REPORT

WELLINGTON TRANSPORT ANALYTICS UNIT

Hutt AIMSUN Model: TN1 Data Collection Report

PREPARED FOR HUTT CITY COUNCIL

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1. Introduction

Wellington Transport Analytics Unit (WTAU) were commissioned to undertake an update of the Hutt AIMSUN Model (HAM) on behalf of Hutt City Council (HCC) and the NZ Transport Agency (NZTA). This report details the scope and methodology of the data collection and processing of data used in the model update. The data used for this purpose includes traffic counts, vehicle travel times, and signal phases. The purpose of this exercise is to obtain a set of 'clean' and consistent observed data for model calibration and validation inputs.

1.1 Model Extent and Data Collection Scope

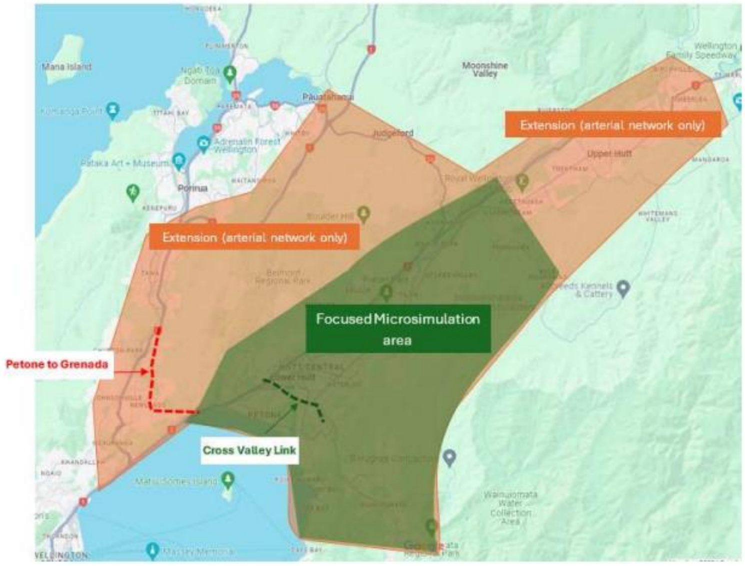

Figure 1: Hutt AIMSUN Model (HAM) proposed model extent

A comprehensive scope for data collection was developed to optimize the use of existing data sources and update where necessary with newly collected data. This scope covered traffic count sites across the model domain, travel time routes for model calibration, and signal phasing data to assist with intersection design.

Figure 1 shows the proposed model extent – a significant extension from the previous Hutt Model – for which observed data was required. The data collected was concentrated in the microsimulation area indicated above, but also covered key links in the extended model domain and entry/exit points for external trips. Data was sourced for the model base year of 2024 where possible, particularly between September 1st and September 27th, 2024 (before the school holidays). In some instances where data from another time period was used this will be noted and justified.

1.2 Definitions and Assumptions

1.2.1 Weekday Averages

Average weekday traffic counts were produced using data from Tuesday to Thursday inclusive where data was available, otherwise one representative weekday was chosen. Public and school holidays were excluded.

1.2.2 Model Time Periods

The observed counts were tabulated over 15-minute periods and split by time period for input into AIMSUN.

HAM is a hybrid AIMSUN model that uses a static layer to determine high level route choice that feeds into the hybrid meso/micro simulation. The modelled time periods for the static and hybrid are outlined in table 1.

Table 1: HAM time period classifications

	Static	Meso/Micro
AM peak	6am to 10am	4hr model 6am to 10am. 15 min time slices
Inter-peak	11 to 1pm	4hr model 10am to 2pm. 15 min time slices
PM peak	3pm to 7pm	4hr model 3pm to 7pm. 15 min time slices

Traffic count data was processed to the 15-minute time slice level and grouped into the 4-hour period for input into the meso/micro layer. Signal phasing data was also summarised at this 4-hour period level. Travel time data was collected at an hourly resolution for the peak hour and preceding hour of each period.

1.2.1 Temporal Variation

Of the data sources used to derive traffic counts, not all were able to be sourced for targeted period of September 2024. This is due to patchy data coverage for some continuous monitoring sites, as well as making use of existing data sources at important locations that were recorded at an earlier date. Of these earlier data sources, date ranges used include September 2023 and March / April 2024.

WTAU has conducted much analysis on traffic volumes in the Wellington Region and it is noted that large-scale, network-wide trends in volumes show minimal change 2023 to 2024. Small levels of growth are outweighed by the daily variation that can be seen anywhere on the network and that is inherent to one-off traffic surveys.

However, where datasets from outside of September 2024 have been used, comparisons were made to Sep 24 data to investigate any effects of yearly, or seasonal variation. For these comparisons, common sites between datasets were chosen to look at the % change in volumes relative to Sep 2024. As a guide, +/- 10% difference at any site can be attributed to daily variation. For larger relative change, the absolute difference was also considered. A 20% increase can look large but if that is due to an absolute increase of 30 vehicles, then it will have a negligible impact on the model. Whereas at a high-volume site (e.g. state highway or core arterial road) with a high absolute difference, longer term trends need to be considered. Comparisons for individual data sources are detailed in section 3 of this report.

2. Traffic Counts Overview

2.1 Data Sources

Observed counts were drawn from a variety of sources including existing data sources as well as a bespoke survey for the model update undertaken by Traffic Engineering and Management (TEAM). All are listed below:

- TEAM Traffic Survey (19/09/2024 – 26/09/2024).
- NZTA: Traffic Monitoring System - state highway counts (March / September 2024).
- AECOM camera counts – undertaken May 2024 for Riverlink.
- Tube / loop count data – provided by territorial authorities (2023).
- SCATS (signal control system) – provided by Wellington Traffic Operations Centre (WTOC) - September 2023.

The order in which these data sources are listed above indicates the priority order in which they were used – i.e. a TEAM Traffic count site was chosen over a SCATS intersection at the same location. This principle is set out here as there are caveats with each data source which must be considered in turn. Caveats are discussed further in section 3 of this report.

Another consideration in the scope of data collection was prioritising counts separated by vehicle class. The TEAM Traffic counts, AECOM counts, some TMS count sites, and tube and loop counts have some vehicle classification ability built into their monitoring systems. These vehicle classifications are grouped into *light vehicles (LV)* and *heavy vehicles (HCV)* for each source for compatibility with AIMSUN.

