

# **Tasman District Council**

## **Traffic and Transportation Effects of Proposed Subdivision at 102 Aranui Road Mapua**

**December 2007**



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## Tasman District Council

# Traffic and Transportation Effects of Proposed Subdivision at 102 Aranui Road Mapua

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## **1 Introduction**

Tasman District Council (TDC) has requested that MWH assess the traffic and transportation effects of a proposed 92 unit residential subdivision at 102 Aranui Road, Mapua.

The key transportation issues associated with the proposed development are as follows:

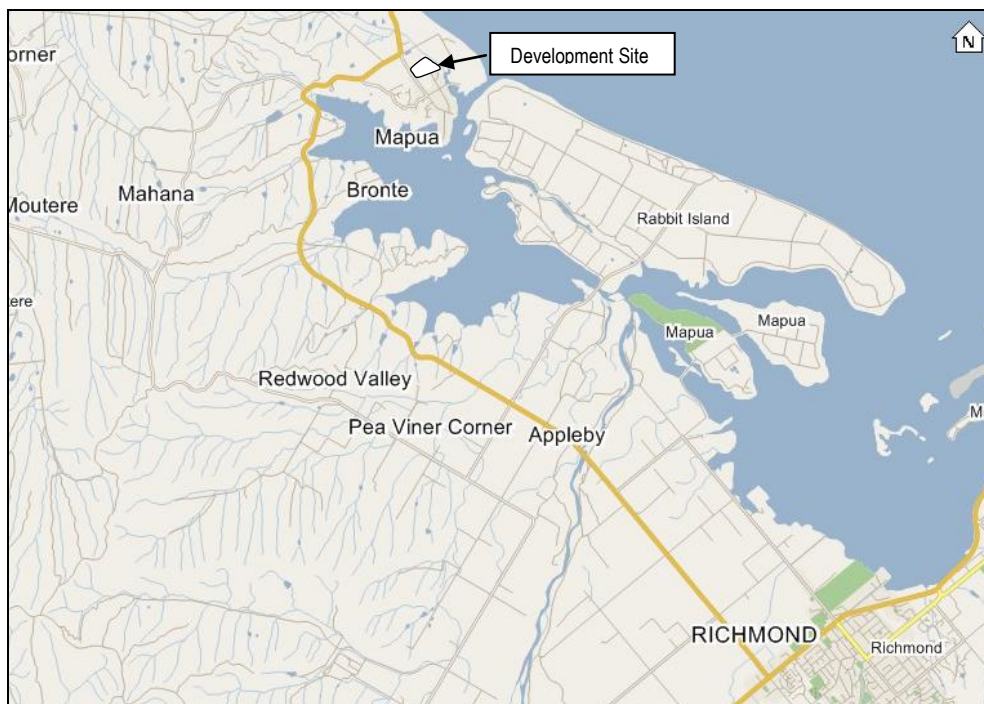
- The ability of the proposed site layout to provide for alternative transport needs;
- The level of traffic that is likely to be generated by the proposed subdivision;
- The extent that the proposed site layout provides for the safe and efficient movement of vehicles to, from, and within the site;
- The ability of the proposed facility to provide for the expected parking demand; and
- The effect that the development traffic will have on the surrounding road network;

These issues are addressed in the body of this report. In summary, it is concluded that the proposed subdivision, with the recommended mitigation measures, will have a less than minor effect on the adjacent road network.

## 2 Existing Site Layout

### 2.1 Site Location

The location of the site in the context of the wider road network is indicated in Figure 2-1: Site Location Plan



**Figure 2-1: Site Location Plan**

The site is located some 17km to the north east of Richmond and has frontage to Aranui Road via a 20 metre access strip. Aranui Road (classed as an urban collector route) forms the main link between the Mapua community and the State Highway, with SH60 providing a coastal link throughout the Tasman Region.

The site is a farm property with a land area of approximately 10.2ha and is currently occupied by a single dwelling. The farming activity on the site appears to be limited and as such the current traffic generation associated with the site is likely to be confined to the existing dwelling which is estimated<sup>1</sup> to generate no more than 10 vehicle trips per day.

