Proposed Rural Residential Plan Change, Holmes Block, Rolleston

Selwyn Plantation Board Limited

Final Transportation Assessment Report

Traffic Design Group

PO Box 13 835, Armagh
Christchurch 8141
P: +64 3 379 2404
www.tdg.co.nz
New Zealand

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April 2009

9819/2
16 April 2009

Chris Fowler
Adderley Head
PO Box 16
Christchurch 8140

Dear Sir

Selwyn Plantation Board Ltd
Proposed 160 Lot Rural Residential Plan Change, Holmes Block Rolleston

Traffic Design Group is pleased to present our Transport Assessment relating to the Plan Change proposal to rezone a site owned by Selwyn Plantation Board Limited at Rolleston, referred to as the Holmes Block. The proposal is to rezone the site from the Outer Plains zone to a new zone, Living 3, which provides for rural residential activities.

Our assessment describes the existing transport environment, provides an assessment of the traffic generation associated with a rural residential rezoning and considers the development in terms of the local, regional and national planning documents. Our assessment includes analysis of the potential traffic effects of development of the site and the potential cumulative traffic effects of the additional development of the Selwyn Plantation Board Limited Skellerup Block, located to the south of the site, for which a parallel Plan Change application has been lodged.

Our assessment has concluded that the proposed Plan Change would not be contrary to the relevant transportation objectives and policies of the various planning documents, and the additional traffic generated could be accommodated by the transport network in a safe, sustainable and efficient manner with the incorporation of roading upgrades recommended by the Christchurch Rolleston and Environs Transportation Study (CRETS) and adopted within the Canterbury Transportation Regional Implementation Plan (TRIP).

Yours faithfully
Traffic Design Group Ltd

Andrew Metherell
Principal Transportation Engineer

Proposed Rural Residential Plan Change, Rolleston

Selwyn Plantation Board Limited

Transportation Assessment Report Quality Assurance Statement

Prepared by:

Ryan Rolston

Project Transportation Engineer

Reviewed by:

Lauren Boyce

Project Transportation Engineer

Approved for Issue by:

Andrew Metherell

Principal Transportation Engineer

Status: Final Draft

Date: 16 April 2009

Table of Contents

Proposed Rural Residential Plan Change, Rolleston
Selwyn Plantation Board Limited

Transportation Assessment Report

1. Introduction

The Selwyn Plantation Board Limited (SPBL) proposes to initiate a private Plan Change relating to land it owns at the south-western edge of Rolleston. The site is referred to as the Holmes Block.

This report provides an assessment of the transportation related effects associated with rezoning the 92ha site from Outer Plains to a new Living 3 zone that provides for rural residential land use. The assessment undertaken considers the existing transport environment in the area, the traffic generation associated with rezoning and provides an assessment of the potential transport related effects.

2. Existing Transport Environment

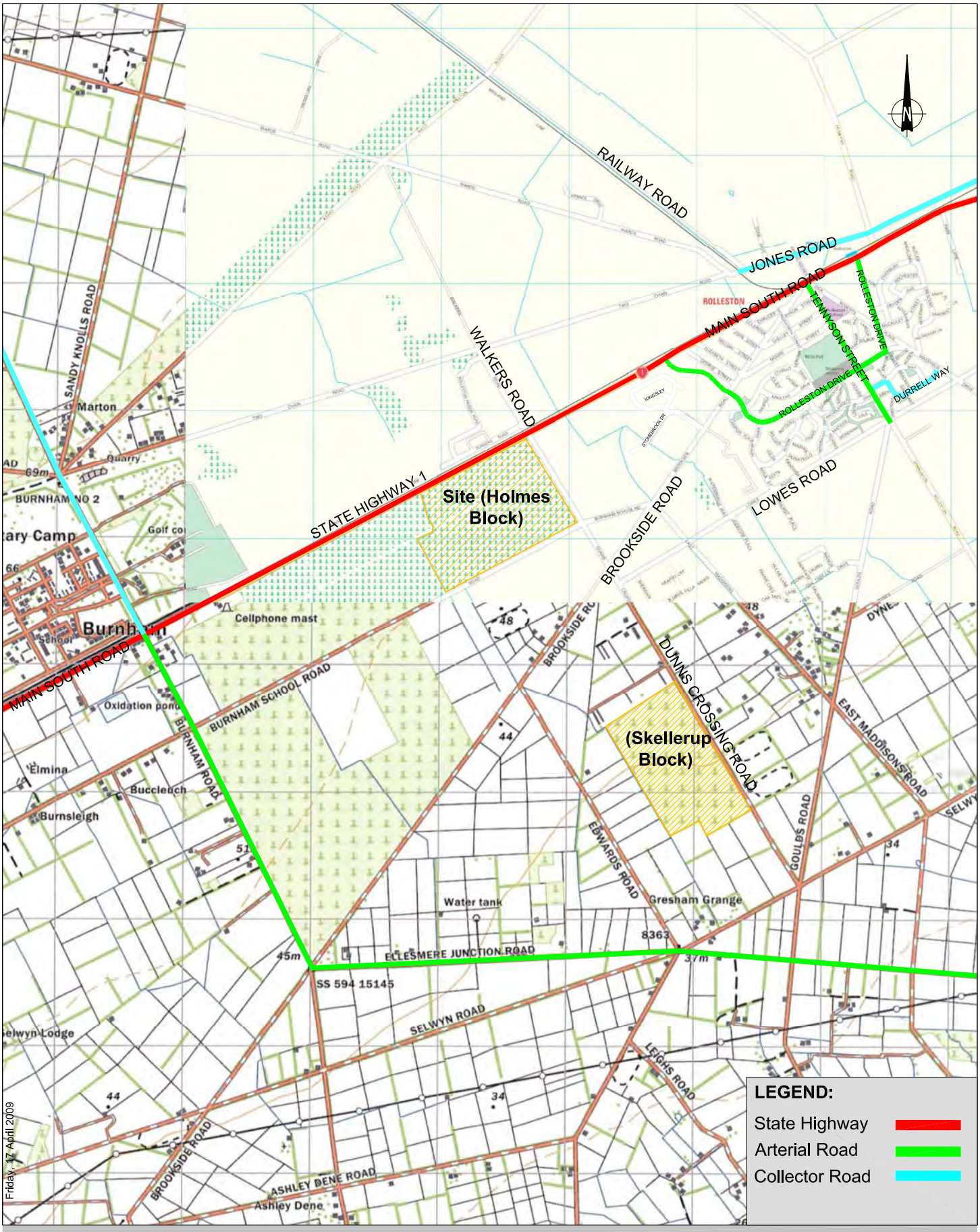
2.1 Site Location

Figure 1 shows the location of the site at the western edge of Rolleston and also indicates the road hierarchy classifications of the Selwyn District Plan for roads in the vicinity of the site. The key transport route within the surrounding road network is SH1, which is classified as a Strategic Road and provides an important national and regional function. Also adjoining the site are Dunns Crossing Road, which currently provides a local access function, and Burnham School Road which also has a local access function. Burnham School Road, Brookside Road and Lowes Road all intersect with Dunns Crossing Road and provide connections into Rolleston Township from the southwest.

Also indicated on Figure 1 is the SPBL Skellerup Block, located to the south of the application site and also fronting Dunns Crossing Road. A rural residential Plan Change application for the Skellerup block site has been lodged by SPBL separately from this proposal.

