



Technical Note

Subject: Bus Stop Capacity Field Observations

Project: Bus Reference Case

Our file: NZ2026

Date: 3 December 2015

Status: Draft for Discussion

Prepared
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1. Methodology

To test the calculations in the *Capacity Calculations* Technical Note, field observations have been carried out at various CBD bus stops. The stops in question were selected to present a variety of types of stop operations, covering size of stops, mix and quantity of services, and including both inbound and outbound stops. The observations were all carried out on the evening of Monday, November 30. Stops were filmed with a GoPro camera for periods of 15 to 25 minutes during the evening peak period.

All buses that frequented the stop were counted, and buses were counted as being in the stop if they were either parked in the stop, or attempting to leave or depart the stop, but were blocked by other buses or vehicles. This way both the volume of buses using the stop, and how often the demand exceeded stop capacity could be counted.

The surveyed stop locations are outlined in Table 1

Table 1: Surveyed stop locations

Stop description	Primary direction of service	Time of recording
7145 - 3 Symonds St	Inbound/Northbound	4.50pm
7099 – Victoria St West opp Skytower	Outbound/Eastbound	5.20pm
1088 – Wellesley St opp Albion	Outbound/Westbound	6.00pm

2. Stop Observations

2.1. Observation Summary

The following table sets out the number of buses observed to be using the stop during the survey period. Based on the length of the survey, an estimation has been made to the number of buses using the stop per hour in the PM peak. This number is then used to ground-truth the stop capacity memo and examine the extent of the impact of different factors influencing stop capacity.



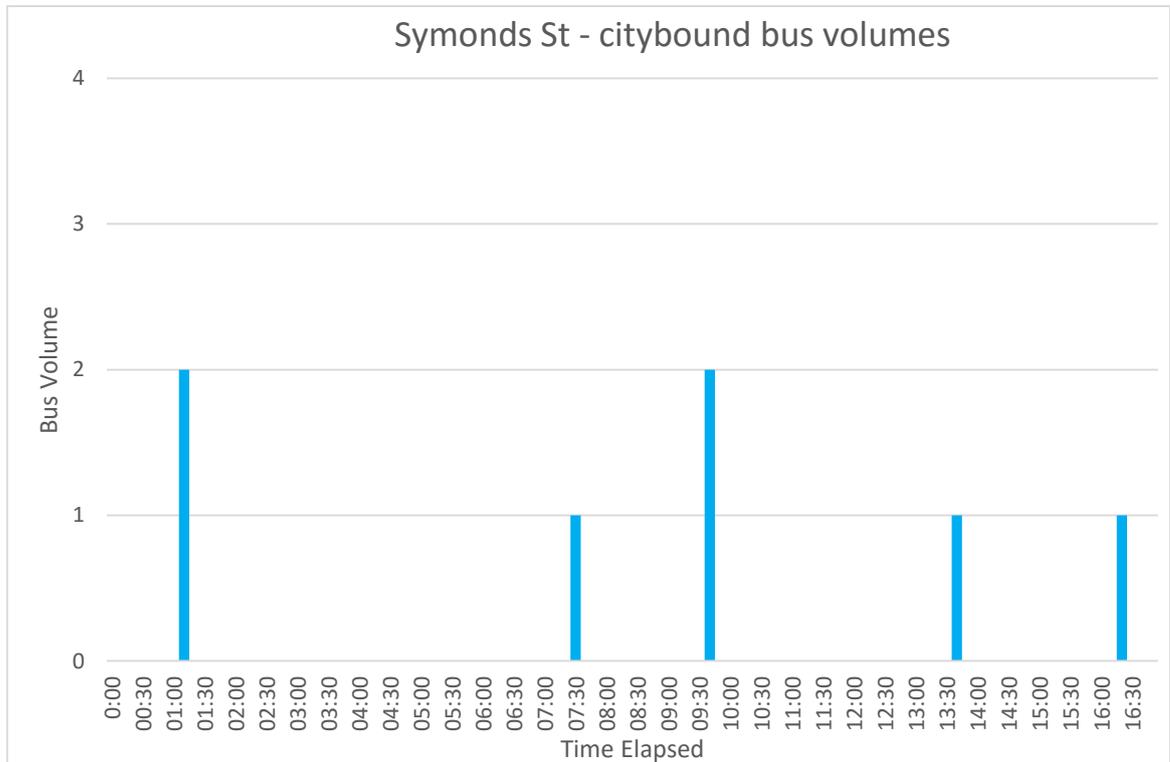
Table 2: Bus stop survey summary

Stop description	Buses Observed Stopping	Time spent recording	Buses per hour
7145 - 3 Symonds St	7	17 minutes	24
7099 – Victoria St West opp Skytower	14	25 minutes	34
1088 – Wellesley St opp Albion	12	15 minutes	48

2.2. 7145 – 3 Symonds Street

In the afternoon peak this bus stop primarily handles inbound services (coming from the East, South and Mt Eden) that terminate in the Britomart area, but also handles several North Shore outbound services such as the 881. The bus stop is 40 metres long, and is designed to handle 2 buses stopped at the same time.

