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Memo

To	Fraser McNutt
From	Cameron Inder
Date	16 February 2021
Job No.	147080
Job name	Matangi Rezoning
Subject	Transport Assessment for the proposed Matangi Rezoning

1. Introduction

1.1 Background

Mowbray Group Limited ("Mowbray") seeks to change the zoning of approximately 5.2 ha of land located in Matangi, Waikato from the current industrial and rural zoning to a "mixed use" zone which will enable repurposing of approximately 35,000 m^2 GFA into a mix of industrial, commercial and retail activities to create a complementary commercial and community heart to Matangi. Mowbray seeks this rezoning through a submission lodged on the proposed plan provisions by Waikato District Council for the district plan review.

The site and its buildings are a prominent feature in Matangi with historic significance to the Waikato, having been the location of the original Anchor Dairy factory and where Highlander Condensed Milk was developed. Both brands are iconic in New Zealand today.

1.2 Report Purpose

This Transport Assessment (TA) forms part of the Assessment of Environmental Effects (AEE) that supports the submission by Mowbray to Waikato District Council's proposed district plan review. The TA assesses the likely transport effects of the rezoning and identifies any related improvement mitigations that are necessary to avoid or remedy those effects.

The scope of the TA includes the following:

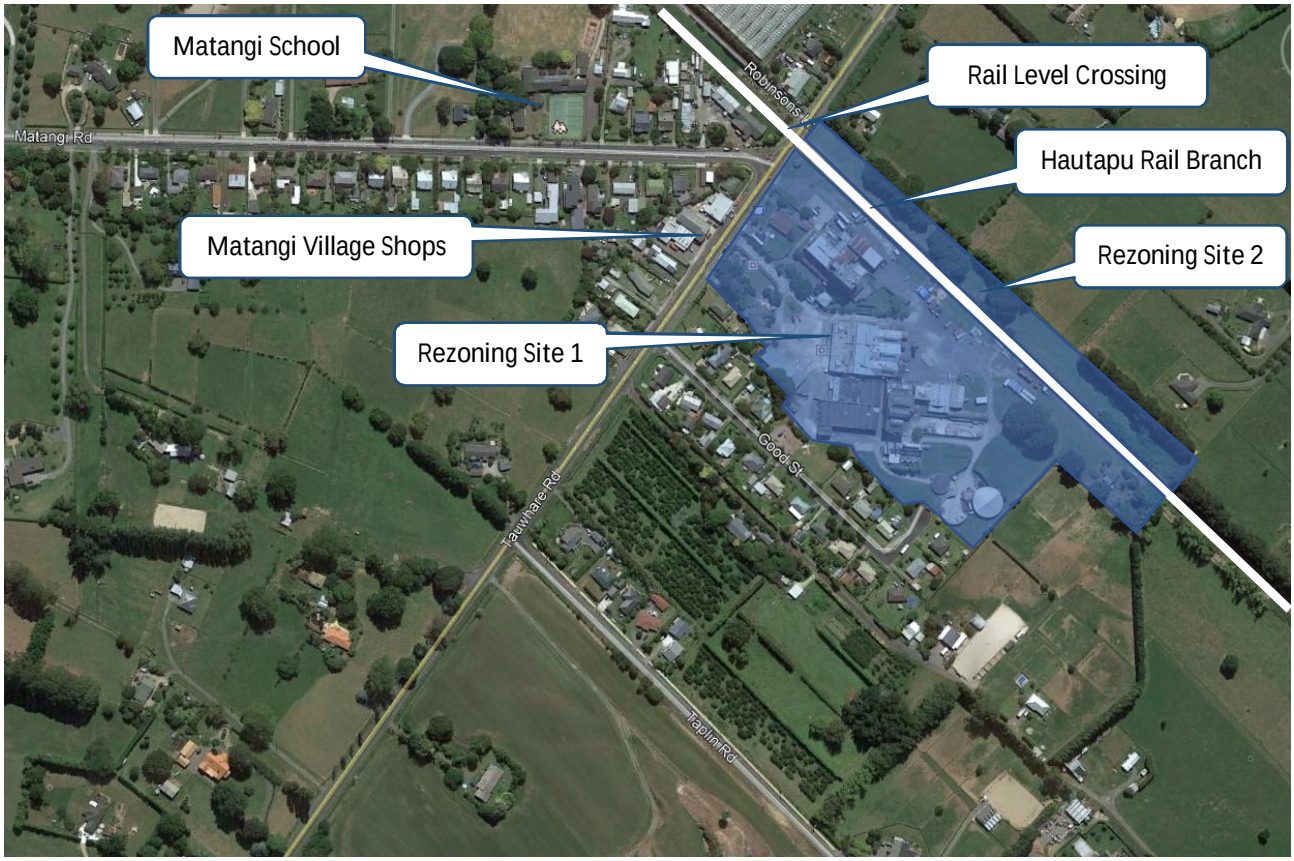
- An assessment of the existing transportation environment in the vicinity of the site, including investigating whether any crash history exists that could highlight safety issues in that vicinity of the road network, using Waka Kotahi's national Crash Analysis System (CAS) database.
- Estimation of the expected trip generation from the zoning proposed by WDC and compare it with the estimated trip generation for the MMUZ,
- Identify the expected distribution of traffic trips from the MMUZ on the immediate adjoining road network and identify any potential impacts that those trips might cause.
- Assessment of the preferred access location/s and any design features necessary to safely accommodate them.

- Identification of the existing and likely future public transport and active mode (walking and cycling) demands, local network provisions and infrastructure needed to support and promote mode neutral travel choices for the future employees and community users of the site.
- Description of the relevant transportation policies and how the proposed development aligns with these, including the Waikato Regional Land Transport and Public Transport Plans, and the Government Policy Statement on Land Transport (2018).

1.3 Site Description and Location

The site is located approximately 12 km from Hamilton CBD within the village of Matangi. Figure 1 illustrates the site and its surrounds.

Figure 1: Site Locality (source, Google Earth)



As shown in Figure 1, the proposed rezoning area comprises an area of land owned by Mowbray but is divided into two sites by the Hautapu Rail Branch. Both sites are located on the south side of Tauwhare Road and each has access to Tauwhare Road.

The main site area (for ease of reference, identified as Site 1) is approximately 4.4 ha, and Site 2 is approximately 0.8 ha.

Site 2 is long and narrow, with approximate dimensions of 21 m wide x 380 m long.

Site 1 is historically significant to the Waikato and New Zealand, having been the location of the original Anchor Dairy factory and headquarters, and where Highlander Condensed Milk was developed and manufactured. Both brands are iconic, long-established brands in New Zealand. Many of the original buildings remain and are prominent landmarks and features of Matangi.

The environment around the site is characterised by a mix of residential dwellings on the south side, and a small group of convenience retail stores and an industrial business on the northern side of Tauwhare Road.

Matangi Road to the northwest of the site also provides access to numerous residential dwellings and Matangi Primary School.

2. Baseline Transport Environment

2.1 Existing Land Use

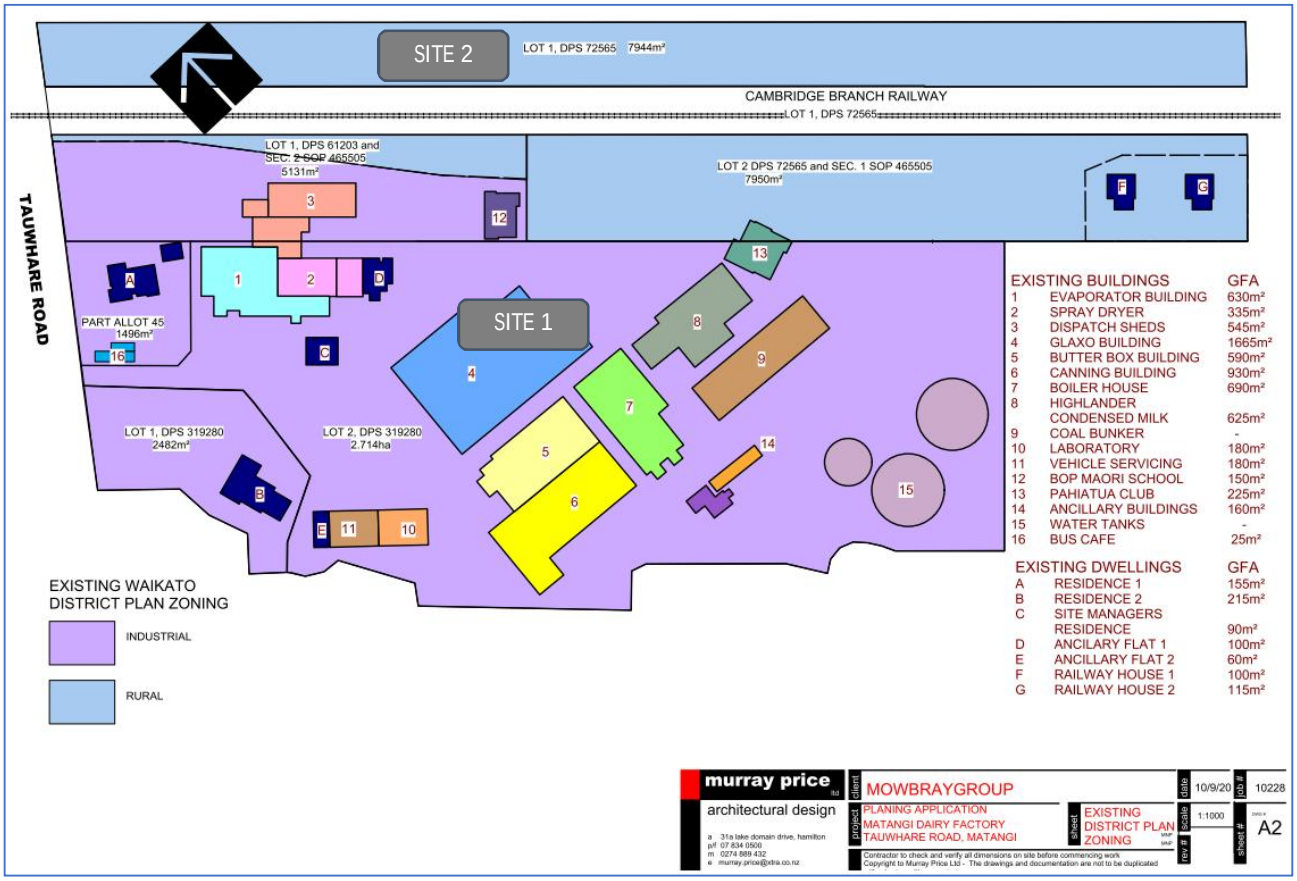
Site 1 is predominantly zoned Industrial with a small area zoned Rural adjacent to the rail line. This area used to be the site of the train station at Matangi which included "a crossing loop, 3 sidings, goods shed siding and a siding for the dairy factory"[1].

Site 2 is zoned Rural at present.

No public roads exist through either of the subject sites.

Figure 2 illustrates the zoning described above, with the existing building footprints and positioning on site.

Figure 2: Operative District Plan Zoning



2.2 Baseline Transport Network Characteristics

2.2.1 Road Network

Matangi Village is accessed by two roads, Tauwhare Road and Matangi Road. Both have a legal speed limit of 50 km/h within Matangi village, which increases to 80 km/h on both roads in the rural areas either side of the village.

A summary of the key characteristics of each road is provided in Table 1 and discussed in the subsections to follow.

[1] https://en.wikipedia.org/wiki/Cambridge_Branch#Matangi_(7.47_km)

Table 1

Local road network characteristics		
Characteristics	Tauwhare Road	Matangi Road
WDC Road Classification[2]	Arterial road	Collector road
Carriageway width (m)[3]	15 m	9.1 m
Posted Speed Limit (km/h)	50 km/h	50 km/h
Estimated ADT (vpd) Error! Bookmark not defined.	3,620 vpd	2,855 vpd
Heavy Commercial Vehicles (%)Error! Bookmark not defined.	4.0 %	3.0 %
Estimated Peak Hour Volume (vph)[4]	400 vph	315 vph

The intersection of Matangi Road and Tauwhare Road is located within the village adjacent to the northwest corner of Site 1. The intersection is a Give Way controlled 'Tee' layout, in close proximity to a railway level crossing of Tauwhare Road and the Hautapu Branch railway line.

2.2.2 Tauwhare Road

Tauwhare Road is a predominantly rural road connecting between State Highway 21 and State Highway 26, and passes through Matangi and crosses State Highway 1B at Hoeka Road.

It has a two-lane sealed carriageway of varying width of approximately 6.4 m in the rural areas that increases to 12.8 m on the south end of Matangi village, and then again to 15 m wide in in the commercial precinct adjacent to the subject site. The 15 m sealed width provides the following line marked layout:

- Two 3.1 m wide traffic lanes separated by a 1 m wide painted central median;
- A 4.3 m wide sealed shoulder on the north-west side of the road, including 2.5m wide parallel parking bays
- A 3.5 m wide sealed shoulder on the south-east side of the road (that of the subject site), including 2.5 m wide parallel parking bays;
- Kerb and channel treatment along both sides of the carriageway (up to the rail way).
- 11 line marked parallel car park spaces, of which 7 are located in the south-east side shoulder adjacent to the site and 4 on the north-west side adjacent to the Four Square shop.

There is also further kerb side space at the south end of the commercial precinct of Matangi for approximately 5 more parallel parked cars.

Figure 3 illustrates the commercial precinct, looking south and Figure 4 the railway level crossing looking north from the intersection of Tauwhare Road and Matangi Road.

[2] Source: Table 14.12.5.6 of the PDP.
[3] Source: Mobile Road (accessed 3 November 2020)
[4] Part 4 of the Austroads *Guide to Road Design* manual states that peak hour volumes or peak hour percentages are not available, it can be assumed that the design peak hour volume equals 8% to 10% of the Annual Average Daily Traffic (AADT) for urban situations and 11% to 16% for rural situations.

Figure 3: Tauhware Road at Matangi, looking south (Source: Google Street View)

Figure 4: Tauwhare Road Level Crossing, looking north from Matangi Road

2.2.3 Matangi Road

Matangi Road is predominantly a rural road connecting between State Highway 26 and Tauwhare Road. However, Matangi Road within the village is an urban road providing access to residential dwellings on either side of the road, and also Matangi Primary School which is located on the north side between Matangi Road and the railway. Access to the Primary School is located approximately 140 m from the Matangi Road / Tauwhare Road intersection.

Matangi Road within the village is a two-lane sealed carriageway with traffic lanes of varying width, and a central painted median. Parallel parking is permitted on both sides of the road up to approximately 25 m from the Tauwhare Road intersection.

2.2.4 Hautapu Branch Railway Corridor

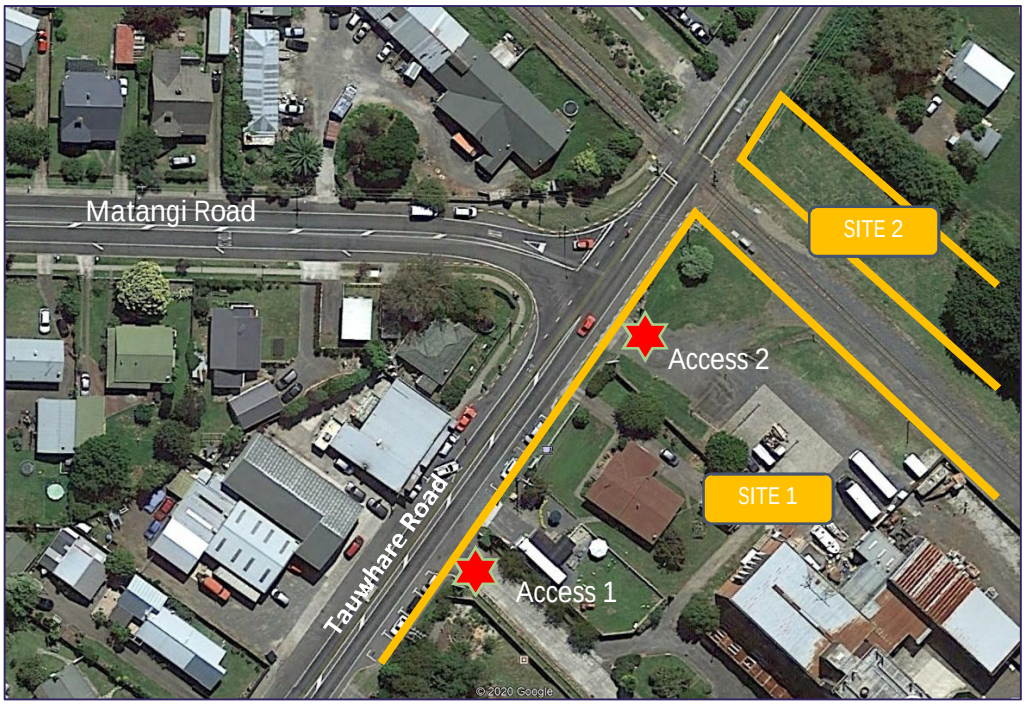
The Hautapu Branch railway line contains one set of rail tracks. Tauwhare Road crosses the railway line at a level crossing controlled by warning bells and lights. There are no barrier arms.

The level crossing includes a separate pedestrian crossing facility at grade connecting the footpaths either side. The form of pedestrian control is a gated entry on each approach with a warning sign on each stating “Look For Trains” together with. There are no barrier arms or lights controlling the pedestrian crossing.

The intersection of Matangi Road and Tauwhare Road is just 23 m from the level crossing (between level crossing stop line to the centre of Tee Intersection). This is seen in Figure 5 below.

Figure 5 illustrates the context of the two sites with Tauwhare Road, Matangi Road and the railway level crossing in close proximity to the sites.

Figure 5: Existing road and rail infrastructure in Matangi (Source: Google Earth)

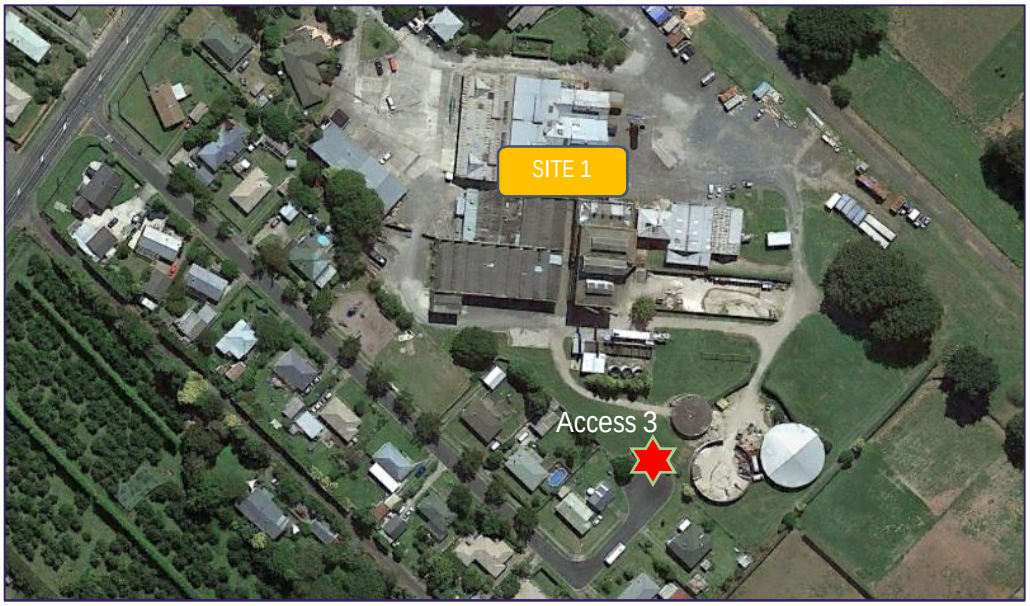


2.3 Existing Accesses

2.3.1 Site 1

Site 1 has two existing formed accesses to public roads. Both are on Tauwhare Road as shown above in Figure 5. The Site also has boundary fronting to Good Street as shown below in Figure 6, however no access is presently formed. Good Street is a narrow residential street with access to 21 dwellings. Therefore, to avoid potential effects on these Mowbray propose not to form or use Access 3 for the MMUZ.

Figure 6: Existing Access to Good Street (Source: Google Earth)



Access 1 is predominantly used at present to enter and exit Site 1, although Access 2 is also used daily but by fewer people. Access 2 is historically the main access for milk tankers entering and existing the Dairy Factory.

Both have complying sight distances, except for Access 1 when on-street parking either side of the access is full. This can cause drivers exiting the Site to have to move out onto the road further than is comfortable, in order to see. Ideally, the closest car park on the northeast side of the access should be removed to protect the sight distance.

Access 2 is located at the Intersection, opposite Matangi Road. While not ideal, it has excellent sight distance in both directions on Tauwhare Road and also down Matangi Road. It is formed to a lower standard than Access 2 but operates safely in its current state and with the low traffic volume using it. It should be upgraded to the current commercial vehicle crossing standards if it is to be more frequently used as a result of rezoning the Site.

2.3.2 Site 2

Site 2 currently has no formed access to a Public Road. Under Proposed District Plan rule 14.12.1.1 (g), any new access must be a minimum of 30 m from a railway level crossing. As Site 2 is just 21 m wide, any new access to Tauwhare Road for this site would be assessed as a Restricted Discretionary Activity, with Council's discretion limited to (from Proposed District Plan rule 14.12.2):

(a) Traffic generation by the activities to be served by the access;
(b) Location, design, construction and materials of the vehicle access;
(c) Safety for vehicles and pedestrians;
(d) Road network safety and efficiency; and
(e) Mitigation to address safety.

