



# Healthy Waters - Harania Flood Resilience Works - Tennessee Bridge

Integrated Transport Assessment

Prepared for

Auckland Council Healthy Waters

Prepared by

Tonkin & Taylor Ltd

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## Document control

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# 1 Introduction and project overview

## 1.1 Background

The January 2023 floods, followed closely by Cyclone Gabrielle, marked a period of unprecedented weather challenges for Auckland. Auckland Council is carrying out flood resilience projects with the aim of mitigating flood risk to property through a series of blue-green networks, addressing critical flood-prone areas with sustainable stormwater solutions. The Harania catchment was one of the worst affect areas of Auckland following the January 2023 floods. Healthy Waters identified significant flooding, causing risk to life, and widespread flood damage to homes. This occurred due to poor flood conveyance at the location of the current Tennessee Avenue embankment dam.

## 1.2 Project Description

A detailed description of the full project works can be found in the Assessment of Effects on the Environment (AEE) report<sup>1</sup>.

The proposed flood resilience works involve removing the current embankment which carries the existing Eastern Interceptor, an approximately 2.6 m diameter reinforced concrete wastewater pipe. The replacement will comprise a new pipe and pipe bridge in the Coastal Marine Area (CMA) to open up the waterway capacity to allow increased flood conveyance. Diversion chambers are required at either end of the new pipe, connecting it to the existing pipe to facilitate the change over from the old pipe to the new pipe bridge diversion. A pedestrian bridge is proposed on top of the pipe bridge. The flood resilience works are referred to as the Tennessee Bridge project and a general overview is shown in Figure 1.2 below.

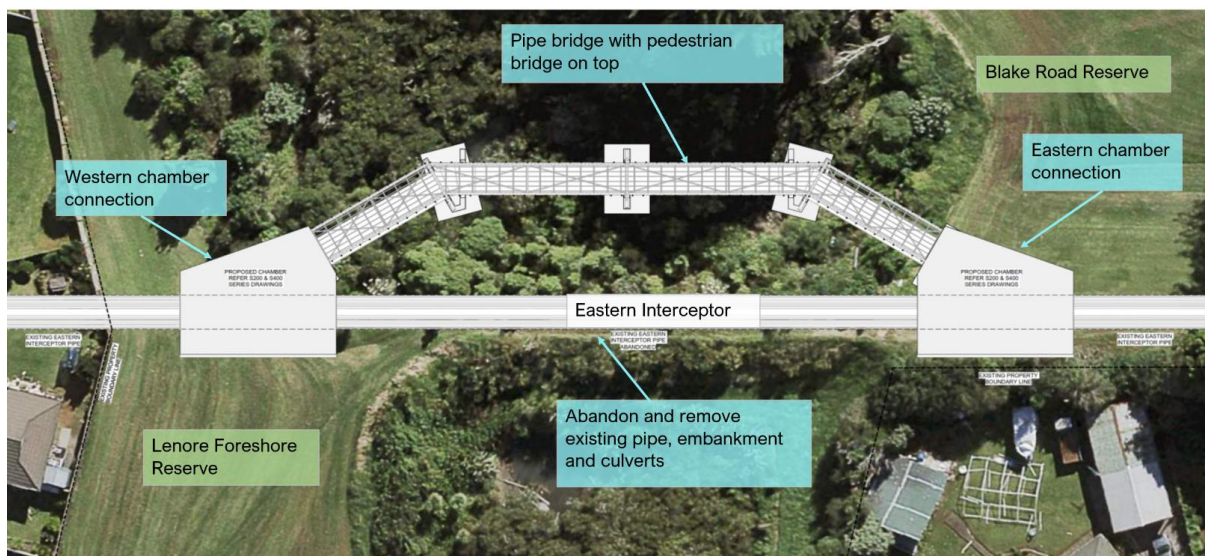


Figure 1.1: Overview of proposed flood resilience works

<sup>1</sup> Harania Flood Resilience Works – Tennessee Bridge Assessment of Effects on the Environment, Beca Limited, November 2024.

### 1.3 Scope of Works

Tonkin & Taylor Ltd (T+T) has been engaged by Auckland Council's Healthy Waters to undertake an Integrated Transport Assessment (ITA) related to the proposed Tennessee Bridge upgrade works (the Project) and this has been prepared to accompany a resource consent application for the Tennessee Bridge project under the Severe Weather Emergency Recovery (Auckland Flood Resilience Works) Order 2024.

The purpose of this ITA is to assess the potential traffic and transport impacts of constructing the proposed works and identify traffic management measures that a contractor could use to minimise potential effects of construction on traffic movements and neighbouring properties. Any further traffic management and mitigation measures identified following Auckland Transport (AT) and other stakeholder consultation is to be considered and undertaken by the Project contractor.

The ITA has been informed by several meetings with Auckland Council and AT SME's (Subject Matter Experts).

### 1.4 Background and experience to date

Healthy Waters has extensive experience in successfully delivering water improvement projects throughout Auckland, which they can bring to this Project. As such, the activities and effects of construction are well understood and the Project team's experience has demonstrated that the effects associated with the proposed construction works, including traffic effects, can be successfully managed by resource consent conditions and the suite of management plans approved by Council for construction sites. However, it is also acknowledged that every new construction site needs to be assessed for its individual characteristics and its potential for effects on the surrounding transport network.

This ITA to support the resource consent application for the Project has been based on an indicative construction methodology and details on the duration and types and numbers of vehicles for the construction activities as provided by the contractor. A detailed construction programme and methodology will be finalised prior to the commencement of construction activities. It is anticipated this will be prepared by the Contractor and incorporated into the Project's Construction Environmental Management Plan (CEMP). The ITA has been prepared on a conservative basis, using worst case traffic scenarios, such that any effects arising from the construction (once methodology is confirmed) will be within the envelope of effects assessed.

This ITA is heavily informed by practical on-the-ground experience, including directly comparable experience in relation to the type of works and location of works (in proximity to houses, schools and reserves). However, while this ITA has been informed by this experience to date, careful consideration has been given to the particular characteristics of the area. The previous experience is helpful insofar as it provides a solid 'real-world' basis for understanding the nature of activities at Blake Road and Bicknell Road, the actual and potential traffic effects of those activities and how the effects are best managed and mitigated to cause the least disruption to surrounding residents and to minimise environmental effects, but ultimately it is the particular receiving environment and characteristics of the surrounding transport network that are paramount and which are the focus of this ITA.

### 1.5 Cumulative assessment

AT have confirmed that there are no planned works in the area adjacent to the Project Site during the proposed construction period. As such a cumulative assessment of effects is not required.

## 1.6 ITA and the traffic management approach

This ITA forms part of a comprehensive suite of technical reports to support the resource consent application and to inform the Assessment of Effects on the Environment (AEE) report. The ITA assesses the impact of construction traffic on the surrounding transport network and identifies key issues to be addressed within conditions and the Contractor's final Construction Traffic Management Plan (CTMP). Site Specific Traffic Management Plans (SSTMP's) with detailed Traffic Management Plan Drawings will also need to be provided to AT prior to construction.

Figure 1.2 shows the relationship between the sequence of documents relating to traffic management activities post approval of the ITA. It is important to note that the CTMP does not enable physical works to take place on the road corridor but rather sets the philosophy as to how traffic is managed for this Project. SSTMP's and Corridor Access Requests (CAR) approved by AT enable physical works to take place within the road corridor. These will be developed in accordance with the philosophy documented in the CTMP. A Draft CTMP is provided for reference.

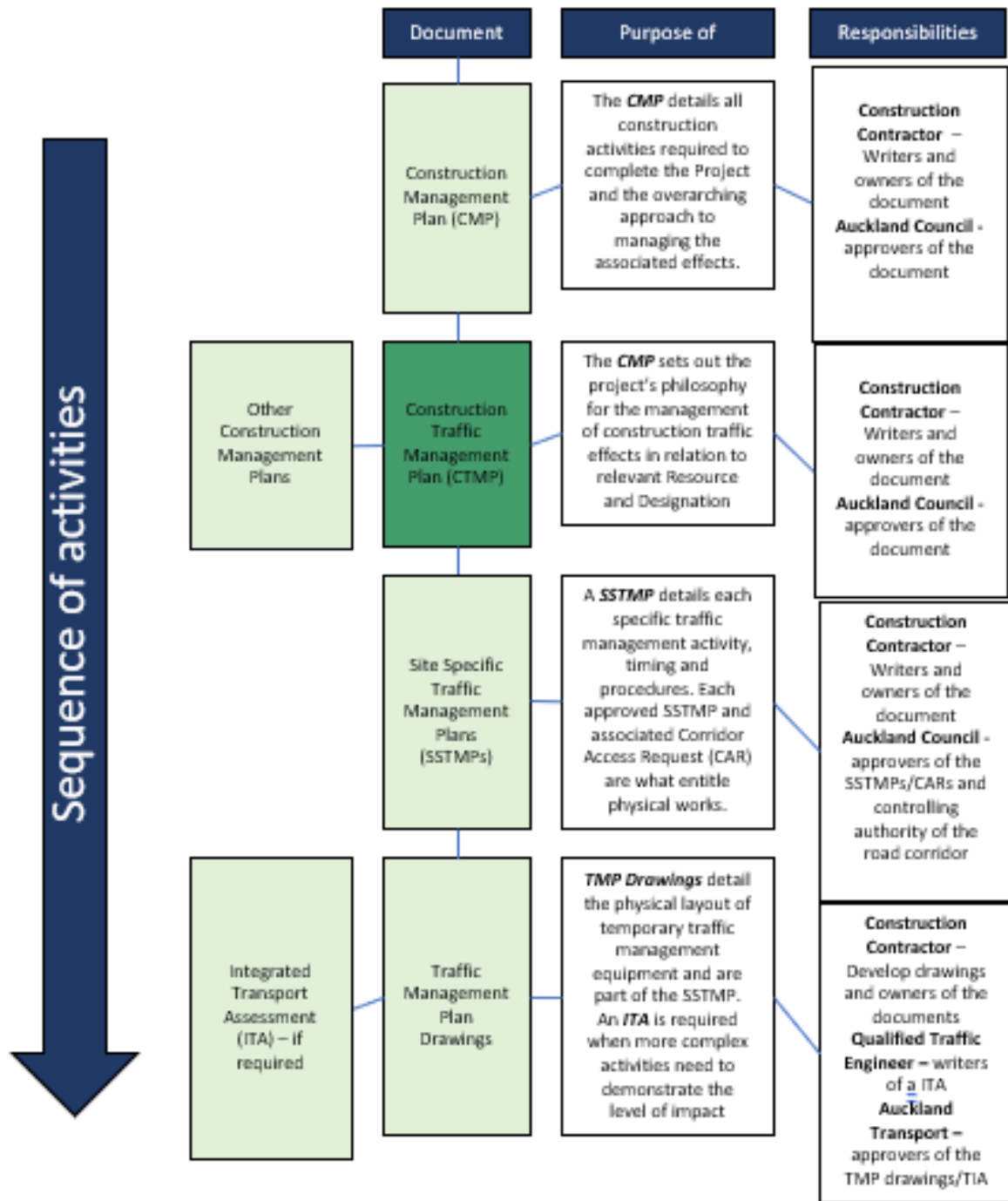


Figure 1.2: Sequence of activities for traffic management related documents following approval of the ITA



