.4.1 of which provides the following in regard to on-site waste collection:

> *If a collection vehicle is required to drive onto a private road or private property, the driveway and road need to be suitable for the collection vehicle in terms of strength, width, geometric design and height. The access points and collection area should be free from overhead obstacles and of an appropriate gradient. When making an on-site collection from within a building, the 'clearance height' should be clear of any air conditioning ducts, sprinklers or other potential obstructions.*
>
> *Appropriate heavy vehicle standards should be incorporated into the development design, including those specified in acts, regulations, guidelines, and codes administered by Austroads, the NSW Roads and Maritime Services, NSW WorkCover and any local traffic requirements.*

All waste vehicle manoeuvring within a development, needs to be designed and certified to meet the requirements of AS2890.2, Part 2: Off-Street Commercial Vehicle Facilities, by a practicing, recognized Traffic Engineer.

3.6.2 Service Vehicle Provisions

The Concept Plan provides a service area off the access driveway from Charles Kay Drive immediately adjacent to the residential and retail waste collection rooms.

The service area has been designed to allow for a medium rigid vehicle to enter the Site in a forward direction, reverse into the loading area, and then depart the Site in a forward direction. The reversing movement and standing area are located such that they do not impact vehicle movements to and from the parking areas.

With regard to emergency vehicles, these could also use the on-site service area or more likely would simple set down in the closest proximity to the residential foyer or wherever the nearest location to the emergency.

3.7 Design

As discussed in the Introduction, a Planning Proposal is designed to provide a proof of concept rather than a detailed assessment of the Proposal; this is particuaurly the case in regard to the detailed design of the development, including access, parking and servicing areas.

Notwithstanding, the Concept Plan has been developed with specific consideration of AS 2890.1, AS 2890.2 and AS 2890.6 such that full compliance with these standards can be achieved, specifically with regard to:

- The access driveway;
- Internal access ramps and parking aisles;
- Standard and accessible parking spaces; and
- Service vehicle manoeuvring and set down areas.

Again, a detailed design assessment would necessarily be provided in a future DA to ensure compliance with all relevant Australian Standards, and it is anticipated that a Condition of Consent further to a DA approval would require such compliance.

4 Conclusions

Further to our assessment of the Proposal, arc traffic + transport has determined the following:

- The Site is provided with good access to both public transport services and active transport infrastructure.
- Access has been provided only to Charles Kay Drive towards the southern boundary of the Site in accordance with the DCP, and would provide left in/left our access only.
- The trip generation of the Site will be very moderate, and in turn have no significant impact on the operation of the local road network or key intersections.
- Parking can be provided in full compliance with the DCP, and appropriately allocated to residents, residential visitors and retail visitors.
- The Proposal will provide an appropriate amount and allocation of accessible parking so as to provide compliance with the BCA.
- The Proposal will provide an appropriate amount of motorcycle and bicycle parking so as to provide compliance with the DCP.
- The Proposal will provide a service area which can appropriately accommodate the manoeuvring and set down of Council's waste collection vehicle.
- The design of all access, parking and service areas will necessarily provide full compliance with the relevant Council guidelines and Australian Standards, and be fully detailed in the future DA.

In summary, arc traffic + transport can fully support the Proposal further to access, traffic and parking considerations.

Appendix A: Traffic Surveys

Source: TIS Surveys

Location	-		Duration	7:00 - 9:00	
	Terrigal Drive			16:00 - 18:00	
	Charles Kay Drive			-	
	Terrigal Drive		Day/Date	Thursday, 4 August 2022	
Suburb	TERRIGAL		Weather	-	

All Vehicles Time Per 15 Mins	NORTH -										EAST Terrigal Drive										TOTAL		
	L			T			R				L			T			R						
	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	TOTAL	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	TOTAL	LIGHT	HEAVY	TOTAL
7:00 - 7:15											57	3	60	128	4	132				192	439	19	458
7:15 - 7:30											78	4	82	112	1	113				195	468	21	489
7:30 - 7:45											69	5	74	151	3	154				228	604	23	627
7:45 - 8:00											72	3	75	218	5	223				298	702	20	722
8:00 - 8:15											73	4	77	190	6	196				273	663	21	684
8:15 - 8:30											67	5	72	179	3	182				254	686	19	705
8:30 - 8:45											90	3	93	181	3	184				277	777	9	786
8:45 - 9:00											81	8	89	204	2	206				295	725	18	743
Period End											587	35	622	1363	27	1390				2012	5064	150	5214
16:00 - 16:15											65	3	68	139	5	144				212	716	17	733
16:15 - 16:30											54	3	57	155	0	155				212	714	8	722
16:30 - 16:45											70	0	70	164	3	167				237	757	9	766
16:45 - 17:00											64	0	64	140	2	142				206	761	8	769
17:00 - 17:15											77	3	80	137	1	138				218	696	12	708
17:15 - 17:30											68	1	69	170	1	171				240	719	7	726
17:30 - 17:45											67	2	69	112	2	114				183	614	8	622
17:45 - 18:00											71	0	71	139	1	140				211	636	2	638
Period End											536	12	548	1156	15	1171				1719	5613	71	5684

