3. TRAFFIC AND ACCESS

3.1 Major Road Description

The main roads into and out of the subdivision are Montwood and Hutley Drives. Their capacity and road type are described in Ballina Council's Road Hierarchy study for the shire. Montwood Drive is a minor collector while Hutley Drive has been classified as a sub arterial road. More recently Council's traffic consultant (Cardno Eppel Olsen) has recommended it operate as a major collector due to existing driveway accessing the road[1]. Analyses by Ardill Payne and Partners (APP) indicates that the proposed development can be adequately served by these roads with the final traffic loads being less than the environmental capacity allocated by Council. The limiting case for each road is the relative increase in noise levels caused by the increased traffic load. Refer to Carter Rytenskld's noise report for details. The increase in load on Montwood Drive does not require any noise attenuation whilst increases in noise along Hutley Drive will require special provisions in house design for adjacent dwellings.

3.2 Internal Road Hierarchy

The internal road hierarchy is defined in Diecke Richards plan of the same and is provided overleaf as Figure 3.1. The plan provides for a range of road types depending on road usage and location. Generally the roads are to be tree lined with defined parking areas. Water Sensitive Urban Design features and materials selection are to be incorporated to treat stormwater runoff and identify features of the road system or open space areas. For example, carparking, pedestrian usage, parks and commercial areas.

The internal road hierarchy and road sections were determined in accordance with Government Guidelines for narrow street design and the number of houses accessing the street. As such roads get wider as more traffic accesses them. Road widths also vary according to road type and location and are generally in 18 metre corridors. The roads generally provide dedicated on street parking with slightly narrower carriageways than older style developments. Carriageways vary from 5.8 metres plus parallel parking to 7 metres depending on road type. However the provision of dedicated, landscaped, on street carparking allows the road width to be read as a wider streetscape by motorists as well as providing traffic calming features by the narrower carriageway.

As part of the Part 3A Concept Plan for the site a Traffic Plan was prepared by APP. The site was divided into traffic catchments with different land uses, sizes and traffic splits summarised in the attached Figure 3.2 and following tables. The impact on roads by external users of the commercial and community facilities provided in the development was calculated by deducting the internal traffic using these facilities from the overall Traffic Generating Values generated by the commercial and community land uses.

[1] CEO Report to Council 2006

3.3 Road Capacities

For this Project Application the Traffic Plan procedure has been recalculated for the Stage 1 application only. As the stage 1 component is less than the ultimate case the traffic outcomes are as expected within the environmental road capacity of the service streets. l

Table 3.1 provides typical trip generation rates based on land use. The data has been sourced from various documents including the RTA's "*Guide to Traffic Generating Developments"*, Department of Main Roads *"Road Planning and Design Fundamentals",* the Institute of Transportation Engineers (ITE) "*Trip Generation"*, San Diego Municipal Code *"Trip Generation Manual"* as well as various internet resources for similar projects within Australia.

The RTA Guide is a relatively old (1995) document with some of the traffic generation values unchanged since the 1980's. More contemporary analyses for a wider range of land uses has been completed by the Authorities listed above. Where variations from the RTA 's Guide have been adopted this has been for the following reasons:

- Residential rate based on actual rates measured in Pacific Pines and confirmed in other parts of Ballina Shire by Council
- Seniors living. A mid range value has been adopted.
- Commercial and retail area. Rates shown in RTA guide are based on large (10,000 sq.m supermarkets) Independent analyses by APP on smaller shopping centres has shown the generation rate works out at 50 trips per 100 square metres. The ITE value shown in Table 3.3 is for small (< 3,000 square metre) centres. Due to the correlation between the ITE figures and our own experience the ITE figure has been adopted.

Table 3.1- Trip Generation Rates
Comparison of Trip Generation Values from Various Sources

Utility	Units	Adopted Trips/unit	RTA	QLD Main Roads	ITE	San Diego
Residential	Trips per house	8	9	6 – 10	9.55	10
Seniors	Trips per house	2	1 - 2	1 – 2	5.86	2.5 – 4
Assisted Living & Independent Living	Trips per bed	1	--	--	--	3
Commercial	Trips per 100 sq. m. GFA	46	121	10	46	120
Community Centre	Trips per 100 sq. m. GFA	20	--	--	--	--
Tavern	Trips per 100 sq. m. GFA	46	--	--	--	--
Childcare	Trips per 100 sq. m. GFA	86	0.8/child	0.8/child	79	80

Traffic loads have been calculated by applying these rates to the existing land use and those proposed in the Concept Plan. Splits between exit and internal trips have been based on traffic counts in Montwood Drive and are approximately 72% external to 28% internal.

