

#### 5.2.2.4 Construction Scenario 1.3

Construction Scenario 1.3 simulates the full closure of Reeves Road, completion of the new SEART offramp and ongoing offline works (see **Appendix K** and **Appendix L**). These include:

- Closure of Reeves Road from Ti Rakau Drive to William Roberts Road in EB2.
- Ongoing construction of the new bus lanes in EB2 on the northern side of Ti Rakau Drive and the completion of the new Ti Rakau Drive / Aylesbury Street / Palm Avenue crossroads intersection. Three lanes on the eastbound carriageway will be maintained.
- Completion of the new SEART offramp in EB2, providing two left-turn lanes (one of which will be temporary) and two right-turn lanes, see **Section 4.2.1.4** (Phase 1). The 3<sup>rd</sup> right-turn lane will have been constructed by this stage, but will not be operational until the Ti Rakau Drive eastbound carriageway has been widened.
- Ongoing construction of the new SEART onramp in EB2 by shifting traffic over to the existing offramp pavement, see **Section 4.2.1.4** (Phase 2). These works are not expected to lead to a reduction in general traffic lanes.
- Completion of the WRRE.
- Temporary signalisation of the Pakuranga Road / William Roberts Road intersection in EB2.
- Ongoing construction of the new westbound lanes in EB3R on the southern side of Ti Rakau Drive as well as the new Ti Rakau Drive / William Roberts Road / Mattson Road crossroads intersection. The left-turn onto SEART will be converted back to a slip lane and the westbound carriageway to two lanes between Tiraumea Drive and Mattson Road. The pedestrian crossing on the eastern approach will be removed temporarily.
- Completion of the enabling works at the Ti Rakau Drive / Gossamer Drive intersection in EB3R, including converting the left-turn slip lane on the western and eastern approaches to pass through the intersection.
- Ongoing temporary closure of the kerbside left-turn lane at Freemantle Place in EB3R.

#### **Intersection Performance:**

Traffic signal phasing diagrams per intersection are provided in **Appendix O** and lane performance summaries per intersection are provided in **Appendix P**.

Table 25 provides a comparison of the intersection performance between the Do-Minimum and Construction Scenario 1.3 during the AM peak, with a 2028 horizon year.

Table 25: Intersection performance – Do-Minimum vs Construction Scenario 1.3 (AM Peak)

Intersection	Do-Minimum			Construction Scenario 1.3		
	LOS	DOS (v/c)	Delay [s]	LOS	DOS (v/c)	Delay [s]
Pakuranga Rd / Ti Rakau Dr	C	0.89	35	C	0.91	34
Pakuranga Rd / Brampton Ct	N/A	2.31	10	N/A	4.12	45
Pakuranga Rd / William Roberts Rd	N/A	7.23	265	B	0.89	22
Pakuranga Rd / St Kentigern College	C	0.86	22	C	0.85	22
William Roberts Rd / Reeves Rd	N/A	0.69	8	N/A	0.26	5
William Roberts Road / Cortina Pl	Built during WRRE			N/A	0.17	1
Ti Rakau Dr / Aylesbury St / Palm Ave	Built during EB2			E	1.01	69
Ti Rakau Dr/ Reeves Rd / SEART	D	0.91	54	D	0.89	54
Ti Rakau Dr / William Roberts Rd	Built during WRRE			N/A	0.50	1
Ti Rakau Dr / Mattson Rd	B	0.78	15	C	0.89	21
Ti Rakau Dr / Edgewater Dr west	C	0.85	27	C	0.89	30
Ti Rakau Dr / Gossamer Dr	F	1.07	91	F	1.27	83

The analysis indicates that in the AM peak, Construction Scenario 1.3 is expected to result in minimal adverse effects at the majority of intersections.

Again, average delay at the Pakuranga Road / Brampton Court intersection is expected to increase due to the full closure of Reeves Road and resultant increased demand on Pakuranga Road. However, all other access points to the Plaza are expected to have spare capacity should these vehicles wish to divert elsewhere.

As above, the temporary signalisation of the Pakuranga Road / William Roberts Road intersection is expected to improve the average delay significantly.

**Table 26** provides a comparison of the intersection performance between the Do-Minimum and Construction Scenario 1.3 during the PM peak, with a 2028 horizon year.

**Table 26: Intersection performance – Do-Minimum vs Construction Scenario 1.3 (PM Peak)**

Intersection	Do-Minimum			Construction Scenario 1.3		
	LOS	DOS (v/c)	Delay [s]	LOS	DOS (v/c)	Delay [s]
Pakuranga Rd / Ti Rakau Dr	D	0.92	53	C	0.93	35
Pakuranga Rd / Brampton Ct	N/A	1.81	9	N/A	1.93	27
Pakuranga Rd / William Roberts Rd	N/A	53.18	3474	B	0.92	28
Pakuranga Rd / St Kentigern College	C	0.89	27	B	0.86	13
William Roberts Rd / Reeves Rd	N/A	1.05	26	N/A	0.28	4
William Roberts Rd / Cortina Pl	Built during WRRE			N/A	0.15	1
Ti Rakau Dr / Aylesbury St / Palm Ave	Built during EB2			B	0.85	20
Ti Rakau Dr / Reeves Rd / SEART	E	0.98	56	E	0.96	64
Ti Rakau Dr / William Roberts Rd	Built during WRRE			N/A	0.43	1
Ti Rakau Dr / Mattson Rd	B	0.68	13	B	0.88	20
Ti Rakau Dr / Edgewater Drive west	C	0.89	31	C	0.89	30
Ti Rakau Dr / Gossamer Dr	D	0.91	45	E	1.08	72

Construction Scenario 1.3 is expected to have acceptable intersection performance during the PM peak with some mitigation measures in place, similar to Construction Scenario 1.2.

The heavy demand on Pakuranga Road eastbound is expected to be manageable through implementing fixed time cycles and offsets at the following intersections:

- Pakuranga Road / William Roberts Road (temporary traffic signal)
- Pakuranga Road / St Kentigern College

A cycle length of 150 seconds and an offset of 13 seconds to St Kentigern College using the William Roberts Road intersection as reference, is expected to lead to manageable queues and delays (see **Appendix O**). Consultation with ATOC will be undertaken with regards to this mitigation measure.

Similar to Construction Scenario 1.2, moderate increases in average delay are expected at the Ti Rakau Drive / Reeves Road /SEART and Ti Rakau Drive / Gossamer Drive intersections. However, these intersections are still expected to operate at an acceptable LOS E.

#### 5.2.2.5 Construction Scenario 1.4

Construction Scenario 1.4 simulates the full closure of Reeves Road, completion of the new SEART onramp and ongoing offline works (see **Appendix K** and **Appendix L**). These include:

- Closure of Reeves Road from Ti Rakau Drive to William Roberts Road in EB2.
- Completion of the new SEART offramp in EB2, providing two left-turn lanes and two right-turn lanes.
- Completion of the new SEART onramp in EB2, see **Section 4.2.1.4**. Offline construction of the southern RRF abutment will then commence (Phase 3).
- Ongoing construction of the new bus lanes in EB2 on the northern side of Ti Rakau Drive and the completion of the new Ti Rakau Drive / Aylesbury Street / Palm Avenue crossroads intersection. Three lanes on the eastbound carriageway will be maintained.
- Completion of the WRRE.
- Temporary signalisation of the Pakuranga Road / William Roberts Road intersection in EB2.
- Ongoing construction of the new westbound lanes in EB3R on the southern side of Ti Rakau Drive as well as the new Ti Rakau Drive / William Roberts Road / Mattson Road crossroads intersection. The left-turn slip lane onto SEART will be maintained while the westbound carriageway is reduced to two lanes between Tiraumea Drive and Mattson Road. The pedestrian crossing on the eastern approach will be removed temporarily.
- Temporary closure and construction of the Ti Rakau Drive / Edgewater Drive east intersection in EB3R, see **Section 4.2.2.3** (Phase 1f). During this closure, all traffic along Edgewater Drive will be diverted to the western intersection.
- Completion of the enabling works at the Ti Rakau Drive / Gossamer Drive intersection in EB3R, including converting the left-turn slip lane on the western and eastern approaches to pass through the intersection.
- Ongoing temporary closure of the kerbside left-turn lane at Freemantle Place in EB3R.

#### **Intersection Performance:**

Traffic signal phasing diagrams per intersection are provided in **Appendix Q** and lane performance summaries per intersection are provided in **Appendix R**. Demand flows from the 2028 AIMSUN Construction Scenario 1.3 were used to test Construction Scenario 1.4 as Construction Scenario 1.3 was determined to be the most critical.

**Table 27** provides a comparison of the intersection performance between the Do-Minimum and Construction Scenario 1.4 during the AM peak, with a 2028 horizon year.

**Table 27: Intersection performance – Do-Minimum vs Construction Scenario 1.4 (AM Peak)**

Intersection	Do-Minimum			Construction Scenario 1.4		
	LOS	DOS (v/c)	Delay [s]	LOS	DOS (v/c)	Delay [s]
Pakuranga Rd / Ti Rakau Dr	C	0.89	35	C	0.92	30
Pakuranga Rd / Brampton Ct	N/A	2.31	10	N/A	4.75	52
Pakuranga Rd / William Roberts Rd	N/A	7.23	265	C	0.89	22
Pakuranga Rd / St Kentigern College	C	0.86	22	C	0.85	23
William Roberts Rd / Reeves Rd	N/A	0.69	8	N/A	0.27	5
William Roberts Road / Cortina Pl	Built during WRRE			N/A	0.17	1
Ti Rakau Dr / Aylesbury St / Palm Ave	Built during EB2			C	0.86	35
Ti Rakau Dr/ Reeves Rd / SEART	D	0.91	54	E	0.90	60
Ti Rakau Dr / William Roberts Rd	Built during WRRE			N/A	0.50	1
Ti Rakau Dr / Mattson Rd	B	0.78	15	C	0.88	21
Ti Rakau Dr / Edgewater Dr west	C	0.85	27	C	0.89	28
Ti Rakau Dr / Gossamer Dr	F	1.07	91	F	1.27	83

The analysis indicates that in the AM peak, Construction Scenario 1.4 is expected to result in minimal adverse effects overall.

Similar to Construction Scenario 1.3, average delay at the Pakuranga Road / Brampton Court intersection is expected to increase due to the full closure of Reeves Road. However, all other access points to the Plaza are expected to have spare capacity should these vehicles wish to divert elsewhere.

Also similar to the previous scenarios, average delay at the Pakuranga Road / William Roberts Road intersection is expected to improve significantly.

**Table 28** provides a comparison of the intersection performance between the Do-Minimum and Construction Scenario 1.4 during the PM peak, with a 2028 horizon year.

**Table 28: Intersection performance – Do-Minimum vs Construction Scenario 1.4 (PM Peak)**

Intersection	Do-Minimum			Construction Scenario 1.4		
	LOS	DOS (v/c)	Delay [s]	LOS	DOS (v/c)	Delay [s]
Pakuranga Rd / Ti Rakau Dr	D	0.92	53	C	0.91	35
Pakuranga Rd / Brampton Ct	N/A	1.81	9	N/A	1.12	8
Pakuranga Rd / William Roberts Rd	N/A	53.18	3474	C	0.89	27
Pakuranga Rd / St Kentigern College	C	0.89	27	B	0.86	12
William Roberts Rd / Reeves Rd	N/A	1.05	26	N/A	0.27	4
William Roberts Rd / Cortina Pl	Built during WRRE			N/A	0.15	1
Ti Rakau Dr / Aylesbury St / Palm Ave	Built during EB2			B	0.85	20
Ti Rakau Dr / Reeves Rd / SEART	E	0.98	56	E	0.99	68
Ti Rakau Dr / William Roberts Rd	Built during WRRE			N/A	0.43	1
Ti Rakau Dr / Mattson Rd	B	0.68	13	B	0.89	20
Ti Rakau Dr / Edgewater Drive west	C	0.89	31	C	0.89	31
Ti Rakau Dr / Gossamer Dr	D	0.91	45	E	1.08	72

Construction Scenario 1.4 is also expected to have acceptable intersection performance during the PM peak with some mitigation measures in place.

Similar to Construction Scenario 1.3, the heavy demand on Pakuranga Road eastbound is expected to be manageable through implementing fixed time cycles and offsets at the following intersections:

- Pakuranga Road / William Roberts Road (temporary traffic signal)
- Pakuranga Road / St Kentigern College

A cycle length of 150 seconds and an offset of 13 seconds to St Kentigern College using the William Roberts Road intersection as reference, is expected to lead to manageable queues and delays (see **Appendix Q**). Consultation with ATOC will be undertaken with regards to this mitigation measure.

