

APPENDIX F

TRAFFIC REVIEW PREPARED BY GRAY MATTER

3 November 2020

Waikato District Council
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Attn: Victoria Majoor



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Dear Victoria

MCPHERSON QUARRY, POKENO – TRANSPORTATION REVIEW

1. Introduction

McPherson Quarry (the Applicant) has made an application for consent to continue with their existing quarry operation on McPherson Road and support future expansion.

Waikato District Council (WDC) has engaged Gray Matter Ltd to peer review the traffic and transportation aspects of the proposal. This proposal seeks consent to extract and move 490,000 tonnes of material per annum.

This letter presents our assessment to support WDC's Section 42A report. It includes:

- = A summary of the key aspects of the application from a traffic and transportation perspective;
- = Comments on the Applicant's assessment and main areas of agreement and disagreement;
- = Summary of the Submitters' traffic concerns;
- = The nature and extent of traffic effects from the proposal including mitigation; and
- = Recommended conditions.

Our review is based on:

- = McPherson Quarry Traffic Impact Assessment, WSP (2018) (TIA);
- = McPherson Resources Limited, Resource Consent Application & Assessment of Environmental Effects – Updated Post-Lodgement, Kinetic Environmental (12 December 2019) (AEE);
- = Site visit and observations on Friday 23 October 2020; and
- = Additional information provided by WSP, email from Kristoffer Hansson to Naomi McMinn dated 29/10/2020.

2. Site Location and Proposal

The application is for consent to continue with the existing quarry operation and support a future expansion of the quarry operation. The proposal is for a maximum 490,000 tonnes per year of extraction and movement of quarry material. The application also seeks permission to import clean fill in trucks that are leaving the site with quarry material. The AEE anticipates up to 100,000 m³ of clean fill per annum¹.

We understand the proposed operational hours are 7am to 7pm (12 hours) for six days per week (Monday to Saturday). Note that the TIA is based on 11 hour working days, 7am to 6pm.

The quarry locality is shown in Figure 1. The quarry is located near the end of McPherson Road. There are two residential dwellings located just past the quarry on McPherson Road.

¹ AEE Section 4.1.3

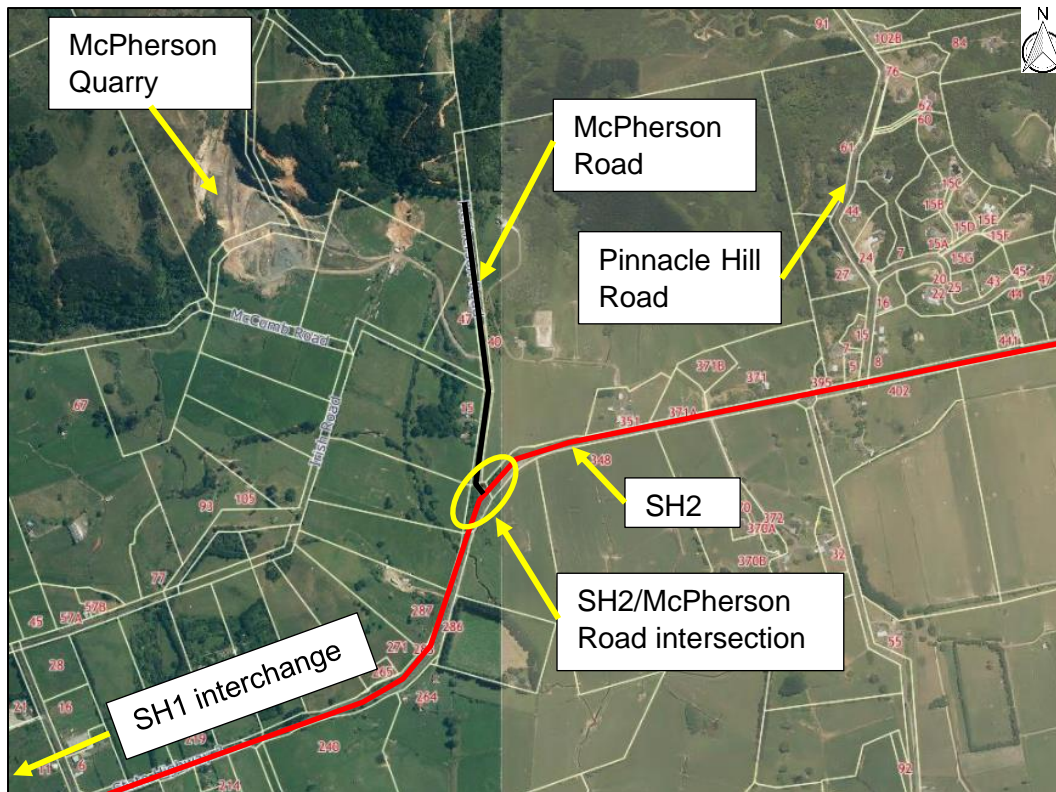


Figure 1: Quarry Site Location

3. Existing Environment

3.1. Existing Site Activity

We understand that there are no existing use rights. However, the quarry has been in operation for some time. The Application² states that the quarry extracted:

- = 330,000 tonnes of material in 2017; and
- = 320,000 tonnes of material in 2018.

The TIA states that the quarry transported 400,000 tonnes of quarry material in 2017. We understand this was estimated at the time of the TIA . The actual tonnage for 2017 was 330,000 tonnes as per the AEE.

The TIA concludes that the recommended mitigation measures (discussed below) are considered appropriate for the proposal taking into consideration the potential future function of SH2.

3.1.1. Existing Truck Data

WSP have provided truck load data at the quarry for the period between 1st November 2019 and 21st October 2020³. Based on the data provided, the key existing quarry movements are summarised:

- = Maximum: 165 loads = 330 trucks/day
- = Minimum: 1 load = 2 trucks/day
- = Average: 56 loads = 112 trucks/day
- = 85thtile: 87 loads = 174 trucks/day

Note that 1 load = 2 truck movements (in and out). When we refer to movements it means the same thing as trips, i.e. 2 trips = 2 vpd (light and heavy vehicles) or 2 trucks/day (heavy vehicles only).

WSP estimate that this represents 280,000-300,000 tonnes of quarry material extracted over the 11-12 month period. The profile in Figure 2 shows that there are variations in daily loads throughout the year. There do

² Kinetic Environmental Application Report (AEE) Section 3.1.1

³ Email from Kristoffer Hansson to Naomi McMinn dated 29/10/2020

not appear to be any distinctive seasonal variations. We would typically expect a period of increased demand for aggregate during the earthworks season (1st October to 31st March). We note this data was recorded during the COVID-19 pandemic lockdown restrictions and is not likely to be representative of typical activity over that time. The maximum number of daily loads is 165, around 3x the average number of daily loads.

