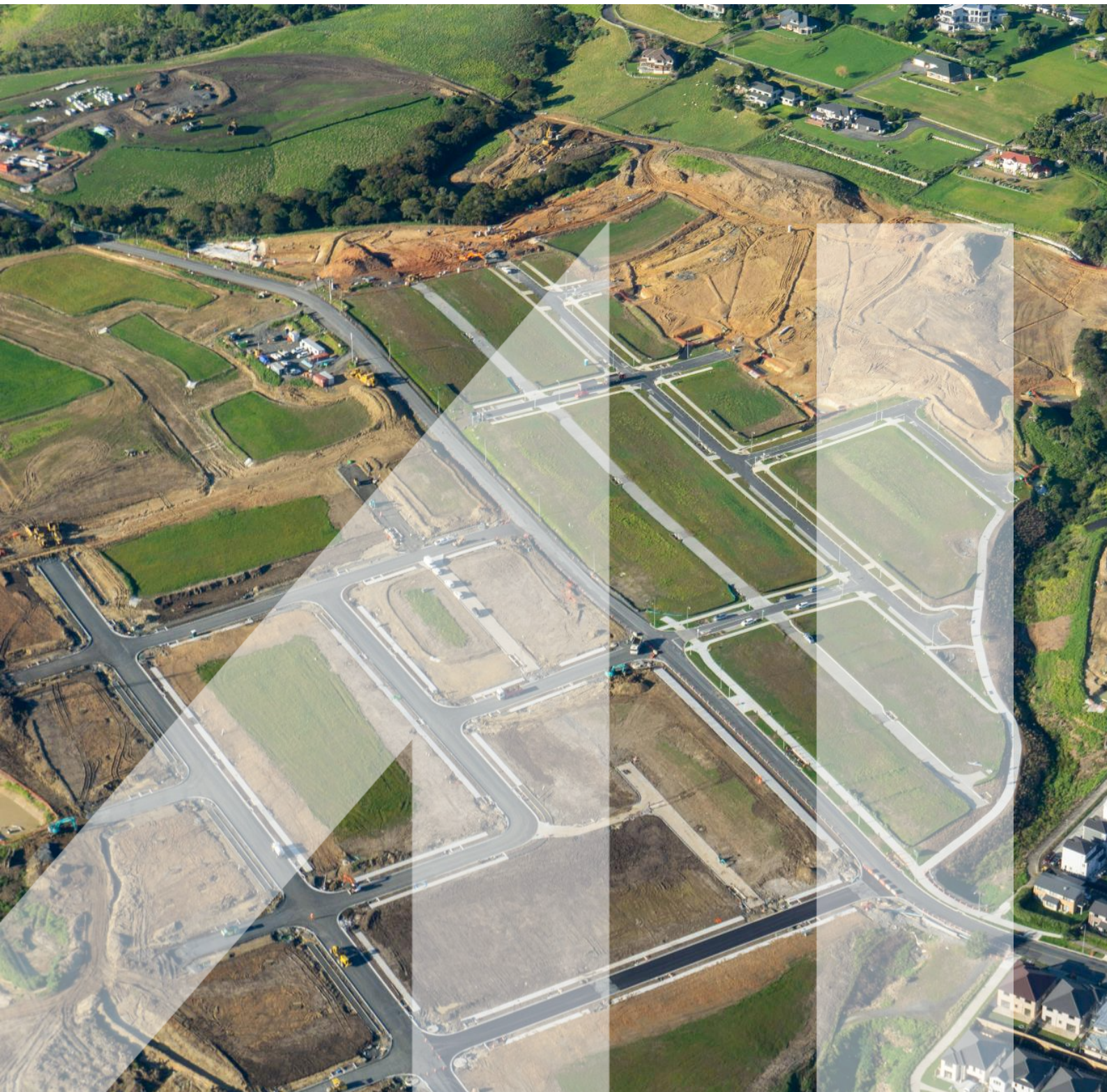


Whenuapai Green Integrated Transport Assessment



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Appendices

Appendix A. Vehicle Tracking Diagrams

Appendix B. Road Cross Sections

Whenuapai Green Integrated Transport Assessment

Quality Assurance Information

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1. Introduction

The Neil Group Limited commissioned Abley Limited (Abley) to prepare an Integrated Transportation Assessment (ITA) report with respect to a Fast Track Consent Application at 98-102 Totara Road, Whenuapai in Auckland. The proposal is to establish a mix of Residential - Mixed Housing Urban zone. This land is currently zoned as Residential – Future Urban.

The purpose of this ITA is to evaluate the potential transportation related effects of the development on the future receiving environment. In accordance with Auckland Transport's Integrated Transport Assessment Guidelines 2015, the need for a full Integrated Transport Assessment (ITA) is triggered for an application where the total number of dwellings is 120 or greater.

As the application is expected to yield 346 dwellings, a full ITA is required. The ITA includes the estimated traffic volumes associated with the likely yield of dwellings in order to understand how the proposal may affect the transport network.

The Neil Group Limited has completed the consent level design of the development. The design includes new public roading upgrades and vehicles access/parking areas which has been assessed in this ITA as well.

In preparing this review Abley has taken into consideration the following documents:

- The Whenuapai Structure Plan maps and movement network, prepared by Auckland Council
- The Whenuapai Structure Plan Integrated Transport Assessment (Structure Plan ITA), prepared by Flow, dated August 2016.
- The Whenuapai 3 Precinct Plan (Plan Change 5) Integrated Transport Assessment (PC5 ITA), prepared by Flow, dated June 2017.
- The proposed Whenuapai - Totara Road Structure Plan map
- Plan Change 5 and 69 documentation and hearing materials.

And the following planning materials were referred to for additional background:

- The Auckland Unitary Plan – Operative in Part (AUPOP)
- The Auckland Regional Land Transport Plan 2021 – 2031 (RLTP)
- The Northwest Area Indicative Strategic Transport Network, prepared by Te Tupu Ngātahi Supporting Growth
- Auckland Council's Long-Term Plan 2021 – 2031 (LTP)
- Auckland Council's Future Urban Land Supply Strategy 2017.

2. Planning Background

Whenuapai and the wider geographical area is part of Auckland Council's 2017 Future Urban Land Supply Strategy that outlines growth expectations and timelines for Auckland's development areas. Whenuapai Stage 2 is indicated in the 'First Half Decade Two (2028-2032)' range of development areas. There is also a Whenuapai live zone which is already consented and under construction, and Whenuapai Stage 1, which roughly correlates to Plan Change 5, described later in this report. The numbers of dwellings are indicatively shown as follows:

- Whenuapai live zone, 1150 dwellings

- Whenuapai Stage 1; 6,000 dwellings
- Whenuapai Stage 2; 11,600 dwellings

2.1 Whenuapai Structure Plan

The proposed development site falls within the Whenuapai Structure Plan area. The Whenuapai Structure Plan and its current progress are described below in order to build an understanding of the baseline that will inform any transport assessment of the proposal.

The Whenuapai Structure Plan was published by Auckland Council in September 2016. It outlines the Council's vision for Whenuapai in terms of land use activities, transport networks including public transport, and other elements of infrastructure and urban form. The large area covered by the Structure Plan requires a staged development approach that is intended to be realised through the statutory plan change process. The Structure Plan Integrated Transport Assessment (ITA) published by Flow in August 2016 outlines the transport aspects of the Whenuapai Structure Plan, including the density and location of land use activities and their relation to transport facilities, and the proposed transport network in the structure plan area, and how this connects to the wider network.

The Structure Plan ITA identifies the investments in infrastructure that will be necessary to accommodate the growth in demand associated with the Whenuapai Structure Plan as it is enacted. These include walking and cycling facilities, public transport routes and connections, and roading projects within the structure plan area as well as regional projects (associated with other planning programmes) that the structure plan will rely upon. In particular, the ITA outlines likely growth level triggers and the investments required to support those triggers.

The Whenuapai Structure Plan area and staging as per the 2016 Auckland Council documentation is shown in Figure 2.1

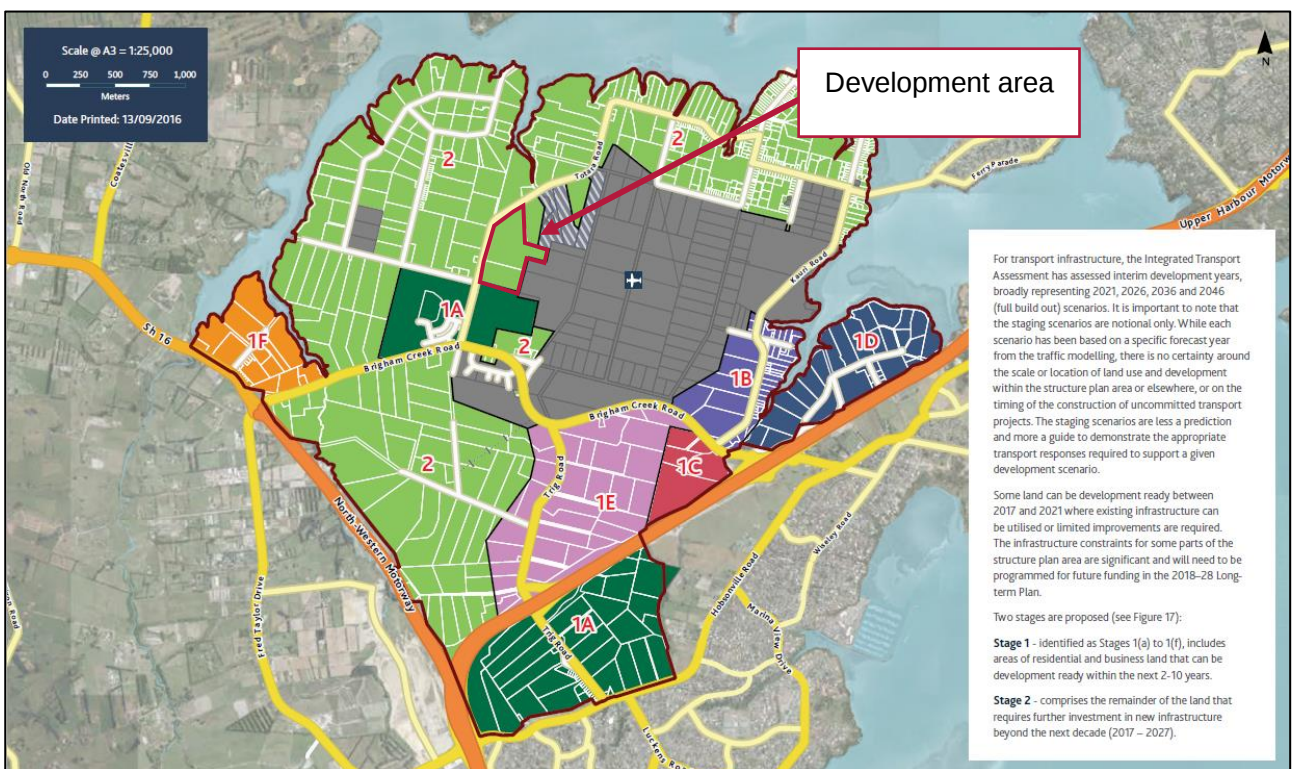


Figure 2.1 Whenuapai Structure Plan Staging (Auckland Council)

This proposal is located within an area forming part of Stage 2 of the Whenuapai Structure Plan. Stage 2 areas are indicated as being those requiring investment in infrastructure likely to be funded beyond 2027. This is consistent with the Future Urban Land Supply Strategy. It is noted that the Totara Road area is indicated in the Structure Plan as 'Medium Density Residential'.

The scenarios identified in the Structure Plan ITA each include:

- A scenario year for background growth based on the Auckland Regional Transport (ART) model;
- Land use assumptions for the scenario for Whenuapai, with the numbers of dwellings including those existing (ie outside the Future Urban Zone) and consented, such as the dwellings under construction on Totara Road between Brigham Creek Road and Dale Road;
- Development assumptions for adjacent areas, such as the consented Plan Change 14 in Hobsonville, dwellings in Hobsonville Point, Riverhead, Redhills and Kumeu/Huapai, and employment numbers in those areas.
- A list of transport investments that are considered required for the assumed land development figures.

In order to identify what transport investment needs are likely to be triggered by the development, any existing plan changes should be considered as a baseline, and the proposed development levels superimposed on that baseline.

3. Existing Land Use and Transport Environment

3.1 Site location and land use

The proposal site is shown in Figure 3.1. The site is over two parcels of land which are 98-100 Totara Road and 102 Totara Road. The site currently is mostly farmland and used for rural activities with only a few dwellings present.

Approximately 200m and 500m south of the site is residential mixed housing and the Whenuapai town centre respectively. Adjacent to the site to the east is the Whenuapai Royal New Zealand Air Force Base. North and west of the site is zoned as a future urban zone.



Figure 3.1 Site locality

3.2 Description of site frontage roads

Totara Road

Totara Road is a 3.5km long road which connects to Bringham Creek Road on its southern end and Waimarie Road on its north-eastern end. Totara Road is classified as a collector within Auckland Geomaps.

The cross section of the road is different along the length of the road. For the Bringham Creek Road to Dale Road section, the road is in an urban form and features one 3m wide lane in each direction with a 2.5m wide flush median in centre of the road. There are 1.4m separated cycleways and 1.8m footpaths along both sides as well. The cycleways terminate at this intersection. Frequent pedestrian refuge island crossings are present along this section of the road.



Figure 3.2 Totara Road Layout (Urban) (source: Google Maps)

Totara Road between Dale Road and Waimarie Road is currently formed as a rural road. For this section, the road features one lane 3m in each direction, with limited shoulders from 2m wide on either side of the road. There are no cycle facilities, and the 1.2m wide footpath is only on one side of the road (on the opposite side to the development site).



Figure 3.3 Totara Road Layout (Rural) (source: Google Maps)

McCaw Avenue

McCaw Avenue is a local residential road within Auckland Council Geomaps. The carriageway width is 6m which allows for two-way traffic flow but there is no marked centreline on the road. There are no cycle facilities present. Footpaths are provided on both side of the road which are 1.8m in width. There are frequent indented parking bays for vehicles and speed tables within the carriageway to encourage lower speeds roughly every 70m.



Figure 3.4 McCaw Avenue Layout (source: Google Maps)

3.3 Nearby intersections

McCaw Avenue, Dale Road and Totara Road

The intersection of McCaw Avenue, Dale Road and Totara Road is formed as crossroads intersection with Totara Road being the main through road and having priority over the side roads McCaw Avenue to the east and Dale Road to the west. The McCaw Avenue approach is controlled via a Give-way control while the Dale Road approach is controlled via a Stop control. The flush median on Totara Road aids turnings movements into the side roads.

Brigham Creek Road, Mamari Road and Totara Road

The intersection of Brigham Creek Road, Mamari and Totara Road is a multi-lane signalised intersection with three approach lanes for right, through and left turning movements and two exit lanes on Brigham Creek Road. Both Totara Road and Mamari Road approaches have two approach lanes for through/right turning vehicles and left turning vehicles with one exit lane. Each approach has cycle stop boxes in front of the approach lanes.

