Planning. Traffic. Development.

Integrated Transport Assessment

Prepared for

TWO CHAIN ROAD LTD

7 – 183 Two Chain Road
Rolleston

October 2021

Integrated Transport Assessment
Prepared for

Two Chain Road Ltd

7 – 183 Two Chain Road
Rolleston

Novo Group Ltd
Level 1, 279 Montreal Street
PO Box 365, Christchurch 8140
P: (03) 365 5570
E: info@novogroup.co.nz
W: www.novogroup.co.nz

Document Date:	**5/10/2021**
Document Version/Status:	Revision D | FINAL
Project Reference:	021-037
Project Manager:	Kim Seaton, Principal Planner
Prepared by:	Nick Fuller, Senior Transport Engineer
Reviewed by	Rhys Chesterman, Director and Traffic Engineer/Planner

Table of Contents

List of Figures and Tables

Appendices

Introduction

1. Two Chain Road Ltd has commissioned Novo Group to prepare an Integrated Transport Assessment (ITA) for a Plan Change to rezone Rural land to Industrial at Two Chain Road.

2. This report provides an assessment of the transport aspects of the proposed development. It also describes the transport environment in the vicinity of the site, describes the transport related components of the proposal. It has been prepared broadly in accordance with the Integrated Transportation Assessment Guidelines specified in New Zealand Transport Agency Research report 422, November 2010 and other relevant best practice guides.

3. It is proposed to rezone 98Ha of *Inner Plains* (rural) land to become *Business Zone 2A* (Industrial) land. The location of this land is illustrated in **Figure 1** and a copy of the Outline Development Plan (ODP) is included in **Appendix 1**.

Figure 1: Site Location

4. The predicted traffic generation of the rezoned land site is:

   i. AM Peak (2 hours): 1,078 vehicle movements; and

   ii. PM Peak (2 hours): 996 vehicle movements.

Transport Environment

Road Network

5. The following sections set out the transport network in the vicinity of the Application site.

State Highway 1

6. **Table 1** sets out the transport characteristics of State Highway 1 (SH1) in the vicinity of the application site.

Table 1: State Highway 1 Road Characteristics

Key Feature or Characteristic	Comment
Road Classification	State Highway and Arterial Road
Cross-Section Description	3.5m lanes in both directions, plus sealed shoulders.
Traffic Volumes	20,500 vehicles per day[1].
Speed	100km/hr (although currently a 70km/hr limit at the intersection with Dunns Crossing Road)
Cycling, Pedestrian Infrastructure and Public Transport	None

State Highway 1 / Dunns Crossing Road / Walkers Road Intersection

7. The SH1 / Dunns Crossing Road / Walkers Road intersection is a priority controlled cross-road, with SH1 having the priority. This intersection is currently operating poorly with regards to traffic capacity and Waka Kotahi (NZ Transport Agency) are committed to upgrading this intersection with the current proposal being a roundabout. The design of this roundabout is under investigation and is programmed for construction in 2024. There is funding committed for this project, although the final design of the roundabout is not yet known.

8. The NZTA Crash Analysis System (CAS) has been reviewed to identify crashes that have been reported within 100m of this intersection in the most recent five-year period available[2]. A total of 16 crashes were reported in that period, of which one included severe injuries and seven resulted in minor injuries. **Figure 2** is the collision diagram, and the crashes are summarised below.

   i. SH1 South-Westbound Approach: 1 minor injury and 2 non-injury crashes:

      (a) Head-on when a south-west bound driver hit a vehicle waiting to turn right into Dunns Crossing Road – 1 minor injury crash.

      (b) Merging crash where a driver in the right turn bay changed to the through lane without checking – 1 non-injury crashes.

[1] From Mobile Road website.
[2] 01/06/2016 to 01/06/2021.

(c) Rear-end when vehicles have stopped for road works – 1 non-injury crash.

ii. Dunns Crossing Road: 1 serious, 4 minor injury and 3 non-injury crashes. These were all failure to give-way.

iii. SH1 North-Eastbound Approach: 2 non-injury crashes:

(a) Loss of control when turning – 1 non-injury crash.

(b) Loss of control because of fatigue - 1 non-injury crash.

iv. Walkers Road: 2 minor injury and 1 non-injury crashes. These were all failure to give-way.

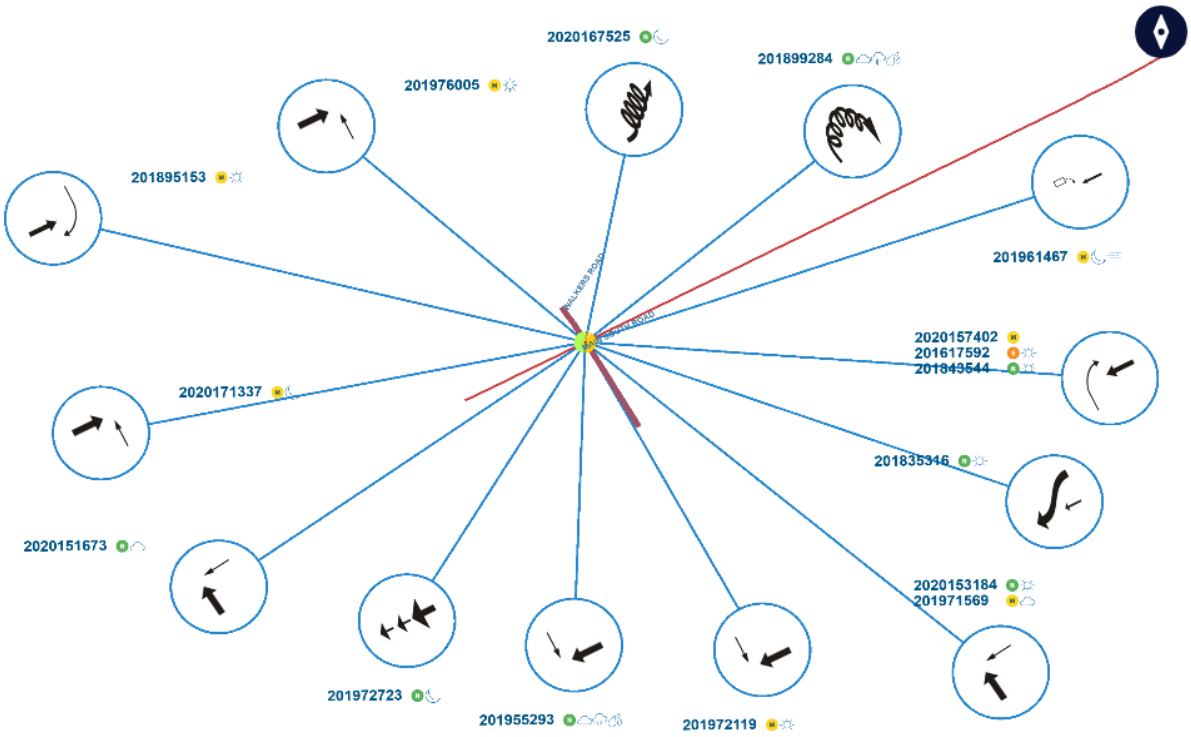


Figure 2: SH1 / Dunns Crossing Rd / Walkers Rd Collision Diagram

9. The above identifies that a number of crashes have occurred at the SH1 / Dunns Crossing Road / Walkers Road intersection. These are primarily caused by vehicles on the minor arms failing to give-way to through traffic on SH1 and these crashes will be addressed by the provision of a roundabout, as anticipated to occur at this location. Planned road upgrades in the vicinity of the Application site are further discussed at **paragraph 23**.

Two Chain Road

10. **Table 2** sets out the transport characteristics of Two Chain Road in the vicinity of the Application site.

Table 2: Two Chain Rd Characteristics

Key Feature or Characteristic	Comment
Road Classification	Arterial Road
Cross-Section Description	Carriageway width of 6.1m (i.e. two 3.05m wide traffic lanes) plus wide berms both sides.
Traffic Volumes	1,800 vehicles per day[3].
Speed	100km/hr.
Cycling, Pedestrian Infrastructure and Public Transport	No cycle or pedestrian infrastructure is provided. Route 820 travels on Two Chain Road. This service links Burnham to Lincoln (via Rolleston) on an hourly frequency.
Road Safety	No mid-block crashes have been reported on the road in the most recent five-year period available (01/06/2016 to 01/06/2021).

Two Chain Road / Walkers Road Intersection

11. The Two Chain Road / Walkers Road intersection is a priority controlled cross-road, with Two Chain Road having priority. The Walkers Road approaches are stop controlled.

12. The NZTA Crash Analysis System (CAS) has been reviewed to identify crashes that have been reported within 50m of this intersection in the most recent five-year period available[4]. A total of five crashes were reported in that period, all of which were non-injury. **Figure 3** is the collision diagram. Four of the crashes were caused by northbound drivers on Walkers Road failing to give-way to through traffic on Two Chain Road. The other crash was an emergency vehicle southbound on Walkers Road that did not give-way to through traffic on Two Chain Road.

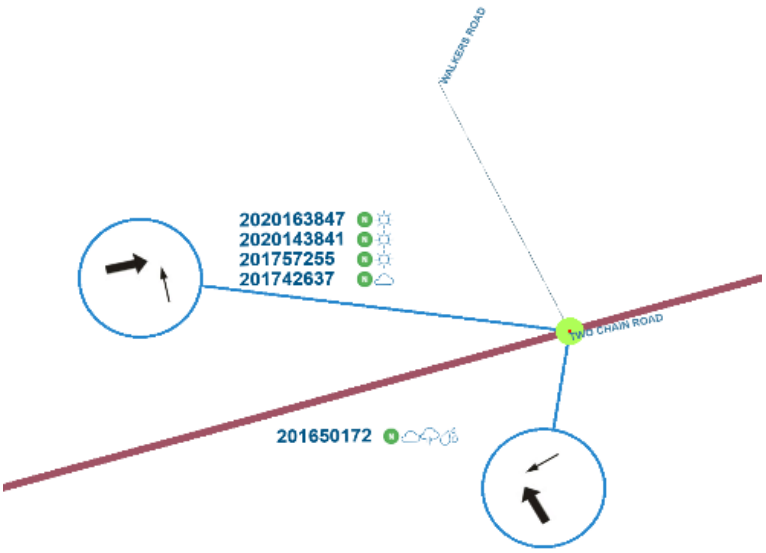


Figure 3: Two Chain Rd / Walkers Rd Collision Diagram

[3] From Mobile Road website
[4] 01/06/2016 to 01/06/2021.