Low to moderate increases in average delay are expected at the Ti Rakau Drive / Reeves Road /SEART and Ti Rakau Drive / Gossamer Drive intersections. However, these intersections are still expected to operate at an acceptable LOS E.

Following Construction Scenario 1.4, before the RRF is operational, Phase 2 works are expected to commence in the centre of Ti Rakau Drive in EB3R between Mattson Road and Gossamer Drive (see **Section 4.2.2.4**). During these works the existing number of lanes on Ti Rakau Drive will be maintained in addition to the two new U-turn facilities and the U-turn manoeuvres as Mattson Road and Gossamer Drive. As such, the temporary effects are expected to similar to Construction Scenario 1.4.

### 5.2.2.6 Construction Scenario 2

Construction Scenario 2 simulates the completion of the RRF, while Reeves Road underneath remains closed. Various other ongoing construction activities, with lesser expected effects, as well as sections of work already completed were also included under Construction Scenario 2. These include:

- Completion of the William Roberts Road north closure works, see **Section 4.2.1.2**.
- Completion of the Pakuranga Road / RRF tie-in works, see **Section 4.2.1.3**.
- Completion of the SEART off-ramp and on-ramp works, during which the off-ramp left-turn lanes will be reduced to one lane, see **Section 4.2.1.4**.
- Completion of the new bus lanes on Ti Rakau Drive between Pakuranga Road and Reeves Road as well as the crossroads intersection with Palm Avenue and Aylesbury Street. This will allow for construction to commence in the centre of Ti Rakau Drive, between Pakuranga Road and Reeves Road, requiring eastbound traffic to be temporarily diverted onto the new bus lanes, see **Section 4.2.1.5 (Phase 2)**. This will reduce both the eastbound and westbound carriageways to two lanes.
- The western approach to the Ti Rakau Drive / Reeves Road intersection will provide two through lanes and a right-turn lane. The eastern approach will provide one left-turn lane onto SEART and two through lanes. The pedestrian crossing on the eastern approach of the Ti Rakau Drive / Reeves Road / SEART will not be operational yet.
- Completion of the Pakuranga Road works between Ti Rakau Drive and the RRF, see **Section 4.2.1.6**.
- Completion of the Ti Rakau Drive / William Roberts Road / Mattson Road intersection works, see **Section 4.2.2.1**.
- Completion of Phases 1 and 2 of the Ti Rakau Drive works between Mattson Road and Gossamer Drive, see **Section 4.2.2.3** and **Section 4.2.2.4**. This will allow for Phase 3 works to commence in EB3R (see **Section 4.2.2.5**). All side roads on the southern side of Ti Rakau Drive in EB3R will be temporarily converted back to full movement intersections. The western U-turn facility and the U-turn manoeuvres at the Ti Rakau Drive / William Roberts Road / Mattson Road and Ti Rakau Drive / Gossamer Drive intersections will be operational.
- Ongoing construction on the western and eastern approaches of the Ti Rakau Drive / Gossamer Drive intersection.

#### Intersection Performance:

Traffic signal phasing diagrams per intersection are provided in **Appendix F** and lane performance summaries per intersection are provided in **Appendix G**.

**Table 29** provides a comparison of the intersection performance between the Do-Minimum and Construction Scenario 2 during the AM peak, with a 2028 horizon year.

**Table 29: Intersection performance – Do-Minimum vs Construction Scenario 2 (AM peak)**

Intersection	Do-Minimum			Construction Scenario 2		
	LOS	DOS (v/c)	Delay [s]	LOS	DOS (v/c)	Delay [s]
Pakuranga Rd / Ti Rakau Dr	C	0.89	35	D	0.90	50
Pakuranga Rd / Brampton Ct	N/A	2.31	10	N/A	0.34	1
Pakuranga Rd / RRF	Built during EB2			C	0.90	35
Reeves Rd / Aylesbury St	N/A	0.24	1	N/A	0.03	3
William Roberts Rd / Reeves Rd	N/A	0.69	8	N/A	0.19	5
William Roberts Rd / Cortina Pl	Built during WRRE			N/A	0.15	1
Ti Rakau Dr / Aylesbury St / Palm Ave	Built during EB2			D	0.88	37
Ti Rakau Dr/ Reeves Rd / SEART	D	0.91	54	C	0.89	24
Ti Rakau Dr / William Roberts Rd	Built during WRRE			C	0.87	27
Ti Rakau Dr / Mattson Rd	B	0.78	15			
Ti Rakau Dr western U-turn facility	Built during EB3R			N/A	0.53	2
Ti Rakau Dr / Edgewater Drive west	C	0.85	27	N/A	2.00	66
Ti Rakau Dr / Gossamer Dr	F	1.07	91	D	0.97	50

SIDRA analysis indicates that overall, in the AM peak, Construction Scenario 2 is expected to result in minimal adverse effects to intersection performance along the network. Compared to the Do-Minimum scenario, similar intersection performance is expected at the following intersections:

- Reeves Road / Aylesbury Street
- William Roberts Road / Reeves Road

Once constructed, the following new intersections are expected to operate with spare capacity during the AM peak under Construction Scenario 2, all with acceptable LOS and DOS:

- Pakuranga Road / RRF
- William Roberts Road / Cortina Place
- Ti Rakau Drive / Aylesbury Street / Palm Avenue
- Ti Rakau Drive / William Roberts Road
- Ti Rakau Drive western U-turn facility

Increases in delay are expected at the Pakuranga Road / Ti Rakau Drive intersection during the AM peak hour, however the intersection is expected to operate at an acceptable LOS D.

Significant improvements in DOS and delay are predicted at the Ti Rakau Drive / Reeves Road / SEART intersection, and is expected to operate with spare capacity (LOS C). Improvements in performance are also expected at the Pakuranga Road / Brampton Court and Ti Rakau Drive / Gossamer Drive intersections.



**Table 30** provides a comparison of the intersection performance between the Do-Minimum and Construction Scenario 2 during the PM peak, with a 2028 horizon year.

**Table 30: Intersection performance – Do-Minimum vs Construction Scenario 2 (PM Peak)**

Intersection	Do-Minimum			Construction Scenario 2		
	LOS	DOS (v/c)	Delay [s]	LOS	DOS (v/c)	Delay [s]
Pakuranga Rd / Ti Rakau Dr	D	0.92	53	D	0.94	53
Pakuranga Rd / Brampton Ct	N/A	1.81	9	N/A	0.38	1
Pakuranga Rd / RRF	Built during EB2			E	0.94	57
Reeves Rd / Aylesbury St	N/A	1.03	42	N/A	0.04	4
William Roberts Rd / Reeves Rd	N/A	1.05	26	N/A	0.41	6
William Roberts Rd / Cortina Pl	Built during WRRE			N/A	0.14	1
Ti Rakau Dr / Aylesbury St / Palm Ave	Built during EB2			C	0.86	21
Ti Rakau Dr/ Reeves Rd / SEART	E	0.98	56	E	1.00	77
Ti Rakau Dr / William Roberts Rd	Built during WRRE			D	0.95	50
Ti Rakau Dr / Mattson Rd	B	0.68	13			
Ti Rakau Dr western U-turn facility	Built during EB3R			N/A	0.56	2
Ti Rakau Dr / Edgewater Drive west	C	0.89	31	N/A	1.93	63
Ti Rakau Dr / Gossamer Dr	D	0.91	45	E	1.02	74

SIDRA analysis indicates that in the PM peak, Construction Scenario 2 is also expected to result in acceptable intersection performance along the network overall, with some mitigation measures in place.

The demand on Ti Rakau Drive westbound, between Pakuranga Road and SEART, is expected to be manageable through implementing fixed time cycles and offsets at the following intersections:

- Pakuranga Road / Ti Rakau Drive
- Ti Rakau Drive / Aylesbury Street / Palm Avenue
- Ti Rakau Drive / Reeves Road / SEART

A cycle length of 150 seconds, offsets of 11 seconds to Palm Avenue and 28 seconds to Pakuranga Road using the SEART intersection as reference, is expected to lead to manageable queues and delays (see Appendix F). Consultation with ATOC will be undertaken with regards to this mitigation measure.

Compared to the Do-Minimum scenario, similar intersection performance is expected at the following intersections:

- Pakuranga Road / Brampton Court
- Reeves Road/ Aylesbury Street

SIDRA analysis indicates that the following new intersections are expected to operate with spare capacity during the PM peak under Construction Scenario 2, all with acceptable LOS and DOS:

- Pakuranga Road / RRF
- William Roberts Road / Cortina Place
- Ti Rakau Drive / Aylesbury Street / Palm Avenue
- Ti Rakau Drive / William Roberts Road / Mattson Road
- Ti Rakau Drive western U-turn facility

Improvements in DOS and delay are predicted at the William Roberts Road / Reeves Road intersection during the PM peak hour under Construction Scenario 2.

An increase in DOS and delay is predicted at the Ti Rakau Drive / Gossamer Drive intersection under Construction Scenario 2. Regardless, the intersection is expected to operate at an acceptable LOS E.

#### 5.2.2.7 Construction Scenario 3

The various pieces of work originally proposed under Construction Scenario 3 will now be undertaken earlier in the construction programme. Therefore, this modelling scenario is no longer relevant to this assessment.

#### 5.2.2.8 EB2 – Pakuranga Road / William Roberts Road Temporary Signalisation

The assessment of the temporary signalisation of the Pakuranga Road / William Roberts Road intersection is now incorporated into Construction Scenario 1.2 to 1.4, see Section 5.2.2.3 to Section 5.2.2.5.

#### 5.2.2.9 EB2 – Pakuranga Road Drainage Works

As stated in Section 4.2.1.6, the Pakuranga Road drainage works will be undertaken concurrently with the enabling works, early in the construction programme. Therefore, these works are now incorporated into Construction Scenario 1.1, see Section 5.2.2.2.

#### 5.2.2.10 EB3R – Ti Rakau Drive / Edgewater Drive East Temporary Signalisation

The assessment of the temporary closures of the Edgewater Drive intersections is now incorporated into Construction Scenario 1.2 and 1.4, see Section 5.2.2.3 and Section 5.2.2.5, respectively.

### 5.2.3 General Traffic Travel Times

Route travel times were determined using the AIMSUN model, with a 2028 horizon year. Four routes were selected to compare route travel times between the Do-Minimum and EB2/EB3R scenarios for general traffic. This is similar to the assessment of travel times in the existing environment (see **Section 3.4.2**) and to maintain consistency across the different assessments already conducted as well as future ITAs. These routes are outlined below:

- Botany to Pakuranga (Ti Rakau Drive / Chapel Road intersection to Pakuranga Road / Williams Avenue intersection) – both directions
- Botany to SEART (Ti Rakau Drive / Te Irirangi Drive intersection to the western abutment on Waipuna Bridge) – both directions
- Howick to Pakuranga (Pakuranga Road / Glenmore Road intersection to Pakuranga Road / Williams Avenue intersection) – both directions
- Howick to SEART (Pakuranga Road / Glenmore Road intersection to the western abutment on Waipuna Bridge) – both directions

The sections below assess the temporary effects to travel times during the construction scenarios.

#### 5.2.3.1 Construction Scenario 1.1

As the vast majority of the proposed works under Construction Scenario 1.1 are offline (see **Section 5.2.2.2**), a limited impact on general traffic travel time is expected. Therefore, route travel times under Construction Scenario 1.1 have not been remodelled in AIMSUN and are expected to be comparable to the travel times in the Do-Minimum scenario.

#### 5.2.3.2 Construction Scenario 1.2 to 1.4

The transport network under Construction Scenario 1.2, 1.3 and 1.4 is roughly similar in terms of route options, ongoing works and lane configuration. As such, route travel times have only been remodelled in AIMSUN for Construction Scenario 1.3, which is expected to be the most conservative. Route travel times under Construction Scenario 1.2 and 1.4 are expected to perform similar or better.

**Table 31** provides a comparison of the route travel times between the Do-Minimum and **Construction Scenario 1.3**, with a 2028 horizon year.

