14. TRAFFIC CONGESTION MANAGEMENT

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PURPOSE OF REPORT

1. The purpose of this report is to provide information to the Council on the status of traffic congestion within the city following the implementation of numerous improvements at strategic locations.

EXECUTIVE SUMMARY

2. Councillors will recall that in July 2011, staff advised the Council of around 60 initiatives specifically targeted at reducing traffic congestion post 22 February 2011. Most of these initiatives involved changes to lane configurations at significant intersections to recognise changes in travel patterns and elevated levels of congestion. Each change had an associated tenure; while some were deemed permanent others were considered only necessary or warranted while congestion and travel patterns remained altered as a consequence of the effects of the earthquake. Monitoring of these measures is therefore necessary to ensure they are both effective and are still required.

3. Table 1 shows the complete list of measures that were ultimately implemented, together with the anticipated duration and a comment with respect to the current status. Note that the item Bealey Avenue/Harper Avenue/Park Terrace is the subject of a specific request for detailed information and this has been provided in Section 4.

(See Table 1 next page.)

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Table 1

Project	Description	Status at July 2011	Duration	Comment at March 2012
Fitzgerald Avenue North of Avonside Drive	Road subsidence and bridge damage repairs interim solution involves two lanes contra-flow on the east side of Fitzgerald Avenue.	COMPLETE	Until road repairs are complete	Still required Working effectively
Main North Road / Cranford Street	Extension of the two south bound lanes on Main North Road to improve intersection clearance capacity and reduce left turn queues out of Cranford Street. Shared use path to be installed on eastern footpath.	COMPLETE	Until Pre-quake travel patterns are realised	Still required Working effectively
Fitzgerald Avenue at Avonside Drive	Road subsidence and bridge damage repairs interim solution involves two lanes contra-flow on the east side of Fitzgerald Avenue including and north Avonside Drive / Kilmore Street intersection. (Left turn only in and out of Avonside Drive and Kilmore Street).	COMPLETE	Until road repairs are complete	Still required Working effectively
Idris Road / Straven Road / Fendalton Road	Ban Right Turns on Straven and Idris Road approaches to accommodate two through lanes to increase intersection capacity.	REMOVED	Scheme Removed and intersection changed back to pre-quake layout	No Longer Required
Main North Road / Northcote Road approach	Remove parking on Northcote Road west of the intersection to create a kerb side cycle lane and a wide traffic lane for merging.	COMPLETE	Permanent	Still required Working effectively
Hills Road / North Avon Road	Install no stopping and mark two lanes on North Avon Road approach to the intersection.	COMPLETE	Permanent	Still required Working effectively
Clarence Street / Whiteleigh Avenue	Extend two traffic lanes on Clarence Street south approach and departure side of the intersection to increase intersection capacity.	COMPLETE	Permanent	Still required Working effectively
Ferry Road at Rutherford Street	Reconfigure lanes with dedicated left, through and right.	COMPLETE	Removed	No Longer Required
Idris Road / Glandovey Road	Flow regulating using stop/go person to improve the efficiency of the roundabout.	COMPLETE (ceased on 1 May)	Removed	No Longer Required
Riccarton Road / Clarence Street	Extend two approach lanes on Clarence Street south of Riccarton Road, prevent right turns into private access-ways and Nelson Street.	REMOVED	Scheme Removed and section of road changed back to pre quake layout	No Longer Required
Bridle Path Road at Port Hills Road	Increase corner radii to facilitate heavy vehicles.	COMPLETE	Permanent	Still required Working effectively
Curletts Road (Main South Road to Blenheim Road)	Remove flush median and refuge islands to enable a third lane to be installed and operated on a tidal basis (NZTA project).	COMPLETE	NZTA controlling this scheme.	Still required Working effectively

