RANGITOOPUNI DEVELOPMENT

Integrated Transportation Assessment

1 May 2025

commute
TRANSPORTATION CONSULTANTS

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Final Report	[redacted]	[redacted]	[redacted]

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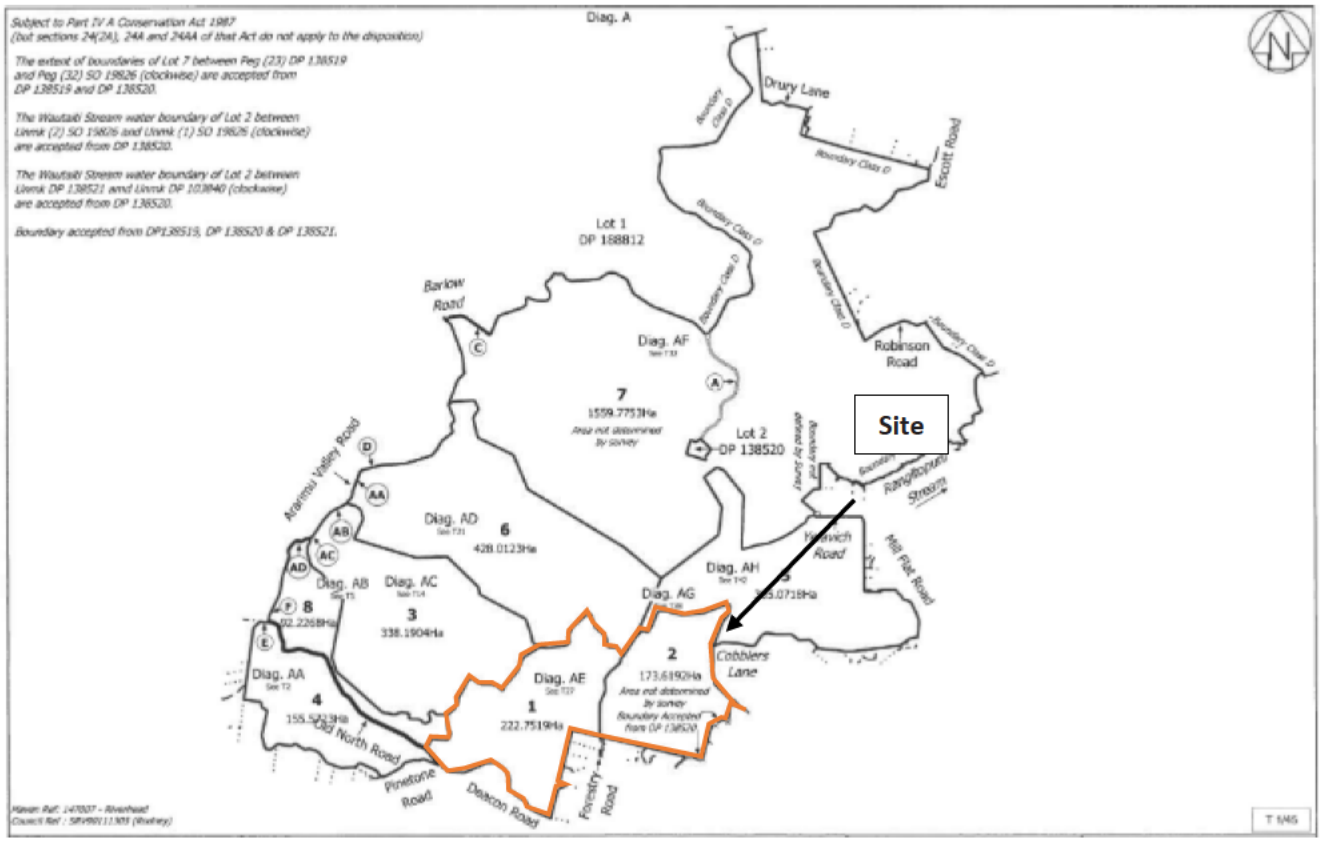
1 Introduction

Commute Transportation Consultants have been commissioned to assess the transport effects of the proposed residential development and retirement village located on Old North Road, Huapai in order to support the fast track consenting application.

The development will comprise of two main lots. Lot one will include of a total of 208 residential dwellings and a community centre, lot two will include a large-scale retirement village with approximately 260 lots, 36 care suites, and an amenity centre. This development will include a new internal road network including five access points onto Old North Road. Access to lot 1 (residential) and lot 2 (retirement village) will be accessed via Forestry Road which will be a public road to vest. The wider site is subdivided into a total of 8 lots with the residential subdivision is to occupy lot 1 while the retirement village is slated to occupy lot 2.

Figure 1: Lot 1 & 2 in relation to the wider Riverhead Forest



This report provides an assessment of the transport-related matters of the proposal, including:

- A description of the site and its surrounding transport environment;
- The traffic generating potential of the site and resultant effects on the road network;
- The proposed form of access arrangements for vehicles and pedestrians;
- The parking supply in relation to anticipated parking demands; and
- The adequacy of the proposed servicing arrangements.

These and other matters are addressed in detail in this report. By way of summary, it is considered that the proposed development, as detailed in this report, will have minimal traffic effects to the function, capacity and safety of the surrounding transport network.

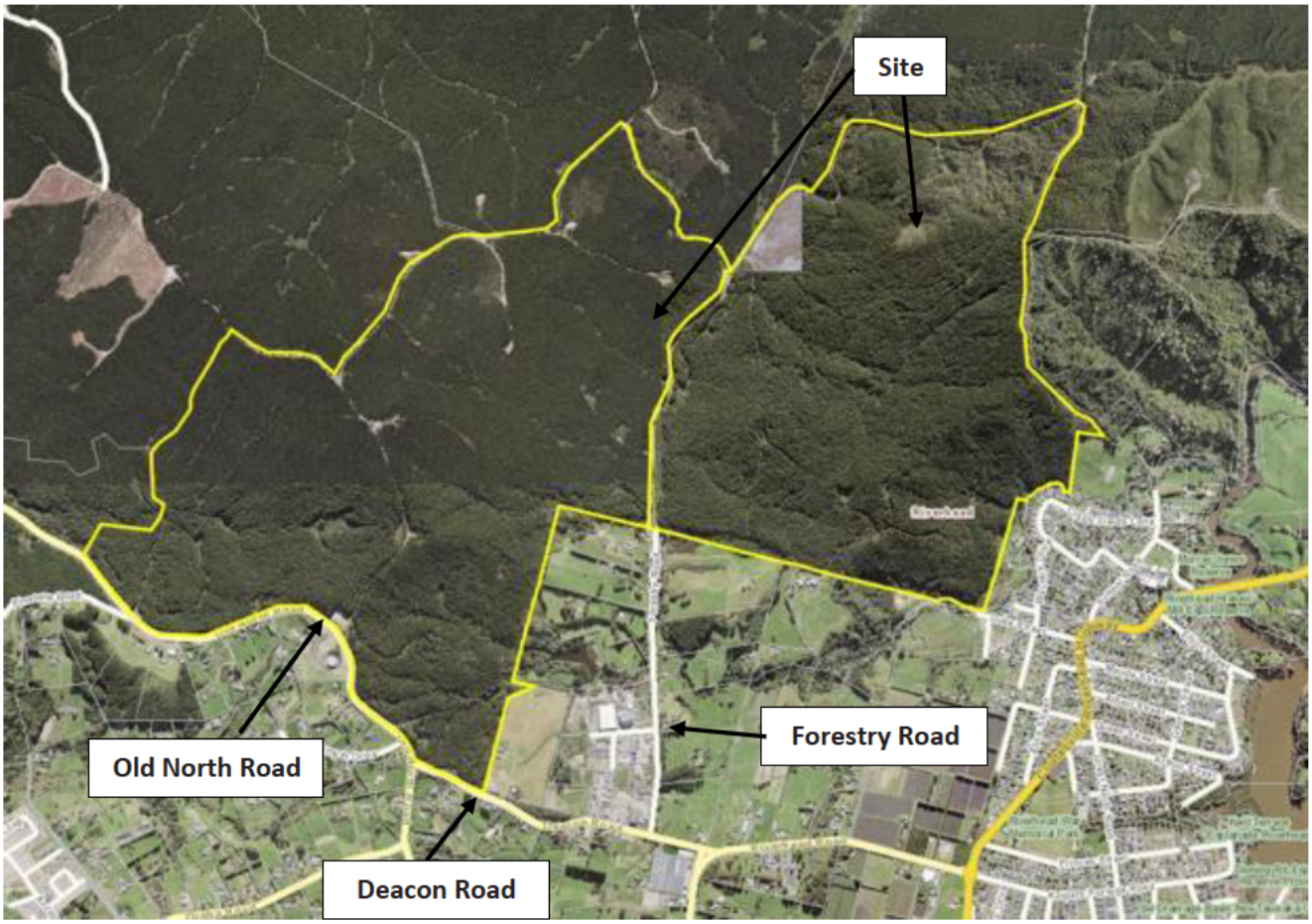
Although this is not a hearing before the Environment Court, I record that I have read and agree to comply with the Environment Court's Code of Conduct for Expert Witnesses as specified in the Environment Court's Practice Note 2023. I confirm that this report is within my area of expertise, except where I state that I rely upon the evidence or reports of other expert witnesses lodged forming part of the project's application material. I have not omitted to consider any material facts known to me that might alter or detract from the opinions expressed.

2 Existing Road Environment

2.1 Site Location

The site is located on Old North Road and Forestry Road, Huapai. Figure 2 shows the location of the site in relation to the surrounding road network. The site is currently zoned Rural – Countryside Living and Rural – Mixed Use Zone, and until recently has been part of the Riverhead Forest. This area of the forest was recently partially cleared, some areas will be harvested later this year and Lot 2 was replanted in 2021.

Figure 2: Location of Site



2.2 Road Network

2.2.1 Old North Road

The site has road frontage on to Old North Road, Forestry Road, and Deacon Road in the south.

Old North Road is not classified as an arterial road within the Auckland Unitary Plan. The corridor provides an alternative route to the SH16 corridor between Riverhead and Helensville. Old North Road is currently rural in nature and has a carriageway width of 6.0m, allowing for a single lane in each direction. Photographs 1 and 2 below shown the current roading environment. The road features an unsealed shoulder along its northern side in the vicinity of the site. No footpaths are provided on either side of the road and it has a posted speed limit of 80km/hr.

Photograph 1: Old North Road – typical layout

There are several local intersections from Old North Road, providing access to the existing forestry activities on site. These roads are not currently vested and are operated as haulage routes within the forest. They are also used by recreational users, for walking and cycling activities. An example of these routes is Barlow Road/Browns Road as shown below in Photograph 3.

Photograph 2: Barlow Road/Browns Road Accessway

2.2.2 Deacon Road

The site has road frontage on to Deacon Road in the south. Deacon Road is not classified as an arterial road within the Auckland Unitary Plan.

Deacon Road runs in a general east west alignment, connecting to Old North Road to the east and Riverhead Road to the west. The road is approximately 7m wide, providing a single lane in each direction, and is rural in nature. There is no provision for walking or cycling on either side of the road. There is one intersection with Forestry Road, and this is formed as a typical Basic Right Turn (BAR) intersection.

2.2.3 Forestry Road

Forestry Road provides a connection from Deacon Road to the northeast section of the proposed development area. Forestry Road is currently sealed from the intersection with Deacon Road for approximately 500m along the corridor, to just beyond the intersection with Sawmill Road. The corridor is approximately 8m wide and rural in nature, with no dedicated walking and cycling facilities.

2.2.4 Traffic Volumes

Traffic Volumes obtained from Auckland Transport[1] are summarised Table 1 below. From these counts, traffic volumes on Old North Road between Deacon Road and Ararimu Valley are double that of the count taken further north between Peak Road and Kiwitahi Road. The traffic volumes are relatively consistent across the week, with minor variations largely due to the recreational users of the forest area.

[1] Traffic Counts sourced from Auckland Transport Counts, surveyed March and May 2024

Table 1: Traffic Volumes Old North Road (2024)

	Count Location	5 Day ADT	7 Day ADT	Saturday	AM Peak Hour	PM Peak Hour
Old North Road[2]	Between Deacon Road and Ararimu Valley Road	6,377	6,025	5,863	7:45	16:30
Deacon Road [3]	Between Riverhead Road and Old North Road	4,643	4,211	3,423	6:30	16:45

2.3 Existing Traffic Counts

Traffic counts at a number of intersections in the vicinity of the site were surveyed in September 2023. There is no significant change to the transport or land use environment that would necessitate updated traffic counts in this area.

The following intersections were surveyed:

- Old North Road / Deacon Road;
- Riverhead Road / Deacon Road;
- Riverhead Road / Coatesville-Riverhead Highway /Kaipara Portage Road;
- Riverhead Road / Old North Road;
- Coatesville-Riverhead Highway / State Highway 16;
- Old North Road / State Highway 16 / Taupaki Road;
- Riverhead Road / SH 16; and
- Oraha Road / SH 16.

All intersections were surveyed for the period between 6am to 9am and 3pm to 6pm. From these surveys the AM peak hour period was determined to be 7-8am while the PM peak hour period was 4:30-5:30pm. Accordingly the data from these peak periods was reported per monitored intersection and can be seen in **Appendix E**.

[2] Traffic Counts sourced from Auckland Transport Counts, surveyed March 2024
[3] Traffic Counts sourced from Auckland Transport Counts, surveyed May 2024

Figure 3: Locations of Intersections surveyed by Stantec in 2023

2.4 Public Transport

There are currently no public transport services that travel on Old North Road or in close vicinity to the site. The nearest bus stop is approximately 1.5km (25-30 minutes) located in Riverhead. Service 126 which connects Albany to Westgate via Riverhead operates at that bus stop providing services hourly Monday to Friday.

Public transport does not offer a competitive travel time to personal vehicles.

2.5 Walking and Cycling

There are no dedicated walking and cycling facilities on Old North Road or Deacon road both of which the proposed site has frontage onto; however, The road is regularly used by confident cyclists, including pack cyclists. It is anticipated that the vast majority of trips out of the proposed development will be private vehicle trips, with minimal walking and cycling trips.

2.6 Road Safety

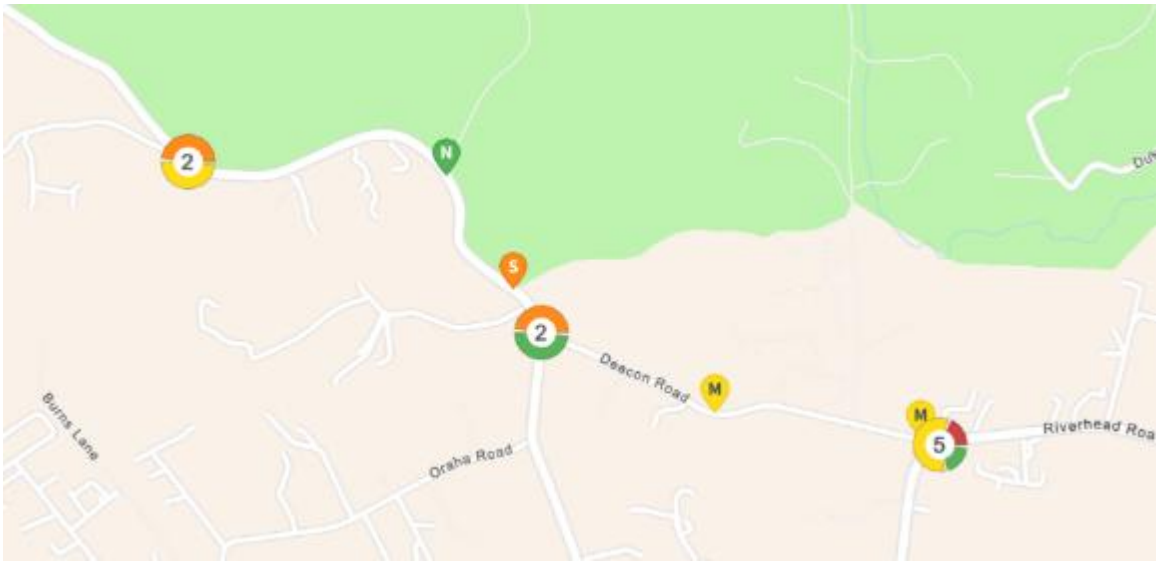
An assessment of the road safety record of the surrounding area has been undertaken using the NZTA CAS database. A search was made for all reported crashes occurring on Old North Road between the intersections of Pinetone Road and Deacon Road, Forestry Road, and Deacon Road including the Riverhead / Deacon Road intersection for the five-year period from 2020 to 2024, and including any crashes in 2025.

A total of 13 crashes were reported in this time period. The crashes are made up of the following:

- One fatal collision occurring at the Riverhead / Deacon Road intersection due to driver losing control and crashing into a pole, substance abuse was a factor;
- Three serious collision occurring on Deacon Road due to a driver colliding with a cyclist due to sunstrike, driver losing control leading to crossing of the centreline and collision with oncoming vehicle, and a vehicle lost control while turning onto Old North Road;
- Six minor collisions, four of which occurred at the Deacon / Riverhead Road intersection generally due to vehicles failing to stop or give way at the intersection. One occurred along Deacon Road due to driver losing control, and the last occurred on Old North Road due to driver losing control when the road was wet; and
- Two non-injury collisions occurring on Old North Road and the Deacon Road / Old North Road intersection both as a result of drive losing control in the wet.

The results do not highlight any significant safety concerns. Figure 4 highlights the CAS search and crash locations.

Figure 4: CAS search of surrounding area



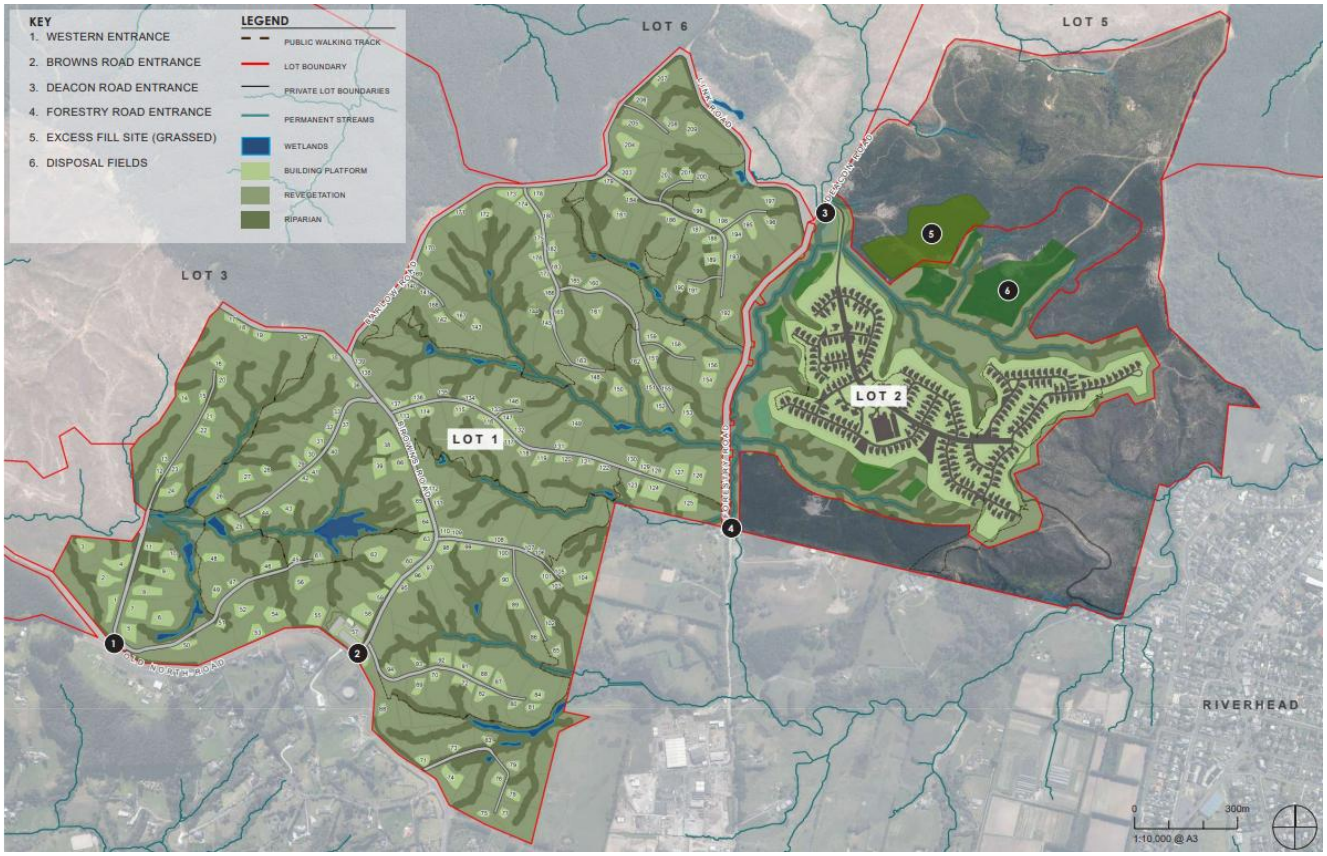
3 Proposal

3.1 General

The proposal intends to introduce a 208-lot residential development, an approximate 260-unit retirement village (villas and care suites), and a community centre that will serve residents and the public on lots 1 and 2 of

the site. The proposal includes a new internal road network with five access points onto Old North Road servicing the countryside living lots, and an extension of Forestry Road to link to the retirement village. The proposed development area covers the southern section of the wider site and can be seen in Figure 5 below.

Figure 5: Masterplan of proposal

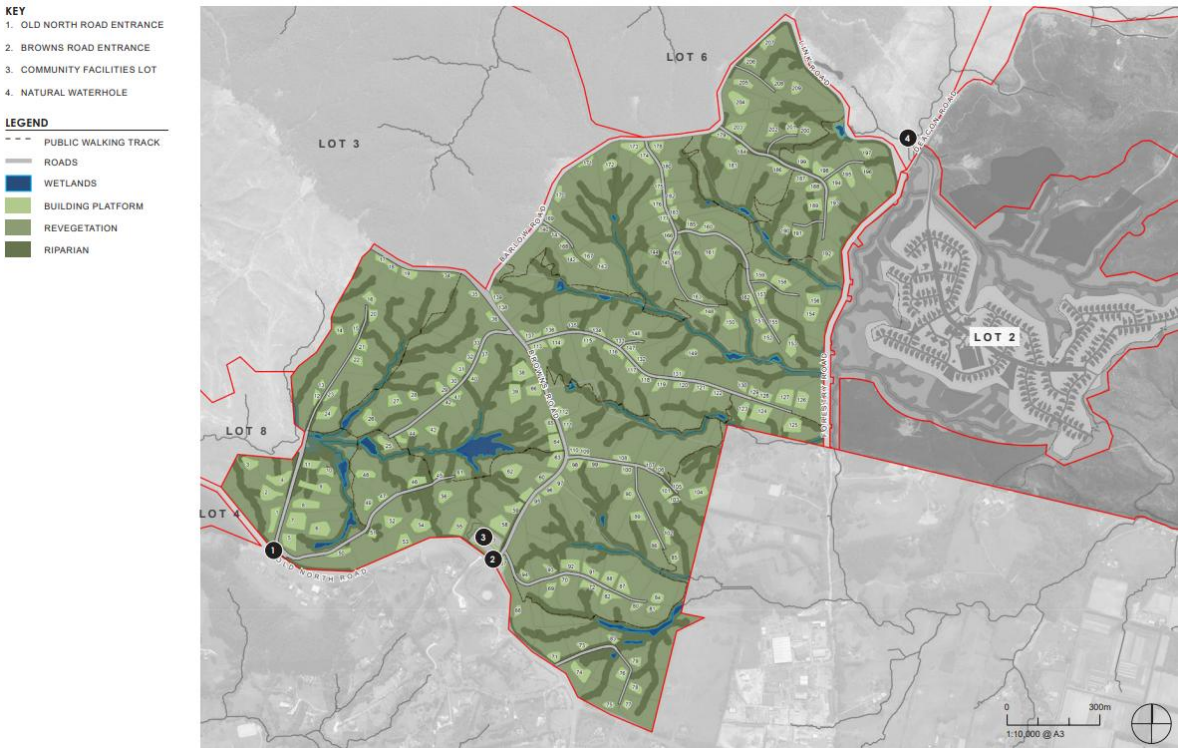


3.2 Residential / Retirement village

The proposed residential and retirement village proposed developments can be seen in Figure 6 and Figure 7 respectively.

Figure 6: Proposed Site layout of retirement village

Figure 7: Proposed Site layout of Residential site



3.3 Commercial

A private community centre and public car park is proposed within lot 1, at the entrance to the site, adjoining the Browns Road/Old North Road intersection. The community centre will be available for the residents use only.

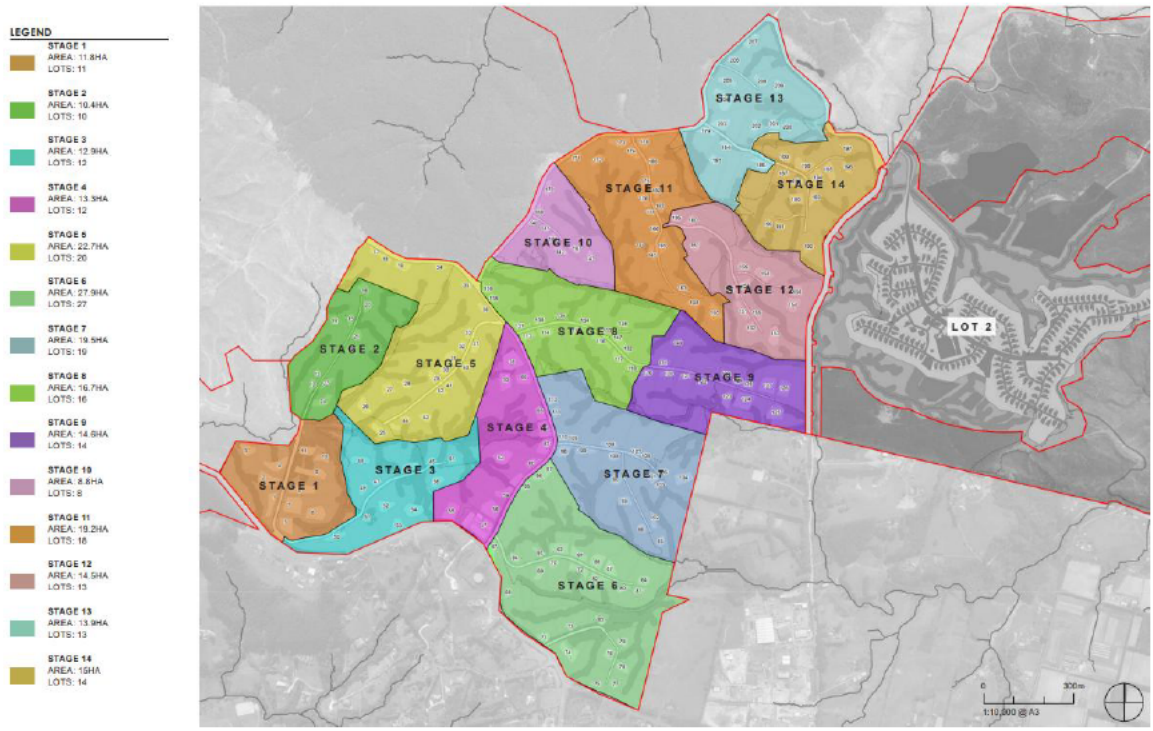
The proposed community centre and public car park layouts can be seen below Figure 8.

Figure 8: Lot 1 Private Community Centre and public car park

3.4 Staging

Lot 1 (residential) is proposed to be constructed across 14 stages as seen below in Figure 9.

Figure 9: Staging of Lot 1



Lot 2 (retirement village) is proposed to be constructed across four stages as seen below in Figure 10.

Figure 10: Lot 2 (retirement village) Staging Plan

3.5 Pedestrian provision

Existing pedestrian facilities in the surrounding area are limited as discussed earlier in this report. Figure 11 and Figure 12 highlights the walking track network through both the Countryside Living and retirement village development, in this regard:

- Multiple on and off track pedestrian facilities are provided across both Lot 1 and 2
  - Lot 1 (Country-side living)
    - Pedestrian facilities are provided as a part of the formed width.
  - Lot 2 (retirement village)
    - Pedestrian footpaths are provided on both the local road and connector streets throughout the retirement village linking the units to the main buildings.
  - A 3.0m share path pedestrian connection to Riverhead is proposed from the retirement village and connecting to Duke Street.

The above pedestrian facilities are considered to be well connected and appropriate within the proposal. Given the rural nature of the area, no footpath is proposed or considered necessary on every JOAL or indeed linking to Old North Road (which also has no footpaths). This is considered to be acceptable as JOALs will be infrequently used, exhibit a low speed environment, and knowledge that the JOAL is a shared space with pedestrians.

Figure 11: Walking Tracks

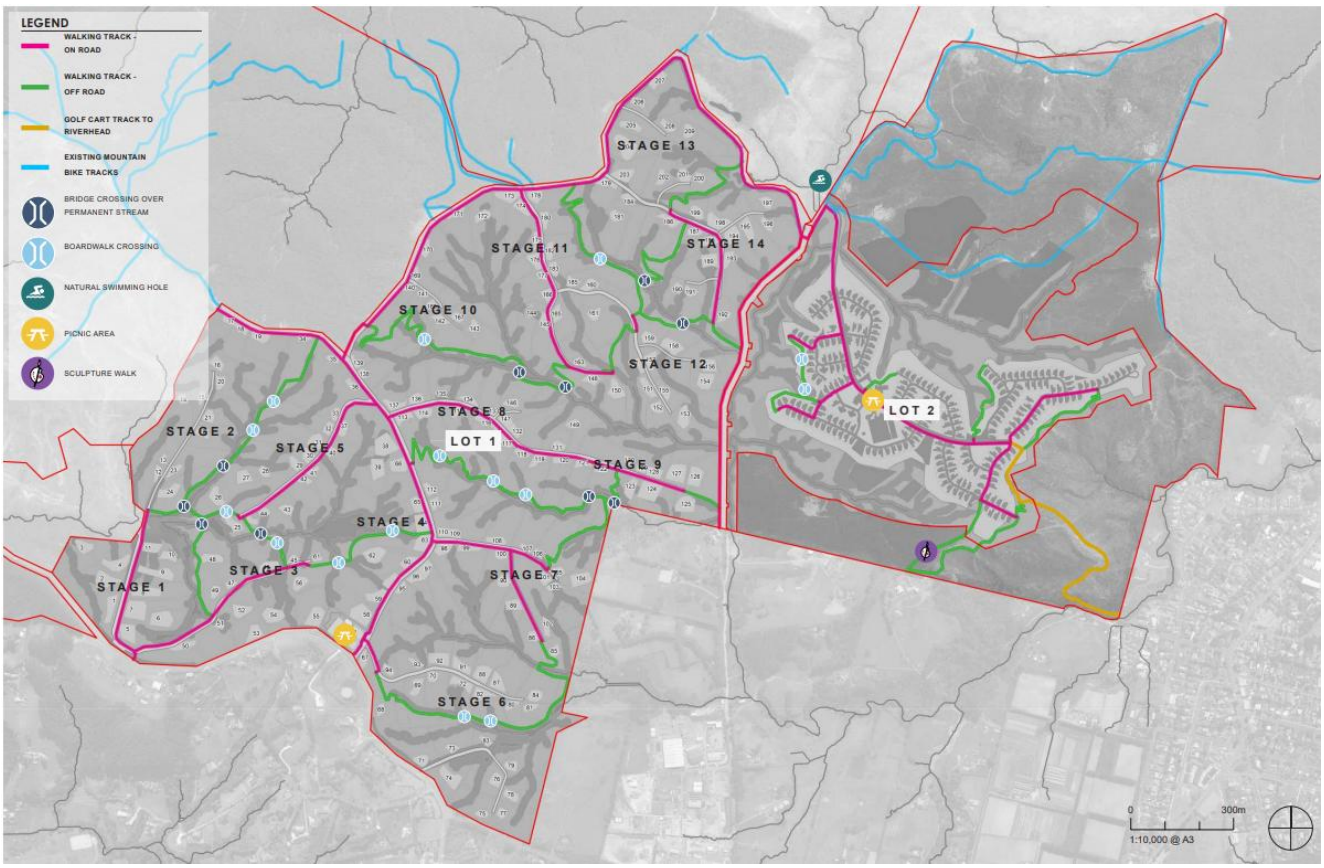


Figure 12: Shared Path Connection to Duke Street

4 Local area changes

4.1 PPC100

It is noted that Proposed Plan Change (100) has been notified and will likely be going to hearing in late May relating to urbanising land immediately to the west of Riverhead village. An Integrated Transport Assessment report was prepared by FLOW transportation specialists in 2023 to assess the transport planning and traffic engineering matters related to the proposed plan change, this report aims to summarise the proposed plan change.

The proposal plans for PPC100 includes the following:

- Approximately 1,468 residential dwellings including;
    - 385 low density and 775 medium density dwellings in Mixed Housing Suburban Zone
    - 100 dwellings in the Terrace Housing and Apartment Buildings Zone
    - 208 retirement village villas
- A local centre containing;
    - Supermarket of up to 4,000sqm
    - Ancillary Retail of 650sqm
    - Cafe of 600sqm
    - Office of up to 1,000sqm
    - Medical Centre up to 250sqm
- Neighbourhood Centre of approximately 300sqm
- Retirement village complex containing;
    - Approximately 310 retirement village apartments

- 90 aged care beds
- Café of 450sqm
- Retail of 10 sqm
- Childcare Centre accommodating 100 children
- Medical centre of 250 sqm

- Corridor upgrades to provide include pedestrian and cycling facilities on Coatesville-Riverhead Highway, Riverhead Road, and Lathrope Road.
- Upgrade or construction of intersections to improve safety & facilitate active modes

For a full list of the proposed changes, please consult FLOW transportation specialists 2023 ITA report.

The key intersection being the Coatesville-Riverhead Highway / SH 16 intersection is proposed to a requirement of PPC100 discussed above as seen in Figure 13. The upgrade allows for two entry lanes on each approach and pedestrian crossings on the Coatesville-Riverhead Highway & western SH 16 approaches.

Figure 13: Coatesville-Riverhead Highway / SH 16 Intersection Upgrade

Riverhead Road and Coatesville-Riverhead Highway are anticipated to be upgraded as a part of PPC100.

The anticipated AM and PM peak trip generation after internal factors have been applied can be seen below in Table 2. (taken from FLOW 2023 ITA)

Table 2: PPC 100 Trip Generation

Activity	Peak Hour Trips AM	Peak Hour Trips PM
Residential – Dwelling Houses	265	265
Residential – Medium density	435	435
Primary School	145	35
Childcare Centre	20	20

Supermarket	40	40
Retail	10	10
Offices	15	15
Retirement Village	85	85
Aged care facility	15	15
Café	10	10
Medical Centre	15	15
Total	**1,055**	**945**

The proposed transport and other infrastructure networks within Riverhead will be progressively upgraded over time to support development in the proposed plan change area. The precinct includes provisions to ensure that the subdivision and development of land for development is coordinated with the transport and infrastructure upgrades necessary to manage potential adverse effects on the wider transport network. Prior to occupation of a dwelling or building within the Riverhead Precinct, all transport infrastructure must be constructed and operational. This is discussed below.

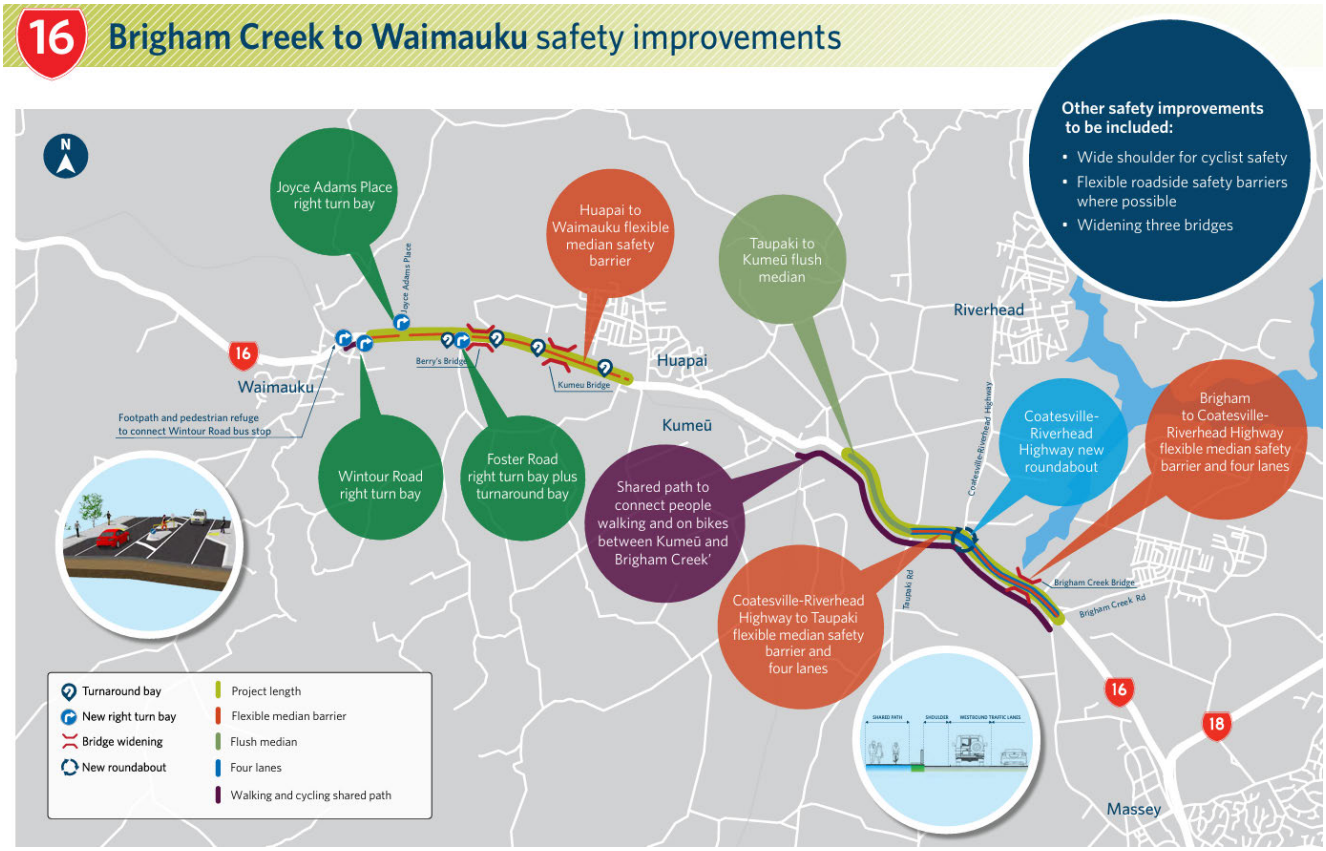
4.2 NZTA Brigham Creek to Waimauku Upgrades

This project, (currently partly under construction), will deliver safety and capacity improvements between Waimauku and the end of the Northwestern Motorway (SH16) at Brigham Creek Road. The relevant components to the Plan Change include:

- Safety improvements, with a new roundabout being located at the Coatesville-Riverhead Highway / SH16 intersection, as shown in Figure 14
- Upgrading the SH16 corridor to four traffic lanes between Brigham Creek Road to the Taupaki Roundabout, therefore removing the bottleneck experienced at the Coatesville-Riverhead Highway intersection citybound during the morning peak, and removing the two to one lane merge west of the SH16 / Brigham Creek Road / Fred Taylor Drive roundabout westbound, which causes congestion during the evening peak
- A shared path from Brigham Creek Road to Kumeu

These upgrades will improve safety, increase capacity of the road network and alleviate congestion at the SH16/Coatesville-Riverhead Highway intersection, which is the main intersection used to access the state highway network from Riverhead. The planned upgrades along SH16 results in several consecutive roundabouts, being located at the Riverhead Road intersection, Old North Road intersection (existing), Coatesville-Riverhead Highway intersection and the SH16/Brigham Creek Road/Fred Taylor Drive intersection.

Figure 14: Overview of Brigham Creek to Waimauku Safety Improvements



4.3 Supporting Growth

The Notice of Requirement documentation was lodged with Auckland Council to protect the land for future North West projects in December 2022. Public notification of lodgement took place on 23 March 2023, and submissions closed on 23 April 2023. NZTA and Auckland Transport notified the decisions for these Notices of Requirement on 20 June 2024 with appeals closing 12 July 2024.

A well-designed, integrated transport network is being planned now to transform how people move around the North West in the future. It includes these strategic projects which are anticipated to be delivered in the next 10 to 30 years to support growth:

- A future rapid transit corridor between Redhills North and Kumeū-Huapai to enable development of fast, frequent and high-capacity public transport.
- A station located at Huapai will enable residents from the surrounding area to access a park and ride adjacent to the station.
- A station located near the Kumeū town centre will provide access to the station by all types of transport – public transport, walk, bike, scoot, or drive
- Provision for a cycling and walking corridor alongside the rapid transit corridor connecting Whenuapai and the northern part of Redhills to Kumeū-Huapai.
- A future Alternative State Highway which will be a new route extending the existing North Western Motorway from Brigham Creek Road to State Highway 16 east of Waimauku, supporting the upgrade of the current state highway in Kumeū-Huapai town centre.

- A future new interchange at SH16 Brigham Creek Road to improve access for all areas across the North West. It will create a central connection point for a wide range of transport options, including the Alternative State Highway, new public transport routes via the rapid transit corridor, and new walking and cycling networks, to flow through.
- Future upgrades to local transport connections in Whenuapai, Redhills, Kumeū-Huapai and Riverhead.

Figure 15 shows the long terms SGA strategic connections in the area.

Figure 15: SHA long term changes

These improvements will substantially improve all modes in the area.

5 Proposed Trip Generation

5.1 Guidelines

The RTA Guide[4] and 453 guide are[5] commonly used by traffic engineering practitioners in Australasia to assess the traffic generating potential of various land uses.

The proposed residential sites were assessed and are considered to exhibit the characteristics of a *"dwelling house"* or a typical low density residential building.

The RTA predicts the following rates for a low density residential dwellings:

. . . . . .

[4] The Roads and Traffic Authority of New South Wales – Guide to Traffic Generating Developments (RTA), Version 2.2, October 2002

5 Trips and Parking Related to Land Use November 2011 – NZ Transport Agency Research Report 453

- 0.85 trips / dwelling in the peak hour; and
- 9.0 trips / unit daily.

With regard to the retirement village development, the proposed development is considered to provide independent living units, and based on surveys completed for similar retirement villages these generate in the order of:

- 0.2 trips per dwelling in the peak
- 2 trips per dwelling/daily

Regarding the proposed care units within the retirement village development the RTA 453 guide the care units exhibit the characteristics of a rest home which generate trips in the order of:

- 0.6 trips per unit
- 6 trips per day per unit

5.2 Proposed Level of Traffic Generation

There are no existing dwellings within the areas currently proposed development. The Riverhead Forest does generate a modest level of traffic, primarily related to recreational trips, largely on the weekend. For the purpose of this assessment, this existing traffic generation has not been considered, and as such the forecasted trip generation can be considered to be a conservative assessment. Additionally, lot 2 (retirement village) includes a wellness centre and amenity centre and lot 1 includes a community centre; however, it is expected that these facilities will generally cater to the retirement village and hence no external trips will be generated from those activities. While there may be some external traffic associated with these facilities, it is considered this will be more than offset by local residents staying in the area and not needs to travel externally.

Table 3: Traffic Generation Estimate

Activity	Trip Rate	Units	Peak Hour Trips	Daily Trips
Residential Dwellings	0.85 trips per dwelling for peak 9.0 trips per dwelling for daily trips	208	177 trips	1,872 trips
Retirement Village	0.2 trips per dwelling in the peak hour 2 trips per dwelling for daily trips	260	52 trips	520 trips
Retirement Village (Care Suits)	0.6 trips per dwelling in the peak hour 6 trips per dwelling for daily trips	36	22 trips	216
Lot 1 Community Centre	Considered to mainly serve local residential / retirement and thus no additional wider network vehicle movements			
Total			**251**	**2608**

5.3 Traffic Effects

The Auckland Unitary Plan Rule E27.6.1 Trip Generation requires resource consent for residential developments with over 100 dwellings. As seen above, the proposal is likely to increase trips in the order of 253 peak hour trip movements and 2,626 daily vehicle trips; therefore, the proposal is above the 100 dwellings threshold and therefore traffic modelling will be undertaken on the following intersections:

- Old North Road / Deacon Road
- Riverhead Road / Deacon Road
- Riverhead Road / Coatesville-Riverhead Highway / Kaipara Portage Road
- Riverhead Road / Old North Road
- Coatesville-Riverhead Highway / SH16
- Old North Road / SH16 / Taupaki Road
- Riverhead Road / SH 16
- Oraha Road / SH 16
- The Three Access Points on Old North Road / Forestry Road

5.4 Trip Distribution

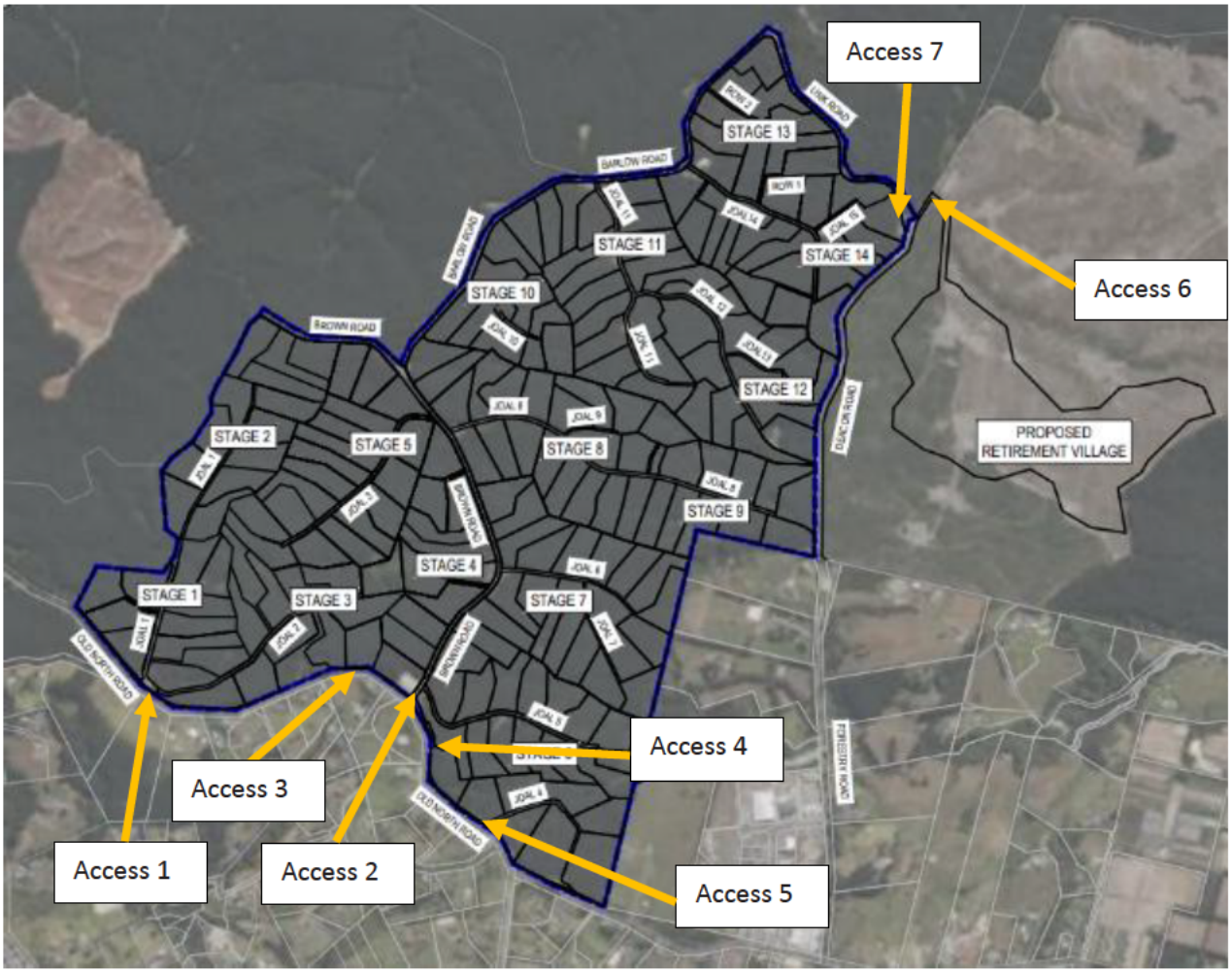
Arrival and departure splits for residential activities are typically assumed to be 80% departing / 20% arriving during the morning peak period and vice versa for the evening peak period. This would equate to 202 outbound and 51 inbound movements in the morning peak period and vice versa in the evening peak hour.