2.2 Count Sites and Screenlines

A total of 618 link and turn counts were processed in the outlined format. Not all of these counts were used for calibration and validation but were collected with an understanding that some data sources could be unreliable, and it was useful to have back-up data to replace with or check against. A breakdown of these sites by area is shown in table 2.

Table 2: HAM traffic count locations

Area (resolution)	Use	No. Counts
Lower Hutt (micro)	Screenlines	50
	Link counts	338
	Turn counts	115
Upper Hutt (meso)	Link counts	40
	Turn counts	0
Newlands / Tawa (meso)	Link counts	73
	Turn counts	0
SH58 (meso)	Link counts	2
	Turn counts	0
Total	**Total**	**618**

For the micro-simulation area, 50 of the counts (largely from the TEAM survey) were grouped into five screenlines which captured inbound / outbound traffic movements into the Lower Hutt CBD as well as East-West movements across the Hutt Valley. Two further screenlines were added on key state highway links outside the micro-simulation area. All are outlined in figure 1 and detailed in table 3 below.

Figure 2: HAM micro-simulation area screenlines

Table 3: Screenline counts

Area	Screenline	Direction	No. Counts
Lower Hutt	River Screenline	Eastbound	4
		Westbound	4
	Railway	Eastbound	6
		Westbound	6
	Eastern Hills	Eastbound	8
		Westbound	8
	Wainuiomata	Eastbound	2
		Westbound	2
	Fairway Dr / Daysh St	Eastbound	5
		Westbound	5
Other	SH2	Northbound	1
		Southbound	1
	SH58	Eastbound	1
		Westbound	1

3. Traffic Counts - Processing

3.1 General Data Processing Procedure

The processing, formatting, and mapping of the traffic count data was done using Python, Microsoft Excel, and ArcGIS Pro. While the details of scripts differ from source to source, the general process was the same. This included initial processing in python, mapping to the AIMSUN network in GIS and Excel, and using a common python script to configure data for input into AIMSUN.

All datasets were checked and cleaned throughout this process – removing any unwanted or unreliable data. This included a final review of summarized counts in GIS software by a peer reviewer.

3.2 TEAM Traffic Survey

The TEAM survey was conducted in the week of 19th – 26th of September 2024, with 21 cameras and 21 tubes installed to collect link and turn counts. Tube count locations were chosen to cover the screenlines shown in fig. 2 and data was collected for the whole week but filtered to weekday averages during processing. Turn counts were collected using temporarily installed cameras, from which video was processed using specialist software to assign vehicle trajectories and classification. Weekday turn counts were completed on Thursday Sep 19th, this was taken as a representative weekday, and Weekends on Saturday Sep 21st.

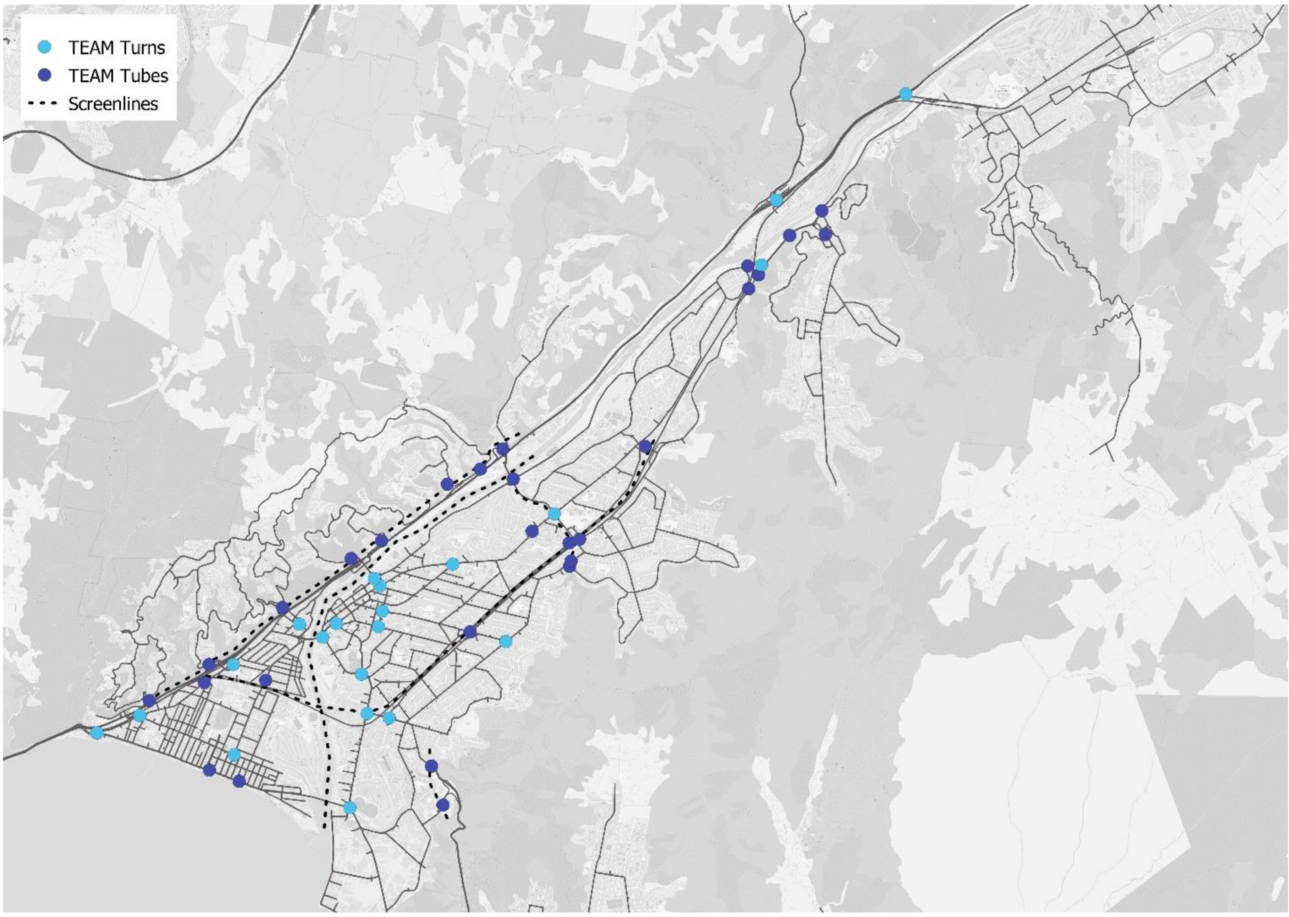

Figure 3: TEAM tube and turn surveyed sites

Tube counts were provided in the standard format which TEAM's usual counts for HCC usage. Initial processing was done using existing WTAU process for this format, and the general processing procedure was followed with no issues.