Table 3.2 - Existing Traffic Catchment Areas & Volumes

Residential Lots	Montwood Drive	Stoneyhurst Road	Hutley Drive
Single	205	8	121
Duplex	23	0	32
Total Trips	**2008**	**64**	**1480**
Exit Trips	1440	46	1061
Internal Trips	568	18	419

Note: Duplex site are assumed to have twice the generation rate of single dwellings.

The subdivision has been divided into traffic catchment areas for ease of calculation. These areas include residential lots as well as community, commercial and assisted living areas. A summary of the findings is presented in Table 3.3 below.

Table 3.3 - Proposed Traffic Catchment Areas For Stage 1 (393 Lots)

Catchment	Residential Lots	Seniors Lots	Assisted Living & Independent Living	Commercial	Community Centre	Tavern	Childcare
(Location)	*(Dwellings)*	*(Dwellings)*	*(Beds)*	*(m²)*	*(m²)*	*(m²)*	*(m²)*
A							
B							
C							
D	52						
E	40						
F	9						
G		120					
H							
I							
J	10						
K							
L							
M							
N							
O							
P							
Q							
R	22			1200			
S			140		300	800	600
Total	133	120	140	1200	300	800	600

Note: There are no duplex lots as part of Stage 1.

Table 3.4 - Proposed Development Traffic Generation

Catchment	Residential			Montwood Drive	Stoneyhurst Road	Hutley Drive	Montwood Drive	Stoneyhurst Road	Hutley Drive
(Location)	*(Total Trips)*	*(Exit Trips)*	*(Internal Trips)*	*External Usage Ratios*			*External Trips*		
A	0	0	0	0.5	0	0.5	0	0	0
B	0	0	0	0.5	0	0.5	0	0	0
C	0	0	0	0.75	0	0.25	0	0	0
D	416	298	118	0.75	0	0.25	224	0	75
E	320	229	91	0.75	0	0.25	172	0	57
F	72	52	20	0.75	0	0.25	39	0	13
G	0	0	0	0.25	0	0.75	0	0	0
H	0	0	0	0.25	0	0.75	0	0	0
I	0	0	0	0.2	0	0.8	0	0	0
J	80	57	23	0.2	0	0.8	11	0	46
K	0	0	0	0.5	0	0.5	0	0	0
L	0	0	0	0.3	0	0.7	0	0	0
M	0	0	0	0.5	0	0.5	0	0	0
N	0	0	0	0.8	0	0.2	0	0	0
O	0	0	0	0.2	0	0.8	0	0	0
P	0	0	0	0	0	1	0	0	0
Q	0	0	0	0	0	1	0	0	0
R	176	126	50	0	0	1	0	0	126
S	0	0	0	0	0	1	0	0	0
Sub Total	**1064**	**763**	**301**				**446**	**0**	**317**
Seniors	240	172	68		0	0.5	86	0	86
Assisted Living & Independent Living	140	100	40		0	0.5	50	0	50
Sub Total	380	272	108				**136**	**0**	**136**
						GRAND TOTAL	**582**	**0**	**453**

Table 3.5 - Total Traffic Loads (Two Way)

GRAND TOTAL	Montwood Drive	Stoneyhurst Road	Hutley Drive 1	Hutley Drive 2
Existing	**1440**	**46**	**NA**	**1061**
Proposed residential directed traffic	**582**	**0**	**453**	**453**
Estimated External Traffic through Pines to other land uses	**65**	**0**	**137**	**137**
Total Daily Trips	**2087**	**46**	**591**	**1652**

*Total at assumed location of Hutley Drive 2
Note: All figures have been rounded.

The capacity of Hutley and Montwood Drives can be expressed in terms of their environmental capacity or, alternatively, as a level of service for the mid-block one way capacity measured in vehicles per hour.

Montwood Drive is rated as a Minor Collector street in Ballina Council's Road Hierarchy Plan. The environmental capacity for Montwood Drive (2 lane interrupted urban road with frontage access) is 3,000 vpd as described in the subject plan. Hutley Drive is classified as a Sub Arterial Traffic Distributor with unlimited traffic volume. By way of comparison a lesser order road (e.g. sub-arterial main street) has an environmental capacity of 10,000 vpd. Ballina Council's traffic consultant, Cardno Eppell Olsen, most recent report to Council on traffic planning in Lennox Head (2006 report to Counci) recommended to Council to down grade the Hutley Drive to a Major Collector due to the driveways already constructed along its alignment through Lennox Meadows. The 10,000 vpd rating can therefore be considered an upper limit capacity allocation.

Hence with access to Hutley Drive and Montwood Drive limited to Pacific Pines and Lennox Meadows only, both roads are within environmental load recommendations.