An estimate of the trip distribution has been made based on the existing surveys and Google Maps are summarised in **Appendix C and E**.

5.4.1 Access Driveways

A total of eight access driveways are provided as part of this proposal. Five of which are located on Old North Road, and three on the newly formed section of Forestry Road. Figure 16 shows these locations.

Figure 16: Roading Layout of Proposal



Note that number of access locations is as seen in Figure 16, additionally for each access the number of country living units and retirement units that will be serviced is summarised below:

- Access One:
  - Serves 21 Country Living Lots creating 14 outbound trips and 4 inbound trips in the AM peak period and vice versa for the evening peak hour
- Access Two:
  - Serves 122 Country Living Lots creating 83 outbound trips and 21 inbound trips in the morning peak period and vice versa for the evening peak hour
- Access Three:
  - Serves 1 Country Living Lot with negligible traffic (1 vehicle per hour)
- Access Four:
  - Serves 1 Country Living Lot with negligible traffic (1 vehicle per hour)
- Access Five:
  - Serves 9 Country Living Lots creating 6 outbound trips and 2 inbound trip during the morning peak period and vice versa for the evening peak hour

- Access Six:
    - Serves 260 Retirement Units, and 36 care units creating 46 outbound trips and 14 inbound trips during the morning peak period and vice versa for the evening peak period
- Access Seven:
    - Serves 56 Country living units creating 38 outbound trips and 10 inbound trips during the morning peak period and vice versa for the evening peak period

Figure 17, Figure 18, and Figure 19 show the proposed trip distribution (existing + generated trips) for each of the main access points on Old North Road. It is noted that trip diagrams for accesses 6 & 7 on Forestry Road have not been included as that section of road does not currently and trip diagrams for accesses 3 and 4 only serve a single dwelling and have not been included.

Figure 17: Access One Proposed Trip Distribution AM and PM peak

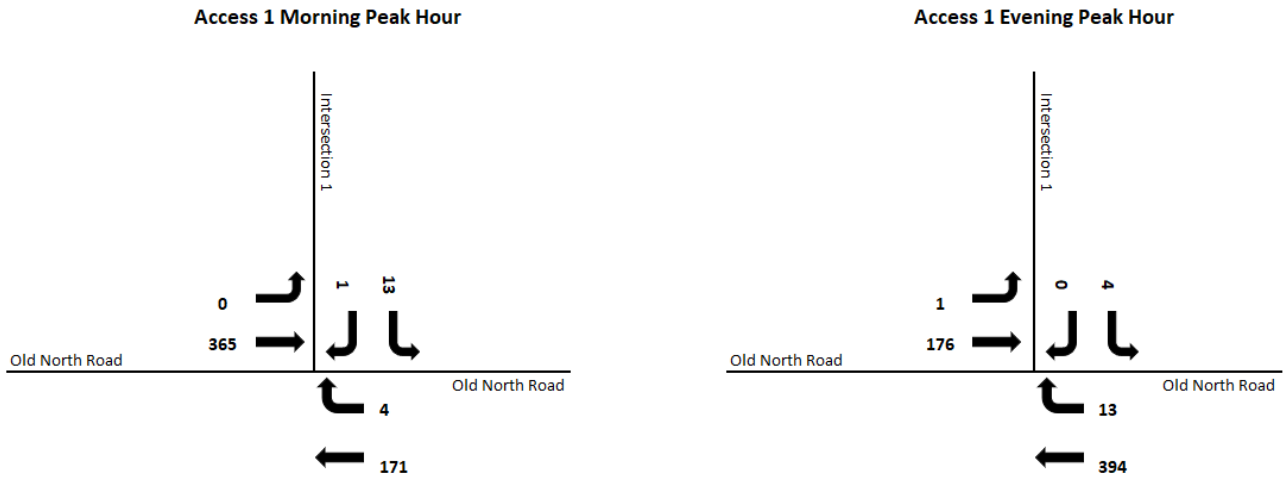


Figure 18: Access Two Proposed Trip Distribution AM and PM Peak

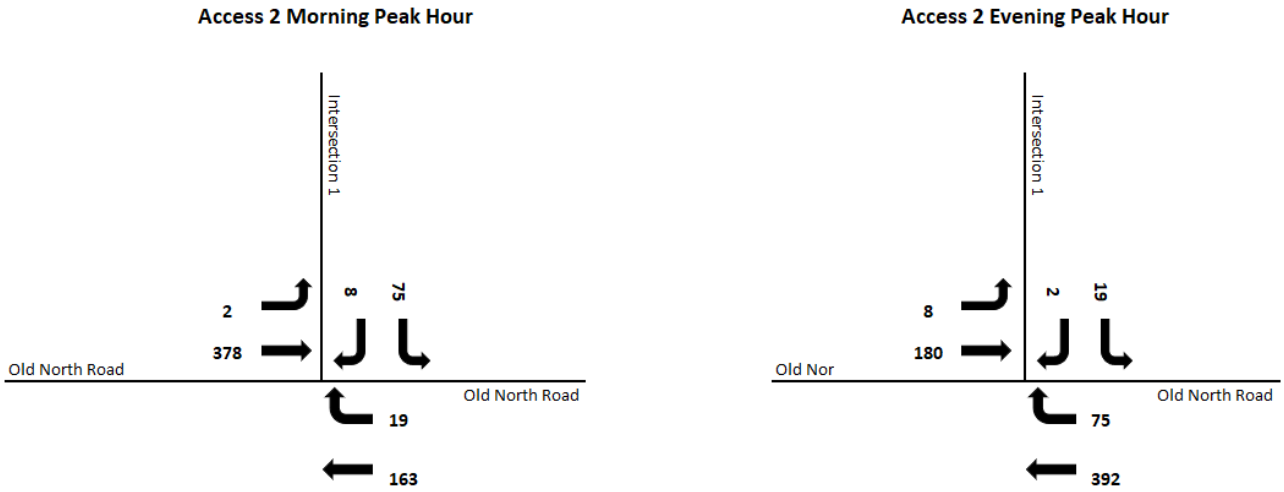
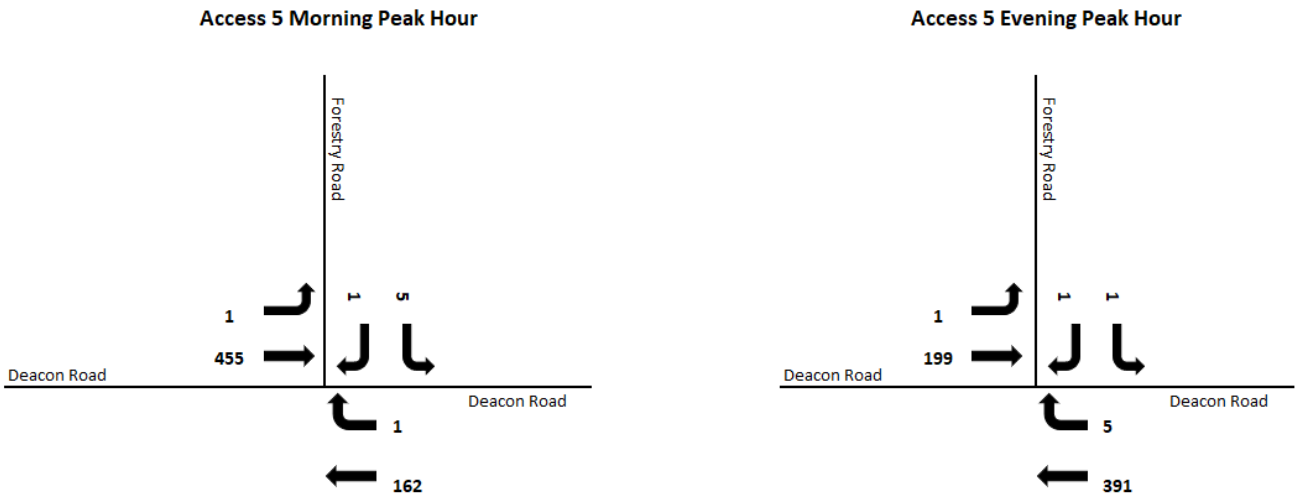


Figure 19: Access Four Trip Distribution AM & PM Peak



5.4.2 Wider Network Trip Distribution

As mentioned earlier, eight intersections have been assessed to ensure the wider roading network can accommodate the proposed number of trips generated.

Appendix E shows the generated traffic trip distribution for each intersection.

In general, compared to existing traffic volumes, the additional volumes added at each intersection is relatively low and the network is anticipated to be able to accommodate the additional volumes safely and efficiently.

6 Intersection Models

Modelling of the intersections mentioned above has been conducted using the SIDRA modelling software, the results for each intersection during the AM & PM peak periods will be discussed below and can be seen in **Appendix E, F, and G.**

6.1 Access points

The proposed trip distribution for each of the three main access points on Old North Road (not including Access 3 & 4 which only serve a single dwelling) have been modelled using SIDRA in both the AM and PM peak periods. Of note given the minimal traffic on Forestry Road these have not been modelled and are considered will operate with minimal delay.

The results are shown in **Appendix D** and show all access points (including the provisions of right turn bays at the major access points, will operate with minimal delay and queuing and are considered appropriate.

6.2 Wider Network Intersection Models

6.2.1 General

Both the existing, proposed, and proposed + PPC 100 scenarios have been modelled using the trip volumes and distributions discussed above. **Appendix E, F, and G** showcase the resulting modelling results for each

intersection. Discussion and comparisons between the existing and proposed trip distribution and intersection performance has been provided below. Of note three scenarios have been undertaken:

1. Existing volume and intersection layouts
2. Existing + proposed volumes with existing intersection layouts
3. Existing + proposed + PC100 with Pc100 upgrades

6.2.2 Discussion

Overall, although some modelling reveals noticeable queues or delay times, the amount of generated traffic is very low compared to existing volumes and is unlikely to have any noticeable adverse impact on the wider transport network.

Overall, in both the existing and proposed scenarios all intersections that do not involve SH 16 perform within acceptable standards. These intersections generally have an LOS of A or B, experience delays of less than 20 seconds, and do not result in excessive queuing, however, most of the intersections that do involve SH 16 (Oraha Road / SH 16, Coatesville-Riverhead Highway / SH 16, and Riverhead Road / SH 16) result in LOS ratings of F for turning movements from the minor approach and unacceptable queueing and delays. Each of these intersections will be discussed in further detail below.

It is noted that the Old North Road / SH16 / Taupaki Road roundabout generally performs well and thus is expected to be the main access to SH16 for the site at peak hours.

Table 4: Summary of Intersection Modelling

Intersection	Existing			Proposed			Proposed with PPC 100		
AM top and PM bottom	Average LOS	Average Delay	Average Queue Length	Average LOS	Average Delay	Average Queue Length	Average LOS	Average Delay	Average Queue length
Old North Road / Deacon Road	LOS A	3.7 seconds	7.4m	LOS A	4.0 seconds	8.1m	LOS A/B	4.0 seconds	8.1m
	LOS A	3.6 seconds	5m	LOS A	3.4 seconds	5.2m	LOS A	3.5 seconds	5.9m
Riverhead Road / Deacon Road	LOS A	5.1 seconds	12.4m	LOS A	4.8 seconds	10.9m	LOS A	4.6 seconds	11.5m
	LOS A	4.5 seconds	11.1m	LOS A/B	4.7 seconds	11.7m	LOS B	4.6 seconds	13.1m
Riverhead Road / Coatesville-Riverhead Highway/Kaipara Portage Road	LOS A	6.7 seconds	38.7m	LOS A	7.4 seconds	50.3m	LOS F (Western Approach)	65.3 seconds	638m
	LOS A	6.4 seconds	43.9m	LOS A	5.9 seconds	25.4m	LOS B	10.4 seconds	53m
Riverhead Road / Old North Road	LOS A	5.9 seconds	14.1m	LOS A	6.2 seconds	22.1m	LOS A	6.6 seconds	23.2m
	LOS A	4.4 seconds	22.1m	LOS A	4.9 seconds	31.7m	LOS A	5.7 seconds	44.9m
	LOS F	1184 seconds	2582m	LOS F	2086.9 seconds	2882m	LOS B/C	9.6 seconds	81.4m

Coatesville-Riverhead Highway / SH16	LOS F	537 seconds	2524m	LOS F	743.2 seconds	3376m	LOS B	7.2 seconds	91.9m
Old North Road / SH 16 / Taupaki Road	LOS A	5.2 seconds	26.6m	LOS A	5.3 seconds	36.2m	LOS A	7.5 seconds	74.4m
	LOS A	7.2 seconds	81.7m	LOS B	8.0 seconds	89.5m	LOS B	11.6 seconds	131m
Riverhead Road / SH 16	LOS F	47.4 seconds	218m	LOS F	48.3 seconds	220m	LOS F	48.3 seconds	220m
	LOS F	90 seconds	240m	LOS F	90 seconds	240m	LOS F	90 seconds	240m
Oraha Road / SH 16	LOS F	23.6 seconds	114.5m	LOS F	230.8 seconds	388.6m	LOS F	230.8 seconds	388.6m
	LOS F	218 seconds	422m	LOS F	285.5 seconds	467.1m	LOS F	285.5 seconds	467.1m
Forestry Road / Deacon Road	LOS A	2.2 seconds	3.6m	LOS A	3.0 seconds	5.8m	LOS A	3.0 seconds	5.8m
	LOS A	1.5 seconds	2.m	LOS A	2.3 seconds	6.2m	LOS A	2.3 seconds	6.2m

Overall, the surveyed intersections generally performed within acceptable standards, with LOS A often being seen with low delay and queues. Intersections onto SH 16 observed excessive queues for turning vehicles from the minor approach; however, the addition of the proposed traffic has will result in minimal effects. It is also anticipated that the majority of generated traffic will travel through the Old North Road / SH 16 / Taupaki intersection which operates well within acceptable parameters.

This is further discussed below.

6.2.2.1 Coatesville-Riverhead Highway / Riverhead Road / Kaipara Portage Road

The addition of PPC 100 and the current proposals generated traffic has led to the western approach (Riverhead Road) operating with an LOS of F in the AM peak period.

It is noted that this assessment is conservative as it has not accounted for reductions in traffic due to pass-by-trips generated by retail activities within the PPC 100 development and the current proposal development. If the pass-by trips are considered, a reduction in traffic at the above intersection is expected. We consider this to be acceptable, given that issues would potentially only occur in the AM peak period.

6.2.2.2 Riverhead Road / SH 16 Intersection

In terms of the Riverhead Road / SH 16 intersection, only small differences are observed between the existing and proposed intersection modelling in both the AM and PM peak periods. Both result in the left and right out movements from Riverhead Road operating at an LOS of F, with slightly higher vehicle queuing in the proposed scenario.

Minimal traffic from the proposal is anticipated to travel through the Riverhead Road / SH 16 intersection; hence is unlikely to have an effect on the operation of the intersection which is considered to be acceptable.

6.2.2.3 Coatesville-Riverhead Highway / SH 16

In both the existing and proposed scenarios excessive queuing and delays are observed for vehicles turning out of Coatesville-Riverhead Highway resulting in an LOS of F. It was found that long queues on SH 16 and on Coatesville-Riverhead Highway starting from around 6am to 9am. It was further observed that a high degree of courtesy is exercised by drivers on SH 16 letting in right turning vehicles from SH 16 onto Coatesville-Riverhead Highway therefore allowing left turning vehicles from Coatesville-Riverhead Highway to turn onto SH 16.

This intersection has been identified as critical and currently does not perform within acceptable standards; however, the proposed development does not add any turning vehicles to the intersection. Additionally, it can be expected that generated traffic will avoid the Coatesville-Riverhead Highway / SH 16 intersection due to the congestion and instead use the Old North Road / SH 16 / Taupaki Road intersection which operates within acceptable standards and is closer to the proposed site.

Furthermore, PPC 100 includes provisions of a standard to ensure that the New Zealand Transport Agency / Waka Kotahi's SH16 Brigham Creek to Waimauku Upgrade project ("the Waka Kotahi Project"), which includes an upgrade of the SH16 / Coatesville-Riverhead Highway intersection to a two-laned roundabout is constructed prior to occupation of the proposed activities with the PPC area. An assessment of the performance of the upgraded intersection with the additional traffic from PPC 100 operates within acceptable standards and can be seen below in Figure 20 (from FLOW traffic report).

Figure 20: Upgraded Coatesville-Riverhead Highway / SH 16 Intersection (with PPC 100 & generated traffic)

		AM Peak		PM Peak	
Approach	Movement	Delay (s/veh)	LOS	Delay (s/veh)	LOS
SH16 (East)	Through	2.4	A	2.5	A
	Right	7.9	A	8.1	A
Coatesville-Riverhead	Left	58.7	E	9.8	A
	Right	68.8	E	15.8	B
SH16 (West)	Left	7.7	A	14.5	B
	Through	7.7	A	15.0	B
Intersection		19.2	B	8.1	A

Approach	Queue (veh)	Queue (veh)
SH16 (East)	5.8	16.4
Coatesville-Riverhead	25.5	4.4
SH16 (West)	8.0	12.2

Overall, the above performance generally aligns with the modelling conducted in this report in that the upgraded intersection is capable of handling the anticipated trips generated from the current proposal and PPC 100 and thus is considered to be acceptable.

6.2.2.4 Oraha Road / SH 16

Similar to the above intersections, in both the existing and proposed scenarios excessive queuing and delays are observed for vehicles turning out of Oraha Road resulting in an LOS of F. Very minor changes as a result of the

proposed traffic have occurred meaning that effectively the proposed development will have minimal effect on the wider transport network.

7 Nearby Intersection arrangement

7.1 Deacon Road / Riverhead Road Intersection

7.1.1 General

The Deacon Road / Riverhead Road intersection is shown in Figure 21. The Deacon Road / Riverhead Road intersection is a slightly unusual stop controlled T-intersection with the major approach being Riverhead Road with a south to east alignment and the minor approach being Deacon Road with an east west alignment.

Additionally, another a one-way exit is provided on Riverhead Road leading to a give-way controlled t-intersection where Deacon Road is the main approach and Riverhead Road is the minor approach.

Figure 21: Deacon Road / Riverhead Road Intersection

7.1.2 Sight Distance

Safe Intersection Sight Distance (SISD) is the minimum distance that should be provided on the major road at any intersection, for a driver on the major road to observe a vehicle moving into a collision position from the minor road and to decelerate to a stop before reaching the collision point.

Both Deacon and Riverhead road have a posted speed limit of 80km/h, using the Austroads 2023: Guide to Road Design Part 4A Table 3.2 requires for intersections on an 80 km/h carriageway and a reaction time of 2.0s that a safe sight distance of 181m be provided.

Figure 22: Sight Distance from Deacon Road onto Riverhead Road looking left

Figure 23: Sight Distance from Deacon Road onto Riverhead Road looking right

Figure 22 and Figure 23 above highlight the sight distance onto Riverhead Road. Based on this, the 181m sight distance is not provided looking right onto Riverhead Road, in this regard:

- The sight distance looking right onto Riverhead Road is limited due to a turn where it would be expected that vehicles would be slowing down to make the turn safely.
- The intersection is stop controlled, it would be expected that vehicles turning onto Deacon Road will be travelling at a much lower speed and therefore, adequate sight distance is provided.
- The sight distance is an existing issue in the network and not exacerbated by the proposal.

7.1.3 Existing Safety

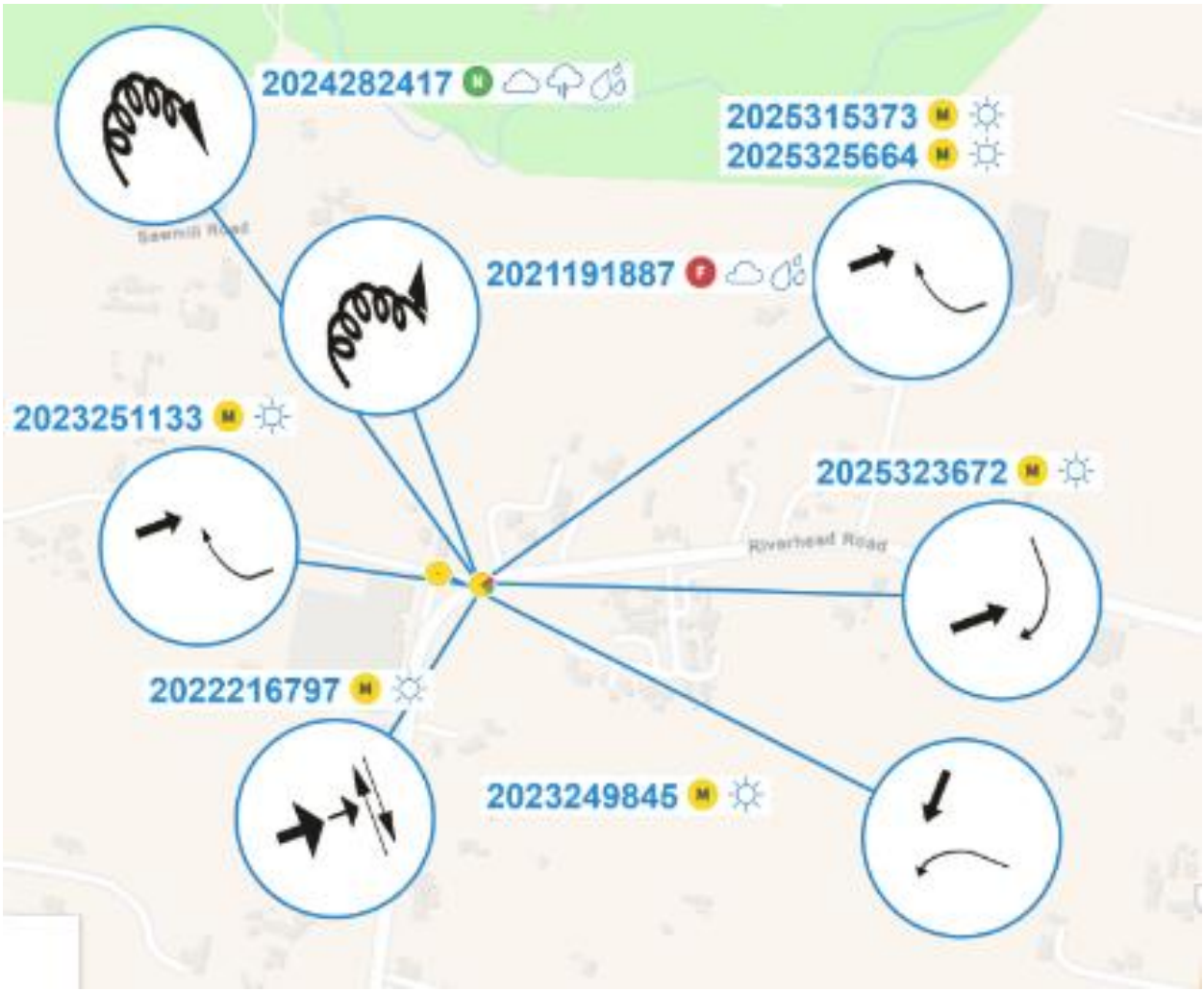
A CAS search of the surrounding area including the Deacon Road / Riverhead Road intersection; however, a more detailed summary of the Deacon Road / Riverhead Road crash history will be conducted here. A Crash diagram showcasing the crashes at the intersection between the years 2020-2024 including all available information for 2025.

A total of 8 crashes occurred at the intersection and are summarised below:

- One fatal collision occurring at the Riverhead / Deacon Road intersection due to driver losing control and crashing into a pole, substance abuse was a factor;
- Six minor collision generally due to vehicles failing to stop or give way at the intersection; and
- A single non-injury collision due to losing control of the vehicle on the bend.

Generally, a potential crash trend has appeared due to vehicles failing to stop or giveaway at the intersection this is further reinforced as three new crashes were observed in the first couple months of 2025.

Figure 24: Crash Diagram Riverhead Road / Deacon Road Intersection



7.1.4 Overall

Overall, the Deacon Road / Riverhead Road operates acceptably and provides adequate sight distance in both directions; however, there has been a potential crash trend identified with vehicles failing to give way to oncoming traffic.

7.2 Deacon Road / Forestry Road

7.2.1 General

The Deacon Road / Forestry Road intersection as seen Figure 25. The Deacon Road / Riverhead Road intersection is a standard give way controlled T-intersection with the major approach being Deacon Road with an east to west alignment and the minor approach being Forestry Road with an north south alignment.

It is noted that the intersection does not have a right turn bay, but does include widening in the westbound direction to allow a vehicle to pass a right turning vehicle.

Figure 25: Deacon Road / Riverhead Road Intersection

7.2.2 Sight Distance

Safe Intersection Sight Distance (SISD) is the minimum distance that should be provided on the major road at any intersection, for a driver on the major road to observe a vehicle moving into a collision position from the minor road and to decelerate to a stop before reaching the collision point.

Deacon has a posted speed limit of 80km/h and Forestry Road has a posted speed limit of 60km/h, using the Austroads 2023: Guide to Road Design Part 4A Table 3.2 requires for intersections on an 80 km/h carriageway and a reaction time of 2.0s that a safe sight distance of 181m be provided.

Figure 26: Sight Distance on Riverhead Road looking left

Figure 27: Sight Distance on Riverhead Road looking right

Figure 26 and Figure 27 above highlights the sight distance onto Deacon Road, based on this, a 181m sight distance is provided looking in both directions onto Deacon Road, which is considered to be acceptable.

7.2.3 Existing Safety

A CAS search of the surrounding area including the Deacon Road / Forestry Road intersection; however, a more detailed summary of the Deacon Road / Forestry Road crash history will be conducted here. A Crash diagram showcasing the crashes at the intersection between the years 2020-2024 including all available information for 2025.

No crashes were reported within a 50m vicinity of the Deacon Road / Forestry Road intersection; therefore, there is very little crash risk associated with the above intersection.

7.2.4 Overall

Overall, the Deacon Road / Forestry Road operates acceptably and provides adequate sight distance in both directions; Additionally, as a part of the proposal, an upgrade of Forestry Road is proposed the upgrade will be able to accommodate the anticipated traffic generation due to the proposed development and is considered to be acceptable.

From a traffic perspective, there are no safety or other concerns with Forestry Road and it should be able to accommodate development safely.

7.3 Deacon Road / Old North Road

7.3.1 General

The Deacon Road / Old North Road intersection as seen Figure 28. The Deacon Road / Riverhead Road intersection is a standard stop controlled t-intersection with the major approach being Old North Road with a north to south alignment and the minor approach being Deacon Road with an east to west alignment.

Figure 28: Deacon Road / Old North Road Intersection

7.3.2 Sight Distance

Safe Intersection Sight Distance (SISD) is the minimum distance that should be provided on the major road at any intersection, for a driver on the major road to observe a vehicle moving into a collision position from the minor road and to decelerate to a stop before reaching the collision point.

Both Deacon Road and Old North Road have a posted speed limit of 80km/h, using the Austroads 2023: Guide to Road Design Part 4A Table 3.2 requires for intersections on an 80 km/h carriageway and a reaction time of 2.0s that a safe sight distance of 181m be provided.

Figure 29: Sight Distance on Riverhead Road looking right then left

Figure 29 above highlights the sight distance onto Deacon Road, based on this, a 181m sight distance is provided looking in both directions onto Old North Road, which is considered to be acceptable. It is however noted that sight distance for right turning into Deacon Road is somewhat limited however this appears to be causing no noticeable issues.

7.3.3 Existing Safety

A CAS search of the surrounding area including the Deacon Road / Forestry Road intersection; however, a more detailed summary of the Deacon Road / Forestry Road crash history will be conducted here. A Crash diagram showcasing the crashes at the intersection between the years 2020-2024 including all available information for 2025.

Two crashes were reported within a 100m vicinity of the Deacon Road / Old North Road intersection, in this regard:

- A serious collision due to driver losing control of the vehicle while turning onto Old North Road; and
- A minor collision due to driver losing control of vehicle when driving too fast for conditions.

Therefore, there is very little crash risk associated with the above intersection.

7.3.4 Overall

Overall, the Deacon Road / Old North Road operates acceptably and provides adequate sight distance in both directions.

From a traffic perspective, there are no safety or other concerns with Forestry Road and it should be able to accommodate development safely.

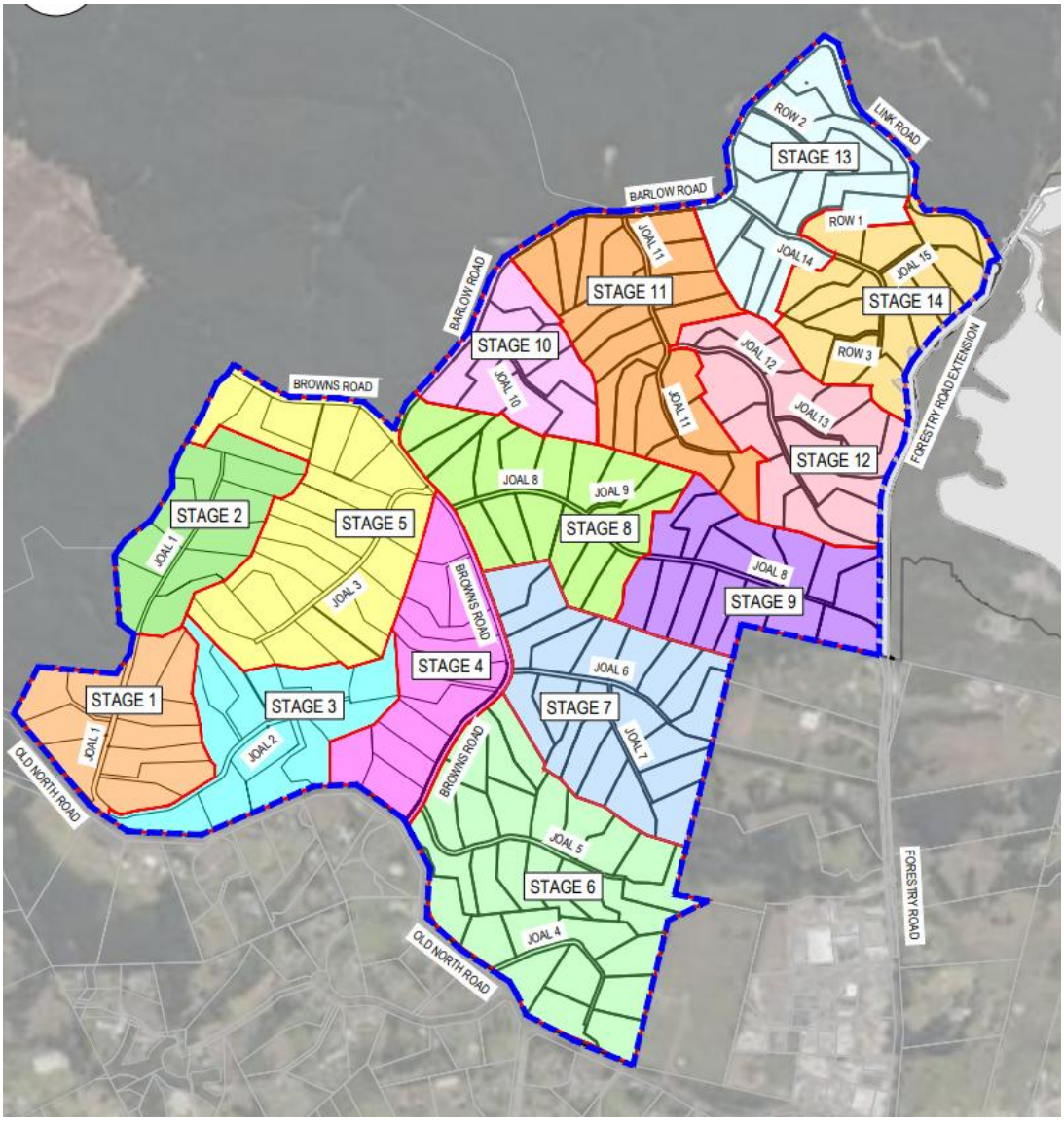
8 Internal Network

8.1 Lot 1 (Residential)

8.1.1 General

The Residential component connects to the wider road network at five locations on Old North Road and one location on Forestry Road. Internal to the site, the lot 1 or the residential development includes 15 JOALs 2 ROWs and one local road (an extension of Forestry Road). Figure 30 shows the proposed internal road layout and connections to the wider road network.

Figure 30: Lot 1 Countryside Living Internal Layout



8.1.2 Road & Accessway Cross-sections

Table 5 shows the cross sections of the proposed internal road & accessway.

Table 5: Proposed Road Cross Sections

Road/Accessway	Reserve Width	Lane Width	Parking Provisions
Typical Private Access Serving up to 5 lots	7m	3.5m formed width	NA
Typical Private Access Serving >5 lots	10.0m	6m formed width (3.0m in each direction)	NA
Forestry Road (After Upgrade)	20-32.0m	6m carriage way (3.0m lane in each direction)	NA

It is noted that the carriageway width will have localised widening at the bends to accommodate truck movements.

An assessment has been undertaken of the proposed new road (Forestry Road upgrade) against the local road cross-sectional requirements in the Auckland Transport Design Manual (ATDM) standards.

The proposed road reserve, lane width and footpath dimensions comply with the applicable cross-section in the ATDM.

Of note turning heads have been included in all Accessways that serve greater than 6 dwellings and thus are expected to accommodate private rubbish collection.

The cross sections of the proposed roads, Accessways, and upgrade of Forestry Road are shown in Figure 31, Figure 32, Figure 33.

Figure 31. Forestry Road upgrade Cross Section

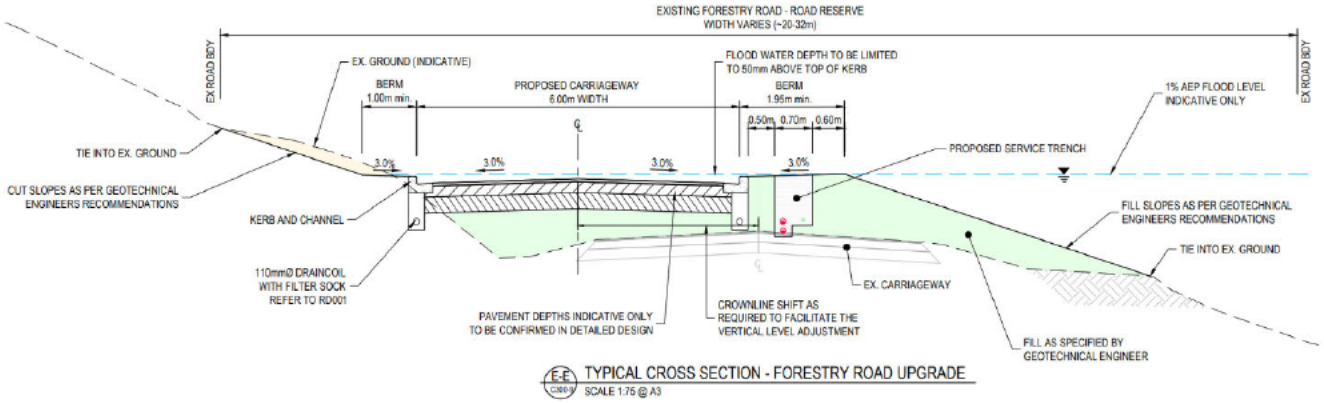


Figure 32: JOAL Serving 1-5 Lots Cross Section

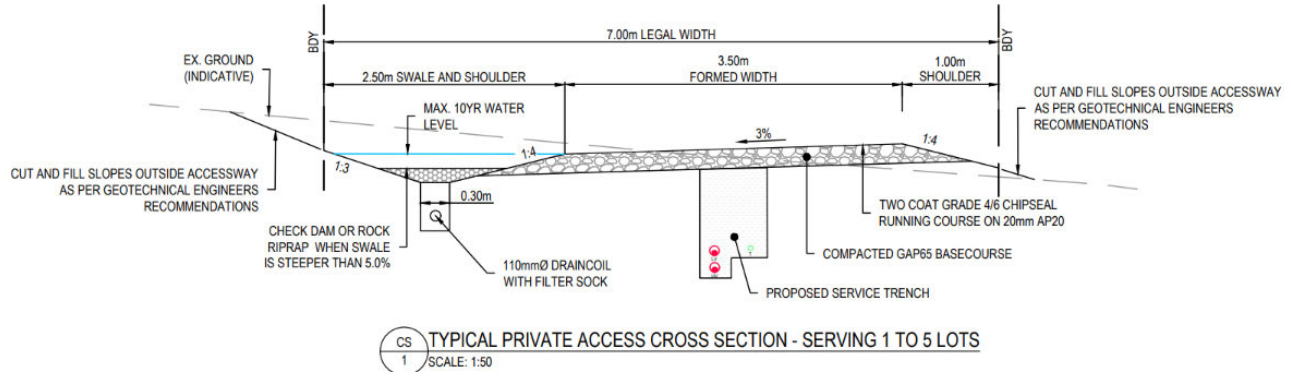
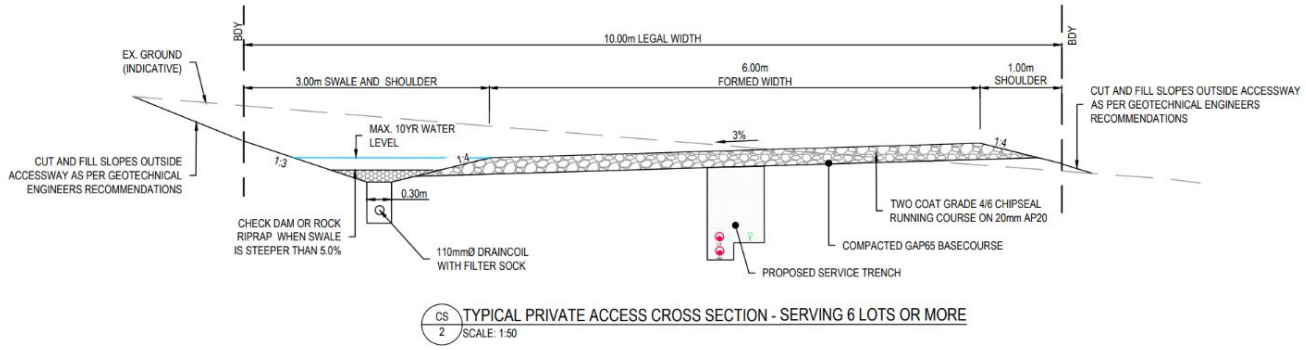


Figure 33: JOAL Serving 6+ Lots Cross Section



8.1.3 Passing Bays

Table E27.6.4.3.1 in the AUP highlights passing bay requirements for developments in various zones. The site is zoned 'Rural – Country Living Zone' under the AUP, as such when an access is less than 5.5m and exceeds a length of 100m. A passing bay is required at minimum every 100m which provides a formed width of access of 5.5m over a 15m length (allowing two vehicles to safely pass each other).

As seen in Figure 34, a typical private access passing bay included in the proposal can be seen. It is proposed that a 15m passing bay will be provided increasing the formed width to 5.5m which is considered to be acceptable.

Figure 34: Typical Private Access Passing Bay

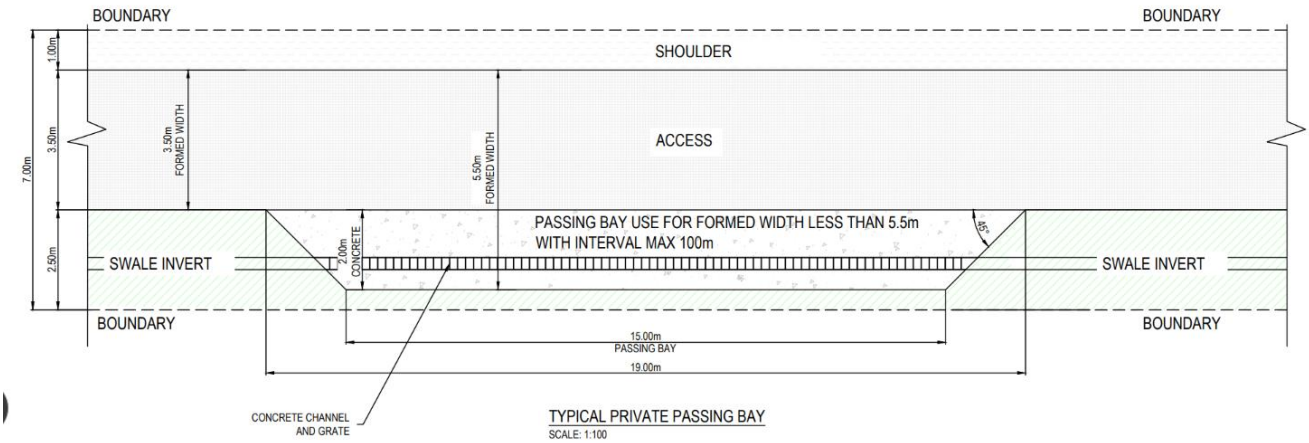
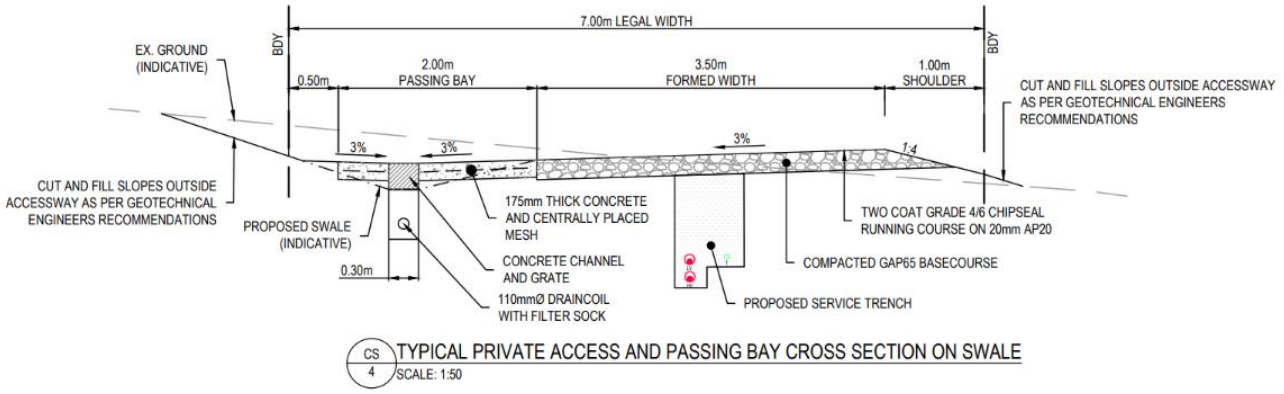


Figure 35: Typical JOAL Passing Bay Cross Section



8.1.4 Vehicles tracking

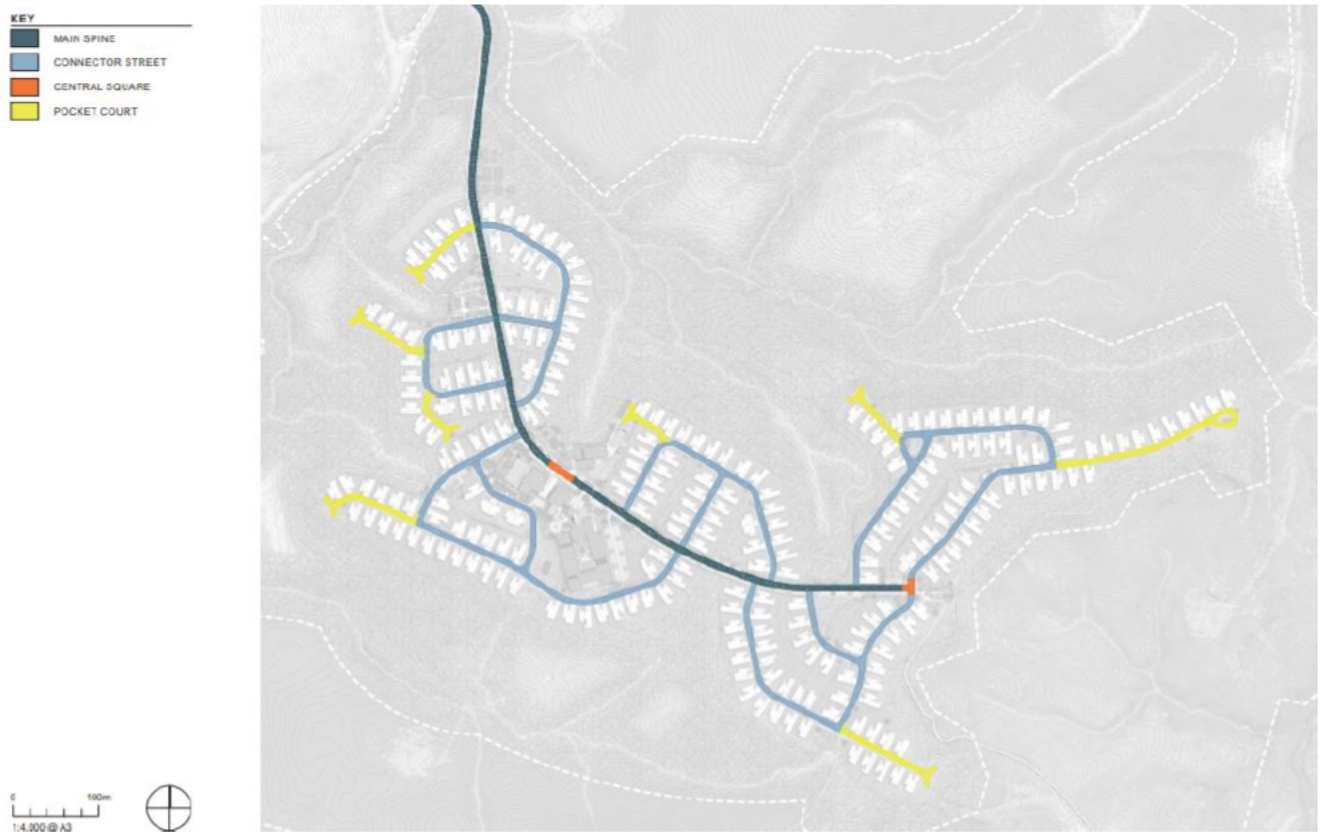
Vehicle tracking has been undertaken using a 85%ile car (two passing each other) and 7.4m private rubbish truck and a 8m Fire appliance. This is shown in **Appendix B** and is shown in be appropriate.

8.2 Lot 2 (Retirement Village)

8.2.1 General

The proposed retirement village located within lot 2 connects to the wider network via Forestry Road to the Forestry Road / Deacon Road intersection. Internal to the site the retirement village proposal includes a single primary accessway and 20 private accessways. Figure 36 shows the proposed internal layout of the retirement village contained within lot 2.

Figure 36: Retirement Village Internal Layout



8.2.2 Cross Sections

Table 5 shows the cross sections of the proposed internal roads.

