

Local Intersection

- 3.9 The Tram Road / McHughs Road / Bradleys Road intersection is located adjacent to the northwest corner of the plan change site. Tram Road provides both a left and right turning bay in each direction at the four arm intersection. A flush median is provided on both Tram Road approaches to the intersection.
- 3.10 McHughs Road is flared at the intersection with Tram Road, and provides a separate left hand turning lane and a straight through/right turn lane.
- 3.11 Bradleys Road is also flared at the intersection with Tram Road but separate through and left turning lanes are not marked out. The overall layout of the intersection is shown in **Figure 3.5**.

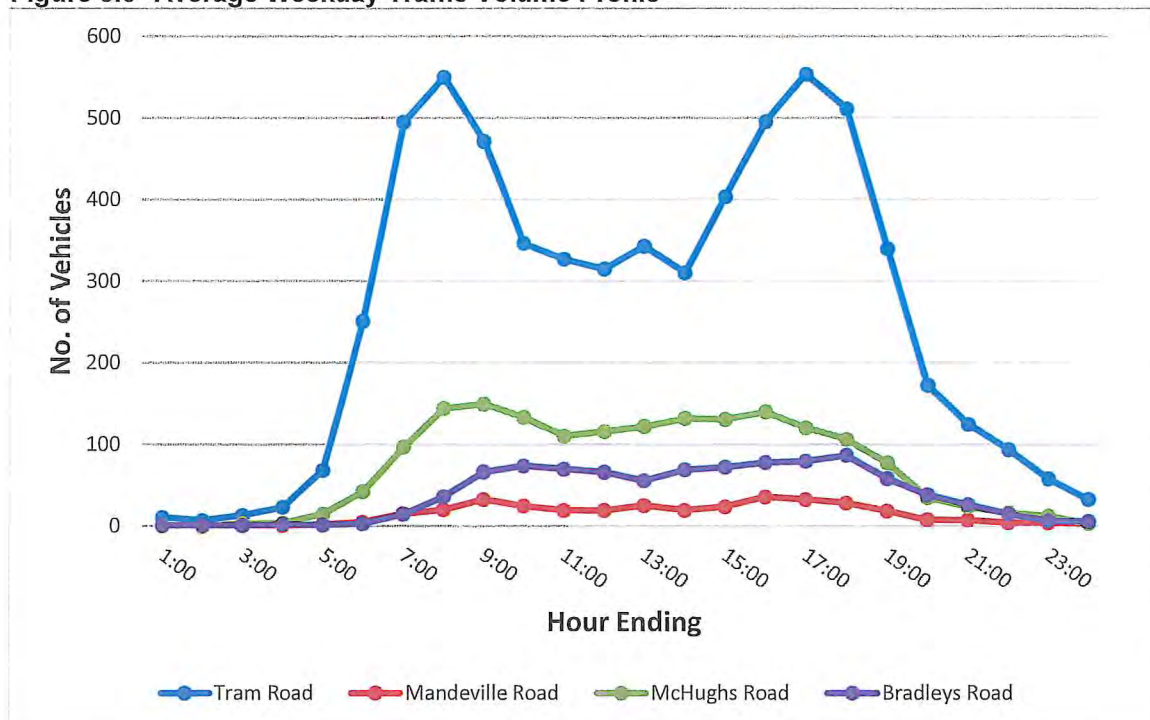
Figure 3.5 Tram Road/McHughs Road/Bradleys Road Intersection



Existing Traffic Flows

- 3.12 Traffic count data for the roads in the vicinity of the plan change site was obtained from Waimakariri District Council. All of the count data obtained was recorded in October 2013, except the Bradleys Road count data which was recorded in October 2010.
- 3.13 The locations of the nearest traffic counts are as follows;
- Tram Road 400m east and 600m west of Bradleys Road
 - McHughs Road 500m south of Tram Road
 - Mandeville Road 200m south of Truro Close
 - Bradleys Road 1700m south of Mill Road
- 3.14 It should be noted that these counts have been undertaken with axle sensors, and divided by 2 to give vehicle counts. As a result, any roads with a high proportion of heavy vehicles are likely to show artificially high traffic volumes, as one 6-axle truck would count as 3 vehicle movements.
- 3.15 The daily traffic profile for Tram Road, Mandeville Road, Bradleys Road and McHughs Road are shown in **Figure 3.6**.

Figure 3.6 Average Weekday Traffic Volume Profile



3.16 As shown in the figure above, there are two distinct peak periods throughout the day on Tram Road occurring from 7am to 8am and 4pm to 5pm. This is commensurate with the use of the road by commuter traffic. There are approximately 550 vehicle movements (both directions) in the morning peak hour and 554 vehicle movements (both directions) in the evening peak hour.

3.17 Due to the type of trip counter used for these surveys the directionality of the traffic flows cannot be determined. However, previous analysis carried out on the directional data for a nearby parallel road, Oxford Road, was used to indicate the directional split of movements in each of the peak periods. This data shows a direction split in the order of 65% eastbound and 35% westbound in morning peak hour and 64% westbound and 36% eastbound for the evening peak hour.

3.18 Mandeville Road, Bradleys Road and McHughs Road all show comparatively steady levels of vehicle volumes throughout the day. The peak hourly traffic volumes on these roads does not exceed 150 vehicles per hour.

Existing Intersection Performance

3.19 The existing performance of the Tram Road / McHughs Road / Bradleys Road intersection has been modelled using SIDRA Intersection software. SIDRA Intersection offers a range of outputs for any given model. The outputs selected for this analysis are:

- Degree of Saturation (DOS)
The DOS is a ratio of the demand placed on the intersection against the capacity of the intersection. A DOS equal to 1.0 indicates that the intersection is operating at its maximum theoretical capacity.
- Average delay (seconds)
Average delay is the average delay experienced by vehicles travelling through an intersection and includes deceleration, queuing, stopping and acceleration.
- Level of Service (LOS)

The LOS generally describes the traffic conditions in terms of travel time, volume, capacity, freedom to manoeuvre and convenience. The LOS ranges from A to F where A represents the least impediment to vehicle movement and F represents heavy congested conditions.

- 95th percentile back of queue and queue distance (metres)

The 95th percentile back of queue and queue distance is the value below which 95% of all observed queue lengths fall (i.e. 5% of all observed queue lengths exceed this value).

- 3.20 A summary of SIDRA outputs for the existing traffic flows during the evening peak hour through the intersection are provided below in **Table 3.1**. Turning movement surveys have not been undertaken at the intersection, but have been approximated from traffic flow and directional data previously provided by Council.

