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Lakes Estate, North Boambee Valley
Coffs Harbour

Residential Subdivision

Traffic Impact Assessment Report
(FINAL REPORT)

January 2009

CLIENT:

Noubia Projects Pty Ltd

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1. INTRODUCTION

John Piper Traffic Pty Ltd (JPT) has been engaged by Noubia Projects Pty Ltd to undertake a traffic impact assessment of the additional Lakes Estate residential subdivision off North Boambee Road, Coffs Harbour.

The existing Lakes Estate subdivision (Stage 1) yields 160 residential allotments (DA 575/03) with the expansion and subsequent stages (the subject of this report) yielding approximately 195 additional allotments. It has been identified that the ultimate development and generally complies with the relevant traffic requirements of RTA and Council Standards.

A summary for the site and the proposed development is shown in Table 1.

Address	Lakes Estate, Lakes Drive, Coffs Harbour	
Proposed development	Residential subdivision	
	Lakes Estate Stage 1.2 +	**195 lots**
	Lakes Estate Existing	160 lots
	Total	**355 lots**
Traffic Generation	**Stages 1.2 + (proposed expansion):**	
	Daily:	approx. 1,950 vpd
	Peak hour:	approx. 195 vehicles
	Lakes Estate Total Development:	
	Daily:	approx. 3,550 vpd
	Peak hour:	approx. 355 vehicles
External road network **Traffic safety/capacity works required**	No additional works are required.	
Internal road layout **Traffic safety/capacity works required**	Additional traffic calming treatments, principally along Lakes Drive to ensure motorists travel at an appropriate speed.	

Table 1 – Site and development summary

2. BACKGROUND

It is proposed to extend the Lakes Estate residential subdivision, off North Boambee Road, Coffs Harbour. Stage 1 is being finalised and provides 160 allotments (approximately 50 dwellings have been constructed to date), the remaining stages will provide approximately an additional 195 allotments.

The site is located on the outskirts of Coffs Harbour in the North Boambee Valley, where residential subdivision is gradually being developed. To ensure the appropriate development of Lakes Estate and appropriate connectivity and development of surrounding land, an overall structure plan and a development plan for North Boambee Valley has been prepared.

This document provides guidance regarding the appropriate use and development of the land and ensures optimal subdivision concept plans can be prepared.

2.1 Subdivision Proposal and Surrounding Land Use

The site location (shown in Figure 2.1) is predominately used for farming and grazing purposes as is the majority of the North Boambee Valley. Some existing minor residential development occurs along North Boambee Road including the Bishop Druitt College. Towards the Pacific Highway, traditional highway type businesses occur with a KFC restaurant and caravan dealership occurring at the intersection of North Boambee Road.

It should be noted that the Coffs Harbour Pacific Highway Bypass route is yet to be finalised. It is anticipated that the Highway will be diverted through the North Boambee Valley and ultimately truncate North Boambee Road. The future highway diversion will essentially form the western boundary to any further residential development in this area.

The site is located north west of the existing residential subdivision (refer to Figure 2.1). Access to the site is from North Boambee Road via Lakes Drive. Additional access to North Boambee Road would also occur through a proposed residential subdivision (DA 711/06). An indicative layout of the subdivision is shown in Appendix A, however it should be noted that minor changes at the western boundary are still to be resolved associated with the Bypass. These changes would have negligible traffic impact in terms of assessing the proposed subdivision.