## 2 Site Location

The Project is located at the Blake Road Reserve and Lenore Foreshore Reserve (the Site), as shown in Figure 2.1 below.



Figure 2.1: Project location

As shown in Figure 2.2 below, the land immediately surrounding the site is zoned 'Open Space – Informal Recreation Zone' apart from land to the southeast and west which is zoned as 'Residential – Single House Zone'. The surrounding land uses are detailed below:

- North – Public reserve (Blake Road and Lenore Foreshore Reserves).
- South – Lenore Foreshore Reserve, residential.
- East – Blake Road Reserve.
- West – Residential.

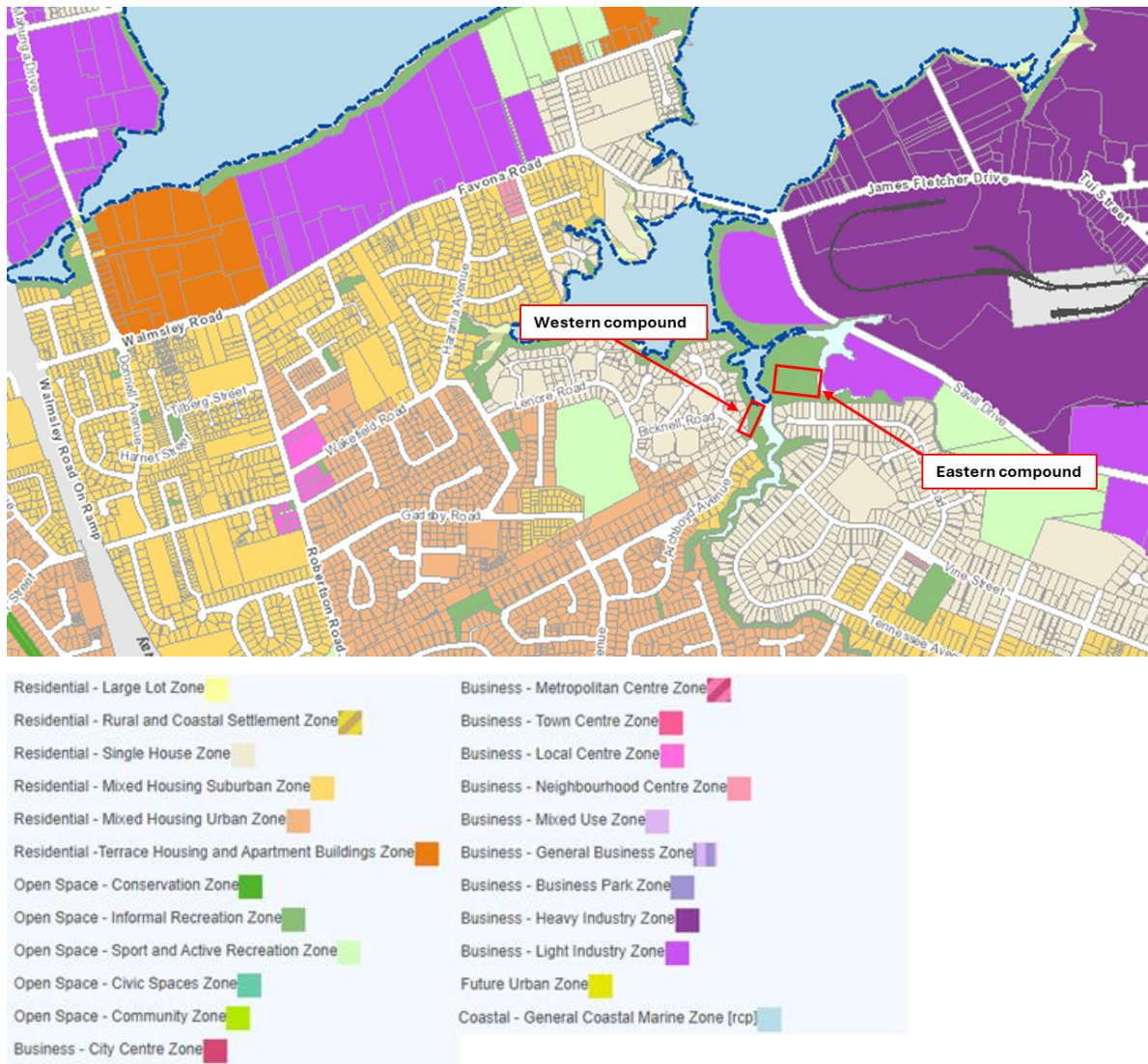


Figure 2.2: Zoning of surrounding areas to Project

Figure 2.3 below shows the location of the indicative Project Compounds and work areas.



Figure 2.3: Indicative Project Compounds and work areas

### 3 Existing Transport Network


#### 3.1 Existing road network


The proposed construction traffic routes are shown in orange on Figure 2.1 above and are:



- Eastern Compound - from Massey Road, traffic will route via Vine Street and Blake Road to the proposed site access point at the Blake Road Reserve access at the Blake Road cul de sac.
- Western Compound – from Buckland Road traffic will route via Wickham Way, Garus Avenue, Archboyd Avenue, Bicknell Road to the proposed site access point at the existing Lenore Foreshore Reserve concrete vehicle crossing opposite #41 Bicknell Road.


Table 3.1 below provides a brief description of the layout for each road on these construction vehicle routes.

**Table 3.1: Existing road network**

Road name	Posted Speed (km/h)	Road description	Auckland Council GeoMaps Road Classification
<b>Eastern Compound</b>			
Blake Road (west of Tennessee Avenue)	30	<ul style="list-style-type: none"> <li>• 7 m wide carriageway with no centre line or parking restrictions.</li> <li>• Footpath on both sides (1.5 m wide).</li> <li>• Residential land use.</li> <li>• The site access will be from the section of Blake Road immediately west of Tennessee Ave as shown below:</li> </ul> 	Local Road
Blake Road (east of Tennessee Avenue)	30	<ul style="list-style-type: none"> <li>• 8 m wide carriageway with no centre line or parking restrictions.</li> <li>• Footpath on both sides (1.5 m wide).</li> <li>• Two pairs of bus stops.</li> <li>• Bus route 325.</li> <li>• School bus routes 12 and 41.</li> <li>• Give way priority intersection with Vine Street.</li> <li>• 30 km/h school speed zone signage at intersection.</li> <li>• Residential land use.</li> </ul>	Collector
Vine Street (Massey Road to Blake Road)	30	<ul style="list-style-type: none"> <li>• 8m wide carriageway including two 3.5 m traffic lanes and 0.5m shoulders on either side.</li> <li>• Footpath on both sides (1.5 m wide).</li> <li>• No on road parking restrictions.</li> <li>• Four pairs of bus stops.</li> </ul>	Collector

Road name	Posted Speed (km/h)	Road description	Auckland Council GeoMaps Road Classification
		<ul style="list-style-type: none"> <li>• Bus route 325.</li> <li>• School bus routes 12 and 41.</li> <li>• Raised zebra crossing and give way priority intersection with Massey Road.</li> <li>• Predominantly residential land use noting Sutton Park School is located 300 m west of the Vine Street/Blake Road intersection, Sutton Park reserve and the Mighty Mind and Little Vines Early Childhood Education (ECE).</li> </ul>	
Massey Road (at Vine Street intersection)	50	<ul style="list-style-type: none"> <li>• Circa 15 m wide carriageway.</li> <li>• Bus stops.</li> <li>• On AT Over Dimension (OD) and Over Weight (OW) route.</li> <li>• NSAAT parking restrictions.</li> <li>• Bus route 32.</li> <li>• School bus routes 12, 41 and 59.</li> <li>• Mix of commercial and residential land uses.</li> </ul>	Arterial
<b>Western Compound</b>			
Bicknell Road	50	<ul style="list-style-type: none"> <li>• Two 3.6 m traffic lanes.</li> <li>• Unrestricted on-road parking.</li> <li>• Footpath on both sides (1.5 m wide), intermittent berms along the road.</li> <li>• Bus route 324.</li> <li>• Residential land use.</li> <li>• There is an existing concrete vehicle crossing into the reserve opposite #41.</li> <li>• Tight bend at Archboyd Avenue/Bicknell Road with buses observed to cross over the centre line to negotiate the bend (see image below):</li> </ul>	Collector
			
Archboyd Avenue	50	<ul style="list-style-type: none"> <li>• Two 3.6 m traffic lanes.</li> </ul>	Collector