Table 3.1 Existing Intersection Performance – Tram Road/McHughs Road/Bradleys Road

Movement	Degree of Saturation	Average Delay (s)	Level of Service	95% Back of Queue (veh)	95% queue Distance (m)
South Approach: McHughs Road					
Left	0.018	10.3	LOS B	0.1	0.4
Through	0.188	16.0	LOS C	0.7	5.2
Right	0.188	16.4	LOS C	0.7	5.2
East Approach: Tram Road					
Left	0.033	7.9	LOS A	0.0	0.0
Through	0.126	0.0	LOS A	0.0	0.0
Right	0.056	8.9	LOS A	0.2	1.6
North Approach: Bradleys Road					
Left	0.020	9.5	LOS A	0.1	0.5
Through	0.083	14.9	LOS B	0.3	2.2
Right	0.083	15.7	LOS C	0.3	2.2
West Approach: Tram Road					
Left	0.005	7.9	LOS A	0.0	0.0
Through	0.065	0.0	LOS A	0.0	0.0
Right	0.002	9.3	LOS A	0.0	0.1
Intersection	0.188	5.1	N/A	0.7	5.2

- 3.21 Table 3.1 indicates that the intersection operates efficiently with all approaches having a LOS C or better and with drivers experiencing minimal delays.

Public Transport

- 3.22 There are no public transport bus routes operating through Mandeville. The closest services are the Blue Line and Route 95 which travel along Main North Road. This is approximately 10km from the site. Public Transport is therefore currently not considered to be a viable mode of transport to/from the site.

Cycle and Pedestrian Environment

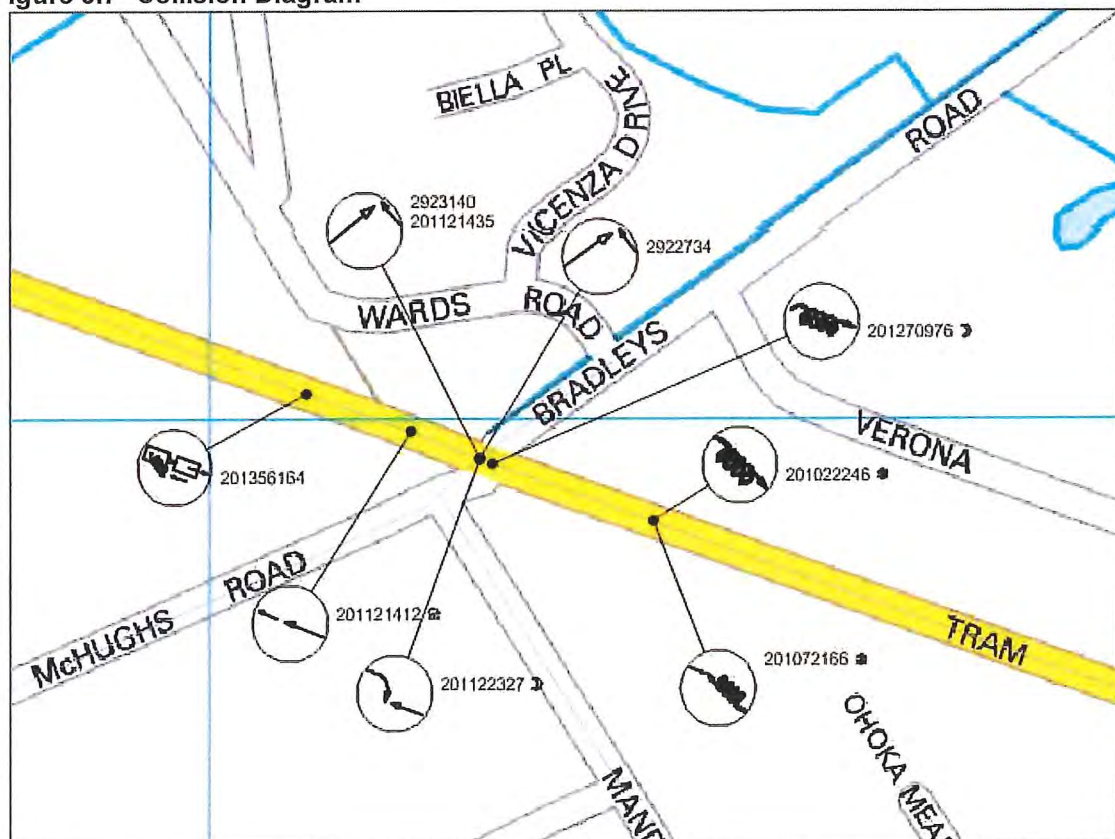
- 3.23 There is currently no existing dedicated provision for cyclists or pedestrians in the vicinity of the plan change site.

Road Safety

- 3.24 A search of the NZTA Crash Analysis System (CAS) database for the period 2009-2013 (inclusive) was carried out. This identified nine crashes within the vicinity of the site.

- 3.25 None of the crashes resulted in fatalities, one crash resulted in serious injuries and six crashes resulted in minor injuries. No injuries were reported for the remaining three crashes.
- 3.26 All of the reported crashes occurred on Tram Road and involved:
- One driver losing control as they were going too fast and the road surface was under construction / maintenance
 - Two drivers losing control due to the road conditions being icy
 - One driver failing to notice the car in front slowing down
 - One driver with a load on a SUV that was not secured and hit a tree
 - One driver crossing at the intersection who failed to stop as they were suddenly ill with no warning
 - Three drivers failing to give way to non-turning traffic as they failed to look when required to give way to traffic from another direction.
- 3.27 A collision diagram is shown in **Figure 3.7** and the full CAS report is contained in **Appendix A**.
- 3.28 Five of the crashes occurred at the intersection and the main trend appears to be drivers failing to look and give way to non-turning traffic.
- 3.29 The icy conditions of the road was a factor in two of the reported crashes. These occurred to the east of the proposed access on Tram Road where there is a row of tall trees lining the northern side of Tram Road which is likely to cause shading of the road.

Figure 3.7 Collision Diagram



4 PROPOSED PLAN CHANGE

Outline Development Plan

- 4.1 An Outline Development Plan (ODP) has been developed for Plan Change 33 as shown in **Figure 4.1**. The ODP indicates the area proposed for rezoning to Residential 4A comprising approximately 54,100m² and the Business 4 zone comprising approximately 6,200m². The existing reserve (4,700m²) located adjacent to the McHughs / Tram Road intersection is also contained within the ODP area.
- 4.2 The Business 4 zoned area will comprise the following;
- Commercial building/s which will have a combined maximum floor area of 1,300m² gross floor area (GFA)
 - One vehicular access from Mandeville Road permitting both ingress and egress movements
 - From Tram Road, there will be one left turn ingress point for service vehicles, one left turn ingress point for other vehicles and one left turn egress point

Figure 4.1 Mandeville Road / McHughs Road Outline Development Plan



5 APPRAISAL OF TRANSPORT EFFECTS

Current Traffic Generation of the Site

- 5.1 The Plan Change site is currently occupied by a mix of rural-residential properties and low intensity farming purposes and therefore has very low existing trip generation. For the purposes of assessing the trip generation of the proposed Business 4 zoning and the effects on the receiving transport network, it has been assumed that the current trip generation of the site is zero.