Camera counts had to be assigned manually to the AIMSUN network with no location data provided. As a lot of count locations were for roundabouts, turns were grouped to approach / exit links for all intersections. Where an individual turn matched a turn in the AIMSUN network, these were assigned (e.g. signalized intersections, slip lanes etc.).

Of the TEAM survey count sites, the only noted data collection issue was for camera count C2 - Hutt Rd - Jackson St intersection. The weekend count here was affected by an accident nearby, and the road was closed for a period. Weekend data was discarded for this site.

3.3 NZTA – Traffic Monitoring System

9 TMS sites were chosen for the HAM model build. NZTA's monitoring system includes a range of loop, telemetry, and tube counters across the state highway network. NZTA provide tracking of count sites and their data collection status to track data issues across the network. This information was used to determine which sites and date ranges to include in the dataset. For the 9 sites used for HAM the aim was to use data from September 2024, however other dates had to be used for certain locations. The relevant TMS counters and their date ranges are displayed in figure 4 and table 4 below.

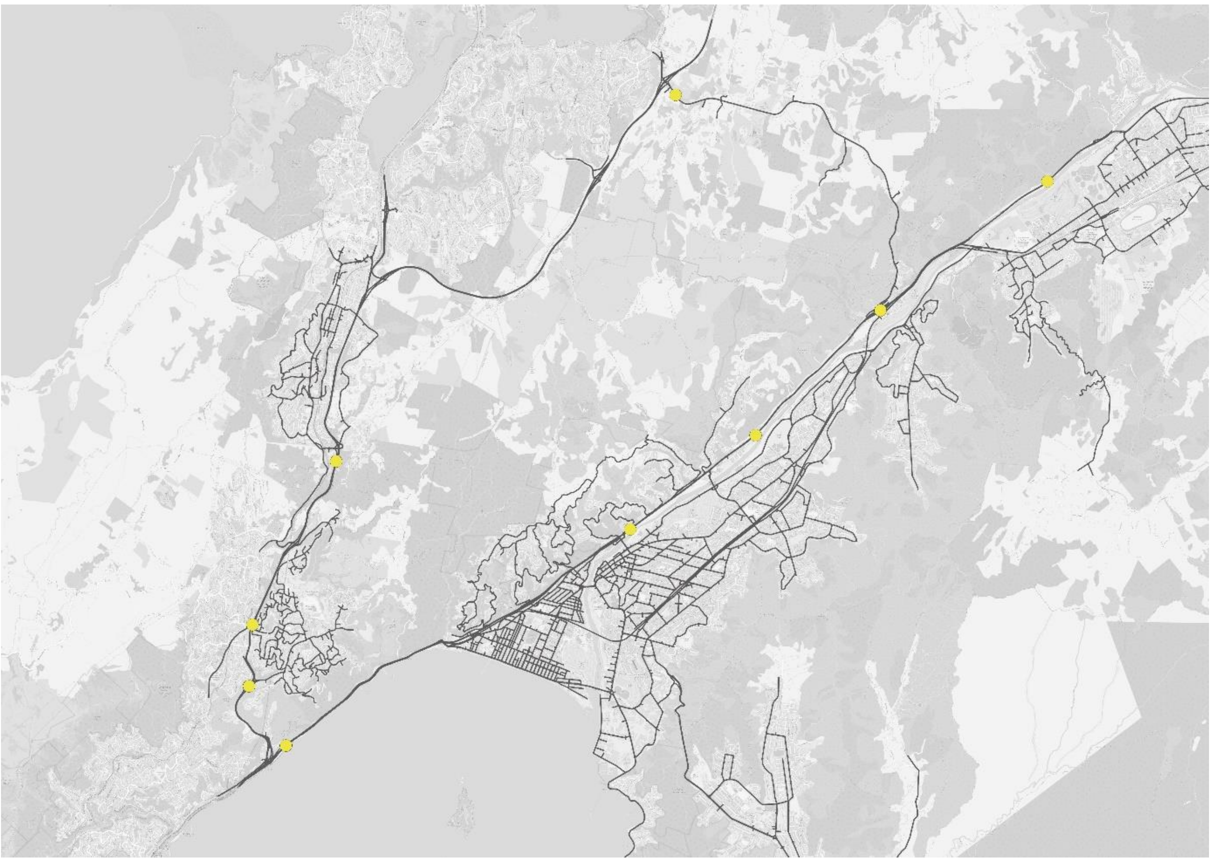

Figure 4: TMS Sites

Table 4: TMS Count Sites

TMS Site	Counter ID	Type	Date Range
Haywards Interchange	NB on ramp from SH58	Dual Loop	01/09 - 15/09
	SB off ramp to SH58	Dual Loop	01/09 - 15/09
	SB on ramp from SH58	Dual Loop	01/09 - 15/09
	Decreasing	Dual Loop	01/09 - 15/09
	Increasing	Dual Loop	Discarded
	NB off ramp to SH58	Dual Loop	Discarded
Kelson	SB Lanes	Telemetric	21/09 - 29/09
	NB Lanes	Telemetric	Discarded
Newlands Interchange	NB Off Ramp	Single Loop	01/03 - 16/03
	SB On Ramp	Single Loop	01/09 - 15/09
	SB Through Traffic	Single Loop	01/09 - 15/09
	NB Through Traffic	Single Loop	Discarded

