

Memo

Date: 1 February 2024
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To: Elected Members
Cc:
Reference: 23/1889756

Parking near Christchurch Hospital

1. Purpose of this Memo Te take o tēnei Pānui

- 1.1 To brief the Council regarding the results of the recent lane closure trial along Riccarton Avenue and Hagley Avenue near Hospital Corner and request feedback regarding the next steps.
- 1.2 Since November 2022 several Notices of Motion have been submitted by Councillor Keown requesting that on-street parking be reinstated on the Hagley Park side of the road at Hospital Corner as soon as practically possible.
- 1.3 Staff advice to the Office of the Chief Executive in response to the Notices of Motion and the requests made by Councillor Keown, stated that investigations would be conducted by staff to explore potential solutions for providing parking options in the vicinity of Christchurch Hospital.
- 1.4 In July 2023, staff presented to Council various options to provide parking opportunities near the Hospital.
- 1.5 With the exception of the Do Nothing option, as all other options involved closure of part of the kerbside lane along Hagley Avenue and Riccarton Avenue, staff proposed trialling lane closures at these location in order to observe and analyse the resulting impacts on traffic, and to gather road user and stakeholder feedback.
- 1.6 The information in this memo is not confidential and can be made public.

2. Background

- 2.1 The Christchurch Hospital, located at the corner of Riccarton Avenue and Oxford Terrace, is the largest tertiary hospital in the South Island, serving the wider Canterbury region. Due to its close proximity to Hagley Park and the central business district (CBD), the surrounding roads experience a significant flow of traffic, with over 18,000 vehicles traversing the busy intersection of Riccarton Avenue/Hagley Avenue/Oxford Terrace/Tuam Street on a daily basis. This intersection is also frequented by a high number of pedestrians and cyclists, given its proximity to various amenities and dedicated infrastructure.
- 2.2 This intersection lies in one of the main routes for ambulances seeking access to the hospital and the emergency services department.

- 2.3 Several bus routes pass through the Riccarton Avenue/Hagley Avenue/Oxford Terrace/Tuam Street intersection.
- 2.4 Parking demand in the immediate vicinity of Christchurch Hospital is high, particularly during regular working hours. Close proximity to the Christchurch CBD, also contributes to the high parking demand.
- 2.5 Tū Waka-Waipapa, the new private car park building on Hagey Avenue which provides 463 paid parking spaces for the public and was opened for use on 21 November 2023 after the trial was completed.
- 2.6 In response to the Notices of Motion, staff undertook investigations assessing current parking availability, proposed configurations, and engineering treatments. Potential options were presented to the Council in July 2023.
- 2.7 A lane closure trial along Riccarton Avenue and Hagley Avenue was approved in August 2023 to gather data for informed decision-making on potential parking solutions.

3. Trial

- 3.1 Prior to the lane closure trial traffic movements were monitored for one week to provide base data.
- 3.2 The lane closure trial involved closing part of the kerbside traffic lane along Hagley Avenue and Riccarton Avenue. A plan of the temporary lane closure is shown in Attachment A Fig 1.2.
- 3.3 The Temporary Traffic Management measures were put in place on Wednesday 25th October 2023 and were removed on Thursday 9th October 2023 ensuring an uninterrupted two-week trial period for traffic monitoring.
- 3.4 External consultants QTP were also engaged to independently assess the effects of the trial and the potential impacts of providing on-street parking at this location.
- 3.5 During the two-week lane closure trial, traffic was monitored during two distinct scenarios:
 - Week 1: Lane closures with no alterations to the phasing of the traffic lights at the Riccarton Avenue / Hagley Avenue / Tuam Street / Oxford Terrace intersection.
 - Week 2: Lane closures coupled with a modification to the phasing of the traffic lights at the Riccarton Avenue / Hagley Avenue / Tuam Street / Oxford Terrace intersection. This modification allocated reduced time for pedestrians and cyclists crossing Hagley Avenue, while providing more time for left-turning vehicles from Hagley Avenue to Riccarton Avenue.
- 3.6 Traffic flow on-site was monitored by staff and external consultants. The analysis of traffic flow involved utilising video feeds from permanent traffic cameras and journey time information from travel time monitoring data (TomTom).

4. Trial Results

- 4.1 Most significant effects occurred during the evening peak, with potential 50-80% longer travel times experienced (during the lane closure).
- 4.2 The observations made during different stages of the trial are summarised below.
- 4.3 Without Lane Closures (normal operating conditions):
 - 4.3.1 The longest traffic queues during the evening peak hour (when traffic volumes at this location were observed to be the highest) were found to extend approximately halfway between the Riccarton Avenue / Hagley Avenue / Tuam Street / Oxford Terrace

intersection and the Hagley Avenue / St Asaph Street intersection i.e., approximately 80 metres southwards.

- 4.3.2 Traffic originating from St Asaph Street or the southwestern section of Hagley Avenue seamlessly merged with traffic waiting at the Riccarton Avenue / Hagley Avenue / Tuam Street / Oxford Terrace intersection. This facilitated a smooth continuation of traffic flow without any noticeable delays.
- 4.4 Lane Closures – Week 1 (with existing signal phasing):
- 4.4.1 During the evening peak hour, traffic queues along Hagley Avenue were observed to extend up to its intersection with St Asaph Street and further encroaching into St Asaph Street and/or southwest along Hagley Avenue past the traffic lights. This was due to reduced capacity (lane removal for the left turn from Hagley Avenue into Riccarton Avenue) and poor operation of the merge on the northbound departure from the Hagley Avenue/St Asaph Street intersection.
- 4.4.2 Several instances were observed where extended queues along Hagley Avenue blocked the intersection departure and inhibited vehicles from moving even with a “green” signal to proceed. Observations included:
- Vehicles unable to execute a right turn from St Asaph Street into Hagley Avenue.
 - Vehicles unable to proceed straight along Hagley Avenue (from the southwest).
- 4.4.3 There were multiple instances where only one or two vehicles could go past the traffic lights during a “Green” phase from Hagley Avenue (from the southwest) resulting in traffic queues stretching back along Hagley Avenue up to Moorhouse Avenue.
- 4.4.4 Also, despite a “Green” light, there were several instances of vehicles from Hagley Avenue unable to enter Riccarton Avenue due to extended queues along Riccarton Avenue (from the signals at the Hospital Entrance).
- 4.4.5 Travel time data was assessed for multiple routes within the surrounding area. Analysis indicated that the highest delays were observed on the St Asaph Street → Hagley Avenue → Riccarton Avenue route. Average additional delays of approximately 67 seconds were recorded in the evening peak hours during the trial). Considerable delays were also noted along the Hagley Avenue (South) → Riccarton Avenue route. During the trial, this route witnessed average additional delays of approximately 63 seconds. The table below presents outputs for key routes, more detailed outputs are provided in Attachment A.

Table 1: Travel Time data on key routes in study area

Route	Time	Pre- Trial Journey Time	Trial Journey Time	Change in Travel Time	% Change in Delay	Pre- Trial 85%ile Journey Time	Trial 85%ile Journey Time	Change in Delay	% Change in Delay
St Asaph → Riccarton	17:00-17:30	00:02:00	00:03:07	+67	+56%	00:02:27	00:04:09	+102	+69%
Hagley → Riccarton	16:30-17:00	00:01:59	00:03:02	+63	+53%	00:02:31	00:03:57	+86	+57%
St Asaph → Riccarton	17:30-18:00	00:01:50	00:02:48	+58	+53%	00:02:25	00:04:22	+117	+81%
St Asaph → Riccarton	16:30-17:00	00:01:55	00:02:52	+57	+50%	00:02:22	00:03:54	+92	+65%
Hagley → Riccarton	17:00-17:30	00:02:08	00:02:57	+49	+38%	00:02:38	00:03:38	+60	+38%
Hagley → Riccarton	17:30-18:00	00:01:59	00:02:47	+48	+40%	00:02:28	00:03:52	+84	+57%

4.4.6 Given the close proximity to the Hospital, a high number of emergency vehicles travel along the Riccarton Avenue and Hagley Avenue route. Throughout the trial period, it was observed that some emergency vehicles (without sirens in operation) were hindered by / stuck behind the prolonged queues.



Figure 1: Captured by Traffic Camera at the St Asaph Street / Hagley Avenue intersection – 31 October 2023, 5:51PM

4.5 Lane Closures – Week 2 (with modified signal phasing):

4.5.1 The modifications involved a reduction in the "Green" time allocated for pedestrians and cyclists crossing Hagley Avenue, coupled with an extension of the "Green" time for left-turning vehicles from Hagley Avenue into Riccarton Avenue.

4.5.2 The mitigation efforts didn't fully eliminate queuing. The longest traffic queues along Hagley Avenue during the evening peak hour predominantly did not extend past its

intersection with St Asaph Street or further southwest into Hagley Avenue past the traffic lights. They were shorter than the queues observed during Week 1 but were longer than the traffic queues when the lane closures were not in place.

- 4.5.3 There were instances when the queues along Hagley Avenue extended up to its intersection with St Asaph Street but generally traffic was observed to clear within a cycle of the traffic signals due to the extra "Green" time for left turning vehicles.
- 4.5.4 There were several instances of a high number of pedestrians and cyclists congregating in the slip lane island on the southwest corner of the Riccarton Avenue / Hagley Avenue / Tuam Street / Oxford Terrace intersection.
- 4.5.5 It is important to note that this intersection represents one of the city's busiest crossing points for pedestrians and cyclists. The regular congregation of a substantial number of pedestrians and cyclists at this location poses safety risks and results in frequent non-compliance with traffic signals. The trial period witnessed numerous instances of non-compliance by pedestrians and cyclists, likely due to the longer wait times.

5. Feedback Received

5.1 Engagement on the lane closure trial included:

- A memo all elected members.
- A Newsline story
- A social media update posted on the Council Facebook page.
- Emails sent to St John and Te Whatu Ora contacts, including internal comms messaging.
- Informational email sent to the rest of the stakeholders.
- An internal comms update posted on The Hub.

5.2 A summary of the key points from the main stakeholders is shown in the table below. Other feedback included facebook post reactions, comments and shares which overall had a generally negative sentiment.

Organisation	Support / Against	Feedback
Public	Against	The removal of a traffic lane near the hospital has led to severe congestion, adversely affecting drivers, ambulances and public transportation. This change seems counterproductive to the city's goal of reducing private vehicle use.
Public	Against	This lane closure is a problematic trial, seen as a short-sighted and ridiculous solution. Strongly opposed for potential permanence.
Canterbury Health Laboratories – Te Whatu Ora staff member	Against	Night shift worker expressed concern over morning traffic congestion caused by the lane closure trial on Hagley Avenue, emphasizing the difficulty of making a right turn and warning against making the closure permanent.
Emergency Department – Te Whatu Ora staff member	Against	Traffic on Selwyn St merging onto Hagley Ave around 5:00 PM is severely congested. Expressed concern about the one-lane capacity and mentioned that more carparks may not be a suitable solution if it causes significant traffic impact.

Transport – Te Whatu Ora staff member	Against	Widespread unsupportive feedback from drivers on restricting hospital access by shutting down a lane. Concerns about bad driver behaviour, ambulance access, and potential parking issues for staff and patients crossing a busy road.
Te Whatu Ora staff member	Against	Suggested adjusting traffic light intervals for cars entering Hagley Avenue from St Asaph Street due to congestion during peak times, causing limited flow for cars already on Hagley Avenue (southwest) heading towards the hospital.
Te Whatu Ora staff member	Against	Concerns about potential ambulance access during the evening hours due to the road changes.
Te Whatu Ora staff member	Against	New road layout deemed frustrating, dangerous, and causing significant congestion during peak hours; concerns raised about ambulances being stuck, dangerous driving behavior, and inadequate options for emergency vehicles.
Te Whatu Ora staff member	Support	Supportive of lane closure, unaffected personally, appreciates the idea of more parking for patients and staff, eager for additional spots closer to the hospital.
Te Whatu Ora staff member	Support	Experienced no delays during the kerbside lane closure. Fully supporting its conversion into additional on-street parking due to the critical need for more hospital-area parking, which is a common complaint among patients and Social Workers.
Te Whatu Ora staff member	Against	Observed improved traffic flow on Riccarton Avenue after the lane closure was removed. Cautious about parking impact on flow as waiting for spots can disrupt traffic during peak hours.
St Johns	Against	<ul style="list-style-type: none"> • The temporary lane closure consistently delayed ambulance access to the Emergency Department, causing peak-time congestion and restricted manoeuvrability. • The lane closure increased drive time to the Emergency Department, especially during peak hours, adding up to 10 minutes at its worst.

6. Proposed options and impact on traffic and parking

This section provides information on potential options that could be implemented along with a thorough analysis of the associated impacts and issues derived from the trial's observations and data.

6.1 Option 1: Parallel parking on Riccarton Avenue & Hagley Avenue

6.1.1 Involves changing the western lane on Hagley Avenue and the southern lane on Riccarton Avenue, into a dedicated area for parallel kerbside parking as shown in Attachment B.