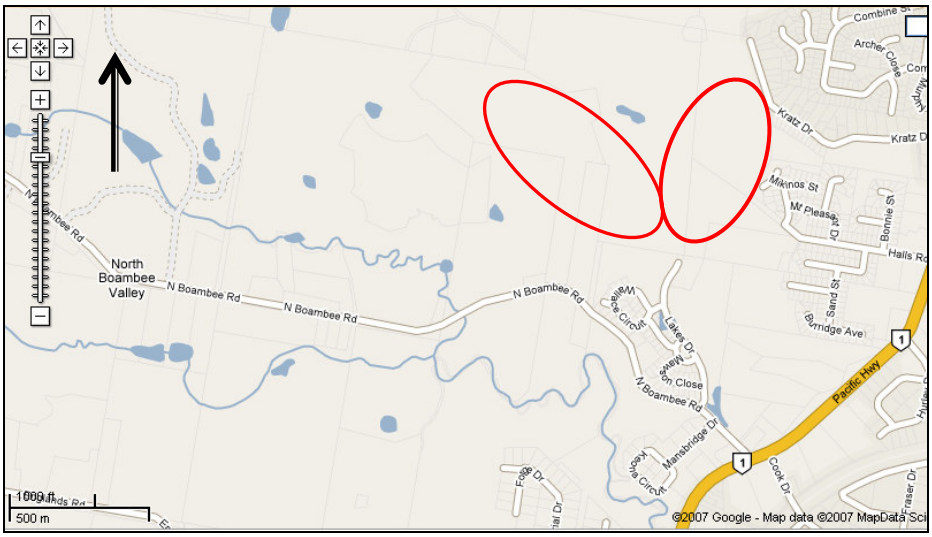

Figure 2.1: Locality Plan
(reproduced from Google Maps)

For analysis purposes, the major existing and proposed developments in the North Boambee Valley are:

Lakes Estate (existing subdivision)	160 residential allotments (approx. 50 dwellings constructed)
Lakes Estate (proposed subdivision)	*195 residential allotments (approx.) (total 355 allotments)*
DA 711/06 (proposed subdivision)	70 residential allotments (approx.)
Total	**425 residential allotments**

3. EXISTING ROAD NETWORK

3.1 North Boambee Road

North Boambee Road would be classified as a collector road and services a number of residential properties fronting the road as well the Bishop Druitt College. This road also provides the primary access into the Lakes Estate via Lakes Drive which is controlled with a roundabout.

North Boambee Road is a sealed 2 lane – 2 way road which is consistent with its current use as a semi-rural road. It is posted with 60 km/h speed limit for the majority of its length except for the 40 km/h time based school speed limit at the school.

Typical road conditions are shown in Figures 3.1.1 and 3.1.2.

Figure 3.1.1 North Boambee Road looking east towards the roundabout which provides the primary access into Lakes Estate.

Figure 3.1.2 North Boambee Road looking east from Lakes Drive towards the Pacific Highway showing wider carriageway and highway type/light industrial business uses on RH side of the photo.

3.1.1 North Boambee Road Traffic Flow

Traffic surveys were carried out in June 2007 for North Boambee Road at Pacific Highway which is considered to be representative of current conditions.

Key survey results are shown below.

Daily traffic flow: 5,500 vehicles per day

AM peak (8 – 9am) 710 vehicles

PM peak (4:15 – 5:15pm) 335 vehicles

Collector roads generally carry 3,000 – 6,000 vehicles per day which is consistent with the operation of North Boambee Road.

It should be noted that traffic volumes can vary significantly depending on abutting land use and road layout. As discussed, North Boambee Road provides access to Bishop Druitt College and a number of industrial properties which contribute to traffic flow on this road.

Traffic volumes will significantly reduce further west along North Boambee Road, in particular, west of Lakes Drive where the development only consists of farmland, a number of residential dwellings fronting the road and Bishop Druitt College.

3.2 Pacific Highway

Pacific Highway is classified as a National Highway and provides access along the east coast of Australia north from Sydney. It is a significant inter-regional route.

Near the site, the Pacific Highway consists of a divided two lane highway with sheltered left and right turn lanes at North Boambee Road. This intersection is controlled with traffic signals.

A 70 km/h speed limit applies along this section of Highway.

3.2.1 Pacific Highway Traffic Flow

Traffic surveys were carried out in June 2007 for the Pacific Highway which are considered to be representative of current conditions.

Key survey results are shown below.

Daily traffic flow:	40,000 vehicles per day (approx.)
AM peak (8 – 9am)	3,200 vehicles (approx.)
PM peak (4:15 – 5:15pm)	3,000 vehicles (approx.)

3.2.2 Coffs Harbour Bypass

As discussed the RTA is currently resolving the preferred route for the Coffs Harbour Bypass. The preferred route is shown in Figure 3.2.1. The key issues associated with the Bypass are that:

- it essentially truncates North Boambee Road and the valley, essentially forming the western boundary to future development in this precinct;
- Pacific Highway traffic volumes near the site would reduce with non local traffic utilising the Bypass. Traffic modelling suggests that traffic volumes on the Pacific Highway would reduce by approximately 15 – 20%. This would result in improved traffic conditions and operation of the existing traffic signals at North Boambee Road.