Addressing these items would likely require an Integrated Transport Assessment report by a suitably qualified Transportation Engineer, and involve input and review by Kiwi Rail and Waikato District Council.

2.4 Alternative Transport Modes

2.4.1 Public Transport

There is presently no public transport service operating in Matangi or connecting Matangi to Hamilton. This is likely due to the small population living and working in the Village.

2.4.2 Pedestrian Facilities

Existing pedestrian facilities within Matangi village consist of the following:

- A concrete footpath of varying width along the northern side of Tauwhare Road between Good Street and Matangi Road, continuing from the northern side of Matangi Road to a point approximately 245 m northeast of the level crossing. Also a path along the southern side where Tauwhare Road provides access to existing residential dwellings.
- Concrete footpaths on both sides of Matangi Road where access to existing residential dwellings and Matangi School is provided.
- A pedestrian crossing facility over the railway level crossing.

There are currently no pedestrian paths or crossing points on Tauwhare Road immediately in front of Site 1 or 2.

2.4.3 Cycling Facilities

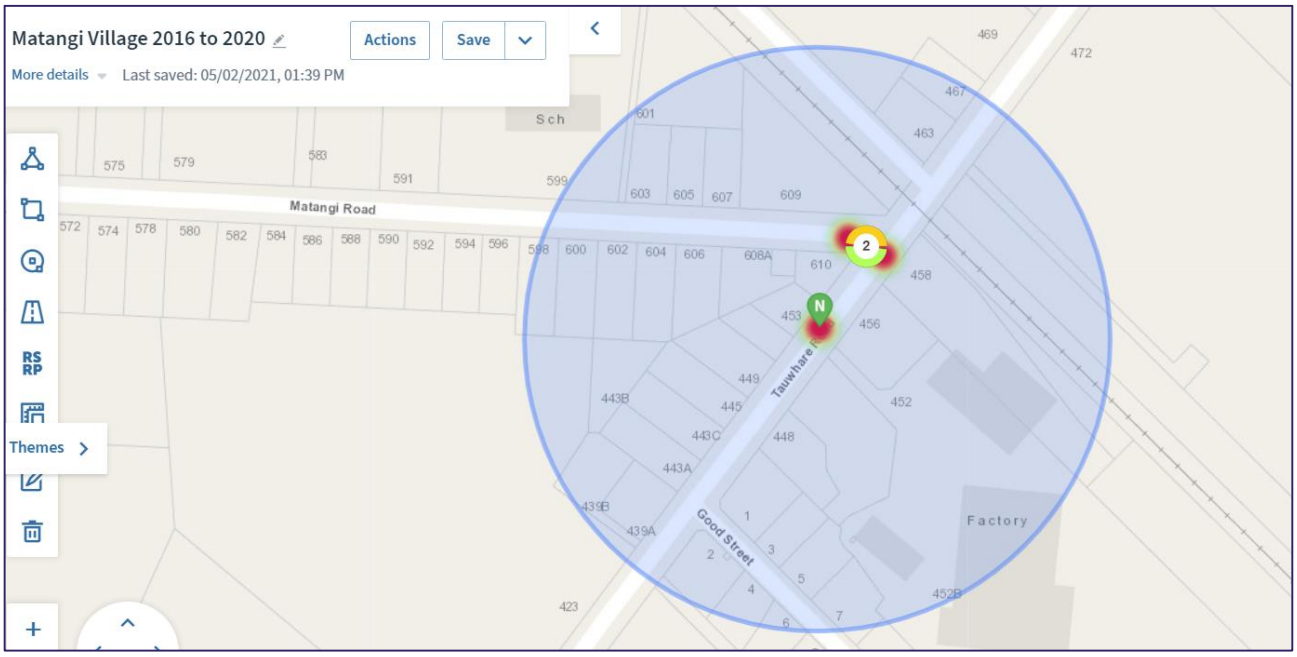
There are presently no dedicated cycling facilities (paths or lanes) through Matangi village. However Tauwhare Road and Matangi Road both have sealed shoulders no less than 1.5 m wide on either side of the road.

It is also observed that where the shoulder includes parallel car parking spaces the kerb line indents leaving a 1.0 m gap between the car park and the lane edge line.

2.5 Crash History Assessment

The current crash history relating to the previous five-year period (January 2016 to December 2020) has been obtained from Waka Kotahi's Crash Analysis System (CAS) for the area of interest shown in Figure 7. The blue circle represents a 150 m radius area of interest around Access 1.

Figure 7: Matangi Village 2016 to 2020 Crash History (Source: Waka Kotahi Crash Analysis System)



A total of three crashes are recorded in the database, two of which resulted in no injuries and one resulted in a minor injury.

The minor injury crash is shown on the CAS map to have occurred at the Matangi Road / Tauwhare Road intersection, but the Crash Report shows it in fact was a loss of control through a fence into the property at 608a Matangi Road. Hence the CAS location coding is incorrect. According to the Crash Report the key contributing factors were aggression, speed, and alcohol. The intersection was not a factor in the crash.

Of the two non-injury crashes, one near the Matangi Road / Tauwhare Road intersection was the result of a driver trying to flee the scene of shoplifting, and backed into a Give Way sign. This crash can also not be attributed to any safety issue with the intersection.

On the basis of Waka Kotahi's High-Risk Intersection Guide (HRIG) assessment, the risk ratings for this intersection are "Low" personal risk, and "Low" collective risk since no fatal or serious injury crashes have been recorded at the intersection.

The other non-injury crash in the database occurred near Access 1 of the site and was due to a truck driver performing a U-turn and the top of the truck colliding with the shop signage above the footpath. Only property and vehicle damage occurred.

Overall, the crash history shows a lack of frequency, commonality and injury severity, all of which suggests there are no apparent road safety issues at present on this section of Tauwhare Road or Matangi Road.

3. Proposal Overview

3.1 Notified Proposed District Plan Zoning

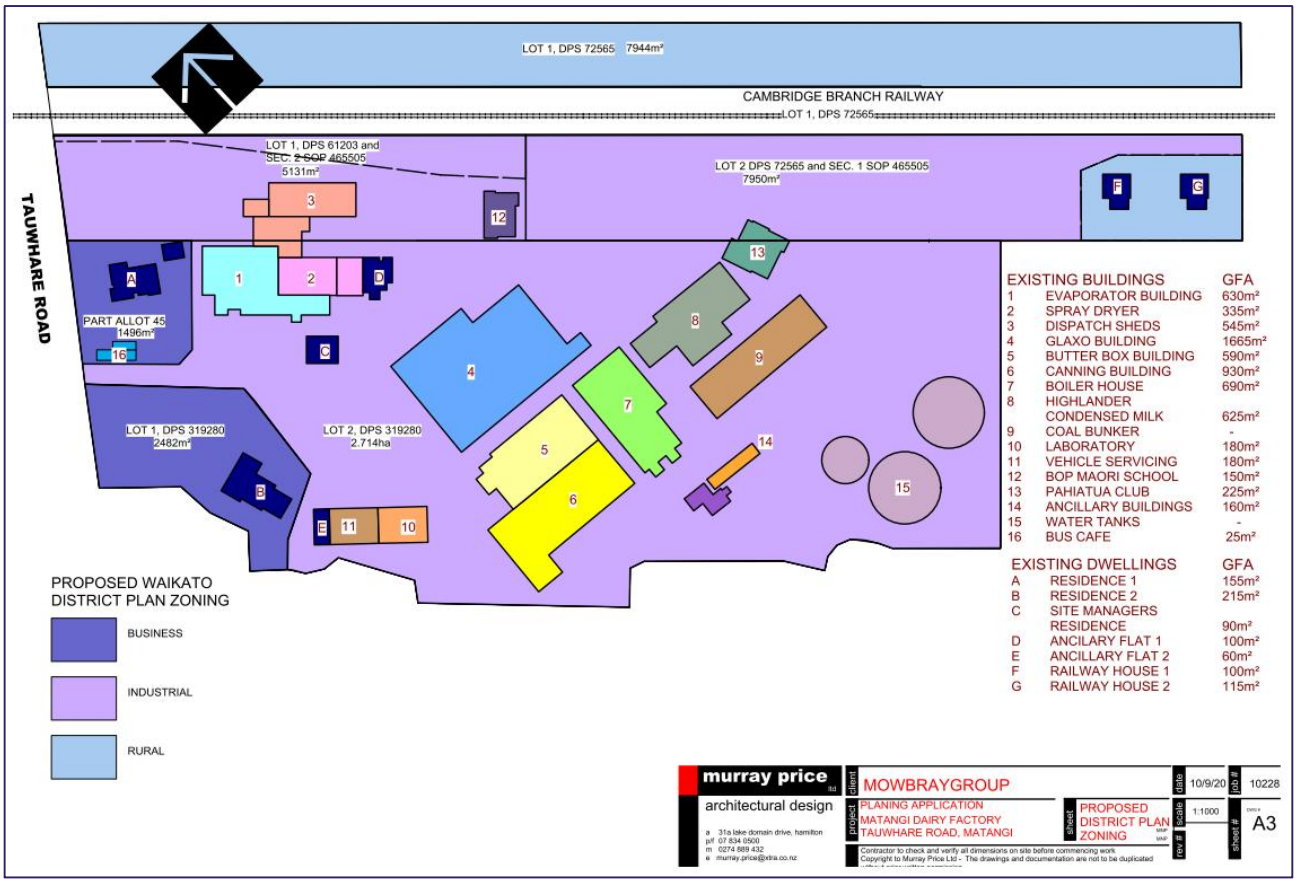
The Proposed District Plan notified to the public by Waikato District Council identifies rezoning of the Site (from the existing predominant Light Industrial zone and rural zone) to:

- 3980 m2 of Business Zone
- Approximately 38,000 m2 of Industrial zone (cf. Existing = 35,160 m2 of Light Industrial)
- Approximately 9950 m2 of Rural zone (cf. Existing = 16,980 m2 of Rural zone)

The notified zoning is illustrated in Figure 8. This would allow retail and commercial activities to operate within the Business zone fronting Tauwhare Road, and heavy industry to establish in the Industrial zone.

It is assumed that WDC has undertaken some form of transportation assessment for such rezoning, although none has been made available or sighted for the purposes of this MMUZ Transportation Assessment.

Figure 8: Notified Proposed District Plan Zoning for the Matangi Heritage site

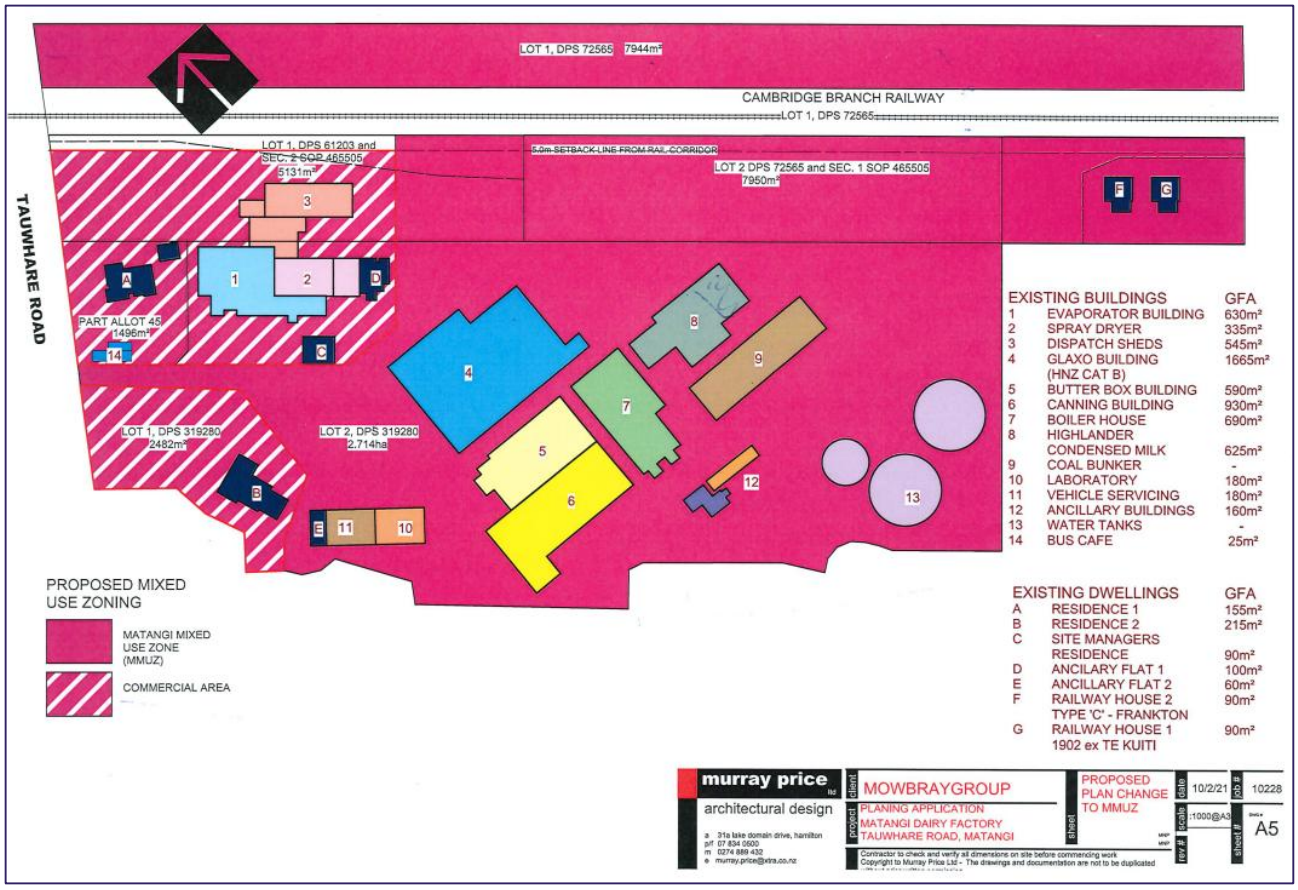


3.2 Proposed Mixed Use Zone

As outlined earlier, Mowbray propose through their submission to instead rezone the 5.4 ha Site to a "mixed use" zone (MMUZ) which will enable repurposing of much of the 7,370 m^2 GFA of existing and historical buildings into a mix of industrial, commercial, residential and retail activities to create a complementary commercial and community heart to Matangi. Within the MMUZ is an area where Commercial and Commercial Services activities are to be concentrated (near the Tauwhare Road road frontage).

The proposed Mixed Use Zone is illustrated in Figure 9.

Figure 9: Mowbray Proposed Mixed Use Zone for the Matangi site



A description of the proposed activity types and status (Permitted, Restricted Discretionary, etc) is provided in the planning report by Barker and Associates.

The proposed Permitted Activity rules include thresholds relating to Gross Floor Area (GFA) and developable area, which are based on permitting a level of development that can occur within the MMUZ whilst being confident these will generate negligible effects on the adjacent transportation network. The intention is that any level of development or land use other than a Permitted Activity will trigger the need for a resource consent that includes the need for a specific Integrated Transportation Assessment to address the cumulative effects over and above that already assessed in this Transportation Assessment.

On that basis, this Transportation Assessment relates primarily to the evaluation behind the proposed Permitted Activity thresholds and identifies and recommends any baseline transportation infrastructure mitigation needed to support this.

3.3 Development Yield

The existing Light Industrial zone rules for Site 1 allow up to 80% site coverage as developed area. The proposed rules for the MMUZ retain this maximum site coverage, although as shown by the existing layout of buildings on the Site, a GFA yield relating to 80% site coverage is highly unlikely to occur under existing or the proposed zoning.

However, the Transportation Assessment adopts the 80% site coverage in the trip generation calculations which results in the GFA thresholds for Permitted Activities, to ensure a conservative robust assessment is provided and that the actual effects of Permitted Activities is very likely to be less than assessed.

4. Trip Generation

The predicted trip generation for the MMUZ has been assessed and compared with the existing actual traffic counts for the site, the baseline trip generation allowed under the current Operative District Plan (ODP) rules, and also the trip generation that could occur under WDC's notified zone for the site.

4.1 Existing Activity Trips

A turning movement count survey of light and heavy vehicles was conducted at the intersection of Matangi Road / Tauwhare Road on 27 and 28 October 2020, during the typical AM and PM peak periods. The surveyed periods on both days were from:

- 7:15am to 8:45 am to capture the commuter and school arrival peak flow
- 2:30pm to 3:30 pm during the school departure peak
- 4:00 pm to 6:00 pm for the commuter departure peak

The AM Peak hour was found from the survey data to occur from 7:45 to 8:45am, with an average of 850 vehicles per hour (vph) passing through the intersection. The PM Peak hour occurs from 4:45 to 5:45 pm where approximately 790 vph were recorded.

Turning movement counts were then recorded at Access 1 to the site during the AM and PM peak hours over three days; 2nd, 3rd and 5th November 2020. Additionally, the survey on 5 November recorded the number of pedestrians and cyclists crossing the railway during the peak periods. This totalled just 3 people in the AM peak hour and 1 in the PM peak hour.

The Site access survey recorded that the existing activities generate between 16 and 27 vph (average of 22 vph) in the AM Peak hour, of which 78% is inbound and 22% outbound.

The PM peak hour recorded between 23 and 33 vph (average of 28 vph), of which 34% (approximately 1/3) is inbound and 66% (2/3) is outbound.

4.2 Baseline Trip Generation Potential (ODP rules)

The current ODP rules for the site would allow the Light Industrial zoned land (approximately 3.52 ha) to be developed to 80% site coverage. In addition there are effectively two rural areas within the site that could each generate the equivalent of 10 to 30 trips each per day if used for rural activities and each with a dwelling.

On this basis, the following combined trip generation totals could be expected under baseline development rules:

- Average peak hour = 75 vph
- Daily volume; approximately 500 trips (vpd), (assuming a typical ratio of peak hour = 15% of the daily volume).

The 75 vph figure is calculated by applying a standard Light Industrial average peak hour trip rate of 20.8 trips/ha (net). This rate is commonly referred to across most large rezoning/consenting assessments in the Waikato area such as Ruakura Industrial zone, Northgate Business Park (Horotiu), Ohinewai (Ambury Properties), Shand rezoning (Huntly) and Titanium Park (Hamilton Airport).

This representative peak hour rate based on hectare of developable land (excluding roads and reserves) is commonly applied for Light Industrial rezoning assessments given that the specific activity types that will establish in future and associated the travel behaviour of staff and good/services is unknown.

A further 16 trips per hour have been added for the Rural zoned areas within Site 1. Rural Zone land is permitted in the PDP (14.12.1.4) to generate up to 200 movements per day per activity, which is approximately 15-16 vph.

4.3 Notified PDP Trip Generation Potential

For reference, the Notified PDP proposed the following for Site 1:

- Business Zone area of approximately 3980 m^2
- Industrial Zone of 38,221 m^2 (cf. Existing = 35,160 m^2 of Light Industrial)
- Rural Zone of 2000 m^2 gross area (cf. Existing = 9,038 m^2 of Rural zone)

There appears to be no transportation assessment by WDC relating to the PDP zoning for the Site. Therefore, in the absence of such information this assessment references the notified PDP rule 24.15.1 (a) which states that an activity is a Permitted Activity in the Industrial Zone if it does not generate more than 250 daily trips.

On this basis the baseline cumulative daily trips if 15 industrial activities established separately is actually up to 3750 trips per day. On the basis that the typical peak hour is approximately 15% of the daily volume, the average peak hour would generate 560 trips.

In addition, and a typical peak hour trip generation rate for offices is 2.5 trips per 100 m2 GFA (ie 10% of the typical daily trip generation rate as identified in the PDP Table 14.12.5.13 Trip Generation Rates. This would add around 80 vph (530 vpd) in addition to the above 560 trip/hour, assuming development to the allowable 80% site coverage maximum.

Combining these, a cumulative Permitted Activity baseline trip generation of around 640 vph and 4300 vpd is possible under the PDP rules; although it is acknowledged that this would be a low probability worse case.

There is no limitation on the number of Industrial activities per site or total tip generation under the notified PDP rules. There is only a site coverage limitation of 80%. This means 15 Industrial activities could practically establish over the 3.8 ha site area, averaging 2000 m^2 each under Permitted Activity rules.

4.4 Proposed MMUZ Permitted Activity Trip Generation

With reference to the proposed MMUZ rules in the Barker and Associates planning report, the proposed Permitted Activity status in the MMUZ would allow (to occur in Site 1):

- Commercial Activity; Maximum floor area total of 1600 m^2 GFA
- Commercial Services; Maximum floor area per tenancy 300 m^2 GFA up to a total of 1600 m^2 GFA
- Community Activity; Nil
- Light Industry; up to 80% site coverage over MMUZ area (38,221 m^2)
- Childcare facility; Maximum Gross Floor area no greater than 300 m^2 GFA
- Education; No more than 9 students
- Public Amenity and Health Facility; Nil
- Restaurants; Maximum floor area of 250 m^2 GFA
- Rural Zone of 2000 m^2 gross area.

The primary contributing activity types to peak hour trip generation are the Offices, Commercial Service, Light Industry and Childcare facility. The peak hour trip generation calculations below applied the same rates as for the Baseline and Notified scenarios above, but in addition for Childcare facilities the average peak hour rate of 10.5 trips/100 m2 GFA is used. This is derived from the NZ and Australian trips and parking databases (TDB) for surveyed sites from 2005 to present.