6.1.2 Permanent parking spaces in this location will require permanent closure of the traffic lanes mentioned above.

6.1.3 A footpath also needs to be constructed along the edge of the kerb in Riccarton Avenue in order to provide a safe walking space for the users of the parking spaces. This will be an additional cost.

6.1.4 As witnessed during the trial, lane closures at this location are expected to severely increase traffic queue lengths and travel times in this part of the network.

6.1.5 Potential inappropriate driver behaviour like unsafe merging or manoeuvres due to the increased delays also pose safety risks if implemented.

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- 6.1.6 It is essential to ensure free flow for ambulances and other emergency vehicles near the Hospital. This could be impossible during the evening peak hours due to the long traffic queues and there is limited space for the queued vehicles to move out of the way due to parked cars and median traffic islands to allow emergency vehicles to pass.
 - 6.1.7 An alternative route for ambulances to access Riccarton Avenue via Antigua Street and Tuam Street is not reliable or faster as they could encounter buses queuing within the single bus / traffic lane at this location.
 - 6.1.8 Additional delays caused by vehicles entering or exiting the parking spaces cannot be quantified at this stage. The parking demand around the Hospital and the planned time restrictions are expected to lead to several entry and exit manoeuvres around this location all throughout the day and would lead to additional delays for the vehicles passing through this location.
 - 6.1.9 Long queues were visible with the existing traffic volumes. As traffic is expected to increase after the nearby car parking building and the Parakiore Recreation and Sport Centre become operational, queues would likely be longer in the future
 - 6.1.10 During the evening peak hours, there were several instances of vehicles from Hagley Avenue unable to enter Riccarton Avenue due to extended queues along Riccarton Avenue.
 - 6.1.11 Modifying the phasing of traffic lights at the Riccarton Avenue / Hagley Avenue / Tuam Street / Oxford Terrace intersection could reduce traffic queue lengths to a certain extent. However, it will involve reducing the "Green" time available for pedestrians and cyclists crossing at this location, thereby reducing the level of service and creating safety concerns for active mode users in one of the busiest locations in the city.
 - 6.1.12 Initially, 6m long parking bays were considered as part of this option. This could result in providing 53 on street parking spaces at this location. Given the potential impact of entry and exit manoeuvres on other traffic the length of the parking bays could be increased to 7m to make manoeuvring easier. This would reduce the number of available parking spaces to 43.
- 6.2 Option 2: Removal of flush median on Hagley Avenue
- 6.2.1 Involves the removal of the existing flush median along Hagley Avenue and shifting the existing northbound traffic lanes eastwards. By doing so, more road space becomes available to allow for the inclusion of on-street parallel parking spaces on Hagley Avenue only without the need to eliminate any of the existing traffic lanes.
 - 6.2.2 However, this is no longer an option as the consent requirements for the car parking building requires the flush median to be changed to accommodate a right turn lane for vehicles entering the parking building by installing two raised median islands.
 - 6.2.3 The purpose of the northern raised median is to manage the interaction of car park traffic with the neighbouring Te Whatu Ora labs. The southern raised median is required to guide and separate right turning traffic into the new car park building from those turning right into Tuam Street. Advance signage is proposed in the vicinity of the vehicle access to guide road users toward the appropriate lane. These changes have been developed through a road safety audit process during consenting.
- 6.3 Option 3: Time restricted Clearways
- 6.3.1 Involves allowing parking along the kerbside lanes of Hagley Avenue and Riccarton Avenue during off-peak hours while designating the lanes as clearways during peak hours of the day, from 7 AM to 9 AM and 4 PM to 6 PM.
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- 6.3.2 Based on the observations made during the trial, this option would provide a balance between providing parking spaces near the hospital and maintaining the efficiency of the transport network during the peak hours.
 - 6.3.3 However, it needs to be noted that non-compliance has been observed in multiple other clearways and / or special vehicle lanes with similar restrictions in other parts of the city.
 - 6.3.4 Given its proximity to the Hospital and Emergency department, a heightened level of involuntary non-compliance is anticipated at this location, stemming from the unique circumstances that may prompt numerous individuals to overstay when parked in this area.
 - 6.3.5 Even a minimal presence of vehicles during designated clearway hours would impede traffic flow in the kerbside lanes, presenting challenges akin to those outlined in Option 1.
 - 6.3.6 The clearance of non-compliant vehicles necessitates dedicated resources to ensure the clearway's actual and intended functionality. This process could be time-intensive, potentially exceeding the entire "Clearway" duration and consequently negating the advantages associated with this option.
 - 6.3.7 A footpath would need to be constructed along the edge of the kerb in Riccarton Avenue in order to provide a safe walking space for the users of the parking spaces. This will be an additional cost.
- 6.4 Option 4: Do Nothing
- 6.4.1 Entails maintaining the status quo i.e., making no changes to parking arrangements, traffic lanes, or any other elements related to the road infrastructure along Riccarton Avenue and Hagley Avenue.
 - 6.4.2 While this option doesn't introduce additional free on-street parking options near the hospital, it does guarantee the preservation of traffic efficiency and network resilience.
 - 6.4.3 The surplus road capacity available during peak hours ensures that the current road network can absorb the increased traffic flow resulting from the new car parking facility and the Parakiore Recreation and Sport Centre, without causing significant delays.
- 6.5 Option 5: Time restricted Clearways with parking only at night (New option and not discussed earlier)
- 6.5.1 Similar to Option 3, this option involves permitting parking along the kerbside lanes of Hagley Avenue and Riccarton Avenue only at night.
 - 6.5.2 This will greatly benefit night shift staff and nighttime visitors to the Hospital.
 - 6.5.3 The time frame considered for parking is well clear of peak traffic hours. This provides sufficient time for the enforcement team to clear any offending vehicles thereby causing minimal disruptions to the traffic flow.
 - 6.5.4 A footpath would need to be constructed along the edge of the kerb in Riccarton Avenue in order to provide a safe walking space for the users of the parking spaces. This will be an additional cost.

7. Additional risks and unconsidered factors

- 7.1 Additional Risks:

7.1.1 Some additional risks of providing on-street parking spaces by removing a traffic lane include:

- Public Transport – The routes passing through Hospital Corner intersection account for around 45% of all Metro boardings. Lane reduction could cause additional delays thereby leading to reduced patronage.
- Ambulance Access - Ambulance access to the Hospital would inevitably be compromised during weekday evening peak periods to a significant degree due to the reduced capacity.
- Car Park Building – Entering and exiting the building during peak hours might be challenging which could make the new parking building a less attractive option.

7.2 Unconsidered Factors:

7.2.1 Many factors could not be accounted for during the trial. They include:

- Traffic effects due to the New Hospital Car Park Building
- Increased traffic demands due to the Metro Sports Facility
- Delays caused while vehicles entering and exiting the parking spaces - this cannot be predicted or simulated. The traffic cones do not replicate on-street parking conditions.

7.2.2 Each factor mentioned is likely to contribute to increased delays compared to the trial results.

8. Recommended Option

- 8.1 Do nothing to maintain the existing conditions to ensure optimal traffic operations, levels of service and safety for active modes, uphold network resilience, and minimize potential delays for ambulances and emergency vehicles at this location.
- 8.2 Alternatively, a viable option to explore involves implementing nighttime-only parking. This approach not only caters to the parking needs of night shift hospital staff but also strategically ensures the availability of kerbside lanes for traffic during peak hours.

9. Conclusion Whakakapinga

- 9.1 In November 2023, a trial involving the closure of lanes along Hagley Avenue and Riccarton Avenue adjacent to Christchurch Hospital was conducted.
- 9.2 The trial aimed to assess the effects of converting a westbound traffic lane on Hagley and Riccarton Avenues for on-street parking. The trial caused significant queuing and delays during the weekday evening peak. Changes to signal phasing (which was planned to be done during the trial) reduced queue lengths and overall delays but reduced the level of service for active mode users.
- 9.3 This memo provides a comprehensive overview of the trial outcomes, observations, and feedback received.
- 9.4 Factors such as the opening of the new car parking building, delays due to entry and exit of vehicles into the parking spaces, and increased traffic demands suggest that the trial's observed delays might be understated. Evening peak periods could compromise ambulance access, (new) car park usability, and overall traffic flow, challenging the viability of implementing on-street parking on Hagley Avenue's west side.
- 9.5 Staff recommend either retaining the existing conditions or exploring the possibility of allowing nighttime-only parking.

- 9.6 The input of Elected Members is sought to guide the determination of the subsequent course of action.

Attachments Ngā Tāpirihanga

No.	Title	Reference
A	Hospital On-Street Parking Trial Analysis - QTP Traffic Impact Assessment	23/2060297
B	Option 1 - Parallel Kerbside Parking	23/1098628
C	Approved Plan - Central median Islands Riccarton Avenue	23/1098670
D	Option 3 - Clearway	23/1098684

Signatories Ngā Kaiwaitohu

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Hospital On-Street Parking Trial

Traffic Impact Analysis

November 2023



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Appendix A: Journey Times by Day (Monday-Friday Peak Hours Only) A1



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1 Introduction

- 1.1 QTP have been asked by Christchurch City Council (**CCC**) to provide an independent analysis of traffic impacts observed during the recent Hospital On-Street Parking Trial.
- 1.2 The following is key data that has been reviewed and analysed:
 - Intersection traffic counts undertaken by CCC at Hagley/Oxford/Riccarton/Tuam ('Hospital corner'), Deans/Riccarton, Hospital/Riccarton and Antigua/Tuam intersections (2021-2022).
 - Traffic signal SCATS data for adjacent signalised intersections (phase timings and in-ground induction loop demands).
 - Travel time data for general traffic on key routes potentially affected by the Trial (from TomTom).
 - Traffic queue observations of the affected area by video from cameras located at the Hagley/St Asaph and Antigua/Tuam intersections.
- 1.3 Each of the above data has been reviewed using combinations of the following checks on a case-by-case basis, where appropriate:
 - Sensibility checks to ensure data is within realistic bounds.
 - Cross checks using manual observations (video analysis)
 - Calculations based on engineering first principles.
 - Cross checks using traffic models and other traffic count data.
 - Completeness and relevance of data.
- 1.4 In some cases, we have given some data sources less weight where potential deficiencies or limitations have been identified (e.g. intermittent video quality, misreading of some SCATS loops) and, where necessary, 'filled-in' resulting missing data with estimates from other times or sources (e.g. valid data from the same intersection at a similar time or from adjacent intersections).
- 1.5 The Trial was implemented using Temporary Traffic Management (**TTM**) – road cones - to replicate the potential permanent closure of the existing nearside lane (to provide for parallel on-street parking) between the approximate location of Tū Waka-Waipapa, the new Hospital Car Park Building (**HCPB**) entry/exit in Hagley Avenue (**Figure 1.1**) and the bus stop on Riccarton Avenue westbound, located just west of the Hospital/Riccarton Avenue intersection.



Figure 1.1: Trial Implementation in Hagley Avenue (viewed towards Tū Waka-Waipapa HCPB Access)

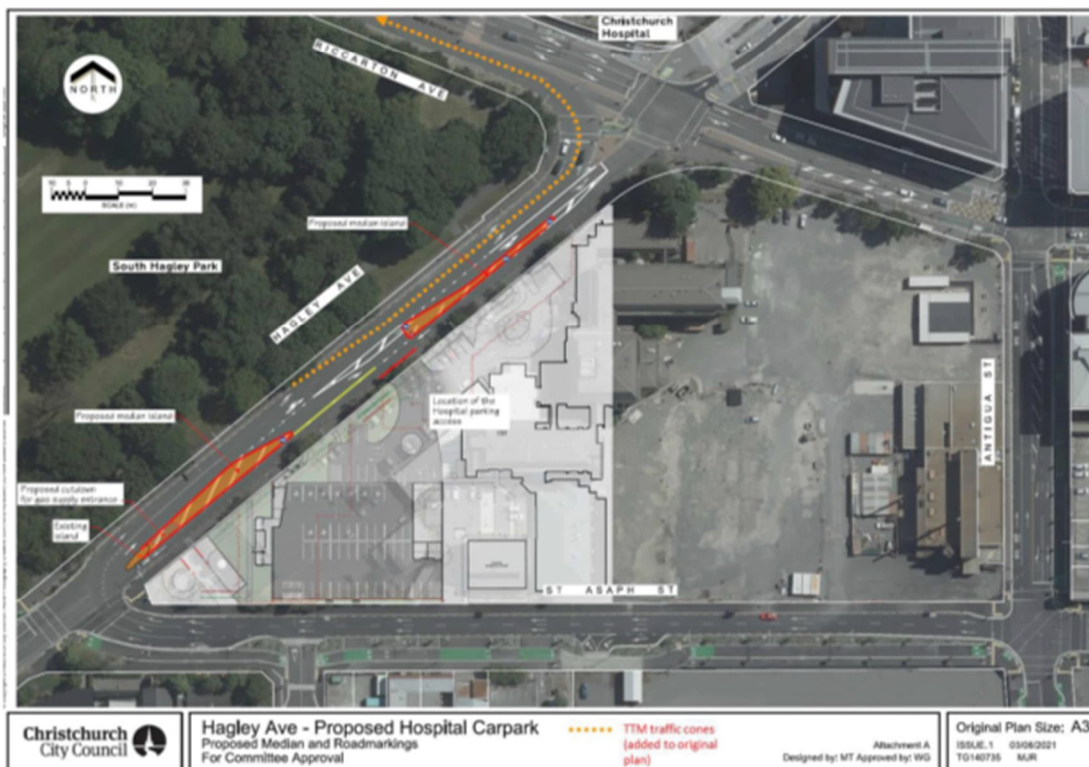


(Photograph taken 4:25pm Tuesday 7 November 2023, QTP)