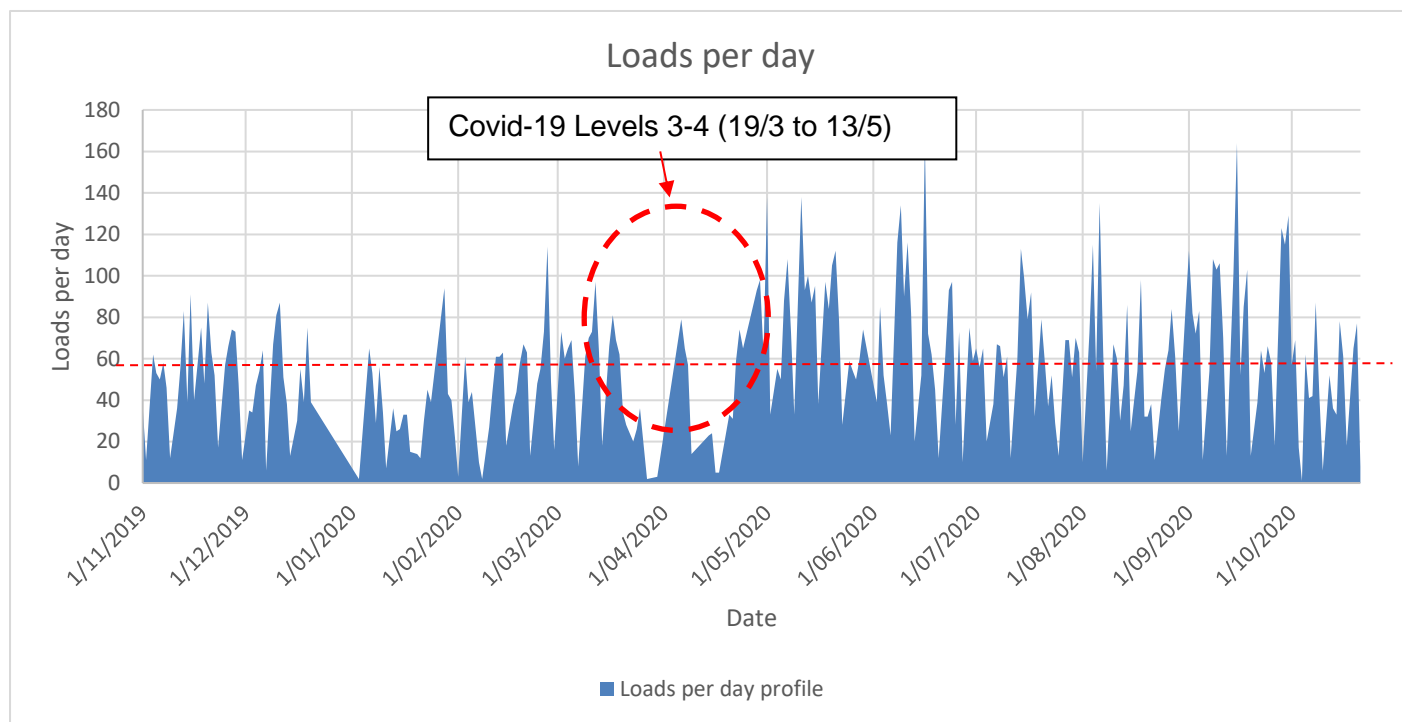


Figure 2: Daily quarry load profile (data provided by WSP 29/10/20) (red line indicates average daily loads)

3.2. Surrounding Network

The site access is located 325m from the SH2/McPherson Road intersection. The TIA does not provide the traffic volume for McPherson Road. The mobileroad.org estimate is 173 veh/day with 7% HCV. WDC have provided RAMM data for McPherson Road. The 2020 RAMM estimate is 150 veh/day with 4% HV on McPherson Road. The percentage of HVs appears low given that the quarry is currently operating from the site.

McPherson Road is formed for around 80m beyond the site access and provides access to two properties. It is an unformed paper road beyond that.



Figure 3: McPherson Road and the quarry vehicle crossing

The TIA reported six crashes at the McPherson Road/SH2 intersection during the five year period (January 2013 to May 2018). We have completed a search of the Waka Kotahi NZ Transport Agency Crash Analysis System (CAS) data for the McPherson Road/SH2 intersection (2015-2020 inclusive). There have been six reported crashes during this period as well (collision diagram attached at Appendix E). We note that there has been one crash since the WSP TIA was written (crash occurred 4/1/2019). There does not appear to be an existing crash issue related to movements to/from the SH2/McPherson Road Intersection.

3.2.1. Future SH2 Realignment

We understand that this section of SH2 has been considered for realignment. Commute Transport Consultants completed a re-evaluation summary for the SH2 Pokeno to Mangatarata realignment⁴.

The proposed works are summarised in the Waka Kotahi (NZTA) map shown in Figure 4. The future realignment of SH2 would reduce traffic passing the existing SH2/McPherson Road intersection. It is unclear when this project will be implemented.

⁴ SH2 Pokeno to Mangatarata, Re-evaluation summary – Commute Transportation Consultants (24 October 2018)