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Project	Description	Status at July 2011	Duration	Comment at March 2012
Greers Road / Harewood Road	Signal phasing changes and changes to lane configuration on the north east Greers Road approach to improve intersection capacity – no stopping on departure side.	COMPLETE	Permanent	Still required Working effectively
Papanui Road at Bealey Avenue	Dual right turn lanes from Papanui Road into Bealey Avenue.	COMPLETE	Removed	No Longer Required
Hospital Parking	Remove parking on grass berm enforce two hour time limit - to create turnover for visitor parking.	COMPLETE	Permanent	No Longer Required
Hagley Park (within park) Shared Use Lanes	Priority repairs of shared use lanes in North Hagley Park to improve level of service and connectivity for cyclists.	COMPLETE	Permanent	No Longer Required
Antigua Street / Tuam Street / Riccarton Avenue	Priority repairs to Oxford Terrace at pedestrian tunnel investigate possible Bailey Bridge - Oxford Terrace Road repairs. Works completed Oxford Terrace now re-opened.	COMPLETE	Permanent	No Longer Required
Riccarton Road (Deans Avenue to Bartlett Street)	Lengthen east bound approach lanes to roundabout.	COMPLETE	Permanent	Still required Working effectively
Durham Street South at Brougham Street	Change lane configuration to favour changed volume splits, remove parking and install Give-way controls on side roads.	COMPLETE	Permanent	Still required Working effectively
Moorhouse Avenue / Barbadoes Street	Change lane configuration to favour changed volume splits.	COMPLETE	Until original route capacity is restored	Still required Working effectively
Hills Road, Southbound approach to North Avon Road	Signage for southbound traffic to indicate alternative route using Stanmore Road.	COMPLETE	Until Pre-quake travel patterns are realised	Still required Working effectively
Science Alive Clock Tower	Cycle routes: shared cycle lane / pedestrian path around barriers.	COMPLETE	Until building repairs are complete	Removed
Antigua Bridge at Boat Shed	Cycle routes: Hospital detour.	REMOVED	Hospital detour has been removed and cyclists now directed to shared use path on Montreal Street	Still required Working effectively
Bealey Avenue Cycle Lanes	Cycle routes: remove parking during peak periods 6-9am and 4-6pm and install cycle lanes.	COMPLETE	Removed	NA
Blenheim Road Cycle Lanes	Cycle routes: Remove parking & install cycle lanes (NZTA project).	COMPLETE	Permanent	Still required Working effectively

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Project	Description	Status at July 2011	Duration	Comment at March 2012
Riccarton Road (Matipo Street to Mandeville Street)	Provide additional bus stop space and install sections of flush median to improve traffic flow along Riccarton Road by assisting right turn function.	COMPLETE	Permanent	Still required Working effectively
St Asaph Street- Madras Street contra-flow cycle lane	Provide eastbound contra-flow cycle from Durham Street to High Street.	COMPLETE	Until alternative east/west cycle links are opened	Still required Working effectively
Strowan Road / Glandovey Road / Rossall Street / Heaton Street	Widen right turn bay on Strowan Road to assist through lane traffic.	COMPLETE	Until Pre-quake travel patterns are realised	Still required Working effectively
Durham Street South / Moorhouse Avenue	Lane marking changes to increase Left Turn capacity from Durham into Moorhouse.	COMPLETE	Permanent	Still required
Riccarton Road / Riccarton Avenue / Deans Avenue	Cross hatching within intersection to discourage blocking.	COMPLETE	Trial (being monitored)	Will not be remarking
Bealey Avenue/ Carlton Mill Road / Harper Avenue / Park Terrace	Ban Right Turn from Harper Avenue for benefit of Bealey Avenue traffic flows.	COMPLETE	Until original route capacity is restored	Still required Working effectively
Grasmere Street	Extension of no stopping restriction to allow left turners on Grasmere Street to access intersection.	COMPLETE	Permanent	Still required Working effectively
Hills Road at Dudley Street	Extension of no stopping restriction and relocation of cycle lane to kerbside.	COMPLETE	Until site is rebuilt	Still required Working effectively
Main North Road at Barnes Road intersection	Installation of no stopping restrictions.	COMPLETE	Permanent	Still required Working effectively
Main South Road (Yaldhurst Road to Craven Street)	Installation of no stopping restrictions.	COMPLETE	Permanent	Still required Working effectively
Yaldhurst Road - Curletts to Main South	Relocate Bus stop and install no stopping restrictions.	COMPLETE	Permanent	Still required Working effectively

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4. Right Turn from Harper Avenue into Park Terrace

4.1 Background

During the period following the 22 February 2011 earthquake, traffic volumes were not at normal levels, and some key roads (including Kilmore Street and Salisbury Street) were closed. This resulted in huge volumes of traffic using Bealey Avenue, instead of the Kilmore Street and Salisbury Street one-way pair.