Road name	Posted Speed (km/h)	Road description	Auckland Council GeoMaps Road Classification
		<ul style="list-style-type: none"> <li>• Unrestricted on-road parking.</li> <li>• Footpath predominantly on both sides (1.5 m wide), berms along both sides of the road.</li> <li>• 1 pair of bus stops.</li> <li>• Bus route 324.</li> <li>• Give way priority intersection with Garus Avenue with a refuge island (see image below):</li> </ul>  <ul style="list-style-type: none"> <li>• Residential land use.</li> </ul>	
Garus Avenue	50 (30 kmh 15 m east of McNaughton Street)	<ul style="list-style-type: none"> <li>• Circa 10 m carriageway width.</li> <li>• Unrestricted on-road parking.</li> <li>• Footpath predominantly on both sides (1.5 m wide), berms along both sides of the road.</li> <li>• 1 pair of bus stops.</li> <li>• Refuge island circa 85 m west of Wickham Way (see image below):</li> </ul>  <ul style="list-style-type: none"> <li>• Bus route 324 (north of McKinstry Ave).</li> <li>• School bus routes 12 and 41 (south of McKinstry Ave).</li> <li>• Residential land use with shops and commercial uses at Wickam Way intersection.</li> </ul>	Collector

Road name	Posted Speed (km/h)	Road description	Auckland Council GeoMaps Road Classification
		<ul style="list-style-type: none"> <li>Stop priority intersection with Wickham Way with refuge island/median (see image below):</li> </ul> 	
Wickham Way	30	<ul style="list-style-type: none"> <li>11 m carriageway width.</li> <li>Unrestricted on-road parking with designated school bus parking adjacent to the school 0800-0900 and 1430-1530 on school days</li> <li>Footpath on both sides (1.5 m wide), berms along both sides of the road.</li> <li>1 pair of bus stops.</li> <li>Bus route 325.</li> <li>School bus routes 12 and 41.</li> <li>Southern Cross Campus, St Therese Mangere East church and residential land uses.</li> <li>Traffic signal intersection with Buckland Road.</li> </ul>	Collector
Buckland Road	50	<ul style="list-style-type: none"> <li>12m carriageway width.</li> <li>Mixture of restricted and unrestricted on-road parking.</li> <li>Footpath on both sides (1.5 m wide), berms along both sides of the road.</li> <li>Bus stops.</li> <li>Sections of unbuffered cycle lane.</li> <li>Bus routes 325 and N10.</li> <li>School bus routes 12 and 41.</li> <li>Southern Cross Campus and residential land uses.</li> </ul>	Arterial

### 3.2 Existing traffic flows

Table 3.2 below summarises existing traffic flows from MobileRoad<sup>2</sup> and AT GIS database on the proposed construction traffic routes.

**Table 3.2: Existing traffic flows**

Road name	Average Daily Traffic two way veh/day (heavy veh %)	Peak Period two way veh/hour and peak period hour starting
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#### Eastern Compound

Blake Road (west of Tennessee Avenue)	37	N/A
Blake Road (east of Tennessee Avenue)	1,075 (4%)	116 (1715)
Vine Street	5,826 (5%)	490 (0800)
Massey Road	28,837 (8%)	2,117 (1500)

#### Western Compound

Bicknell Road	2,121 (2%)	235 (1500)
Archboyd Avenue	2,658 (1%)	273 (1645)
Garus Avenue	4,660 (4%)	496 (1645)
Wickham Way	10,819 (4%)	1,159 (0800)
Buckland Road	10,952 (2%)	1,050 (1515)

### 3.3 Existing traffic conditions

Google maps was used as a guide to typical traffic speeds and hence to indicate any congestion on the proposed construction traffic routes for the weekday AM and PM peaks. Extracts are shown below in Figure 3.1 (AM peak 0800-0900) and Figure 3.2 (PM peak 1700-1800 period).

<sup>2</sup> Data access July 2024, and retrieved from [Mobile Road](#)



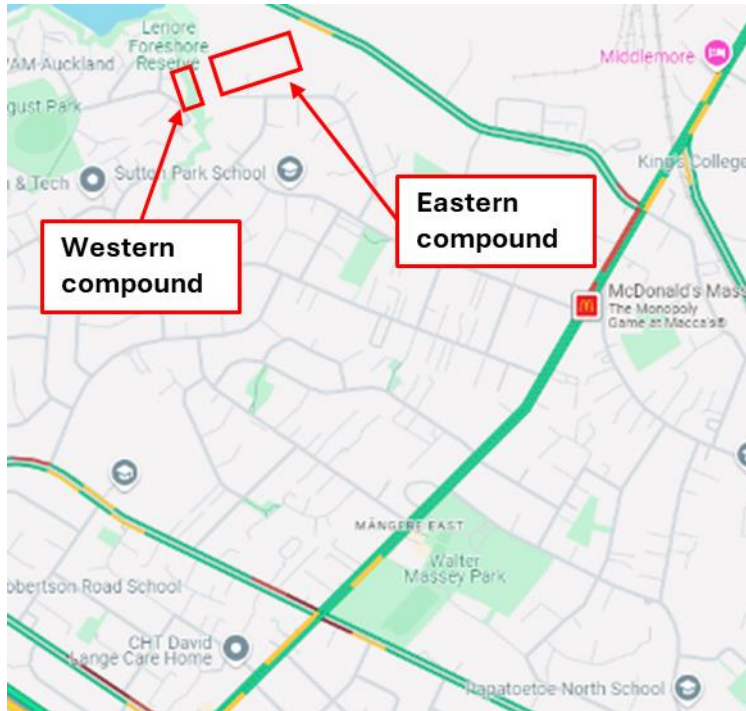


Figure 3.1: Typical congestion during AM peak period (0800-0900)

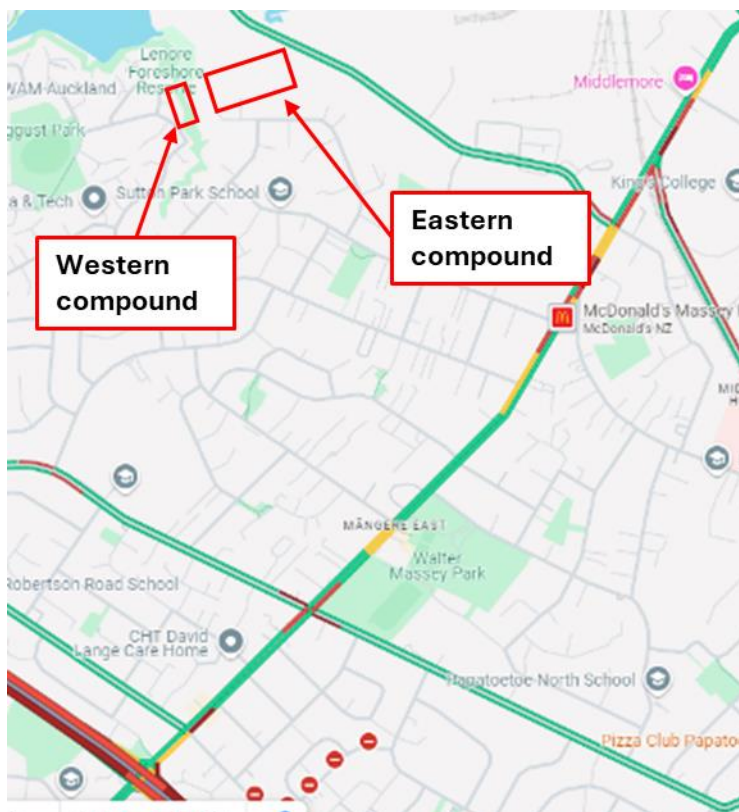


Figure 3.2: Typical congestion during PM Peak period 17:00 - 18:00

The peaks in these figures were selected as examples of the busiest/worst-case congestion, with slow (shown as red) traffic speeds assumed to be due to congestion. Figure 3.1 and Figure 3.2 above indicate on routes to/from both compounds:

- Massey Road - small amount of congestion in both peak periods at the Vine Street intersection.
- Buckland Road - small amount of congestion in both peak periods at the Massey Road and Wickham Way intersections.
- Local road network to both compounds is uncongested.

### 3.4 Public transport

On the proposed construction traffic route to the eastern compound, bus route 325 travels along Blake Road and Tennessee Avenue. Three buses run each hour in each direction (six buses an hour) during the AM and PM peak periods.

On the proposed construction traffic route to the western compound, bus route 324 travels along Bicknell Road and Archboyd Avenue. Two buses run each hour in each direction (four buses an hour) during the AM and PM peak periods.

### 3.5 School buses

AT GIS data ([School Bus Route | Auckland Transport Open GIS Data \(arcgis.com\)](https://arcgis.com)) indicates that there are the following AT contracted school bus routes on the proposed construction traffic routes:

- S012 - Otahuhu Intermediate to Mangere Town Centre.
- S041 - Mangere to Otahuhu Schools.
- S059 - De La Salle College to Papakura.