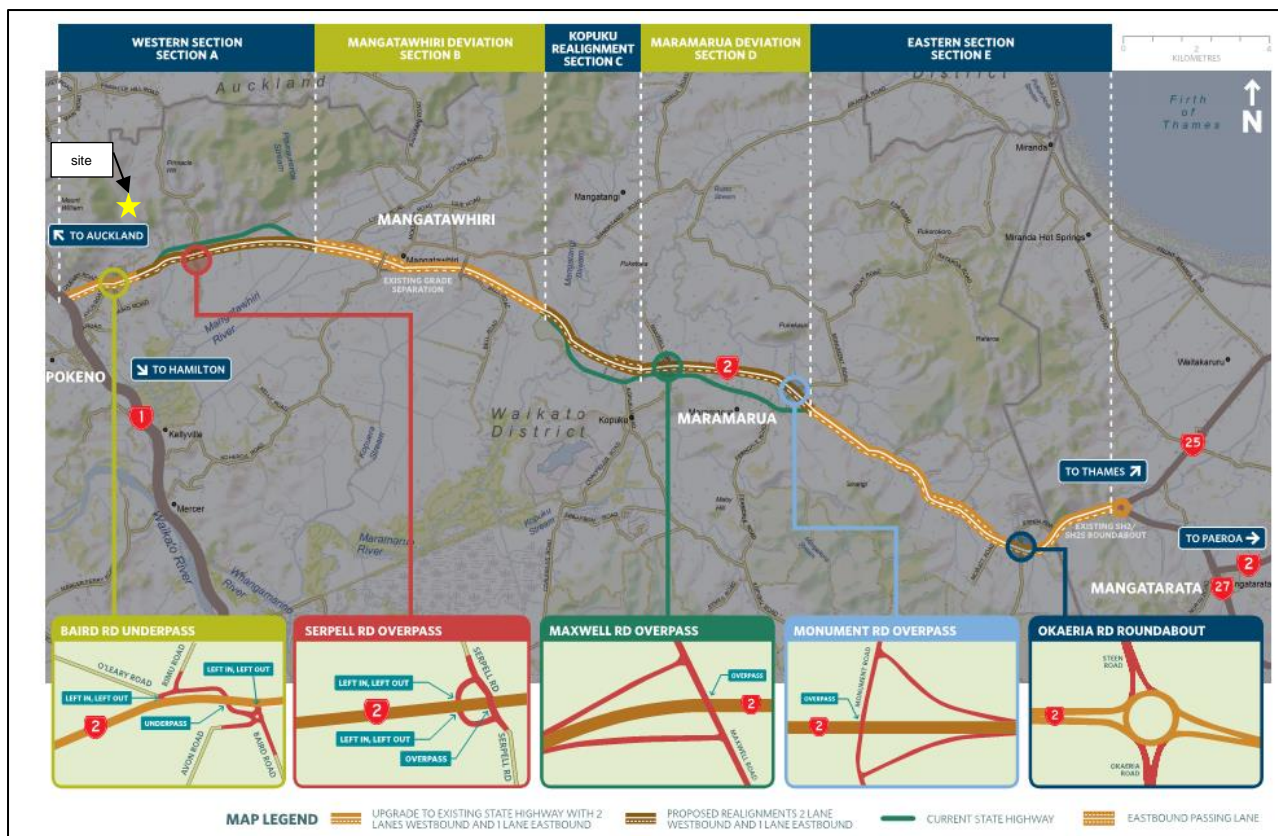


Figure 4: Proposed SH2 Works

4. Proposed Vehicle Access and Internal Circulation

The proposal does not change the existing vehicle access arrangement on McPherson Road. The TIA does not include an assessment of the existing vehicle crossing or internal circulation.

We have been provided information from WSP⁵ stating that the normal operation of the quarry includes one loader working and the normal capacity for loading is 12 truck loads per hour. The email states that the quarry has the capacity to load a maximum of 24 truck loads per hour if there are two loaders working in different locations. The further information provided by WSP also states this means the truck movements will be distributed over the day and will assist with internal circulation.

As shown below, there are potholes and deficiencies in the existing surface at the vehicle crossing that should be repaired.

⁵ Kristoffer Hansson email to Naomi McMinn dated 29 October 2020



Figure 5: Existing vehicle crossing and poor condition of surface

The WDC District Plan requires 250m sight distance for a rural vehicle crossing located within a 100km/h speed environment. The visibility to the right (towards SH2) is restricted due to the combined horizontal geometry of McPherson Road and the height of the adjacent paddock. Based on aerial photos there is approximately 90m visibility available which complies with the District Plan requirement of 90m for a 50km/h speed environment. The Mega Maps tool⁶ indicates a mean operating speed of less than 40km/h. This appears reasonable as the majority of traffic would be decelerating to turn into the quarry vehicle crossing or access the two dwellings.



Figure 6: View from the existing vehicle crossing towards SH2

Since the vehicle crossing is located near the end of McPherson Road movements are likely to be limited to left-in and right-out and there will only be a low number of vehicles passing the site to access the two properties (around 20 veh/day). Although visibility does not meet the District Plan requirement for a 100 km/h

⁶ <https://megamaps.abley.com/Maps/>

speed environment, it complies for a 50 km/h speed environment. There does not appear to be any existing safety issues at the vehicle crossing. The additional truck movements will increase the likelihood of interaction between opposing vehicles at the vehicle crossing.

The existing gate is located approximately 12m back from the edge of seal. It is desirable to set the gate back further to ensure a truck and trailer can wait clear of the traffic lane. We recommend that the gate is located 22m from the edge of seal to provide enough stacking space for one truck and trailer.

Given the increase in turning movements, we recommend that the vehicle crossing is formed to RITS standards for heavy commercial/industrial vehicle crossing and that the swept paths are checked to ensure that the layout is sufficient for two-way movement. The final layout will need to be approved by Council prior to operation.

5. Trip Generation

The TIA trip generation is based on the following assumptions:

- = 50% of haulage vehicles are trucks (10 tonne payload) and 50% being truck and trailer units (30 tonne payload), resulting in an average payload of 20 tonnes per haulage vehicle;
- = The quarry will operate between 7.00am to 6.00pm (11hrs)⁷ for six days per week (Monday to Saturday);
- = The quarry will operate 297 days a year (with the facility closed on Sundays, 2 weeks over Christmas and public holidays, equating to 68 days a year);
- = Consistent movement of trucks throughout the day; and
- = 50/50 split between left and right turning trucks at McPherson Road/SH2.

Using the above assumptions, the TIA assesses daily trip generation as 165 truck movements per day (approximately 82 inbound and 82 outbound). The TIA averages the daily truck movements over 11 hours which results in hourly movements of 16 vehicles per hour (8 inbound and 8 outbound). We note that if the movements were averaged over a 12 hour day the hourly movements would reduce to 13 veh/hr.

The TIA states that some trucks travelling to the quarry will transport clean fill and leave loaded with extracted quarry material. The TIA states that the clean fill operations will not generate additional truck movements. The transport assessment appears reasonable based on the information provided.

Further assessment from WSP and Kinetic Environmental Planning states that based on client provided information on recent markets and activity, the directional split at McPherson Road/SH2 is more likely to be 70/30 with more vehicles heading to and from Auckland.

Based on the above amended assumption it is likely that the majority of vehicles will be turning left in and right out via SH2. The turning proportions are summarised in the table below.

Entering McPherson Road (8 veh/hr)		Exiting McPherson Road (8 veh/hr)	
Left-in	Right-in	Left-out	Right-out
6 veh/hr	2 veh/hr	2 veh/hr	6 veh/hr

Table 1: Hourly vehicle movements at the McPherson Road/SH2 Intersection

The clean fill operation will mean there will be laden trucks inbound and outbound. Provided that the clean fill is transported in trucks heading to the quarry to collect aggregate, there is no change to the expected number of trucks per day. The TIA does not provide the number of expected clean fill trucks. Based on an average load⁸ of 12 m³ the number clean fill trucks is 28 loads/day, around a third of the average quarry trucks expected.

⁷ We note that it has since been confirmed that the quarry operates 7am -7pm (12hrs)

⁸ Based on a combination of truck only and truck and trailer units.

6. Peak Trip Generation

The peak operating scenario occurs when two loaders are working in two different areas with a capacity of 24 loads/hour resulting in 48 truck movements/hour. Extended over the proposed 12 hour working day this equates to 576 trucks/day. Based on normal loading operations (1 loader capable of 12 loads/hour) is 24 truck movements/hour and up to 288 trucks/day.

48 truck movements/hour is around one truck every 75 seconds. Based on the turning split of 70/30 (and equal inbound/outbound split) would be one truck turning right into McPherson Road every 8-9 minutes. The right turn bay with 42m stacking is considered adequate for the peak demand.

The dominant right-out movement towards SH1 would result in 17 trucks/hr turning left in and 17 trucks/hr turning right out of McPherson Road. The proposed left turn auxiliary lane will provide for the increase in left turning trucks.