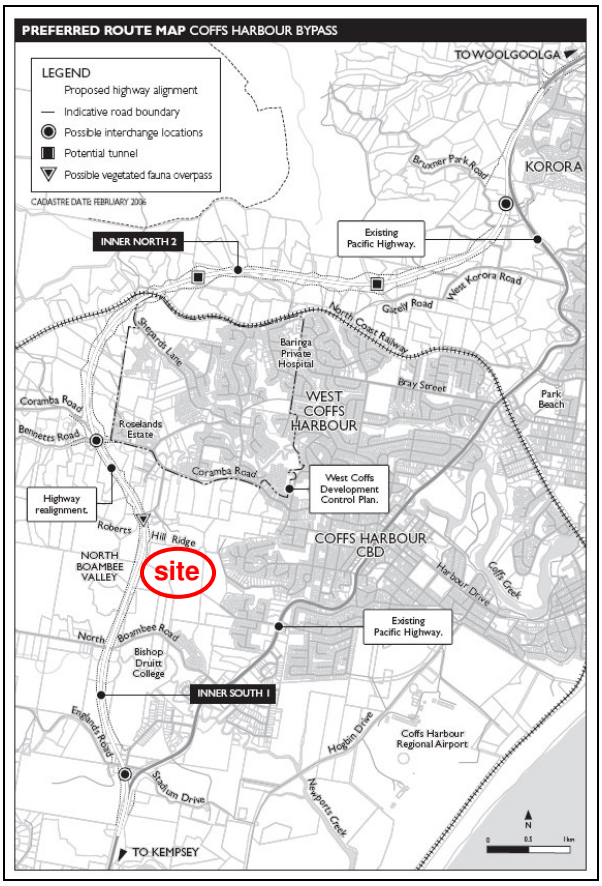

Figure 3.2.1 Coffs Harbour Pacific Highway Bypass

(reproduced from RTA community update information sheet November 2006)

3.2.3 Pacific Highway/North Boambee Road/Cook Drive Traffic Signals

RTA, in conjunction with Council is considering a number of options to improve the operation, safety and performance of the signalised intersection of Pacific Highway/North Boambee Road/Cook Drive intersection. These works were identified, in part, to service development along the North Boambee Valley.

Council officers have advised that a development contribution scheme is in place for these major infrastructure works and it is anticipated that the subdivider would be required to contribute to this scheme.

3.3 Lakes Drive

Lakes Drive provides the principal access into the existing and ultimate subdivision. Lakes Drive is a main collector road and services the existing Lakes Estate subdivision (160 allotments) and ultimately the majority of the proposed additional subdivision.

Lakes Drive consists of an 8.5 m carriageway which can comfortably accommodate 2 way traffic flow. Should parking occurring on both sides, the road width is sufficient for only 1 lane of traffic. At key locations indented bus bays have been provided to service future public transport services.

The Lakes Estate and the internal road network operate with the default 50 km/h speed limit.

Lakes Drive is estimated to currently carry 500 vehicles per day and 50 vehicles in the peak hour. Typical road conditions are shown in Figures 3.3.1 and 3.3.2.

Figure 3.3.1 Lakes Drive looking south from the extent of Stage 1 subdivision. Note indented bus bay on LH side of photo.

Figure 3.3.2 Lakes Drive looking south towards North Boambee Road. The wide carriageway can comfortably accommodate bus movements.

4. TRAFFIC GENERATION & DISTRIBUTION

4.1 Traffic generation

In outer suburban and regional areas, it is generally accepted that residential properties would generate around 8 to 10 vehicle movements per lot per day with a peak hour flow of around 10% of the total daily flow. Various codes and guidelines suggest these rates, and JPT has carried out surveys in new subdivisions where similar traffic generation rates have been obtained. These rates are generally higher than that for metropolitan areas because public transport facilities are generally not as prevalent in regional cities.

The estimated traffic generation for the Lakes Estate existing and proposed subdivision and the remaining land to be developed is shown in Table 4.1.

