

PUKEHANGI HEIGHTS - PLAN CHANGE 2

PREPARED FOR ROTORUA LAKES DISTRICT COUNCIL

August 2020

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QUALITY STATEMENT

PROJECT MANAGER

Grant Smith

PROJECT TECHNICAL LEAD

Grant Smith

PREPARED BY

Grant Smith /...../.....

CHECKED BY

..... /...../.....

REVIEWED BY

..... /...../.....

APPROVED FOR ISSUE BY

..... /...../.....

CHRISTCHURCH

Hazeldean Business Park, 6 Hazeldean Road, Addington, Christchurch 8024
PO Box 13-052, Armagh, Christchurch 8141
TEL +64 3 366 7449, FAX +64 3 366 7780

Rotorua Lakes District Council

PUKEHANGI HEIGHTS - PLAN CHANGE 2

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1. Pukehangi Heights – Plan Change 2

The Pukehangi Heights area, on the southwestern side of Pukehangi Road, was identified as a Future Growth Area within the Council's District Plan. Given the need for additional land for housing, and the desire to make it easier for landowners to move ahead with development, Council is proposing to alter the zoning of the area to a mix of residential and rural residential.

There are three blocks of land involved, known as the Sumner block, north of Sunset Road, the Hunt block roughly between Malfroy Road and Pegasus Drive, and the block owned by Te Arawa Group Holdings (TAGH) to the west of Matipo Avenue.

The Sumner and Hunt blocks are currently zoned as Future Residential 1 and Future Rural 2 zones, which anticipate future residential and rural residential development. The TAGH block is zoned as Rural Residential with a small area of residentially zoned land adjoining Matipo Avenue. Under the current District Plan, the TAGH site also has an approved Development Plan associated with the site.¹ This would have enabled the development of a retirement village on the site subject to approval of a resource consent.

2. Report Purpose

Public submissions on the Proposed Plan Change closed on 20 February 2020. This report has been prepared in response to the submissions which relate to Transport and traffic issues.

The submissions relating to traffic addressed in this report have been grouped into three main topic areas.

- The wider network:
 - Waka Kotahi (NZ Transport Agency) (#11)
 - Ministry of Education (#15)
 - Rotorua District Residents and ratepayers Association (#18)

- The local network external to the Plan Change area:
 - David, Eric and Rosemary Brackfield (#3)
 - Pukehangi Parklands Estate (#4)
 - Jonathon Dodd (#17)
 - David Crowley (#19)
 - Utuhina Valley Farm (#21)
 - The Storey Family (#32-37)
 - Rachel Mischewski (#39)
 - Greg and Heather Bell (#46)

- The local network internal to the Plan Change area:
 - Pukehangi Parklands Estate (#4)
 - Matipo Ave Residents Society (MARIS) (#12)

¹ PC2 proposes the removal of this Development Plan.

3. Waka Kotare (NZTA)

3.1 The Submission

The submission from NZTA sought further information on five issues:

- A request for information on trip generation and distribution
- Details of the residential yield
- Analysis of the effects of traffic on the Old Taupo Road (SH5) intersections with
 - Malfroy Road
 - Sunset Road
 - Devon Street
 - Springfield Drive
- Information on public transport routes
- Construction traffic volumes

The response to each of these is given below.

3.2 Trip Generation and Distribution

The trip generation has been derived using the Rotorua Traffic model which was updated in 2014 using the 2013 census. The model build report has been made available and this describes the approach to trip generation in detail.²

3.3 Residential Yield

Base household data used in the model was derived from the 2013 census. Growth in households was updated in the model to align with the housing accord scenario of Council's G18 growth projections as at 2028, as set out in the table below.

Table 3-1: Growth in Households 2013-2028

Pukehangi Heights	Refer scenarios below
Matipo Heights	35
Eastside	360
Ngongotaha	330
Lynmore & Owhata	330
Lake Okareka	10
Lake Rotoiti	10
Lake Rotoma	10
Lake Tarawera	10
Hamurana	110
Western Heights	275
Fordlands	160
Central City (CBD)	40
Central City (Whakatau)	100
Fenton Street & Racecourse	0
Springfield Golf Course	0
City (Central & South)	43
City (East)	142

² TDG, 'Rotorua Model Update 2013, Rotorua District Council Transportation Model', TDG Ref: 12428 20140411, Report for Rotorua District Council April 2014.

City (West & North)	
Ngongotaha (Infill)	

For the Pukehangi area we have assessed three yield scenarios in this report:

1. **Base yield:** Using the structure plan, we have assumed 300 lots in the Sumner block, 79 in TAGH and 336 in Hunt – a total of 715³ (these generate 0.80 trips per hour per household in the morning peak which is the similar to the existing generation from households in Matipo Ave, as noted in the Section 32 report).
2. **Revised yield:** 50 lots in the Sumner block and 326 in the Hunt Block (755 Total) in order to better reflect the development potential of the sites.
3. **High yield:** To test the sensitivity of the traffic network to a greater level of development, a scenario of 900 lots over the three blocks – roughly a 20% increase in yields – has also been considered.

In addition, a 'No development' scenario has also been modelled which includes growth throughout the city, but none in the three development areas subject to this proposed Plan Change.

The effects of the increase in yields are small. Total trip generation from the revised yield in the Sumner block increases by about 16% from 250 to around 290 trips per hour in the evening peak compared with the earlier development plans, and a further 16% with the high yield scenario.

Traffic on Pukehangi Road just north of Sunset Road increases from 434⁴ vph in the evening peak hour with the no development scenario, to 535 vph from the base yield, to 549 vph with the revised yield and 710 vph with the high yield. There are no additional problems caused by the increased yields over that already reported in the base scenario.