Figure 2 shows a planning map proposed by the Canterbury Regional Council and the Selwyn District Council for long term (2041) urban limits within Rolleston, which has been notified under Variation 1 to Proposed Change 1 (PC1) to the Regional Policy Statement. The map includes the currently zoned Rolleston Township area with the site added to the map for reference. Land to the northeast of Dunns Crossing Road is generally zoned for residential purposes and will form part of Rolleston Township when developed.

Some development of this zoned land is already occurring and the new residential subdivisions are being supported within the township by development of a central business area and an industrial park to the northwest of SH1. The land on the north-eastern side of Dunns Crossing Road within the Rolleston settlement is currently zoned Living 2A, being lower density residential.



SPBL Rural Residential Plan Change

Site Location & Road Hierarchy

Traffic Design Group

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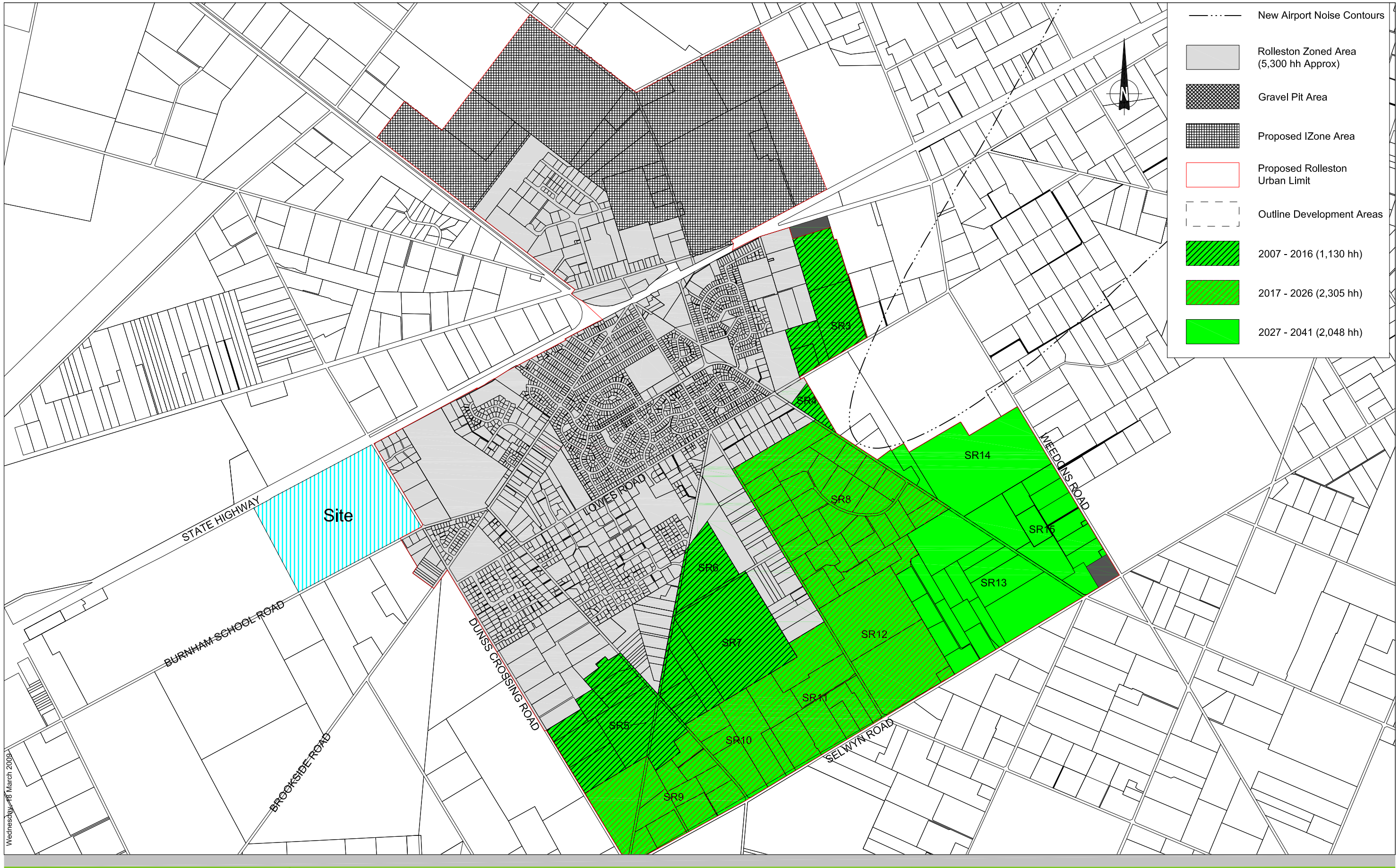

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SPBL Rural Residential Plan Change

Proposed Rolleston Urban Limits

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DATE: 05.11.2008
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Land to the southwest of Dunns Crossing Road is zoned Outer Plains and generally provides for rural activities. Existing non-rural land use activities in the vicinity of the site include a resource recovery centre on the south side of Burnham School Road and to the west of the site, and Rolleston Prison on the north-western side of SH1. A site for a sewerage treatment and disposal facility is designated on the southern side of Burnham School Road.

2.2 Roading Network

SH1 is a rural two-lane road with standard highway geometric characteristics in the vicinity of the site. The road typically has a width of some 10m, and along its length contains several dedicated passing lanes to ensure that an appropriate level of service is retained for the traffic volumes that use it between Christchurch and Ashburton. Road widening designations exist along SH1 on both sides of the highway to accommodate potential future widening, and the designation (Designation TR3 as shown on Planning Map 102) includes 5m into the Holmes Block site on the southern side of SH1.

Dunns Crossing Road has a flat and straight alignment and runs approximately northwest-southeast along the north-eastern boundary of the site. It has a 6m to 7m wide sealed carriageway from SH1 to Lowes Road, and is rural in nature with a centreline only and no edge delineation markers. Dunns Crossing Road has been widened to approximately 7.6m, with a 1.8m footpath on the eastern side, adjacent to a recent subdivision situated between Lowes Road and 650m south of Lowes Road. To the south of the subdivision, the carriageway reverts to a 6.5m sealed width for approximately 1km, before becoming a gravel road with a 7m width for the remainder of the road through to Selwyn Road. Photographs 1 and 2 show representative sections of Dunns Crossing Road.

Photograph 1: Dunns Crossing Road south of Brookside Road

Photograph 2: Dunns Crossing Road north of Boulez Mews

Burnham School Road has a 7m sealed carriageway in the vicinity of the site, as shown in Photograph 3. Again there are no road markings or edge markers on this road.

Photograph 3: Burnham School Road west of Dunns Crossing Road

Dunns Crossing Road has a posted speed limit of 70km/h from SH1 to the current southern urban limit. Roads within the urban area to the east have a 50km/h speed limit. SH1 has a posted speed limit of 100km/hr in the vicinity of the site, as does Burnham School Road and Brookside Road to the southwest of Dunns Crossing Road.

The four legged SH1/Dunns Crossing Road/Walkers Road intersection is give-way controlled with priority given to through traffic on SH1. Right turn bays are provided for turns from SH1 into both Walkers Road and Dunns Crossing Road and good visibility is provided from the Dunns Crossing

Road and Walkers Road approaches. The main trunk railway line runs parallel to SH1 on its north-western side, with the Walkers Road level crossing located 38m from the SH1 edgeline.

The intersection of Dunns Crossing Road and Burnham School Road is stop controlled with priority given to through traffic on Dunns Crossing Road. Kerbed turning radii are provided on each corner to clearly define the intersection and good visibility is available from both Burnham School Road approaches.