Given the through volume on SH2, the additional right turn demand from McPherson Road will increase queuing and delays on McPherson Road leading to drivers risking smaller gaps to turn right, particularly during peak traffic periods on SH2. Although the turning volume of one truck every 3-4 minutes is relatively low, these vehicles will be fully laden with larger gaps required to account for the slower vehicle acceleration. We consider that extended periods of operation at maximum loading is likely to lead to safety risks at the intersection and increased risk of queuing at SH2/McPherson Road.

A daily maximum of 210 truck movements would allow for some increased production to meet peaks in demand and a daily average of 165 truck movements (calculated over three-months) would control the frequency/ intensity of the peak periods.

7. Summary of Trip Generation

Based on the TIA and considering the existing quarry data, and given the existing activity has no existing use rights, the average trip generation of the proposal is:

- = Daily truck movements = 165veh/day (approximately 82 inbound and 82 outbound); and
- = Hourly movements = 16 veh/hr (approximately 8 inbound and 8 outbound).

The TIA does not provide information on light vehicle trips such as staff and servicing movements associated with the proposal. However, these movements are likely to be low (around 10-20 veh/day). The trips generated by light vehicles are not considered significant when compared to the increase in truck movements.

The proposal results in an increase in truck movements on SH2 of approximately 0.4-1.3%. SH2 is a regional state highway which carries approximately 17,000 veh/day of which approximately 2,050 are heavy vehicles. We agree that the quarry is appropriately located with ready access to the regional arterial network and that the heavy vehicles generated by the quarry are typical of the current vehicle mix on SH2 given the form and function of the road.

8. SH2/McPherson Road Intersection

The existing intersection is priority controlled with no channelised right turn treatment. We note that the TIA states that sight distances have not been measured on-site but measured based on imagery. The TIA includes an assessment of turning treatment warrants and based on turning proportions a right turn bay and left turn auxiliary lane is warranted.

The proposal includes improving sight distances, provision of a right turn bay and left turn auxiliary lane for access to McPherson Road. Consultation with Waka Kotahi has informed the design. The following mitigation measures are proposed:

- = Modification of the bank and vegetation on the southern side of the McPherson Road/SH2 intersection;
- = 42m right turn bay to allow sufficient stacking space; and
- = Auxiliary left turn lane (approximately 100m long).

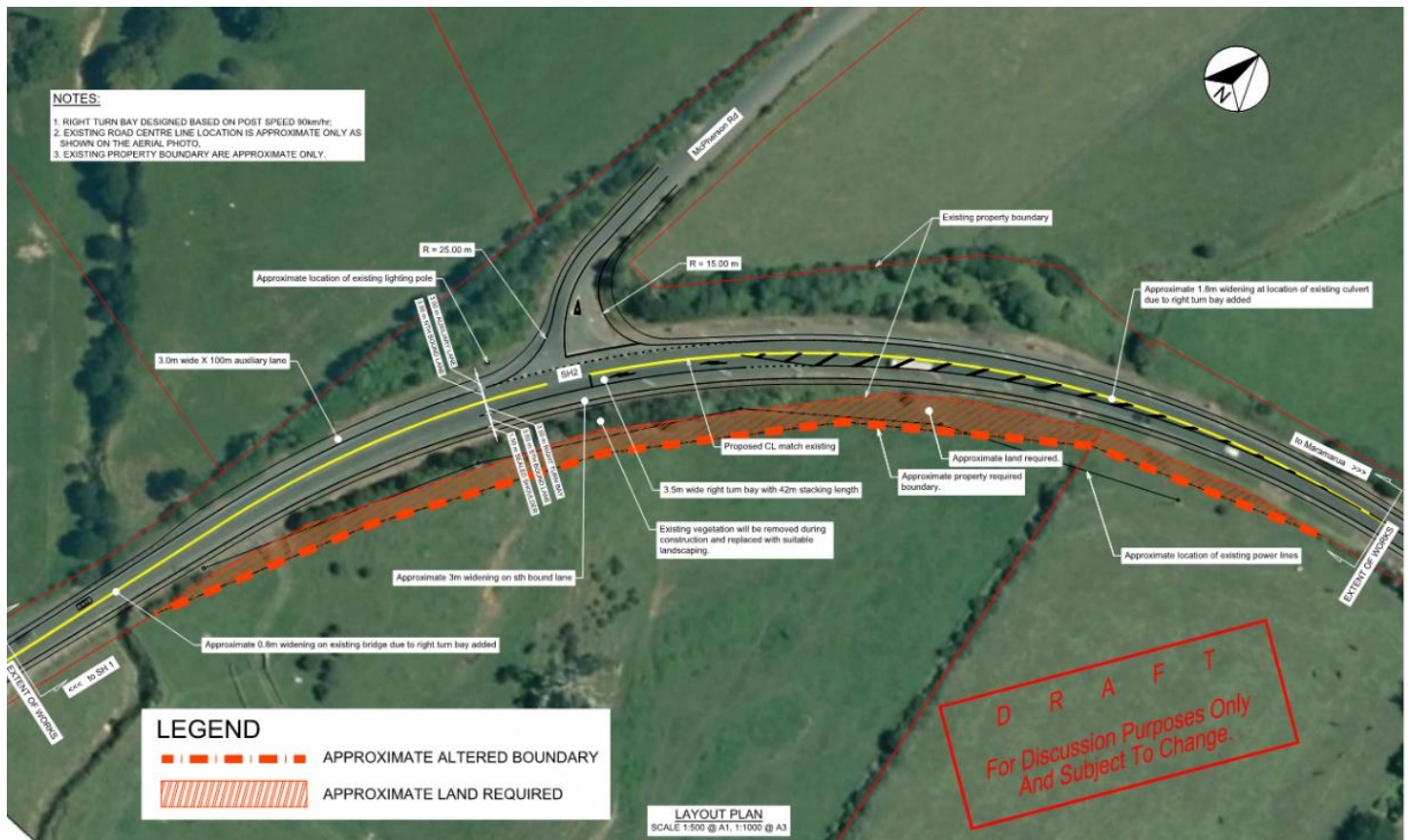


Figure 7: Proposed McPherson Road/SH2 upgrade (Appendix A)

During our site visit we observed an area of ponding at the SH2/McPherson Road intersection and it appears that trucks are tracking over the edge of the seal. The proposed intersection upgrade shows the radius for the left turn being modified and we expect this will address the ponding and existing edge break issues.



Figure 8: Existing ponding at the SH2/McPherson Road intersection and faded limit line markings.

9. Heavy Vehicle Pavement Impacts

In 2018 Gray Matter completed a heavy vehicle impact fee assessment for the initial application by McPherson Quarry to extract 490,000 tonnes/year. The assessment was based on an increase of 38 HCV/day on the basis that the existing quarry operation had existing use rights. We understand that existing use rights do not apply⁹ and have therefore reassessed the pavement impact¹⁰.