All Vehicles Time Per 15 Mins	SOUTH Charles Kay Drive										WEST Terrigal Drive										TOTAL		
	L			T			R				L			T			R						
	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	TOTAL	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	TOTAL	LIGHT	HEAVY	TOTAL
7:00 - 7:15	73	3	76				61	2	63	139				75	5	80	45	2	47	127	439	19	458
7:15 - 7:30	105	3	108				68	5	73	181				72	4	76	33	4	37	113	468	21	489
7:30 - 7:45	167	3	170				65	4	69	239				100	6	106	52	2	54	160	604	23	627
7:45 - 8:00	168	2	170				74	5	79	249				108	2	110	62	3	65	175	702	20	722
8:00 - 8:15	168	3	171				61	3	64	235				103	3	106	68	2	70	176	663	21	684
8:15 - 8:30	160	1	161				62	1	63	224				137	7	144	81	2	83	227	686	19	705
8:30 - 8:45	141	0	141				62	1	63	204				215	1	216	88	1	89	305	777	9	786
8:45 - 9:00	143	0	143				75	1	76	219				133	3	136	89	4	93	229	725	18	743
Period End	1125	15	1140				528	22	550	1690				943	31	974	518	20	538	1512	5064	150	5214
16:00 - 16:15	124	2	126				64	3	67	193				186	4	190	138	0	138	328	716	17	733
16:15 - 16:30	124	2	126				65	2	67	193				171	1	172	145	0	145	317	714	8	722
16:30 - 16:45	104	2	106				57	0	57	163				191	3	194	171	1	172	366	757	9	766
16:45 - 17:00	98	2	100				63	2	65	165				214	1	215	182	1	183	398	761	8	769
17:00 - 17:15	89	1	90				65	2	67	157				194	2	196	134	3	137	333	696	12	708
17:15 - 17:30	78	1	79				51	1	52	131				193	2	195	159	1	160	355	719	7	726
17:30 - 17:45	76	1	77				61	1	62	139				176	2	178	122	0	122	300	614	8	622
17:45 - 18:00	81	0	81				53	1	54	135				172	0	172	120	0	120	292	636	2	638
Period End	774	11	785				479	12	491	1276				1497	15	1512	1171	6	1177	2689	5613	71	5684

Location	Charles Kay Drive	Duration	7:00 - 9:00
	Scenic Highway		16:00 - 18:00
	-		-
	Scenic Highway	Day/Date	Thursday, 4 August 2022
Suburb	TERRIGAL	Weather	-