The intersection of Dunns Crossing and Brookside Road has priority given to Brookside Road, with Dunns Crossing Road controlled by Give Way signs. As can be seen in Photograph 4, the intersection (which is typical of the cross road intersections in the vicinity) does not have any features to provide additional delineation of the cross road intersection such as central traffic islands on the sign controlled approach.

Photograph 4: Dunns Crossing Road approach to Brookside Road Intersection

2.3 Public Transport

Figure 3 shows the existing public bus service route (service 520 and Burnham B) through Rolleston, which is operated by Environment Canterbury and runs between Burnham, Rolleston, Hornby and the Christchurch City CBD. The route currently operates along Main South Road east of Dunns Crossing Road and turns into Walkers Road northwest of SH1 to service Rolleston Prison.

The 520 service typically operates with a weekday frequency of one trip per hour into the City, and one service per hour from the City. Additional buses in the morning and evening commuter peaks are provided on the B service, in the predominant commuter direction. Weekend services also operate hourly in each direction, with Sunday services terminating in the late afternoon.

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Existing Bus Route

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2.4 Footpaths and Cycle Routes

A formed 2m wide footpath runs along the north-eastern side of Dunns Crossing Road from Lowes Road to approximately 500m further south. The footpath serves the recent subdivision on the south-eastern corner of Lowes Road and Dunns Crossing Road. There are no other formed footpaths or cycle routes on Dunns Crossing Road or Burnham School Road. Within the Rolleston urban area, most roads are formed with a footpath on at least one side of the road.

3. Future Transport Environment

3.1 Christchurch, Rolleston and Environs Transportation Study

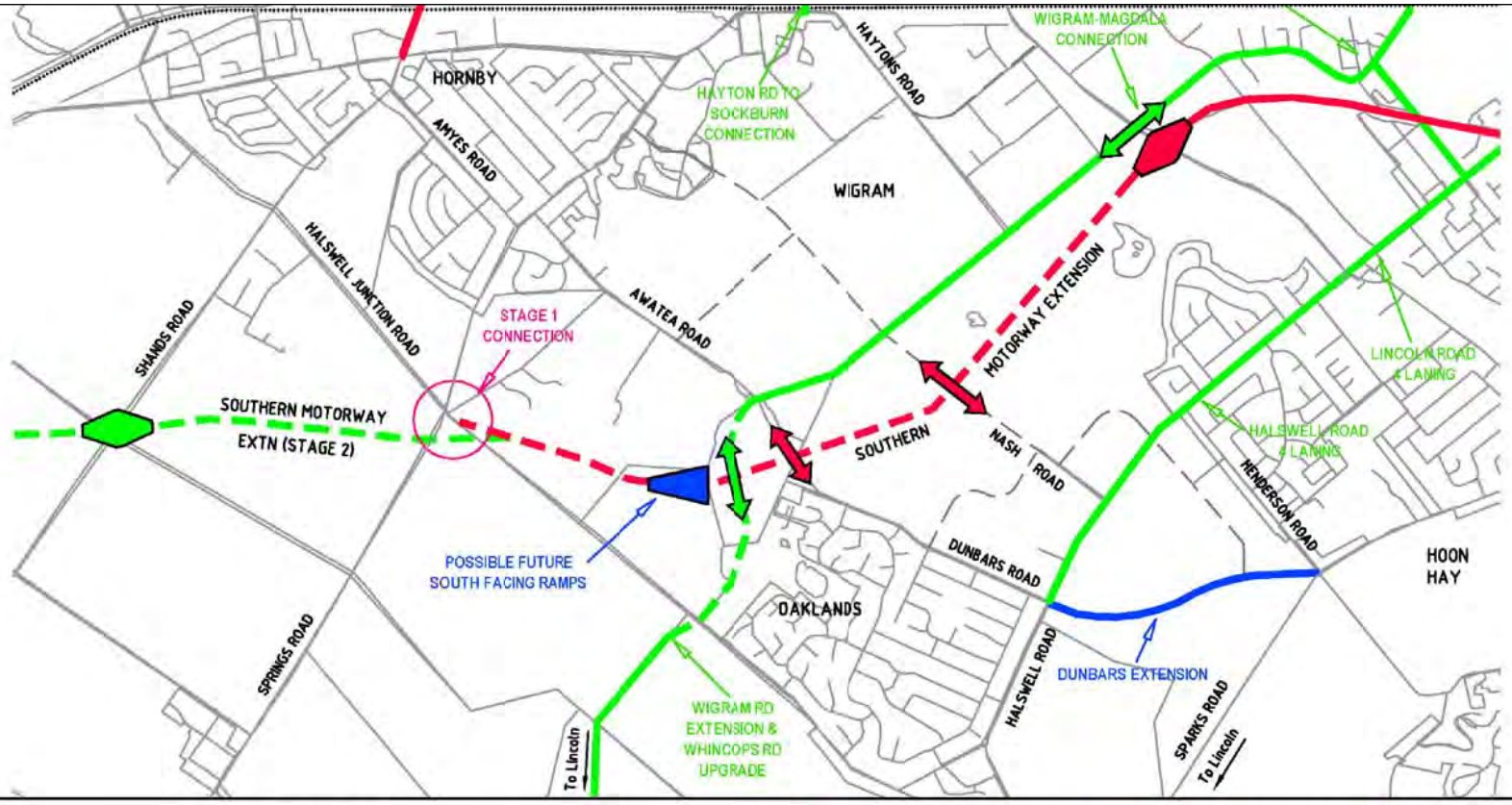
The current residential zoning will enable Rolleston's population to increase to about 14,000 people, with over 5,000[1] households. The township is also expected to accommodate over 2,000 jobs with full development of the industrial area.

This expected increase in population means that extensive measures are also required to increase the traffic capacity of the town's road network and connections to the wider strategic road network. A major transportation study titled the Christchurch Rolleston and Environs Transportation Study (CRETS) has been undertaken by Connell Wagner for Transit New Zealand (now part of the NZ Transport Agency – the NZTA), Selwyn District Council, the Christchurch City Council, Environment Canterbury and Christchurch International Airport Limited and developed a strategy to meet the transportation requirements of the transport network to the southwest and the south of Christchurch.

