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Western Bay of Plenty District Council
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4 August 2023

Attention: Raj Sumeran

Dear Raj,

Omokoroa Roundabout Performance Metrics and Development Thresholds

This memo has been prepared to define a threshold for development of Household Equivalent Units (HEUs) within Stage 3 of the Omokoroa Peninsula Structure Plan relative to the performance of the SH2 / Omokoroa Roundabout. The memo builds upon the findings of the *Omokoroa Stage 3 Modelling Update – Summary Memo*, prepared by Beca in April 2023.

Previous Summary Memo Findings

The previous memo assessed the Omokoroa Stage 3 Structure Plan (dated July 2022), which included the following:

- 5,145 dwellings/HEUs
- 25.80 ha of Industrial Development
- 5.87 ha of Commercial development, and
- 8.3 ha School.

This stage was expected to result in a population of approximately 12,348 by 2048, over a 20 year period from 2028 onwards. This land use was incorporated into the regional strategic transport model (TTSM) and the traffic volumes forecast by the model were applied to the SH2 / Omokoroa Interim Roundabout to determine indicative performance for the 2031, 2038 & 2048 design years. In summary the performance was as follows:

- 2031, Both AM and PM peak performance is expected to result in an Intersection Level of Service of A, with individual movements ranging from LOS A-C, with minimal delays and queuing of less than 40m (approximately 7 vehicles).
- 2038, Both AM and PM peak performance is expected to result in an intersection Level of Service of B, with individual movements also ranging from LOS A-C, however delays increase by approximately 50% to ~12s per vehicle, and queues doubling to Approximately 80m (or 14 vehicles).
- By 2048, AM and PM peak performance is expected to result in an intersection Level of Service of E-F. This indicates there is insufficient capacity at the SH2 / Omokoroa Road interim Roundabout to

accommodate the full development scenario listed above, with queues of up to 1.3km, delays of almost 3 minutes. The key movements affected (with an LOS F) include:

- Omokoroa Road (eastern) Approach (both left & right) AM Peak
- SH2 (Northern) Approach (through) both peaks & left in the PM Peak
- SH2 (Southern) Approach (right) PM Peak

The summary memo then evaluated an alternative option that considered a revised scenario where a large parcel is now proposed to be developed as a retirement village. The benefits of this are twofold:

- Reduced overall density of development (375 dwellings reduced to 160); and
- Fewer vehicle trips generated from the remaining dwellings, retirement units generate fewer vehicle trips than a standard residential dwelling.

The revised trip generation was then reapplied to the 2048 intersection model which indicates the following:

- AM Peak:
  - Intersection LOS E, queue length of 150m (approximately 25 vehicles), average delays of 55 seconds.
- PM Peak
  - Intersection LOS B, queue length of 110m (approximately 20 vehicles), average delays of 15 seconds.

This performance indicates that under the revised scenario that the intersection is anticipated to effectively be operating close to capacity in the 2048 year. Effectively indicating that there is sufficient capacity within the revised scenario to accommodate the current development plan.

Estimating the Development Threshold

Derived from the above, the SH2/Omokoroa Road Intersection capacity is expected to be somewhere between 4,806 and 5,145 HEUs. For the purposes of this assessment, a retirement village/country club dwelling is expected to be the equivalent of 0.23 HEU, or a reduction from 375 to 37 HEU for this land use. Converting these HEUs to traffic volumes at the SH2 / Omokoroa Road Intersection indicates the following total peak hour intersection volumes (with corresponding intersection performance as noted above):

- 4806 HEU - 3116 AM & 3184 PM
- 5145 HEU – 3491 AM & 3531 PM.

Effectively this indicates that there is 10% more traffic between the two scenarios, from an approx. 7% increase in HEU. When considering the SH2 / Omokoroa Road intersection will reach capacity (in the AM peak) somewhere between this 10% of traffic, a growth scenario has been applied to both the AM and PM to determine the indicative peak hour capacity relative to the estimated HEU.