Traffic Generation and Trip Distribution

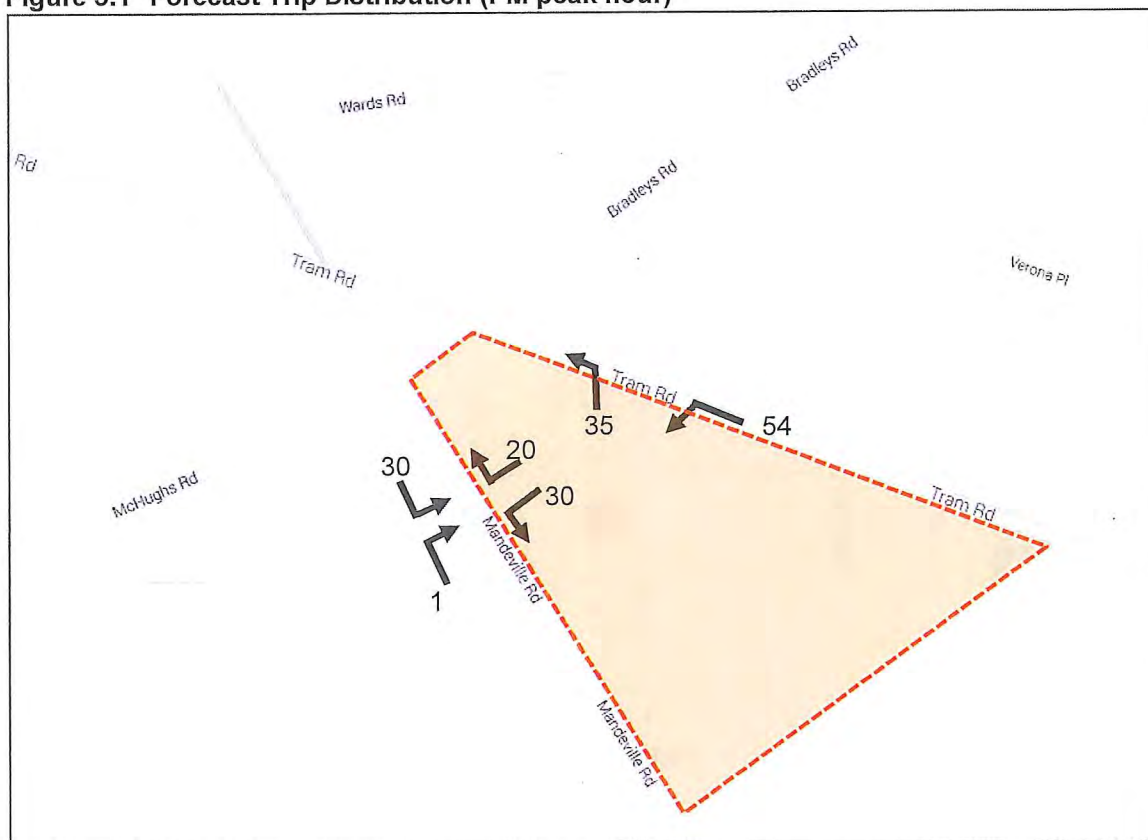
- 5.2 The exact nature of the activities to be established on site as part of the Business 4 zone has not been determined, although it is expected that activities could potentially include the following;
- General store
 - Café
 - Bakery
 - Restaurant
 - Medical centre
 - Other retail
- 5.3 To assist in determining the trip generation of the Business 4 activity within PC33, trip generation rates have been obtained using the Trips Database (TDB). TDB is New Zealand's pre-eminent source of trips and parking information for land use activities. Using the TDB, the expected trip generation for the site has been estimated and is shown in **Table 5.1**.

Table 5.1 Estimated Trip Generation Rates

Land Use		Trip Generation	
		PM (vph)/100m ²	Daily (vpd)/100m ²
Weekday	Restaurants	12.6	64.7
	Shops	11.8	76.9
	Shopping Centre (small <2,000m ²)	16.0	133.0
	Medical	12.0	56.4
	Other commercial	-	43.0
Average		13.1	75
Proposed Plan Change (1,300m²)		170	975

- 5.4 Table 5.1 shows that approximately 170 trips in the peak hour and 975 trips daily will be generated by the activity on site. It is assumed that the peak hour trips will be evenly split between ingress and egress movements (85 in and 85 out).
- 5.5 The assignment of trips has been determined assuming a PM peak hour directional flow of 64% westbound and 36% eastbound on Tram Road and the magnitude of flows on Mandeville Road and McHughs Road compared to Tram Road as discussed previously in Section 3.
- 5.6 The arrival and departure patterns of traffic movement to and from the PC33 site during the PM peak hour is illustrated in **Figure 5.1**.

Figure 5.1 Forecast Trip Distribution (PM peak hour)