Evening peak hour generation from the Hunt and TAGH developments only changes by a small amount from 400 vph with the base yield to 473 vph with the high yield – an 18% increase. The traffic effect quickly dissipates away from the site, with traffic on Pukehangi Road south of Malfroy Road increasing by about 6% and Malfroy Road by about 9% relative to the base scenario. Traffic through the intersection of Malfroy and Old Taupo Road only increases by 1.3% with the high yield scenario over the revised scenario (an increase of 7% over the no development scenario).

There is also a proposal for a retirement village to the north of the Sumner Block – approximately nine hectares in total, with around seven hectares proposed for housing, known as the Freedom block. Retirement villages do not generate much traffic in the peak hours – their generation is more in the off peak. However, if the underlying zoning is Residential 1 there is an estimated potential for approximately 80 lots if the retirement village is not built, on the assumption that the site would yield 11 lots per hectare. No analysis has been undertaken for a higher 'medium density' residential yield on the Freedom Villages site.

The model indicates that 80 lots would add about 25 vehicles per hour in the morning peak to Pukehangi road south of the site.

3.4 Key SH5 Intersections

Modelled flows for the four intersections noted by NZTA for 2028 with and without the Proposed Plan Change are included in Appendix One.

Both Sunset Road and Malfroy Road intersections were identified from the initial modelling as potentially of concern and requiring further assessment. Current phasing, cycle times and detector flows in March 2020 were obtained from the Tauranga Traffic Operation Centre (TTOC) for both of these intersections from the SCATS⁵ system. These were used as inputs to SIDRA⁶ to check the performance of the intersection under the various yield scenarios. Rather than relying on the absolute modelled results, the modelled change in flow resulting from the proposed Plan Change was added to each of the observed movements, and the intersections were analysed using SIDRA for the morning and evening peaks.

The intersection performance was assessed using the concept of Level of Service, which is a scale developed by American engineers, and is in common usage there and in Australia and New Zealand. It

³ The S32 Report incorrectly quoted 708

⁴ Average daily traffic can be estimated by multiplying the hourly traffic by a factor of 10.0

⁵ SCATS is the traffic signal control system used throughout New Zealand, with the Rotorua signals controlled from Tauranga

⁶ SIDRA is software used to analyse the performance of intersections, widely used throughout Australasia.

works off 6 levels – ‘A’ through ‘F’ where ‘A’ is free flow of traffic with no impedance, and ‘F’ is complete flow breakdown.

A general rule of thumb is that when a part of the network reaches LoS ‘D’ , a solution should have been identified, when it reaches ‘E’ a detailed design should be completed, and construction completed before it reaches LoS ‘F’.

With signalised intersections, any movement with an average delay of 20 seconds to 35 seconds is LoS ‘C’, 35 to 55 seconds is LoS ‘D’, 55 to 80 Seconds is LoS ‘E’ and above 80 seconds LoS ‘F’.

Note that these are average delays over an hour – peak delays could be higher than these.

3.4.1 Sunset Road/SH5 Intersection

At present, based on the current phasing and March 2020 detector flows, SH5 is operating at Level of Service (LoS) ‘C’ on both approaches although the right turn into Sunset Road is operating at LoS ‘E’ in the morning Peak. The northbound through movement on SH5 is operating at LoS ‘D’ in the evening peak. Sunset Road is operating at LOS ‘D’ in both periods.