Nth of Block Rd	Increasing	Single Loop	01/09 - 15/09
	Decreasing	Single Loop	01/09 - 15/09
Nth of Helston Rd Overbridge	NB	Single Loop	01/09 - 15/09
	SB	Single Loop	01/09 - 15/09
Nth of Block Rd	Increasing	Single Loop	01/09 - 15/09
	Decreasing	Single Loop	01/09 - 15/09
Nth of Ngauranga Interchange	NB	Dual Loop	01/03 - 09/03
	NB On Ramp	Single Loop	01/03 - 09/03
	SB	Dual Loop	01/03 - 09/03
	SB Off Ramp	Single Loop	01/03 - 09/03
Pauatahanui East	Increasing	Telemetric	01/09 - 15/09
	Decreasing	Telemetric	01/09 - 15/09
Sth of Craigs Flat	Increasing	Single Loop	01/09 - 15/09
	Decreasing	Single Loop	01/09 - 15/09
Tawa Interchange	NB Through Traffic	Single Loop	01/09 - 15/09
	NB Off Ramp	Single Loop	01/09 - 15/09
	SB On Ramp	Single Loop	01/09 - 15/09
	SB Through Traffic	Single Loop	01/09 - 15/09

Where data was unusable for September, March was chosen as a representative month. For some count sites , no reliable data was available for these dates, so they were discarded. The Haywards Interchange sites included problematic ones, however these were superseded by TEAM count sites at the same location. For the count sites that did use March data, comparisons were made to September counts to justify their usage.

3.3.1 Newlands Interchange

Table 5: Traffic volume link comparison - Newlands IC (Mar-24 v. Sep-24)

Period	Link	Peak Hour Volume		
		Mar-24	Sep-24	% Diff
AM 08:00-09:00	Newlands IC - NB Off Ramp	320		
	Newlands IC - SB On Ramp	792	810	2.2%
	Newlands IC - SB Through	3465	3276	-5.4%
IP 12:00-13:00	Newlands IC - NB Off Ramp	349		
	Newlands IC - SB On Ramp	604	586	-2.9%
	Newlands IC - SB Through	1707	1615	-5.4%
PM 17:00-18:00	Newlands IC - NB Off Ramp	864		
	Newlands IC - SB On Ramp	486	439	-9.6%
	Newlands IC - SB Through	1858	1737	-6.5%

At the Newlands Interchange count site, data from the NB Off Ramp counter was extracted for March 2024 as no September data was available. A comparison between March and September at the southbound counters show small differences in volumes which can be attributed to daily variation.

3.3.2 North of Ngauranga Interchange

Table 6: Traffic volume link comparison - Nth of Ngauranga (Mar-24 v. Sep-24)

Period	Link	Peak Hour Volume

		Mar-24	Sep-24	% Diff
AM 08:00-09:00	Nth of Ngauranga IC - SB Off Ramp	960	933	-2.80%
	Nth of Ngauranga IC - NB On Ramp	1334		
	Nth of Ngauranga IC - NB	2791		
	Nth of Ngauranga IC - SB	3233	3139	-2.90%
IP 12:00-13:00	Nth of Ngauranga IC - SB Off Ramp	1001	963	-3.80%
	Nth of Ngauranga IC - NB On Ramp	1007		
	Nth of Ngauranga IC - NB	2341		
	Nth of Ngauranga IC - SB	2273	2177	-4.30%
PM 17:00-18:00	Nth of Ngauranga IC – SB Off Ramp	1331	1083	-18.60%
	Nth of Ngauranga IC – NB On Ramp	873		
	Nth of Ngauranga IC – NB	2871		
	Nth of Ngauranga IC – SB	3060	2490	-18.60%

At the 'Nth of Ngauranga Interchange' count site, all data was extracted for March 2024 to obtain a consistent dataset. Two of the four counters did have September data available, which was used to validate the March dataset. A comparison between the two months shows negligible differences in the AM and IP but a more significant decrease (March-September) in the PM. This was noted and care will be taken when this observed data is used in model calibration.

3.4 AECOM Counts

Several of the camera counts supplied by AECOM for the Riverlink modelling development were used for HAM calibration and validation. These were at three key intersections on SH2:

- Kennedy Good Bridge – Major Dr – SH2
- Melling-Block Rd-SH2
- Dowse Dr – SH2

The links captured by the AECOM camera counts are shown in figure 5 below.

Figure 5: AECOM section and turn counts

These counts were from a survey conducted from 20/05/2024 – 26/05/2024. To justify their usage in a Sep 2024 based model, they were compared to September counts where possible. These comparisons were against TEAM tube counts (19th – 26th Sep) and TMS counts (1st – 27th Sep).

3.4.1 Kennedy Good Bridge

Table 7: Traffic volume link comparison – Kenney Good Bridge – SH2

Period	Link	Peak Hour Volume			
		AECOM Count	TEAM Count	TMS Count	% Diff
AM 08:00-09:00	Major Dr - Eastbound	273	223		-18.5%
	Major Dr - Westbound	501	470		-6.3%
	SH2 - SB Through	2095		2084	-0.5%
IP 12:00-13:00	Major Dr - Eastbound	164	168		2.2%
	Major Dr - Westbound	139	144		3.8%
	SH2 - SB Through	1145		1176	2.7%
PM 17:00-18:00	Major Dr - Eastbound	398	366		-8.1%
	Major Dr - Westbound	183	204		11.7%
	SH2 - SB Through	1473		1453	-1.3%

At the Kennedy Good Bridge – SH2 intersection, a comparison to September 2024 data shows small increases or decreases in flows on most links – attributable to daily variation. The largest differences here, -18.5% on Major Dr Eastbound (AM) and +11.7% on Major Dr Westbound (PM), account for absolute differences of -50 and +19 vehicles respectively. These can also be attributed to daily variation.

3.4.2 Melling Link

Table 8: Traffic volume link comparison - Melling - SH2

Period	Link	Peak Hour Volume			
		AECOM Count	TEAM Count	TMS Count	% Diff
AM 08:00-09:00	SH2 - NB Through	1198		1182	-1.4%
	Tirohanga Rd - EB	160	170		5.8%
	Melling Link - Eastbound	1068	1187		11.2%
IP 12:00-13:00	SH2 - NB Through	1254		1292	3.0%
	Tirohanga Rd - EB	50	52		2.6%
	Melling Link - Eastbound	765	804		5.1%
PM 17:00-18:00	SH2 - NB Through	2176		2155	-1.0%
	Tirohanga Rd - EB	65	74		14.9%
	Melling Link - Eastbound	895	1070		19.6%

Table 8 displays an April – September comparison for the Melling Link – SH2 intersection. Again here, the minor increases and decreases from April on most links are insignificant. The link that stands out is Melling Link – Eastbound which sees 5% - 20% growth across all periods. This could be an indication of a change in the network more significant than daily variation. This was noted, and the Melling Link counts from this dataset were removed – another data source was available for the two Eastbound and Westbound links.