- 1.6 Our observation period ran between 6 October – 8 November. Within this period, the days between 6 October- 19 October 2023 (inclusive) have been used as a 14 day period of 'Pre-Trial' conditions and compared to 14 days when the Trial TTM was implemented (25 October-7th November). We have thus omitted to include the days between Friday 20 October-Tuesday 24 October (Labour Day Monday, its preceding weekend and Friday and the following Tuesday) from the observation period. Exclusion of the Tuesday following Labour Day also ensures that 2 full weeks of data remain for each period, with the same number of Mondays, Tuesdays, etc. This ensures that when calculating weekly or daily averages these are less affected by any daily variations between the two periods.
- 1.7 Given that within this observation period average *weekend* demands in the area were observed to only be around 60% of the average *weekday* however (and the weekend peak hour about 55% of that during the average weekday PM peak hour), we have, for the sake of brevity, concentrated our reporting here on observations made for *weekday* conditions only. Thus, where we may report statistics for 'average' Pre-Trial vs Trial periods, we refer hereafter to statistics gathered over 10 (2 x Mon-Fri) 'Pre-Trial' weekdays and compare these to 10 (2 x Mon-Fri) Trial weekdays.
- 1.8 The changes to enable access for the new HCPB off Hagley Avenue are shown in plan view in **Figure 1.2** below. These changes were approved by Council at their meeting in September 2021 and we understand **form a condition of consent** for the building. It is however important to note that during the Trial (and our comparative Pre-Trial period), only the southern-most median island shown on this plan was in place - with the northern-most median island yet to be constructed.
- 1.9 We note that Tū Waka-Waipapa, the HCPB, which provides 463 paid-parking spaces for the public, was opened for use on Tuesday 21 November (after the Trial concluded) – with the northern-most median island shown in **Figure 1.2** still to be constructed at the time of opening.



Figure 1.2: Approved Hospital Car Park Building Access (with extent of Trial TTM in vicinity imposed)



- 1.10 That the Trial was implemented prior to the opening of the HCPB is one of the compromises made to accommodate an early illustration (via the Trial) of the potential impact of implementing the potential additional on-street parking: It was anticipated it would likely take some time for the public to become aware of the HCPB's existence (and being under construction, the opening date was in any event uncertain at the time of Trial planning). Unfortunately, this would have meant the Trial and a comparative Pre-Trial period in close proximity, unaffected by Statutory Holidays, would have had to be deferred to either incorporate an atypical time (when traffic demands typically start to increase on the approach to Christmas (from late November), or be deferred to a neutral month in the New Year (March 2024).
- 1.11 A further (and we suggest much less significant) compromise is that during the observation period there was other TTM in the vicinity, namely restrictions on Southbound movements along Antigua Street. However, typically this southbound traffic only forms between 8% (PM peak) and 12% (AM peak) of total inflow to the Antigua/St Asaph intersection. It is always about 50% (or less) of the corresponding Northbound flow along Antigua St and therefore never 'controls' the Antigua Street signal phase time allocation at this intersection. Furthermore, observed changes in demand for the right turn from Riccarton W at Hospital Corner between both Pre-Trial and Trial periods were relatively small (+24vehs in AM Peak and -22 vech in PM peak), particularly when compared to the May 2022 demand counted of 101 and 146 vech respectively in each of these periods for this movement and compared to total Sbound flows on Antigua (South of Tuam Street) of 138 vech in the AM peak hour and



87 vehs in the PM peak hour. These comparisons confirm therefore that whilst less than ideal, the Antigua Street southbound closure would have had a minimal effect on overall traffic demands in the area that would have materially affected the Pre-Trial and Trial comparison.

1.12 We note below some important factors **not** taken into account by simply coning off the extent of the nearside traffic lanes in Hagley and Riccarton Avenues that might be used for potential additional on-street parking over the observation period. These include:

- The HCPB was yet to open. As is Parakiore, the Metro Sports Facility (with an access off St Asaph Street west of Hagley Avenue). Thus additional new or reassigned traffic demands in the area attracted by both facilities can be expected in the future, compared to the traffic demands observed during both the Pre-Trial and Trial periods.
- Even without the additional traffic likely to be attracted to the area by the new HCPB and, at some point in the future, Parakiore, we note (from the Pre-Trial period data analysis) that present (peak) traffic demands in the vicinity generally appear to be a little way (5-10%) below pre-Covid levels. Given on-going recovery of the wider City and Central City, a gradual reduction in Working-from-Home etc., the traffic demands may thus reasonably be expected to increase above the present levels.
- The use of traffic cones alone to replicate the space that could potentially be used for additional on-street parking cannot mimic the full impact of such a change: In the proposed environment and given the limited width, additional 'friction' would occur when drivers park or unpark in practice (and when some merely slow down to search for a potential park). The extent of this additional friction (and its effects on further reducing capacity for through movements) would however likely depend on details yet to be established, such as:
 - the length of the on-street parks adopted: Use of 7m bays enables easier manoeuvring and thus lower friction that would adoption of a standard 6m-long parallel on-street park length - albeit at the 'cost' of around 20% fewer on-street car parks, in this particular case¹; and
 - the particular restrictions that may potentially be imposed: The impacts of additional friction are likely to be lower were the on-street parking able to be utilised by staff rather than short-term visitors, but this would depend upon the shifts using it. However, given adoption of a P120 time-restriction (to be consistent with other on-street parking adjacent to the Hospital) may be the most-likely, we suggest that this would mitigate availability for and use by staff, at least during 'normal' work hours when these time-restrictions apply.
- The northern-most median island in Hagley Avenue forming part of the HCPB access works had not yet been constructed. It may be noted that vehicles (and in particular buses) headed for the City currently pull over to turn into Tuam Street around where this HCPB entry is now located. This will no longer be possible once the approved northern island has been constructed, and the Hagley Avenue combined through/ right turn northbound lane at Hospital Corner will be reduced from about 130m to 60m in length as a result. This change (and in particular given the reduction in capacity along Hagley

¹ A total of approximately 59 on-street parallel parking spaces of 6m length could be created within the Trial area, compared to 47 using 7m-long parks.



Avenue should the on-street parking proceed to be implemented) will almost certainly extend Hagley Avenue queues further SW, particularly compared to those observed during the Trial period.

- As we shall come on to demonstrate from the data, even before the potential for increased demand in the area, because of the reduced capacity for westbound traffic imposed by a reduction from 2 to 1 lanes, increased queuing and delay during the weekday PM peak period was clearly evident on both Riccarton Avenue (westbound) and Hagley Avenue northbound during the Trial Period. The latter was and would be the more significant, should the additional on-street parking be implemented permanently: Given the queuing regularly observed during the Trial across the location of the new HCPB entry/exit (in the evening peak period), we consider it likely that should the on-street parking be permanently implemented, together with an open and more-fully utilised HCPB, some **'reverse priority'** would be likely to operate at this HCPB exit, with some northbound drivers on Hagley Avenue in standing or slow-moving queues providing courtesy gaps to allow users of the HCPB to exit to the north. Whilst (some) drivers provide such gaps as a courtesy, seldom do they consider the impact this can have on extending queuing and delay behind them – which, in near or over-capacity situations, such as that evidenced during the Trial during the weekday PM peak, may be significant.

1.13 Remaining sections of this report cover in turn our consideration of:

- Traffic counts (demands) before and after the Trial
- Changes on traffic signal timings throughout the observation period
- Impacts on travel times
- Impacts on queue lengths; and
- Our conclusions and recommendations

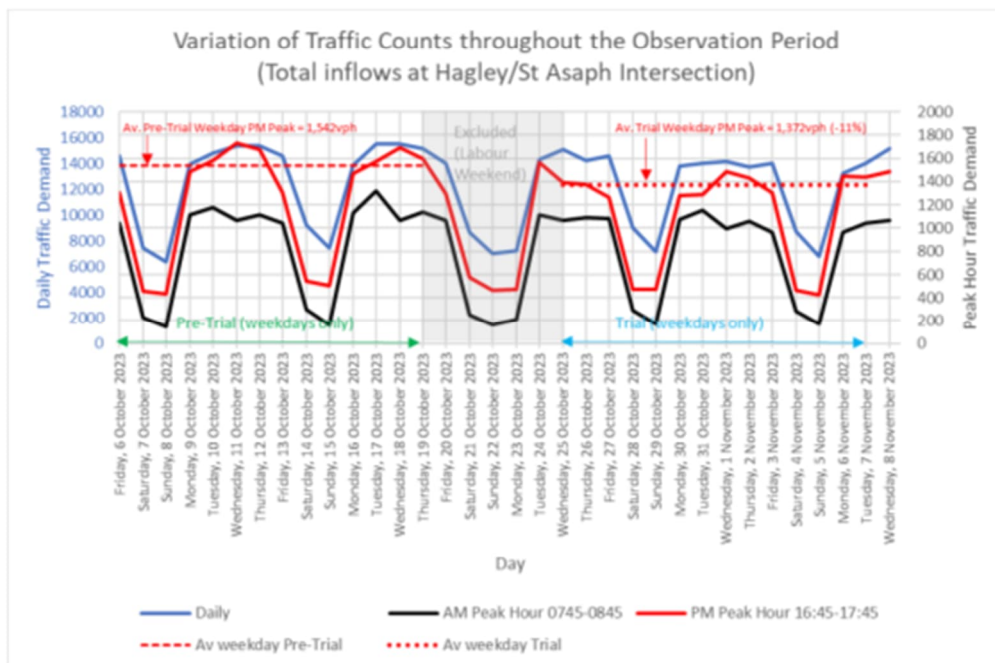


2 Traffic Counts

2.1 An indication of the day-by-day variation of traffic counts over the observation period within the area of the trial is provided by **Figure 2.1** below. It can be noted from this chart that:

- Traffic varies day-by-day throughout the week, with Tuesdays typically close to the average for all weekdays in a particular week;
- Weekend traffic is significantly lower than that during the working week;
- In this area, Wednesdays have atypically higher demands, as a result (primarily) of use of the netball courts close-by;
- Average weekday daily (24hr) traffic volumes recorded in the Trial period were around 5% lower than those recorded in the Pre-Trial Period. AM peak hour volumes were 6% lower – but PM peak hour volumes were 11% lower (noting that the latter represent *counts* of traffic signal loop hits within the peak hour, rather than *demand* as such, as any queued vehicles at the end of the hour are not recorded for that hour); and
- The recorded daily (and in particular PM peak hour traffic volumes) in the week *after* first implementation of the Trial appear particularly low (which could indicate some reassignment of traffic to avoid additional delay). There is however some evidence provided by this data that volumes recovered somewhat upwards towards the latter stages of the Trial, whilst still below more typical values. (We note that limited changes, described in the following section, were made around 2 November to the phasing at Hospital Corner in an attempt to mitigate the apparent congestion induced by the Trial)

Figure 2.1: Indicative Variation of Traffic Counts over Observation Period (Hagley/St Asaph Total Inflows)





- 2.2 Other surrounding signalised intersections monitored exhibit similar patterns of demand variation and have been omitted here for brevity
- 2.3 The routes for scheduled public transport in the area are shown in **Figure 2.2**, with the frequency of these services summarised in **Table 2.1**.