**Table 31: General traffic travel times – Do-Minimum vs Construction Scenario 1.3**

AM Peak						
Route	Westbound			Eastbound		
	Do Minimum [min]	CS 1.3 [min]	Difference [min]	Do Minimum [min]	CS 1.3 [min]	Difference [min]
Botany - Pakuranga	24.7	32.2	7.5	13.9	20.9	7.0
Botany - SEART	20.9	29.3	8.4	13.7	12.3	-1.4
Howick - Pakuranga	5.3	5.7	0.4	4.7	4.3	-0.3
Howick - SEART	11.6	26.9	15.3	8.0	6.6	-1.4

PM Peak						
Route	Westbound			Eastbound		
	Do Minimum [min]	CS 1.3 [min]	Difference [min]	Do Minimum [min]	CS 1.3 [min]	Difference [min]
Botany - Pakuranga	18.4	15.2	-3.2	24.6	27.0	2.4
Botany - SEART	11.6	10.0	-1.6	24.5	32.7	8.2
Howick - Pakuranga	4.7	4.4	-0.4	3.4	3.3	-0.1
Howick - SEART	5.0	5.5	0.5	7.5	11.7	4.2

Travels times from Botany towards SEART (westbound) and Botany to Pakuranga (both directions) as well as from Howick to SEART (westbound) are predicted to experience moderate to relatively large increases during the AM peak period compared to the Do-Minimum. This is not unexpected given the following factors:

- The addition of the new Ti Rakau Drive / William Roberts Road and Ti Rakau Drive / Aylesbury Street / Palm Avenue intersections to the network
- The closure of Reeves Road, whereby more vehicles are likely to divert to Ti Rakau Drive and Pakuranga Road
- Ongoing construction on the northern side Ti Rakau Drive, between Pakuranga Road and Reeves Road as well as on the southern side between Reeves Road and Gossamer Drive.

Ti Rakau Drive is a congested corridor in the existing environment; therefore, it is likely that a redistribution of traffic or reduction in capacity due to road works will lead to increased queues and delays. It should also be noted that these increases in travel times are temporary, and are inherent in the majority of transport projects of this scale.

Consequently, changes in travel behaviour are also inherent in the majority of transport projects which the AIMSUN models do not account for. These include:

- The AIMSUN models do not account for peak spreading, i.e., motorists choosing to travel earlier or later on the network for their daily commute. 'As the capacity of the corridors is reached, especially during the peak period, travel behaviour changes. One of these changes may involve travelling to work earlier or later to avoid congestion'<sup>26</sup>. This change in behaviour is expected to occur at least to some degree with sufficient community engagement and on-road messaging such as Variable Message Signs (VMS).
- Another change in travel behaviour not included in the modelling assessment is flexible working options, i.e., to work from home. During and following the Covid-19 pandemic, many motorists with the option to do so changed their travel patterns in this manner. During construction it is expected that some motorists may choose to not travel on the network in order to avoid the temporary disruption.

<sup>26</sup> Research into Traffic Peak Spreading, Transfund New Zealand Research Report No. 241, 2003

- Multiple route choices are also an inherent limitation of the AIMSUN model being assessed. East-West route options within the model are limited to Ti Rakau Drive and Pakuranga Road. **Figure 69** shows the route options for motorists in Howick (red outline) and Botany (blue outline) to/from Panmure and the CBD.



**Figure 69: Howick (red outline) and Botany (blue outline) route options**

- Route options for motorists in the Howick area are geographically limited to Pakuranga Road and Ti Rakau Drive. As such, it is expected that no significant diversion of traffic will occur during construction from this area. However, Highbrook Drive, which is not within the extent of the model, may be an alternative route option over Ti Rakau Drive for some motorists in the Botany area for east-west movement to avoid the temporary disruption.

Therefore, a combination of the above factors could be expected to lead to a reduction in traffic volumes during construction, leading to more manageable queues and delays overall.

Mode shift is another travel behaviour change that the AIMSUN model does not take into account. However, realistically it is not expected that significant mode shift to public transport will occur during construction in the EB2 and EB3R areas with the existing public transport provision. Therefore, this travel behaviour change was excluded.

Various mitigation options were tested, ranging from traffic signal phasing amendments to delaying specific pieces of the proposed works, in an attempt improve travel times. However, this testing indicated that the only alternative to improve general traffic travel times would be to temporarily add more lanes, which would add significant construction cost and potentially delay the construction programme even further.

Once constructed the RRF will, in part, alleviate the congestion around the Pakuranga Town Centre and improve travel times for general traffic (see **Section 5.2.3.3**). Also, the completion of EB2 and EB3R is expected to further improve travel times, by means of the new RRF and dedicated bus lanes (see **Section 6.3.3**).

Nevertheless, to mitigate these effects, appropriate public communication and advance warning of the planned works will be undertaken prior to the works being initiated. Public communication and signage will also be provided during construction informing motorists of the works and potential delays, which would lead to changes in travel behaviour such as travelling outside the peak periods or using alternative routes. This will be achieved through the CTMP.

During the AM peak period, travel times of the majority of eastbound routes are predicted to experience small improvements.

The majority of route travel times during the PM peak, in all directions, are expected to experience small improvements, or in some cases manageable increases under **Construction Scenario 1.3**.

Based on the above, the potential adverse effects are considered to be mitigated as far as is reasonably practicable.

5.2.3.3 Construction Scenario 2

**Table 32** provides a comparison of the route travel times between the Do-Minimum and Construction Scenario 2, with a 2028 horizon year.

**Table 32: General traffic travel times – Do-Minimum vs Construction Scenario 2**

AM Peak						
Route	Westbound			Eastbound		
	Do Minimum [min]	Construction 2 [min]	Difference [min]	Do Minimum [min]	Construction 2 [min]	Difference [min]
Botany - Pakuranga	24.7	33.5	8.8	13.9	15.2	1.3
Botany - SEART	20.9	30.5	9.6	13.7	12.7	-1.0
Howick - Pakuranga	5.3	9.6	4.3	4.7	4.5	-0.2
Howick - SEART	11.6	7.3	-4.3	8.0	5.3	-2.7
PM Peak						
Route	Westbound			Eastbound		
	Do Minimum [min]	Construction 2 [min]	Difference [min]	Do Minimum [min]	Construction 2 [min]	Difference [min]
Botany - Pakuranga	18.4	13.4	-5.0	24.6	26.8	2.2
Botany - SEART	11.6	8.6	-3.0	24.5	26.1	1.6
Howick - Pakuranga	4.7	6.6	1.9	3.4	3.8	0.4
Howick - SEART	5.0	3.0	-2.0	7.5	9.6	2.1

Similar to Construction Scenario 1.3 during the AM peak, the westbound routes from Botany towards Pakuranga and SEART are predicted to experience moderate increases in travel times under Construction Scenario 2. This is likely due to the addition of a new intersection, additional traffic as a result of the Reeves Road and William Roberts Road north closures and capacity reduction due to the construction in the centre of Ti Rakau Drive.

The westbound route from Howick to Pakuranga is predicted to experience an increase in travel time during the AM peak period. This is likely due to the operation of the newly completed Pakuranga Road / RRF intersection. The right turn from Pakuranga Road east towards Pakuranga Road west is treated as the minor movement, and the majority of the traffic signal green time is allocated to the through movements between Pakuranga Road east and the RRF.

As the operation of this intersection as well as the wider network is a balance of not only the various movements of traffic flows, but also the competing modes of transport, the trade-off is the improvement of travel times of the other routes. Particularly the improvement in travel times for the major route from Howick towards SEART. It should also be noted that this increase in travel time is temporary. Upon completion of EB2 and EB3R, travel time for this route is expected to be improved (see **Section 6.3.3**), compared to Construction Scenario 2. As above, travel time increases are generally inherent in construction projects of this scale, and in context of the improvements that will be experienced once completed, this level of delay is considered to be acceptable.

The eastbound routes are predicted to experience small improvements or in some cases negligible increases in travel time during the AM peak period.

During the PM peak period, route travel times under Construction Scenario 2 are predicted to experience negligible increases or small improvements, in all directions.

Again, public communication and advance warning of the planned works will be undertaken prior to the works as well as during construction, along with appropriate signage of expected travel times and possible alternative routes. This will be achieved through the CTMP.

#### *5.2.3.4 Construction Scenario 3*

As stated in **Section 5.2.2.7**, the various pieces of work originally proposed under Construction Scenario 3 will now be undertaken earlier in the construction programme. Therefore, this modelling scenario is no longer relevant to this assessment.



#### 5.2.4 Summary of Temporary General Traffic Effects

During the development of the updated construction methodology, based on an updated design, efforts have been made to create efficiencies in construction delivery and produce construction staging that would minimise adverse transport effects. Overall, the temporary effects on intersection performance during most construction scenarios across the EB2 and EB3R network are considered to be negligible or low as indicated by the SIDRA analysis, with some mitigation measures in place.

It is expected that the effects of the Pakuranga Road drainage works and the RRF tie-in works can be managed by utilising the flush median as a running lane in order to maintain three lanes westbound and two lanes eastbound during these works. Mitigation measures in the form of phasing adjustments and fixed-time cycles to facilitate better coordination between closely spaced intersection have been recommended in the PM peak during the majority of the construction scenarios. Consultation with ATOC will be undertaken to implement these measures.

The pedestrian crossing on the eastern arm of the Ti Rakau Drive / Reeves Road / SEART intersection will require removal for the majority of the construction programme to allow for more efficient traffic signal phasing, which will assist in managing the increased demand on Ti Rakau Drive. The pedestrian crossing on the western arm will be maintained.

Analysis indicated that the temporary signalisation of the Pakuranga Road / William Roberts Road intersection, to support the operation of the construction yard, is expected to lead to improved intersection performance. A temporary traffic signal will be provided at the Ti Rakau Drive / Edgewater Drive east intersection during the construction of the Ti Rakau Drive / Edgewater Drive west intersection. This will ensure that signalised movements for vehicles turning into and out of Edgewater Drive are maintained.

Although the temporary effects to intersection performance during construction are predicted to be negligible to low overall, some adverse effects to general traffic travel times are expected, particularly during Construction Scenario 1.3. These effects are not unexpected due to the additional intersections along the network and the number of ongoing construction activities.

A number of mitigation options were tested; however, it is expected that the only alternative to maintain existing travel times would be to add more lanes. This was not considered practicable as it would be expected to have significant implications on construction cost and programme.

Increases in travel times through the project area are inherent in the majority of transport projects of this scale as are changes in travel behaviour that could be reasonably expected to reduce traffic volumes on the network, such as peak spreading, flexible working options and alternative route selection. With appropriate public engagement and on-road messaging, it is expected that these travel behaviour changes could occur. This in turn could lead to more manageable queues, reduced delays and improved travel times on the network. These will be managed through the CTMP.

It should be noted that these effects are temporary, and once constructed, the RRF and EB2/EB3R as a whole will alleviate congestion, particularly around the Pakuranga Town Centre. In light of the improvements that will be experienced once completed, this level of delay is considered to be acceptable. Based on the above, the potential adverse effects are considered to be mitigated as far as is reasonably practicable.

### 5.3 Effects to Bus Services and Facilities

The sections below provide details and assessment of the temporary effects during construction to bus services and facilities in the EB2 and EB3R project areas. **Figure 70** shows the existing bus services operating through the project areas. These include the 70, 72C, 72M, 72X, 352, 711 and 712 services.

School bus service operating in the EB2 and EB3R project areas include the following:

- S415 – Pakuranga to Sacred Heart College
- S416 – Botany Downs to Sacred Heart College
- S440 – Bucklands Beach to Sancta Maria College
- S013 – Otara to Edgewater College
- S073 – Otahuhu to Edgewater College



Figure 70: Existing bus services in the EB2 and EB3R project areas

#### 5.3.1 EB2 – Reeves Road

At present, the 711 service travels partly along Reeves Road as a connector service between Howick and Panmure. During the Reeves Road closure, the 711 outbound (eastbound) service will be diverted temporarily to the newly completed WRRE (see **Figure 71**).



**Figure 71: 711 outbound service, existing and proposed routes**

The increase in distance of approximately 270 m and the resultant increase in travel time (20s) are considered negligible. It is noted that currently there are no bus stops located along Reeves Road between Ti Rakau Drive and William Roberts Road utilised by the 711 outbound service.

### 5.3.2 EB2 – William Roberts Road North

Currently, the 711 inbound (westbound) service travels partly along William Roberts Road north. Once William Roberts Road north is closed, the 711 inbound service will be diverted temporarily to William Roberts Road south and along Ti Rakau Drive (see **Figure 72**).



**Figure 72: 711 inbound service, existing and proposed routes**

The increase in distance of approximately 290 m and the resultant increase in travel time (21s) are considered to be negligible.

