

Paramics modelling of congested offset T intersection

Presented to: Transportation Conference 2006
Prepared by: Axel Wilke (Traffix)
Bill Sissons (Baseplus)
Client: Christchurch City Council
Date: 10 October 2006





Clyde Road

12,000 veh/day

Riccarton Road

27,000 veh/day

5,000 veh/day

Wharenui Road



Problem Definition



- 🚶 Congested offset T intersection
- 🚶 Queue space between intersections fills up
- 🚶 Significant queues on side streets
- 🚶 Double lane approaches and substandard departure lane
- 🚶 Poor provisions for cyclists along Riccarton Road



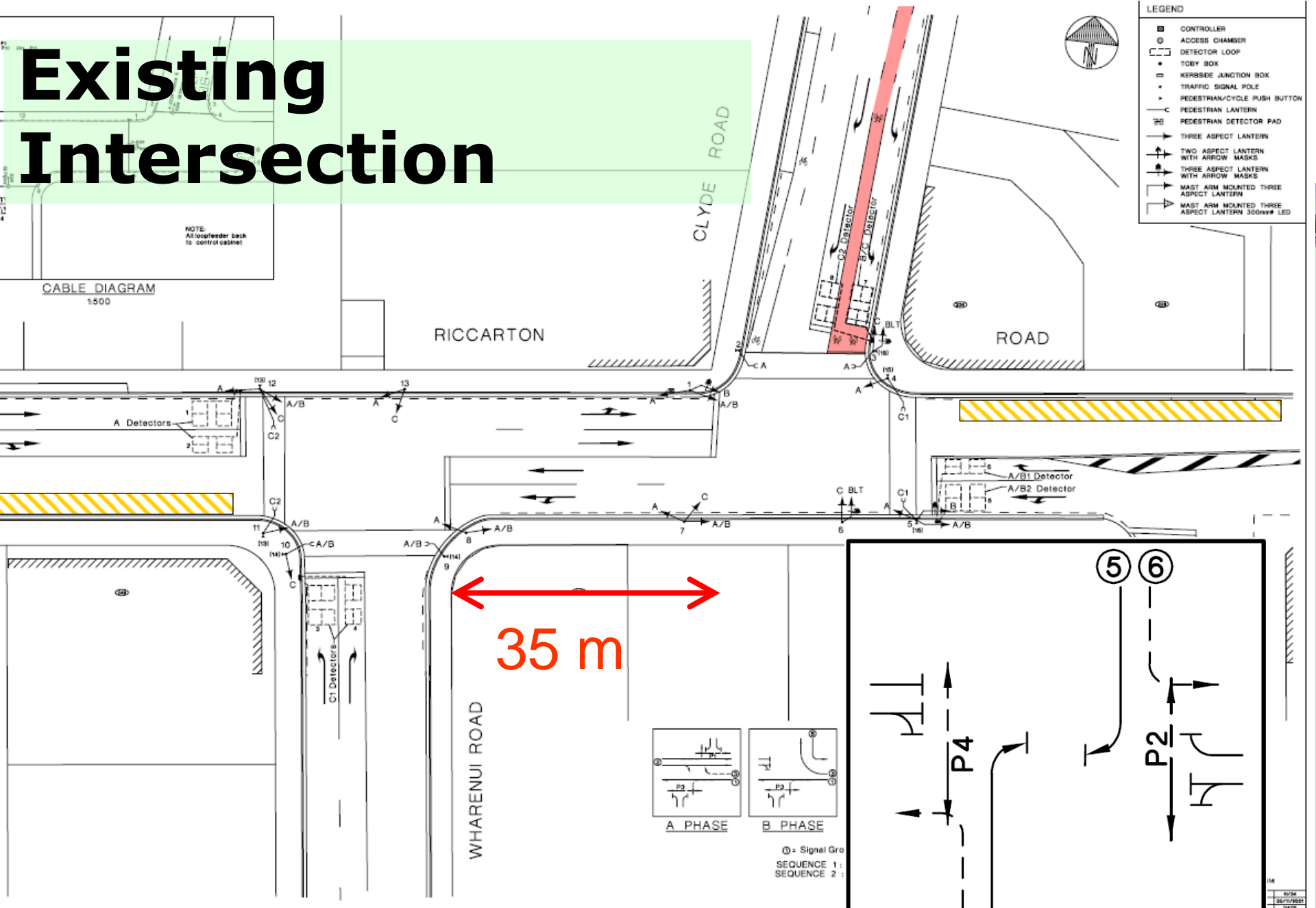
Existing Intersection