3.4 Speed limits

Existing speed limit

The existing speed limits for the roads in the vicinity of the development are:

- Totara Road (between Brigham Creek Road and Dale Road) – 50 km/hr.
- Totara Road (between Dale Road and Waimarie Road) – 80 km/hr.
- McCaw Avenue – 50 km/hr.
- Dale Road – 50 km/hr for the section 45m on approach to the intersection of Dale Road and Totara Road. 80 km/hr further away from the intersection.

Future speed limits

Auckland Transport is in the process of reviewing speed limits on all of the roads in its jurisdiction. The following speed limits are proposed by AT¹ and at the time of writing are out to public consultation. It is anticipated that these will be adopted in 2023 subject to review of public consultation feedback and approval by AT board:

- Totara Road (between Dale Road and 275m north of McKean Road) – The speed is proposed to be reduced from 80 km/hr to 60 km/hr.
- Dale Road – The speed is proposed to be reduced from 80 km/hr to 60 km/hr for the section between Totara Road and Riverlea Road.

3.5 Existing traffic counts

An intersection turning movement traffic count was carried at the intersection of Totara Road and McCaw Avenue on 3rd May 2022. It was found that the morning peak hour for the intersection occurred between 8-9am and the evening peak hour occurred between 4:15-5:15pm. Table 3.1 is a summary of the two-way traffic flows for each leg at the intersection during both peak periods.

Table 3.1 Surveyed traffic volumes of the McCaw Avenue, Dale Road and Totara Road intersection

Road	Morning peak hour (vph) (Surveyed)	Evening peak hour (vph) (Surveyed)
Totara Road (northern leg)	151	149
Totara Road (southern leg)	234	262
McCaw Avenue	14	7
Dale Road	89	136
Total	488	554

Mobile Roads² was used to retrieve the Average Daily Traffic (ADT) of the surrounding roads of the wider network in proximity to the site. These are listed with Table 3.2.

Table 3.2 ADT of the surrounding network

Road	Year	ADT
Totara Road	2020	2,924
Dale Road	2022	1,387
McCaw Road	2020	125
Brigham Creek Road	2022	11,544
Riverlea Road	2020	572

¹ <https://at.govt.nz/about-us/have-your-say/proposed-speed-limit-changes-phase-three/full-list-of-new-speed-limits-phase-three/>

² <https://www.mobileroad.org/>

3.6 Current road safety record

A search for reported crashes was carried out for the period 2016 to 2022 (including all available crashes available for 2022) using New Zealand Transport Agency's Crash Analysis System (CAS) on the roads and intersections relevant to the development. The following is a summary of findings.

- The search returned no crash results for the sections of Totara Road and McCaw Avenue fronting the development site.
- At the intersection of Totara Road and McCaw Avenue, the search returned one non-injury crash from 2017. The crash occurred when a driver attempted a U-turn manoeuvre at the intersection and a second vehicle crashed into the side of the turning vehicle.

Therefore, based on the above, it can be said that there are no existing crash trends present on the roads, and the assessment does not indicate underlying safety issues in the immediate vicinity of the development site.

3.7 Transport Accessibility

Public transport access

The closest bus stops are located at the intersection of McCaw Avenue and Totara Road, 550m south of the development. It is a 6-minute walk from the edge of the site to the bus stop. There is currently one bus route that operates along this road which Route 114. The 114 route connects the Westgate bus interchange with Hobsonville Point. The Hobsonville ferry service can be accessed from Hobsonville Point which provides a link to Auckland CBD. The public transport network in the vicinity of the site can be found in Figure 3.5.



Figure 3.5 Public Transport Network

Private vehicle access

The site is located boarding Totara Road which connects to Brigham Creek Road to the south. Brigham Creek Road is an east to west connection that links to State Highway 18 used to travel to the North Shore on its eastern end, and State Highway 16 used to travel into the Auckland CBD and Kumeu to the southeast and northwest respectively on its western end. Therefore, the site is well connected to the State Highway network.

Figure 3.6 shows the sites proximity to local destinations. The Whenuapai shopping area is within a 1-2 minute drive, 3 minute cycle ride and 12 minute walk and Whenuapai School is within a 2 minute drive, 5 minute cycle ride and 16 minute walk from the edge of the site on Totara Road.

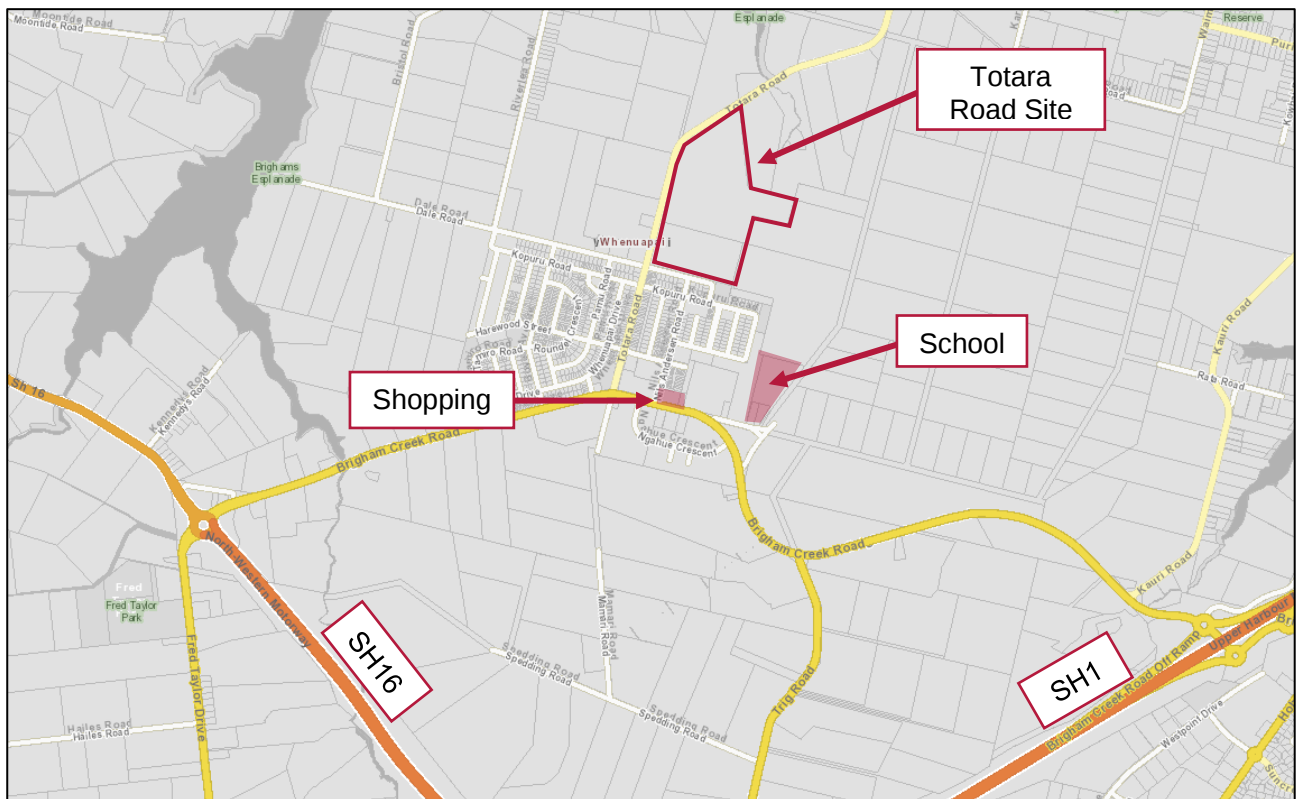


Figure 3.6 Local Area

Walking and cycling access

In terms of the local area, Totara Road for the section directly adjacent to the subject site currently does not provide any cycle facilities. Footpaths are currently also only present on the west side of the road. The cycling and pedestrian infrastructure on Totara Road south of McCaw Avenue is much better, with footpaths and separated cycle lanes provided on both sides of the road. Therefore, the site is currently not well connected for walking and cycling access and development of the subject site will require investment into improving the existing facilities for active users on Totara Road adjacent to the site which will be delivered as part of the proposal.

Regarding the wider network, south of McCaw/Dale Road, Totara Road has protected cycle lanes up until the intersection with Brigham Creek Road. Brigham Creek Road to the East has a shared path continuing to SH18 where it links with Hobsonville. The protected cycleways continue west along Brigham Creek Road, where cyclist can travel along SH32 which connects to further cycling infrastructure (e.g. on-road cycle lanes and shared paths) that lead to the Auckland CBD.

Figure 3.7 shows the cycling facilities in the wider area.

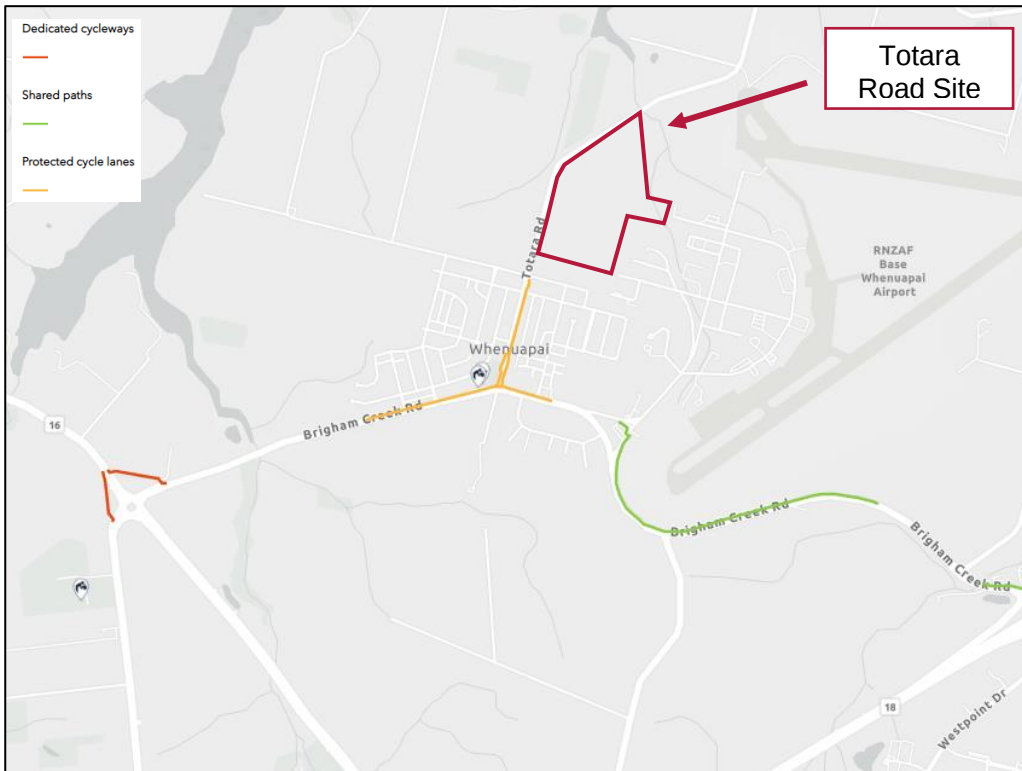


Figure 3.7 Local Cycling Infrastructure

4. Planned Future Upgrades

4.1 Spedding Block Plan Change 69

A notified decision to approve the Spedding Block Private Plan Change (PC69) was made on the 11th November 2022. The PC69 site is located south of Brigham Creek Road to the southwest of Whenuapai. The plan change seeks to rezone approximately 52 hectares of land at 23-27 & 31 Brigham Creek Road and 13 & 15-19 Spedding Road, Whenuapai from Future Urban Zone to Business – Light Industry Zone and to introduce a new precinct within the Auckland Unitary Plan (Operative in Part) 2016. The location of the site is located within Figure 4.1.

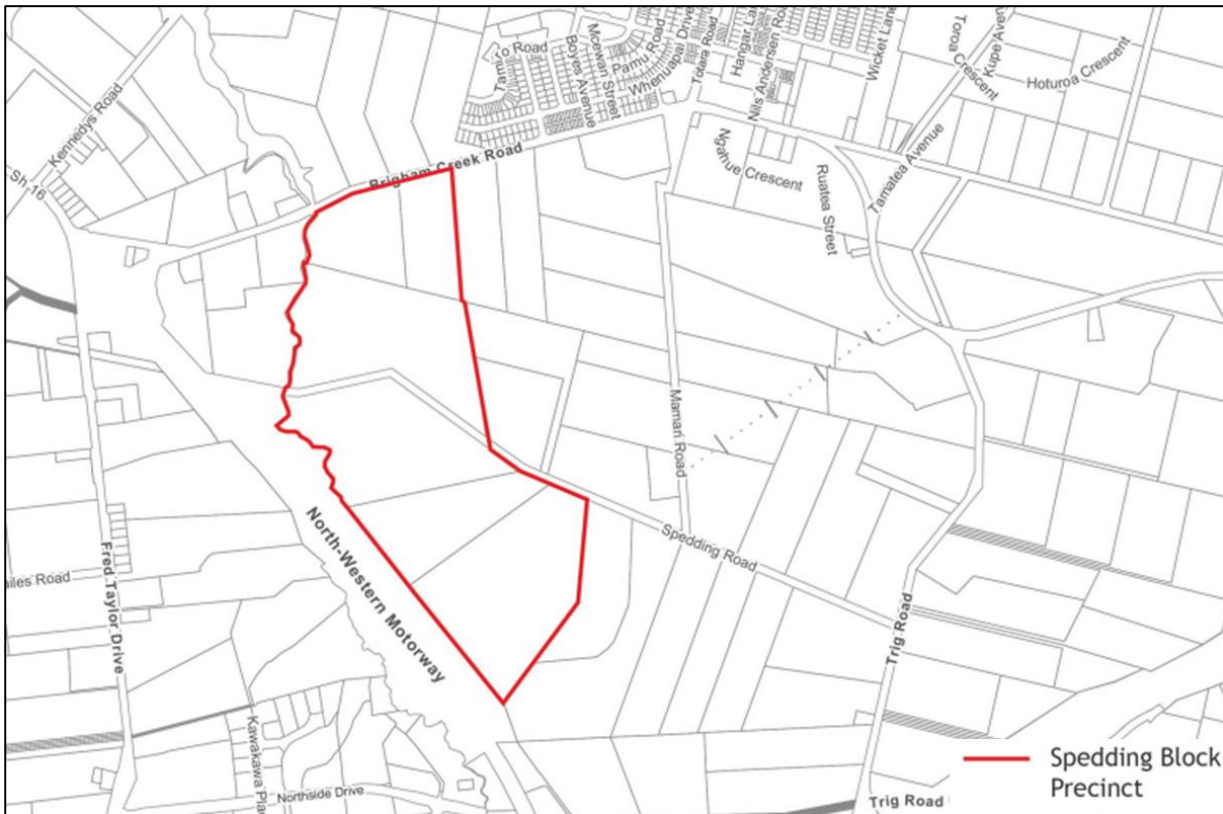


Figure 4.1 Location of PC69

4.2 SH16 Brigham Creek to Waimauku Safety Improvements

Waka Kotahi have planned safety improvements³ for the SH16 stretch between Brigham Creek Road to Waimauku. The Brigham Creek Road and SH16 roundabout has been included as part of the planned upgrades which includes an extension of the northbound merge length which will result in a substantial improvement in the capacity and performance of the roundabout especially when northbound flows are high such as in the evening peak period. Other improvements include a signalised crossing, shared path, additional bus stops and a flexible median barrier.