<sup>1</sup> Estimate based on data from Trips and Parking Related to Land Use – TNZ Research Report 209

## 2.2 Existing Road Layout

The location of the site in the context of the local road network is set out in Figure 2-2: Local Road Network



**Figure 2-2: Local Road Network**

Aranui Road, in the vicinity of the site has a sealed carriageway width of approximately 8 metres and is marked with a single lane in each direction. It has a straight and level alignment and is subject to a 50km/hr speed limit. Photos 1 and 2 show Aranui Road in the vicinity of the site.

The application site is zoned Residential Deferred under the Proposed Tasman Resource Management Plan (the Plan) with an existing zoning of Rural 1. The deferment is based on stormwater issues.

The site is bound to the south by the Mapua Domain and existing residential units, to the east by the Seaton Valley Stream and to the north by a mix of rural and low density residential units.



Photo 1: Aranui Road looking North with the site on the right of the photo



Photo 2: Aranui Road looking South with the site on the left of the photo

Aranui Road intersects with SH60 approximately 390m north of the site. SH60 in this location has a right angle bend in it with left and right turn lanes provided for vehicles turning into Aranui Road. Photos 3 and 4 show SH60 in the vicinity of the Aranui Road intersection. Photo 5 shows the Aranui Road approach to the intersection.



Photo 3: SH60 looking east towards Aranui Road



Photo 4: SH60 looking south towards Aranui Road



Photo 5: Aranui Road looking north towards SH60

As shown in Photo 5, the Aranui Road/SH60 intersection has a 'Give-Way' control on Aranui Road.



## 3 Existing Transport Data

### 3.1 Walking and Cycling

A pedestrian footpath is provided on the eastern site of Aranui Road only. This forms part of the Tasman cycle network and provides for a shared pedestrian and cycle use. Aranui Road provides pedestrian and cycle access to local amenities such as shops and recreational activities and the local Mapua School. These local amenities are located within approximately 400 metres from the site and are considered to be within acceptable walk and cycle distances.

Tasman District Cycling and Walking Strategy 2005 sets out the existing and proposed pedestrian and cyclist network in the Mapua area. This indicates that there is a high level of connectivity envisaged for the area and shows that the existing site accommodates a key part of a proposed coastal pedestrian trail.

### 3.2 Public Transport

There are currently no timetabled bus services in the area. However the local road network including Aranui Road appears to be capable of accommodating bus services in the future.

### 3.3 Daily Traffic Volumes

The latest available traffic count data for Aranui Road and SH60 has been sourced from Transit New Zealand and Council records. The daily traffic volumes have been surveyed and found to be as follows:

- Aranui Road 2478 veh/day (AADT)
- SH60 7686 veh/day

Peak hour network traffic flows generally equate to 10% of the daily traffic volumes. Applying this rule to the above flows results in peak hour network flows of around **250 veh/hr** on Aranui Road and **770 veh/hr** on State Highway 60.

### 3.4 Road Safety

A search of the Land Transport New Zealand Crash Analysis System (CAS) has been carried out to identify all crashes in the vicinity of the site. The search was carried out for all recorded crashes on Aranui Road from Higgs Road to SH60 and 50m in all directions, from the intersection at SH60. The search was carried out for the five year period 2002-2006, with crashes entered to date for 2007 also included. The crash report from CAS is attached in Appendix A.

A total of 9 crashes were identified as follows:

- Six of the crashes occurred at the intersection of Aranui Road and SH60. Of these crashes, three resulted in minor injury with the remaining crashes being non-injury. The general trend of crashes at this location is one of southbound vehicles turning right losing control on the tight, low speed, right angle bend. This is a Transit NZ road and falls outside the jurisdiction of the City Council. However the nature of the crashes suggest that this location could benefit form more advance and conspicuous warning of the tight bend for uses travelling on the State Highway.
- The remaining three crashes occurred on Aranui Road between SH60 and Higgs Road. One of the crashes involved a pedestrian and resulted in minor injury. The remaining two crashes were non-injury.

The existing crash rates for both the intersection and midblock have been calculated and compared with the expected crash rates, calculated using the procedures given in the Transfund Project Evaluation Manual. The results are given in Table 1.

