

is to be erected, and no vegetation allowed to grow so as to obstruct a traffic sight line.		
At the intersection of a road or rail level crossing, no building, fence or other obstruction which block sight lines for trains shall be erected, placed or grown in the hatched area marked in TP-Diagram 1.		Not Applicable
Land use activities with direct access to a State Highway shall comply with access and visibility standards set out in TP Diagrams 2 to 9.		Not Applicable

TP-S3	Proposed	Compliance
All car parks and loading areas shall be surfaced and maintained so they do not create a dust nuisance or allow vehicles to carry deleterious materials such as mud, stone, chips or gravel onto any road, footpath or service lane.	Parking and access will be sealed (concrete)	Will comply.

TP-S5	Proposed	Compliance
Provision shall be made for vehicles associated with any permitted activity in the General Rural, Rural Production or Rural Lifestyle Zones to be maneuverer on the site	On-site manoeuvring provided for each lot	Complies

TP-S6	Proposed	Compliance
Every car park shall be designed and constructed in accordance with the Code of Practice for Civil Engineering Works.	N/A	Will Comply

TP-S6	Proposed	Compliance
Every car park shall be designed and constructed in accordance with the Code of Practice for Civil Engineering Works.	N/A	Will Comply

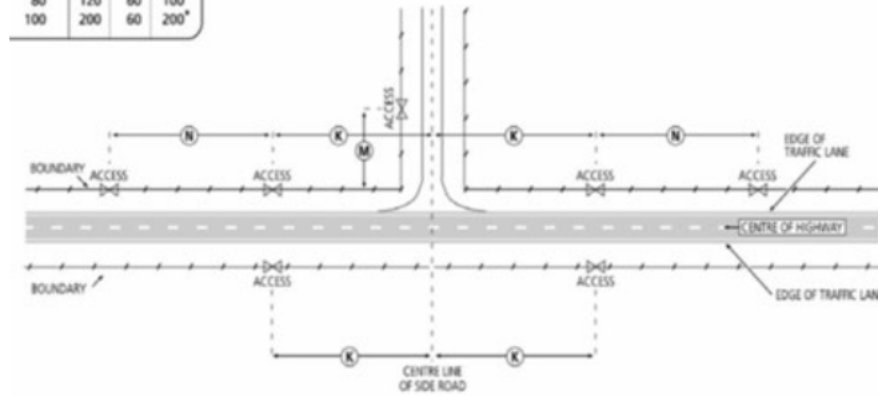
TP-S7	Proposed	Compliance
Every car park shall be designed and ensure the vehicles are not required to reverse onto State Highways.	The site does not have direct access to nearby State Highways.	Not Applicable

TP-S8	Proposed	Compliance
Where any car park area accommodates more than five vehicle spaces and adjoins a site which is zoned General Residential, High Density Residential, General Rural, Rural Production, Rural Lifestyle, Open Space or Special Activity, then it shall be effectively screened from that site by a close boarded fence, wall or landscaping of no less than 1.6m in height. A car parking area with more than five vehicle spaces that joins a	The site does not have direct access to nearby State Highways.	Not Applicable

road shall also be screened by a landscaped strip within the site of at least 0.6m in width. Note that additional landscape requirements apply in the Special Activities Zone.

TP-Diagram 4 Access separation from intersection and other accesses (Plan view)

SPEED LIMIT	DISTANCES (metres)		
	K	M	N
50	30	20	--
60	50	30	--
70	100	45	40
80	120	60	100
100	200	60	200*



Proposed

All intersection identified within the proposed development complies to this rule.

Compliance

Complies.

8. Discussion and Conclusion

8.1 Assessment of Effects

Table 8-1 and

Intersection	Approach	Movement	Delay (sec)			LOS		
			Base	DM	Opt4	Base	DM	Opt4
SH2/Totara Park	Totara Park North	Left	67	85	77	E	F	E
		Thru	57	75	70	E	E	E
		Right	62	76	72	E	E	E
	SH2 East	Left	52	62	47	D	E	D
		Thru	55	63	49	D	E	D
		Right	56	61	48	E	E	D
	Totara Park South	Left	53	60	69	D	E	E
		Thru	52	60	66	D	E	E
		Right	50	51	67	D	D	E
	SH2 West	Left	17	17	16	B	B	B
		Thru	41	42	43	D	D	D
		Right	53	50	67	D	D	E

Table 8-2 are summaries of the Turn Delay, Turn Level of Service (LoS) comparison between Base, DM, and Option 4.