Table 6: Proposed Accessway Cross Sections

Roads	Road Reserve Width	Lane Width	Pedestrian Provisions	Parking Provisions
Primary Accessway/Main Spine	16m	6m carriageway width (3.0m lane in each direction)	2.0m footpath	NA
Minor Accessway 1/Connector Street	11.0m	5.5m formed width (2.75m in each direction)	1.5m footpath	NA
Minor Accessway 2/Pocket Court	9.5m	5.5m carriage way (2.75m lane in each direction)	NA	NA

It is noted that the carriageway width will have localised widening at the bends to accommodate truck movements.

An assessment has been undertaken of the proposed new roads against the local road cross-sectional requirements.

The cross sections of the proposed roads, JOALs can be seen in Figure 37, Figure 38, and Figure 39 below.

Figure 37: Local Road Cross Section

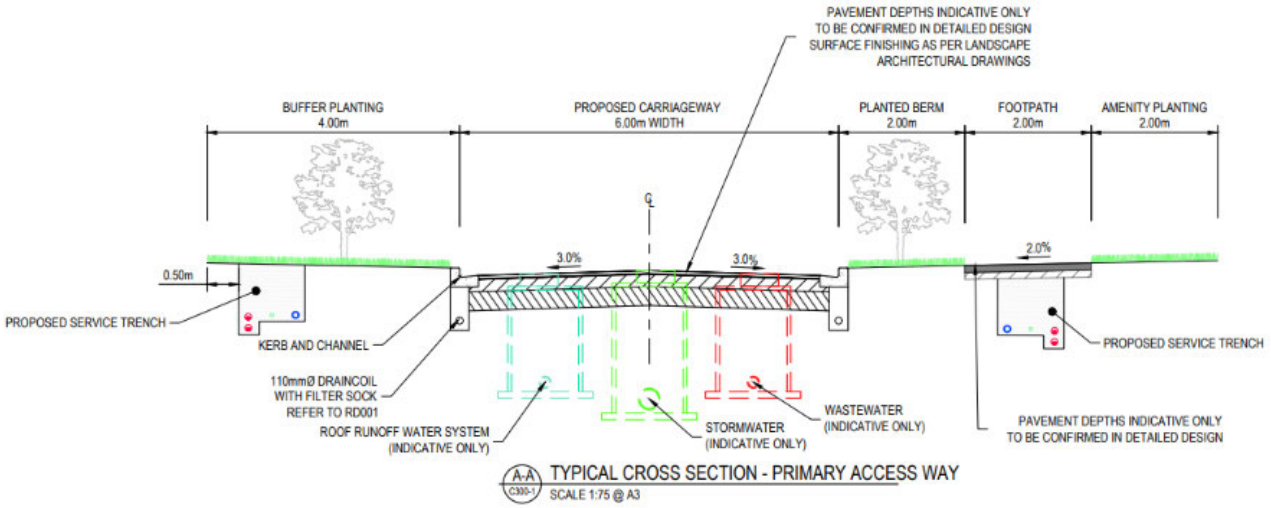


Figure 38: Connector Street Cross Section

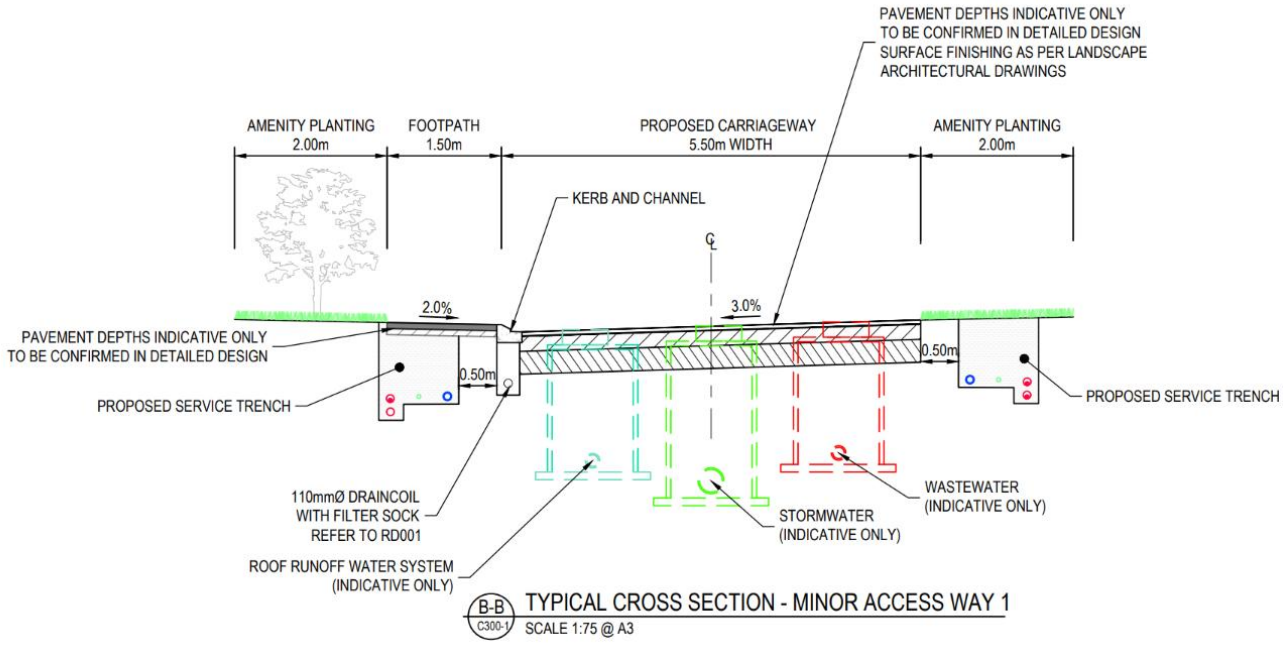
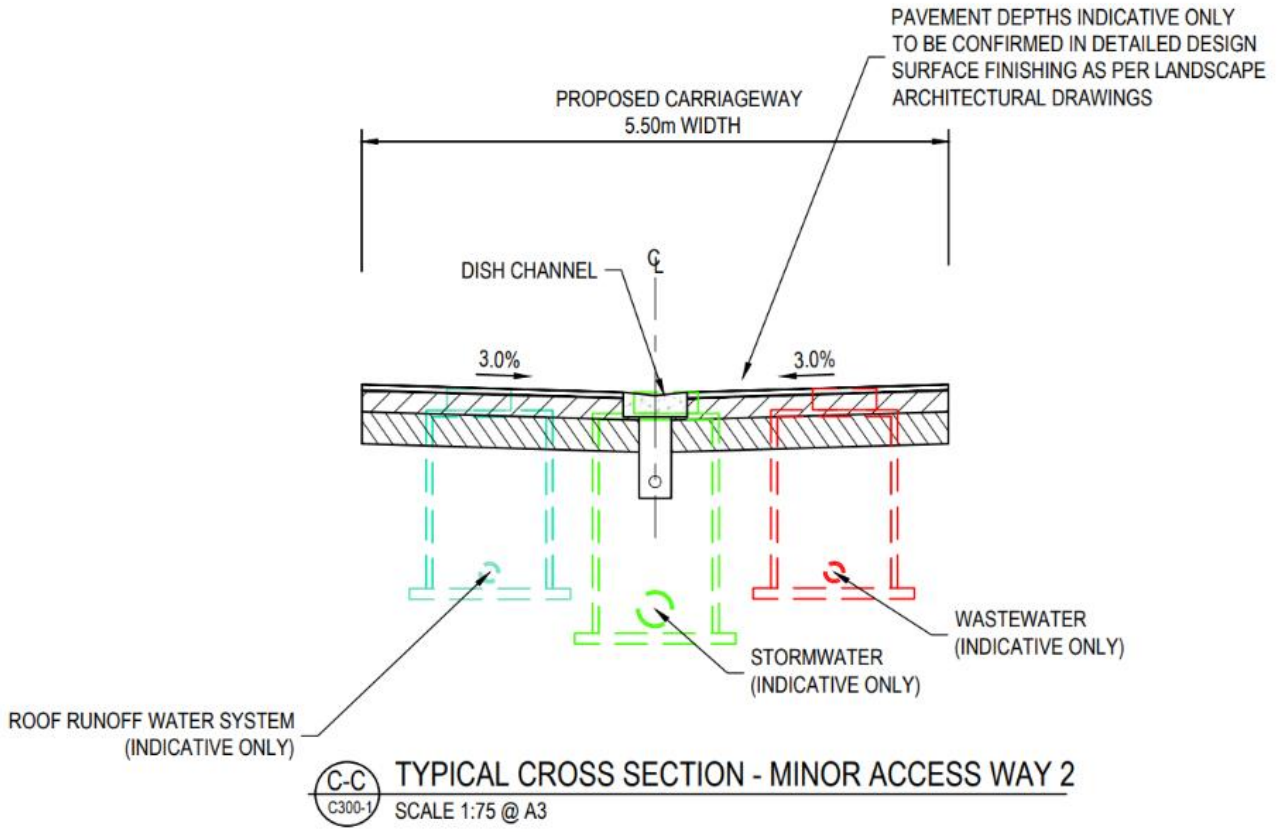


Figure 39: JOAL Cross Section



8.3 Longitudinal Gradients

With reference to the Auckland Transport TDM "*the maximum longitudinal grade accepted by Auckland Transport for new footpaths is 8%. This is to ensure that all new footpaths can be accessed by users with mobility impairments. Any footpaths above this gradient up to the legal limit of 12.5% must be assessed through the departure of standard process*."

In this regard, with reference to the Civil Engineering design drawings prepared by Maven the steepest grade on the Forestry Road upgrade is less than 8% which is considered to be acceptable and meets Auckland Transport requirements.

8.4 Vehicle Tracking

Given that JOALS and internal Retirement Village roads are all private the Auckland Transport Standards to not technically apply. The internal JOAL's / accessway have all been designed to accommodate:

- Mid-block:
  - Simultaneous movement of two large cars
  - 8m fire truck and a 7.4m rubbish truck
- Intersections:
  - Both 7.4m and 8m truck (essentially a private collection rubbish truck) using full road width to turn

- Simultaneous turning movement of two cars

Vehicle tracking has been undertaken for all roads within the proposed internal road network. The following parameters were used for vehicle tracking:

- 500mm body clearance for trucks, 300mm to cars;
- Body clearance provided to the kerb and any oncoming vehicle (where simultaneous movement is occurring); and
- 20km/h speed midblock and 15km/h speed when turning within intersections

Vehicle tracking has been checked and is considered to be acceptable, tracking can be found in **Attachment B**. Overall, the design of the JOAL's / internal accessway is considered appropriate.

8.5 Major External Driveways

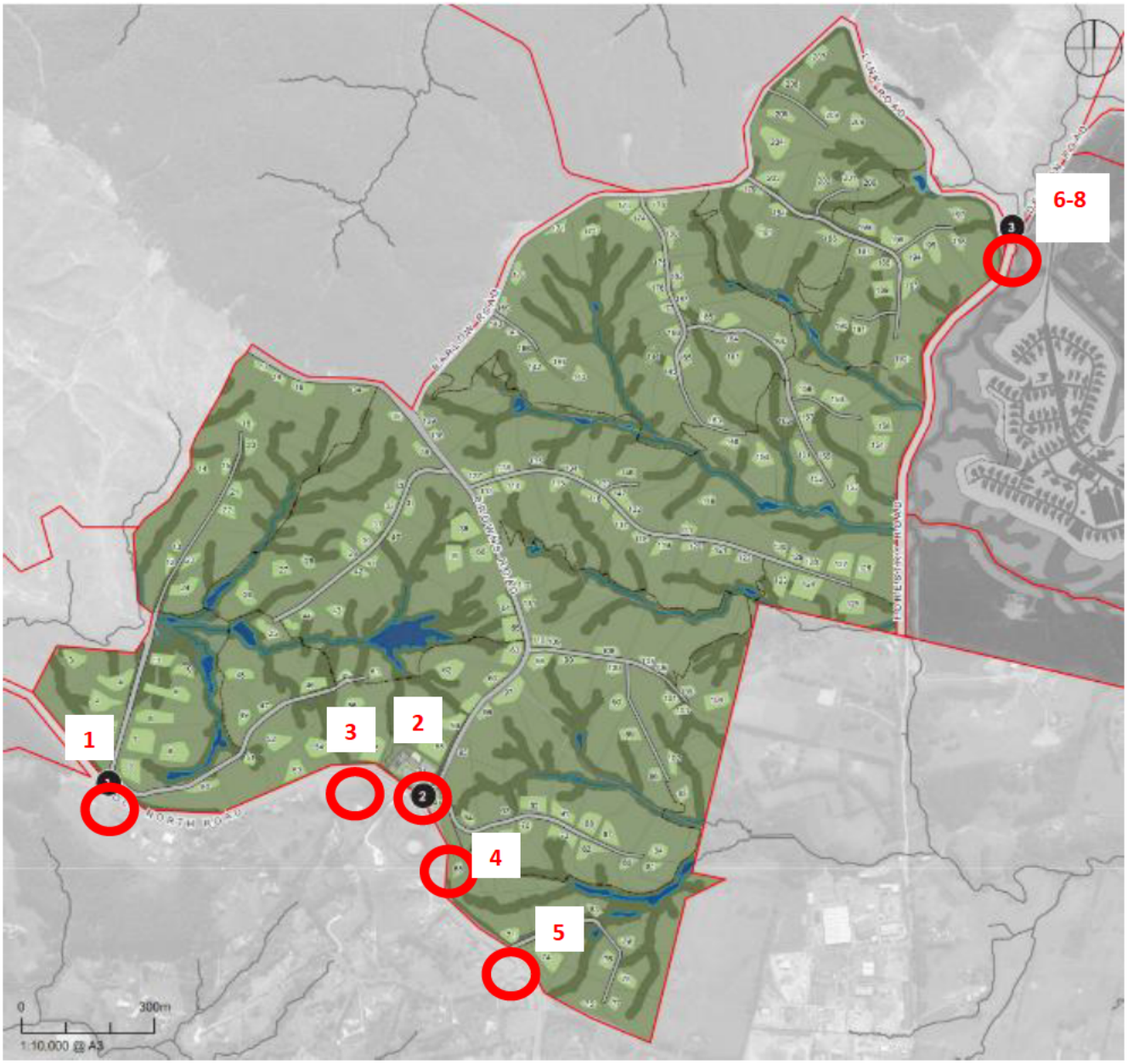
8.5.1 Lot 1: Residential Development

8.5.1.1 General

A total of four "*major driveways*" have been proposed within stage 1, with all driveways. As discussed in Section 9.1, each driveway has been designed to accommodate the simultaneous turning manoeuvres of a 6.3m van and 6.3m van, and a 8m fire truck utilising both lanes when manoeuvring on the local road. Priority controlled intersections are considered appropriate from a capacity perspective within the development.

These local road driveways are shown in Figure 40 below.

Figure 40. Stage 1 Proposed Local Road driveway locations



8.5.1.2 Safe Intersection Sight Distance

Safe Intersection Sight Distance (SISD) is the minimum distance that should be provided on the major road at any intersection, for a driver on the major road to observe a vehicle moving into a collision position from the minor road and to decelerate to a stop before reaching the collision point.

Old North Road has a posted speed limit of 80km/h, however multiple bends in the road occur outside of the site near Access points 4 and 5 so a speed limit of 60km/h is deemed to be more appropriate.

The Austroads: Guide to Road Design Part 4A Table 3.2 requires for driveways on a 80 km/h carriageway that a safe sight distance of 181m be provided and for 60km/hr it is 123m.

Table 7 shows the SISD provided at each proposed intersection and the compliance based on the SISD requirements.

Table 7: Safe Intersection Sight Distance at all local road driveways

Driveway	Speed	Requirement	SISD western/Left direction	SISD eastern/right direction	Compliance
1	80	181m	181+ metres*	181+ metres*	Yes
2	80	181m	181+ metres*	181+ metres*	Yes
3	80	181m	190 metres	190 metres	Yes
4	60	123m	141+ metres	158 metres	Yes
5	60	123m	190+ metres	161 metres	Yes
6-8	Three driveways not assessed as this section of Forestry Road does not exist however driveways will be located near end of new Forestry Road and therefore considered appropriate.				

*Sight distance assuming vegetation maintained / bank altered as per civil plans (sightline)

8.5.1.3 Driveway form

In terms of the intersection design the following is proposed:

- No 1 (Old North Road): Full right turn bay in accordance with Austroads is proposed.
- No 2 (Old North Road): Full right turn bay in accordance with Austroads is proposed
- No 3 (Old North Road): Basic road widening proposed given access only serves a single lot
- No 4 (Old North Road): Basic road widening proposed given access only serves a single lot
- No 5 (Old North Road): Basic road widening proposed given access only serves 6 lots
- All other internal "driveways" are essentially private (no public road involved) and have been designed as simple priority driveways.

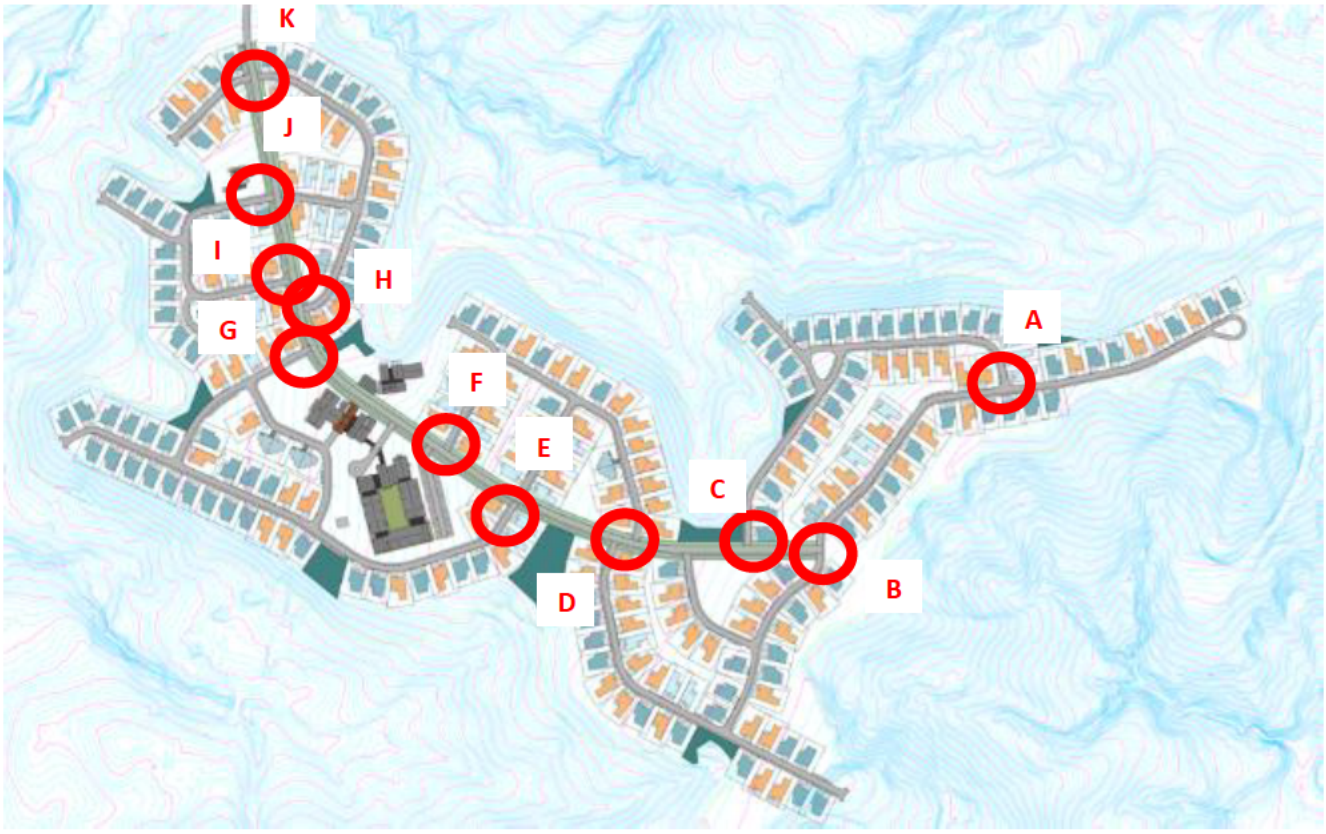
8.5.2 Lot 2: Retirement Village

8.5.2.1 General

A total of 13 private intersections have been proposed within Lot 2, with all intersections characterised as local / local road, priority-controlled 'T' intersections and priority afforded to the major approach. As discussed in Section 9.1, each intersection has been designed to accommodate the simultaneous turning manoeuvres of a 6.3m van and 6.3m van, and a 8m fire truck utilising both lanes when manoeuvring on the local road. Priority controlled intersections are considered appropriate from a capacity perspective within the development.

These local road intersections are shown in Figure 41 below. These intersections will be referred to by these labels in this report.

Figure 41. Stage 2 Proposed Local Road Intersection locations



8.5.2.2 Safe Intersection Sight Distance (SISD)

Safe Intersection Sight Distance (SISD) is the minimum distance that should be provided on the major road at any intersection, for a driver on the major road to observe a vehicle moving into a collision position from the minor road and to decelerate to a stop before reaching the collision point.

All new internal private intersections as part of this proposal will be controlled with give way road markings. While the proposed accessways have an intended posted speed limit of 50km/hr, they have been designed to be lower operating speed roads (30km/hr) with the provisions for traffic calming devices such as speed tables. As such, sight distance has been calculated based on 30km/h, which is considered an appropriate operating speed of the accessways.

The Austroads: Guide to Road Design Part 4A Table 3.2 requires for intersections on a 30 km/h carriageway that a safe sight distance of 43m be provided.

Table 7 shows the SISD provided at each proposed private intersection and the compliance based on the SISD requirement of 43m.

Table 8: Safe Intersection Sight Distance at all local road intersections

Intersection	Required SISD	SISD western/Left direction	SISD eastern/right direction	Compliance
A	43	73m	80m	Complies
B	43	150+m	~	Complies
C	43	100m+	60m	Complies
D	43	150m+	150m+	Complies
E	43	150m+	150m+	Complies
F	43	100m+	100m+	Complies
G	43	150m+	130m	Complies
H	43	150m+	73m	Complies
I	43	150m+	80m	Complies
J	43	150m+	150m	Complies
K	43	100m+	75m	Complies

As shown in the table above, all proposed internal private intersections meet the full minimum SISD requirement of 43 metres.

All internal retirement village private intersections will be designed as simple priority private intersections which is considered appropriate.

9 Community & Amenity Centre

9.1 General

As a part of the proposal includes a community centre within lot 1 and amenity building within lot 2 which will be further discussed below.

It is noted that the amenity centre (lot 2) will cater to residents of the site only and will not produce external trips; however, the community centre within the lot 1 countryside living development provides a public carpark.

Section 11 of this report outlines further details regarding these areas.

9.2 Countryside Community Centre

Included in the lot 1 countryside residential development is a community centre as seen in Figure 42. The community centre includes both a residents and public carpark, basketball court, tennis court, and a community building.

Separated access points for the private and public parking lots are provided and are currently 4m wide at the lot boundary, it is recommended that this is widened to 6m to accommodate two-way movements and heavy vehicle access as required.

Figure 42: Lot 1 (Countryside Living) Community Centre

9.3 Lot 2: Retirement Village

Within the retirement village are two wellness & amenity buildings which can be seen in Figure 43, as noted above the wellness & amenity buildings are anticipated to cater to residents only and are unlikely to produce any external trips.

Figure 43: Lot 2 (Retirement Village) Wellness Centre and Amenity Building

10 Unitary Plan Requirements (Access)

10.1 General

Access to individual lots has been provided directly onto the road via individual vehicle crossings, combined vehicle crossings or via JOALs. Vehicle crossings have been combined to minimise crossing points and maximise crossing separation and JOALs have been provided on higher volume roads to minimise the number of vehicle crossings.

The following sections outline the applicable AUP access requirements

10.2 Proximity to Intersections

AUP E27.6.4.1(3) states that vehicle crossings should be located to provide a separation distance greater than 10m from an intersection, measured at the property boundary (illustrated in Figure 27.6.4.1.1 of the AUP). Otherwise, the driveway is within the vehicle access restriction and a restricted discretionary assessment is required.

No vehicle crossings are located within 10m of an intersection and therefore, the proposal complies with the Unitary Plan.

10.3 Vehicle Crossing Number and Widths

10.3.1 Requirements

Table E27.6.4.2.1 (T146) of the AUP indicates that one vehicle crossing is a permitted activity per 25m of road frontage. Vehicle crossings should be separated by a minimum of 6m when serving the same site and a minimum of 2m when serving adjacent sites. Two vehicle crossings can be combined (thus have no separation) providing the total width of the crossing does not exceed 6m.

Table E27.6.4.3.2 of the AUP outlines the dimensional requirements for vehicle crossing and access widths in 'Rural – Countryside Living Zone' zones as follows:

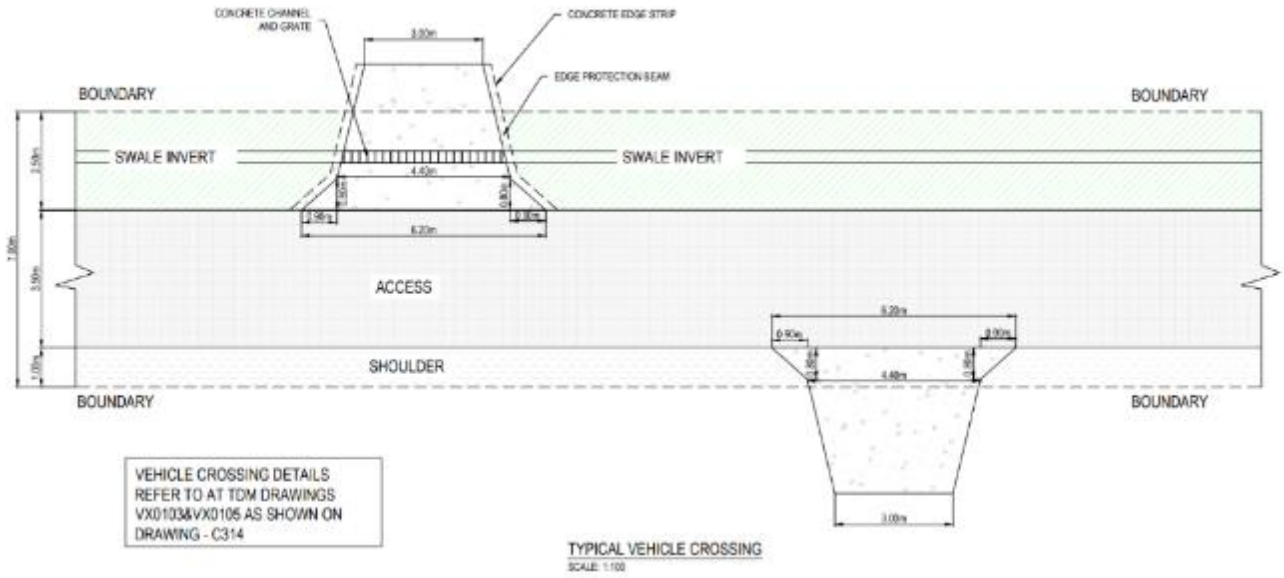
Table 9: Unitary Plan vehicle crossing dimensional requirements

Zone	No. of parking spaces served	Minimum width of crossing at site boundary	Maximum width of crossing at site boundary	Minimum formed access width
Rural Zones		3.0m	6.0m	No minimum specified

With reference to Table E27.6.4.2.1 (T146) of the AUP, two crossings on adjacent sites can be combined where they do not exceed a total width of 6 m at the property boundary

A typical vehicle crossing can be seen below in Figure 44. It can be seen that the width at the property boundary is 3.0m which complies with the Unitary Plan. Vehicle crossings onto JOALs provide a 6.0m width at the site boundary which is also considered to be appropriate.

Figure 44: Typical Vehicle Crossing



10.3.2 Number of Driveways

As noted above, Table E27.6.4.2.1 specifies that one driveway per 25 m of frontage (or part thereof) needs to be provided for rural sites to be a permitted activity.

The proposal includes eight driveways (five of which are onto Old North Road and the remaining two onto Forestry Road) in which the site has well over 1000m of frontage onto Old North Road and more than 50m of frontage onto Forestry Road.

Based on the above, the overall development site complies with the maximum of one crossing per 25m of road frontage permitted activity rule outlined in the AUP.

10.4 Passing Bays

10.4.1 Requirements

Standard E27.6.4.3.1 provides passing bay requirements from rural zoning. The site is located within a 'Rural – Countryside Living Zone' and therefore the following is required:

- When length of access exceeds 100m and is less than 5.5m width;
    - A passing bay is required every 100m increases formed width to 5.5m over a 15m length

An assessment for compliance to the above will be conducted below.

The retirement village (Lot 2) provides a minimum formed width of 5.5m on all roads and JOALs and therefore, no passing bays are required.

10.4.2 Lot 1 (Residential)

Table 10: Lot 1 Passing Bay requirements

JOAL	Minimum Formed Width	Length of <5.5m	Passing bay distance	Compliance
1	3.5	~400m	4 x ~85m distance	Yes
2	3.5	~200m	1 x ~100m distance	Yes
3	3.5	100m	1 ~50m from end	Yes
4	3.5	~200m	2 x 50m distance	Yes
5	3.5	~130m	None	No
6	3.5	100m	None	Yes
7	3.5	~300m	None	No
8	3.5	~130m	1 x ~50 distance	Yes
9	3.5	80m	None	Yes
10	3.5	~200m	2 x ~100m distance	Yes
11	3.5	~200m	1 x ~100m distance	Yes
12	3.5	~170m	2 x ~ 50m distance	Yes
13	3.5	~150m	1 x ~100 m distance	Yes
14	3.5	~100m	None	Yes
15	3.5	~150m	2 x ~100m distance	Yes
ROW 1	3.5	~120m	1 x ~50 distance	Yes
ROW 2	3.5	~150m	2 x ~50 distance	Yes
ROW 3	3.5	100m	None	Yes

As seen above, JOALS 5 and 7 do not comply with the passing bay requirements, in this regard:

- JOAL 5 is effectively straight and provides adequate sight lines along the JOAL which is considered to be acceptable.

It is recommended that passing bays are added to JOAL 7.

10.5 Vehicle Access Gradients

10.5.1 Requirements

Table E27.6.4.4.1 of the AUP sets out the maximum gradients for access to be permitted. In this case, the parking areas themselves should be designed to have a maximum gradient of 1 in 20 (5 per cent) to be permitted.

AUP Rule E27.6.4.4 requires that all vehicle accesses be designed so that where the access adjoins the road there is sufficient space on-site for a platform to enable vehicles to stop safely and check for pedestrians and other vehicles prior to exiting. To achieve this Note 1 under Table E27.6.4.4.1, states that the platform must have a maximum gradient no steeper than 1 in 20 (5 per cent) and a minimum length of 4m to be permitted.

Further, to avoid the underside of the car striking the ground, the AUP states that access must have a maximum gradient of 1 in 5 (20%) with a change in gradient exceeding 1 in 8 (greater than 12.5 per cent change) at the summit or a 1 in 6.7 (15 per cent change) at a sag, must include transition sections to achieve adequate ground clearance, (Figure E27.6.4.4.3 of the Unitary Plan). Typically, a transition section requires a minimum length of 2m.

Referring to the civil plans prepared by Maven, the maximum gradient along accesses in both lot 1 and lot 2 is ~19%. This falls below the 20% gradient requirement stated in the AUP and therefore, is considered to be acceptable.

11 Parking

11.1 Unitary Plan Requirements

11.1.1 General

Table E27.6.3.1.1 of the AUP sets out the minimum permitted activity car parking space and manoeuvring dimensions for "regular users". As such for resident parking spaces, the following dimensional requirements are set out in Table 12.

Table 11: Parking Dimensions

User Type	Space Width	Space length	Manoeuvring Aisle
Regular 90-degree parking space	2.4m 2.5m 2.6m 2.7m	5m	7.1m 6.7m 6.3m 5.9m
0 degrees (parallel)	6m	2.4m	3.7m

All proposed parking spaces have compliant space width and space length.

For all parking spaces accessed via the road, the manoeuvring width meeting AUP permitted activity requirements.

For all vehicles accessed off JOALs, the proposed JOAL widths generally provide sufficient manoeuvring width.

Vehicle tracking has been undertaken on the most difficult to access spaces proposed on the JOALs and within the community centre to determine their accessibility. **Attachment B** shows vehicle tracking for an 85th percentile Unitary Plan car accessing these spaces, which are all considered acceptable and comply with the AUP.

11.1.2 Parking Provisions

The parking provision summary is shown below as follows:

Lot 1 Countryside Living:

- Community Centre;
  - 47 public parking spaces; and
  - 23 private parking spaces (for residents).

Lot 2 Retirement Village:

- Amenity Centre/Community Centre
    - 28 parking spaces
- Care building
    - 56 spaces
- Surrounding area
    - 58 spaces throughout the site

11.1.3 Parking Gradients

Rule E27.6.3.6 relates to formation and gradients of car parks and their manoeuvring areas and requires that the gradient of all manoeuvring areas does not exceed 1 in 8 (12.5%) and that the gradient within all parking spaces does not exceed 1 in 20 (5%) in any direction and 1 in 25 (4%) for accessible spaces, for these to be permitted

The car park and manoeuvring area gradients have been assessed based on the 'Stage 1 and 2 Parking Gradients Plan'.

All lots proposing a car pad space provide a maximum gradient of 1 in 20 along the length of the car pad, thus satisfying the Unitary Plan permitted activity requirements.

11.1.4 Reverse Manoeuvring

Rule E27.6.3.4 in the Unitary Plan outlines the following: "Sufficient space must be provided on the site, so vehicles do not need to reverse off the site or onto the road from any site where any of the following apply:

- Four or more required parking spaces are served by a single access;
- There is more than 30 m between the parking space and the road boundary of the site; or
- Access would be from an arterial road or otherwise within a Vehicle Access Restriction covered in Standard E27.6.4.1."

The proposed residential lots satisfy all these requirements, with no reversing onto the local road network.

Vehicle tracking has been checked using an 85th percentile Unitary Plan car to ensure that manoeuvring into and out of the crossings is workable with any road. This is provided in **Attachment B.**

11.1.5 Vertical Clearance

Under the AUP rule E27.6.3.5 a minimum clearance between the formed surface and the structure must be:

- 2.1m where access and/or parking for cars is provided for residential activities;
- 2.3m where access and/or parking for cars is provided for all other activities;
- 2.5m where access and/or accessible parking for people with disabilities is provided; or
- 3.8m where loading is required.

No overhead structures are proposed above formed surfaces which is considered to be acceptable.

11.2 Lot 1 Countryside Living

Exact lot parking configurations is not yet confirmed however each lot has sufficient area for numerous parking spaces.

Generally parking dimensions comply with the Unitary Plan requirements. In regard to the community centre, 2.65m wide parking spaces are provided with a 6m manoeuvring aisle which is considered to be acceptable.

11.3 Lot 2 Retirement Village

There is no specific parking requirement for retirement villages in the unitary Plan.

All individual retirement lots have a single or double garage as well as parking in front of the garage for visitors.

Generally parking dimensions comply with the Unitary Plan requirements. It is assumed that for parking serving the retirement village amenity centre/wellness building that a 1m overhang is provided.

Parking spaces should be re-checked in detailed design stage.

12 Servicing

12.1 Lot 1 Countryside Living

Servicing requirements for residential activity are typically minimal and generally limited to rubbish collection and occasional deliveries (e.g. furniture or appliances). These can be easily accommodated on-street.

Occasional servicing (deliveries) by heavy vehicles may occur (e.g. deliveries of furniture / appliances). Such events can be accommodated within the proposed internal road network.

In terms of waste management strategy, it is anticipated that all residential lots will be serviced by private on-street kerbside collection (using the Rubbish Direct 7.4m truck).

Additionally, emergency vehicle access also needs to be provided. Tracking using an 8m fire truck has been conducted, for JOALs serving less than six lots it is anticipated that fire trucks and other heavy vehicles will use lot driveways to turn around which is considered to be appropriate

12.2 Lot 2 Retirement Village

Servicing requirements for retirement village activities are typically limited to rubbish collection, food deliveries and occasional deliveries (e.g. furniture or appliances). These can be easily accommodated on-street or in the loading area outside the main amenity building.

In terms of waste management strategy, it is anticipated that all residential lots will be serviced by private on-street kerbside collection (using the Rubbish Direct 7.4m truck).

Additionally, emergency vehicle access also needs to be provided. Tracking using an 8m fire truck has been conducted, all local accessways can accommodate the 8m fire truck except for a few short dead end accessways serving less than six dwellings which is considered to be acceptable.

13 Construction

13.1 General

The development site is currently unoccupied for the most part. To facilitate construction, access would be established via Deacon Road, Old North Road, and Forestry Road.

As is typical with a development of this scale, it is recommended that as part of any resource consent, a Construction Traffic Management Plan (CTMP) should be required as a condition (or an equivalent be required as a component of a Construction Management Plan). It is considered that this Construction Traffic Management Plan should include:

(i) Construction dates and hours of operation including any specific non-working hours for traffic congestion/noise etc.

(ii) Truck route diagrams both internal to the site and external to the local road network. This should take into account of the large trucks expected delivering the houses.

(iii) Temporary traffic management signage/details for both pedestrians and vehicles to appropriately manage the interaction of these road users with heavy construction traffic.

(iv) Details of site access/egress over the entire construction period. Noting that all egress points to be positioned so that they achieve appropriate site distance as per the Land Transport Safety Authority "Guidelines for visibility at driveways" RTS-6 document.

(v) Location of construction vehicle parking onsite.

Based on experience of constructing similar projects and bearing in mind capacity within the existing road network, with the appropriate Construction Traffic Management Plan in place and the above measures implemented, it is considered that construction activities can be managed to ensure any generated traffic effects are appropriately mitigated.

13.2 Site Access

Construction vehicles are expected to access the site using Forestry Road and Old North Road accesses. In this regard all roads have appropriate width to safely and efficiently accommodate heavy vehicles associated with construction of residential dwellings.

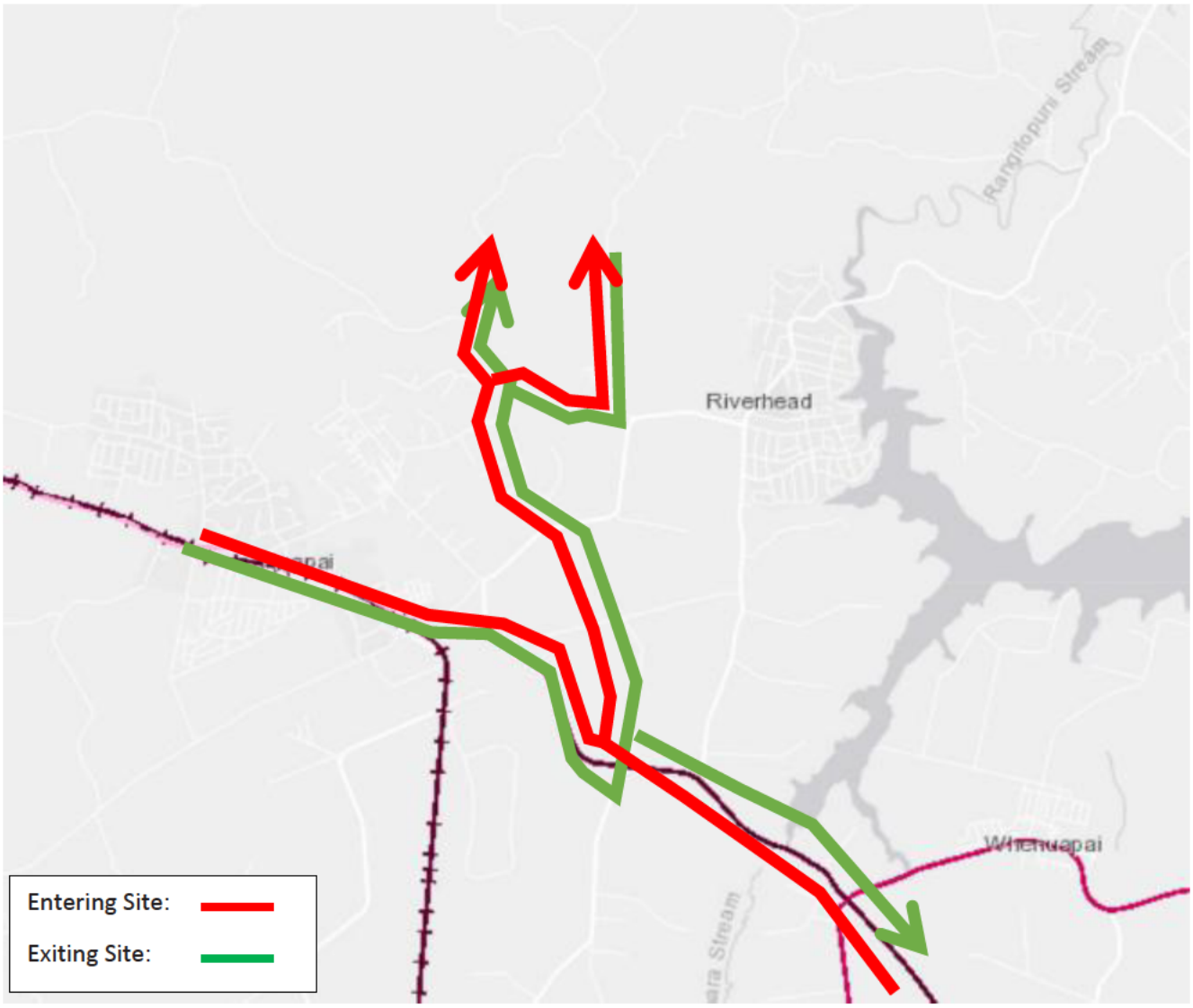
13.3 Vehicles of Workers and Subcontractors

Given the size of the site, construction parking requirements can be accommodated on-site and thus not need to require parking in existing residential areas.

13.4 Truck Routes

Using the strategic freight network map, SH1 is the safest and most efficient route for trucks, routes to and from the site are expected to be focused to and from SH16 as shown in Figure 45.

Figure 45: Truck Routes to and from site



13.5 Construction Hours

Construction hours are expected to be between 7AM-7PM Monday to Saturday.

Based on the existing road network this is considered to be acceptable from a traffic / transportation point of view

13.6 Conclusions

Based on experience of constructing similar residential development and bearing in mind the capacity within the existing roading network, with the appropriate Construction Traffic Management Plan in place and the measures implemented, it is considered that construction activities will be managed to ensure an appropriately low level of traffic effects and in accordance with best practice.

The construction activities are temporary and anticipated by the Unitary Plan development expectations for the site. The construction traffic effects can be appropriately managed and are considered minimal.

14 Conclusion

The proposal is for a residential development (approximately 208 residential dwellings, 260 retirement village units, 36 care units, and a community centre at Riverhead, Auckland within the Rangitoopuni Land Trust Project. The development includes a new internal road network which will connect to Old North Road and Forestry Road.

Following a review of the proposal, the following can be concluded:

- The site and surrounding area currently have little pedestrian and cyclist connectivity to nearby activities. The proposal improves this by adding additional walkways/bike tracks throughout the site and a pedestrian connection to Riverhead via Duke Street as shown in Figure 11;
- No traffic safety issues have been identified near the proposed development. Given the local residential nature of the surrounding roads, the proposed development is considered unlikely to exacerbate the road safety in any way both during construction and once the development is completed;
- Eight key intersections have been surveyed and modelled, revealing that while there is pressure at some intersection with SH16 in the surrounding road network, there will be little difference in the overall performance as a result of the proposal;
- It should be noted that from a transportation perspective, the proposal represents a lower intensity than what is currently enabled under the site's existing live zoning. Under the Treaty Settlement (E21) provisions of the Auckland Unitary Plan, the theoretical yield allows for approximately 395 dwellings across the site (based on one dwelling per hectare). In comparison, the current application proposes a total of 209 standalone residential lots, 260 retirement village units and a community centre, resulting in a combined yield that is generally consistent with, and arguably less intensive in terms of traffic generation than, the potential development under the operative zoning.
- The internal road layout and cross-sections comply with accepted standards and are considered be appropriate. All Vehicle tracking shown in **Attachment G** is considered appropriate.
- All proposed driveways have been reviewed in relation to the relevant sight distance requirements are appropriate to ensure a safe and efficient roading environment;
- The driveway locations are considered appropriate;
- All waste is expected to be accommodated via private collection; and
- The effects relating to construction are temporary and the site is well positioned for safe and efficient access for construction vehicles.

Recommendations / Conditions:

- A CTMP as described in Section 4, should be a condition of consent.
- Vehicle tracking / parking dimension should be re-checked again at the EPA stage to ensure compliance.
- The vehicle crossings be constructed as per the Auckland Transport Standards
- Vehicle crossings are checked again at EPA to ensure 8m fire truck access can be accommodated
- The community centre internal driveways are currently shown as 4m wide at the lot boundary, however it is recommended that this is widened to 6m to accommodate two-way movements and heavy vehicle access as required.

Overall, there is no reason to preclude acceptance of the proposal as currently intended, subject to the recommendations made above. Accordingly, it is concluded that there are no traffic engineering or transportation planning reasons that would preclude the development of the subject site as proposed.

Appendix A: Plan Change 79 Assessments

A Plan Change 79 assessment has been undertaken for both lots 1 and 2 of the proposal. It is noted that a community centre is included in the proposal; however, as they are not residential activities the vast majority of plan change 79 will not apply and hence has not been conducted.

Overall, the proposal complies with plan change 79.

Table A-1: Plan Change 79 Amendment Assessment Lot 1 (Countryside Living)

<table>
<tr><th>PC79 ID</th><th>Assessment Criteria</th><th>Assessment</th></tr>
<tr><td>18</td><td>E27.6.1 Tip generation
(1) Where a proposal (except where excluded in Standard E27.6.1(2)) exceeds one of the following thresholds:
(a) A new development or subdivision in Table E27.6.1.1;
(b) 100 v/hr (any hour) for activities not specified in Table E27.6.1.1 requiring a controlled or restricted discretionary land use activity consent in the applicable zone where there are no requirements for an assessment of transport or trip generation effects. This standard does not apply to development activities provided for as permitted in the applicable zone.</td><td>The proposed development is for approximately 208 dwellings and 179 peak hour trips; therefore, exceeds thresholds in Table E27.6.1. of TA1 and T1.
Requires Assessment.
The vehicle trip generation assessment is triggered regardless of PC79 and is assessed in Section 6 of this report. The alternative mode assessment is provided after this Table.</td></tr>
<tr><td>20</td><td>E27.6.2 Number of parking and loading spaces
(6) Bicycle parking:
(e) The activities specified in Table E27.6.2.5 must provide the minimum number of bicycle parking spaces specified;
(aa) For residential developments, the required secure long-stay bicycle parking must be located and designed in a manner that (is):
i) Not required of any required outdoor living space or landscaped area;
ii) In a location accessible from either the road, vehicle access, pedestrian access or car parking area;
iii) Sheltered from the weather;
iv) Lockable and secure;
xii) The following bicycle parking requirements apply to new buildings and developments.
Table E27.6.2.5 Required bicycle parking rates
(T81)
Visitor (short-stay) minimum rate
1 per 20 for developments of 20 or more dwellings
Secure (long-stay) minimum rate
1 per dwelling without a dedicated garage or basement car parking space</td><td>Site is not zoned residential; therefore, no bicycle parking is required.