All Vehicles	NORTH													EAST													
Time Per 15 Mins	Charles Kay Drive													Scenic Highway													
	L			T			R			U				L			T			R			U				TOTAL	
	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	TOTAL	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	TOTAL	LIGHT	HEAVY	TOTAL
7:00 - 7:15	11	0	11			0	86	5	91	2	0	2	104			0	50	1	51	40	1	41	2	0	2	94	331	13	344
7:15 - 7:30	16	1	17			0	103	6	109	2	0	2	128			0	54	1	55	49	4	53	0	0	0	108	409	21	430
7:30 - 7:45	17	1	18			0	115	5	120	2	0	2	140			0	52	1	53	63	3	66	4	0	4	123	474	19	493
7:45 - 8:00	15	0	15			0	98	5	103	1	0	1	119			0	63	2	65	89	1	90	0	0	0	155	462	17	479
8:00 - 8:15	26	1	27			0	105	3	108	1	0	1	136			0	55	1	56	69	2	71	0	0	0	127	461	10	471
8:15 - 8:30	26	1	27			0	106	3	109	1	0	1	137			0	53	2	55	63	0	63	1	0	1	119	464	11	475
8:30 - 8:45	38	0	38			0	151	5	156	1	0	1	195			0	46	1	47	61	0	61	8	0	8	116	524	8	532
8:45 - 9:00	48	2	50			0	115	8	123	4	0	4	177			0	53	2	55	44	0	44	1	0	1	100	507	14	521
Period End	197	6	203	0	0	0	879	40	919	14	0	14	1136	0	0	0	426	11	437	478	11	489	16	0	16	942	3632	113	3745
16:00 - 16:15	52	0	52			0	165	4	169	2	0	2	223			0	70	3	73	43	1	44	0	0	0	117	533	13	546
16:15 - 16:30	60	1	61			0	142	2	144	3	0	3	208			0	60	4	64	37	0	37	0	0	0	101	523	13	536
16:30 - 16:45	67	0	67			0	167	1	168	1	0	1	236			0	65	1	66	34	1	35	1	0	1	102	517	4	521
16:45 - 17:00	64	1	65			0	173	0	173	0	0	0	238			0	57	1	58	41	1	42	0	0	0	100	503	6	509
17:00 - 17:15	48	1	49			0	162	6	168	1	0	1	218			0	61	1	62	37	0	37	0	0	0	99	457	11	468
17:15 - 17:30	59	1	60			0	159	2	161	0	0	0	221			0	48	0	48	26	0	26	3	0	3	77	448	4	452
17:30 - 17:45	51	0	51			0	152	1	153	2	0	2	206			0	57	0	57	34	2	36	2	0	2	95	455	3	458
17:45 - 18:00	40	0	40			0	122	0	122	0	0	0	162			0	56	0	56	31	0	31	0	0	0	87	404	2	406
Period End	441	4	445	0	0	0	1242	16	1258	9	0	9	1712	0	0	0	474	10	484	283	5	288	6	0	6	778	3840	56	3896

All Vehicles	SOUTH													WEST													
Time Per 15 Mins	-													Scenic Highway													
	L			T			R			U				L			T			R			U				TOTAL	
	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	TOTAL	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	TOTAL	LIGHT	HEAVY	TOTAL
7:00 - 7:15			0			0			0			0	0	99	4	103	40	2	42			0	1	0	1	146	331	13	344
7:15 - 7:30			0			0			0			0	0	131	5	136	53	4	57			0	1	0	1	194	409	21	430
7:30 - 7:45			0			0			0			0	0	167	4	171	54	5	59			0	0	0	0	230	474	19	493
7:45 - 8:00			0			0			0			0	0	146	6	152	50	3	53			0	0	0	0	205	462	17	479
8:00 - 8:15			0			0			0			0	0	156	3	159	49	0	49			0	0	0	0	208	461	10	471
8:15 - 8:30			0			0			0			0	0	149	2	151	65	3	68			0	0	0	0	219	464	11	475
8:30 - 8:45			0			0			0			0	0	143	1	144	76	1	77			0	0	0	0	221	524	8	532
8:45 - 9:00			0			0			0			0	0	170	1	171	72	1	73			0	0	0	0	244	507	14	521
Period End	0	0	0	0	0	0	0	0	0	0	0	0	0	1161	26	1187	459	19	478	0	0	0	2	0	2	1667	3632	113	3745
16:00 - 16:15			0			0			0			0	0	137	4	141	63	1	64			0	1	0	1	206	533	13	546
16:15 - 16:30			0			0			0			0	0	144	5	149	76	1	77			0	1	0	1	227	523	13	536
16:30 - 16:45			0			0			0			0	0	128	1	129	53	0	53			0	1	0	1	183	517	4	521
16:45 - 17:00			0			0			0			0	0	117	3	120	51	0	51			0	0	0	0	171	503	6	509
17:00 - 17:15			0			0			0			0	0	102	3	105	45	0	45			0	1	0	1	151	457	11	468
17:15 - 17:30			0			0			0			0	0	95	1	96	55	0	55			0	3	0	3	154	448	4	452
17:30 - 17:45			0			0			0			0	0	104	0	104	53	0	53			0	0	0	0	157	455	3	458
17:45 - 18:00			0			0			0			0	0	95	1	96	60	1	61			0	0	0	0	157	404	2	406
Period End	0	0	0	0	0	0	0	0	0	0	0	0	0	922	18	940	456	3	459	0	0	0	7	0	7	1406	3840	56	3896