The revised assessment based on the previous Waikato DC draft policy results in a financial contribution of \$53,992. If the fee were collected over 45 years¹¹ the contribution would be \$1,200/year. We recommend that if Council chooses to collect a heavy impact fee that the contribution should be collected as a lump sum over a period of 1-3 years to minimise administration costs and to enable it to be used for improvements to McPherson Road.

The assessment of the heavy vehicle impact fee considers the cost to replace the full width of pavement. The impact of clean fill loaded inbound trucks on pavement condition has already been accounted for in the fee. There would be additional pavement impacts if the number of inbound loads exceeds the number of outbound loads. As discussed above, our assessment is that around 28 inbound loads per day will be clean fill trucks, around a third of the expected quarry loads.

We recommend that monitoring and reporting of the clean fill loads be a condition of consent to ensure the impacts on the pavement are consistent with the assumptions in the Application.

10. Submissions

10.1. Waka Kotahi (NZTA)

Waka Kotahi (NZTA) are not opposed to the proposal and have outlined conditions to mitigate their concerns related to road safety, in particular at the SH2/McPherson Road intersection. The conditions are attached at Appendix B. The conditions address sight distance requirements, stacking space and left turn auxiliary lane at the intersection.

⁹ Email from Victoria Majoor to Naomi McMinn dated 20 October 2020.

¹⁰ Baseline heavy vehicles = 12 HV/day which allows for what could reasonably be expected as permitted activity

¹¹ Section 3.2.2 of the AEE states the expansion could be up to 45 years, depending on the resource volume and demand.

We understand that WDC had asked NZTA to provide comments on submitter concerns regarding traffic flows across Grahams Bridge and the increased safety risk. NZTA have provided the following comment in response:

- = *The submitters concerns regarding constriction of traffic flows across the bridge and increased risk of serious accidents was a factor considered when reviewing this proposal. Waka Kotahi consider the deceleration (auxiliary) lane will enable slow moving vehicles to move off the highway before reaching McPherson Road so eastbound vehicles should not be adversely effected, and improvements to sightlines through banking works will ensure westbound vehicles are able to safely view any heavy vehicles manoeuvring right from McPherson Road and amend speeds accordingly.*

10.2. Other Submitters

Traffic related concerns were raised by submitters and are summarised in the table below with mitigation outlined where required.

Submitter concern	Effect	Mitigation required
= Increase in traffic on SH2 which is already a dangerous stretch of road and at McPherson Road intersection.	Increase in traffic increases safety risk at the McPherson Road/SH2 intersection.	Adequate sight distances, space for deceleration lane clear of through lane and right turn bay at the SH2/McPherson Road intersection. Addressed through conditions ensuring the intersection improvements are consistent with conditions provided by NZTA.
= Quarry traffic directional split – assumed as 50:50 split.	Potential for more right turn movements. We note that since the TIA was prepared, WSP have amended their assumption of directional split to 70:30. This would mean an average of two right turns/ hour into McPherson Road. If all inbound vehicles were to turn right into McPherson Road then there would be eight right turn movements per hour. The dominant movement towards SH1 will result in around six trucks/hr turning right out and left-in to McPherson Road.	The auxiliary left turn lane and right turn bay provides space for vehicles to turn with minimal disruption to through traffic. The intersection form should be in accordance with the conditions proposed by NZTA requiring construction of a right turn bay and an auxiliary left turn lane We note that the time of writing this report NZTA had not been advised of the amended trip distribution. In my view, the mitigation proposed is adequate.
= Inadequate sight distances;	Increased risk of crashes on SH2 and McPherson Road.	Proposed design to accommodate appropriate sight distances. This should be addressed through conditions requiring compliant sight distance at the intersection.
= NZTA approval- This has not been given- rather they confirm they do not oppose the application;	NZTA do not oppose the proposal. NZTA have provided conditions to mitigate adverse effects on SH2.	Include proposed conditions outlined by NZTA in the consent.
= Queuing of trucks;	The proposed stacking length at the right turn bay is 42m which is sufficient for two truck and trailer units. The proposal could result in an additional eight trucks per hour turning right into McPherson Road or one truck every 7-8 minutes. There is likely to be sufficient space for trucks to queue in the right turn bay.	42m is sufficient stacking to accommodate the proposed demand. Addressed through conditions requiring a minimum stacking length of 42m for the right turn bay.

Submitter concern	Effect	Mitigation required
= Grahams Bridge and SH2 accident zone concerns.	<p>Submitters raised the concern that the bridge already results in constraints. The existing lane arrangement at the bridge has adequate lane widths but narrow shoulders.</p> <p>The additional traffic is unlikely to result in disproportionate change in safety effects at Grahams Bridge.</p> <p>Correspondence from NZTA states that they considered submitter concerns when reviewing the proposal.</p>	<p>We understand WDC has asked NZTA to comment on this.</p> <p>NZTA have stated that the concerns were considered when reviewing the proposal. No further mitigation is required.</p>
= Additional heavy vehicle movements on Pinnacle Hill Road	<p>It is unclear why quarry traffic would use Pinnacle Hill Road. The quickest route to SH1 would be via a right turn out of McPherson Road.</p> <p>We understand that the applicant does not propose to use Pinnacle Hill Road.</p>	<p>Quarry traffic is unlikely to use this route as there are more direct alternative routes to SH1.</p> <p>No mitigation is required.</p>
= Dust, dirt on road	<p>Dust on the roads results in safety issues in particular where dirt tracked onto the road results in road marking being less visible.</p>	<p>Could be addressed through conditions which cover requirements for water carts onsite and wheel wash stations on-site prior to the vehicle crossing to minimise dust and debris being tracked onto the road.</p> <p>Sealing at the entrance within the site would also minimise the risk of dust and debris being tracked onto McPherson Road.</p>
= Traffic on McPherson Road	<p>During peak operating periods there could be up to 48 trucks/ hour or one every 75 seconds.</p>	<p>The additional traffic is unlikely to result in significant efficiency effects on McPherson Road. McPherson Road has sufficient capacity to accommodate the additional traffic.</p> <p>The pavement impacts have been assessed and a fee is required to compensate for pavement impacts. A condition that restricts daily truck movements would manage truck movements during periods of high demand and reduce the risk of adverse safety effects at the SH2/McPherson Road intersection.</p>
= Increase in heavy vehicles on SH2	<p>An increase in trucks on SH2 could result in an increase in safety risk. The proposal increases the number of heavy vehicles on SH2 by approximately 0.4-1.3%. SH2 is a regional state highway and the increase in heavy vehicles on SH2 is unlikely to result in significant adverse effects on SH2.</p>	<p>Conditions requiring improvements at the SH2/McPherson Road intersection and to manage daily truck numbers are necessary.</p>
= Inadequate stacking room for quarry trucks entering the site	<p>Insufficient stacking space could result in a vehicle blocking other vehicles on McPherson Road while waiting to turn into site.</p>	<p>The vehicle crossing and internal road should allow for two-way movement and sufficient stacking for at least one truck and trailer unit. This can be addressed with conditions.</p>

Submitter concern	Effect	Mitigation required
= Crossing SH2 is dangerous in holiday season	The proposal increases the number of turning movements on McPherson Road. This increases the risk of crashes. However, the proposal provides mitigation in the form of a right turn bay and left turn auxiliary lane.	Conditions requiring improvements at the SH2/McPherson Road intersection and to manage daily truck numbers are necessary.
= Clean fill trucks	There is no guarantee that clean fill trucks will be backloaded with aggregate. Therefore, there could be more trucks to and from site.	This should be addressed with a condition requiring monitoring of clean fill and backloads and condition on total number of vehicle movements.