Figure 2.2: Scheduled (Metro) Bus Services in the Trial Area

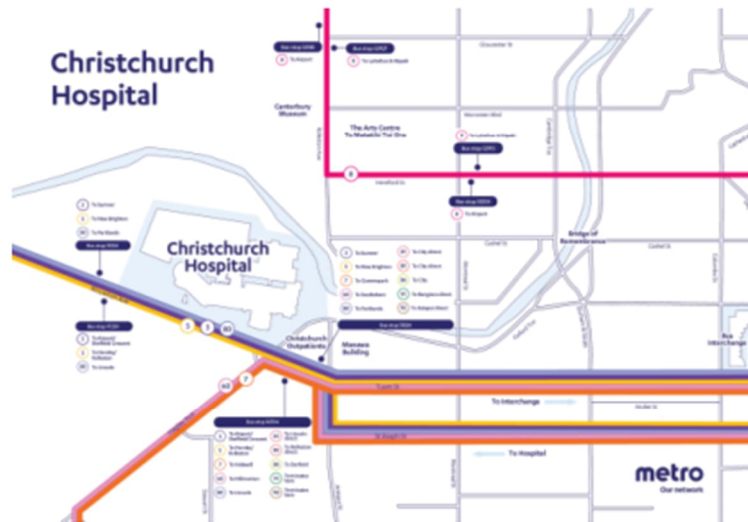


Table 2.1: Scheduled Bus Movements through Hospital Corner

Location	Service	2-way		West/Southbound		East/Northbound		Route
		Daily	Peak (8-9am)	Off-Peak (11-12am)	Peak (8-9am)	Off-Peak (11-12am)		
Superstops	3	182	7	6	6	6	6	Airport-Sumner
	5	142	5	4	8	4	4	Rolleston-New Brighton
	7	128	5	4	5	4	4	Halswell-Queenspark
	60	82	5	2	3	2	2	Hillmorton-Southshore
	80	78	4	2	4	2	2	Lincoln-Parklands
	81	4	0	0	1	0	0	Lincoln/City Direct
	85	6	0	0	1	0	0	Rolleston/City Direct
	86	2	0	0	1	0	0	Darfield-City
	91	8	2	0	0	0	0	Rangiora-City Direct
	92	8	2	0	0	0	0	Kaiapoi-City Direct
	Total	640	30	18	29	18		
Hagley Av	7	128	5	4	5	4	4	Halswell-Queenspark
	60	82	5	2	3	2	2	Hillmorton-Southshore
	81	4	0	0	1	0	0	Lincoln/City Direct
	85	6	0	0	1	0	0	Rolleston/City Direct
		Total	220	10	6	10	6	Total (Metro public only)

Key

- Use Riccarton Avenue W of Hospital Corner
- Use Hagley Avenue S of Hospital Corner
- 91 & 92 services officially start/stop at the Superstops although have to use Hospital Corner for access

Note Hospital Shuttles (every 15 mins) and school buses are excluded from above



-
- 2.4 Buses thus comprise around **4%** of the traffic at Hospital Corner between 7am-7pm (640 of approximately 14,800 vehicles in total), with trucks comprising up to a further 1.5% or so in the interpeak (and below 1% in the PM peak period). Because these services are fairly heavily used however (the routes passing through Hospital Corner account for around 45% of all Metro boardings), it is estimated that the public transport patronage accounts for around **25-33%** of all person-movement through the intersection between 7am-7pm.



3 Traffic Signal Timings

3.1 An indication of the day-by-day variation of traffic signal timings (for weekdays only) at Hospital Corner over the observation period is provided within the **Table 3.1**, with these illustrated in the following **Figure 3.1** and **Figure 3.2** for AM and PM peak hours only, respectively.

Table 3.1: Average Effective Green by Phase & Overall Cycle Times in Seconds, from recorded SCATS Timings (Hospital Corner)

Date	AM Hour (07:45-08:45)						IP Hour (13:00-14:00)						PM Hour (16:30-17:30)					
	A (Riccarton +Hagley LT)	B (Peds, Cycles +Hagley LT post 2/11)	C (Hagley (All))	D (Riccarton (All))	Cycle	Hagley LT	A (Riccarton +Hagley LT)	B (Peds, Cycles +Hagley LT post 2/11)	C (Hagley (All))	D (Riccarton (All))	Cycle	Hagley LT	A (Riccarton +Hagley LT)	B (Peds, Cycles +Hagley LT post 2/11)	C (Hagley (All))	D (Riccarton (All))	Cycle	Hagley LT
Friday, 6 October 2023	20	24	13	9	80	41%	20	22	14	10	80	43%	19	20	15	12	82	41%
Monday, 9 October 2023	20	17	17	10	79	47%	20	20	15	10	80	44%	20	18	15	11	79	44%
Tuesday, 10 October 2023	23	17	16	9	80	49%	20	19	16	9	79	46%	22	16	17	10	80	49%
Wednesday, 11 October 2023	22	17	17	9	80	49%	20	25	13	9	82	40%	22	17	16	9	79	48%
Thursday, 12 October 2023	22	18	16	9	80	48%	21	19	16	10	81	46%	21	17	16	10	79	47%
Friday, 13 October 2023	20	16	17	11	79	47%	23	23	13	8	80	45%	21	19	16	10	81	46%
Monday, 16 October 2023	23	17	16	9	80	49%	20	20	16	10	81	44%	21	18	16	10	80	46%
Tuesday, 17 October 2023	23	16	17	8	79	51%	22	20	16	7	79	48%	20	17	17	11	80	46%
Wednesday, 18 October 2023	22	17	16	9	79	48%	20	21	14	9	78	44%	21	16	17	9	78	49%
Thursday, 19 October 2023	22	17	17	9	80	49%	23	18	16	8	80	49%	22	17	17	9	80	49%
Friday, 20 October 2023	23	17	18	7	79	52%	22	20	15	8	80	46%	23	19	15	9	81	47%
Monday, 23 October 2023	0	24	20	18	80	25%	20	26	11	9	80	39%	7	25	17	14	80	30%
Tuesday, 24 October 2023	22	17	17	9	80	49%	21	22	14	9	80	44%	21	18	17	9	80	48%
Wednesday, 25 October 2023	21	16	17	10	79	48%	22	21	15	8	80	46%	24	20	14	7	78	49%
Thursday, 26 October 2023	24	17	17	7	79	52%	25	21	15	5	79	51%	23	17	16	9	80	49%
Friday, 27 October 2023	24	17	17	7	79	52%	23	22	15	6	80	48%	22	19	18	7	80	50%
Monday, 30 October 2023	20	17	16	11	79	46%	22	19	16	8	79	48%	19	20	14	11	79	42%
Tuesday, 31 October 2023	22	17	17	10	81	48%	21	21	16	8	81	46%	20	19	15	11	81	43%
Wednesday, 1 November 2023	21	17	17	11	81	47%	21	22	15	8	81	44%	23	18	17	8	80	50%
Thursday, 2 November 2023	14	18	14	18	80	58%	16	20	12	17	80	60%	14	18	13	19	80	56%
Friday, 3 November 2023	17	18	14	16	79	61%	18	20	12	16	80	63%	15	19	13	18	80	58%
Monday, 6 November 2023	15	19	13	18	81	58%	17	20	12	16	79	62%	14	20	13	18	80	58%
Tuesday, 7 November 2023	14	17	14	19	80	56%	17	20	11	17	80	60%	14	19	13	18	80	58%
Wednesday, 8 November 2023	15	18	13	19	81	57%	17	22	11	16	80	63%	15	19	12	18	80	58%
Pre-Trial Average - 10 days	22	18	16	9	80	48%	21	21	15	9	80	45%	21	18	16	10	80	46%
Trial (pre-signal change - 5 days)	22	17	17	9	79	49%	23	21	15	7	80	48%	22	19	15	9	80	46%
Trial (post-signal change - 5 days*)	15	18	13	18	80	58%	17	20	12	16	80	63%	14	19	12	18	80	57%
Trial Average (10 days)	19	17	15	14	80	54%	20	21	14	13	80	54%	19	19	14	13	80	52%

Figure 3.1: Weekday AM Peak Hour Phase Times (Hospital Corner)

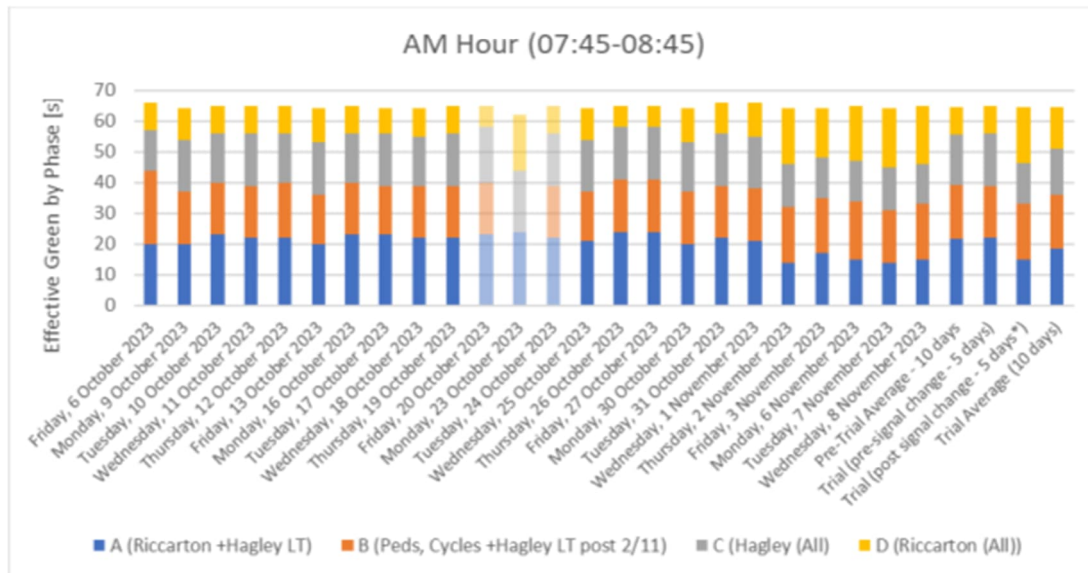
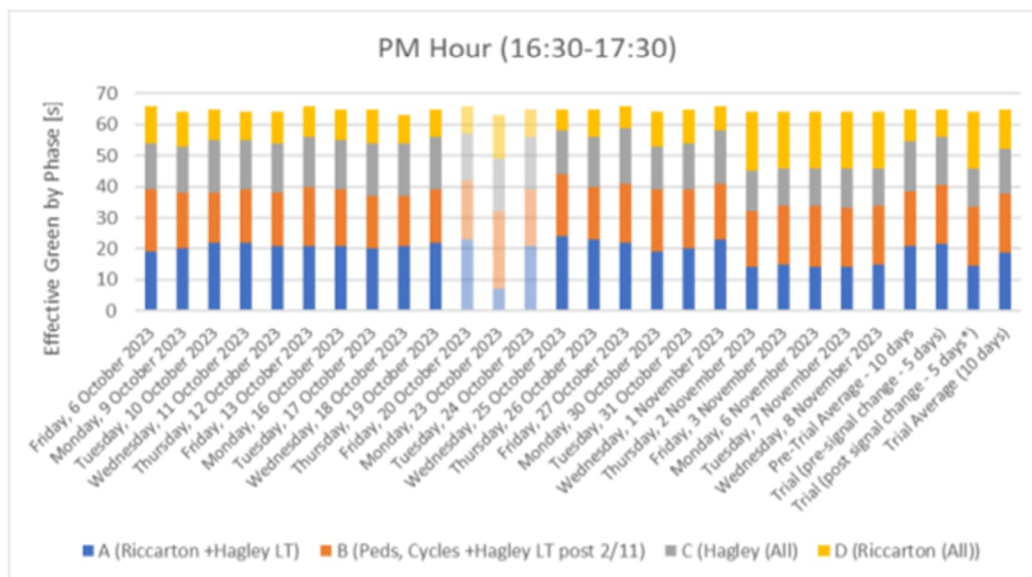




Figure 3.2: Weekday PM Peak Hour Phase Times (Hospital Corner)



3.2 It will be noted that limited changes were made by the Council's Traffic Signals team to the phase arrangements at the Hospital Corner intersection on 2 November, in an attempt to reduce the quite extensive queuing and delay observed in the initial Trial period (during the evening peak period). These changes involved running the left turn into Riccarton Avenue during part of what was formerly a phase fully devoted to pedestrian and cycle movements. This change meant that approximately 10% more of the signal cycle time was added to the effective green time for this movement.

3.3 This change, whilst certainly reducing the extent of vehicular queuing and delay, particularly on Hagley Avenue and St Asaph Street, that was induced by the initial Trial period settings (and reducing its duration over the evening peak period), did however only come at the cost of some compromises, these being:

- Reduced time available for a full Hagley Avenue phase (C), meaning the effective green time for the combined through and right turn lane (to Oxford Terrace and Tuam Street) was reduced from around 20% of the typical cycle to less than 16%. This therefore amounted to about a 25% reduction in capacity for this specific movement; and
- Increased delay² for pedestrians and cyclists using the Riccarton Avenue crossings: Rather than being able to make the full crossing in an exclusive phase, as they could do under Pre-Trial and initial Trial signal settings, with the additional time provided to the left turn from Hagley Avenue they were required to assemble on the splitter island and wait for the left turn movement from Hagley Avenue (to which more time was now being devoted).

² Unfortunately, we have been unable to accurately quantify the extent of this, as (at times) the video surveillance available of pedestrian and cycle movements was compromised (inadequate quality or lack of view of full crossing due to vehicles queued in westbound bus lane). However, that there was added delay following the change in settings is readily apparent from the surveillance videos. An earlier CCC count of pedestrian and cyclist movements however (summarised in Table 3.2) indicates this could affect around 430 pedestrians and cyclists (during the morning peak hour for these movements) and 320 in the evening peak hour.



Table 3.2: Hospital Corner Pedestrian and Cycle Movements (CCC Count, Weds 31 May 2022)

Hour	Crossing	Pedestrians	Cyclists	Total
AM (07:30-08:30)	All Crossings	600	285	885
	Riccarton Avenue	154	275	429
IP (13:00-14:00)	All Crossings	519	68	587
	Riccarton Avenue	67	109	176
PM (16:15-17:15)	All Crossings	502	201	703
	Riccarton Avenue	124	197	321

3.4 Similar monitoring data for the intersection of Hagley Avenue/St Asaph Street, shown in **Table 3.3** confirms that the SCATS system made fairly small changes to green time allocation here, in response to any changing demands over the observation period. Perhaps notable however is that during the PM peak, following the changes made to phasing at Hospital Corner (the figures shown in red), the phase allocation between St Asaph Street and Hagley Avenue returned to be closer to that in the Pre-Trial period. In other words, slightly less time was allocated to St Asaph Street and a little more to Hagley Avenue, thus reducing the extent and duration of delay *on the latter approach*, compared to the initial Trial period (shown by blue shading, black text).