On the basis of the above Permitted Activity thresholds, the expected trip generation for Site 1 under the MMUZ zoning would be approximately;

- 405 trips / hour in the peak hours
- 2700 to 4000 trips / day (based on the peak being between 10% and 15% of the daily volume).

For ease of comparison Table 1 provides a summary of the above derived average peak hour and daily trip generation totals for each of the four scenarios.

Table 1

Trip Generation Comparison Table		
Scenario	Predicted Site 1 Trip Generation	
	Peak Hour Trips (vph)	Daily Trips (vpd)
Existing	28	185*
Baseline ODP	75	500
Notified PDP	640**	4300**
Proposed MMUZ	405	2700 to 4000

*Existing Daily trips figure was not surveyed but derived based on peak hour being 15% of the daily volume.

** Notified PDP rules (Rule 24.15.1 (a)) allowing any individual activity to generate up to 250 daily trips as a Permitted Activity technically could permit up to 3750 vpd. A further 530 vpd for the Business Zone

It appears that there has been no assessment of transportation effects carried out to support the notified PDP rezoning for the site. Not only has the effects of such trip generation not been assessed, but the PDP Industrial zone would allow haulage companies and heavy industry to establish, potentially generating significant numbers of Heavy Commercial Vehicles (HCVs) operating from the site. Typically 15% to 20% of traffic from Industry zones is HCVs. That could result in excess of 100 HCV movements to and from the Site per day if the PDP rezoning was approved and a truck haulage company or bus depot established on site.

The effects of such HCV movements on the Matangi transport network have not been assessed.

Of key importance is what the resulting adverse effects of such trip generation on the network would be, and whether it is negligible and if not, can be avoided or mitigated.

The proposed MMUZ cumulative Permitted Activity trip generation on Site has the potential to reach approximately 405 trips in the typical peak hour if the high trip generating activities (Offices, Commercial Service, and Light Industrial and Childcare facility) were all developed to their Permitted Activity limits.

The HCV component of the traffic generation is likely to be very low for the MMUZ as Light Industry typically relates to small manufacturing businesses and repair and maintenance businesses that typically receive and send goods via HCV once or twice a week. Such HCVs also tend to be smaller, single truck unit types instead of the large truck and trailer haulage units.

To ensure this is the case, Barker and Associates (Planners acting for Mowbray) has proposed a specific zone called the Matangi Light Industry zone, with the following definition as described in Paragraph 8.6 (d) of his evidence;

Matangi Light Industry: Means small scale manufacturing, warehouse, bulk storage, service and repair activities which do not involve the use of heavy machinery, are carried out indoors that can contain ancillary retail. They include but limited to the following: printing works, brewery, furniture manufacture, car repairs, light engineering, tradesmen's depots and the like.

In addition, proposed Rule 81 for the MMUZ limits HCV movements to 1% of the Permitted Activity trip generation cap (discussed further on in this Assessment).

MMUZ R81(b)

No more than 1% of the volume limits set out in (a) above to provide for Heavy Commercial Vehicles (HCV) per activity

In Matangi, the assessment of effects relates to the impact on safety and operation of the urban street environment within the village for all transport modes including walking and cycling, and traffic movement and parking. This is assessed in the following section, including the impact on the performance of the Tauwhare Road / Matangi Road intersection and the railway level crossing.

4.5 Trip Distribution

4.5.1 Internal Trips and Trip Chaining

Given the nature of the mixed-use development, it is anticipated that a reasonable portion of the trips generated by several of the activities would be internal trips within the MMUZ site (i.e. trips that originate and terminate within the Site) or form part of a trip chain (a trip from home, stopping at a shop for a newspaper or a coffee, and travelling on to work).

However, to provide an element of conservatism in the assessment we have assumed no trips are internal or trip chained. Ie All trips are singular and external to and from the MMUZ site itself, and therefore are added to the external road network.

4.5.2 Travel Mode Share

In addition, further conservatism in the assessment of road and intersection capacity, is provided by assuming that all MMUZ related trips are individual private car based trips, with no trips being made by walking, cycling or Public Transport (PT).

While zero PT trips is not unrealistic in this case because there is no PT service in Matangi, the same does not apply for walking and cycling. Both modes are likely to be common once the MMUZ establishes with employment opportunities given the compact nature of the Matangi village community in which the Site is located. Few dwellings would be located in Matangi more than a 10 minute walk from the Site.

4.5.3 Existing External Trip Distribution

As identified in Section 4.1, turning count data for the existing situation was collected at the Site access and at the intersection of Tauwhare Road / Matangi Road during the peak flow periods. This provides suitable directional distribution data that can be applied to assess the impact of future additional trips.

To that end, the Figure 10 and Figure 11 illustrate the Existing AM and PM Peak surveyed volumes (averaged) at Site Access 1 and the Intersection.

Figure 10: Existing AM Peak Hour Volumes and Directional Distribution

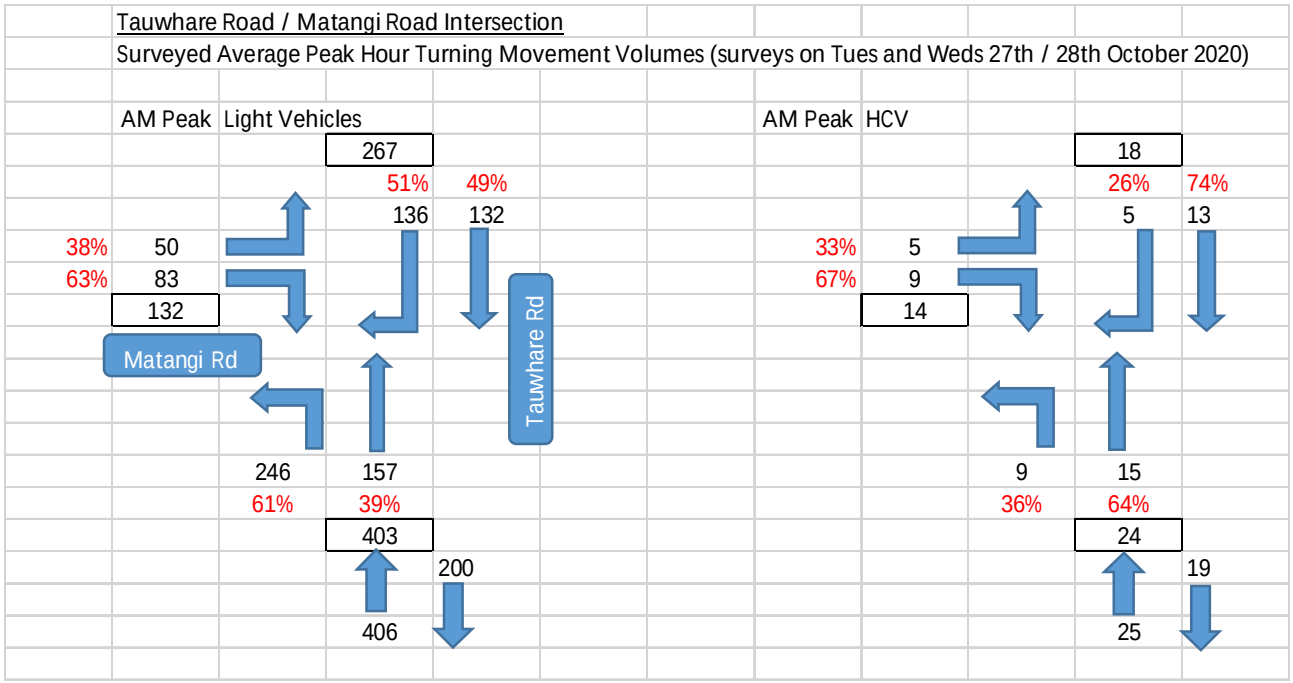
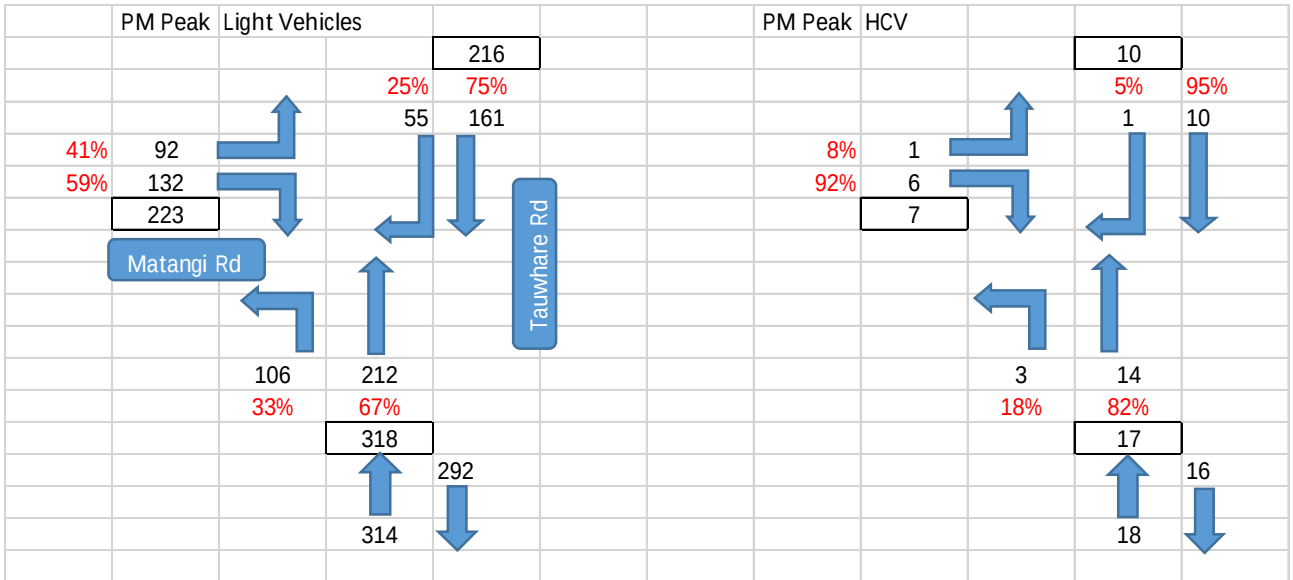
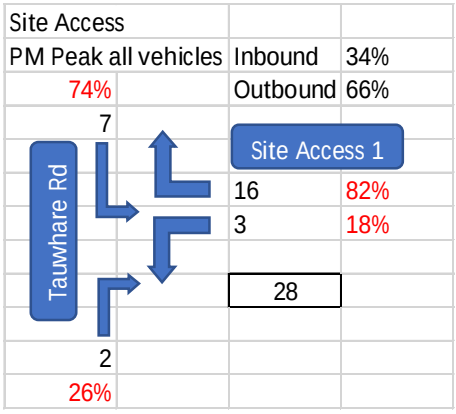


Figure 11: Existing PM Peak Hour Volumes and Directional Distribution





The above distributional figures reveal that approximately two-thirds of existing AM Peak trips entering and leaving the Site access travel to and from the northeast, passing through the Tauwhare Road / Matangi Road intersection. This increases to almost 80% of Site related trips in the PM Peak.

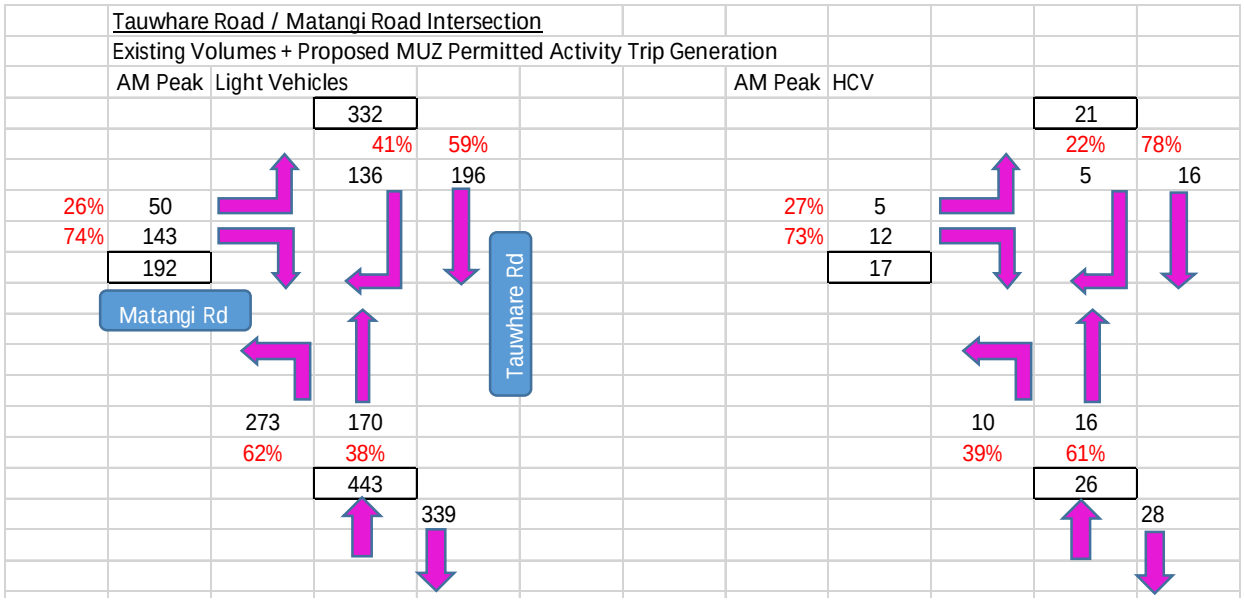
Of those trips, approximately one-third in the AM Peak travel over the railway level crossing on Tauwhare Rd. In the PM Peak this increases to about 45% of Site related trips. (Note: This information is not directly observed from the above Figures. It is derived from the complete survey data that is included in Appendix A).

4.5.4 Predicted MMUZ Permitted Activity Trip Distribution

Applying the existing distributional splits to the predicted trip generation for the combined MMUZ Permitted Activities results in the following AM and PM Peak turning movement volumes (Figure 12 and

Figure 13) at the site access and the Intersection when added to the existing volumes.

Figure 12: MMUZ Permitted Activity Trip Generation (405 vph): Predicted AM Peak Hour Volumes



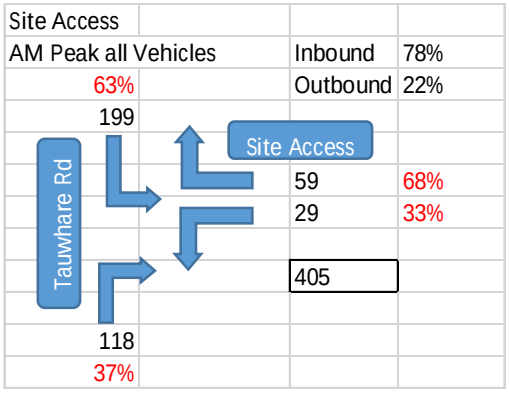
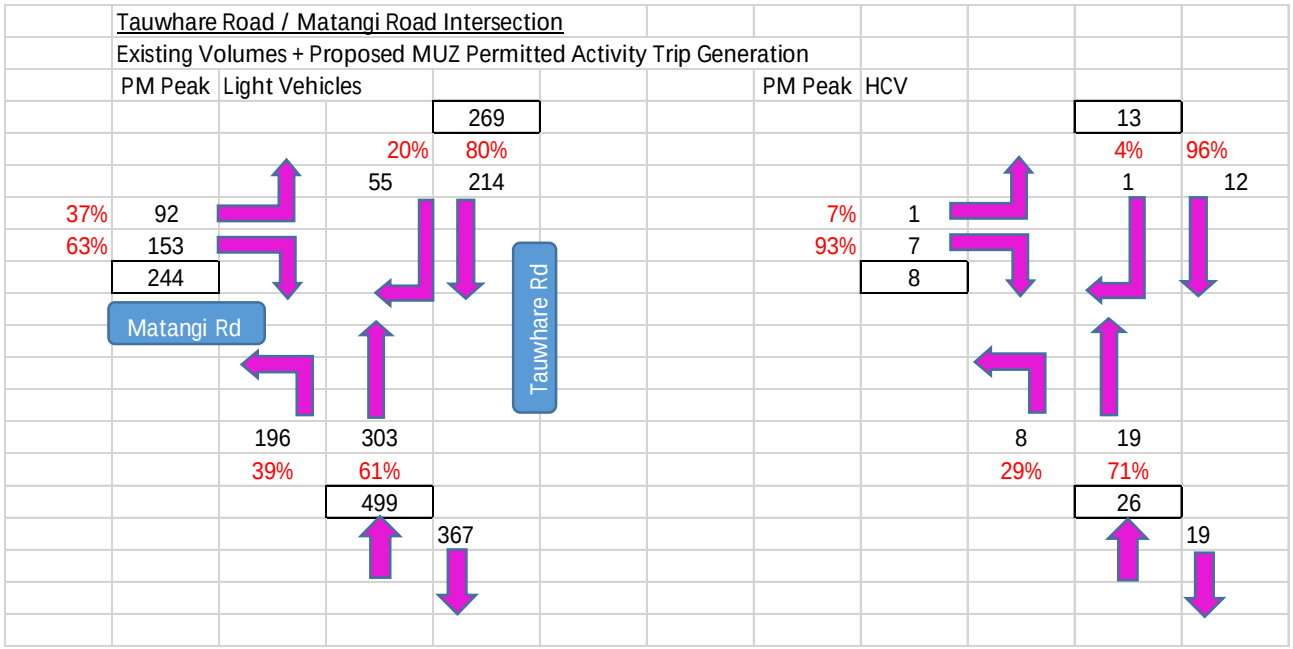
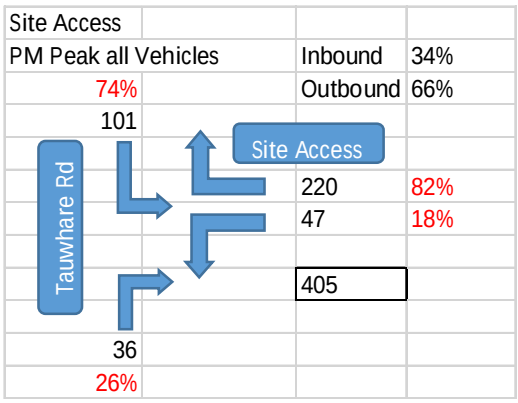


Figure 13: MMUZ Permitted Activity Trip Generation (405 vph): Predicted PM Peak Hour Volumes





The predicted turning movement volumes in Figure 12 and

Figure 13 are applied in the following section to assess the capacity of the Intersection and Access 1 (assuming all Site trips use that access only).

5. Transport Effects Assessment

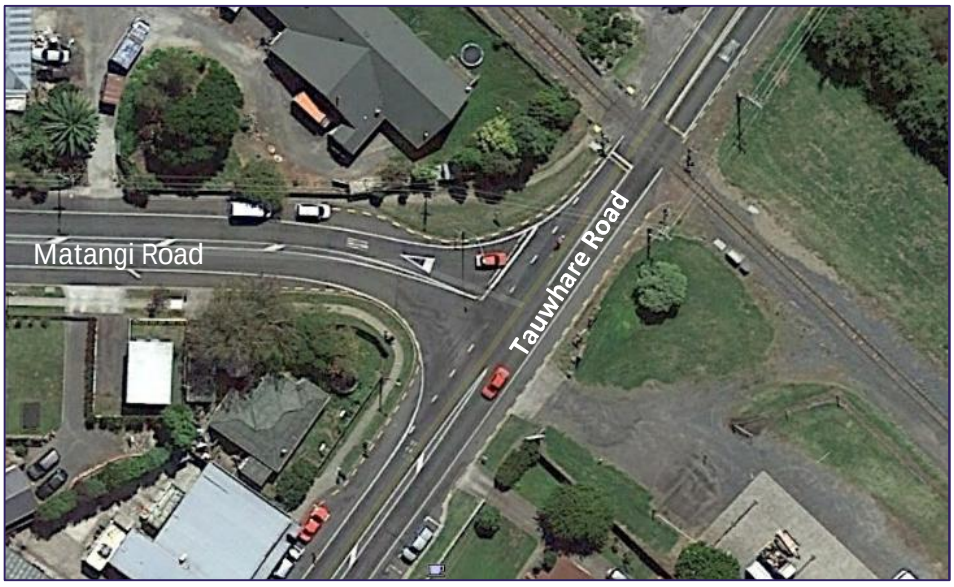
5.1 Capacity Assessment

The Site access and the Intersection (Tauwhare Road / Matangi Road) are the key locations within Matangi that require an assessment of future capacity to accommodate the Permitted Activity level of development traffic with no more than minor effects generated. Their relative position to one another is illustrated in Figure 5.

5.1.1 Tauwhare Road / Matangi Road Intersection

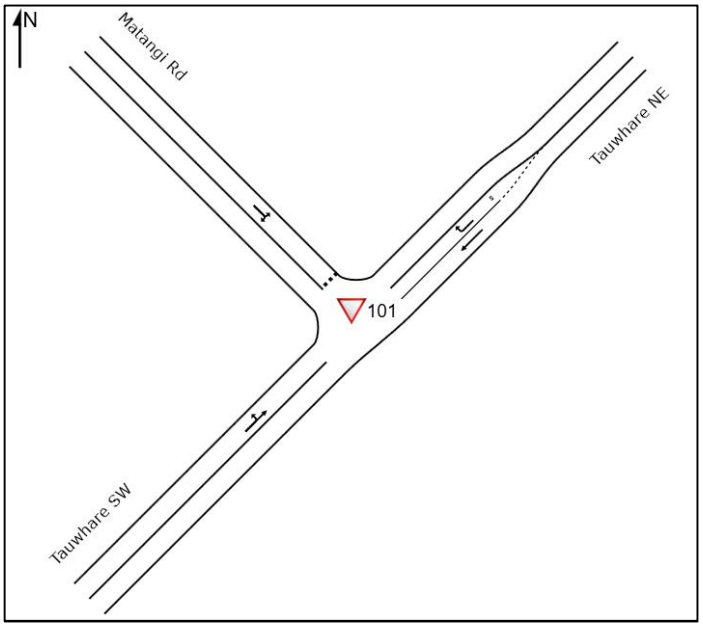
The capacity of this intersection is fundamental to ensuring the immediate network can cope efficiently and more importantly, safely with the additional traffic expected for the proposed Permitted Activity thresholds of the rezoning. For reference, the layout of the existing intersection is shown below in Figure 14.