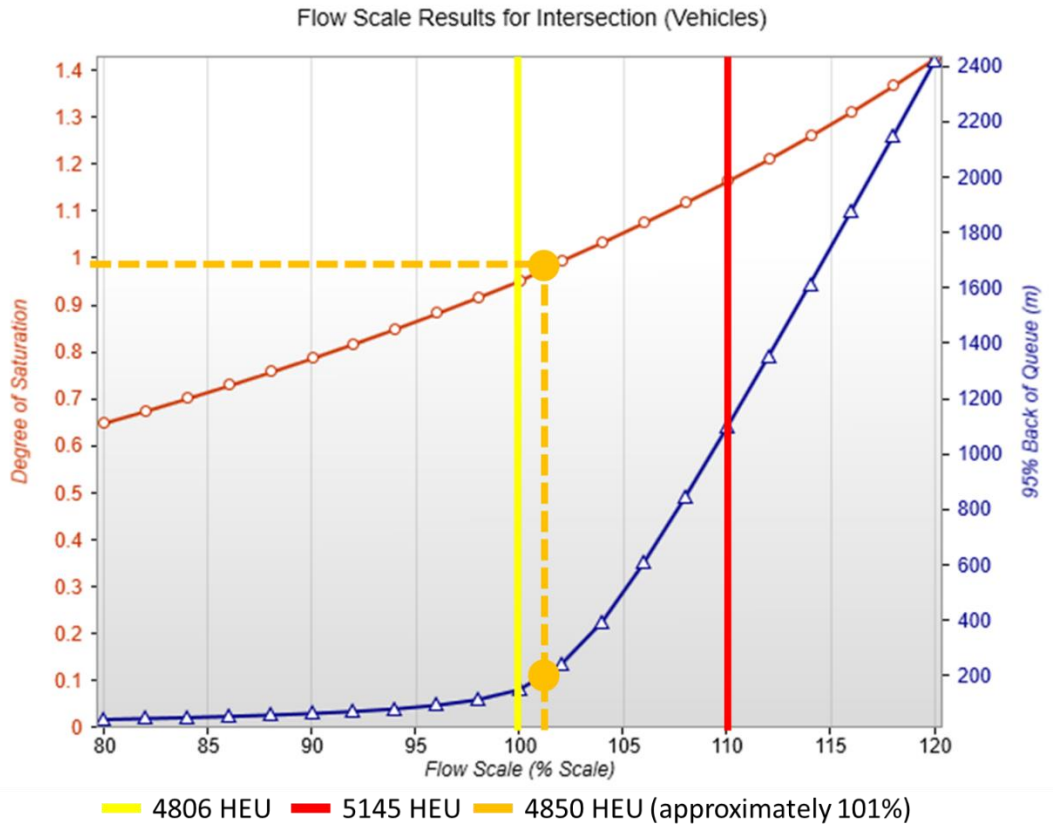

Figure 1: AM Peak Intersection Capacity in HEU

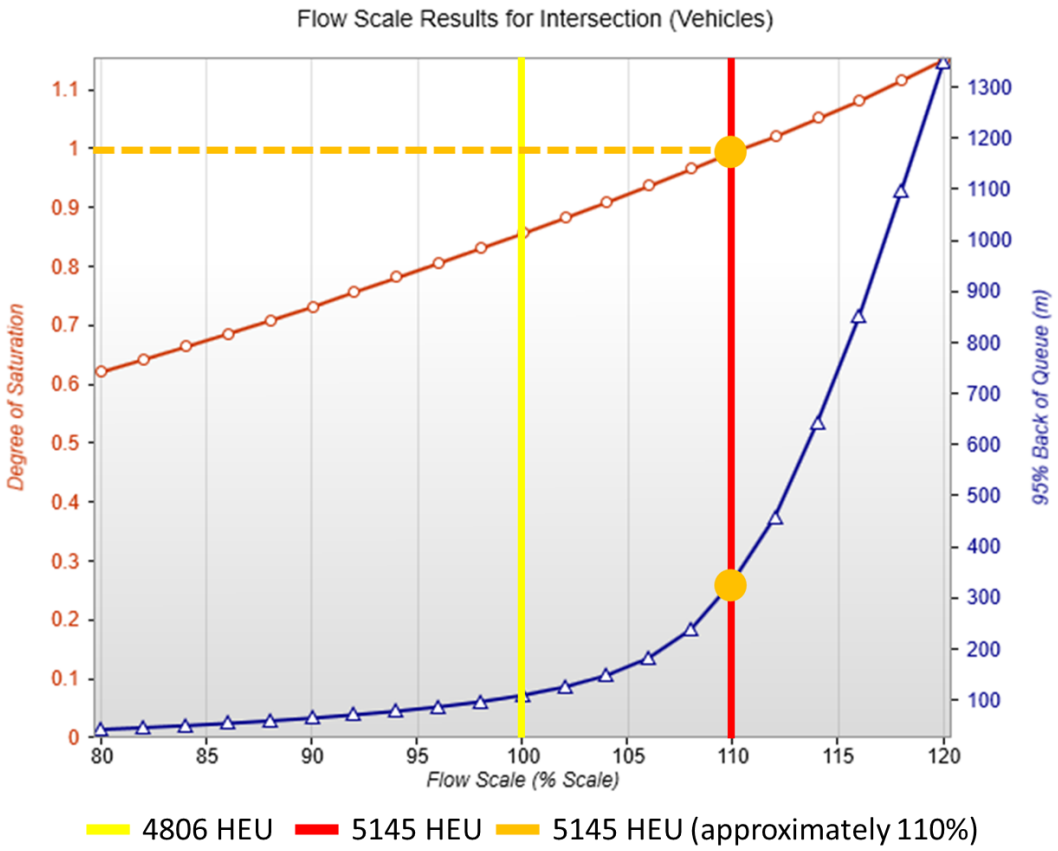

Figure 2: PM Peak Intersection Capacity in HEU

This assessment considers that as the AM peak period reaches capacity prior to the PM peak, this should be the focus when relating to traffic volumes and HEU development.

Essentially, under the growth scenario tested, the SH2 Omokoroa Road Intersection has been modelled to reach capacity (see Attachment A) with 101% traffic growth from the base of 4,806 HEU. As 101% is 10% of the increase in HEU between 4,806 & 5,145, this represents approximately 4,850 HEU. It should be noted that[1]:

- This represents a queue length of less than 300m, which is approximately the distance between Omokoroa Road and Francis Road Roundabouts.
- Level of Service is at the threshold of LOS E (further traffic will exceed the average vehicle delay of 70s per vehicle).

Therefore, our recommendation is that an appropriate intersection performance threshold of Intersection Level of Service E can be correlated to an HEU for Stage 3 of 4,850.

Yours sincerely,

Yours faithfully
Alex Jeffcoat

Associate - Transportation