These upgrades are currently in the design phase with construction expected to occur during 2024/early 2025.

4.3 North West Auckland Transport Upgrades

Te Tupu Ngātahi Supporting Growth has a Northwest Area indicative strategic transport network for the next 10 to 30 years shown in Figure 4.2. Regarding the proposed site, Brigham Creek Road is proposed to be widened to accommodate walking, cycling and public transport. The existing roundabout at the western end will be upgraded to an interchange providing access to potential future rapid transit network, walking and cycling corridor. All improvements are subject to technical assessments which are currently being prepared.

³ <https://www.nzta.govt.nz/projects/sh16-brigham-creek-and-waimauku/>

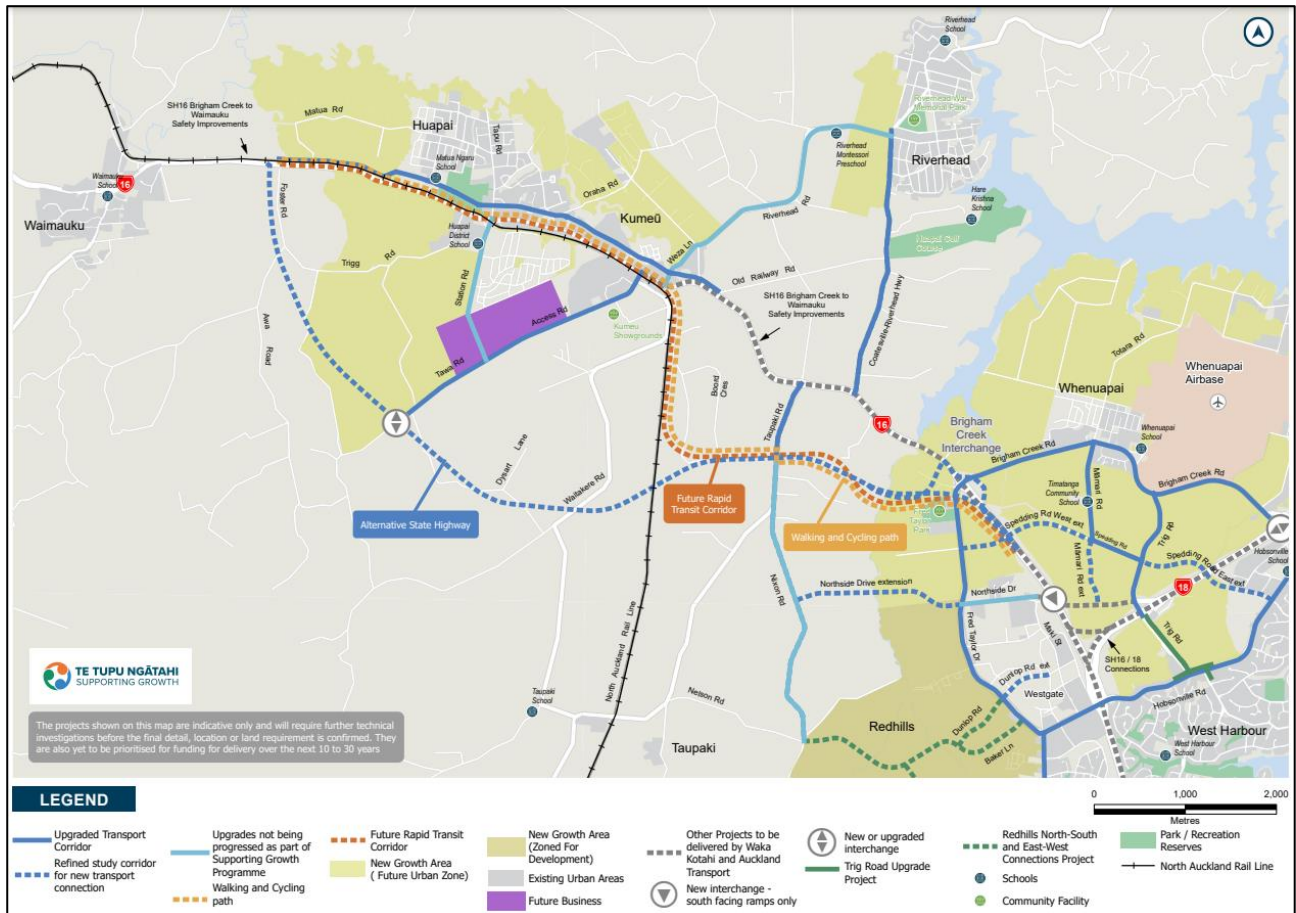


Figure 4.2 North West Auckland strategic connections map

Other key features of the Brigham Creek Road include:

- Increase to four vehicle lanes
- Walking and cycling facilities on both sides of the road
- A bus every 7 minutes to and from the Whenuapai town centre in peak times
- Speed limit reduced to 50km/h

These upgrades are labelled as greenfield transport infrastructure for Northwest (AT) and Northwest Growth Improvements with the Regional Land Transport Plan (2021-2031). The purpose of the project is to support high priority greenfield growth areas including Whenuapai and will cost a total of 142 million across a 10 year period (2021/22 – 2030/31).

4.4 Whenuapai Structure Plan

The Whenuapai Structure plan was discussed in section 2.1 of this report, and includes the following key transport projects:

- completion of the Western Ring Route to provide an alternative route to State Highway 1
- extension of the North Western Cycleway to Westgate
- a new interchange at the State Highway 16/Brigham Creek Road roundabout

- a new bus interchange and park and ride facility at Westgate
- bus shoulder lanes on State Highway 16 south of Westgate
- additional lanes along parts of State Highway 18
- Brigham Creek Road improvements including realignment
- Improvements to State Highway 16 between Brigham Creek Road and Waimauku (see section 4.2)
- State Highway 16 and State Highway 18 busways

Totara Road is outlined to include a bus route travelling past the development site and it is noted that this corridor currently has regular bus services. This is shown in Figure 4.3.

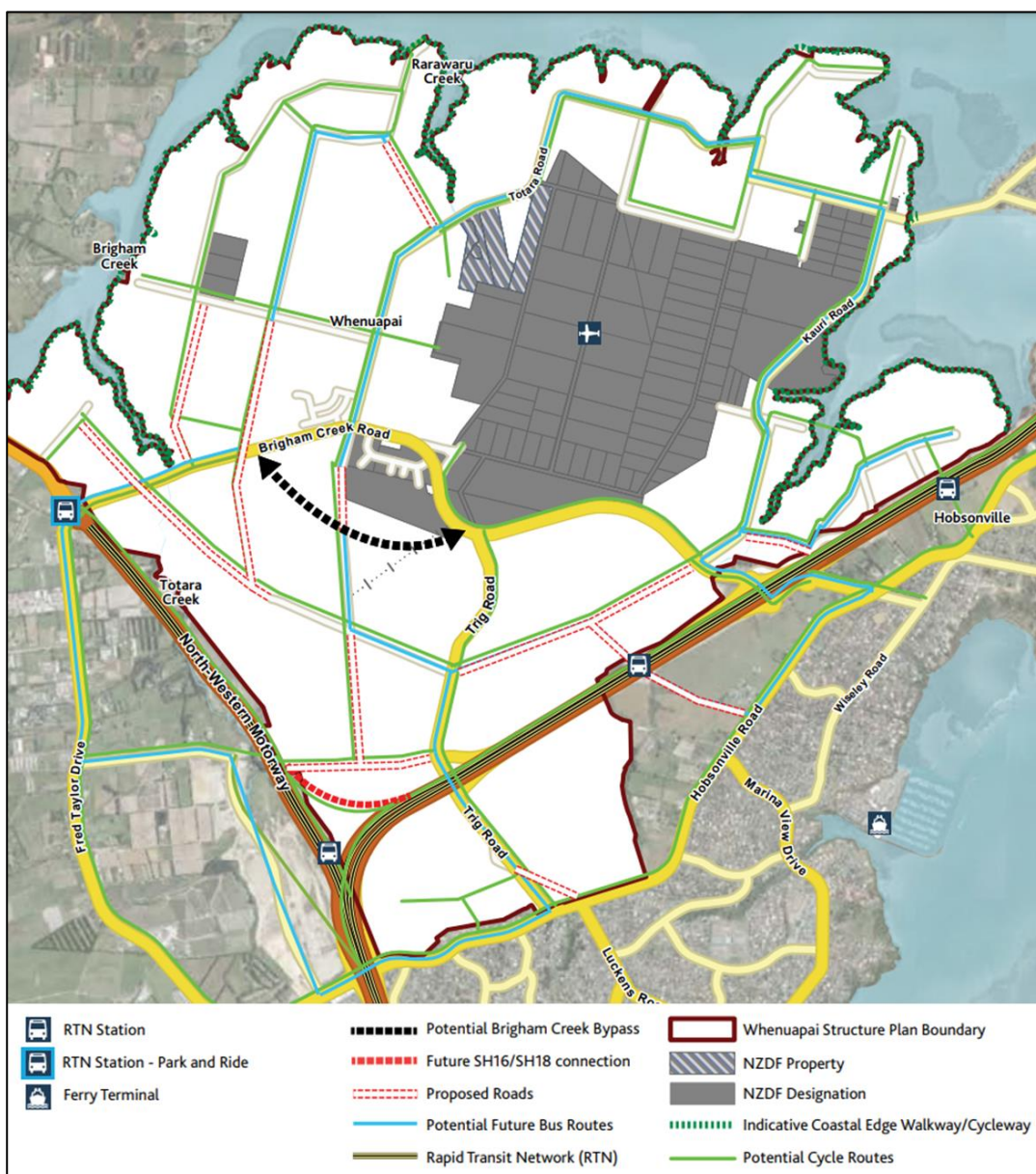


Figure 4.3 Future Public Transport Plan

5. The Proposal

The proposal includes establishing a residential development at 98-102 Totara Road in Whenuapai, Auckland. The site covers approximately 16.4 hectares of currently Residential – Future Urban zone land and is proposed to include 346 dwellings.

The proposed layout of the site shown in Figure 5.1 and includes a connection to McCaw Avenue and three connections to Totara Road. A potential school site is also proposed at its northern end of the site boundary.

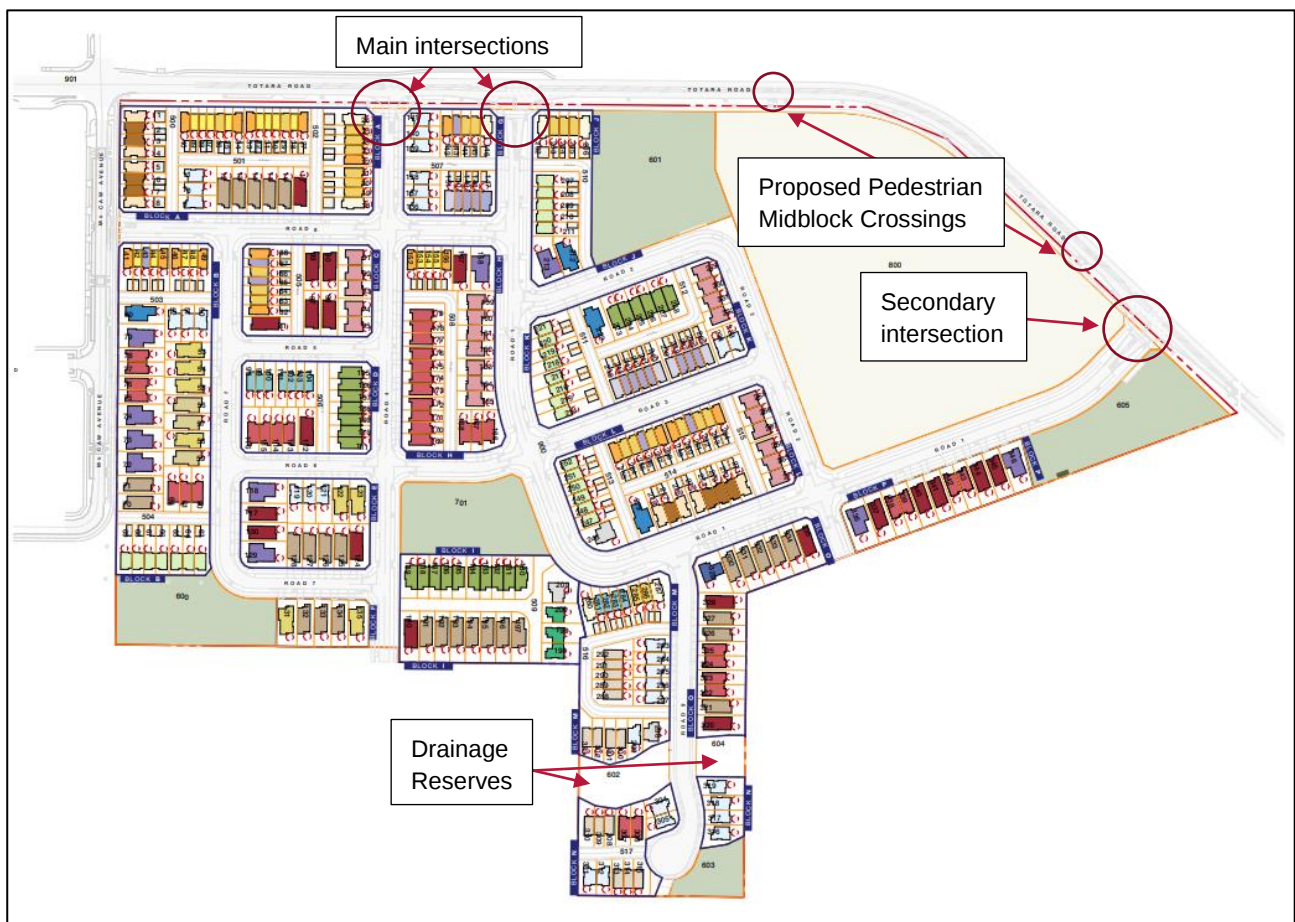


Figure 5.1 Site Layout

Road cross sections as prepared by The Neil Group team are included in Appendix B and are appropriate for the environment including the provision of a 1.8m footpath on both sides of the roads within the site. Roads will be classified as local roads, having a lane width of at least 2.7m and a 1.3m to 2.2m wide berm separating the carriageway from the footpath.

Road upgrades to Totara Road are also part of the proposal which looks to widen the carriageway, install new pedestrian midblock crossing points (shown in Figure 5.1), and reduce the speed limit from 80km/h to 50km/h and include a 1.8m separated footpath and 2m cycleway on the east side of the road. A 2.5m flush median is proposed to be installed on Totara Road along the site frontage.

The internal roading is proposed to include traffic calming and include a posted legal speed limit of 30 kph to provide a safe environment for all cyclists and pedestrians. Footpaths will be provided on both sides of the internal roads. Commonly Owned Access Lots (COALs) are provided for many of the lots

to reduce the number of vehicle crossings on the internal roading. This further improves pedestrian safety throughout the development by reducing the likelihood of conflicts in pedestrian areas.

