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16 October 2014

Project 28 Pty Ltd
C/o Leda Developments Pty Ltd
Level 1 / 46 Cavill Avenue
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Attention: Michael Geale
Sent via email: mgeale@ledaholdings.com.au

Dear Michael

RE: KINGS FOREST STAGE 1 CONDITIONS OF APPROVAL – TRAFFIC ASSESSMENT

1.0 INTRODUCTION

This letter is in response to the New South Wales Department of Planning (DoP)'s Project Approval Condition Item 27 for Stage 1 of the Kings Forest development issued 11th August 2013. Specifically, this letter and accompanying traffic modelling assessment has been prepared to seek agreement from Council on the intersection configuration in order to proceed to detailed design stage. Below details Condition of Consent Item 27.

Old Bogangar Road Access
Item 27.
1) Detailed design of the proposed intersection between the Old Bogangar Road service road and Tweed Coast Road, endorsed by the Director of Engineering and Operations of Tweed Shire Council (the Road Authority), shall be provided to the satisfaction of the Director-General within 12 months of the date of this approval.
2) The detailed design shall take into account the proximity of, and access arrangements at, the Kings Forest Parkway / Tweed Coast Road intersection, and the Precinct 1 access driveway, incorporating the relevant specifications of AUSTROADS, Roads and Maritime Services, and Standards Australia.
3) Options to be considered to achieve compliant intersection arrangements shall include (but not be limited to):
a. Relocation of the Precinct 1 driveway to create a four-way intersection with old Bogangar Road;
b. Appropriate intersection treatment of the four-way intersection created by (a);
c. Provision of U-turn facilities on Tweed Coast Road;
d. Connection of Old Bogangar Road to Kings Forest Parkway.
4) Individual and adjacent intersection modelling be provided to ensure all movements achieve adequate levels of service, queue lengths and time delays, to the satisfaction of the Road Authority.
5) Any preferred option that requires the realignment of Old Bogangar Road from its existing connection to Tweed Coast Road requires stakeholder consultation and separate planning approval from Council.
6) The detailed design shall be submitted to Council with an application under s138 of the Roads Act 1993 for approval prior to the issue of a construction certificate for any works on a public road.

2.0 RESPONSE TO ITEM 27 – OLD BOGANGAR ROAD

To determine the appropriate intersection and road network requirements and respond to DoP's Conditions of Consent, an Aimsun micro-simulation traffic model was developed. Attachment 1 details the Kings Forest Intersection Modelling Report and details the development and outcomes of the micro-simulation modelling of the proposed road network. The outcomes of the micro-simulation traffic assessment formed the basis of concept plans provided in Attachment 2 in which the applicant seeks acceptance from Council to proceed to detailed design.

The following responses are made in reference to the Conditions of Consent Item 27.

2.1. Item 27.1)

Item 27: *1) Detailed design of the proposed intersection between the Old Bogangar Road service road and Tweed Coast Road, endorsed by the Director of Engineering and Operations of Tweed Shire Council (the Road Authority), shall be provided to the satisfaction of the Director-General within 12 months of the date of this approval.*

Response

The Old Bogangar Road / Tweed Coast Road intersection is proposed to be reduced to a left in / left out configuration as shown in Attachment 2. Following acceptance of the intersection configuration, detailed plans shall be provided to Council for approval.

2.2. Item 27.2)

Item 27: *2) The detailed design shall take into account the proximity of, and access arrangements at, the Kings Forest Parkway / Tweed Coast Road intersection, and the Precinct 1 access driveway, incorporating the relevant specifications of AUSTROADS, Roads and Maritime Services, and Standards Australia.*

Response

The proposed intersection locations remain generally consistent with the previously approved intersection locations and include the following characteristics:

1. Kings Forest Parkway / Tweed Coast Road two lane roundabout as per DoP's Conditions of Consent;

2. Old Bogangar Road / Tweed Coast Road priority controlled intersection remains in its current location and restricted to left-in/left out; and

3. Precinct 1 Access / Tweed Coast Road intersection to include a Type CHR (Channelized Right Turn) and Type AUL (Auxiliary Left Turn) lanes into the site and a 'high angle' priority controlled left turn lane exiting the site. The Type CHR shall be designed to cater for a Refuse Collection Vehicle (RCV) to perform a u-turn manoeuvre.

Each intersection has been design and modelled with geometries generally in accordance with Austroads Guide to Road Design. Detailed design plans shall be provided following acceptance from Council regarding the intersection layouts and operations.

2.3. Item 27.3)

Item 27: *3) Options to be considered to achieve compliant intersection arrangements shall include (but not be limited to):* *a. Relocation of the Precinct 1 driveway to create a four-way intersection with old Bogangar Road;* *b. Appropriate intersection treatment of the four-way intersection created by (a);* *c. Provision of U-turn facilities on Tweed Coast Road;* *d. Connection of Old Bogangar Road to Kings Forest Parkway.*

Response

The above-mentioned options were considered with the following outcomes:

a. The provision of a four-way intersection was conceptually designed and assessed. The assessment of this layout found that the four-way layout would require significant works to the western approach 'Old Bogangar Road' and would require either restricting turning movements to side streets or alternatively include a roundabout or signalised intersection.

b. Providing a four way at the existing Old Bogangar Road intersection would reduce the spacing between this subject intersection and the Kings Forest Parkway intersection to the south. When considering that the maximum peak traffic volumes utilising Old Bogangar Road will not exceed 10 vehicles per hour, a substantial intersection configuration over and above a priority controlled intersection is not warranted or appropriate for this location;

c. Given the low traffic volumes which will enter and exit Old Bogangar Road, the provision of u-turn facilities is sufficient and as such has been incorporated into the design. The proposed off-set intersection configuration on Tweed Coast Road for King Forest Parkway and Precinct 1 access provides the ability for u-turn movements to/from Old Bogangar Road. By providing the U-turn facility for Old Bogangar Road at the Precinct 1 access, right turn movements out of Precinct 1 have been removed. In addition, the left out of Precinct 1 has been relocated to the south to reduce conflicts with u-turning vehicles; and

d. Old Bogangar Road is located on the approach side of Kings Forest Parkway within close proximity to Tweed Coast Road. Therefore any connection to Kings Forest Parkway would need to be restricted to left-in/left-out. Considering Kings Forest Parkway will provide the primary access to the Kings Forest development area and ultimately carry high traffic volumes, this connection is not recommended.

2.4. Item 27.4)

Item 27: *4) Individual and adjacent intersection modelling be provided to ensure all movements achieve adequate levels of service, queue lengths and time delays, to the satisfaction of the Road Authority.*

Response

The Kings Forest Intersection Assessment report provided in Attachment 1 details the results of the traffic modelling. The proposed intersection configurations perform acceptably in regards to queue lengths, delays and levels of service.

2.5. Item 27.5)

Item 27: *5) Any preferred option that requires the realignment of Old Bogangar Road from its existing connection to Tweed Coast Road requires stakeholder consultation and separate planning approval from Council.*

Response

Old Bogangar Road in not proposed to be realigned and remain within its current intersection location with Tweed Coast Road. Access to Old Bogangar Road has been revised to left in / left out configuration with U-turns available at adjacent intersections (i.e. Kings Forest Parkway and Precinct 1 access).

2.6. Item 27.6)

Item 27: *6) The detailed design shall be submitted to Council with an application under s138 of the Roads Act 1993 for approval prior to the issue of a construction certificate for any works on a public road.*

Response

Preliminary concept plans are provided in Attachment 2 for Council acceptance of the proposed layout and configurations. Following acceptance from Council in regards to the intersection layout, detailed designs will be submitted to Council for construction approval.

I trust the above information at attachments is sufficient for Council to review and provide acceptance in principle of the proposed intersection layout plans and progress to detailed design. Should you require any further information do not hesitate contacting me.