Table 2: Traffic Related Submission Concerns

11. Evaluation of Transportation Impacts

Our assessment of the potential adverse traffic related effects of the traffic associated with the proposal is summarised below:

Transportation Impact	Discussion	Significance	Recommendations
Efficiency – additional trips on the surrounding network	The proposal results in an average of 165 veh/day. The existing traffic volumes on McPherson Road are relatively low. The additional turning movements at the McPherson Road/SH2 intersection is unlikely to result in significant efficiency effects on SH2 or McPherson Road.	Low	Condition addressing the requirements for a right turn bay and left turn auxiliary lane. Condition restricting daily truck movements.
Safety – intersection	The proposal results in increased movements at the SH2/McPherson Road intersection. The existing intersection does not comply with sight distance requirements due to the intersection being located on a curve. The proposal provides a left turn auxiliary lane and a right turn bay.	Medium-High	The required sight distance should be provided. The turning treatments at the proposed intersection minimise the adverse safety and efficiency effects. This should be addressed through conditions including a condition restricting daily truck movements to reduce the risk of adverse safety effects at the intersection.
Safety – vehicle crossing	The proposal results in an increase in movements at the existing crossing. There does not appear to be an existing safety concern at the vehicle crossing and McPherson Road is a low volume road. However, the vehicle crossing should be formed to RITS standards and vehicle tracking should be completed to demonstrate that two-way movement can be achieved including sealing of the proposed vehicle crossing.	Low	Conditions to address upgrading including sealing of the vehicle crossing, relocating the gate to allow a truck and trailer to wait without encroaching on McPherson Road and clearing vegetation to improve sight distance at the vehicle crossing.
Safety – Internal circulation	No information has been provided regarding internal circulation. The circulation plan should include swept paths to determine that two-way movement can be achieved at the crossing and show the location of the weighbridge to confirm that it does not restrict two-way movement.	Low	This should be addressed through conditions requiring a circulation and loading plan including the weighbridge location.

Transportation Impact	Discussion	Significance	Recommendations
Safety – cyclists and pedestrians	The increased number of trucks increases risk to pedestrians and cyclists. There are no existing facilities for cyclists or pedestrians and there is likely to be a very low number of pedestrian and cyclists, but pedestrians and cyclists are vulnerable.	Very Low	Effects on pedestrian and cyclists are likely to be minimal given the rural location. No further mitigation is required.
Pavement impacts	The additional traffic loading is likely to deteriorate the pavement faster. A Heavy Impact Fee assessment was completed in 2018 which has been updated. The revised assessment concludes that a Heavy Impact Fee is required and should be collected on a lump sum basis to minimise administration costs.	Medium	A condition requiring a heavy impact fee.
Dust and debris on road	There may be additional dust and debris which could be tracked on the road we recommend that wheel wash stations are installed to ensure that vehicles leaving the site are not tracking dust or debris onto the road. Providing a substantial seal area at the vehicle crossing will also minimise the risk of dust being tracked onto McPherson Road.	Low	Provide wheel wash stations on-site. Ensure water carts are on-site to minimise dust. Provide a sealed area within the site at the entrance. Can be addressed through conditions.

Table 3: Evaluation of Transportation Impacts

The proposal results in an increase in trips on McPherson Road and at the McPherson Road/SH2 intersection. The increase in movements increases the risk of collisions at the intersection. To minimise the effects the proposal includes improving sight distance, forming a right turn bay at the intersection and a left turn auxiliary lane.

The proposal should include confirmation of circulation and loading arrangements to determine the location of the weighbridge and demonstrate that on-site circulation can be achieved and adequate dust control measures on-site.

Typically, we would expect seasonal peaks in demand for aggregate. The quarry capacity with two loaders working is 24 trucks loads per hour, 48 truck movements per hour. Prolonged operation at this intensity is likely to lead to unacceptable safety risks at the McPherson Road/SH2 intersection. We recommend a daily cap on the number of heavy vehicles generated by the quarry. This would allow the Applicant to respond to meet peaks in aggregate demand and provide the community with more certainty about the frequency and intensity of the peaks.

12. Recommendations and Suggested Conditions

We recommend that the conditions include the conditions proposed by NZTA. In addition, the conditions should also address the following:

- = Prior to operation of the quarry, the consent holder shall upgrade the SH2/McPherson Road intersection in general accordance with Opus drawing 3-39019.00_SK001.
- = The consent holder shall, no later than 31 March each year, provide Waikato District Council with an annual report detailing the following information for the previous calendar year:
 - (i) Daily numbers of truck movements;
 - (ii) Monthly aggregate volumes extracted; and
 - (iii) Monthly clean fill volumes entering the site.

The consent holder must keep a register of daily truck movements, daily aggregate volume leaving the site and daily clean fill material entering the site. This information must be made available to an authorised officer of the Waikato District Council within 10 working days upon request.

- = The maximum number of heavy vehicle movements generated by the activity shall not exceed:
 - (i) Daily maximum of 210 HCV movements/day; and
 - (ii) Daily average of 165 HCV movements/day (calculated over a three-month period)
- = The consent holder shall submit engineering plans detailing the vehicle crossing and proposed haul road to the Council's Manager Development Engineering for approval in a technical certification capacity in advance of any construction works being undertaken. The design of the vehicle crossing should be in general accordance with the RITS diagram D3.3.4 and accommodate left turn in and right turn out movements by heavy vehicles, including:
 - o Tracking for the design vehicle.
 - o Relocating the gates to be set back at least 22m from the edge of the McPherson Road carriageway.
 - o Sealing the vehicle crossing (grade 3/5 chip) and the driveway for a minimum of 40m within the site.
 - o Removal of vegetation to improve sight distance at the vehicle crossing.
- = The consent holder shall prepare and submit a Quarry Circulation and Loading Management plan to demonstrate that the internal vehicle circulation avoids any impacts on McPherson Road such as queuing or parking within the shoulders/berm. This should include:
 - o swept paths to demonstrate two-way movements through the gate.
 - o identify holding/waiting areas for trucks waiting for the weighbridge.
 - o weighbridge location;
 - o loading areas and arrangements;
 - o internal circulation roads including any passing bays; and
 - o internal parking arrangements for staff and visitors.
- = Payment of a heavy vehicle impact fee of \$53,992 in a lump sum over 1-3 years.
- = The consent holder shall minimise the tracking of dirt and loose material onto the public road as far as practicable. Any spillage onto the public roadway must be cleaned as soon as practicable.