Development	No. of allotments	Daily flow (veh/day)	Peak flow (veh./h)
Lakes Estate Stage 1 (Existing)	160	1,600	160
Lakes Estate Proposed (Stages 1.2 +)	195	1,950	195
Adjacent Subdivision (DA 711/06)	70	700	70
Total	**425**	**4,250**	**425**

Table 4.1 Traffic Generation Associated with Major Residential Developments

4.2 Distribution of Traffic onto the Surrounding Road Network

Discussions with Council officers confirm that the majority of new residents (say 80%) who are purchasing in the local area are working in Coffs Harbour or nearby townships. As such, the majority of traffic is likely to travel north along Pacific Highway into Coffs Harbour.

Peak hour traffic flow for the subdivision would generally be distributed as follows:

AM peak 80% leaving 20% entering

PM peak 40% leaving 60% entering

The indicative traffic distribution for traffic at Pacific Highway/North Boambee Road for Lakes Estate additional subdivision is shown in Table 4.2.

Period	Left in	Right in	Left out	Right out	Total
8 – 9 am	8	31	125	31	195
4 – 5 pm	23	94	61	17	195

Table 4.2: Lakes Estate Additional Development - Turning Movement Summary at Pacific Highway/North Boambee Road intersection

4.3 Traffic Impact on Pacific Highway / North Boambee Road

In order to determine the impact of traffic from the proposed subdivision on the Pacific Highway / North Boambee Road intersection, detailed intersection analysis using Sidra was undertaken. The analysis indicates that the proposed traffic volumes would have minimal impacts on safety and the operation of the intersection.

4.3.1 SIDRA analysis

SIDRA is a computer program that is widely used to model the performance of intersections and provides information on the delays to motorists, queue lengths and the capacity of an intersection to accommodate traffic.

For an unsignalised intersection, the intersection degree of saturation 'X' measures the degree to which a movement at an intersection approaches the capacity for that movement (i.e. the ratio of the demand flow / capacity).

For both signalised and unsignalised intersections, the operational characteristics and level of service are generally considered satisfactory when X is less than 0.90. At higher values longer queues and delays are experienced by motorists on the side road which results in motorists becoming frustrated and potentially selecting inappropriate or smaller gaps in the traffic to enter the intersection (refer to Table 4.3.1).

Degree of Saturation X	**Description of intersection operation**
Less than 0.65	Excellent operating conditions.
0.6 – 0.7	Very good operating conditions.
0.7 – 0.8	Good operating conditions.
0.8 – 0.9	Acceptable operating conditions.
0.9 – 1.0	Poor operating conditions.
> 1.0	Very poor operating conditions.

Table 4.3.1 – Intersection Degree of Saturation Levels

4.3.2 Intersection analysis

The intersection analysis demonstrates that the traffic generated proposed estate would have minimal impacts on the safety and operation of Pacific Highway / North Boambee Road with the degree of saturation and delays at the intersection considered satisfactory.

A summary of the SIDRA analysis is shown in Table 4.3.2 with detailed information included in Appendix B.

Period of operation	Intersection Degree of Saturation (X)	Average delay (s)
Existing Operation AM Peak	0.65	22s
Proposed Operation AM Peak	0.72	26s
Existing Operation PM Peak	0.59	22s
Proposed Operation PM Peak	0.74	28s

Table 4.3.2 – SIDRA analysis for Pacific Highway / North Boambee Road

5. SUBDIVISION INTERNAL ROAD LAYOUT

5.1 Preamble

Council provides design guidelines for residential subdivisions including traffic management works and these have been used to assess the proposed subdivision layout. These guidelines are generally consistent with those specified in Australian Standards and RTA Guidelines.

The proposed subdivision road layout and access to the abutting road network meets good urban design principles and provides a permeable road layout.

The majority of intersections within the subdivision are 'T' intersections which enhance safety and minimise potential confusion for motorists.

Due to the Pacific Highway Bypass truncating the North Boambee Valley and forming the western boundary to the developable land, a redesign of the layout in the north west corner of the site would be required. This would also, include appropriate road connection(s) into the adjacent residential subdivision (DA 711/06) to maintain appropriate connectivity and permeability for all road users (including cyclists, pedestrians). The indicative subdivision plan shown in Appendix A is considered satisfactory in this regard.

5.2 Subdivision Road Cross Section

Lakes Drive is classified and operates as a collector road in the existing subdivision. However, at its northern end, at the top of the subdivision in the proposed development, traffic flows would be relatively low and as such, Lakes Drive should be treated as local road with a corresponding reduction in road width commensurate with its lower order function.