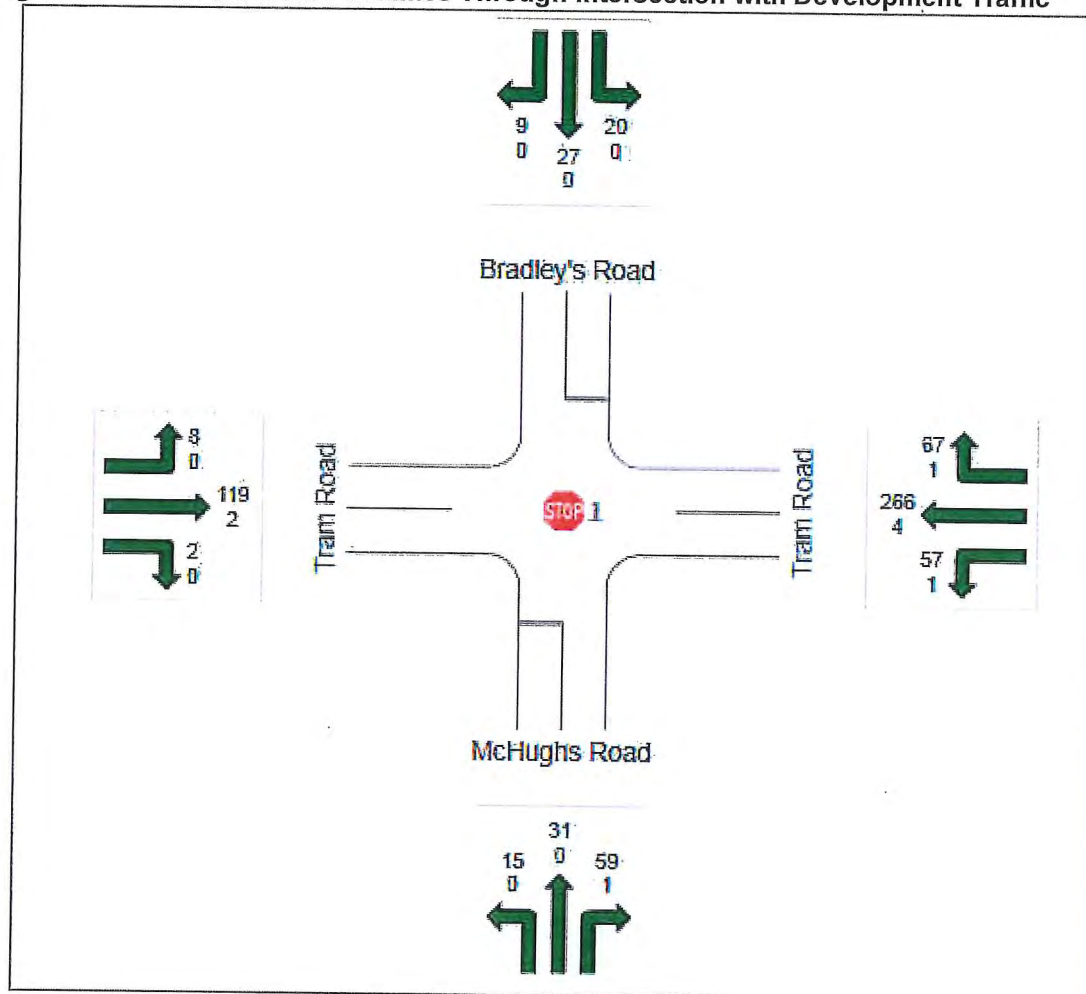


Future Intersection Performance

5.7

Figure 5.1 indicates that a proportion of the trips are likely to travel through the Tram Road / McHughs Road / Bradleys Road intersection. The forecast turning movements, including both light and heavy vehicles, through the intersection are shown in **Figure 5.2**.

Figure 5.2 Forecast Traffic Volumes Through Intersection with Development Traffic



- 5.8 A SIDRA analysis was carried out for the Tram Road / McHughs Road / Bradleys Road intersection during the weekday PM peak hour with the additional trips generated by the development included. The results of the analysis are shown in **Table 5.2**.

Table 5.2 Future Intersection Performance with Development Trip Generation

Movement	Degree of Saturation	Average Delay (s)	Level of Service	95% Back of Queue (veh)	95% queue Distance (m)
South Approach: McHughs Road					
Left	0.019	10.5	LOS B	0.1	0.5
Through	0.245	17.5	LOS C	1.0	7.1
Right	0.245	17.9	LOS C	1.0	7.1
East Approach: Tram Road					
Left	0.033	7.9	LOS A	0.0	0.0
Through	0.145	0.0	LOS A	0.0	0.0
Right	0.056	8.9	LOS A	0.2	1.6
North Approach: Bradleys Road					
Left	0.020	9.5	LOS A	0.1	0.5
Through	0.089	15.6	LOS C	0.3	2.4
Right	0.089	16.5	LOS C	0.3	2.4
West Approach: Tram Road					

Movement	Degree of Saturation	Average Delay (s)	Level of Service	95% Back of Queue (veh)	95% queue Distance (m)
Left	0.005	7.9	LOS A	0.0	0.0
Through	0.065	0.0	LOS A	0.0	0.0
Right	0.002	9.5	LOS A	0.0	0.1
Intersection	0.847	5.4	N/A	5.7	7.1

5.9 Table 5.2 indicates that the intersection will continue to operate satisfactorily with the additional movements from the development with all approaches having a LOS C or better.

5.10 A substantial amount of growth is projected for the Mandeville area, estimated to be in the region of 50% by the year 2022. To assess the performance of the intersection in the future year with this increase in residential properties, the existing number of vehicle movements has been doubled (a coarse and highly conservative approach). These have then been added to the trips generated by the proposed development. The long term post development operation of the intersection is shown in **Table 5.3**.

Table 5.3 Future Intersection Performance with Residential Growth.

Movement	Degree of Saturation	Average Delay (s)	Level of Service	95% Back of Queue (veh)	95% queue Distance (m)
South Approach: McHughs Road					
Left	0.055	13.0	LOS B	0.2	1.3
Through	1.306	350.8	LOS F	32.3	227.6
Right	1.306	351.2	LOS F	32.3	227.6
East Approach: Tram Road					
Left	0.065	7.9	LOS A	0.0	0.0
Through	0.271	0.0	LOS A	0.0	0.0
Right	0.129	9.6	LOS A	0.5	3.7
North Approach: Bradleys Road					
Left	0.047	10.2	LOS B	0.2	1.2
Through	0.496	43.9	LOS E	2.0	14.4
Right	0.496	44.7	LOS E	2.0	14.4
West Approach: Tram Road					
Left	0.009	7.9	LOS A	0.0	0.0
Through	0.130	0.0	LOS A	0.0	0.0
Right	0.006	11.5	LOS B	0.0	0.2
Intersection	1.306	49.1	N/A	32.3	227.6

5.11 Table 5.3 indicates that the through and right turn movements from McHughs Road will start to experience delays during the peak hour. Some minor delays may also start to occur on the through and right turn movements of the Bradleys Road approach. The other approaches of the intersection generally perform satisfactorily. The detailed SIDRA outputs for the intersection can be found in **Appendix B**.

Parking Demand

5.12 The combined size of any buildings within the Business 4 zone will be no more than 1,300m² GFA and while the exact nature of the activities to be established on site has not been determined it is expected that these may include a café, general store, diary and restaurant.

- 5.13 TDB has been used to assist in determining the anticipated parking demand of the activities. The average parking demand from the land use activities classified as 'restaurants', 'shops', 'shopping centres (small)', 'medical' and 'other commercial' (mainly consisting of retail) are shown in **Table 5.4**. The TDB Data indicates that the site could generate a parking demand that requires approximately 79 car park spaces to be provided.

Table 5.4 Estimated Parking Demand Rates

Land Use		Peak Total Parking Demand Rates
		GFA (spaces/100m ² GFA)
Weekday	Restaurants	10.2
	Shops	2.0
	Shopping Centre (small <2,000m ²)	3.6
	Medical	3.9
	Other commercial	11.0
Average		6.1
Proposed Plan Change (1,300m²)		79

- 5.14 To calculate the statutory parking provision required by the Waimakariri District Plan, the activities of the Business 4 zone can be classified as retail activity. Retail activity under the District Plan requires a minimum on-site parking provision of 1 space per 45m² net floor area plus 1 space per 2 employees in attendance at any one time.
- 5.15 Assuming the typical ratio of net floor area to gross floor area is about 80%, the proposed 1,300m² GFA would have a net floor area of 1,040m² and generate a customer parking demand of 23 spaces. Assuming approximately 20 staff will be on site at any one time, a further 10 spaces would be required, bringing the total number to 33 car park spaces to be provided on site.
- 5.16 There is considerable variation between the TDB estimated parking demand of 79 spaces and 33 spaces as required by the Waimakariri District Plan. Given the rural location of Mandeville, it is anticipated that the site would generate a demand closer to the TDB value as it is less likely that customers would walk or cycle to the site due to the dispersed nature of residential dwellings within the Business 4 catchment. Because of this, the District Plan requirement to provide 33 car park spaces is likely to be insufficient to accommodate the parking demand of the site.
- 5.17 The size of the area which will be occupied on site by the car park spaces must also be taken into consideration. A balance must be found between the number of spaces provided and the amount of land which should be set aside to accommodate the likely parking demands.
- 5.18 As a guide, each parking space requires approximately 25m² of land to physically accommodate the parking space and the manoeuvring area from the aisle. The provision of 33 parking spaces requires approximately 825m² of land compared to 1975m² for 79 parking spaces.
- 5.19 With consideration of the above, it is recommended that the Plan Change should provide car parking within a range of 45 – 65 parking spaces provided on site including 4 accessible spaces.