13. Conclusion

The proposal results in an increase in heavy vehicle trips on McPherson Road and at the McPherson Road /SH2 intersection. Compared to the baseline (no existing use rights) the increase is 165 trucks per day. The proposal increases turning movements at the McPherson Road/SH2 intersection and includes upgrading the intersection to provide a right turn bay, an auxiliary left turn in lane and improved sight distance.

We recommend conditions limiting daily trip generation by heavy vehicles to 210 trucks per day, and average daily trip generation of 165 trucks per day (calculated over three months). This framework allows the Applicant to respond to meet peaks in aggregate demand and provide the community with more certainty about the frequency and intensity of the peaks.

Subject to the conditions outlined in Section 12 above to mitigate the potential adverse effects, the proposal appears to be acceptable.

Please contact us if you have any questions.

Yours sincerely



Vinish Prakash
Engineering Technologist

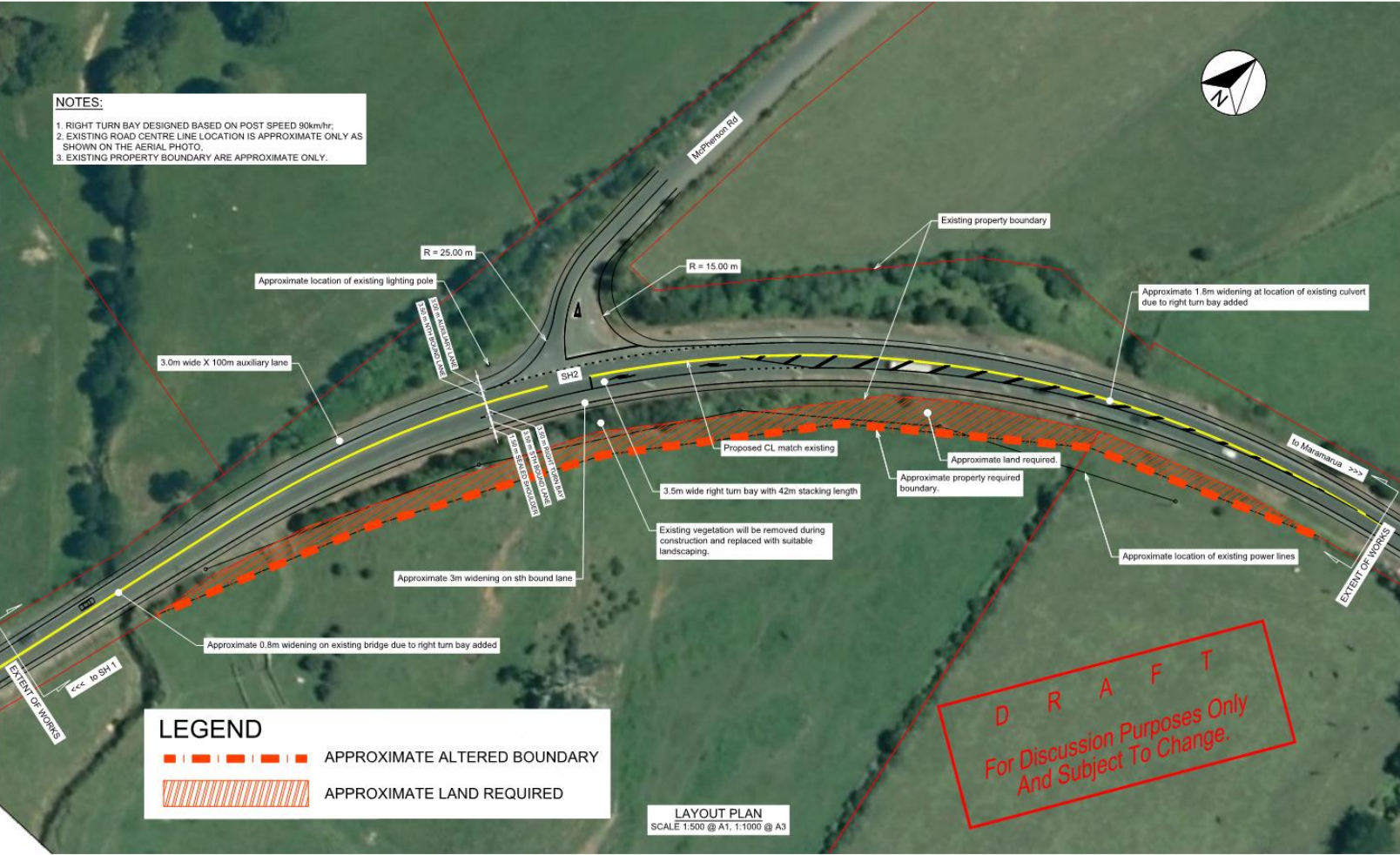


Naomi McMinn
Civil/Transportation Engineer

Appendix A – RTB Concept Plan



3-39019.00_SK001



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Plot Date: 14 Aug 2019 @ 9:27 AM Path: G:\330000\39019_00_Ferocut sand extraction\Traffic\McPherson Quarry RTB\3-39019.00 RIGHT TURN BAY PLAN SK001.dwg SK001

MCPHERSON ROAD - SH2 JUNCTION
RIGHT TURN BAY DESIGN

Appendix B – NZTA Conditions

This information is provided from Waikato District Council



19 March 2019

Delivered via email: eloise@kineticenvironmental.co.nz

Dear Eloise,

Proposed Upgrade of McPherson Rd/SH2 intersection in relation to the operation of McPherson Quarry – 47 McPherson Road, Mangatawhiri

Thank you for submitting your client's proposal to the NZ Transport Agency (Transport Agency) for comment. As you will appreciate, millions of dollars are invested in the transport network each year and the Transport Agency has an interest in ensuring this investment is not compromised, including by ensuring land use and subdivision do not impact on the safety and efficiency of the transport network.

The Transport Agency understands your client is seeking resource consent to extract a yearly tonnage of 492,000 from McPherson Quarry. This proposal includes modifying the McPherson Road intersection with State Highway 2 to include a right turn bay, short deceleration lane for the left turn into McPherson Road and earthworks to maintain sight distances from the intersection.

The key issue for this proposal is achieving appropriate sight distances for westbound traffic on SH2 to slow-moving vehicles that have already turned right out of McPherson Road. Based on Austroads 2016 Part 3, the stopping sight distance for a car travelling at 90 km/h with a reaction time of 2.5 seconds is 151 m. Following initial consultation with the Transport Agency plans have been provided which demonstrate the required 151 metre sight distance can be met.

State Highway 2 in this location is declared a limited access road under the Government Roadway Powers Act 1989 (GRPA). Section 91 of the GRPA enables the Transport Agency to authorise the use of a crossing place on a limited access road, impose conditions on its usage, specify the location of a crossing place or cancel the right to use any crossing place if legal access is available from another road. In accordance with Section 92 of the GRPA, no person may drive or move any vehicle or animal, or permit any vehicle or animal to be driven or moved, on to or from any limited access road except at any crossing place authorised by the Transport Agency.