Table 3.3: Average Effective Green by Phase & Overall Cycle Times in Seconds, from recorded SCATS Timings (Hagley/St Asaph)

Date	AM Hour (07:45-08:45)			IP Hour (13:00-14:00)			PM Hour (16:30-17:30)		
	A (St Asaph)	B (Hagley)	Cycle Length	A (St Asaph)	B (Hagley)	Cycle Length	A (St Asaph)	B (Hagley)	Cycle Length
Friday, 6 October 2023	36	36	80	36	36	80	36	35	79
Monday, 9 October 2023	37	34	79	36	35	79	41	31	80
Tuesday, 10 October 2023	38	34	80	37	35	80	40	32	80
Wednesday, 11 October 2023	38	34	80	42	31	81	42	29	79
Thursday, 12 October 2023	38	34	80	37	34	79	42	30	80
Friday, 13 October 2023	37	35	80	38	34	80	38	34	80
Monday, 16 October 2023	38	34	80	36	35	79	39	33	80
Tuesday, 17 October 2023	39	33	80	37	35	80	40	31	79
Wednesday, 18 October 2023	36	36	80	37	35	80	46	26	80
Thursday, 19 October 2023	38	34	80	37	35	80	42	30	80
Friday, 20 October 2023	37	35	80	37	35	80	38	33	79
Monday, 23 October 2023	37	29	81	36	35	79	37	30	80
Tuesday, 24 October 2023	38	34	80	36	36	80	42	30	80
Wednesday, 25 October 2023	36	36	80	37	35	80	46	26	80
Thursday, 26 October 2023	38	34	80	37	35	80	41	31	80
Friday, 27 October 2023	38	34	80	37	35	80	38	34	80
Monday, 30 October 2023	38	34	80	37	34	79	50	22	80
Tuesday, 31 October 2023	38	34	80	37	35	80	43	29	81
Wednesday, 1 November 2023	37	35	80	37	35	80	46	26	80
Thursday, 2 November 2023	38	34	80	37	35	80	39	33	80
Friday, 3 November 2023	37	35	80	37	35	80	40	32	80
Monday, 6 November 2023	37	35	80	37	35	80	39	32	79
Tuesday, 7 November 2023	36	35	79	36	35	79	39	32	79
Wednesday, 8 November 2023	37	35	80	37	35	80	49	22	79
Pre-Trial Average - 10 days	38	34	80	37	35	80	41	31	80
Trial (pre-signal change - 5 days)	38	34	80	37	35	80	44	28	80
Trial (post signal change - 5 days*)	37	35	80	37	35	80	41	30	79
Trial Average (10 days)	37	35	80	37	35	80	42	29	80



4 Impact on Travel Times

4.1 Data Source

4.1.1 Travel times over the observation period were gathered via TomTom sampling. A comparison with traffic counts at the same time suggests that the sample provided by this data represents about 10-12% of all vehicle movements in the study area (with some limited variation according to the specific location and/or the day). Whilst there may be some bias in the data (towards GPS-equipped vehicles), the number of sample probes is many order of magnitudes greater than could be obtained by more-traditional survey methods for gathering journey times (essentially surveyors driving the route) and the TomTom data adopted thus provides a much more reliable (and less-expensive) source to examine changes in both average vehicle travel times and the sample variation, compared to such traditional methods.

4.1.2 Results are summarised for all routes in **Table 4.1** overleaf with each described in turn below. Day-by-day results (for Monday-Friday AM and PM peaks only) may be found in **Appendix A**.

4.2 St Asaph Street (W Antigua) to Riccarton Avenue (W Hospital)

4.2.1 The TomTom sample confirms that significant changes to the travel time for this route between Pre-Trial and Trial weekdays were restricted to the evening peak period (4:00-6:00pm) and particularly between 4:30-6:00pm. The average increase in delay over this period added around +1 minute to a journey that prior to the Trial typically took around 2 minutes at this time (+50%). However, the 85% travel time increased by approaching +2 minutes (compared to a Pre-Trial time of around 2:30 (+80%)), indicating many drivers would have faced reasonably-significant additional delays, exceeding +1 minute.

4.2.2 It is also notable that there were some significant decreases in the sample size (during the PM peak period) e.g. 30% lower for the period between 5pm and 5:30pm. Whilst these reductions could be due in part to reassignment of traffic to avoid delays, we consider it equally (or indeed more) likely to be simply indicative of a lack of adequate capacity under the Trial, during the evening peak.

4.2.3 Whilst we would characterise the increase in delays during the evening peak under the Trial as being (relatively) significant, it should be noted that over a full 24 hrs (of an average weekday), the increase in travel time between Pre-Trial and Trial periods does only amount to +12 seconds/vehicle (on average), or +15 seconds/vehicle for 85% of the vehicles sampled.

4.3 Hagley Avenue (N Selwyn) to Riccarton Avenue (W Hospital)

4.3.1 A similar picture is presented by the comparison for this route, with what we would suggest is significant additional delay being confined to the evening peak. The order of additional travel time (between 4:30-6pm) was a little lower than the route from St Asaph Street above, at around +50s, with the 85%ile travel time increase also being slightly lower, at around +1:20.

4.3.2 When considered over a full 24 hrs (of an average weekday) however, as above the increase in travel time between Pre-Trial and Trial periods is barely noticeable, amounting to only around an additional +5 seconds/vehicle (on average).



4.4 Hagley Avenue (N Selwyn) to Tuam Street (W Antigua)

- 4.4.1 The travel time sampling for this route again confirms that the Trial's effects were mostly confined to the PM peak period, and at around +30s/vehicle (on average) were lower on this route (which takes in a right turn from Hagley Avenue at Hospital Corner, rather than the left turn affected by the Trial's reduction from 2 lanes to 1 lane), than those experienced by the above routes using the left turn.
- 4.4.2 When considered over a full 24 hrs (of an average weekday) however, the increase in travel time between Pre-Trial and Trial periods again was barely noticeable when considering all sampled vehicles - amounting to only around an additional +8-9 seconds/vehicle (on average).
- 4.4.3 What is perhaps notable for this route is that, in contrast to the 'Hagley left turn' routes above, this route experienced increased delay as a result of the Trial during the morning peak period too, of about +15-20s. This is almost certainly a product (principally) of the changed phasing arrangements implemented at Hospital Corner in the later stages of the Trial, which effectively represented a compromise to reduce the delay for left-turners but at the 'cost' of increased delay for this right turn movement (as well as for pedestrians and cyclists crossing Riccarton Avenue).

4.5 Hagley Avenue (N Selwyn) to Oxford Terrace (Outside Outpatients)

- 4.5.1 As might be expected (given they essentially are confined to the same lane at Hospital Corner), travel times (and changes as a result of the Trial) for this route appear similar to that for the movement from Hagley Avenue to Tuam Street, with the increase in travel time between Pre-Trial and Trial periods barely noticeable at around an additional +8-9 seconds/vehicle on average over a typical 24hr weekday. However, because of the low numbers of vehicles on Hagley Avenue making this manoeuvre (they comprise about 10% of all northbound vehicles on Hagley S of St Asaph, compared to around 50% bound for Tuam St and 40% to Riccarton Avenue), sample sizes (in particular time segments observed) were much lower and hence the reliability of travel time estimates should be treated with some caution.

4.6 Riccarton Avenue (W Hagley) to Hospital Main Access (N Riccarton Avenue)

- 4.6.1 *Once* vehicles move around the corner into Riccarton Avenue, those bound for the Hospital main access appear to have been relatively unaffected by the Trial, at least according to the TomTom data: Over a typical 24hr weekday the additional delay (or more -correctly the observed change in travel time) resulting in the Trial was only +3 seconds (+8%) for this manoeuvre. Again, some caution is warranted due to a relatively low sample size, but it appears as though the principal effects were restricted to the evening peak and, within this, appear most obvious (from this data) between 4:30-5pm, when average delays increased by around 12s (+48%) and the increase or 85% of vehicles being about +21 seconds (+72%)

4.7 Riccarton Avenue (W Hospital) to Tuam Street (W Antigua)

- 4.7.1 The TomTom data confirms that the Trial essentially appears to have had no effect on this Eastbound route, with negligible changes in travel time. This is despite some changes to the precise (A & D) phase times apparent from the SCATS monitoring (described above in **Table 3.1**).



4.8 Riccarton Avenue (W Hospital) to Hagley Avenue (HCPB Access)

- 4.8.1 Similarly for this route, the TomTom data confirms that the Trial essentially appears to have had no effect on this Eastbound route, with negligible changes in travel time and despite some changes to the precise (A & D) phase times apparent from the SCATS monitoring (described above in **Table 3.1**).



5 Queue Length Observations

- 5.1 We appreciate that the travel time (impact) data above may appear somewhat 'abstract' to a lay reader. A more tangible 'high-level' view may be afforded by on-site observations.
- 5.2 Video surveillance throughout the observation period has been recorded using the Council's traffic light cameras. For example, **Figure 5.1** shows an example image captured from one such video.
- 5.3 This example shows (some of) the queue observed on the northbound Hagley Avenue approach to St Asaph Street during the Trial period (late evening peak). Closer inspection will confirm that this affected not only general traffic but also public transport and ambulances that use this route.

Figure 5.1: Indicative Queues during Trial on Hagley Avenue (Northbound Approach to St Asaph St)



(Image captured from Signalised Intersection video, looking South at 5:51pm Tuesday 31 October 2023, CCC)

- 5.4 The following screenshots have been taken from these video observations and show comparable conditions, prevailing at a specific moment.



- 5.5 The top left picture in **Figure 5.2** shows a Pre-Trial screenshot of Hospital Corner looking west (and thus any traffic queuing back from the Hospital/Riccarton Avenue signals further west), at approximately 4:40pm.
- 5.6 The bottom left picture shows the section of Hagley Avenue between St Asaph Street and Hospital Corner (looking north), at exactly the same time as the top left picture.
- 5.7 On the right-hand side are the equivalent pictures under the Trial conditions (i.e. with the closure of the nearside traffic lane from around the location of the HCPB to just west of the main Hospital signalled access). For reference, the approximate location of the HCPB access and proposed northern median island has been imposed on these lower pictures.
- 5.8 It is important to note that the 'Trial period' screenshots within all of the following observations, unlike in **Figure 5.1** above, are taken *after* the traffic phasing changes were made at Hospital Corner to provide *more* green time (and thus capacity), for the left turn from Hagley Avenue west into Riccarton Avenue.

Figure 5.2: Selected PM Peak Period Queue Observations (Tuesday 4:40pm)



- 5.9 The comparison above demonstrates both the increased length of queuing along Riccarton Avenue back from the Hospital access signals (as a result of reducing that approach to a single through lane), as well as the increased length of queuing along Hagley Avenue back from the Hospital Corner signals (as a result of reducing the left turn approach to a single lane), under the Trial
- 5.10 These pictures also illustrate how the extended queues north from St Asaph Street on Hagley Avenue under the Trial meant that emergency vehicles (whether under lights or not) faced increased delay accessing the Hospital under the Trial, particularly during the busiest (PM peak) period.



5.11 **Figure 5.3** below provides a similar picture from 5 minutes later: Indeed, a phase-by-phase examination of the video suggests that **in around 50% of phases between 16:45-17:45**, the extended queue along Riccarton Avenue under the Trial was sufficiently long to impede egress of vehicles from Hagley Avenue, in at least some point during the green signal. This further reduced the potential capacity of the northbound left turn into Riccarton Avenue and exacerbated the queues and delays shown in the lower right picture.

Figure 5.3: Selected PM Peak Period Queue Observations (Tuesday 4:45pm)



5.12 These conditions continued to prevail, confirmed by the similar picture again at 5:00pm:

Figure 5.4: Selected PM Peak Period Queue Observations (Tuesday 5:00pm)





5.13 Whilst a comparison around 10 minutes later still (**Figure 5.5** below) is again generally similar, it also demonstrates in particular how (given extended queues north from St Asaph Street on Hagley Avenue under the Trial), a potential alternative route to Riccarton Avenue for emergency vehicles, via Antigua St and Tuam St, could not provide a *reliable* faster alternative access to the Hospital, given the potential to encounter buses queuing within the single bus lane at Hospital Corner which would impede access further west (until the signals turn green)³.

Figure 5.5: Selected PM Peak Period Queue Observations (Tuesday 5:10pm)



³ A movie version of a real emergency incident occurring during the observation period is available for presentation and shows the potentially different conditions that could have been faced during the Trial - or if permanent implementation of on-street parking is pursued.