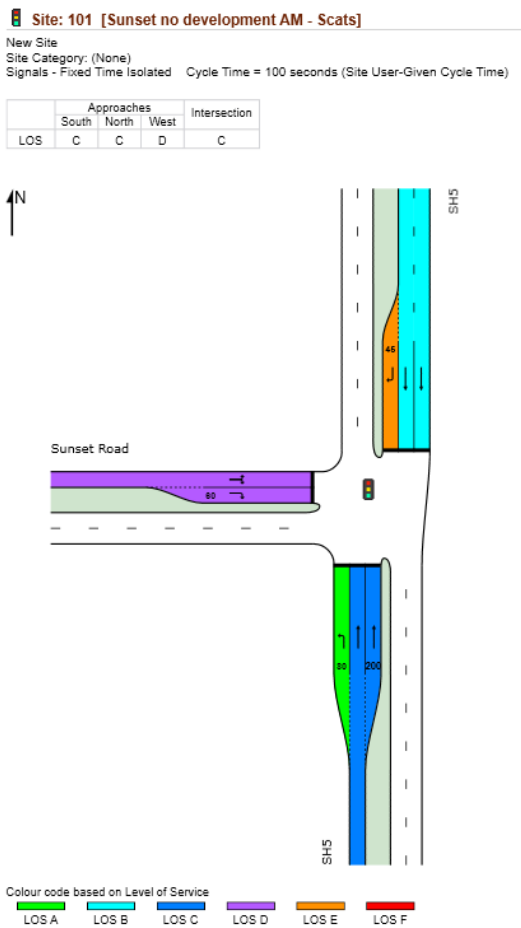


Figure 3-1: Sunset Road/SH5 Existing AM Peak

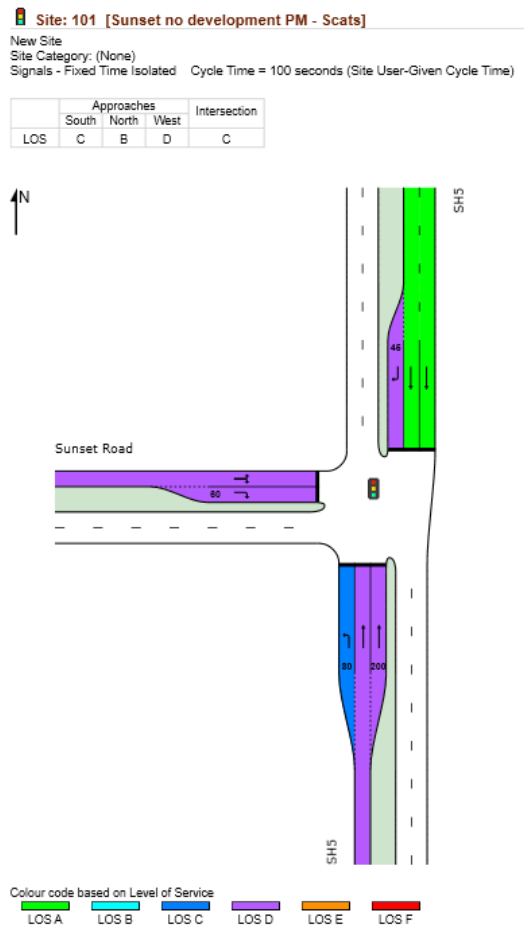


Figure 3-2: Sunset Road/SH5 Existing PM Peak

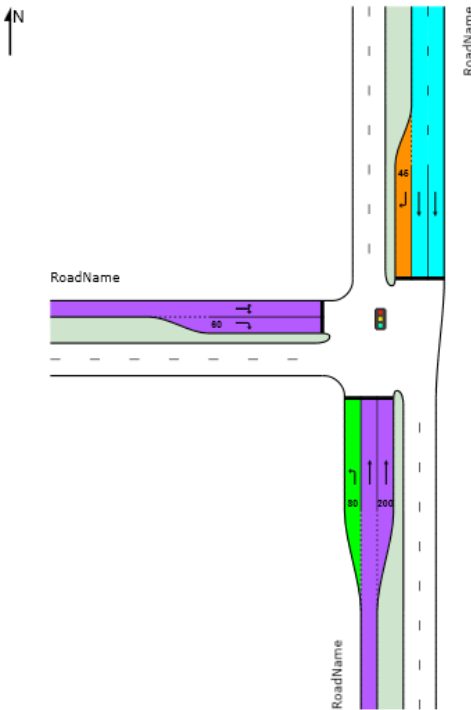
Applying the revised yield scenario for the plan change area with the G18 growth projections for 2028, there are only minor changes to the performance of the intersection. During the morning peak, the northbound through movement goes from LoS ‘C’ to LoS ‘D’, and in the evening peak, Sunset Road goes from LoS ‘D’ to LoS ‘E’.

A design should be in hand for upgrading the intersection by the time the Plan Change is fully developed.

Site: 101 [Sunset full development AM - Scats]

New Site
 Site Category: (None)
 Signals - Fixed Time Isolated Cycle Time = 100 seconds (Site User-Given Cycle Time)

LOS	Approaches			Intersection
	South	North	West	
	D	C	D	C

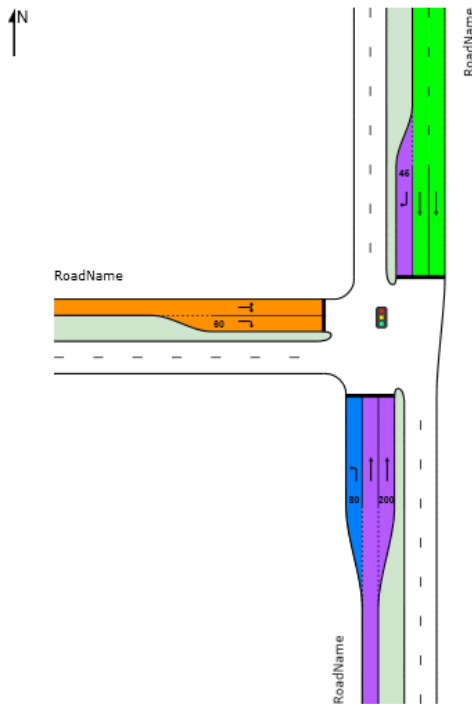


Colour code based on Level of Service
 LOS A LOS B LOS C LOS D LOS E LOS F

Site: 101 [Sunset full development PM - Scats]

New Site
 Site Category: (None)
 Signals - Fixed Time Isolated Cycle Time = 100 seconds (Site User-Given Cycle Time)

LOS	Approaches			Intersection
	South	North	West	
	D	B	E	C



Colour code based on Level of Service
 LOS A LOS B LOS C LOS D LOS E LOS F

Figure 3-3: Sunset Road/SH5 with Development (revised yield) AM Peak

Figure 3-4: Sunset Road/SH5 with Development (revised yield) PM Peak

When the high yield demands are applied to this intersection, there is little change to the performance of the intersection with only the right turn into Sunset Road showing as LoS 'E'. in the morning peak and both movements out of Sunset Road at LoS 'E' in the evening peak. Even with the Freedom village yield added to the high yield demand, there is no further change in the level of service at this intersection beyond those shown in the figures.

3.4.2 Malfroy Road/SH5 Intersection

The flow information provided by TIOC in March showed that there were 2740 vehicles entering the intersection in the morning peak period, with about 500 on each of the Malfroy Road approaches and 900 on each of the State Highway approaches.

Based on the current phasing and March 2020 detector flow information, the modelling suggests that, in the morning peak, both the SH5 approaches are at LoS 'D' now, and the right turns in and out of Malfroy Road west and out of Malfroy Road East are at LoS 'E'. In the evening peak all turns are at LoS 'D' or better. The right turn delays in the morning peak are indicative that the intersection is approaching capacity.

Once the revised yield development is completed, there will be an additional 95 vehicles entering the intersection above the March flows, or a 3.5% increase, with the Malfroy Road west leg increasing by about 10%. The high yield scenario would add a further 30 vehicles per hour.