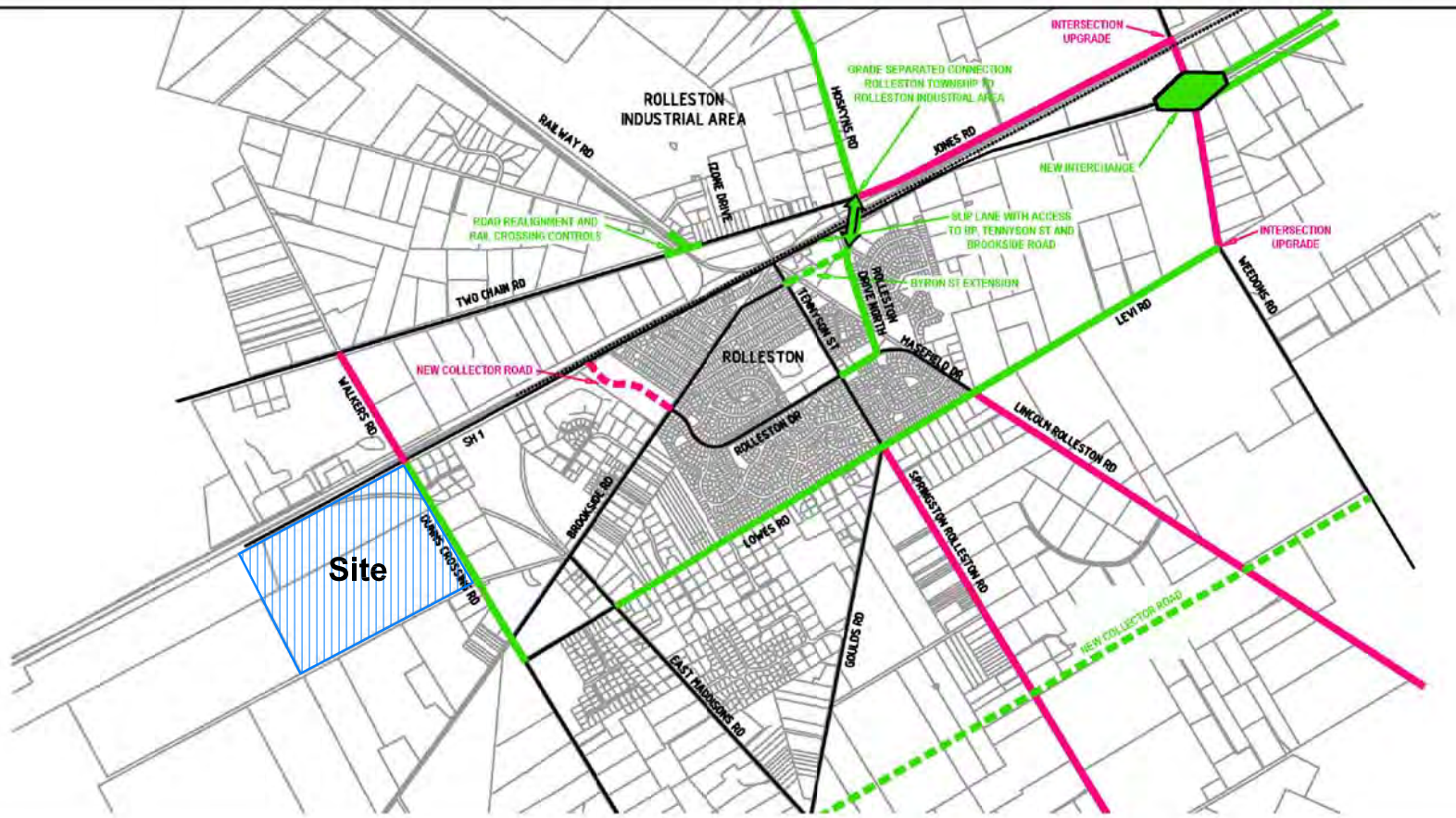
Figure 4 shows the proposed Transport Strategy to address the transport issues through to 2021 for Rolleston that was outlined within the CRETS report. The primary inclusions of the strategy are:

- An inner ring road including Rolleston Drive and its extension from Brookside Road to SH1 west of George Street. This has recently been completed with the construction of the south-western extension of Rolleston Drive to SH1.
- An outer ring road including Weedons Road, Lowes Road, Dunns Crossing Road, Walkers Road, Two Chain Road, Jones Road and Weedons Ross Road with associated road and intersection upgrades.
- Main access to Rolleston from SH1 at Weedons Road via a grade separated interchange.
- Linking of Rolleston Township and the industrial area by replacing the Rolleston Drive and Hoskyns Road traffic signals with a grade separated access across SH1.
- Restriction of local road access onto SH1.
- Access between Rolleston Drive and Tennyson Street via a new link road extension of Byron Street.
- A new Collector Road that runs between Weedons Road and Dunns Crossing Road to the southeast of Lowes Road.

[1] The Christchurch Rolleston and Environs Transportation Study adopted an expected 5,296 households and 2,107 jobs for Rolleston in 2021.



ENLARGEMENT OF CHRISTCHURCH SOUTH WEST AREA



ENLARGEMENT OF ROLLESTON AREA

- SHORT, BY 2011
- MEDIUM, 2011 TO 2021
- LONG, AFTER 2021
- NEW ROAD
- GRADE SEPARATED INTERCHANGE
- GRADE SEPARATED HALF INTERCHANGE
- GRADE SEPARATED LINK

No.	Date	Revision Details	By
B	23-08-07	FINAL REPORT REISSUE	PJK
A	12-06-07	FINAL REPORT	JRD

Connell Wagner

Connell Wagner Limited
Level 4, Tornens House 195 Hereford St.
(P.O. Box 1061) Christchurch New Zealand

Telephone: +64 3 366 0821
Facsimile: +64 3 379 6955
Email: cwchch@conwag.com

Client:

Transit New Zealand | Christchurch International airport | Environment Canterbury | Selwyn | Christchurch

Project:

CHRISTCHURCH ROLLESTON AND ENVIRONS TRANSPORTATION STUDY

Drawing Title:

TRANSPORT STRATEGY STAGING AND TIMING DIAGRAM SW CHCH & ROLLESTON AREAS FINAL REPORT

Drawn	PJK	Date	12-06-07
Designed	JRD		
Verified	MDF	Scale	NTS
Approved	MDF		
CW Project No.	21654	Drawing No.	FR-ST-1b
		Rev.	B

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SPBL Rural Residential Plan Change

Transport Strategy Staging & Timing Diagram SW Christchurch & Rolleston Area

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In a wider context, CRETS also identified major strategic projects for the access corridors between Rolleston and Christchurch. These projects included the extension of the southern motorway corridor from Springs Road to the south of Templeton and four laning of SH1 from Templeton to the recommended Rolleston interchange. In addition, an upgraded arterial corridor is recommended from Rolleston to Hornby via Selwyn Road and Shands Road.

In addition to these strategic facilities, the local transport networks will change as Rolleston expands into the areas zoned for residential purposes. A recommended road hierarchy for the network of major roads is contained in the CRETS Final Report and includes changing Dunns Crossing Road to a District Arterial as part of its function as an outer ring road of Rolleston. The road hierarchy included in CRETS is provided in Figure 5.