Appendix B: SIDRA Movement Reports

2022 AM Peak Hour

MOVEMENT SUMMARY

Site: [AM 2022Terrigal Drive & Charles Kay Drive (Site Folder: General)]

AM Peak Hour 2022
Site Category: Existing Design
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 100 seconds (Site User-Given Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	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: Charles Kay Drive														
1	L2	616	4	648	0.6	0.408	26.7	LOS B	10.9	76.6	0.74	0.78	0.74	41.4
3	R2	266	6	280	2.3	*0.479	48.0	LOS D	6.4	45.7	0.96	0.79	0.96	33.2
Approach		882	10	928	1.1	0.479	33.1	LOS C	10.9	76.6	0.80	0.78	0.80	38.5
East: Terrigal Drive														
4	L2	331	20	348	6.0	0.292	12.8	LOS A	6.9	50.5	0.44	0.71	0.44	48.3
5	T1	768	14	808	1.8	*0.466	20.5	LOS B	13.6	97.0	0.74	0.65	0.74	45.0
Approach		1099	34	1157	3.1	0.466	18.2	LOS B	13.6	97.0	0.65	0.67	0.65	45.9
West: Terrigal Drive														
11	T1	602	14	634	2.3	0.229	4.9	LOS A	5.1	36.2	0.36	0.31	0.36	55.5
12	R2	335	9	353	2.7	*0.461	43.5	LOS D	7.7	54.9	0.92	0.80	0.92	34.7
Approach		937	23	986	2.5	0.461	18.7	LOS B	7.7	54.9	0.56	0.49	0.56	45.7
All Vehicles		2918	67	3072	2.3	0.479	22.9	LOS B	13.6	97.0	0.67	0.64	0.67	43.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle 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: [AM 2022 Charles Kay Drive & Scenic Highway (Site Folder: General)]

2022 AM Peak Hour
Site Category: Existing Design
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	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
East: Scenic Highway														
5	T1	213	6	224	2.8	0.668	13.3	LOS A	7.4	52.4	0.95	1.05	1.23	47.8
6	R2	239	2	252	0.8	0.668	16.5	LOS B	7.4	52.4	0.95	1.05	1.23	47.6
6u	U	10	0	11	0.0	0.668	18.2	LOS B	7.4	52.4	0.95	1.05	1.23	48.1
Approach		462	8	486	1.7	0.668	15.1	LOS B	7.4	52.4	0.95	1.05	1.23	47.7
North: Charles Kay Drive														
7	L2	146	4	154	2.7	0.696	8.8	LOS A	8.5	61.0	0.86	0.82	0.97	49.2
9	R2	515	19	542	3.7	0.696	12.4	LOS A	8.5	61.0	0.86	0.82	0.97	49.7
9u	U	7	0	7	0.0	0.696	13.9	LOS A	8.5	61.0	0.86	0.82	0.97	50.4
Approach		668	23	703	3.4	0.696	11.6	LOS A	8.5	61.0	0.86	0.82	0.97	49.6
West: Scenic Highway														
10	L2	625	7	658	1.1	0.860	12.6	LOS A	17.4	123.4	1.00	0.92	1.30	48.4
11	T1	267	5	281	1.9	0.860	12.9	LOS A	17.4	123.4	1.00	0.92	1.30	49.3
12u	U	1	0	1	0.0	0.860	17.8	LOS B	17.4	123.4	1.00	0.92	1.30	49.5
Approach		893	12	940	1.3	0.860	12.7	LOS A	17.4	123.4	1.00	0.92	1.30	48.7
All Vehicles		2023	43	2129	2.1	0.860	12.9	LOS A	17.4	123.4	0.94	0.91	1.17	48.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
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.