NOTE:
All loopfeeder back to control cabinet

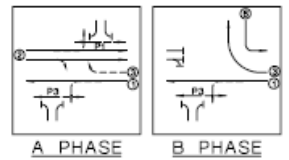
CABLE DIAGRAM
1:500



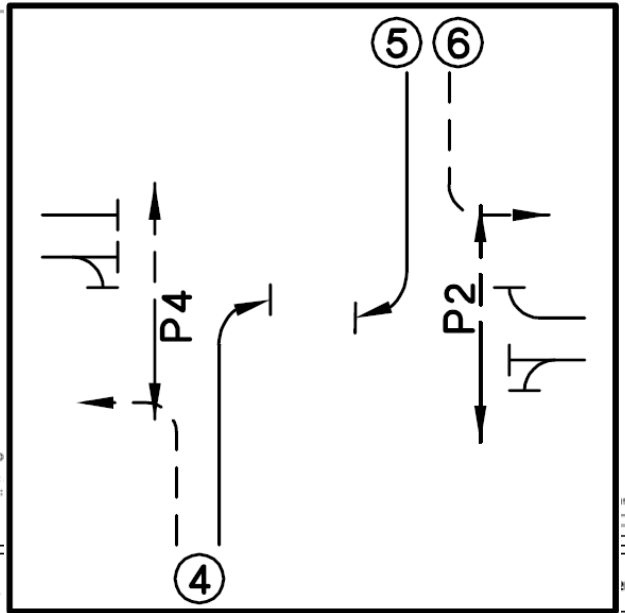
- LEGEND**
- ⊗ CONTROLLER
 - ⊙ ACCESS CHAMBER
 - DETECTOR LOOP
 - TOBY BOX
 - ⊞ KERBSIDE JUNCTION BOX
 - ⊞ TRAFFIC SIGNAL POLE
 - ⊞ PEDESTRIAN/CYCLE PUSH BUTTON
 - ⊞ PEDESTRIAN LANTERN
 - ⊞ PEDESTRIAN DETECTOR PAD
 - ⊞ THREE ASPECT LANTERN
 - ⊞ THREE ASPECT LANTERN WITH ARROW MASKS
 - ⊞ THREE ASPECT LANTERN WITH ARROW MASKS
 - ⊞ MAST ARM MOUNTED THREE ASPECT LANTERN
 - ⊞ MAST ARM MOUNTED THREE ASPECT LANTERN 300mm LED



35 m



⊙ = Signal Gro
SEQUENCE 1:
SEQUENCE 2:



DESIGNED	NAME	SIGNED	DATE	APPROVED	CURT
DES. REVIEW	D. Mitchell		6/21		
DRAWN					
CHKD					

DATE

CHRISTCHURCH CITY COUNCIL
CITY COUNCIL - YOUR PEOPLE - YOUR CITY





PROJECT TITLE
CLYDE ROAD / RICcarton ROAD
WHARENUI ROAD INTERSECTION

AND ROAD MARKINGS

Mid Block Capacity Exceeded



 Not all side street traffic can enter mid block

 Queues then blocking through movement



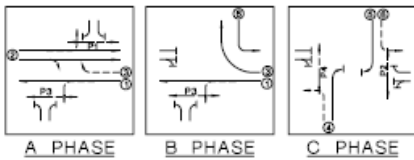
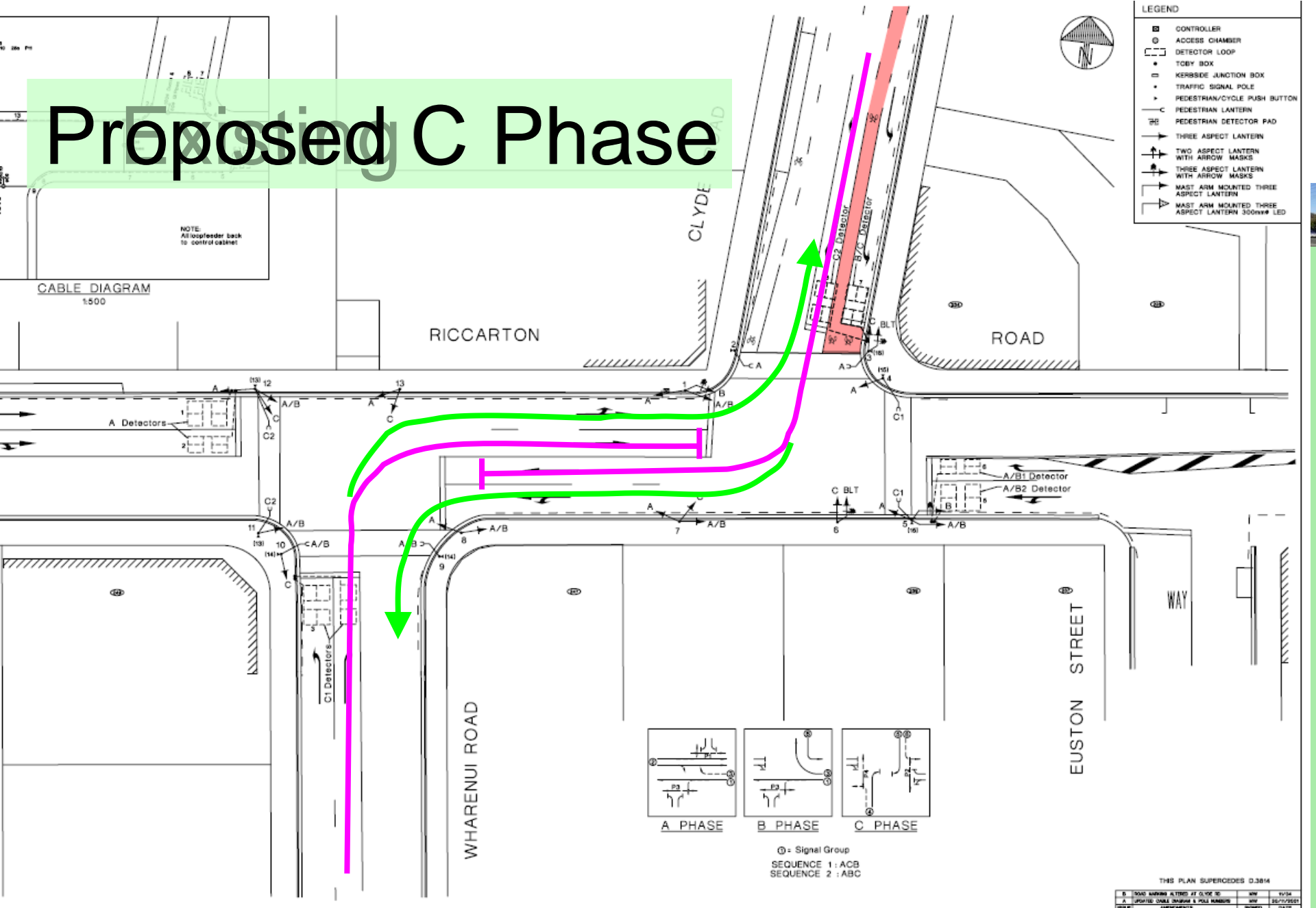
Proposed C Phase



- LEGEND**
- ⊠ CONTROLLER
 - ⊙ ACCESS CHAMBER
 - DETECTOR LOOP
 - TOBY BOX
 - ⊠ KERBSIDE JUNCTION BOX
 - ⊠ TRAFFIC SIGNAL POLE
 - ▶ PEDESTRIAN/BICYCLE PUSH BUTTON
 - ▶ PEDESTRIAN LANTERN
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 - ▶ THREE ASPECT LANTERN WITH ARROW MASKS
 - ▶ MAST ARM MOUNTED THREE ASPECT LANTERN
 - ▶ MAST ARM MOUNTED THREE ASPECT LANTERN 300mm LED