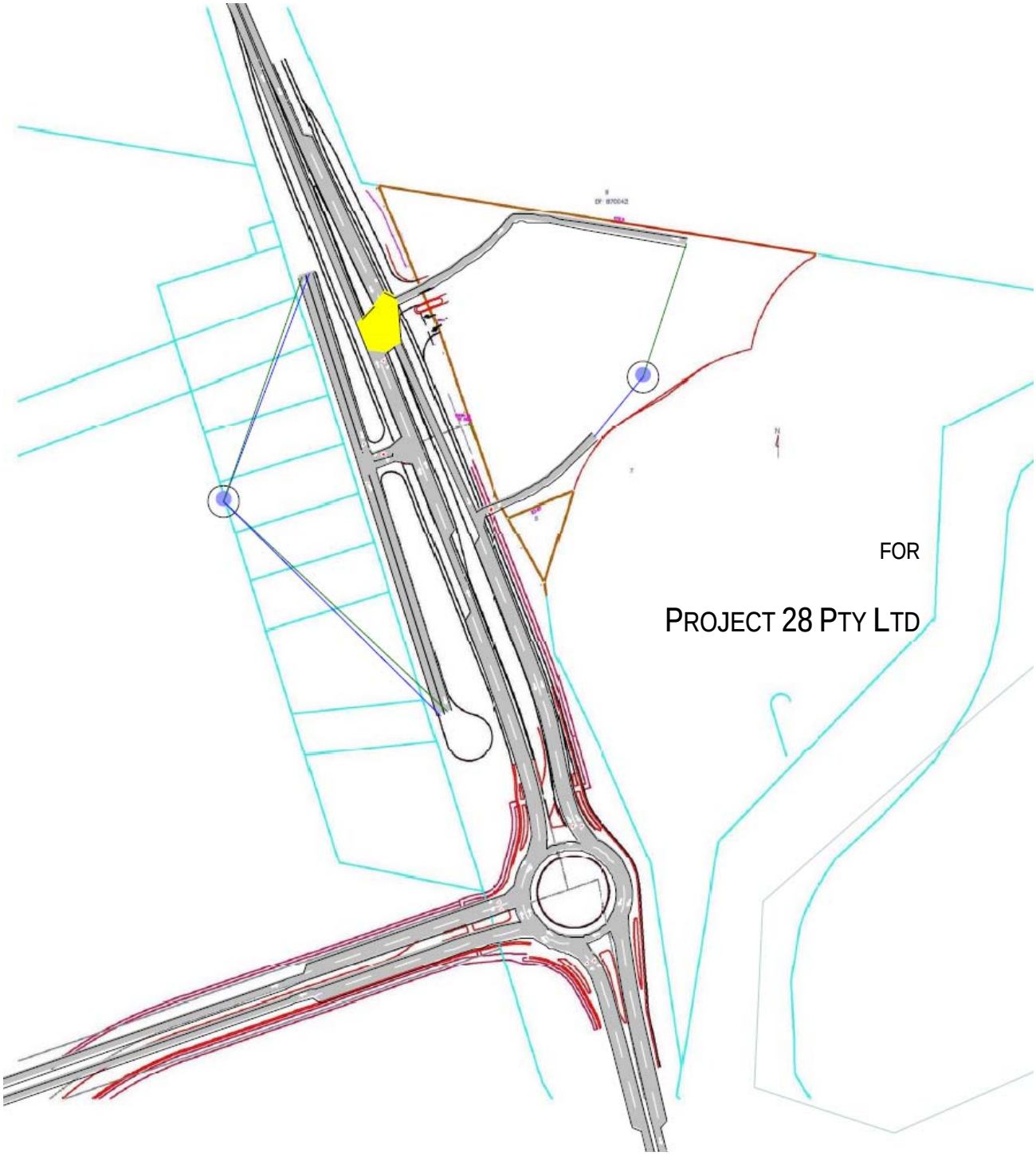
Yours faithfully

Andrew Eke
Manager – Gold Coast & Northern NSW
Senior Traffic Engineer
BITZIOS CONSULTING

ATTACHMENT 1

KINGS FOREST INTERSECTION ASSESSMENT

KINGS FOREST INTERSECTION ASSESSMENT



FOR

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Project No: P1784 Version No: 001 Issue date: 16th October 2014

DOCUMENT CONTROL SHEET

Issue History

Report File Name	Prepared by	Reviewed by	Issued by	Date	Issued to
P1784.001R Kings Forest Intersection Assessment	M.Kimmins	A.Eke	A.Eke	16/10/2014	Michael Geale mgeale@ledaholdings.com.au

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Appendices

Appendix A: Intersection Count

1. INTRODUCTION

1.1 PURPOSE

Bitzios Consulting was commissioned by Project 28 Pty Ltd to assess the intersections on Tweed Coast Road proposed to be constructed as part of the Kings Forest development. CRG had previously undertaken an initial assessment of the intersections using SIDRA modelling, however a more detailed assessment of the intersections was undertaken to assess the interaction of intersections in response to the Department of Planning (DoP)'s Conditions of Approval for Stage 1 of the development. Aimsun microsimulation modelling has therefore been undertaken to assess the intersections.

1.2 LOCATION

The study area including the modelling extents is shown in Figure 1.1 below.

Figure 1.1: Study Area

1.3 SCOPE

The scope of this traffic assessment included the following tasks:

- development of a microsimulation (Aimsun) model of the study area (Figure 1.1) for Stage 1 year of opening (2016) for both an AM and PM peak period;
- determining 2016 year of opening traffic demands based on Stage 1 traffic from previous reports and previous traffic counts and growth for Tweed Coast Road;
- assessment of the 2016 models to identify any specific intersection requirements and confirm the operations of the road network, specifically with respect to the capacity and operations of the proposed left-in/left out treatment for Old Bogangar Road;
- development of 2026 (10 year design horizon) models for AM and PM peaks based on interim staging of the Kings Forest development and Tweed Coast Road growth; and
- assessment of the 2026 models to identify any specific intersection requirements and confirm the operations of the road network, specifically with respect to the road and intersection capacity and vehicle movements between the three intersections on Tweed Coast Road.

2. PROPOSED DEVELOPMENT

For the purpose of this intersection assessment the proposed Kings Forest development has been simplified into two sections, as follows:

- Eastern side of Tweed Coast Road: Precinct 1 - Rural Retail; and
- Western side of Tweed Coast Road: Precincts 2 to 14 - Mixed Use.

The above areas are shown in Figure 2.1 below.

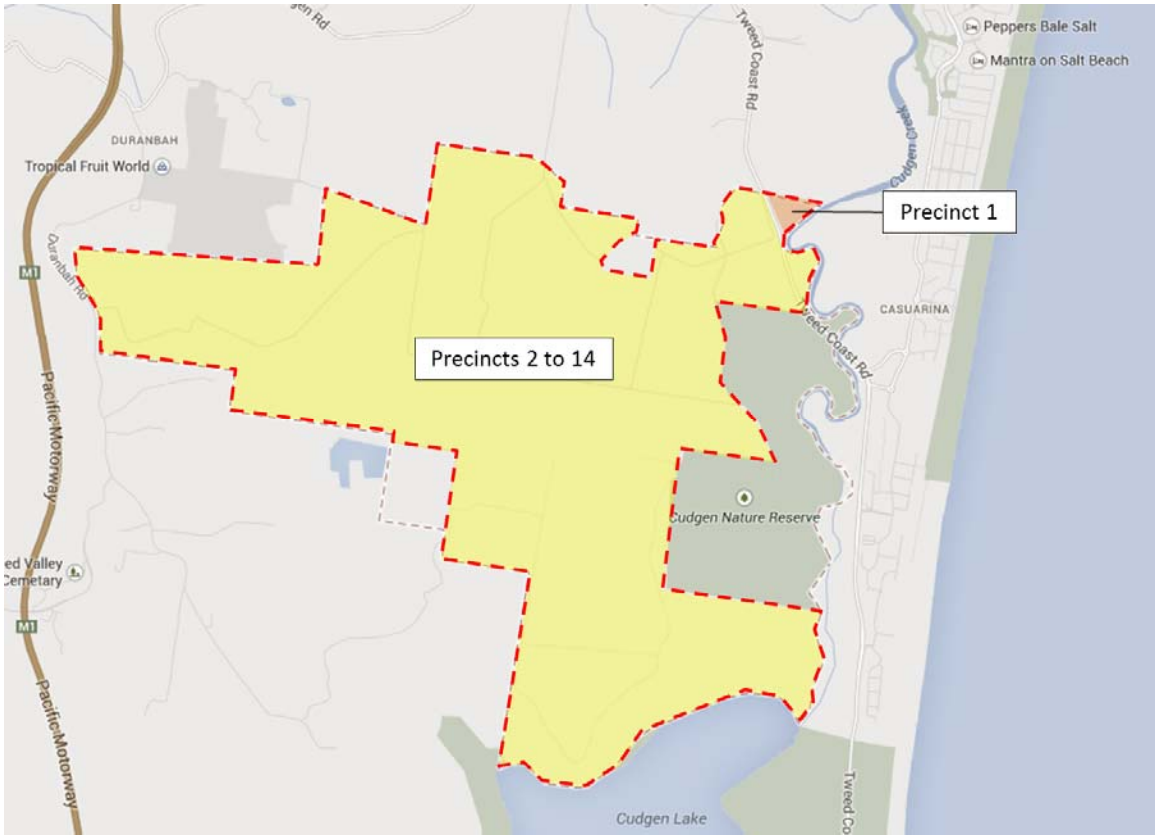


Figure 2.1: King Forest Development

Stage 1 of the development approved by DoP includes the following components:

- residential lots (376 residential lots); and
- rural retail (1,995m^2).

Although the DoP approved number of residential lots 376, to be consistent with the previous traffic assessments, 500 residential dwellings have been assumed for Stage 1 to provide a conservative assessment of traffic impacts.

3. MODEL DEVELOPMENT

3.1 OVERVIEW

The Aimsun models have been developed to test network intersection layouts and network configurations to identify traffic impacts. The following scenarios have been developed:

- 2016 (Year of Opening): Stage 1 of Kings Forest which includes the Rural Retail development on the eastern side of Tweed Coast Road and 500 dwellings on the western side of Tweed Coast Road; and
- 2026 (10 Year Design Horizon): includes the Rural Retail development on the eastern side of Tweed Coast Road and 2,500 dwellings on the western side of Tweed Coast Road, which assumes Kings Forest's continuing construction at a rate of 200 dwellings per year from 2016 to 2026.

The Kings Forest development also includes a number of other land uses which are taken into account in the trip generation for future development over time.

3.2 NETWORK

The modelled network including details of the road and intersection configurations is shown in Figure 3.1 below. It should be noted that both a two lane and four lane cross section for Tweed Coast Road was modelled to confirm the carrying capacity requirements through the intersections under the future development scenerios.