Walkers Road

13. **Table 3** sets out the transport characteristics of Walkers Road in the vicinity of the Application site.

Table 3: Walkers Rd Characteristics

Key Feature or Characteristic	Comment
Road Classification	Arterial Road
Cross-Section Description	Carriageway width of 6.4m (two lanes of 3.2m).
Traffic Volumes	1,700 vehicles per day[5].
Speed	100km/hr.
Cycling, Pedestrian Infrastructure and Public Transport	None provided.
Road Safety	No mid-block crashes have been reported on this road (or at the intersection with Runners Road or the rail crossing by SH1).
Other Comments	Walkers Road has an at-grade rail crossing approximately 37m north of the intersection with SH1. This crossing includes warning lights. Walkers Road has an intersection with Runners Road approximately 38m north of the rail line. Walkers Road has the priority at this location.

Jones Road

14. **Table 4** sets out the transport characteristics of Jones Road in the vicinity of the Application site.

Table 4: Jones Rd Characteristics

Key Feature or Characteristic	Comment
Road Classification	Arterial Road
Cross-Section Description	Carriageway width of 10.4m, which includes a flush median. Parking is not permitted on this road. This road is an extension of Two Chain Road through the IZone industrial area.
Traffic Volumes	5,000 vehicles per day[6].
Speed	60km/hr.
Cycling, Pedestrian Infrastructure and Public Transport	Route 820 travels on Two Chain Road. This service links Burnham to Lincoln (via Rolleston) on an hourly frequency.

Two Chain Road / Wards Road / Jones Road / Railway Road Intersections

15. The existing arrangement of this intersection is illustrated in **Figure 4**, which also includes the at-grade rail crossing. Wards Road has the priority at the intersection with Two Chain Road. Wards Road then

[5] From Mobile Road website
[6] From Mobile Road website

becomes Jones Road at the intersection with Railway Road. Railway Road is the minor arm of the intersection with Jones Road, which has a right turn bay.

16. The railway crossing includes a footpath on the northern side and warning lights, plus barrier arms.

Figure 4: Two Chain Rd / Wards Rd / Railway Rd / Jones Rd Intersection

17. The NZTA Crash Analysis System (CAS) has been reviewed to identify crashes that have been reported within 50m of this intersection in the most recent five-year period available[7]. A total of three crashes were reported in that period, with one minor injury crash and two non-injury crashes. **Figure 5** is the collision diagram.

18. The minor injury crash was a driver turning right into Railway Road that failed to give-way to a motorbike heading east on Jones Road.

19. One of the non-injury crashes was caused by a driver turning right out of Two Chain Road (into Wards Road) that failed to give-way to through traffic northbound on Wards Road. The other crash occurred when a driver stopped at the rail crossing, but the barrier arm hit the waiting vehicle.

[7] 01/06/2016 to 01/06/2021.

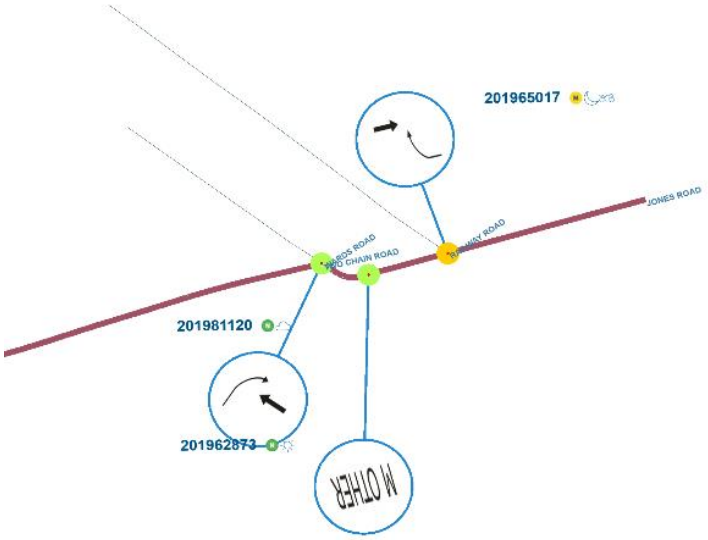


Figure 5: Two Chain Rd / Wards Rd / Railway Rd / Jones Rd Collision Diagram

Dunns Crossing Road

20. **Table 5** sets out the transport characteristics of Dunns Crossing Road.

Table 5: Dunns Crossing Rd Characteristics

Key Feature or Characteristic	Comment
Road Classification	Arterial Road immediately south of SH1.
Cross-Section Description	Carriageway width of 8.4m (i.e. two 4.2m wide traffic lanes).
Traffic Volumes	2,500 vehicles per day[8].
Speed	60km/hr north of Granite Drive.
Cycling, Pedestrian Infrastructure and Public Transport	1.5m wide footpath on the eastern side where the urban development has occurred. No footpaths on the western side, with the exception of immediately adjacent to the West Rolleston Primary School No dedicated cycling facilities or public transport are provided.

Runners Road

21. **Table 6** sets out the transport characteristics of Runners Road.

[8] From Mobile Road website

Table 6: Runners Rd Characteristics

Key Feature or Characteristic	Comment
Road Classification	Local Road.
Cross-Section Description	Carriageway width of 6.8m (i.e. two 3.4m wide traffic lanes).
Traffic Volumes	136 vehicles per day[9]. This road is effectively an access road to Rolleston Prison, as no other activities are accessed from it. This road terminates to the west of the Prison.
Speed	100km/hr.
Cycling, Pedestrian Infrastructure and Public Transport	No pedestrian or cycle facilities are provided.

Alternative Transport Modes

Passenger Transport

22. As indicated above, there is a bus service that travels along Two Chain Road along the site boundary. This service is between Burnham and Lincoln (via Rolleston) and operates on an hourly frequency. The route in the vicinity of the Application site is illustrated in **Figure 6**.

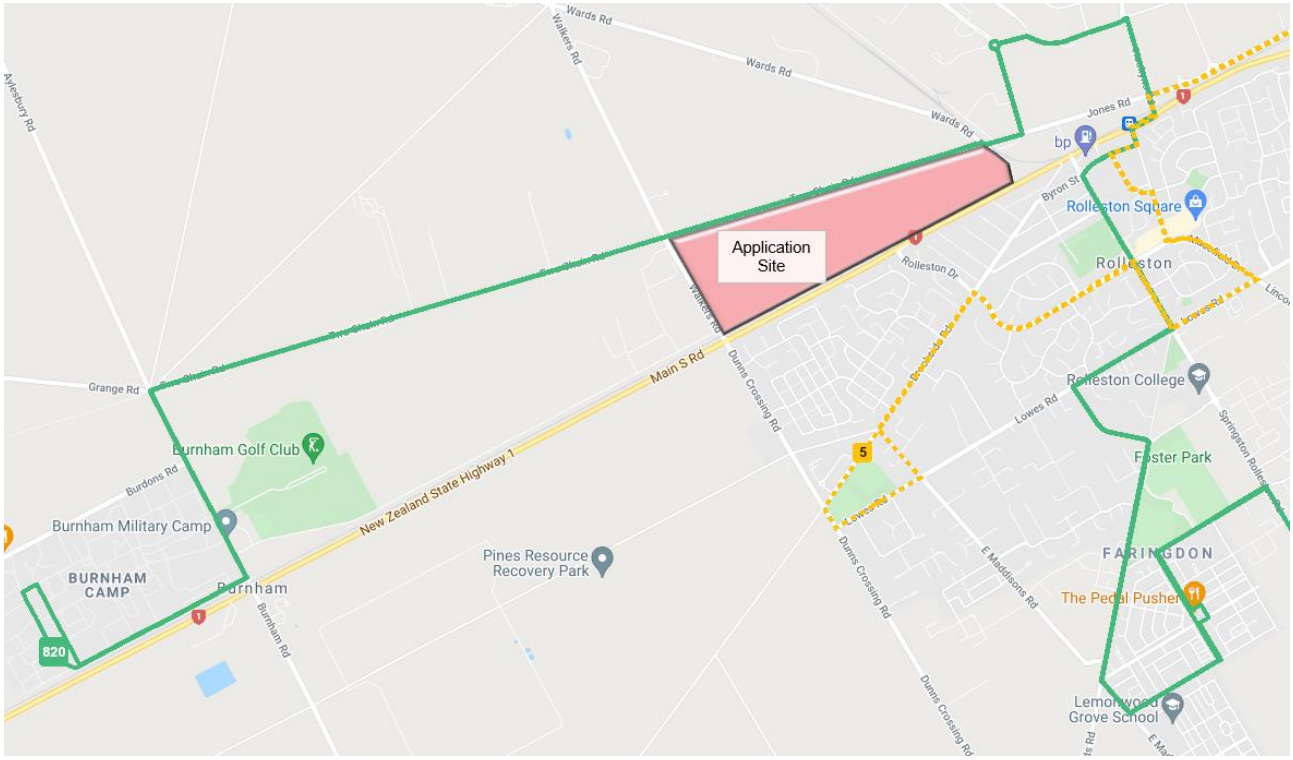


Figure 6: Route 820

[9] From Mobile Road website

Wider Transport Network

Waka Kotahi Planned Upgrades

23. The New Zealand Upgrade Programme (NZUP) is a government initiative to improve transport safety and efficiency in the country's growth areas. This has led to funding for a package of works in Rolleston that is being led by Waka Kotahi (NZ Transport Agency), in conjunction with Selwyn District Council (SDC) and KiwiRail. Broadly, the package of works includes the following:

    i. Fly-over from Rolleston Drive to Jones Road (near Hoskyns Road), facilitating a closure of the SH1 intersections with Rolleston Drive and Hoskyns Road in this location. The fly-over will include pedestrian and cycle facilities; and

    ii. A new roundabout at the SH1 / Dunns Crossing Road / Walkers Road intersection. Discussions with Waka Kotahi have indicated this will be complete in 2024.