NOTE:
All loop/lead back to control cabinet

CABLE DIAGRAM
1:500



⊙ = Signal Group
SEQUENCE 1 : ACB
SEQUENCE 2 : ABC

THIS PLAN SUPERCEDES D.3814

B	ROAD MARKING ALTERED AT 1:00 PM '14	REV	11/14
A	UPDATED CABLE DIAGRAM & POLE NUMBER	REV	28/10/2011
REV	DATE	BY	DATE

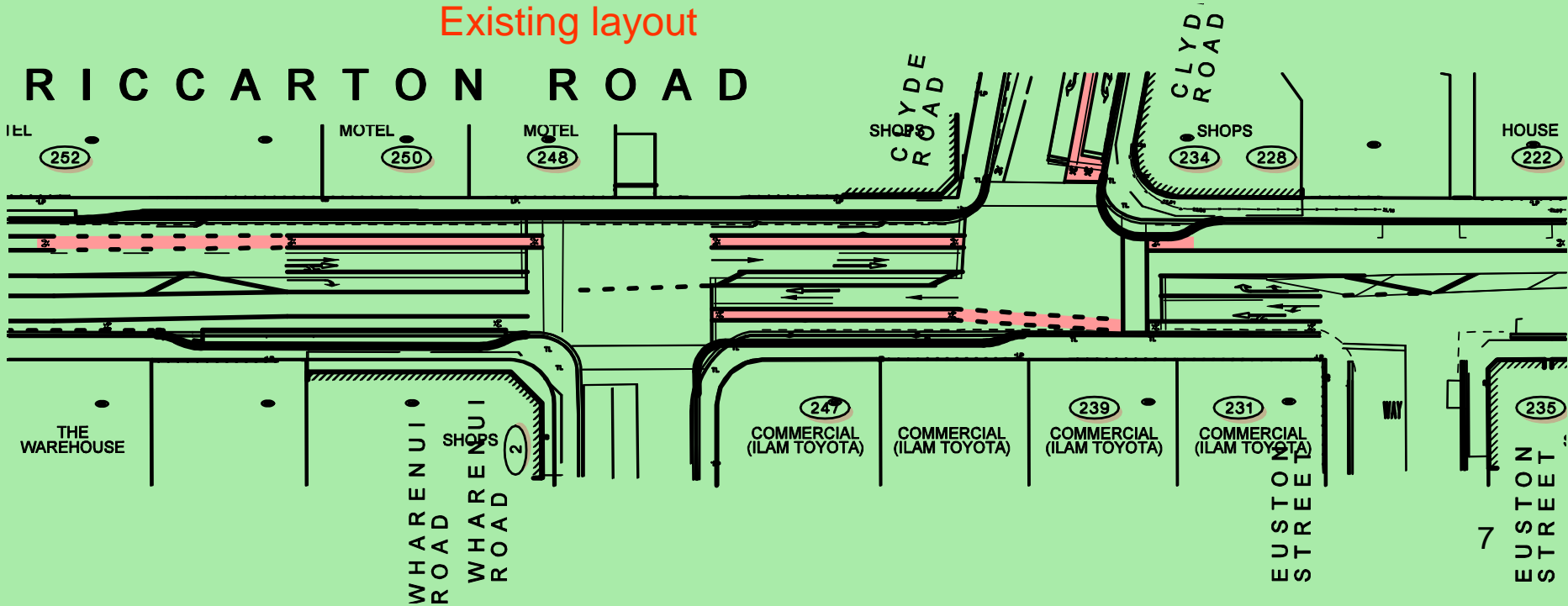
<p>DESIGNED: []</p> <p>DRAWN: D. Murrell</p> <p>CHECKED: []</p>	<p>APPROVED: []</p> <p>DATE: []</p>	<p>CLIENT: CHRISTCHURCH CITY COUNCIL</p> <p>PROJECT TITLE: CLYDE ROAD / RICcarton ROAD / Wharenui ROAD INTERSECTION</p>	<p>PROJECT NUMBER: TSC25501</p> <p>SHEET NUMBER: 254/23801</p> <p>SHEET: T01 OF 1</p>	<p>TRAFFIC SIGNALS AND ROAD MARKINGS</p>	<p>SCALE: 1:200</p> <p>ATTENTION NUMBER: 406</p>
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Proposed Layout



- Add exclusive left turn lanes
 - i.e. reduce through lanes from 2 to 1
- Separate through cyclists and left turners