At present, the 711 inbound service utilises bus stop (ID 6060) to pick-up / drop-off passengers at the Pakuranga Plaza. Once William Roberts Road north is closed and until Reeves Road reopens, the 711 inbound service will utilise bus stop (ID 6127) instead.

The Pakuranga Road / Ti Rakau Drive intersection is located approximately 160 m north and the Ti Rakau Drive / Reeves Road intersection is located approximately 188 m south from the bus stop (ID 6127). Therefore, the increase in pedestrian walking distance to the Pakuranga Plaza is considered to be negligible.

Lewis Road was an alternative route considered during this assessment. However, Lewis Road is not well suited to buses given its narrow carriageway and on-street parking on both sides. Therefore, this alternative was discounted.

### 5.3.3 EB2 – Ti Rakau Drive and Pakuranga Road

Figure 73 shows the existing bus stops near the Pakuranga Town Centre, located on Ti Rakau Drive and Pakuranga Road in the EB2 project area.



Figure 73: Pakuranga Plaza bus stops

During construction of the new bus lanes on the northern side of Ti Rakau Drive, as well as the new bus station (Phase 1 of Ti Rakau Drive in EB2, see **Section 4.2.1.5**), it is anticipated that bus stop (ID 6132) will be maintained as existing. Once this phase of work has been completed, the bus stop will be removed permanently, and the new bus station will be utilised.

Currently, this bus stop is located in-lane on Ti Rakau Drive eastbound, whereas in the future the bus station will provide indented bus bays for improved operation and safety. The remaining bus stops will remain at their current locations following this phase of work. This is due to the ongoing Reeves Road works at this stage. Bus services that will benefit from this initial improvement include the 70 outbound, 352 outbound and the 711 outbound.

Following the completion of the RRF and Reeves Road modifications, it is anticipated that the bus stops (ID 6062, 6060 and 6127) will also be removed with bus services utilising the new bus station. The bus services that will benefit from the new bus station include the 70, 72C, 72M, 72X, 352, 711 and 712.

### 5.3.4 EB3R – Ti Rakau Drive

Figure 74 shows the existing bus stops on Ti Rakau Drive in the EB3R project area.



Figure 74: EB3R Ti Rakau Dr bus stops

During construction of Phase 1 of Ti Rakau Drive (between Mattson Road and Gossamer Drive) in EB3R (see **Section 4.2.2.3**), which will consist of the new westbound lanes on Ti Rakau Drive, bus stops (ID 6129, 6131 and 6133) will largely be kept in accordance with the current arrangement. It is expected that the bus stops will need to shift longitudinally as the works progress. However, the effects to bus services and passengers are expected to be negligible. The eastbound bus station at Gossamer Drive will also be constructed during Phase 1, however, it will not be operational until the completion of Phase 3 of EB3R.

Once Phase 1 is completed, these bus stops will be temporarily relocated to the new westbound lanes, in close proximity to their current locations and will operate until the completion of Phase 2 of EB3R.

Phase 2 of Ti Rakau Drive in EB3R (see **Section 4.2.2.4**) will consist of the central running bus lanes, as well as the new bus station at Edgewater Drive and the westbound bus station at Gossamer Drive. As above, the Gossamer Drive bus station will not be operational until completion of Phase 3 of EB3R.

Upon completion of Phase 2, it is anticipated that the bus stops (ID 6134, 6129, 6131, 6136, 6138 and 6133) will be removed permanently. The new Edgewater Drive bus station will provide improved bus services and facilities, as well as greater pedestrian safety and amenity.

In Phase 3 of Ti Rakau Drive in EB3R (see **Section 4.2.2.5**), the Ti Rakau Drive / Gossamer Drive intersection will be constructed, which will provide a link between the western and eastern bus stations at Gossamer Drive. It is expected that following Phase 3, bus stops (ID 6140 and 6135) will be removed permanently. The new bus station will provide improved bus services and facilities, as well as greater pedestrian safety and amenity.

### 5.3.5 Bus Travel Times

Bus route travel times were determined using the AIMSUN model, with a 2028 horizon year. Travel times were determined in both directions during AM and PM peak periods for the following routes:

- 70 – Botany Town Centre bus station to Ellerslie Panmure Highway / Clare Place intersection
- 72C – Pakuranga Road / Stanniland Street intersection to Ellerslie Panmure Highway / Clare Place intersection
- 72M – Panmure Pakuranga Road / Stanniland Street intersection to Ellerslie Panmure Highway / Clare Place intersection
- 72X – Pakuranga Road / Stanniland Street intersection to Ellerslie Panmure Highway / Clare Place intersection
- 352 – Cryers Road / Neales Road intersection to Panmure bus station
- 711 – Pakuranga Road / Stanniland Street intersection to Panmure bus station
- 712 – Glenmore Road / Meadway intersection to Panmure bus station

Note: The route descriptions refer to the extent of the routes in the AIMSUN model, not the total extent of the services from start to end on the wider network.

The sections below assess the temporary effects on bus travel times during the construction scenarios.

#### 5.3.5.1 Construction Scenario 1.1

As stated in **Section 5.2.3.1**, the vast majority of the proposed works under Construction Scenario 1.1 are offline and as such a limited impact on bus travel time is expected. Therefore, bus travel times under Construction Scenario 1.1 have not been remodelled in AIMSUN and are expected to be comparable to the travel times in the Do-Minimum scenario.

5.3.5.2 Construction Scenario 1.2 to 1.4

Similar to the general traffic travel time assessment in Section 5.2.3.2, the transport network under Construction Scenario 1.2, 1.3 and 1.4 is roughly similar in terms of route options, ongoing works and lane configuration. As such, bus travel times have only been remodelled in AIMSUN for Construction Scenario 1.3, which is expected to be the most conservative. Bus travel times under Construction Scenario 1.2 and 1.4 are expected to perform similar or better.

Table 33 below provides a comparison of the bus route travel times between the Do-Minimum and Construction Scenario 1, with a 2028 horizon year.

Table 33: Bus travel times – Do-Minimum vs Construction Scenario 1.3

AM Peak						
Route Description	Westbound			Eastbound		
	Do-Minimum [min]	CS 1,3 [min]	Difference [min]	Do-Minimum [min]	CS 1,3 [min]	Difference [min]
70 – Botany Town Centre bus station to Ellerslie Panmure Hwy / Clare Pl	42.3	49.5	7.2	26.9	33.0	6.1
72C – Pakuranga Rd / Stanniland St to Ellerslie Panmure Hwy Clare Pl	20.6	41.0	20.4	16.0	15.9	-0.1
72M – Pakuranga Rd / Stanniland St to Ellerslie Panmure Hwy Clare Pl	-	-	-	15.8	17.2	1.4
72X – Pakuranga Rd / Stanniland St to Ellerslie Panmure Hwy Clare Pl	24.6	47.8	23.2	-	-	-
352 – Cryers Rd / Neales Rd to Panmure bus station	36.8	41.8	5.0	29.1	32.3	3.1
711 – Pakuranga Rd / Stanniland St to Panmure bus station	29.1	39.3	10.2	22.7	27.2	4.5
712 – Glenmore Rd / Meadway to Panmure bus station	22.6	34.9	12.3	16.6	15.8	-0.8



PM Peak						
Route Description	Westbound			Eastbound		
	Do-Minimum [min]	CS 1.3 [min]	Difference [min]	Do-Minimum [min]	CS 1.3 [min]	Difference [min]
70 – Botany Town Centre bus station to Ellerslie Panmure Hwy / Clare Pl	35.7	33.8	-1.9	38.1	41.4	3.3
72C – Pakuranga Rd / Stanniland St to Ellerslie Panmure Hwy Clare Pl	14.6	14.4	-0.2	14.8	14.7	-0.1
72M – Pakuranga Rd / Stanniland St to Ellerslie Panmure Hwy Clare Pl	15.0	14.4	-0.6	-	-	-
72X – Pakuranga Rd / Stanniland St to Ellerslie Panmure Hwy Clare Pl	-	-	-	16.8	20.3	3.5
352 – Cryers Rd / Neales Rd to Panmure bus station	33.4	30.2	-3.2	27.9	32.7	4.8
711 – Pakuranga Rd / Stanniland St to Panmure bus station	23.8	25.6	1.8	24.5	24.3	-0.2
712 – Glenmore Rd / Meadway to Panmure bus station	19.7	19.6	-0.1	18.1	19.5	1.4

Bus travel times of the 72C, 72X, 711 and 712 services westbound along Pakuranga Road, as well as the 70 and 352 services (westbound) along Ti Rakau Drive, are predicted to experience moderate to relatively large increases during the AM peak period under Construction Scenario 1.3. This is not unexpected given the following factors:

- The addition of the new Ti Rakau Drive / William Roberts Road and Ti Rakau Drive / Aylesbury Street / Palm Avenue intersections to the network
- The closure of Reeves Road, whereby more vehicles are likely to divert to Ti Rakau Drive and Pakuranga Road
- Ongoing construction on the northern side of Ti Rakau Drive, between Pakuranga Road and Reeves Road as well as on the southern side between Reeves Road and Gossamer Drive.

With the closure of Reeves Road and with the RRF not completed at this stage, large queues are predicted in the westbound kerbside lane on Ti Rakau Drive as vehicles attempt to turn onto SEART. As the existing bus stops along Ti Rakau Drive are located along the kerbside lane, buses are likely to travel in this congested lane, resulting in increased travel times.

As stated in Section 5.2.3.2, a number of mitigation options were tested. However, it is expected that the only alternative to improve bus travel times would be to add temporary bus lanes. For example, converting a westbound general traffic lane on Pakuranga Road into a bus lane. This would be expected to have significant impacts on general traffic travel times.

However, Ti Rakau Drive is a congested corridor in the existing environment; therefore, it is expected that a redistribution of traffic or reduction in capacity due to road works will lead to increased queues and delays. Furthermore, increases in travel times through the project area are inherent in the majority of transport projects of this scale as are changes in travel behaviour that could be reasonably expected to reduce traffic volumes on the network, such as peak spreading, flexible working options and alternative route selection. With appropriate public engagement and on-road messaging, it is expected that these travel behaviour changes could occur. This in turn could lead to more manageable queues, reduced delays and improved travel times on the network. This will be managed through the CTMP.

It should also be noted that these increases in travel times are temporary. Once constructed the RRF will, in part, alleviate the congestion around the Pakuranga Town and improve travel times (see **Section 5.3.5.3**). Furthermore, the completion of EB2 and EB3R is expected to further improve travel times, by means of the new dedicated bus lanes (see **Section 6.4.7**).

Opportunities to improve bus travel times will be explored in the development of the CTMPs, such as the provision of temporary bus priority where feasible, along with measures to manage travel demand through the provisions of the SSTMPs. Appropriate public communication and advance warning of the planned works will be undertaken prior to the works being initiated. Public communication and signage will also be provided during construction informing motorists of the works and potential delays, which could lead to changes in travel behaviour.

It should be noted that the 72M (westbound) and 72X (eastbound) services do not operate during the AM peak period.

All services in both directions are predicted to experience manageable increases, or in some cases small improvements, in travel time during the PM peak period under Construction Scenario **1.3**.

Based on the above, the potential adverse effects are considered to be mitigated as far as is reasonably practicable.

5.3.5.3 Construction Scenario 2

**Table 34** provides a comparison of the bus route travel times between the Do-Minimum and Construction Scenario 2, with a 2028 horizon year.