5.14 By around 5:20pm (**Figure 5.6** below) the delay and queuing on the westbound Riccarton Avenue approach to the Hospital main access signals under the Trial had started to ease a little, although queues on Hagley Avenue remained significantly greater than observed in the Pre-Trial period at a similar time:

Figure 5.6: Selected PM Peak Period Queue Observations (Tuesday 5:20pm)



5.15 By around 5:25pm (**Figure 5.6** below) the delay and queuing on the westbound Riccarton Avenue approach to the Hospital main access signals under the Trial were notably better, although queuing on Hagley Avenue remained (noting these still extended across the HCPB access, shown in blue):

Figure 5.7: Selected PM Peak Period Queue Observations (Tuesday 5:25pm)





5.16 This situation remained similar until past 5:30pm....

Figure 5.8: Selected PM Peak Period Queue Observations (Tuesday 5:30pm)



5.17 By 5:45pm however, conditions under the Trial, shown on the right-hand side of Figure 5.9, appeared to return to those observed in the Pre-Trial period, shown on the left-hand side. In other words, the reduced-capacity due to the Trial appeared adequate to cope with the reduced demand by this time:

Figure 5.9: Selected PM Peak Period Queue Observations (Tuesday 5:45pm)





6 Conclusions and Recommendations

6.1 Conclusions

- 6.1.1 The Trial was intended to demonstrate the impact(s) of potentially converting one of the two westbound traffic lanes on Hagley and Riccarton Avenues around Hospital Corner, to enable its use for on-street parking rather than traffic movement.
- 6.1.2 This demonstration was achieved by cordoning off this lane using Temporary Traffic Management (TTM) - traffic cones - between 25 October and 8 November 2023.
- 6.1.3 Data gathered over the Trial period has been compared to a Pre-Trial period of the two weeks, preceeding Labour Weekend (6 October-18 October 2023).
- 6.1.4 In the initial week of the Trial, significant additional queuing and delay arose during the weekday evening peak period as a result of the westbound capacity reduction (on Riccarton Avenue at the main Hospital access and on Hagley Avenue at Hospital Corner). These effects were sufficient to 'flow-back' and affect both the St Asaph and Hagley Avenue (northbound) approaches at the Hagley/St Asaph intersection.
- 6.1.5 As a result, the CCC Signals Team made some changes to the phasing at the Hospital Corner intersection (only) on 2 November, these going some way to mitigate the most-significant additional queuing and delay, by increasing the capacity of the westbound left turn from Hagley Avenue. However, the compromises made to enable this mitigation included that:
- Reduced time was available for the northbound Hagley Avenue combined through and right turn lane (to Oxford Terrace and Tuam Street), amounting to about a 25% reduction in (peak period) capacity for this specific movement; and
 - Increased delay⁴ for pedestrians and cyclists using the Riccarton Avenue crossings, as they could no longer complete the full crossing in a single phase devoted to their use alone.
- 6.1.6 Overall, over an average weekday, the Trial resulted in added average delay of only between about +6 and +12 seconds for movements west from St Asaph Street and Hagley Avenue respectively (and between +8 and +15 seconds for 85% of vehicles), when compared to the Pre-Trial period.
- 6.1.7 The most-significant effects were confined to the evening peak period (4-6pm), when travel through the local area could take 50-80% longer than with the Pre-Trial capacity. During this time, for 85% of vehicles, the added delay amounted to less than 2 additional minutes.
- 6.1.8 However, the observations confirmed that queuing in the area in the evening peak during the Trial remained at significant levels (compared to negligible queuing in the Pre-Trial comparison period), even after the mitigation noted in 6.1.5 were made.
- 6.1.9 These impose additional delay and, we suggest risk - given the most-affected routes are used by public transport routes (that account for about 45% of all Christchurch boardings),

⁴ Unfortunately, we have been unable to accurately quantify the extent of this, as (at times) the video surveillance available of pedestrian and cycle movements was compromised (inadequate quality or lack of view of full crossing due to vehicles queued in westbound bus lane). However, that there was added delay following the change in settings is readily apparent from the surveillance videos. An earlier CCC count of pedestrian and cyclist movements however (summarised in **Table 3.2**) indicates this could affect around 430 pedestrians and cyclists (during the morning peak hour for these movements) and 320 in the evening peak hour.



ambulance access to Christchurch Hospital – and vehicles seeking access to and from the now-opened Tū Waka-Waipapa, the new Hospital Car Park Building (HCPB).

6.1.10 Indeed, while the Trial has provided some very useful indications and data, we suggest that the Trial results should be considered in the light of a number of factors **not** taken into account when simply coning off the extent of the nearside traffic lanes in Hagley and Riccarton Avenues that might be used for potential additional on-street parking over the observation period. The key of these are:

- The HCPB was yet to open. As is Parakiore, the Metro Sports Facility (with an access off St Asaph Street west of Hagley Avenue).
- Even without the additional traffic likely to be attracted to the area by the new HCPB and, at some point in the future, Parakiore, peak traffic demands in the vicinity are currently a little way (5-10%) below pre-Covid levels. Given on-going recovery of the wider City and Central City, a gradual reduction in Working-from-Home etc. the local traffic demands may thus reasonably be expected to increase above the present levels, compared to those prevailing during the observation period.
- The use of traffic cones alone to replicate the space that could potentially be used for additional on-street parking cannot mimic the additional 'friction' that would occur when drivers park or unpark in practice (and when some drivers merely slow down to search for a park). The impact of this additional friction, in terms of further reducing capacity (and as a result increasing queuing and delay) for westbound through traffic, cannot be established with certainty, as it will depend upon a range of factors, such as potential parking controls.
- The northern-most median island in Hagley Avenue forming part of the HCPB access works approved by Council has not yet been constructed. The Hagley Avenue combined through/ right turn northbound lane at Hospital Corner will be reduced from about 130m to 60m in length as a result. This change will almost certainly extend the queues observed even further SW, particularly compared to those observed during the Trial period, if on-street parking is provided on the west side of Hagley Avenue.
- Given the queuing regularly observed during the Trial across the location of the new HCPB entry/exit (in the evening peak period), we consider it likely that should the on-street parking be permanently implemented, together with an open and more-fully utilised HCPB, some '**reverse priority**' would be likely to operate at times at this HCPB exit, with northbound drivers on Hagley Avenue in standing or slow-moving queues providing courtesy gaps to allow users of the HCPB to exit to the north. Whilst (some) drivers provide such gaps as a courtesy, seldom do they consider the impact this can have on extending queuing and delay behind them – which, in near or over-capacity situations, such as that evidenced during the Trial during the weekday PM peak, may be significant.

6.1.11 It should be noted that *each* of the above factors will essentially result in increased delays and queuing, compared to that revealed by the Trial.

6.1.12 Even without the above factors, whilst we consider that the overall delays, considered over a whole day under current traffic demands, to be relatively 'minor' (particularly in the context of the Central City and particular average overall travel times for journeys using the Hagley Avenue-Riccarton Avenue route), we suggest that the location of this Trial warrants particular



consideration of the potential impacts likely to occur in the evening peak period:

- Ambulance access to the Hospital would, in our view, inevitably be compromised (during weekday evening peak periods) to a significant degree (particularly when employed on emergency call-outs);
- Access, and particularly egress from Tū Waka-Waipapa, the new Hospital Car Park Building (HCPB) in our judgment will be significantly compromised during the same periods, should on-street parking on the west side of Hagley Avenue be pursued (with a consequential reduction to one through northbound lane). This is likely to negatively impact on the perceived accessibility and attractiveness of this parking resource. We suggest that this might be viewed as a somewhat perverse result and counter to the objectives of providing more parking for Hospital users overall, given the relative scale of parking provided (the HCPB providing around 10 times more spaces than the potential additional on-street parking – albeit slightly more remote from the Hospital)

6.2 Recommendations

6.2.1 In light of the above conclusions (and purely confined based on our technical judgment of the traffic and transport data) we cannot recommend that on-street parking be implemented permanently in the nearside traffic lanes on the west side Hagley Avenue (N of St Asaph Street) and on the south side of Riccarton Avenue (between Hagley Avenue and just W of the main access to Christchurch Hospital).

6.2.2 We therefore recommend that the existing (Pre-Trial) layout be retained.



Appendix A: Journey Times by Day (Monday-Friday Peak Hours Only)

(Refer to Table 4.1 for diagrams indicating start and finish points used for each route)



Table A.1: Route 1 - St Asaph Street (W Antigua) to Riccarton Avenue (W Hospital)

Day	7:45-8:45		16:30-17:30		Notes
	Sample Size	Journey Time (Mean) (85%ile)	Sample Size	Journey Time (Mean) (85%ile)	
Fri 6 Oct	24	00:01:53	46	00:01:51	
Mon 9 Oct	43	00:01:37	75	00:01:56	
Tues 10 Oct	47	00:01:40	59	00:01:52	
Wed 11 Oct	32	00:01:38	85	00:02:07	Slightly abnormal (higher) PM TT on Wednesdays (netball demands)
Thurs 12 Oct	36	00:01:39	104	00:02:04	Reasonable PM TT despite high sample (demand) on this day relative to others
Fri 13 Oct	31	00:01:38	69	00:01:51	
Mon 16 Oct	28	00:01:37	61	00:01:57	
Tues 17 Oct	42	00:01:43	68	00:01:51	< Video Example
Weds 18 Oct	39	00:01:41	84	00:01:59	
Thurs 19 Oct	35	00:01:46	74	00:01:59	
Weds 25 Oct	29	00:01:37	52	00:04:15	Very poor PM TT (first day of Trial, and Netball)
Thurs 26 Oct	33	00:01:51	55	00:03:12	
Fri 27 Oct	33	00:01:40	42	00:02:10	
Mon 30 Oct	33	00:01:48	49	00:04:22	Exceptionally poor TT in PM peak
Tues 31 Oct	31	00:01:41	55	00:04:15	<Video (not used, PM TT abnormally poor)
Weds 1 Nov	21	00:01:45	73	00:02:52	
Thurs 2 Nov	36	00:01:33	55	00:02:06	
Fri 3 Nov	41	00:01:38	64	00:02:46	
Mon 6 Nov	33	00:01:39	71	00:02:08	
Tues 7 Nov	31	00:01:35	58	00:02:13	< Video Example (nb Better than average for post-change)
Weds 8 Nov	43	00:01:40	74	00:03:02	
Pre-Trial (10 days)	357	00:01:41	725	00:01:58	Note reasonable TT in PM peak c.f. AM Peak, despite much higher sample (demand)
Trial (10 days)	321	00:01:40	574	00:03:00	Significant reduction in PM sample (throughput?) c.f. Pre-Trial - and higher delays
Trial (5 days pre 2 Nov)	151	00:01:45	274	00:03:22	Very poor in PM Peak, and high variation (85%ile)
Trial (5 days post 2 Nov)	184	00:01:37	322	00:02:29	Higher PM delays c.f. Pre-Trial despite reduction in sample/throughput (per day)

Table A.2: Route 2 - Hagley Avenue (N Selwyn) to Riccarton Avenue (W Hospital)

Day	7:45-8:45		16:30-17:30		Notes
	Sample Size	Journey Time (Mean) (85%ile)	Sample Size	Journey Time (Mean) (85%ile)	
Fri 6 Oct	7	00:01:43	10	00:02:00	
Mon 9 Oct	11	00:01:57	11	00:02:03	
Tues 10 Oct	9	00:02:08	15	00:01:59	
Wed 11 Oct	6	00:01:53	21	00:02:07	Slightly abnormal PM sample on Wednesdays (netball demands)
Thurs 12 Oct	6	00:01:59	14	00:02:07	Reasonable PM TT despite high sample (demand) on this day relative to others
Fri 13 Oct	9	00:01:45	11	00:02:04	
Mon 16 Oct	10	00:01:41	11	00:02:05	
Tues 17 Oct	9	00:01:58	12	00:01:45	< Video Example
Weds 18 Oct	15	00:01:45	12	00:02:15	
Thurs 19 Oct	7	00:02:06	16	00:02:14	
Weds 25 Oct	11	00:01:44	3	00:07:07	Very poor PM TT (first day of Trial, and Netball)
Thurs 26 Oct	11	00:01:50	7	00:03:25	
Fri 27 Oct	13	00:01:52	14	00:02:20	
Mon 30 Oct	6	00:01:47	2	00:02:44	PM TT - Sample v low & unreliable (no throughput indicates likely v high delay)
Tues 31 Oct	9	00:01:48	0	00:00:00	<Video (not used, PM abnormally high congestion - no sample!!!!)
Weds 1 Nov	6	00:02:05	13	00:03:38	Still v high PM TT (netball day)
Thurs 2 Nov	10	00:01:45	10	00:02:19	
Fri 3 Nov	10	00:01:32	14	00:03:10	
Mon 6 Nov	7	00:01:34	13	00:02:25	
Tues 7 Nov	9	00:01:30	6	00:02:38	< Video Example (nb Better than average for post-change)
Weds 8 Nov	13	00:01:26	3	00:03:14	
Pre-Trial (10 days)	89	00:01:53	133	00:02:04	Note reasonable TT in PM peak c.f. AM Peak, despite much higher sample (demand)
Trial (10 days)	92	00:01:44	82	00:03:00	Significant reduction in PM sample (throughput?) c.f. Pre-Trial - and higher delays
Trial (5 days pre 2 Nov)	45	00:01:52	36	00:03:02	Very poor in PM Peak, and high variation (85%ile)
Trial (5 days post 2 Nov)	49	00:01:33	46	00:02:42	Higher PM delays c.f. Pre-Trial despite reduction in sample/throughput (per day)