6. Travel Characteristics and Trip Generation

6.1 Trip Generation

The development is medium density which is anticipated to have a trip rate of 0.6 vehicle driver trips in morning and evening peak hours and is consistent with the assessment in the 'Whenuapai Plan Change Stage 1 Technical Inputs' report prepared by Flow for Plan Change 5. This trip rate is also consistent with the RTA *Guide to Traffic Generating Developments* being at the upper end of medium density residential flats peak hour trip rate for three bedrooms or more (typically townhouses).

The development is proposed to have 346 dwellings which will generate 208 trips during peak hour and 2,080 trips per day (assuming peak hour trip rates are 10%).

6.2 Wider Network

Waka Commuter has been used to understand the distribution of vehicles within the wider network and the existing travel patterns within Whenuapai. Trips that stay local within Whenuapai make up 40% of all trips with 60% of trips being outside the network. The trip distribution on the wider network has been calculated using the Whenuapai departures based on Statistical Area locations and the likely route used to travel. These have been stated as percentage splits for Kumeu-bound, Northbound and Citybound traffic in Figure 6.1 and Figure 6.2.

Directional split has been assumed to be an approximate 70/30 morning peak and 60/40 evening peak based on industry standard practice. Figure 6.1 and Figure 6.2 show the predicted trip distribution of the development based on a peak hour trip generation rate of 208 trips and the departure patterns within Waka Commuter.

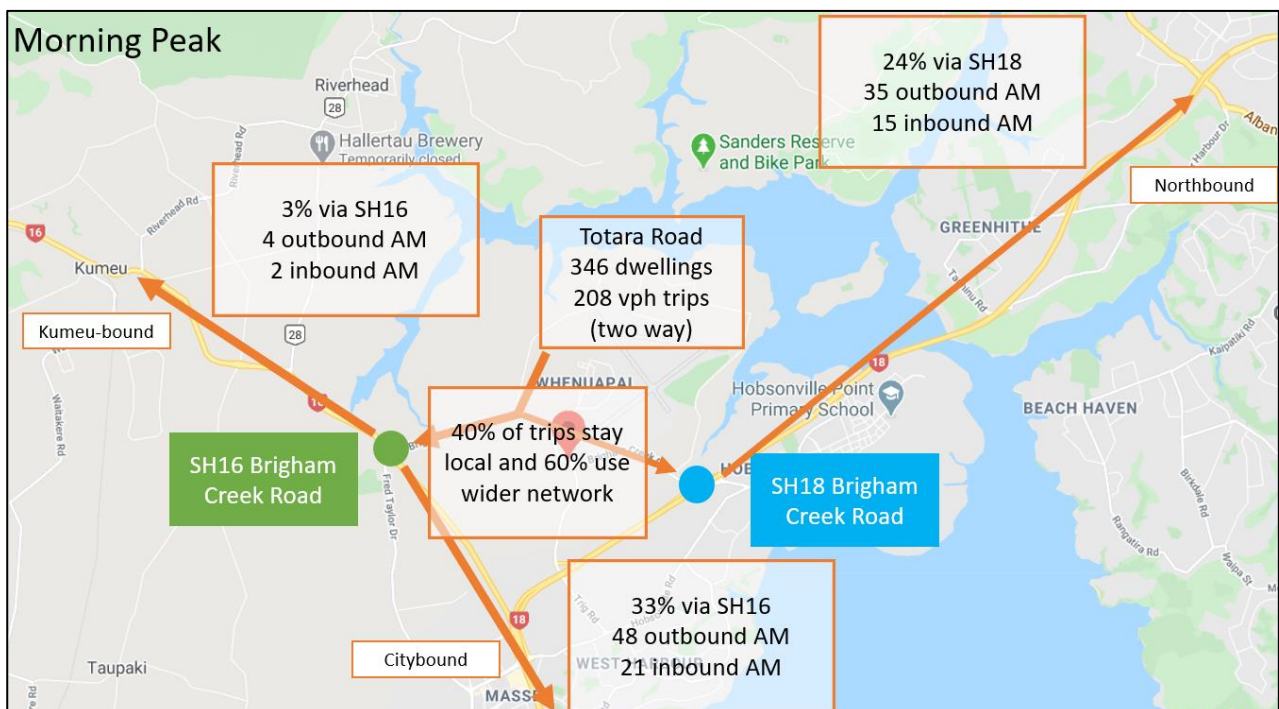


Figure 6.1 Trip distribution of development trips for morning peak

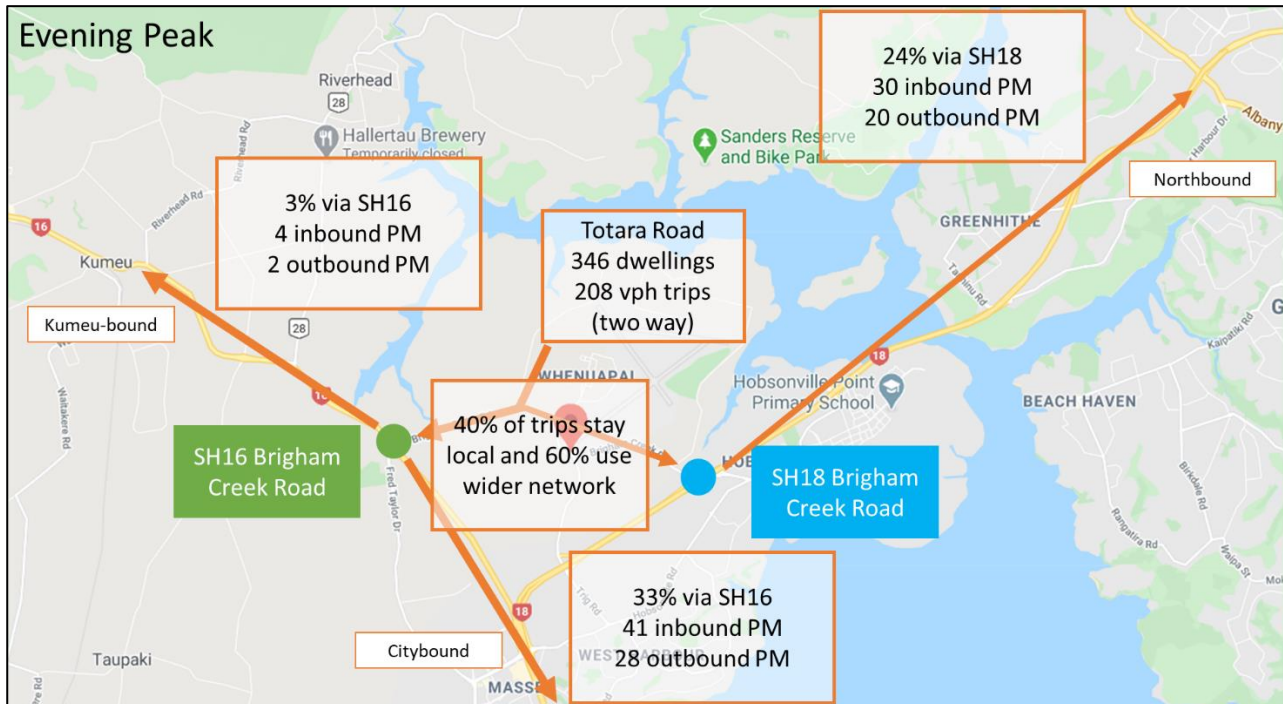


Figure 6.2 Trip distribution of development trips for evening peak

Based on the assessment above, there will be one vehicle every 43 seconds using the SH16 / Brigham Creek Road intersection and one vehicle every 65 seconds using the SH18 / Brigham Creek Road intersection for both peak periods. This is unlikely to have any noticeable effects as SH16 / Brigham Creek Road intersection which is estimated to accommodate up to 3,480 vehicles and SH18 / Brigham Creek Road intersection is estimated to accommodate up to 1,050 vehicles during peak hours⁴.

The impacts of additional traffic associated with the development are most likely to impact on the following two intersections:

- Totara Road / Dale Road / McCaw Avenue priority (give way) control intersection; and
- Brigham Creek Road / Totara Road / Mamari Road signalised intersection.

6.3 Totara Road, Dale Road, and McCaw Avenue intersection

Most traffic generated by the development will be travelling through the Totara Road / Dale Road / McCaw Avenue intersection which is located at the southern end of the development site with Totara Road being the primary connection to the wider transport network. This intersection has existing right turn bays installed on a flush median on Totara Road to enable right turning vehicles to queue and not impede left turning or through traffic.

A survey has been undertaken to collect intersection turning movements. This was conducted using video footage and analytics observing activity at the intersection on the 3rd May 2022 between the hours of 6am and 9am, and 3pm to 6pm. The peak hour was determined based on the highest number of trips within a given hour between the stated time periods as counts were recorded in 15-minute intervals. Morning peak is 8am to 9am and evening peak is 4:15pm to 5:15pm. The results of the survey for peak hours are within Table 6.1. These vehicle movements are the baseline without the development vehicle trips and are the basis for the modelling inputs.

⁴ <https://www.mobileroad.org/desktop.html>

Table 6.1 Vehicle movements at Totara Road, Dale Road, and McCaw Avenue intersection

Movement	AM				AM Total	PM				PM Total
	Cars	Trucks	Buses	Cyclists		Cars	Trucks	Buses	Cyclists	
Totara Rd (North)	83	8	2	9	102	61	1	3	1	66
Left into McCaw Ave	1	0	0	4	5	1	0	0	0	1
Thru to Totara Rd (South)	82	8	2	4	96	57	1	3	1	62
Right into Dale Rd	0	0	0	1	1	3	0	0	0	3
McCaw Ave	6	1	0	0	7	5	0	0	1	6
Left into Totara Rd (South)	5	0	0	0	5	1	0	0	0	1
Thru to Dale Rd	0	1	0	0	1	1	0	0	0	1
Right into Totara Rd (North)	1	0	0	0	1	3	0	0	1	4
Totara Rd (South)	64	9	1	0	74	118	22	2	4	146
Let into Dale Rd	21	5	0	0	26	54	17	0	1	72
Thru to Totara Rd (North)	41	4	1	0	46	63	5	2	3	73
Right into McCaw Ave	2	0	0	0	2	1	0	0	0	1
Dale Rd	53	4	0	4	61	54	2	0	4	60
Left into Totara Rd (North)	2	0	0	0	2	4	0	0	2	6
Thru to McCaw Ave	0	0	0	0	0	1	0	0	0	1
Right into Totara Rd (South)	51	4	0	4	59	49	2	0	2	53
Total	206	22	3	13	244	238	25	5	10	278

The video survey results have been scaled up based on the following assumptions to represent the predicted traffic volumes for 2032:

- Through traffic has been increased by 3% per annum;
- Movements to and from Dale Road have been doubled to reflect the increase in activity associated with ongoing development fronting onto the south side of Dale Road; and
- No further intersection upgrades will occur at this intersection.

Modelling has been undertaken within SIDRA for three different scenarios including;

- 2022 Base - traffic volumes from the video survey;
- 2032 Base – uses the 2022 base traffic volumes with the above assumptions applied; and
- 2032 Development - the 2032 base traffic volumes with the peak hour trip generation applied. All traffic generated from the development is assumed to be through traffic on Totara Road.

The SIDRA model traffic volumes have been summarised in Table 6.2 below.

Table 6.2 Totara Road, Dale Road, and McCaw Avenue modelled traffic volumes

Road	Movement	2022		2032			
		Base		Base		Development	
		AM	PM	AM	PM	AM	PM
Totara Road South	Left	26	71	52	142	52	142
	Thru	46	70	60	91	102	216
	Right	2	1	2	1	2	1
McCaw Avenue	Left	5	1	5	1	5	1
	Thru	1	1	2	2	2	2
	Right	1	3	1	3	1	3
Totara Road North	Left	1	1	1	1	1	1
	Thru	92	64	120	80	287	163
	Right	1	3	1	6	1	6
Dale Road	Left	2	4	4	8	4	8
	Thru	1	7	2	2	1	2
	Right	55	54	110	102	110	102
Total		233	280	360	439	568	647

The key metrics used to assess the performance of the intersections includes the average delay per vehicle and intersection level of service. A general description of level of service is shown in Table 6.3. It is noted that ideally in peak commuter conditions LOS E or better (LOS A-D) is preferable however LOS F is not atypical in the Auckland urban area during peak hours.

Table 6.3 Level of Service (LOS) general descriptions

Level of Service Band	General Traffic Flow Description
LOS A	Primarily free-flow operation
LOS B	Reasonably unimpeded operation
LOS C	Stable operation
LOS D	A less stable condition in which small increases in flow may cause substantial increases in delay and decreases in travel speed
LOS E	Characterised by unstable operation and significant delay
LOS F	Characterised by flow at extremely low speed. Congestion is likely occurring at the boundary intersections, as indicated by high delay

The peak hour delays and associated LoS by movement at the intersection are summarised within Table 6.4. The Totara Road, Dale Road, and McCaw Avenue intersection operates at a LoS of A for each scenario including the 2032 with development scenario under the assumption that there will be no intersection upgrades. The maximum delay will be 7.1 seconds on the Dale Road right hand turn approach.

Table 6.4 Totara Road, Dale Road, and McCaw Avenue intersection LoS and Delay

Road	2022				2032							
	Base AM		Base PM		Base AM		Base PM		Development AM		Development PM	
	LoS	Delay	LoS	Delay	LoS	Delay	LoS	Delay	LoS	Delay	LoS	Delay
Totara Road South	A	1.8	A	2.4	A	2.3	A	3.0	A	1.7	A	2.0
McCaw Avenue	A	5.1	A	4.9	A	5.4	A	5.1	A	6.8	A	6.1
Totara Road North	A	0.1	A	0.3	A	0.1	A	0.4	A	0.1	A	0.3
Dale Road	A	5.3	A	5.2	A	5.7	A	5.8	A	7.1	A	7.0

The 2022 scenario delay outputs from the SIDRA modelling corresponds to the observed performance of the intersection during peak times from reviewing the video footage captured by Team Traffic during the survey. The intersection was observed to be largely being free-flowing with very few cars experiencing stop-line delays.

The maximum delay output is 9.6 seconds for the through movement on McCaw Road and 7.1 seconds for the right turn approach on Dale Road within the 2032 with development scenario. The maximum queue length is 4m during the morning peak for the right turning traffic and through movement vehicles on Dale Road within the 2032 with development scenario, which is no more than one vehicle.

6.4 Totara Road, Brigham Creek Road and Mamari Road intersection

The Totara Road, Brigham Creek Road and Mamari Road signalised intersection has also been assessed at the request of Auckland Transport. This is somewhat more remote from the site however the majority of traffic associated with the development will continue to travel through this intersection to access the wider transport network. This intersection was assessed in the transportation modelling

report for the PC69 Spedding Block Plan Change, and the anticipated traffic volumes and intersection performance is documented in a report prepared by Stantec. The future 2028 traffic volumes including PC69 and other anticipated development in the local area has been taken from the Stantec report and adopted as the basis for the assessment here.