Lakes Drive should be treated as a local road (carriageway width 7 – 8 m) within the proposed subdivision (essentially the interface would occur north of Stage 1 – existing subdivision). At this location, Lakes Drive would service approximately 100 dwellings, with the remainder of the properties utilising other internal road connections to access Lakes Drive further south and North Boambee Road.

The remaining roads within the subdivision would be lower order roads (local roads and minor roads) (refer to Table 6.2 Urban Road Standards reproduced from Coffs Harbour City Council Design Guidelines). These road cross sections are generally consistent with the North Boambee Valley Structure Plan.

	URBAN ROADS			
	Distributor	Collector	Local	Minor Road (cul-de-sac)
Road Reserve Width	23m	20m	15-16m	13.5-15m
Carriageway Width	13m	11m	7-8m	5.5-7m
Verge	2 x 5m	2 x 4.5m	2 x 4.0m	2 x 4.0m
Minimum Design Speed	60km/h	40km/h	30km/h	30km/h
Formation Clear of table drain	N/A	N/A	N/A	N/A
Bitumen Seal	N/A	N/A	N/A	N/A

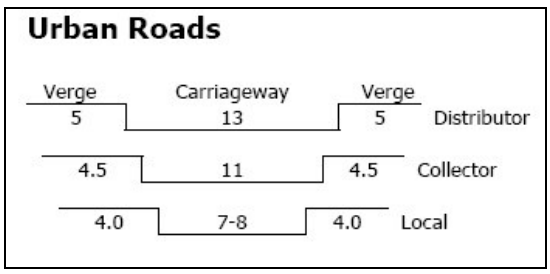

Table 6.2 Coffs Harbour Urban Road Standards

5.3 Traffic Management Works

The location of the subdivision and internal road layout ensure that all roads carry relatively little traffic (less than 1,500 vehicles per day) and that rat runs through the precinct would not occur.

Some of the internal roads have a curvilinear alignment, which in themselves act as natural traffic calming devices.

The major north south route through the subdivision (Lakes Drive) is approximately 1,200 m long (North Boambee Road to Lakes Estate western boundary) which may encourage motorists to travel at inappropriate speeds. It is suggested that additional traffic calming devices to those proposed at the wildlife corridors such as a chicane, raised pavement, or roundabouts be installed at key intersections or at mid block locations.

Whilst Lakes Drive would be used for bus services, it is possible to introduce 'bus friendly' traffic calming devices along this route such as appropriately designed roundabouts (with mountable and semi-mountable islands), chicanes and/or raised platforms.

To encourage motorists to travel at an appropriate speed (40 – 50 km/h) traffic calming treatments should be installed at approximately 100 – 150 m spacing.

5.4 North Boambee Road – Private Vehicle Access Not To Occur

The proposed subdivision ensures that all property vehicle access would occur from the internal road network. This layout is supported as it minimises potential conflict on North Boambee Road which will operate as a higher order collector road.

6. PUBLIC TRANSPORT SERVICES

It is recommended that bus services continue through the Lakes Estate additional development to ensure greater availability of public transport facilities for all residents.

The road network through the proposed development and adjacent subdivision would provide an appropriate route for buses and generally allow them to loop through the subdivision(s) and return to North Boambee Road.

Lakes Estate Stage 1 provides indented bus stops. In the subsequent stages kerb side bus stops would be sufficient as there will be less traffic movement on the local road network at the north/west extremity of the subdivision. The suggested carriageway width of 7 – 8 m for local roads in this part of the proposed subdivision `would provide sufficient space for buses. Generally a 7.5m carriageway can accommodate parking on both sides and allow sufficient space for a single lane of traffic (2 x 2.1 m for parking + 3.3 m for through traffic = 7.5 m).

Generally residents can be expected to walk up to 400 m to access public transport. The proposed road layout, with the bus route using Lakes Drive through the adjacent subdivision onto North Boambee Road ensures that all residents would be within walking distance of the bus.

7. CONCLUSION

The proposed Lakes Estate residential subdivision expansion, North Boambee, Coffs Harbour is considered satisfactory, and it is considered that there would be no traffic management or operational grounds that would warrant refusal of this development proceeding.

The proposed development is anticipated to generate approximately 1,950 vehicles per day and 195 in peak hours.