Based on the information provided, the Transport Agency requires the following conditions to be met so as to avoid/mitigate effects on the transport network. Subject to these conditions being met, the Transport Agency is **not opposed** to the proposal as detailed in the application prepared by Opus for the continued extraction and processing of a high-quality source of aggregate and the associated intersection upgrade, dated 15 August 2017, and further information received 21 January 2019.

Conditions

NZTA Reference: 3170146

1. No works shall be undertaken within State Highway 2 without the prior approval of the NZ Transport Agency pursuant to Section 51 of the GRPA. A Traffic Management Plan and Consent to Work on the Highway shall be submitted to and approved by the Transport Agency at least seven working days prior to the commencement of any works on the state highway.
2. The annual haulage from McPherson Quarry shall be limited to 492,000 tonnes per year.
3. Detailed engineering design plans for the intersection must be submitted to the New Zealand Transport Agency for approval prior to any works associated with its construction commencing. Detailed design should consider, but not be limited to the following:
 - Superelevation and drainage for surface water on the pavement as per Austroads guidelines;
 - Heavy vehicle turning paths;
 - Cross-sectional drawings to indicate batter slopes, drainage lane width and property boundaries;
 - Traffic movement at the intersection for calculation of right turn bay length;
 - Re-alignment of guardrail.
 - An advance warning sign for heavy vehicle crossing as per MOTSAM (sign to be located to the west of the SH2/McPherson Road intersection)
4. An independent safety audit shall be conducted during detailed design of the intersection with State Highway 2 and post construction. Each audit shall be carried out by an appropriately qualified auditor experienced with intersection design and appointed in consultation with the Transport Agency. Any recommendations made by the auditor that require changes to design and construction shall be approved by the Transport Agency.
5. Drawings provided indicate the sightlines are extending into private property. The applicant shall provide evidence that batter slopes and vegetation will not obstruct the required sight lines of 151 metres in perpetuity.

To apply for any necessary approvals or for confirmation that the above conditions have been met, please contact the Transport Agency directly on consentsandapprovals@nzta.govt.nz or call 07 958 7220.

Please be aware that this response is the Transport Agency's current view of the situation. If your application changes or is put on hold for any length of time, the Transport Agency may need to review the application again. Thank you for undertaking consultation with us. Please feel free to contact me if you have any questions or require further information.

Yours sincerely



Emily Hunt
Consultant Planning Advisor
DDI: 07 958 7884
Email: emily.hunt@nzta.govt.nz

NZTA Reference: 3170146

Appendix C – NZTA Email

Vinish Prakash

To: Naomi McMinn
Subject: RE: McPherson Quarry Consent Application - SH2

From: Victoria Majoor <Victoria.Majoor@waidc.govt.nz>
Sent: Tuesday, 13 October 2020 10:58 AM
To: Naomi McMinn <Naomi.McMinn@graymatter.co.nz>
Subject: FW: McPherson Quarry Consent Application - SH2

Hi Naomi,

See response from NZTA below.

Cheers

Victoria

From: Emily Hunt <Emily.Hunt@nzta.govt.nz>
Sent: Monday, 12 October 2020 9:22 am
To: Victoria Majoor <Victoria.Majoor@waidc.govt.nz>
Subject: McPherson Quarry Consent Application - SH2

Morning Victoria,

Sorry for the delay in getting back to you on this one. Please see the Waka Kotahi NZ Transport Agency response below:

The applicant is proposing to undertake upgrades to the intersection of McPherson Road and State Highway 2, however these do not extend to Graham Bridge. These include:

- *Modification of the bank and vegetation on the southern side of the McPherson Road/SH2 intersection to provide at least 151m forward visibility for westbound traffic to observe and respond to a right-turning truck from McPherson road to SH2;*
- *A 42 metre right turn bay on SH2 to provide sufficient stacking space for a truck and trailer unit to wait on SH2 in order to undertake safe right turning movements into McPherson Road; and*
- *An Auxiliary Lane for left turning vehicles from SH2 to McPherson Road. This lane will be 100m long and commence at the barrier flare approximately 10m east of the bridge.*

The applicant undertook consultation with Waka Kotahi which resulted in various mitigation measures being incorporated in the proposal, as detailed above and in the attached submission.

Waka Kotahi is satisfied that the mitigation offered by the applicant will enable free and safe traffic flow and that if there are unforeseen effects on the highway network these will be identified and mitigated through the independent safety audit which Waka Kotahi required as a condition and was agreed to by the applicant.

The submitters concerns regarding constriction of traffic flows across the bridge and increased risk of serious accidents was a factor considered when reviewing this proposal. Waka Kotahi consider the deceleration (auxiliary) lane will enable slow moving vehicles to move off the highway before reaching McPherson Road so eastbound vehicles should not be adversely effected, and improvements to sightlines through banking works will ensure westbound vehicles are able to safely view any heavy vehicles manoeuvring right from McPherson Road and amend speeds accordingly.

Let me know if you have any further questions.

Kind regards,
Emily

Emily Hunt

Planner

Consents & Approvals – Transport Services

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E emily.hunt@nzta.govt.nz / **W** nzta.govt.nz

Waka Kotahi NZ Transport Agency

Hamilton / Level 1, Deloitte Building, 24 Anzac Parade

PO Box 973, Waikato Mail Centre, Hamilton 3240, New Zealand

Appendix D – Revised Heavy Vehicle Impact Fee Calculation

Assessment of Pavement Impacts - McPherson Road
Waikato District Council Draft Methodology

updated 6/11/2020
no existing use rights

	HCV Baseline for Ridge Road Quarry Assessment in 2017	Baseline HCV for this assessment	Road length	Existing Pavement Thickness	Future traffic	Design Pavement Thickness	Revised Design Life	Reduction in Design Life	Period for NPV Calcs	Overlay Depth	Overlay Costs	Rehab Costs	Total Costs	SPPWF	NPV Costs (overlay and rehab)
		HCV/day	(km)	(mm)		(mm)	Years	Years	Years	(mm)	\$	\$			
McPherson Road		12	0.325	388	67.39726	496	4.9	20.1	4.9	108	\$ 19,656	\$ 130,000	\$ 149,656	0.752	\$ 112,485
										Total	\$ 19,656	\$ 130,000	\$ 149,656		\$ 112,485

12.11

For NPV calc
12.5
25

	Total Cost	\$/t
Total cost	\$ 112,485	\$ 0.005
Quantity (m3)		
conversion factor	N/A	
Quantity (tonne)	22,140,000	
Life	45 years	
Annual cost	\$ 2,500	
With FAR	52%	\$ 53,992.90
Cost per tonne	\$ 0.002	
Annual cost	\$ 1,200	

Appendix E – CAS Collision Diagram