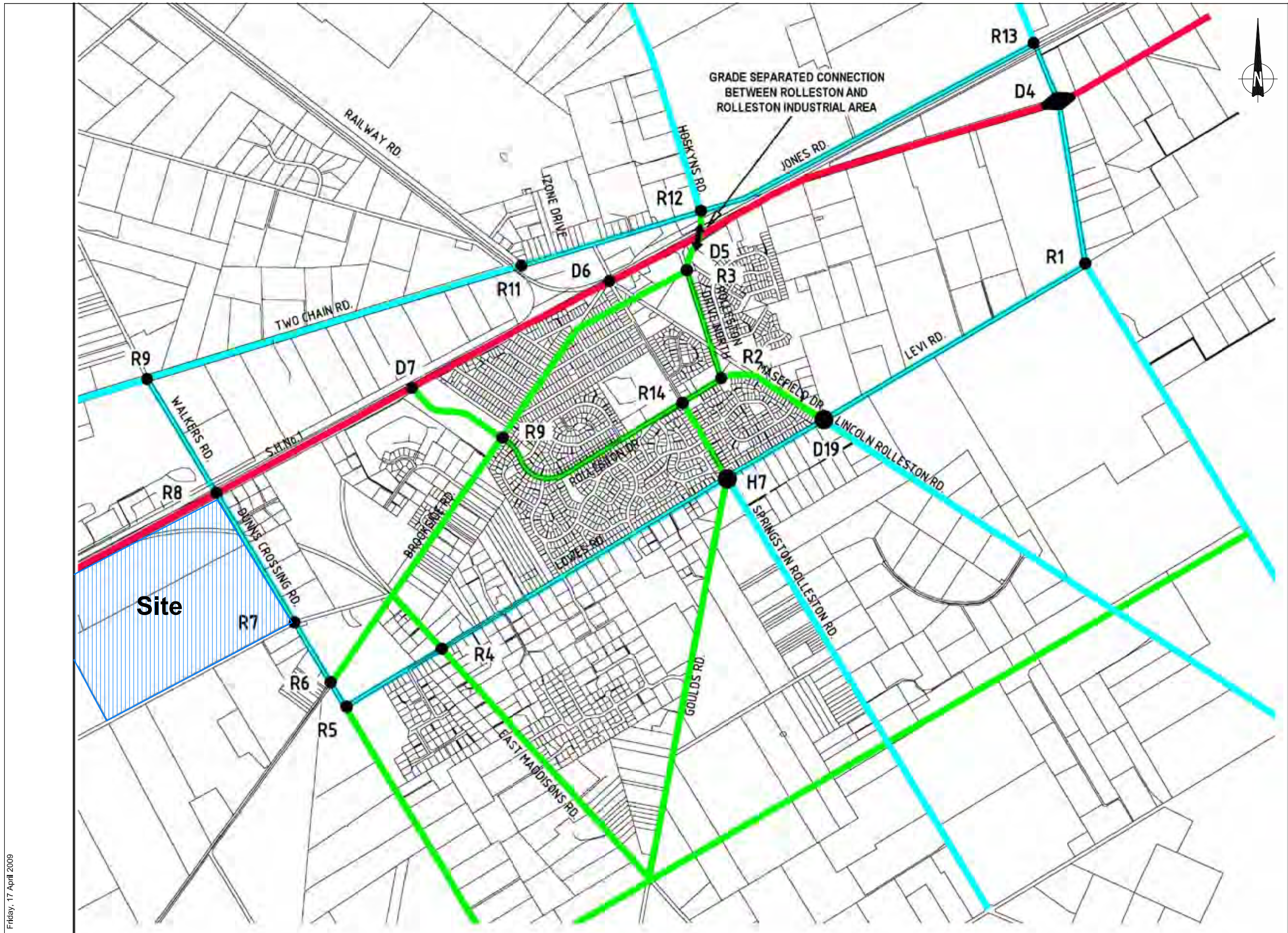
Widening of Dunns Crossing Road is recommended within CRETS in combination with reclassification to a District Arterial between SH1 and Lowes Road and a Collector Road to the southeast of Lowes Road. The recommended cross-section for the road involves an 8.5m sealed carriageway as indicated by Figure 6.

A further recommendation from CRETS is that public transport services will need to be enhanced by higher service frequencies and provision of park and ride facilities in Rolleston.

3.2 Canterbury Transport Regional Implementation Plan

The projects recommended by CRETS have generally been incorporated in the Canterbury Transport Regional Implementation Plan (TRIP), with timeframes proposed based on regional funding prioritisation to assist the ability of the Road Controlling Authorities to secure the necessary funds to implement the strategy. Most of the Rolleston projects are included within a ten year timeframe 2007-2016. Those that are programmed for beyond ten years are the Southern Motorway extension from Springs Road to Templeton, Rolleston Drive grade separated interchange, and four laning of SH1 between Templeton and Rolleston.

Widening of Dunns Crossing Road would be included as part of the “Rolleston Arterial Roading and Intersection Upgrades” projects within TRIP, which are scheduled for construction within a 10 year timeframe. The new Collector Road between Dunns Crossing Road and Weedons Road is not outlined specifically within TRIP.



LEGEND

- SIGNALS
- ROUNDABOUT
- INTERCHANGE (GRADE SEPERATED)
- GRADE SEPARATED LINK
- OTHER
- NATIONAL ARTERIAL
- DISTRICT ARTERIAL
- COLLECTOR (DISTRIBUTOR)

No	Date	Revision Details	By
A	12-06-07	FINAL REPORT	JRD

Connell Wagner

Connell Wagner Limited
Level 4, Tomans House 105 Hereford St.
(P.O. Box 1061) Christchurch New Zealand

Telephone: +64 3 366 0821
Facsimile: +64 3 379 6955
Email: cwchch@conwag.com

Client:

Transit | Christchurch International airport | Environment Canterbury | Selwyn | Christchurch

Project:

CHRISTCHURCH ROLLESTON AND ENVIRONS TRANSPORTATION STUDY

Drawing Title:

TRANSPORT STRATEGY ROLLESTON FINAL REPORT

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Designed	JRD		
Verified	MDF	Scale	NTS
Approved	MDF		
CW Project No	21654	Drawing No.	FR-ROL-1a
		Rev.	A

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SPBL Rural Residential Plan Change

Transport Strategy Rolleston

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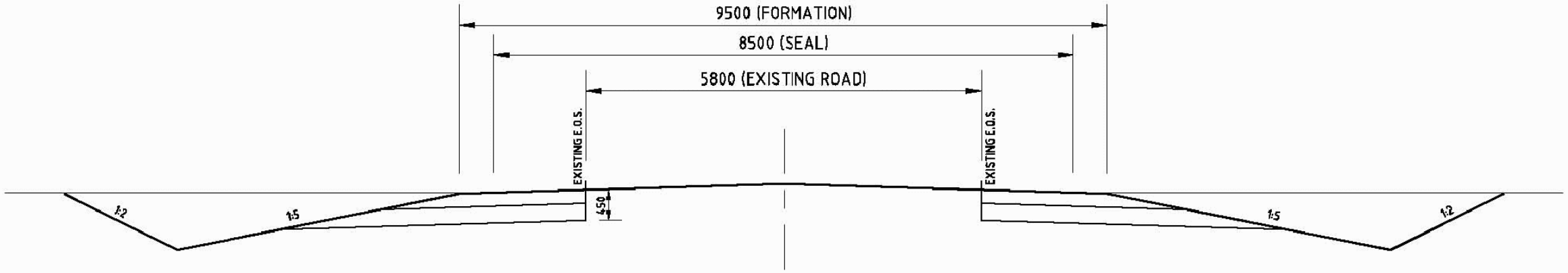

SECTION 9

RURAL 2 LANE ROAD
(UPGRADE OF EXISTING ROAD)

No.	Date	Revision Details	By
A	12-06-07	FINAL REPORT	JRD

Connell Wagner

Connell Wagner Limited
Level 4, Tomans House 185 Hereford St.
(P.O. Box 1061) Christchurch New Zealand

Telephone: +64 3 366 0821
Facsimile: +64 3 379 8955
Email: cwchc@conwag.com

Client:

Project:

CHRISTCHURCH ROLLESTON AND ENVIRONS TRANSPORTATION STUDY

Drawing Title:

TRANSPORT STRATEGY
TYPICAL SECTION 9
FINAL REPORT

Drawn	JRD	Date	12-06-07
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CW Project No.	21654	Figure No.	FR-SEC9
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SPBL Rural Residential Plan Change

Proposed Dunns Crossing Road Carriageway Section

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4. Current Traffic Conditions

4.1 Daily Traffic Volumes

Daily traffic count information has been provided by the Selwyn District Council and the NZ Transport Agency (NZTA) for SH1. The most recent Annual Average Daily Traffic (AADT) volumes on roads in the vicinity of the site are summarised in the following table.