There will be a slight deterioration in the performance of the intersection. In the morning peak, the right turn out of Malfroy East will be at LoS 'F', the other right turns will be at LoS 'E' as will be the left turn lane northbound on SH5. In the evening peak, all approaches are at LoS 'D' or better except for the right turns out of Malfroy west, and SH5 north. It is worth noting the increase in the right turn flow is only 8 vph above the 'no development' scenario but that is sufficient to cross the threshold between 'E' and 'F'.

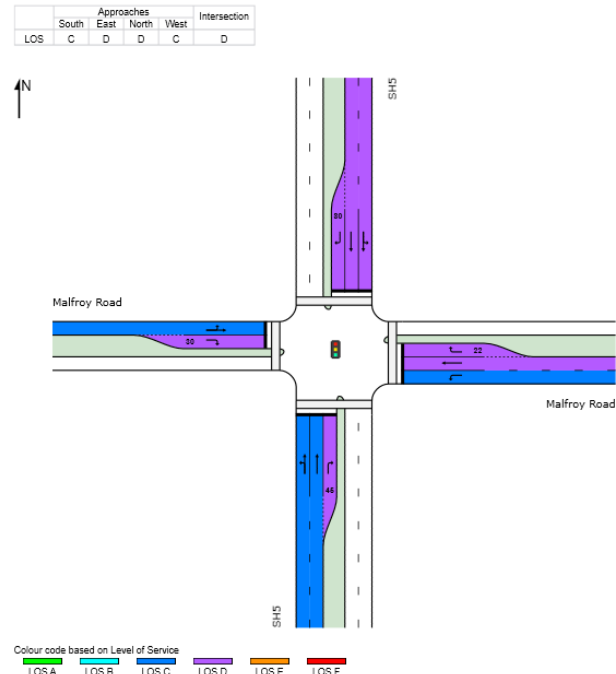
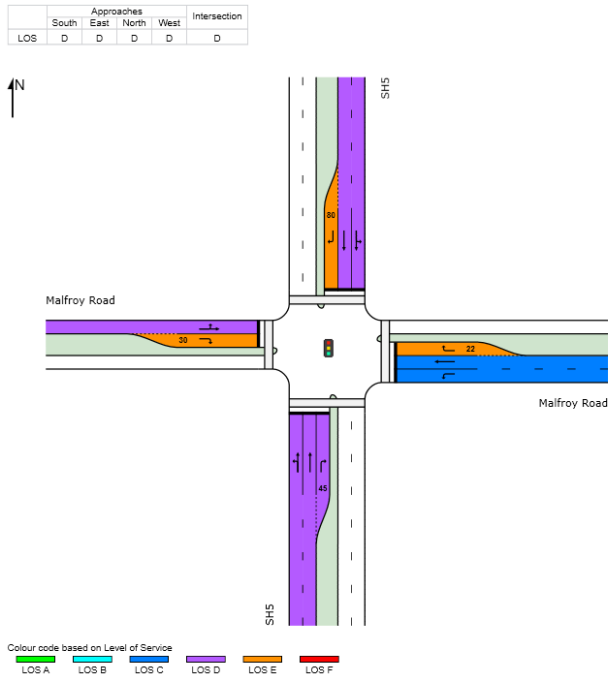


Figure 3-5: Malfroy Road/SH5 Existing AM Peak

Figure 3-6: Malfroy Road/SH5 Existing PM Peak

Council has been pursuing an upgrade of the intersection to provide additional turning lanes. The land required to upgrade the intersection was designated in the Council's operative District Plan, and Council has been pursuing a policy of purchasing affected properties as they came on the market, taking off the necessary land required for the intersection, and on selling the property. There are still here properties to be acquired.

When the high yield demands are placed on the intersection, the right turn into Malfroy Road west also goes to LoS 'F' in the morning peak, but the evening peak levels do not alter.

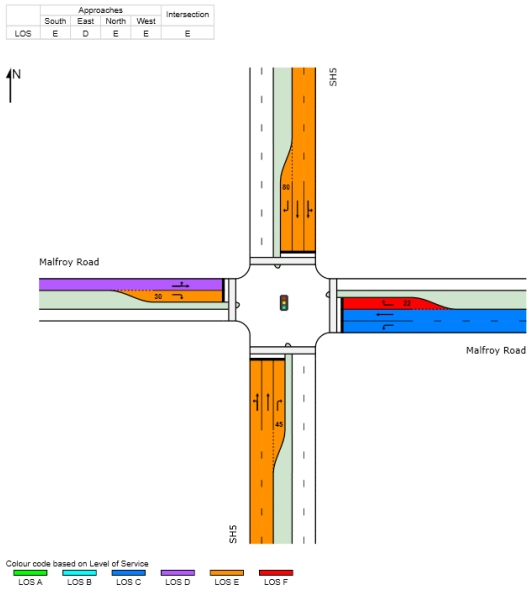


Figure 3-7: Malfroy Road/SH5 with Development (revised yield) AM Peak

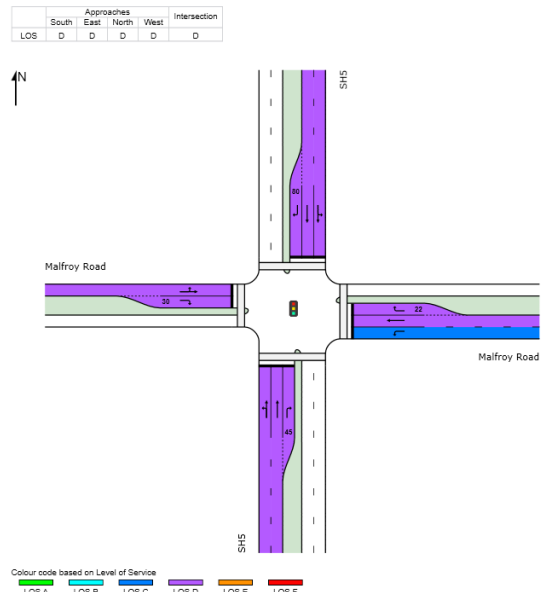


Figure 3-8: Malfroy Road/SH5 with Development (revised yield) PM Peak

Adding a lane to Malfroy Road West brings the intersection operation back to acceptable levels under both the revised yield and high yield scenarios in the morning peak. The evening peak remains at acceptable levels.