3.4.3 Dowse Interchange

Table 9: Traffic volume link comparison - Dowse Dr – SH2

Period	Link	Peak Hour Volume

		AECOM Count (Apr 2024)	TEAM Count (Sep 2024)	% Diff
AM 08:00-09:00	Dowse Dr E - Eastbound	1344	1370	1.9%
	Dowse Dr E - Westbound	675	731	8.3%
	Dowse Dr W - Eastbound	514	538	4.6%
	Dowse Dr W - Westbound	190	167	-12.3%
IP 12:00-13:00	Dowse Dr E - Eastbound	760	748	-1.5%
	Dowse Dr E - Westbound	648	672	3.8%
	Dowse Dr W - Eastbound	223	193	-13.5%
	Dowse Dr W - Westbound	223	210	-5.8%
PM 17:00-18:00	Dowse Dr E - Eastbound	931	1084	16.4%
	Dowse Dr E - Westbound	1083	1040	-4.0%
	Dowse Dr W - Eastbound	285	301	5.9%
	Dowse Dr W - Westbound	590	531	-10.1%

An April – September comparison at Dowse Interchange (table 9) shows slightly larger differences than at other sites. However, most of these changes account for relatively small absolute changes in volumes, in the range of 0 – 60 vehicles. Furthermore, these absolute changes include both decreases and increases – meaning that total volumes in and around the intersection are similar between datasets. These results are attributable to daily variation.

3.5 Tube Counts

WTAU are regularly provided with tube counts by various TAs in the Wellington Region and use these counts to maintain the publicly available Traffic Data Portal. Due to a lag between data being collected and received by WTAU, few 2024 counts were available within the HAM model extent. For this reason, some 2023 counts from WCC, HCC, and UHCC were used for model calibration and validation. Additionally, HCC provided loop count data for 2021 from which one site, Fairway Dr – Kennedy Good Bridge, was used. All processed sites are shown in figure below:

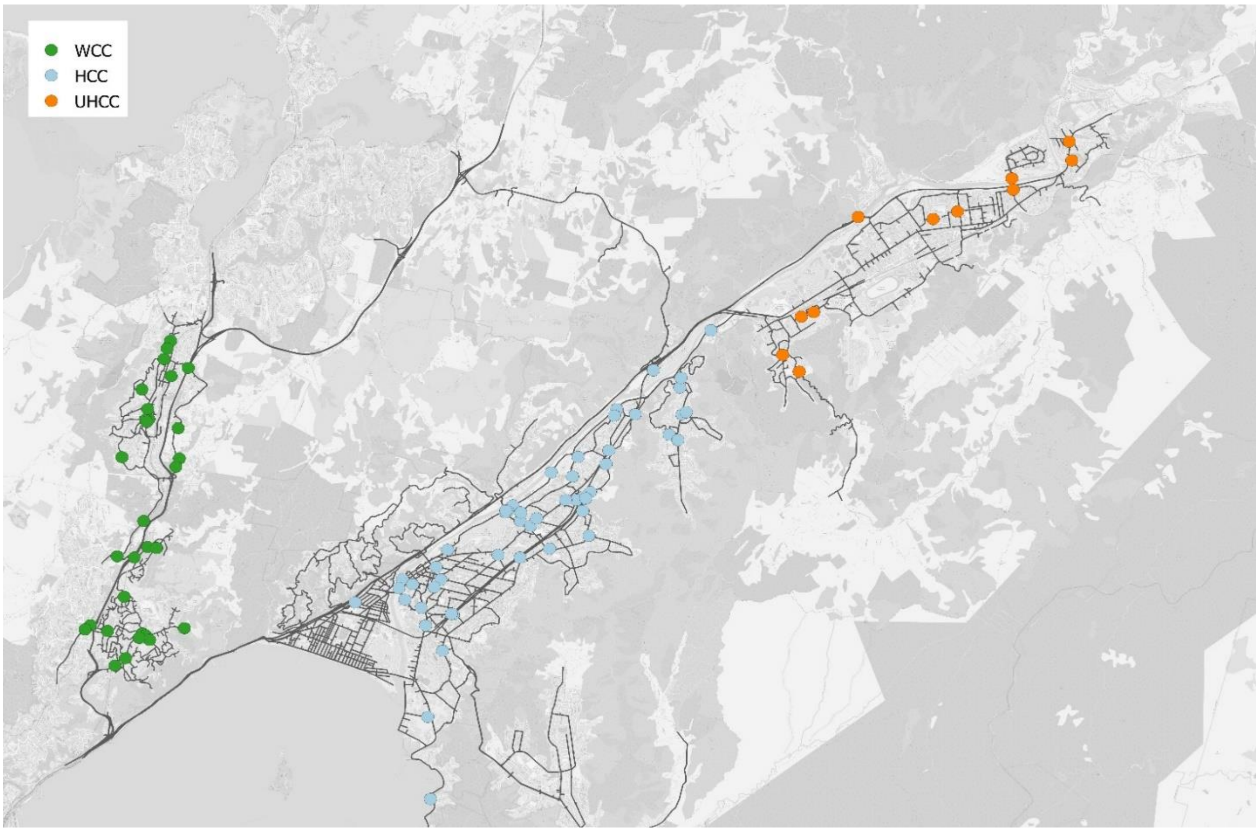

Figure 6: Tube (and loop) count sites provided by TAs

To justify the usage of 2023 data, a comparison to a 2024 dataset was done at several locations to look at the change in traffic over that year.