Figure 1: Bus stop utilisation 3 Symonds St (number of buses stopped at the stop)

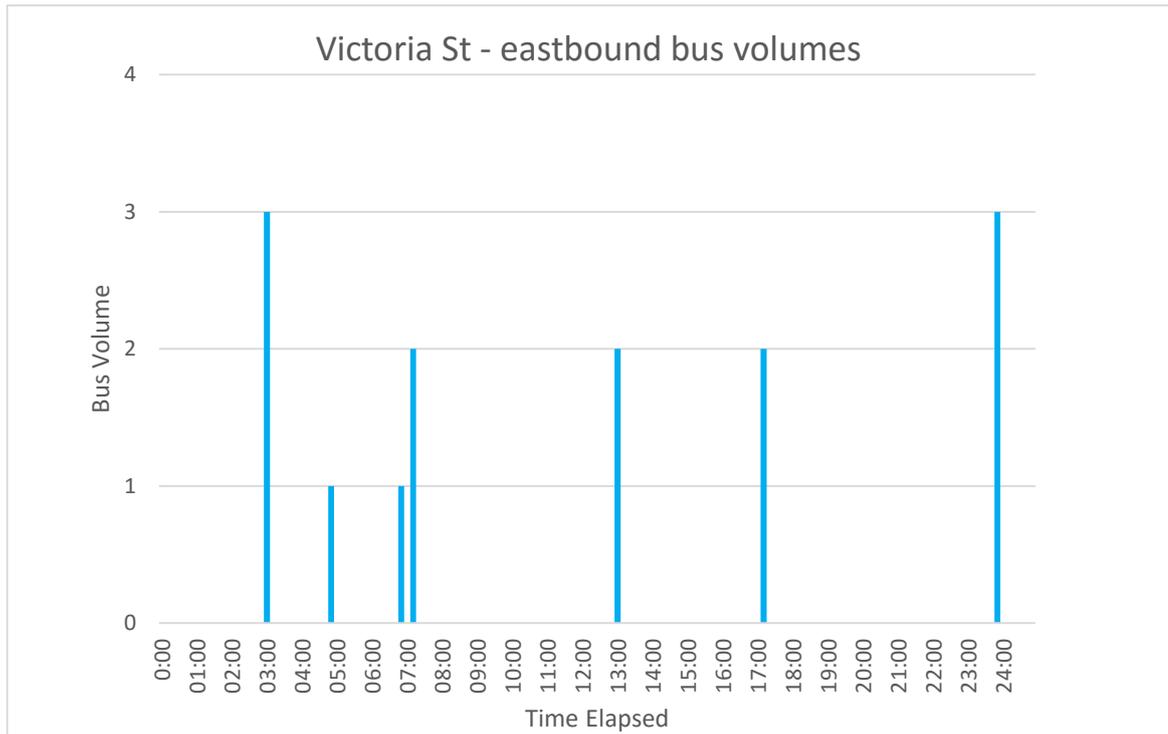


A total of 7 buses were noted to have stopped in the 17 minute period filmed, and no more than 2 at the same time. This equates to 24 over the period of an hour. Therefore this double stop is adequate to handle the buses that stop over the course of an hour. As this stop is primarily used by inbound services, departure timetabling plays less role in the arrival patterns compared at other stops, and these arrivals are more determined by signal phasing along Symonds Street.

2.3. 7099 – Victoria Street West (opposite Sky Tower)

Stop 7099 is located on Victoria Street West, opposite the Sky Tower. In the afternoon peak this bus stop is the second stop for services departing the CBD, bound for New North Road and Sandringham Road, as well as handling Britomart bound Inner Link services. The bus stop is 25 metres long, and designed to handle 1 bus stopped at any time.

Figure 2: Bus stop utilisation Victoria St West (number of buses stopped at the stop)