An extract of the AT contracted school bus routes is shown in Figure 3.3 below:

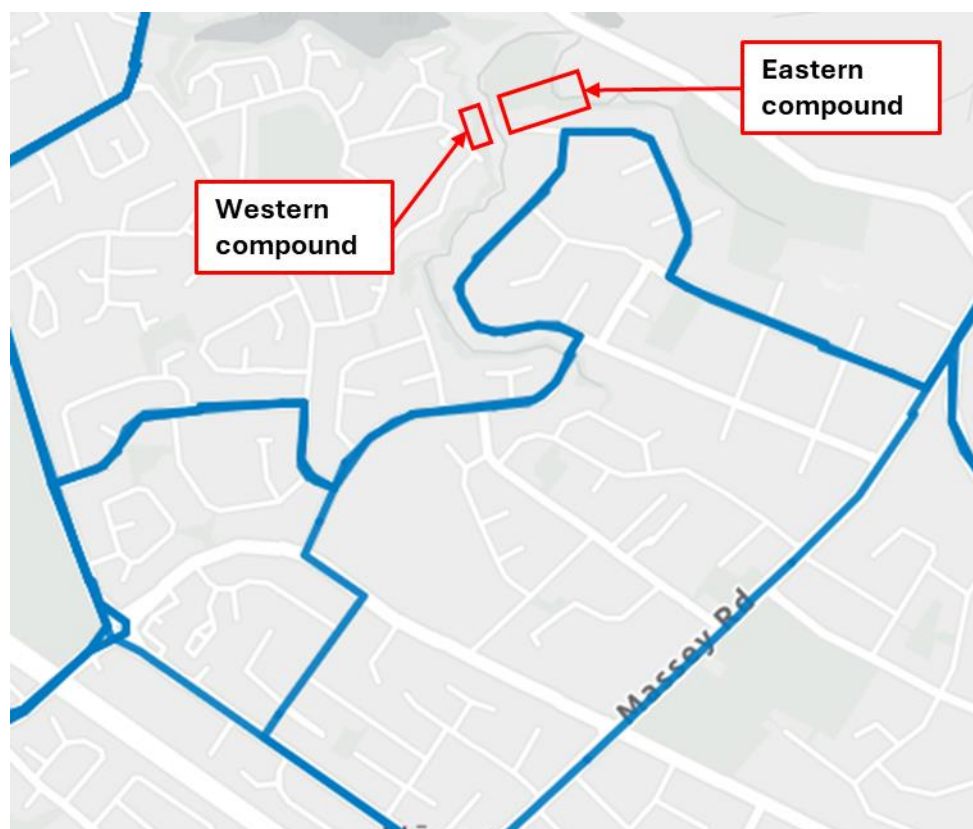


Figure 3.3: Walmsley Road AT contracted school bus routes

A review of the Ministry of Education School Bus information ([School bus route maps \(arcgis.com\)](https://arcgis.com)) indicates that there are no MoE contracted school bus services on the roads leading to both compounds.

### **3.6 Walking and Cycling**

As detailed in Table 3.1 above, there are footpaths along both sides of the roads on the proposed construction traffic routes. There is an unofficial walkway over Harania Creek on the current embankment between Lenore Foreshore Reserve and Blake Road reserve, this will be replaced by an improved shared facility upon completion of works. There are no dedicated cycling facilities adjacent to the Project.

### **3.7 Road Safety**

#### **3.7.1 Introduction**

An assessment of the road safety record on the proposed construction traffic routes has been undertaken using the NZTA Crash Analysis System (CAS). Crash history was assessed for the period from 2019 – 2024 (inclusive) on the route of the Project (noting some of the 2024 data may be incomplete due to a delay between crashes and upload of their data).

#### **3.7.2 Crashes on the proposed construction traffic route to Western Compound**

The reported crash history for the road network on the route to the western compound site access is shown below in Figure 3.4 below.

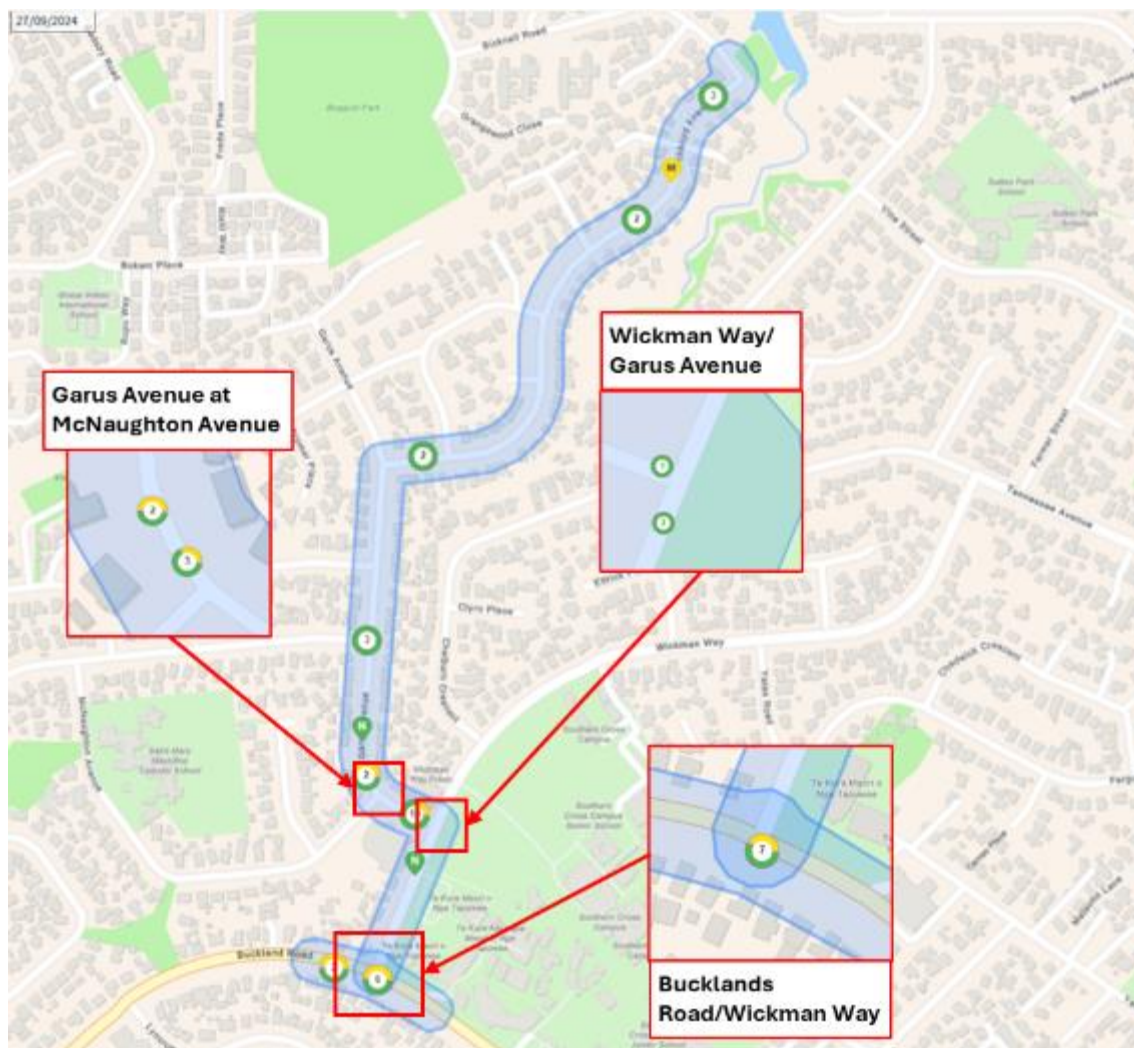


Figure 3.4: Crash study area

From this search a total of 36 crashes were recorded. A summary of the crash severities and factors can be found in Table 3.3 and Table 3.4 below and the collision diagram can be found in Appendix A.

**Table 3.3: Crash summary**

Year	Minor	Non-injury	Total
2019	4	7	11
2020	2	3	5
2021	2	6	8
2022	0	5	5
2023	1	4	5
2024	0	2	2
<b>Total</b>	<b>9</b>	<b>27</b>	<b>36</b>

**Table 3.4: Crash factor summary**

Crash Type	Crash Numbers
------------	---------------

Bend – lost control/head on	14
Crossing/turning	10
Rear end/obstruction	10
Straight road lost control/head on	2
<b>TOTAL</b>	<b>36</b>

None of the crashes within this study period involved cyclists or pedestrians and none were fatal or serious crashes. One crash occurred near the entrance to the western compound, when a motorcycle entered the grassed area and lost control. The crashes are widely dispersed on the route with locations including:

- 7 crashes at the Buckland Road/Wickman Way intersection. These crashes involved either turning vehicles into/out of Wickman Way or rear-ending of vehicles waiting at the traffic signals.
- 5 crashes at the Wickman Way/Garus Avenue intersection. Four of these crashes involved vehicles failing to give way.
- 5 crashes on Garus Avenue (at the bend near McNaughton Avenue). Four of these crashes involved vehicles swinging too wide or losing control as they came around the bend.

Overall, the number of crashes, as well as the severity of the crashes, is considered to be low and it is considered that there are no inherent safety issues present on the route to the Western Compound.

### 3.7.3 Crashes on the proposed construction traffic route to Eastern Compound

The reported crash history for the road network on the route to the eastern compound site access is shown below in Figure 3.5 below.