Detailed intersection analysis was undertaken at the Pacific Harbour / North Boambee Road intersection and it was determined the traffic increase as a result of the proposed subdivision would have minimal impacts on the operation and safety of the intersection.

On the internal road layout (Lakes Drive), additional 'bus friendly' traffic calming devices should be installed to complement the proposed treatments at the wildlife crossing corridors to ensure motorists travel at an appropriate speed.

APPENDIX A

PROPOSED SUBDIVISION LAYOUT

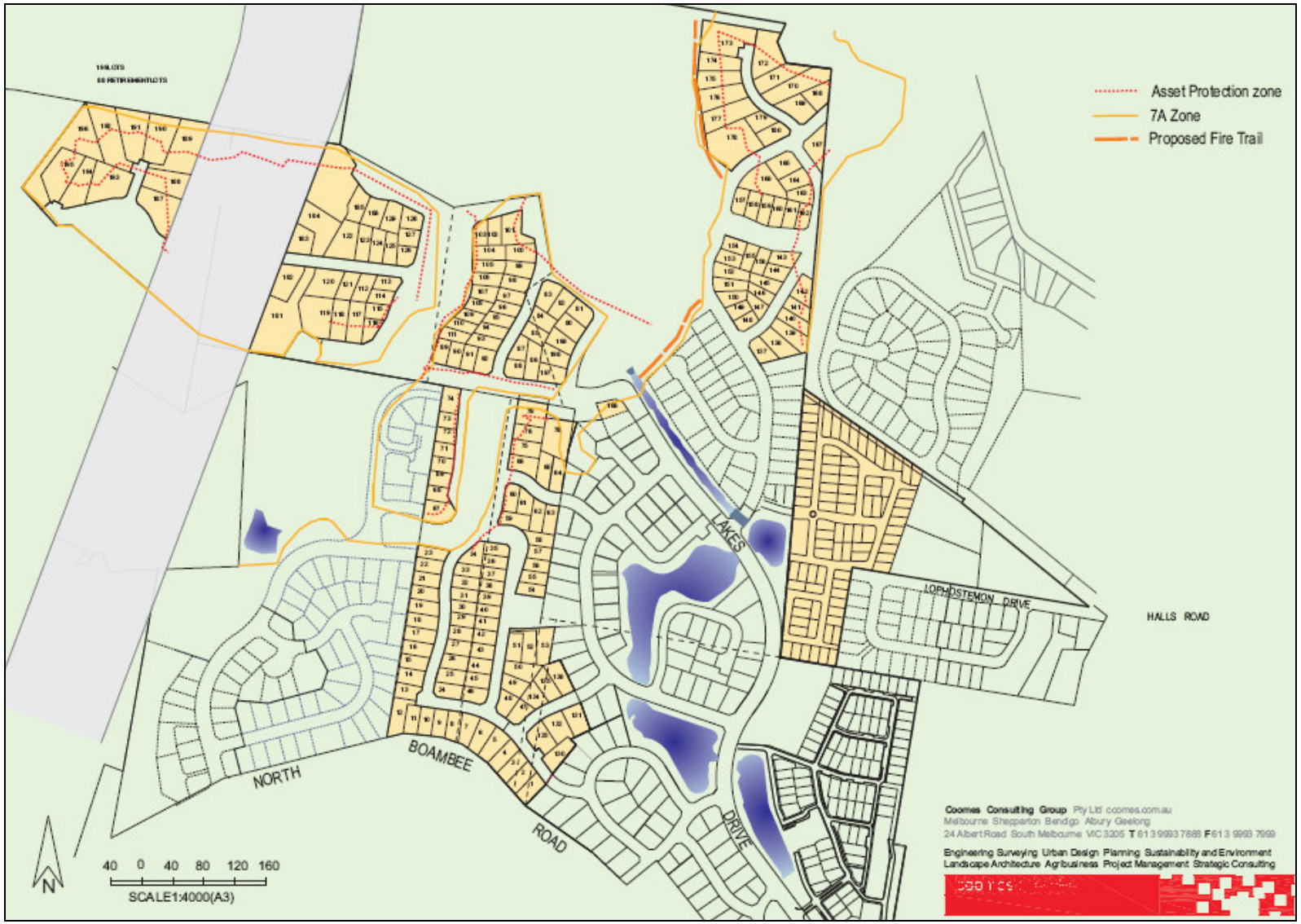

Figure A1 – Proposed subdivision layout - (not to scale)