**Table 34: Bus travel times – Do-Minimum vs Construction Scenario 2**

AM Peak						
Route Description	Westbound			Eastbound		
	Do Minimum [min]	Construction 2 [min]	Difference [min]	Do Minimum [min]	Construction 2 [min]	Difference [min]
70 – Botany Town Centre bus station to Ellerslie Panmure Hwy / Clare Pl	42.3	47.3	5.0	26.9	26.6	-0.3
72C – Pakuranga Rd / Stanniland St to Ellerslie Panmure Hwy Clare Pl	20.6	23.5	2.9	16.0	15.0	-1.0
72M – Pakuranga Rd / Stanniland St to Ellerslie Panmure Hwy Clare Pl	-	-	-	15.8	16.0	0.2
72X – Pakuranga Rd / Stanniland St to Ellerslie Panmure Hwy Clare Pl	24.6	28.4	3.8	-	-	-
352 – Cryers Rd / Neales Rd to Panmure bus station	36.8	39.1	2.3	29.1	27.0	-2.1
711 – Pakuranga Rd / Stanniland St to Panmure bus station	29.1	32.7	3.6	22.7	26.9	4.2
712 – Glenmore Rd / Meadway to Panmure bus station	22.6	27.3	4.7	16.6	15.5	-1.1

PM Peak						
Route Description	Westbound			Eastbound		
	Do Minimum [min]	Construction 2 [min]	Difference [min]	Do Minimum [min]	Construction 2 [min]	Difference [min]
70 – Botany Town Centre bus station to Ellerslie Panmure Hwy / Clare Pl	35.7	29.8	-5.9	38.1	36.7	-1.4
72C – Pakuranga Rd / Stanniland St to Ellerslie Panmure Hwy Clare Pl	14.6	17.8	3.2	14.8	14.8	0.0
72M – Pakuranga Rd / Stanniland St to Ellerslie Panmure Hwy Clare Pl	15.0	20.9	5.9	-	-	-
72X – Pakuranga Rd / Stanniland St to Ellerslie Panmure Hwy Clare Pl	-	-	-	16.8	17.2	0.4
352 – Cryers Rd / Neales Rd to Panmure bus station	33.4	28.2	-5.2	27.9	26.7	-1.2
711 – Pakuranga Rd / Stanniland St to Panmure bus station	23.8	26.4	2.6	24.5	24.1	-0.4
712 – Glenmore Rd / Meadway to Panmure bus station	19.7	25.2	5.5	18.1	19.8	1.7

The completion of the RRF is predicted to result in improved travel times of bus routes under Construction Scenario 2, compared to Construction Scenario 1.3. This is due to a significant redistribution of general traffic from Pakuranga Road and Ti Rakau Drive to the RRF.

Acceptable increases in bus travel times of the 70 and 352 (westbound) services are predicted during the AM peak. The 70 and 352 (eastbound) services are predicted to experience small travel time improvements.

The remaining westbound and eastbound services are predicted to experience manageable increases, or in some cases small improvements, in travel times during the AM peak under Construction Scenario 2.

Similar to the AM peak, travel times of the 70 and 352 services along Ti Rakau Drive are expected to experience improvements, in both directions, during the PM peak.

Again, travel times of the remaining westbound and eastbound services are expected to experience manageable increases or small improvements during the PM peak under Construction Scenario 2.

#### 5.3.5.4 Construction Scenario 3

The various pieces of work originally proposed under Construction Scenario 3 will now be undertaken earlier in the construction programme. Therefore, this modelling scenario is no longer relevant to this assessment.

### 5.3.6 School Bus Services

The S415 school bus service between Pakuranga and Sacred Heart College will continue to depart from bus stop (ID 6060) outside Farmers in the AM peak and will continue to terminate at bus stop (ID 6062) on the return journey in the afternoon during construction. Furthermore, the service will also continue to travel in the general traffic lanes on Pakuranga Road during construction. As stated in **Section 5.3.3**, it is anticipated that the bus stops (ID 6062 and 6060) will only be removed following the completion of the RRF and Reeves Road underneath.

The S416 school bus service between Botany and Sacred Heart College will continue to use the general traffic lanes along Ti Rakau Drive as well as the existing bus stops in the EB2 and EB3R projects areas during construction. As stated in **Section 5.3.3**, it is anticipated that the bus stop (ID 6127) in the Pakuranga Town Centre will only be removed after the RRF, and Reeves Road have been completed. Also, as stated in **Section 5.3.4**, it is anticipated that bus stops (ID 6134, 6129, 6131, 6136, 6138 and 6133) along Ti Rakau Drive will only be removed following Phase 2 of Ti Rakau Drive in EB3R (Mattson Road to Gossamer Drive) and bus stops (ID 6140 and 6135) following Phase 3 of EB3R.

During construction, the S440 school bus services between Bucklands Beach and Sancta Maria College and Primary will remain on its current route and students will board and alight at the existing bus stops.

Edgewater College is located near the Ti Rakau Drive / Edgewater Drive west intersection. In the existing environment, the S013 school bus service proceeds down Edgewater Drive east and the S073 proceeds down Edgewater Drive west. Currently, both of these school bus services enter through the western access to pick-up/drop-off students at the off-street bus stop inside the parking area (see **Figure 75**).



**Figure 75: Edgewater College existing school bus services and bus stop**

As stated in **Section 4.2.2.3**, Phase 1 of Ti Rakau Drive in EB3R (Mattson Road to Gossamer Drive) will include the construction of the Edgewater Drive east and west intersections. This will require the closure of one intersection while diverting all traffic along Edgewater Drive to the other in an alternating fashion. As such, during each of these closures, both services will access the bus stop from the same direction along Edgewater Drive. During the Edgewater Drive west closure, the S073 is expected to experience an increased travel time of approximately 1.5min, while the S013 is expected to experience a decreased travel time of approximately 40sec during the Edgewater Drive east closure. Therefore, the temporary effects to these school bus services are considered to be very low.

### 5.3.7 Summary of Temporary Effects to Bus Services and Facilities

Overall, the temporary effects during construction to bus services and facilities in the EB2 and EB3R project areas are considered to be negligible during Construction Scenario 1.1, moderate to relatively large during Construction Scenario 1.3, and low during Construction Scenario 2. Again, these effects are not unexpected due to the additional intersections along the network and the number of ongoing construction activities.

A number of mitigation options were tested. However, it is expected that the only alternative to improve bus travel times would be to add temporary bus lanes. This is expected to have additional impacts on general traffic travel times.

Ti Rakau Drive is a congested corridor in the existing environment; therefore, it is expected that a redistribution of traffic or reduction in capacity due to road works will lead to increased queues and delays. Furthermore, increases in travel times through the project area are inherent in the majority of transport projects of this scale as are changes in travel behaviour that could be reasonably expected to reduce traffic volumes on the network, such as peak spreading, flexible working options and alternative route selection. With appropriate public engagement and on-road messaging, it is expected that these travel behaviour changes could occur. This in turn could lead to more manageable queues, lower delays and improved travel times on the network. These will be managed through the CTMP.

It should also be noted that these increases in travel times are temporary. Once constructed the RRF will, in part, alleviate the congestion around the Pakuranga Town and improve travel times. Furthermore, the completion of EB2 and EB3R is expected to further improve travel times, by means of the new dedicated bus lanes.

Opportunities to improve bus travel times will be explored in the development of the CTMPs, such as the provision of temporary bus priority or temporary bus lanes where feasible, along with measures to manage travel demand through the provisions of the SSTMPs. Appropriate public communication and advance warning of the planned works will be undertaken prior to the works being initiated. Public communication and signage will also be provided during construction informing motorists of the works and potential delays, which could lead to changes in travel behaviour.

Lastly, the 711 service will undergo minor route changes as construction progresses through the closure of Reeves Road and William Roberts Road north. Existing bus stops along Pakuranga Road and Ti Rakau Drive will also experience minor changes during construction, undergoing minor relocation as the works progress. Based on the above, the potential adverse effects are considered to be mitigated as far as is reasonably practicable.

## 5.4 Effects to Pedestrians and Cyclists

Currently, pedestrian footpaths are provided along both sides of Ti Rakau Drive, between Pakuranga Road and Gossamer Drive. Signalised pedestrian facilities for crossing Ti Rakau Drive are provided at the following intersections:

- Ti Rakau Drive / Pakuranga Road southern and eastern approaches
- Ti Rakau Drive / Reeves Road all approaches
- Ti Rakau Drive / Mattson Road Western and southern approaches
- Ti Rakau Drive / Edgewater Drive west / Chevis Place western and southern approaches
- Ti Rakau Drive / Gossamer Drive northern, eastern and southern approaches

Pedestrian footpaths are also provided along both sides of Pakuranga Road, between Ti Rakau Drive and William Roberts Road. A midblock signalised pedestrian crossing is provided near the Pepler Street exit.

In the residential area to the north of SEART, pedestrian footpaths are provided along both sides of Dale Crescent. At the southern end of the street, the footpath continues along the northern side of Seven Oaks Drive.

In the commercial area south of the Pakuranga Plaza, pedestrian footpaths are provided along both sides of Reeves Road and Cortina Place. A midblock pedestrian crossing is also provided on Reeves Road. Footpaths are provided along both sides of William Roberts Road north, to the east of the Pakuranga Plaza. Once the WRRE is completed, footpaths will be provided along both sides of William Roberts Road south, from Ti Rakau Drive up to Ti Rakau Park.

Footpaths with the same width as existing footpaths will be provided during construction.

As stated in **Section 3.6.2**, no cycle facilities are provided in the existing environment, except at the Ti Rakau Drive / Gossamer Drive intersection.

Pedestrian crossings and footpaths will be maintained at all times during construction. Should this be unachievable, temporary facilities will be provided to ensure pedestrian connectivity. This will be ensured through the CTMPs.

### 5.4.1 EB2 – Reeves Road

Footpaths along both sides of Reeves Road as well as the midblock pedestrian crossing will be maintained during construction. When beam-landing activities are required for construction of the RRF, pedestrians may need to be diverted around these areas for safety purposes. CTMPs will be employed to achieve this.

### 5.4.2 EB2 – William Roberts Road North

Although construction is required to form the cul-de-sacs at each end, the existing footpaths along both sides of William Roberts Road north will be maintained. Once the RRF northern abutment is under construction, it is anticipated that the pedestrian footpath on the western side of William Roberts Road north will be closed. The effects of this closure are considered to be negligible as the footpath on the opposite side of the road will be maintained.

### 5.4.3 EB2 – Pakuranga Road Tie-In

The footpath along the northern side of the Pakuranga Road / RRF intersection will be maintained at all times. While the Pakuranga Road tie-in is under construction, pedestrians will be unable to utilise the existing refuge island on the southern side of the intersection. A temporary pedestrian crossing will be provided in a similar location to limit the effects to pedestrian walking time and distance.

### 5.4.4 EB2 – SEART

There are no footpaths along SEART provided at present.

Once the new SEART off-ramp has been completed and Seven Oaks Drive has been reinstated further north, it is anticipated that the footpath along the northern side of the Seven Oaks Drive will also be reinstated, similar to the existing environment.

### 5.4.5 EB2 – Ti Rakau Drive from Pakuranga Road to Reeves Road

Footpaths along both sides of the carriageway will be maintained. During the construction of the bus lanes on this section of Ti Rakau Drive as well as the new Ti Rakau Drive / Aylesbury Street / Palm Avenue crossroads intersection, pedestrians may need to be diverted around these areas for safety purposes. CTMPs will be employed to achieve this.

During construction of the Ti Rakau Drive / Reeves Road intersection, pedestrian crossings will be maintained, **except for the crossing on the eastern arm of the intersection**. Temporary crossings will be provided as necessary to avoid the construction areas.

### 5.4.6 EB2 – Pakuranga Road

The existing footpaths along both sides of Pakuranga Road will be maintained during construction. The existing signalised midblock pedestrian crossing on Pakuranga Road, constructed as part of EB1, is also expected to be maintained.

### 5.4.7 EB2 – Side Roads

The existing footpaths along both sides of Palm Avenue, Aylesbury Street north, Cortina Place and William Roberts Road will be maintained. In the case of Aylesbury Street, the footpaths will be maintained until the completion of the new Ti Rakau Drive / Aylesbury Street / Palm Avenue crossroads intersection. Following which the existing footpaths will be removed. CTMPs will be employed to divert pedestrians around work zones as necessary.

### 5.4.8 EB3R – Ti Rakau Drive from Reeves Road to Mattson Road

Footpaths along both sides of the carriageway will be maintained. During construction of the Ti Rakau Drive / **William Roberts Road / Mattson Road intersection**, temporary crossing facilities will be provided as per the CTMPs to avoid the work zones.



#### **5.4.9 EB3R – Ti Rakau Drive from Mattson Road to Gossamer Drive (Phase 1)**

Pedestrian footpaths on both sides of Ti Rakau Drive will be maintained. A new **raised** three-stage pedestrian crossing will be constructed, between Marriot Road and Edgewater Drive west, during the construction of the new westbound lanes. However, this crossing will not be in use until the completion of the bus lanes and the Edgewater bus station in the centre of Ti Rakau Drive. Pedestrians will continue to use the existing pedestrian crossing at the Ti Rakau Drive / Edgewater Drive west intersection.

#### **5.4.10 EB3R – Ti Rakau Drive from Mattson Road to Gossamer Drive (Phase 2)**

The footpath along the northern side of Ti Rakau Drive will be maintained, and pedestrians will be able to utilise the new footpath along the southern side during Phase 2. As above, the new staged pedestrian crossing towards the Edgewater bus station will not be in use until completion of the bus lanes and the bus station. A temporary signalised pedestrian crossing will be provided at the Ti Rakau Drive / Edgewater Drive west intersection.