2022 PM Peak Hour

MOVEMENT SUMMARY

Site: [PM 2022 Terrigal Drive & Charles Kay Drive (Site Folder: General)]

PM Peak Hour 2022
Site Category: Existing Design
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 100 seconds (Site User-Given Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	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: Charles Kay Drive														
1	L2	458	8	482	1.7	0.235	17.5	LOS B	5.9	41.7	0.54	0.71	0.54	46.2
3	R2	256	7	269	2.7	*0.493	49.0	LOS D	6.2	44.7	0.96	0.79	0.96	32.9
Approach		714	15	752	2.1	0.493	28.8	LOS C	6.2	44.7	0.69	0.74	0.69	40.3
East: Terrigal Drive														
4	L2	259	6	273	2.3	0.282	19.4	LOS B	7.3	51.9	0.59	0.74	0.59	44.5
5	T1	608	10	640	1.6	*0.518	30.0	LOS C	12.8	90.7	0.87	0.74	0.87	40.3
Approach		867	16	913	1.8	0.518	26.8	LOS B	12.8	90.7	0.78	0.74	0.78	41.5
West: Terrigal Drive														
11	T1	771	9	812	1.2	0.287	4.9	LOS A	6.6	46.9	0.37	0.32	0.37	55.6
12	R2	638	2	672	0.3	*0.518	33.4	LOS C	13.0	91.6	0.85	0.81	0.85	38.4
Approach		1409	11	1483	0.8	0.518	17.8	LOS B	13.0	91.6	0.58	0.55	0.58	46.2
All Vehicles		2990	42	3147	1.4	0.518	23.0	LOS B	13.0	91.6	0.67	0.65	0.67	43.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle 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: [PM 2022 Charles Kay Drive & Scenic Highway (Site Folder: General)]

2022 PM Peak Hour
Site Category: Existing Design
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	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
East: Scenic Highway														
5	T1	261	9	275	3.4	0.760	20.0	LOS B	9.7	69.3	1.00	1.21	1.54	44.3
6	R2	158	3	166	1.9	0.760	23.2	LOS B	9.7	69.3	1.00	1.21	1.54	44.1
6u	U	1	0	1	0.0	0.760	24.8	LOS B	9.7	69.3	1.00	1.21	1.54	44.5
Approach		420	12	442	2.9	0.760	21.2	LOS B	9.7	69.3	1.00	1.21	1.54	44.2
North: Charles Kay Drive														
7	L2	247	2	260	0.8	0.851	11.9	LOS A	16.5	116.3	1.00	0.87	1.26	47.4
9	R2	654	7	688	1.1	0.851	15.4	LOS B	16.5	116.3	1.00	0.87	1.26	47.9
9u	U	6	0	6	0.0	0.851	17.1	LOS B	16.5	116.3	1.00	0.87	1.26	48.4
Approach		907	9	955	1.0	0.851	14.5	LOS A	16.5	116.3	1.00	0.87	1.26	47.8
West: Scenic Highway														
10	L2	539	13	567	2.4	0.675	6.2	LOS A	7.6	54.3	0.72	0.62	0.72	51.9
11	T1	245	2	258	0.8	0.675	6.3	LOS A	7.6	54.3	0.72	0.62	0.72	53.0
12u	U	3	0	3	0.0	0.675	11.3	LOS A	7.6	54.3	0.72	0.62	0.72	53.2
Approach		787	15	828	1.9	0.675	6.2	LOS A	7.6	54.3	0.72	0.62	0.72	52.2
All Vehicles		2114	36	2225	1.7	0.851	12.8	LOS A	16.5	116.3	0.90	0.85	1.11	48.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
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.

Base 2032 AM Peak Hour

MOVEMENT SUMMARY

Site: [AM Base 2032 Terrigal Drive & Charles Kay Drive (Site Folder: General)]

AM Peak Hour 2032
Site Category: Existing Design
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 100 seconds (Site User-Given Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	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: Charles Kay Drive														
1	L2	671	4	706	0.6	0.444	27.1	LOS B	12.1	85.1	0.75	0.79	0.75	41.2
3	R2	290	7	305	2.4	*0.523	48.3	LOS D	7.0	50.3	0.96	0.80	0.96	33.1
Approach		961	11	1012	1.1	0.523	33.5	LOS C	12.1	85.1	0.82	0.79	0.82	38.4
East: Terrigal Drive														
4	L2	361	22	380	6.1	0.319	12.9	LOS A	7.7	56.4	0.45	0.71	0.45	48.2
5	T1	837	15	881	1.8	*0.515	21.0	LOS B	15.5	110.4	0.76	0.67	0.76	44.7
Approach		1198	37	1261	3.1	0.515	18.6	LOS B	15.5	110.4	0.67	0.68	0.67	45.7
West: Terrigal Drive														
11	T1	656	15	691	2.3	0.250	5.0	LOS A	5.6	40.2	0.37	0.32	0.37	55.4
12	R2	365	10	384	2.7	*0.502	43.9	LOS D	8.4	60.5	0.93	0.81	0.93	34.6
Approach		1021	25	1075	2.4	0.502	18.9	LOS B	8.4	60.5	0.57	0.49	0.57	45.6
All Vehicles		3180	73	3347	2.3	0.523	23.2	LOS B	15.5	110.4	0.68	0.66	0.68	43.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle 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: [AM Base 2032 Charles Kay Drive & Scenic Highway (Site Folder: General)]