Active Transport

- 5.20 As discussed previously, there is no existing dedicated provision for cyclists or pedestrians in the vicinity of the site. The high speed nature of Tram Road is likely to be an impediment to safe walking and cycling and deter people from using active modes of transport when travelling to the plan change site.

- 5.21 To promote walking and cycling as realistic modes of transport for people getting to and from the site, improvements to the walking and cycling network will be required including the formation of paths and crossing points. This is discussed further in Section 6.

Road Safety

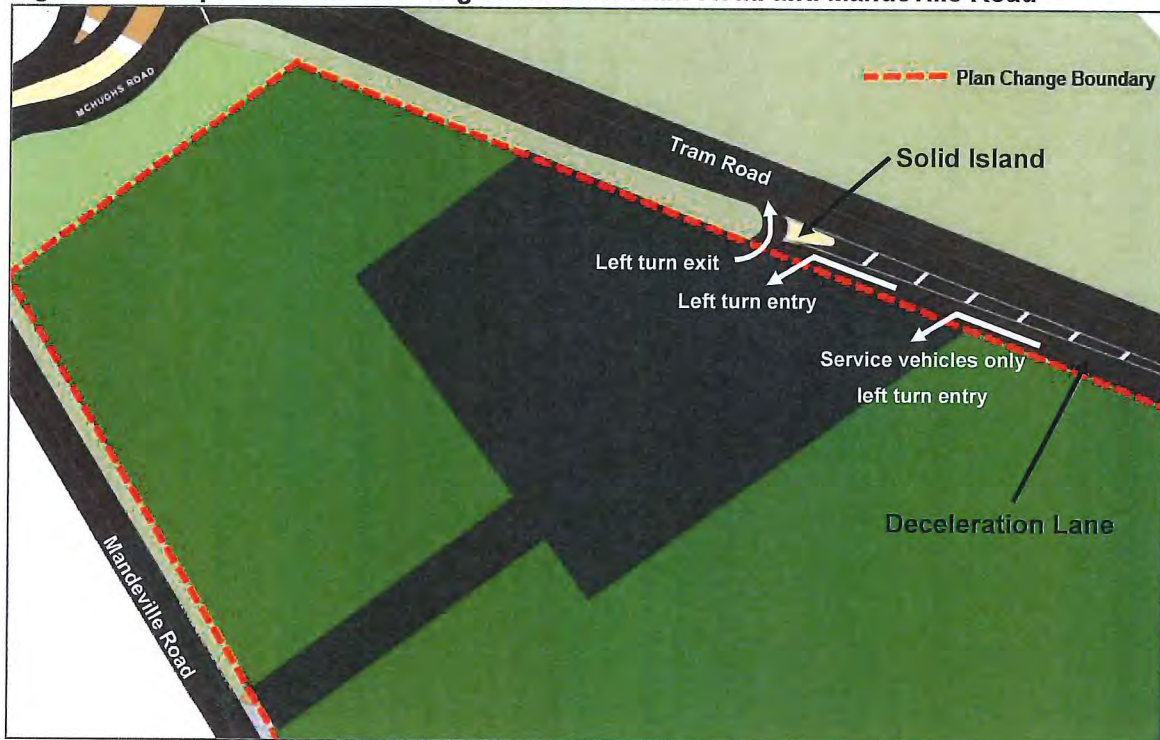
- 5.22 Overall, the CAS records to not indicate any road safety issues which would be exacerbated by the traffic associated with the proposed development. A number of recommendations are outlined in the Section 6 regarding the layout and operation of the accesses to ensure the safe and efficient operation of the road network.

6 SITE AND NETWORK LAYOUT CONSIDERATIONS

Site Access

- 6.1 The site is proposed to have formed accesses from both Tram Road and Mandeville Road as shown in **Figure 6.1**. On Tram Road there will be one left turn ingress point for service vehicles only, one left turn ingress point for other vehicles and one left turn only egress point. Service vehicles are expected to enter through the service lane left turn entry and exit via the Mandeville Road access. The Mandeville Road access will permit all movements into / out of the site. The requirements for the safe and efficient operation of these accesses are discussed below.

Figure 6.1 Proposed Access Arrangement from Tram Road and Mandeville Road



Tram Road Access

- 6.2 The Tram Road access is proposed to operate as a left-in / left-out only for safety reasons. A crash prediction analysis was previously undertaken to determine the implications of an all movement priority 'T' intersection from Tram Road into the proposed Business 4 area. This indicated an increase in crashes if an all movement 'T' intersection were to be installed.
- 6.3 The Tram Road accesses therefore need to operate as left-in / left-out only for safety reasons. The access points should be designed at such an angle that would not allow right turning vehicles to enter or vehicles to turn right out of the site. Appropriate signage and line marking should also be implemented at the Tram Road left turn exit to clearly indicate to drivers that no right turn exit movements onto Tram Road are permitted. A raised island may also be constructed at the access as shown in Figure 6.1 which will assist in preventing right turn movements.
- 6.4 For the left turn entry on Tram Road a deceleration lane will be required along the southern side of Tram Road to the east of the access. Austroads recommends left turn filter lanes to be 70 metres long incorporating a 30 metre taper for roads with a speed limit of 100km/h². Whereas the Waimakariri District Plan requires deceleration

² Austroads Guide to Road Design Part 4A, Unassigned and Signalised Intersections, Table 8.2: Dimensions for

tapers of 2.5m width over a length of 88 metres allowing for a 1 in 10 taper to be provided. There is a 4.5m – 5m wide grass berm along the southern side of Tram Road which is sufficient to facilitate the District Plan requirements of a deceleration lane 88m in length into the site.

- 6.5 There is existing directional signage located within the berm on the southern side of Tram Road. This would need to be relocated as it would fall within the path of the left turn lane. The sign would need to be relocated in such a way as to not conflict or obstruct either the existing left turn lane at the intersection or the new left turn deceleration lane.
- 6.6 To avoid conflicting movements between vehicles turning left out of the site and vehicles turning left onto McHughs Road, the Tram Road left turn egress point should be located no less than 150m from the intersection (measured from the commencement of the left turn lane to the centre of McHughs Road) so that it is not positioned within the existing left turn lane on Tram Road as shown in **Figure 6.2**. This will also prevent drivers that are exiting the site using the auxiliary left turn lane as an acceleration lane.