^a Note better AM TT post-change in signals at Hospital Corner



Table A.3: Route 3 - Hagley Avenue (N Selwyn) to Tuam Street (W Antigua)

Route		3		Hagley-Tuam					
		7:45-8:45		16:30-17:30					
		AM Peak Hour		PM Peak Hour					
Day	Sample Size	Journey Time (Mean)	Journey Time (85%ile)	Sample Size	Journey Time (Mean)	Journey Time (85%ile)	Notes		
Fri 6 Oct	13	00:01:01	00:01:44	16	00:01:05	00:01:38			
Mon 9 Oct	24	00:01:30	00:02:01	12	00:01:13	00:01:39			
Tues 10 Oct	22	00:01:39	00:01:53	19	00:01:23	00:01:37			
Wed 11 Oct	14	00:01:22	00:01:52	24	00:01:37	00:01:56	Slightly abnormal PM sample & TT on Wednesdays (netball demands)		
Thurs 12 Oct	27	00:01:20	00:01:43	23	00:01:26	00:01:43			
Fri 13 Oct	11	00:01:28	00:01:48	15	00:01:15	00:01:37			
Mon 16 Oct	16	00:01:41	00:02:05	17	00:01:30	00:01:52			
Tues 17 Oct	22	00:01:42	00:02:05	7	00:01:33	00:01:57	< Video Example (slightly worse delays than 'average' Pre-Trial workday)		
Weds 18 Oct	23	00:01:17	00:01:42	20	00:01:41	00:01:58			
Thurs 19 Oct	13	00:01:27	00:01:49	25	00:01:18	00:01:47			
Weds 25 Oct	25	00:01:30	00:01:52	11	00:01:58	00:02:51	Very poor PM TT (first day of Trial, and Netball)		
Thurs 26 Oct	20	00:01:35	00:01:59	19	00:01:59	00:02:42			
Fri 27 Oct	18	00:01:32	00:02:02	22	00:01:22	00:01:39			
Mon 30 Oct	22	00:01:41	00:01:59	9	00:02:00	00:02:35	PM TT - Sample v low & unreliable (no throughput indicates likely v high delay)		
Tues 31 Oct	17	00:01:26	00:01:56	12	00:01:54	00:02:35	<Video (not used)		
Weds 1 Nov	13	00:02:01	00:03:16	11	00:01:37	00:02:08			
Thurs 2 Nov	24	00:01:37	00:02:03	16	00:01:45	00:02:43			
Fri 3 Nov	15	00:01:33	00:01:58	16	00:01:41	00:02:36			
Mon 6 Nov	16	00:01:24	00:01:50	9	00:01:16	00:01:43			
Tues 7 Nov	25	00:02:00	00:02:45	14	00:01:45	00:02:10	< Video Example (nb about average for post-change)		
Weds 8 Nov	19	00:01:50	00:02:33	12	00:01:55	00:02:46			
Pre-Trial (10 days)	185	00:01:27	00:01:52	178	00:01:25	00:01:47	Note similar Demand and TT PM peak c.f. AM Peak		
Trial (10 days)	195	00:01:38	00:02:09	139	00:01:43	00:02:21	Reduction in PM sample (throughput?) c.f. Pre-Trial - and higher delays		
Trial (5 days pre 2 Nov)	90	00:01:38	00:02:10	73	00:01:44	00:02:16			
Trial (5 days post 2 Nov)	99	00:01:43	00:02:17	67	00:01:42	00:02:27	Reduction in capacity (post Nov 2) introduced more variability (higher 85%ile TT)		

Table A.4: Route 4 - Hagley Avenue (N Selwyn) to Oxford Terrace (Outside Outpatients)

Route		4		Hagley-Oxford				NOTE VERY SMALL SAMPLES BY DAY (& HOUR) - CAUTION	
		7:45-8:45		16:30-17:30					
		AM Peak Hour		PM Peak Hour					
Day	Sample Size	Journey Time (Mean)	Journey Time (85%ile)	Sample Size	Journey Time (Mean)	Journey Time (85%ile)	Notes		
Fri 6 Oct	3	00:02:22	00:02:52	0	00:00:00	00:00:00			
Mon 9 Oct	5	00:01:53	00:03:38	0	00:00:00	00:00:00			
Tues 10 Oct	4	00:01:52	00:02:34	2	00:01:11	00:01:19			
Wed 11 Oct	1	00:01:33	00:01:33	1	00:02:36	00:02:36	Slightly abnormal PM sample & TT on Wednesdays (netball demands)		
Thurs 12 Oct	2	00:00:58	00:01:06	5	00:02:10	00:03:10	Note high 85%ile, but low sample		
Fri 13 Oct	3	00:01:19	00:02:45	4	00:01:23	00:01:35			
Mon 16 Oct	2	00:01:51	00:02:05	0	00:00:00	00:00:00	No PM Sample		
Tues 17 Oct	3	00:01:44	00:01:52	3	00:01:31	00:02:09	< Video Example (slightly worse delays than 'average' Pre-Trial workday)		
Weds 18 Oct	5	00:01:56	00:03:35	0	00:00:00	00:00:00	No PM sample		
Thurs 19 Oct	1	00:00:47	00:00:47	0	00:00:00	00:00:00	No PM sample, Single AM trip shows variability possible!		
Weds 25 Oct	4	00:01:24	00:02:20	0	00:00:00	00:00:00	No PM Sample		
Thurs 26 Oct	3	00:02:25	00:03:11	2	00:01:57	00:02:46			
Fri 27 Oct	4	00:01:36	00:01:57	2	00:01:16	00:01:16			
Mon 30 Oct	5	00:01:18	00:01:35	1	00:02:08	00:02:08	PM TT - Sample v low & unreliable (no throughput indicates likely v high delay)		
Tues 31 Oct	5	00:01:19	00:01:45	2	00:01:23	00:01:59	<Video (not used)		
Weds 1 Nov	5	00:01:45	00:02:35	2	00:01:43	00:02:10			
Thurs 2 Nov	4	00:02:41	00:03:15	1	00:02:19	00:02:19	Only single PM sample, indicative of potential variability		
Fri 3 Nov	2	00:02:13	00:03:16	1	00:01:24	00:01:24	Only single PM sample, indicative of potential variability		
Mon 6 Nov	0	00:00:00	00:00:00	2	00:01:57	00:02:08	No AM Sample		
Tues 7 Nov	6	00:01:26	00:02:01	2	00:01:58	00:02:15	< Video Example (nb about average for post-change)		
Weds 8 Nov	4	00:02:20	00:03:34	1	00:02:55	00:02:55			
Pre-Trial (10 days)	29	00:01:45	00:02:40	15	00:01:44	00:02:15	Note similar Demand and TT PM peak c.f. AM Peak		
Trial (10 days)	38	00:01:42	00:02:19	15	00:01:45	00:02:04	Reduction in PM sample (throughput?) c.f. Pre-Trial - and higher delays		
Trial (5 days pre 2 Nov)	22	00:01:37	00:02:08	9	00:01:38	00:02:03			
Trial (5 days post 2 Nov)	16	00:02:04	00:02:52	7	00:02:04	00:02:12	Reduction in capacity (post Nov 2) introduced more variability (higher 85%ile TT AM)		



Table A.5: Route 5 - Riccarton Avenue (W Hagley) to Hospital Main Access (N Riccarton Avenue)

Route		5		Right Turn into Hospital from Riccarton Av (from Hos		NOTE VERY SMALL SAMPLES BY DAY (& HOUR) - CAUTION	
		7:45-8:45		16:30-17:30			
		AM Peak Hour		PM Peak Hour			
Day	Sample Size	Journey Time (Mean)	Journey Time (85%ile)	Sample Size	Journey Time (Mean)	Journey Time (85%ile)	Notes
Fri 6 Oct	7	00:00:25	00:00:28	9	00:00:26	00:00:28	
Mon 9 Oct	8	00:00:23	00:00:26	6	00:00:30	00:01:05	Note highly variable PM (85%ile)
Tues 10 Oct	13	00:00:29	00:00:34	6	00:00:21	00:00:28	
Wed 11 Oct	8	00:00:36	00:01:02	13	00:00:29	00:01:03	Slightly abnormal PM sample & TT on Wednesdays (netball demands)
Thurs 12 Oct	8	00:00:27	00:00:26	6	00:00:20	00:00:23	
Fri 13 Oct	7	00:00:29	00:00:30	11	00:00:26	00:00:28	
Mon 16 Oct	8	00:00:26	00:00:36	5	00:00:31	00:00:47	
Tues 17 Oct	11	00:00:38	00:01:12	5	00:00:26	00:00:31	< Video Example (slightly worse delays than 'average' Pre-Trial workday)
Weds 18 Oct	7	00:00:29	00:00:35	6	00:00:32	00:01:14	
Thurs 19 Oct	11	00:00:31	00:01:10	3	00:00:21	00:00:22	
Weds 25 Oct	8	00:00:38	00:00:37	9	00:00:37	00:01:07	Very poor PM TT (first day of Trial, and Netball)
Thurs 26 Oct	9	00:00:33	00:00:50	3	00:00:59	00:01:22	
Fri 27 Oct	7	00:00:28	00:00:32	5	00:00:22	00:00:24	
Mon 30 Oct	8	00:00:28	00:00:38	4	00:00:34	00:00:50	
Tues 31 Oct	11	00:00:26	00:00:35	9	00:00:43	00:00:59	<Video (not used)
Weds 1 Nov	7	00:00:31	00:00:43	5	00:00:41	00:01:23	
Thurs 2 Nov	5	00:00:35	00:00:44	8	00:00:31	00:00:38	
Fri 3 Nov	5	00:00:35	00:01:09	7	00:00:36	00:00:50	
Mon 6 Nov	5	00:00:28	00:00:36	7	00:00:35	00:00:36	
Tues 7 Nov	16	00:00:29	00:00:36	4	00:00:36	00:01:01	< Video Example (nb mean about average for post-change, but 85%ile higher)
Weds 8 Nov	12	00:00:40	00:00:51	2	00:00:43	00:00:52	
Pre-Trial (10 days)	88	00:00:30	00:00:44	70	00:00:27	00:00:42	Note similar Demand and TT PM peak c.f. AM Peak
Trial (10 days)	81	00:00:31	00:00:41	61	00:00:37	00:00:54	nb 10-12sec delay c.f. Pre-Trial (over this section)
Trial (5 days pre 2 Nov)	42	00:00:29	00:00:40	26	00:00:39	00:00:58	
Trial (5 days post 2 Nov)	43	00:00:33	00:00:45	28	00:00:35	00:00:45	Mean additional Trial delay reduced to 7 secs post-change - on this section only!

Table A.6: Route 6 - Riccarton Avenue (W Hospital) to Tuam Street (W Antigua)

Route		6		Riccarton-Tuam Ebnd			
		7:45-8:45		16:30-17:30			
		AM Peak Hour		PM Peak Hour			
Day	Sample Size	Journey Time (Mean)	Journey Time (85%ile)	Sample Size	Journey Time (Mean)	Journey Time (85%ile)	Notes
Fri 6 Oct	103	00:01:02	00:01:27	109	00:01:01	00:01:23	
Mon 9 Oct	123	00:01:09	00:01:31	103	00:00:56	00:01:15	Note highly variable PM (85%ile)
Tues 10 Oct	100	00:02:16	00:03:28	103	00:00:57	00:01:17	
Wed 11 Oct	105	00:01:12	00:01:39	104	00:01:09	00:01:38	Slightly abnormal PM sample & TT on Wednesdays (netball demands)
Thurs 12 Oct	99	00:01:03	00:01:29	114	00:01:02	00:01:30	
Fri 13 Oct	92	00:01:26	00:02:23	109	00:01:01	00:01:24	
Mon 16 Oct	97	00:01:07	00:01:31	100	00:00:56	00:01:17	
Tues 17 Oct	70	00:03:34	00:04:45	97	00:00:59	00:01:21	< Video Example (slightly worse delays than 'average' Pre-Trial workday)
Weds 18 Oct	107	00:01:25	00:02:00	114	00:01:34	00:02:26	Note high PM variability this (netball) day
Thurs 19 Oct	116	00:01:18	00:01:50	132	00:00:59	00:01:19	Note high PM sample on this day of others
Weds 25 Oct	101	00:01:36	00:02:18	110	00:00:59	00:01:23	
Thurs 26 Oct	101	00:01:17	00:01:51	97	00:01:08	00:01:38	
Fri 27 Oct	114	00:01:46	00:02:38	119	00:01:10	00:01:35	
Mon 30 Oct	98	00:01:30	00:02:34	109	00:00:57	00:01:19	
Tues 31 Oct	92	00:01:55	00:03:13	120	00:01:30	00:02:32	<Video (not used, but higher-than-normal AM & PM variability on this day)
Weds 1 Nov	110	00:01:53	00:02:45	109	00:01:26	00:02:34	
Thurs 2 Nov	114	00:01:07	00:01:37	120	00:01:00	00:01:24	
Fri 3 Nov	108	00:01:05	00:01:40	123	00:00:54	00:01:18	
Mon 6 Nov	119	00:01:04	00:01:31	104	00:00:55	00:01:18	
Tues 7 Nov	109	00:01:07	00:01:46	94	00:00:57	00:01:18	< Video Example (similar to post-change average workday PM)
Weds 8 Nov	123	00:01:05	00:01:32	121	00:01:04	00:01:36	
Pre-Trial (10 days)	1012	00:01:29	00:02:06	1085	00:01:04	00:01:29	Note similar sample but higher TT AM peak c.f. PM Peak
Trial (10 days)	1066	00:01:25	00:02:10	1105	00:01:06	00:01:38	Minimal impact c.f. Pre-Trial
Trial (5 days pre 2 Nov)	515	00:01:40	00:02:36	554	00:01:15	00:01:56	
Trial (5 days post 2 Nov)	573	00:01:06	00:01:37	562	00:00:58	00:01:23	Minimal impact c.f. Pre-Trial (and appears slightly better post-change)