AM Peak Hour 2032
Site Category: Existing Design
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	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
East: Scenic Highway														
5	T1	233	7	245	3.0	0.784	18.6	LOS B	11.0	78.2	1.00	1.21	1.54	44.8
6	R2	260	2	274	0.8	0.784	21.8	LOS B	11.0	78.2	1.00	1.21	1.54	44.6
6u	U	11	0	12	0.0	0.784	23.5	LOS B	11.0	78.2	1.00	1.21	1.54	45.0
Approach		504	9	531	1.8	0.784	20.4	LOS B	11.0	78.2	1.00	1.21	1.54	44.7
North: Charles Kay Drive														
7	L2	159	4	167	2.5	0.778	11.1	LOS A	11.7	84.2	0.96	0.91	1.19	47.8
9	R2	562	21	592	3.7	0.778	14.7	LOS B	11.7	84.2	0.96	0.91	1.19	48.3
9u	U	8	0	8	0.0	0.778	16.3	LOS B	11.7	84.2	0.96	0.91	1.19	48.9
Approach		729	25	767	3.4	0.778	14.0	LOS A	11.7	84.2	0.96	0.91	1.19	48.2
West: Scenic Highway														
10	L2	682	8	718	1.2	0.961	25.1	LOS B	33.3	236.3	1.00	1.25	1.93	41.6
11	T1	292	6	307	2.1	0.961	25.4	LOS B	33.3	236.3	1.00	1.25	1.93	42.2
12u	U	1	0	1	0.0	0.961	30.3	LOS C	33.3	236.3	1.00	1.25	1.93	42.4
Approach		975	14	1026	1.4	0.961	25.2	LOS B	33.3	236.3	1.00	1.25	1.93	41.8
All Vehicles		2208	48	2324	2.2	0.961	20.4	LOS B	33.3	236.3	0.99	1.12	1.60	44.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
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: [PM Base 2032 Terrigal Drive & Charles Kay Drive (Site Folder: General)]

PM Peak Hour 2032
Site Category: Existing Design
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 100 seconds (Site User-Given Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	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: Charles Kay Drive														
1	L2	500	9	526	1.8	0.256	17.6	LOS B	6.5	46.2	0.55	0.72	0.55	46.1
3	R2	279	8	294	2.9	*0.538	49.3	LOS D	6.8	49.1	0.97	0.80	0.97	32.7
Approach		779	17	820	2.2	0.538	29.0	LOS C	6.8	49.1	0.70	0.75	0.70	40.2
East: Terrigal Drive														
4	L2	283	7	298	2.5	0.308	19.6	LOS B	8.1	57.7	0.60	0.75	0.60	44.4
5	T1	663	11	698	1.7	*0.565	30.5	LOS C	14.2	100.8	0.89	0.76	0.89	40.1
Approach		946	18	996	1.9	0.565	27.3	LOS B	14.2	100.8	0.80	0.76	0.80	41.3
West: Terrigal Drive														
11	T1	841	10	885	1.2	0.313	5.0	LOS A	7.4	52.4	0.38	0.33	0.38	55.5
12	R2	695	2	732	0.3	*0.564	34.0	LOS C	14.5	101.8	0.86	0.82	0.86	38.1
Approach		1536	12	1617	0.8	0.564	18.1	LOS B	14.5	101.8	0.60	0.56	0.60	46.0
All Vehicles		3261	47	3433	1.4	0.565	23.4	LOS B	14.5	101.8	0.68	0.66	0.68	43.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle 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: [PM Base 2032 Charles Kay Drive & Scenic Highway (Site Folder: General)]