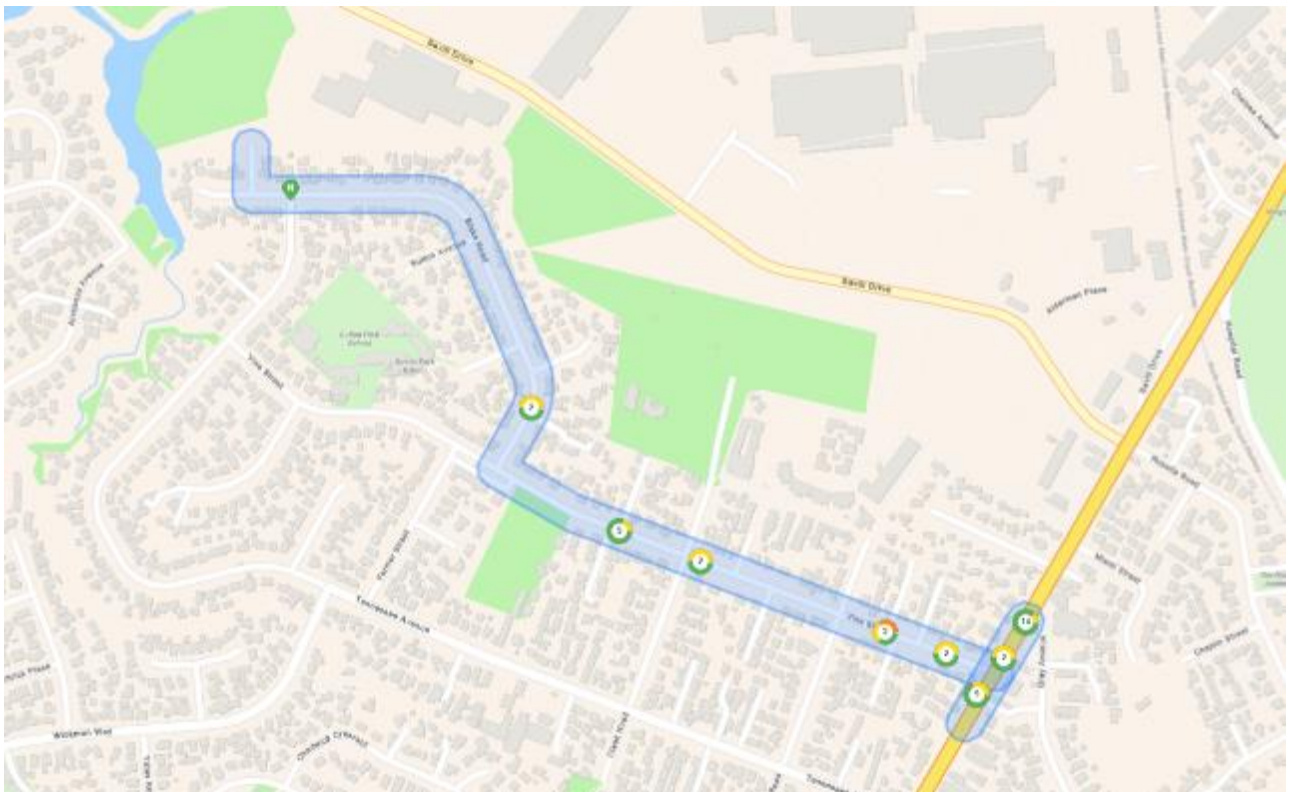


Figure 3.5: Crash study area

From this search a total of 39 crashes were recorded and a summary of the crash severities and factors can be found in Table 3.5 and Table 3.6 below and the collision diagrams can be found in Appendix A.

**Table 3.5: Crash summary**

Year	Serious	Minor	Non-injury	Total
2019	0	5	5	10
2020	0	2	4	6
2021	0	0	6	6
2022	1	0	6	7
2023	0	4	6	10
<b>Total</b>	<b>1</b>	<b>11</b>	<b>28</b>	<b>39</b>

**Table 3.6: Crash factor summary**

Crash Type	Crash Numbers
Bend – lost control/head on	2
Crossing/turning	12
Overtaking	5
Rear end/obstruction	9
Straight road lost control/head on	11
<b>TOTAL</b>	<b>39</b>

There were no fatal crashes and there was one serious crash which involved a vehicle striking another oncoming vehicle. Three of the crashes involved cyclists, all of which were minor crashes involving a vehicle failing to give way. No pedestrians were involved in any crashes. Most of the crashes occurred at or within 50m of the Massey Road/Vine Street intersection, with 26 of the crashes occurring at this location. The majority of the crashes occurring here were as a result of crossing/turning or straight-lost control/head on crash factors.

Apart from at the Massey Road/Vine Street intersection, overall, the number of crashes, as well as the severity of the crashes, is considered to be low and it is considered that there are no inherent safety issues present on the route to the Eastern Compound.

### 3.8 Future Improvements

AT have confirmed that there are no planned works adjacent to the Project site during the proposed construction period. It is understood that a new shared path around Lenore Foreshore Reserve is planned that will eventually tie in with the Tennessee bridge, but this is anticipated to take place after construction of the Tennessee bridge works.

## 4 Proposed Construction Methodology and Construction Traffic Volumes

### 4.1 Overview of flood resilience works and programme

An indicative construction methodology and programme is provided in the AEE report. The construction of the flood resilience works is likely to occur over a period of approximately 15 months. The flood resilience works will include the following:

- The formation and operation of two construction laydown / compound areas. The laydowns/ compounds will be used for the storage of materials, machinery, construction related activities, site offices (e.g. portacom and containers), ablutions and carparking.
- Installation of an approximately 2700 mm internal diameter wastewater pipe parallel to the Eastern Interceptor and associated pipe bridge within the CMA. This will require piles and piers within the CMA.
- Installation of two chambers (upstream and downstream) which tie the new pipe into the Eastern Interceptor.
- Demolition and removal of the embankments, culverts and section of existing Eastern Interceptor between the two chambers.
- The construction and use of a temporary staging platform within the CMA. This will require piles within the CMA, of which will remain permanently below the bed of the CMA.
- Temporary damming and diversion of water required for construction.
- Construction of new pedestrian bridge on top of the pipe bridge to maintain walking access between Lenore Foreshore Reserve and Blake Road Reserve.
- Vegetation clearance, including within the coastal and riparian margins, and the removal of seven trees.
- Earthworks associated with temporary and permanent works, including within the coastal and riparian margins.
- Landscaping.

Construction works will generally be undertaken during standard working hours (Monday to Saturday, 07:30 to 18:00, with night works required for discrete activities (e.g. pipe cut in).

### 4.2 Construction traffic volumes

#### 4.2.1 Overview

The Project transport movements will be associated with activities including delivery of plant and construction materials, staff access, site establishment, piling, removal of material, temporary/permanent bridge construction, concrete pours, demobilisation and site remediation.

Construction worker activity vehicle movements will predominantly be outside of the AM and PM peak periods since staff will arrive from 0700 and depart after 1800 (i.e., before and after the AM and PM peak periods). All other vehicle trips are expected to be dispersed throughout the construction working period of 0730 to 1800.

### 4.3 Construction vehicle trip generation

Based on the construction methodology and work programme in the AEE, Table 4.1 below outlines the expected construction traffic associated with different aspects of construction.

**Table 4.1: Indicative construction traffic**

Construction scope	Type of trucks	Approximate trucks (total during construction)	Number of trucks via Blake Road (Eastern Compound)	Number of trucks via Bicknell Road (Western Compound)	Start/finish date of work
Site compound establishment, plant and equipment mobilisation	Truck and Trailer	85	68	17	25/2/25 to 17/3/25 (4 weeks = 24 working days)
	12 m Flat Deck	15	15	0	
	Low Loaders	30	30	0	
	<b>Total</b>	130	113 (circa 5 trucks /day)	17 (circa 1 truck /day)	
Construction of gravel platforms in Coastal Marine Area (CMA)	Tipper Truck/ <b>Total</b>	161	161 (circa 5 trucks /day)	0	18/3/25 to 29/4/25 (6 weeks = 36 working days)
Access staging installation	Flat deck – Articulated/ <b>Total</b>	26	26 (circa 1 truck /day)	0	30/4/25 to 10/7/25 (11 weeks = 66 working days)
Coffer dam construction and screw pile Install	12 m Flat Deck	3	3	0	11/7/25 to 14/11/25 (18 weeks = 108 working days)
	Concrete truck	15	15		
	Tipper Truck	94	94	0	
	Flat deck - Articulated	28	28	0	
	<b>Total</b>	140	140 (circa 1 truck /day)	0	
Chamber construction	12 m Flat Deck	14	7	7	Bicknell Chamber 17/10/25 to 2/2/26
	Tipper Truck	197	99	98	



Construction scope	Type of trucks	Approximate trucks (total during construction)	Number of trucks via Blake Road (Eastern Compound)	Number of trucks via Bicknell Road (Western Compound)	Start/finish date of work
	Truck and Trailer	77	39	38	(12 weeks = 72 working days – with 3 week xmas shutdown)  Blake Chamber 24/11/25 to 10/3/26  (13 weeks = 78 working days – with 3 week xmas shutdown)
	Concrete Truck	83	42	41	
	<b>Total</b>	371	187 (circa 2 trucks/day)	184 (circa 2 trucks /day)	
Pile-cap Construction	12 m Flat Deck	13	13	0	22/08/25 to 16/10/25  (8 weeks = 48 working days)
	Concrete Truck	46	46	0	
	<b>Total</b>	59	59 (circa 1 truck /day)	0	
Pipe Assembly (including assembly bed construction)	Tipper Truck	53	53	0	24/10/25 to 5/12/25  (7 weeks = 42 working days)
	Concrete Truck	4	4	0	
	12 m Flat Deck	12	12	0	
	<b>Total</b>	69	69 (circa 2 trucks /day)	0	
Pedestrian Bridge delivery	12 m Flat Deck/ <b>Total</b>	12	12		April 2026
Cofferdam, temporary platform and access staging removal	12 m Flat Deck	12	12	0	24/4/26 to 29/5/26  (6 weeks = 36 working days)
	Flat Deck - Articulated	26	26	0	
	<b>Total</b>	38	38 (circa 1 truck /day)	0	

Construction scope	Type of trucks	Approximate trucks (total during construction)	Number of trucks via Blake Road (Eastern Compound)	Number of trucks via Bicknell Road (Western Compound)	Start/finish date of work
Removal of redundant pipe and existing earth embankment	Tipper Truck/ <b>Total</b>	422	0	422 (circa 12 trucks /day)	24/4/26 to 29/5/26 (6 weeks = 36 working days)
Site compound, plant and equipment demobilisation	Truck and Trailer	85	68	17	2/6/26 to 30/6/26 (4 weeks = 24 working days)
	Flat Deck - Articulated	15	15	0	
	Low Loaders	30	30	0	
	<b>Total</b>	130	113 (circa 5 trucks /day)	17 (circa 1 truck /day)	

In relation to Table 4.1 above, the following is noted:

- The numbers are in relation to the number of truck vehicles (i.e. one way movement) and therefore, to derive construction truck vehicle movements (i.e. two way movements), these numbers need to be doubled.
- Workforce is anticipated to be up to 25 staff who will all arrive in cars/utes. As a worst case transport assessment, all staff are assumed to arrive individually. In reality, staff will likely car share and thus there will be less vehicle movements than that assumed in this transport assessment. Staff will be able to walk between both compounds.
- Minimal numbers of service vehicles are expected at each of the compounds which would consist of rubbish collection with one skip per month and Portaloo's serviced once a week.