The modelled traffic movements for the peak hours are shown in Table 6.5. These vehicle movements are considered to provide a robust and appropriate future baseline for the assessment of the proposed Totara Road development.

Table 6.5 Vehicle movements at Mamari Road, Brigham Creek Road intersection

Movement	AM		AM Total	PM		PM Total
	Cars	Heavy Vehicles		Cars	Heavy Vehicles	
Mamari Road (South)	3	0	3	3	0	3
Left into Brigham Creek Road (West)	1	0	1	1	0	1
Thru to Totara Road	1	0	1	1	0	1
Right into Brigham Creek Road (East)	1	0	1	1	0	1
Brigham Creek Road (East)	437	43	480	643	64	707
Left into Mamari Road	1	0	1	1	0	1
Thru to Brigham Creek (West)	422	42	464	606	60	665
Right into Totara Rd	14	1	15	37	4	41
Totara Rd (North)	472	12	484	242	6	248
Left into Brigham Creek Road (East)	201	5	206	91	2	93
Thru to Mamari Road	1	0	1	1	0	1
Right into Brigham Creek (West)	269	7	276	150	4	154
Brigham Creek Road (West)	767	75	841	695	68	763
Left into Totara Rd	146	15	160	216	21	237
Thru to Brigham Creek Road (East)	620	60	680	478	47	525
Right into Totara Rd (South)	1	0	1	1	0	1
Total	1677	130	1807	1583	138	1721

Modelling has been undertaken within SIDRA for two different scenarios including;

- 2028 Base - future baseline traffic volumes including PC69 from the modelling report by Stantec shown in Table 6.5 ; and
- 2028 Development - the 2028 base traffic volumes with the peak hour trip generation applied and shown in Table 6.6. To provide a conservative assessment it is assumed that all traffic generated by the development is assumed to be through traffic on Totara Road.

The SIDRA model traffic volumes have been summarised in Table 6.6.

Table 6.6 Mamari Road, Brigham Creek Road intersection modelled traffic volumes

Road	Movement	2032			
		Base		Development	
		AM	PM	AM	PM
Mamari Road	Left	1	1	1	1
	Thru	1	1	1	1
	Right	1	1	1	1
Brigham Creek Road East	Left	1	1	1	1
	Thru	464	665	464	665
	Right	15	41	57	125
Totara Road	Left	206	93	304	149
	Thru	1	1	1	1
	Right	276	154	332	186
Brigham Creek Road West	Left	160	237	183	284
	Thru	680	525	680	525
	Right	1	1	1	1
Total		1807	1721	2025	1939

The key metrics used to assess the performance of the intersections includes the average delay per vehicle and intersection level of service. A general description of level of service is shown in Table 6.3.

The peak hour delays and associated LoS by movement at the Totara Road, Brigham Creek Road and Mamari Road intersection are summarised within Table 6.7.

Table 6.7 Mamari Road, Brigham Creek Road intersection LoS and Delay

Road	2028							
	Base AM		Base PM		Development AM		Development PM	
	LoS	Delay	LoS	Delay	LoS	Delay	LoS	Delay
Mamari Road	D	52.1	C	34.6	E	58	D	40.4
Brigham Creek Road East	B	18.8	C	22	C	24.1	C	25.9
Totara Road	D	49.3	D	41.4	D	54.2	D	40.6
Brigham Creek West	C	29.3	C	23.4	D	32	C	21

The intersection performance in the future base and with development traffic is LOS E or better for all intersection approaches which demonstrates that the intersection performs well in the context of urban peak hour operation. The incremental delay as a result of development traffic is in the order of 3-6 seconds which is not considered to be noticeable to road users in the context of the length of a peak hour journey on the wider network which would generally be anywhere between 10 minutes and could potentially be upward of 60 minutes.

It is concluded that the intersection has sufficient capacity to accommodate the proposed development.

7. Vehicle Tracking

Team traffic have undertaken vehicle tracking for the development within Appendix A. A summary of the vehicle tracking is as follows:

- The proposed COALs are wide enough to accommodate 85th percentile vehicle tracking curves for garage parking spaces in one manoeuvre;
- An 8.3m rigid vehicle can manoeuvre with the COAL;
- The proposed roads allow for two way flow between a 6.3m delivery van and a 10.3m rubbish truck even on the bends; and
- A 13.5m bus and 12.6m truck (no hitch) can both enter and exit the site via the main intersection on Totara Road. A 11.3m rubbish truck can enter and exit the site via the secondary access onto Totara Road.

8. Strategic Planning Framework

8.1 Regional Land Transport Plan (RLTP)

The Regional Land Transport Plan (2021-2031) lists Auckland's directions and focus areas to support the growth of Auckland over 10 years. It is important for the proposed development site to be consistent with the RLTP to support Auckland's overall strategic growth direction for land transport.

The primary directions are as follows:

- Better connected people, places, goods, and services.
- Increase genuine travel choices for a healthy, vibrant and equitable Auckland.
- Maximise safety and environmental protection.

The primary focus areas are as follows:

- Make better use of existing transport networks
- Target new transport investment to the most significant challenges
- Maximise the benefits from transport technology
- Better integrate land use and transport decisions
- Move to a safe transport network, free from death and serious injury
- Develop a sustainable and resilient transport system
- Make walking, cycling and public transport preferred choices for many more Aucklanders

The proposal is for residential development in a zone that is marked as Future Urban. The development is proposing an upgrade of Totara Road and bring it to a standard that will be safer for use by road users and also bring it closer in line with Auckland Transport's vision for the corridor in the future. Adequate road space is provided in the cross section of the Totara Road upgrade to allow for the construction of bus stops in the future. A footpath and separated cycleway is also proposed which will support active travel choice. Therefore, the proposal is considered consistent with the direction and focus of the RLTP.

8.2 Auckland Unitary Plan (Operative in Part) (AUPOP)

Abley has reviewed the proposal in accordance with the transport standards of the AUPOP.

The standards are listed below in Table 8.1 with comments on the compliance of the proposal with respect to each standard. This assessment will be included within the future Integrated Transportation Assessment (ITA) in support of the Whenuapai Green fast-track consent application.

Table 8.1 AUPOP Transportation Standards Assessment

Transport Rule in the AUPOP	Complies (Y/N)	Comment
E27.6.1 Trip Generation	N	There are 346 dwellings proposed under the development. This number of dwellings exceeds the new development threshold of 100 dwellings and hence a resource consent for trip generation is required.
E27.6.2 Number of Parking and Loading Spaces		
E27.6.2 (1-5) Number of Parking Spaces	Y	The number of parking spaces required: The parking minimums have been removed from the AUPOP in accordance with the National Policy Statement for Urban Development 2020. There are no parking minimum or maximum requirements that apply to the development. The number of parking spaces provided: Each dwelling is provided with at least one parking space and therefore the number of parking spaces provided complies with the standard.
E27.6.2 (6) Cycle Parking	Y	The following cycle parking requirements apply: - A requirement of 1 visitor cycle space per 20 dwellings applies to the development. - A requirement of 1 secure cycle space is required for every dwelling without a dedicated garage. The number of cycle parking spaces provided: - Visitor cycle parking will be possible on the individual lots being visited. - Most dwellings are provided with a dedicated garage for secure parking. For dwellings with no garage, secure cycle parking will be possible within the dwelling or rear yard of the lot but will be confirmed at a later stage. Therefore, the cycle parking provisions comply with the standard.
E27.6.2 (7) End of Trip Facilities	NA	No requirement for residential activities.

Transport Rule in the AUPOP	Complies (Y/N)	Comment
E27.6.2 (8) Number of Loading Spaces	N	The total GFA of all the residential dwellings combined is more than 5,000m ² and hence a dedicated loading space is required. No dedicated loading space is proposed and hence this standard is infringed.
E27.6.3 Design of Parking and Loading Areas		
E27.6.3.1 Size and Location of Parking Spaces	Y	There is adequate space provided on each lot to provide a standard parking space of 5m deep, minimum of 2.4m wide and manoeuvring area of 7.1m.
E27.6.3.2 Size and Location of Loading Spaces	NA	No loading space is proposed and hence this standard does not apply.
E27.6.3.3 Access and Manoeuvring	Y	All parking spaces will be located on a driveway for access from the road or a COAL. Adequate space is provided on each of the lots for access and manoeuvring areas that will accommodate the 85 th percentile AUP design vehicle.
E27.6.3.4 Reverse Manoeuvring	Y	All lots are formed on to local roads and will contain a maximum of up to two garage parking spaces and another two informal parking spaces on the driveways. Reverse manoeuvring from these lots is permitted for this number of parking spaces under this standard.
E27.6.3.5 Vertical Clearance	Will comply	All garages will comply with the minimum 2.1m vertical height clearance. No other vertical obstructions are proposed within the development.
E27.6.3.6 Formation and Gradients	Y	Development roads gradients Long sections of the new roads have been reviewed and the proposed gradients vary from flat to about 8%. Vertical curves have been provided to tie in changes in grade together to ensure a smooth vertical alignment for the roading network. Lot vehicle access gradients The maximum permitted gradient for any parking spaces is 1 in 20 (5%). The parking spaces formed in the garages will be flat and will comply. The parking spaces formed on the driveways will likely be on a slight grade which will comply with the requirements. Lot manoeuvring gradients The maximum permitted gradient for manoeuvring areas is 1 in 8 (12.5%). The proposed manoeuvring areas comply with this requirement. For lots manoeuvring on to the road to exit their lot, the grade of the road is at most 8% which is less than the maximum permitted grade of 12.5%.
E27.6.3.7 Lighting	Y	There are multiple new public roads proposed. The cross sections of these roads show street lighting which will ensure all the pedestrian, vehicle access, and manoeuvring areas will be adequately lit during the periods of darkness.
E27.6.4 Access		

Transport Rule in the AUPOP	Complies (Y/N)	Comment
E27.6.4.1 Vehicle Access Restrictions	N	Development roads vehicle access The roading networking within the development is proposed to link to existing roads in the vicinity of the site. All roads that the development will link to are not identified as arterial roads on the planning maps. Lot vehicle access The driveways for the individual lots located near the intersections within the development will have their vehicle access within 10m of the proposed intersections. Driveways are not permitted to be located within 10m of intersections and hence, this standard is infringed.

E27.6.4.2 Width and Number of Vehicle Crossings	N	Number of vehicle crossings One vehicle crossing per 25m of frontage is permitted. - The Totara Road frontage is 690m and there are three vehicle access points proposed. - The McCaw Avenue frontage is 310m and there are nine vehicle access points proposed. - Within the development there are multiple frontages. For half of the Blocks, there are more vehicle crossings proposed than permitted to comply with the 1 per 25m of frontage standard and hence there is an infringement. This is summarised in the table below: <table border="1"> <thead> <tr> <th>Lot</th><th>Crossings per Frontage</th><th>Compliant?</th></tr> </thead> <tbody> <tr><td>A</td><td>1 per 40m</td><td>Yes</td></tr> <tr><td>B</td><td>1 per 19m</td><td>No</td></tr> <tr><td>C</td><td>1 per 24m</td><td>No</td></tr> <tr><td>D</td><td>1 per 19m</td><td>No</td></tr> <tr><td>E</td><td>1 per 17m</td><td>No</td></tr> <tr><td>F</td><td>1 per 14m</td><td>No</td></tr> <tr><td>G</td><td>1 per 28m</td><td>Yes</td></tr> <tr><td>H</td><td>1 per 20m</td><td>No</td></tr> <tr><td>I</td><td>1 per 80m</td><td>Yes</td></tr> <tr><td>J</td><td>1 per 40m</td><td>Yes</td></tr> <tr><td>K</td><td>1 per 53m</td><td>Yes</td></tr> <tr><td>L</td><td>1 per 90m</td><td>Yes</td></tr> <tr><td>M</td><td>1 per 28m</td><td>Yes</td></tr> <tr><td>N</td><td>1 per 14m</td><td>No</td></tr> <tr><td>O</td><td>1 per 12m</td><td>No</td></tr> <tr><td>P</td><td>1 per 14m</td><td>No</td></tr> </tbody> </table> Width of vehicle crossings - The width of the public roads is 6m. - The width of the vehicle crossings serving single lots will be between 3 and 3.5m. - Some vehicle crossings for adjacent lots are to be combined into one. The width of these vehicle crossings is to be at most 6m. Separation between vehicle crossings - The proposed road connections are more than 2m away from vehicle crossings serving neighbouring sites and 6m away from any other vehicle crossing serving the development. - Vehicle crossings serving individual lots within the development are also 2m apart from the neighbouring lots with some vehicle crossings being combined which is acceptable.	Lot	Crossings per Frontage	Compliant?	A	1 per 40m	Yes	B	1 per 19m	No	C	1 per 24m	No	D	1 per 19m	No	E	1 per 17m	No	F	1 per 14m	No	G	1 per 28m	Yes	H	1 per 20m	No	I	1 per 80m	Yes	J	1 per 40m	Yes	K	1 per 53m	Yes	L	1 per 90m	Yes	M	1 per 28m	Yes	N	1 per 14m	No	O	1 per 12m	No	P	1 per 14m	No
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Transport Rule in the AUPOP	Complies (Y/N)	Comment
E27.6.4.3 Width of Vehicle Access and Queuing Requirements	Y	Width of vehicle accessway - The formed width of the public roads is 6m. - The formed width of the vehicle access serving singles lots are at least 3m wide. - The formed width of the COALs serving multiple lots is at least 5.5m wide. Passing bay requirements There are no passing bays required for any of the vehicle accesses as they satisfy the width requirements, and no accesses are proposed to be one-way for a length greater than 50m.
E27.6.4.4 Vehicle Access Gradient	Y	Maximum gradient The grades of the proposed roads are at most 8% which is less than the maximum of 1 in 5 (20%). The grades within the individual lots accessways are less than the maximum of 1 in 5 (20%). Gradient of safety platform at boundary At the location where the proposed roads meet the adjacent roading network, the grade of the road is less than 1 in 20 (5%) for at least the first 6m. The proposed roading network ties into the existing network at acceptable grades. The individual lots within the development comply with the residential lot platform requirement of a less than 1 in 20 (5%) grade for 4m.
E39.6.1.2. Access and entrance strips	Y	All proposed sites will be provided with legal and physical access to a road. The proposed roads will be vested to Auckland Transport and the COAL accessways will have access to the proposed roads.

8.3 Assessment of Non-Compliances

Any non-compliances identified in Table 8.1 are considered below in accordance with the relevant Assessment Criteria.

E27.6.1 Trip Generation

There are 346 dwellings proposed under the development. This number of dwellings exceeds the new development threshold of 100 dwellings and hence a resource consent for trip generation is required.

As per E27.8.1(4), the assessment criteria relevant to this infringement is:

(a) effects on the transport network

The two intersections that are most likely to be impacted on have been assessed in this ITA report. Early engagement with Auckland Transport confirmed that these were the key intersections that required consideration.

The results of the modelling for the Totara Road / Dale Road / McCaw Ave intersection demonstrate that the intersection can handle the additional traffic from the development with the LoS remaining at "A" for free-flowing operations.

Results for the Totara Road / Brigham Creek Road / Mamari Road intersection show that the additional traffic can be accommodated by the intersection with only small incremental delays of around 4-7 seconds on each intersection approach.