Table 10: Traffic volume link comparison – Tubes (2023) v. TEAM (2024)

Period	Link	Direction	Peak Hour Volume		
			Tube Count (2023)	TEAM Count (2024)	% Diff
AM 08:00-09:00	Fairway Dr	EB	840	774	-7.8%
		WB	723	707	-2.2%
	High St	NB	275	328	19.1%
		SB	455	443	-2.6%
	Waterloo Rd	EB	366	412	12.7%
		WB	620	628	1.3%
IP 12:00-13:00	Fairway Dr	EB	540	510	-5.6%
		WB	538	529	-1.7%
	High St	NB	395	452	14.4%
		SB	424	418	-1.5%
	Waterloo Rd	EB	363	322	-11.4%
		WB	367	319	-13.0%
PM 17:00-18:00	Fairway Dr	EB	540	627	16.1%
		WB	351	504	43.7%
	High St	NB	436	506	16.1%
		SB	491	427	-13.1%
	Waterloo Rd	EB	676	716	6.0%
		WB	452	471	4.2%

For three sites where 2023 tube count data corresponded to TEAM survey sites, the datasets were compared. This comparison shows that there was no significant network-wide growth or decrease in traffic. On most links in table 10 slight increases are decreases were seen, with the absolute changes falling within +/- 70 on all links except Fairway Dr in the PM. The 43.7% increase on Fairway Dr – WB is noticeably higher, however a difference of 153 trips is still a relatively small difference in comparison to volumes on key links.

3.6 SCATS Counts

Traffic count data was provided by WTOC for 26 intersections and pedestrian signals in Lower Hutt. This dataset covered the period 01/09/2023 – 14/09/2023. One further SCATS site was provided by WCC, that being the Hutt Rd – Jarden Mile intersection. As SCATS data has known issues, 8 of the 27 sites were superseded by either TEAM or AECOM intersection counts. This is detailed in figures 7 and 8 below.

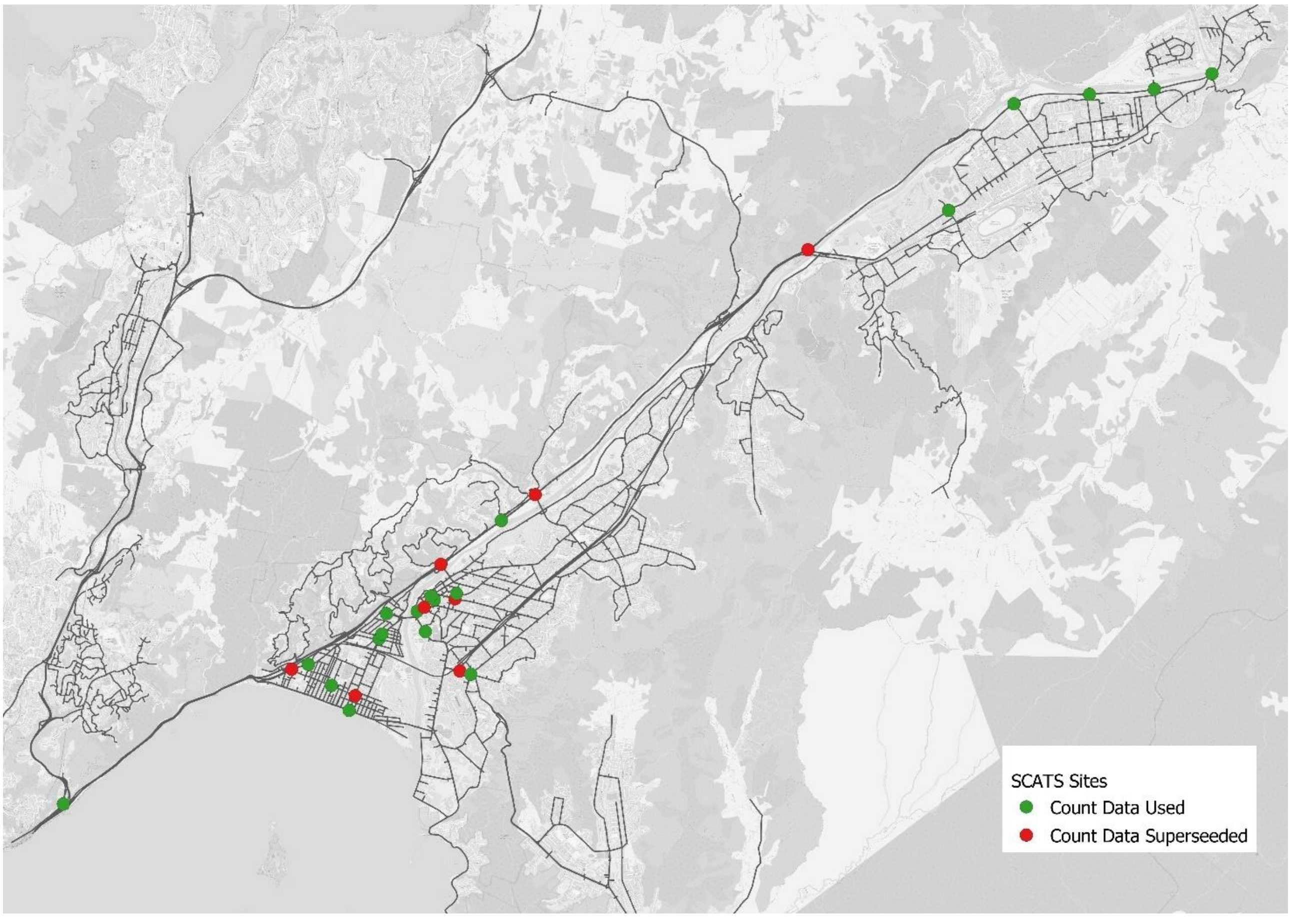

Figure 7: SCATS Sites within HAM model extent

Figure 8: Hutt CBD SCATS sites

3.6.1 Data Cleaning

Volumetric data from SCATS is known for being unreliable at times so care was taken to process and filter the data. These measures included the following:

- SCATS data is provided for one intersection on a detector basis. The primary use of these detectors is to trigger signal phases and detect queue lengths, however they do also collect volumetric data. These detectors are known to undercount for slow moving traffic on links at or near capacity.
- Often two or more SCATS detectors are present in a lane of traffic. To avoid double counting, one detector was mapped to each lane at an intersection, before each lane was mapped to an approach link. The selection of which detector to use was made by looking at the data from each one individually. As they are known for undercounting, the detector with the highest count was chosen.
- Where there was corrupted data for any detector, this was noted and the approach link of which this detector was a part was discarded.
- Manual data checks were made throughout processing.

After these measures were taken, the final SCATS dataset was robust enough to use for calibration and validation but was used with care due to its known issues.