Table 8-1: Overall Turn Level of Service (LoS) and Turn Delay Results (AM Peak)

Intersection	Approach	Movement	Delay (sec)			LOS		
			Base	DM	Opt4	Base	DM	Opt4
SH2/Totara Park	Totara Park North	Left	67	85	77	E	F	E
		Thru	57	75	70	E	E	E
		Right	62	76	72	E	E	E
	SH2 East	Left	52	62	47	D	E	D
		Thru	55	63	49	D	E	D
		Right	56	61	48	E	E	D
	Totara Park South	Left	53	60	69	D	E	E
		Thru	52	60	66	D	E	E
		Right	50	51	67	D	D	E
	SH2 West	Left	17	17	16	B	B	B
		Thru	41	42	43	D	D	D
		Right	53	50	67	D	D	E

Table 8-2: Overall Turn Level of Service (LoS) and Turn Delay Results (PM Peak)

Intersection	Approach	Movement	Delay (sec)			LOS		
			Base	DM	Opt4	Base	DM	Opt4
SH2/Totara Park	Totara Park North	Left	57	58	62	E	E	E
		Thru	50	53	56	D	D	E
		Right	49	51	58	D	D	E
	SH2 East	Left	35	37	46	D	D	D
		Thru	39	39	50	D	D	D

	Totara Park South	Right	46	46	58	D	D	E
		Left	57	60	53	E	E	D
		Thru	51	53	49	D	D	D
		Right	51	50	45	D	D	D
	SH2 West	Left	26	24	19	C	C	B
		Thru	53	53	44	D	D	D
		Right	60	58	51	E	E	D

8.2 Weekend Traffic Impacts

In addition to the weekday peak-hour analysis, a weekend model assessment was previously undertaken to capture traffic behaviour associated with recreational and local shopping trips. The weekend model was calibrated using available SCATS data and observed flow patterns to ensure consistency with real-world conditions. The weekend model assessment shows that the traffic impact of the development is consistent with weekday peak impact as minor.

The results and detailed outputs of the weekend assessment are provided in the Appendix C - Cannon Point Traffic Impact Assessment Report Tōtara Park V2.1 for reference.

8.3 Conclusion of Effects

- The transport modelling assessment suggests that the proposed development of 225 additional dwellings (Stages 3 and 4) will result in a minor change to existing traffic conditions at the Tōtara Park Road/ SH 2 signalised intersection.
- However, the modelling also confirms that this intersection is already operating at or near its functional capacity under current conditions, and is forecasted to deteriorate further under the Do Minimum 2032 scenario due to background growth alone.
- Under the Base 2025 scenario, the intersection operates at an average turn delay of 51 seconds (LoS D) during the AM peak. Under the Do Minimum 2032 scenario, which includes only background traffic growth and the already-congested Stages 1 and 2, this degrades to 58 seconds (LoS E) during the AM peak, with several individual movements deteriorating from LoS D to LoS E and the Tōtara Park North left-turn movement reaching LoS F (85 seconds delay). During the PM peak, the Do Minimum scenario maintains LoS D at 48 seconds average delay. These results demonstrate that the intersection's capacity constraints are an existing network deficiency, driven by the current geometric layout and signal configuration, and are not a consequence of the proposed development.
- **Travel Time Do Min 2032:**
 - AM peak, the following routes experience high travel times:
 - Cannon Point – Upper Hutt 245.3s;
 - Cannon Point – Fergusson 245.2s;
 - Cannon Point – Lower Hutt 237s.





- PM peak, the following routes experience high travel times:
 - Fergusson- Cannon Point 304.8s;
 - Cannon Point- Upper Hutt 195.1s;
 - Upper Hutt- Cannon Point 187.3s
 - Cannon Point- Lower Hutt 191.6s.