Figure 14: Existing Intersection Layout



The capacity assessments have been carried out using SIDRA INTERSECTION v9 software (SIDRA). Figure 15 shows the intersection layout in SIDRA.

Figure 15: Existing Intersection Layout Modelled in SIDRA, and Volumes



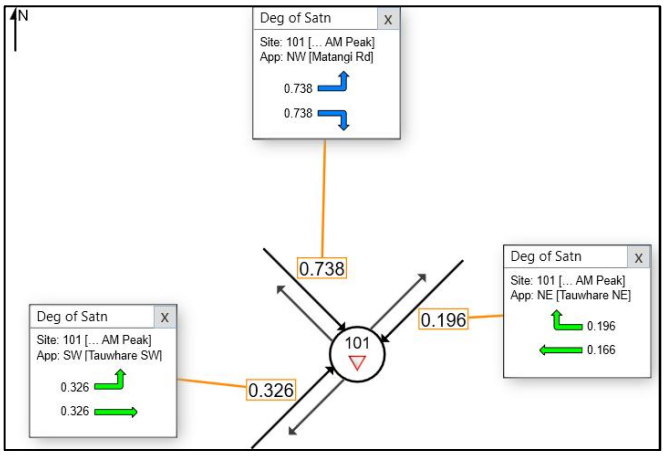
A right turn pocket (or bay) from Tauwhare NE to Matangi Road has been included in the model layout despite not existing on the ground, because observations on site show that there is sufficient seal width for southbound Tauwhare Road traffic to move around one stationary right turning vehicle of up to 19 m in length. Drivers use the shoulder at the intersection in this manner.

The railway line is approximately 23 m from the Intersection centreline, which enables a car to move around a stationary truck and trailer without blocking the rail line.

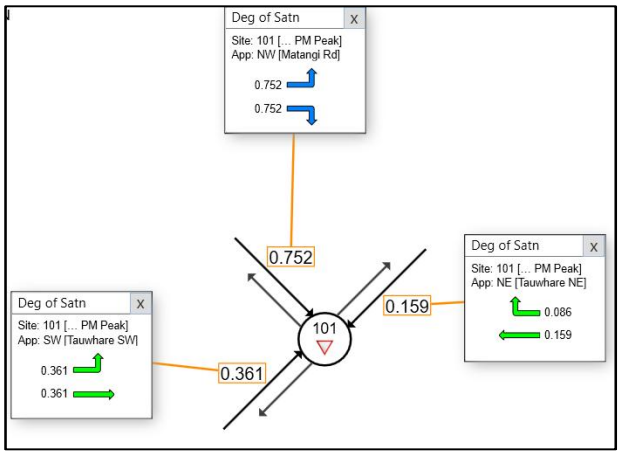
Figure 16 , Figure 17 and 18 illustrate the SIDRA performance results per movement in terms of Volume to Capacity ratio (Degree of Saturation), the Average Control Delay (Level of Service), and the 95th percentile queue length, for the AM and PM Peak Hour predicted volumes respectively.

Figure 16: Volume to Capacity Ratio: Tauwhare Road / Matangi Road with MMUZ Trips

AM Peak Hour



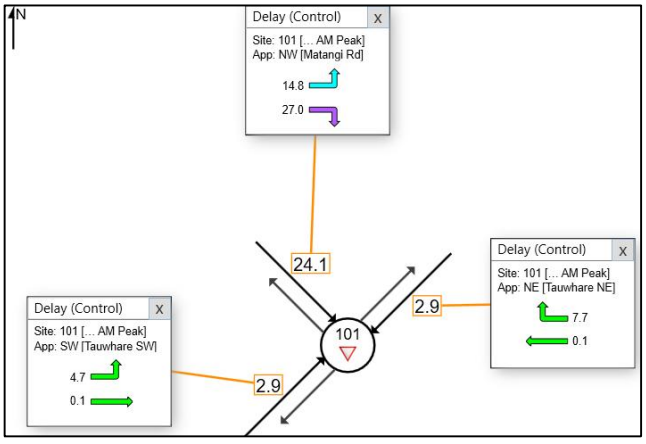
PM Peak Hour



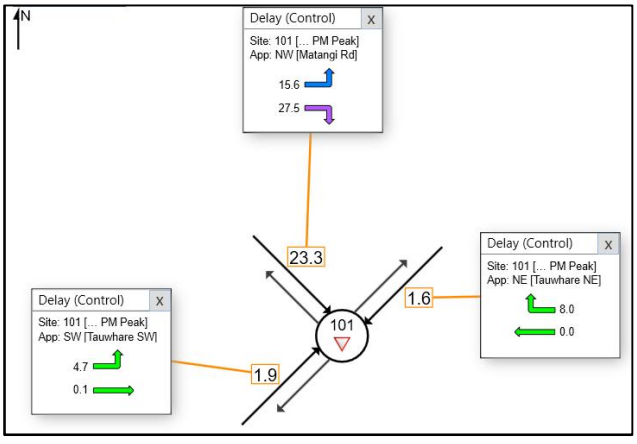
The above results show that a maximum Volume to Capacity (V/C) ratio of 0.75 (75%) for the Matangi Road right and left turn movements can be expected with the MMUZ activities at Permitted Activity maximum thresholds. This is still below the practical capacity (approximately 90%) but is not far off. It is likely the intersection would need to be upgrade in the future (most likely to a roundabout to meet Safe System objectives) with development beyond the proposed Permitted Activity level.

Figure 17: Average Delay per Vehicle (Level of Service): Tauwhare Road / Matangi Road with MMUZ Trips

AM Peak Hour



PM Peak Hour

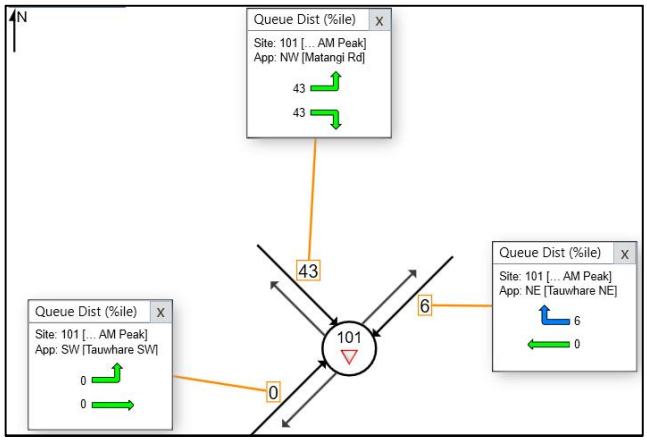


Given the V/C ratio, the Average Control Delay for the right turn from Matangi Road is 27.5 seconds/veh in the PM Peak, and similar for the AM Peak. This is effectively Level of Service (LoS) D, which is a level where Road Controlling Authorities ideally consider planning and carrying out business cases for future funding for a safety improvement upgrades once the Intersection performance deteriorates to LoS E or worse.

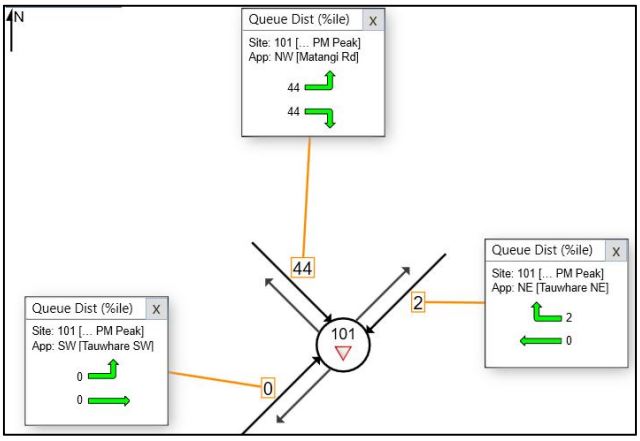
In contrast, LoS A to C are typically regarded as being excellent to good levels of performance (respectively) with only negligible to minor effects evident (if any). Therefore, no intersection improvements are economically justified unless there is a clear safety issue demonstrated by the crash history or through a Safety Audit. Section 2.5 shows there is no evidence of an existing safety issue.

Figure 18: Queue Length (95th Percentile in metres): Tauwhare Road / Matangi Road with MMUZ Trips

AM Peak Hour



PM Peak Hour



The 95th percentile queue results show that queuing is not a significant problem with the MMUZ traffic added. Of critical importance is that the results show no excessive queuing for the right turn into Matangi Road that could risk blocking the railway line. The 95th percentile queue length (ie just 5% of queue lengths exceed this length) is 6 m.

5.1.2 Capacity Assessment Conclusion

Given the Level of Service D result for the Matangi Road approach, it is considered appropriate that the level of Permitted Activity be not only restricted to floor and site coverage areas, but also subject to a cumulative traffic generation cap to ensure effects of the MMUZ remain no more than minor at worst. Any activity exceeding the trip generation cap should require a resource consent together with a supporting ITA to address any more than minor cumulative effects on the safety and function of the local transportation network.

On this basis, it is recommended that the Permitted Activity traffic generation cap relates to the Intersection performing at no worse than LoS C on any movement, based on traffic volume predictions in this assessment.

The derivation of the volume cap is explained in the following section.

5.2 Permitted Activity Traffic Generation Cap

With a target maximum LoS C for any movement at the Intersection to ensure capacity (and safety) related effects for Permitted Activity status is no more than minor, the Intersection was iteratively remodelled with lower volumes to find the upper limit of LoS C (ie 24 seconds/veh, before transitioning to LoS D).

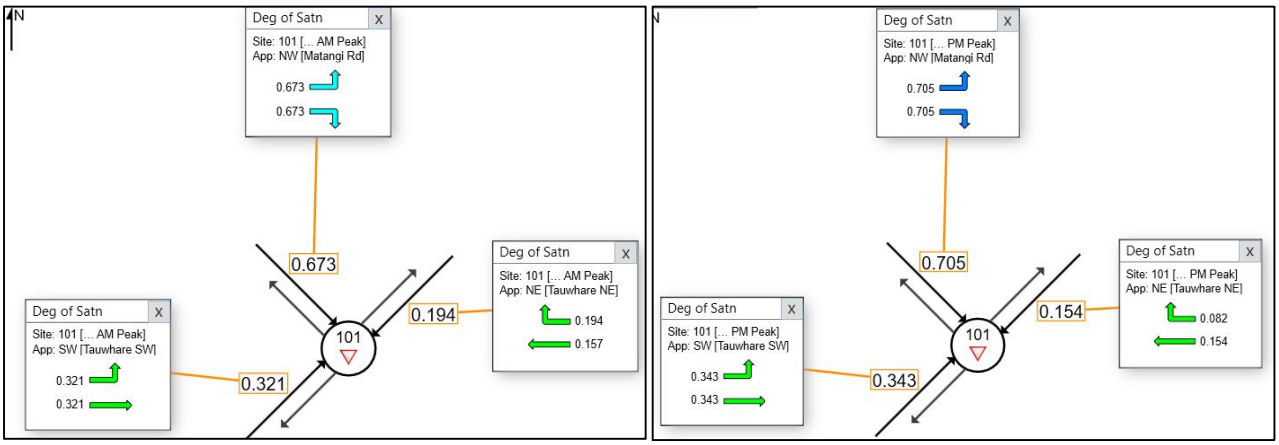
From there a back-calculation was used to find that the maximum trip generation to be 330 vph in addition to the baseline surveyed volumes. The combination predicts LoS C for the right turn movement from Matangi Road. A peak hour generation of 330 vph translates to approximately 2200 trips per day on the basis of the typical peak hour to daily volume ratio being 15%.

Figure 19 , Figure 20 and Figure 21 illustrate the SIDRA performance results as per Section 5.1 for the AM and PM Peak Hours flows but with the 330 vph cap applied.

Figure 19: Volume to Capacity Ratio: Tauwhare Road / Matangi Road with 330 vph MMUZ Cap

AM Peak Hour

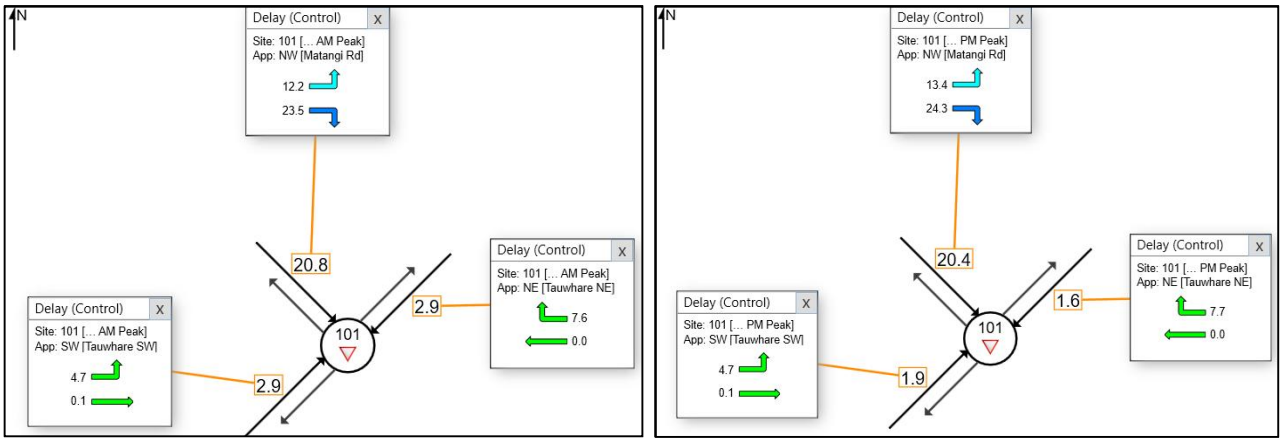
PM Peak Hour



The above results show that the maximum Volume to Capacity (V/C) ratio reduces to 0.705 (71%) from 0.75 for the Matangi Road right and left turn movements with the 330 vph MMUZ cap.

Figure 20: Level of Service: Tauwhare Road / Matangi Road with 330 vph MMUZ Cap

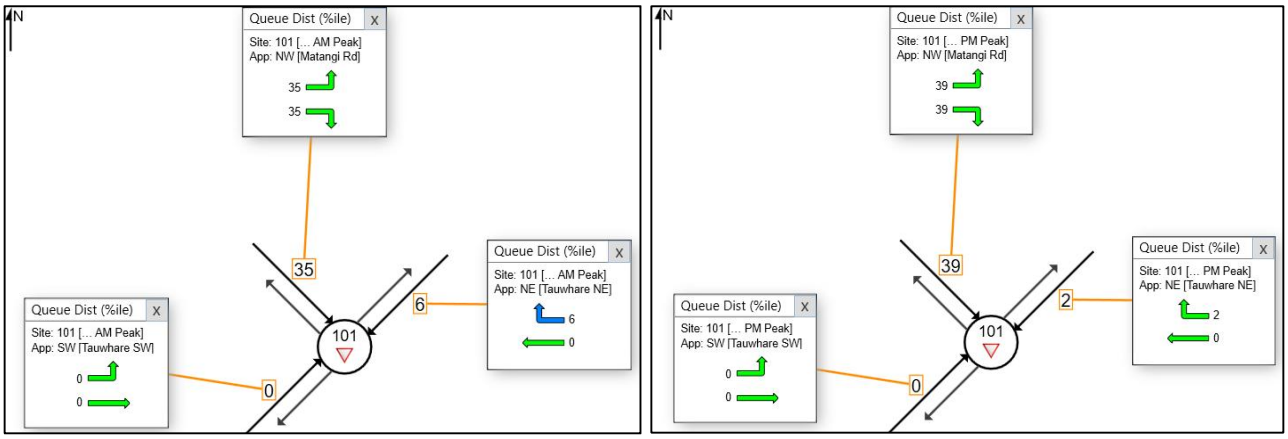
AM Peak Hour PM Peak Hour



The Average Control Delay for the right turn from Matangi Road reduces to 24.3 seconds/veh in the PM Peak, and similar for the AM Peak. This is LoS C.

Figure 21: Queue Length (95th Percentile (m)): Tauwhare Road / Matangi Road with 330 vph MMUZ Cap

AM Peak Hour PM Peak Hour



The 95th percentile queue results show that the largest queue reduces from 44 m to 39 m (effectively one car length) with the 330 vph MMUZ cap. Queuing for the right turn movement into Matangi Road has little chance of blocking the railway line with a 95th percentile queue length of 2 m. Ie, Less than 5% of queues will extend more than one car length.

Given the favourable predicted performance results above, it is recommended that the peak hour and daily volume figures of 330 vph and 2200 vpd be included in the MMUZ rules as cumulative trip generation caps for Permitted Activities, in addition to the GFA and site area caps proposed.

Any activity that causes the cumulative trip generation limits of 330 vph or 2200 vpd to be exceeded should trigger a resource consent requiring an Integrated Transport Assessment (ITA). The ITA is to address any transport related effects of the activity and identify if any mitigation measures on the local network or at the access points are appropriate and necessary.

Including a cumulative traffic generation cap in addition to the Permitted Activity GFA and site area caps is preferred and appropriate as there is an infinite combination of different activities and sizes that could establish under the proposed MMUZ rules. And this combination will change on Site over time as well. Not all activities will establish to their maximum Permitted Activity GFA or site coverage levels at any one time.

5.3 Parking and Loading

There are currently ten parallel car park spaces provided on Tauwhare Road in the vicinity of the Site. Four of these are on the northern side adjacent to the superette store, and six on the southern side along the frontage of the Site. There are no time limits and no formal loading spaces on the street.

Observations on site show that the small commercial area of Matangi is often busy with a high rate of occupancy of the ten parking spaces. U-turns on Tauwhare Road are a common occurrence. With just ten spaces available it is also not uncommon to observe all car park spaces occupied. The Google Earth image below in Figure 22 shows 90% occupancy at the time of the photo.

On this basis, it is my assessment that there would be insufficient on-street parking in the commercial area of the village to support the additional parking demand of either the MMUZ or PDP zoning. If the ten spaces was the only parking possible for the foreseeable future then it is likely that the increased demand due to rezoning would cause unacceptable congestion on Tauwhare Road at regular times through the day. Such congestion would likely lead to impacts on the safety of all road users, including pedestrians, as drivers scramble, double park, illegally park and aggressively u-turn in a small area to claim a rare car park space.

However, I am confident that this will not be the case for the proposed MMUZ as the Site has ample available space for the provision off-street parking to the PDP requirements for each activity. Indeed it is Mowbray's intention to provide sufficient off-street parking throughout the site to enable businesses established in the MMUZ to be successful, and that the Site functions without adding to existing demand for the ten spaces on the street.

Figure 22: Tauwhare Road at Matangi. Snapshot of On-Street Car Park Occupancy

Therefore, I consider that car parking effects on the network can and will be mitigated by the provision of sufficient off-street parking within the Site.

5.4 Other Transport Modes

5.4.1 Effects of Rezoning on Rail Level Crossing Safety

KiwiRail does not appear to have submitted on the PDP zone provisions for the Site, no provided a further submission to Mowbray's submission for the mixed use zone.

However, given the proximity of the railway level crossing and the fact that the railway passes through the Site, consultation was undertaken with KiwiRail to obtain their feedback on the proposed MMUZ.

In terms of transportation effects, KiwiRail consider that they are an affected party because of the potential for increased trips by traffic and pedestrians crossing the railway line on Tauwhare Road.

As part of the consultation, KiwiRail requested that a Level Crossing Safety Impact Assessment (LCSIA) be carried out in order for them to fully understand the effects of the proposal and therefore whether they support or oppose the mixed use rezoning proposal.

The LCSIA process is specific to KiwiRail, and requires a safety team comprising a team leader who is a Certified Assessor by KiwiRail together with a team involving a KiwiRail safety engineer, locomotive drivers and the Council road safety engineer. It is a detailed safety assessment process, and one that can take a minimum of 3 weeks to schedule Locomotive drivers and KiwiRail staff for the site visit, then a further 3 to 5 weeks for each person involved to submit their scoring, the LCSIA report written and reviewed by all involved before completion.

The date for filing evidence was previously 30 November 2020. It became apparent in late October 2020 that KiwiRail wanted the LCSIA report to inform their feedback on the rezoning. This was not going to be achievable by 30 November. Instead, BBO commissioned Arrive consultants (Mr Wes Edwards, who is a KiwiRail Certified Assessor) to provide a "preliminary" LCSIA report which would essentially be a standard LCSIA but excluding input from KiwiRail locomotive drivers and KiwiRail safety engineer.

A copy of the preliminary LCSIA report (the Report) is included in Appendix B.

The Report states in the Introduction that the intention of the preliminary LCSIA is to indicate the range of possible LCSIA outcomes that could be expected with KiwiRail staff involved, and whether it is practicable for safety improvement infrastructure (if required to support the rezoning), to be provided.