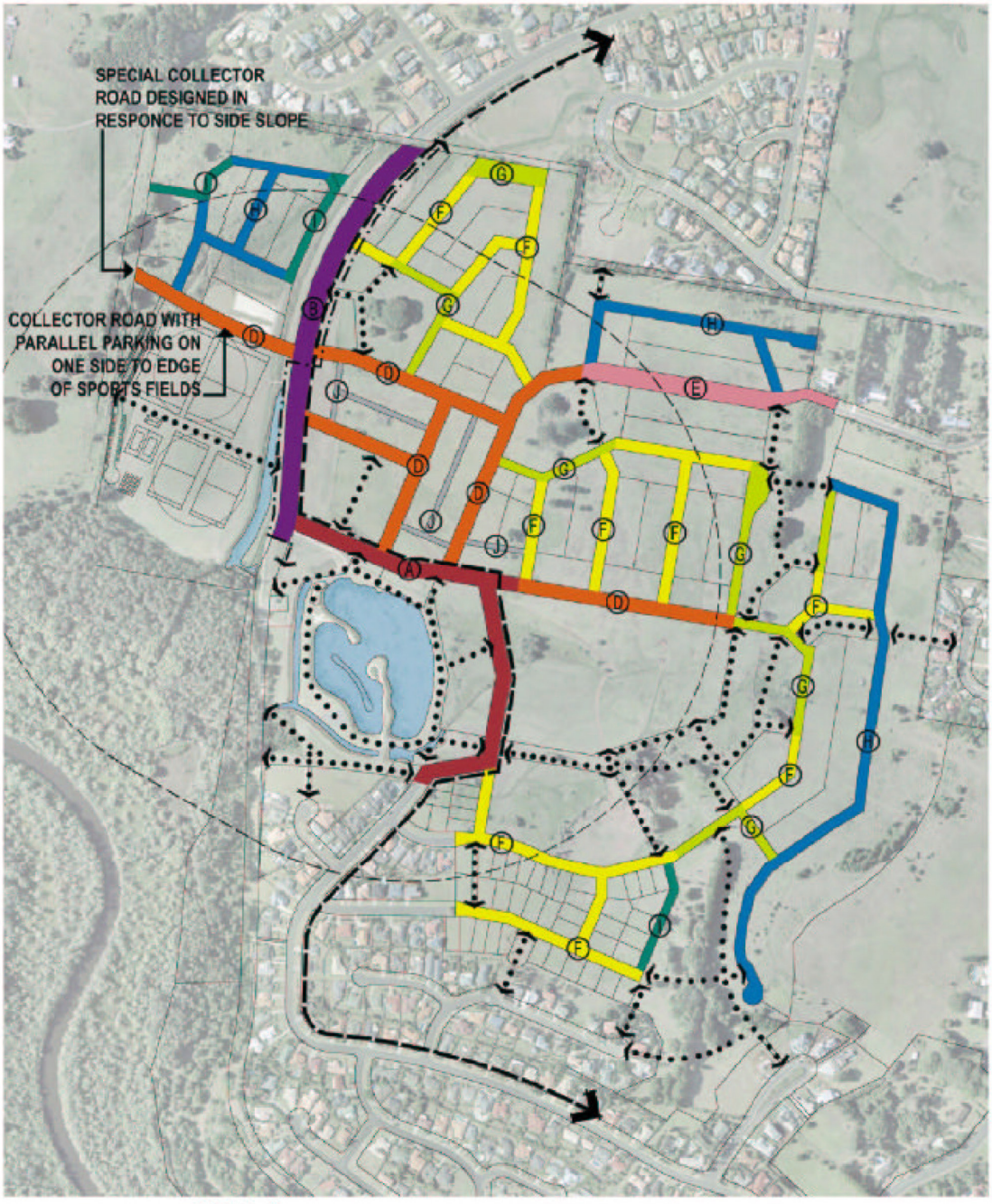
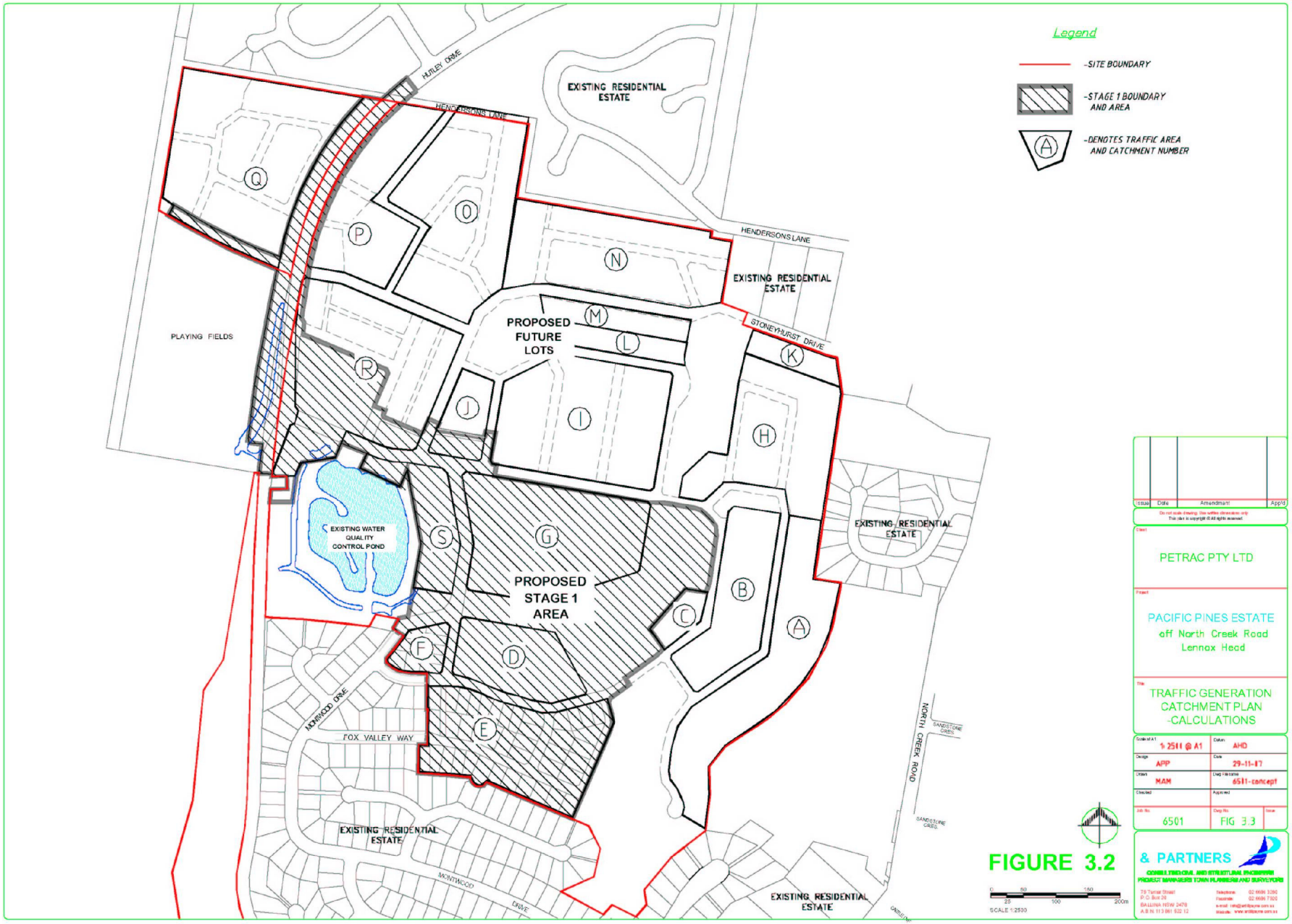