3.6.2 Dataset Comparison

As the supplied SCATS data was for September 2023, a comparison was done to the TEAM survey at certain locations. The advantage here was that both datasets were for September weekdays, eliminating any seasonal variation. The one-year change is displayed in table X below.

Table 11: Traffic volume link comparison - SCATS (2023) v. TEAM (2024)

Period	Link	Direction	Peak Hour Volume: SCATS Count (2023)	Peak Hour Volume: TEAM Count (2024)	Peak Hour Volume: % Diff
AM 08:00-09:00	Laings Rd	EB	53	64	20.8%
		WB	526	523	-0.6%
	Cambridge Tce	NB	345	364	5.7%
		SB	390	380	-2.5%
	Queens Dr	NB	662	662	-0.1%
		SB	188	178	-5.1%
IP 12:00-13:00	Laings Rd	EB	84	70	-16.8%
		WB	354	368	4.0%
	Cambridge Tce	NB	89	101	14.1%
		SB	248	240	-3.1%
	Queens Dr	NB	551	586	6.4%
		SB	352	367	4.4%
PM 17:00-18:00	Laings Rd	EB	114	109	-4.2%
		WB	418	424	1.6%
	Cambridge Tce	NB	193	173	-10.4%
		SB	317	315	-0.6%
	Queens Dr	NB	716	806	12.5%
		SB	357	384	7.7%

As in comparisons above the yearly change in traffic volumes show not significant growth or reduction. For the three sites shown here, the % differences are generally small and split evenly between positive and negative. This indicates that the differences exhibited are likely due to random, daily variation. There are several instances of > +/-10% change, however these account for low absolute change (<90 vehicles) and thus will not have a significant impact on model calibration.

4. Observed Travel Times

4.1 Travel Time Routes

Vehicle travel time data was obtained from TomTom Traffic Stats for September 2024 over 11 routes. These are displayed in figure 5 below:

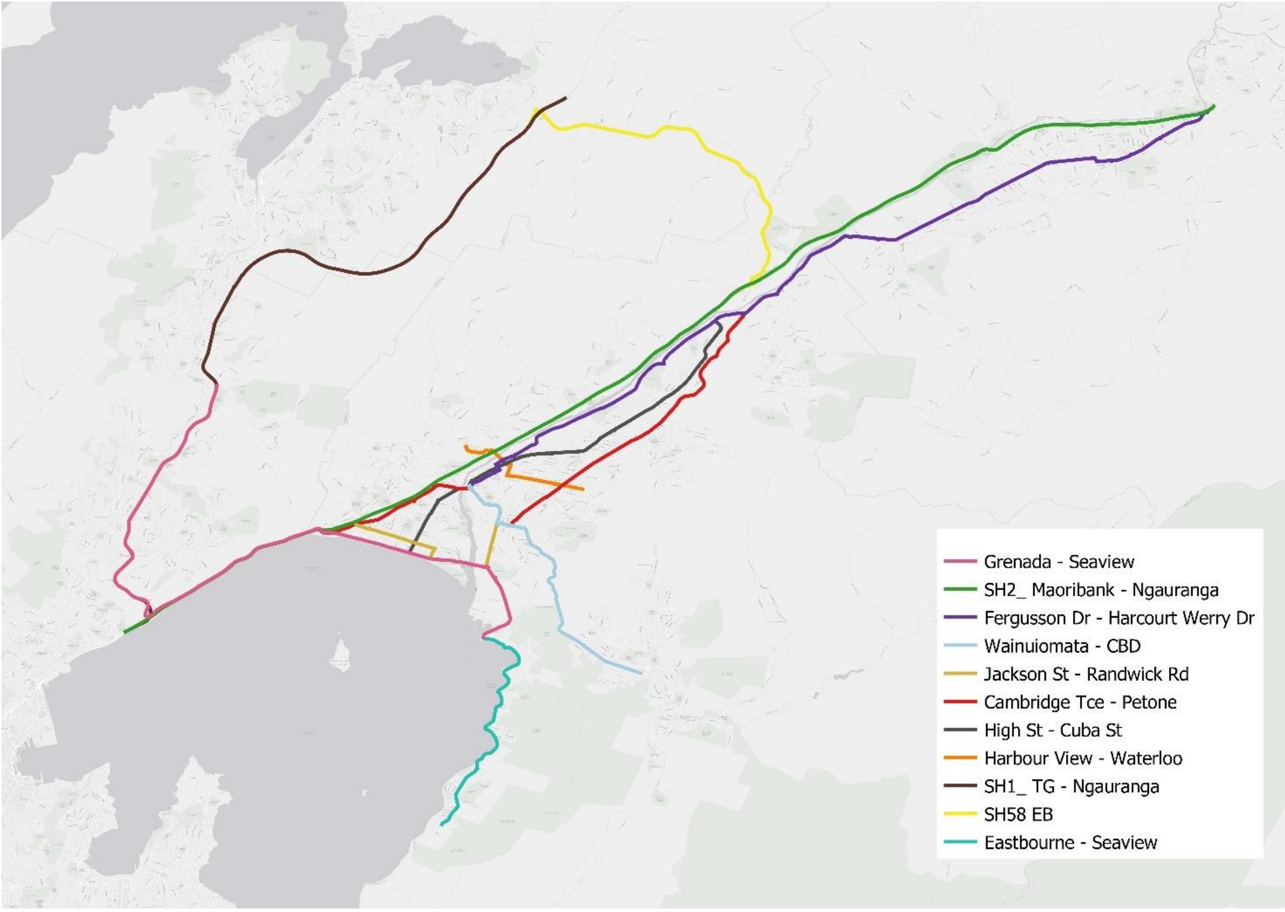

Figure 9: HAM Travel Time Routes

4.2 Data Format and Extraction

Data was extracted hourly and averaged over the time period 17/09/2024 – 19/09/2024 (Tuesday – Thursday) to determine weekday averages. Peak hour and preceding hour travel times were collected for each period over the three days. These hours are defined in table 11

Table 12: Travel time collected hours by period.