The preliminary LCSIA process was underway when WDC confirmed on 5 November 2020 that that the filing date for submitter's evidence was to shift to 17 February 2021. It was agreed with Arrive to continue with the preliminary LCSIA due to the upcoming Christmas break and office closure period likely making it difficult to get a full LCSIA team organised and the assessment completed in time for completion of submitter evidence and this Transport Assessment.

Furthermore, in speaking to Mr Edwards about the Level Crossing Safety Score process and given what we knew about the existing level crossing's recently upgraded condition I considered that a full LCSIA was unlikely to provide a significantly different conclusion than the preliminary LCSIA.

The key finding of the preliminary LCSIA process is sumarised at the end of the report's Introduction as follows:

> *After assessing the proposal using a partial LCSIA procedure we conclude that the proposed rezoning would have a minimal impact on the safety of the level crossings, and that no changes to the crossings would be required if the zoning being sought by Mowbray Group Ltd was approved.*

Further to that, in the Conclusion the Report states concerning the assessment not being a full LCSIA:

> *This "Preview" report indicates that the possible change of use would result in a full LCSIA concluding that KiwiRail criteria would be met for all scenarios, regardless of the engineers' scores, and as a result changes to the level crossings are not required because of the possible change in use.*
>
> *Irrespective of any change in use that may occur it is recommended that Council and KiwiRail improve sightlines at the crossings by modifying the vegetation on the north-eastern corner of the crossing.*

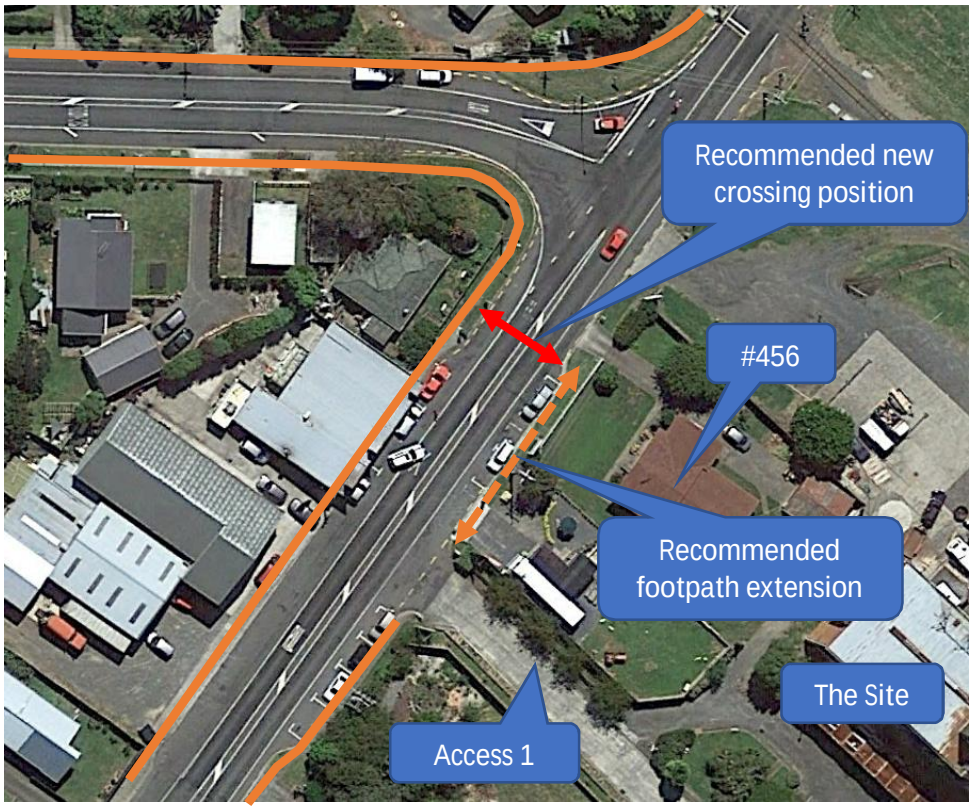
Accordingly, it is concluded that the transport effects of the MMUZ on the safety of the level crossing will be negligible. KiwiRail have been forward the preliminary LCSIA report for review and comment but as at 16 February, no feedback has been received.

5.4.2 Walking

Existing infrastructure provision for pedestrians near the site consists of a footpath on the northern side on Tauwhare Road adjacent to the superette, and footpaths on both sides of Matangi Road. However, there is presently no footpath along the frontage of the Site. Existing footpaths are shown as orange lines in Figure 23.

The lack of a footpath along the Site frontage may be historical because the Site was a dairy factory and there was little reason for a footpath. However, I consider that it would be appropriate now for Council to extend the footpath on the south side of Tauwhare Road to finish in front of # 456 Tauwhare Road, as shown by the orange dash arrow below. Pedestrian flows will increase in this location with either the PDP zoning or the proposed MMUZ because both include a commercial frontage for the site.

Figure 23: Tauwhare Road at Matangi Road Existing and Recommended Pedestrian Infrastructure.



There is also a crossing point on Tauwhare Road The only formal pedestrian crossing point on Tauwhare Road in the village is located approximately 65 m southwest of Access 1, as shown in Figure 3 below.

Figure 24: Existing Pedestrian Refuge Crossing on Tauwhare Road

This crossing is a basic central refuge island type, where pedestrians give way to vehicles. There is no active speed calming measures on the road approaches to the crossing. The location of this crossing appears to be adequate only for connecting residents in Good Street to the north side of Matangi (including the school). It is too far south of the commercial area of the village to be used by people whose desire line is between the superette or Matangi Road and the Site.

Accordingly, this Transport Assessment recommends that WDC considers adding a raised platform pedestrian crossing (zebra style) in the location of the red arrow on Tauwhare Road in Figure 23, together with kerb extensions to reduce the length of the crossing. The location shown will address the desire line for pedestrians from Matangi Road accessing the future commercial services or business zone of the Site as well as create a needed safe crossing for others moving between the superette on the north side and the car park

spaces on the south side of the road. The location is also not immediately adjacent to car park spaces that when occupied might cause sight distance problems for drivers seeing a pedestrian that is about to step on to the crossing.

Ideally, for maximum pedestrian safety benefit the raised platform zebra crossing should be implemented as a package improvement with the south side footpath extension (dashed orange arrow in Figure 23) and a 40 km/h urban speed limit through the commercial precinct of the village.

For the avoidance of doubt, I consider this safety improvement is warranted with either the PDP zoning or the proposed MMUZ because both provisions include a commercial land-use fronting Tauwhare Road. Pedestrian volumes and demand to cross the road will increase in this location with either zoning.

5.4.3 Cycling

There is no specific infrastructure for cycling in Matangi. However, sealed shoulders exist on Tauwhare Road (as shown in Photo 3) and on Matangi Road. There does not appear to be adequate berm width for off-road shared walking and cycling paths.

A reduced speed limit to 40 km/h within the commercial precinct of the village would improve safety for cyclists traveling on the road shoulders in the village. This further supports this Transport Assessment's recommendation that WDC considers reducing the urban speed limit to 40 km/h in the commercial area of Matangi.

5.4.4 Public Transport

There is presently no Public Transport service operating through Matangi and it is unlikely that there would be sufficient demand in future for a PT service connecting Matangi to Hamilton even with the additional jobs enabled by either the PDP or MMUZ rezoning provisions.

However, it is important to note that the proposed MMUZ does not preclude the ability for a public transport service to operate in future if it became viable.

However, it is likely that some on-street parking spaces on Tauwhare Road would be lost in order to accommodate a bus stop in close proximity to the commercial hub of the village. This is unlikely to be a significant issue in terms of effects due to the likelihood of plenty of car parking in the MMUZ.

6. ALIGNMENT WITH TRANSPORT STRATEGIES AND POLICIES

The following documents were referred to in order to determine the proposed rezoning consistency with national and regional transport strategies and policies:

- Government Policy Statement (GPS) and Land Transport– 2027 / 28; and
- 2018 Update to the Waikato Regional Land Transport Plan 2015 – 2045

This assessment finds that the proposed rezoning is consistent with the new GPS and directions set out in the Waikato Regional Land Transport Plan because:

1. There is strong emphasis on improving transport safety and accessibility for the community in Matangi through the proposed MMUZ rules and controls compared to the PDP zone provisions.
2. The proposed rezoning will establish more employment options in close proximity to existing Residential development in Matangi, thus providing greater ability for current and future residents to reduce reliance on private motor vehicles for short trips and increase walking and cycling.

7. Conclusions

The following is concluded on the basis of this assessment of transportation-related effects of the proposed rezoning:

- Subject to the proposed Permitted, Controlled and Restricted Discretionary rule provisions by Barker and Associates being adopted into the District Plan, any resulting transportation effects of the proposed MMUZ trip generation will be minor if not negligible.
- Further land use activity on Site that does not comply with the Permitted Activity limits including the cumulative traffic generation caps, should trigger the need for a resource consent with an activity specific Integrated Transport Assessment to identify and mitigate any resulting adverse effects on the network. This is effectively reflected in the proposed MMUZ rules in the Planners report by Barker and Associates.
- Suitable transport mitigation measures that an ITA might identify include, a contribution towards upgrading the Tauwhare Road / Matangi Road intersection to an urban roundabout, or alternatively limiting the traffic movements at Access 2 to Left in and Left Out only for improved safety.
- An ITA should be required in support of any consent application to develop Site 2, due to the access separation distance to the railway level crossing being less than the required 30 m minimum.
- The proposed MMUZ will produce a much better outcome for the Matangi community in terms of transport safety and function when compared to WDC's PDP zoning that predominantly enables "Industrial" land uses. The PDP Industrial zoning would permit heavy industry to establish on Site along with potentially significant numbers of large HCVs accessing the site on a daily basis.
- In contrast, the proposed Matangi Light Industry zone restricts the types of industrial activities to small scale, low generators of HCV movements.
- Car parking effects on Tauwhare Road due to increased demand associated with the MMUZ can and will be mitigated by the provision of sufficient parking on the Site for each land-use activity that establishes.

8. Transportation Infrastructure Improvements recommended for Rezoning (applicable to both the PDP and MMUZ rules).

- For the increased safety of pedestrians in the community it is recommended that WDC considers the addition of a raised platform pedestrian crossing (zebra) on Tauwhare Road in the location of the red arrow in Figure 23, together with kerb extensions to reduce the length of the crossing.
- Ideally, to maximise pedestrian safety the raised platform zebra crossing should be implemented as a package improvement with the extension of the footpath southern side fronting the Site (dashed orange arrow in Figure 23) and a 40 km/h speed limit zone on Tauwhare Road through the commercial precinct of the village.
- For clarity it is considered that this safety improvement is warranted regardless of which zoning is approved (the PDP zoning or the proposed MMUZ) because both provisions include a similar commercial land-use fronting Tauwhare Road. Pedestrian volumes and demand to cross the road will increase in this location with either zoning.
- The preliminary LCSIA finds that the proposed rezoning would have a minimal impact on the safety of the level crossings (vehicle and pedestrian crossings), and that no changes to the crossings would be required if the MMUZ was approved.
- Irrespective of any change in use on the Site it is recommended that WDC and KiwiRail improve sightlines at the crossings by modifying the vegetation on the north-eastern side of the crossing.

Bloxam Burnett & Olliver

Cameron Inder
Transportation Engineering Manager

Appendix A – Survey and Trip Data

CARS - MATANGI FACTORY (MOWBRAY)

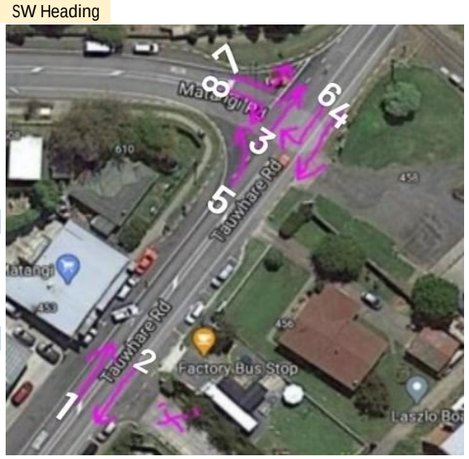
	Tauwhare Road				Matangi Road				
	Factory Access		Intersection		Tauwhare onto Matangi		Matangi onto Tauwhare		
Movements	1 (Heading NE)	2 (Heading SW)	3 (Heading NE)	4 (Heading SW)	5 (Enter Left)	6 (Enter Right)	7 (Exit Left)	8 (Exit Right)	
0715-0730	80	40	28	30	47	27	7	20	
0730-0745	10	48	34	33	54	19	12	16	
0745-0800	101	62	35	40	58	26	25	24	
0800-0815	135	50	50	39	78	42	10	18	
0815-0830	94	48	31	34	60	35	11	21	
0830-0845	77	47	27	27	56	32	7	31	
	407	207	143	140	252	135	53	94	817
1430-1445	50	52	26	34	19	21	34	37	
1445-1500	57	59	33	41	22	21	31	31	
1500-1515	37	42	26	27	17	16	18	14	
1515-1530	42	52	26	30	16	5	12	24	
	186	205	111	132	74	63	95	106	581
				1530-1600 BREAK					
1600-1615	58	61	34	33	24	19	28	26	
1615-1630	51	64	43	34	15	13	21	36	
1630-1645	55	54	49	32	14	14	25	25	
1645-1700	73	73	49	37	18	13	25	34	
1700-1715	78	79	63	45	26	18	31	36	
1715-1730	58	74	45	36	19	16	16	38	
1730-1745	86	77	56	46	28	13	20	28	
1745-1800	55	57	39	26	21	6	16	30	
	295	303	213	164	91	60	92	136	756

TRUCKS & BUSES - MATANGI FACTORY (MOWBRAY)

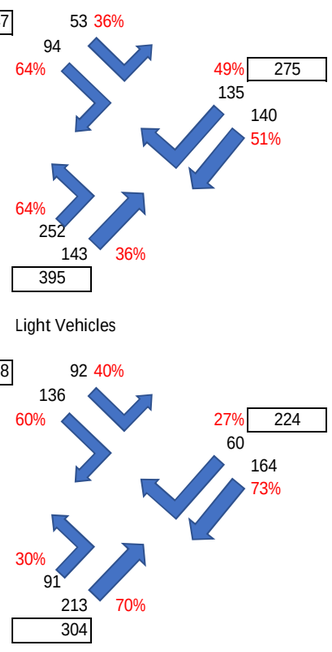
	Tauwhare Road				Matangi Road				
	Factory Access		Intersection		Tauwhare onto Matangi		Matangi onto Tauwhare		
Movements	1 (Heading NE)	2 (Heading SW)	3 (Heading NE)	4 (Heading SW)	5 (Enter Left)	6 (Enter Right)	7 (Exit Left)	8 (Exit Right)	
0715-0730	4	4	2	4	3	1	0	2	
0730-0745	3	6	2	4	1	0	1	1	
0745-0800	4	3	3	1	1	0	2	2	
0800-0815	6	2	3	3	2	3	0	3	
0815-0830	3	4	2	4	1	1	0	0	
0830-0845	4	6	3	5	1	0	2	1	
	17	15	11	13	5	4	4	6	43
1430-1445	9	8	9	5	2	0	2	1	
1445-1500	10	5	8	4	2	2	1	3	
1500-1515	3	5	3	1	0	1	0	4	
1515-1530	5	5	2	4	3	0	0	2	
	27	23	22	14	7	3	3	10	59
				1530-1600 BREAK					
1600-1615	9	5	8	4	1	0	0	1	
1615-1630	8	4	6	2	3	0	1	2	
1630-1645	4	5	3	3	1	0	1	2	
1645-1700	4	5	3	0	1	0	1	5	
1700-1715	4	4	4	1	0	0	0	2	
1715-1730	5	4	3	2	2	0	0	2	
1730-1745	5	3	5	3	0	0	0	0	
1745-1800	1	0	1	0	0	0	0	0	
	18	16	15	6	3	0	1	9	34

LEGEND

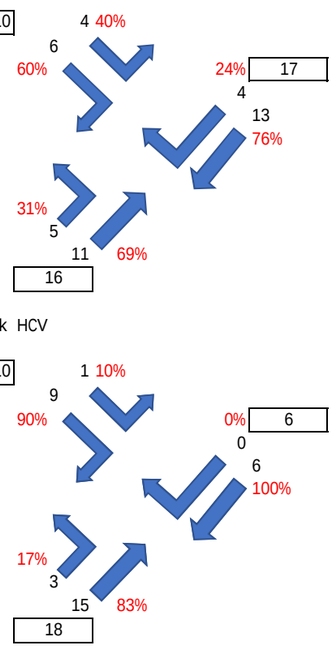
NE Heading | SW Heading



AM Peak Light Vehicles



AM Peak HCV



PM Peak Light Vehicles

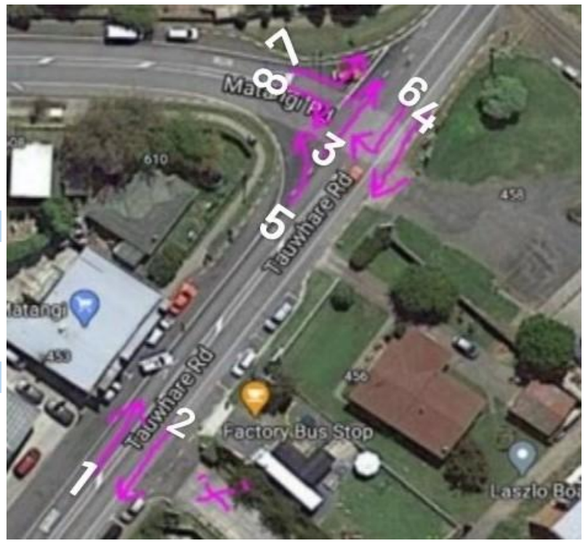
PM Peak HCV

CARS - MATANGI FACTORY (MOWBRAY)

	Tauwhare Road				Matangi Road				
	Factory Access		Intersection		Tauwhare onto Matangi		Matangi onto Tauwhare		
Movements	1 (Heading NE)	2 (Heading SW)	3 (Heading NE)	4 (Heading SW)	~~5~~ (Enter Left)	6 (Enter Right)	7 (Exit Left)	8 (Exit Right)	
0715-0730	84	55	26	35	47	29	9	20	
0730-0745	88	43	30	32	56	28	13	14	
0745-0800	111	66	41	45	71	38	13	22	
0800-0815	112	45	47	33	69	34	8	16	
0815-0830	85	31	42	24	43	33	4	9	
0830-0845	97	50	40	21	57	31	21	24	
	405	192	170	123	240	136	46	71	786
1430-1445	46	33	24	28	22	14	12	10	
1445-1500	64	56	34	35	34	25	32	30	
1500-1515	33	53	25	26	17	15	25	32	
1515-1530	42	50	26	26	16	12	19	24	
	185	192	109	115	89	66	88	96	563
1530-1600 BREAK									
1600-1615	47	76	35	36	12	14	22	41	
1615-1630	59	65	41	27	19	13	24	37	
1630-1645	58	63	35	27	19	9	21	32	
1645-1700	74	70	52	35	18	12	32	41	
1700-1715	77	77	51	38	28	16	23	38	
1715-1730	103	75	66	46	39	13	20	28	
1730-1745	79	59	42	39	35	8	16	20	
1745-1800	66	54	35	27	35	11	17	32	
	333	281	211	158	120	49	91	127	756

LEGEND

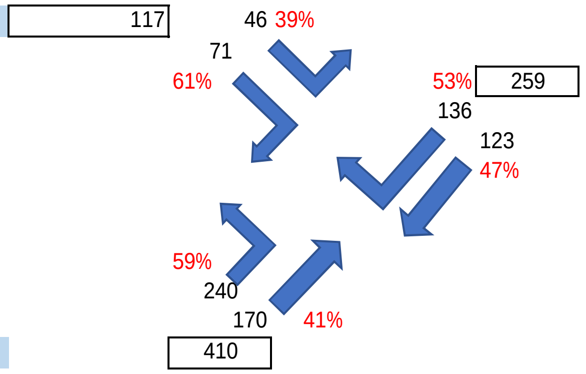
NE Heading	SW Heading



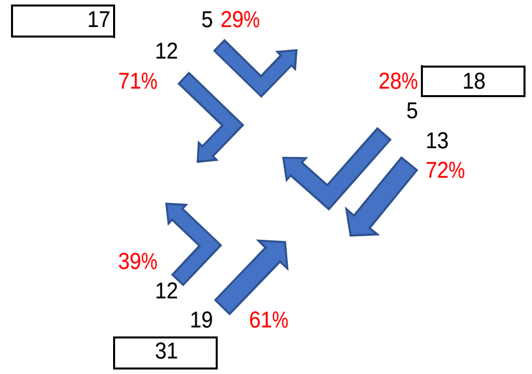
TRUCKS & BUSES - MATANGI FACTORY (MOWBRAY)