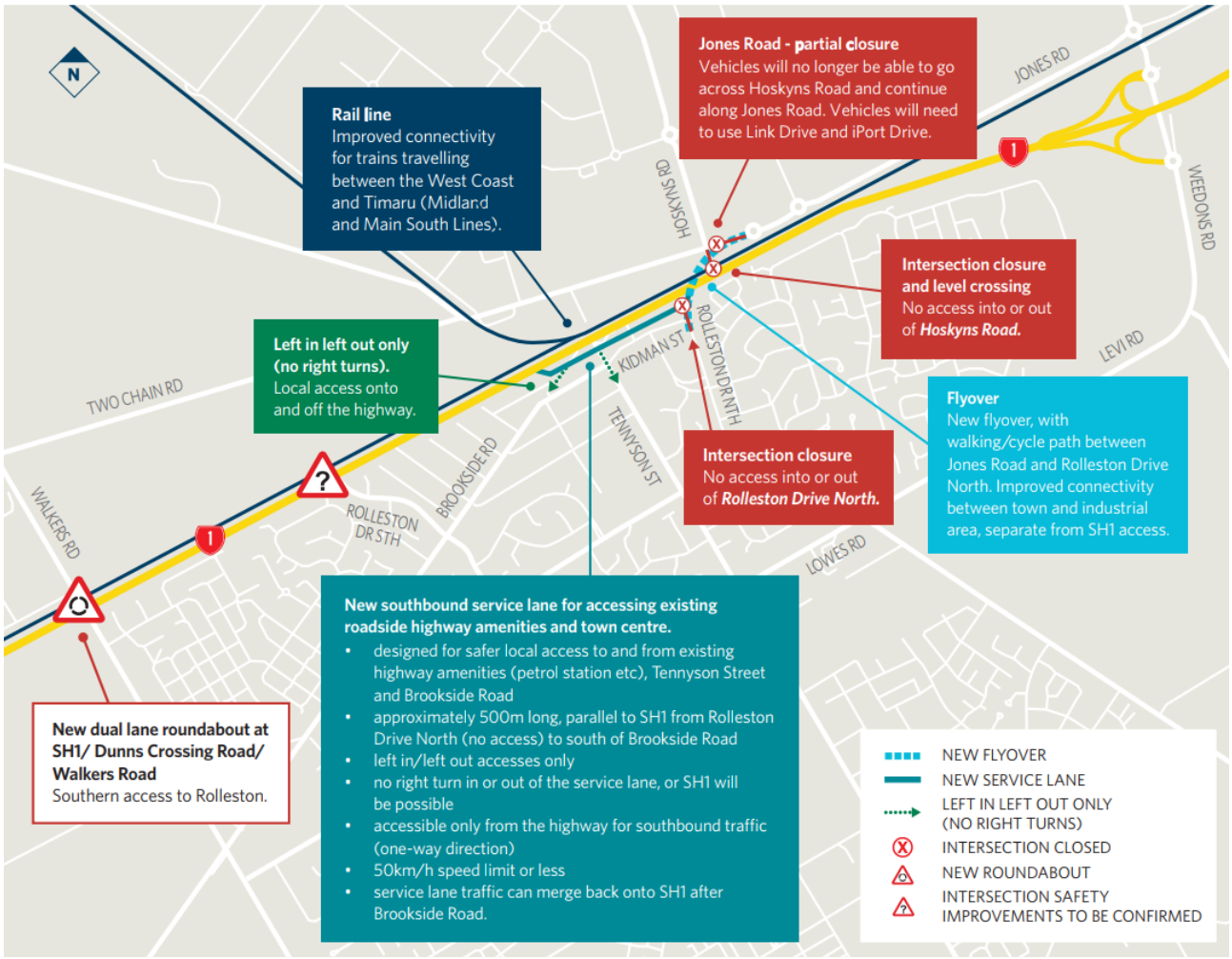


Figure 7: NZUP Transport Improvements

(Sourced from Waka Kotahi Newsletter dated July 2021)

24. **Figure 7** illustrates the resultant traffic movement priorities for the Rolleston Road network upon completion of the above works. Notably, this indicates that Walkers Road and Two Chain Road are proposed to be part of a '*southern access to industrial area and key freight route*'.

Figure 8: NZUP Transport Network

(Sourced from Waka Kotahi Newsletter dated July 2021)

25. The Business Case tender documentation for the NZUP project has been reviewed, which identifies the following additional projects are under consideration (see also **Figure 9**):

i. Pavement widening and strengthening of Walkers Road and Two Chain Road;

ii. Level crossing upgrade at the Jones Road / Two Chain Road / Wards Road intersection;

iii. Roundabout at the Walkers Road / Two Chain Road intersection;

iv. A shared path to the north of the rail corridor; and

v. New rail connectivity between the Main South Line and the Midland Line at the eastern end of the Application site.

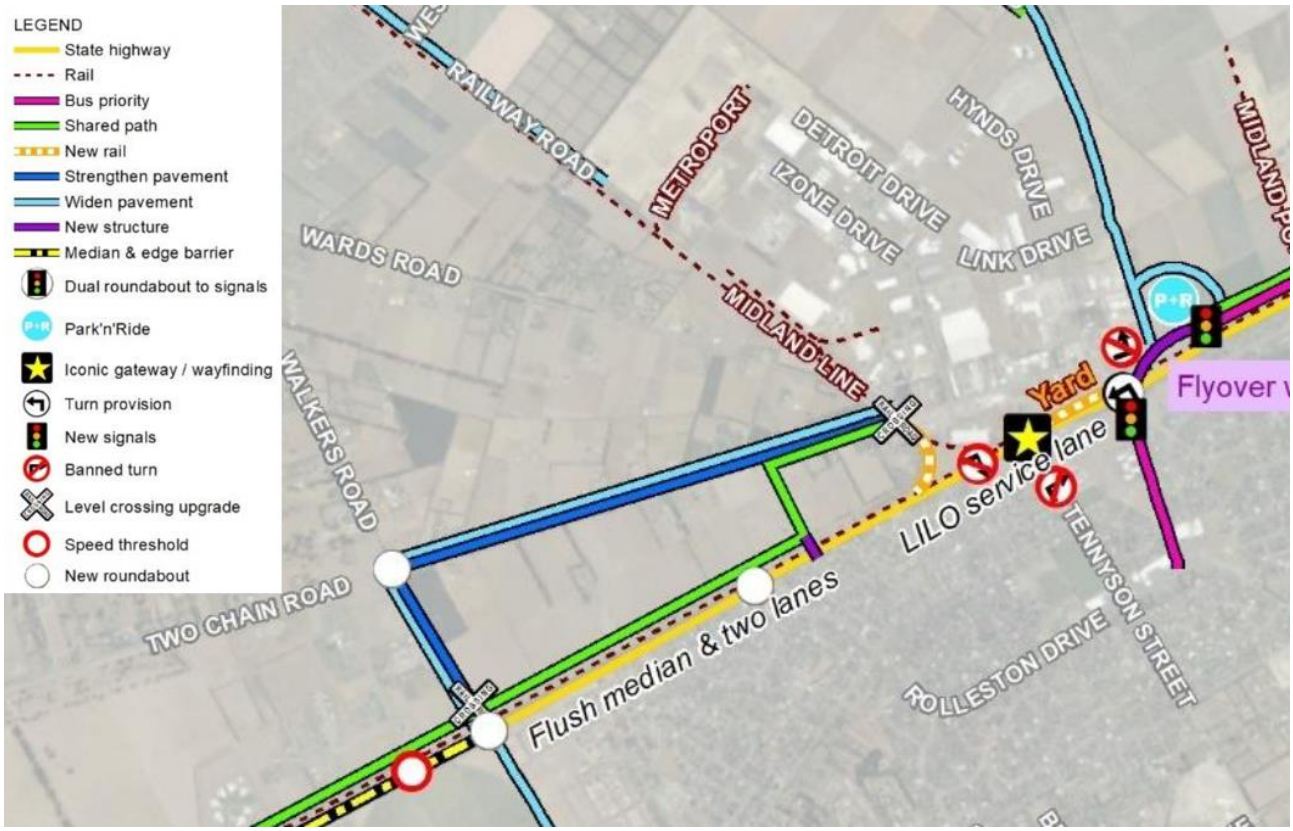


Figure 9: NZUP Rolleston Detailed Business Case RFT Extract

Selwyn District Council Long-Term Plan

26. Waka Kotahi will not be responsible for all of the above works and some will be undertaken by SDC. The SDC 2021 to 2031 Long-Term Plan identifies the following:

    i. Walkers Road / Two Chain Roundabout is funded in 2028/2029;

    ii. Two Chain Road / Jones Road realignment is funded in 2028/2029, along with widening of Two Chain Road; and

    iii. Jones Road cycleway plus Rolleston to Burnham cycleway funded in 2027/2028 and 2029/2030 respectively.

Rolleston Plan Changes

27. In addition to the Application site, there are a series of Plan Changes that have been lodged in Rolleston. These are illustrated in **Figure 10**.