Figure 6.2 Location of Tram Road Access Points



- 6.7 No acceleration lane is provided for vehicles exiting given the proximity to the intersection. However it is not considered that this should be problematic as visibility on Tram Road is excellent so vehicles exiting can easily see vehicles approaching from the east on Tram Road. Vehicles approaching the intersection on Tram Road will also be aware of the potential for vehicles exiting due to the signs recommended to be implemented.
- 6.8 On approach to the left turn lane entry lane, Tram Road is a flat straight section of road which will allow left turning drivers the necessary time to perceive the location of the deceleration lane. This ensures they have time to make the necessary speed reduction in the through traffic lane prior to diverging. Nonetheless, it is recommended that advance warning signs for the development should be provided for traffic approaching in both directions.
- 6.9 Traffic approaching from the west should be made aware that they are required to turn right at the Tram Road / McHughs Road / Bradleys Road intersection to access the

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development. This will prevent motorists from missing the turn off and then trying to make a U-turn or trying to make a right turn into the site via the access on Tram Road.

Mandeville Road Access

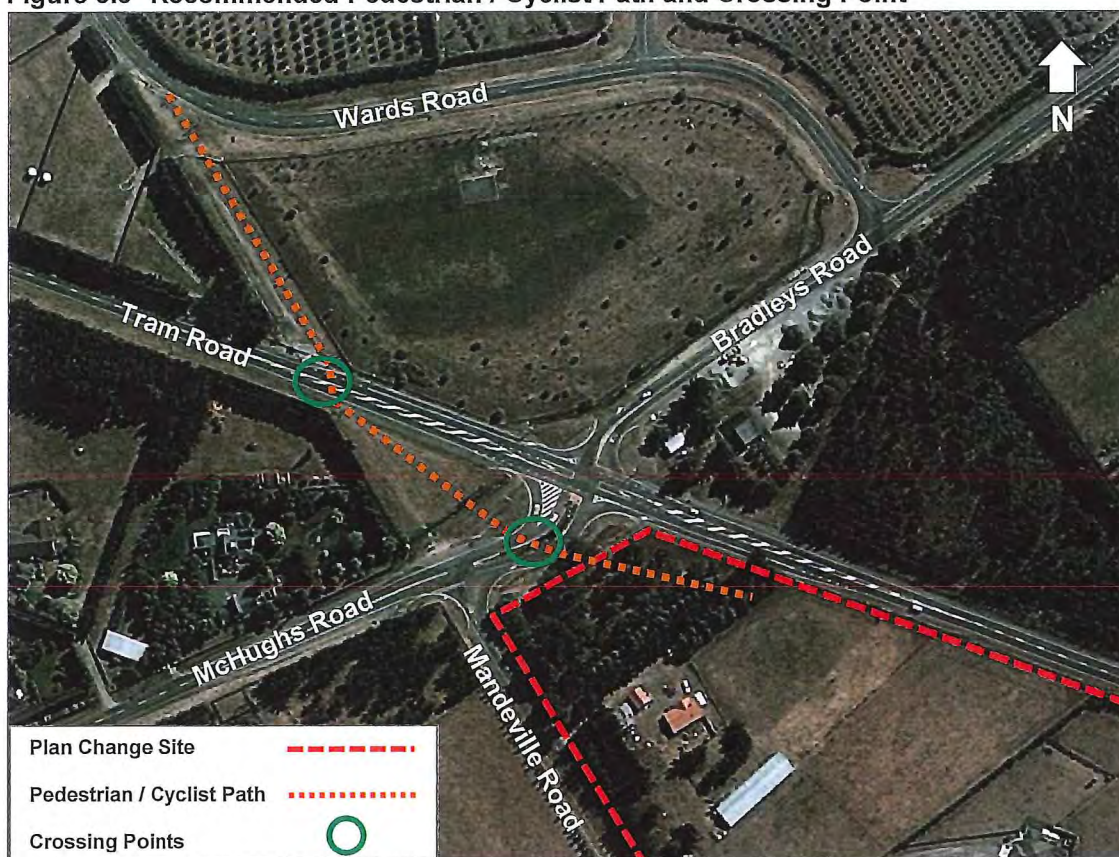
- 6.10 There is sufficient width along the Mandeville Road frontage for the accessway to be designed to incorporate a separated pedestrian footpath and cycleway path into the site. This will facilitate any pedestrians or cyclists travelling to the site from the south.
- 6.11 To ensure vehicle speeds remain low within the site, it recommended that speed reduction devices (e.g. speed humps) be implemented on the Mandeville Road accessway. This will encourage drivers to reduce speeds before entering the car park circulation area.
- 6.12 A deceleration and acceleration taper for Mandeville Road is not required, given the lower operating speed and low traffic volumes on that road. However it is recommended that the width of the carriageway (currently 6.3m) should be widened between the intersection with McHughs Road and past the site access to a point where it joins the wider 7.2m wide carriageway to the east of the site access point. This would provide a consistent carriageway width of 7.2m along Mandeville Road between McHughs Road and the Mandeville Sports Ground.

Upgrades to Existing Transport Environment

Walking and Cycling Connections

- 6.13 While it is not a prerequisite to enable the Plan Change, it is recommended that consideration is given to forming a shared pedestrian/cycle path and a crossing facility provided across Tram Road to the plan change site to encourage cycling and walking trips given the expected increase in residential properties to the north of Tram Road, . The proposed route of the path is shown **Figure 6.3**.
- 6.14 Ideally the Tram Road crossing point should be located away from the Tram Road / McHughs Road / Bradleys Road intersection in order to avoid conflict between cyclists and pedestrians with turning traffic at the intersection. The most appropriate location for a crossing point has been identified approximately 120m west of the intersection.
- 6.15 This crossing point would join up with the stopped part of Wards Road and travel across the vacant triangle of land between McHughs Road and Tram Road. There is a small drain located within this triangular parcel of land which will require a bridge structure to facilitate access. A pedestrian refuge could be formed within the existing raised median on McHughs Road with the path continuing through the reserve into the site.