FIGURE 3.1

SOURCE:
Deike Richards
20 Sept 2007

Issue / Date / Amendment	Client: PETRAC PTY LTD	Project: PACIFIC PINES ESTATE off North Creek Road Lennox Head	Title: INTERNAL ROAD HIERARCHY	ARDILL PAYNE & PARTNERS CONSULTING CIVIL AND STRUCTURAL ENGINEERS PROJECT MANAGERS TOWN PLANNERS AND SURVEYORS	Scale at A1: As Shown; Datum: N/A; Design: DR; Date: 21-09-07; Drawn: MAM; Dwg Filename: 6501-concept; Checked; Approved; Job No.: 6501; Dwg No.: FIG 3.1


Legend
-SITE BOUNDARY
-STAGE 1 BOUNDARY AND AREA
-DENOTES TRAFFIC AREA AND CATCHMENT NUMBER
HUTLEY DRIVE
HENDERSONS LANE
EXISTING RESIDENTIAL ESTATE
PLAYING FIELDS
PROPOSED FUTURE LOTS
STONEYHURST DRIVE
EXISTING WATER QUALITY CONTROL POND
PROPOSED STAGE 1 AREA
MONTWOOD DRIVE
FOX VALLEY WAY
NORTH CREEK ROAD
SANDSTONE CRES
SCALE 1:2500
PETRAC PTY LTD
PACIFIC PINES ESTATE
off North Creek Road
Lennox Head
TRAFFIC GENERATION CATCHMENT PLAN -CALCULATIONS
1:2511 @ A1
AHD
APP
29-11-17
MAM
6511-concept
6501
FIG 3.3
FIGURE 3.2
& PARTNERS