- **Travel time Option 4 Scenario:** The routes experiencing the highest travel times under Option 4 are consistent with those already identified under the Do Min 2032 scenario,
 - AM Peak
 - Cannon Point – Upper Hutt 269.6s; (+10%)
 - Cannon Point – Fergusson 267.3s; (+9%)
 - Cannon Point – Lower Hutt 264.2s.(+13%)
 - PM Peak:
 - Fergusson- Cannon Point 352.5s; (16%)
 - Cannon Point- Upper Hutt 204.1s; (+5%)
 - Upper Hutt- Cannon Point 204.0s; (+9%)
 - Cannon Point- Lower Hutt 191.6s.(+4%)
- **Queue Length:** The notable shift under Option 4 is the redistribution of queuing in the AM peak – the SH2 Upper Hutt approach drops significantly while Tōtara Park absorbs the increase, which is a direct result of the signal retiming reallocating green time toward the development approach.
 - Do Minimum 2032 Scenario:
 - AM Peak – the highest queue is observed on:
 - SH2 – Upper Hutt (Lanes 1 & 2): 35 vehicles
 - Tōtara Park (all approaches): 27 vehicles
 - PM Peak – the highest queue is observed on:
 - Fergusson Drive (Lane 1): 37 vehicles

- SH2 – Lower Hutt (Lanes 2 & 3): 33 vehicles
- Option 4 Scenario:
 - AM Peak – the highest queue is observed on:
 - Tōtara Park (all approaches): 54 vehicles (+27 vehicles / +100% from Do Min)
 - PM Peak – the highest queue is observed on:
 - Fergusson Drive (Lane 1): 48 vehicles (+11 vehicles / +30% from Do Min)
- **Turn Level of Service:** Under the Do Minimum 2032 scenario, the intersection is already operating at an average LoS E during the AM peak (58 seconds delay) and LoS D during the PM peak (48 seconds delay), with several individual movements reaching LoS E and the Tōtara Park – Upper Hutt movement deteriorating to LoS F (85 seconds delay). This confirms that the intersection is at its performance ceiling under forecast background traffic growth alone, prior to any development traffic being introduced.

Under Option 4, the average turn LoS remains unchanged – LoS E during the AM peak and LoS D during the PM peak. Where individual turn LoS ratings transition from D to E, these changes result from delays marginally crossing the threshold between LoS categories rather than reflecting a deterioration step-change in intersection performance. The proposed development does not alter the overall operating condition of the intersection beyond what is already forecast under the Do Minimum scenario.

- **Road Safety:** The Surrogate Safety Assessment Model indicates a marginal increase in predicted injury crashes of 3–5% at the Tōtara Park Road / SH2 intersection under the development scenario. This is considered a minor and proportionate increase relative to the scale of additional traffic introduced.
- **Emissions:** Under the VEPM modelling, Option 4 results in total emission costs of approximately \$1.39M per year, an increase of \$0.1M over the Do Minimum 2032 scenario (\$1.29M per year). Both future scenarios represent a significant reduction from the Base 2025 estimate of \$1.92M per year, driven by projected fleet electrification. The marginal increase under Option 4 is modest and proportionate.
- In summary, the transport effects attributable to the proposed development are minor to moderate. The modelling clearly demonstrates that the performance constraints observed at the Tōtara Park Road / SH2 intersection are a pre-existing network condition that will continue to worsen with or without the proposed development. The development does not cause the deterioration – it adds a proportionate and manageable increment of traffic to a network that is already at capacity. With the implementation of signal timing adjustment, the additional demand from Stage 3 and Stage 4 can be accommodated without causing the intersection to perform materially worse than it would under the Do Minimum scenario.

9. Recommendations

Based on the modelling results, the Tōtara Park Road / SH2 intersection is already operating at or near its maximum capacity under the Do Minimum 2032 scenario, driven by background traffic growth and existing geometric constraints. Intersection improvements and upgrades – such as additional turning lanes and intersection widening, accompanied by signal timing adjustment – would benefit the intersection by relieving existing congestion, reducing queue lengths and delays, and improving the overall Level of Service for all road users. Any such improvements should be investigated and treated as a separate matter, independent of the proposed development, given that

the need for intersection upgrades exists under the Do Minimum scenario irrespective of whether Stage 3 and Stage 4 proceed.

At this stage, the additional traffic from the proposed development does not cause substantial network degradation.