Location	Average Daily Traffic (vpd)	Count Year
SH1, east of Weedons Ross Road (northeast of Rolleston)	18,169	2007
SH1, south of Burnham Road (southwest of Rolleston)	10,403	2007
Dunns Crossing Road, south of SH1	367	2005
Burnham School Road, west of Dunns Crossing Road	292	2007
Walkers Road, north of SH1	887	2007

Table 1 : Daily Traffic Volumes

The traffic volumes shown above indicate the dominance of SH1 in the vicinity of the site and highlight its arterial function. Rolleston itself clearly contributes significantly to the traffic volumes on SH1 to the east of Rolleston, with a substantial change in traffic volume between the two SH1 count sites. Both Dunns Crossing Road and Burnham School Road have traffic volumes consistent with Local Roads providing an access function.

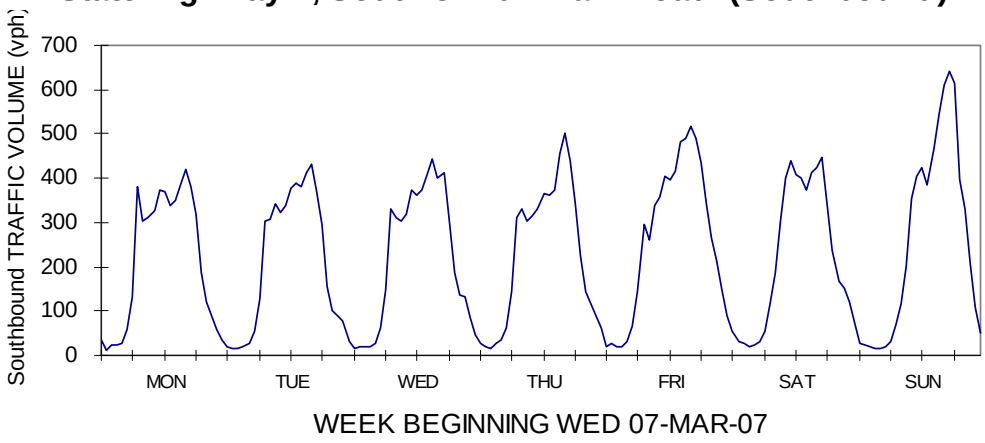
4.2 SH1 Traffic Patterns

The most recent full seven-day count on SH1 south of Burnham Road (located 3.5km southwest of Dunns Crossing Road) was undertaken by the NZTA during March 2007. The data from the count is shown in Figure 7.

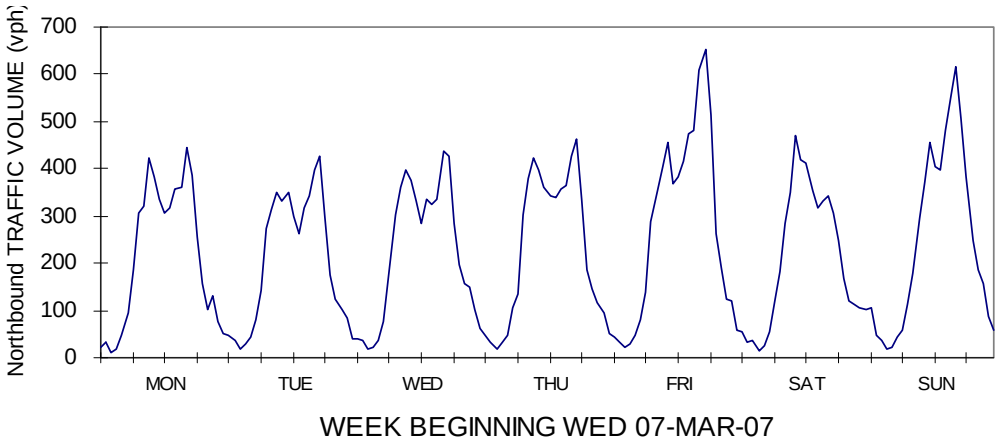
During the week SH1 carried an average daily traffic volume of 10,900 vehicle movements per day (vpd), slightly higher than the AADT. The weekday pattern typically involves volumes increasing from a low hourly flow at 7am to 700 vehicle movements per hour (vph) throughout the day, prior to reaching a peak of 900vph between 4pm and 5pm and then reducing to a low hourly flow in the evening. Such volumes are well within the practical traffic carrying capacity of the road.

The northbound and southbound patterns show some influence of commuter traffic during the peak periods, although less pronounced in comparison to the pattern of SH1 traffic closer to Christchurch.

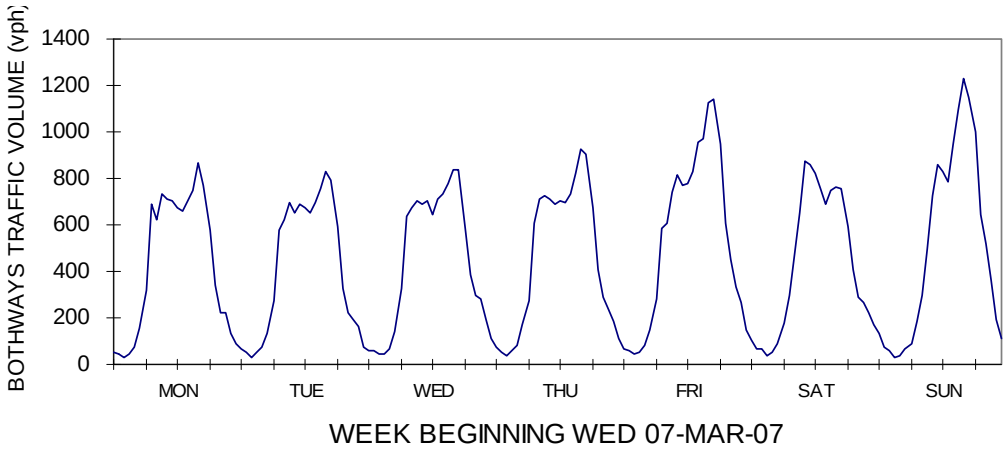
State Highway 1, South of Burnham Road (Southbound)



State Highway 1, South of Burnham Road (Northbound)



State Highway 1, South of Burnham Road (BOTHWAYS)



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SPBL Rural Residential Plan Change

State Highway 1 Traffic Patterns

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4.3 Traffic Growth

Records of the annual average daily traffic volume (AADT) of SH1 are published by the NZTA each year. The last ten years of records have been analysed to determine the historical traffic growth patterns for the count site south of Burnham Road, and are shown in Figure 8.

The annual traffic growth on SH1 south of the site (south of Burnham Road) is approximately 180vpd, which is equivalent to a linear growth rate of 1.7% per annum based on current traffic volumes. Over the last five years the rate of growth is somewhat lower at some 0.9%, or 100vpd annually.

4.4 Intersection Turning Patterns

Surveys of traffic movements at the intersection of Dunns Crossing Road, Walker Road and SH1 were undertaken during August 2008 for the morning and evening peak hours of traffic on SH1. The results are summarised on Figure 9.

Total through traffic on SH1 at the intersection was 839vph and 1,101vph for the morning and evening peak hours respectively.

The surveys indicate that the predominant turning movements at the intersection are right turns from SH1 onto Walkers Road and left turns from Walkers Road onto SH1. The right turn from SH1 onto Walkers Road involved some 40vph during both peak hours, while the left turn from Walkers Road onto SH1 involved 29vpd in the morning peak and 37vph during the evening peak.