PM Peak Hour 2032
Site Category: Existing Design
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	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
East: Scenic Highway														
5	T1	285	10	300	3.5	0.907	38.7	LOS C	17.3	124.2	1.00	1.52	2.33	36.2
6	R2	172	3	181	1.7	0.907	41.9	LOS C	17.3	124.2	1.00	1.52	2.33	36.1
6u	U	1	0	1	0.0	0.907	43.5	LOS D	17.3	124.2	1.00	1.52	2.33	36.4
Approach		458	13	482	2.8	0.907	39.9	LOS C	17.3	124.2	1.00	1.52	2.33	36.2
North: Charles Kay Drive														
7	L2	269	2	283	0.7	0.944	21.1	LOS B	29.7	209.9	1.00	1.09	1.74	42.4
9	R2	713	8	751	1.1	0.944	24.7	LOS B	29.7	209.9	1.00	1.09	1.74	42.8
9u	U	7	0	7	0.0	0.944	26.4	LOS B	29.7	209.9	1.00	1.09	1.74	43.2
Approach		989	10	1041	1.0	0.944	23.8	LOS B	29.7	209.9	1.00	1.09	1.74	42.7
West: Scenic Highway														
10	L2	587	14	618	2.4	0.742	6.9	LOS A	9.8	69.9	0.81	0.66	0.84	51.6
11	T1	267	2	281	0.7	0.742	7.1	LOS A	9.8	69.9	0.81	0.66	0.84	52.7
12u	U	3	0	3	0.0	0.742	12.1	LOS A	9.8	69.9	0.81	0.66	0.84	52.9
Approach		857	16	902	1.9	0.742	7.0	LOS A	9.8	69.9	0.81	0.66	0.84	52.0
All Vehicles		2304	39	2425	1.7	0.944	20.7	LOS B	29.7	209.9	0.93	1.02	1.52	44.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
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: [AM Base 2032 Terrigal Drive & Charles Kay Drive + Proposal (Site Folder: General)]

AM Peak Hour 2032
Site Category: Existing Design
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 100 seconds (Site User-Given Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	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: Charles Kay Drive														
1	L2	680	4	716	0.6	0.450	27.2	LOS B	12.3	86.5	0.76	0.79	0.76	41.2
3	R2	290	7	305	2.4	*0.523	48.3	LOS D	7.0	50.3	0.96	0.80	0.96	33.1
Approach		970	11	1021	1.1	0.523	33.5	LOS C	12.3	86.5	0.82	0.79	0.82	38.4
East: Terrigal Drive														
4	L2	365	22	384	6.0	0.322	13.0	LOS A	7.8	57.2	0.45	0.71	0.45	48.2
5	T1	837	15	881	1.8	*0.515	21.0	LOS B	15.5	110.4	0.76	0.67	0.76	44.7
Approach		1202	37	1265	3.1	0.515	18.6	LOS B	15.5	110.4	0.67	0.68	0.67	45.7
West: Terrigal Drive														
11	T1	656	15	691	2.3	0.250	5.0	LOS A	5.6	40.2	0.37	0.32	0.37	55.4
12	R2	369	10	388	2.7	*0.508	44.0	LOS D	8.5	61.2	0.93	0.81	0.93	34.5
Approach		1025	25	1079	2.4	0.508	19.1	LOS B	8.5	61.2	0.57	0.50	0.57	45.5
All Vehicles		3197	73	3365	2.3	0.523	23.3	LOS B	15.5	110.4	0.68	0.66	0.68	43.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle 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: [AM Base 2032 Charles Kay Drive & Scenic Highway + Proposal (Site Folder: General)]

AM Peak Hour 2032
Site Category: Existing Design
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	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
East: Scenic Highway														
5	T1	233	7	245	3.0	0.803	20.1	LOS B	11.7	83.1	1.00	1.24	1.61	44.0
6	R2	260	2	274	0.8	0.803	23.3	LOS B	11.7	83.1	1.00	1.24	1.61	43.8
6u	U	11	0	12	0.0	0.803	25.0	LOS B	11.7	83.1	1.00	1.24	1.61	44.2
Approach		504	9	531	1.8	0.803	21.9	LOS B	11.7	83.1	1.00	1.24	1.61	43.9
North: Charles Kay Drive														
7	L2	163	4	172	2.5	0.792	11.5	LOS A	12.4	89.0	0.97	0.92	1.22	47.5
9	R2	565	21	595	3.7	0.792	15.1	LOS B	12.4	89.0	0.97	0.92	1.22	48.0
9u	U	17	0	18	0.0	0.792	16.6	LOS B	12.4	89.0	0.97	0.92	1.22	48.6
Approach		745	25	784	3.4	0.792	14.3	LOS A	12.4	89.0	0.97	0.92	1.22	47.9
West: Scenic Highway														
10	L2	682	8	718	1.2	0.970	28.3	LOS B	35.9	253.9	1.00	1.33	2.09	40.1
11	T1	291	5	306	1.7	0.970	28.5	LOS C	35.9	253.9	1.00	1.33	2.09	40.7
12u	U	1	0	1	0.0	0.970	33.5	LOS C	35.9	253.9	1.00	1.33	2.09	40.9
Approach		974	13	1025	1.3	0.970	28.3	LOS B	35.9	253.9	1.00	1.33	2.09	40.3
All Vehicles		2223	47	2340	2.1	0.970	22.2	LOS B	35.9	253.9	0.99	1.17	1.69	43.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
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: [PM Base 2032 Terrigal Drive & Charles Kay Drive + Proposal (Site Folder: General)]