The previous controls used at the intersection of Bealey/Carlton/Harper/Park were not suitable to handle this redistribution of traffic. For this reason, the wording of the strategic routes report read *"The right turn movement from Harper Avenue into Park Terrace be banned; until such a time as the one way east west network of Salisbury Street, Kilmore Street, Lichfield Street and St Asaph Street is fully operative".*

These roads are not yet all fully operative. At present, the only way to move from the central-eastern suburbs (e.g. Linwood, Dallington etc) to the western side of town is via Bealey Avenue. This traffic would have previously used Kilmore Street, and entered the Bealey/Carlton/Harper/Park intersection from the Park Terrace approach. Now, traffic heading to the west uses Bealey Avenue.

4.2 Information requested

There are two main considerations before we would recommend returning the signals control to that used before 22 February 2011. These are:

- Traffic Volumes and Flow
- Intersection Layout and Safety.

4.3 Traffic Volumes and Flow

Prior to 22 February 2011, vehicles coming from the east side of town used Kilmore Street to connect with Park Terrace. They would then left-turn onto Harper Avenue, and continue west. Due to the current closure of Kilmore Street and the closed connection from Avonside Drive, these vehicles are now using Bealey Avenue to head west.

As a result, the traffic volumes heading west in the morning peak have increased to 180 per cent of pre-quake levels. The traffic volumes for the evening peak heading west have also increased to 110 per cent of pre-quake levels. For this reason, the west-bound traffic in both the AM and PM peaks requires a longer green-time than previously allocated.

To conflict with this, in the PM peak, the east-bound traffic has also increased to 115 per cent. For this reason, the east-bound traffic in the PM peak also requires a longer green-time than previously allocated.

Park Terrace is currently acting as a main through-route south through the CBD while Durham Street is closed. Park Terrace is also acting as a north-bound replacement for traffic previously using Madras Street (closed from Tuam Street to Hereford Street), and Fitzgerald Avenue (reduced to one-lane and 30 kilometres per hour from Kilmore Street to Cambridge Terrace).

If we reduce the time currently allocated to Park Terrace/Carlton Mill Road, these vehicles will suffer longer delays and is likely to generate significant West bound queues.

Reinstating the right turn from Harper Avenue into Park Terrace will not be recommended until capacity has been added elsewhere in the network, to allow for the displaced traffic from Kilmore Street, so this traffic does not use Bealey Avenue, or Kilmore Street is operational again.

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4.4 Conclusion

Both east-bound and west-bound traffic through Bealey Avenue/Harper Avenue require more time than allocated pre-quake. No time can be sacrificed from Park Avenue/Carlton Mill Road, and time can not be increased.

4.5 Intersection Layout and Safety

The bridge at the Harper Avenue approach to this intersection is very narrow, and only has space for the current two east-bound lanes. There is nowhere to add a turning bay for right turning traffic to wait-in while looking for a gap in the traffic. Therefore, right turning vehicles will be blocking through traffic, and will be under extreme pressure to enter the intersection, and turn unsafely.

The offset layout of the intersection means that visibility for right turning traffic down Bealey Avenue is poor, and there is no safe space in the intersection to wait and prepare to turn. In addition to this, Bealey Avenue is also wide at this point, with turning vehicles required to cross two through-lanes before exiting the intersection. This creates a major safety issue, which can only be resolved by preventing west-bound traffic from flowing while east-bound traffic has a green light. This is called 'split-approach phasing'.

This is how the intersection control used to operate prior to 22 February 2011. Unfortunately due to the increased traffic flows the intersection will not sustain this type of control. Modelling data shows that the financial cost of level-of-service reduction will increase by 15 percent, using the NZTA Economic Evaluation Manual.

There is an allowance in the proposed Central City Plan for upgrading the capacity of the Four Avenues. Hopefully this will include improvement of the bridge to carry a right-turning lane, or an allowance to provide improved, safer, access into this corner of the city nearby.