Complies.</td></tr>
<tr><td>21</td><td>E27.6.2 Number of parking and loading spaces
(8) Number of loading spaces:
(a) All activities must provide loading as specified in Table E27.6.2.7.
(b) Residential activities where part of the site has frontage to an arterial road as identified on the planning maps, must provide loading as specified in Table E27.6.2.7A
Table E27.6.2.7A Minimum small loading space requirements
<table>
<tr><th>Activity</th><th>GFA/Number of dwellings</th><th>Minimum rate</th></tr>
<tr><td>(T111B)</td><td>Developments where all dwellings have individual pedestrian access directly from a public road</td><td>No loading space required</td></tr>
<tr><td></td><td>Up to 9 dwellings without individual pedestrian access directly from a public road</td><td>No loading space required</td></tr>
<tr><td></td><td>Greater than 9 dwellings up to 5,000m² without individual pedestrian access directly from a public road</td><td>1*</td></tr>
</table></td><td>Upon subdivision one dwelling is proposed per Lot which will not trigger the requirement for loading when assessed as residential activity. Similarly, if assessed as a rural activity no loading is required.
NA

Loading especially rubbish collection is provided throughout the site</td></tr>
</table>

	Greater than 5,000m² N/A * Refer to T137A of Table E27.6.3.2.1 Minimum loading space dimensions	
22	**E27.6.2 (9)** (9) Fractional spaces: (c) Where the calculation of the permitted parking results in a fractional space, any fraction that is less than one-half will be disregarded and any fraction of one-half or more will be counted as one space. If there are different activities within a development, the parking permitted for each activity must be added together prior to rounding.	Fractional space calculations are considered when assessing PC79. **Complies.**
23	**E27.6.3.1 Size and location of parking spaces** (1) Every parking space must: (a) Comply with the minimum dimensions given in Table E27.6.3.1.1 and Figure E27.6.3.1.1; except accessible parking dimensions and accessible route requirements must be designed in accordance with the New Zealand Standard for Design for Access and Mobility – Buildings and Associated Facilities (NZS: 4121-2001).	Lot contents are not yet known. **NA**
24	**E27.6.3.2 Size and location of loading spaces** (1) Every loading space must: (d) Comply with the following when any yard of a site is used to provide the loading space (where it is permitted within the zone). i) The use of the loading space does not create a traffic hazard on the road at any time; and (e) Have a maximum crossfall of 1:50 (2%) in all directions. **Table E27.6.3.2.1 Minimum loading space dimensions** (T137A) **Activities requiring a small loading space under Standard E27.6.2(8)(b)** Length of loading space(m) 6.4 Width of loading space (m) 3.5	No loading spaces are required, and none have been provided for the residential. **NA**
25	**E27.6.3.2(A) Accessible parking** (1) Accessible parking must be provided for all new activities, changes of activity type, and / or the expansion or intensification of an existing activity in all zones, except for those listed below in E27.6.3.2(A)(2); (2) Accessible parking is not required in the following zones, unless car parking is provided on site, in which case the required number of accessible parking spaces must be determined in accordance with Table 1 or Table 2 below, whichever is relevant: Business Zones: (a) Business – City Centre Zone; (b) Business – Metropolitan Centre Zone; (c) Business – Town Centre Zone; (d) Business – Local Centre Zone; (e) Business – Mixed Use Zone; (f) Business – Neighbourhood Centre Zone. Residential Zones: (a) Residential – Terrace Housing and Apartment Buildings Zone. (3) For residential developments in residential zones (excluding the Terrace Housing and Apartment Buildings Zone unless car parking is provided on site), accessible parking spaces must be provided for developments of 10 or more dwellings on a site. (4) The required number of onsite accessible parking spaces provided must be calculated using the following method: (i) For non-residential land uses: Step 1 – Use the Parking Demand Guidelines in Appendix 23 to determine the theoretical parking demand Step 2 – Use Table 1 – Number of accessible parking spaces – Non-Residential, below to determine the required number of accessible car park spaces based on either the number of parking spaces that are proposed to be provided or the	Lot contents are not yet known; however, it is proposed for country style living meaning it is anticipated that adequate space for an informal accessible park can be provided. For approximately 208 dwellings 9 accessible parking spaces are required, which the proposal informally achieves. **NA.**

<table>
<tr><td></td><td>theoretical parking demand calculated in Step 1, whichever is higher.
Table 1 – Number of accessible parking spaces – Non-Residential land uses<table><tr><th>Total number of parking spaces provided or theoretical parking spaces, whichever is the higher</th><th>Number of accessible parking spaces</th></tr><tr><td>1-20</td><td>Not less than 1</td></tr><tr><td>21-50</td><td>Not less than 2</td></tr><tr><td>For every additional 50 parking spaces or part of a parking space</td><td>Not less than 1</td></tr></table>(ii) For retirement villages, supported residential care, visitor accommodation and boarding houses
The same method for calculating the required number of onsite accessible parking spaces for non-residential uses in 4(i) applies.
(iii) For residential land uses
The required number of accessible parking spaces provided must be in accordance with Table 2 below:
Table 2 – Number of accessible parking spaces – Residential land uses<table><tr><th>Number of dwellings</th><th>Number of accessible parking spaces</th></tr><tr><td>10-19</td><td>Not less than 1</td></tr><tr><td>20-29</td><td>Not less than 2</td></tr><tr><td>30-50</td><td>Not less than 3</td></tr><tr><td>For every additional 25 dwellings or units</td><td>Not less than 1</td></tr></table></td><td></td></tr>
<tr><td>26</td><td>E27.6.3.3 Access and manoeuvring
(2A) For every loading space required by Table E27.6.3.2.1 (T137A) the access and manoeuvring areas associated with that loading space must accommodate the 6.4m van tracking curves set out in Figure E27.6.3.3.3.</td><td>No loading spaces are required
N/A.</td></tr>
<tr><td>27</td><td>E27.6.3.4 Reverse manoeuvring
(1) Sufficient space must be provided on the site so vehicles do not need to reverse off the site or onto or off the road from any site where any of the following apply:
(a) Four or more parking spaces are served by a single access;
(b) There is more than 30m between the parking space and the road boundary of the site; or
(c) Access would be from an arterial road or otherwise within a Vehicle Access Restriction covered in Standard E27.6.4.1</td><td>Due to the large nature of the lots, it is anticipated that vehicles will be able to turn around within the lot boundary meaning it is unlikely that reversing onto the road network will be required.
Complies.</td></tr>
<tr><td>28</td><td>E27.6.3.4A Heavy vehicle access
(1) Where a site in a residential zone provides heavy vehicle access it must provide sufficient space on the site so an 8m heavy vehicle does not need to reverse onto or off the site or road, with a maximum reverse manoeuvring distance within the site of 12m.
(2) Heavy vehicle access and manoeuvring areas associated with access required by E27.6.3.4A (1) must comply with the tracking curves set out in the Land Transport New Zealand Road and traffic guidelines: RTS 18: New Zealand on-road tracking curves for heavy motor vehicles (2007).</td><td>No loading spaces are required
N/A.</td></tr>
<tr><td>29</td><td>E27.6.3.5 Vertical clearance
(1) To ensure vehicles can pass safely under overhead structures to access any parking and loading spaces, the minimum clearance between the formed surface and the structure must be:
(a) 2.1m where access and/or parking for cars is provided for residential activities;
(b) 2.3m where access and/or parking for cars is provided for all other activities;</td><td>Lot contents not yet known.
NA.</td></tr>
</table>

	(c) 2.5m where access and/or accessible parking is provided and/or required; (ca) 2.8m where loading is required for residential activities denoted with an asterisk (*) in Table E27.6.2.7A; (cb) 3.8m where heavy vehicle access in Standard E27.6.3.4A is provided; or (d) 3.8m where loading is required in Table E27.6.2.7	
30	**E27.6.3.7 Lighting** (1) Lighting is required where there are 10 or more parking spaces which are likely to be used during the hours of darkness. The parking and manoeuvring areas and associated pedestrian routes must be adequately lit during use in a manner that complies with the rules in Section E24 Lighting. (2) Lighting is required, in residential zones to primary pedestrian access, vehicle access, parking and manoeuvring areas, where any of the following apply: (a) There are four or more dwellings accessible from a primary pedestrian access which is not adjacent to a vehicle access; (b) There are 10 or more parking spaces; or (c) There are 10 or more dwellings. Adequate must be provided during the hours of darkness in a manner that complies with the rules in Section E24 Lighting.	The site is currently zoned as 'rural' so this standard would not apply; however, the proposed development will include a high proportion of elderly residents. It is recommended that lighting is provided regardless to ensure residents can easily see during hours of darkness. This is not a traffic engineering matter.
31	**E27.6.4.3 Width of vehicle access, queueing and speed management requirements** (1) Every on-site parking and loading space must have vehicle access from a road, with the vehicle access complying with the following standards: (a) Passing bays are provided in accordance with Table E27.6.4.3.1; and (b) Meeting the minimum formed access width specified in Table E27.6.4.3.2; and (c) Meeting the minimum speed management measure spacing specified in Table E27.6.4.3.3. … Emergency responder access requirements are further controlled by the Building Code. Plan users should refer to the Building Code to ensure compliance can be achieved at building consent stage. Granting of a resource consent does not imply that waivers of Building Code requirements will be granted. Fire and Emergency New Zealand publishes guidance in the context of Building Code requirements. **Table E27.6.4.3.3 Speed management requirements** (T156A) Residential Zones **Length of vehicle access** Exceeds 30m **Location of minimum speed management measures** Not more than 10m from the site boundary with the legal road; and Not more than 30m spacing between speed management measures. *Note: Where heavy vehicle access and speed management measures are required, the design of speed management measures should include consideration of heavy vehicle requirements.*	Traffic calming can be provided within the JOALs as and where required. JOALs generally provide a formed width of 5.5m, where this narrows to 3.5m adequate passing bays have been provided. It is recommended that passing bays are provided on JOAL 7. **Complies**
32	**E27.6.6 Design and location of pedestrian access in residential zones** (1) Where two or more dwellings are proposed in residential zones, primary pedestrian access must be provided which meets the following: (a) Have the minimum pedestrian access width and separation specified in Table E27.6.6.1 for its full length; (c) Have a gradient no greater than: (i) 1 in 12 for pedestrian access which is not adjacent to vehicle access; (ii) The maximum vehicle access gradient as specified in Table E27.6.4.4.1 where the pedestrian access is adjacent to vehicle access;	The site is zoned 'Rural – Countryside Living' and therefore, this standard does not apply. Regardless pedestrian access is provided off track separated pedestrian footpaths or within the formed width which is considered to be acceptable. **Complies**

(e) Have a surface treatment which is firm, stable and slip resistant in any weather conditions;
(f) Provide direct and continuous access to the dwellings from a public footpath;
(g) Be free from permanent obstructions and have a clear height of at least 2.1m;

(2) A minimum clear width of 3m and a minimum clear height of 2.1m for its full length is required for primary pedestrian access where not adjacent to vehicle access and serving:
(a) Up to three dwellings and has a length greater than 50m; or
(b) Four or more dwellings.

(3) For the purposes of (2) above, the clear width may include:
(a) The minimum 1.8m formed primary pedestrian access width;
(b) Landscape treatment with a maximum mature height of 600mm;
(c) Lighting infrastructure.

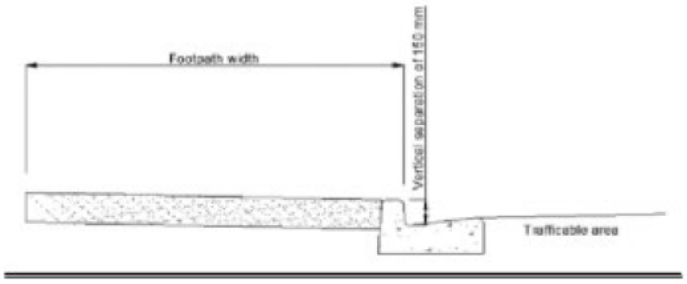
(4) Standards E27.6.6(1), (2) and (3) above do not apply where:
(a) Up to three dwellings are proposed on a site and vehicle access is provided to each dwelling; or
(b) A dwelling directly fronts and has direct access to a street.

(5) For four or more dwellings in residential zones, pedestrian access must be provided to each parking space within a parking area consisting of four or more parking spaces served by the same vehicle access and:
(a) Have a minimum width of 1.2m;
(b) Be vertically separated from trafficable areas as shown in Figure E27.6.4.3.1;
(c) Connect to the primary pedestrian access or the dwellings associated with those parking spaces;
(d) Have a surface treatment which is firm, stable and slip resistant in any weather condition; and
(e) Be free from permanent obstructions and have a clear height of 2.1m for its full length.

This standard does not apply where the pedestrian access forms part of a primary pedestrian access.

Table E27.6.6.1 Primary Pedestrian Access width and separation requirements

Location of site	The total number of parking spaces or dwellings served by a vehicle and/or Primary Pedestrian Access	Minimum formed Primary Pedestrian Access width where not adjacent to vehicle access	Minimum formed Primary Pedestrian Access width and separation where adjacent to vehicle access
(T156A)	Serves 2-3 dwellings	1.8m	No requirement under E27.6.6(1) to (3)
(T156B)	Serves 4 to 19 parking spaces or 4 to 19 dwellings, whichever is the greater	1.8m	1.4m (including the kerb), which must be vertically separated from trafficable areas as shown in Figure E27.6.4.3.1
(T156C)	Serves 20 or more parking spaces or 20 or more dwellings, whichever is the greater	1.8m	1.8m (including the kerb), which must be vertically separated from trafficable areas as shown in

	Figure E27.6.4.3.1 **Figure E27.6.4.3.1 Vertical separation of pedestrian access**  	
33	**E27.6.7 Provision for electric vehicle charging** *Purpose: to ensure that any undercover car parks for new semi-detached dwellings or for new dwellings within a terrace or apartment building are provided with the capability to install Electric Vehicle Supply Equipment.* (1) Any new dwellings with car parking (with the exception of new detached dwellings) must provide each undercover car park with the capability to install Electric Vehicle Supply Equipment with designated space for the necessary conduit, circuit and metering between the car park and an electrical distribution board on the same building storey, or ground level if the car parking space is at ground level. Note: (a) This standard does not apply to any car parking permanently allocated to visitors. *Refer to the following standards and guidelines:* - *Australian/New Zealand Wiring Rules AS/NZS 3000:2018* - *SNZ PAS 6011:2021 Electric Vehicle Chargers for Residential Use* - *SNZ PAS 6011:2021 Electric Vehicle Chargers for Commercial Applications* - *WorkSafe EV charging safety guidelines 2nd addition plus addendums 1 and 2*	Lot contents are not yet known. **NA.**

As discussed in Table A-1 above, the proposed development generally complies with the Plan Change 79 amendments, with the primary exception being the trip generation.

The proposed trip generation triggers the 40 dwelling threshold and has been assessed against the amended criteria outlined in E27.8.2 (3) of Plan Change 79 and is provided in Table A-2 below.

Table A-2: Plan Change 79 Amended Assessment Criteria E27.8.2 (3)

Assessment Criteria	Comment
(3) any activity or subdivision which exceeds the trip generation thresholds under Standard E27.6., with the exception of the thresholds (TA1), (T1A), (T2A) and (T3A) in Table E27.6.1.1:	
a) the effects on the function and the safe and efficient operation of the transport network with consideration of all modes of transport, particularly at peak times;	Adequate pedestrian facilities are provided within the site connecting both lots 1 and 2 through either separated pedestrian footpaths or pedestrian provisions within the formed width. Additionally, a pedestrian connection is provided from the retirement village to Riverhead via Duke Street; therefore, promoting some active mode trips at peak times. Currently there are limited public transport facilities in the area, however as mentioned above adequate pedestrian facilities are provided including a pedestrian connection to Riverhead where public transport services are offered.

	The effects of vehicle traffic have been assessed in the original transport assessment.
b) the implementation of mitigation measures proposed to address adverse effects which may include, but are not limited to, the following measures: **i. travel planning;** **ii. providing alternatives to private vehicle trips including accessibility to public transport;** **iii. staging development;** **iv. providing or contributing to improvements to the local transport network across all modes; or**	It is also anticipated that as development occurs in the area that it will become more feasible to provide bus services. The public bus network is operated by Auckland Transport and therefore this ultimately sits with Auckland Transport.
c) the trip characteristics of the proposed activity on the site.	The proposal is for residential, which is anticipated to primarily result in vehicle trips. Within the proposal is a community centres that are within walking or cycling distance of both lots, it is expected that some trips will be active mode to access these centres within the site. Additionally, as the surrounding area is urbanised it can be expected that additional retail/town centres will appear allowing multi-modal travel options.
(3A) any activity or subdivision which exceeds the thresholds (TA1), (T1A), (T2A) and (T3A) in Table E27.6.1.1:	
a) the effects on the function and the safe and efficient operation of the transport network as they relate to active modes (walking and cycling) and public transport infrastructure, particularly at peak times; and	Please see above the response to (3) a) above.
b) the assessment criteria at E27.8.2(3)(b) and (c) above apply, but with consideration of the implementation of mitigation measures and trip characteristics focused on active modes (walking and cycling) and public transport infrastructure; and	Please see above the response to (3) b) above.
c) for the purpose of assessing E27.8.2(3A) a) and b) only*, the local transport network refers to the area in the immediate vicinity of the site. For the purpose of this assessment, public transport infrastructure includes infrastructure associated with public transport stops, and excludes bus lanes. Any mitigation measures must relate to the effects of the proposal on the environment, demand on public transport infrastructure and active mode journeys from the site. **Note: this does not alter the meaning of 'local transport network' in any other context.**	Until such a time that AT proposes a local bus route in the surrounding area, provision of bus facilities (stops, shelters, etc) would be premature. The exact route of the bus is yet to be determined and therefore providing facilities at this stage is not recommended. With regards to pedestrian connectivity, the proposed site will have internal footpaths, as well as connect to neighbouring projects.

Table 12: PC 79 Assessment Lot 2 (Retirement Village)

<table>
<tr><th>PC79 ID</th><th>Assessment Criteria</th><th>Assessment</th></tr>
<tr><td>18</td><td>E27.6.1 Tip generation
(2) Where a proposal (except where excluded in Standard E27.6.1(2)) exceeds one of the following thresholds:
(c) A new development or subdivision in Table E27.6.1.1;
(d) 100 v/hr (any hour) for activities not specified in Table E27.6.1.1 requiring a controlled or restricted discretionary land use activity consent in the applicable zone where there are no requirements for an assessment of transport or trip generation effects. This standard does not apply to development activities provided for as permitted in the applicable zone.</td><td>The proposed development is for approximately 290 village units and 36 care units resulting in 80 peak hour trips; therefore, does not exceed thresholds in Table E27.6.1. of TA1 and T1.
Complies.</td></tr>
<tr><td>20</td><td>E27.6.2 Number of parking and loading spaces
(7) Bicycle parking:
(f) The activities specified in Table E27.6.2.5 must provide the minimum number of bicycle parking spaces specified;
(bb) For residential developments, the required secure long-stay bicycle parking must be located and designed in a manner that (is):
v) Not required of any required outdoor living space or landscaped area;
vi) In a location accessible from either the road, vehicle access, pedestrian access or car parking area;
vii) Sheltered from the weather;
viii) Lockable and secure;
xiii) The following bicycle parking requirements apply to new buildings and developments.
Table E27.6.2.5 Required bicycle parking rates
(T81)
Visitor (short-stay) minimum rate
1 per 20 for developments of 20 or more dwellings
Secure (long-stay) minimum rate
1 per dwelling without a dedicated garage or basement car parking space</td><td>Site is not zoned residential; therefore, no bicycle parking is required.
Complies.</td></tr>
<tr><td>21</td><td>E27.6.2 Number of parking and loading spaces
(10) Number of loading spaces:
(f) All activities must provide loading as specified in Table E27.6.2.7.
(g) Residential activities where part of the site has frontage to an arterial road as identified on the planning maps, must provide loading as specified in Table E27.6.2.7A
Table E27.6.2.7A Minimum small loading space requirements
<table>
<tr><th>Activity</th><th>GFA/Number of dwellings</th><th>Minimum rate</th></tr>
<tr><td>(T111B)</td><td>Developments where all dwellings have individual pedestrian access directly from a public road</td><td>No loading space required</td></tr>
<tr><td></td><td>Up to 9 dwellings without individual pedestrian access directly from a public road</td><td>No loading space required</td></tr>
<tr><td></td><td>Greater than 9 dwellings up to 5,000m^2 without individual pedestrian access directly from a public road</td><td>1*</td></tr>
<tr><td></td><td>Greater than 5,000m^2</td><td>N/A</td></tr>
</table>
* Refer to T137A of Table E27.6.3.2.1 Minimum loading space dimensions</td><td>Upon subdivision one dwelling is proposed per Lot which will not trigger the requirement for loading when assessed as residential activity. Similarly, if assessed as a rural activity no loading is required.
NA</td></tr>
<tr><td>22</td><td>E27.6.2 (9)
(11) Fractional spaces:
(h) Where the calculation of the permitted parking results in a fractional space, any fraction that is less than one-half will be</td><td>Fractional space calculations are considered when assessing PC79.
Complies.</td></tr>
</table>

	disregarded and any fraction of one-half or more will be counted as one space. If there are different activities within a development, the parking permitted for each activity must be added together prior to rounding.	
23	**E27.6.3.1 Size and location of parking spaces** (2) Every parking space must: (b) Comply with the minimum dimensions given in Table E27.6.3.1.1 and Figure E27.6.3.1.1; except accessible parking dimensions and accessible route requirements must be designed in accordance with the New Zealand Standard for Design for Access and Mobility – Buildings and Associated Facilities (NZS: 4121-2001).	Lot contents are not yet known. **NA**
24	**E27.6.3.2 Size and location of loading spaces** (2) Every loading space must: (i) Comply with the following when any yard of a site is used to provide the loading space (where it is permitted within the zone). ii) The use of the loading space does not create a traffic hazard on the road at any time; and (j) Have a maximum crossfall of 1:50 (2%) in all directions. **Table E27.6.3.2.1 Minimum loading space dimensions** (T137A) **Activities requiring a small loading space under Standard E27.6.2(8)(b)** Length of loading space(m) 6.4 Width of loading space (m) 3.5	No loading spaces are required, and none have been provided however loading is provided outside the main amenity building. **NA**
25	**E27.6.3.2(A) Accessible parking** (5) Accessible parking must be provided for all new activities, changes of activity type, and / or the expansion or intensification of an existing activity in all zones, except for those listed below in E27.6.3.2(A)(2); (6) Accessible parking is not required in the following zones, unless car parking is provided on site, in which case the required number of accessible parking spaces must be determined in accordance with Table 1 or Table 2 below, whichever is relevant: Business Zones: (g) Business – City Centre Zone; (h) Business – Metropolitan Centre Zone; (i) Business – Town Centre Zone; (j) Business – Local Centre Zone; (k) Business – Mixed Use Zone; (l) Business – Neighbourhood Centre Zone. Residential Zones: (b) Residential – Terrace Housing and Apartment Buildings Zone. (7) For residential developments in residential zones (excluding the Terrace Housing and Apartment Buildings Zone unless car parking is provided on site), accessible parking spaces must be provided for developments of 10 or more dwellings on a site. (8) The required number of onsite accessible parking spaces provided must be calculated using the following method: (iv) For non-residential land uses: Step 1 – Use the Parking Demand Guidelines in Appendix 23 to determine the theoretical parking demand Step 2 – Use Table 1 – Number of accessible parking spaces – Non-Residential, below to determine the required number of accessible car park spaces based on either the number of parking spaces that are proposed to be provided or the theoretical parking demand calculated in Step 1, whichever is higher. **Table 1 – Number of accessible parking spaces – Non-Residential land uses** **Total number of parking spaces provided or theoretical parking spaces, whichever is the higher** / **Number of accessible parking spaces**	For approximately 290 dwellings and 36 care units 14 accessible parking spaces are required, which the proposal informally achieves. These should be detailed in building consent stage. **NA.**

1-20	Not less than 1
21-50	Not less than 2
For every additional 50 parking spaces or part of a parking space	Not less than 1

(v) For retirement villages, supported residential care, visitor accommodation and boarding houses

The same method for calculating the required number of onsite accessible parking spaces for non-residential uses in 4(i) applies.

(vi) For residential land uses

The required number of accessible parking spaces provided must be in accordance with Table 2 below:

Table 2 – Number of accessible parking spaces – Residential land uses

Number of dwellings	Number of accessible parking spaces
10-19	Not less than 1
20-29	Not less than 2
30-50	Not less than 3
For every additional 25 dwellings or units	Not less than 1

26	**E27.6.3.3 Access and manoeuvring** (2A) For every loading space required by Table E27.6.3.2.1 (T137A) the access and manoeuvring areas associated with that loading space must accommodate the 6.4m van tracking curves set out in Figure E27.6.3.3.	No loading spaces are required **N/A.**
27	**E27.6.3.4 Reverse manoeuvring** (2) Sufficient space must be provided on the site so vehicles do not need to reverse off the site or onto or off the road from any site where any of the following apply: (d) Four or more parking spaces are served by a single access; (e) There is more than 30m between the parking space and the road boundary of the site; or (f) Access would be from an arterial road or otherwise within a Vehicle Access Restriction covered in Standard E27.6.4.1	In cases where a single site is served (1-2 parking spaces) vehicles will reverse off the site. Where four or more parking spaces are served, no reversing off the site will be required. **Complies.**
28	**E27.6.3.4A Heavy vehicle access** (3) Where a site in a residential zone provides heavy vehicle access it must provide sufficient space on the site so an 8m heavy vehicle does not need to reverse onto or off the site or road, with a maximum reverse manoeuvring distance within the site of 12m. (4) Heavy vehicle access and manoeuvring areas associated with access required by E27.6.3.4A (1) must comply with the tracking curves set out in the Land Transport New Zealand Road and traffic guidelines: RTS 18: New Zealand on-road tracking curves for heavy motor vehicles (2007).	No loading spaces are required **N/A.**
29	**E27.6.3.5 Vertical clearance** (2) To ensure vehicles can pass safely under overhead structures to access any parking and loading spaces, the minimum clearance between the formed surface and the structure must be: (e) 2.1m where access and/or parking for cars is provided for residential activities; (f) 2.3m where access and/or parking for cars is provided for all other activities; (g) 2.5m where access and/or accessible parking is provided and/or required; (ca) 2.8m where loading is required for residential activities denoted with an asterisk (*) in Table E27.6.2.7A; (cb) 3.8m where heavy vehicle access in Standard E27.6.3.4A is provided; or	Lot contents not yet known. **NA.**

	(h) 3.8m where loading is required in Table E27.6.2.7	
30	**E27.6.3.7 Lighting** (3) Lighting is required where there are 10 or more parking spaces which are likely to be used during the hours of darkness. The parking and manoeuvring areas and associated pedestrian routes must be adequately lit during use in a manner that complies with the rules in Section E24 Lighting. (4) Lighting is required, in residential zones to primary pedestrian access, vehicle access, parking and manoeuvring areas, where any of the following apply: (d) There are four or more dwellings accessible from a primary pedestrian access which is not adjacent to a vehicle access; (e) There are 10 or more parking spaces; or (f) There are 10 or more dwellings. Adequate must be provided during the hours of darkness in a manner that complies with the rules in Section E24 Lighting.	The site is currently zoned as 'rural' so this standard would not apply; however, the proposed development will include a high proportion of elderly residents. It is recommended that lighting is provided regardless to ensure residents can easily see during hours of darkness. This is not a traffic engineering matter.
31	**E27.6.4.3 Width of vehicle access, queueing and speed management requirements** (2) Every on-site parking and loading space must have vehicle access from a road, with the vehicle access complying with the following standards: (d) Passing bays are provided in accordance with Table E27.6.4.3.1; and (e) Meeting the minimum formed access width specified in Table E27.6.4.3.2; and (f) Meeting the minimum speed management measure spacing specified in Table E27.6.4.3.3. … Emergency responder access requirements are further controlled by the Building Code. Plan users should refer to the Building Code to ensure compliance can be achieved at building consent stage. Granting of a resource consent does not imply that waivers of Building Code requirements will be granted. Fire and Emergency New Zealand publishes guidance in the context of Building Code requirements. **Table E27.6.4.3.3 Speed management requirements** (T156A) Residential Zones **Length of vehicle access** Exceeds 30m **Location of minimum speed management measures** Not more than 10m from the site boundary with the legal road; and Not more than 30m spacing between speed management measures. *Note: Where heavy vehicle access and speed management measures are required, the design of speed management measures should include consideration of heavy vehicle requirements.*	Traffic calming can be provided within the JOALs as and where required. All proposed JOALs provides a minimum formed width of 5.5m. **Complies**
32	**E27.6.6 Design and location of pedestrian access in residential zones** (6) Where two or more dwellings are proposed in residential zones, primary pedestrian access must be provided which meets the following: (b) Have the minimum pedestrian access width and separation specified in Table E27.6.6.1 for its full length; (d) Have a gradient no greater than: (iii) 1 in 12 for pedestrian access which is not adjacent to vehicle access; (iv) The maximum vehicle access gradient as specified in Table E27.6.4.4.1 where the pedestrian access is adjacent to vehicle access; (h) Have a surface treatment which is firm, stable and slip resistant in any weather conditions; (i) Provide direct and continuous access to the dwellings from a public footpath; (j) Be free from permanent obstructions and have a clear height of at least 2.1m;	The site is zoned 'Rural – Countryside Living' and therefore, this standard does not apply. Regardless pedestrian access is provided by footpaths provided on all JOALs serving more than four lots which is considered to be acceptable. **Complies**

(7) A minimum clear width of 3m and a minimum clear height of 2.1m for its full length is required for primary pedestrian access where not adjacent to vehicle access and serving:
  (c) Up to three dwellings and has a length greater than 50m; or
  (d) Four or more dwellings.

(8) For the purposes of (2) above, the clear width may include:
  (d) The minimum 1.8m formed primary pedestrian access width;
  (e) Landscape treatment with a maximum mature height of 600mm;
  (f) Lighting infrastructure.

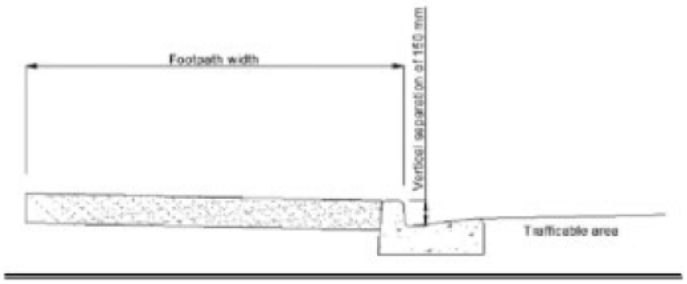
(9) Standards E27.6.6(1), (2) and (3) above do not apply where:
  (c) Up to three dwellings are proposed on a site and vehicle access is provided to each dwelling; or
  (d) A dwelling directly fronts and has direct access to a street.

(10) For four or more dwellings in residential zones, pedestrian access must be provided to each parking space within a parking area consisting of four or more parking spaces served by the same vehicle access and:
  (f) Have a minimum width of 1.2m;
  (g) Be vertically separated from trafficable areas as shown in Figure E27.6.4.3.1;
  (h) Connect to the primary pedestrian access or the dwellings associated with those parking spaces;
  (i) Have a surface treatment which is firm, stable and slip resistant in any weather condition; and
  (j) Be free from permanent obstructions and have a clear height of 2.1m for its full length.

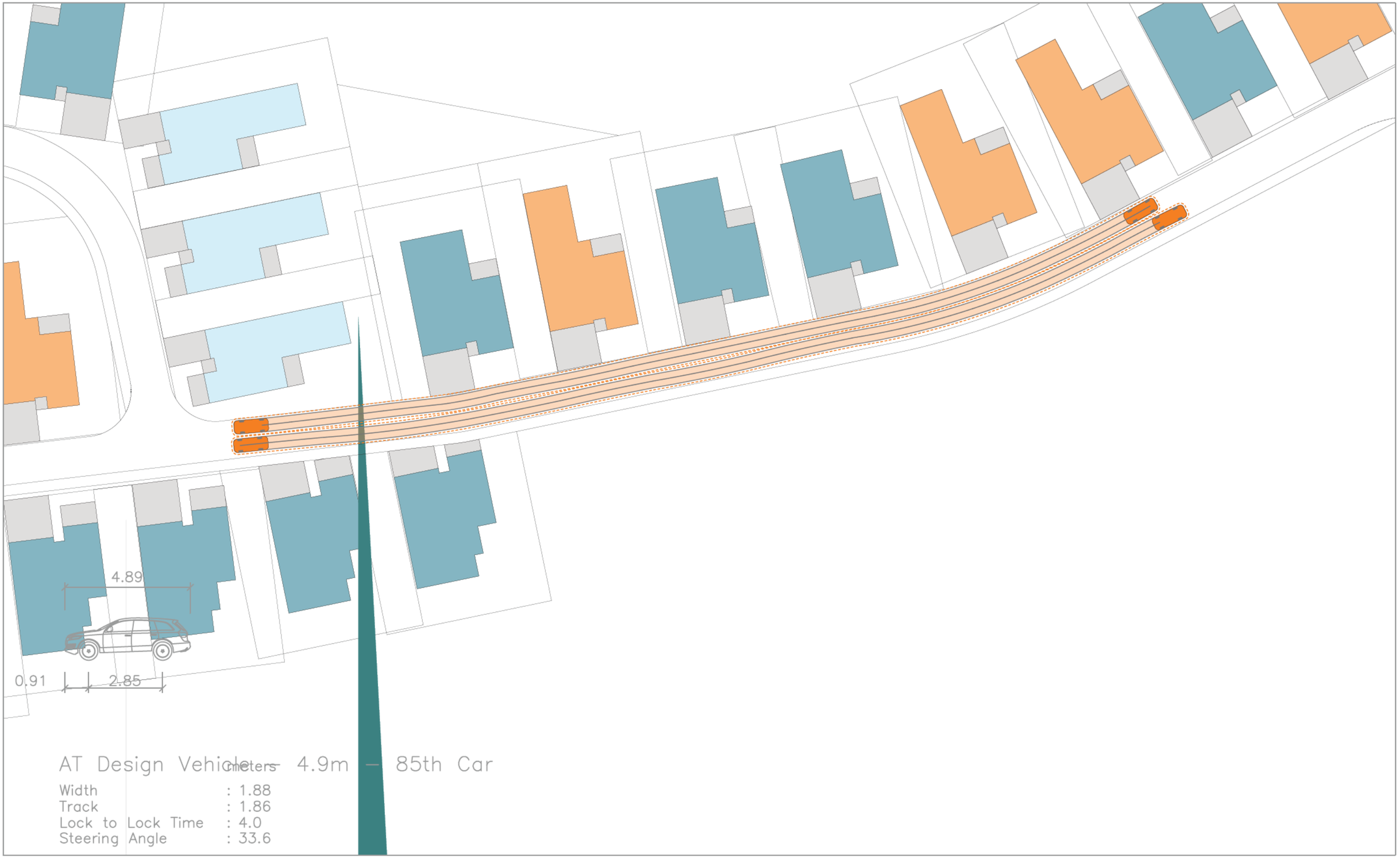
This standard does not apply where the pedestrian access forms part of a primary pedestrian access.

Table E27.6.6.1 Primary Pedestrian Access width and separation requirements

Location of site	The total number of parking spaces or dwellings served by a vehicle and/or Primary Pedestrian Access	Minimum formed Primary Pedestrian Access width where not adjacent to vehicle access	Minimum formed Primary Pedestrian Access width and separation where adjacent to vehicle access
(T156A)	Serves 2-3 dwellings	1.8m	No requirement under E27.6.6(1) to (3)
(T156B)	Serves 4 to 19 parking spaces or 4 to 19 dwellings, whichever is the greater	1.8m	1.4m (including the kerb), which must be vertically separated from trafficable areas as shown in Figure E27.6.4.3.1
(T156C)	Serves 20 or more parking spaces or 20 or more dwellings, whichever is the greater	1.8m	1.8m (including the kerb), which must be vertically separated from trafficable areas as shown in Figure E27.6.4.3.1

	Figure E27.6.4.3.1 Vertical separation of pedestrian access  	
33	**E27.6.7 Provision for electric vehicle charging** *Purpose: to ensure that any undercover car parks for new semi-detached dwellings or for new dwellings within a terrace or apartment building are provided with the capability to install Electric Vehicle Supply Equipment.* (2) Any new dwellings with car parking (with the exception of new detached dwellings) must provide each undercover car park with the capability to install Electric Vehicle Supply Equipment with designated space for the necessary conduit, circuit and metering between the car park and an electrical distribution board on the same building storey, or ground level if the car parking space is at ground level. Note: (b) This standard does not apply to any car parking permanently allocated to visitors. *Refer to the following standards and guidelines:* - *Australian/New Zealand Wiring Rules AS/NZS 3000:2018* - *SNZ PAS 6011:2021 Electric Vehicle Chargers for Residential Use* - *SNZ PAS 6011:2021 Electric Vehicle Chargers for Commercial Applications* - *WorkSafe EV charging safety guidelines 2nd addition plus addendums 1 and 2*	Provision for electric charging can be provided for garage parking as required. **Complies.**

Appendix B: Vehicle Tracking



Revision notes:		
Rev:	Date:	Notes:

Drawn by: HA J003122

Client:

Project: Rangitoopuni Land Trust Project
Proposed Retirement Village

Drawing Title: Vehicle Tracking
85th% Vehicle Tracking

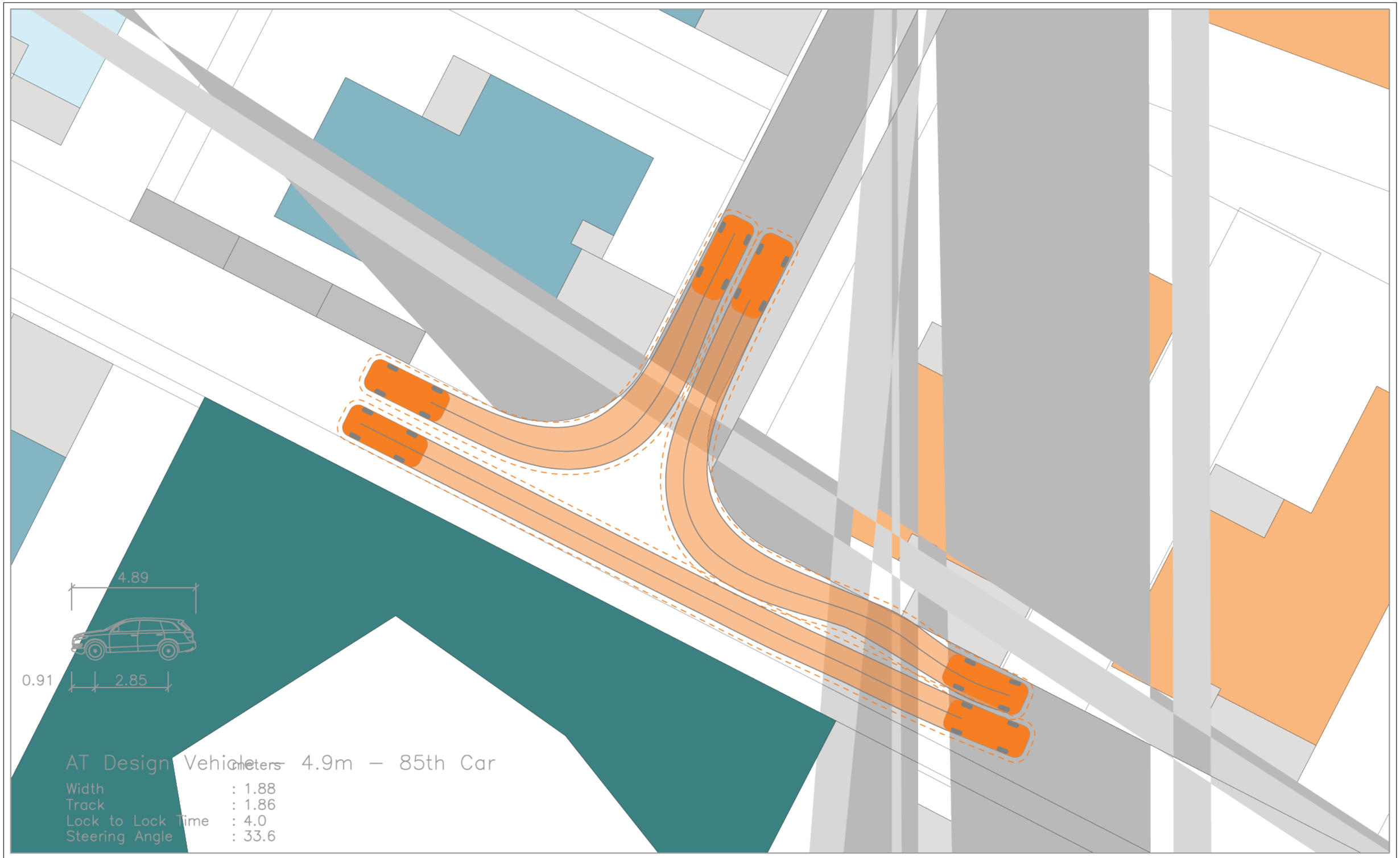
Date: 27/03/25

Scale @ A3: 1:500

Revision: A

commute TRANSPORTATION CONSULTANTS

Figure: A1



Revision notes:

Rev:	Date:	Notes:

Drawn by:
HA
J003122

Client:

Project:
Rangitoopuni Land Trust Project
Proposed Retirement Village

Drawing Title:
Vehicle Tracking
85th% Vehicle Tracking

Date:
27/03/25

Scale @ A3:
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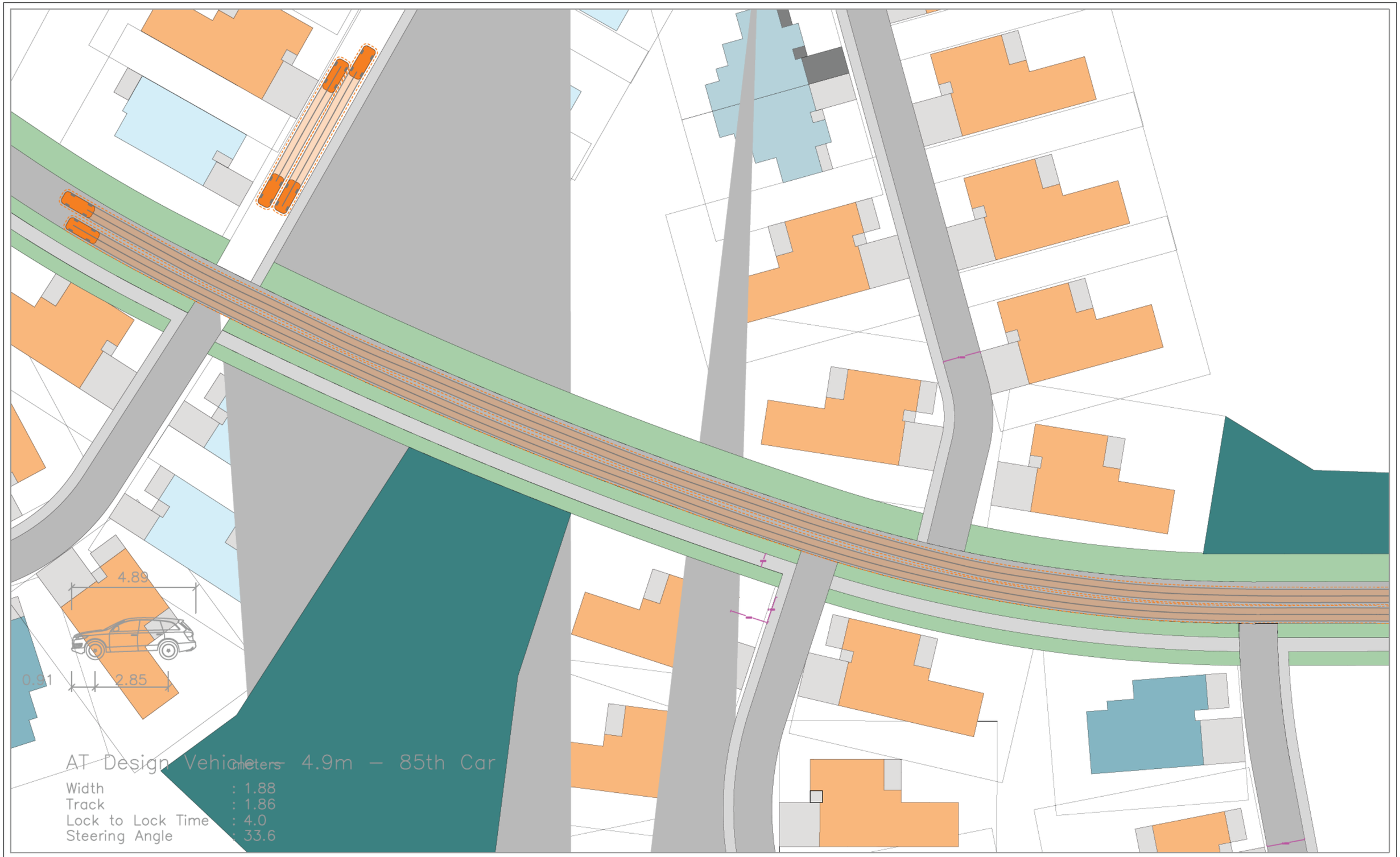
Revision:
A

commute
TRANSPORTATION CONSULTANTS

Figure:
A2



Revision notes:

Rev:	Date:	Notes:

Drawn by:
HA
J003122

Client:

Project:
Rangitoopuni Land Trust Project
Proposed Retirement Village

Drawing Title:
Vehicle Tracking
85th% Vehicle Tracking

Date:
27/03/25

Scale @ A3:
1:200

Revision:
A

commute
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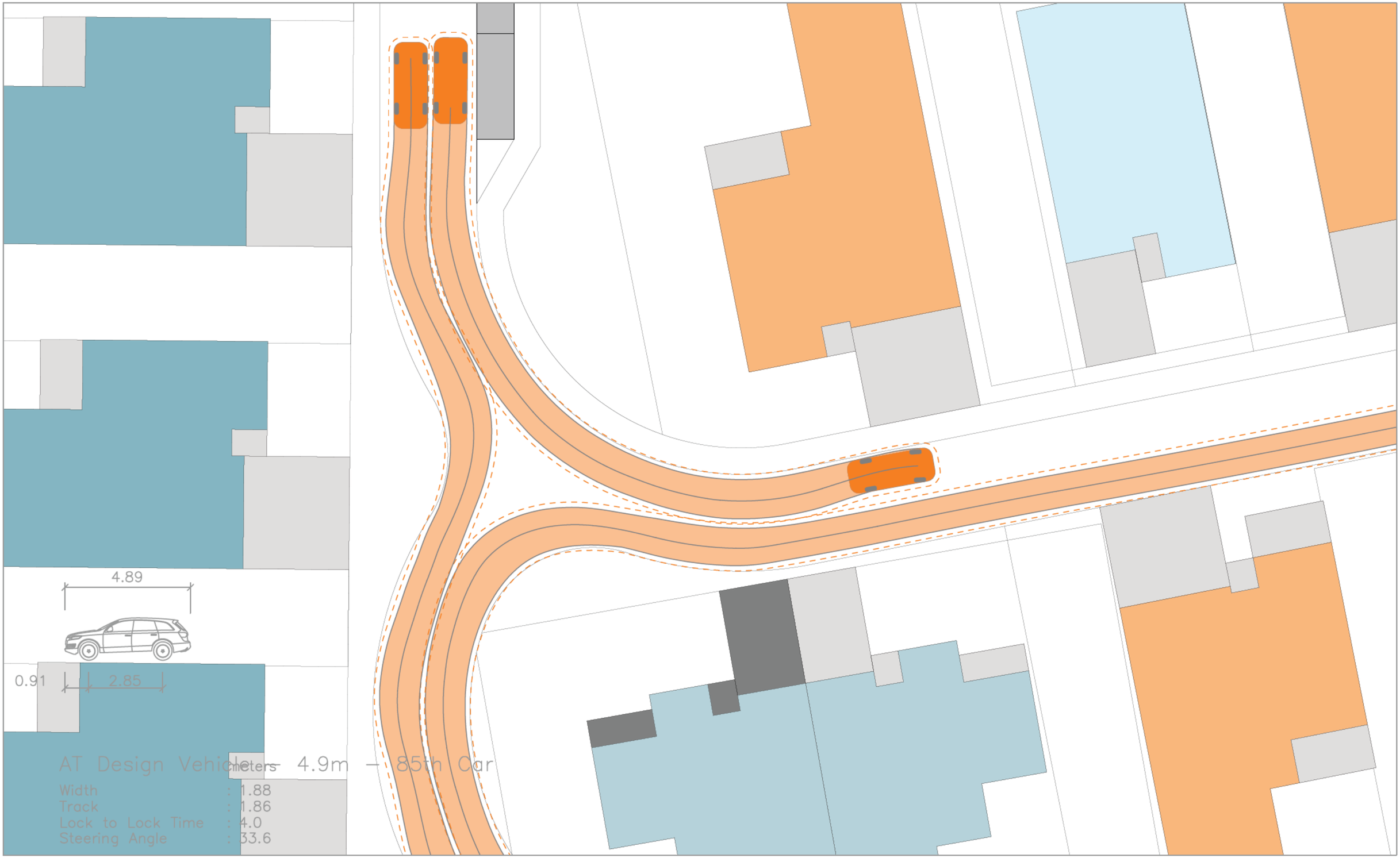
Figure:
A3