	Tauwhare Road				Matangi Road				
	Factory Access		Intersection		Tauwhare onto Matangi		Matangi onto Tauwhare		
Movements	1 (Heading NE)	2 (Heading SW)	3 (Heading NE)	4 (Heading SW)	~~5~~ (Enter Left)	6 (Enter Right)	7 (Exit Left)	8 (Exit Right)	
0715-0730	4	4	2	4	3	1	0	2	
0730-0745	5	2	5	1	0	1	0	1	
0745-0800	8	7	2	4	6	2	0	4	
0800-0815	8	4	6	0	3	2	2	5	
0815-0830	8	3	4	2	1	0	2	1	
0830-0845	8	8	7	7	2	1	1	2	
	32	22	19	13	12	5	5	12	66
1430-1445	8	9	7	7	1	0	0	2	
1445-1500	6	5	4	6	1	0	1	0	
1500-1515	6	13	4	8	1	0	1	5	
1515-1530	5	6	4	4	0	0	1	1	
	25	33	19	25	3	0	3	8	58
1530-1600 BREAK									
1600-1615	6	5	4	4	2	1	2	1	
1615-1630	5	5	4	4	0	1	1	2	
1630-1645	5	3	5	2	0	2	0	1	
1645-1700	4	6	4	6	0	1	0	0	
1700-1715	6	0	5	0	1	0	0	1	
1715-1730	4	6	1	4	2	0	0	2	
1730-1745	3	3	3	3	0	0	0	0	
1745-1800	5	3	5	2	1	0	1	1	
	17	15	13	13	3	1	0	3	33

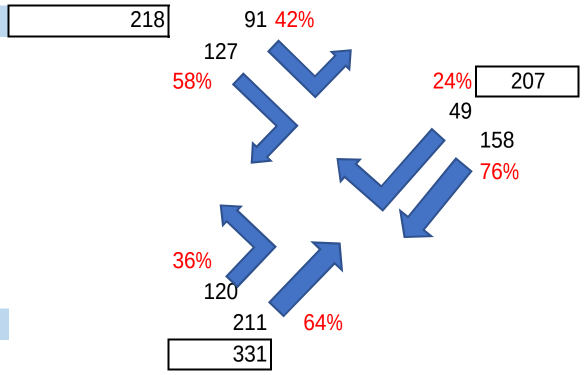
AM Peak Light Vehicles



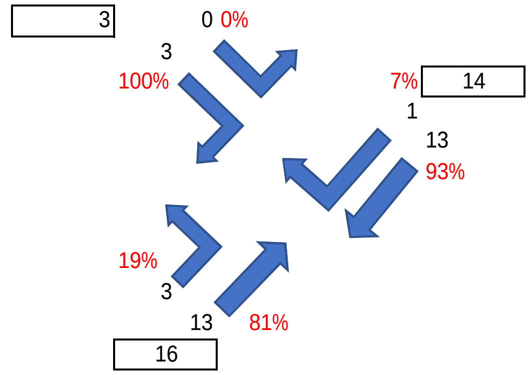
AM Peak HCV



PM Peak Light Vehicles



PM Peak HCV



Appendix B – Preliminary LCSIA Report

Proposed Rezoning
452 Tauwhare Rd, Matangi

Level Crossing Safety Impact Preview

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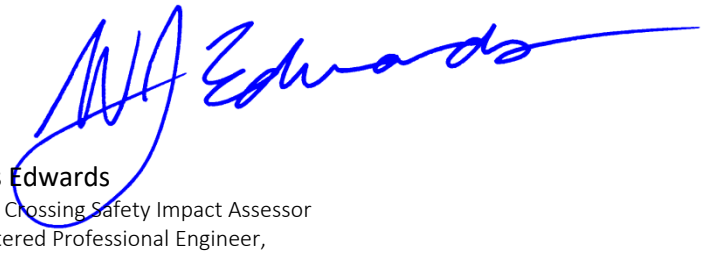
Proposed Rezoning
452 Tauwhare Rd, Matangi
Level Crossing Safety Impact Preview

for

Mowbray Group Ltd

arrive
your transportation advisors™

Prepared for Mowbray Group Ltd by



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File Ref: 101126
Issue: A 05/02/2021

1 Executive Summary

Mowbray Group Ltd is proposing to rezone land on Tauwhare Road, Matangi to a zoning that provides for mixed use activities.

The site is close to the Tauwhare Road crossing of the Hautapu Branch railway (previously known as the Cambridge Branch), and KiwiRail have requested a Level Crossing Safety Impact Assessment [LCSIA] to assess the safety impacts of the change in use on the railway crossing.

There are two public level crossings at this location – a road crossing for vehicles and a pedestrian crossing on the northern side of Tauwhare Road (referred to as the "Down" direction for the railway).

Mowbray Group Ltd has asked Arrive to prepare this Level Crossing Safety Impact Preview. This preview is intended to indicate the probable range of outcomes from a full LCSIA process by undertaking analysis of the safety impact using parts of the LCSIA procedures; however, this preview does not include input from KiwiRail staff or Waikato District Council engineers so is **not a full LCSIA** report. The intention of the preview is to indicate the range of possible LCSIA outcomes and if it is practicable for infrastructure required by the rezoning to be provided.

This Executive Summary is provided in the format required by KiwiRail for LCSIAs.

The Level Crossing Safety Score (LCSS) procedure assesses and scores the risk of each crossing point at each assessment stage of the project.

Figure 1: ALCAM Data for Road Crossing

Scenario	LCSS Points	Fatality Return	Risk Change	Comments
Published ALCAM	3/30	7286		Based on AADT of 6513 veh/d and 2 trains/d. ALCAM Risk Score is 1.4 and the risk band is LOW
Updated Existing	6/30	5763		Based on AADT of 5300 veh/d and 4 trains/d. ALCAM Risk Score is 1.7 and the risk band is LOW
Future (Baseline)	7/30	5185	+12%	Based on AADT of 6900 veh/d and 4 trains/d. ALCAM Risk Score is 1.9 and the risk band is MEDIUM-LOW
Future (Proposal)	7/30	4869	+24%	Based on AADT of 8005 veh/d and 4 trains/d. ALCAM Risk Score is 2.1 and the risk band is MEDIUM-LOW

Figure 2: ALCAM Data for Pedestrian Crossing

Scenario	LCSS Points	Risk Change	Comments
Published ALCAM	1/30		Based on 2 trains/d, 5 ped/h, 25 ped/day. ALCAM Risk Score is 8,430 and the risk band is LOW
Updated Existing	2/30		Based on 4 trains/d, 6 ped/h, 30 ped/day. ALCAM Risk Score is 20,578 and the risk band is LOW
Future (Baseline)	4/30	+67%	Based on 4 trains/d, 10 ped/h, 50 ped/day. ALCAM Risk Score is 34,297 and the risk band is LOW
Future (Proposal)	7/30	+233%	Based on 4 trains/d, 20 ped/h, 100 ped/day. ALCAM Risk Score is 68,594 and the risk band is MEDIUM-LOW

1.1 Roadway LCSS

A range of possible scores is provided as the full LCSIA process has not yet been completed.

Table 1: Summary of the change in LCSS at roadway level crossing

	Updated Existing	Future (Baseline)	Future (Proposal)
LCSS	7 to 17 /60	8 to 18 /60	8 to 18 /60
LCSS Risk Band	LOW	LOW	LOW
Criterion Met	-	Yes	Yes

1.1.1 Roadway Crossing Discussion

The Updated Existing LCSS is Low, and remains low for the two future scenarios considered, achieving Criterion 1 for all scenarios, and no changes to the roadway crossing are required. A summary of the changes to the ALCAM risk band is presented in the following table.

Table 2: Summary of ALCAM changes at roadway level crossing

	Updated Existing	Future (Baseline)	Future (Proposal)
ALCAM Risk Band	LOW	MEDIUM-LOW	MEDIUM-LOW
ALCAM risk score change (%)	-	+12%	+24%
Fatal Return Period	5763 years	5185 years	4869 years

The Updated Existing ALCAM risk band is Low. The Future (Baseline) scenario risk band is Medium-Low with a 12% increase in risk, and the Future (Proposal) scenario risk band is also Medium-Low with an increase in risk of 24% compared with the existing situation. There were no Red Flag issues raised at this road crossing for any of the assessment stages.

As the crossing meets Criterion 1, no changes are required.

1.2 Pedestrian LCSS

A range of possible scores is provided as the full LCSIA process has not yet been completed.

Table 3: Summary of the change in LCSS at pedestrian level crossing

	Updated Existing	Future (Baseline)	Future (Proposal)
LCSS	6 to 16 /60	8 to 18 /60	11 to 21 /60
LCSS Risk Band	LOW	LOW	LOW to MEDIUM-LOW
Criterion Met	-	Yes	Yes

1.2.1 Pedestrian Crossing Discussion

The Updated Existing LCSS is Low, and both future scenarios considered are likely to be Low, except the Future (Proposal) scenario may be Medium-Low if the engineers score is 8 or more. A summary of the changes to the ALCAM risk band is presented in the following table.

Table 4: Summary of ALCAM changes at northern pedestrian level crossing

	Updated Existing	Future (Baseline)	Future (Proposal)
ALCAM Risk Band	LOW	LOW	MEDIUM-LOW
ALCAM risk score change (%)	-	+67%	+233%

The Updated Existing ALCAM risk band was Low, as was the Future (Baseline) scenario. The Future (Proposal) risk band was Medium-Low.

No changes to the pedestrian level crossing are required to reduce the risk score to achieve Criterion 1.

1.3 Recommended ALCAM updates in LXM

To assist KiwiRail with improvements to the ALCAM database, the following data should be considered to update the existing level crossings in LXM.

Roadway Crossing: ALCAM ID # 2554

1. Adjust the rail volume to 4 trains per day (including 2 light-loco movements per day)
2. Adjust the road volume to 5,300 veh/day and 7% HCV
3. Update the crossing pavement condition to Good.

Pedestrian Crossing: ALCAM ID # 2556

4. Adjust the rail volume to 4 trains per day (including 2 light-loco movements per day)
5. Adjust the pedestrian volume to 6 pedestrians/ hour.
6. Update the crossing pavement condition to Good.

2 Introduction

Mowbray Group Ltd is proposing to rezone land on Tauwhare Road, Matangi to a zoning that provides for mixed use activities.

The site is close to the Tauwhare Road crossing of the Hautapu Branch railway (previously known as the Cambridge Branch), and KiwiRail have requested a Level Crossing Safety Impact Assessment [LCSIA] to assess the safety impacts of the change in use on the railway crossing.

There are two public level crossings at this location – a road crossing for vehicles and a pedestrian crossing on the northern side of Tauwhare Road (referred to as the "Down" direction for the railway).

This Level Crossing Safety Impact Preview is intended to indicate the probable range of outcomes from a full LCSIA process to indicate if it is practicable for infrastructure required by the rezoning to be provided.

Our assessment is based on information provided by Mowbray Group Ltd, their engineering consultants Bloxam Burnett and Olliver [BBO], and on observations we made at and near the site. The LCSIA assessor has had no prior involvement with the project.

After assessing the proposal using a partial LCSIA procedure we conclude that the proposed rezoning would have a minimal impact on the safety of the level crossings, and that no changes to the crossings would be required if the zoning being sought by Mowbray Group Ltd was approved.

3 The Level Crossing Safety Impact Assessment Process

KiwiRail uses the Austalian Level Crossing Assessment Model [ALCAM] to assess risks at level crossings, and this model calculates a risk from a number of parameters. KiwiRail developed the Level Crossing Safety Impact Assessment (LCSIA) process to extend the ALCAM model and account for a few additional factors that are not represented in ALCAM.

The LCSIA risk is assessed using the Level Crossing Safety Score (LCSS). This is a score out of 60 comprised of:

- ALCAM score 30 points.
- Crash and Incident History score 10 points.
- Site Specific Safety Score 10 points.
- Engineers' Risk score 10 points.

The assessment is undertaken separately for vehicle and pedestrian crossings. Based on these scores, the crossing is placed into risk bands as shown in the following figure.

In this assessment the LCSS is calculated for three stages:

- **UPDATED EXISTING:** an LCSS of the existing level crossing conditions.
- **FUTURE SCORE (BASELINE):** an LCSS of the forecast ten-year user volumes over the crossing in its existing state, with the land use zoning contained in the Notified version of the Proposed Waikato District Plan.
- **FUTURE SCORE (PROPOSAL):** an LCSS of the forecast ten-year user volumes over the crossing in its existing state, with the land use zoning contained in the Mowbray Group submission on the Proposed Waikato District Plan.

KiwiRail require a crossing to meet one or both of the following criteria:

- **Criterion 1:** requires the ***Proposed Design*** and ***Future Score*** of a level crossing to achieve a '***Low***' or '***Medium-Low***' risk.
- **Criterion 2:** requires the ***Proposed Design*** and ***Future Score*** of a level crossing to achieve an LCSS number (out of 60) lower than, or equal to, the ***Updated Existing*** LCSS number.

Where a new crossing is proposed it must meet ***Criterion 1***.

Where changes to an existing facility are proposed the crossing must meet ***Criterion 1 unless*** the required changes are not reasonably practicable in which case the changes must be agreed with KiwiRail and the crossing must meet or exceed ***Criterion 2***.

Table 5: LCSIA Risk Bands

High (50-60)	•The most dangerous level crossing situation, posing a real risk of death or serious injury occurring to users crossing the railway line. Level crossings which fall under this category will generally have scored highly on all four of the LCSS categories to warrant an overall risk rating of 'HIGH'.
Medium-High (40-49)	•A dangerous level crossing situation, in which there is a medium-high risk of death or serious injury occurring to users crossing the railway line. May include one or two serious safety concerns that bring the level crossing into this band, or is a culmination of a number of moderate safety concerns. It will generally have a high exposure of daily users as well.
Medium (30-39)	•A level crossing situation that is neither overly dangerous, nor particularly safe and has a medium risk of death or serious injury to users crossing the railway line. Some medium level safety concerns will exist, or the level crossing has one unsafe feature in amongst other well performing safety features.
Medium-Low (20-29)	•A relatively safe level crossing situation, with a medium-low risk of death or serious injury to users crossing the railway line. There may be one or two specific features of the level crossing layout which has medium risk level associated to it, but the rest of the level crossing is regarded as low risk. Or the level crossing has a similar layout to a "low" rating, but the user exposure is much higher.
Low (≤19)	•The safest level crossing situation, with a low chance of death or serious injury occurring to users crossing the railway line. Level crossings which fall under this category will generally have scored lowly on all four of the LCSS categories to warrant an overall risk rating of 'LOW'.

4 The Change in Use

The site being considered for a potential change in land use zoning is located on the south side of Tauwhare Road in Matangi, being the site of a former dairy factory on the western side of the Hautapu Industrial Branch railway and a narrow strip of land on the eastern side of the railway.

Mowbray Group Ltd is proposing to rezone the 5.4ha of land for mixed-use activities. Submission #404 on the Proposed Waikato District Plan posits the current Industrial and Rural zoning is unsuitable and proposes a new zone to provide for activities like those provided for by the Business Town Centre zone, including office, retail, café, day-care and medical centre activities.

Figure 3: Locality Map

The area where rezoning is sought includes the former dairy factory site on the west side of the railway (referred to as Site 1) and a narrow strip of land on the east side of the railway (referred to as Site 2), as shown in the following diagram provided by Mowbray Group.

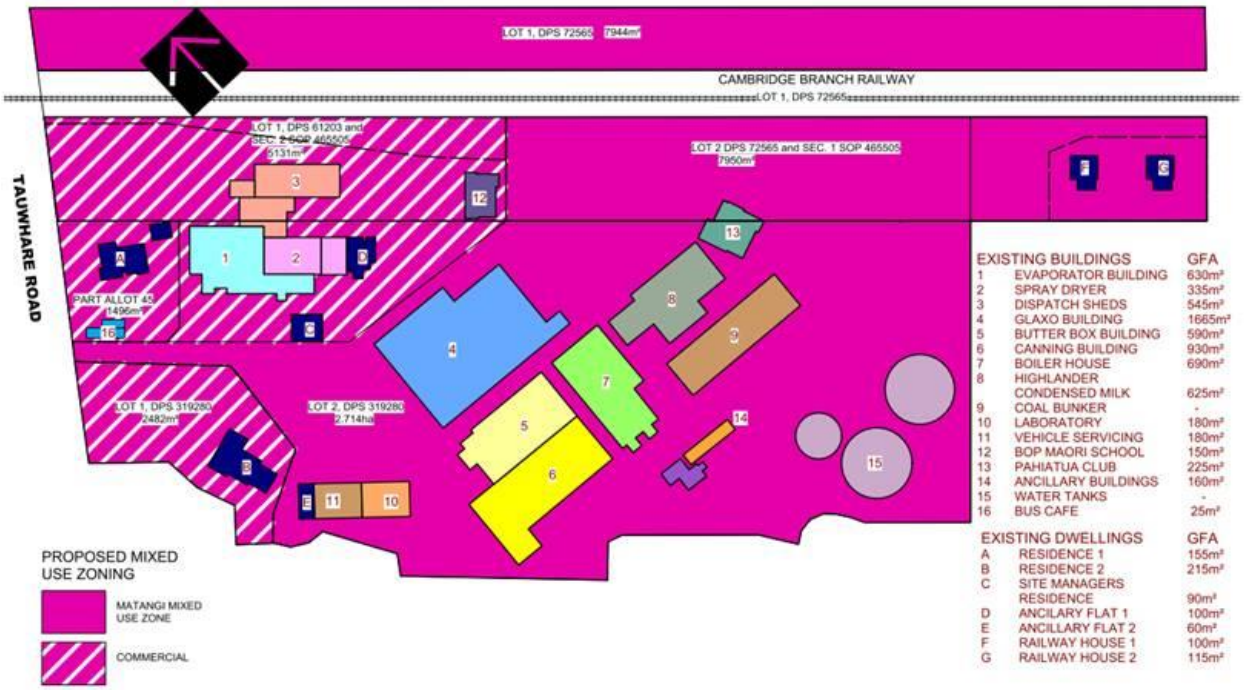
The intent is that Commercial activities (as defined in the DP) can only establish in the hatched areas of the Mixed-Use Zone (MUZ). The proposed Permitted Activity Rules for the MUZ in Site 1 would enable:

- 640m^2 GFA retail in Commercial area (20% of gross developable area)
- 1600m^2 GFA offices in Commercial area (50% of gross developable area)
- 6900m^2 GFA existing buildings as commercial offices in the MUZ
- 465m^2 GFA existing "Residential" in the MUZ.

The zoning in the Proposed District Plan would enable:

- Approximately 3180m^2 GFA of commercial in the "Business" area.
- Balance of Site 1 remains as Industrial, and Site 2 remains as Rural.

Figure 4: Zoning proposed by Mowbray Group



Estimates of future traffic volume supplied by BBO are summarised below.

5 Site Characteristics

5.1 Locality

The intersection of Tauwhare Road with Matangi Road is located opposite the site frontage and approximately 30m west of the railway.

Matangi School is located on Matangi Road approximately 150m west of the intersection, and a small group of service activities including a convenience store are located on Tauwhare Road a short distance south of Matangi Road.

Robinson Lane, a minor council-controlled lane on the eastern side of the railway provides access to a Council facility and has a low volume of traffic.

The level crossing is located within a 50km/h speed limit.

5.2 Traffic Volumes

5.2.1 Existing Volumes

The 2018 estimated daily traffic volume over the level crossing recorded in ALCAM is 6513 veh/day with 4% heavy vehicles.

Traffic count data published on the Waikato District Council website is summarised in the following table.

Figure 5: Aerial Photograph [Waikato Regional Council]

Table 6: Traffic volume data from Waikato District Council

Road	Latest Count	Latest Estimate
Tauwhare Road	Mar 2016. 3534 veh/d, 7% HCV	Jan 2020. 3534 veh/d, 7% HCV
Matangi Road	Mar 2016. 2855 veh/d, 3% HCV	Jan 2020. 2855 veh/d, 3% HCV

Traffic count data supplied by BBO shows turning movements at the Tauwhare/ Matangi intersection during peak periods. From this data the traffic volume over the level crossing was:

- 07:45-08:45 513 veh/h, 7.4% HCV
- 16:45-17:45 546 veh/h, 4.8% HCV

An estimate of the daily volume based on the peak-hour volumes is 5,300 veh/d.

Based on this data the ALCAM estimate of traffic volume, and the ALCAM calculation of risk, would appear to be a little high for the existing situation.

5.2.2 Future Volumes

Estimates of future traffic volume in each peak hour have also been provided by BBO for the baseline (zoning in Proposed District Plan), and the zoning sought by Mowbray Group. We have estimated the average daily volume from the peak hour counts. The projected traffic volumes over the level crossing are summarised in the following table.

Table 7: Projected Traffic Volumes from site development

	Baseline Zoning	Proposed Zoning
AM Peak Hour	589	691
PM Peak Hour	632	751
Daily	6105	7210

Those projections make no allowance for traffic growth from other sources, which is estimated to be at a rate of 1.5% per year (linear), or a 15% increase over 10 years. Starting at 5,300 veh/d the future traffic volume without any development would increase by 795veh/d to 6095 veh/d. With other traffic growth allowed for, the traffic volumes used for this analysis are contained in the following table.

Table 8: Traffic volumes for assessment

	AADT	% Heavy
Existing	5300	7
Future (Baseline)	6900	7
Future (Proposed)	8005	7

5.3 Pedestrians and Cyclists

The estimated daily pedestrian volume recorded in ALCAM for the Ped Down crossing is 5 pedestrians per hour noting that child pedestrians are present, and 25 pedestrians per day.

Counts provided by BBO show 6 pedestrians crossed the railway between 07:45 and 08:45, and a total of 8 pedestrians crossed the railway between 14:30 and 17:30, with the highest count I any hour being 6 pedestrians between 15:45 and 16:45. All pedestrians crossed over the pedestrian level crossing on the north side of the road.

In the morning peak all pedestrians were pairs of school children. In the afternoon peak there were two instances of people pushing a pram and accompanying school children.