Based on the above, the highest/worst case daily number of construction vehicles associated with each of the compounds is:

- Eastern Compound = 5 trucks, 25 cars and 2 service vehicles i.e. 32 vehicles/day (64 two way vehicle movements/day). Over an 11 hour working day period this equates to 6 vehicle movements an hour or 1 vehicle movement every 10 minutes.
- Western Compound = 12 trucks, 25 cars and 2 service vehicles i.e. 39 vehicles/day (78 two way vehicle movements/day). Over an 11 hour working day period this equates to 7 vehicle movements an hour or 1 vehicle movement every 8.5 minutes.

#### **4.4 Overweight and Over Dimension Vehicles**

Overweight and Over Dimension permits will be required for the transporters of the crane at the start and end of the project. These deliveries are effectively one-offs that will happen in the early hours of the morning and pilot vehicles usually stop traffic as needed to get trucks into the site. Agreement on routes taken by these transporters will be agreed with AT at the permitting stage.

#### **4.5 Staff and visitor car parking**

Car parking for staff and visitors will be provided within the site compounds.

## 5 Assessment Of Temporary Transport Effects

### 5.1 Introduction

The following sections provide detail on the assessment of the temporary transport related effects. The assessment includes:

- Additional construction traffic flow increases and effects on existing congestion.
- Additional construction traffic flow increases and effects on road safety.
- Effects on adjacent properties.
- Effects on pedestrians and cyclists.
- Effects on buses and school buses.
- Effects on on-street parking.
- Effects of additional construction traffic on pavement condition of the construction routes.

### 5.2 Traffic impact of the additional construction vehicles on the surrounding road network

#### 5.2.1 Usual construction hours

##### 5.2.1.1 Assessment

Based on the highest number of construction traffic movements/day (outlined in section 4.3), Table 5.1 below summarises the temporary increase in traffic compared to the existing flows:

**Table 5.1: Impact of temporary additional construction traffic**

Road name	Average Daily Traffic two way veh/day	% impact (two way)
-----------	---------------------------------------	--------------------

#### Eastern Compound

Blake Road (west of Tennessee Avenue)	37	178%
Blake Road (east of Tennessee Avenue)	1,075	6%
Vine St	5,826	1%
Massey Road	28,837	0.2%

#### Western Compound

Bicknell Road	2,121	4%
Archboyd Avenue	2,658	3%
Garus Avenue	4,660	2%
Wickham Way	10,819	0.7%
Buckland Road	10,952	0.7%

Overall, the increase in traffic generated from the construction of the Project is considered to be negligible given:

- Although there is a large % increase on Blake Road west of Tennessee Avenue, this is due to this section of road having a very low existing traffic flow. It is considered that 78 construction traffic movements/day can be easily accommodated on this section of road and should not result in a noticeable increase in congestion or unreasonable delays for road users.
- For the remainder of the roads which are either Collectors or Arterials, construction traffic will temporarily increase traffic volumes by between 0.2% and 6% which is well within the range of typical day to day fluctuations in traffic flow of 5% to 10% that regularly occur on the road network. These roads are already performing a movement function. The negligible increase in daily traffic movements therefore should not result in a noticeable increase in congestion or unreasonable delays for road users.

#### **5.2.1.2 Mitigation**

It is proposed that the CTMP includes measures to provide traffic management supervisors to safely manage the movement of construction traffic to and from the road network to ensure the safety of all road users is maintained and that the construction vehicles can safely negotiate access and egress and avoid any additional queueing on the adjacent road network in the peak periods.

#### **5.2.2 Outside of usual construction hours**

As detailed in Section 4, there may be occasions where it is necessary to undertake construction activities outside of usual construction hours. Given these activities will take place at off peak times on the surrounding road network (when there is no congestion), then it is considered that the traffic impact of these activities is negligible.

### **5.3 Road safety impact of the additional construction vehicles on the surrounding road network**

#### **5.3.1 Assessment**

The low number of temporary additional trips generated by the construction traffic for the Project will have a negligible impact on the safety of the surrounding road network and is not likely to exacerbate any existing crash patterns.

#### **5.3.2 Mitigation**

It is proposed that the CTMP includes measures to safely accommodate the construction traffic including:

##### **5.3.2.1 Eastern Compound**

- Vehicle tracking of construction vehicles for the route to the Eastern Compound from the Massey Road/Vine Street intersection has been carried out and temporary works improvements are required at the site access -in the form of temporary parking restrictions adjacent to the reserve site access and at the Blake Road intersection.
- Although construction traffic will not directly pass Sutton Park School, Vine Street (east of Blake Road) and Blake Road itself are likely routes to be used by children to access the school. In addition, there are two ECE's on Vine Street and also there are two school bus routes on Vine Street and Blake Road. Provisions will be made for restricting movements of the Project construction traffic during peak school drop-off and pick-up times for example 0830 to 0915 and 1445 to 1530 (based on Sutton Park school start time of 0900 and finish time of 1500

[School Hours – Sutton Park School](#)). This restriction would not apply on Saturdays and during school holiday periods.

- Continuous communications with residents on Vine Street, Blake Road and Sutton Park School will be essential to rapidly address any traffic issues should they arise.

### 5.3.2.2 Western Compound

- Vehicle tracking of construction vehicles for the route to the Western Compound from the Buckland Road /Wickham Way intersection has been carried out and the following temporary works improvements are identified:
  - Site access - widening of existing concrete vehicle crossing and temporary parking restrictions adjacent to the site access. Trucks arriving and departing will need to be managed by TM personnel since this won't be able to operate as a two-way access for trucks.
  - Bicknell Road /Archboyd Avenue bend and site access. Temporary parking restrictions on the bend and temporary 30 km/h speed limit on the approaches to the bend and site access to reduce vehicle speeds. Introduction of three-way TTM traffic signals during the short periods when this compound will be in use.
  - Garus Avenue /Archboyd Avenue intersection - Temporary removal of existing island and replacement with road markings and re-instatement of island following completion of the works.
- Provisions will be made for restricting movements of the Project construction traffic during peak school drop-off and pick-up times for the Southern Cross Campus for example 0830 to 0930 and 1430 to 1530. This is based on Junior school start time of 0845 (0900 on a Tuesday) and finish time of 1510 and College start time of 0900 and finish time of 1510 (1440 on a Tuesday) from [Southern Cross Campus – Junior School and College | CAB Directory Listing](#). This restriction would not apply on Saturdays and during school holiday periods.
- Continuous communications with residents and schools on Wickam Way, Garus Avenue, Archboyd Avenue and Bicknell Road and the Southern Cross Campus will be essential to rapidly address any traffic issues should they arise.

### 5.3.2.3 Driver Safety Briefings

The CTMP will include provision of safety briefings to truck drivers to include:

- Confirmation of the routes of travel to and from the Eastern and Western Compounds.
- Permissible times of deliveries (noting the suggested restrictions at school arrival and departure times).
- Requirement for, and use of possible communication systems.
- Requirements to abide by local speed restrictions for dust and detritus management.
- Requirement for courteous driving.
- Appropriate following distances.
- Requirements to report hazards on the transport route.
- Check rear view mirrors regularly and where safe to pull over, allow traffic behind to pass.
- No overtaking on public roads unless this can be done safely.
- Strict adherence to speed limits. The contractor will strictly monitor speeds of the construction workforce.
- Protocols around other road users such as cyclists/pedestrians. This includes, all construction related activity to give way to pedestrian/cycle traffic, all traffic to reduce to 20 km/h when

passing pedestrians/cyclists and ensuring that at least 1.5 metres of separation between vehicles and cyclists/pedestrians. If this separation cannot be achieved, then the vehicle is to wait until a safe passing space is available or the rider signaled that it was safe to pass.

- No unnecessary stopping and no idling outside private residences/driveways.
- Reporting of any incidents/issues to the Contractor.
- Drivers made aware to maintain clean public road surfaces throughout the construction period and report any dust/dirt tracking.
- Headlights should be dipped (low beam) at all times if required. Signs will be installed within the site requiring that when vehicles headlights are used, they shall be dipped (low beam) at all times.

## 5.4 Effects on properties, pedestrians and cyclists, buses and on street parking

### 5.4.1 Assessment

Table 5.2 below presents the findings from an assessment of the impacts of additional construction traffic on access to properties, pedestrians and cyclists, buses and school buses and on street parking.

**Table 5.2: Assessment of effects**

Criteria	Impact Assessment	Comments/Mitigation
<b>Access to residential properties</b>	Negligible	Residential access not impacted. CTMP will contain measures and protocols with regard to no unnecessary stopping and no idling outside private residences/ driveways.
<b>Pedestrians and cyclists</b>	Negligible during works and benefit following works with improved shared route	Temporary removal of the existing informal walkway across the existing pipe. To be replaced by an improved shared facility upon completion of works. No change to other existing footpaths and no existing cycleways impacted. CTMP will contain measures and protocols with regard to driving when pedestrians and cyclists present. CTMP will include for no construction vehicles during school drop off and pick up times.
<b>Buses and School Buses</b>	Negligible	Bus journey times and reliability unaffected. CTMP will include measures including continuous communications with AT Metro to monitor bus journey times and reliability and identify any TTM measures that could assist bus operations. School bus journey times and reliability unlikely to be affected given CTMP includes for no construction vehicles during school drop off and pick up times. CTMP will also include measures including continuous communications with AT school bus operators to monitor school bus journey times and reliability and identify any Temporary Traffic Management (TTM) measures that could assist school bus operations.
<b>On street parking.</b>	Minimal	A limited amount of on street parking maybe temporarily removed but residential properties have off street parking.
<b>Overall Assessment</b>	<b>Negligible</b>	

## 5.5 Pavement Condition Assessment

As demonstrated above, construction traffic movements will result in a negligible temporary increase in traffic and, as such, it is considered that there will be a negligible impact on the pavement condition of these roads.

Although this is considered to be a negligible increase on the road pavement condition, it is proposed that the CTMP includes measures to carry out a Pavement Condition Assessment (PCA). The PCA will provide an assessment of the road surface condition, prior to and post construction of:

- Vine Street (between Massey Road and Blake Road).
- Blake Road (between Vine Street and the Blake Road Reserve access road).
- Wickham Way (between Buckland Road and Garus Avenue).
- Garus Avenue (between Wickham Way and Archboyd Avenue).
- Archboyd Avenue/Bicknell Road (between Garus Avenue and the site access opposite #41 Bicknell Road).