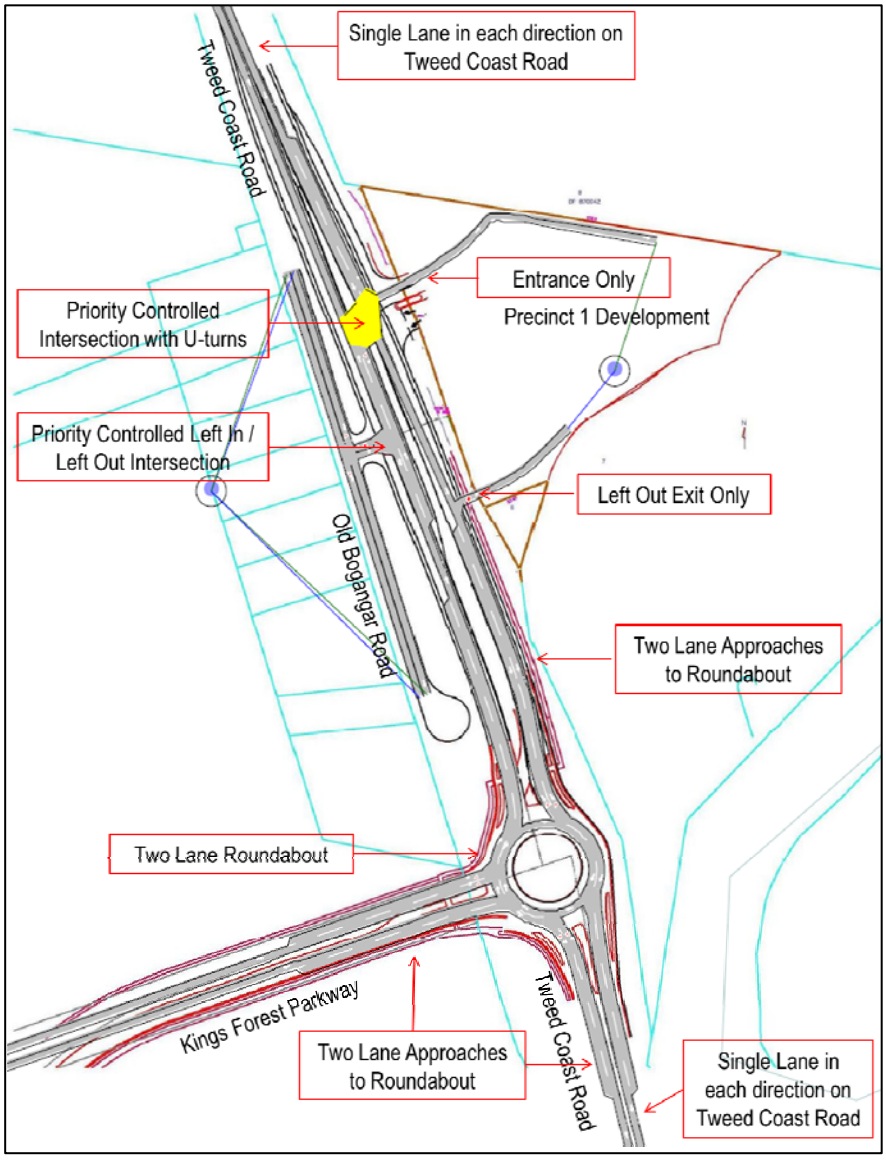


Figure 3.1: Modelled Network

3.3 DATA

The data used in the development of the Aimsun models included an intersection count previously undertaken by Traffic Data and Control (TDC) on the 23 October 2012 at the Tweed Coast Road / Dianella Drive Intersection, located approximately 1km south of Kings Forest. As there are no side roads or property accesses between Kings Forest and the intersection, the intersection counts provide an accurate survey of Tweed Coast Road volumes past Kings Forest. The intersection count survey is provided in Appendix A.

3.4 DEMANDS

3.4.1 Development Trip Generation

Kings Forest

Development traffic generation was determined based on Road and Maritime Services (RMS) *Guide to Traffic Generating Developments* for Stage 1 of Kings Forest (500 dwellings). The trip generation for the Interim stage of Kings Forest is based on a previously accepted rate used in the CRG report for the Ultimate Kings Forest development. The Interim rate is an interpolation of the trip generation rate for Stage 1 and the Ultimate staging of Kings Forest. Table 3.1 below shows the estimated peak hour traffic volumes generated by the Kings Forest.

Table 3.1: Kings Forest - Traffic Generation

Scenario	Rate Source	Unit	Peak Hour Trip Generation Rate	No. of Units	Trips
Stage 1	RMS	dwellings	0.85 per dwelling	500	425
10 year Design Horizon	Interim Interpolation	dwellings	0.65 per dwelling	2,500	1,625
Ultimate	CRG – Accepted Assessment Rate	dwellings	0.45 per dwelling	4,503	2,026

The above reducing trip generation rates are considered appropriate given the increasing level of internalisation as a result of additional land uses within Kings Forest over time.

For the purpose of this assessment only Stage 1 year of opening (2016) and the 10 year design horizon (2026) stages of Kings Forest have been assessed. Table 3.2 summarises the trip generation splits for each peak period for each stage of development.

Table 3.2: Kings Forest - Trip Generation Splits

		AM Split (%)		AM Trips (veh/h)		PM Split (%)		PM Trips (veh/h)	
Scenario	Trips	In	Out	In	Out	In	Out	In	Out
2016 Stage 1 Year of Opening	425	20%	80%	85	340	60%	40%	255	170
2026 10 Year Design Horizon	1,625	20%	80%	325	1,300	60%	40%	975	650

Rural Retail

Development traffic generation for the Rural Retail component was determined based on Road and Maritime Services (RMS) *Guide to Traffic Generating Developments*. Table 3.3 below shows the estimated peak hour traffic volumes generated by the Rural Retail development.

Table 3.3: Rural Retail - Traffic Generation

Land Use	Unit	Trip Generation Rate	No. of Units	Trips	
				AM	PM
Rural Retail	GFA (m2)	12.3 PM Peak trips per 100m^2 (RMS Retail)	1,995 m^2	122*	244

** AM Peak trips were assumed at 50% of the PM Peak Rate*

The above trip generation rates are consistent with the previous CRG traffic reports.

Table 3.4 summarises the trip generation splits for the Rural Retail development in each peak period.

Table 3.4: Rural Retail - Trip Generation Splits

Land Use	Trips		AM Split (%)		AM Trips (veh/h)		PM Split (%)		PM Trips (veh/h)	
	AM	PM	In	Out	In	Out	In	Out	In	Out
Rural Retail	122	244	60%	40%	73	49	50%	50%	122	122

Old Bogangar Road

Old Bogangar Road traffic generation was determined based trip generation rates from the Road and Maritime Services (RMS) *Guide to Traffic Generating Developments*. Table 3.5 below shows the estimated peak hour traffic volumes generated by the Old Bogangar Road land uses.

Table 3.5: Old Bogangar Road - Traffic Generation

Land Use	Unit	Trip Generation Rate	No. of Units	Trips
Residential Lots	dwellings	0.85 per dwelling (RMS)	11	9

Table 3.6 summarises the trip generation splits for Old Bogangar Road in each peak period.

Table 3.6: Old Bogangar Road - Trip Generation Splits

Land Use	Trips	AM Split (%)		AM Trips (veh/h)		PM Split (%)		PM Trips (veh/h)	
		In	Out	In	Out	In	Out	In	Out
Residential Lots	9	20%	80%	2	7	80%	20%	7	2

3.4.2 Traffic Distribution

Table 3.7 summarises the direction al splits on the Tweed coast Road for each development in each peak period.

Table 3.7: Trip Distribution

Generator	AM (%)		PM (%)	
	North	South	North	South
Kings Forest	70%	30%	43%	57%
Rural Retail	50%	50%	50%	50%
Old Bogangar Road	70%	30%	43%	57%

3.4.3 Background Traffic and Growth

Background traffic growth for Tweed Coast Road was based on the previous growth agreed within the Stage 1 Traffic Impact Assessments at a rate of 2% compounding per annum. This rate has been applied to the 2012 Tweed Coast Road surveyed volumes to determine 2016 and 2026 through traffic volumes.

3.4.4 2016 Volumes

2016 volumes are based on the following:

- through traffic volumes based on 2012 surveys at the Tweed Coast Road / Dianella Drive Intersection with 2% growth compounding per annum from 2012 to 2016;

- Rural Retail development on the on the eastern side of Tweed Coast Road; and
- 500 residential dwellings on the western side of Tweed Coast Road accessed via Kings Forest Parkway.

Figure 3.2 shows the 2016 AM and PM volumes.

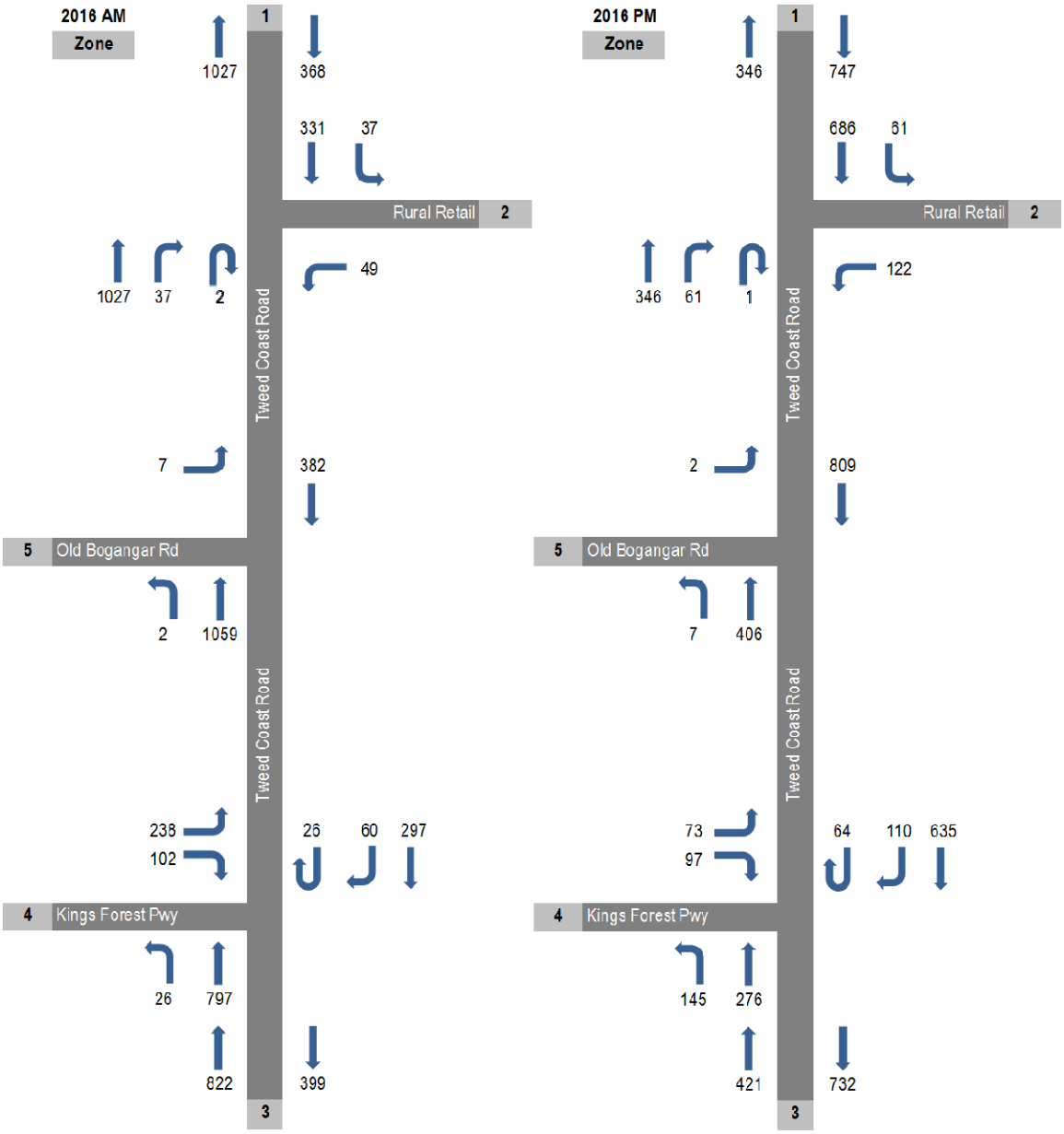


Figure 3.2: 2016 Volumes

3.4.5 2026 Volumes

2026 volumes are based on the following:

- through traffic volumes based on 2012 surveys at the Tweed Coast Road / Dianella Drive Intersection with 2% growth compounding per annum from 2012 to 2026;
- Rural Retail development on the on the eastern side of Tweed Coast Road; and
- 2,500 residential dwellings on the western side of Tweed Coast Road accessed via Kings Forest Parkway.

Figure 3.3 shows the 2026 AM and PM volumes.

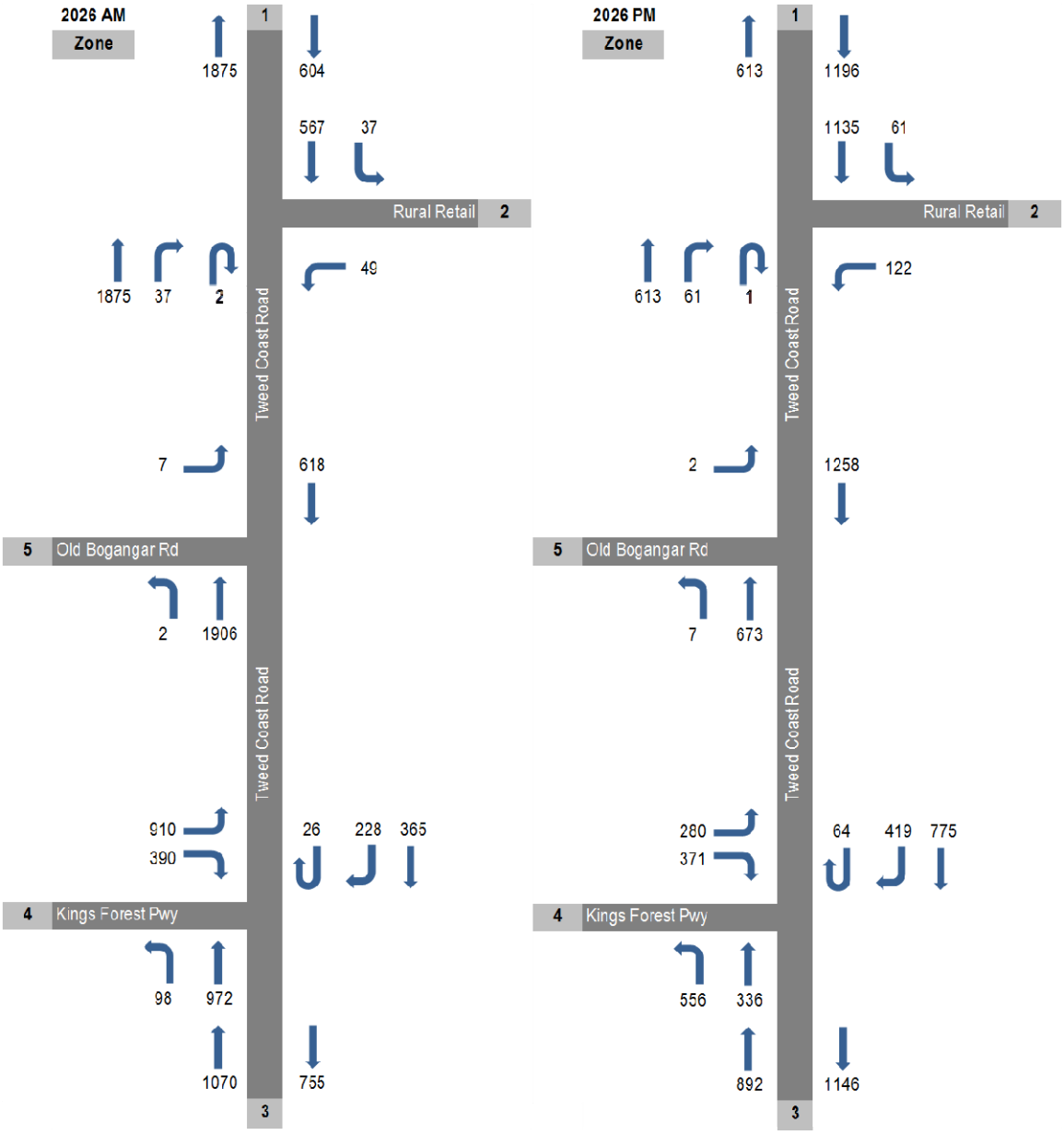


Figure 3.3: 2026 Volumes

3.5 MODELLED PERIODS

The Base models were developed for the following one hour periods which were determined from the Tweed Coast Road / Dianella Drive Intersection Survey:

- 2014 AM Base model: 8:00am to 9:00am; and
- 2014 PM Base model: 4:15pm to 5:15pm.

The Base models also include a warm up period to load traffic onto the network prior to the above periods.

3.6 TRAFFIC ASSIGNMENT

Traffic Assignment is based on a stochastic route choice model as there is no route choice available in the modelled network.

4. MODELLING OUTPUTS

Average Delay and Maximum Queues for each roadway section were extracted from the Aimsun models. Figure 4.1 below shows the legend corresponding to the output figures (Figures 4.2 to 4.5). Average delays and the corresponding Level of Service (LOS) are measured in seconds and maximum queues are measured in the number of vehicle within the queue.

LOS	Average Delay (s)	Colour
A	0 to 10	
B	10 to 20	
C	20 to 35	
D	35 to 55	
E	55 to 80	
F	80 to ∞	

Max Queue (veh)	Colour
0 to 3	
3 to 6	
6 to 9	
9 to 12	
12 to ∞	

Figure 4.1: Modelling Output Legends

The Average Delays and Maximum Queues for each modelled scenario are shown in Figures 4.2 to 4.5.