4.6 Conclusion

The intersection layout does not allow for right turners wait safely to turn. Split approach phasing will be required, which will not handle the post-earthquake traffic volumes, causing longer queues to form along Bealey Avenue and Harper Avenue.

4.7 Looking Ahead

Currently the right turn from Bealey Avenue into Victoria Street is causing frustration for many drivers. For this reason this movement is receiving about 25 percent of the entire cycle time at this intersection. Looking ahead, we expect that a majority of these right-turning vehicles will continue east along Bealey Avenue to Durham Street, once Durham Street is reopened. The green arrow at this intersection will make the right turn easier and safer than the current right turn into Victoria Street.

This will have a major congestion-relief effect on Victoria Street, Dorset Street, and Park Terrace. When traffic using Park Terrace as a through-route has migrated from Park Terrace to Durham Street, the extra time involved detouring via Victoria Street will be similar to the delay inflicted to all vehicles at Bealey/Carlton/Harper/Park, if the right turn was reinstated.

4.8 Summary

Reinstating the right turn from Harper Avenue into Park Terrace is not recommended for two main reasons:

- The changed traffic flows and volumes would be adversely affected by the way the traffic signals had to operate, using split-approach phasing, and

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- This split-approach phasing is required, due to the lack of space on the existing Harper Avenue bridge for a dedicated right-turn lane.

Modelling done in accordance with the NZTA Economic Evaluation Manual shows that the financial cost of level-of-service reduction will increase by 15 percent.

Reinstating the right turn from Harper Avenue into Park Terrace will not be recommended until capacity has been added elsewhere in the network to allow for the displaced traffic from Kilmore Street, so this traffic does not use Bealey Avenue, or Kilmore Street is operational again. There is an allowance in the proposed Central City Plan for upgrading the capacity of the Four Avenues. Hopefully this will include improvement of the bridge to carry a right-turning lane, or an allowance to provide improved, safer, access into this corner of the city nearby.

Looking ahead, the displaced vehicles heading from west to south will be better served to turn at Bealey/Durham, so will naturally migrate there. This will allow for easier turning and reduced delays to vehicles needing to access Park Terrace via Dorset Street.

FINANCIAL IMPLICATIONS

5. Nil.

Do the Recommendations of this Report Align with 2009-19 LTP budgets?

6. Not applicable.

LEGAL CONSIDERATIONS

7. Nil.

Have you considered the legal implications of the issue under consideration?

8. Nil.

ALIGNMENT WITH LTP AND ACTIVITY MANAGEMENT PLANS

9. Aligns with the Streets and Transport activities by contributing to the Council's Community Outcomes - Safety and Community.

Do the recommendations of this report support a level of service or project in the 2009-19 LTP?

10. As above.

ALIGNMENT WITH STRATEGIES

11. The recommendations align with the Council strategies including the Road Safety Strategy 2004 and the Metropolitan Transport Statement.

Do the recommendations align with the Council's strategies?

12. As above.

CONSULTATION FULFILMENT

13. Not applicable.

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STAFF RECOMMENDATION

It is recommended that the Council receive the information within this report.

BACKGROUND

Post-22 February 2011

14. Immediately following the earthquake key traffic operational staff across the Council, New Zealand Transport Authority (NZTA) and the private sector formed a dedicated task force subsequently referred to as the Strategic Routes Team, working from the Emergency Operations Centre and reporting through the Civil Defence Hierarchy. The task was to find out what was damaged, and get a basic network up and running. Bridges were inspected and opened where possible, but many remained closed. A large team of contractors, consultants, the Council and NZTA staff were deployed to inspect the roads, of which over half were damaged. Debris from collapsed buildings blocked many lanes, the first priority was to get key routes re-opened to "Get Christchurch Moving" again. Routes for emergency recovery works were top priority, and other strategic routes. Building debris was cleared from the roads to enable at least one lane of traffic. Where buildings were precarious, they needed to be demolished, stabilised or barriers erected so as to remove the risk. Other tasks included:

    (a) prioritised building demolitions and/or make safe
    (b) prioritised road/bridge repairs
    (c) prioritised road re-openings
    (d) capacity improvements - signals, signs and markings
    (e) cycle route repairs and alternative cycle routes.