On the basis of the above, the following is recommended:

- It is recommended that Stage 3 and Stage 4 be allowed to proceed, contingent on the implementation of traffic monitoring measures at the Tōtara Park Road / SH2 intersection. No further physical road upgrades are required as a direct consequence of the proposed development.
- The adjusted signal phasing and timing should be implemented prior to, or concurrent with, the occupation of Stage 3 and Stage 4 dwellings. It is noted that the signal timings adopted under Option 4 were directly inherited from those developed under Option 2 during the previous resource consent application. Further signal tuning should be tested and refined to account for updated background traffic growth, as forecast demand patterns in 2032 may differ from those assumed at the time Option 2 was developed. Coordination with WTOC will be required to confirm and implement the final signal timing changes within the SCATS system.
- Ongoing monitoring of intersection performance is recommended at intervals of 6 and 12 months following the completion of each stage, including queue length surveys, travel time observations, and SCATS data review, to verify that actual traffic conditions are consistent with modelled predictions.

Appendix A – Detailed Section Calibration

AM Peak (7:30 AM – 8:30 AM)					
Object	Observed (veh/hr)	Modelled (veh/hr)	Absolute Difference (veh)	Relative Difference (%)	GEH
850: Tōtara Park Road (239550471)	225	228	3	1.3	0.1
836: Tōtara Park Road (239550464)	153	163	10	6.5	0.8
834: Tōtara Park Road (239550462)	147	151	4	2.7	0.3
826: River Road (239550459)	921	1092	171	18.6	5.3
816: River Road (204496915)	536	391	-145	-27.0	6.7
538: Tōtara Park Road (30141302)	334	340	6	1.8	0.3
1144: River Road (1054125059)	477	504	27	5.7	1.2
1140: River Road (1054125057)	877	855	-22	-2.5	0.7
Mean	458.75	465.5	6.75	1.5	2.0

PM Peak (4:30 PM – 5:30 PM)					
Object	Observed (veh/hr)	Modelled (veh/hr)	Absolute Difference (veh)	Relative Difference (%)	GEH
850: Tōtara Park Road (239550471)	189	182	-7	-3.7	0.5
836: Tōtara Park Road (239550464)	406	392	-14	-3.4	0.7
834: Tōtara Park Road (239550462)	398	391	-7	-1.8	0.3
826: River Road (239550459)	790	789	-1	0.1	0.0
816: River Road (204496915)	935	927	-8	-0.9	0.3
538: Tōtara Park Road (30141302)	232	236	4	1.7	0.3
1144: River Road (1054125059)	1119	1112	-7	-0.6	0.2
1140: River Road (1054125057)	573	553	-20	-3.4	0.8
Mean	580.25	572.75	-7.5	-1.3	0.4

Weekend Data Saturday (11:30 AM– 12:30 PM)					
Object	Observed (veh/hr)	Modelled (veh/hr)	Absolute Difference (veh)	Relative Difference (%)	GEH
1140: River Road (1054125057)	671	670	-1	0.0	0.0
834: Tōtara Park Road (239550462)	322	318	-4	-1.2	0.2
1144: River Road (1054125059)	977	969	-8	-0.8	0.3
538: Tōtara Park Road (30141302)	246	251	5	2.0	0.3
826: River Road (239550459)	803	816	13	1.6	0.5
850: Tōtara Park Road (239550471)	219	209	-10	-4.6	0.7
816: River Road (204496915)	884	905	21	2.4	0.7
836: Tōtara Park Road (239550464)	312	278	-34	-11.0	1.0
Mean	554.25	552	-2.25	0.4	0.5