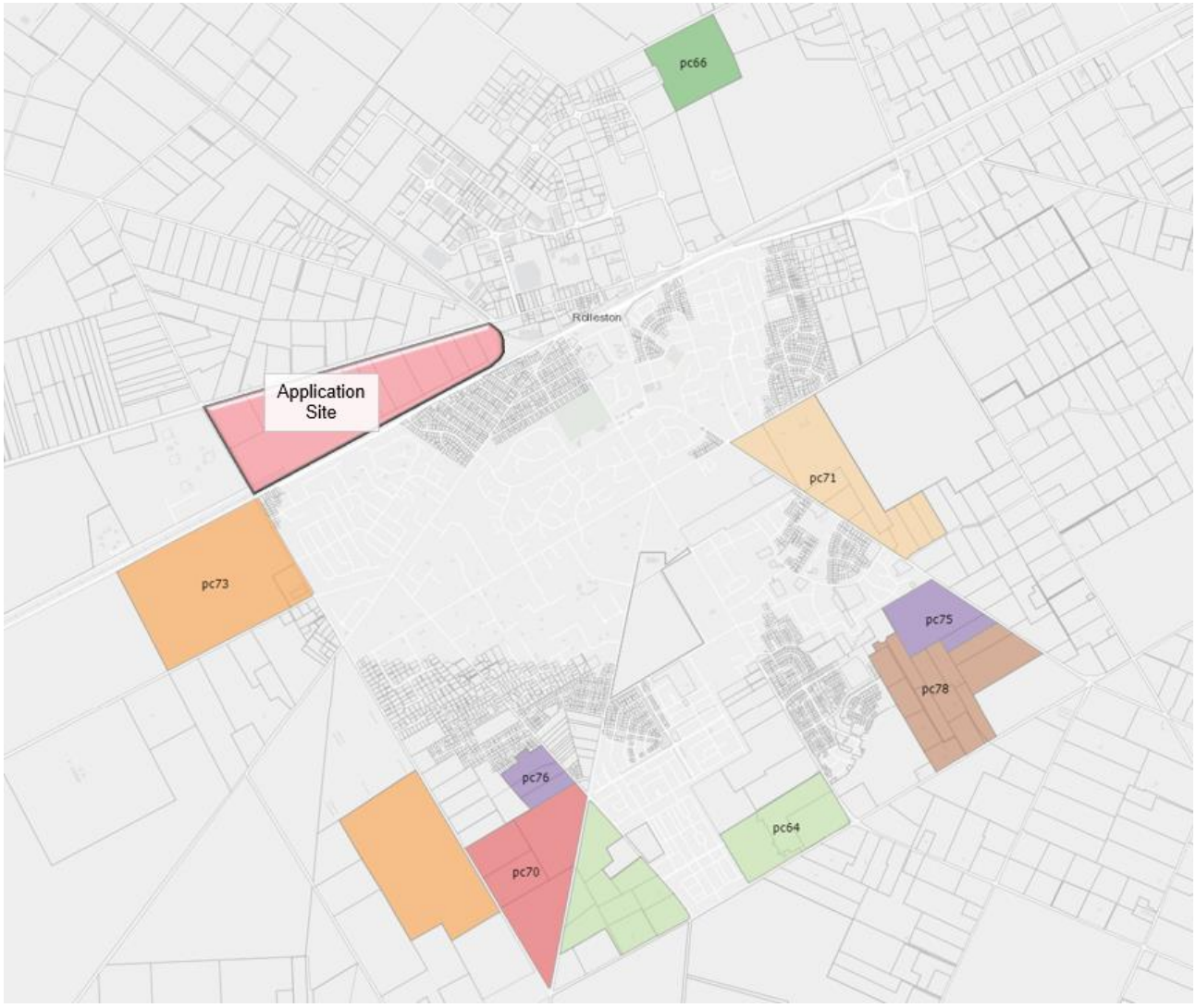


Figure 10: Rolleston Plan Change Sites

(Sourced from SDC Website)

28. The above Plan Change applications comprise:

i. Plan Change 64 – 969 residential lots;

ii. Plan Change 66 – 27ha of industrial land;

iii. Plan Change 70 – 800 residential lots;

iv. Plan Change 73 – 2,100 residential lots;

v. Plan Change 75 – 280 residential lots;

vi. Plan Change 76 – 150 residential lots; and

vii. Plan Change 78 – 750 residential lots.

The Proposal

29. It is proposed to rezone 98ha of rural (Inner Plains) land at the application site to become industrial (Business Zone 2A). A copy of the ODP is illustrated in **Figure 11** and included in **Appendix 1**.

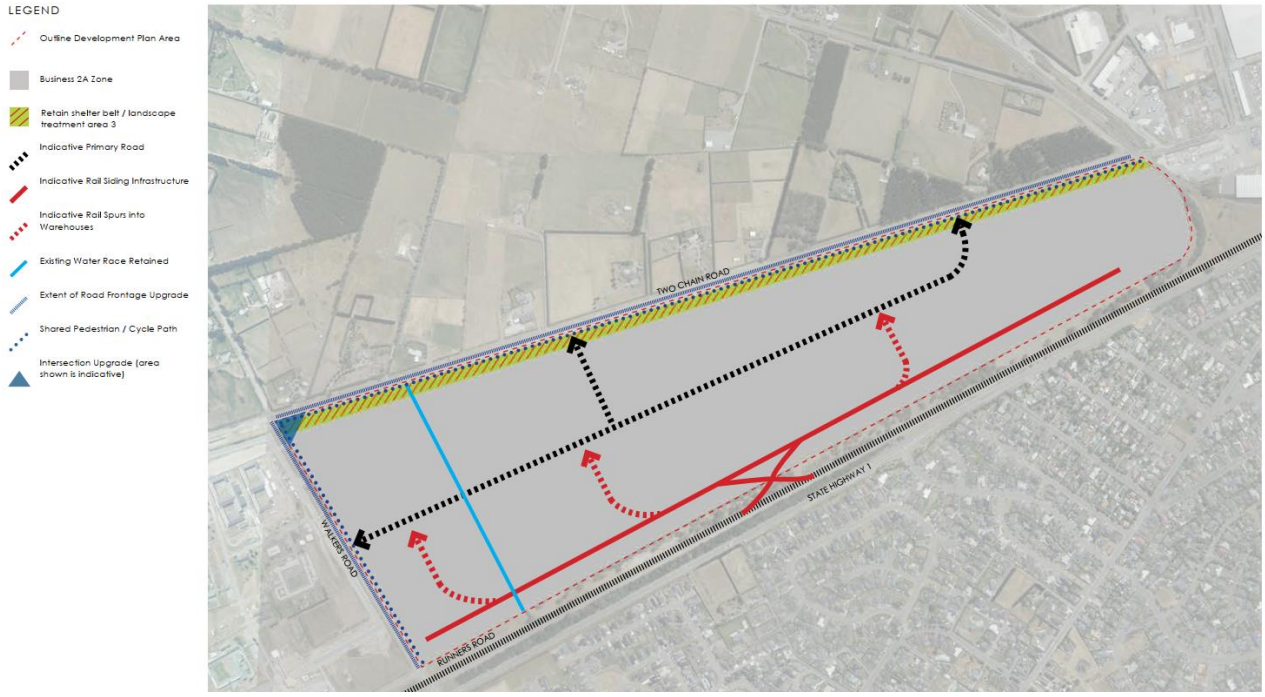


Figure 11: Proposed ODP

30. The following provides a description of the transport components of the proposed Plan Change.

Traffic Generation

31. The traffic generation of the application site has been based on the industrial trip rates from Plan Change 10, which established the IPort industrial area. Those trips rates, plus the resultant traffic generation from the Application site are included in **Table 7**.

Table 7: Plan Change Traffic Generation – Two-Hour

Peak Period		Arrivals	Departures	Total
AM Peak	Trip Rate per Ha	8.80	2.20	11.00
	Traffic Generation	***862***	***216***	***1,078***
PM Peak	Trip Rate per Ha	3.05	7.11	10.16
	Traffic Generation	***299***	***697***	***996***

32. The assignment and distribution of this traffic has been determined by the Rolleston Paramics traffic model, as described in **Appendix 2**.

Site Layout

Access Arrangements & Internal Roads

33. The ODP indicates the primary road network within the Application site. This includes:

    i. An access to Walkers Road approximately 400m north of SH1 (or roughly midblock for this frontage);

    ii. An access to Two Chain Road approximately 720m east of Walkers Road; and

    iii. An access to Two Chain Road approximately 1,700m east of Walkers Road.

34. These accesses are assumed to be priority-controlled T-intersections, with Walkers Road and Two Chain Road having the priority. The final design of these accesses will be considered at subdivision stage, although there is ample room within the road corridor to provide turning lanes if required.

35. It is noted that there could be up to three road accesses to Two Chain Road, although the ODP only illustrates the proposed Primary Road network accesses.

36. In addition to the above, no access (vehicle crossing, accessway or road connection) is proposed to Runners Road.

37. The internal road network is proposed to meet the requirements of the Selwyn District Plan and Engineering Code of Practice. The primary network will be designed such that it can accommodate passenger transport should that be routed through the site.

38. Individual property accesses are not proposed to Two Chain Road, with all access being from the internal road network. Property accesses are proposed to be permitted from Walkers Road, with the Walkers Road upgrade needing to provide a flush median to safely accommodate turning movements to / from this road.

Cycle Network

39. The ODP indicates the provision of a shared path around the outside of the Application site along Two Chain Road and Walkers Road. Whilst it is acknowledged that the proposed arrangement for the NZUP works (illustrated in **Figure 9**) indicated the shared path as following the rail corridor, the ODP seeks to facilitate rail sidings that would lead to conflicts with the shared path.

40. Similarly, routing the shared path through the ODP would lead to potential conflicts with multiple accesses to industrial activities. As such, the preference is to provide the shared path around the outside of the ODP to minimise conflict points and take advantage of the very wide road reserve existing on the southern side of Two Chain Road. Although accesses are proposed to Walkers Road that would cross the shared path, activities with notable traffic generation would be required to undertake an assessment of effects relating to the safety effects of this may have[10].

41. The internal road network will be designed to accommodate on-road cycle facilities, where appropriate. This separation from individual site boundaries is considered acceptable and it is anticipated that this network would primarily be used by confident cyclists.

[10] Rule 17.3.4 of the Operative District Plan would be applicable to access to Walkers Road as this is an Arterial Road. Similar rules are proposed in the Proposed District Plan.

Pedestrian Network

42. No dedicated pedestrian network is proposed within the ODP. That said, the internal road network would be designed to provide footpaths and crossing points as required. A shared path is provided around the northern and western perimeter of the site as well.