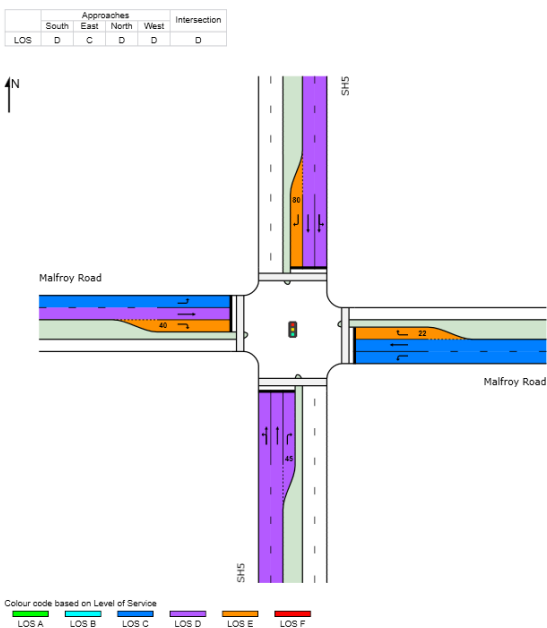


Figure 3-9: Malfroy Road/SH5 with Development AM Peak Intersection Upgrades (revised and high yield Scenarios)

Given the sensitivity of the intersection, additional data on signal phasing and detector flows was obtained from the Tauranga Traffic Operations Centre for 2 and 3 July 2020, and SIDRA was configured so that it reproduced the average cycle time and phase splits over the morning peak hour. The July total flows are similar to those observed in March at 2657 vehicles per hour, but the Malfroy Road flows are a little higher and the State Highway a little lower.

The level of service and approach delays with the July flows are very similar to the March position, as shown in Figure 3-9.

However, when the revised scenario flows are added, the small change to the base flow between March and July means that all movements stay within or below the LoS 'E' band as shown on Figure 3-10

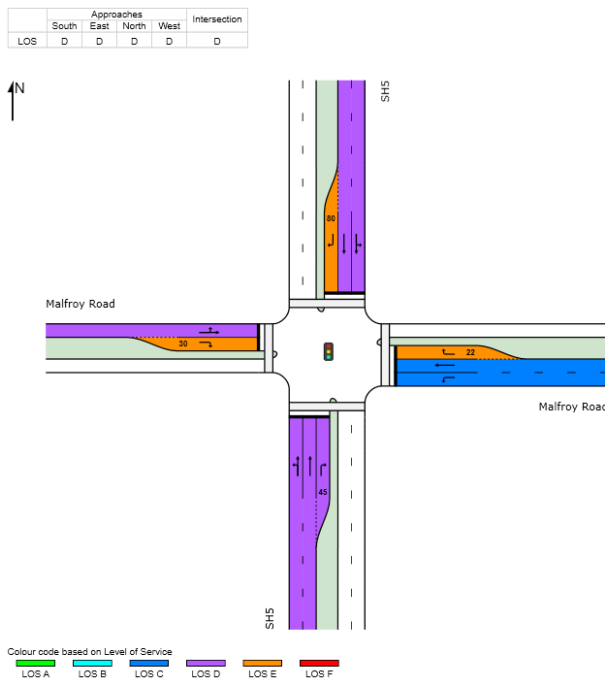


Figure 3-9: Malfroy Road/SH5 with existing July flows AM Peak

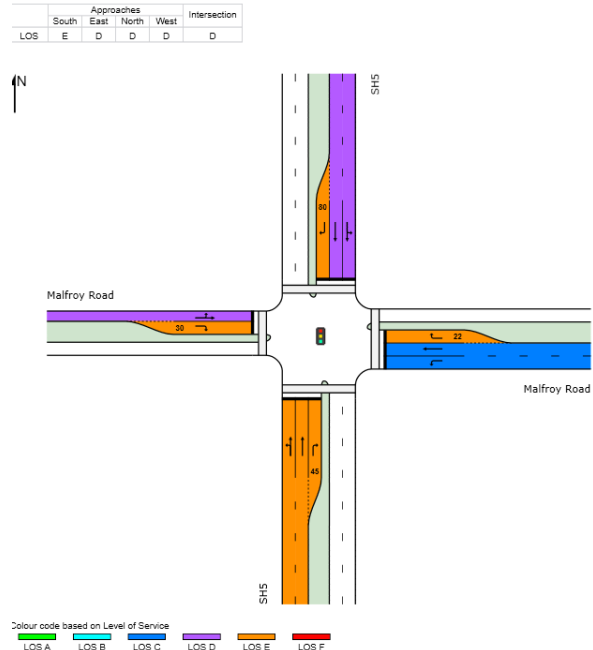


Figure 3-10: Malfroy Road/SH5 with Development (revised yield) AM Peak July base

The primary differences between Figures 3-7 and 3-10 are that the right turn out of Malfroy Road East remains at LoS 'E', and the SH5 North approach remains at LoS 'E' except for the right turn.