Appendix B – Turn Calibration Data tables

AM peak (7:30 AM - 8:30 AM)					
Time	Turn	Observed (veh/hr)	Modelled (veh/hr)	Difference (veh)	GEH
7:30	Tōtara- LH	56	65	-9	0.6
7:30	Tōtara - Uh	11	7	4	0.7
7:30	Tōtara - Fergusson	22	19	3	0.3
7:30	LH - Tōtara	12	10	2	0.3
7:30	LH - UH	74	77	-3	0.2
7:30	LH - Fergusson	21	17	4	0.5
7:30	UH - TŌTARA	2	4	-2	0.6
7:30	UH - LH	204	217	-13	0.4
7:30	UH - Fergusson	13	15	-2	0.3
7:30	Fergusson - Tōtara	13	26	-13	1.4
7:30	Fergusson - LH	17	19	-2	0.3
7:30	Fergusson - UH	1	0	1	0.7
7:45	Tōtara- LH	51	55	-4	0.3
7:45	Tōtara - Uh	12	11	1	0.2
7:45	Tōtara - Fergusson	25	30	-5	0.5
7:45	LH - Tōtara	11	8	3	0.5
7:45	LH - UH	72	83	-11	0.6
7:45	LH - Fergusson	19	19	0	0.0
7:45	UH - TŌTARA	8	10	-2	0.3
7:45	UH - LH	185	183	2	0.1
7:45	UH - Fergusson	12	10	2	0.3
7:45	Fergusson - Tōtara	13	6	7	1.2
7:45	Fergusson - LH	17	22	-5	0.6
7:45	Fergusson - UH	2	1	1	0.4
8:00	Tōtara- LH	44	42	2	0.2
8:00	Tōtara - Uh	11	10	1	0.1
8:00	Tōtara - Fergusson	21	28	-7	0.7
8:00	LH - Tōtara	17	17	0	0.0
8:00	LH - UH	82	80	2	0.1
8:00	LH - Fergusson	20	21	-1	0.1
8:00	UH - TŌTARA	7	5	2	0.4
8:00	UH - LH	193	191	2	0.1
8:00	UH - Fergusson	12	8	4	0.7
8:00	Fergusson - Tōtara	20	19	1	0.1
8:00	Fergusson - LH	25	19	6	0.7
8:00	Fergusson - UH	2	2	0	0.0
8:15	Tōtara- LH	50	62	-12	0.8

8:15	Tōtara - Uh	9	9	0	0.0
8:15	Tōtara - Fergusson	18	19	-0	0.0
8:15	LH - Tōtara	25	34	-9	0.8
8:15	LH - UH	106	111	-5	0.2
8:15	LH - Fergusson	27	26	1	0.1
8:15	UH - TōTARA	9	9	0	0.0
8:15	UH - LH	225	213	12	0.4
8:15	UH - Fergusson	14	7	7	1.1
8:15	Fergusson - Tōtara	15	15	0	0.0
8:15	Fergusson - LH	20	20	0	0.0
8:15	Fergusson - UH	2	1	1	0.4

PM Peak (4:30PM - 5:30PM)					
Time	Turn	Observed (veh/hr)	Modelled (veh/hr)	Difference (veh/hr)	GEH
4:30	Tōtara - LH	28	14	14	1.5
4:30	Tōtara - Uh	28	24	4	0.4
4:30	Tōtara - Fergusson	6	4	2	0.4
4:30	LH - Tōtara	63	62	1	0.1
4:30	LH - UH	189	194	-5	0.2
4:30	LH - Fergusson	36	34	2	0.2
4:30	UH - TōTARA	8	2	6	1.3
4:30	UH - LH	135	133	2	0.1
4:30	UH - Fergusson	9	1	8	1.7
4:30	Fergusson - Tōtara	31	25	6	0.6
4:30	Fergusson - LH	56	53	3	0.2
4:30	Fergusson - UH	16	15	1	0.1
4:45	Tōtara - LH	24	22	2	0.2
4:45	Tōtara - Uh	24	21	3	0.3
4:45	Tōtara - Fergusson	6	4	2	0.3
4:45	LH - Tōtara	55	45	10	0.7
4:45	LH - UH	183	184	-1	0.0
4:45	LH - Fergusson	24	20	4	0.4
4:45	UH - TōTARA	13	11	2	0.3
4:45	UH - LH	141	130	11	0.5
4:45	UH - Fergusson	9	9	0	0.0
4:45	Fergusson - Tōtara	32	41	-9	0.8
4:45	Fergusson - LH	56	50	6	0.4
4:45	Fergusson - UH	10	11	-1	0.2
5:00	Tōtara - LH	31	31	0	0.0
5:00	Tōtara - Uh	31	22	9	0.9

5:00	Tōtara - Fergusson	9	15	-6	0.8
5:00	LH - Tōtara	51	61	-10	0.7
5:00	LH - UH	204	192	12	0.4
5:00	LH - Fergusson	42	36	6	0.5
5:00	UH - TōTARA	21	24	-3	0.3
5:00	UH - LH	90	100	-10	0.5
5:00	UH - Fergusson	6	8	-2	0.4
5:00	Fergusson - Tōtara	26	22	4	0.4
5:00	Fergusson - LH	46	54	-8	0.6
5:00	Fergusson - UH	16	10	6	0.8
5:15	Tōtara- LH	30	35	-5	0.4
5:15	Tōtara - Uh	30	39	-9	0.8
5:15	Tōtara - Fergusson	8	7	1	0.2
5:15	LH - Tōtara	65	62	3	0.2
5:15	LH - UH	177	192	-15	0.6
5:15	LH - Fergusson	26	32	-6	0.6
5:15	UH - TōTARA	7	6	1	0.2
5:15	UH - LH	126	122	4	0.2
5:15	UH - Fergusson	8	7	1	0.2
5:15	Fergusson - Tōtara	30	30	0	0.0
5:15	Fergusson - LH	52	45	7	0.5
5:15	Fergusson - UH	27	29	-2	0.2