The survey indicated only 7vpd turning right onto SH1 from Dunns Crossing Road during the morning peak and an even lower 4vph during the evening peak. This is despite residential properties having direct frontage to Dunns Crossing Road further to the southeast of the site. This would indicate that traffic from the Dunns Crossing vicinity prefers to utilise the high capacity signal controlled access at Rolleston Drive via local roads for access to SH1, or Selwyn Road and Shands Road for movements to and from Christchurch. With the site being located closer to the Dunns Crossing and SH1 intersection than existing residential development it is likely that there will be a higher utilisation of the route for generated traffic from the site, as discussed further in Section 7.3.1 of this report.

4.5 Road Safety

A search of the NZTA Crash Analysis System (CAS) has been undertaken to determine the road safety history of the road network in the vicinity of the site. The crash analysis was undertaken to include Dunns Crossing Road between SH1 and Selwyn Road, including intersections, for the five year period from 2004 and 2008 inclusive. The crash search identified nine crashes during the review period.

A minor injury crash and two non-injury crashes occurred at the SH1/Dunns Crossing Road /Walkers Road intersection. The injury crash and one non-injury crash occurred as a result of vehicles on Dunns Crossing Road failing to give way to SH1 traffic. The other non-injury crash occurred due to driver loss of control.

An injury crash and two non-injury crashes occurred at the Dunns Crossing Road/Brookside Road intersection. All the crashes at the intersection were due to drivers failing to give way to oncoming traffic.

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SPBL Rural Residential Plan Change

State Highway 1 Traffic Growth

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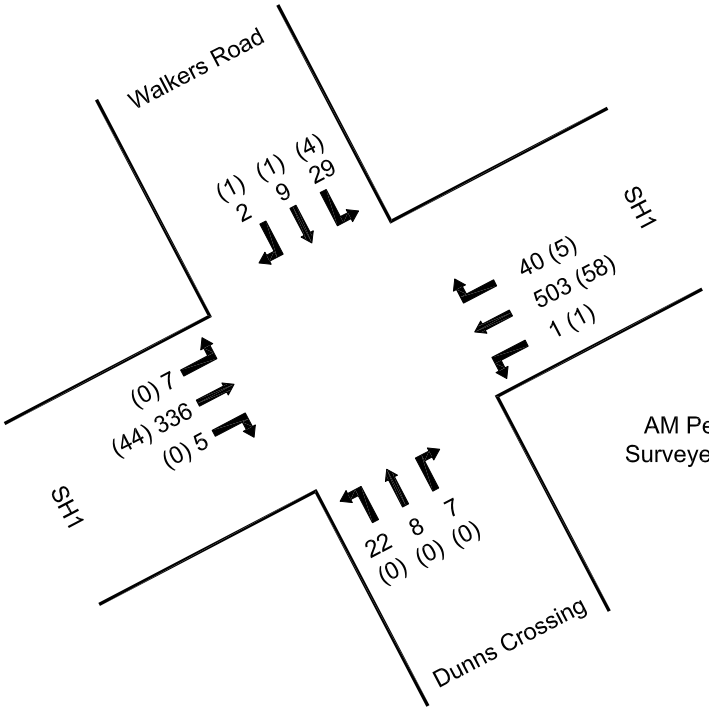

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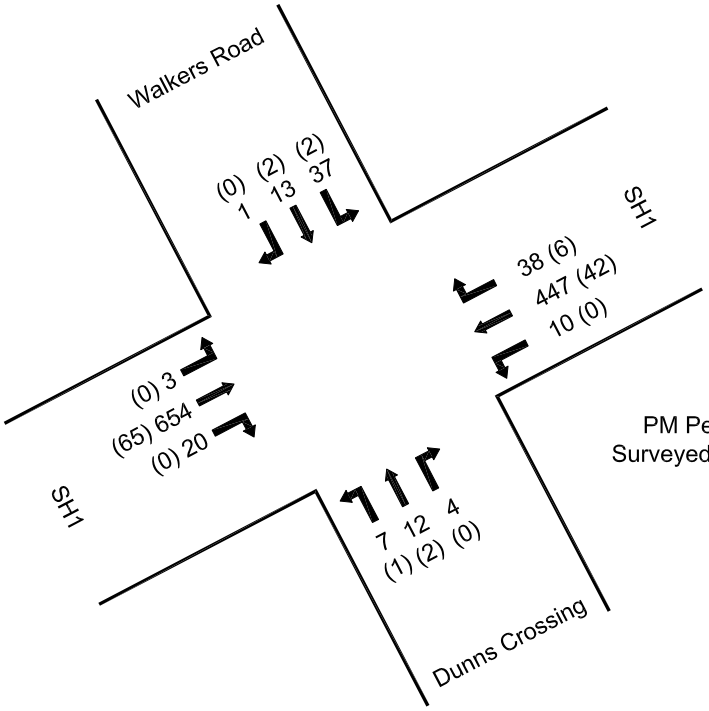
Surveyed: Thursday 07/08/08



PM Peak Hour 4:00 - 5:00
Surveyed: Wednesday 07/08/08

XX= Total Movement
(XX)= Heavy Movement

Friday, 17 April 2009

SPBL Rural Residential Plan Change

Surveyed Turning Movements

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Two loss of control crashes occurred on Dunns Crossing Road at a position 800m and 1500m north of Selwyn Road respectively. Neither crash resulted in injury.

The remaining crash resulted in minor injuries and occurred at the Dunns Crossing Road/ Selwyn Road intersection. The crash was a result of a vehicle southbound on Dunns Crossing Road failing to give way to oncoming traffic.

This crash search shows that there are no locations in the immediate vicinity where there have been multiple injury accidents. However, the presence of the multiple crashes (including non-injury) at the low volume crossroad intersection of Brookside Road / Dunns Crossing indicates the issue associated with the geometric layout referenced earlier relating to the high run up speeds to the intersection that has a 'see through' effect ie drivers could perceive a continuous road.

5. The Proposal

It is proposed to rezone the 92ha site from the existing Outer Plains zone to a new zone, Living 3, which permits rural residential development. The proposed average lot size for development of the site is 5,000m^2 and the site will provide for 160 lots. Development of the lots is expected to occur from approximately 2011, with full development achieved prior to 2026.

Figure 10 shows the Concept Plan for the site. It is proposed to provide an internal road network in a grid layout. The site will be accessed from a new road connection to Dunns Crossing Road and two new road connections to Burnham School Road. There will be a number of lots fronting Dunns Cross Road and Burnham School Road that will be accessed directly from these roads. The internal road hierarchy and road standards are discussed in detail within the following section of this report.

For the purpose of informing the roading design, the Land Transport Rule: *Setting of Speed Limits* was used to determine the expected speed limit within the site. Application of a speed limit rating survey to the sections under consideration indicates the provision of a speed limit of 70km/hr on Dunns Crossing Road and 80km/hr for the road network within the site. However, the style of the existing residential development on the northern side of Dunns Crossing Road may suggest that a future speed limit of 50km/h will be more appropriate both on Dunns Crossing Road and within the site, particularly as the extent of the road network within the site will ensure a relatively low speed environment.

6. Internal Road Standards

6.1 Road Hierarchy

An assessment of traffic volumes on the internal road network of the site has been undertaken based on the location of lots and the relevant connections to the existing road network. This assessment has then been used to create a proposed road hierarchy diagram for the site.