#### **5.4.11 EB3R – Ti Rakau Drive from Mattson Road to Gossamer Drive (Phase 3)**

During Phase 3, the staged pedestrian crossing at the Edgewater Drive bus station will be completed and will be opened for use. During construction of Ti Rakau Drive / Gossamer Drive intersection, pedestrian crossings will be maintained. Temporary crossings will be provided as necessary to avoid the construction areas, and will form part of the CTMP.

#### **5.4.12 EB3R – Side Roads**

The existing footpaths along both sides of Tiraumea Drive, Mattson Road, Roseburn Place, Edgewater Drive west, Chevis Place, Wheatley Avenue, Edgewater Drive east, Freemantle Place and Gossamer Drive will be maintained during construction. CTMPs will be employed to divert pedestrians around work zones as necessary.

#### **5.4.13 Summary of Temporary Effects to Pedestrians and Cyclists**

Temporary effects to pedestrians and cyclists during construction are considered to be negligible overall. Pedestrian crossings and footpaths will be maintained at all times during construction. Should this be unachievable, temporary facilities and diversions will be provided to ensure pedestrian connectivity. Furthermore, pedestrian access to properties will be maintained at all times. This will be ensured through the CTMPs.

## 5.5 Effects to Property Access and Parking

The sections below provide assessment of the temporary effects of EB2 and EB3R on property access, as well as on-street and off-street parking during construction, split between the EB2 and EB3R project areas.

### 5.5.1 EB2 – Reeves Road

The construction of Reeves Road will have no effect on on-street parking along this section of road as none is provided currently.

An assessment of temporary effects to property access and off-street parking at specific properties along Reeves Road in the EB2 project area is provided below.

#### 5.5.1.1 3 Reeves Road – Gull Service Station

**Figure 76** shows the location and property boundary of 3 Reeves Road, as well as the Gull service station (red outline) developed on the site. Access to the property from Reeves Road will not be maintained during the Reeves Road closure. Discussions are ongoing with the owner regarding loss of direct road access onto Reeves Road.



**Figure 76: 3 Reeves Rd and Gull service station (red outline)**

5.5.1.2 11 Reeves Road – Eastside Pups Dog Grooming and Daycare

Access to the property at 11 Reeves Road will not be maintained during the closure of Reeves Road. A temporary two-way access will be provided from Cortina Place via the property at 2 Cortina Place (see **Figure 77**), which is owned by AT. The manoeuvring width between parking spaces to the rear of the property is approximately 8.4m and will be sufficient to accommodate a two-way temporary access, while having no effect on on-site parking. Therefore, the temporary effects to property access and parking are considered to be negligible.



Figure 77: 11 Reeves Rd temporary access during construction

### 5.5.1.3 7 Aylesbury Street and 2R Ti Rakau Drive – The Warehouse and Pakuranga Library

Currently, access from Reeves Road is provided to The Warehouse’s goods access and the associated undercover carpark at 7 Aylesbury Street (orange outline). Similarly, the service entrance of the Pakuranga Library and Citizens Advice Bureau at 2R Ti Rakau Drive (blue outline) is also accessed from Reeves Road.

During the initial stages of the Reeves Road closure, from approximately mid-2023 to mid-2024<sup>27</sup>, access will be maintained through the work site to the goods access. Access to the undercover carpark from Reeves Road as well as the library service entrance from Reeves Road will not be maintained during this period. However, the existing secondary access to the undercover carpark off the private access road in the Pakuranga Plaza will remain open (see Figure 78). The main access to the Library on Aylesbury Street east will also remain open. Therefore, effects to property access during this period at these properties, as well as during events such as the Pakuranga Night Market, are expected to be very low.

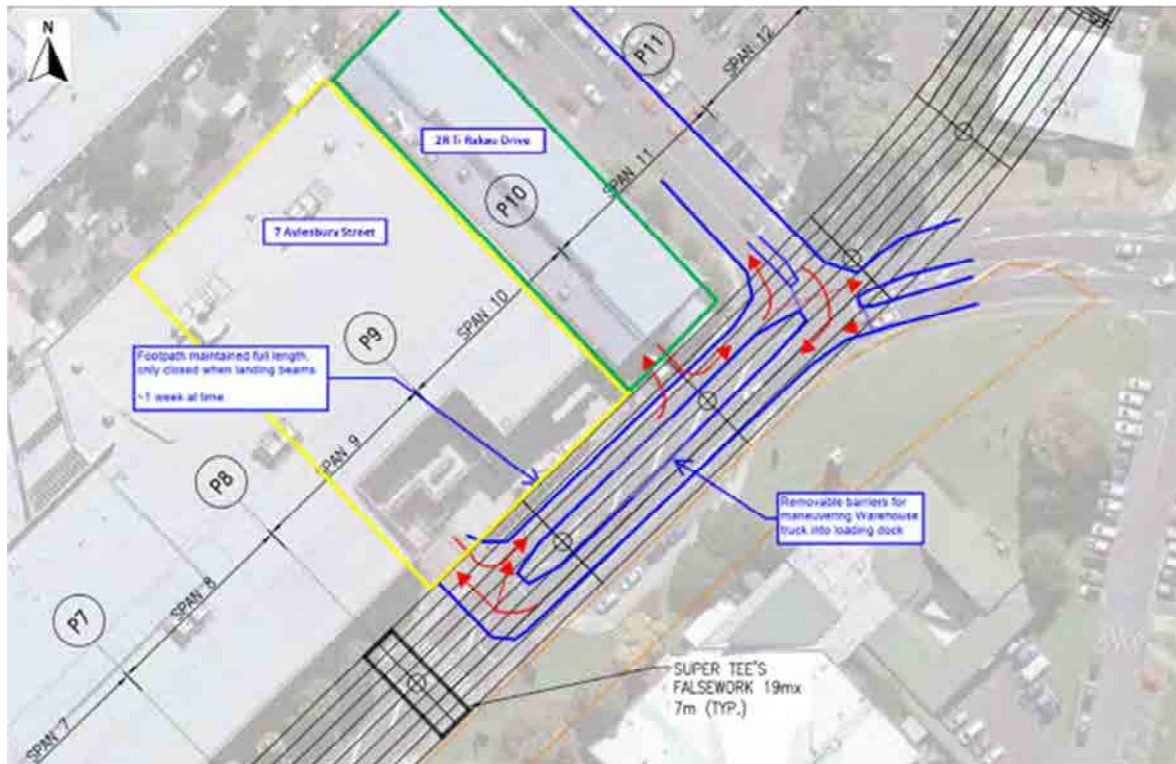


Figure 78: Pakuranga Plaza undercover carpark accesses

It should be noted that during this period, access to the Pakuranga Plaza at the Reeves Road / Aylesbury Street east intersection will also not be maintained. A full assessment of effects to property access at the Pakuranga Plaza is presented in Section 5.5.5.3.

Following this initial period, and in addition to the access being maintained to The Warehouse, access will also be reinstated to the undercover carpark and the Library service access. These access arrangements are shown in Figure 79 below.

<sup>27</sup> These periods are indicative, and the EBA is reviewing the design and construction methodology to accelerate construction.



**Figure 79: 7 Aylesbury St and 2R Ti Rakau Dr temporary access during construction**

At present, The Warehouse’s goods access is left-in left-out only, with trucks accessing the site via Reeves Road from the south and exiting to the north. Trucks will access the site from the north on Reeves Road, execute a U-turn and return northbound on Reeves Road towards William Roberts Road during construction.

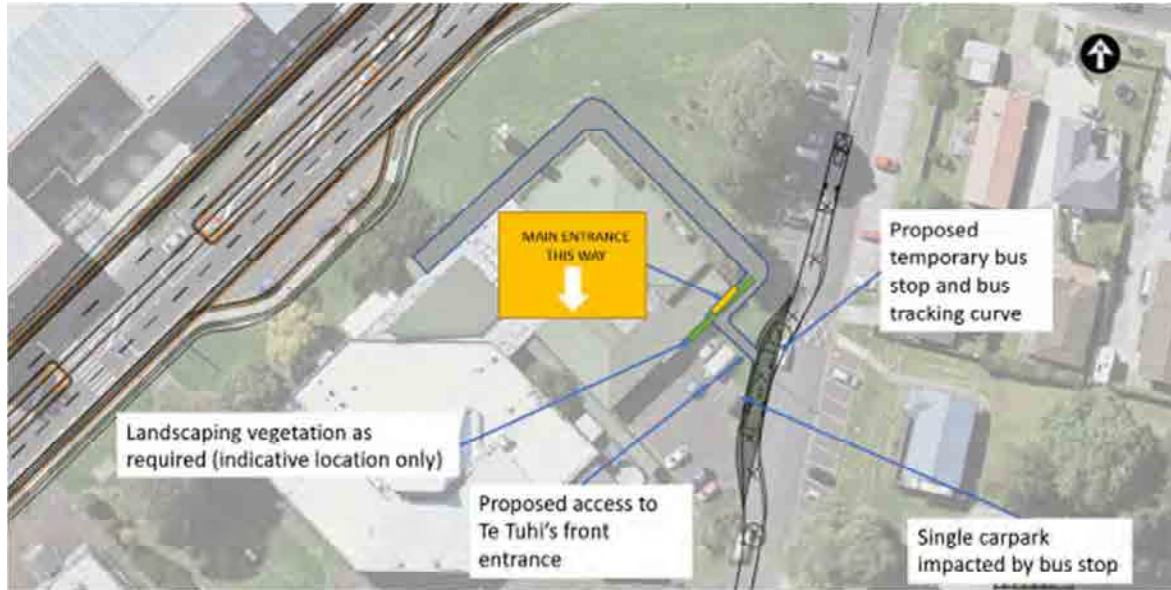
Removable barriers will be installed in the median and the existing masonry wall on the property boundary will be removed, if required, to accommodate this manoeuvre. The wall will be reinstated after construction of Reeves Road. Deliveries to the property are currently limited to one semi-trailer per day (as per the terms of the existing resource consent for the property) and background traffic volumes on Reeves Road will be significantly reduced.

Access to the undercover carpark will also be from the north on Reeves Road, turning right into the carpark. Left-out only movements will be provided at this access for vehicles exiting from the carpark.

Access to the service entrance of the Library will be from the north on Reeves Road, executing a U-turn manoeuvre at the undercover carpark access. During construction, this access will provide for left-in left-out movements only. Given the nature of the service access and its size, it is expected that a low number of vehicles would require access to this entrance during construction. Effects to property access are expected to be negligible as the existing background traffic on the road will be redistributed elsewhere during the Reeves Road closure.

#### 5.5.1.4 13R Reeves Road – Te Tuhi

The main access to the property off Reeves Road will not be maintained during the Reeves Road closure. A temporary indented drop-off area will be provided on the western side of William Roberts Road, with a temporary walkway leading around the property to the main entrance (see **Figure 80**).



**Figure 80: 13R Reeves Rd temporary access during construction**

The drop-off will result in the temporary loss of one off-street parking space to the rear of the property. It is expected that the remaining 12 off-street parking spaces on the property would be sufficient during construction. Temporary effects on property access and off-street parking during construction are expected to be very low.

Once the WRRE is completed, on-street parking fronting this property will be removed via No Stopping at All Time (NSAAT) line markings. Therefore, the proposed temporary drop-off will have no additional effects on on-street parking along William Roberts Road.

#### 5.5.2 EB2 – William Roberts Road North

As stated in **Section 5.1.1.4**, the construction yard will be located on the south-western quadrant of the Pakuranga Road / William Roberts Road intersection. The properties at 169, 171, 173 Pakuranga Road and 3 William Roberts Road have been acquired by AT and will provide the necessary space for this CSA. Again, it should be noted that this CSA is subject to a separate resource consent application and associated transport assessment. As such, no further comment on the construction yard is provided in this ITA.

AT have also acquired the remaining properties on the western side of William Roberts Road north, including 5, 7, 9, 11, 13, 15, 17 and 19 William Roberts Road. These properties will provide the necessary space for the northern RRF abutment. The removal of these residential properties will further reduce the need for on-street parking along William Roberts Road north.

Lastly, AT have also acquired the properties at 177, 179, 181, 187 Pakuranga Road and 2 William Roberts Road on the southern side of the carriageway to allow for the Pakuranga Road / RRF tie-in.

Accesses to the remaining properties on the eastern side of the road will be maintained as per the existing environment.

