

# Intersection Form – Traffic Signals

The purpose of the factsheet is to provide guidance and information regarding traffic signals. The benefits, limitations, and appropriateness of traffic signals are explored.

Conflict at intersections can be managed through the choice of intersection form. Intersections also play a key role in the performance of the road network from an efficiency perspective. A signalised intersection requires entering traffic to stop and wait until their movement is permitted.

Benefits	Limitations
<ul style="list-style-type: none"> <li>• Can cater for large traffic volumes, even if unbalanced flows on each approach</li> <li>• A well designed set of traffic signals will generally enhance pedestrian, cyclist and driver safety</li> <li>• Provides a crossing phase for pedestrians</li> <li>• Ability to control level of delay on each approach</li> <li>• Can provide right turn arrows for high demand</li> </ul>	<ul style="list-style-type: none"> <li>• Ongoing operational costs</li> <li>• Can lead to higher vehicle speeds through the intersection, particularly near the end of phases when motorists attempt to 'catch the lights'</li> <li>• Can change the urban landscape in a way that reduces amenity and urban design outcomes</li> </ul>

## Local Example

- Intersection of Heuheu Street and Tongariro Street

## Best Practice Considerations

- Through and turning traffic should be separated where possible
- Pedestrian crossings should be included on all legs and the crossing distances should be minimised
- Cycling facilities should be provided on approaches to intersections, at intersections and on the departure lanes
- Right turn arrows should be used where possible
- Right turn bays should be aligned on opposite approaches

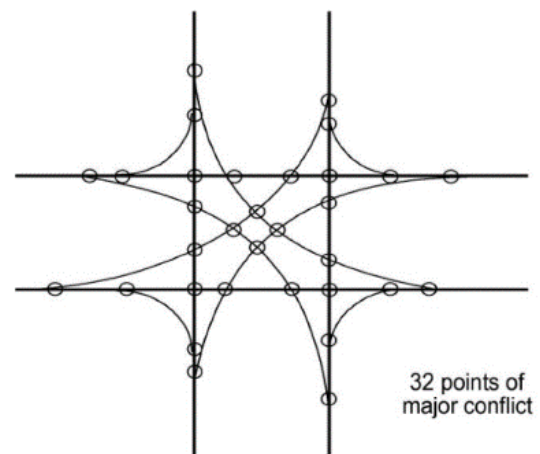
## Safety Performance

- Generally have higher severity crash outcomes than roundabouts
- May provide improved cyclist safety performance
- Signalised intersections use signal phasing to isolate conflicting movements and therefore reduce crash risk. Increasing signal phase (such as right turn arrows) results in fewer conflict points but reduces the efficiency of the intersection.

Heuheu Street Traffic Signals



Image © 2019 Google Street View



(Source: Austroads)

## Traffic Performance

- Traffic signal traffic performance can be measured by its “Level of Service”, an index measured on an A (best) to F(worst) scale.
- Traffic signals are capable of handling very high traffic volumes.
- Traffic signal coordination is possible with other intersections through cabling, wireless communication or camera traffic analysis.
- Implementation of new traffic signals in place of a priority intersection can result in overall time savings for all.
- Traffic signals are desirable for freight routes.

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## Consideration for Pedestrians

Signalised intersection features have similar design considerations to the mid-block signalised crossings as described in the pedestrian crossings fact sheet. At mid-block the pedestrian phase is always segregated from vehicles, but at a signalised intersection, pedestrians may have to share the phase with turning vehicles, which must give way to pedestrians. Pedestrian time should allow sufficient time for all users to cross safely.



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## Consideration for Cyclists

While signalised intersections allow for the efficient and safe flow of motor vehicles, cyclists should also be considered when designing or siting traffic signals. Ultimately, good intersection design should balance the needs of all road users.

Various design measures can be taken to improve the intersection for cyclists. Often, this includes maintaining space for cyclists. Maintaining visibility of cyclists before, through and after the intersection is key to providing a safe and comfortable intersection for all users.

Cyclists are at much higher serious crash risk at intersections than along a corridor. This is partly due to the increased amount of conflict points at the intersections with a much higher probability for turning crashes.

Signalised intersections with high cycle volumes or separated cycleways may benefit from dedicated cycle signals, which are continuously being developed by the NZ Transport Agency. These signals can separate the phases of cycle movements from vehicular movements.



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## Summary

**Safety** – Good as conflicts are managed

**Traffic** – Good as can be altered to traffic flows across the day

**Cost** – Medium - high depending on complexity and space requirements + ongoing operational costs

## Additional Resources:

Austrroads Guide to Traffic Management, Part 3: Traffic Studies and Analysis and Part 6: Intersections, Interchanges and Crossings  
NZ Transport Agency Traffic Control Devices Manual  
NZ Transport Agency Cycle Network Guidance  
NZ Transport Agency Pedestrian Planning and Design Guide  
NZ Transport Agency High Risk Intersections Guide