Revision notes:		
Rev:	Date:	Notes:

Drawn by: HA J003122	**Project:** Rangitoopuni Land Trust Project Proposed Retirement Village	**Date:** 27/03/25	commute TRANSPORTATION CONSULTANTS	**Figure:** A4
Client:	**Drawing Title:** Vehicle Tracking 85th% Vehicle Tracking	**Scale @ A3:** 1:200		
		Revision: A		

Revision notes:

Rev:	Date:	Notes:

Drawn by:
HA
J003122

Client:

Project:
Rangitoopuni Land Trust Project
Proposed Retirement Village

Drawing Title:
Vehicle Tracking
Road 1 8m Truck and 85th% Vehicle

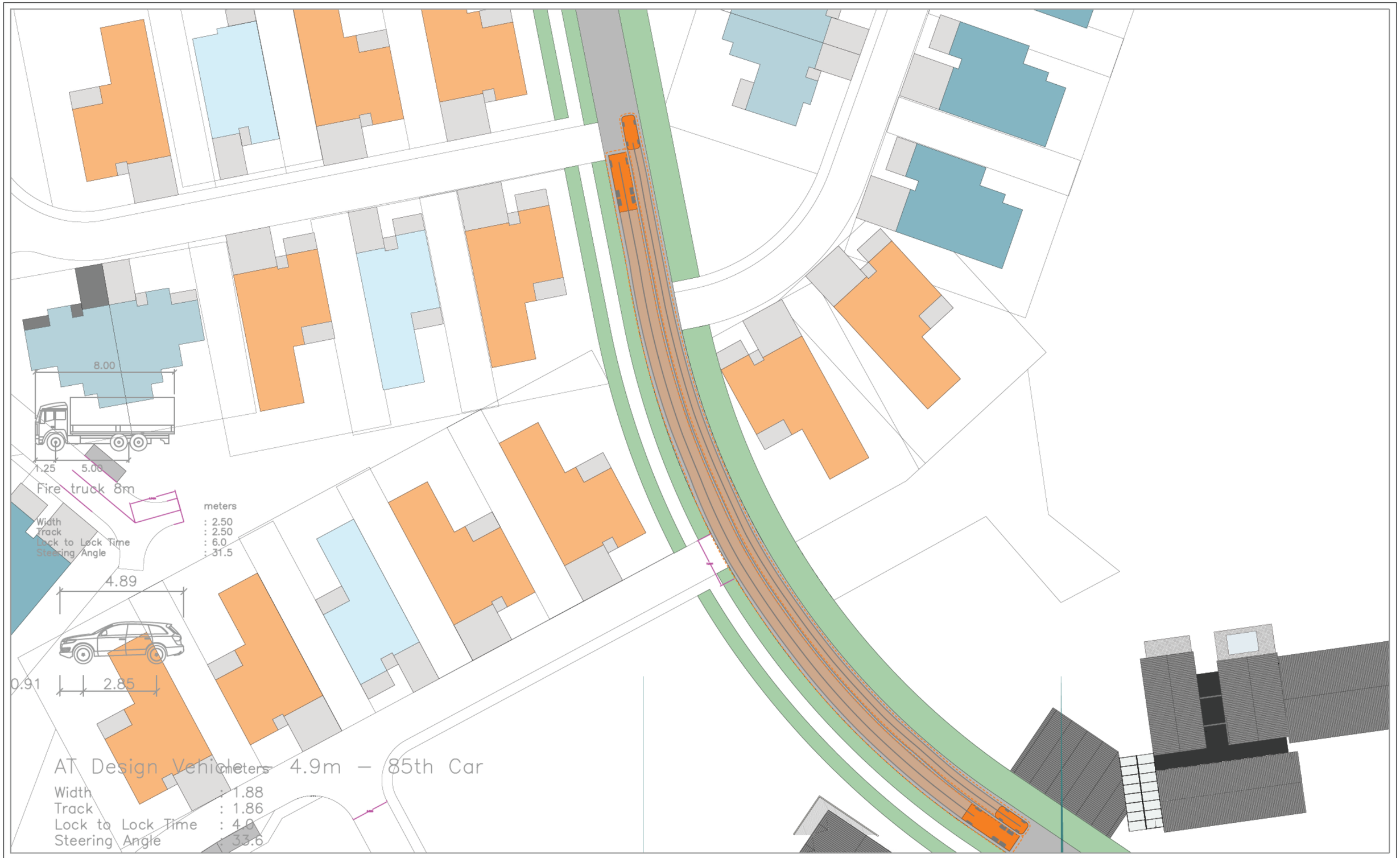
Date:
27/03/25

Scale @ A3:
1:500

Revision:
A

commute TRANSPORTATION CONSULTANTS

Figure:
B1



Revision notes:

Rev:	Date:	Notes:

Drawn by:
HA
J003122

Client:

Project:
Rangitoopuni Land Trust Project
Proposed Retirement Village

Drawing Title:
Vehicle Tracking
Road 1 8m Truck and 85th% Vehicle

Date:
27/03/25

Scale @ A3:
1:500

Revision:
A

commute
TRANSPORTATION CONSULTANTS

Figure:
B2

Revision notes:

Rev:	Date:	Notes:

Drawn by:
HA
J003122

Client:

Project:
Rangitoopuni Land Trust Project
Proposed Retirement Village

Drawing Title:
Vehicle Tracking
8m Truck Internal Tracking

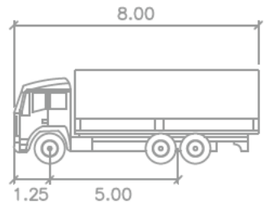
Date:
27/03/25

Scale @ A3:
1:1000

Revision:
A

commute
TRANSPORTATION CONSULTANTS

Figure:
B3



Fire truck 8m

	meters
Width	: 2.50
Track	: 2.50
Lock to Lock Time	: 6.0
Steering Angle	: 31.5

Revision notes:

Rev:	Date:	Notes:

Drawn by:
HA
J003122

Client:

Project:
Rangitoopuni Land Trust Project
Proposed Retirement Village

Drawing Title:
Vehicle Tracking
8m Truck Internal Tracking

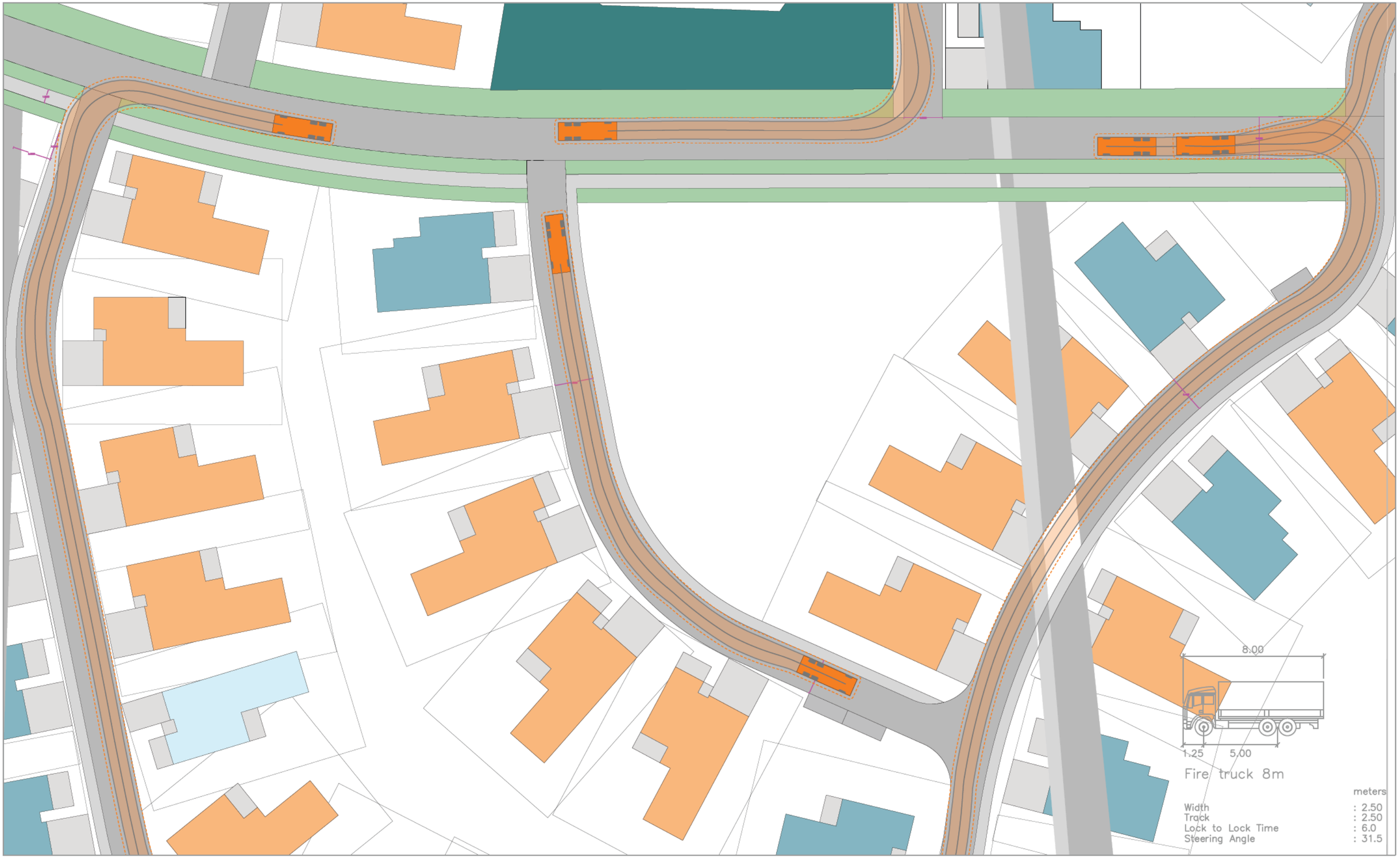
Date:
27/03/25

Scale @ A3:
1:1000

Revision:
A

commute
TRANSPORTATION CONSULTANTS

Figure:
B4



Revision notes:

Rev:	Date:	Notes:

Drawn by:
HA
J003122

Client:

Project:
Rangitoopuni Land Trust Project
Proposed Retirement Village

Drawing Title:
Vehicle Tracking
8m Truck Internal Tracking

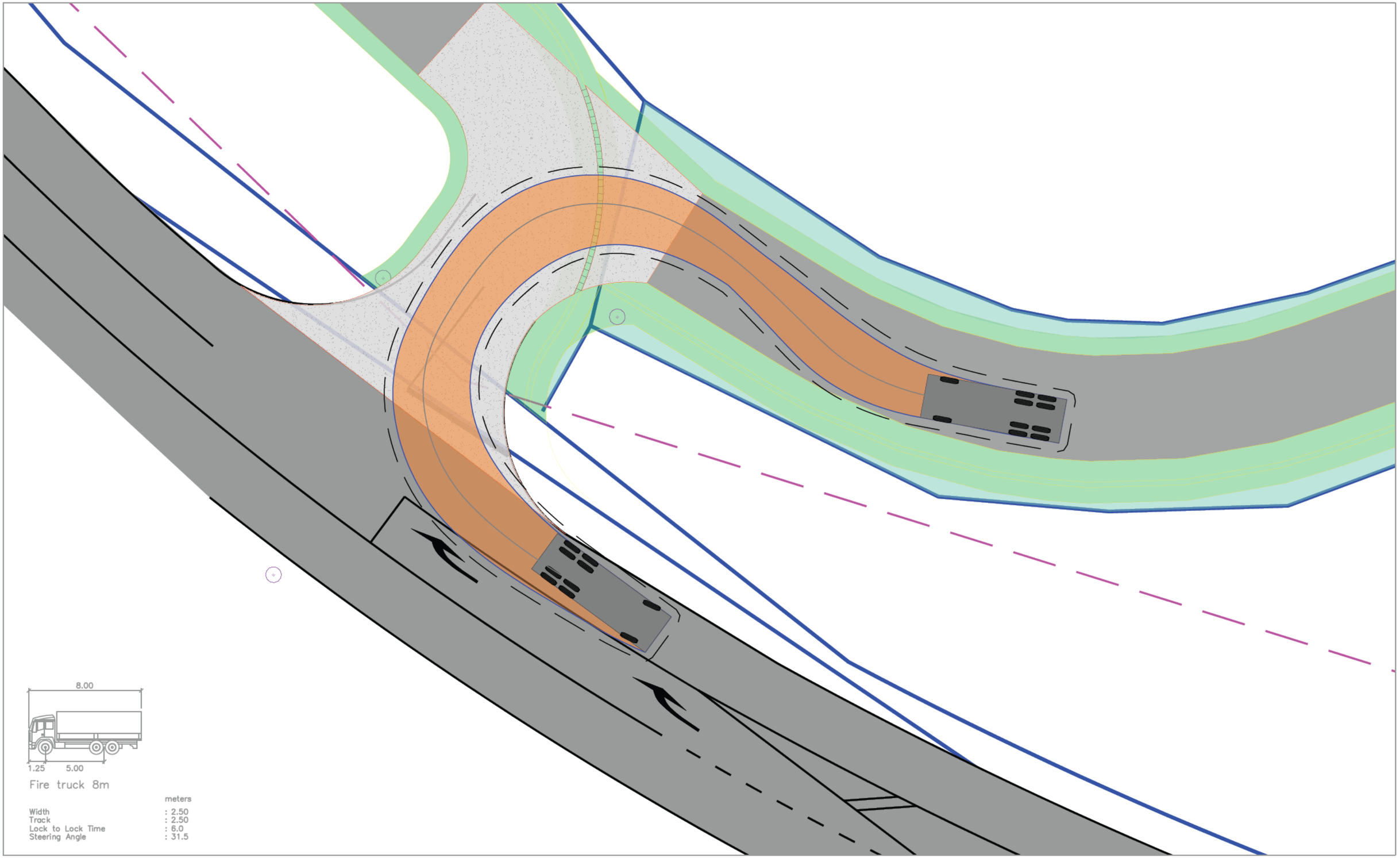
Date:
27/03/25

Scale @ A3:
1:1000

Revision:
A

commute
TRANSPORTATION CONSULTANTS

Figure:
B5



Revision notes:

Rev:	Date:	Notes:

Drawn by:
HA
J003122

Client:

Project:
Rangitoopuni Land Trust Project
Proposed Residential Development

Drawing Title:
Vehicle Tracking
Old North Road Access 8m Truck Tracking

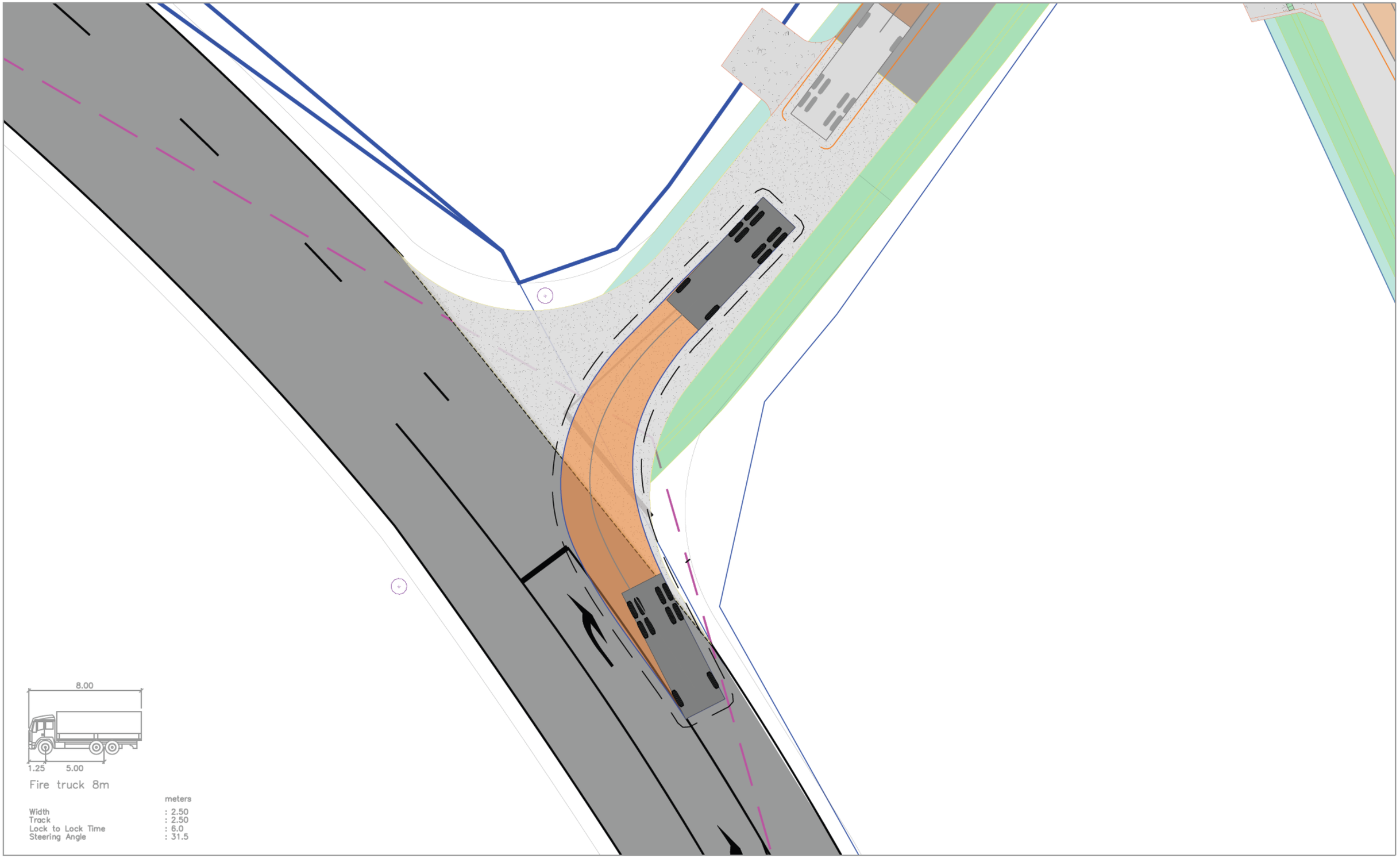
Date:
27/03/25

Scale @ A3:
1:200

Revision:
A

commute TRANSPORTATION CONSULTANTS

Figure:
C1



Revision notes:

Rev:	Date:	Notes:

Drawn by:
HA
J003122

Client:

Project:
Rangitoopuni Land Trust Project
Proposed Residential Development

Drawing Title:
Vehicle Tracking
Old North Road Access 8m Truck Tracking

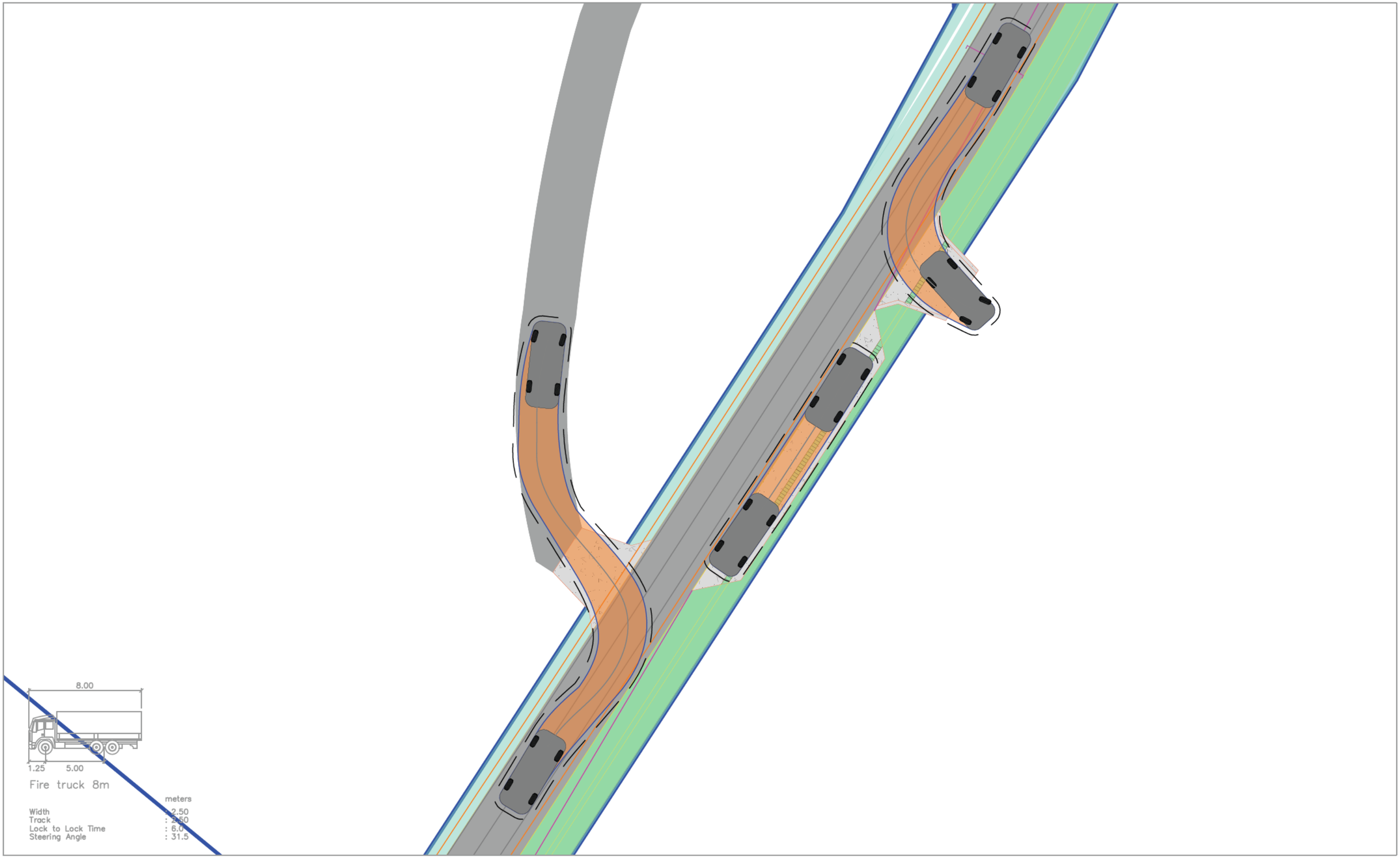
Date:
27/03/25

Scale @ A3:
1:200

Revision:
A

commute TRANSPORTATION CONSULTANTS

Figure:
C2



Revision notes:

Rev:	Date:	Notes:

Drawn by:
HA
J003122

Client:

Project:
Rangitoopuni Land Trust Project
Proposed Residential Development

Drawing Title:
Vehicle Tracking
JOAL 1 8m Truck and 85 Vehicle Tracking

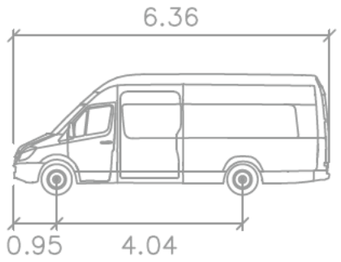
Date:
27/03/25

Scale @ A3:
1:200

Revision:
A

commute
TRANSPORTATION CONSULTANTS

Figure:
C3



AT Design Vehicle – 6.3m – Delivery Van

	meters
Width	: 2.05
Track	: 1.81
Lock to Lock Time	: 4.0
Steering Angle	: 38.6

Revision notes:

Rev:	Date:	Notes:

Drawn by:
HA
J003122

Client:

Project:
Rangitoopuni Land Trust Project
Proposed Residential Development

Drawing Title:
Vehicle Tracking
Old North Road Access 6.3m Truck Tracking

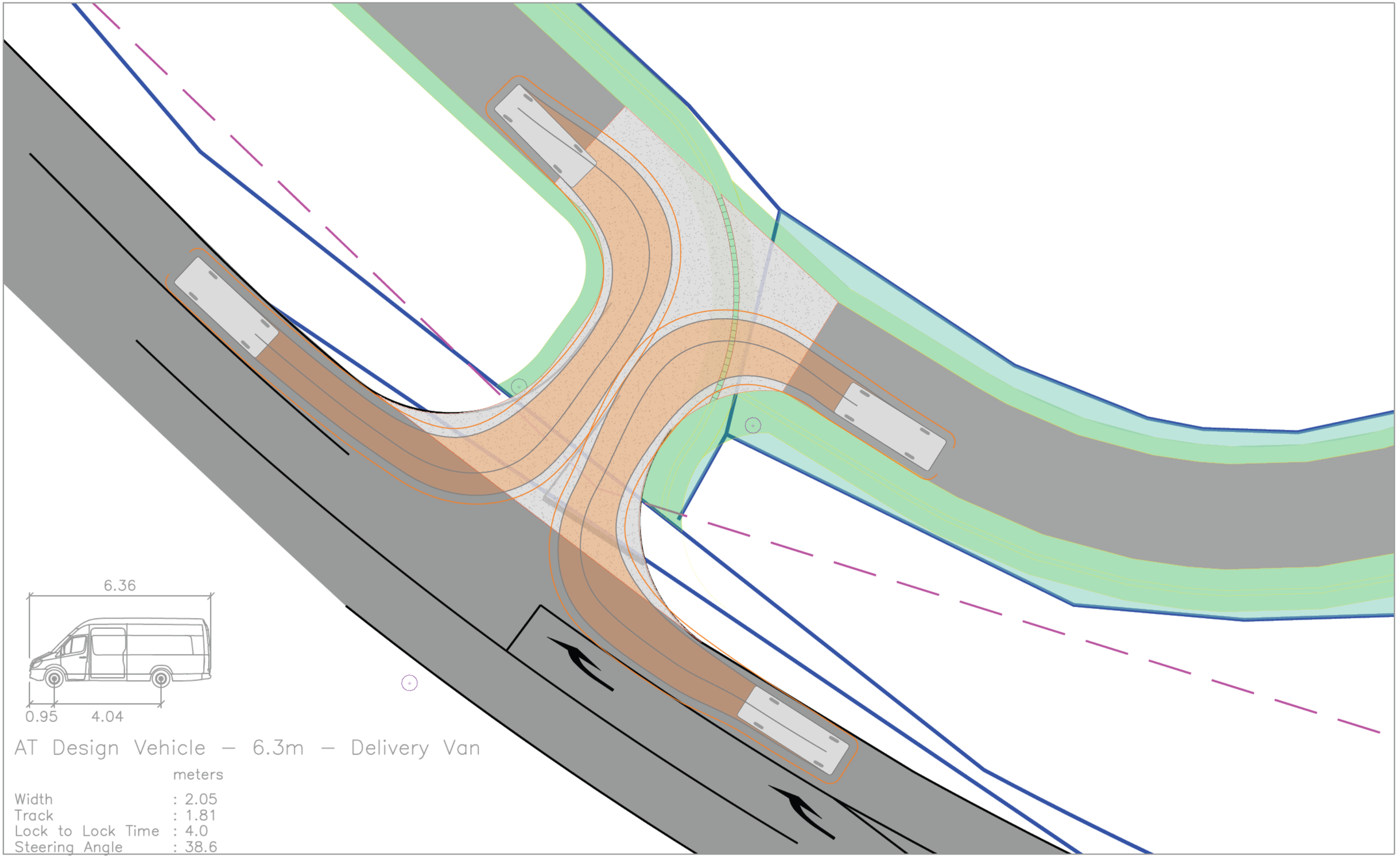
Date:
27/03/25

Scale @ A3:
1:200

Revision:
A

commute TRANSPORTATION CONSULTANTS

Figure:
C4



AT Design Vehicle – 6.3m – Delivery Van

	meters
Width	: 2.05
Track	: 1.81
Lock to Lock Time	: 4.0
Steering Angle	: 38.6

Revision notes:

Rev:	Date:	Notes:

Drawn by: HA J003122

Client:

Project: Rangitoopuni Land Trust Project
Proposed Residential Development

Drawing Title: Vehicle Tracking
Old North Road Access 6.3m Truck Tracking

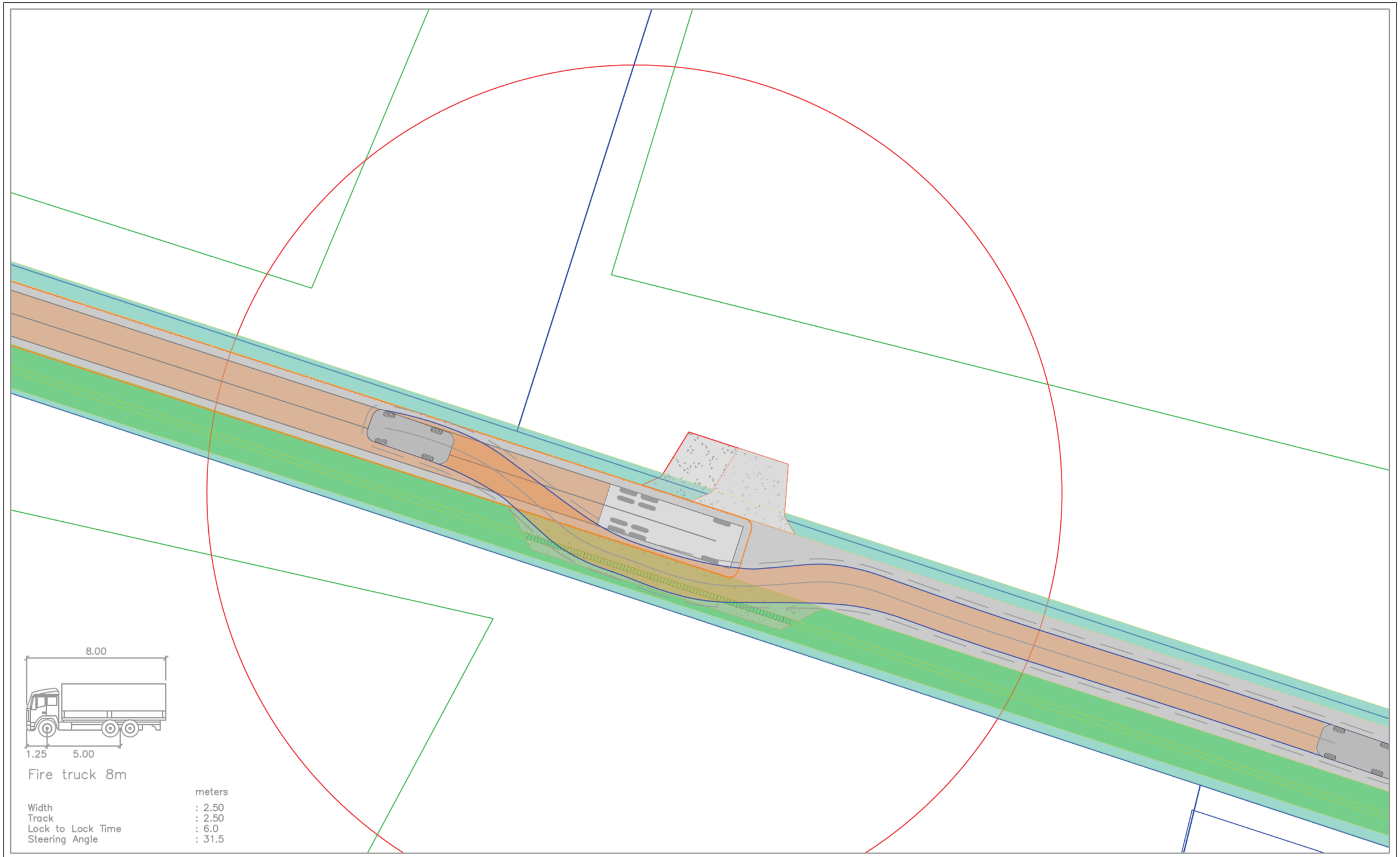
Date: 27/03/25

Scale @ A3: 1:200

Revision: A

commute TRANSPORTATION CONSULTANTS

Figure: C5



Revision notes:

Rev:	Date:	Notes:

Drawn by:
HA
J003122

Client:

Project:
Rangitoopuni Land Trust Project
Proposed Residential Development

Drawing Title:
Vehicle Tracking
JOAL 8 8m fire truck tracking

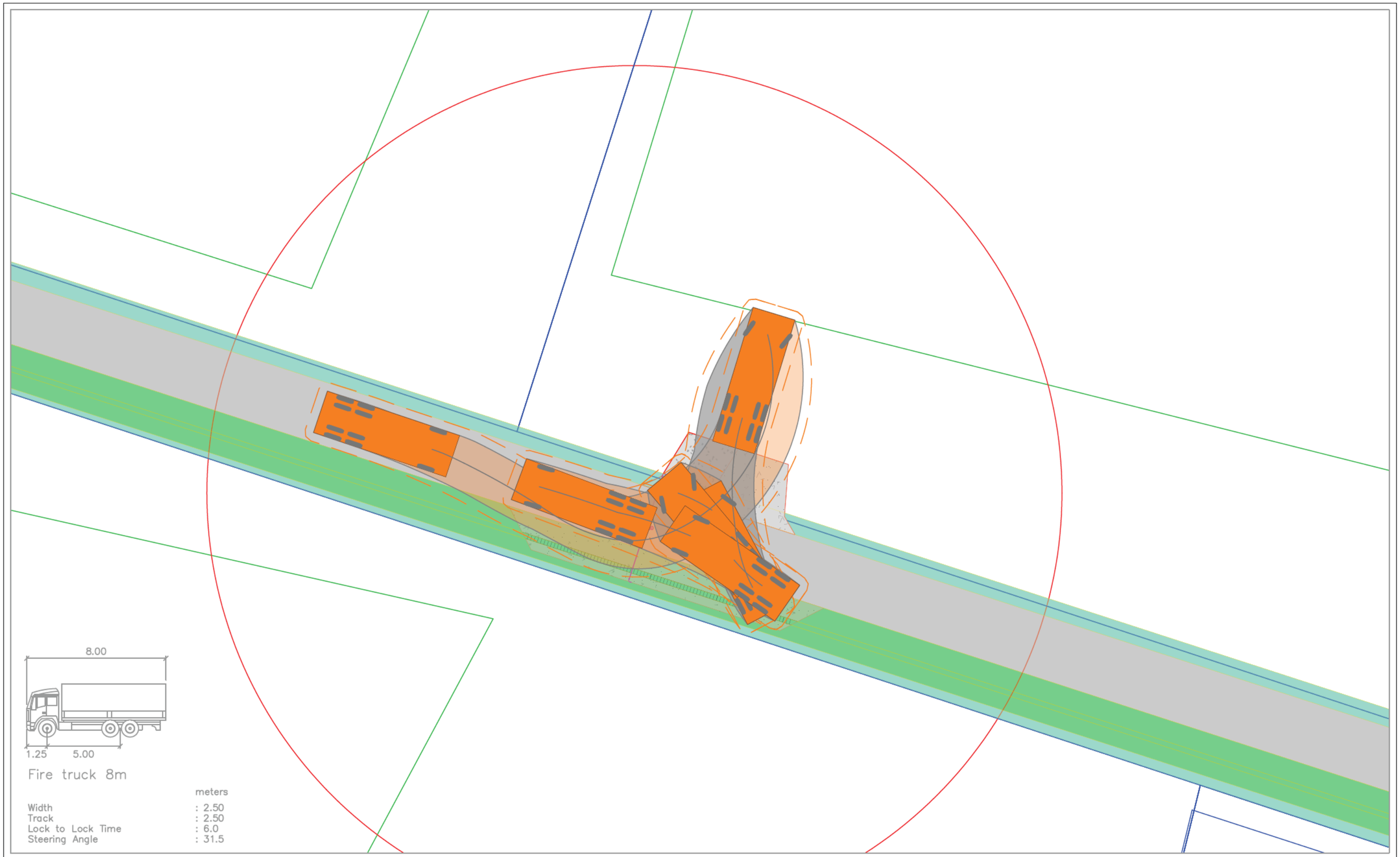
Date:
27/03/25

Scale @ A3:
1:200

Revision:
A

commute TRANSPORTATION CONSULTANTS

Figure:
D1



Revision notes:

Rev:	Date:	Notes:

Drawn by:
HA
J003122

Client:

Project:
Rangitoopuni Land Trust Project
Proposed Residential Development

Drawing Title:
Vehicle Tracking
JOAL 8 8m fire truck tracking

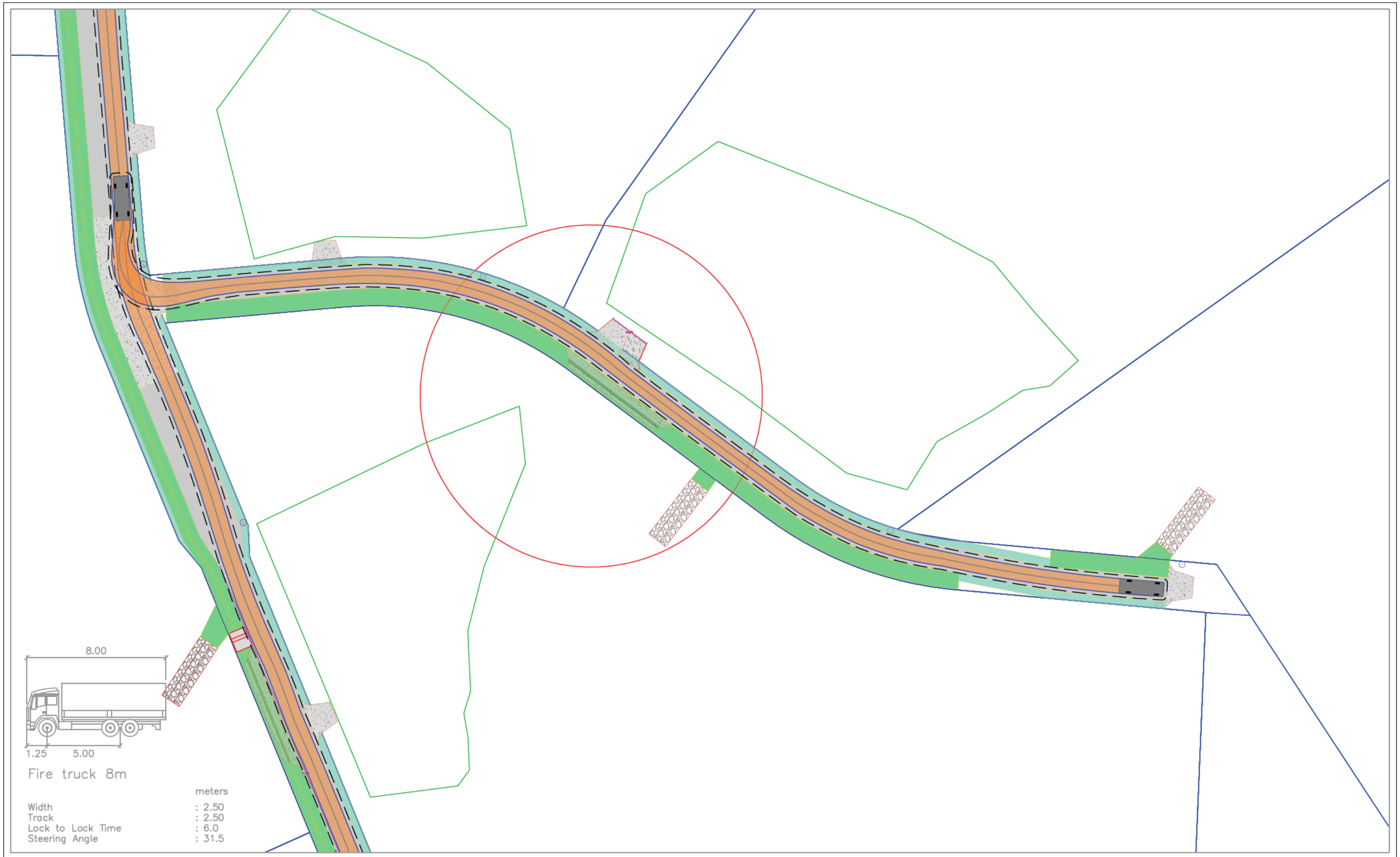
Date:
27/03/25

Scale @ A3:
1:200

Revision:
A

commute TRANSPORTATION CONSULTANTS

Figure:
D2



Revision notes:

Rev:	Date:	Notes:

Drawn by:
HA
J003122

Client:

Project:
Rangitoopuni Land Trust Project
Proposed Residential Development

Drawing Title:
Vehicle Tracking
JOAL 13 8m fire truck tracking

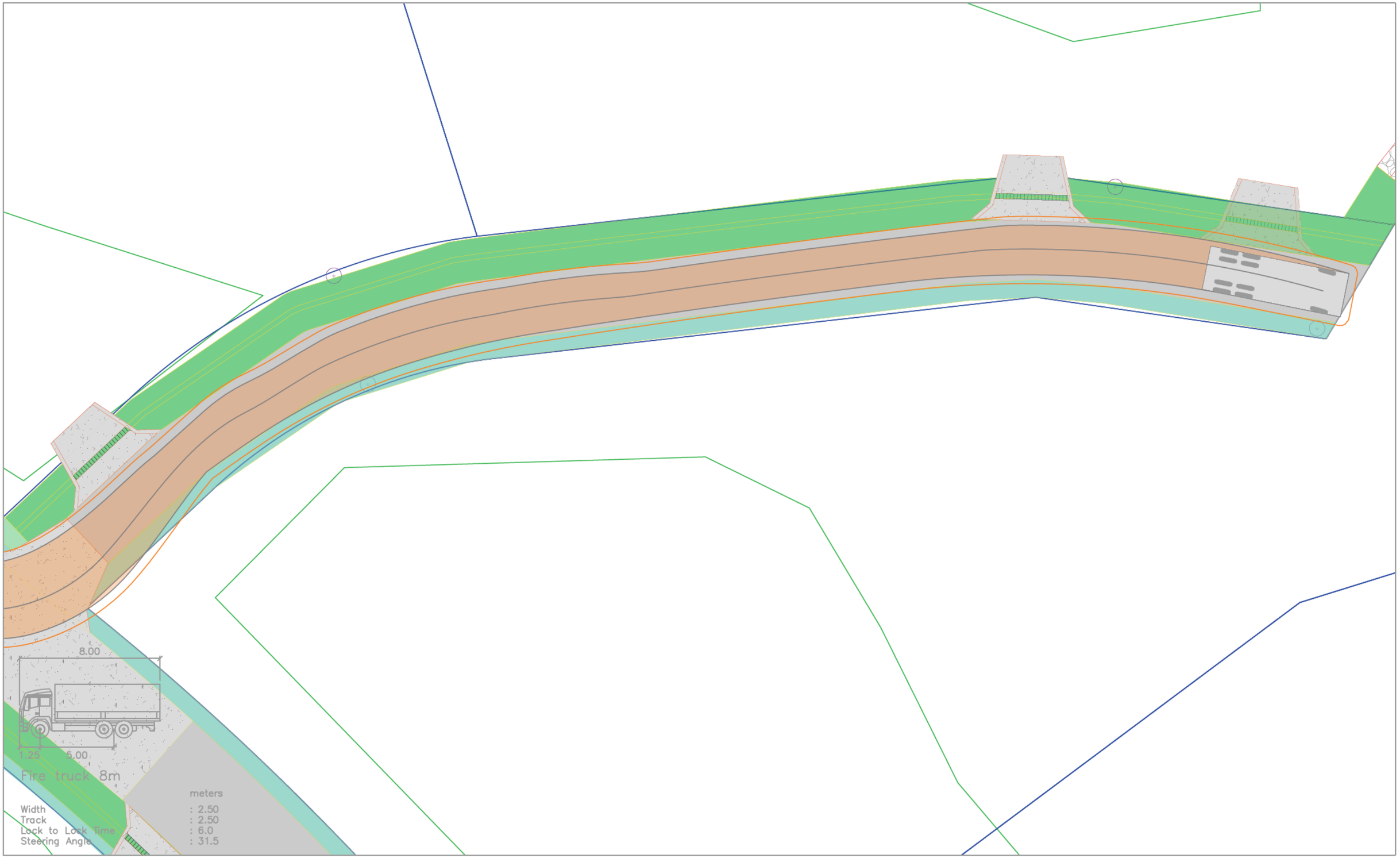
Date:
27/03/25

Scale @ A3:
1:500

Revision:
A

commute TRANSPORTATION CONSULTANTS

Figure:
D3



Revision notes:

Rev:	Date:	Notes:

Drawn by:
HA
J003122

Client:

Project:
Rangitoopuni Land Trust Project
Proposed Residential Development

Drawing Title:
Vehicle Tracking
JOAL 9 8m fire truck tracking

Date:
27/03/25

Scale @ A3:
1:200

Revision:
A

commute TRANSPORTATION CONSULTANTS

Figure:
D4

Revision notes:

Rev:	Date:	Notes:

Drawn by:
HA
J003122

Client:

Project:
Rangitoopuni Land Trust Project
Proposed Residential Development

Drawing Title:
Vehicle Tracking
JOAL 14 & ROW 1 8m fire truck tracking

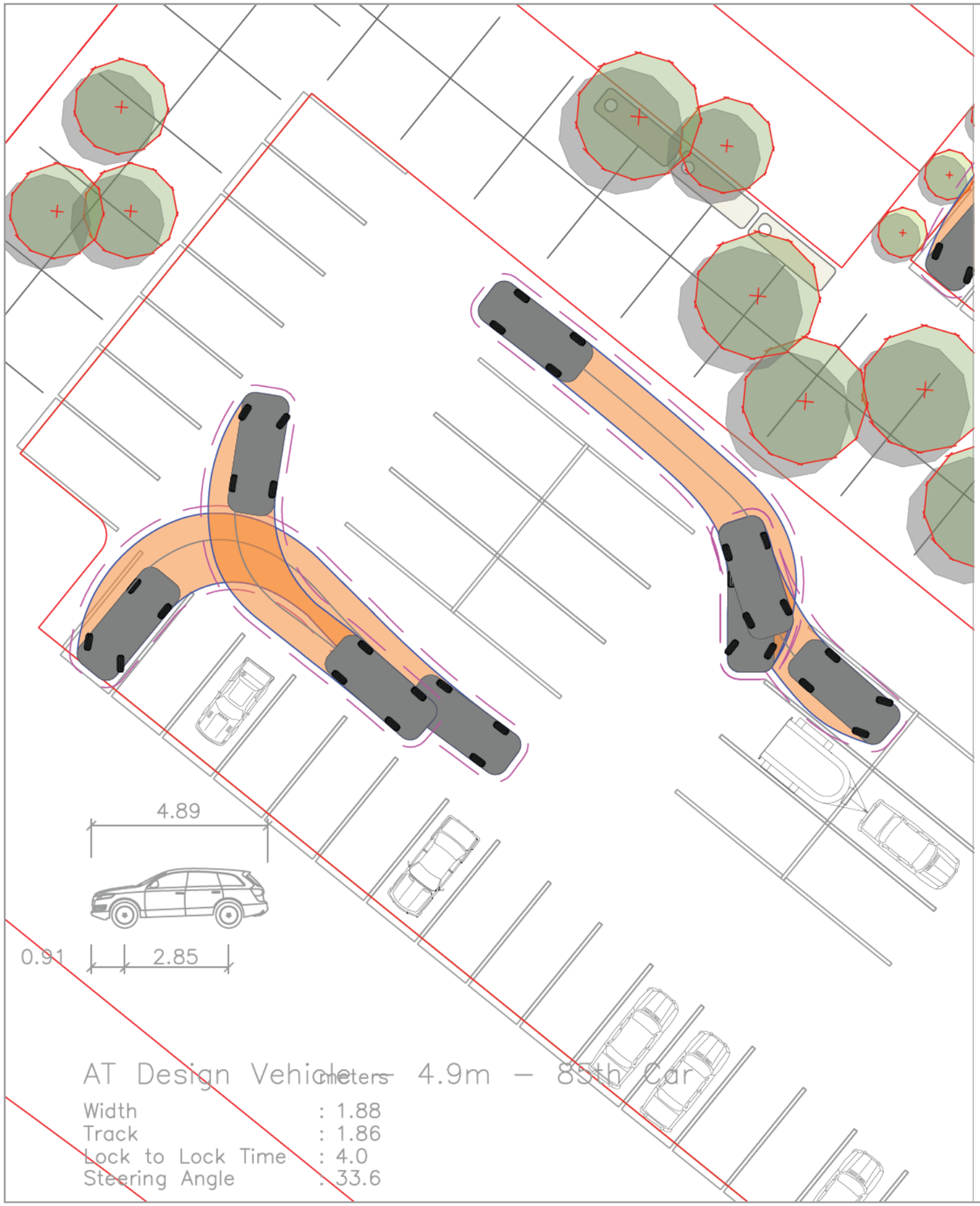
Date:
27/03/25

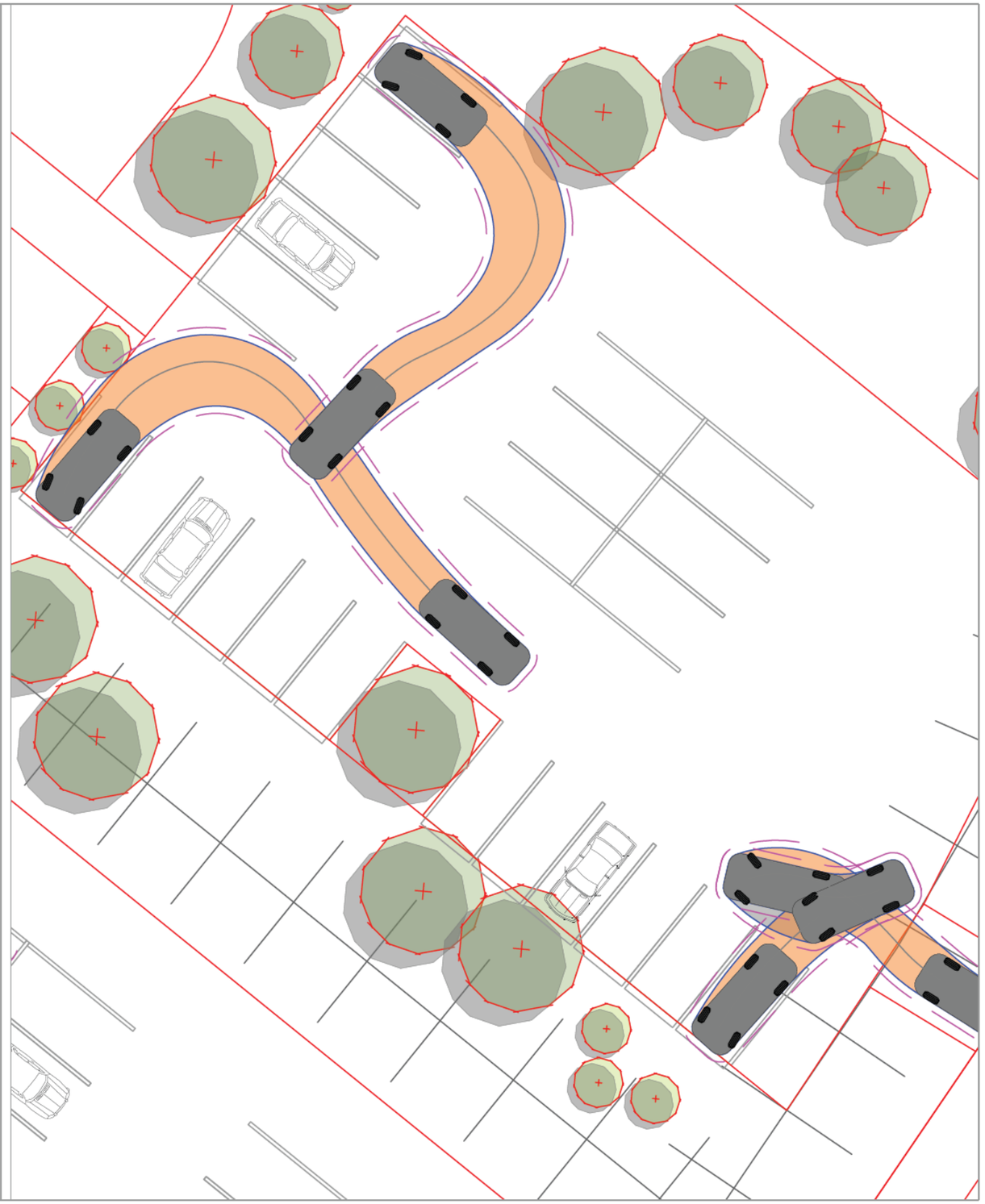
Scale @ A3:
1:500

Revision:
A

commute
TRANSPORTATION CONSULTANTS

Figure:
D5





Revision notes:		
Rev:	Date:	Notes:

Drawn by: HA J003122

Client:

Project: Rangitoopuni Land Trust Project
Proposed Lot 1 Community Centre

Drawing Title: Vehicle Tracking
85th Percentile Parking

Date: 27/03/25

Scale @ A3: 1:200

Revision: A

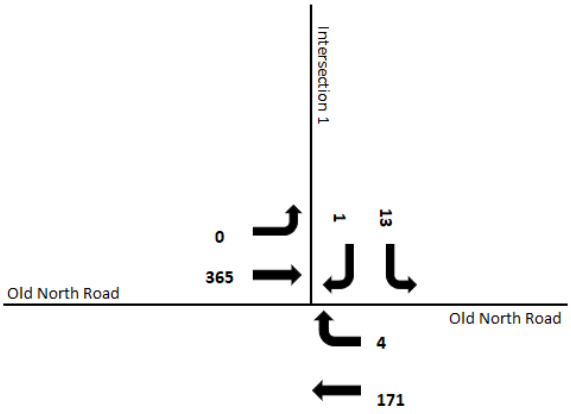
commute TRANSPORTATION CONSULTANTS

Figure: E1

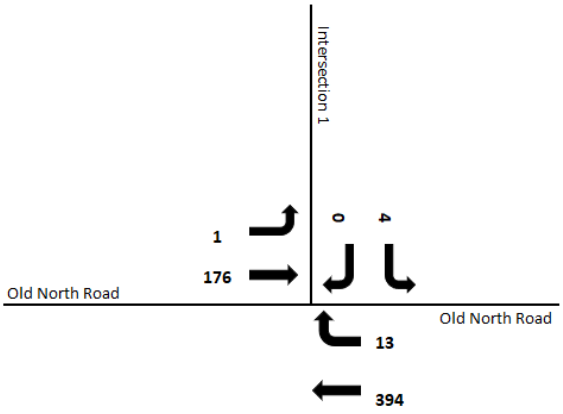
Appendix C: Access Trip Distribution

Access 1 Trip Distribution

Access 1 Morning Peak Hour

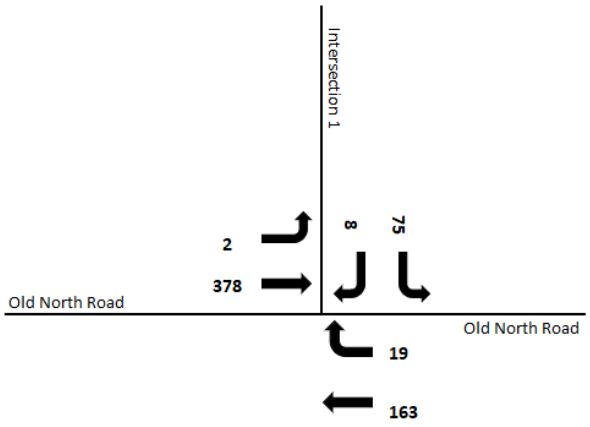


Access 1 Evening Peak Hour

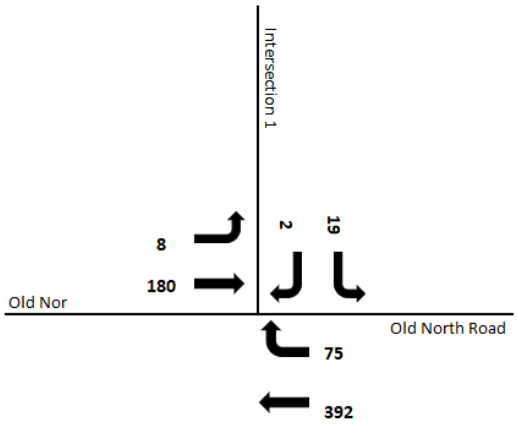


Access 2 Trip Distribution

Access 2 Morning Peak Hour

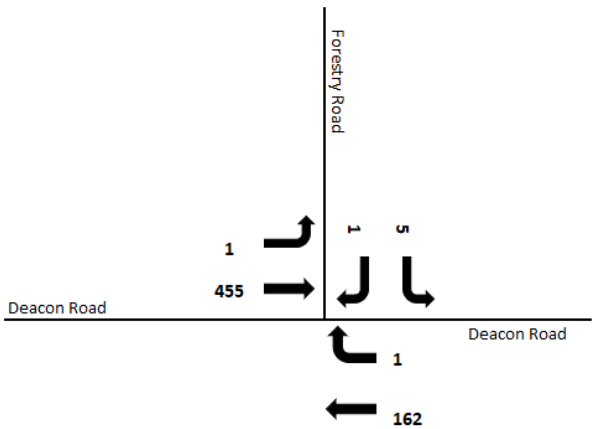


Access 2 Evening Peak Hour

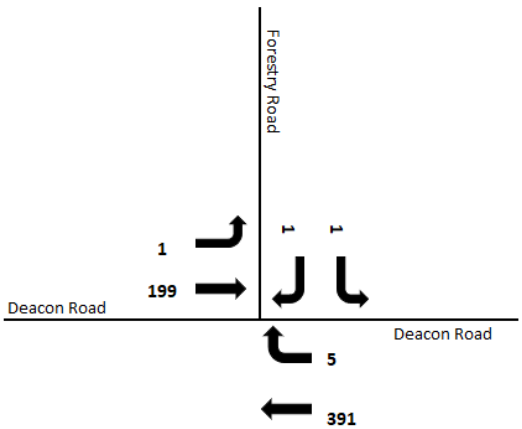


Access 5 Trip Distribution

Access 5 Morning Peak Hour



Access 5 Evening Peak Hour



Appendix D: Access Modelling

Access 1 Proposed Model AM top and PM bottom

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
East: Old North Road WESTBOUND															
5	T1	All MCs	180	0.0	180	0.0	0.096	0.0	LOS A	0.0	0.3	0.03	0.03	0.03	49.9
6	R2	All MCs	4	0.0	4	0.0	0.096	5.9	LOS A	0.0	0.3	0.03	0.03	0.03	48.4
Approach			184	0.0	184	0.0	0.096	0.2	NA	0.0	0.3	0.03	0.03	0.03	49.8
North: Access 1															
7	L2	All MCs	14	0.0	14	0.0	0.013	5.8	LOS A	0.0	0.3	0.41	0.57	0.41	45.0
9	R2	All MCs	1	0.0	1	0.0	0.013	7.0	LOS A	0.0	0.3	0.41	0.57	0.41	44.8
Approach			15	0.0	15	0.0	0.013	5.9	LOS A	0.0	0.3	0.41	0.57	0.41	45.0
West: Old North Road EASTBOUND															
10	L2	All MCs	1	0.0	1	0.0	0.198	4.6	LOS A	0.0	0.0	0.00	0.00	0.00	48.7
11	T1	All MCs	384	0.0	384	0.0	0.198	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	49.9
Approach			385	0.0	385	0.0	0.198	0.1	NA	0.0	0.0	0.00	0.00	0.00	49.9
All Vehicles			584	0.0	584	0.0	0.198	0.3	NA	0.0	0.3	0.02	0.03	0.02	49.7

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
East: Old North Road WESTBOUND															
5	T1	All MCs	415	0.0	415	0.0	0.222	0.0	LOS A	0.1	0.8	0.03	0.03	0.03	49.8
6	R2	All MCs	14	0.0	14	0.0	0.222	5.0	LOS A	0.1	0.8	0.03	0.03	0.03	48.4
Approach			428	0.0	428	0.0	0.222	0.2	NA	0.1	0.8	0.03	0.03	0.03	49.8
North: Access 1															
7	L2	All MCs	4	0.0	4	0.0	0.005	5.1	LOS A	0.0	0.1	0.30	0.50	0.30	45.3
9	R2	All MCs	1	0.0	1	0.0	0.005	7.3	LOS A	0.0	0.1	0.30	0.50	0.30	45.1
Approach			5	0.0	5	0.0	0.005	5.5	LOS A	0.0	0.1	0.30	0.50	0.30	45.2
West: Old North Road EASTBOUND															
10	L2	All MCs	1	0.0	1	0.0	0.096	4.6	LOS A	0.0	0.0	0.00	0.00	0.00	48.7
11	T1	All MCs	185	0.0	185	0.0	0.096	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	49.9
Approach			186	0.0	186	0.0	0.096	0.1	NA	0.0	0.0	0.00	0.00	0.00	49.9
All Vehicles			620	0.0	620	0.0	0.222	0.2	NA	0.1	0.8	0.02	0.02	0.02	49.8

Access 2 Model AM top and PM bottom

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
East: Old North Road WESTBOUND															
5	T1	All MCs	172	0.0	172	0.0	0.105	0.3	LOS A	0.2	1.2	0.12	0.14	0.12	49.3
6	R2	All MCs	20	0.0	20	0.0	0.105	6.1	LOS A	0.2	1.2	0.12	0.14	0.12	47.9
Approach			192	0.0	192	0.0	0.105	0.9	NA	0.2	1.2	0.12	0.14	0.12	49.2
North: Access 2															
7	L2	All MCs	79	0.0	79	0.0	0.082	6.0	LOS A	0.3	2.2	0.43	0.63	0.43	45.0
9	R2	All MCs	8	0.0	8	0.0	0.082	7.4	LOS A	0.3	2.2	0.43	0.63	0.43	44.8
Approach			87	0.0	87	0.0	0.082	6.2	LOS A	0.3	2.2	0.43	0.63	0.43	45.0
West: Old North Road EASTBOUND															
10	L2	All MCs	2	0.0	2	0.0	0.205	4.6	LOS A	0.0	0.0	0.00	0.00	0.00	48.7
11	T1	All MCs	398	0.0	398	0.0	0.205	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	49.9
Approach			400	0.0	400	0.0	0.205	0.1	NA	0.0	0.0	0.00	0.00	0.00	49.9
All Vehicles			679	0.0	679	0.0	0.205	1.1	NA	0.3	2.2	0.09	0.12	0.09	49.0

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
East: Old North Road WESTBOUND															
5	T1	All MCs	413	0.0	413	0.0	0.266	0.2	LOS A	0.6	4.4	0.13	0.15	0.13	49.1
6	R2	All MCs	79	0.0	79	0.0	0.266	5.4	LOS A	0.6	4.4	0.13	0.15	0.13	47.7
Approach			492	0.0	492	0.0	0.266	1.0	NA	0.6	4.4	0.13	0.15	0.13	48.9
North: Access 2															
7	L2	All MCs	20	0.0	20	0.0	0.018	5.1	LOS A	0.1	0.5	0.29	0.52	0.29	45.3
9	R2	All MCs	2	0.0	2	0.0	0.018	7.9	LOS A	0.1	0.5	0.29	0.52	0.29	45.1
Approach			22	0.0	22	0.0	0.018	5.4	LOS A	0.1	0.5	0.29	0.52	0.29	45.3
West: Old North Road EASTBOUND															
10	L2	All MCs	8	0.0	8	0.0	0.102	4.6	LOS A	0.0	0.0	0.00	0.02	0.00	48.6
11	T1	All MCs	189	0.0	189	0.0	0.102	0.0	LOS A	0.0	0.0	0.00	0.02	0.00	49.8
Approach			198	0.0	198	0.0	0.102	0.2	NA	0.0	0.0	0.00	0.02	0.00	49.8
All Vehicles			712	0.0	712	0.0	0.266	0.9	NA	0.6	4.4	0.10	0.13	0.10	49.0

Access 5 AM top and PM bottom

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total	HV]	Arrival Flows [Total	HV]	Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue [Veh.	Dist]	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
East: Deacon Road WESTBOUND															
5	T1	All MCs	171	0.0	171	0.0	0.088	0.0	LOS A	0.0	0.1	0.01	0.01	0.01	50.0
6	R2	All MCs	1	0.0	1	0.0	0.088	5.2	LOS A	0.0	0.1	0.01	0.01	0.01	48.5
Approach			172	0.0	172	0.0	0.088	0.0	NA	0.0	0.1	0.01	0.01	0.01	49.9
North: Access 5															
7	L2	All MCs	5	0.0	5	0.0	0.007	6.3	LOS A	0.0	0.2	0.46	0.58	0.46	44.9
9	R2	All MCs	1	0.0	1	0.0	0.007	7.6	LOS A	0.0	0.2	0.46	0.58	0.46	44.7
Approach			6	0.0	6	0.0	0.007	6.5	LOS A	0.0	0.2	0.46	0.58	0.46	44.9
West: Deacon Road EASTBOUND															
10	L2	All MCs	1	0.0	1	0.0	0.246	4.6	LOS A	0.0	0.0	0.00	0.00	0.00	48.7
11	T1	All MCs	479	0.0	479	0.0	0.246	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	49.9
Approach			480	0.0	480	0.0	0.246	0.1	NA	0.0	0.0	0.00	0.00	0.00	49.9
All Vehicles			658	0.0	658	0.0	0.246	0.1	NA	0.0	0.2	0.01	0.01	0.01	49.8

Vehicle Movement Performance

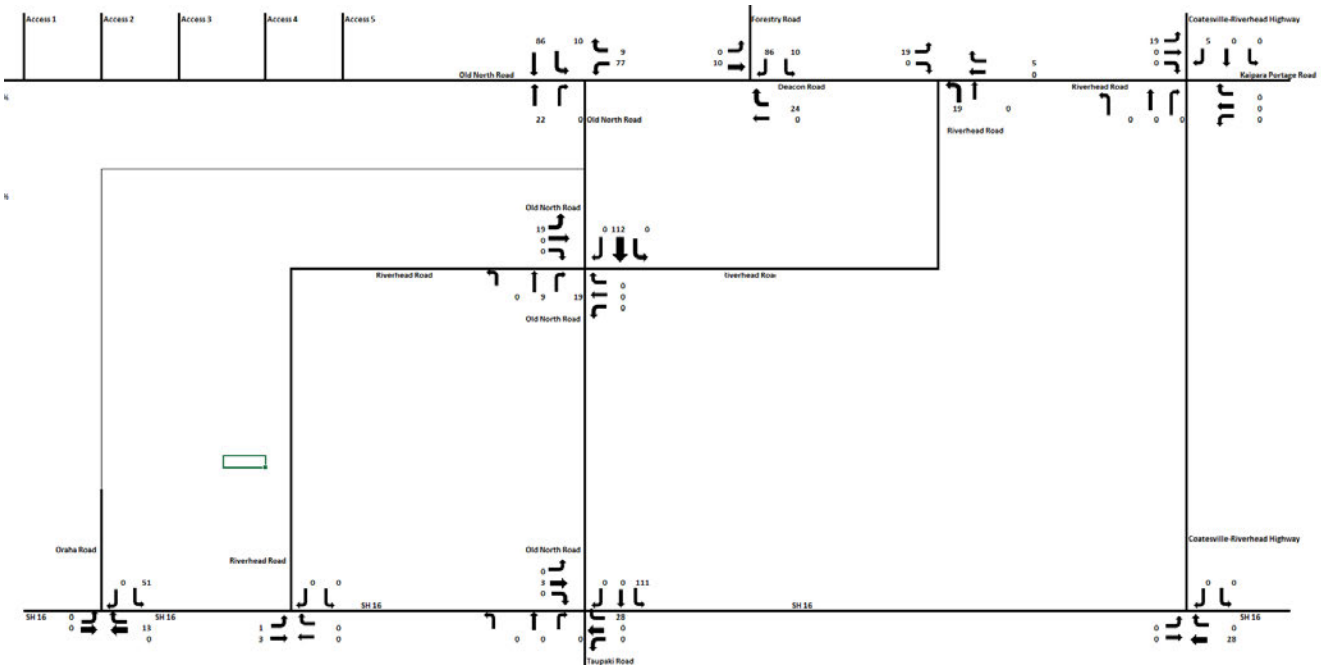
Mov ID	Turn	Mov Class	Demand Flows [Total	HV]	Arrival Flows [Total	HV]	Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue [Veh.	Dist]	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
East: Deacon Road WESTBOUND															
5	T1	All MCs	412	0.0	412	0.0	0.217	0.0	LOS A	0.1	0.5	0.02	0.02	0.02	49.9
6	R2	All MCs	8	0.0	8	0.0	0.217	4.9	LOS A	0.1	0.5	0.02	0.02	0.02	48.4
Approach			420	0.0	420	0.0	0.217	0.1	NA	0.1	0.5	0.02	0.02	0.02	49.9
North: Access 5															
7	L2	All MCs	1	0.0	1	0.0	0.002	5.1	LOS A	0.0	0.1	0.38	0.52	0.38	45.0
9	R2	All MCs	1	0.0	1	0.0	0.002	7.3	LOS A	0.0	0.1	0.38	0.52	0.38	44.8
Approach			2	0.0	2	0.0	0.002	6.2	LOS A	0.0	0.1	0.38	0.52	0.38	44.9
West: Deacon Road EASTBOUND															
10	L2	All MCs	1	0.0	1	0.0	0.108	4.6	LOS A	0.0	0.0	0.00	0.00	0.00	48.7
11	T1	All MCs	209	0.0	209	0.0	0.108	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	49.9
Approach			211	0.0	211	0.0	0.108	0.1	NA	0.0	0.0	0.00	0.00	0.00	49.9
All Vehicles			633	0.0	633	0.0	0.217	0.1	NA	0.1	0.5	0.01	0.01	0.01	49.9

Appendix E: Wider Network Trip Distribution

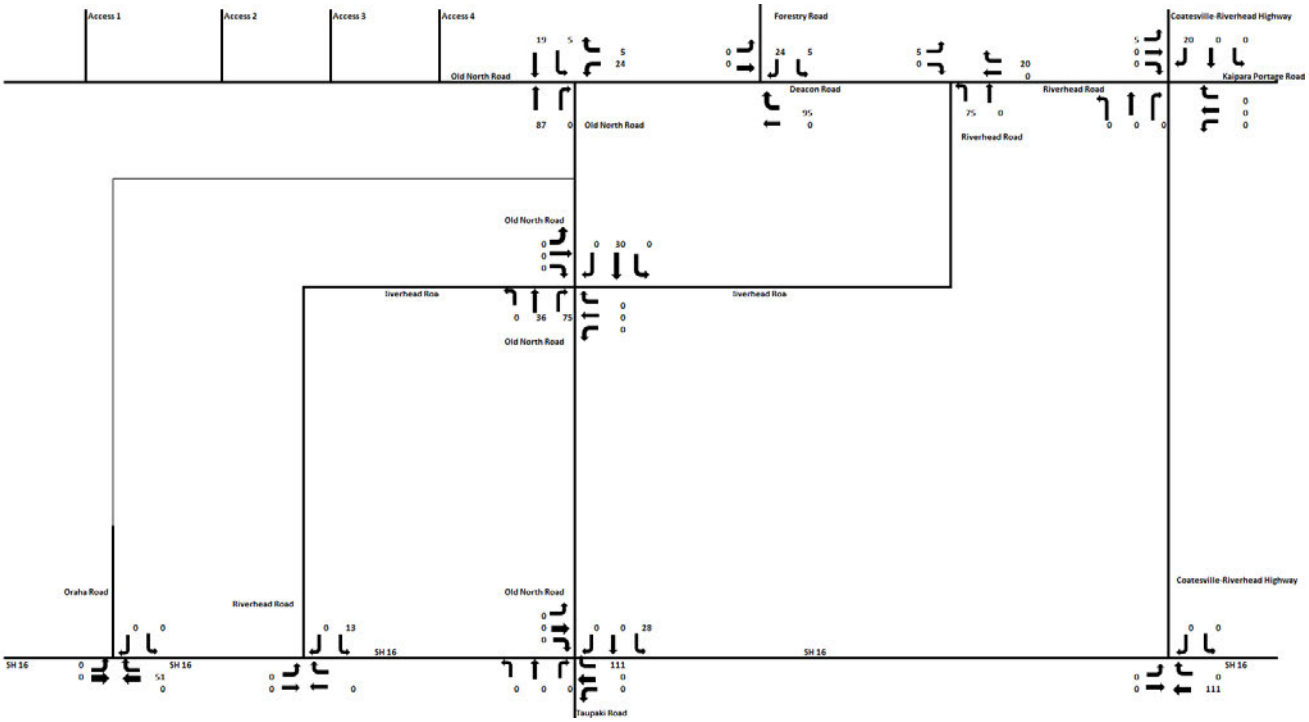
Existing Trip Distribution AM Peak

Existing Trip Distribution PM Peak

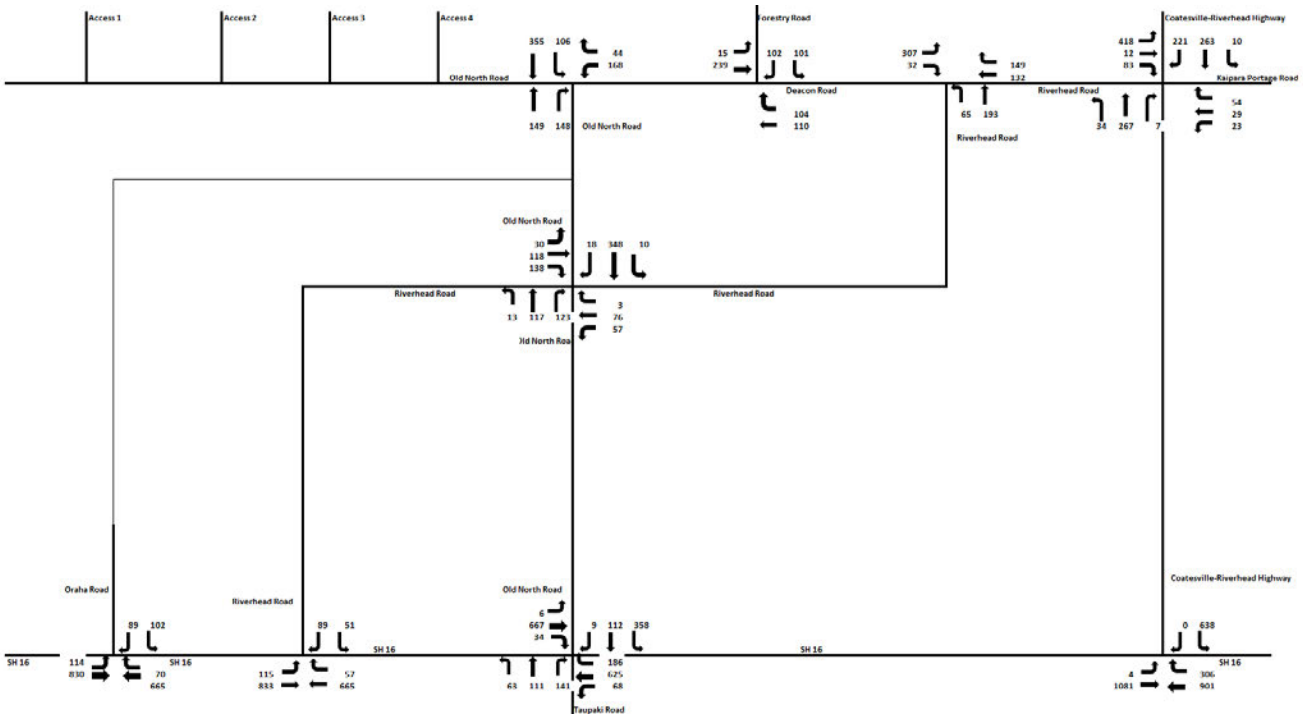
Generated Trip Distribution AM Peak



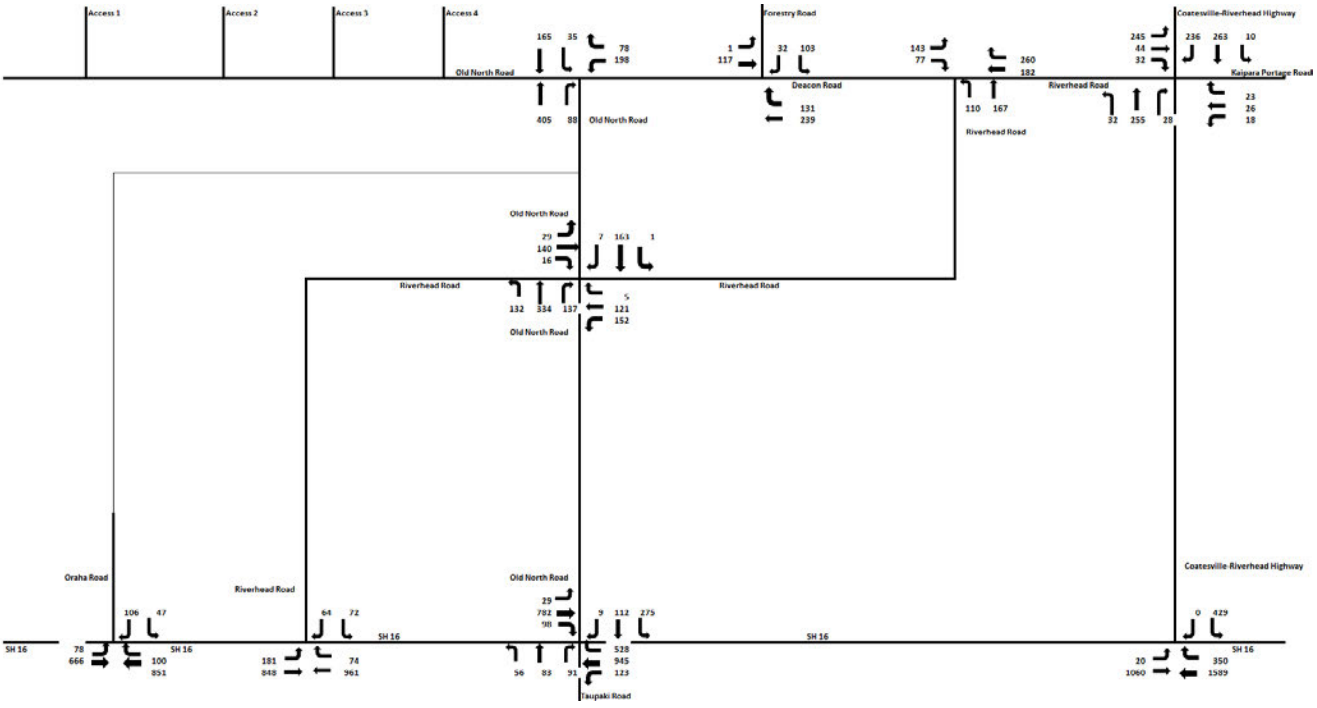
Generated Trip Distribution PM Peak



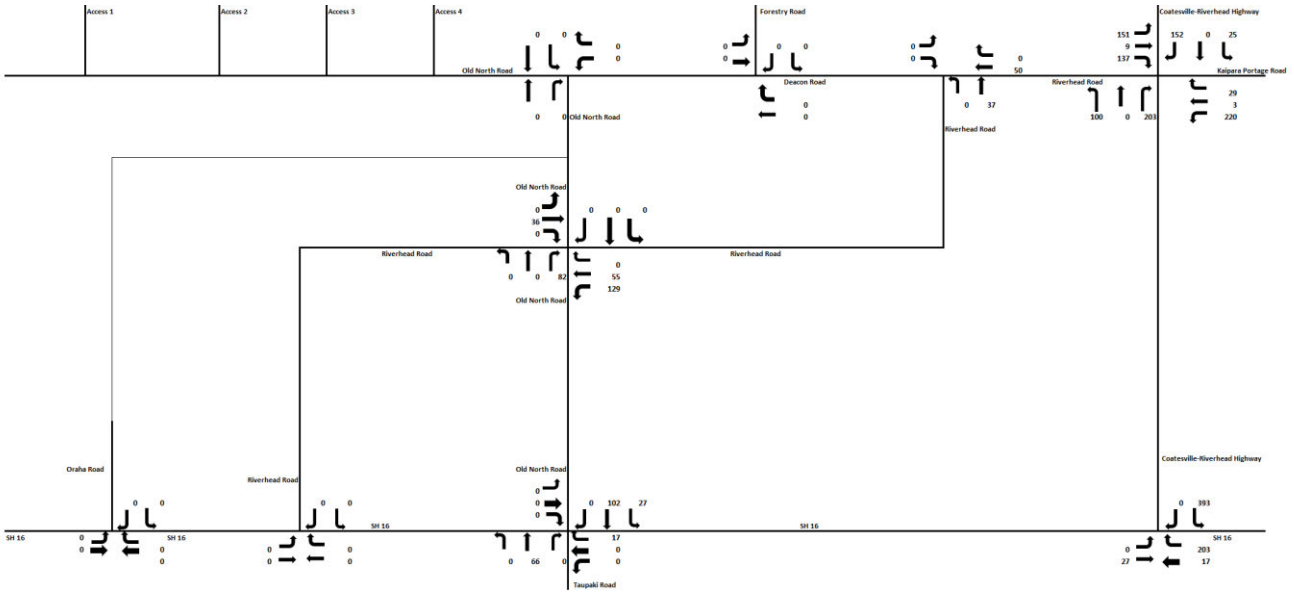
Proposed Trip Distribution AM Peak



Proposed Trip Distribution PM Peak

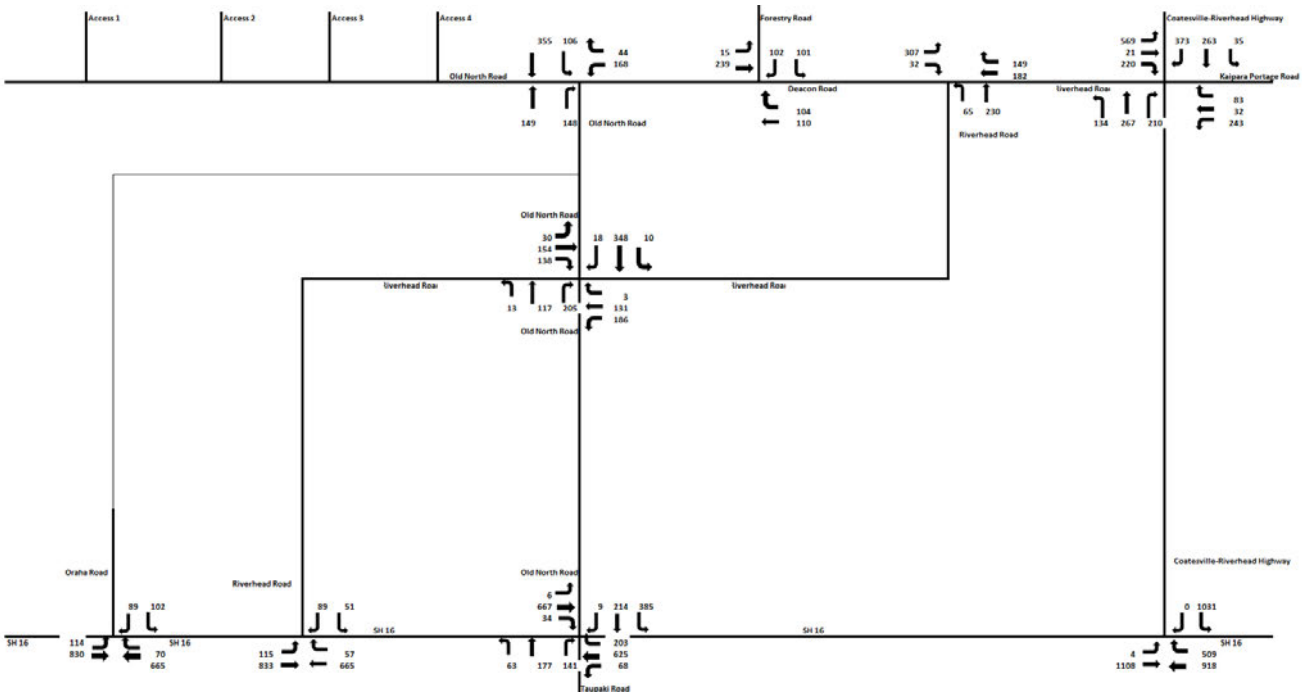


PPC 100 Trip Distribution AM Peak

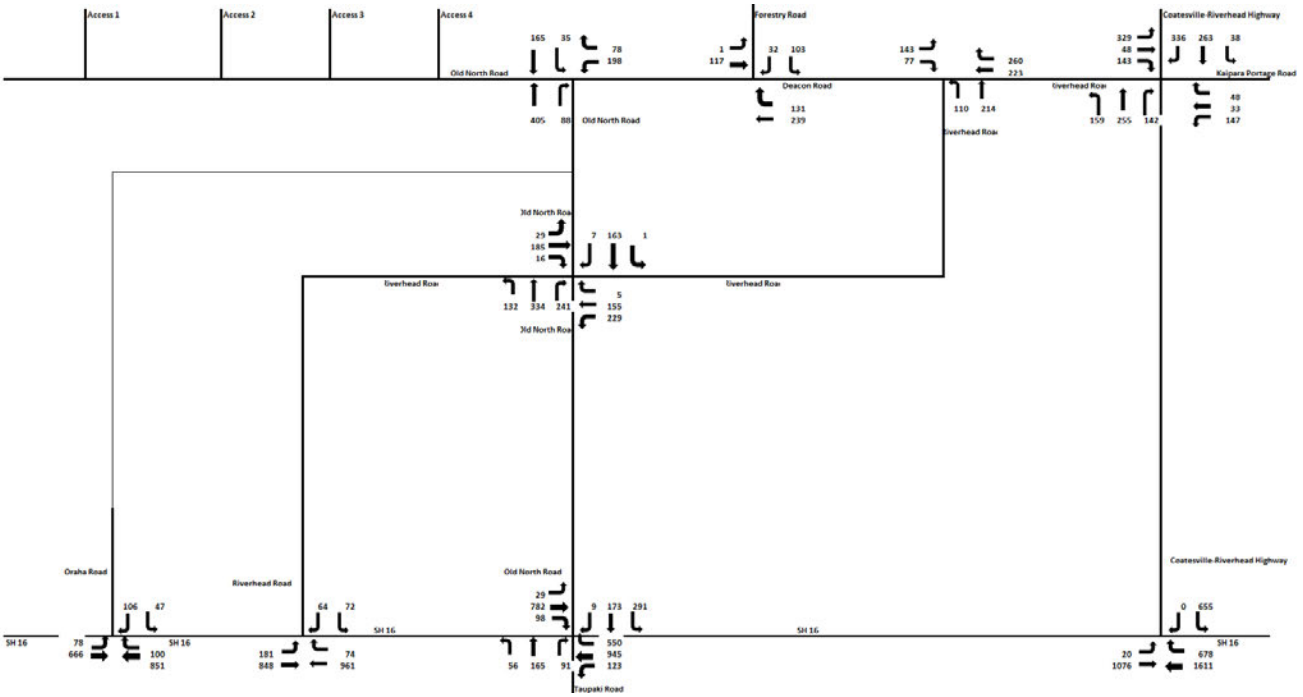


PPC 100 Trip Distribution PM Peak

Total + PPC100 Trip Distribution AM Peak



Total + PPC100 Trip Distribution PM Peak



Appendix F: Wider Network Modelling Existing

Old North Road / Deacon Road AM top and PM bottom

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h]	Demand Flows [HV %]	Arrival Flows [Total veh/h]	Arrival Flows [HV %]	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh]	95% Back Of Queue [Dist m]	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Old North Road															
2	T1	All MCs	134	6.3	134	6.3	0.201	1.4	LOS A	1.0	7.4	0.45	0.50	0.45	47.2
3	R2	All MCs	156	2.0	156	2.0	0.201	6.3	LOS A	1.0	7.4	0.45	0.50	0.45	46.0
Approach			289	4.0	289	4.0	0.201	4.0	NA	1.0	7.4	0.45	0.50	0.45	46.5
East: Deacon Road															
4	L2	All MCs	98	8.8	98	8.8	0.095	9.2	LOS A	0.4	2.8	0.39	0.89	0.39	43.9
6	R2	All MCs	37	17.1	37	17.1	0.076	12.6	LOS B	0.2	1.9	0.55	1.00	0.55	42.1
Approach			133	11.1	133	11.1	0.095	10.2	LOS B	0.4	2.8	0.44	0.92	0.44	43.4
North: Old North Road															
7	L2	All MCs	101	6.3	101	6.3	0.208	4.7	LOS A	0.0	0.0	0.00	0.14	0.00	47.5
8	T1	All MCs	283	3.7	283	3.7	0.208	0.1	LOS A	0.0	0.0	0.00	0.14	0.00	49.1
Approach			384	4.4	384	4.4	0.208	1.3	NA	0.0	0.0	0.00	0.14	0.00	48.8
All Vehicles			806	5.4	806	5.4	0.208	3.7	NA	1.0	7.4	0.23	0.40	0.23	47.6

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h]	Demand Flows [HV %]	Arrival Flows [Total veh/h]	Arrival Flows [HV %]	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh]	95% Back Of Queue [Dist m]	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Old North Road															
2	T1	All MCs	395	3.5	395	3.5	0.238	0.2	LOS A	0.7	5.0	0.18	0.18	0.18	48.9
3	R2	All MCs	93	1.1	93	1.1	0.238	5.3	LOS A	0.7	5.0	0.18	0.18	0.18	47.6
Approach			487	3.0	487	3.0	0.238	1.3	NA	0.7	5.0	0.18	0.18	0.18	48.6
East: Deacon Road															
4	L2	All MCs	183	5.2	183	5.2	0.153	8.4	LOS A	0.7	4.8	0.29	0.88	0.29	44.2
6	R2	All MCs	77	1.4	77	1.4	0.132	11.0	LOS B	0.4	3.1	0.53	1.00	0.53	42.8
Approach			260	4.0	260	4.0	0.153	9.2	LOS A	0.7	4.8	0.36	0.92	0.36	43.8
North: Old North Road															
7	L2	All MCs	32	3.3	32	3.3	0.059	4.8	LOS A	0.0	0.0	0.03	0.09	0.00	48.2
8	T1	All MCs	154	4.8	154	4.8	0.099	0.0	LOS A	0.0	0.0	0.03	0.09	0.00	49.4
Approach			185	4.5	185	4.5	0.099	0.8	NA	0.0	0.0	0.03	0.09	0.00	49.2
All Vehicles			873	3.8	873	3.8	0.238	3.8	NA	0.7	5.0	0.19	0.38	0.19	47.2

Riverhead Road / Kaipara Portage Road / Coatesville-Riverhead Highway Intersection AM top PM bottom

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h]	Demand Flows [HV %]	Arrival Flows [Total veh/h]	Arrival Flows [HV %]	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh]	95% Back Of Queue [Dist m]	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Coatsville Highway															
1	L2	All MCs	36	2.9	36	2.9	0.337	5.4	LOS A	2.1	15.4	0.57	0.55	0.57	45.2
2	T1	All MCs	281	6.7	281	6.7	0.337	5.6	LOS A	2.1	15.4	0.57	0.55	0.57	45.5
3	R2	All MCs	7	0.0	7	0.0	0.337	9.2	LOS A	2.1	15.4	0.57	0.55	0.57	45.0
Approach			324	6.2	324	6.2	0.337	5.7	LOS A	2.1	15.4	0.57	0.55	0.57	45.4
East: Kaipara Portage Road															
4	L2	All MCs	24	0.0	24	0.0	0.143	6.9	LOS A	0.8	5.8	0.67	0.69	0.67	43.9
5	T1	All MCs	31	0.0	31	0.0	0.143	6.9	LOS A	0.8	5.8	0.67	0.69	0.67	44.2
6	R2	All MCs	57	0.0	57	0.0	0.143	10.7	LOS B	0.8	5.8	0.67	0.69	0.67	43.7
Approach			112	0.0	112	0.0	0.143	8.9	LOS A	0.8	5.8	0.67	0.69	0.67	43.9
North: Coatsville Highway															
7	L2	All MCs	11	0.0	11	0.0	0.419	4.0	LOS A	3.3	24.4	0.42	0.50	0.42	45.1
8	T1	All MCs	277	6.5	277	6.5	0.419	4.1	LOS A	3.3	24.4	0.42	0.50	0.42	45.3
9	R2	All MCs	227	8.8	227	8.8	0.419	8.0	LOS A	3.3	24.4	0.42	0.50	0.42	44.7
Approach			515	7.4	515	7.4	0.419	5.8	LOS A	3.3	24.4	0.42	0.50	0.42	45.0
West: Riverhead Road															
10	L2	All MCs	420	9.3	420	9.3	0.566	7.2	LOS A	4.9	36.7	0.74	0.69	0.80	44.4
11	T1	All MCs	13	0.0	13	0.0	0.566	6.8	LOS A	4.9	36.7	0.74	0.69	0.80	44.7
12	R2	All MCs	87	10.8	87	10.8	0.566	11.1	LOS B	4.9	36.7	0.74	0.69	0.80	44.1
Approach			520	9.3	520	9.3	0.566	7.8	LOS A	4.9	36.7	0.74	0.69	0.80	44.3
All Vehicles			1471	7.2	1471	7.2	0.566	6.7	LOS A	4.9	36.7	0.59	0.59	0.61	44.8

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total	HV]	Arrival Flows [Total	HV]	Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue [Veh.	Dist]	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Coatsville Highway															
1	L2	All MCs	33	0.0	33	0.0	0.376	6.3	LOS A	2.5	17.5	0.68	0.63	0.68	44.8
2	T1	All MCs	268	2.0	268	2.0	0.376	6.4	LOS A	2.5	17.5	0.68	0.63	0.68	45.0
3	R2	All MCs	29	0.0	29	0.0	0.376	10.1	LOS B	2.5	17.5	0.68	0.63	0.68	44.5
Approach			331	1.6	331	1.6	0.376	6.7	LOS A	2.5	17.5	0.68	0.63	0.68	45.0
East: Kaipara Portage Road															
4	L2	All MCs	19	0.0	19	0.0	0.117	8.8	LOS A	0.7	5.1	0.78	0.74	0.78	43.3
5	T1	All MCs	27	3.8	27	3.8	0.117	9.0	LOS A	0.7	5.1	0.78	0.74	0.78	43.5
6	R2	All MCs	24	0.0	24	0.0	0.117	12.6	LOS B	0.7	5.1	0.78	0.74	0.78	43.0
Approach			71	1.5	71	1.5	0.117	10.2	LOS B	0.7	5.1	0.78	0.74	0.78	43.2
North: Coatsville Highway															
7	L2	All MCs	26	4.0	26	4.0	0.614	4.3	LOS A	6.1	43.9	0.50	0.51	0.50	44.8
8	T1	All MCs	377	4.7	377	4.7	0.614	4.3	LOS A	6.1	43.9	0.50	0.51	0.50	45.0
9	R2	All MCs	395	2.9	395	2.9	0.614	8.1	LOS A	6.1	43.9	0.50	0.51	0.50	44.5
Approach			798	3.8	798	3.8	0.614	6.2	LOS A	6.1	43.9	0.50	0.51	0.50	44.7
West: Riverhead Road															
10	L2	All MCs	253	2.5	253	2.5	0.346	5.4	LOS A	2.3	16.4	0.61	0.59	0.61	45.4
11	T1	All MCs	46	0.0	46	0.0	0.346	5.4	LOS A	2.3	16.4	0.61	0.59	0.61	45.7
12	R2	All MCs	34	3.1	34	3.1	0.346	9.3	LOS A	2.3	16.4	0.61	0.59	0.61	45.1
Approach			333	2.2	333	2.2	0.346	5.8	LOS A	2.3	16.4	0.61	0.59	0.61	45.4
All Vehicles			1532	2.9	1532	2.9	0.614	6.4	LOS A	6.1	43.9	0.58	0.56	0.58	44.8