Overall, the need for on-street parking along William Roberts Road north will be significantly reduced during construction. Therefore, the temporary effects to property access and parking are considered to be negligible.

### 5.5.3 EB2 – SEART

To enable the proposed design of the new SEART off-ramp and the southern RRF abutment, AT have acquired the following properties on the northern side of SEART:

- 25 and 27 Ti Rakau Drive
- 2, 4, 6, 8, 10, 12, 14, and 18 Seven Oaks Drive
- 1R and 19 Dale Crescent

The properties have been earmarked for demolition, thereby removing the current use of these properties.

### 5.5.4 EB2 – Pakuranga Road

In the existing environment, clearways are provided in the kerbside lanes on Pakuranga Road in the EB2 project area. The westbound clearway is enforced during the AM peak period (07:00 – 09:00) and the eastbound clearway during the PM peak period (16:00 – 18:00). In the off-peak periods, on-street parking is permitted along these sections of Pakuranga Road. **Figure 81** shows the location and extent of the clearways (blue outline) along Pakuranga Road in the EB2 project area.



**Figure 81: Pakuranga Rd clearways and on-street parking (blue outline)**

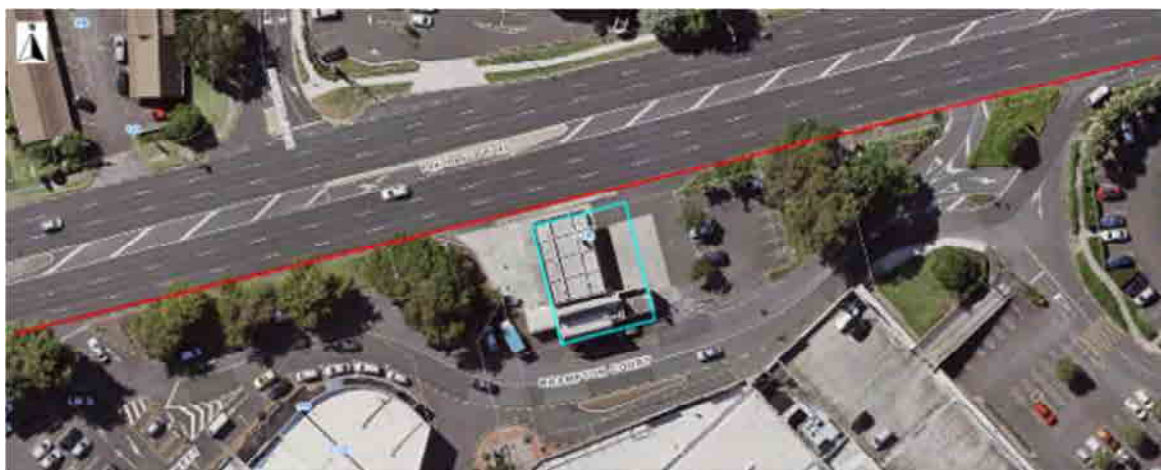
During construction of the Pakuranga Road / RRF tie-in, these clearways and on-street parking sections will be removed to provide the necessary workspace. As Pakuranga Road is largely similar to Ti Rakau Drive in the EB3R project area, in terms of traffic volumes and operating speeds, it is not unreasonable to assume that Pakuranga Road experiences the same low level of parking utilisation in the existing environment during weekdays and weekends. Based on this assumption, the temporary effects on on-street parking are expected to be negligible.

As per the existing environment, left-in/left-out access to the residential and commercial properties on the frontage of Pakuranga Road in EB2 will be maintained throughout the construction programme. This will be achieved through the CTMP. During the Reeves Road closure and before the RRF is open, vehicles exiting properties fronting this arterial road are expected to experience a minor increase in delay and queueing, and will still rely on driver behaviour for gaps within the opposing traffic streams. Once the RRF is completed, this section of Pakuranga Road is expected to experience a significant decrease in traffic volumes. The result is expected to be significantly less delay for vehicles attempting to enter the corridor. Therefore, the effects to these properties are considered to be very low.

As stated in **Section 4.2.1.6**, the initial stages of the Pakuranga Road construction will also include longitudinal drainage works and will be undertaken concurrently with the enabling works, early in the construction programme. A full assessment of effects to general traffic is presented in **Section 5.2.2.2**.

#### 5.5.4.1 141 Pakuranga Road – GAS Service Station

**Figure 82** shows the general location of the proposed longitudinal drainage works along Pakuranga Road and the property boundary of the GAS service station located at 141 Pakuranga Road.



**Figure 82: Pakuranga Rd longitudinal drainage works and GAS service station (blue outline)**

Longitudinal drainage construction will consist of the temporary closure of a section of the westbound kerbside lane on Pakuranga Road between William Roberts Road and Ti Rakau Drive. During this phase of work, access to the Pakuranga Plaza via Brampton Court, access to the GAS service station and the Pepler Street exit will be maintained.

The drainage works will be completed in sections to ensure this. It is envisaged that lateral shifts of the access points may be required. The construction team will also liaise with the operators of the GAS service station to ensure sufficient access widths are provided, as and when required, for fuel delivery tankers. Therefore, the effects to property access are expected to be negligible.



## 5.5.5 EB2 – Ti Rakau Drive, Side Roads and Pakuranga Plaza

### 5.5.5.1 Ti Rakau Drive

Ti Rakau Drive in the EB2 project area, between Pakuranga Road and Reeves Road, provides no on-street parking in the existing environment. Therefore, the construction phase will have no effects on on-street parking.

As per the existing environment, left-in/left-out access to the residential and commercial properties on the western side of the carriageway will be maintained throughout the construction programme. These properties include 3-27 Ti Rakau Drive. This will be achieved through the CTMP. Similar to Section 5.5.4, during the Reeves Road closure and before the RRF is open, vehicles exiting from these properties are expected to experience a minor increase in delay, and will still rely on driver behaviour for gaps within the opposing traffic stream. Once the RRF is completed, this section of Ti Rakau Drive is expected to experience a significant decrease in traffic volumes and delay. Therefore, the effects to these properties are considered to be very low.

Effects on property access with regards to the Pakuranga Plaza are discussed below.

### 5.5.5.2 Side Roads

Construction works on Palm Avenue will be limited to the approach of the intersection with Ti Rakau Drive. Works on Aylesbury Street will be more extensive; however, no on-street parking is provided in the existing environment and property access will be maintained during these works. Therefore, the construction phase will have no effects on on-street parking or property access along these side roads.

### 5.5.5.3 Pakuranga Plaza

The works in the EB2 project area around Pakuranga Plaza will be constantly evolving as works transition from one phase to the next. This in turn will require multiple changes to the accesses and parking currently serving the Pakuranga Plaza until the completion of the Project. The sections below provide an assessment of the temporary effects, in chronological order, to property access and parking.

It should be noted that for the purposes of this ITA, the term ‘Pakuranga Plaza’ is used here to refer to the entire area encompassed in the yellow outline in **Figure 83** below and includes the following properties:

- 7 and 10 Aylesbury Street
- 2R Ti Rakau Drive
- 1 Pepler Street
- 121, 123, 125, 127, 129, 131, 135, 141 and 167 Pakuranga Road

The assessment presented here excludes the property located at 26 Ti Rakau Drive (red outline).



Figure 83: Pakuranga Plaza

**Property Access:**

The Pakuranga Plaza currently has six access points allowing for both in and out movements, with a seventh allowing for movements out onto Pakuranga Road only. All accesses are currently priority-controlled. **Figure 84** below shows the traffic volumes for both the AM and PM peak hours at these access points (PM traffic volumes in brackets).

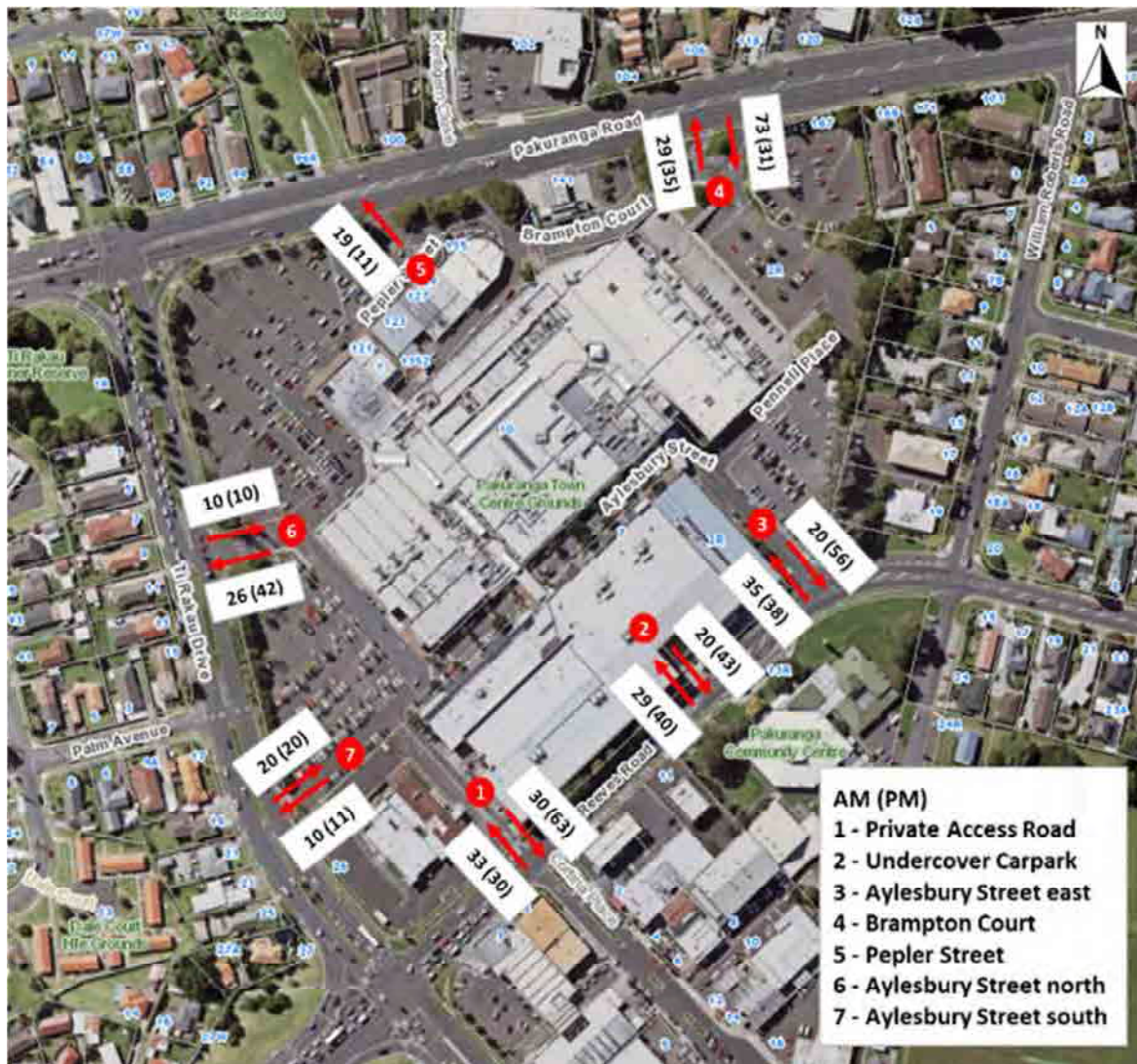


Figure 84: Pakuranga Plaza access volumes<sup>28</sup>

The initial stages of the Pakuranga Road construction will also include longitudinal drainage works and will be undertaken concurrently with the enabling works, early in the construction programme. However, as stated in **Section 5.5.4.1**, access to the Plaza via Brampton Court (Access 4) and the Pepler Street exit (Access 5) will be maintained. The drainage works will be completed in sections to ensure this. It is envisaged that lateral shifts of the access points may be required. The temporary effects to property access are expected to be negligible.

Construction of the new Ti Rakau Drive / Palm Avenue / Aylesbury Street crossroads intersection will be brought forward, and will be undertaken during Phase 1 of Ti Rakau Drive in EB2. The early completion of this intersection will provide improved access to the Pakuranga Plaza, with increased capacity and will allow for all movements. It is anticipated that the intersection will be completed before the closure of Reeves Road. During this phase of work, the existing priority-controlled Aylesbury Street accesses

<sup>28</sup> Traffic volumes sourced from the AIMSUN Do-Minimum model, with a 2028 horizon year.

(Access 6 and 7) will be maintained until completion of the new signalised crossroads intersection. Once completed, the accesses will be removed.