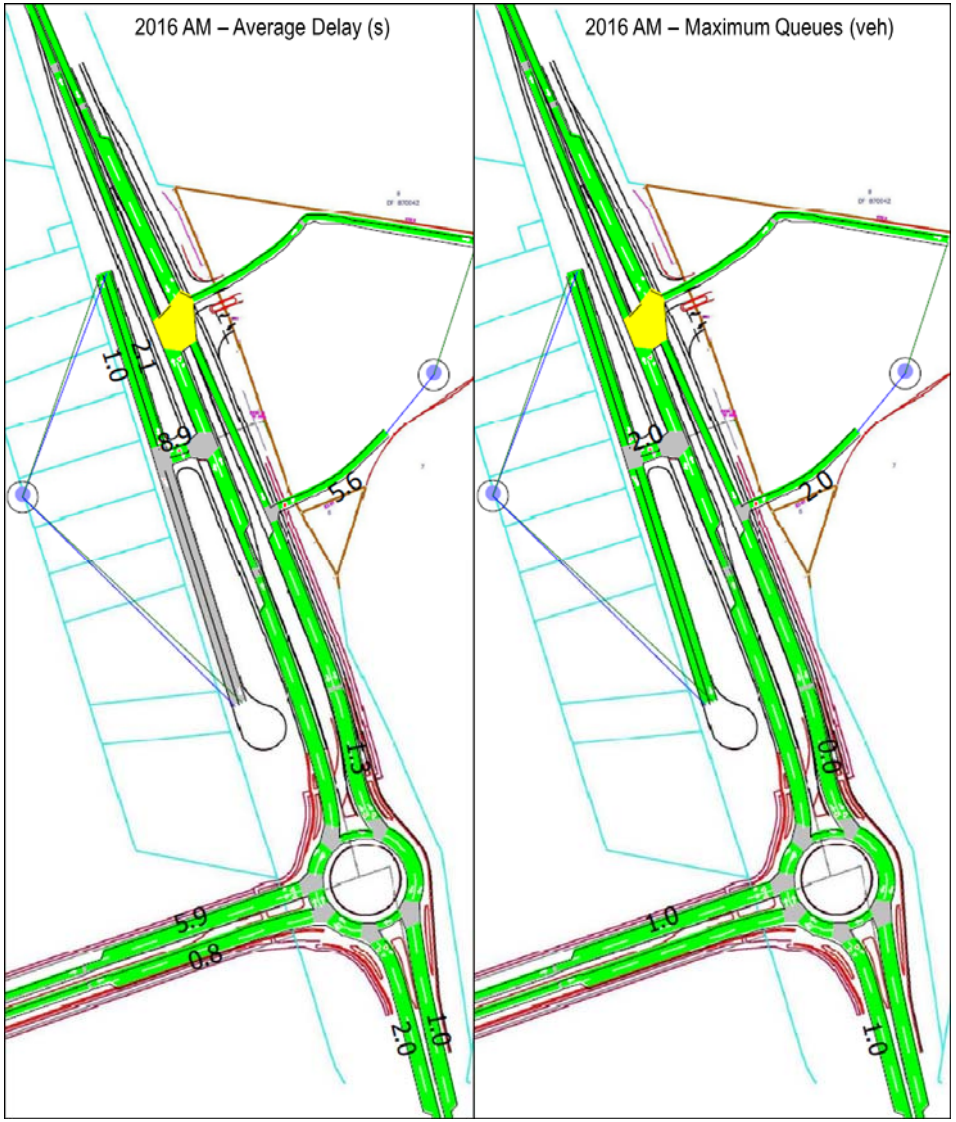


Figure 4.2: 2016 AM Model Outputs

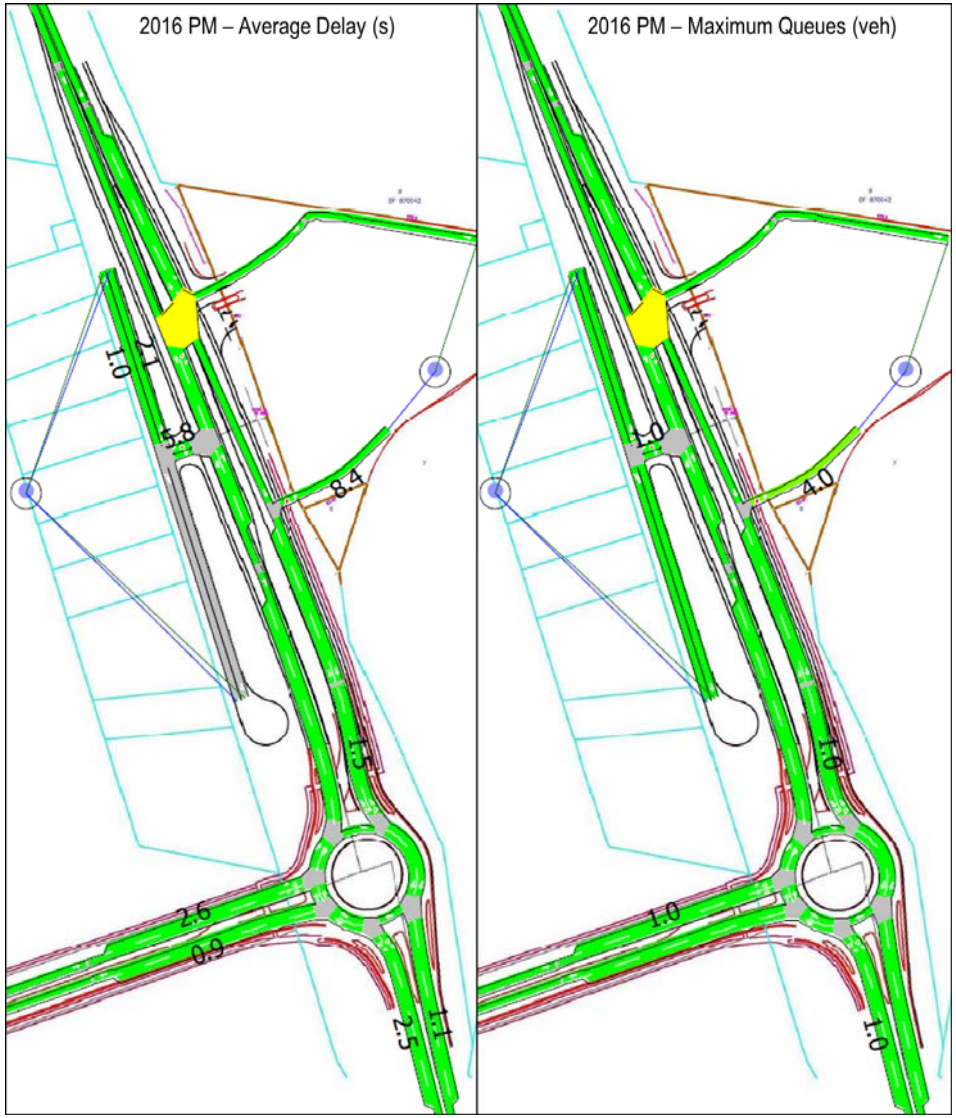


Figure 4.3: 2016 PM Model Outputs

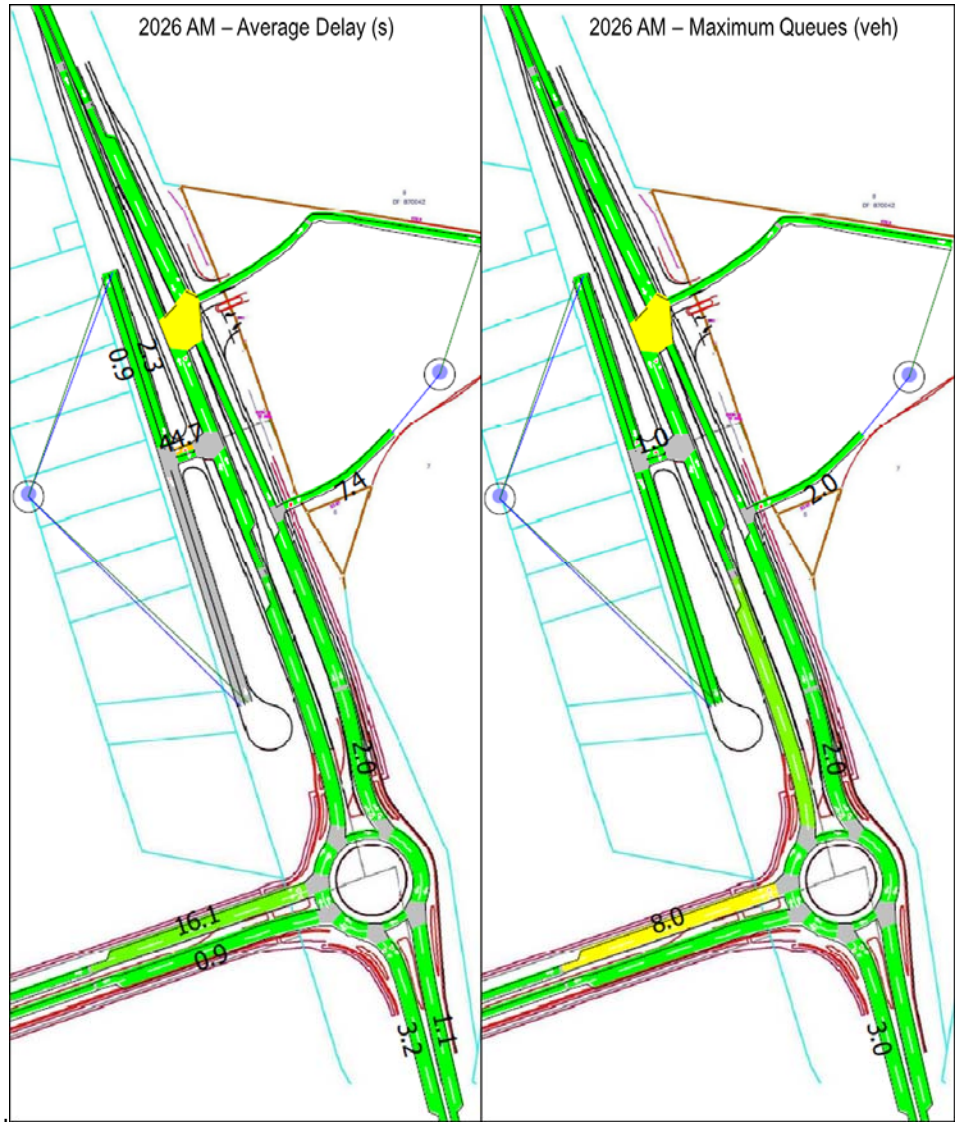


Figure 4.4: 2026 AM Model Outputs

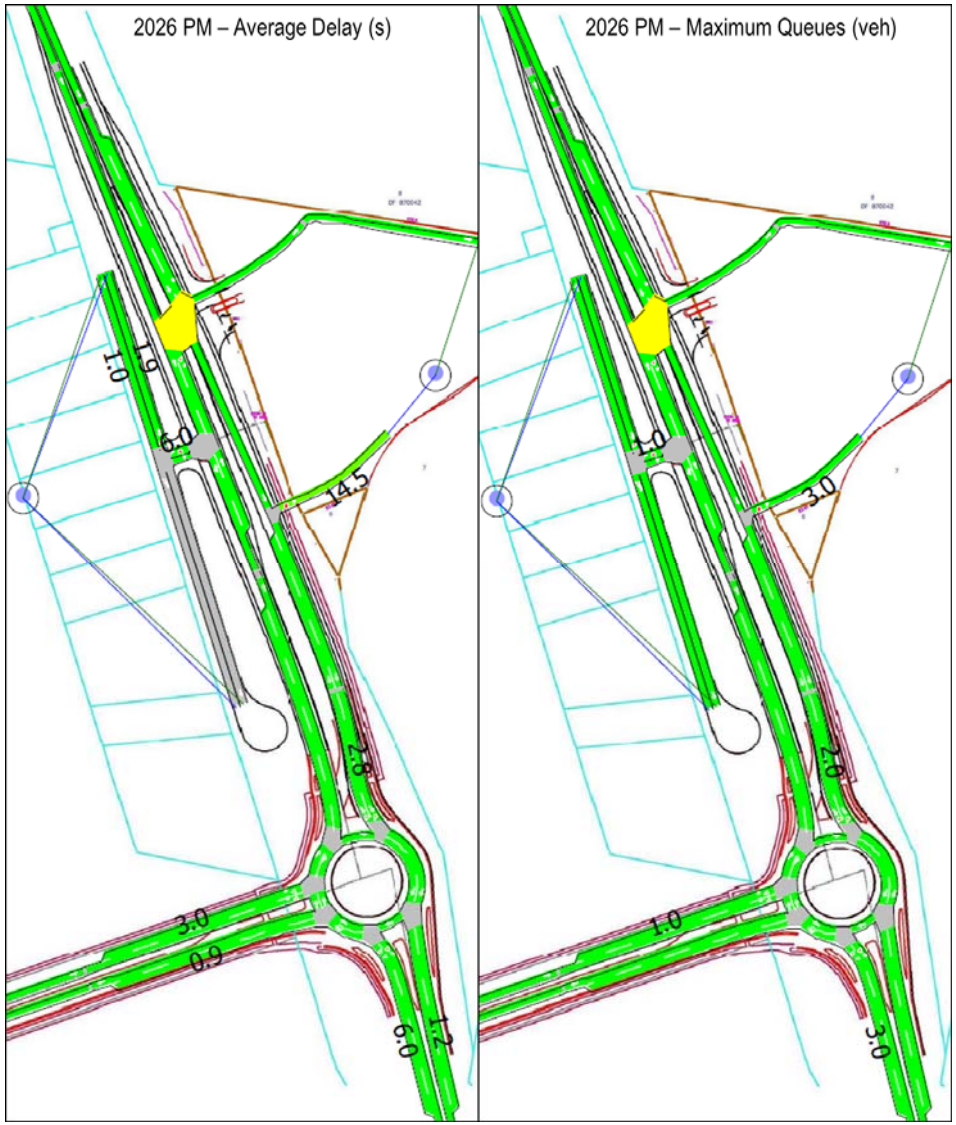


Figure 4.5: 2026 PM Model Outputs

5. TRAFFIC ASSESSMENT

5.1 TWEED COAST ROAD / RURAL RETAIL ENTRANCE INTERSECTION

The Rural Retail access intersection as shown in Figure 5.1 below provides sufficient capacity for all movements into the Rural Retail development whilst adequately catering for the low volume of U-turns movements. There are no adverse queuing impacts or significant delays experienced at the intersection in 2016 or 2026. The single lane cross section on Tweed Coast Road is sufficient out to the 10 year (2026) design horizon.

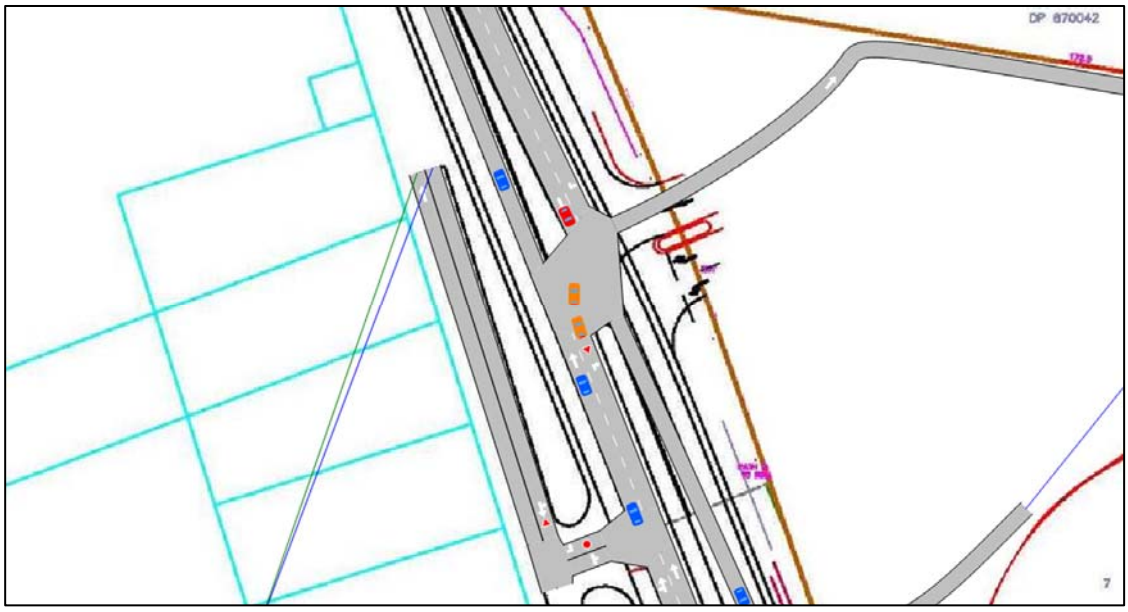


Figure 5.1: Tweed Coast Road / Rural Retail Entrance Intersection

5.2 TWEED COAST ROAD / OLD BOGANGAR ROAD INTERSECTION

The Old Bogangar Road Left in / Left out intersection shown in Figure 5.2 operates satisfactorily in all scenarios. There is an average delay of 44.7 seconds (LOS D) on the Old Bogangar Road approach to Tweed Coast Way in the 2026 AM model, however given that only 7 vehicles are required to undertake this movement, the resultant maximum queue is one (1) vehicle in the 2026 AM peak hour. This operation remains within acceptable parameters.