The intersection is close to capacity now and the modelling suggests it will be close to or at capacity once the development is complete (revised scenario). Whether the intersection exceeds capacity (level F) in the above analysis is sensitive to small differences in the base flow between March and July. It is not sensitive to small changes in the signal operational settings. The timing of the proposed upgrade will need periodic review in the years ahead.

Devon Street and Springfield Drive Intersections

These intersections have no capacity issues, even with the high yield option. All movements on all intersections are running at LoS 'C' or better.

3.5 Public Transport

There are three routes which service the area to the east of Pukehangi Road – the Number 4 Service known as Sunnybrook, the Number 7 service known as Mitchell Downs and the Number 8 service known as Westbrook. The details of these routes are shown below (abstracted from the Baybus web site).

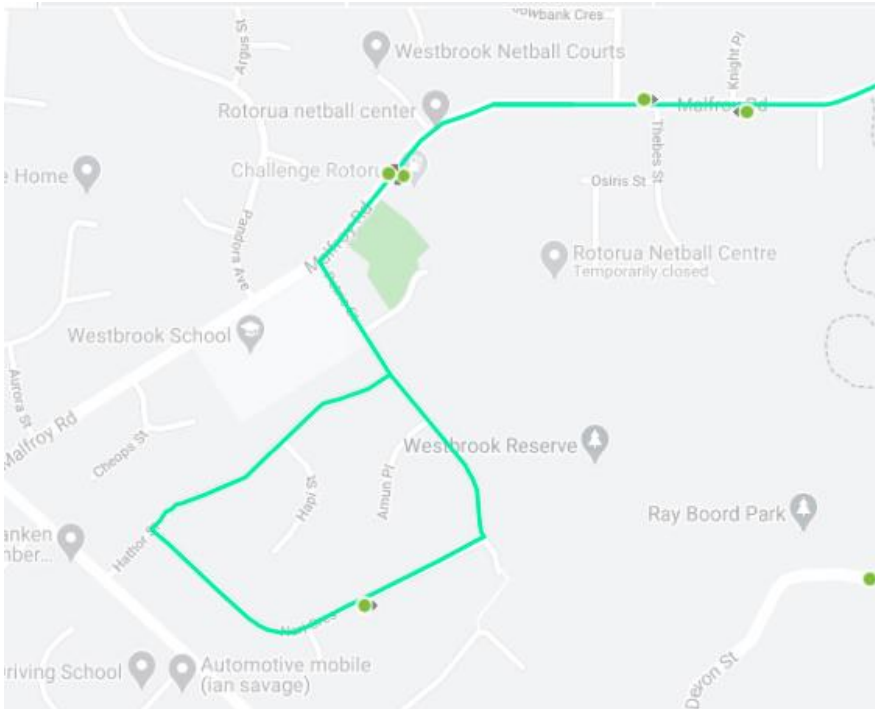


Figure 3-10: Number 8 Service – Westbrook

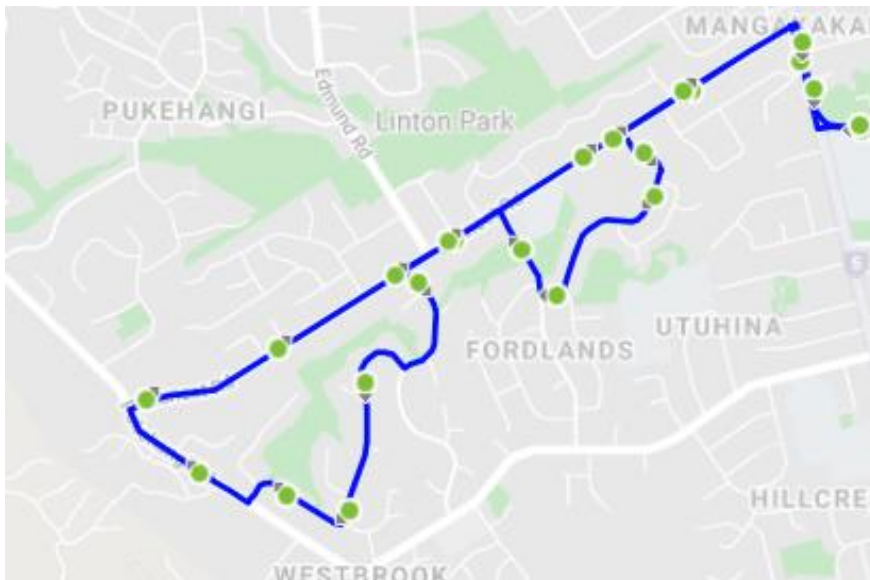


Figure 3-11: Number 4 Service – Sunnybrook

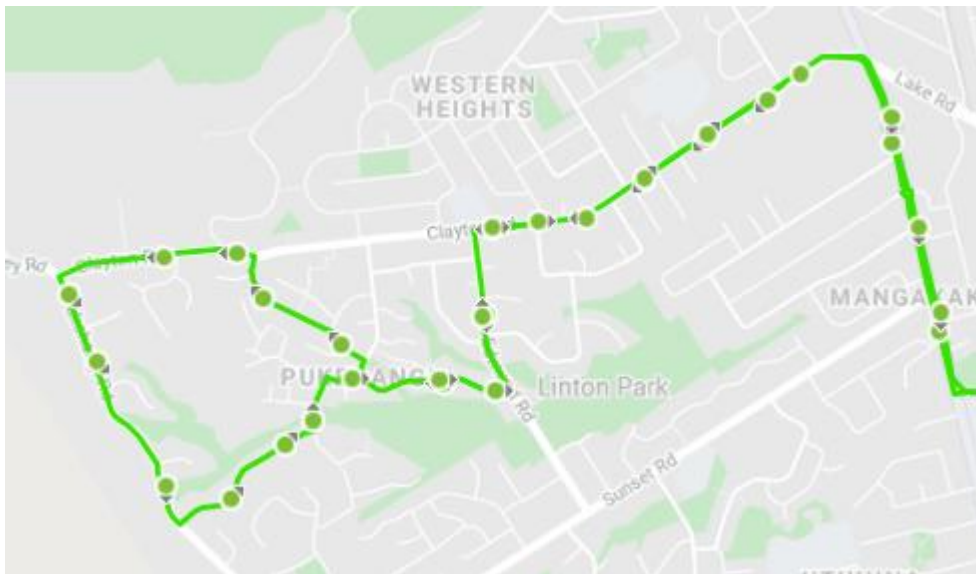


Figure 3-12: Number 7 Service – Mitchell Downs

This is a radial system centred on the Rotorua CBD. Each of these services has a loop at the end presumably for operational reasons, and each of the three services runs on a half hour headway,