**Table 3-1: Comparison of existing and expected Crash Rates**

Road	Reported Crash Rate (crashes/yr)	Expected Crash Rate (crashes/yr)
Aranui Road midblock	0.2	0.14
Intersection of Aranui Road and SH60	0.6	0.13

Table 1 shows that the reported crash rates for both the midblock and intersection situations are higher than expected. The reported crash rate at the intersection of Aranui Road and SH60 in particular is significantly higher than expected and warrants further comment. Examining the nature of the intersection crashes more closely, the majority of the crashes are associated with alignment of the State Highway. Rather than the expected conflict between vehicles pulling out after entering Aranui Road, drivers are losing control on the State Highway approaches.

It is recommended that Transit be given the opportunity to review the proposed development and comment on the need or otherwise for a financial contribution to any planned roading upgrades at this intersection.<sup>2</sup>

## **4 Proposed Development Detail**

### **4.1 Site Layout and Access**

The proposed development consists of the subdivision of the 10.2ha property at 102 Aranui Road into a total of 103 allotments. Of these allotments, 96 will be developed as residential activity with the remaining seven allotments vested to TDC in the form of roads and reserve areas.

<sup>2</sup> It is noted that the proposed Ruby Bay Bypass, planned for completion in 2010, will reduce traffic flows on SH60 at this location.

Appendix B contains an indicative site layout plan of the proposed residential development. The proposals consist of a mix of residential lots ranging in size from 450m<sup>2</sup> to 2160m<sup>2</sup>.

The plan shows a single main access road to the subdivision, Road A, intersecting with Aranui Road with the internal road system forming a loop road.

A further link to the existing residential area to the south of the site via Iwa Street is shown as Road I. This would provide a secondary access point for the site but relies upon the successful negotiations between Tasman District Council and a third party land owner who owns a link strip that separates Iwa Street from the proposed site. Should negotiations be delayed or remain unresolved the area marked as Road I will in any event be vested to the Council to expedite the completion of the link in the future.

The proposals provide for an internal road system that, with the exception of Road H and the cul de sac roads F and G provides for footway provision on both sides of the road. Access to the neighbouring Mapua Domain (to be vested to the Council) also forms part of the proposals.

The development is proposed to be constructed in three stages. The site layout plan in Appendix B illustrates the staging with completion of the lots coloured green representing the extent of stage 1, the yellow lots representing the extent of stage 2 and the completion of the blue lots representing stage 3.

## **4.2 Parking**

Figure 16.2D – On-site parking requirements, of the TRMP requires the provision of two on-site parking spaces for each residential unit. The lots shown in the plans are of adequate area to allow this requirement to be met for each lot. Control of this requirement will be managed on a lot by lot basis, as each is developed, through the provisions of the zone rules of the TRMP.

# **5 Traffic Generation**

## **5.1 Expected Traffic Generation**

Published data on the expected traffic generation of various land use activities is available from ‘Trips and Parking Related to Land Use Transfund New Zealand Research Report No. 209 (RR209).’

When the proposed development is assessed using the trip rates set out in RR 209 the following vehicle trip<sup>3</sup> generation is expected.

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<sup>3</sup> One trip represents two movements (eg. 1 arrival and 1 departure equates to 1 trip)

**Table 5-1: Expected Traffic Generation**

Land Use	Numbered Lots	Traffic Generation Rate	Trip Generation
Residential (daily)	92	10.4 trips/day/lot	957 trips/day
Residential (peak hour)	92	1.4 trips/hr/lot	129 trips/hr

Table 2 shows that the daily traffic generation of the proposed development is expected to be around 1000 trips per day with an equivalent peak hour trip generation of **129 trips/hr**.

The traffic turning movements associated with the proposed site access and the intersection of Aranui Road/ SH60 are set out in Appendix C.

Reference to the TDC zoning map for the area indicates that the scope for further growth in Mapua is limited to some residential sections to the rear of properties on the western side of Aranui Road and the reclaimed ex-fruit growers sites. Growth in traffic flows on Aranui Road is therefore unlikely to increase to an extent that capacity at the access junction are mid block capacity on Aranui Road will be compromised.