Timing of Development Relative to Infrastructure Improvements

43. It is proposed that the following infrastructure upgrades would be complete prior to occupation of any development at the Application site:

    i. SH1 / Walkers Road / Dunns Crossing Road upgrade; and

    ii. Walkers Road and Two Chain Road frontage upgrades.

44. The above are all planned by Council, although the timing of development of the Plan Change site would bring these forward.

District Plan Requirements

45. It is proposed that the transport related rules and standards of the Business 2A zone would apply to the Application site.

Assessment of Effects

Traffic Effects

Basis of Assessment

46. The basis of the assessment of traffic effects is from a Paramics model of Rolleston. The modelling has been undertaken by Abley and a copy of the results is included in **Appendix 2**. This modelling is representative of 2033 and includes:

    i. The NZUP works set out from paragraph 23;

    ii. The SDC projects set out in paragraph 26;

    iii. The Plan Change application sites set out in paragraph 27; and

    iv. Both with and without this proposed Plan Change site to compare the effects of the proposal against the base network operation.

Network Operation

State Highway 1 / Dunns Crossing Road / Walkers Road Intersection

47. The traffic modelling assumed this intersection would be constructed as a roundabout prior to development occurring at the Plan Change site. **Table 8** provides a summary of the intersection operation for the base model (without Plan Change) and with the Plan Change.

Table 8: SH1 / Dunns Crossing Rd / Walkers Rd Intersection – Paramics Results

Period	Approach	Base Model		With Plan Change	
		Level of Service	Delay (seconds)	Level of Service	Delay (seconds)
AM Peak	Walkers Road	C	22	B	16
	SH1 East	A	5	A	7
	Dunns Crossing Rd	C	24	D	44
	SH1 West	C	27	E	70
	Overall	***B***	***19***	***D***	***35***
PM Peak	Walkers Road	B	11	B	12
	SH1 East	A	8	B	12
	Dunns Crossing Rd	A	6	A	7
	SH1 West	A	9	A	10
	Overall	***A***	***8***	***B***	***11***

48. The above results indicate that the State Highway 1 / Dunns Crossing Road / Walkers Road intersection will be able to accommodate the predicted traffic volumes associated with the Plan Change. Although it is noted that the SH1 west approach is at Level of Service E in the AM peak.

49. The operation of this intersection (with the Plan Change traffic) has been further reviewed by creating an isolated intersection model in SIDRA. This model assumed the layout illustrated in **Figure 12**, an 80km/hr speed environment and the default settings. The results are included in **Appendix 3** and summarised in **Table 9**, along with the Paramics model results for comparison.

50. The results identify a much-improved operation in the AM compared to that of the Paramics model. PM model results indicate a similar level of operation being predicted by the Paramics model and the SIDRA model. Overall, it is considered that the Paramics model may be underestimating the capacity of this roundabout and the operation would likely be better than predicted. As such, it is considered that the effects of the proposed Plan Change at this location will be acceptable.

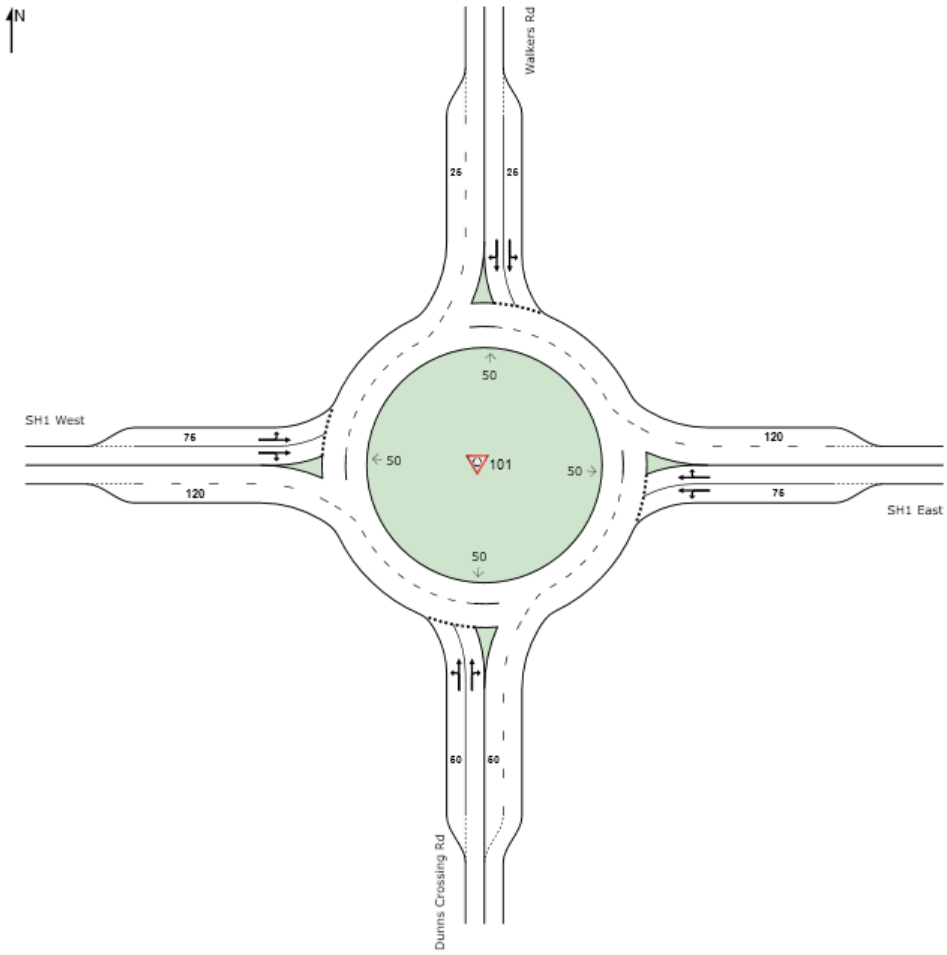


Figure 12: SH1 / Dunns Crossing Road / Walkers Road Assumed Layout

Table 9: SH1 / Dunns Crossing Rd / Walkers Rd Intersection – Paramics Comparison to SIDRA Results

Period	Approach	Paramics Model With Plan Change		SIDRA Results With Plan Change	
		Level of Service	Delay (seconds)	Level of Service	Delay (seconds)
AM Peak	Walkers Road	B	16	B	13
	SH1 East	A	7	A	8
	Dunns Crossing Rd	D	44	B	16
	SH1 West	E	70	B	16
	Overall	***D***	***35***	***B***	***13***
PM Peak	Walkers Road	B	12	B	10
	SH1 East	B	12	B	11
	Dunns Crossing Rd	A	7	B	19
	SH1 West	A	10	B	19
	Overall	***B***	***11***	***B***	***12***

Two Chain Road / Walkers Road Intersection

51. The traffic modelling also assumed this intersection would be constructed as a roundabout prior to development occurring at the Plan Change site. The results of the traffic modelling of this intersection are included in **Table 10**.

Table 10: Walkers Rd / Two Chain Rd Intersection – Paramics Results

Period	Approach	Base Model		With Plan Change	
		Level of Service	Delay (seconds)	Level of Service	Delay (seconds)
AM Peak	Walkers Rd North	A	4	A	3
	Two Chan Rd East	A	0	A	0
	Walkers Rd South	A	7	A	4
	Two Chan Rd West	A	4	A	2
	Overall	***A***	***4***	***A***	***2***
PM Peak	Walkers Rd North	A	3	A	2
	Two Chan Rd East	A	0	A	0
	Walkers Rd South	A	7	A	3
	Two Chan Rd West	A	3	A	3
	Overall	***A***	***2***	***A***	***1***

52. The above results indicate that the Walkers Road / Two Chain Road intersection has excellent operation in the peak periods. It also indicates an improved operation with the proposed Plan Change, because traffic re-routes through the Plan Change internal road network and avoids the roundabout.

53. Given the outcome that the proposed Plan Change site enables traffic to bypass the Walkers Road / Two Chain Road intersection, there is the ability to progress development of the Plan Change land ahead of constructing the roundabout. This would be acceptable, so long as the roading connection through the Application site (from Walkers Road to Two Chain Road) is constructed prior to the occupation of development.

Dunns Crossing Road / Newman Road Intersection

54. **Table 11** summarises the traffic modelling results of the Dunns Crossing Road / Newman Road intersection.

Table11: Dunns Crossing Road / Newman Road Intersection – Paramics Results

Period	Approach	Base Model		With Plan Change	
		Level of Service	Delay (seconds)	Level of Service	Delay (seconds)
AM Peak	Dunns Crossing Rd North	A	1	A	1
	Newman Rd	F	54	F	78
	Dunns Crossing Rd South	A	3	B	11
	Overall	***F***	***54***	***F***	***78***
PM Peak	Dunns Crossing Rd North	A	1	A	2
	Newman Rd	C	20	C	20
	Dunns Crossing Rd South	A	3	A	4
	Overall	***C***	***20***	***C***	***20***

55. The results in **Table 11** indicate that the Newman Road approach to this intersection is over-capacity in the base model during the AM peak.

56. An isolated intersection model of this intersection has been created in SIDRA to better understand whether the operation is a result of high traffic volumes passing Newman Road, or as a result of queueing from the SH1 / Dunns Crossing Road / Walkers Road intersection. The results of the traffic model are included in **Appendix 4** and indicate that the intersection operation is predicted to be satisfactory, so the issue relates to queues extending back from the SH1 intersection.

57. The SIDRA modelling undertaken for the SH1 / Dunns Crossing Road / Walkers Road intersection indicated that the intersection may well operate better than predicted by the Paramics model. In this event, the queues from that intersection would be less and there would not be the same level of interaction with the Dunns Crossing Road / Newman Road intersection.

58. Plan Change 73 includes a commitment to alter the approach lanes on Newman Road to provide dedicated left and right turn lanes. This is illustrated in **Figure 13** and reduces the delay at the intersection by separating the turning traffic.

59. In the context of the above, the operation of the Dunns Crossing Road / Newman Road intersection is considered to be tolerable.