As stated in **Section 5.5.1.3**, Reeves Road will be closed during the initial stages of the construction programme, from approximately mid-2023 to mid-2024<sup>29</sup>. Access to the Plaza via the private access road (Access 1), the undercover carpark (Access 2), and Aylesbury Street east (Access 3) will not be maintained.

However, access will be maintained through the work site to The Warehouse's goods access. Furthermore, the existing secondary access to the undercover carpark off the private access road in the Pakuranga Plaza will remain open. The main access to the Library on Aylesbury Street east will also remain open.

It is expected that vehicles would divert to the three remaining accesses on Ti Rakau Drive and Pakuranga Road, which would have sufficient spare capacity due to the low background traffic volumes at those accesses. Therefore, the effects of the temporary closure of these accesses are expected to be very low.

Lastly, the Pakuranga Road / Brampton Court priority-controlled access to the Pakuranga Plaza will be realigned to allow for easier access for right turners.

#### **Parking:**

As stated in **Section 3.7.1**, the Pakuranga Plaza currently supports 1,355 parking spaces on site. The utilisation of 840 of these parks was captured during the parking survey, shown in **Figure 85**. The utilisation of the surveyed parking spaces was determined to not exceed 60% capacity on a typical weekday or weekend.

It is not unreasonable to assume that the remaining 495 un-surveyed parking spaces experience a similar utilisation profile. Therefore, based on this assumption, it is expected that the Pakuranga Plaza has at least 542 unoccupied parking spaces on an average weekday and weekend. It should be noted that AT owns all of parking areas shown in **Figure 85**, except for those parking spaces located on Aylesbury Street.

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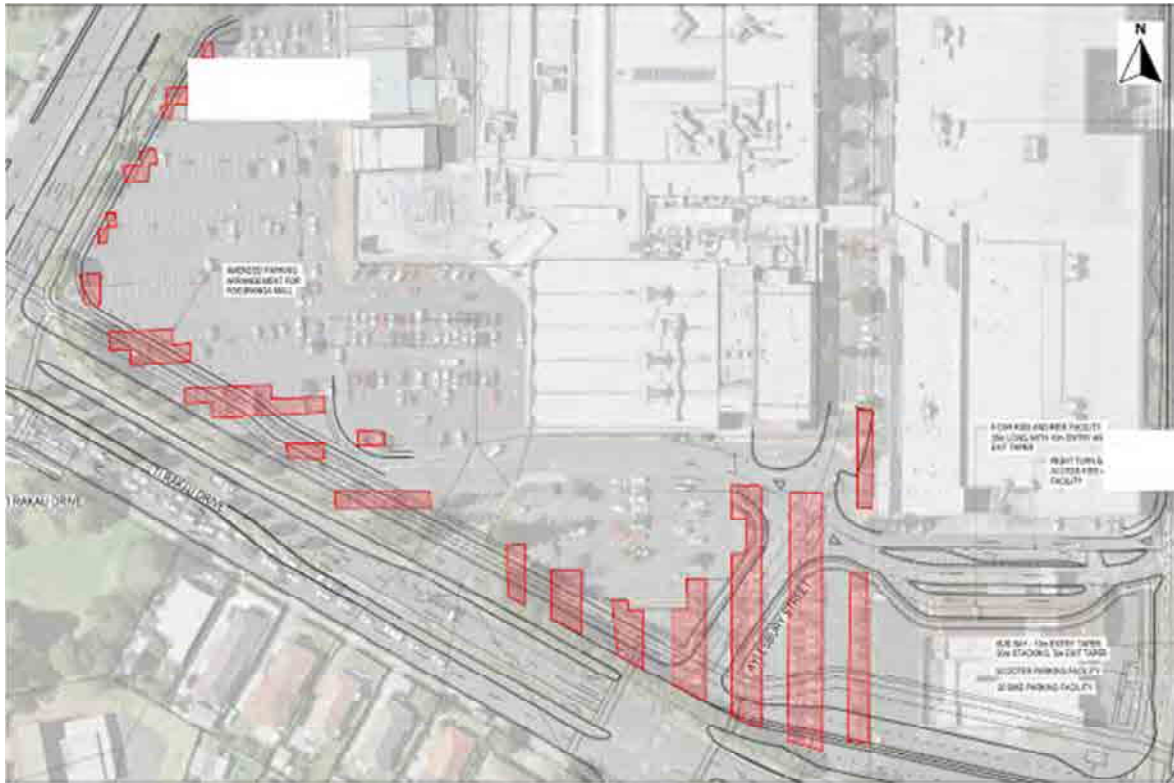
<sup>29</sup> These periods are indicative, and the Alliance is reviewing the design and construction methodology to accelerate construction.



**Figure 85: Pakuranga Plaza surveyed parking areas**

As stated in **Section 5.1.1.3**, the parking area off Pennell Place in the Pakuranga Plaza will be temporarily occupied and established as a CSA. This carpark in its current form provides 108 parking spaces and will be occupied for approximately two years and two months. Taking the spare capacity of parking spaces at the Plaza into account, it is expected that there would still be 434 unoccupied parking spaces on site during the period where this parking area is occupied by the CSA. Therefore, in light of the existing spare capacity, the temporary effects of the use of the carpark as a CSA on parking at the Plaza are expected to be negligible.

During the Reeves Road closure and the RRF construction, works will commence on the new offline bus lanes on the northern side of Ti Rakau Drive between Pakuranga Road and Reeves Road. These works will also include the new bus station, the Ti Rakau Drive / Aylesbury Street / Palm Avenue crossroads intersection and the 'Kiss-and-Ride' facility (see **Section 4.2.1.5**). **Figure 86** shows the layout of the proposed works and the effects on parking at the Plaza.



**Figure 86: EB2 Ti Rakau Drive effects on parking at Pakuranga Plaza**

For the purposes of this ITA it was assumed that all of the required land area will be under construction simultaneously, in other words the full effects of the proposed works on parking. Based on this assumption, the works will result in the permanent loss of 245 parking spaces at Pakuranga Plaza. Taking the spare capacity of parking at the Plaza into account, it is expected that there would still be 189 unoccupied parking spaces on site. Therefore, the effects of these works on parking at the Plaza are expected to be negligible.

Following construction of the RRF, late in the construction programme, the Reeves Road / Aylesbury Street and the Reeves Road / William Roberts Road intersections will be signalised. This will include the realignment of Reeves Road and Aylesbury Street east. **Figure 87** shows the proposed alignment of Reeves Road and Aylesbury Street east, as well as the effects on parking at the Plaza.



**Figure 87: Reeves Rd / Aylesbury St signalisation effects on parking at Pakuranga Plaza**

The proposed works will result in an additional and permanent loss of 12 parking spaces at the Pakuranga Plaza. However, these proposed works will occur after the CSA at Pennell Place has been disestablished and the parking area re-established. Taking the spare capacity of the remaining 297 parking spaces into account, it is expected that there would still be 285 unoccupied parking spaces on site. Therefore, the effects of this signalisation on parking at the Plaza are expected to be negligible.

### 5.5.6 EB3R – Ti Rakau Drive, Side Roads and Properties

The sections below provide assessment of the temporary effects during construction on property access and parking in the EB3R project area.

To enable the EB3R construction, AT have acquired the vast majority of properties along the southern frontage of Ti Rakau Drive including:

- 37 – 69, 73-105, 121-143, 147-207 Ti Rakau Drive
- 3 Tiraumea Drive
- 1, 3, 4 and 5 Mattson Road as well as small parcels of 7 and 9 Mattson Road
- 1 Roseburn Place
- 1 Snell Place
- 2 and 167 Edgewater Drive
- 1-2 Wheatley Avenue

Properties acquired on the northern side of the carriageway include:

- 216-222 Ti Rakau Drive
- 170, 174 and 178 Gossamer Drive
- A parcel of 168R Gossamer Drive

The majority of these properties are scheduled for demolition to facilitate the busway, thereby removing the current use of these properties.

#### 5.5.6.1 *Ti Rakau Drive*

Ti Rakau Drive in the EB3R project area, between Reeves Road and Gossamer Drive, provides on-street parking along both sides for the majority of the corridor in the existing environment. The on-street parking will be removed during construction to provide the necessary space for the work zones. However, as stated in **Section 3.7.4**, the average utilization is poor with only 3% occupancy on weekdays and 8% on Saturdays. This is not unexpected as this high-volume road does not create an appealing location to park vehicles and is likely leading to a high perceived risk of crashes. It is also not unreasonable to assume that the surrounding residential properties have sufficient off-street parking.

Furthermore, the acquisition of the majority of the residential properties on the southern frontage of Ti Rakau Drive will remove the need for on-street parking along this section. Lastly, the current left-in/left-out access arrangements to the properties on the northern side of Ti Rakau Drive will be maintained during construction. Therefore, the temporary effects on on-street parking and property access along Ti Rakau Drive are considered to be negligible.

#### 5.5.6.2 *Side Roads*

##### **Tiraumea Drive, Roseburn Place, Edgewater Drive and Wheatley Avenue:**

Construction works along the side roads of Tiraumea Drive, Roseburn Place, Edgewater Drive west, Wheatley Avenue and Edgewater Drive east will be limited to the approaches of the intersections with Ti Rakau Drive. Therefore, the construction phase will have negligible effects on on-street parking and property access along these side roads.



**Marriot Road and Chevis Place:**

No works are planned along Marriott Road and Chevis Place. Therefore, construction will have no temporary effects on on-street parking and property access along these side roads.

**Mattson Road:**

Construction works along Mattson Road will be relatively more extensive. The Mattson Road approach will be set back approximately 27m south and 36m west of its current location where it intersects Ti Rakau Drive. This will provide space for the new westbound lanes on Ti Rakau Drive.

However, the properties on the southern side of Ti Rakau Drive have been acquired, removing the need for on-street parking. Accesses to properties along Mattson Road not acquired by AT will be maintained and will interface with the new alignment of Mattson Road similar to the existing environment. Therefore, the temporary effects on on-street parking and property access along Mattson Road are considered to be negligible.

**Gossamer Drive:**

The Gossamer Drive approach limit line will be set back approximately 15 m from its current location and the kerbside exit lane will be extended to 100 m. NSAAT line markings are currently provided on the eastern side of the road up to the bus stop near the intersection with Riverhills Avenue. These markings will be replicated on the western side of the road. This will result in the loss of on-street parking in front of 169, 171, 173 and 175 Gossamer Drive. It is likely that these properties have sufficient off-street parking, and that on-street parking is not occupied on a regular basis. Accesses to properties along Gossamer Drive not acquired by AT will be maintained and will interface with the roadway similar to the existing environment. Therefore, the effects on on-street parking and property access along Gossamer Drive are considered to be negligible.

**Freemantle Place:**

The Freemantle Place approach will be set back approximately 11 m. NSAAT line markings are provided on the western side of the road for approximately 31 m from the limit line. The line markings will be reinstated upon completion and will result in the loss of one parking space in front of 3 Freemantle Place. It is expected that the remaining on-street parking space in front of the property will be sufficient. The existing line markings on the eastern side of the road will be retained. Property access along Freemantle Place will be maintained as per the existing environment. Therefore, the effects on on-street parking and property access along Freemantle Place are considered to be negligible.

### 5.5.6.3 Residential Properties on Southern Frontage of Ti Rakau Drive

During Phase 1 of EB3R, there will be 10 long driveways or ‘strip accessways’ to residential properties not being acquired by AT on the southern side of Ti Rakau Drive. As the new westbound lanes are constructed, access via Ti Rakau Drive will not be possible. Access to these properties will be provided via temporary residential access tracks along the back of the acquired properties as mitigation.

The temporary access tracks will run alongside a haul road to be used by site traffic, meaning construction and residential traffic will be separated. The tracks will be constructed with Chip Seal as the surface and in cases where the access tracks are greater than 50 m in length, these tracks will be wide enough for two-way traffic flow. The effect on each individual property is assessed below, however, overall the effects to property access are considered to be very low or negligible. As stated in **Section 4.2.2.3**, Phase 1 of EB3R is anticipated to have a duration of approximately one year and three months.

#### 75A Ti Rakau Drive:

A temporary access point will be provided for 75A Ti Rakau Drive on the eastern side of Roseburn Place. The driveway will effectively line up with the existing access of 73 Ti Rakau Drive and will be separated from the haul road. Therefore, the effects to property access are considered to be negligible. **Figure 88** shows the location of the proposed temporary access.



Figure 88: 75A Ti Rakau Dr temporary access