There may be an opportunity to link the services by passing through Pukehangi Road or the plan change area – particularly routes 4 and 8, which means that the headway could reduce to 15 minutes with the same number of busses.

It is unlikely that there would need to be an additional traffic on SH5.

3.6 Construction Traffic

It is premature to consider construction traffic volumes at the time of a Plan Change. A Construction Management Plan will be needed as part of resource consents prior to subdivision approval, and this will depend in turn on the way in which each property is developed.

4. Rotorua District Residents and Ratepayers

4.1 Issues Raised

The Association raises three issues:

1. *The documentation states that "This assessment concludes that traffic flows from the development will be relatively low, with no significant delays to traffic turning in or out of the development, or on the performance of the wider network". How can traffic from an additional 700 houses have a 'relatively low' impact on the roading networks surrounding them?*
2. *How are the roading networks going to be altered to cope with the additional traffic flows? With these proposed subdivisions alone, the flow of traffic onto Pukehangi Road and adjoining networks, at certain times of the day, will surely impact quite heavily.*
3. *There are schools down both Malfroy and Sunset Roads, so heavy traffic flow through those areas at school times will surely have an impact on the people trying to get to work. Does the RLC plan on putting in more traffic lights or roundabouts? If so, where are these proposed to go?*

The Section 32 report included a diagram showing the way in which traffic to and from the Plan Change areas site use the wider network. Primarily the traffic distributes onto Pukehangi Road, and then uses Sunset Road, Malfroy Road and to a lesser extent Devon Street. All of these roads are designated as Urban Secondary Arterials in the District Plan. The function of a Secondary arterial is to join smaller centres of population, joining larger centres of population to nearby primary arterials (Old Taupo Road – SH5) or linking between Primary arterials, and that is exactly why the Plan change traffic is using them.

Currently, Pukehangi Road carries around 410-420 vehicles per hour in the both the AM and PM peaks, or around 4,000 vehicles per day – a very light load for an arterial road. The highest modelled increase on Pukehangi Road for the high yield scenario is some 190 vehicles per hour in southbound in the morning peak - that is about 1 every 20 seconds on average. The evening peak increases by 100 vph in the northbound direction under this yield scenario. The resulting 6,000 vpd is still a light load for an arterial road.

Malfroy Road will take the largest increase in traffic. In the morning peak this will coincide with school hours, and the largest directional increase modelled in the revised yield scenario will be about 150 vehicles per hour toward SH5. The evening peak increase will be similar but in the opposite direction and occurs after school finishes. Having said that Malfroy Road is reasonably heavily trafficked at present, carrying between 10,000 and 12,000 vehicles per day.

There will be an impact on the Malfroy/SH5 intersection and that has been addressed in the response to the submission from NZTA.

The notified structure plan included a proposed roundabout at the intersection of Malfroy Road and Pukehangi Road, with a leg into the Hunt block; and the closure of the intersection of Pukehangi Road with Matipo Avenue. About half of the traffic generated by the development would use the Malfroy and Pukehangi Road intersection, with most of that travelling on to Malfroy Road. Further modelling suggests that this roundabout is not required as a priority intersection would achieve an adequate LOS. This is discussed further in section 5.5.

5. The Local Network External to the Site

5.1 Issues Raised

In summary, the issues raised by these submitters are:

- Construction traffic – noise and dust
- Peak hour traffic at the Sunset Road/SH5 intersection
- Design of Pukehangi Road, including intersection treatment, carriageway width and safety for cyclists
- Traffic noise (current)
- Capacity at key intersections
- Safety around schools

5.2 Construction Traffic

It is premature to consider construction traffic at the time of a Plan Change. A Construction Management Plan will be needed as part of resource consents prior to subdivision approval, and this will depend in turn on the way in which each property is developed. It will cover such items as access, times of operation, dust and noise control.

5.3 Peak Hour Traffic at Sunset Road

The Sunset Road/ SH5 intersection has been covered in the response to NZTA. A suggestion has been made that the no parking zone be extended. At present the no parking area extends to approximately 215m from the intersection with the 95-percentile queue modelled at 160m with full development of the Plan Change area. Therefore, there is no need to extend the no parking zone.

5.4 Pukehangi Road

Submissions raise the following matters regarding the design of Pukehangi Road:

- Speed limits.
- The adequacy of the carriageway width of Pukehangi Road to accommodate parking, additional traffic and cycling; Safety for residents along Pukehangi Road entering and exiting their property due to increased traffic.

- The proposed use of a roundabout at the Pukehangī Road / Malfroy Road intersection (some submitters support the proposal in the structure plan for a roundabout while submitters concerned about cyclists seeks alternative solutions).
- Consideration of the need for an additional roundabout at the intersection of Pukehangī Road / Sunset Road.
- Consideration of the need for slip lanes at right turning traffic from Pukehangī Road into Sunset Road, Hodgkins Street, Barraud Place and Bloomfield Street.
- Safety of cyclists on Pukehangī Road choosing to cycle on-road rather than use the potential future cycleway extension.