on behalf of
Beca Limited

CC: Craig Richards, Beca

[1] Note that this assumes the remainder of development remains consistent.

Attachment A – SIDRA Modelled AM Peak at 4850 HEU

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: SH2 South														
2	T1	500	24.2	505	24.2	0.465	7.1	LOS A	3.3	26.3	0.62	0.64	0.62	52.9
3	R2	325	12.3	328	12.3	0.465	10.6	LOS B	3.3	26.3	0.63	0.70	0.63	51.7
3u	U	1	0.0	1	0.0	0.465	12.4	LOS B	3.3	26.3	0.63	0.70	0.63	53.1
Approach		826	19.5	834	19.5	0.465	8.5	LOS A	3.3	26.3	0.62	0.66	0.62	52.4
East: Omokoroa Road														
4	L2	845	9.0	853	9.0	0.967	147.7	LOS F	23.6	175.2	0.96	1.51	2.44	40.8
6	R2	295	4.7	298	4.7	0.967	42.9	LOS D	23.6	175.2	1.00	1.91	3.50	36.5
Approach		1140	7.9	1151	7.9	0.967	120.6	LOS F	23.6	175.2	0.97	1.62	2.71	39.5
North: SH2 North														
7	L2	250	7.3	253	7.3	0.564	7.1	LOS A	4.4	33.9	0.69	0.74	0.74	52.3
8	T1	899	15.0	908	15.0	0.621	78.1	LOS F	5.5	43.8	0.71	0.75	0.78	53.2
9u	U	1	0.0	1	0.0	0.621	13.8	LOS B	5.5	43.8	0.72	0.75	0.79	54.4
Approach		1150	13.3	1162	13.3	0.621	62.6	LOS E	5.5	43.8	0.71	0.75	0.77	53.0
All Vehicles		3116	13.0	3147	13.0	0.967	69.5	LOS E	23.6	175.2	0.78	1.04	1.44	47.0