Weekend Data Saturday (11:30 AM – 12:30 PM)

Time	Turn	Observed (veh/hr)	Modelled (veh/hr)	Difference (veh/hr)	GEH
11:45	Fergusson - LH	38	39	-1	0.2
12:00	Fergusson - LH	34	32	2	0.3
12:15	Fergusson - LH	35	38	-3	0.4
12:30	Fergusson - LH	41	51	-10	1.5
11:45	Fergusson - Tōtara	30	37	-7	1.2
12:00	Fergusson - Tōtara	26	31	-5	1.0
12:15	Fergusson - Tōtara	28	31	-3	0.5
12:30	Fergusson - Tōtara	32	21	11	2.1
11:45	Fergusson - UH	6	11	-5	1.7
12:00	Fergusson - UH	8	13	-5	1.5
12:15	Fergusson - UH	8	8	0	0.0
12:30	Fergusson - UH	7	5	2	0.8
11:45	LH - Fergusson	20	21	-1	0.2
12:00	LH - Fergusson	21	16	5	1.1
12:15	LH - Fergusson	30	38	-8	1.4
12:30	LH - Fergusson	20	26	-6	1.2

11:45	LH - Tōtara	33	33	0	0.0
12:00	LH - Tōtara	28	31	-3	0.5
12:15	LH - Tōtara	39	37	2	0.3
12:30	LH - Tōtara	37	32	5	0.8
11:45	LH - UH	145	168	-23	1.8
12:00	LH - UH	174	205	-31	2.2
12:15	LH - UH	190	198	-8	0.6
12:30	LH - UH	148	164	-16	1.3
11:45	Tōtara - Fergusson	16	13	3	0.8
12:00	Tōtara - Fergusson	23	23	0	0.0
12:15	Tōtara - Fergusson	15	15	0	0.0
12:30	Tōtara - Fergusson	19	26	-7	1.5
11:45	Tōtara - LH	8	10	-2	0.5
12:00	Tōtara - LH	11	11	0	0.0
12:15	Tōtara - LH	7	15	-8	2.2
12:30	Tōtara - LH	9	6	3	0.9
11:45	Tōtara - UH	28	28	0	0.0
12:00	Tōtara - UH	31	33	-2	0.3
12:15	Tōtara - UH	26	31	-5	0.9
12:30	Tōtara - UH	29	40	-11	1.8
11:45	UH - Fergusson	8	6	2	0.7
12:00	UH - Fergusson	9	7	2	0.7
12:15	UH - Fergusson	9	10	-1	0.3
12:30	UH - Fergusson	10	8	2	0.6
11:45	UH - LH	122	136	-14	1.2
12:00	UH - LH	138	134	4	0.3
12:15	UH - LH	133	168	-35	2.7
12:30	UH - LH	161	176	-15	1.2
11:45	UH - TŌTARA	5	0	5	2.2
12:00	UH - TŌTARA	7	6	1	0.4
12:15	UH - TŌTARA	9	15	-6	1.6
12:30	UH - TŌTARA	7	4	3	1.2

Appendix C – Traffic Impact Assessment Tōtara Park V2.1

Caveats and Limitation:

The Traffic Impact Assessment Report – Totara Park Fast Track v2.0 supersedes the findings and conclusions presented in the Appendix C- Traffic Impact Assessment – Totara Park v2.1.

The Appendix C- Traffic Impact Assessment – Totara Park v2.1 should be used only as a reference document for background information, including the model development methodology, consent history, and project details submitted during the resource consent stage.

The findings, conclusions, and recommendations presented in the Traffic Impact Assessment Report – Totara Park Fast Track v2.0 are based on the latest assessment, which incorporates updated dwelling numbers, further technical review, feedback and advice received from WTOC, and additional information requested during the review process. Information considered no longer relevant to the proposed development has also been removed.

Appendix D – Construction Vehicle Tracking