Therefore, the traffic generation impacts on the traffic network are determined to be acceptable for the site and the proposal.

E27.6.2 (8) Number of Loading Spaces

The total GFA of all the residential dwellings combined is more than 5,000m² which requires a dedicated loading space to be provided within the development. No dedicated loading space is proposed and hence this standard is infringed.

As per E27.8.1(8), the assessment criteria relevant to this infringement is:

- (a) adequacy for the site and the proposal; and*
- (b) effects on the transport network.*

The proposal covers a large area and providing a dedicated loading space is not considered to be an efficient use of road reserve space as it will serve only a limited number of dwellings directly adjacent to the loading space.

The likely times a truck will need to carry out any loading activities will be when refuse is being collected from the dwellings or when residents are moving in or out of their homes. Vehicle tracking conducted by Team Traffic for refuse collection trucks and other vehicles is demonstrated within Appendix A. Refuse collection will be undertaken by Council and will be collected from the kerbside so a dedicated loading space is not required for this activity.

For when residents are moving in or out of their homes, the truck will prefer parking close to the dwelling being served and on-street parking or the driveway for the dwelling can be used. Similarly, for lots served by COALs, the truck can park within the COAL while carrying out loading activities and there would be enough space for vehicles to pass the truck and use the COALs safely. The frequency of this type of loading activity will be very low which further reduces the likelihood of any negative impacts resulting.

There will be no effects on the transport network as a result of the described loading activities. Therefore, not providing a dedicated loading space for the development is considered acceptable and is typical for residential developments of this nature.

E27.6.4.1 Vehicle Access Restrictions

The scheme plan includes lots located near the intersections of the development which will have their vehicle crossing within 10m of the proposed intersections. Driveways are not permitted to be located within 10m of intersections and hence, this standard is infringed.

As per E27.8.1(12), the assessment criteria relevant to this infringement is:

- (a) adequacy for the site and the proposal;*
- (b) design and location of access;*
- (c) effects on pedestrian and streetscape amenity; and*
- (d) effects on the transport network.*

The lots proposed are narrow lots with only one road frontage and hence this results in some dwellings having driveways formed on the T-intersections, however lots throughout much of the development will be accessible via one-way COALS.

The design and location of the driveways complies with the 3.5m maximum width requirement and 2m spacing to neighbouring crossings requirements under the E27 standards. Having a large amount of

vehicle crossings on a road increases the likelihood of conflict between pedestrians and vehicles. Pedestrians require refuge between vehicle crossings which is not viable for medium density development due to the limited space available between dwellings. This results in no impacts on pedestrians.

There are expected to be adequate sightlines to and from the vehicle crossings to the road, the proposed speed environment within the development is 30 km/hr, and as the development is not a through route (or expected to attract any rat-running) the traffic volumes throughout will be low. These three factors will mitigate the risk of the vehicle crossings having any negative impact on the operation of the intersection as the vehicles will be travelling at low speeds and will have time to observe and react to any vehicles entering or exiting the vehicle crossings within the intersection. The vehicle crossings in question will only serve one lot each which will experience very low traffic movements when compared to vehicle movements within the intersection. The low number of vehicle movements throughout the development further reduces the likelihood of any conflict.

Therefore, having vehicle crossings within 10m of the T-intersections within the development is considered acceptable.

E27.6.4.2 Width and Number of Vehicle Crossings

The infringement under this standard relates to the number of vehicle crossings proposed along the frontages for each residential Block that are proposed under the development. For residential activities a maximum of one vehicle crossing per 25m of road frontage is permitted. When assessing each residential Block, it is found that more vehicle crossings proposed than permitted to comply with the one per 25m of road frontage standard and hence there is an infringement.

As per E27.8.1(9), the assessment criteria relevant to this infringement is:

- (a) adequacy for the site and the proposal;*
- (b) design of parking, loading and access;*
- (c) effects on pedestrian and streetscape amenity; and*
- (d) effects on the transport network.*

The development is a medium density residential development. This results in many vehicle crossings being proposed in relatively close proximity to each other. Where possible, COALs have been designed in the development to reduce the number of vehicle crossing formed on the public roading network. This is not possible for all residential blocks due to space constraints.

Regarding pedestrian safety, although there are frequent vehicle crossings, all vehicle crossings are at least 2m apart which allows for space between vehicle crossings for pedestrians to wait at in the unlikely scenario that both adjacent crossings are being used by vehicles at the same time.

Adequate sightlines will be possible between vehicles turning in and out of the vehicle crossing and pedestrians on the footpath. Sightlines are aided by the proposed back berm behind the footpath from the property boundaries (between 0.5m to 1.32m) which will allow for a visibility splay. The back berm will also add some separation between the footpath and vehicles exiting the lots which will provide more space for pedestrians and vehicles to navigate each other safely.

The occurrence of this infringement is not site wide and is only for some blocks which cannot be served by COALs. Furthermore, the infringement is usually on one side of the road only, so pedestrians have the option to walk on the opposite side of the road if they prefer where there are not as many vehicle crossings.

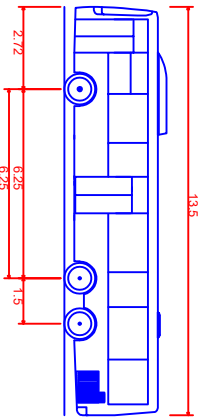
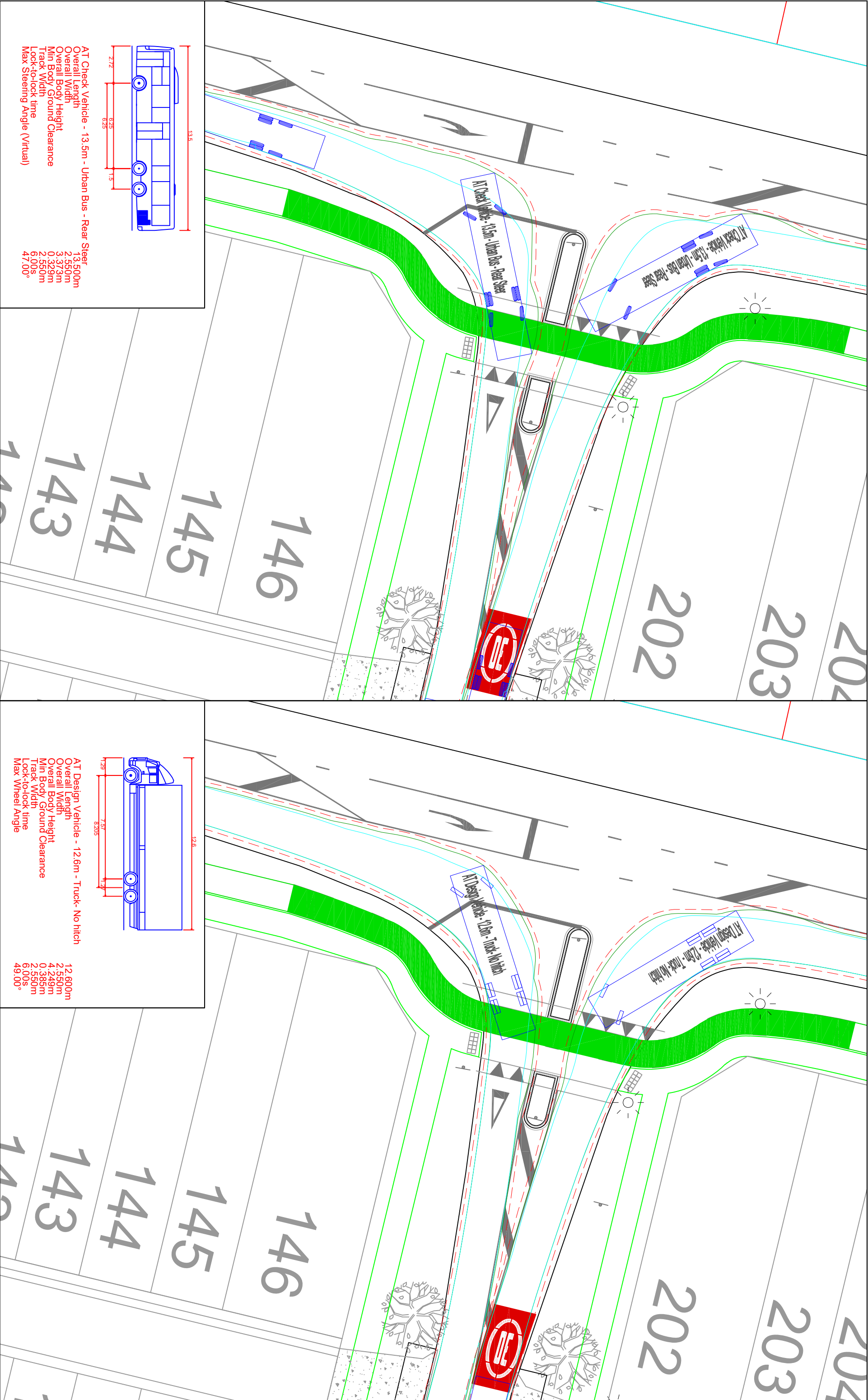
There will be no effects on the transport network as a result of this infringement as the adverse effects are contained within the site. Therefore, having vehicle crossings proposed more frequently than the one in 25m road frontage standard is considered acceptable.

9. Conclusions and Recommendations

The transportation assessment of the proposed development of 98-102 Totara Road has focussed on the likely impacts of establishing a residential development. It is concluded that the site is appropriate for this activity from a transport perspective as:

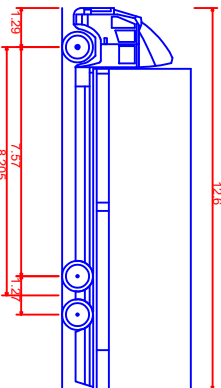
- the proposed development will be well served by public transport, walking and cycling connections in the near future which are currently being planned by Te Tupu Ngātahi Supporting Growth Alliance and Waka Kotahi through the North West Auckland transport upgrades and SH16 Brigham Creek to Waimauku Safety Improvements respectively;
- there is the potential for new bus stops along Totara Road and a number of pedestrian crossing points to be included in the site frontage to maximise public transport opportunities and further improve pedestrian access to public transport;
- there is excellent accessibility to key activities and services by all modes; and
- the site is well-served by SH16 and SH18 resulting in negligible increases in traffic across the wider network.
- the traffic modelling results demonstrates that the Totara Road / Dale Road / McCaw Avenue intersection will operate in free-flowing conditions with the additional generated traffic. The Totara Road / Brigham Creek Road / Mamari Road intersection will operate well within in capacity of the intersection with minimal changes in delays.

Appendix A. Vehicle Tracking Diagrams



AT Check Vehicle - 13.5m - Urban Bus - Rear Steer

Overall Length	13.500m
Overall Width	2.550m
Overall Body Height	3.373m
Min Body Ground Clearance	0.329m
Track Width	2.550m
Lock-to-lock time	6.00s
Max Steering Angle (Virtual)	47.00°



AT Design Vehicle - 12.6m - Truck - No hitch

Overall Length	12.600m
Overall Width	2.550m
Overall Body Height	4.249m
Min Body Ground Clearance	0.385m
Track Width	2.550m
Lock-to-lock time	6.00s
Max Wheel Angle	49.00°

NOTES

Design vehicle is a large rigid truck such as a moving truck, which is larger than a rubbish truck.

Check vehicle is an urban bus given that there is potential for a school to be established within Whenuapi Green

PROJECT

WHENUAPI GREEN VEHICLE TRACKING

DRAWING TITLE

MAIN INTERSECTION

STATUS

VEHICLE TRACKING ANALYSIS

DATE

18/11/2022

PROJECT NO.

21267

SCALE

1:250
A3

REV

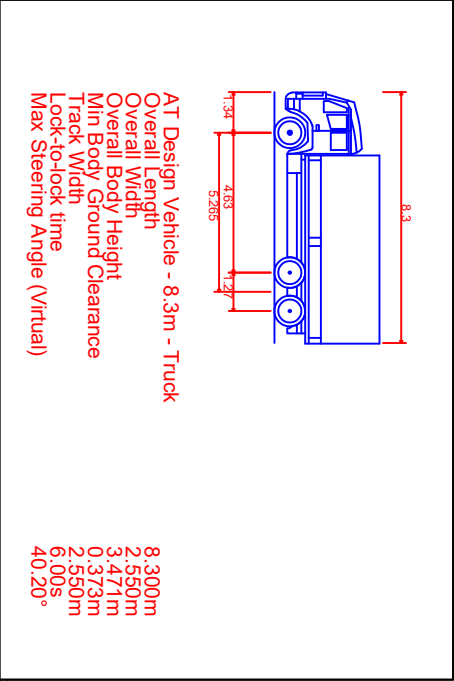
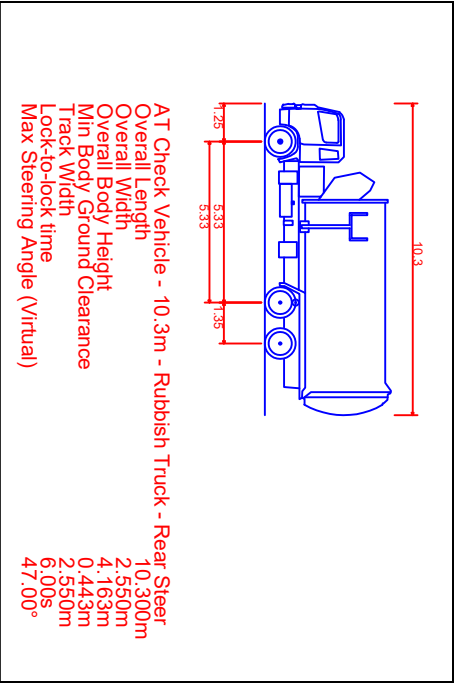
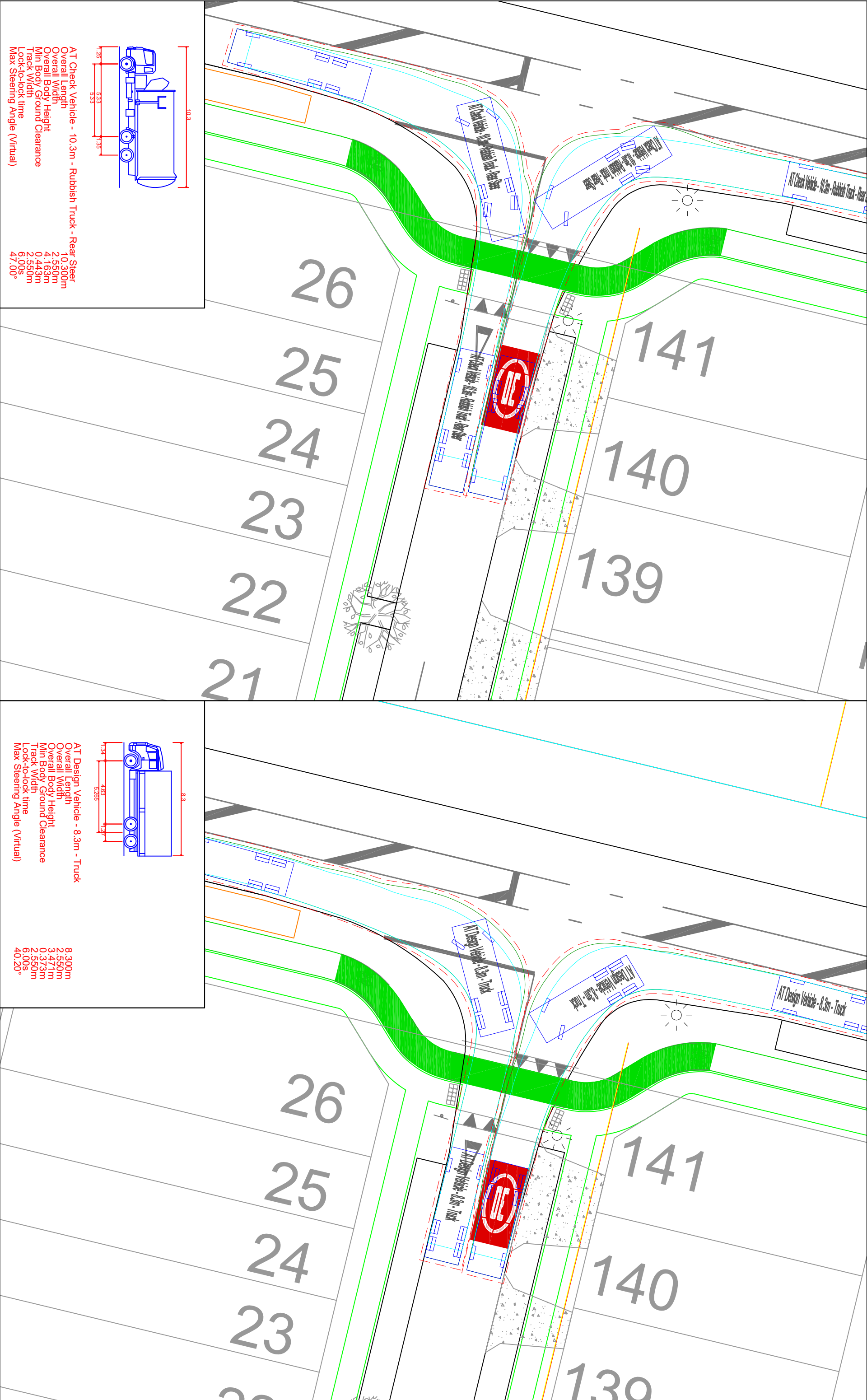
A