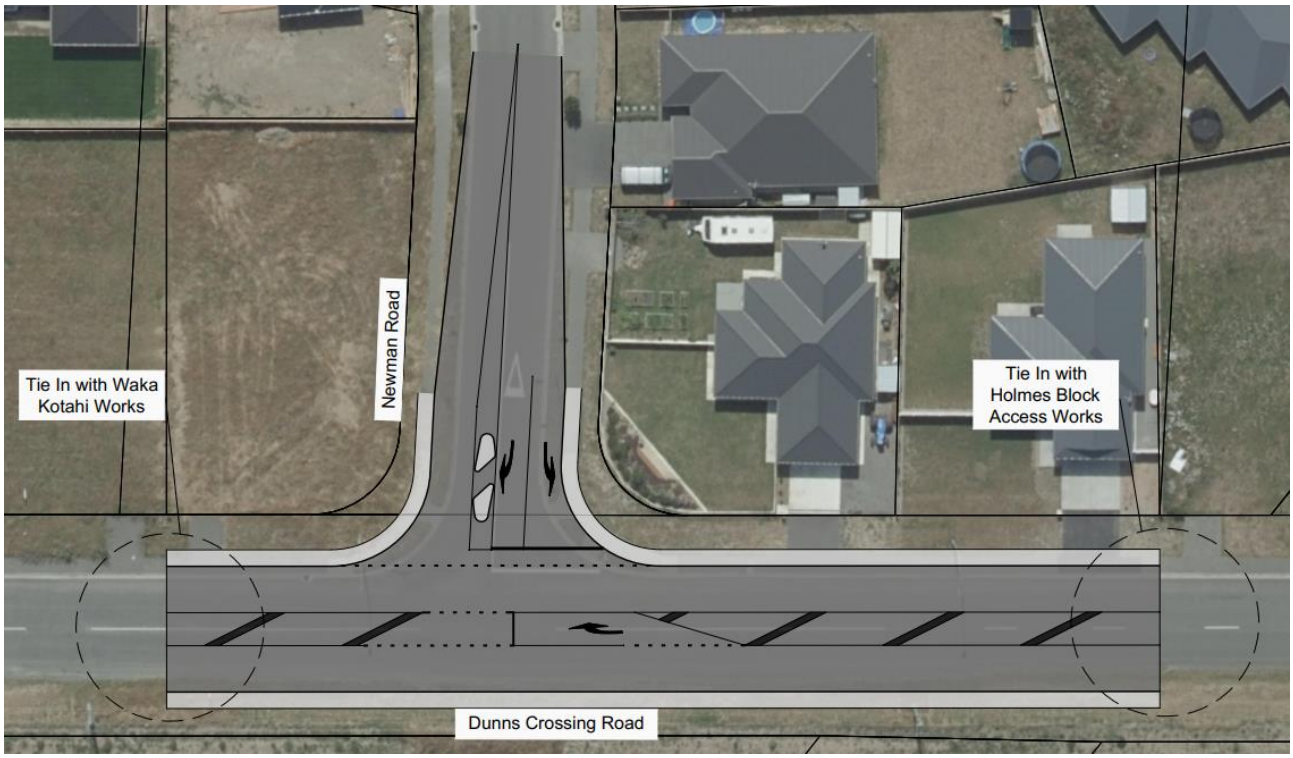


Figure 13: Proposed Dunns Crossing Road / Newman Road Intersection

Alternate Transport Modes

Passneger Transport

60. Paragraph 22 identifies there is a bus route passing the site along Two Chain Road that could be diverted into the Plan Change site if desired. This would need to be undertaken in conjunction with Environment Canterbury as it sits outside the Plan Change process.

61. In addition to the above, the primary internal road network will be designed to accommodate buses, should passenger transport be routed through the site. Detailed design of this would ultimately be provided at the subdivision stage.

Walking & Cycling

62. The ODP includes the provision of a shared path around the Application site, that will accommodate cyclists and pedestrians around the outside of the site. Particularly for cyclists, this is considered to be a safer arrangement than providing the shared path through an industrial subdivision. This shared path is intended to link to the Jones Road cycleway, as well as the shared path on Dunns Crossing Road (subject to crossing SH1).

63. The internal transport network will also accommodate cyclists (where required) and provide footpaths. This will be determined in greater detail at the time of subdivision.

64. The above is considered to be sufficient to accommodate walking and cycling through, as well as to / from the Plan Change site.

Summary & Conclusion

Summary

65. It is proposed to rezone 98ha of rural (Inner Plains) land at the application site to become industrial (Business Zone 2A). The predicted traffic generation of the rezoned land site is:

    i. AM Peak (2 hours): 1,078 vehicle movements; and

    ii. PM Peak (2 hours): 996 vehicle movements.

66. The Plan Change site would gain access to Walkers Road and Two Chain Road. The timing of development would be such that no development will be occupied prior to construction of the following:

    i. SH1 / Walkers Road / Dunns Crossing Road upgrade;

    ii. Walkers Road (including provision of a flush median) and Two Chain Road frontage upgrades; and

    iii. Construction of a roading link within the Application site that links Two Chain Road to Walkers Road.

67. Subject to the above roading upgrades being completed, the traffic effects of the proposed Plan Change are considered to be acceptable.

68. The site has been identified as being accessible by existing passenger transport routes, that could also be rerouted through the site to provide improved accessibility (should Environment Canterbury be amenable to this change). The site will facilitate the shared path between the SH1 / Dunns Crossing Road / Walkers Road intersection through to Jones Road. There would also be pedestrian and cycle facilities (if required) provided within the Plan Change site.

69. The application site could comply with the relevant Code of Practice and the design can be tailored to the satisfaction of the Council when a subdivision application is eventually proposed. This includes detailed design pertaining to roads, intersections, berms and footpath widths, lighting, cross fall and kerb design. It is noted that any industrial development on any proposed allotments (once subdivided) could comply with all the relevant transport related requirements of the Business 2A zone in District Plan. This for example, includes parking dimensions, access and manoeuvring for each new allotment. Failure to comply with any of these standards would result in the requirement for resource consent approval.

Conclusion

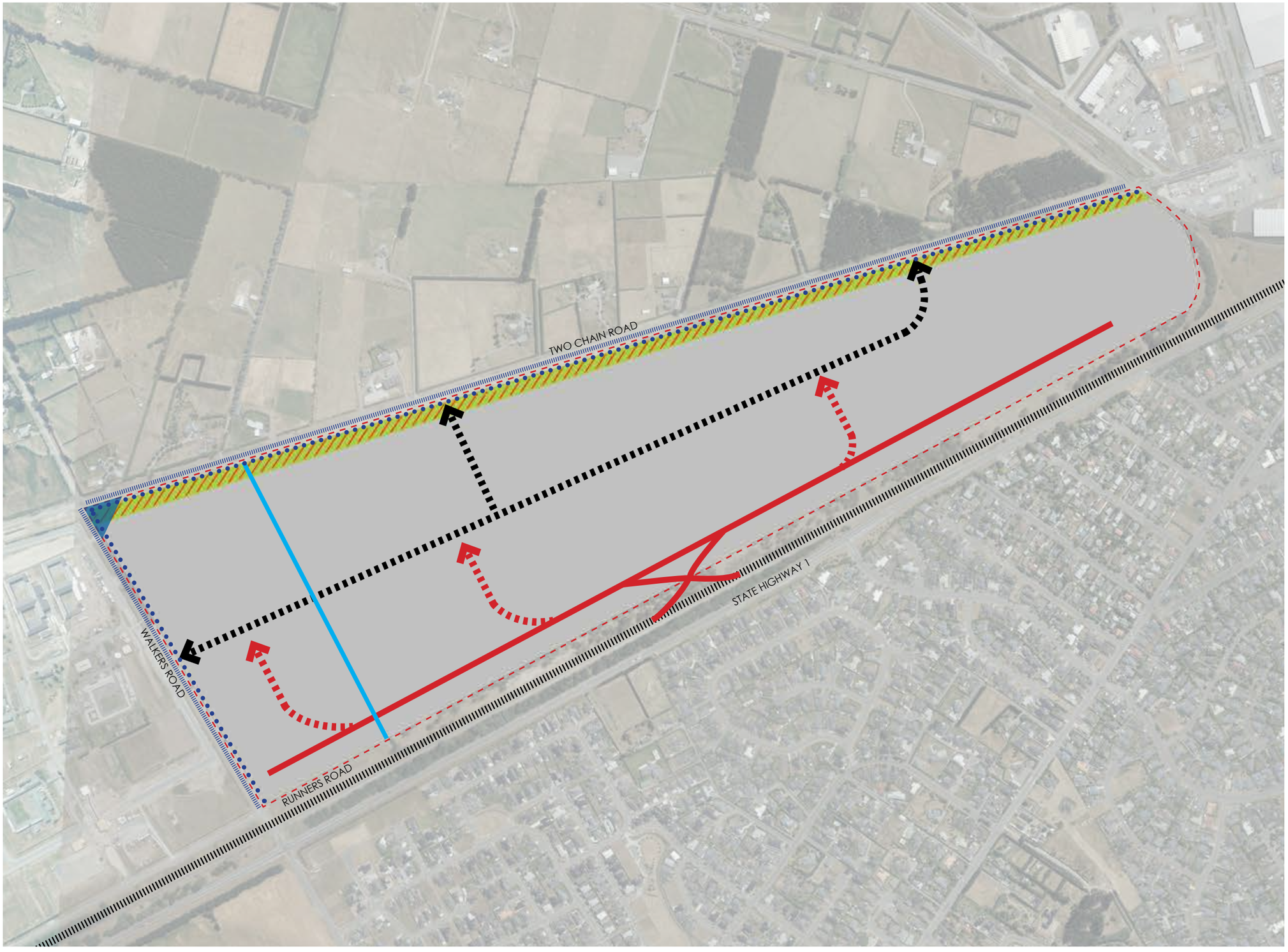
70. Given the above assessment, the transport effects of the proposed Plan Change are considered to be acceptable.