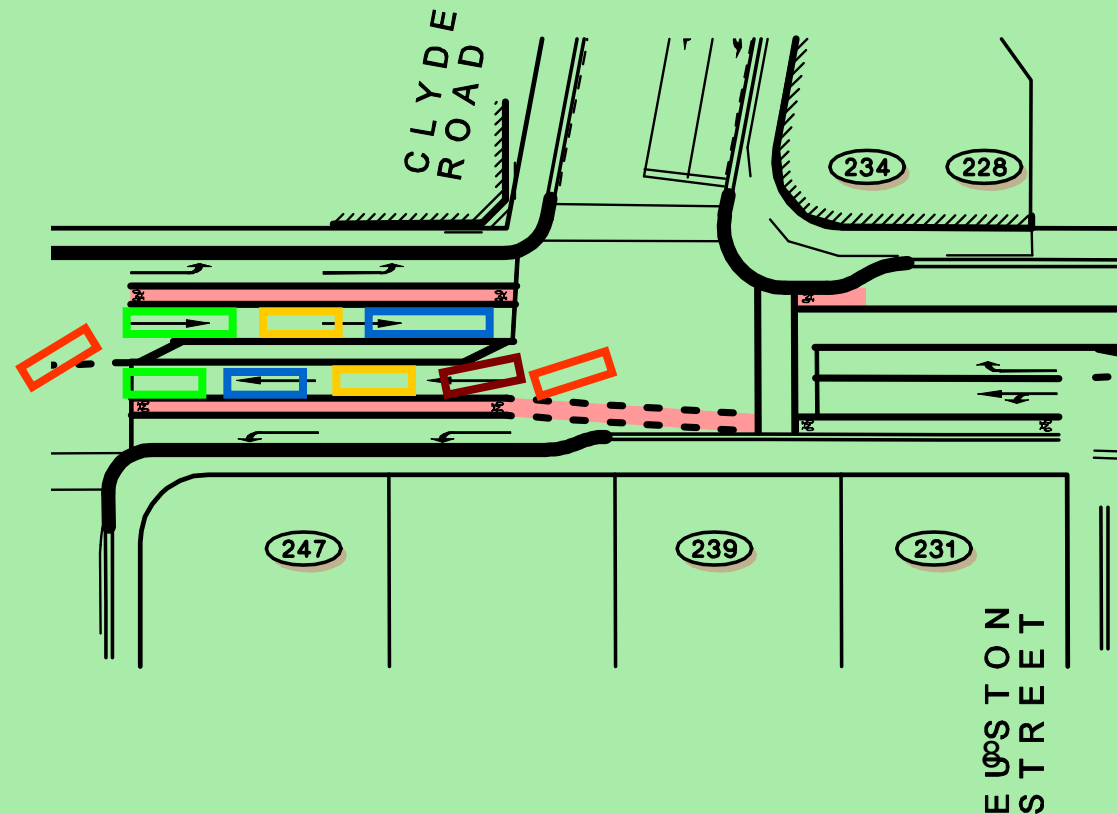
Existing layout



SIDRA Modelling Problems







- 🚶 Can model one T intersection at a time only
- 🚶 Cannot assess queuing on departure side
- 🚶 Through traffic stops at red light
- 🚶 Side street traffic fills up mid block through lane
- 🚶 Eventually left turners are blocked by through traffic
- 🚶 Or through traffic blocked



Use Microsimulation



-  Microsimulation (e.g. Paramics) allows to:
-  Simulate more than one intersection
 -  Model the interaction of adjacent intersections
 -  View visual output

Paramics Movie








Comparing Existing and Option



Microsimulation Outcomes



-  Confirmation that mid block capacity is not exceeded
-  Overall intersection efficiency improvement
 -  am peak 27% travel time improvement
 -  pm peak 35% travel time improvement
-  Improvement for Riccarton Road travel times

Recommendations



- 🚶 Use modelling software appropriate for the task
 - 🚶 Don't use what you've got when it's not appropriate
 - 🚶 Engage others when required
- 🚶 Be aware of the limitations of different software packages
 - 🚶 Avoid a 'black box' approach

Thank you



 Any questions?

Contacts

 Axel Wilke 027 2929 810

 Bill Sissons 021 99 44 91