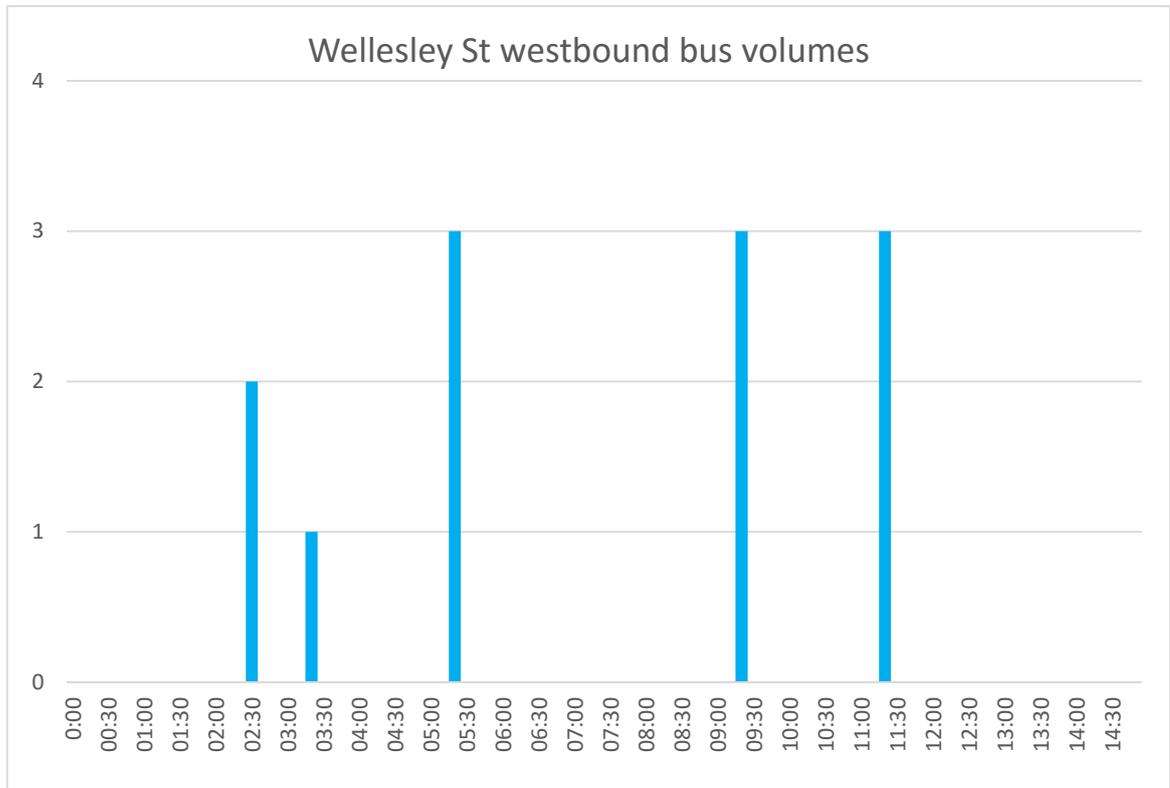
A total of 14 buses were noted to have stopped in the 24 minute period filmed, and no more than 3 at the same time. This equates to 34 buses over the course of an hour. The volumes observed would need a triple stop to handle these buses adequately due to long gaps where no buses arrived, then 2 or 3 buses would arrive at once.

This stop is primarily used by outbound services, and is the second stop in the route, timetabling of departures plays a significant role in determining the capacity of the stop. A check of the published timetable shows that New North Road and Sandringham Road buses often depart at 5 minute intervals, at 5,10,15 etc minutes past the hour. This causes more bunching than would otherwise be the case if the buses were spread more evenly.

2.4. 1088 – Wellesley Street opposite Albion

In the afternoon peak this bus stop is the third stop for North Shore services departing the CBD via Wellesley Street. It also handles Ponsonby-bound Outer Link services, and New North Road and Sandringham Road services that terminate at the next stop. The bus stop is 15 metres long, and designed to handle 1 bus stopped at any time.

Figure 3: Bus stop utilisation Wellesley St (number of buses stopped at the stop)



A total of 12 buses were noted to have stopped in the 15 minute period observed, and no more than 3 at the same time. This equates to 48 buses of the course of an hour. The volumes observed would need a triple stop to handle these buses adequately.

This stop is primarily used by outbound services, and is the third stop in the route, timetabling of departures plays a significant role in determining the capacity of the stop. A check of the published timetable shows that North Shore buses often depart at 5 minute intervals, at 5,10,15 etc minutes past the hour. This causes more bunching than would otherwise be expected if the buses are spread more evenly. In this instance however, signal phasing also plays a significant role. These buses all pass through the Queen and Wellesley Street intersection which has a 2 minute 30 second cycle time, and then through Hobson and Wellesley Street intersection, which has a 2 minute cycle time. This effectively meters the buses so they pass through bus stops together.



3. Discussion

These field observations compare well to Table 1 in the *Capacity Calculations* Technical Note (included below).

Table 3: Impact of signal cycle time on bus stop capacity

Number of loading areas per stop per direction	Maximum corridor volume (Buses per hour per direction)		
	90 seconds	120 seconds	180 seconds
1	21	16	10
2	45	33	22
3	71	53	35
4	98	74	49
5	127	95	63
6	157	118	78
7	188	141	94
8	219	164	109
9	251	188	125
10	283	212	141

The Symonds Street stop handles the volume of 24 buses per hour well in the double stop provided, with no spill-overs seen in the time observed.

Number of loading areas per stop per direction	Maximum corridor volume (Buses per hour per direction)		
	90 seconds	120 seconds	180 seconds
2	45	33	22

The Victoria Street stop would need a triple stop to handle the 34 buses per hour, however the impact of timetabling means this stop behaves more like a stop with a cycle time of 180 seconds. So this matches the need for a triple stop to be provided for numbers of 35 buses per hour when long cycle times lead to bunching of volumes.

Number of loading areas per stop per direction	Maximum corridor volume (Buses per hour per direction)		
	90 seconds	120 seconds	180 seconds
3	71	53	35

The Wellesley Street stop would need a triple stop to handle the 48 buses per hour observed. This aligns well with the theoretical maximum number of 53 buses per hour with a 120 second cycle phase.

Number of loading areas per stop per direction	Maximum corridor volume (Buses per hour per direction)		
	90 seconds	120 seconds	180 seconds
3	71	53	35