Appendix 1

Proposed Outline Development Plan

LEGEND

- Outline Development Plan Area
- Business 2A Zone
- Retain shelter belt / landscape treatment area 3
- Indicative Primary Road
- Indicative Rail Siding Infrastructure
- Indicative Rail Spurs into Warehouses
- Existing Water Race Retained
- Extent of Road Frontage Upgrade
- Shared Pedestrian / Cycle Path
- Intersection Upgrade (area shown is indicative)



A. OUTLINE DEVELOPMENT PLAN - BUSINESS 2A ZONE TWO CHAIN ROAD

Appendix 2

Paramics Model Results

2033 Base Model Results

SH1 / Dunns Crossing Road / Walkers Road roundabout

Approach	Movement	07:00 to 08:00						08:00 to 09:00						16:00 to 17:00						17:00 to 18:00					
		Flow	Max Delay	Avg Delay	LOS	Approach delay	Approach LOS	Flow	Max Delay	Avg Delay	LOS	Approach delay	Approach LOS	Flow	Max Delay	Avg Delay	LOS	Approach delay	Approach LOS	Flow	Max Delay	Avg Delay	LOS	Approach delay	Approach LOS
Walkers Road North	Left	103	84	16	B			95	52	10	B			93	35	8	A			87	28	7	A		
Walkers Road North	Through	70	137	26	C	22	C	86	108	17	B	14	B	210	51	11	B	11	B	226	58	12	B	12	B
Walkers Road North	Right	18	146	44	D			18	88	25	C			58	50	16	B			48	53	16	B		
SH1 East	Left	70	8	3	A			79	8	3	A			477	19	5	A			686	24	6	A		
SH1 East	Through	723	24	6	A	5	A	700	21	6	A	5	A	636	40	9	A	8	A	742	41	11	B	9	A
SH1 East	Right	76	19	6	A			90	32	6	A			87	34	10	B			82	39	11	B		
Dunns Crossing Road South	Left	137	54	14	B			131	29	7	A			73	21	4	A			94	20	4	A		
Dunns Crossing Road South	Through	181	52	16	B	24	C	199	46	8	A	12	B	119	25	4	A	6	A	113	29	5	A	6	A
Dunns Crossing Road South	Right	607	128	29	C			537	91	15	B			136	43	8	A			144	43	9	A		
SH1 West	Left	64	86	19	B			61	48	10	B			36	25	6	A			32	26	6	A		
SH1 West	Through	582	142	27	C	27	C	459	80	14	B	14	B	649	40	9	A	9	A	594	33	8	A	8	A
SH1 West	Right	90	140	33	C			76	77	18	B			120	39	10	A			158	29	9	A		
Intersection Total		2718		19	B	19	B	2530		10	B	10	B	2692		8	A	8	A	3004		9	A	9	A

Dunns Crossing Road / Newmans Road priority intersection

Approach	Movement	07:00 to 08:00						08:00 to 09:00						16:00 to 17:00						17:00 to 18:00					
		Flow	Max Delay	Avg Delay	LOS	Approach delay	Approach LOS	Flow	Max Delay	Avg Delay	LOS	Approach delay	Approach LOS	Flow	Max Delay	Avg Delay	LOS	Approach delay	Approach LOS	Flow	Max Delay	Avg Delay	LOS	Approach delay	Approach LOS
Dunns Crossing Road North	Left	31	2	1	A	1	A	34	2	1	A	1	A	127	6	1	A	1	A	166	5	1	A	1	A
Dunns Crossing Road North	Through	197	5	1	A			208	4	1	A			676	8	1	A			906	8	1	A		
Newmans Road East	Left	18	265	45	E	54	F	20	57	8	A	15	B	25	65	12	B	14	B	31	75	18	C	20	C
Newmans Road East	Right	102	329	56	F			92	80	17	C			55	75	14	B			50	83	21	C		
Dunns Crossing Road South	Through	838	23	3	A	3	A	766	5	2	A	2	A	275	5	1	A	2	A	302	4	1	A	3	A
Dunns Crossing Road South	Right	16	14	3	A			20	12	3	A			19	112	21	C			15	177	52	F		
Intersection Total		1202		56	F	54	F	1139		17	C	15	B	1177		21	C	14	B	1469		52	F	20	C

Two Chains Road / Walkers Road roundabout

Approach	Movement	07:00 to 08:00						08:00 to 09:00						16:00 to 17:00						17:00 to 18:00					
		Flow	Max Delay	Avg Delay	LOS	Approach delay	Approach LOS	Flow	Max Delay	Avg Delay	LOS	Approach delay	Approach LOS	Flow	Max Delay	Avg Delay	LOS	Approach delay	Approach LOS	Flow	Max Delay	Avg Delay	LOS	Approach delay	Approach LOS
Walkers Road North	Left	0	0	0	A			0	4	4	A			0	0	0	A			0	0	0	A		
Walkers Road North	Through	90	19	4	A	4	A	86	21	4	A	4	A	66	15	3	A	3	A	69	16	3	A	3	A
Walkers Road North	Right	5	12	5	A			5	7	3	A			4	6	3	A			3	6	3	A		
Two Chains Road East	Left	194	1	0	A			198	1	0	A			368	1	0	A			357	1	0	A		
Two Chains Road East	Through	81	1	0	A	0	A	92	1	0	A	0	A	88	1	0	A	0	A	88	1	0	A	0	A
Two Chains Road East	Right	82	1	0	A			89	1	0	A			77	1	0	A			93	1	0	A		
Walkers Road South	Left	64	37	7	A			76	27	6	A			52	33	6	A			63	22	5	A		
Walkers Road South	Through	79	40	8	A	8	A	85	29	7	A	7	A	72	30	5	A	7	A	88	24	5	A	5	A
Walkers Road South	Right	172	41	9	A			191	32	8	A			114	33	9	A			78	24	6	A		
Two Chains Road West	Left	4	5	3	A			4	4	2	A			5	11	4	A			6	6	2	A		
Two Chains Road West	Through	34	20	4	A	4	A	29	15	4	A	4	A	15	14	3	A	3	A	12	9	3	A	3	A
Two Chains Road West	Right	68	22	3	A			65	18	4	A			103	21	4	A			98	21	4	A		
Intersection Total		**871**		**4**	A	**4**	**A**	**919**		**4**	A	**4**	**A**	**962**		**2**	A	**2**	**A**	**953**		**2**	A	**2**	**A**

2033 With Plan Change Model Results

SH1 / Dunns Crossing Road / Walkers Road roundabout

Approach	Movement	07:00 to 08:00						08:00 to 09:00						16:00 to 17:00						17:00 to 18:00					
		Flow	Max Delay	Avg Delay	LOS	Approach delay	Approach LOS	Flow	Max Delay	Avg Delay	LOS	Approach delay	Approach LOS	Flow	Max Delay	Avg Delay	LOS	Approach delay	Approach LOS	Flow	Max Delay	Avg Delay	LOS	Approach delay	Approach LOS
Walkers Road North	Left	133	59	13	B	16	B	112	50	10	B	13	B	197	46	9	A	12	B	188	41	9	A	12	B
Walkers Road North	Through	86	89	18	B			90	84	14	B			243	58	13	B			295	71	14	B		
Walkers Road North	Right	22	86	25	C			22	86	22	C			71	55	17	B			59	77	18	B		
SH1 East	Left	67	10	3	A	7	A	77	9	3	A	6	A	471	21	6	A	7	A	673	37	9	A	12	B
SH1 East	Through	723	23	6	A			696	21	6	A			635	39	9	A			741	59	14	B		
SH1 East	Right	209	33	9	A			199	37	8	A			111	37	10	A			135	58	15	B		
Dunns Crossing Road South	Left	123	78	29	C	44	D	120	54	10	B	19	B	76	17	4	A	6	A	100	23	5	A	7	A
Dunns Crossing Road South	Through	251	92	30	C			274	71	12	B			129	23	5	A			152	32	6	A		
Dunns Crossing Road South	Right	525	195	54	D			508	144	25	C			137	55	9	A			162	45	10	B		
SH1 West	Left	89	142	49	D	70	E	79	95	17	B	28	C	43	25	6	A	9	A	37	31	7	A	10	A
SH1 West	Through	566	285	69	E			468	180	28	C			637	40	10	A			589	41	10	A		
SH1 West	Right	85	267	98	F			79	164	38	D			121	38	9	A			153	38	10	B		
Intersection Total		2878		35	D	35	D	2723		16	B	16	B	2870		9	A	9	A	3281		11	B	11	B

Dunns Crossing Road / Newmans Road priority intersection

Approach	Movement	07:00 to 08:00						08:00 to 09:00						16:00 to 17:00						17:00 to 18:00					
		Flow	Max Delay	Avg Delay	LOS	Approach delay	Approach LOS	Flow	Max Delay	Avg Delay	LOS	Approach delay	Approach LOS	Flow	Max Delay	Avg Delay	LOS	Approach delay	Approach LOS	Flow	Max Delay	Avg Delay	LOS	Approach delay	Approach LOS
Dunns Crossing Road North	Left	33	1	0	A	1	A	33	1	0	A	1	A	132	6	1	A	1	A	172	8	2	A	2	A
Dunns Crossing Road North	Through	204	5	1	A			214	5	1	A			700	8	1	A			950	11	2	A		
Newmans Road East	Left	13	489	77	F	117	F	23	169	14	B	44	E	30	59	10	A	12	B	27	81	16	C	24	C
Newmans Road East	Right	83	597	123	F			86	325	52	F			52	94	13	B			52	130	28	D		
Dunns Crossing Road South	Through	840	92	18	C	17	C	801	33	3	A	3	A	293	5	1	A	2	A	362	7	1	A	6	A
Dunns Crossing Road South	Right	17	38	10	B			20	25	5	A			17	89	26	D			22	319	85	F		
Intersection Total		1189		123	F	117	F	1176		52	F	44	E	1224		26	D	12	B	1585		85	F	24	C