Figure 6.3 Recommended Pedestrian / Cyclist Path and Crossing Point



Other considerations

- 6.16 Consideration has been given to the impact the proposed accesses into the Business Zone from Tram Road may have on the ability for future access to be formed from Tram Road particularly to residential units located towards the eastern boundary of the ODP.
- 6.17 Under Rule 30.6.1.15 of the District Plan, the spacing of vehicle crossings for roads other than State Highways with a speed limit greater than 70km/h is;
- Less than 1m or greater than 7m for residential zones and
 - Less than 6m or greater than 12m for business zones.
- 6.18 Under Rule 30.6.1.16, the minimum distance between crossings for any vehicle crossing accessing a State Highway with a posted speed limit of 100km/hr is 200m, provided that there shall be no more than five individual crossings along any 1km section of State Highway (on both sides) measured 500m on either side of the proposed crossing.
- 6.19 While Tram Road is not classified as a State Highway, it serves an important function as an Arterial Road and has a speed limit of 100km/h. The number of existing vehicle crossings on Tram Road, 500m either side of the proposed access is two, the closest being located adjacent to the eastern corner of the ODP. The distance of this vehicle crossing from the proposed access is greater than 200m.
- 6.20 Should access to a small number of residential units be required towards the eastern edge of the ODP (located approximately adjacent to where the existing crossing is positioned), there are no fundamental issues which would prevent this. It is noted that while not required to, an access in this location could still meet the more stringent State Highway requirements for spacing between vehicle crossings.

7 DISTRICT PLAN ASSESSMENT

- 7.1 It is anticipated that the design of the Business 4 zone will generally be able to comply with the transportation related rules of the District Plan. However, there are three rules which the plan change will not be able to meet or will differ from, the reasons for this and proposed exemptions are discussed below.

Proposed Rules

Acceleration and deceleration lanes

- 7.2 The Tram Road left turn entry should incorporate a deceleration lane as discussed in Section 6. As no right turns will be permitted into the site from Tram Road there is no need for additional widening to be carried out along the northern side of Tram Road opposite the access.
- 7.3 The position of the left turn exit lane cannot incorporate an acceleration lane as it is adjacent to the lane turn auxiliary lane on Tram Road. Including an acceleration lane would lead to confusion for motorists whether the driver is turning left or using this an acceleration lane. It is therefore recommended that the following exemption is made to Rule 30.6.1.23 in Chapter 30: Utilities and Traffic Management as part of the plan change.
- **Rule 30.6.1.23:** *For any retail activity on a site, acceleration and deceleration tapers shall be constructed as part of the road carriageway and in accordance with Figure 30.3 where any vehicle crossing from the site connects to any road, other than a State Highway, and that road is shown in the District Plan Maps as a strategic, arterial or collector road with a posted speed limit of more than 70km/hr in the Rural Zone and Residential 4A and 4B Zones.*
 - **Exemption:** Within the Mandeville Road / McHughs Road Outline Development Plan no additional widening is required along the northern side of Tram Road. A deceleration lane of 2.5m width over a length of 88m allowing for a 1 in 10 taper is to be provided on the southern side of Tram Road in advance of the access. No acceleration lane is to be provided for the left turn exit from the site.

Distance from intersection

- 7.4 Due to the length of the road frontage along the Tram Road site boundary, the plan change is unable to meet the requirements of Rule 30.6.1.26 which states that the minimum spacing between an intersection and access shall be 800m where the posted speed limit is 100km/h. This requirement is significantly greater than what can be achieved within the confines of the site.
- 7.5 The layout and operation of the Tram Road accesses have been designed with consideration of any potential road safety implications due to turning movements and potential conflicts. Therefore, it is considered that any safety issues associated with the non-compliance have been mitigated.
- 7.6 It is recommended that the following exemption to Rule 30.6.1.26 is inserted into Chapter 30: Utilities and Traffic Management as part of the plan change;
- **Rule 30.6.1.26:** The minimum spacing between an intersection and access shall be 800m where the posted speed limit is 100km/h as shown in Table 30.7.
 - **Exemption:** Within the Mandeville Road / McHughs Road Outline Development Plan the left turn exit lane onto Tram Road should be no less than 150 metres from the Tram Road / McHughs Road / Bradleys Road intersection and located so that it is not positioned within the auxiliary left turn lane on Tram Road.

Parking spaces

- 7.7 As discussed in Section 5, a minimum number of 33 parking spaces is required by the Waimakariri District Plan (including staff parking spaces). Examination of the TDB data for similar activities expected on site show that a parking demand of up to 79 spaces may be generated. An average between the two rates is approximately 56 spaces.
- 7.8 Although the site can comply with the requirements of the District Plan i.e. provide 33 spaces, the District Plan does not take into account the rural nature of development and the rates used are generally for urban developments. Given the rural location of the proposed Business 4 zone and the variance between the District Plan requirements and the TDB Data, it is recommended that Council consider the plan change to be exempt from Rule 30.6.1.28 which requires all retail activity to provide 1 space per 45m² net floor area of retail area.
- 7.9 It is recommended that the following exemption is inserted into Chapter 30: Utilities and Traffic Management as part of the plan change;
- **Rule 30.6.1.28:** Table 30.8 requires a minimum of 33 spaces
 - **Exemption:** Within the Mandeville Road / McHughes Road Outline Development Plan, there shall be a minimum of 45 parking spaces and a maximum of 65 parking spaces provided including 4 accessible spaces within the Business 4 zone area.

8 CONCLUSIONS

- 8.1 This report has identified, evaluated and assessed the various transport and access elements of the proposed Plan Change to rezone approximately 7ha of land currently zoned Rural to Business 4 and Residential 4A located between Tram Road and Mandeville Road. Overall, it is considered that the development can be accommodated on the adjacent roading network without capacity, efficiency or road safety issues arising.
- 8.2 The crash records do not indicate any existing road safety issues at the site that could be exacerbated by additional traffic associated with the development.
- 8.3 The peak weekday PM trip generation of the Business 4 activity is anticipated to be 170 vehicle movements (85 in and 85 out). A SIDRA analysis was carried out to determine the impact the development will have of the operation of the Tram Road / McHughs Road / Bradleys Road intersection. The analysis indicates that the intersection can comfortably accommodate the additional trip generation of the development and continues to operate efficiently.
- 8.4 Based on 1,300m² GFA of commercial space, the parking demand of the Business 4 activity is determined to generate a statutory parking demand of 33 spaces, however TDB data indicates that the actual parking demand may be significantly higher than this. It is recommended that between 45 – 65 car park spaces are provided for the Business 4 zone.
- 8.5 Advance warning signs for the development should be provided for traffic approaching in both directions. Traffic approaching from the west should be made aware that they are required to turn right at the Tram Road / McHughs Road / Bradleys Road intersection to access the development.
- 8.6 The Tram Road accesses should operate as left in / left out only. The access points should be designed at such an angle that would not allow right turning vehicles to enter or exit the site. This can be reinforced with the construction of a raised island at the access and appropriate marking and signage.
- 8.7 The left turn exit should not be positioned within the left turn auxiliary lane on Tram Road to avoid conflicting movements between drivers exiting the site and turning left onto McHughs Road.
- 8.8 A deceleration and acceleration taper for Mandeville Road is not required, given the lower operating speed and low traffic volumes on that road. The Mandeville Road access will permit all movements and should be designed to include a separate pedestrian footpath and cycle lane.
- 8.9 The Plan Change should be exempt from three rules of the Waimakariri District Plan;
- **Rule 30.6.1.23:** Within the Mandeville Road / McHughs Road Outline Development Plan no additional widening is required along the northern side of Tram Road. A deceleration lane of 2.5m width over a length of 88m allowing for a 1 in 10 taper is to be provided on the southern side of Tram Road in advance of the access. No acceleration lane is to be provided for the left turn exit from the site
 - **Rule 30.6.1.26:** Within the Mandeville Road / McHughs Road Outline Development Plan the left turn exit lane onto Tram Road should be no less than 150 metres from the Tram Road / McHughs Road / Bradleys Road intersection and located so that it is not positioned within the auxiliary left turn lane on Tram Road.
 - **Rule 30.6.1.28:** Within the Mandeville Road / McHughs Road Outline Development Plan, there shall be a minimum of 45 parking spaces and a

maximum of 65 parking spaces provided including 4 accessible spaces within the Business 4 zone area.