SHEET

1



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NOTES

Design vehicle is a medium rigid truck such as a delivery truck, which is smaller than a rubbish truck.

Check vehicle is a rubbish truck

PROJECT

WHENUAPAI GREEN VEHICLE TRACKING

DRAWING TITLE

SECONDARY INTERSECTION

STATUS

VEHICLE TRACKING ANALYSIS

DATE

18/11/2022

PROJECT NO.

21267

SCALE

1:250
A3

REV

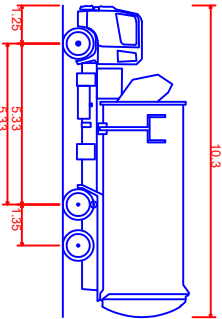
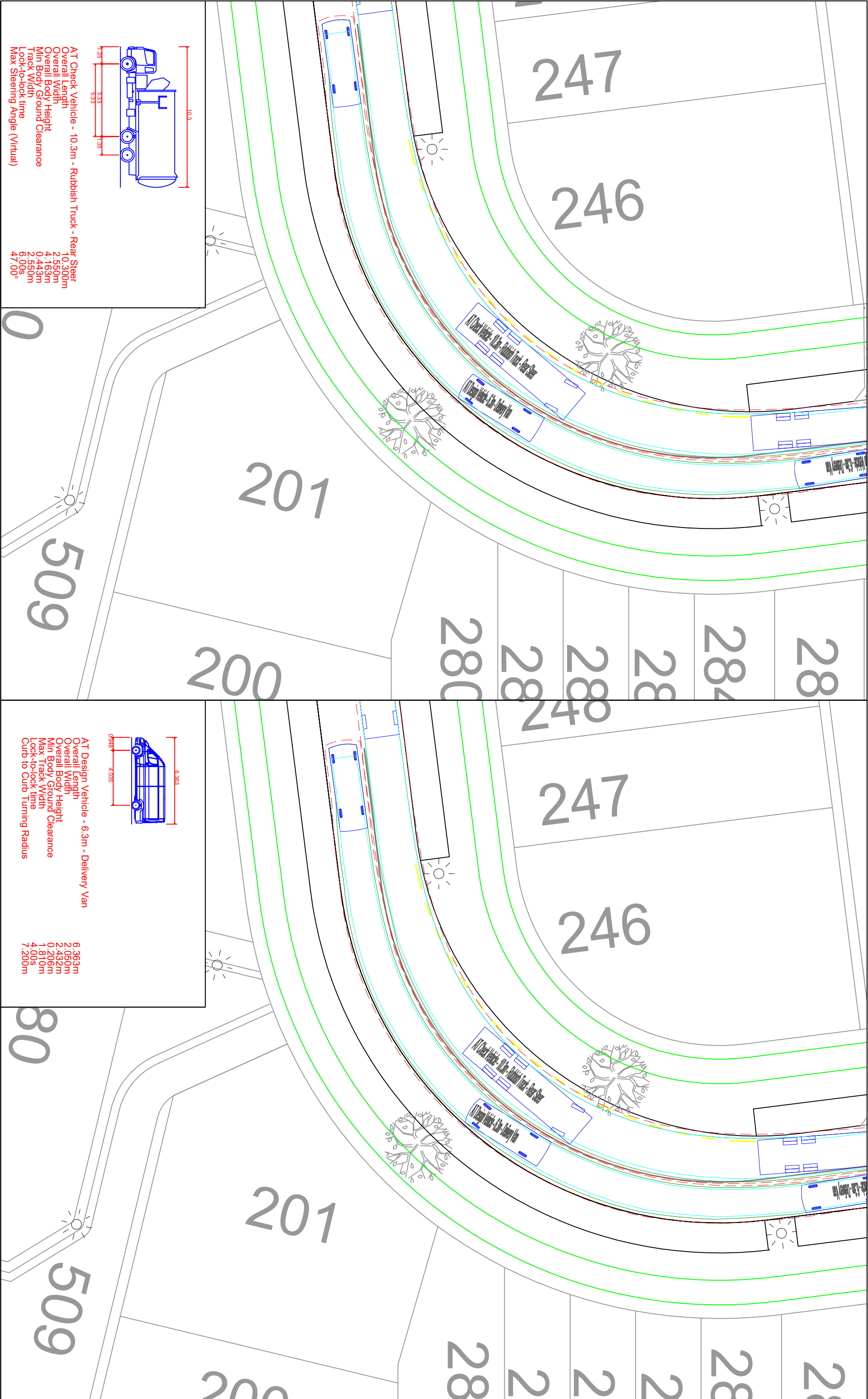
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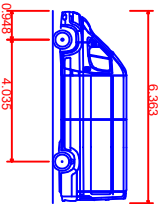
2



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AT Check Vehicle - 10.3m - Rubbish Truck - Rear Steer
Overall Length 10.300m
Overall Width 3.330m
Overall Body Height 1.350m
Min Body Ground Clearance 1.250m
Track Width 5.330m
Lock-to-lock time 1.350s
Max Steering Angle (Virtual) 47.00°



AT Design Vehicle - 6.3m - Delivery Van
Overall Length 6.363m
Overall Width 2.432m
Overall Body Height 1.810m
Min Body Ground Clearance 0.206m
Max Track Width 1.810m
Lock-to-lock time 4.00s
Curb to Curb Turning Radius 7.200m

NOTES

Design vehicle is a rubbish truck.

Check vehicle is a delivery van.

Both directions simulated with 500mm clearance envelope.

PROJECT

WHENUAPAI GREEN VEHICLE TRACKING

DRAWING TITLE

MAIN ACCESS RD BEND

STATUS

VEHICLE TRACKING
ANALYSIS

DATE

18/11/2022

REV

A

SHEET

4

PROJECT NO.

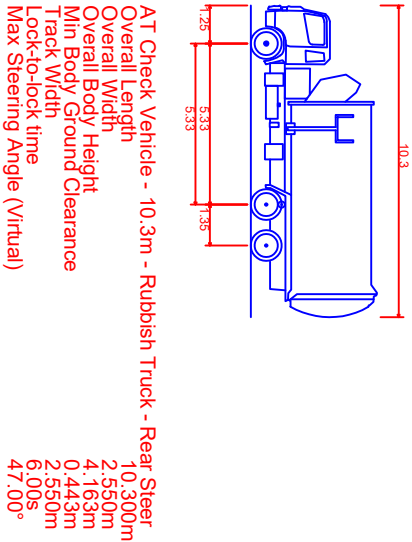
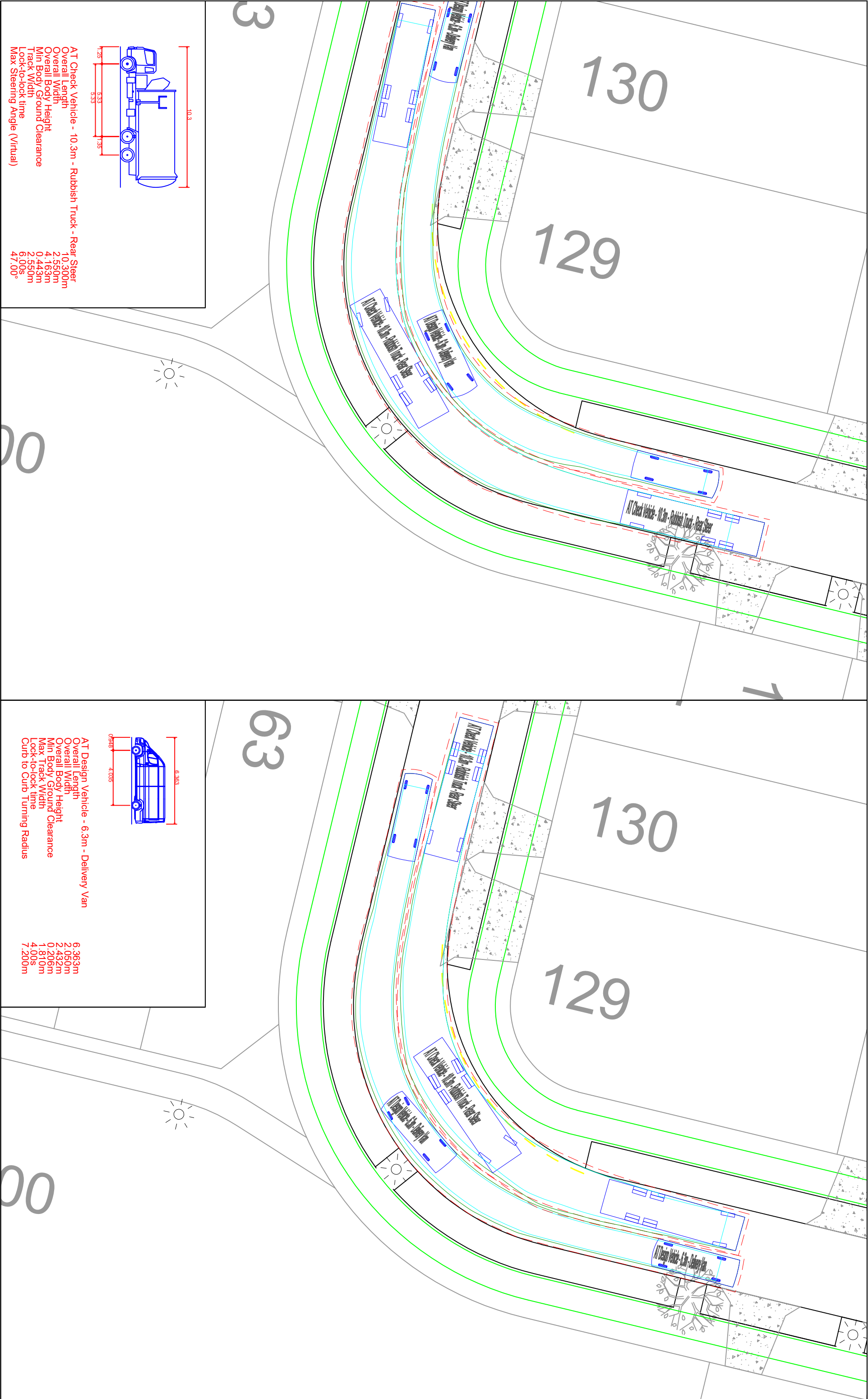
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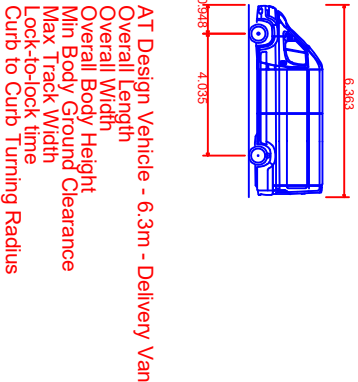
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A3

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AT Check Vehicle - 10.3m - Rubbish Truck - Rear Steer
Overall Length 10.300m
Overall Width 2.550m
Overall Body Height 4.163m
Min Body Ground Clearance 0.443m
Track Width 2.350m
Lock-to-lock time 6.00s
Max Steering Angle (Virtual) 47.00°



AT Design Vehicle - 6.3m - Delivery Van
Overall Length 6.363m
Overall Width 2.050m
Overall Body Height 2.432m
Min Body Ground Clearance 0.206m
Max Track Width 1.810m
Lock-to-lock time 4.00s
Curb to Curb Turning Radius 7.200m

NOTES

Design vehicle is a rubbish truck.

Check vehicle is a delivery van.

Both directions simulated with 500mm clearance envelope.

PROJECT

WHENUAPAI GREEN VEHICLE TRACKING

DRAWING TITLE

INTERNAL RD BEND

STATUS

VEHICLE TRACKING
ANALYSIS

DATE

18/11/2022

PROJECT NO.

21267

SCALE

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REV

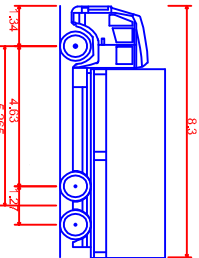
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SHEET

5



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AT Design Vehicle - 8.3m - Truck
Overall Length 8.300m
Overall Width 2.471m
Min Body Height 0.373m
Track Width 2.550m
Lock-to-lock time 6.00s
Max Steering Angle (Virtual) 40.20°

NOTES

Design vehicle is an 85th percentile car accessing garages. All garages have manoeuvring depths compliant with Unitary Plan standards..

Check vehicle is a medium rigid truck, such as a delivery truck or private rubbish truck.

PROJECT

WHENUAPAI GREEN VEHICLE TRACKING

DRAWING TITLE

BLOCK 5 COAL TRACKING

STATUS

VEHICLE TRACKING ANALYSIS

DATE

18/11/2022

PROJECT NO.