APPENDIX A

PROPOSED SUBDIVISION LAYOUT

Pacific Hwy / Cook Dv / Nth Boambee Rd
2007 AM Peak
Intersection ID: 3550
Fixed-Time Signals, Cycle Time = 108 (User-given Cycle Time)

Lane No.	Demand Flow (veh/h) L	T	R	Tot	%HV	Adj. Basic Satf.	Eff Grn (secs) 1st	2nd	Deg Sat x	Aver. Delay (sec)	Longest Queue (m)	Shrt Lane (m)
South: Pacific Hwy S.app												
1 L	131			131	7	1960	79		0.156	12.9	21	100
2 T		681		681	7	1970	61		0.640	17.0	181	500
3 T		681		681	7	1970	61		0.640	17.0	181	500
	131	1362	0	1493	7				0.640	16.7	181	
East: Cook Dv E.app												
1 L	85			85	7	1949	35		0.148	36.2	33	500
2 R			102	102	7	1949	12		0.519	59.1	51	500
	85	0	102	187	7				0.519	48.7	51	
NorthEast: Right Turn N.app												
1 R			275	275	7	1919	35	17	0.645	36.7	103	50
	0	0	275	275	7				0.645	36.7	103	
North: Pacific Hwy N.app												
1 L	163			163	7	1970	79		0.173	12.9	26	125
2 T		606		606	7	1970	61		0.569	16.0	155	500
3 T		609		609	7	1980	61		0.569	16.0	156	500
	163	1215	0	1378	7				0.569	15.7	156	
West: Nth Boambee Rd W.app												
1 L	218			218	7	1970	35		0.376	38.7	78	500
2 R			124	124	7	1919	12		0.642	60.5	62	500
	218	0	124	342	7				0.642	46.6	78	
SouthWest: Right Turn S.app												
1 R			151	151	7	1949	39	17	0.347	24.0	54	50
	0	0	151	151	7				0.347	24.0	54	

ALL VEHICLES	Total Flow	% HV	Cycle Time	Max X	Aver. Delay	Max Queue
	3826	7	108	0.645	22.3	181

Peak flow period = 30 minutes.

Queue values in this table are 95% back of queue (metres).

Pacific Hwy / Cook Dv / Nth Boambee Rd
2007 PM Peak
Intersection ID: 3550
Fixed-Time Signals, Cycle Time = 108 (User-given Cycle Time)

Lane No.	Demand Flow (veh/h) L	T	R	Tot	%HV	Adj. Basic Satf.	Eff Grn (secs) 1st	2nd	Deg Sat x	Aver. Delay (sec)	Longest Queue (m)	Shrt Lane (m)
South: Pacific Hwy S.app												
1 L	67			67	7	1960	88		0.067	10.5	8	100
2 T		622		622	7	1970	63		0.565	14.9	154	500
3 T		622		622	7	1970	63		0.565	14.9	154	500
	67	1243	0	1310	7				0.565	14.6	154	
East: Cook Dv E.app												
1 L	111			111	7	1949	33		0.206	38.3	43	500
2 R			180	180	7	1949	19		0.579	53.3	79	500
	111	0	180	291	7				0.579	47.6	79	
NorthEast: Right Turn N.app												
1 R			167	167	7	1919	41	8	0.555	30.1	67	50
	0	0	167	167	7				0.555	30.1	67	
North: Pacific Hwy N.app												
1 L	117			117	7	1970	88		0.106	10.5	13	125
2 T		646		646	7	1970	63		0.588	15.2	162	500
3 T		650		650	7	1980	63		0.588	15.2	163	500
	117	1296	0	1413	7				0.588	14.8	163	
West: Nth Boambee Rd W.app												
1 L	313			313	7	1970	33		0.573	42.6	113	500
2 R			173	173	7	1919	19		0.564	53.1	76	500
	313	0	173	486	7				0.573	46.4	113	
SouthWest: Right Turn S.app												
1 R			89	89	7	1949	40	8	0.310	26.3	33	50
	0	0	89	89	7				0.310	26.3	33	

ALL VEHICLES	Total Flow	% HV	Cycle Time	Max X	Aver. Delay	Max Queue
	3756	7	108	0.588	22.3	163

Peak flow period = 30 minutes.