PM Peak Hour 2032
Site Category: Existing Design
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 100 seconds (Site User-Given Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	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: Charles Kay Drive														
1	L2	502	9	528	1.8	0.257	17.6	LOS B	6.5	46.5	0.55	0.72	0.55	46.1
3	R2	279	8	294	2.9	*0.538	49.3	LOS D	6.8	49.1	0.97	0.80	0.97	32.7
Approach		781	17	822	2.2	0.538	29.0	LOS C	6.8	49.1	0.70	0.75	0.70	40.2
East: Terrigal Drive														
4	L2	289	7	304	2.4	0.314	19.7	LOS B	8.3	59.2	0.60	0.75	0.60	44.4
5	T1	663	11	698	1.7	*0.565	30.5	LOS C	14.2	100.8	0.89	0.76	0.89	40.1
Approach		952	18	1002	1.9	0.565	27.2	LOS B	14.2	100.8	0.80	0.76	0.80	41.3
West: Terrigal Drive														
11	T1	841	10	885	1.2	0.313	5.0	LOS A	7.4	52.4	0.38	0.33	0.38	55.5
12	R2	701	2	738	0.3	*0.569	34.1	LOS C	14.7	102.9	0.87	0.82	0.87	38.1
Approach		1542	12	1623	0.8	0.569	18.2	LOS B	14.7	102.9	0.60	0.56	0.60	46.0
All Vehicles		3275	47	3447	1.4	0.569	23.4	LOS B	14.7	102.9	0.68	0.66	0.68	43.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle 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: [PM Base 2032 Charles Kay Drive & Scenic Highway + Proposal (Site Folder: General)]

PM Peak Hour 2032
Site Category: Existing Design
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	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
East: Scenic Highway														
5	T1	285	10	300	3.5	0.913	40.2	LOS C	17.8	127.8	1.00	1.54	2.38	35.7
6	R2	172	3	181	1.7	0.913	43.4	LOS D	17.8	127.8	1.00	1.54	2.38	35.5
6u	U	1	0	1	0.0	0.913	45.0	LOS D	17.8	127.8	1.00	1.54	2.38	35.8
Approach		458	13	482	2.8	0.913	41.4	LOS C	17.8	127.8	1.00	1.54	2.38	35.6
North: Charles Kay Drive														
7	L2	270	2	284	0.7	0.949	22.0	LOS B	30.8	217.5	1.00	1.11	1.78	42.0
9	R2	715	8	753	1.1	0.949	25.6	LOS B	30.8	217.5	1.00	1.11	1.78	42.4
9u	U	9	0	9	0.0	0.949	27.2	LOS B	30.8	217.5	1.00	1.11	1.78	42.8
Approach		994	10	1046	1.0	0.949	24.6	LOS B	30.8	217.5	1.00	1.11	1.78	42.3
West: Scenic Highway														
10	L2	587	14	618	2.4	0.744	7.0	LOS A	9.9	70.6	0.82	0.67	0.85	51.6
11	T1	267	2	281	0.7	0.744	7.2	LOS A	9.9	70.6	0.82	0.67	0.85	52.7
12u	U	3	0	3	0.0	0.744	12.2	LOS A	9.9	70.6	0.82	0.67	0.85	52.9
Approach		857	16	902	1.9	0.744	7.1	LOS A	9.9	70.6	0.82	0.67	0.85	51.9
All Vehicles		2309	39	2431	1.7	0.949	21.4	LOS B	30.8	217.5	0.93	1.03	1.55	43.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
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.