^a Note much lower post-change TT in AM peak & reduced variability (mean-85%ile difference)



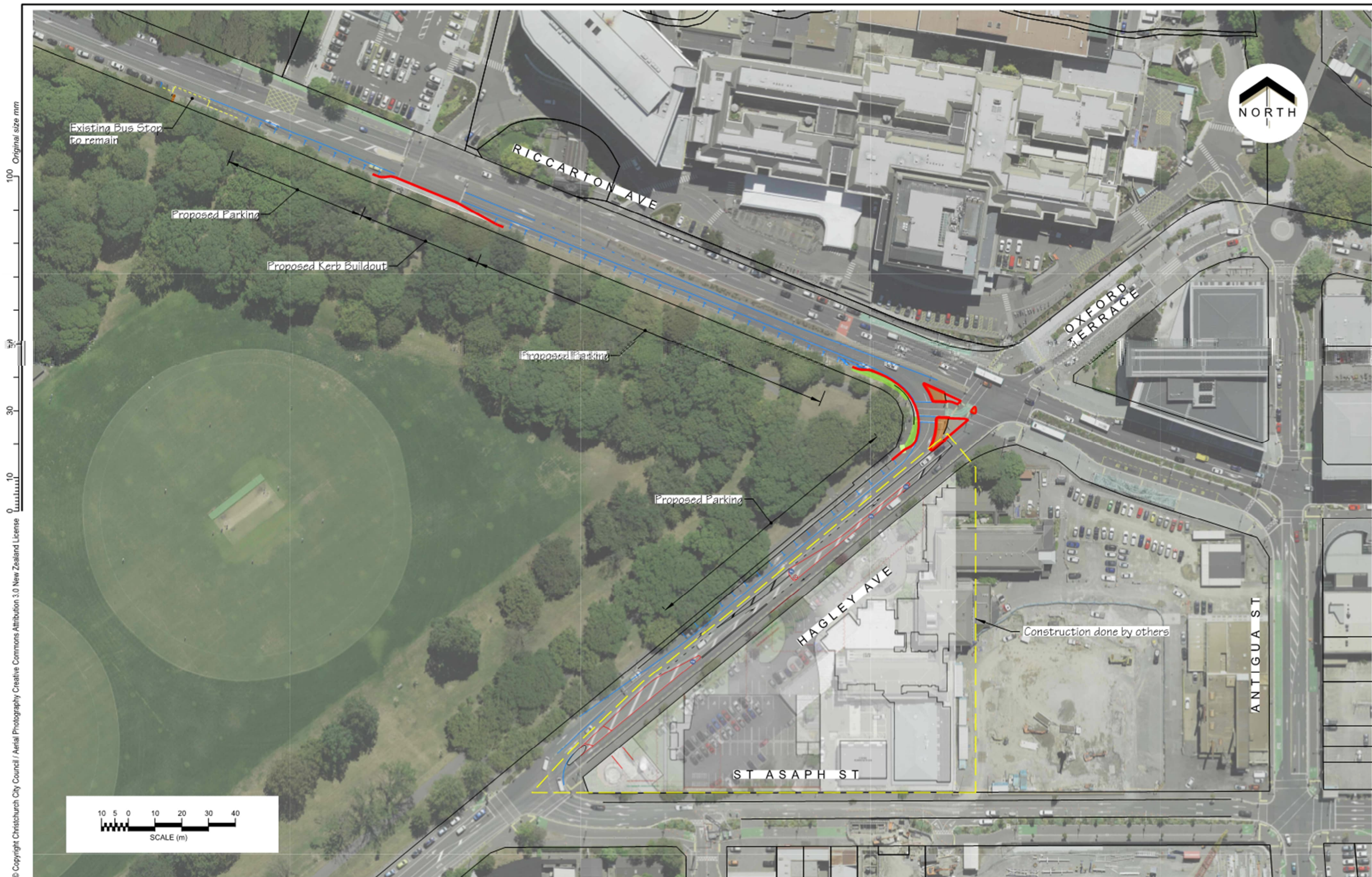
Table A.7: Route 7 - Riccarton Avenue (W Hospital) to Hagley Avenue (HCPB Access)

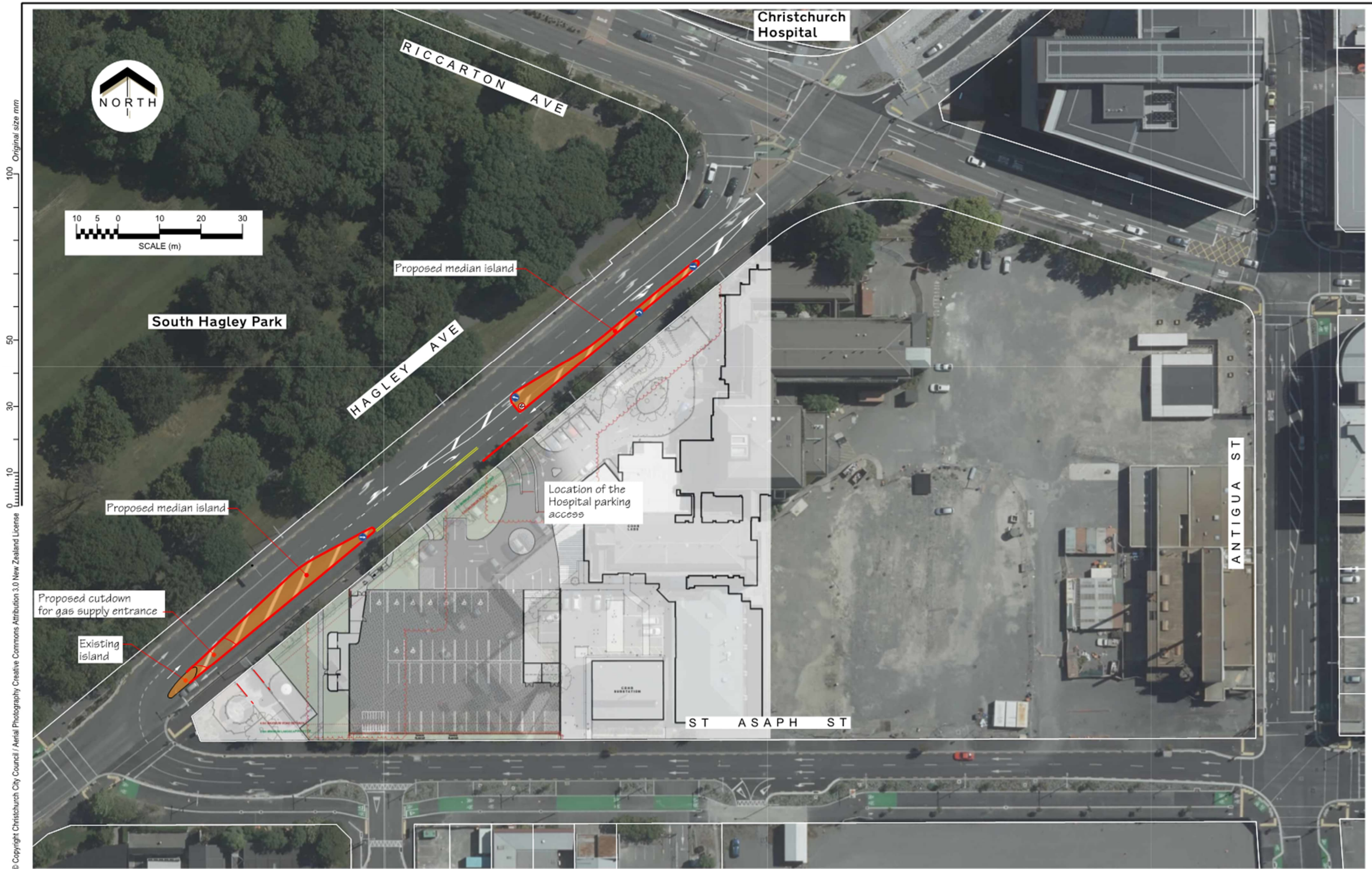
Route		7		Riccarton-Hagley Ebnd		NOTE VERY SMALL SAMPLES BY DAY (& HOUR) - CAUTION	
		7:45-8:45		16:30-17:30			
		AM Peak Hour		PM Peak Hour			
Day	Sample Size	Journey Time (Mean)	Journey Time (85%ile)	Sample Size	Journey Time (Mean)	Journey Time (85%ile)	Notes
Fri 6 Oct	2	00:00:50	00:00:59	9	00:00:46	00:00:58	
Mon 9 Oct	13	00:01:05	00:01:31	2	00:00:57	00:01:07	
Tues 10 Oct	4	00:02:43	00:03:26	14	00:00:50	00:01:07	
Wed 11 Oct	7	00:01:20	00:01:28	10	00:01:07	00:01:20	
Thurs 12 Oct	8	00:00:51	00:01:21	8	00:00:49	00:01:00	
Fri 13 Oct	7	00:01:09	00:02:05	5	00:00:50	00:01:06	
Mon 16 Oct	9	00:00:56	00:01:20	6	00:00:43	00:00:56	
Tues 17 Oct	7	00:02:56	00:02:46	3	00:01:00	00:01:31	< Video Example (good representation of 'average' Pre-Trial TTs)
Weds 18 Oct	5	00:01:26	00:02:53	17	00:01:30	00:02:36	Note high PM variability this (netball) day
Thurs 19 Oct	5	00:01:26	00:01:55	7	00:01:11	00:01:32	Note high PM sample on this day cf others
Weds 25 Oct	8	00:01:22	00:01:55	11	00:01:07	00:01:29	
Thurs 26 Oct	12	00:01:00	00:01:30	6	00:01:07	00:01:43	
Fri 27 Oct	8	00:01:46	00:03:22	12	00:00:58	00:01:45	
Mon 30 Oct	13	00:01:16	00:01:55	10	00:01:04	00:01:21	
Tues 31 Oct	7	00:01:33	00:01:46	10	00:01:22	00:02:10	<Video (not used.)
Weds 1 Nov	8	00:01:53	00:02:34	13	00:01:29	00:02:44	Note v high PM 85%ile this day (netball)
Thurs 2 Nov	3	00:00:50	00:01:03	6	00:01:21	00:02:32	Note v high PM 85%ile this day - but low sample so unreliable
Fri 3 Nov	8	00:01:04	00:01:09	12	00:01:10	00:01:29	
Mon 6 Nov	10	00:01:03	00:01:16	7	00:00:47	00:00:58	
Tues 7 Nov	9	00:01:02	00:01:29	7	00:00:57	00:01:13	< Video Example (PM slightly better than post-change average workday PM)
Weds 8 Nov	5	00:01:28	00:03:29	11	00:00:50	00:01:13	
Pre-Trial (10 days)	67	00:01:24	00:01:53	81	00:01:02	00:01:28	Note similar sample but higher TT AM peak c.f. PM Peak
Trial (10 days)	86	00:01:17	00:01:49	94	00:01:09	00:01:46	Minimal impact c.f. Pre-Trial
Trial (5 days pre 2 Nov)	48	00:01:26	00:02:08	51	00:01:13	00:02:00	
Trial (5 days post 2 Nov)	35	00:01:05	00:01:36	43	00:01:01	00:01:26	Minimal impact c.f. Pre-Trial (and appears slightly better post-change)

^a Note lower post-change TT in AM peak & reduced variability (mean-85%ile difference)



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Hagley Ave - Proposed Hospital Carpark
 Proposed Median and Roadmarkings
 For Committee Approval

Attachment A
 Designed by: MT Approved by: WG

Original Plan Size: A3
 ISSUE.1 03/08/2021
 TG140735 MJR



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Hagley Ave - Riccarton Ave
 Proposed Part time Clearway
 For Information

Original Plan Size: A3
 ISSUE: 06/07/2023
 TG146301 MJR