Old North Road / SH16 / Taupaki Road Intersection Model AM top and PM bottom

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total	HV]	Arrival Flows [Total	HV]	Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue [Veh.	Dist]	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Taupaki Road															
1	L2	All MCs	66	3.2	66	3.2	0.188	6.2	LOS A	0.5	3.3	0.63	0.57	0.63	45.8
2	T1	All MCs	117	7.2	117	7.2	0.282	4.3	LOS A	1.5	11.0	0.87	0.86	0.87	45.0
3	R2	All MCs	148	6.4	148	6.4	0.282	10.5	LOS B	1.5	11.0	0.87	0.86	0.87	44.4
Approach			332	6.0	332	6.0	0.282	7.5	LOS A	1.5	11.0	0.86	0.86	0.86	44.9
East: SH 16															
4	L2	All MCs	72	4.4	72	4.4	0.225	3.3	LOS A	1.4	10.3	0.41	0.34	0.41	46.8
5	T1	All MCs	658	8.5	658	8.5	0.438	2.5	LOS A	3.5	26.6	0.45	0.37	0.45	46.6
6	R2	All MCs	168	10.1	168	10.1	0.438	8.4	LOS A	3.5	26.6	0.47	0.38	0.47	45.8
Approach			898	8.5	898	8.5	0.438	3.7	LOS A	3.5	26.6	0.45	0.37	0.45	46.5
North: Old N Road															
7	L2	All MCs	280	4.0	280	4.0	0.542	7.9	LOS A	3.5	26.0	0.79	0.84	0.97	45.2
8	T1	All MCs	118	7.1	118	7.1	0.542	7.1	LOS A	3.5	26.0	0.79	0.84	0.97	45.3
9	R2	All MCs	9	22.2	9	22.2	0.542	13.9	LOS B	3.5	26.0	0.79	0.84	0.97	44.8
Approach			387	5.4	387	5.4	0.542	7.5	LOS A	3.5	26.0	0.79	0.84	0.97	45.2
West: SH 16															
10	L2	All MCs	6	0.0	6	0.0	0.366	4.6	LOS A	1.0	13.4	0.63	0.57	0.63	46.1
11	T1	All MCs	699	10.1	699	10.1	0.359	4.3	LOS A	2.9	22.0	0.85	0.49	0.85	46.2
12	R2	All MCs	36	2.9	36	2.9	0.359	9.6	LOS A	2.9	22.0	0.88	0.48	0.88	45.5
Approach			741	9.7	741	9.7	0.359	4.6	LOS A	2.9	22.0	0.85	0.49	0.85	46.1
All Vehicles			2358	8.0	2358	8.0	0.542	5.2	LOS A	3.5	26.6	0.80	0.62	0.83	45.9

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total	HV]	Arrival Flows [Total	HV]	Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue [Veh.	Dist]	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Taupaki Road															
1	L2	All MCs	81	3.4	81	3.4	0.154	9.5	LOS A	0.8	5.9	0.84	0.83	0.84	44.0
2	T1	All MCs	87	1.2	87	1.2	0.320	7.1	LOS A	2.1	15.0	0.92	0.83	0.92	43.8
3	R2	All MCs	96	2.2	96	2.2	0.320	13.6	LOS B	2.1	15.0	0.92	0.83	0.92	43.3
Approach			264	2.2	264	2.2	0.320	10.4	LOS B	2.1	15.0	0.90	0.83	0.90	43.7
East: SH 16															
4	L2	All MCs	129	4.1	129	4.1	0.404	4.1	LOS A	2.8	20.2	0.58	0.43	0.58	46.4
5	T1	All MCs	995	3.9	995	3.9	0.766	4.5	LOS A	11.4	81.7	0.73	0.60	0.79	45.5
6	R2	All MCs	439	3.6	439	3.6	0.766	10.6	LOS B	11.4	81.7	0.81	0.67	0.88	44.4
Approach			1563	3.2	1563	3.2	0.766	6.2	LOS A	11.4	81.7	0.74	0.60	0.80	45.2
North: Old N Road															
7	L2	All MCs	213	4.5	213	4.5	0.575	8.8	LOS A	4.0	28.7	0.86	0.90	1.07	44.7
8	T1	All MCs	133	2.4	133	2.4	0.575	7.8	LOS A	4.0	28.7	0.88	0.90	1.07	44.8
9	R2	All MCs	13	0.0	13	0.0	0.575	13.6	LOS B	4.0	28.7	0.86	0.90	1.07	44.3
Approach			358	3.5	358	3.5	0.575	8.6	LOS A	4.0	28.7	0.86	0.90	1.07	44.7
West: SH 16															
10	L2	All MCs	29	0.0	29	0.0	0.424	8.6	LOS A	3.1	22.3	0.81	0.87	0.83	45.4
11	T1	All MCs	823	4.0	823	4.0	0.593	6.8	LOS A	6.3	45.7	0.87	0.74	0.97	45.2
12	R2	All MCs	103	4.1	103	4.1	0.593	12.8	LOS B	6.3	45.7	0.90	0.78	1.05	44.6
Approach			956	3.9	956	3.9	0.593	7.4	LOS A	6.3	45.7	0.87	0.74	0.97	45.1
All Vehicles			3121	3.3	3121	3.3	0.766	7.2	LOS A	11.4	81.7	0.80	0.70	0.89	45.0

Old North Road / Riverhead Road Intersection Model AM top and PM bottom

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Old N Road															
1	L2	All MCs	15	7.1	15	7.1	0.217	3.9	LOS A	1.3	9.8	0.33	0.49	0.33	45.3
2	T1	All MCs	124	8.5	124	8.5	0.217	3.4	LOS A	1.3	9.8	0.33	0.49	0.33	45.7
3	R2	All MCs	121	9.6	121	9.6	0.217	8.0	LOS A	1.3	9.8	0.33	0.49	0.33	45.1
Approach			260	8.9	260	8.9	0.217	5.6	LOS A	1.3	9.8	0.33	0.49	0.33	45.4
East: Riverhead Road															
4	L2	All MCs	73	17.4	73	17.4	0.173	5.2	LOS A	1.0	7.5	0.58	0.55	0.58	45.8
5	T1	All MCs	84	5.0	84	5.0	0.173	5.1	LOS A	1.0	7.5	0.58	0.55	0.58	46.0
6	R2	All MCs	3	0.0	3	0.0	0.173	9.5	LOS A	1.0	7.5	0.58	0.55	0.58	45.5
Approach			160	10.5	160	10.5	0.173	5.2	LOS A	1.0	7.5	0.58	0.55	0.58	45.9
North: Old N Road															
7	L2	All MCs	12	9.1	12	9.1	0.317	6.2	LOS A	2.0	14.1	0.63	0.58	0.63	45.1
8	T1	All MCs	256	2.9	256	2.9	0.317	5.5	LOS A	2.0	14.1	0.63	0.58	0.63	45.5
9	R2	All MCs	21	10.0	21	10.0	0.317	10.3	LOS B	2.0	14.1	0.63	0.58	0.63	44.8
Approach			288	3.6	288	3.6	0.317	5.9	LOS A	2.0	14.1	0.63	0.58	0.63	45.5
West: Riverhead Road															
10	L2	All MCs	13	8.3	13	8.3	0.271	4.1	LOS A	1.6	12.0	0.49	0.55	0.49	45.1
11	T1	All MCs	141	11.9	141	11.9	0.271	4.4	LOS A	1.6	12.0	0.49	0.55	0.49	45.2
12	R2	All MCs	145	0.0	145	0.0	0.271	8.7	LOS A	1.6	12.0	0.49	0.55	0.49	44.7
Approach			299	6.0	299	6.0	0.271	6.5	LOS A	1.6	12.0	0.49	0.55	0.49	45.0
All Vehicles			1007	6.8	1007	6.8	0.317	5.9	LOS A	2.0	14.1	0.50	0.54	0.50	45.4

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Old N Road															
1	L2	All MCs	139	1.5	139	1.5	0.421	4.1	LOS A	3.1	22.1	0.43	0.45	0.43	45.8
2	T1	All MCs	314	3.0	314	3.0	0.421	3.7	LOS A	3.1	22.1	0.43	0.45	0.43	46.2
3	R2	All MCs	65	12.9	65	12.9	0.421	8.4	LOS A	3.1	22.1	0.43	0.45	0.43	45.4
Approach			518	3.9	518	3.9	0.421	4.4	LOS A	3.1	22.1	0.43	0.45	0.43	46.0
East: Riverhead Road															
4	L2	All MCs	160	1.3	160	1.3	0.237	3.4	LOS A	1.4	10.1	0.39	0.42	0.39	46.5
5	T1	All MCs	127	2.5	127	2.5	0.237	3.7	LOS A	1.4	10.1	0.39	0.42	0.39	46.7
6	R2	All MCs	5	0.0	5	0.0	0.237	8.2	LOS A	1.4	10.1	0.39	0.42	0.39	46.1
Approach			293	1.8	293	1.8	0.237	3.6	LOS A	1.4	10.1	0.39	0.42	0.39	46.6
North: Old N Road															
7	L2	All MCs	1	0.0	1	0.0	0.143	4.4	LOS A	0.8	5.7	0.44	0.45	0.44	45.8
8	T1	All MCs	140	6.8	140	6.8	0.143	4.1	LOS A	0.8	5.7	0.44	0.45	0.44	46.2
9	R2	All MCs	7	0.0	7	0.0	0.143	8.5	LOS A	0.8	5.7	0.44	0.45	0.44	45.6
Approach			148	6.4	148	6.4	0.143	4.3	LOS A	0.8	5.7	0.44	0.45	0.44	46.1
West: Riverhead Road															
10	L2	All MCs	31	3.4	31	3.4	0.195	4.7	LOS A	1.1	8.3	0.56	0.54	0.56	45.7
11	T1	All MCs	147	4.3	147	4.3	0.195	4.9	LOS A	1.1	8.3	0.56	0.54	0.56	45.8
12	R2	All MCs	17	0.0	17	0.0	0.195	9.3	LOS A	1.1	8.3	0.56	0.54	0.56	45.3
Approach			195	3.8	195	3.8	0.195	5.2	LOS A	1.1	8.3	0.56	0.54	0.56	45.7
All Vehicles			1154	3.6	1154	3.6	0.421	4.4	LOS A	3.1	22.1	0.44	0.46	0.44	46.1

Riverhead Road / SH16 Intersection Modelling AM top and PM bottom

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total	HV]	Arrival Flows [Total	HV]	Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue [Veh.	Dist]	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
East: Sh16															
5	T1	All MCs	700	0.0	700	0.0	0.359	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	49.8
6	R2	All MCs	60	0.0	60	0.0	0.156	13.3	LOS B	0.5	3.7	0.76	0.89	0.76	41.3
Approach			760	0.0	760	0.0	0.359	1.2	NA	0.5	3.7	0.06	0.07	0.06	49.0
North: Riverhead Road															
7	L2	All MCs	54	0.0	54	0.0	0.130	11.9	LOS B	0.4	2.9	0.72	0.87	0.72	42.1
9	R2	All MCs	94	0.0	94	0.0	1.926	938.2	LOS F	31.1	217.8	1.00	2.61	7.28	3.6
Approach			147	0.0	147	0.0	1.926	600.8	LOS F	31.1	217.8	0.90	1.98	4.89	5.4
West: SH16															
10	L2	All MCs	120	0.0	120	0.0	0.065	4.6	LOS A	0.0	0.0	0.00	0.53	0.00	46.0
11	T1	All MCs	874	0.0	874	0.0	0.448	0.2	LOS A	0.0	0.0	0.00	0.00	0.00	49.7
Approach			994	0.0	994	0.0	0.448	0.7	NA	0.0	0.0	0.00	0.06	0.00	49.2
All Vehicles			1901	0.0	1901	0.0	1.926	47.4	NA	31.1	217.8	0.09	0.21	0.40	30.2

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total	HV]	Arrival Flows [Total	HV]	Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue [Veh.	Dist]	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
East: Sh16															
5	T1	All MCs	1012	0.0	1012	0.0	0.519	0.3	LOS A	0.0	0.0	0.00	0.00	0.00	49.7
6	R2	All MCs	78	0.0	78	0.0	0.235	15.9	LOS C	0.8	5.9	0.81	0.94	0.89	40.2
Approach			1089	0.0	1089	0.0	0.519	1.4	NA	0.8	5.9	0.06	0.07	0.06	48.8
North: Riverhead Road															
7	L2	All MCs	62	0.0	62	0.0	0.157	12.4	LOS B	0.5	3.5	0.74	0.88	0.74	41.9
9	R2	All MCs	67	0.0	67	0.0	4.125	3040.3	LOS F	34.3	239.9	1.00	1.90	4.70	1.2
Approach			129	0.0	129	0.0	4.125	1587.9	LOS F	34.3	239.9	0.87	1.41	2.80	2.2
West: SH16															
10	L2	All MCs	191	0.0	191	0.0	0.103	4.6	LOS A	0.0	0.0	0.00	0.53	0.00	45.9
11	T1	All MCs	893	0.0	893	0.0	0.458	0.2	LOS A	0.0	0.0	0.00	0.00	0.00	49.7
Approach			1083	0.0	1083	0.0	0.458	1.0	NA	0.0	0.0	0.00	0.09	0.00	49.0
All Vehicles			2302	0.0	2302	0.0	4.125	90.4	NA	34.3	239.9	0.08	0.15	0.19	22.3

Coatesville-Riverhead Highway Road / SH 16 Intersection Modelling AM top and PM bottom

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total	HV]	Arrival Flows [Total	HV]	Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue [Veh.	Dist]	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
East: Sh16															
5	T1	All MCs	919	8.8	919	8.8	1.205	229.4	LOS F	134.9	1015.5	1.00	1.00	12.86	12.1
6	R2	All MCs	322	6.2	322	6.2	1.301	308.6	LOS F	51.4	379.1	1.00	4.95	14.21	9.6
Approach			1241	8.1	1241	8.1	1.301	251.4	NA	134.9	1015.5	1.00	2.02	13.21	11.2
North: Coatesville-Riverhead Highway															
7	L2	All MCs	672	4.5	672	4.5	6.421	4924.1	LOS F	355.1	2582.4	1.00	7.54	25.28	0.7
9	R2	All MCs	1	0.0	1	0.0	0.409	579.9	LOS F	0.9	6.3	1.00	1.00	1.00	5.6
Approach			673	4.5	673	4.5	6.421	4917.3	LOS F	355.1	2582.4	1.00	7.53	25.25	0.7
West: SH16															
10	L2	All MCs	4	0.0	4	0.0	0.004	5.9	LOS A	0.0	0.1	0.39	0.53	0.39	45.1
11	T1	All MCs	1138	8.5	1138	8.5	0.616	0.4	LOS A	0.0	0.0	0.00	0.00	0.00	49.5
Approach			1142	8.5	1142	8.5	0.616	0.4	NA	0.0	0.1	0.00	0.00	0.00	49.4
All Vehicles			3056	7.5	3056	7.5	6.421	1184.1	NA	355.1	2582.4	0.63	2.48	10.92	2.9

Vehicle Movement Performance														
Mov ID	Turn	Mov Class	Demand Flows [Total	HV]	Arrival Flows [Total	HV]	Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue [Veh.	Dist]	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
East: Sh16															
5	T1	All MCs	1556	3.3	1556	3.3	1.510	479.5	LOS F	350.6	2524.1	1.00	0.97	22.27	6.6
6	R2	All MCs	368	3.1	368	3.1	1.182	202.3	LOS F	42.1	302.5	1.00	4.24	11.71	13.3
Approach			1924	3.3	1924	3.3	1.510	428.4	NA	350.6	2524.1	1.00	1.59	20.25	7.3
North: Coatesville-Riverhead Highway															
7	L2	All MCs	452	4.7	452	4.7	3.579	2361.3	LOS F	205.2	1493.8	1.00	7.50	24.70	1.5
9	R2	All MCs	1	0.0	1	0.0	1.000	1125.5	LOS F	2.0	13.7	1.00	1.00	1.00	3.0
Approach			453	4.7	453	4.7	3.579	2356.4	LOS F	205.2	1493.8	1.00	7.48	24.64	1.5
West: SH16															
10	L2	All MCs	21	0.0	21	0.0	0.022	6.2	LOS A	0.1	0.6	0.42	0.58	0.42	45.0
11	T1	All MCs	1116	4.1	1116	4.1	0.587	0.4	LOS A	0.0	0.0	0.00	0.00	0.00	49.5
Approach			1137	4.0	1137	4.0	0.587	0.5	NA	0.1	0.6	0.01	0.01	0.01	49.4
All Vehicles			3514	3.7	3514	3.7	3.579	537.5	NA	350.6	2524.1	0.68	1.84	14.27	6.0

Oraha Road / SH 16 Intersection Modelling AM top and PM bottom

Vehicle Movement Performance														
Mov ID	Turn	Mov Class	Demand Flows [Total	HV]	Arrival Flows [Total	HV]	Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue [Veh.	Dist]	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
East: Sh16															
5	T1	All MCs	507	10.4	507	10.4	0.278	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	49.9
6	R2	All MCs	26	4.0	26	4.0	0.076	14.1	LOS B	0.2	1.8	0.76	0.89	0.76	40.9
Approach			534	10.1	534	10.1	0.278	0.8	NA	0.2	1.8	0.04	0.04	0.04	49.3
North: Oraha Road															
7	L2	All MCs	31	13.8	31	13.8	0.121	20.8	LOS C	0.3	2.7	0.78	1.01	0.78	38.9
9	R2	All MCs	62	5.1	62	5.1	1.503	581.0	LOS F	15.7	114.5	1.00	2.19	5.53	5.6
Approach			93	8.0	93	8.0	1.503	396.4	LOS F	15.7	114.5	0.93	1.80	3.96	7.8
West: Sh16															
10	L2	All MCs	152	2.1	152	2.1	0.083	4.6	LOS A	0.0	0.0	0.00	0.53	0.00	45.9
11	T1	All MCs	831	7.7	831	7.7	0.447	0.2	LOS A	0.0	0.0	0.00	0.00	0.00	49.7
Approach			982	6.9	982	6.9	0.447	0.9	NA	0.0	0.0	0.00	0.08	0.00	49.1
All Vehicles			1608	8.0	1608	8.0	1.503	23.6	NA	15.7	114.5	0.07	0.17	0.24	37.6

Vehicle Movement Performance														
Mov ID	Turn	Mov Class	Demand Flows [Total	HV]	Arrival Flows [Total	HV]	Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue [Veh.	Dist]	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
East: SH16															
5	T1	All MCs	896	2.1	896	2.1	0.466	0.2	LOS A	0.0	0.0	0.00	0.00	0.00	49.7
6	R2	All MCs	52	2.0	52	2.0	0.098	10.2	LOS B	0.3	2.4	0.65	0.84	0.65	42.8
Approach			947	2.1	947	2.1	0.466	0.8	NA	0.3	2.4	0.04	0.05	0.04	49.3
North: Oraha Road															
7	L2	All MCs	49	6.4	49	6.4	0.121	14.9	LOS B	0.4	2.9	0.67	1.00	0.67	41.4
9	R2	All MCs	112	5.7	112	5.7	4.948	3682.3	LOS F	57.6	422.6	1.00	2.54	7.04	1.0
Approach			161	5.9	161	5.9	4.948	2555.7	LOS F	57.6	422.6	0.90	2.07	5.08	1.4
West: SH16															
10	L2	All MCs	82	1.3	82	1.3	0.045	4.6	LOS A	0.0	0.0	0.00	0.53	0.00	45.9
11	T1	All MCs	701	3.8	701	3.8	0.368	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	49.8
Approach			783	3.5	783	3.5	0.368	0.6	NA	0.0	0.0	0.00	0.06	0.00	49.4
All Vehicles			1892	3.0	1892	3.0	4.948	218.2	NA	57.6	422.6	0.09	0.22	0.45	12.5

Deacon Road / Riverhead Road Existing modelling AM top and PM bottom

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total	HV]	Arrival Flows [Total	HV]	Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue [Veh.	Dist]	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Riverhead Road															
1	L2	All MCs	37	25.7	37	25.7	0.114	4.6	LOS A	0.0	0.0	0.00	0.09	0.00	47.9
2	T1	All MCs	176	1.2	176	1.2	0.114	0.0	LOS A	0.0	0.0	0.00	0.09	0.00	49.5
Approach			213	5.4	213	5.4	0.114	0.8	NA	0.0	0.0	0.00	0.09	0.00	49.2
North: Riverhead Road															
8	T1	All MCs	182	2.2	182	2.2	0.281	0.0	LOS A	1.5	11.1	0.36	0.42	0.36	47.4
9	R2	All MCs	253	5.4	253	5.4	0.281	5.8	LOS A	1.5	11.1	0.36	0.42	0.36	46.0
Approach			444	4.0	444	4.0	0.281	3.5	NA	1.5	11.1	0.36	0.42	0.36	46.6
West: Deacon Road															
10	L2	All MCs	145	1.4	145	1.4	0.269	8.4	LOS A	1.1	7.9	0.44	0.88	0.44	43.8
12	R2	All MCs	81	1.3	81	1.3	0.269	12.4	LOS B	1.1	7.9	0.44	0.95	0.44	43.4
Approach			226	1.4	226	1.4	0.269	9.8	LOS A	1.1	7.9	0.44	0.88	0.44	43.5
All Vehicles			883	3.7	883	3.7	0.281	4.5	NA	1.5	11.1	0.29	0.48	0.29	48.4

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total	HV]	Arrival Flows [Total	HV]	Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue [Veh.	Dist]	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Riverhead Road															
1	L2	All MCs	37	25.7	37	25.7	0.114	4.6	LOS A	0.0	0.0	0.00	0.09	0.00	47.9
2	T1	All MCs	176	1.2	176	1.2	0.114	0.0	LOS A	0.0	0.0	0.00	0.09	0.00	49.5
Approach			213	5.4	213	5.4	0.114	0.8	NA	0.0	0.0	0.00	0.09	0.00	49.2
North: Riverhead Road															
8	T1	All MCs	182	2.2	182	2.2	0.281	0.0	LOS A	1.5	11.1	0.36	0.42	0.36	47.4
9	R2	All MCs	253	5.4	253	5.4	0.281	5.8	LOS A	1.5	11.1	0.36	0.42	0.36	46.0
Approach			444	4.0	444	4.0	0.281	3.5	NA	1.5	11.1	0.36	0.42	0.36	46.6
West: Deacon Road															
10	L2	All MCs	145	1.4	145	1.4	0.269	8.4	LOS A	1.1	7.9	0.44	0.88	0.44	43.8
12	R2	All MCs	81	1.3	81	1.3	0.269	12.4	LOS B	1.1	7.9	0.44	0.95	0.44	43.4
Approach			226	1.4	226	1.4	0.269	9.8	LOS A	1.1	7.9	0.44	0.88	0.44	43.5
All Vehicles			883	3.7	883	3.7	0.281	4.5	NA	1.5	11.1	0.29	0.48	0.29	48.4

Forestry Road / Deacon Road Existing modelling AM top and PM bottom

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total	HV]	Arrival Flows [Total	HV]	Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue [Veh.	Dist]	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
East: Deacon Road															
5	T1	All MCs	116	0.0	116	0.0	0.120	0.6	LOS A	0.5	3.6	0.30	0.34	0.30	48.0
6	R2	All MCs	84	0.0	84	0.0	0.120	5.5	LOS A	0.5	3.6	0.30	0.34	0.30	46.6
Approach			200	0.0	200	0.0	0.120	2.6	NA	0.5	3.6	0.30	0.34	0.30	47.4
North: Forestry Road															
7	L2	All MCs	96	0.0	96	0.0	0.092	5.4	LOS A	0.4	2.5	0.34	0.57	0.34	45.2
9	R2	All MCs	17	0.0	17	0.0	0.092	6.5	LOS A	0.4	2.5	0.34	0.57	0.34	45.0
Approach			113	0.0	113	0.0	0.092	5.5	LOS A	0.4	2.5	0.34	0.57	0.34	45.2
West: Deacon Road															
10	L2	All MCs	16	0.0	16	0.0	0.132	4.6	LOS A	0.0	0.0	0.00	0.03	0.00	48.5
11	T1	All MCs	241	0.0	241	0.0	0.132	0.0	LOS A	0.0	0.0	0.00	0.03	0.00	49.8
Approach			257	0.0	257	0.0	0.132	0.3	NA	0.0	0.0	0.00	0.03	0.00	49.7
All Vehicles			569	0.0	569	0.0	0.132	2.2	NA	0.5	3.6	0.17	0.25	0.17	47.9

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total	HV]	Arrival Flows [Total	HV]	Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue [Veh.	Dist]	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
East: Deacon Road															
5	T1	All MCs	252	0.0	252	0.0	0.153	0.1	LOS A	0.3	1.8	0.08	0.10	0.08	49.4
6	R2	All MCs	38	0.0	38	0.0	0.153	5.0	LOS A	0.3	1.8	0.08	0.10	0.08	48.0
Approach			289	0.0	289	0.0	0.153	0.7	NA	0.3	1.8	0.08	0.10	0.08	49.2
North: Forestry Road															
7	L2	All MCs	103	0.0	103	0.0	0.080	4.9	LOS A	0.3	2.2	0.23	0.52	0.23	45.4
9	R2	All MCs	8	0.0	8	0.0	0.080	6.3	LOS A	0.3	2.2	0.23	0.52	0.23	45.2
Approach			112	0.0	112	0.0	0.080	5.0	LOS A	0.3	2.2	0.23	0.52	0.23	45.4
West: Deacon Road															
10	L2	All MCs	1	0.0	1	0.0	0.064	4.6	LOS A	0.0	0.0	0.00	0.00	0.00	48.7
11	T1	All MCs	123	0.0	123	0.0	0.064	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	50.0
Approach			124	0.0	124	0.0	0.064	0.1	NA	0.0	0.0	0.00	0.00	0.00	49.9
All Vehicles			525	0.0	525	0.0	0.153	1.5	NA	0.3	2.2	0.09	0.17	0.09	48.5

Appendix G: Wider Network Modelling Proposed

Old North Road / Deacon Road Intersection Model Proposed AM top and PM bottom

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Old North Road															
2	T1	All MCs	157	0.0	157	0.0	0.224	1.7	LOS A	1.2	8.1	0.49	0.55	0.49	47.2
3	R2	All MCs	156	0.0	156	0.0	0.224	6.8	LOS A	1.2	8.1	0.49	0.55	0.49	46.0
Approach			313	0.0	313	0.0	0.224	4.2	NA	1.2	8.1	0.49	0.55	0.49	46.6
East: Deacon Road															
4	L2	All MCs	177	0.0	177	0.0	0.182	9.4	LOS A	0.8	5.3	0.47	0.91	0.47	43.9
6	R2	All MCs	46	0.0	46	0.0	0.093	12.1	LOS B	0.3	2.1	0.59	1.00	0.59	42.3
Approach			223	0.0	223	0.0	0.182	9.9	LOS A	0.8	5.3	0.49	0.93	0.49	43.5
North: Old North Road															
7	L2	All MCs	112	0.0	112	0.0	0.252	4.6	LOS A	0.0	0.0	0.00	0.13	0.00	48.0
8	T1	All MCs	374	0.0	374	0.0	0.252	0.1	LOS A	0.0	0.0	0.00	0.13	0.00	49.2
Approach			485	0.0	485	0.0	0.252	1.1	NA	0.0	0.0	0.00	0.13	0.00	48.9
All Vehicles			1021	0.0	1021	0.0	0.252	4.0	NA	1.2	8.1	0.26	0.43	0.26	46.9

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Old North Road															
2	T1	All MCs	426	0.0	426	0.0	0.283	0.2	LOS A	0.7	5.2	0.15	0.17	0.15	49.0
3	R2	All MCs	93	0.0	93	0.0	0.283	5.4	LOS A	0.7	5.2	0.15	0.17	0.15	47.7
Approach			519	0.0	519	0.0	0.283	1.2	NA	0.7	5.2	0.15	0.17	0.15	48.8
East: Deacon Road															
4	L2	All MCs	208	0.0	208	0.0	0.171	8.2	LOS A	0.7	5.2	0.31	0.87	0.31	44.3
6	R2	All MCs	82	0.0	82	0.0	0.162	12.1	LOS B	0.5	3.7	0.61	1.00	0.61	42.3
Approach			291	0.0	291	0.0	0.171	9.3	LOS A	0.7	5.2	0.39	0.91	0.39	43.7
North: Old North Road															
7	L2	All MCs	37	0.0	37	0.0	0.109	4.6	LOS A	0.0	0.0	0.00	0.10	0.00	48.2
8	T1	All MCs	174	0.0	174	0.0	0.109	0.0	LOS A	0.0	0.0	0.00	0.10	0.00	49.4
Approach			211	0.0	211	0.0	0.109	0.8	NA	0.0	0.0	0.00	0.10	0.00	49.2
All Vehicles			1020	0.0	1020	0.0	0.283	3.4	NA	0.7	5.2	0.19	0.36	0.19	47.3

Riverhead Road / Kaipara Portage Road / Coatesville-Riverhead Highway Intersection Model Proposed AM top and PM bottom

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Coatsville Highway															
1	L2	All MCs	38	5.6	38	5.6	0.368	5.8	LOS A	2.3	17.3	0.61	0.57	0.61	45.1
2	T1	All MCs	300	6.3	300	6.3	0.368	5.8	LOS A	2.3	17.3	0.61	0.57	0.61	45.4
3	R2	All MCs	7	0.0	7	0.0	0.368	9.4	LOS A	2.3	17.3	0.61	0.57	0.61	44.9
Approach			345	6.1	345	6.1	0.368	5.9	LOS A	2.3	17.3	0.61	0.57	0.61	45.3
East: Kaipara Portage Road															
4	L2	All MCs	24	0.0	24	0.0	0.152	7.4	LOS A	0.9	6.3	0.71	0.70	0.71	43.7
5	T1	All MCs	31	0.0	31	0.0	0.152	7.4	LOS A	0.9	6.3	0.71	0.70	0.71	43.9
6	R2	All MCs	57	0.0	57	0.0	0.152	11.2	LOS B	0.9	6.3	0.71	0.70	0.71	43.4
Approach			112	0.0	112	0.0	0.152	9.3	LOS A	0.9	6.3	0.71	0.70	0.71	43.6
North: Coatsville Highway															
7	L2	All MCs	11	0.0	11	0.0	0.459	4.1	LOS A	3.8	28.3	0.46	0.51	0.46	45.0
8	T1	All MCs	295	6.1	295	6.1	0.459	4.2	LOS A	3.8	28.3	0.46	0.51	0.46	45.2
9	R2	All MCs	254	8.3	254	8.3	0.459	8.1	LOS A	3.8	28.3	0.46	0.51	0.46	44.6
Approach			559	7.0	559	7.0	0.459	6.0	LOS A	3.8	28.3	0.46	0.51	0.46	44.9
West: Riverhead Road															
10	L2	All MCs	480	8.3	480	8.3	0.648	8.6	LOS A	6.7	50.3	0.82	0.76	0.96	43.7
11	T1	All MCs	13	0.0	13	0.0	0.648	8.2	LOS A	6.7	50.3	0.82	0.76	0.96	44.0
12	R2	All MCs	97	9.8	97	9.8	0.648	12.5	LOS B	6.7	50.3	0.82	0.76	0.96	43.3
Approach			589	8.4	589	8.4	0.648	9.2	LOS A	6.7	50.3	0.82	0.76	0.96	43.6
All Vehicles			1605	6.8	1605	6.8	0.648	7.4	LOS A	6.7	50.3	0.64	0.63	0.69	44.4

Vehicle Movement Performance														
Mov ID	Turn	Mov Class	Demand Flows [Total	HV]	Arrival Flows [Total	HV]	Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue [Veh.	Dist]	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Coatsville Highway															
1	L2	All MCs	34	0.0	34	0.0	0.338	5.3	LOS A	2.1	15.1	0.57	0.55	0.57	45.2
2	T1	All MCs	274	1.9	274	1.9	0.338	5.4	LOS A	2.1	15.1	0.57	0.55	0.57	45.4
3	R2	All MCs	29	0.0	29	0.0	0.338	9.1	LOS A	2.1	15.1	0.57	0.55	0.57	44.9
Approach			337	1.6	337	1.6	0.338	5.7	LOS A	2.1	15.1	0.57	0.55	0.57	45.4
East: Kaipara Portage Road															
4	L2	All MCs	19	0.0	19	0.0	0.093	6.7	LOS A	0.5	3.7	0.65	0.67	0.65	44.3
5	T1	All MCs	28	3.7	28	3.7	0.093	6.9	LOS A	0.5	3.7	0.65	0.67	0.65	44.6
6	R2	All MCs	24	0.0	24	0.0	0.093	10.5	LOS B	0.5	3.7	0.65	0.67	0.65	44.1
Approach			72	1.5	72	1.5	0.093	8.0	LOS A	0.5	3.7	0.65	0.67	0.65	44.3
North: Coatsville Highway															
7	L2	All MCs	12	9.1	12	9.1	0.449	4.1	LOS A	3.5	25.4	0.40	0.50	0.40	45.0
8	T1	All MCs	295	6.1	295	6.1	0.449	4.1	LOS A	3.5	25.4	0.40	0.50	0.40	45.3
9	R2	All MCs	260	4.5	260	4.5	0.449	7.9	LOS A	3.5	25.4	0.40	0.50	0.40	44.7
Approach			566	5.4	566	5.4	0.449	5.9	LOS A	3.5	25.4	0.40	0.50	0.40	45.0
West: Riverhead Road															
10	L2	All MCs	264	2.4	264	2.4	0.357	5.5	LOS A	2.4	16.8	0.61	0.59	0.61	45.4
11	T1	All MCs	46	0.0	46	0.0	0.357	5.5	LOS A	2.4	16.8	0.61	0.59	0.61	45.7
12	R2	All MCs	35	3.0	35	3.0	0.357	9.4	LOS A	2.4	16.8	0.61	0.59	0.61	45.1
Approach			345	2.1	345	2.1	0.357	5.9	LOS A	2.4	16.8	0.61	0.59	0.61	45.4
All Vehicles			1320	3.3	1320	3.3	0.449	5.9	LOS A	3.5	25.4	0.51	0.55	0.51	45.2

Old North Road / SH 16 / Taupaki Road Intersection Model Proposed AM top and PM bottom

Vehicle Movement Performance														
Mov ID	Turn	Mov Class	Demand Flows [Total	HV]	Arrival Flows [Total	HV]	Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue [Veh.	Dist]	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Taupaki Road															
1	L2	All MCs	66	0.0	66	0.0	0.104	6.0	LOS A	0.4	3.1	0.62	0.66	0.62	46.0
2	T1	All MCs	117	0.0	117	0.0	0.265	4.0	LOS A	1.4	9.8	0.65	0.64	0.65	45.1
3	R2	All MCs	148	0.0	148	0.0	0.265	10.3	LOS B	1.4	9.8	0.65	0.64	0.65	44.6
Approach			332	0.0	332	0.0	0.265	7.2	LOS A	1.4	9.8	0.65	0.65	0.65	45.0
East: SH 16															
4	L2	All MCs	72	0.0	72	0.0	0.221	3.2	LOS A	1.4	9.6	0.40	0.33	0.40	47.0
5	T1	All MCs	658	0.0	658	0.0	0.429	2.4	LOS A	3.5	24.5	0.44	0.36	0.44	46.6
6	R2	All MCs	196	0.0	196	0.0	0.429	8.2	LOS A	3.5	24.5	0.45	0.38	0.45	45.8
Approach			925	0.0	925	0.0	0.429	3.7	LOS A	3.5	24.5	0.44	0.37	0.44	46.5
North: Old N Road															
7	L2	All MCs	377	0.0	377	0.0	0.657	8.7	LOS A	5.2	36.2	0.83	0.91	1.12	44.6
8	T1	All MCs	118	0.0	118	0.0	0.657	8.0	LOS A	5.2	36.2	0.83	0.91	1.12	44.8
9	R2	All MCs	9	0.0	9	0.0	0.657	14.0	LOS B	5.2	36.2	0.83	0.91	1.12	44.2
Approach			504	0.0	504	0.0	0.657	8.6	LOS A	5.2	36.2	0.83	0.91	1.12	44.6
West: SH 16															
10	L2	All MCs	6	0.0	6	0.0	0.270	4.8	LOS A	1.7	11.8	0.63	0.50	0.63	46.1
11	T1	All MCs	702	0.0	702	0.0	0.377	4.1	LOS A	2.7	19.2	0.64	0.48	0.64	46.2
12	R2	All MCs	36	0.0	36	0.0	0.377	9.6	LOS A	2.7	19.2	0.65	0.46	0.65	45.6
Approach			744	0.0	744	0.0	0.377	4.3	LOS A	2.7	19.2	0.64	0.48	0.64	46.2
All Vehicles			2505	0.0	2505	0.0	0.657	5.3	LOS A	5.2	36.2	0.61	0.55	0.66	45.8

Vehicle Movement Performance														
Mov ID	Turn	Mov Class	Demand Flows [Total	HV]	Arrival Flows [Total	HV]	Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue [Veh.	Dist]	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Taupaki Road															
1	L2	All MCs	59	0.0	59	0.0	0.155	10.4	LOS B	0.9	6.0	0.87	0.84	0.87	43.7
2	T1	All MCs	87	0.0	87	0.0	0.341	8.1	LOS A	2.3	16.2	0.94	0.84	0.95	43.5
3	R2	All MCs	96	0.0	96	0.0	0.341	14.3	LOS B	2.3	16.2	0.94	0.84	0.95	43.0
Approach			242	0.0	242	0.0	0.341	11.1	LOS B	2.3	16.2	0.92	0.84	0.93	43.4
East: SH 16															
4	L2	All MCs	129	0.0	129	0.0	0.417	3.9	LOS A	3.0	20.9	0.55	0.41	0.55	46.5
5	T1	All MCs	995	0.0	995	0.0	0.813	4.3	LOS A	12.8	89.5	0.72	0.58	0.77	45.5
6	R2	All MCs	556	0.0	556	0.0	0.813	10.6	LOS B	12.8	89.5	0.81	0.67	0.88	44.3
Approach			1680	0.0	1680	0.0	0.813	6.4	LOS A	12.8	89.5	0.74	0.60	0.79	45.1
North: Old N Road															
7	L2	All MCs	289	0.0	289	0.0	0.658	9.6	LOS A	5.1	36.0	0.90	0.96	1.19	44.2
8	T1	All MCs	118	0.0	118	0.0	0.658	8.8	LOS A	5.1	36.0	0.90	0.96	1.19	44.3
9	R2	All MCs	9	0.0	9	0.0	0.658	14.9	LOS B	5.1	36.0	0.90	0.96	1.19	43.8
Approach			417	0.0	417	0.0	0.658	9.5	LOS A	5.1	36.0	0.90	0.96	1.19	44.2
West: SH 16															
10	L2	All MCs	31	0.0	31	0.0	0.464	8.4	LOS A	3.8	26.5	0.89	0.76	0.97	45.0
11	T1	All MCs	823	0.0	823	0.0	0.648	8.9	LOS A	8.0	56.3	0.95	0.85	1.16	44.4
12	R2	All MCs	103	0.0	103	0.0	0.648	15.2	LOS B	8.0	56.3	0.99	0.90	1.26	43.4
Approach			957	0.0	957	0.0	0.648	9.6	LOS A	8.0	56.3	0.95	0.85	1.16	44.3
All Vehicles			3296	0.0	3296	0.0	0.813	8.0	LOS A	12.8	89.5	0.83	0.73	0.96	44.7

Old North Road / Riverhead Road Intersection Model Proposed AM top and PM bottom

Vehicle Movement Performance														
Mov ID	Turn	Mov Class	Demand Flows [Total	HV]	Arrival Flows [Total	HV]	Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue [Veh.	Dist]	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Old N Road															
1	L2	All MCs	15	7.1	15	7.1	0.240	3.9	LOS A	1.5	11.2	0.34	0.49	0.34	45.3
2	T1	All MCs	134	7.9	134	7.9	0.240	3.5	LOS A	1.5	11.2	0.34	0.49	0.34	45.6
3	R2	All MCs	141	8.2	141	8.2	0.240	8.0	LOS A	1.5	11.2	0.34	0.49	0.34	45.0
Approach			289	8.0	289	8.0	0.240	5.7	LOS A	1.5	11.2	0.34	0.49	0.34	45.3
East: Riverhead Road															
4	L2	All MCs	74	18.6	74	18.6	0.197	6.1	LOS A	1.2	9.1	0.67	0.61	0.67	45.4
5	T1	All MCs	84	5.0	84	5.0	0.197	5.9	LOS A	1.2	9.1	0.67	0.61	0.67	45.6
6	R2	All MCs	3	0.0	3	0.0	0.197	10.3	LOS B	1.2	9.1	0.67	0.61	0.67	45.1
Approach			161	11.1	161	11.1	0.197	6.1	LOS A	1.2	9.1	0.67	0.61	0.67	45.5
North: Old N Road															
7	L2	All MCs	12	9.1	12	9.1	0.452	6.8	LOS A	3.1	22.1	0.70	0.62	0.70	44.9
8	T1	All MCs	374	2.0	374	2.0	0.452	6.1	LOS A	3.1	22.1	0.70	0.62	0.70	45.3
9	R2	All MCs	21	10.0	21	10.0	0.452	10.9	LOS B	3.1	22.1	0.70	0.62	0.70	44.6
Approach			406	2.6	406	2.6	0.452	6.3	LOS A	3.1	22.1	0.70	0.62	0.70	45.3
West: Riverhead Road															
10	L2	All MCs	33	3.2	33	3.2	0.298	4.3	LOS A	1.8	13.5	0.52	0.57	0.52	45.1
11	T1	All MCs	142	12.6	142	12.6	0.298	4.7	LOS A	1.8	13.5	0.52	0.57	0.52	45.2
12	R2	All MCs	145	0.0	145	0.0	0.298	8.9	LOS A	1.8	13.5	0.52	0.57	0.52	44.7
Approach			320	5.9	320	5.9	0.298	6.6	LOS A	1.8	13.5	0.52	0.57	0.52	45.0
All Vehicles			1177	6.0	1177	6.0	0.452	6.2	LOS A	3.1	22.1	0.56	0.57	0.56	45.2

Vehicle Movement Performance														
Mov ID	Turn	Mov Class	Demand Flows [Total	HV]	Arrival Flows [Total	HV]	Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue [Veh.	Dist]	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Old N Road															
1	L2	All MCs	141	1.5	141	1.5	0.526	4.3	LOS A	4.4	31.7	0.50	0.48	0.50	45.4
2	T1	All MCs	361	2.6	361	2.6	0.526	3.9	LOS A	4.4	31.7	0.50	0.48	0.50	45.8
3	R2	All MCs	153	5.5	153	5.5	0.526	8.4	LOS A	4.4	31.7	0.50	0.48	0.50	45.1
Approach			655	3.1	655	3.1	0.526	5.1	LOS A	4.4	31.7	0.50	0.48	0.50	45.5
East: Riverhead Road															
4	L2	All MCs	162	1.3	162	1.3	0.253	3.7	LOS A	1.6	11.1	0.45	0.45	0.45	46.4
5	T1	All MCs	131	2.4	131	2.4	0.253	3.9	LOS A	1.6	11.1	0.45	0.45	0.45	46.5
6	R2	All MCs	5	0.0	5	0.0	0.253	8.4	LOS A	1.6	11.1	0.45	0.45	0.45	45.9
Approach			298	1.8	298	1.8	0.253	3.9	LOS A	1.6	11.1	0.45	0.45	0.45	46.4
North: Old N Road															
7	L2	All MCs	1	0.0	1	0.0	0.195	5.0	LOS A	1.1	8.0	0.52	0.50	0.52	45.6
8	T1	All MCs	181	5.2	181	5.2	0.195	4.7	LOS A	1.1	8.0	0.52	0.50	0.52	45.9
9	R2	All MCs	7	0.0	7	0.0	0.195	9.1	LOS A	1.1	8.0	0.52	0.50	0.52	45.3
Approach			189	5.0	189	5.0	0.195	4.9	LOS A	1.1	8.0	0.52	0.50	0.52	45.9
West: Riverhead Road															
10	L2	All MCs	32	3.3	32	3.3	0.229	5.6	LOS A	1.4	10.3	0.67	0.60	0.67	45.3
11	T1	All MCs	154	4.1	154	4.1	0.229	5.8	LOS A	1.4	10.3	0.67	0.60	0.67	45.4
12	R2	All MCs	17	0.0	17	0.0	0.229	10.2	LOS B	1.4	10.3	0.67	0.60	0.67	44.9
Approach			202	3.6	202	3.6	0.229	6.2	LOS A	1.4	10.3	0.67	0.60	0.67	45.4
All Vehicles			1344	3.1	1344	3.1	0.526	4.9	LOS A	4.4	31.7	0.51	0.50	0.51	45.8

Riverhead Road / SH 16 Intersection Model Proposed AM top and PM bottom

Vehicle Movement Performance														
Mov ID	Turn	Mov Class	Demand Flows [Total	HV]	Arrival Flows [Total	HV]	Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue [Veh.	Dist]	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
East: Sh16															
5	T1	All MCs	700	0.0	700	0.0	0.359	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	49.8
6	R2	All MCs	60	0.0	60	0.0	0.157	13.4	LOS B	0.5	3.7	0.77	0.89	0.77	41.3
Approach			760	0.0	760	0.0	0.359	1.2	NA	0.5	3.7	0.06	0.07	0.06	49.0
North: Oraha Road															
7	L2	All MCs	54	0.0	54	0.0	0.131	12.0	LOS B	0.4	2.9	0.72	0.87	0.72	42.1
9	R2	All MCs	94	0.0	94	0.0	1.949	958.7	LOS F	31.4	220.1	1.00	2.61	7.30	3.5
Approach			147	0.0	147	0.0	1.949	613.8	LOS F	31.4	220.1	0.90	1.98	4.90	5.3
West: SH16															
10	L2	All MCs	121	0.0	121	0.0	0.065	4.6	LOS A	0.0	0.0	0.00	0.53	0.00	46.0
11	T1	All MCs	877	0.0	877	0.0	0.450	0.2	LOS A	0.0	0.0	0.00	0.00	0.00	49.7
Approach			998	0.0	998	0.0	0.450	0.7	NA	0.0	0.0	0.00	0.06	0.00	49.2
All Vehicles			1905	0.0	1905	0.0	1.949	48.3	NA	31.4	220.1	0.09	0.21	0.40	30.0