Pacific Hwy / Cook Dv / Nth Boambee Rd
2007 AM Peak (Future)
Intersection ID: 3550
Fixed-Time Signals, Cycle Time = 108 (User-given Cycle Time)

Lane No.	Demand Flow (veh/h) L	T	R	Tot	%HV	Adj. Basic Satf.	Eff Grn (secs) 1st	2nd	Deg Sat x	Aver. Delay (sec)	Longest Queue (m)	Shrt Lane (m)
South: Pacific Hwy S.app												
1 L	149			149	7	1960	72		0.200	15.3	29	100
2 T		681		681	7	1970	54		0.723	22.6	207	500
3 T		681		681	7	1970	54		0.723	22.6	207	500
	149	1362	0	1511	7				0.723	21.9	207	
East: Cook Dv E.app												
1 L	85			85	7	1949	34		0.153	37.0	33	500
2 R			102	102	7	1949	12		0.519	59.1	51	500
	85	0	102	187	7				0.519	49.0	51	
NorthEast: Right Turn N.app												
1 R			346	346	7	1919	24	24	0.660	38.2	117	50
	0	0	346	346	7				0.660	38.2	117	
North: Pacific Hwy N.app												
1 L	163			163	7	1970	80		0.170	12.6	25	125
2 T		606		606	7	1970	62		0.560	15.3	152	500
3 T		609		609	7	1980	62		0.560	15.3	153	500
	163	1215	0	1378	7				0.560	15.0	153	
West: Nth Boambee Rd W.app												
1 L	503			503	7	1970	42		0.724	38.7	171	500
2 R			131	131	7	1919	12		0.676	61.2	65	500
	503	0	131	634	7				0.724	43.3	171	
SouthWest: Right Turn S.app												
1 R			151	151	7	1949	41	16	0.358	23.5	53	50
	0	0	151	151	7				0.358	23.5	53	

ALL VEHICLES	Total Flow	% HV	Cycle Time	Max X	Aver. Delay	Max Queue
	4207	7	108	0.724	25.5	207

Peak flow period = 30 minutes.

Queue values in this table are 95% back of queue (metres).

Pacific Hwy / Cook Dv / Nth Boambee Rd
2007 PM Peak (Future)
Intersection ID: 3550
Fixed-Time Signals, Cycle Time = 108 (User-given Cycle Time)

Lane No.	Demand Flow (veh/h) L	T	R	Tot	%HV	Adj. Basic Satf.	Eff Grn (secs) 1st	2nd	Deg Sat x	Aver. Delay (sec)	Longest Queue (m)	Shrt Lane (m)
South: Pacific Hwy S.app												
1 L	120			120	7	1960	72		0.161	15.2	24	100
2 T		622		622	7	1970	48		0.742	26.6	201	500
3 T		622		622	7	1970	48		0.742	26.6	201	500
	120	1243	0	1363	7				0.742	25.6	201	
East: Cook Dv E.app												
1 L	111			111	7	1949	33		0.206	38.3	43	500
2 R			180	180	7	1949	18		0.612	54.4	80	500
	111	0	180	291	7				0.612	48.3	80	
NorthEast: Right Turn N.app												
1 R			380	380	7	1919	19	24	0.741	43.6	131	50
	0	0	380	380	7				0.741	43.6	131	
North: Pacific Hwy N.app												
1 L	117			117	7	1970	87		0.108	10.7	14	125
2 T		646		646	7	1970	63		0.588	15.2	162	500
3 T		650		650	7	1980	63		0.588	15.2	163	500
	117	1296	0	1413	7				0.588	14.8	163	
West: Nth Boambee Rd W.app												
1 L	455			455	7	1970	48		0.573	32.4	139	500
2 R			209	209	7	1919	18		0.721	57.0	93	500
	455	0	209	664	7				0.721	40.1	139	
SouthWest: Right Turn S.app												
1 R			89	89	7	1949	40	9	0.293	25.6	32	50
	0	0	89	89	7				0.293	25.6	32	

ALL VEHICLES	Total Flow	% HV	Cycle Time	Max X	Aver. Delay	Max Queue
	4200	7	108	0.742	27.5	201

Peak flow period = 30 minutes.

Queue values in this table are 95% back of queue (metres).