5.4.1 Speed Limit Reductions

Speed limits are not within the matters addressed by the plan change. However it is understood from discussions with Council staff that a speed limit reduction proposal is currently being developed and is expected to be presented to the Council for approval to consult late this year.

5.4.2 Carriageway Width

The Section 32 Report notes:

Pukehangī Road is classified as a Minor Arterial which would indicate a desirable width of 13.0m or greater based on the above standards.⁷ The required width is directly related to parking and /or cyclist demands. The existing width of Pukehangī Road, at approximately 9.7m, provides for two traffic lanes plus a narrow flush median and narrow shoulders is not sufficient to accommodate parking

The road reserve is 20m which would be sufficient to accommodate an increased carriageway width of 13m carriageway, while leaving 7m available for a 2m footpath on the east side, and 5m for a shared cycleway/footpath on the west side where there will be very few access points.

However, it is noted that traffic volumes on Pukehangī Road are expected to remain low for an arterial road and the design of the plan change is intended to discourage properties fronting Pukehangī Road and contributing to on street parking. In the absence of carriageway widening reducing the speed limit and limiting on-street parking would assist to avoid safety concerns for road users (including cyclists).

5.4.3 Pukehangī / Malfroy Road Intersection

As noted above, about half of the traffic generated by the development is expected to use the Malfroy and Pukehangī Road intersection, with most of that travelling on to Malfroy Road.

The notified structure plan proposed a roundabout at the Pukehangī / Malfroy intersection, with a leg into the Hunt block. However, further modelling of a priority intersection (stop signs) has now been completed. That indicates an adequate LOS can be achieved without a roundabout. This would assist to address submitter concerns about cyclists navigating roundabouts, and pedestrian safety crossing Pukehangī Road. It would also have the benefit of reduced construction costs, which will be exacerbated by the gradients in that area.

A small commercial centre has been proposed alongside the access road. While this has not yet been detailed, consideration should be given at the design stage for access and parking to be off the subdivision road rather than Pukehangī Road

5.4.4 Pukehangī / Sunset Intersection

Even with the high yield scenario for the Plan Change Area, there will be no significant delays at the Sunset Road /Pukehangī Road intersection and no justification for a roundabout. Having said that, it could be a consideration if the access to Pukehangī Parkland Estate were shifted to that intersection, but that is not a matter for consideration as part of the Proposed Plan Change. There is potential to provide a right turn bay into the Sunset Road / Pukehangī intersection within the current carriageway width, in the same way as the existing bay at Malfroy Road. However, traffic volumes are small, and the bay is unlikely to be needed.

⁷ Rotorua Civil Engineering Industry Standard 2000 (Version 2004)

5.4.5 Other Right Turn Bays

A right turn bay is already provided for right turning traffic at the Malfroy Road / Pukehangī intersection and would be retained with the proposed priority intersection. There is no need for bays at any of the other intersections.

5.5 Traffic Noise

The lower speed limit on Pukehangī Road should assist to reduce traffic noise, and when the road needs to be resealed, a lower noise seal might be considered.

5.6 Capacity at Key Intersections

All intersections in the area have been assessed through the modelling and the only ones that were identified of potential concern and requiring further assessment were Sunset Road/SH5, Malfroy Road/SH5, and Malfroy Road/Pukehangī Road.

The two SH5 intersections have been addressed in the response to NZTA. The diagram below shows how the priority intersection at Malfroy Road/Pukehangī Road might look.



Figure 5-1: Malfroy Road/Pukehangī Road Intersection

5.7 Safety at Schools

There is anecdotal evidence that there are traffic issues around the Malfroy Road School, particularly in the afternoon when parents are waiting in cars for the children to come out of school. This is not the peak traffic time and is an existing issue.

The morning peak school drop-off period will coincide with the morning peak commuter traffic but is not as pronounced as the school arrivals are more staggered.

Suggestions have been made for a speed restricted area around the Malfroy School, but that will have little effect. Speeds are already slow.

6. The Local Network Internal to the site

6.1 Issues raised

Submissions were received from the two neighbouring subdivisions, namely the Matipo Street residents, and the Pukehangī Parklands Estate, and a resident who live opposite the existing Hunt Farm access. In summary, the matters raised in submissions are:

- Parklands are concerned about a potential road to the northern end of the Hunt Farm site running along the Parklands boundary.

- The Matipo Street residents primary concern is that Matipo Street will be used as an access for the TAGH development.

6.1.1 Road Alongside Parklands

If the road were built alongside Parklands to give the houses on the eastern high terrace an alternative route, it would only attract 15-20 vehicles an hour in the morning peak which will have a negligible effect on the houses near the boundary.

6.1.2 TAGH Subdivision Access to Matipo Avenue

The proposal to close Matipo Street and connect the TAGH subdivision onto the Hunt spine road, along with the future severing of the Pukehangi / Matipo intersection will minimise the amount of traffic that will use Matipo Street as the spine road route will be shorter than travelling through Matipo Street for most of the houses in the TAGH development.

It is considered that the access to between the Matipo Avenue and the TAGH subdivision should however remain an option for a limited level of development. The traffic impacts are covered in the initial traffic modelling, which found that if the road network is developed as provided for in the structure plan, the number of vehicle movements on Matipo Avenue will be less than those enabled under the existing provisions for Twin Oaks in Area A under the current District Plan. Traffic volumes would comply with engineering standards.

Christchurch

Hazeldean Business Park, 6 Hazeldean Road
Addington, Christchurch 8024
PO Box 13-052, Armagh
Christchurch 8141
Tel +64 3 366 7449
Fax +64 3 366 7780

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