This will allow for an evaluation of any changes to the condition of the road pavement.

A pre-construction PCA will be carried out by a visual inspection of the road surface and the findings will be presented in a Pre-construction PCA report which will identify any pre-existing road surface condition issues. Upon completion of the construction works, a post construction PCA will be carried out by a visual inspection of the road surface. A comparison of the road surface conditions pre-and post-construction will be carried out and reported in a post construction PCA report. This will also identify any remedial works and a timescale for implementation that are directly attributable to the construction traffic (as opposed to general wear and tear).



## 6 Conclusions

Based on the assessments detailed in Section 5, Table 6.1 below summarises the assessment of transport effects.

**Table 6.1: Summary of Transport Effects**

Transport effect assessed	Temporary effect rating
Traffic impact of the additional construction vehicles on the surrounding road network (usual construction hours)	Negligible
Traffic impact of the additional construction vehicles on the surrounding road network (outside usual construction hours)	Negligible
Road Safety impact of the additional construction vehicles on the surrounding road network	Negligible
Adjacent properties	Negligible
Pedestrians	Negligible
Cyclists	Negligible
Buses and school buses	Negligible
On Street parking	Minimal

Overall, it is considered that the project has a negligible transport effect.

## 7 Recommendations - Construction Traffic Management Plan (CTMP)

### 7.1 Background and objectives

It is recommended that a condition is imposed on any resource consent for a CTMP to be submitted for certification prior to any works commencing. The objectives of the CTMP are to:

- a Ensure construction traffic movements on the transport network are appropriately managed.
- b Provide for the safety of everyone at all times.
- c Minimise disruption and maintain pedestrian and vehicle access to/from surrounding residential properties.
- d Minimise disruption from construction traffic on the travelling public and road users along the identified sections of the construction routes.
- e Seek to avoid full road closures and minimise any partial or managed closures.
- f Manage integration with other construction projects and Auckland Transport projects.

A draft CTMP will be submitted with the Resource Consent submission.

### 7.2 CTMP measures

Specific issues that the CTMP will need to address includes:

#### 7.2.1 Construction traffic routing

- Access to the eastern compound will be from Massey Road/Vine Street/Blake Road.
- Access to the eastern compound will be from Buckland Road/Wickham Way/Garus Avenue/Archboyd Avenue/Bicknell Road.
- Eastern and western compound construction accesses will be designed in accordance with relevant AT design standards (including sight lines, accessway widths and gradients).

#### 7.2.2 Construction site operation

- A 1.8 m high security fence will be erected around the perimeter of the site to delineate the construction area to prevent public access.
- TTM and clear warning signs of the construction site access and egress.
- Appropriate wheel wash facilities to be set up at the exit points.
- Site Traffic Management Supervisor will safely manage the movements of construction traffic to and from the road network to ensure the safety of all road users is maintained and that construction vehicles can negotiate access and egress.
- Site Traffic Management Supervisor will co-ordinate (for example via radio control) trucks accessing the site to ensure that construction vehicles arriving and departing the site can do safely.
- The CTMP will implement a construction driver education programme given the close proximity to residential properties and schools.
- Movements of specialised machinery or large components (e.g., cranes) will not occur on a day to day basis. Separate to the Resource Consent application, bespoke SSTMPs and CARs will be developed once exact details of the machinery and vehicles required is known, as they have successfully been carried out for other Healthy Water projects. Agreement with AT will be required and over-dimension rules and associated permitting processes will need to be complied with.
- Contractor to provide appropriate staff and visitor parking within the site.

### 7.2.3 Communications

- Communication campaigns should be undertaken in relation to traffic management activities throughout construction activities (including letter drops to affected residents and schools, flier drops, project signage, web based resources, etc).
- Appropriate temporary traffic management measures should be incorporated by AT to advise other road users of the construction traffic.
- Continuous communications with AT Metro to monitor bus journey times and reliability and identify any TTM measures that could assist bus operations.
- Continuous communications with AT school bus operators to monitor school bus journey times and reliability and identify any Temporary Traffic Management (TTM) measures that could assist school bus operations.

### 7.2.4 Eastern Compound

- Vehicle tracking of construction vehicles for the route to the to the Eastern Compound from the Massey Road/Vine Street intersection has been carried out and temporary works improvements are required at the site access -in the form of temporary parking restrictions adjacent to the reserve site access and at the Blake Road intersection.
- Although construction traffic will not directly pass Sutton Park School, Vine Street (east of Blake Road) and Blake Road itself are likely routes to be used by children to access the school. In addition, there are two ECE's on Vine Street and also there are two school bus routes on Vine Street and Blake Road. Provisions will be made for restricting movements of the Project construction traffic during peak school drop-off and pick-up times for example 0830 to 0915 and 1445 and 1530 (based on Sutton Park school start time of 0900 and finish time of 1500 [School Hours – Sutton Park School](#)). This restriction would not apply on Saturdays and during school holiday periods.
- Continuous communications with residents on Vine Street, Blake Road and Sutton Park School will be essential to rapidly address any traffic issues should they arise.

### 7.2.5 Western Compound

- Vehicle tracking of construction vehicles for the route to the Western Compound from the Buckland Road /Wickham Way intersection has been carried out and the following temporary works improvements are identified:
  - Site access - widening of existing concrete vehicle crossing and temporary parking restrictions adjacent to the site access. Trucks arriving and departing will need to be managed by TM personnel since this won't be able to operate as a two-way access for trucks.
  - Bicknell Road /Archboyd Avenue bend and site access. Temporary parking restrictions on the bend and temporary 30 km/h speed limit on the approaches to the bend and site access to reduce vehicle speeds. Introduction of three-way TTM traffic signals during the short periods when this compound will be in use.
  - Garus Avenue /Archboyd Avenue intersection - Temporary removal of existing island and replacement with road markings and re-instatement of island following completion of the works.
- Provisions will be made for restricting movements of the Project construction traffic during peak school drop-off and pick-up times for the Southern Cross Campus for example 0830-0930 and 1430 and 1530. This is based on Junior school start time of 0845 (0900 on a Tuesday) and finish time of 1510 and College start time of 0900 and finish time of 1510 (1440 on a Tuesday) This restriction would not apply on Saturdays and during school holiday periods.

- Continuous communications with residents on Wickam Way, Garus Avenue, Archboyd Avenue and Bicknell Road and Southern Cross Campus will be essential to rapidly address any traffic issues should they arise.

### 7.2.6 Driver Safety Briefings

The CTMP will include provision of safety briefings to truck drivers to include:

- Confirmation of the routes of travel to and from the Eastern and Western Compounds.
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- Requirements to report hazards on the transport route.
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- No overtaking on public roads unless this can be done safely.
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- Protocols around other road users such as cyclists/pedestrians. This includes, all construction related activity to give way to pedestrian/cycle traffic, all traffic to reduce to 20 km/h when passing pedestrians/cyclists and ensuring that at least 1.5 metres of separation between vehicles and cyclists/pedestrians. If this separation cannot be achieved, then the vehicle is to wait until a safe passing space is available or the rider signaled that it was safe to pass.
- No unnecessary stopping and no idling outside private residences/driveways.
- Reporting of any incidents/issues to the Contractor.
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- Headlights should be dipped (low beam) at all times if required. Signs will be installed within the site requiring that when vehicles headlights are used, they shall be dipped (low beam) at all times.

### 7.2.7 Pavement Condition Assessment (PCA)

As demonstrated above, construction traffic movements will result in a negligible temporary increase in traffic and, as such, it is considered that there will be a negligible impact on the pavement condition of these roads.

Although this is considered to be a negligible increase on the road pavement condition, it is proposed that the CTMP includes measures to carry out a Pavement Condition Assessment (PCA). The PCA will provide an assessment of the road surface condition, prior to and post construction of:

- Vine Street (between Massey Road and Blake Road).
- Blake Road (between Vine Street and the Blake Road Reserve access road).
- Wickham Way (between Buckland Road and Garus Avenue).
- Garus Avenue (between Wickham Way and Archboyd Avenue).
- Archboyd Avenue/Bicknell Road (between Garus Avenue and the site access opposite #41 Bicknell Road).

This will allow for an evaluation of any changes to the condition of the road pavement.

A pre-construction PCA will be carried out by a visual inspection of the road surface and the findings will be presented in a Pre-construction PCA report which will identify any pre-existing road surface condition issues. Upon completion of the construction works, a post construction PCA will be carried out by a visual inspection of the road surface. A comparison of the road surface conditions pre-and post-construction will be carried out and reported in a post construction PCA report. This will also identify any remedial works and a timescale for implementation that are directly attributable to the construction traffic (as opposed to general wear and tear).

## 8 Applicability


This report has been prepared for the exclusive use of our client Healthy Waters, with respect to the particular brief given to us and it may not be relied upon in other contexts or for any other purpose, or by any person other than our client, without our prior written agreement.