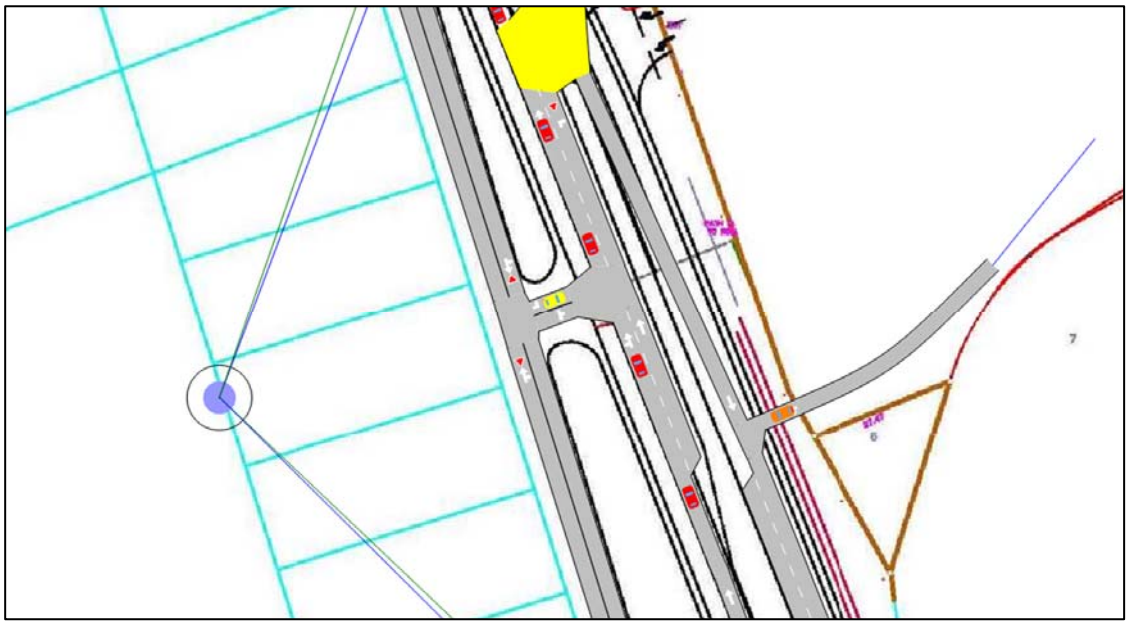


Figure 5.2: Tweed Coast Road / Old Bogangar Road Intersection

5.3 TWEED COAST ROAD / RURAL RETAIL EXIT INTERSECTION

The Rural Retail egress intersection shown in Figure 5.3 performs satisfactorily in all scenarios with a peak 2026 PM average delay of 14.5 seconds (LOS B) and a maximum queue of three vehicles. The left out only configuration for this intersection and the required U-turn at the Tweed Coast Road / King Forest Parkway Roundabout does not result in any impacts to the operation or performance of the roundabout or Tweed Coast Road.

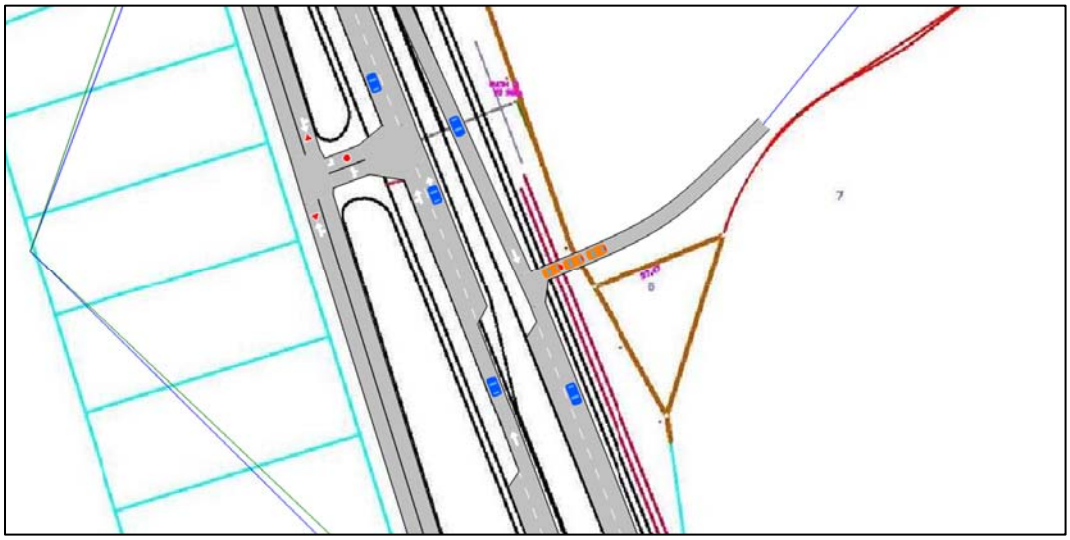


Figure 5.3: Tweed Coast Road / Rural Retail Exit Intersection

5.4 TWEED COAST ROAD / KINGS FOREST PARKWAY ROUNDABOUT

The proposed two lane roundabout at the Tweed Coast Road / Kings Forest Parkway intersection shown in Figure 5.4 performs adequately in all scenarios. The worst performing approach in the 2026 AM model results in a maximum queue of 8 vehicles with an average delay of 16.1 seconds (LOS B) on the Kings Forest Parkway approach to Tweed Coast Road.