## 5.2 Permitted Baseline

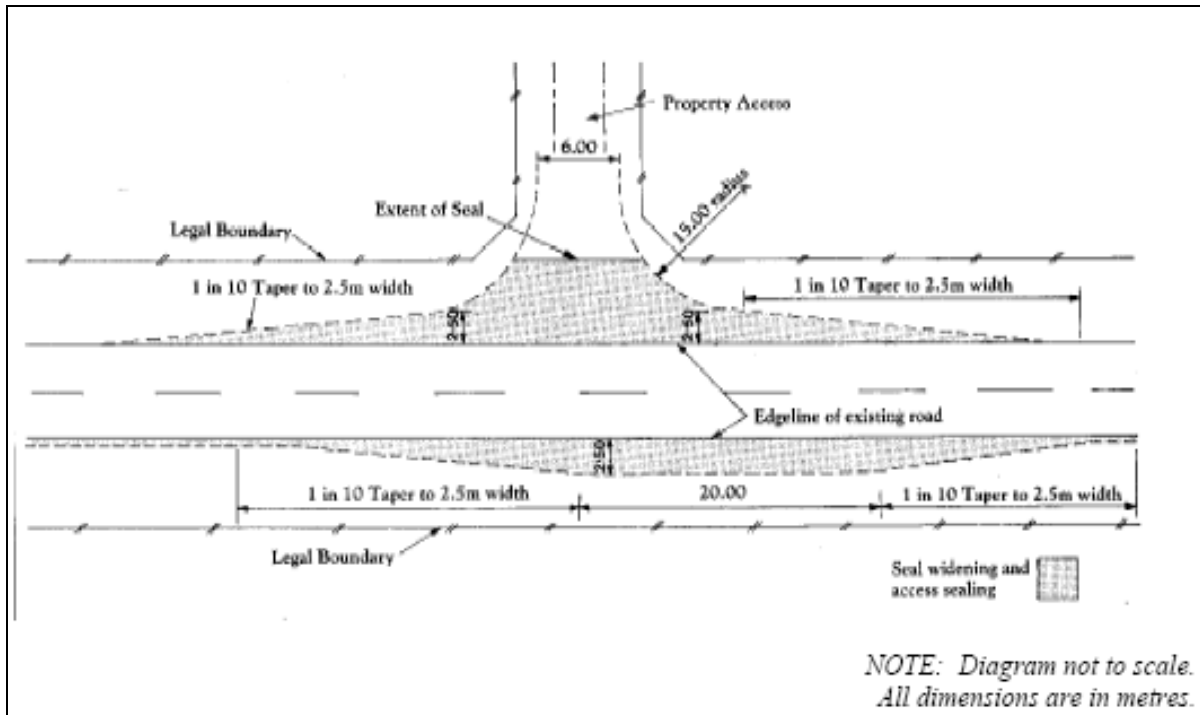
In order to gain an understanding of the expected traffic generation in relation of that expected by the TRMP for the site a permitted baseline calculation has been undertaken. To assess this, the total site area of 10.2ha is reduced by 20% to allow for roads and services and the remaining 8.16ha divided by the minimum lot size of 600sqm defined in the TRMP for this zone. This results in a maximum of 136 residential lots that the site could have been subdivided into under the provision of the TRMP. The traffic generation associated with this scenario would be approximately 50% higher than that predicted for the proposed development.

## 5.3 Traffic Generation Effects

In assessing the operation of the proposed site access, reference has been made to Austroads Guide to Traffic Engineering Practice – Part 5: Intersections at Grade, Table 4.1 which states that uninterrupted flow conditions would be present if both the major road flow is under 400 vph and the minor road flow is less than 250 vph.

Reference to section 3.3 and table 2 above indicate that the peak hour traffic volumes on Aranui Road and those anticipated at the site access fall below the Austroads traffic volume thresholds and as such it can be concluded that the proposed access arrangement will operate within capacity.

Whilst the proposed junction is predicted to operate within capacity, the scale of the development proposals are such that it is required to accord with the standards set out in section 16.2 - Transport (Access, Parking and Traffic) of the TRMP. For ease of reference this has been copied below.