- 8.10 Overall, and subject to the preceding comments, the proposed Plan Change can be supported from a traffic and transportation perspective and it is considered that there are no traffic and transportation reasons why the development could not be approved.

APPENDIX A

CAS Data



First Street	(D) Second street (I) or landmark Distance (R)	Crash Number	Date DD/MM/YYYY	Day Time DDD HHMM	Description of Events	Crash Factors	Road	Natural Light	Weather	Junction	Cntrl	Tot Inj F S M A E I T R N
TRAM ROAD	15E BRADLEYS ROAD	201270976	24/03/2012	Sat 0500	CAR1 EBD on TRAM ROAD lost control but did not leave the road, CAR1 hit Ditch	CAR1 too fast on straight, failed to notice roadworks signs ENV: road surface under construction or maintenance (ENV = Environmental factors)	Dry	Dark	Fine	Unknown	N/A	
TRAM ROAD	200E BRADLEYS ROAD	201022246	15/07/2010	Thu 0800	VAN1 EBD on TRAM ROAD lost control; went off road to right, VAN1 hit Fence	VAN1 lost control due to road conditions ENV: road slippery (frost or ice)	Ice/ Snow	Bright	Fine	Unknown	N/A	2
TRAM ROAD	80W BRADLEYS ROAD	201121412	22/03/2011	Tue 1550	CAR1 WBD on TRAM ROAD hit rear end of CAR2 stopped/moving slowly	CAR1 lost control, failed to notice car slowing	Wet	Overcast	Light Rain	Unknown	N/A	2
TRAM ROAD	200W BRADLEYS ROAD	201356164	23/11/2013	Sat 1540	load or trailer from SUV1 EBD on TRAM ROAD SUV1 hit Tree	SUV1 load not well secured or moved	Dry	Bright	Fine	Unknown	Nil	
TRAM ROAD	I BRADLEYS ROAD	2922734	25/07/2009	Sat 1500	CAR1 NBD on BRADLEYS ROAD hit SUV2 crossing at right angle from right	CAR1 did not stop at stop sign, illness with no warning (eg heart attack)	Dry	Bright	Fine	X Type Junction	Stop Sign	1
TRAM ROAD	200E MCHUGHS ROAD	201072166	05/07/2010	Mon 0900	CAR1 WBD on TRAM ROAD lost control on straight and hit CAR2 head on	CAR1 lost control due to road conditions, driver over-reacted ENV: road slippery (frost or ice)	Ice/ Snow	Bright	Fine	Unknown	N/A	
TRAM ROAD	I MCHUGHS ROAD	201121435	14/04/2011	Thu 1150	CAR1 NBD on MCHUGHS ROAD hit CAR2 crossing at right angle from right	CAR1 failed to give way at stop sign, didnt see/look when required to give way to traffic from another direction	Dry	Overcast	Fine	X Type Junction	Stop Sign	2
TRAM ROAD	I MCHUGHS ROAD	201122327	04/08/2011	Thu 1745	CAR2 turning right hit by oncoming SUV1 WBD on TRAM ROAD	CAR2 failed to give way when turning, didnt see/look when required to give way to traffic from another direction	Dry	Dark	Fine	X Type Junction	Stop Sign	1 1
TRAM ROAD	I MCHUGHS ROAD	2923140	01/11/2009	Sun 1600	CAR1 NBD on MCHUGHS ROAD hit CAR2 crossing at right angle from right	CAR1 failed to give way at stop sign, attention diverted by other traffic, didnt see/look when required to give way to traffic from another direction	Dry	Bright	Fine	X Type Junction	Stop Sign	1

APPENDIX B

SIDRA Outputs



MOVEMENT SUMMARY

 **Site: Mandeville - Base 2013**

Mandeville Intersection
Stop (Two-Way)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: McHughs Road											
1	L2	16	1.6	0.018	10.3	LOS B	0.1	0.4	0.36	0.86	62.1
2	T1	32	1.5	0.188	16.0	LOS C	0.7	5.2	0.61	1.00	57.0
3	R2	47	1.6	0.188	16.4	LOS C	0.7	5.2	0.61	1.00	57.4
Approach		95	1.6	0.188	15.2	LOS C	0.7	5.2	0.57	0.97	58.0
East: Tram Road											
4	L2	60	0.9	0.033	7.9	LOS A	0.0	0.0	0.00	0.66	74.2
5	T1	243	1.8	0.126	0.0	LOS A	0.0	0.0	0.00	0.00	99.9
6	R2	71	0.9	0.056	8.9	LOS A	0.2	1.6	0.24	0.60	72.4
Approach		374	1.5	0.126	2.9	NA	0.2	1.6	0.05	0.22	88.7
North: Bradley's Road											
7	L2	21	0.6	0.020	9.5	LOS A	0.1	0.5	0.23	0.87	62.9
8	T1	28	0.6	0.083	14.9	LOS B	0.3	2.2	0.58	0.96	58.2
9	R2	9	0.7	0.083	15.7	LOS C	0.3	2.2	0.58	0.96	58.9
Approach		59	0.6	0.083	13.1	LOS B	0.3	2.2	0.46	0.93	59.9
West: Tram Road											
10	L2	8	0.9	0.005	7.9	LOS A	0.0	0.0	0.00	0.66	74.2
11	T1	125	1.9	0.065	0.0	LOS A	0.0	0.0	0.00	0.00	100.0
12	R2	2	0.0	0.002	9.3	LOS A	0.0	0.1	0.37	0.58	72.9
Approach		136	1.8	0.065	0.6	NA	0.0	0.1	0.01	0.05	97.3
All Vehicles		663	1.5	0.188	5.1	NA	0.7	5.2	0.15	0.36	80.7

Level of Service (LOS) Method: Delay (HCM 2000).

Vehicle movement LOS values are based on average delay per movement

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Processed: Monday, 3 November 2014 10:44:03 a.m.

SIDRA INTERSECTION 6.0.24.4877

Project: J:\4344 RHL Mandeville Village\DocCalcs\Mandeville sidra.sip6

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INTERSECTION 6**