15. Many of the congestion relief measures were implemented during the state of emergency, and were subsequently ratified through the formal Council processes. These measures included extension of merge lanes to avoid bottle-necks, and the introduction of additional lanes such as the tidal lanes implemented on Curletts Road.

Current State of Congestion

16. Christchurch City Council, Environment Canterbury and the NZTA have been monitoring congestion trends in Christchurch since 2006.

17. This data is now being used to study the effect of recent disruption to the transport network.

18. Historically, congestion trends have been relatively stable year to year. Congestion even reduced slightly in 2009, due to the completion of several road projects, and as recessionary factors led to a reduction in peak demand on the network.

19. Following the September 2010 and February 2011 earthquakes, road users experienced an elevated level of congestion, significantly higher than previous years. During morning and evening peak periods in April 2011, a typical trip would experience an average of one minute of delay for every kilometre travelled, an increase in travel time delay of 30 to 40 per cent from previous years.

20. In some parts of the network, congestion increases were even more severe.

21. Historically, the Christchurch road network operated on a hub-and-spoke system, where traffic movements were prioritised to and from the central city (the Christchurch "hub") as this has historically been the primary centre of employment.

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22. The February 2011 earthquake resulted in the city centre cordon. In response to the cordon, many businesses shifted outside the city and trips directly through the city had to be diverted. This placed particular strain on the ring-roads (e.g. SH1, SH73, SH74) as a result of changing travel destinations and the need to avoid trips through the central city. The outer approaches to the city (SH1, SH73a, SH75, etc) also experienced a significant increase in delay, which is likely to be the effect of a lack of downstream capacity, due to shifts in travel behaviour.

23. The results from the November 2011 surveys show that the congestion mitigation measures implemented post 22 February 2011 were quite successful, with average delays settling across the region.

24. Relative to pre-quake trends, the November 2011 results show that the ring roads and outer approaches to the city continue to feature prominently as areas of increasing travel time delay, due to increasing demand on these parts of the network. However, many of the urban arterial corridors have had a decrease in average delay as a result of operational intervention, as well as shifts in travel behaviour and a resulting fall in demand.

25. Relative to April 2011, the November 2011 results indicate that almost the entire surveyed network showed an improvement during the course of last year, with delays in November less than in April in most areas, although a small part of this will be due to seasonal variance.

26. Parts of the state highway ring roads and some areas around the Airport went against the overall trend, with average delays higher in November than in April, indicating that congestion in these areas increased during the year.

27. However, areas that have been the focus of Council intervention have seen a significant reduction in average delays. The ring route formed by roads from Barrington Street, Clarence Street through to Innes Road had travel times reduce by up to a third between April and November 2011.

28. The findings of these surveys are summarised as follows:

    (a) Average northbound travel time was reduced by one minute in the AM and three minutes in the PM peak periods.
    (b) Average southbound travel time was reduced by 13 minutes in the AM and one minute in the PM peak periods.
    (c) Average northbound speeds increased by four kilometres per hour during both the AM and PM peak periods.
    (d) A significant increase was observed in average speeds in the AM peak period in the southbound direction from 16 kilometres per hour to 28 kilometres per hour.
    (e) Average speeds in the PM peak in the southbound direction were observed to be similar.

29. The March 2012 travel time surveys are currently underway. Results from these surveys will indicate how much has changed since this time last year. The surveys will also continue to provide data to direct long term planning decisions and aid in on-going operational improvements to the network.

30. While there will be a lot of work on local road networks, the key focus is to minimise travel disruptions on strategic routes roads, public transport and cycling. If an impact is likely to be "significant", then every effort must be made to minimise the impacts, possibly re-scheduling works, and provide customers with improved traveller information of the impacts on the network. The Strategic Routes Team have developed a customer focused "*Transport for Christchurch*" (TfC) website that is the one-stop portal for travel information and shows real time information about the operating spend on the network and where road closures and other works will affect how people plan their journeys.

31. **Attachment 1** shows a screen shot from the TfC home page. It will 'go live' in the next week or so.

ATTACHMENT 1: TRANSPORT FOR CHRISTCHURCH WEBSITE SCREEN SHOT