**Figure 5-1: Required Access Arrangement – source section 16.2 TRMP**

From the diagram it can be seen that localised widening is required. The purpose of this is to ensure the free flow of traffic on the collector road and to provide a sealed surface on the main road for vehicles passing dwelling right turning traffic.

To provide for pedestrian and cyclists on the Aranui Road it is suggested that a central refuge island is provided at the site access approach. Sufficient treatment and signage associated with the cycle path at the site access should be incorporated into the site access design.

In providing for a refuge island the designer should ensure that the corner radii are of sufficient dimensions to enable service vehicles to enter and exit the access without the need to traverse across the opposite side of the road.

Access to the neighbouring property at 104 Aranui Road is currently taken from the leg-strip that is proposed as the main site access route. The development site access junction will therefore need to make provision for this vehicle crossing and ensure that the crossing is placed no closer than 12 metres from the junction and that the crossing is a formed surface and of appropriate length in accordance with the standards set out in the TRMP.

The other key intersection on the local road network is that of SH60 and Aranui Road. Given that the SH60 peak hour flows exceed 450 vph it is necessary to undertake a capacity assessment of this to ensure that the intersection can operate safely with the additional development traffic. This has been assessed using an industry standards junction capacity model (aaSIDRA3.1.)

The results of the capacity assessment have been expressed in terms of levels of service (LOS), summarised as follows:

- LOS A is the top level representing free flow conditions
- LOS B and C offer stable conditions with less freedom to select desired speeds and manoeuvres.
- LOS D is approaching unstable flow conditions; and
- LOS E and F represent conditions whereby junctions are operating at or over capacity characterised by flow break-down with queuing and delays occurring.

In assessing the traffic effects on the operation of the SH60/Aranui Road intersection the following assumptions regarding the development traffic has been made:

- 80% of development traffic will leave the site and 20% will arrive at the site during the morning peak period and these proportions will be reversed during the evening peak period.
- The development traffic will be assigned on to the road network whereby 70% of the development traffic will travel north along Aranui Road and 30% will travel south with these proportions being reversed in the evening peak period.
- The development traffic will be assigned to SH60 to reflect the observed turning proportions at the Aranui Road/SH60 junction.

Table 3 below summarises the capacity outputs from the SIDRA models in terms of LOS.

**Table 5-2: AM Peak Comparisons of Level of Service on Aranui Road/ SH60 Intersection**

Road	LOS Existing	LOS Existing + Development
<b>Aranui Road Heights</b>		
Left turn to SH60	A	A
Right turn to SH60	B	B
<b>SH60 east (from Motueka)</b>		
Left turn into Aranui Road	A	A
Through	A	A
<b>SH60 west (from Richmond)</b>		
Through	A	A
Right turn into Aranui Road	A	A

**Table 5-3: PM Peak Comparisons of Level of Service on Aranui Road/ SH60 Intersection**

Road	LOS Existing	LOS Existing + Development
<b>Aranui Road</b>		
Left turn to SH60	A	A
Right turn to SH60	C	C
<b>State highway 60 east (from Motueka)</b>		
Left turn into Aranui Road	A	A
Through	A	A
<b>State Highway 60 west ( from Richmond)</b>		
Through	A	A
Right turn into Aranui Road	A	A

The assessment indicates that the intersection would continue to operate within capacity with no change occurring for the level of service at the intersection. The traffic effects on this intersection are therefore considered to be less than minor.

## 5.4 Network Connectivity

In order to retain adequate connectivity throughout the local road network in Mapua it is recommended that Road I be connected through to Iwa Street. This will serve to provide a local road link between the proposed development and the Mapua shopping and wharf areas without the need to use Aranui Road. This will in turn protect the collector road function of Aranui Road.

A set out in section 4.1 a link strip has been established which prevents the connection to Iwa Street from taking place. It is therefore suggested that negotiations between TDC and the link strip owner are precipitated.