21267

SCALE

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A3

REV

A

SHEET

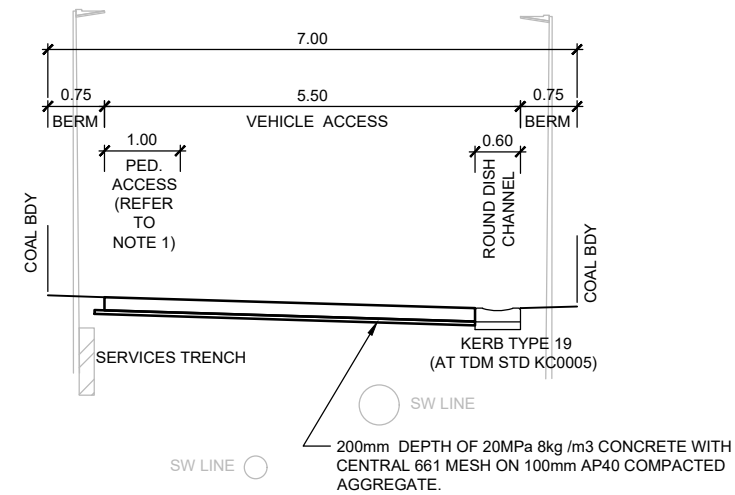
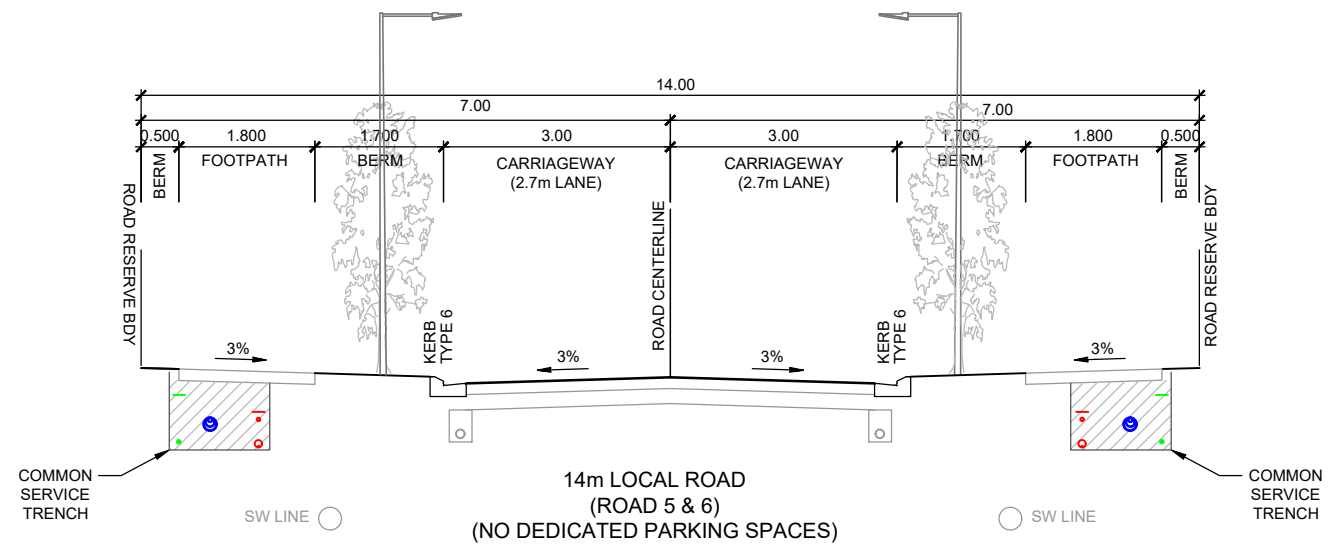
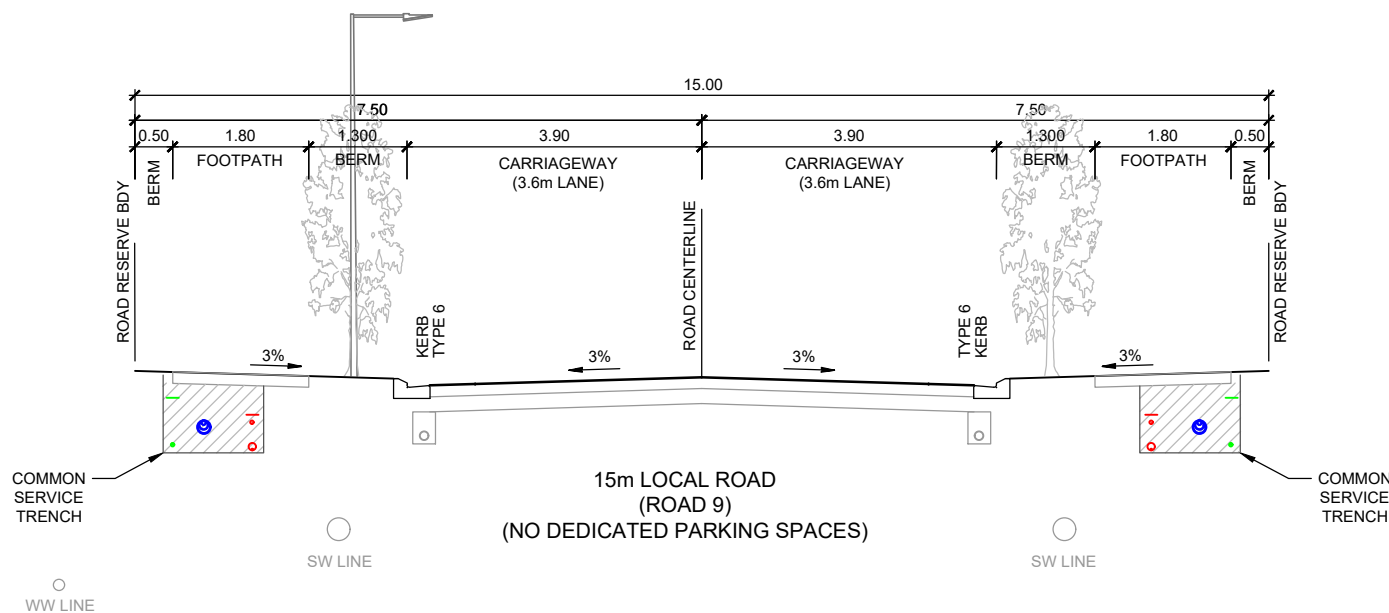
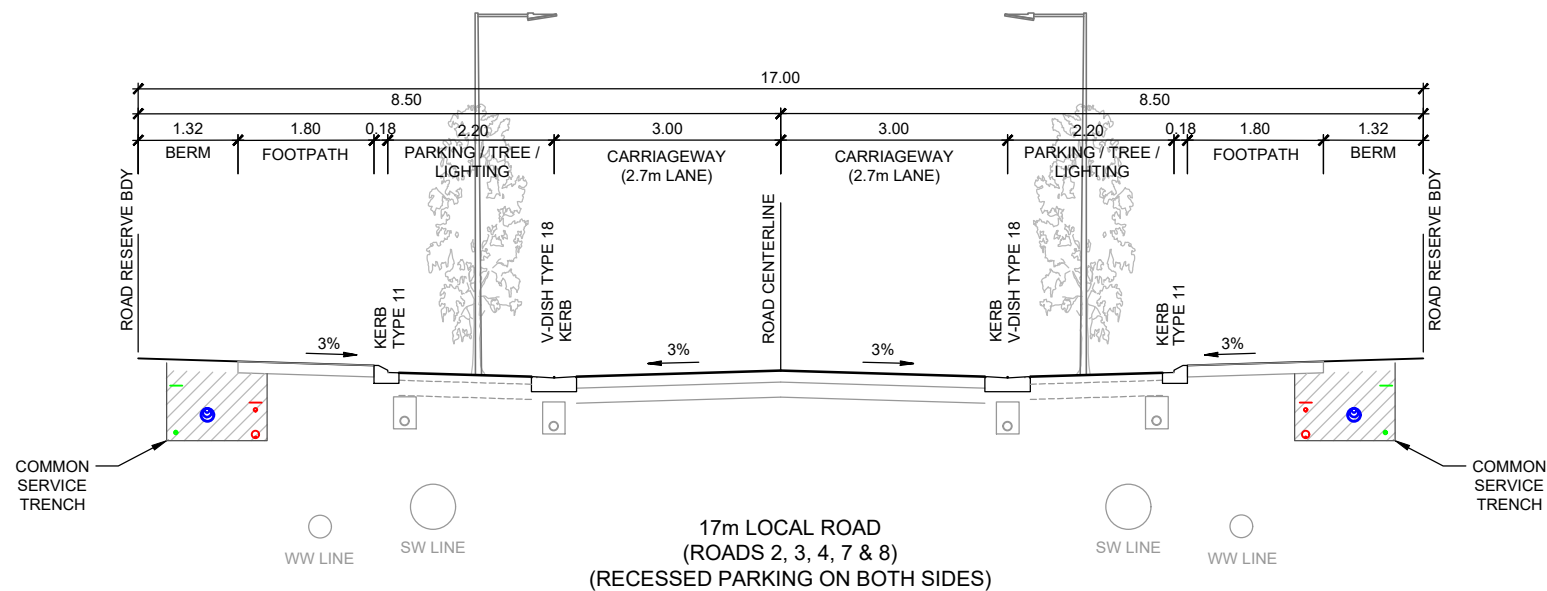
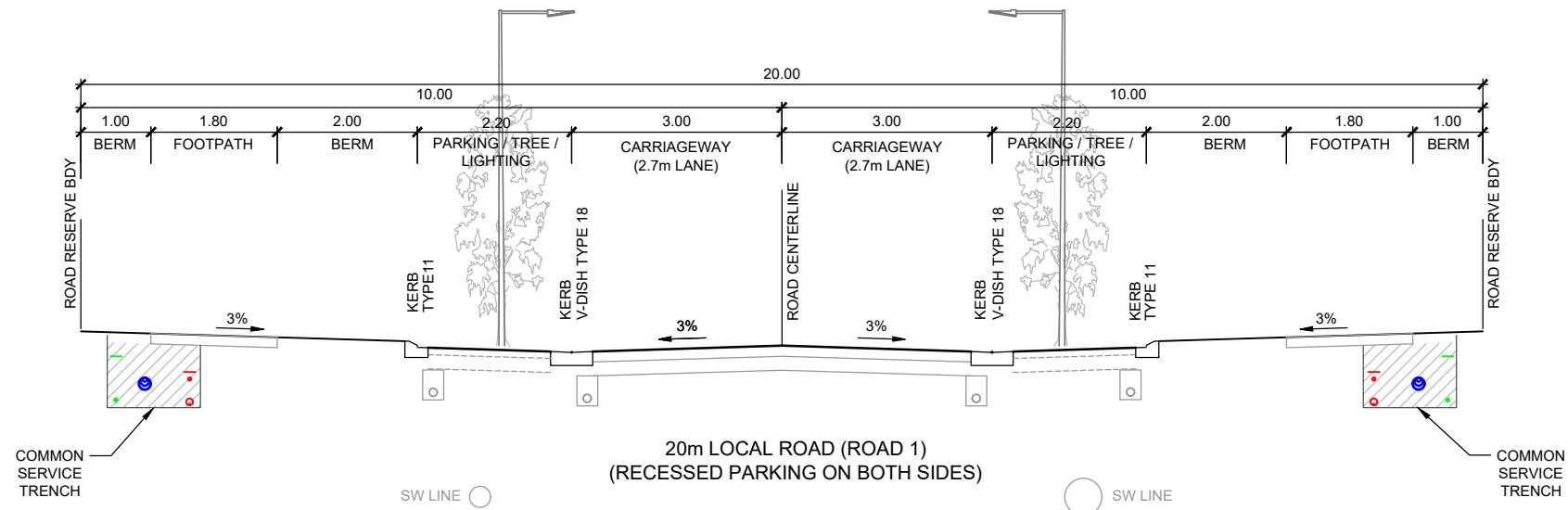
6



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Appendix B.
Road Cross Sections





RESOURCE CONSENT

Rev	Description	By	Date
A	ISSUED FOR RESOURCE CONSENT	BJ	01/11/2022

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THE NEIL GROUP

NEIL CONSTRUCTION LIMITED
LAND DEVELOPERS

THE NEIL GROUP LIMITED
LEVEL 3, BUILDING B
8 NUGENT STREET
GRAFTON

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FAX/MAIL: +64 9 918 6567
WEB: www.neilgroup.co.nz

Job Title

**WHENUAPAI GREEN
98-102 TOTARA ROAD
WHENUAPAI**

Drawing Title

**ROADWORKS
TYPICAL CROSS SECTIONS**

By	Date	Scale	Job No.	Rev
Surveyed: MS		1:100@A3	Drawing No.	
Designed: KLP	11/2022		4520-01-RD-330	A
Drawn: KLP				
Approved: BJ				

TOTARA ROAD EXISTING FORMATION
(20.12m COLLECTOR) [80km/h]
(CROSS FALL & BATTER SLOPE VARIES)

24m COLLECTOR (TOTARA ROAD) [50km/h]
(PROPOSED INTERIM DESIGN)
(WHEN ADJACENT TO RESIDENTIAL LOTS)

24m COLLECTOR (TOTARA ROAD) [50km/h]
(ULTIMATE DESIGN)
(WHEN ADJACENT TO RESIDENTIAL LOTS)

RESOURCE CONSENT

Rev	Description	By	Date
A	ISSUED FOR RESOURCE CONSENT	BJ	01/11/2022



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www.neilgroup.co.nz

Job Title	98-102 TOTARA ROAD WHENUAPAI GREEN WHENUAPAI
-----------	--

Drawing Title	ROADWORKS TOTARA ROAD WIDENING TYPICAL CROSS SECTION
---------------	--

	By	Date	Scale	Job No.	Rev
Surveyed:	MS		1:100@A3	Drawing No. 4520-01-RD-332	A
Designed:	KLP				
Drawn:	KLP	11/2022			
Approved:	BJ				

TOTARA ROAD EXISTING FORMATION
(20.12m COLLECTOR) [80km/h]
(CROSS FALL & BATTER SLOPE VARIES)

24m COLLECTOR (TOTARA ROAD) [50km/h]
(ULTIMATE DESIGN)
(RECESSED PARKING ON ONE SIDE)
(WHEN ADJACENT TO SCHOOL / RESERVE)

24m COLLECTOR (TOTARA ROAD) [50km/h]
(ULTIMATE DESIGN)
(RECESSED PARKING ON BOTH SIDES)
(WHEN ADJACENT TO SCHOOL / RESERVE)

RESOURCE CONSENT

Rev	Description	By	Date
A	ISSUED FOR RESOURCE CONSENT	BJ	01/11/2022



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WEB: www.neilgroup.co.nz

Job Title	98-102 TOTARA ROAD WHENUAPAI GREEN WHENUAPAI
-----------	--

Drawing Title	ROADWORKS TOTARA ROAD WIDENING TYPICAL CROSS SECTION
---------------	--

By	Date	Scale	Job No.	Rev
Surveyed: MS		1:100@A3	Drawing No. 4520-01-RD-333	A
Designed: KLP				
Drawn: KLP	11/2022			
Approved: BJ				

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