Two pedestrian movements across the crossing were generated by an elderly pedestrian visiting the convenience store.

From the count data provided the current ALCAM estimate of 5 ped/h or 25 ped/d is increased to 6 ped/h or 30 ped/h for the updated existing.

One cyclist was recorded in the afternoon, travelling over the roadway crossing southbound.

5.4 Conditions at Site Visit

A preliminary site visit was undertaken by the assessor with the applicant's consultant available to describe the proposal and to observe the visit.

This preview is not a full LCSIA as the site visit was not attended by KiwiRail or Waikato District Council staff.

5.4.1 Crossing Features

The railway is a single-track industrial branch serving a dairy factory at Hautapu. Upon enquiry KiwiRail could not provide a Signals and Interlocking [S&I] diagram for this location. It appears there are no signals or interlocking along this railway (apart from at the junction with the East Coast Main Trunk), and it is assumed the branch operates under a warrant system with only one train permitted on the branch at any one time. Combined with the single-track, there is no risk that a train stopped at a nearby signal would obscure sightlines along the railway to other trains.

KiwiRail's ALCAM LXM database records the railway at this location having a maximum rail line speed of 25km/h in both directions. The longest train length in LXM is 100m, and LXM records 2 trains per day.

The rail traffic is understood to consist of 4 movements per day on most days, being a shunt transferring a train of wagons to the Hautapu dairy factory with a returning light-locomotive movement in the morning, and the reverse in the afternoon.

The railway has a straight approach from the south and a broad curve and short straight from the north and is broadly level.

The road crossing is equipped with Flashing Lights and Bells [FLB's] with crossbuck signs on the left side of each approach, plus a third set opposite Matangi Road facing that approach. The road pavement and panel were in good condition and appeared to have been maintained recently. The road crosses the rail at close to a right angle and flange gaps were not excessive.

Figure 6: View of pavement at road crossing

Figure 7: View of pavement at road crossing

A paved footpath is present along the northern side of Tauwhare Rd. The down pedestrian crossing on the northern side of the road is equipped with fences, “Look for Trains” signs, tactile tiles and pavement markings, and an asphalt surface in good condition that appeared to have been recently maintained. Flange gaps appeared to be moderate.

Figure 8: View of pavement at pedestrian crossing

There is no footpath or pedestrian level crossing on the southern side of the road and no significant pedestrian generating activities on the southern side of the road east of the railway.

North of the crossing the railway curves to the west. Vegetation or boundary fences limit the sight distances to the north, and this is recorded in LXM as providing less than 50% visibility. Sightlines for each approach are described below.

The LXM data also notes there is a possible sun glare issue along the track at sunset and along the road from the east.

5.4.2 Approach from northeast on Tauwhare Rd

The eastern Tauwhare Rd approach is straight and generally flat in a semi-rural environment. The warning signs and crossing features are visible and conspicuous.

Figure 9: View on eastern approach showing correct advanced warning signs and markings

Robinson Ln is a minor Council access track with a gravel surface that appears as a private driveway and is understood to carry a similar level of traffic to a domestic driveway. The lane intersects Tauwhare Rd adjacent to the crossing. There is no warning signage on this lane. The flashing light aspects are just visible from this approach.

Figure 10: View along Robinson Ln from Tauwhare Rd, railway on left.

Figure 11: View on eastern approach showing Robinson Ln intersection close to crossing on left.

Figure 12: View from Robinson Ln intersection. Flashing lights on far side of road visible.

Sightlines along the railway from the eastern side of the road crossing are excellent to the south, but to the north are limited by planting along the railway and Robinson Lane.

Figure 13: View to left (south) along railway from eastern Tauwhare Rd approach

Figure 14: View to right (north) along railway from eastern Tauwhare Rd approach

The eastern side of the pedestrian crossing has fences guiding pedestrians to the crossing location. The fences are short and detours around the fences are easy to achieve, but the detours are not as easy to negotiate as the provided route, so are unlikely to be used.

Figure 15: View on eastern approach to pedestrian crossing

Figure 16: View on eastern approach to pedestrian crossing

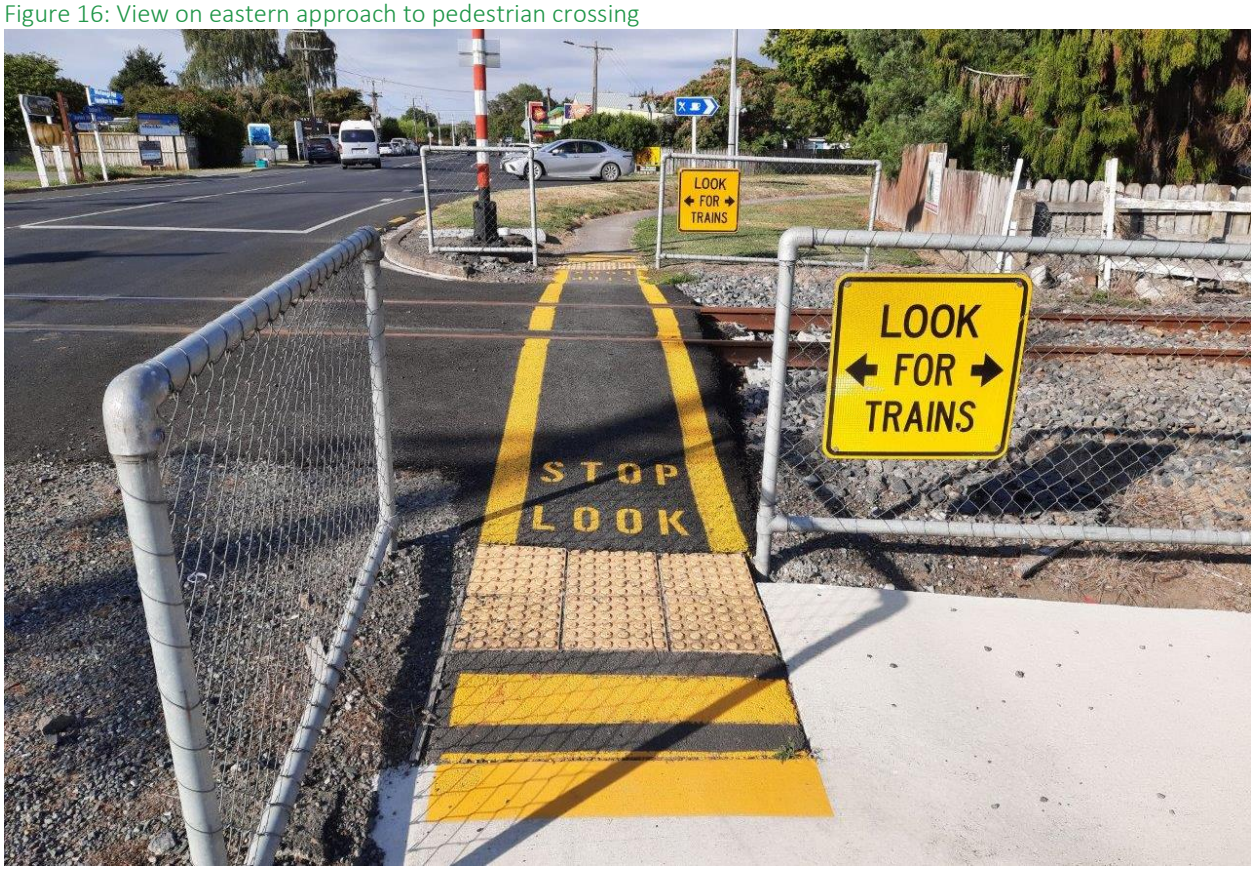


Figure 17: View on eastern approach to pedestrian crossing

The view to the north from the pedestrian crossing is limited by landscape planting located in Robinson Lane and it is recommended that this planting be modified to improve visibility along the railway from this location.

Figure 18: View north along railway from eastern side of pedestrian crossing showing vegetation in Robinson Ln restricting the view.

5.4.3 Approach from southwest on Tauwhare Rd

The western approach on Tauwhare Rd passes through an urban village environment. The approach is straight and generally flat. The crossing and crossing features are visible and reasonably conspicuous on this approach.

Figure 19: View on western approach showing advanced warning signs

The Matangi Rd intersection is located within 30m of the level crossing. Due to a No Stopping at all Times [NSAAT] parking restriction marked along the southern side of the road there is sufficient road width for westbound vehicles to pass a vehicle waiting to turn right into Matangi Rd.

Figure 20: View on western approach showing advanced warning sign and Matangi Rd intersection

Figure 21: View on western approach to vehicle crossing

Figure 22: View on western approach to pedestrian crossing

Figure 23: Western approach to pedestrian crossing

The view along the railway to the south is good.

Figure 24: View along railway to the south

The view along the railway to the north from the western side of the road and pedestrian crossings is constrained by boundary fencing and to a lesser extent by private vegetation on the properties adjoining the railway.

Figure 25: View along railway to the north

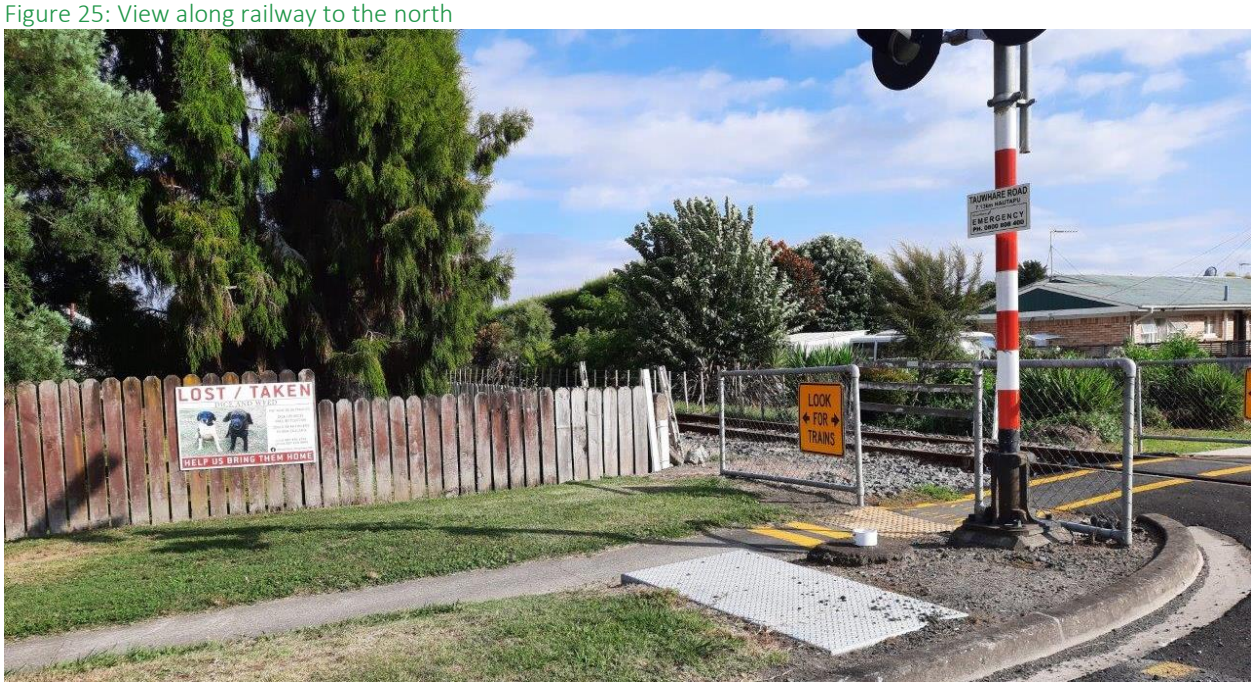


Figure 26: View along railway to the north

5.4.4 Approach from Matangi Rd

The Matangi Road approach is straight and generally flat and passes through an urban village environment and past a primary school. The necessary advanced warning signs are in place and sufficiently conspicuous. A dedicated FLB and crossbuck display is provided for this approach and is clearly visible from some distance back up Matangi Road and at the intersection.

Figure 27: View of advanced warning sign on Matangi Rd approach

Figure 28: View on Matangi Rd approach to intersection. Extra flashing lights and crossbuck visible from Matangi Rd

5.5 Existing Safety Issues

As noted above, sightlines to the north along the railway are constrained. There are no dedicated pedestrian FLB's, and pedestrian visibility of the road FLBs from the pedestrian waiting location is poor. The bells are clearly audible.

5.6 Proposed Measures

It is recommended that at a minimum vegetation within Robinson Lane that limits visibility to the north from the eastern side of the railway be modified to improve visibility in this area.

6 Level Crossing Safety Scores

6.1 ALCAM Score

The ALCAM LXM system is used to produce the ALCAM scores and represents 30 LCSS Points. Three scenarios have been created for this assessment in addition to the current LXM data.

Updated Existing

This uses existing traffic, characteristics, and control measures that are currently at the site, updating any incorrect or outdated data in LXM. The existing LXM characteristics and details were retained as they reflect the current conditions, except that:

- the number of daily train movements was updated from 2 to 4 to account for the returning light-locomotive movements.
- the AADT was reduced to 5300 veh/d based on peak-hour traffic counts.
- the percentage of heavy vehicles was increased to 7% based on historic Council counts.
- the road pavement condition was updated from Unknown to Good.
- The pedestrian volumes were updated to 6/hour and 30/day based on the counts provided.

Future (Baseline)

This applies future traffic volumes to the existing crossing, with future volumes estimated from 10 years of growth at 1.5% per annum plus development enabled by the Proposed District Plan zoning on the site. This proposal is based on an ADDT of 6900 veh/d for the roadway and 10 ped/h (50 ped/d) for the pedestrian crossing.

Future (Proposal)

This applies future traffic volumes to the existing crossing, with future volumes estimated from 10 years of growth at 1.5% per annum plus development enabled by the zoning proposed by Mowbray Group. This proposal is based on an ADDT of 8005 veh/d for the roadway and 20 ped/h (100 ped/d) for the pedestrian crossing.

Figure 29: ALCAM Data for Road Crossing

Scenario	LCSS Points	Fatality Return	Risk Change	Comments
Published ALCAM	3/30	7286		Based on AADT of 6513 veh/d and 2 trains/d. ALCAM Risk Score is 1.4 and the risk band is **LOW**
Updated Existing	6/30	5763		Based on AADT of 5300 veh/d and 4 trains/d. ALCAM Risk Score is 1.7 and the risk band is **LOW**
Future (Baseline)	7/30	5185	+12%	Based on AADT of 6900 veh/d and 4 trains/d. ALCAM Risk Score is 1.9 and the risk band is **MEDIUM-LOW**
Future (Proposal)	7/30	4869	+24%	Based on AADT of 8005 veh/d and 4 trains/d. ALCAM Risk Score is 2.1 and the risk band is **MEDIUM-LOW**

Figure 30: ALCAM Data for Pedestrian Crossing

Scenario	LCSS Points	Risk Change	Comments
Published ALCAM	1/30		Based on 2 trains/d, 5 ped/h, 25 ped/day. ALCAM Risk Score is 8,430 and the risk band is LOW
Updated Existing	2/30		Based on 4 trains/d, 6 ped/h, 30 ped/day. ALCAM Risk Score is 20,578 and the risk band is LOW
Future (Baseline)	4/30	+67%	Based on 4 trains/d, 10 ped/h, 50 ped/day. ALCAM Risk Score is 34,297 and the risk band is LOW
Future (Proposal)	7/30	+233%	Based on 4 trains/d, 20 ped/h, 100 ped/day. ALCAM Risk Score is 68,594 and the risk band is MEDIUM-LOW

6.2 Historical Crash and Incident Data

The crash and incident history is based on the number of records in the KiwiRail IRIS system and the number of rail-related crashes in the NZTA CAS system and represents 10 LCSS points.

There are no incidents in the 2010-2020 IRIS data at either crossing. IRIS score: 0/5.

A search of the CAS database for the ten-year period 2011-2020 contained a small number of crashes with none related to the level crossing. CAS score: 0/5

LCSS Points: 0/10

As there are no proposals to adjust the existing conditions of the level crossings, there is no predicted reduction in crashes for the future scenarios.

6.3 Site Specific Safety Scores

This site-based scores aim to reflect elements of the crossings that are not well covered or missing from the ALCAM risk rating. The Site Specific Safety score is assessed as a total score out of 30, and then factored to represent 10 LCSS points.

6.3.1 Road Crossing

Grounding out is not known to have occurred and is highly unlikely at this crossing.

The Matangi Road intersection lies to the south-west of the crossing with 27m of queueing distance between the near-side level crossing limit line and the Matangi Rd centreline to provide for vehicles waiting to turn right into Matangi Rd. This is not considered to be a high-risk short-stacking situation as the 27m length is sufficient to accommodate any one vehicle, and any vehicle in the right turn queue could travel south along Tauwhare Rd to move away from the crossing if needed. Queues were not observed to reach back close to the crossing during the traffic counts, and no short-stacking incident have occurred.

No accessways or driveways are located between the railway and the crossing limit lines.

Figure 31: Aerial photograph showing queueing distance for right turn into Matangi Rd

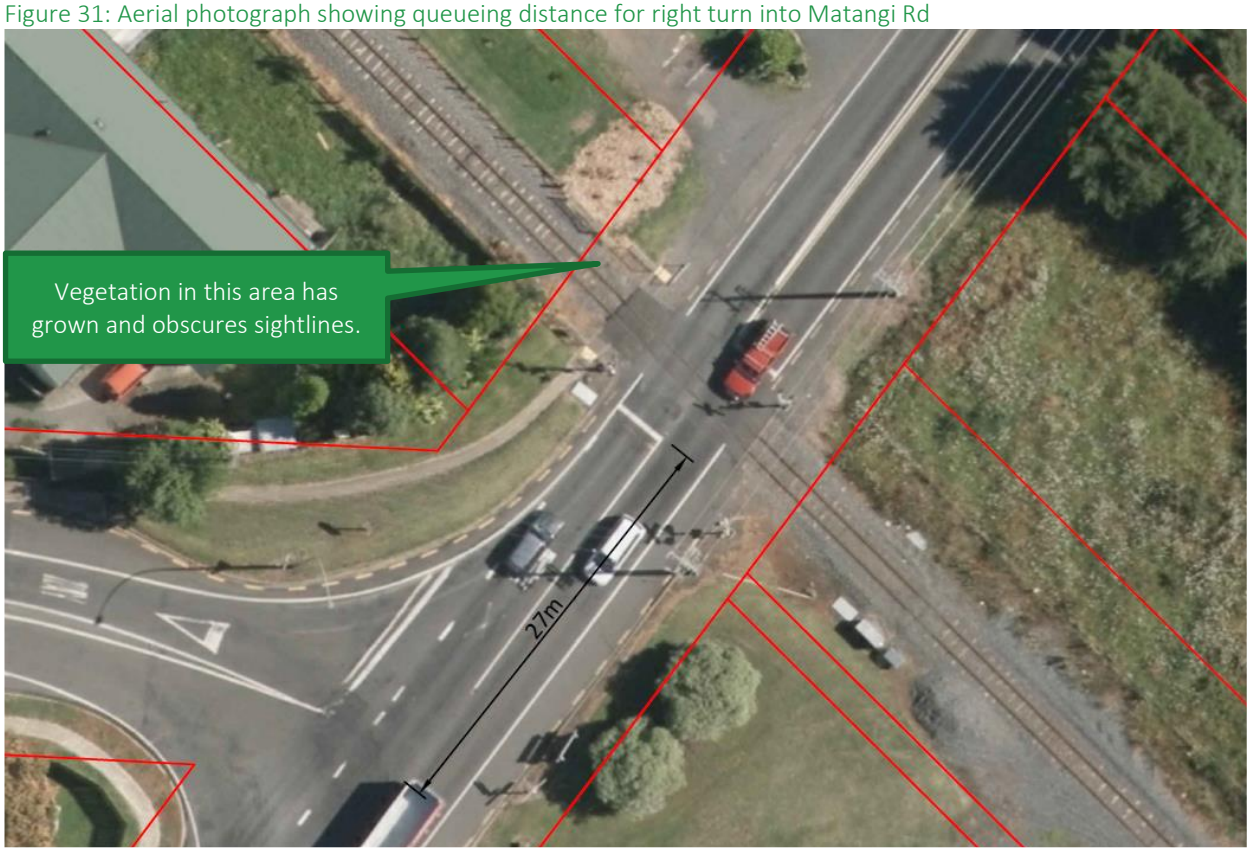


Table 9: Site Specific Safety Scoring for Roadway Crossing

SSSS Category	Scenario	Score
Red Flags	No red flag issues	0
Crossing controls	Flashing Lights and Bells	3/5
Queuing back from bisecting intersection	Queues form back to the crossing infrequently, one side	1/6
Short stacking/ grounding out	Short stacking not possible and no evidence of grounding out visible	0/10
Adjacent major commercial accessways/ side roads	There is a side road on the departure side of the crossing but there is sufficient room on the left-hand side of a right-turning vehicle for any following vehicles to pass safely.	0/6
Non-compliance with signs and warning systems	No non-compliance issues	0/3
Total SSS Score		**4/30**
LCSS Points		**1/10**

Table 10: Site Specific Safety Scoring for Pedestrian Crossing

SSSS Category	Scenario	Score
Crossing Type	Poor visibility, warning bells and “look for trains” signs present (i.e., FLBs are not installed for all pedestrian approaches).	7/10
Distraction/ Inattention	Peri-urban with crossings provided, but with relatively low user numbers. Assumes that distraction / inattention must occur from time to time.	2/5
Flange gap wheel entrapment for wheeled pedestrians	Small and well-maintained flange gaps that a wheeled pedestrian is unlikely to become trapped. Crossing is perpendicular to the rail tracks.	1/5
Volume of ‘vulnerable’ users (school children, elderly, etc)	<25 vulnerable user numbers per day	1/6
Cycle Patronage	No evidence of any cyclists using the crossing.	0/4
Total SSS Score		**11/30**
LCSS Points		**4/10**

While the future development scenarios would increase the number of people using the crossing, the number of vulnerable users is not expected to increase significantly.