Period	Peak Hour	Preceding Hour
AM	08:00 - 09:00	07:00 - 08:00
IP	12:00 - 13:00	11:00 - 12:00
PM	17:00 - 18:00	16:00 - 17:00

After initial testing, it was determined to extract data with TomTom's 'full traversal' setting turned off. This format follows the precedent set by other AIMSUN models developed for the region, such as the Porirua Transport Model, and it gives the data some characteristics that must be kept in mind:

- The data does not represent an actual sample of trips from beginning to end of a route, but rather an aggregate of all trips collected over each segment of the route. This allows for a sufficient sample size on each route segment and corresponds to the methodology used to extract travel times from AIMSUN.
- The output dataset supplies a mean travel time and speed, along with a 5th – 95th percentile range on each segment. From this the mean, median, 15th percentile, and 85th percentile travel time and speed were collected. Due to the aggregated nature of the data, the 85th percentile travel time tends to be higher than it would be from a traditional trip survey. This is because it represents a trip that experienced the slowest times on every single segment (including signal delays, right turns etc). Thus, the 15th – 85th percentile range is large and should be considered when using the data for validation. However, this methodology (aggregated rather than actual trips) can be mirrored in AIMSUN so comparisons between the two are valid.
- Travel time percentiles are not supplied for each segment – rather speeds are. These percentile speeds were converted to times using the formula $time = distance/velocity$. Note that reverses the percentiles, i.e. the 15th percentile speed is the 85th percentile time.

4.3 Dataset Summary

A summary of the observed travel time data is shown in table 12.

Table 13: HAM Travel Times Routes - Summary Data

Route	Direction	Distance (km)	Median Travel Time (min)					
			7:00-8:00	8:00-9:00	11:00-12:00	12:00-13:00	16:00-17:00	17:00-18:00
Grenada - Seaview	EB	19.2	24.1	27.3	18.0	18.1	21.3	20.2
	WB	19.2	23.9	28.5	17.5	17.5	21.1	22.1
SH2: Maoribank - Ngauranga	SB	29.6	32.3	29.6	21.3	21.4	22.4	23.0
	NB	29.6	20.5	21.3	20.7	20.6	29.0	29.6
Fergusson Dr - Harcourt Werry Dr	SB	21.2	27.2	28.9	27.8	27.5	28.4	28.0
	NB	21.1	26.4	28.0	27.3	27.5	32.6	30.2
Wainuiomata - CBD	WB	7.9	10.1	12.9	10.0	9.9	10.1	9.9
	EB	7.8	9.4	10.7	10.3	10.3	10.9	10.7
Jackson St - Randwick Rd	EB	4.8	7.5	8.2	8.6	9.0	8.7	8.7
	WB	4.9	8.4	8.8	8.8	9.3	8.7	8.6
Cambridge Tce - Petone	SB	14.1	20.7	27.5	20.0	20.2	20.1	20.0
	NB	14.0	18.6	20.0	19.3	19.3	20.1	19.6
High St - Cuba St	SB	10.7	16.1	18.8	17.6	17.3	17.5	17.7
	NB	10.7	15.7	17.1	17.2	17.2	18.2	17.5
Harbour View - Waterloo	EB	3.4	5.5	6.5	7.1	6.8	6.5	7.3
	WB	3.5	6.9	6.8	7.1	7.0	6.4	6.2
SH1: TG - Ngauranga	SB	22.4	24.2	26.4	14.5	14.4	14.4	14.4
	NB	22.4	14.1	14.3	14.3	14.3	16.9	17.8
SH58 EB	EB	10.4	10.7	10.4	10.0	10.0	10.4	10.2
	WB	10.1	9.1	9.4	9.1	9.1	9.3	9.3
Eastbourne - Seaview	NB	7.0	9.8	11.2	10.9	10.9	9.7	9.8
	SB	7.0	10.8	11.7	11.1	10.6	9.6	9.6

5. Signal Phases

WTOC provided the phase history, alongside traffic volumes, for all 26 signalized intersections within the model extent for the period 01/09/2023 – 14/09/2023. WCC also provided phase history data for SCATS site Hutt Rd – Jarden Mile. The extracted data included daily signal operation files which capture the actual operation of the signals – the start and end timestamp of each phase throughout the day and its duration. Intersection schema were also provided so that these phases could be mapped to real movements.

Site 6801 – Queens Dr PedX was removed due to data corruption.

For the purpose of model calibration, signal summaries were produced for each intersection for a representative weekday – Thursday 12th of September. This summary format was designed to contain all the data needed to code the intersections in AIMSUN. An example is shown in the tables below:

Table 14: Signal phase summary for SCATS site Woburn Rd PedX

Site ID	Phase	Period	Total Duration (s)	Mean Duration (s)	Calls	Period Duration (%)
6824	<A>	AM	10005	130	77	89%
6824	B	AM	1228	16	77	11%
6824	<A>	IP	12836	138	93	90%
6824	B	IP	1492	16	93	10%
6824	<A>	PM	16984	283	60	94%
6824	B	PM	1116	19	60	6%

Table 13 displays the summarised format used at a simple, two-phase intersection. Here the duration of all instances of phase A or phase B were totalled for a period (AM, IP, PM) and used to calculate the percentage of time they were called in that period. This could then be used in tandem with table 14 to determine the phase timings in an average cycle.

Table 15: Cycle summary for Woburn Rd PedX

Period	Total Cycles	Mean Cycle Time (s)
AM	77	146
IP	93	154
PM	60	302

6. Conclusion

The Hutt AIMSUN Model update used a range of data sources for calibration and validation, covering traffic counts, travel times, and signal phases. Datasets were sourced from a variety of providers, focussing on coverage of the base model period of September 2024. While some datasets were not available for this time period, these were compared to Sep 2024 data to validate their use in model calibration. Cleaning and filtering of the data occurred throughout the processing, and finalised datasets were reviewed before input into AIMSUN. Data sources are summarised in table 16 below:

Table 16: HAM Data Collection Summary

Data Type	Source	Dataset	No. Counts
Traffic Count	TEAM Traffic	Tube Counts	21
		Camera Counts	21
	TMS (NZTA)	Highway Counts	9
	AECOM (Riverlink)	Camera Counts	3
	HCC	Tubes + Loops	50
	WCC	Tube Counts	30
	UHHC	Tube Counts	11
	WTOC	SCATS Counts	26
	WCC	SCATS Counts	1
Travel Time Routes	TomTom Traffic Stats	Segment times	11
Signal Phases	SCATS (WTOC)	Phase History	25
	SCATS (WCC)	Phase History	1