We understand and agree that our client will submit this report as part of an application for resource consent and that Auckland Council will use this report for the purpose of assessing that application

Tonkin & Taylor Ltd

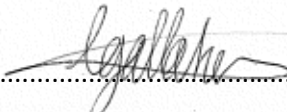
Environmental and Engineering Consultants

Report prepared by:

  
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Senior Principal Transport Engineer

  
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Anna Gallaher

Transport Engineer

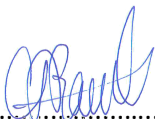
Report reviewed by:

  
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James Dyer

Principal Transport Engineer

Authorised for Tonkin & Taylor Ltd by:

  
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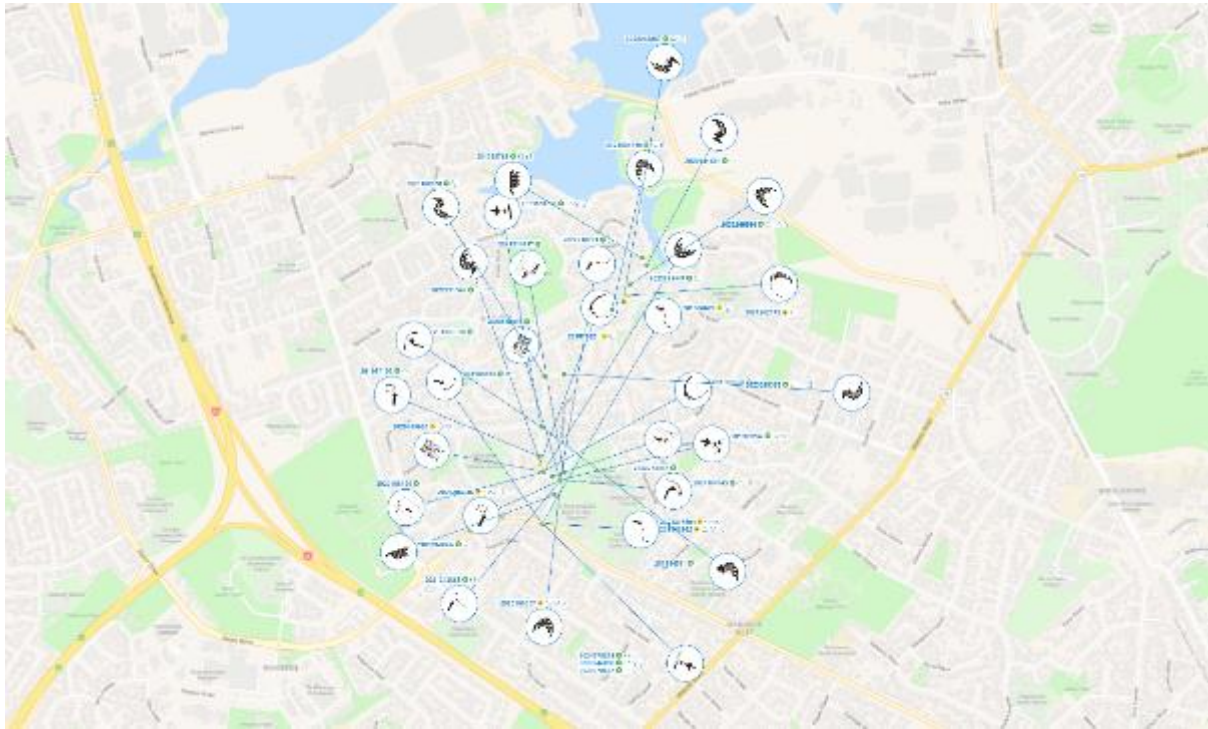
Chris Bauld

Project Director

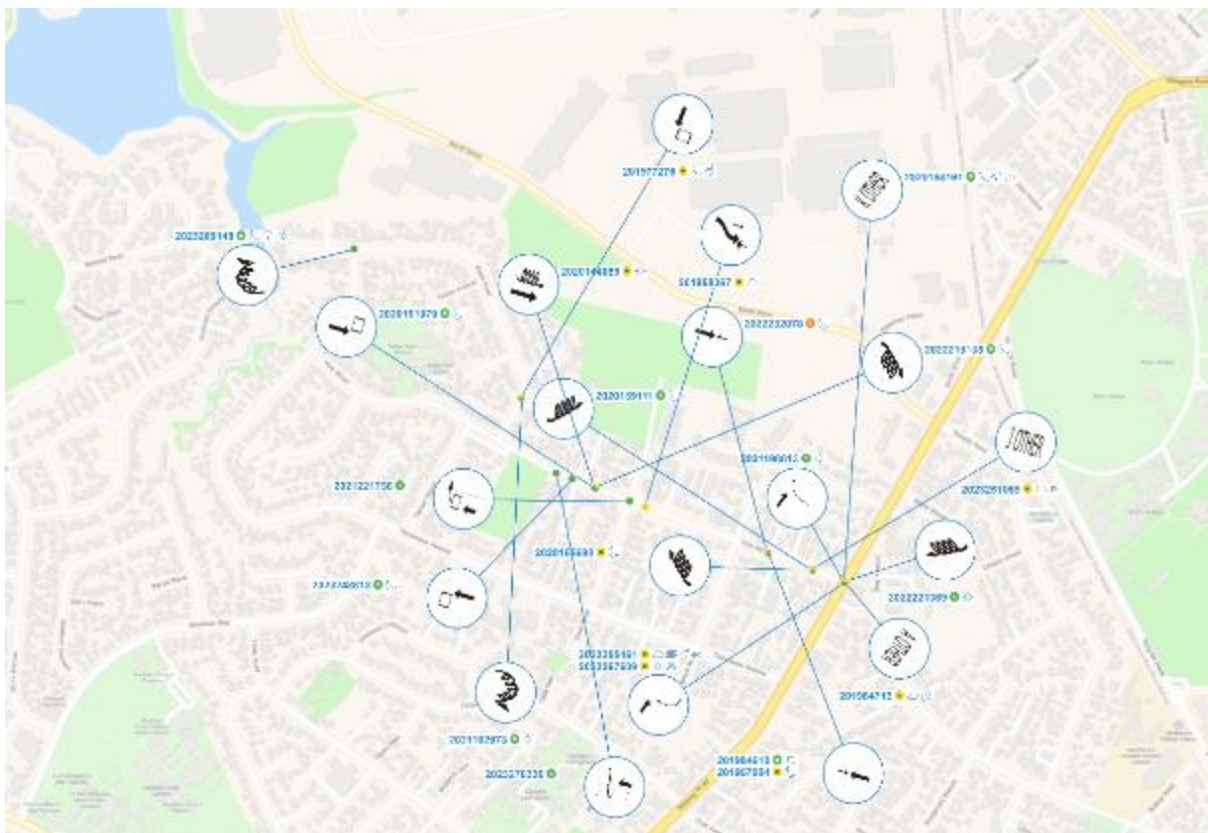
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## Appendix A Collision Diagrams



Western compound crash study area collision diagram



Eastern compound crash study area collision diagram



# VEHICLE MOVEMENT CODING SHEET

For use with crash data from CAS (Version 2.8 May 2010)

TYPE	A	B	C	D	E	F	G	O
<b>A</b> OVERTAKING AND LANE CHANGE	PULLING OUT OR CHANGING LANE TO RIGHT	HEAD ON	CUTTING IN OR CHANGING LANE TO LEFT	LOST CONTROL (OVERTAKING VEHICLE)	SIDE ROAD	LOST CONTROL (OUBERTAKEN VEHICLE)	WEAVING IN HEAVY TRAFFIC	OTHER
<b>B</b> HEAD ON	ON STRAIGHT	CUTTING CORNER	SWINGING WIDE	BOTH OR UNDERCORN	LOST CONTROL ON STRAIGHT	LOST CONTROL ON CURVE		OTHER
<b>C</b> LOST CONTROL OR OFF ROAD (STRAIGHT ROADS)	OUT OF CONTROL ON ROADWAY	OFF ROADWAY TO LEFT	OFF ROADWAY TO RIGHT					OTHER
<b>D</b> CORNERING	LOST CONTROL TURNING RIGHT	LOST CONTROL TURNING LEFT	MISSED INTERSECTION OR END OF ROAD					OTHER
<b>E</b> COLLISION WITH OBSTRUCTION	PARKED VEHICLE	CRASH OR BROKEN DOWN	NON VEHICULAR OBSTRUCTIONS (INCLUDING ANIMALS)	WORKMAN VEHICLE	OPENING DOOR			OTHER
<b>F</b> REAR END	SLOWER VEHICLE	CROSS TRAFFIC	PEDESTRIAN	QUEUE	SIGNALS T	OTHER		OTHER
<b>G</b> TURNING VERSUS SAME DIRECTION	REAR OF LEFT TURNING VEHICLE	LEFT TURN SIDE SWIPE	STOPPED OR TURNING FROM LEFT SIDE	NEAR CENTRE LINE	OVERTAKING VEHICLE	TWO TURNING		OTHER
<b>H</b> CROSSING (NO TURNS)	RIGHT ANGLE (70° TO 110°)							OTHER
<b>J</b> CROSSING (VEHICLE TURNING)	RIGHT TURN RIGHT SIDE	OPPOSING RIGHT TURNS	TWO TURNING					OTHER
<b>K</b> MERGING	LEFT TURN IN	RIGHT TURN IN	TWO TURNING					OTHER
<b>L</b> RIGHT TURN AGAINST	STOPPED WAITING TO TURN	MAKING TURN						OTHER
<b>M</b> MANOEUVRING	PARKING OR LEAVING	U TURN	U TURN	DRIVEWAY MANOEUVRE	ENTERING OR LEAVING FROM OPPOSITE SIDE	ENTERING OR LEAVING FROM SAME SIDE	REVERSING ALONG ROAD	OTHER
<b>N</b> PEDESTRIANS CROSSING ROAD	LEFT SIDE	RIGHT SIDE	LEFT TURN LEFT SIDE	RIGHT TURN RIGHT SIDE	LEFT TURN RIGHT SIDE	RIGHT TURN LEFT SIDE	MANOEUVRING VEHICLE	OTHER
<b>P</b> PEDESTRIANS OTHER	WALKING WITH TRAFFIC	WALKING FACING TRAFFIC	WALKING ON FOOTPATH	CHILD PLAYING (INCLUDING TRICYCLE)	ATTENDING TO VEHICLE	ENTERING OR LEAVING VEHICLE		OTHER
<b>Q</b> MISCELLANEOUS	FELL WHILE BOARDING OR ALIGHTING	FELL FROM MOVING VEHICLE	TRAIN	PARKED VEHICLE RAN AWAY	EQUESTRIAN	FELL INSIDE VEHICLE	TRAILER OR LOAD	OTHER

\* = Movement applies for left and right hand bends, curves or turns

New Zealand Government



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