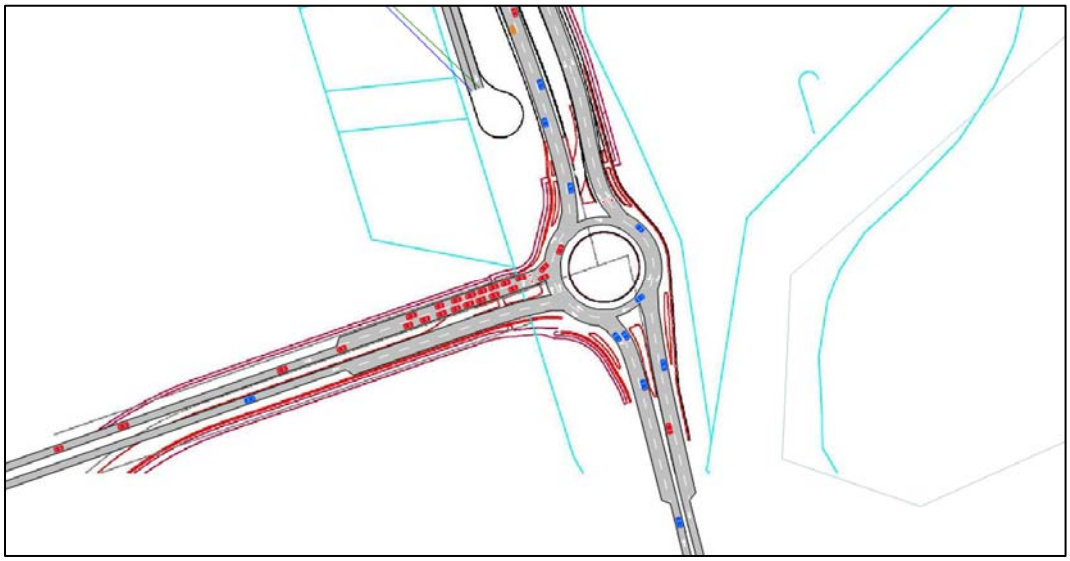


Figure 5.4: Tweed Coast Road / Kings Forest Parkway Intersection

5.5 SUMMARY

Overall, the operations and performance of the traffic network is adequate to cater for both 2016 and 2026 demands. There are no significance delays or queues that adversely impact the traffic network in any scenario tested. The two lane cross section with the provision of associated turning lanes remains sufficient to cater for through traffic volumes on Tweed Coast Road out to the 2026 10 year design horizon. The proposed road network and intersection configurations are therefore deemed appropriate.

6. CONCLUSIONS

The key outcomes of the Kings Forest Intersection Assessment include:

- the 2016 Stage 1 Aimsun model which includes the Rural Retail and 500 dwellings performs satisfactorily in both the AM and PM peak periods;
- the 2026 Aimsun model which includes the Rural Retail development and 2,500 dwellings also performs satisfactorily in both AM and PM peak periods;
- the priority controlled Tweed Coast Road / Rural Retail Entrance Intersection provides sufficient capacity for all movements into the Rural Retail development and adequately caters for the U-turn movements for southbound Old Bogangar Road traffic;
- the Tweed Coast Road / Old Bogangar Road Intersection operates satisfactorily with a worst case average delay of 44.7 seconds (LOS D) in the 2026 AM model, resulting in a maximum queue of one (1) vehicle;
- the Tweed Coast Road / Rural Retail Exit Intersection performs satisfactorily in all scenarios with a peak 2026 PM average delay of 14.5 seconds (LOS B) and a maximum queue of 3 vehicles;
- the Tweed Coast Road / Kings Forest Parkway Roundabout performs adequately in all scenarios with the worst approach in the 2026 AM model resulting in a maximum queue of 8 vehicles and an average delay of 16.1 seconds (LOS B); and
- Tweed Coast Road performs within an acceptable level of service through the proposed intersection configurations without the provision of a continual four lane cross-section out to 2026. As such, two lane cross section on Tweed Coast Road with associated turning lanes and the two lane roundabout at Kings Forest Parkway intersection is sufficient to cater for the 2026 design horizon.

Overall, the proposed road layout and intersection configurations are adequate to cater for the 2026 (10 year) design scenario and do not result in any unacceptable peak period delays, queues or levels of service.

APPENDIX A

INTERSECTION COUNT

TDC

Traffic Data & Control

Site ID: 1

Location: Tweed Coast Rd & The Coast Rd

Weather: Fine / Windy

Suburb: Casuarina

Duration: 7:00am - 9:00am & 4:00pm - 6:00pm

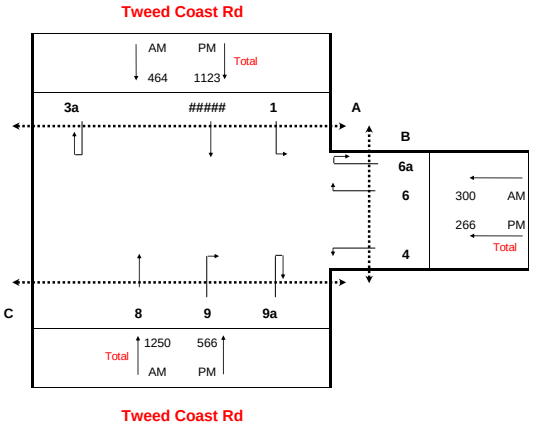
Day/Date: Tuesday, 23 October 2012

AM Peak 09:00 (hour ending)

PM Peak 17:15 (hour ending)