Vehicle Movement Performance														
Mov ID	Turn	Mov Class	Demand Flows [Total	HV]	Arrival Flows [Total	HV]	Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue [Veh.	Dist]	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
East: Sh16															
5	T1	All MCs	1012	0.0	1012	0.0	0.519	0.3	LOS A	0.0	0.0	0.00	0.00	0.00	49.7
6	R2	All MCs	78	0.0	78	0.0	0.235	15.9	LOS C	0.8	5.9	0.81	0.94	0.89	40.2
Approach			1089	0.0	1089	0.0	0.519	1.4	NA	0.8	5.9	0.06	0.07	0.06	48.8
North: Oraha Road															
7	L2	All MCs	76	0.0	76	0.0	0.191	12.6	LOS B	0.6	4.4	0.75	0.89	0.77	41.7
9	R2	All MCs	67	0.0	67	0.0	4.125	3040.3	LOS F	34.3	239.9	1.00	1.90	4.70	1.2
Approach			143	0.0	143	0.0	4.125	1437.4	LOS F	34.3	239.9	0.87	1.36	2.62	2.4
West: SH16															
10	L2	All MCs	191	0.0	191	0.0	0.103	4.6	LOS A	0.0	0.0	0.00	0.53	0.00	45.9
11	T1	All MCs	893	0.0	893	0.0	0.458	0.2	LOS A	0.0	0.0	0.00	0.00	0.00	49.7
Approach			1083	0.0	1083	0.0	0.458	1.0	NA	0.0	0.0	0.00	0.09	0.00	49.0
All Vehicles			2316	0.0	2316	0.0	4.125	90.0	NA	34.3	239.9	0.08	0.16	0.19	22.3

Coatesville-Riverhead Highway / SH 16 Intersection Model Proposed AM top and PM bottom

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total	HV]	Arrival Flows [Total	HV]	Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue [Veh.	Dist]	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
East: Sh16															
5	T1	All MCs	1029	7.9	1029	7.9	1.606	585.2	LOS F	267.9	2001.7	1.00	1.00	18.42	5.5
6	R2	All MCs	342	5.8	342	5.8	1.935	879.5	LOS F	106.2	780.8	1.00	7.03	22.04	3.8
Approach			1372	7.4	1372	7.4	1.935	661.9	NA	267.9	2001.7	1.00	2.50	19.32	5.0
North: Coatesville-Riverhead Highway															
7	L2	All MCs	702	4.3	702	4.3	10.446	8562.9	LOS F	396.9	2882.0	1.00	5.90	19.83	0.4
9	R2	All MCs	1	0.0	1	0.0	1.000	1398.2	LOS F	2.1	14.9	1.00	1.00	1.01	2.5
Approach			703	4.3	703	4.3	10.446	8552.2	LOS F	396.9	2882.0	1.00	5.89	19.81	0.4
West: SH16															
10	L2	All MCs	4	0.0	4	0.0	0.004	6.0	LOS A	0.0	0.1	0.40	0.54	0.40	45.0
11	T1	All MCs	1236	7.9	1236	7.9	0.666	0.5	LOS A	0.0	0.0	0.00	0.00	0.00	49.3
Approach			1240	7.9	1240	7.9	0.666	0.5	NA	0.0	0.1	0.00	0.00	0.00	49.3
All Vehicles			3315	6.9	3315	6.9	10.446	2086.9	NA	396.9	2882.0	0.63	2.29	12.20	1.7

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total	HV]	Arrival Flows [Total	HV]	Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue [Veh.	Dist]	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
East: Sh16															
5	T1	All MCs	1724	3.0	1724	3.0	1.723	670.9	LOS F	470.2	3376.1	1.00	0.97	24.93	4.9
6	R2	All MCs	380	3.0	380	3.0	1.388	382.3	LOS F	71.0	510.2	1.00	5.83	17.26	8.0
Approach			2104	3.0	2104	3.0	1.723	621.4	NA	470.2	3376.1	1.00	1.85	23.55	5.3
North: Coatesville-Riverhead Highway															
7	L2	All MCs	473	4.5	473	4.5	4.454	3153.6	LOS F	230.6	1675.6	1.00	7.07	23.53	1.1
9	R2	All MCs	1	0.0	1	0.0	1.000	1081.7	LOS F	1.9	13.1	1.00	1.00	1.00	3.2
Approach			474	4.4	474	4.4	4.454	3148.9	LOS F	230.6	1675.6	1.00	7.06	23.48	1.1
West: SH16															
10	L2	All MCs	21	0.0	21	0.0	0.022	6.3	LOS A	0.1	0.6	0.43	0.59	0.43	45.0
11	T1	All MCs	1161	3.9	1161	3.9	0.610	0.4	LOS A	0.0	0.0	0.00	0.00	0.00	49.5
Approach			1182	3.8	1182	3.8	0.610	0.5	NA	0.1	0.6	0.01	0.01	0.01	49.4
All Vehicles			3760	3.4	3760	3.4	4.454	743.2	NA	470.2	3376.1	0.69	1.93	16.14	4.5

Deacon Road / Riverhead Road intersection Model Proposed AM top and PM bottom

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Riverhead Road															
1	L2	All MCs	68	0.0	68	0.0	0.141	4.6	LOS A	0.0	0.0	0.00	0.14	0.00	48.0
2	T1	All MCs	203	0.0	203	0.0	0.141	0.0	LOS A	0.0	0.0	0.00	0.14	0.00	49.2
Approach			272	0.0	272	0.0	0.141	1.2	NA	0.0	0.0	0.00	0.14	0.00	48.9
North: Riverhead Road															
8	T1	All MCs	139	0.0	139	0.0	0.185	0.8	LOS A	0.9	6.5	0.36	0.42	0.36	47.5
9	R2	All MCs	157	0.0	157	0.0	0.185	5.6	LOS A	0.9	6.5	0.36	0.42	0.36	46.2
Approach			296	0.0	296	0.0	0.185	3.3	NA	0.9	6.5	0.36	0.42	0.36	46.8
West: Deacon Road															
10	L2	All MCs	323	0.0	323	0.0	0.325	8.5	LOS A	1.6	10.9	0.40	0.86	0.40	44.1
12	R2	All MCs	34	0.0	34	0.0	0.325	11.1	LOS B	1.6	10.9	0.40	0.86	0.40	43.9
Approach			357	0.0	357	0.0	0.325	8.8	LOS A	1.6	10.9	0.40	0.86	0.40	44.1
All Vehicles			924	0.0	924	0.0	0.325	4.8	NA	1.6	10.9	0.27	0.51	0.27	46.3

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Riverhead Road															
1	L2	All MCs	116	0.0	116	0.0	0.152	4.6	LOS A	0.0	0.0	0.00	0.22	0.00	47.6
2	T1	All MCs	176	0.0	176	0.0	0.152	0.0	LOS A	0.0	0.0	0.00	0.22	0.00	48.7
Approach			292	0.0	292	0.0	0.152	1.9	NA	0.0	0.0	0.00	0.22	0.00	48.3
North: Riverhead Road															
8	T1	All MCs	192	0.0	192	0.0	0.301	1.1	LOS A	1.7	11.7	0.42	0.48	0.42	47.2
9	R2	All MCs	274	0.0	274	0.0	0.301	5.8	LOS A	1.7	11.7	0.42	0.48	0.42	45.9
Approach			465	0.0	465	0.0	0.301	3.9	NA	1.7	11.7	0.42	0.48	0.42	46.4
West: Deacon Road															
10	L2	All MCs	151	0.0	151	0.0	0.279	8.3	LOS A	1.2	8.2	0.45	0.86	0.45	43.5
12	R2	All MCs	81	0.0	81	0.0	0.279	13.0	LOS B	1.2	8.2	0.45	0.86	0.45	43.3
Approach			232	0.0	232	0.0	0.279	9.9	LOS A	1.2	8.2	0.45	0.86	0.45	43.5
All Vehicles			988	0.0	988	0.0	0.301	4.7	NA	1.7	11.7	0.30	0.49	0.30	46.2

Oraha Road / SH 16 intersection Model Proposed AM top and PM bottom

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
East: Main Road															
5	T1	All MCs	752	6.9	752	6.9	0.403	0.2	LOS A	0.0	0.0	0.00	0.00	0.00	49.8
6	R2	All MCs	76	2.8	76	2.8	0.261	18.1	LOS C	0.9	6.5	0.84	0.96	0.94	39.2
Approach			827	6.5	827	6.5	0.403	1.8	NA	0.9	6.5	0.08	0.09	0.09	48.6
North: Oraha Road															
7	L2	All MCs	112	3.8	112	3.8	0.491	28.1	LOS D	1.8	13.2	0.89	1.11	1.24	36.1
9	R2	All MCs	98	4.3	98	4.3	6.218	4893.6	LOS F	53.5	388.6	1.00	1.99	5.00	0.7
Approach			209	4.0	209	4.0	6.218	2301.9	LOS F	53.5	388.6	0.94	1.52	3.00	1.5
West: Main Road															
10	L2	All MCs	124	3.4	124	3.4	0.068	4.6	LOS A	0.0	0.0	0.00	0.53	0.00	45.9
11	T1	All MCs	938	6.8	938	6.8	0.502	0.3	LOS A	0.0	0.0	0.00	0.00	0.00	49.7
Approach			1062	6.4	1062	6.4	0.502	0.8	NA	0.0	0.0	0.00	0.06	0.00	49.2
All Vehicles			2099	6.2	2099	6.2	6.218	230.8	NA	53.5	388.6	0.12	0.22	0.33	12.0

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
East: Main Road															
5	T1	All MCs	915	2.1	915	2.1	0.475	0.2	LOS A	0.0	0.0	0.00	0.00	0.00	49.7
6	R2	All MCs	106	1.0	106	1.0	0.208	11.0	LOS B	0.8	5.4	0.69	0.86	0.71	42.5
Approach			1021	2.0	1021	2.0	0.475	1.3	NA	0.8	5.4	0.07	0.09	0.07	48.8
North: Oraha Road															
7	L2	All MCs	53	6.0	53	6.0	0.136	15.4	LOS C	0.4	3.2	0.69	1.00	0.69	41.1
9	R2	All MCs	118	5.4	118	5.4	6.190	4825.1	LOS F	63.8	467.1	1.00	2.27	6.07	0.7
Approach			171	5.6	171	5.6	6.190	3340.6	LOS F	63.8	467.1	0.90	1.88	4.41	1.1
West: Main Road															
10	L2	All MCs	83	1.3	83	1.3	0.045	4.6	LOS A	0.0	0.0	0.00	0.53	0.00	45.9
11	T1	All MCs	727	3.6	727	3.6	0.382	0.2	LOS A	0.0	0.0	0.00	0.00	0.00	49.8
Approach			811	3.4	811	3.4	0.382	0.6	NA	0.0	0.0	0.00	0.05	0.00	49.4
All Vehicles			2002	2.8	2002	2.8	6.190	285.5	NA	63.8	467.1	0.11	0.23	0.41	10.2

Forestry Road / Deacon Road Model Proposed AM top and PM bottom

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
East: Deacon Road															
5	T1	All MCs	116	0.0	116	0.0	0.139	0.7	LOS A	0.6	4.5	0.33	0.39	0.33	47.7
6	R2	All MCs	109	0.0	109	0.0	0.139	5.5	LOS A	0.6	4.5	0.33	0.39	0.33	46.4
Approach			225	0.0	225	0.0	0.139	3.1	NA	0.6	4.5	0.33	0.39	0.33	47.0
North: Forestry Road															
7	L2	All MCs	106	0.0	106	0.0	0.212	5.5	LOS A	0.8	5.8	0.42	0.63	0.42	45.0
9	R2	All MCs	107	0.0	107	0.0	0.212	7.0	LOS A	0.8	5.8	0.42	0.63	0.42	44.8
Approach			214	0.0	214	0.0	0.212	6.3	LOS A	0.8	5.8	0.42	0.63	0.42	44.9
West: Deacon Road															
10	L2	All MCs	16	0.0	16	0.0	0.138	4.6	LOS A	0.0	0.0	0.00	0.03	0.00	48.5
11	T1	All MCs	252	0.0	252	0.0	0.138	0.0	LOS A	0.0	0.0	0.00	0.03	0.00	49.8
Approach			267	0.0	267	0.0	0.138	0.3	NA	0.0	0.0	0.00	0.03	0.00	49.7
All Vehicles			706	0.0	706	0.0	0.212	3.0	NA	0.8	5.8	0.23	0.33	0.23	47.3

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
East: Deacon Road															
5	T1	All MCs	252	0.0	252	0.0	0.217	0.2	LOS A	0.9	6.2	0.19	0.24	0.19	48.4
6	R2	All MCs	138	0.0	138	0.0	0.217	5.0	LOS A	0.9	6.2	0.19	0.24	0.19	47.1
Approach			389	0.0	389	0.0	0.217	1.9	NA	0.9	6.2	0.19	0.24	0.19	47.9
North: Forestry Road															
7	L2	All MCs	108	0.0	108	0.0	0.116	5.0	LOS A	0.5	3.2	0.27	0.53	0.27	45.4
9	R2	All MCs	34	0.0	34	0.0	0.116	7.1	LOS A	0.5	3.2	0.27	0.53	0.27	45.2
Approach			142	0.0	142	0.0	0.116	5.5	LOS A	0.5	3.2	0.27	0.53	0.27	45.3
West: Deacon Road															
10	L2	All MCs	1	0.0	1	0.0	0.064	4.6	LOS A	0.0	0.0	0.00	0.00	0.00	48.7
11	T1	All MCs	123	0.0	123	0.0	0.064	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	50.0
Approach			124	0.0	124	0.0	0.064	0.1	NA	0.0	0.0	0.00	0.00	0.00	49.9
All Vehicles			656	0.0	656	0.0	0.217	2.3	NA	0.9	6.2	0.17	0.26	0.17	47.7

Appendix H: Wider Network Modelling Proposed & PPC100

Old North Road / Deacon Road Intersection Modelling AM top and PM bottom

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total	HV]	Arrival Flows [Total	HV]	Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue [Veh.	Dist]	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Old North Road															
2	T1	All MCs	157	0.0	157	0.0	0.224	1.7	LOS A	1.2	8.1	0.49	0.55	0.49	47.2
3	R2	All MCs	156	0.0	156	0.0	0.224	6.8	LOS A	1.2	8.1	0.49	0.55	0.49	46.0
Approach			313	0.0	313	0.0	0.224	4.2	NA	1.2	8.1	0.49	0.55	0.49	46.6
East: Deacon Road															
4	L2	All MCs	177	0.0	177	0.0	0.182	9.4	LOS A	0.8	5.3	0.47	0.91	0.47	43.9
6	R2	All MCs	46	0.0	46	0.0	0.093	12.1	LOS B	0.3	2.1	0.59	1.00	0.59	42.3
Approach			223	0.0	223	0.0	0.182	9.9	LOS A	0.8	5.3	0.49	0.93	0.49	43.5
North: Old North Road															
7	L2	All MCs	112	0.0	112	0.0	0.252	4.6	LOS A	0.0	0.0	0.00	0.13	0.00	48.0
8	T1	All MCs	374	0.0	374	0.0	0.252	0.1	LOS A	0.0	0.0	0.00	0.13	0.00	49.2
Approach			485	0.0	485	0.0	0.252	1.1	NA	0.0	0.0	0.00	0.13	0.00	48.9
All Vehicles			1021	0.0	1021	0.0	0.252	4.0	NA	1.2	8.1	0.26	0.43	0.26	46.9

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total	HV]	Arrival Flows [Total	HV]	Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue [Veh.	Dist]	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Old North Road															
2	T1	All MCs	439	2.9	439	2.9	0.295	0.3	LOS A	0.8	5.5	0.16	0.17	0.16	49.0
3	R2	All MCs	94	1.1	94	1.1	0.295	5.5	LOS A	0.8	5.5	0.16	0.17	0.16	47.7
Approach			533	2.6	533	2.6	0.295	1.2	NA	0.8	5.5	0.16	0.17	0.16	48.8
East: Deacon Road															
4	L2	All MCs	218	4.3	218	4.3	0.186	8.5	LOS A	0.8	5.9	0.33	0.88	0.33	44.2
6	R2	All MCs	83	1.3	83	1.3	0.175	12.8	LOS B	0.6	4.0	0.63	1.00	0.63	42.0
Approach			301	3.5	301	3.5	0.186	9.7	LOS A	0.8	5.9	0.41	0.91	0.41	43.6
North: Old North Road															
7	L2	All MCs	38	2.8	38	2.8	0.116	4.6	LOS A	0.0	0.0	0.00	0.09	0.00	48.2
8	T1	All MCs	181	4.1	181	4.1	0.116	0.0	LOS A	0.0	0.0	0.00	0.09	0.00	49.4
Approach			219	3.8	219	3.8	0.116	0.8	NA	0.0	0.0	0.00	0.09	0.00	49.2
All Vehicles			1053	3.1	1053	3.1	0.295	3.5	NA	0.8	5.9	0.20	0.37	0.20	47.2

Riverhead Road / Kaipara Portage Road / Coatesville-Riverhead Highway Road Intersection Modelling AM top and PM bottom

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total	HV]	Arrival Flows [Total	HV]	Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue [Veh.	Dist]	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Coatsville Highway															
1	L2	All MCs	141	0.0	141	0.0	0.795	14.7	LOS B	11.8	82.3	1.00	1.03	1.48	40.5
2	T1	All MCs	281	0.0	281	0.0	0.795	14.7	LOS B	11.8	82.3	1.00	1.03	1.48	40.7
3	R2	All MCs	221	0.0	221	0.0	0.795	18.5	LOS B	11.8	82.3	1.00	1.03	1.48	40.3
Approach			643	0.0	643	0.0	0.795	16.0	LOS B	11.8	82.3	1.00	1.03	1.48	40.5
East: Kaipara Portage Road															
4	L2	All MCs	256	0.0	256	0.0	0.723	21.0	LOS C	8.5	59.4	1.00	1.12	1.56	38.0
5	T1	All MCs	34	0.0	34	0.0	0.723	21.0	LOS C	8.5	59.4	1.00	1.12	1.56	38.2
6	R2	All MCs	87	0.0	87	0.0	0.723	24.8	LOS C	8.5	59.4	1.00	1.12	1.56	37.8
Approach			377	0.0	377	0.0	0.723	21.8	LOS C	8.5	59.4	1.00	1.12	1.56	38.0
North: Coatsville Highway															
7	L2	All MCs	37	0.0	37	0.0	0.784	12.6	LOS B	11.4	79.5	0.96	0.95	1.35	41.1
8	T1	All MCs	277	0.0	277	0.0	0.784	12.6	LOS B	11.4	79.5	0.96	0.95	1.35	41.3
9	R2	All MCs	393	0.0	393	0.0	0.784	16.4	LOS B	11.4	79.5	0.96	0.95	1.35	40.9
Approach			706	0.0	706	0.0	0.784	14.7	LOS B	11.4	79.5	0.96	0.95	1.35	41.0
West: Riverhead Road															
10	L2	All MCs	599	0.0	599	0.0	1.156	162.6	LOS F	91.1	638.0	1.00	4.30	7.90	15.4
11	T1	All MCs	22	0.0	22	0.0	1.156	162.6	LOS F	91.1	638.0	1.00	4.30	7.90	15.4
12	R2	All MCs	232	0.0	232	0.0	1.156	166.4	LOS F	91.1	638.0	1.00	4.30	7.90	15.4
Approach			853	0.0	853	0.0	1.156	163.6	LOS F	91.1	638.0	1.00	4.30	7.90	15.4
All Vehicles			2579	0.0	2579	0.0	1.156	65.3	LOS E	91.1	638.0	0.99	2.10	3.58	26.2

Vehicle Movement Performance														
Mov ID	Turn	Mov Class	Demand Flows [Total	HV]	Arrival Flows [Total	HV]	Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue [Veh.	Dist]	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Coatsville Highway															
1	L2	All MCs	167	0.0	167	0.0	0.662	9.3	LOS A	7.2	50.6	0.87	0.81	1.06	43.2
2	T1	All MCs	268	0.0	268	0.0	0.662	9.4	LOS A	7.2	50.6	0.87	0.81	1.06	43.4
3	R2	All MCs	149	0.0	149	0.0	0.662	13.2	LOS B	7.2	50.6	0.87	0.81	1.06	42.9
Approach			585	0.0	585	0.0	0.662	10.3	LOS B	7.2	50.6	0.87	0.81	1.06	43.2
East: Kaipara Portage Road															
4	L2	All MCs	155	0.0	155	0.0	0.396	9.5	LOS A	2.9	20.2	0.88	0.78	0.91	43.2
5	T1	All MCs	35	0.0	35	0.0	0.396	9.5	LOS A	2.9	20.2	0.88	0.78	0.91	43.4
6	R2	All MCs	51	0.0	51	0.0	0.396	13.3	LOS B	2.9	20.2	0.88	0.78	0.91	42.9
Approach			240	0.0	240	0.0	0.396	10.3	LOS B	2.9	20.2	0.88	0.78	0.91	43.1
North: Coatsville Highway															
7	L2	All MCs	40	0.0	40	0.0	0.679	8.2	LOS A	7.6	53.0	0.82	0.76	0.96	43.3
8	T1	All MCs	277	0.0	277	0.0	0.679	8.2	LOS A	7.6	53.0	0.82	0.76	0.96	43.5
9	R2	All MCs	354	0.0	354	0.0	0.679	12.0	LOS B	7.6	53.0	0.82	0.76	0.96	43.0
Approach			671	0.0	671	0.0	0.679	10.2	LOS B	7.6	53.0	0.82	0.76	0.96	43.2
West: Riverhead Road															
10	L2	All MCs	346	0.0	346	0.0	0.649	9.5	LOS A	7.0	48.7	0.89	0.82	1.08	43.0
11	T1	All MCs	51	0.0	51	0.0	0.649	9.6	LOS A	7.0	48.7	0.89	0.82	1.08	43.2
12	R2	All MCs	151	0.0	151	0.0	0.649	13.4	LOS B	7.0	48.7	0.89	0.82	1.08	42.7
Approach			547	0.0	547	0.0	0.649	10.6	LOS B	7.0	48.7	0.89	0.82	1.08	43.0
All Vehicles			2043	0.0	2043	0.0	0.679	10.4	LOS B	7.6	53.0	0.86	0.79	1.02	43.1

Old North Road / SH16 / Taupaki Road Intersection Modelling AM top and PM bottom

Vehicle Movement Performance														
Mov ID	Turn	Mov Class	Demand Flows [Total	HV]	Arrival Flows [Total	HV]	Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue [Veh.	Dist]	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Taupaki Road															
1	L2	All MCs	68	3.1	68	3.1	0.116	6.2	LOS A	0.5	3.7	0.65	0.68	0.65	45.8
2	T1	All MCs	195	4.3	195	4.3	0.384	4.5	LOS A	2.3	16.5	0.73	0.66	0.74	45.1
3	R2	All MCs	158	6.0	158	6.0	0.384	10.9	LOS B	2.3	16.5	0.73	0.66	0.74	44.5
Approach			421	4.8	421	4.8	0.384	7.2	LOS A	2.3	16.5	0.72	0.67	0.73	45.0
East: SH 16															
4	L2	All MCs	72	0.0	72	0.0	0.249	3.8	LOS A	1.6	11.3	0.54	0.40	0.54	46.5
5	T1	All MCs	658	0.0	658	0.0	0.485	3.0	LOS A	4.2	29.6	0.60	0.43	0.60	46.1
6	R2	All MCs	214	0.0	214	0.0	0.485	8.8	LOS A	4.2	29.6	0.62	0.44	0.62	45.3
Approach			943	0.0	943	0.0	0.485	4.4	LOS A	4.2	29.6	0.60	0.43	0.60	45.9
North: Old N Road															
7	L2	All MCs	405	0.0	405	0.0	0.860	15.2	LOS B	10.6	74.4	0.96	1.22	1.75	41.4
8	T1	All MCs	225	0.0	225	0.0	0.860	14.4	LOS B	10.6	74.4	0.96	1.22	1.75	41.6
9	R2	All MCs	9	0.0	9	0.0	0.860	20.5	LOS C	10.6	74.4	0.96	1.22	1.75	41.1
Approach			640	0.0	640	0.0	0.860	15.0	LOS B	10.6	74.4	0.96	1.22	1.75	41.5
West: SH 16															
10	L2	All MCs	6	0.0	6	0.0	0.298	5.7	LOS A	2.0	13.7	0.71	0.58	0.71	45.8
11	T1	All MCs	702	0.0	702	0.0	0.416	4.9	LOS A	3.3	22.8	0.74	0.56	0.74	45.9
12	R2	All MCs	36	0.0	36	0.0	0.416	10.3	LOS B	3.3	22.8	0.75	0.55	0.75	45.2
Approach			744	0.0	744	0.0	0.416	5.2	LOS A	3.3	22.8	0.74	0.56	0.74	45.8
All Vehicles			2748	0.7	2748	0.7	0.860	7.5	LOS A	10.6	74.4	0.74	0.69	0.92	44.7

Vehicle Movement Performance														
Mov ID	Turn	Mov Class	Demand Flows [Total	HV]	Arrival Flows [Total	HV]	Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue [Veh.	Dist]	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Taupaki Road															
1	L2	All MCs	59	0.0	59	0.0	0.175	10.7	LOS B	1.0	7.0	0.89	0.86	0.89	43.5
2	T1	All MCs	174	0.0	174	0.0	0.563	13.3	LOS B	4.8	33.3	1.00	1.00	1.28	41.5
3	R2	All MCs	96	0.0	96	0.0	0.563	19.5	LOS B	4.8	33.3	1.00	1.00	1.28	41.1
Approach			328	0.0	328	0.0	0.563	14.6	LOS B	4.8	33.3	0.98	0.98	1.21	41.7
East: SH 16															
4	L2	All MCs	129	0.0	129	0.0	0.450	4.3	LOS A	3.3	23.4	0.63	0.46	0.63	46.2
5	T1	All MCs	995	0.0	995	0.0	0.876	6.7	LOS A	18.7	131.0	0.86	0.75	1.02	44.6
6	R2	All MCs	579	0.0	579	0.0	0.876	14.0	LOS B	18.7	131.0	0.97	0.89	1.22	43.2
Approach			1703	0.0	1703	0.0	0.876	9.0	LOS A	18.7	131.0	0.88	0.78	1.06	44.2
North: Old N Road															
7	L2	All MCs	306	0.0	306	0.0	0.797	13.3	LOS B	7.8	54.6	0.96	1.11	1.50	42.3
8	T1	All MCs	182	0.0	182	0.0	0.797	12.5	LOS B	7.8	54.6	0.96	1.11	1.50	42.5
9	R2	All MCs	9	0.0	9	0.0	0.797	18.6	LOS B	7.8	54.6	0.96	1.11	1.50	42.0
Approach			498	0.0	498	0.0	0.797	13.1	LOS B	7.8	54.6	0.96	1.11	1.50	42.4
West: SH 16															
10	L2	All MCs	31	0.0	31	0.0	0.534	11.6	LOS B	4.9	34.6	0.97	0.88	1.17	43.4
11	T1	All MCs	823	0.0	823	0.0	0.746	13.9	LOS B	11.6	81.0	0.99	1.04	1.42	42.0
12	R2	All MCs	103	0.0	103	0.0	0.746	21.2	LOS C	11.6	81.0	1.00	1.13	1.56	40.7
Approach			957	0.0	957	0.0	0.746	14.6	LOS B	11.6	81.0	0.99	1.04	1.43	41.9
All Vehicles			3486	0.0	3486	0.0	0.876	11.6	LOS B	18.7	131.0	0.93	0.92	1.24	43.1

Old North Road / Riverhead Road Intersection Modelling AM top and PM bottom

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total	HV]	Arrival Flows [Total	HV]	Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue [Veh.	Dist]	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Old N Road															
1	L2	All MCs	14	0.0	14	0.0	0.297	4.1	LOS A	2.0	13.9	0.43	0.54	0.43	44.9
2	T1	All MCs	123	0.0	123	0.0	0.297	3.7	LOS A	2.0	13.9	0.43	0.54	0.43	45.2
3	R2	All MCs	216	0.0	216	0.0	0.297	8.2	LOS A	2.0	13.9	0.43	0.54	0.43	44.6
Approach			353	0.0	353	0.0	0.297	6.4	LOS A	2.0	13.9	0.43	0.54	0.43	44.8
East: Riverhead Road															
4	L2	All MCs	196	0.0	196	0.0	0.375	5.9	LOS A	2.6	18.3	0.73	0.63	0.73	45.5
5	T1	All MCs	138	0.0	138	0.0	0.375	6.1	LOS A	2.6	18.3	0.73	0.63	0.73	45.6
6	R2	All MCs	3	0.0	3	0.0	0.375	10.6	LOS B	2.6	18.3	0.73	0.63	0.73	45.1
Approach			337	0.0	337	0.0	0.375	6.0	LOS A	2.6	18.3	0.73	0.63	0.73	45.6
North: Old N Road															
7	L2	All MCs	11	0.0	11	0.0	0.461	7.3	LOS A	3.3	23.2	0.75	0.67	0.78	44.8
8	T1	All MCs	366	0.0	366	0.0	0.461	6.9	LOS A	3.3	23.2	0.75	0.67	0.78	45.2
9	R2	All MCs	19	0.0	19	0.0	0.461	11.4	LOS B	3.3	23.2	0.75	0.67	0.78	44.6
Approach			396	0.0	396	0.0	0.461	7.1	LOS A	3.3	23.2	0.75	0.67	0.78	45.1
West: Riverhead Road															
10	L2	All MCs	32	0.0	32	0.0	0.319	4.5	LOS A	2.1	14.4	0.58	0.58	0.58	45.1
11	T1	All MCs	162	0.0	162	0.0	0.319	4.7	LOS A	2.1	14.4	0.58	0.58	0.58	45.2
12	R2	All MCs	145	0.0	145	0.0	0.319	9.3	LOS A	2.1	14.4	0.58	0.58	0.58	44.7
Approach			339	0.0	339	0.0	0.319	6.7	LOS A	2.1	14.4	0.58	0.58	0.58	44.9
All Vehicles			1424	0.0	1424	0.0	0.461	6.6	LOS A	3.3	23.2	0.62	0.61	0.63	45.1

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total	HV]	Arrival Flows [Total	HV]	Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue [Veh.	Dist]	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Old N Road															
1	L2	All MCs	141	1.5	141	1.5	0.636	4.8	LOS A	6.1	43.9	0.64	0.54	0.64	44.9
2	T1	All MCs	361	2.6	361	2.6	0.636	4.5	LOS A	6.1	43.9	0.64	0.54	0.64	45.2
3	R2	All MCs	262	3.2	262	3.2	0.636	8.9	LOS A	6.1	43.9	0.64	0.54	0.64	44.6
Approach			764	2.6	764	2.6	0.636	6.1	LOS A	6.1	43.9	0.64	0.54	0.64	44.9
East: Riverhead Road															
4	L2	All MCs	243	0.9	243	0.9	0.347	3.8	LOS A	2.4	17.0	0.49	0.46	0.49	46.3
5	T1	All MCs	166	1.9	166	1.9	0.347	4.0	LOS A	2.4	17.0	0.49	0.46	0.49	46.4
6	R2	All MCs	5	0.0	5	0.0	0.347	8.5	LOS A	2.4	17.0	0.49	0.46	0.49	45.8
Approach			415	1.3	415	1.3	0.347	3.9	LOS A	2.4	17.0	0.49	0.46	0.49	46.3
North: Old N Road															
7	L2	All MCs	1	0.0	1	0.0	0.223	6.1	LOS A	1.3	9.5	0.63	0.58	0.63	45.2
8	T1	All MCs	181	5.2	181	5.2	0.223	5.8	LOS A	1.3	9.5	0.63	0.58	0.63	45.6
9	R2	All MCs	7	0.0	7	0.0	0.223	10.1	LOS B	1.3	9.5	0.63	0.58	0.63	45.0
Approach			189	5.0	189	5.0	0.223	6.0	LOS A	1.3	9.5	0.63	0.58	0.63	45.5
West: Riverhead Road															
10	L2	All MCs	32	3.3	32	3.3	0.320	6.6	LOS A	2.2	15.9	0.78	0.67	0.78	44.9
11	T1	All MCs	201	3.1	201	3.1	0.320	6.8	LOS A	2.2	15.9	0.78	0.67	0.78	45.0
12	R2	All MCs	17	0.0	17	0.0	0.320	11.3	LOS B	2.2	15.9	0.78	0.67	0.78	44.5
Approach			249	3.0	249	3.0	0.320	7.1	LOS A	2.2	15.9	0.78	0.67	0.78	45.0
All Vehicles			1618	2.6	1618	2.6	0.636	5.7	LOS A	6.1	43.9	0.62	0.55	0.62	45.4

Riverhead Road / SH 16 Intersection Modelling AM top and PM bottom

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total	HV]	Arrival Flows [Total	HV]	Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue [Veh.	Dist]	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
East: Sh16															
5	T1	All MCs	700	0.0	700	0.0	0.359	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	49.8
6	R2	All MCs	60	0.0	60	0.0	0.157	13.4	LOS B	0.5	3.7	0.77	0.89	0.77	41.3
Approach			760	0.0	760	0.0	0.359	1.2	NA	0.5	3.7	0.06	0.07	0.06	49.0
North: Oraha Road															
7	L2	All MCs	54	0.0	54	0.0	0.131	12.0	LOS B	0.4	2.9	0.72	0.87	0.72	42.1
9	R2	All MCs	94	0.0	94	0.0	1.949	958.7	LOS F	31.4	220.1	1.00	2.61	7.30	3.5
Approach			147	0.0	147	0.0	1.949	613.8	LOS F	31.4	220.1	0.90	1.98	4.90	5.3
West: SH16															
10	L2	All MCs	121	0.0	121	0.0	0.065	4.6	LOS A	0.0	0.0	0.00	0.53	0.00	46.0
11	T1	All MCs	877	0.0	877	0.0	0.450	0.2	LOS A	0.0	0.0	0.00	0.00	0.00	49.7
Approach			998	0.0	998	0.0	0.450	0.7	NA	0.0	0.0	0.00	0.06	0.00	49.2
All Vehicles			1905	0.0	1905	0.0	1.949	48.3	NA	31.4	220.1	0.09	0.21	0.40	30.0

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows [Total	HV]	Arrival Flows [Total	HV]	Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue [Veh.	Dist]	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
East: Sh16															
5	T1	All MCs	1012	0.0	1012	0.0	0.519	0.3	LOS A	0.0	0.0	0.00	0.00	0.00	49.7
6	R2	All MCs	78	0.0	78	0.0	0.235	15.9	LOS C	0.8	5.9	0.81	0.94	0.89	40.2
Approach			1089	0.0	1089	0.0	0.519	1.4	NA	0.8	5.9	0.06	0.07	0.06	48.8
North: Oraha Road															
7	L2	All MCs	76	0.0	76	0.0	0.191	12.6	LOS B	0.6	4.4	0.75	0.89	0.77	41.7
9	R2	All MCs	67	0.0	67	0.0	4.125	3040.3	LOS F	34.3	239.9	1.00	1.90	4.70	1.2
Approach			143	0.0	143	0.0	4.125	1437.4	LOS F	34.3	239.9	0.87	1.36	2.62	2.4
West: SH16															
10	L2	All MCs	191	0.0	191	0.0	0.103	4.6	LOS A	0.0	0.0	0.00	0.53	0.00	45.9
11	T1	All MCs	893	0.0	893	0.0	0.458	0.2	LOS A	0.0	0.0	0.00	0.00	0.00	49.7
Approach			1083	0.0	1083	0.0	0.458	1.0	NA	0.0	0.0	0.00	0.09	0.00	49.0
All Vehicles			2316	0.0	2316	0.0	4.125	90.0	NA	34.3	239.9	0.08	0.16	0.19	22.3

Coatesville-Riverhead Highway Road / SH16 Intersection Modelling AM top and PM bottom

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows [Total	HV]	Arrival Flows [Total	HV]	Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue [Veh.	Dist]	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
East: Sh16															
5	T1	All MCs	966	0.0	966	0.0	0.428	2.0	LOS A	4.8	33.9	0.03	0.28	0.03	48.0
6	R2	All MCs	536	0.0	536	0.0	0.428	7.5	LOS A	4.7	33.0	0.03	0.54	0.03	45.4
Approach			1502	0.0	1502	0.0	0.428	4.0	LOS A	4.8	33.9	0.03	0.37	0.03	47.0
North: Coatesville-Riverhead Highway															
7	L2	All MCs	1085	0.0	1085	0.0	0.882	20.8	LOS C	11.6	81.4	0.99	1.35	2.03	38.7
9	R2	All MCs	1	0.0	1	0.0	0.882	28.4	LOS C	10.3	71.8	0.99	1.36	2.06	37.5
Approach			1086	0.0	1086	0.0	0.882	20.8	LOS C	11.6	81.4	0.99	1.35	2.03	38.7
West: SH16															
10	L2	All MCs	4	0.0	4	0.0	0.526	6.0	LOS A	4.6	31.9	0.76	0.62	0.79	45.4
11	T1	All MCs	1166	0.0	1166	0.0	0.526	6.3	LOS A	4.6	31.9	0.78	0.65	0.83	45.5
Approach			1171	0.0	1171	0.0	0.526	6.3	LOS A	4.6	31.9	0.78	0.65	0.83	45.5
All Vehicles			3759	0.0	3759	0.0	0.882	9.6	LOS A	11.6	81.4	0.54	0.74	0.86	43.9

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows [Total	HV]	Arrival Flows [Total	HV]	Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue [Veh.	Dist]	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
East: Sh16															
5	T1	All MCs	1696	0.0	1696	0.0	0.691	2.0	LOS A	13.1	91.9	0.05	0.28	0.05	47.9
6	R2	All MCs	725	1.6	725	1.6	0.691	7.5	LOS A	12.6	88.9	0.06	0.49	0.06	45.7
Approach			2421	0.5	2421	0.5	0.691	3.7	LOS A	13.1	91.9	0.05	0.35	0.05	47.2
North: Coatesville-Riverhead Highway															
7	L2	All MCs	711	3.0	711	3.0	0.653	11.2	LOS B	5.3	37.9	0.93	1.01	1.25	43.0
9	R2	All MCs	1	0.0	1	0.0	0.653	17.5	LOS B	4.7	33.8	0.92	1.03	1.26	42.0
Approach			712	3.0	712	3.0	0.653	11.2	LOS B	5.3	37.9	0.93	1.01	1.25	43.0
West: SH16															
10	L2	All MCs	21	0.0	21	0.0	0.644	11.0	LOS B	8.1	58.7	0.92	0.90	1.25	43.4
11	T1	All MCs	1178	3.8	1178	3.8	0.644	12.1	LOS B	8.1	58.7	0.93	0.93	1.29	43.0
Approach			1199	3.8	1199	3.8	0.644	12.1	LOS B	8.1	58.7	0.93	0.92	1.29	43.0
All Vehicles			4332	1.8	4332	1.8	0.691	7.2	LOS A	13.1	91.9	0.44	0.62	0.59	45.3

Deacon Road / Riverhead Road Intersection Modelling AM top and PM bottom

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total	HV]	Arrival Flows [Total	HV]	Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue [Veh.	Dist]	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Riverhead Road															
1	L2	All MCs	68	0.0	68	0.0	0.161	4.6	LOS A	0.0	0.0	0.00	0.12	0.00	48.1
2	T1	All MCs	242	0.0	242	0.0	0.161	0.0	LOS A	0.0	0.0	0.00	0.12	0.00	49.3
Approach			311	0.0	311	0.0	0.161	1.1	NA	0.0	0.0	0.00	0.12	0.00	49.0
North: Riverhead Road															
8	T1	All MCs	192	0.0	192	0.0	0.217	0.9	LOS A	1.1	7.4	0.37	0.41	0.37	47.7
9	R2	All MCs	157	0.0	157	0.0	0.217	5.8	LOS A	1.1	7.4	0.37	0.41	0.37	46.4
Approach			348	0.0	348	0.0	0.217	3.1	NA	1.1	7.4	0.37	0.41	0.37	47.1
West: Deacon Road															
10	L2	All MCs	323	0.0	323	0.0	0.343	8.8	LOS A	1.6	11.5	0.45	0.87	0.45	44.0
12	R2	All MCs	34	0.0	34	0.0	0.343	12.2	LOS B	1.6	11.5	0.45	0.87	0.45	43.8
Approach			357	0.0	357	0.0	0.343	9.1	LOS A	1.6	11.5	0.45	0.87	0.45	43.9
All Vehicles			1016	0.0	1016	0.0	0.343	4.6	NA	1.6	11.5	0.28	0.48	0.28	46.5

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total	HV]	Arrival Flows [Total	HV]	Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue [Veh.	Dist]	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Riverhead Road															
1	L2	All MCs	116	0.0	116	0.0	0.178	4.6	LOS A	0.0	0.0	0.00	0.18	0.00	47.7
2	T1	All MCs	225	0.0	225	0.0	0.178	0.1	LOS A	0.0	0.0	0.00	0.18	0.00	48.9
Approach			341	0.0	341	0.0	0.178	1.6	NA	0.0	0.0	0.00	0.18	0.00	48.5
North: Riverhead Road															
8	T1	All MCs	235	0.0	235	0.0	0.334	1.3	LOS A	1.9	13.1	0.45	0.50	0.45	47.3
9	R2	All MCs	274	0.0	274	0.0	0.334	6.1	LOS A	1.9	13.1	0.45	0.50	0.45	46.0
Approach			508	0.0	508	0.0	0.334	3.9	NA	1.9	13.1	0.45	0.50	0.45	46.6
West: Deacon Road															
10	L2	All MCs	151	0.0	151	0.0	0.308	8.7	LOS A	1.4	9.5	0.52	0.88	0.55	43.2
12	R2	All MCs	81	0.0	81	0.0	0.308	14.6	LOS B	1.4	9.5	0.52	0.88	0.55	43.0
Approach			232	0.0	232	0.0	0.308	10.8	LOS B	1.4	9.5	0.52	0.88	0.55	43.1
All Vehicles			1081	0.0	1081	0.0	0.334	4.6	NA	1.9	13.1	0.32	0.48	0.33	46.3

Oraha Road / SH 16 Intersection Modelling AM top and PM bottom

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total	HV]	Arrival Flows [Total	HV]	Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue [Veh.	Dist]	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
East: Main Road															
5	T1	All MCs	752	6.9	752	6.9	0.403	0.2	LOS A	0.0	0.0	0.00	0.00	0.00	49.8
6	R2	All MCs	76	2.8	76	2.8	0.261	18.1	LOS C	0.9	6.5	0.84	0.96	0.94	39.2
Approach			827	6.5	827	6.5	0.403	1.8	NA	0.9	6.5	0.08	0.09	0.09	48.6
North: Oraha Road															
7	L2	All MCs	112	3.8	112	3.8	0.491	28.1	LOS D	1.8	13.2	0.89	1.11	1.24	36.1
9	R2	All MCs	98	4.3	98	4.3	6.218	4893.6	LOS F	53.5	388.6	1.00	1.99	5.00	0.7
Approach			209	4.0	209	4.0	6.218	2301.9	LOS F	53.5	388.6	0.94	1.52	3.00	1.5
West: Main Road															
10	L2	All MCs	124	3.4	124	3.4	0.068	4.6	LOS A	0.0	0.0	0.00	0.53	0.00	45.9
11	T1	All MCs	938	6.8	938	6.8	0.502	0.3	LOS A	0.0	0.0	0.00	0.00	0.00	49.7
Approach			1062	6.4	1062	6.4	0.502	0.8	NA	0.0	0.0	0.00	0.06	0.00	49.2
All Vehicles			2099	6.2	2099	6.2	6.218	230.8	NA	53.5	388.6	0.12	0.22	0.33	12.0

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total	HV]	Arrival Flows [Total	HV]	Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue [Veh.	Dist]	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
East: Main Road															
5	T1	All MCs	915	2.1	915	2.1	0.475	0.2	LOS A	0.0	0.0	0.00	0.00	0.00	49.7
6	R2	All MCs	106	1.0	106	1.0	0.208	11.0	LOS B	0.8	5.4	0.69	0.86	0.71	42.5
Approach			1021	2.0	1021	2.0	0.475	1.3	NA	0.8	5.4	0.07	0.09	0.07	48.8
North: Oraha Road															
7	L2	All MCs	53	6.0	53	6.0	0.136	15.4	LOS C	0.4	3.2	0.69	1.00	0.69	41.1
9	R2	All MCs	118	5.4	118	5.4	6.190	4825.1	LOS F	63.8	467.1	1.00	2.27	6.07	0.7
Approach			171	5.6	171	5.6	6.190	3340.6	LOS F	63.8	467.1	0.90	1.88	4.41	1.1
West: Main Road															
10	L2	All MCs	83	1.3	83	1.3	0.045	4.6	LOS A	0.0	0.0	0.00	0.53	0.00	45.9
11	T1	All MCs	727	3.6	727	3.6	0.382	0.2	LOS A	0.0	0.0	0.00	0.00	0.00	49.8
Approach			811	3.4	811	3.4	0.382	0.6	NA	0.0	0.0	0.00	0.05	0.00	49.4
All Vehicles			2002	2.8	2002	2.8	6.190	285.5	NA	63.8	467.1	0.11	0.23	0.41	10.2

Forestry Road / Deacon Road Intersection Modelling AM top and PM bottom

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total	HV]	Arrival Flows [Total	HV]	Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue [Veh.	Dist]	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
East: Deacon Road															
5	T1	All MCs	116	0.0	116	0.0	0.139	0.7	LOS A	0.6	4.5	0.33	0.39	0.33	47.7
6	R2	All MCs	109	0.0	109	0.0	0.139	5.5	LOS A	0.6	4.5	0.33	0.39	0.33	46.4
Approach			225	0.0	225	0.0	0.139	3.1	NA	0.6	4.5	0.33	0.39	0.33	47.0
North: Forestry Road															
7	L2	All MCs	106	0.0	106	0.0	0.212	5.5	LOS A	0.8	5.8	0.42	0.63	0.42	45.0
9	R2	All MCs	107	0.0	107	0.0	0.212	7.0	LOS A	0.8	5.8	0.42	0.63	0.42	44.8
Approach			214	0.0	214	0.0	0.212	6.3	LOS A	0.8	5.8	0.42	0.63	0.42	44.9
West: Deacon Road															
10	L2	All MCs	16	0.0	16	0.0	0.138	4.6	LOS A	0.0	0.0	0.00	0.03	0.00	48.5
11	T1	All MCs	252	0.0	252	0.0	0.138	0.0	LOS A	0.0	0.0	0.00	0.03	0.00	49.8
Approach			267	0.0	267	0.0	0.138	0.3	NA	0.0	0.0	0.00	0.03	0.00	49.7
All Vehicles			706	0.0	706	0.0	0.212	3.0	NA	0.8	5.8	0.23	0.33	0.23	47.3

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total	HV]	Arrival Flows [Total	HV]	Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue [Veh.	Dist]	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
East: Deacon Road															
5	T1	All MCs	252	0.0	252	0.0	0.217	0.2	LOS A	0.9	6.2	0.19	0.24	0.19	48.4
6	R2	All MCs	138	0.0	138	0.0	0.217	5.0	LOS A	0.9	6.2	0.19	0.24	0.19	47.1
Approach			389	0.0	389	0.0	0.217	1.9	NA	0.9	6.2	0.19	0.24	0.19	47.9
North: Forestry Road															
7	L2	All MCs	108	0.0	108	0.0	0.116	5.0	LOS A	0.5	3.2	0.27	0.53	0.27	45.4
9	R2	All MCs	34	0.0	34	0.0	0.116	7.1	LOS A	0.5	3.2	0.27	0.53	0.27	45.2
Approach			142	0.0	142	0.0	0.116	5.5	LOS A	0.5	3.2	0.27	0.53	0.27	45.3
West: Deacon Road															
10	L2	All MCs	1	0.0	1	0.0	0.064	4.6	LOS A	0.0	0.0	0.00	0.00	0.00	48.7
11	T1	All MCs	123	0.0	123	0.0	0.064	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	50.0
Approach			124	0.0	124	0.0	0.064	0.1	NA	0.0	0.0	0.00	0.00	0.00	49.9
All Vehicles			656	0.0	656	0.0	0.217	2.3	NA	0.9	6.2	0.17	0.26	0.17	47.7