Two Chains Road / Walkers Road roundabout

Approach	Movement	07:00 to 08:00						08:00 to 09:00						16:00 to 17:00						17:00 to 18:00					
		Flow	Max Delay	Avg Delay	LOS	Approach delay	Approach LOS	Flow	Max Delay	Avg Delay	LOS	Approach delay	Approach LOS	Flow	Max Delay	Avg Delay	LOS	Approach delay	Approach LOS	Flow	Max Delay	Avg Delay	LOS	Approach delay	Approach LOS
Walkers Road North	Left	1	3	3	A	3	A	1	5	5	A	3	A	0	0	0	A	3	A	0	0	0	A	2	A
Walkers Road North	Through	89	14	3	A			87	15	3	A			66	14	3	A			69	11	3	A		
Walkers Road North	Right	5	10	4	A			6	9	4	A			4	3	2	A			4	5	3	A		
Two Chains Road East	Left	179	1	0	A	0	A	166	1	0	A	0	A	228	1	0	A	0	A	224	1	0	A	0	A
Two Chains Road East	Through	80	1	0	A			89	1	0	A			91	1	0	A			91	1	0	A		
Two Chains Road East	Right	81	1	0	A			85	1	0	A			76	1	0	A			92	1	0	A		
Walkers Road South	Left	65	15	4	A	4	A	73	14	4	A	4	A	56	13	2	A	3	A	63	15	3	A	3	A
Walkers Road South	Through	76	16	4	A			81	15	4	A			70	13	4	A			87	15	4	A		
Walkers Road South	Right	43	15	4	A			50	15	4	A			24	11	4	A			29	13	4	A		
Two Chains Road West	Left	4	4	2	A	2	A	4	5	2	A	2	A	6	5	2	A	2	A	6	12	3	A	3	A
Two Chains Road West	Through	34	17	3	A			33	10	3	A			18	10	2	A			12	12	2	A		
Two Chains Road West	Right	79	12	2	A			66	13	2	A			96	13	2	A			95	13	3	A		
Intersection Total		**735**		**2**	A	**2**	**A**	**738**		**2**	A	**2**	**A**	**732**		**1**	A	**1**	**A**	**770**		**1**	A	**1**	**A**

Appendix 3

SH1 / Dunns Crossing Road / Walkers Road Intersection Model Results

MOVEMENT SUMMARY

Site: 101v [Newman Rd - 2033 AM (Site Folder: Newman)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Dunns Crossing Rd														
2	T1	842	0.0	886	0.0	0.451	0.2	LOS A	0.0	0.0	0.00	0.00	0.00	59.7
3	R2	15	0.0	16	0.0	0.011	6.2	LOS A	0.0	0.3	0.27	0.55	0.27	52.6
Approach		857	0.0	902	0.0	0.451	0.3	NA	0.0	0.3	0.00	0.01	0.00	59.5
East: Newman Rd														
4	L2	16	0.0	17	0.0	0.012	6.1	LOS A	0.0	0.3	0.28	0.54	0.28	52.7
6	R2	80	0.0	84	0.0	0.325	22.2	LOS C	1.3	9.0	0.84	0.98	1.02	42.8
Approach		96	0.0	101	0.0	0.325	19.5	LOS C	1.3	9.0	0.75	0.91	0.90	44.2
North: Dunns Crossing Rd														
7	L2	28	0.0	29	0.0	0.118	5.6	LOS A	0.0	0.0	0.00	0.08	0.00	57.7
8	T1	192	0.0	202	0.0	0.118	0.0	LOS A	0.0	0.0	0.00	0.08	0.00	59.3
Approach		220	0.0	232	0.0	0.118	0.7	NA	0.0	0.0	0.00	0.08	0.00	59.1
All Vehicles		1173	0.0	1235	0.0	0.451	1.9	NA	1.3	9.0	0.06	0.10	0.08	57.8

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101v [Newman Rd - 2033 PM (Site Folder: Newman)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Dunns Crossing Rd														
2	T1	362	0.0	381	0.0	0.194	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
3	R2	22	0.0	23	0.0	0.076	17.1	LOS C	0.2	1.5	0.84	0.93	0.84	45.7
Approach		384	0.0	404	0.0	0.194	1.0	NA	0.2	1.5	0.05	0.05	0.05	58.9
East: Newman Rd														
4	L2	27	0.0	28	0.0	0.064	12.5	LOS B	0.2	1.5	0.74	0.89	0.74	48.6
6	R2	52	0.0	55	0.0	0.549	60.5	LOS F	1.9	13.5	0.96	1.06	1.29	29.5
Approach		79	0.0	83	0.0	0.549	44.1	LOS E	1.9	13.5	0.89	1.00	1.10	34.1
North: Dunns Crossing Rd														
7	L2	172	0.0	181	0.0	0.604	5.8	LOS A	0.0	0.0	0.00	0.09	0.00	57.1
8	T1	950	0.0	1000	0.0	0.604	0.3	LOS A	0.0	0.0	0.00	0.09	0.00	58.6
Approach		1122	0.0	1181	0.0	0.604	1.2	NA	0.0	0.0	0.00	0.09	0.00	58.4
All Vehicles		1585	0.0	1668	0.0	0.604	3.3	NA	1.9	13.5	0.06	0.13	0.07	56.5

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Appendix 4

Dunns Crossing Road / Newman Road Intersection Model Results

MOVEMENT SUMMARY

Site: 101 [SH1 / Dunns Crossing / Walkers - 2033 AM (Site Folder: SH1 / Dunns / Walkers)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Dunns Crossing Rd														
1	L2	123	10.0	129	10.0	0.317	10.0	LOS B	1.5	11.2	0.69	0.78	0.70	63.1
2	T1	251	10.0	264	10.0	0.723	10.7	LOS B	6.6	50.0	0.79	0.96	1.04	61.2
3	R2	525	10.0	553	10.0	0.723	19.1	LOS B	6.6	50.0	0.85	1.06	1.22	59.0
Approach		899	10.0	946	10.0	0.723	15.5	LOS B	6.6	50.0	0.81	0.99	1.10	60.1
East: SH1 East														
4	L2	67	10.0	71	10.0	0.387	6.0	LOS A	2.2	16.7	0.42	0.49	0.42	64.7
5	T1	723	10.0	761	10.0	0.417	6.6	LOS A	2.5	19.1	0.42	0.53	0.42	66.6
6	R2	209	10.0	220	10.0	0.417	13.8	LOS B	2.5	19.1	0.41	0.57	0.41	65.5
Approach		999	10.0	1052	10.0	0.417	8.1	LOS A	2.5	19.1	0.42	0.53	0.42	66.3
North: Walkers Rd														
7	L2	133	10.0	140	10.0	0.244	14.2	LOS B	1.5	11.7	0.84	0.85	0.84	62.4
8	T1	86	10.0	91	10.0	0.244	10.4	LOS B	1.5	11.7	0.81	0.87	0.81	63.6
9	R2	22	10.0	23	10.0	0.136	18.6	LOS B	0.7	5.5	0.79	0.88	0.79	62.3
Approach		241	10.0	254	10.0	0.244	13.2	LOS B	1.5	11.7	0.82	0.86	0.82	62.8
West: SH1 West														
10	L2	89	10.0	94	10.0	0.549	14.7	LOS B	4.2	31.6	0.90	1.01	1.15	58.9
11	T1	566	10.0	596	10.0	0.591	14.9	LOS B	5.5	41.4	0.92	1.04	1.19	61.4
12	R2	85	10.0	89	10.0	0.591	20.8	LOS C	5.5	41.4	0.94	1.05	1.21	61.4
Approach		740	10.0	779	10.0	0.591	15.5	LOS B	5.5	41.4	0.92	1.04	1.18	61.1
All Vehicles		2879	10.0	3031	10.0	0.723	12.7	LOS B	6.6	50.0	0.70	0.83	0.86	62.6

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [SH1 / Dunns Crossing / Walkers - 2033 PM (Site Folder: SH1 / Dunns / Walkers)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Dunns Crossing Rd														
1	L2	100	10.0	105	10.0	0.246	15.4	LOS B	1.7	12.6	0.92	0.93	0.92	59.5
2	T1	152	10.0	160	10.0	0.555	16.0	LOS B	5.8	43.7	1.00	1.05	1.25	56.5
3	R2	163	10.0	172	10.0	0.555	23.8	LOS C	5.8	43.7	1.00	1.05	1.25	56.5
Approach		415	10.0	437	10.0	0.555	18.9	LOS B	5.8	43.7	0.98	1.02	1.17	57.1
East: SH1 East														
4	L2	673	10.0	708	10.0	0.749	10.6	LOS B	7.3	55.1	0.82	0.99	1.10	61.7
5	T1	741	10.0	780	10.0	0.781	9.8	LOS A	8.6	65.0	0.82	0.89	1.09	63.3
6	R2	135	10.0	142	10.0	0.781	17.7	LOS B	8.6	65.0	0.82	0.89	1.09	63.4
Approach		1549	10.0	1631	10.0	0.781	10.9	LOS B	8.6	65.0	0.82	0.94	1.09	62.6
North: Walkers Rd														
7	L2	188	10.0	198	10.0	0.430	9.8	LOS A	2.7	20.4	0.76	0.74	0.82	62.7
8	T1	295	10.0	311	10.0	0.430	9.6	LOS A	2.7	20.4	0.74	0.75	0.78	64.7
9	R2	59	10.0	62	10.0	0.240	16.5	LOS B	1.2	8.8	0.70	0.78	0.70	63.1
Approach		542	10.0	571	10.0	0.430	10.4	LOS B	2.7	20.4	0.74	0.75	0.78	63.8
West: SH1 West														
10	L2	37	10.0	39	10.0	0.390	8.2	LOS A	2.5	19.1	0.68	0.62	0.68	62.7
11	T1	589	10.0	620	10.0	0.420	8.4	LOS A	3.0	22.7	0.69	0.64	0.69	64.7
12	R2	153	10.0	161	10.0	0.420	19.0	LOS B	3.0	22.7	0.69	0.66	0.69	63.8
Approach		779	10.0	820	10.0	0.420	10.4	LOS B	3.0	22.7	0.69	0.64	0.69	64.4
All Vehicles		3285	10.0	3458	10.0	0.781	11.7	LOS B	8.6	65.0	0.80	0.85	0.95	62.5

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.