Traffic Control: Give-Way

HOME

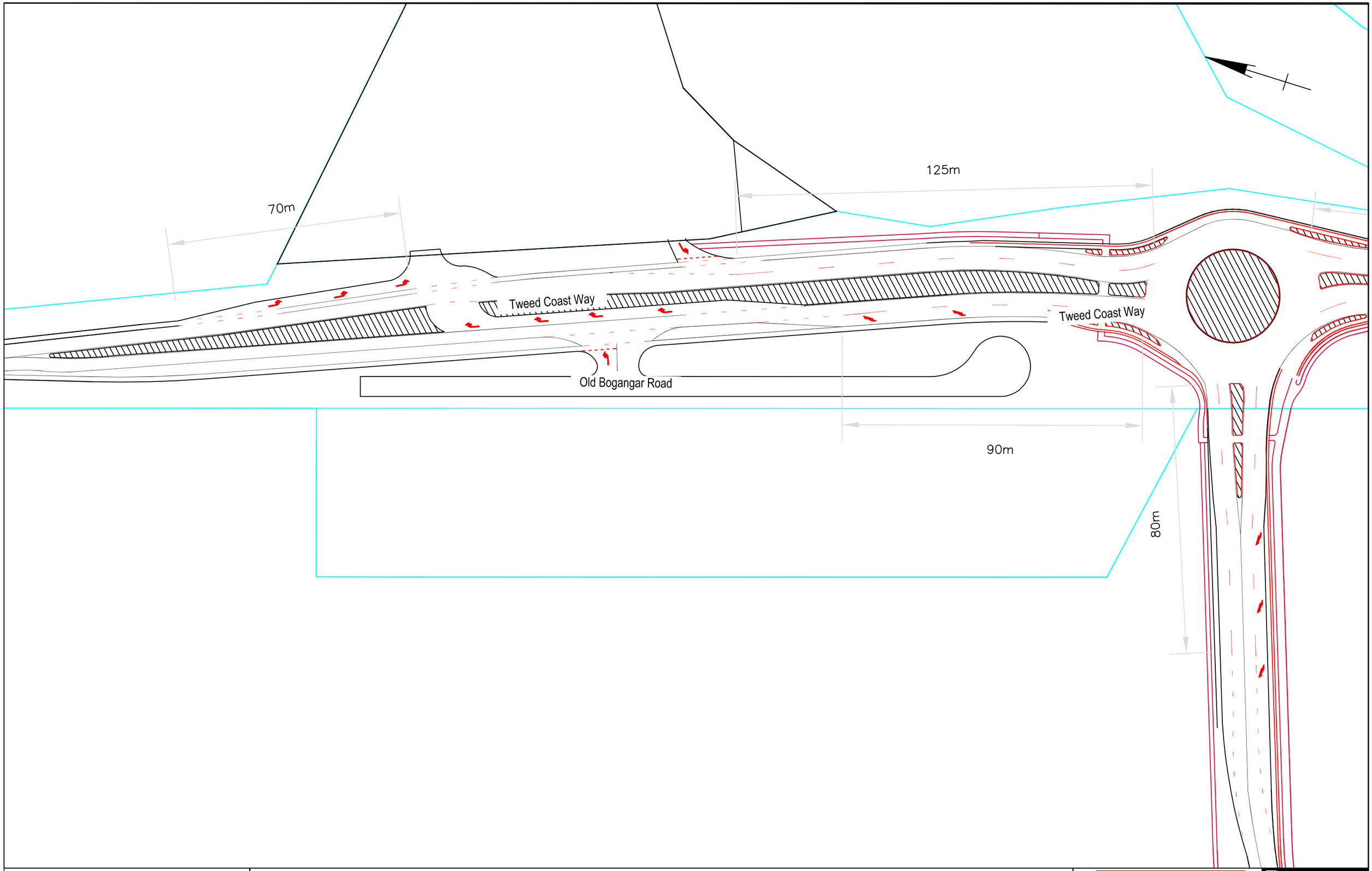


TIME	Tweed Coast Rd (Southbound)												The Coast Rd (Westbound)												Tweed Coast Rd (Northbound)												Pedestrians		
	Movement 1 (Left Turn)				Movement 2 (Through)				Movement 3a (U Turn)				Movement 4 (Left Turn)				Movement 6 (Right Turn)				Movement 6a (U Turn)				Movement 8 (Through)				Movement 9 (Right Turn)				Movement 9a (U Turn)				A	B	C
15 MINUTE PERIOD ENDING	Cars, Utilities & Motorcycles	Trucks	Cyclists		Cars, Utilities & Motorcycles	Trucks	Cyclists		Cars, Utilities & Motorcycles	Trucks	Cyclists		Cars, Utilities & Motorcycles	Trucks	Cyclists		Cars, Utilities & Motorcycles	Trucks	Cyclists		Cars, Utilities & Motorcycles	Trucks	Cyclists		Cars, Utilities & Motorcycles	Trucks	Cyclists		Cars, Utilities & Motorcycles	Trucks	Cyclists		Cars, Utilities & Motorcycles	Trucks	Cyclists		North	East	South
1 7:15 AM	5	0	0		14	6	0		0	0	0		6	0	0		9	0	0		1	0	0		70	2	0		19	0	0		0	0	0		0	0	0
2 7:30 AM	4	0	0		38	4	0		0	0	0		10	0	0		9	0	0		0	0	0		81	5	0		15	1	0		0	0	0		0	0	0
3 7:45 AM	6	3	0		32	8	0		0	0	0		15	0	1		13	1	0		0	0	0		130	3	1		20	3	0		0	0	0		0	0	0
4 8:00 AM	12	2	0		32	10	0		0	0	0		7	1	0		27	0	0		0	0	0		149	6	0		13	2	0		0	0	0		0	0	0
5 8:15 AM	6	1	0		34	7	1		0	0	0		9	0	0		38	1	0		0	0	0		146	5	0		18	0	0		0	0	0		0	0	0
6 8:30 AM	15	3	0		51	4	0		0	0	0		24	1	0		23	2	0		0	0	0		156	7	0		21	3	0		0	0	0		0	0	0
7 8:45 AM	13	1	0		57	7	0		0	0	0		22	5	0		24	0	0		0	0	0		148	7	1		30	0	0		0	0	0		0	0	0
8 9:00 AM	10	3	0		68	5	2		0	0	0		29	0	0		21	1	0		0	0	0		152	6	0		30	0	0		0	0	0		0	0	0
2HR Total	71	13	0	0	326	51	3	0	0	0	0	0	122	7	1	0	164	5	0	0	1	0	0	0	1032	41	2	0	166	9	0	0	0	0	0	0	0	0	0
Peak Hour Total	44	8	0	0	210	23	3	0	0	0	0	0	84	6	0	0	106	4	0	0	0	0	0	0	602	25	1	0	99	3	0	0	0	0	0	0	0	0	0

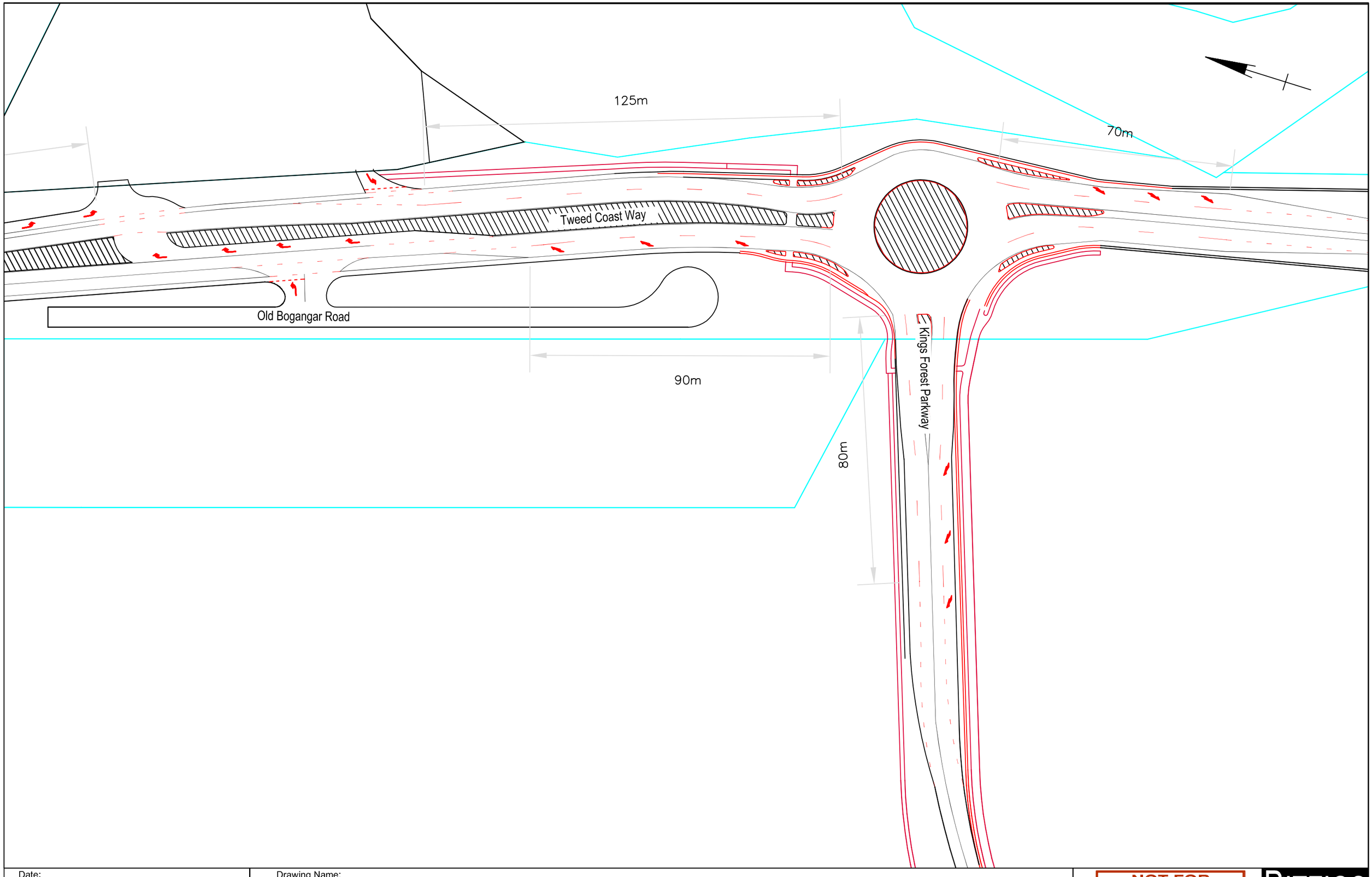
TIME	Tweed Coast Rd (Southbound)												The Coast Rd (Westbound)												Tweed Coast Rd (Northbound)												Pedestrians		
	Movement 1 (Left Turn)				Movement 2 (Through)				Movement 3a (U Turn)				Movement 4 (Left Turn)				Movement 6 (Right Turn)				Movement 6a (U Turn)				Movement 8 (Through)				Movement 9 (Right Turn)				Movement 9a (U Turn)				A	B	C
15 MINUTE PERIOD ENDING	Cars, Utilities & Motorcycles	Trucks	Cyclists		Cars, Utilities & Motorcycles	Trucks	Cyclists		Cars, Utilities & Motorcycles	Trucks	Cyclists		Cars, Utilities & Motorcycles	Trucks	Cyclists		Cars, Utilities & Motorcycles	Trucks	Cyclists		Cars, Utilities & Motorcycles	Trucks	Cyclists		Cars, Utilities & Motorcycles	Trucks	Cyclists		Cars, Utilities & Motorcycles	Trucks	Cyclists		Cars, Utilities & Motorcycles	Trucks	Cyclists		North	East	South
1 4:15 PM	16	1	0		109	2	1		0	0	0		25	0	0		13	0	0		0	0	0		51	4	0		16	2	0		0	0	0		0	0	0
2 4:30 PM	16	0	0		145	2	1		0	0	0		33	0	0		11	4	0		0	0	0		68	3	0		16	1	0		0	0	0		0	0	0
3 4:45 PM	16	3	0		110	1	0		0	0	0		23	1	0		7	1	0		0	0	0		52	3	0		30	0	0		0	0	0		0	0	0
4 5:00 PM	17	0	0		121	3	0		0	0	0		24	2	0		5	1	0		0	0	0		45	0	0		21	0	0		0	0	0		0	0	0
5 5:15 PM	22	0	1		132	1	0		0	0	0		30	1	0		6	1	0		0	0	0		46	2	0		16	0	0		0	0	0		0	0	0
6 5:30 PM	22	1	0		122	2	1		0	0	0		17	1	0		7	0	0		0	0	0		42	0	0		26	1	0		0	0	0		0	0	0
7 5:45 PM	12	0	0		100	0	1		0	0	0		25	1	0		7	0	0		0	0	0		44	0	0		17	0	0		0	0	0		0	0	0
8 6:00 PM	19	0	1		121	1	0		0	0	0		18	0	0		2	0	0		0	0	0		33	1	0		26	0	0		0	0	0		0	0	0
2HR Total	140	5	2	0	960	12	4	0	0	0	0	0	195	6	0	0	58	7	0	0	0	0	0	0	381	13	0	0	168	4	0	0	0	0	0	0	0	0	0
Peak Hour Total	71	3	1	0	508	7	1	0	0	0	0	0	110	4	0	0	29	7	0	0	0	0	0	0	211	8	0	0	83	1	0	0	0	0	0	0	0	0	0

ATTACHMENT 2

INTERSECTION CONCEPT PLANS



Date: 09/10/14	Drawing Name: Two Lane Layout	NOT FOR CONSTRUCTION	BITZIOS consulting
Project No: P1784	Project Name: Kings Forest Intersection Assessment	0 10 20 30 40m Scale 1:1000(A3)	Sheet 1 / Version A



Date: 09/10/14	Drawing Name: Two Lane Layout	NOT FOR CONSTRUCTION	BITZIOS consulting	
Project No: P1784	Project Name: Kings Forest Intersection Assessment	0 10 20 30 40m Scale 1:1000(A3)	Sheet 2	Version A