6.4 Engineers' Assessment

The Engineers' assessment reflects the level of risk that the Locomotive Engineer and RCA Engineer perceive at the site. The score provides an indication of the risk of the site in comparison to other sites the Engineers' are familiar with in the vicinity and represents 10 LCSS Points.

As this preview assessment does not include input from KiwiRail or Council engineers, the scoring assumes a worst-case scenario with each engineer scoring the crossing badly. 10/10 LCSS Points.

6.5 Level Crossing Safety Score

The below table summarises the scoring of each category and the overall LCSS.

Table 11: Level Crossing Safety Score - Roadway Crossing

	ALCAM	History	SSSS	Engineers	Total Score	Risk Band
Existing	3/30	0/10	1/10	*0-10/10**	4 – 14 /60	LOW
Updated Existing	6/30	0/10	1/10	*0-10/10**	7 – 17 /60	LOW
Future (Baseline)	7/30	0/10	1/10	*0-10/10**	8 – 18 /60	LOW
Future (Proposal)	7/30	0/10	1/10	*0-10/10**	8 – 18 /60	LOW

Table 12: Level Crossing Safety Score – Pedestrian Crossing

	ALCAM	History	SSSS	Engineers	Total Score	Risk Band
Existing	1/30	0/10	4/10	*0-10/10**	5 – 15 /30	LOW
Updated Existing	2/30	0/10	4/10	*0-10/10**	6 – 16 /30	LOW
Future (Baseline)	4/30	0/10	4/10	*0-10/10**	8 – 18 /30	LOW
Future (Proposal)	7/30	0/10	4/10	*0-10/10**	11 – 21 /30	LOW – MEDIUM LOW

***** *Engineers scores have not yet been obtained.*

The roadway crossing is in the Low risk band for all scenarios, and therefore meets Criterion 1 without any physical changes to the crossing.

The pedestrian crossing is in the Low Risk band for all but the Future (Proposal) Scenario. That scenario would be in the Low Risk band if the Engineers' score is 8/10 or less, otherwise it would be Medium-Low. The pedestrian crossing therefore meets Criterion 1 without any physical changes to the crossing.

7 Recommendations

7.1 Roadway Crossing

The roadway crossing is in good condition and is consistently in the Low risk band for all scenarios, no doubt due in part to the low number of train movements on the railway. There are no recommendations for improvements to the roadway crossing.

7.2 Pedestrian Crossings

The pedestrian crossing is physically in a good condition with a moderate level of provision, although sightlines to the north are limited.

The pedestrian crossing is in the Low risk band for all scenarios, or potentially the Medium-Low risk band for the Future (Proposal) Scenario if the engineers scores were high, the crossing meets KiwiRail Criterion 1 for all scenarios, indicating that an upgrade to the crossing is not required.

Improvements that could be optionally be made at this crossing to address the poor sightlines to the north include by addressing the vegetation on the north-eastern corner of the crossing. This vegetation is in either the KiwiRail reserve or the road reserve. Another measure that would assist in mitigating the sightline issue would be to add flashing light displays clearly visible to pedestrians close to the crossing. This may also assist in making the flashing lights more visible to any traffic exiting the nearby Lane.

Despite the LCSIA process indicating that no changes to the level crossings are required to meet KiwiRail criteria, it is recommended that the developer liaise with KiwiRail and Council over the potential for a footpath and a pedestrian level crossing to be provided on the south side of Tauwhare Road, particularly if the developer intends to develop Site 2 on the eastern side of the railway for any activity that may generate pedestrian traffic.

7.3 Recommended LXM Updates

The following section lists the characteristics of the crossing that were noted to be different to the existing LXM database. These have not been updated as part of the LCSIA process and are required to be changed in the LXM programme by KiwiRail.

7.3.1 Road Crossing

Volumes

Based on an estimate of daily traffic based on the peak-hour traffic counts, the existing AADT appears to be a little high, and could be reduced to 5,300 veh/day, and updated to 7% HCV based on the latest Council traffic counts in the area.

Rail Vehicles

The LXM database has a figure of 2 trains per day. There appears to be 2 train shunts plus 2 light-loco movements on most days, so recommended to increase to 4 train movements (at this crossing and all others along this line).

Characteristics

Panel Surface Condition – change from Unknown to Good.

7.3.2 Pedestrian Crossing

Volumes

Based on the count data provided, increase the volume of pedestrians to 6 per hour, and pro-rata they daily estimate to 30 per day.

Rail Vehicles

The LXM database has a figure of 2 trains per day. There appears to be 2 train shunts plus 2 light-loco movements on most days, so recommended to increase to 4 train movements (at this crossing and all others along this line).

Characteristics

Panel Surface Condition – change from Unknown to Good.

8 Conclusion

This report describes a partial Level Crossing Safety Impact Assessment that has been undertaken in response to a potential Change in Use depending on the zoning that is adopted for the land. The LCSIA process is not yet complete as a site visit including KiwiRail and Council representatives has not yet been undertaken or their feedback incorporated into the assessment.

This Preview report indicates that the possible change of use would result in a full LCSIA concluding that KiwiRail criteria would be met for all scenarios, regardless of the engineers' scores, and as a result changes to the level crossings are not required because of the possible change in use.

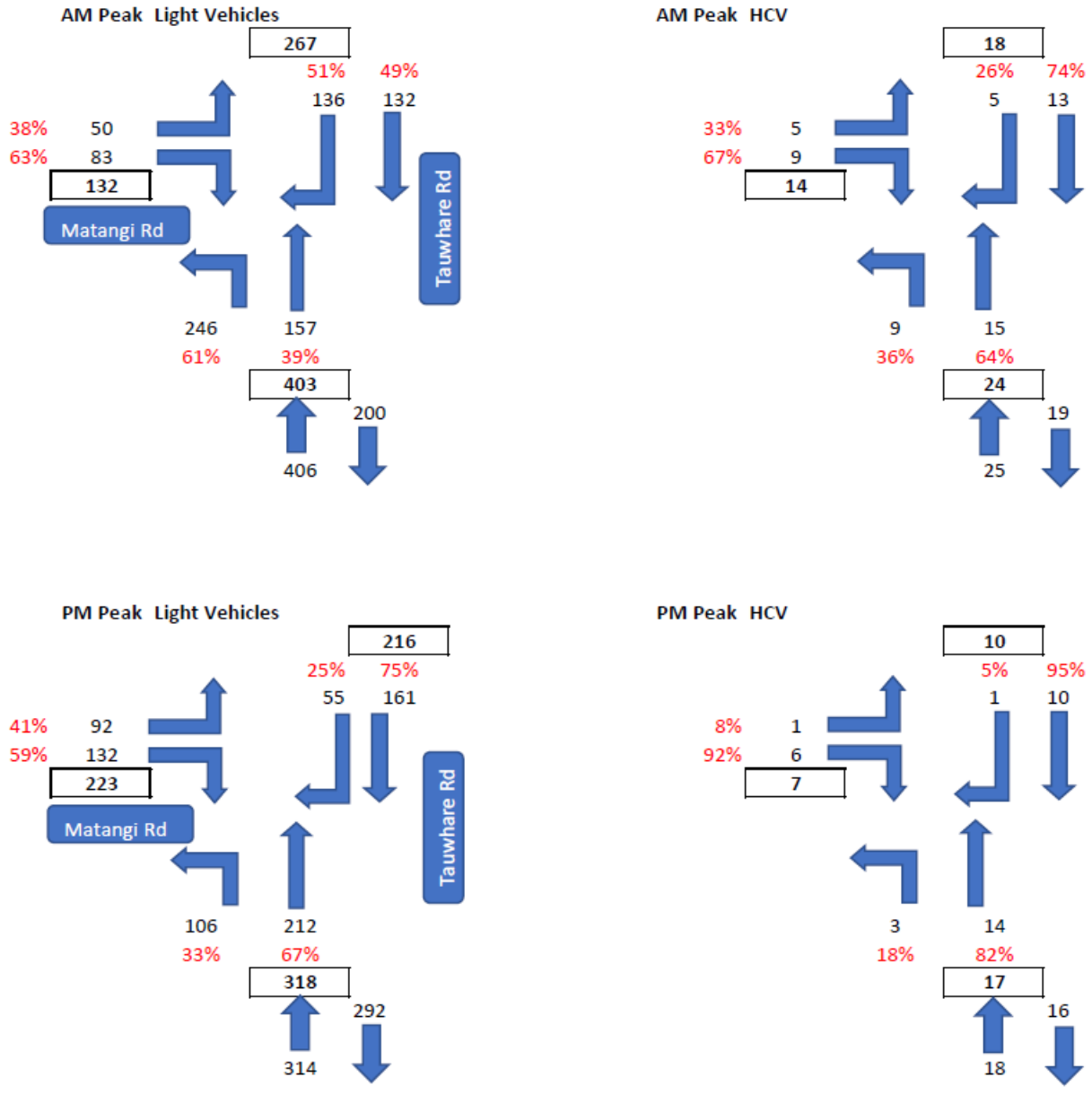
Irrespective of any change in use that may occur it is recommended that Council and KiwiRail improve sightlines at the crossings by modifying the vegetation on the north-eastern corner of the crossing.

If the submission to change the zoning on the land is accepted and development occurs on both sides of the railway it may be appropriate for the developer to liaise with Council and KiwiRail over provision of a footpath and a new pedestrian level crossing on the southern side of Tauwhare Road as no pedestrian facilities are currently provided there.

Appendix A – Counts

Existing Counts

Average Surveyed Turning Movement Peak Hour Volumes (surveys on Tues and Weds 27th / 28th October 2020)



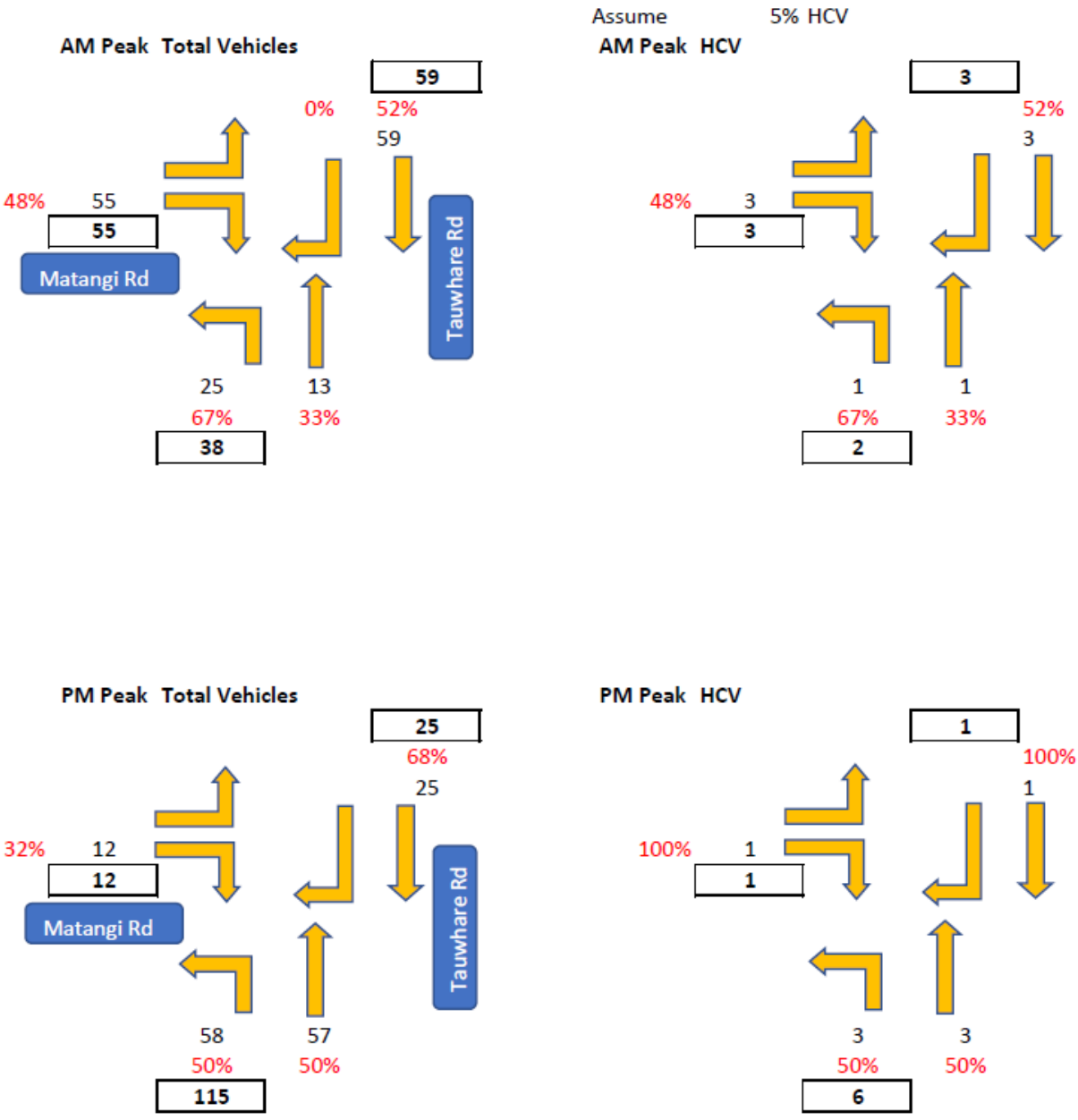
Total traffic volume over level crossing:

- AM Peak: 475 light + 38 heavy = 513 veh/h (7.4% HCV)
- PM Peak 520 light + 26 heavy = 546 veh/h (4.8% HCV)

Estimate of daily volume, (AM + PM) x 5 = (513 + 546) * 5 = 5,295 veh/d.

Projected Future Counts – Existing Zoning

Predicted "WDC Baseline" and Scenario 1,2 and 3 Development Volumes

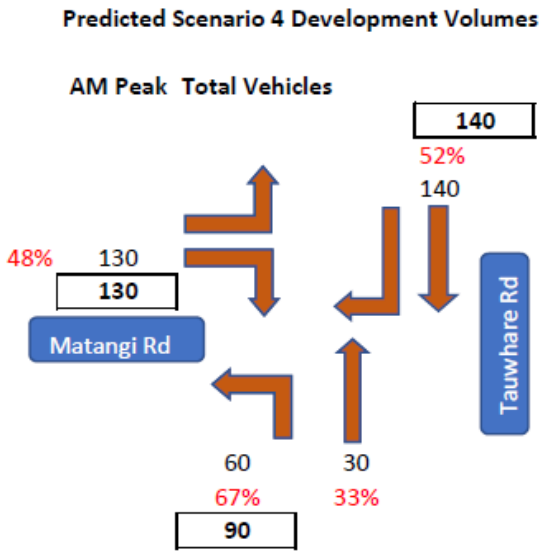


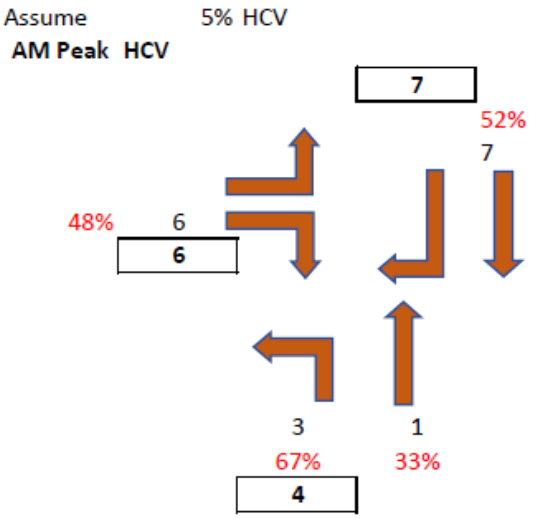
Total traffic volume over level crossing:

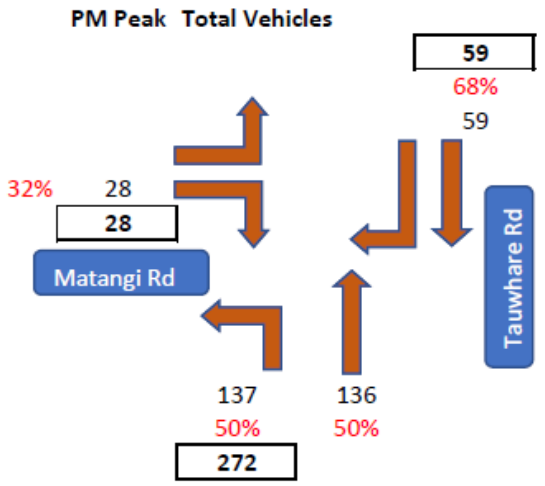
- AM Peak: 475 + 72 light + 38 + 4 heavy = 589 veh/h (7.1% HCV)
- PM Peak 520 + 82 light + 26 + 4 heavy = 632 veh/h (4.7% HCV)

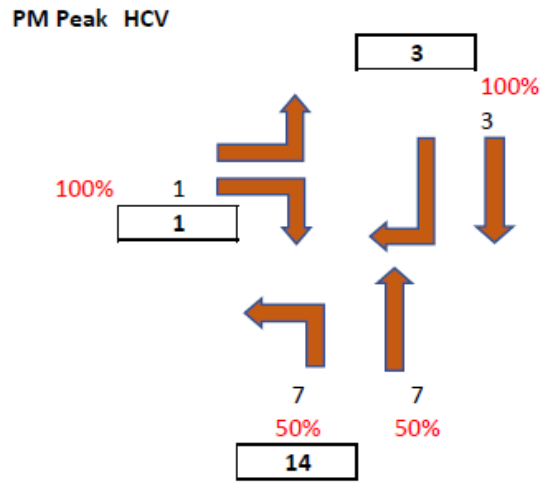
Estimate of daily volume, (AM + PM) x 5 = (589 + 632) * 5 = 6,105 veh/d.

Projected Future Counts – Proposed Zoning







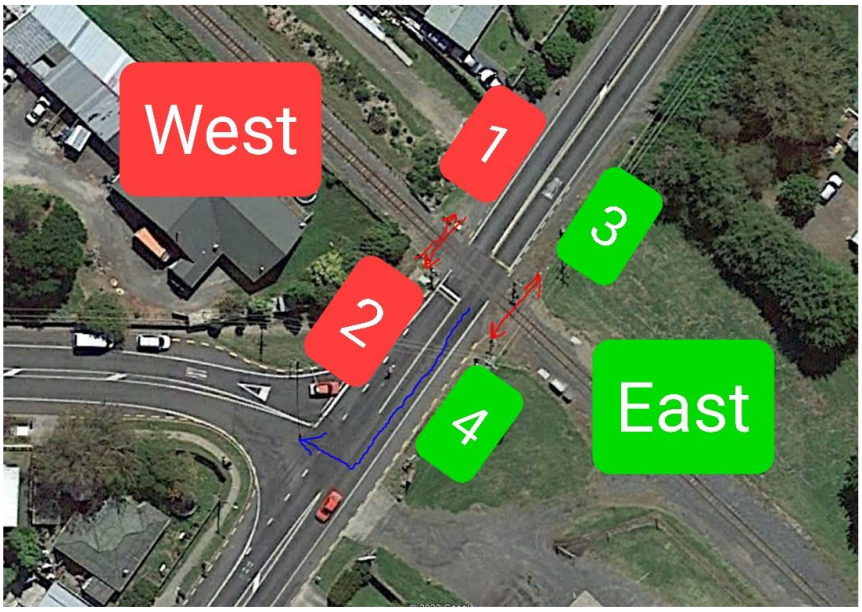


Total traffic volume over level crossing:

- AM Peak: 475 + 170 light + 38 + 8 heavy = 691 veh/h (6.7% HCV)
- PM Peak 520 + 195 light + 26 + 10 heavy = 751 veh/h (4.8% HCV)

Estimate of daily volume, (AM + PM) x 5 = (691 + 751) * 5 = 7,210 veh/d.

Pedestrian Counts



MATANGI RAIL CROSSING SURVEY						
	Pedestrian Movements				Tauwhare Road Southbound Traffic	
	West Sidewalk		East Sidewalk		Vehicle Blocks (from Right-Turning Traffic)	
	1 (Northbound)	2 (Southbound)	3 (Northbound)	4 (Southbound)	Quantity of Blocks	Quantity of Cars Blocked
0745-0800	0	2	0	0	1	2
0800-0815	0	2	0	0	0	0
0815-0830	0	2	0	0	2	3
0830-0845	0	0	0	0	0	0
0845-0900	0	0	0	0	0	0
Interval						
1430-1445	0	0	0	0	0	0
1445-1500	0	1	0	0	0	0
1500-1515	7	0	0	0	0	0
1515-1530	0	0	0	0	0	0
1530-1545	4	0	0	0	1	8
1545-1600	0	1	0	0	0	0
1600-1615	0	3	0	0	0	0
1615-1630	1	1	0	0	1	1
1630-1645	0	1	0	0	0	0
1645-1700	1	0	0	0	1	1
1700-1715	0	0	0	0	0	0
1715-1730	0	1	0	0	2	11