## 6 Internal Road Network

As illustrated in the site layout plan in Appendix B, vehicle access to the subdivision is proposed via Road A with Roads B, C and D forming a loop through the development. Roads F, G and H provide further access to the remaining lots and three separate rights of ways are proposed. Table 4 below details the proposed cross-sections:

**Table 6-1: Proposed Internal Road Cross-sections**

	Legal width	Sealed Width	Footpath 1.4 m wide	Kerb and Channel	Grass Verge
Roads A – C	23 m	12-13m	Both Sides	✓	1m -1.5m between road and footpath, 2.6 m between footpath and reserve boundary
Road I	20 m	10 m	Both Sides	✓	2.6 m between the road and footpath, 1m between footpath and road reserve boundary
Roads E and D	16.8 m	8 m	Both Sides	✓	1.5 m either side of the footpath
Roads F - H	11.4 m	7 m	Both Sides	✓	1 m either side of the footpath or the road reserve boundary
Road J		3m	none		

In general the cross-sections are adequate to provide safe and efficient access to, from and within the development. However access to units 63 - 67 is taken from a right of way which in turn takes access from a cul de sac. This is an inferior arrangement in comparison to a well connected road network and presents problems for access for refuse collection and provision for visitor parking to these units. This arrangement could also reduce the potential for passive surveillance over Road J.

It is therefore recommended that an alternative access arrangement is provided. This could include the removal of the ROW 3 and an extended cul de sac arrangement provided to units 55 -67. It is also recommended that Road J is widened to allow two-way traffic movements and provide for visitor parking to units 63 – 67.

All turning head within the development should also be provided to accord with the appropriate radii set out in section 18.10 of the TRMP.

Traffic calming devices in the form of traffic islands are shown at the three main intersections. Given the low traffic volumes expected within the development, these are unnecessary and present an ongoing maintenance cost for TDC. Should these islands be accepted, careful design and placement of them is needed in order to ensure access to the development for larger service and delivery vehicles.

A roundabout control is shown at the intersection of Roads A, B and C. Again, given the low traffic volumes expected within the development this is not considered necessary and it is recommended that this intersection be a simple priority control.

Details of the internal road network can be finalised in consultation with the Council Engineering department.

## **7 Summary and Recommendations**

### **7.1 Report Findings**

The traffic related issues discussed in this report are summarised as follows:

- The site has been identified as deferred residential within the TRMP with the deferment being uplifted subject to stormwater issues being addressed;
- The development provides direct, short travel routes by vehicle, cycle and pedestrian modes to local amenities;
- The site has frontage to Aranui Road which forms part of the existing cycle network and is therefore well located to serve short length non-car trips;
- The development provides for the further development of a pedestrian network as envisaged in the Tasman District Cycling and Walking Strategy 2005;
- Whilst there are no regular bus services in the area, the local road network is of a standard that is capable of accommodating future passenger transport;
- The site access and surrounding road network is capable of accommodating the anticipated development traffic;
- The proposed development provides a mix of lot sizes which results in a lower traffic generation than could be generated under an alternative site layout;



- In general, the internal access roads comply with design standards but require to be amended in places.

## **7.2 Recommendations**

- The access junction should be designed to the standards set out in Diagram 2 of section 16.2 of the TRMP and include sufficient lighting;
- The access junction should make provision of a central pedestrian/cycle refuge island to maintain the safety of users of the shared pedestrian cycle path along Aranui Road;
- The site access junction should include adequate signage associated with the interruption of the shared pedestrian/cycle path to ensure that safety is not compromised;
- The site access should make provision for access to 104 Aranui Road in accordance with accessway standards as set out in the TRMP.
- An alternative access arrangement for units 63 – 67 should be provided to enable access for service vehicles such as refuse collection.
- Road J should be widened to a minimum of 5 metres to provide for two-way traffic movements and provide a parking opportunity for visitors of units 63 – 67.
- Turning heads within the site should be designed to accord with the appropriate standards as set out in the TRMP.

Subject to the above mitigation measures being implemented, it is concluded that the transport effects of the development proposals would be less than minor. The Council is also advised to precipitate negotiations with the Iwa Street link strip owner to ensure that the secondary access to the site can be established.

## Appendix A – Crash Analysis

## Appendix B – Proposed Site Layout



Lots 1 to 98 hereon being Proposed Subdivision of Lot 2 DP 307114

## – Traffic Flows