Figure 11 shows the proposed internal road hierarchy. Only two road standards are proposed, a secondary road and a neighbourhood road, given the variation in traffic volumes anticipated on roads within the site.

scale 1:5,000 @ A3

PLANTING TYPES:

- Feature Planting
- Street Tree Planting
- Shelter Belt Planting
- Buffer Planting

YIELD:

Total Lots: 160

Gross Area: 92ha

Net Area: 80.5ha (87.5%)

Average Lot Size: 5031m²

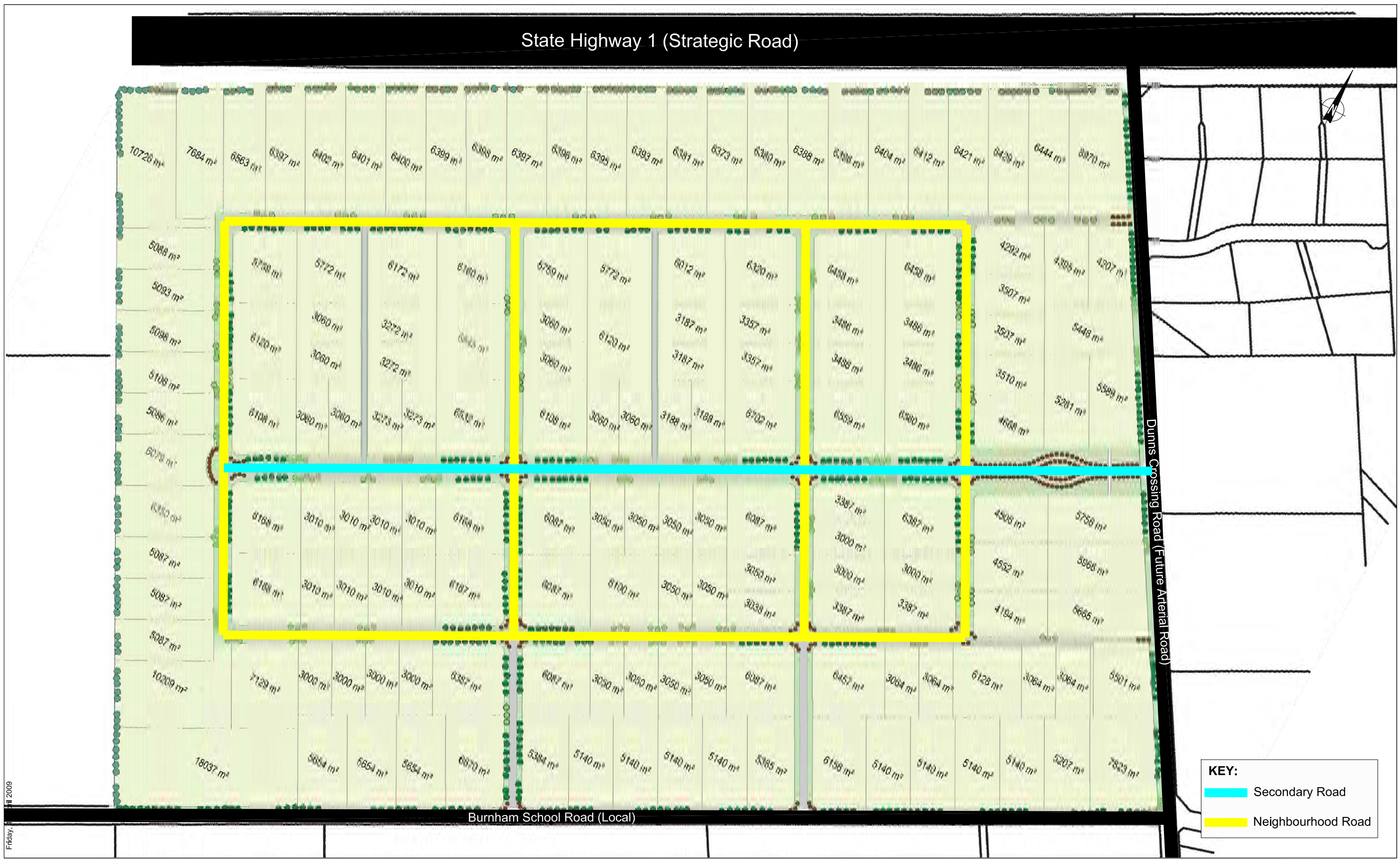
Project No. 1021.127337.01
Drawing No. 127337-PSC1-v22
Scale: 1:5000 at A3

10

Selwyn Plantation Board Limited
Land at Dunns Crossing Road
Rolleston
March 2009

HOLMES BLOCK
Subdivision and Landscape Concept

HARRISON GRIERSON
CONSULTING ENGINEERS SURVEYORS PLANNERS
71 Great South Road Auckland Ph 09 917 5000 Fax 09 917 5001



REVISION	DATE	DESCRIPTION
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SPBL Rural Residential Plan Change

Road Hierarchy

DRAWN: DKN
DATE: 05.11.2008
SCALE: 1:4,000 @ A3
DWG NO:9819-2-C11C

Traffic Design Group

11

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The Selwyn District Plan Road Hierarchy consists of Strategic, Arterial, Collector and Local Road classifications. Based on the predicted traffic volumes it is considered that all internal roads within the site will be classified as Local Roads under the District Plan.

6.2 Cross Sections

The following standards are proposed for the internal road network based on the assessed volumes and speed limits:

Road	Typical Daily Traffic Volume (vpd)	Traffic Lanes	Sealed Shoulder	Sealed Width
Neighbourhood	100vpd	5.0m (2x2.5m)	0.5m	6.0m
Secondary	100-1,000vpd	6.0m (2x3.0m)	0.5m	7.0m

Table 2: Proposed Road Carriageway Standards

Road standards for rural roads are provided within Table 3.2 – Road design standards - Rural of NZS4404:2004, *Land Development and Subdivision Engineering*. The following table summarises the specifications:

Element	Design AADT (vpd)			
	1-300	300-700	700-1,000	1,000-3,000
Traffic Lanes	5.0m (2x2.5m)	6.0m (2x3.0m)	7.0m (2x3.5m)	7.0m (2x3.5m)
Each Shoulder (sealed)	0.5m (0.5m)	1.0m (0.5m)	1.0m (0.5m)	1.0m (0.5m)
Total Sealed Width	6.0m	7.0m	8.0m	8.0m

Table 3: Rural Road Carriageway Standards (NZS4404:2004)

In terms of the traffic volumes of the roads internal to the site, neighbourhood roads will carry volumes under 300vpd. The secondary road will carry up to 1,000vpd between Dunns Crossing Road and the first intersection within the site. The remaining section of the secondary road will carry less than 500vpd. As indicated by the table above, the specifications proposed for the majority of the secondary road and neighbourhood roads are consistent with NZS4404:2004.

The 8m sealed carriageway standards for rural roads carrying higher than 700vpd outlined within the table above anticipate typical high volume rural environments, where factors such as high speeds, heavy vehicles and provisions for vehicles to overtake comfortably are important considerations. In the case of the Plan Change site, there is only a small section of road that will carry greater than 700vpd and this will be subject to particular design being the main entrance link to the Plan Change area.

The District Plan provides requirements for new roads within Table E13.9 – Roading Standards, which incorporate local roads within rural residential developments. It is proposed to amend Table E13.9 as part of this Plan Change to incorporate the proposed Living 3 zone, with the changes proposed outlined in detail within Section 9.4.1 of this report.

7. Trip Generation and Distribution

7.1 Traffic Generation

In order to quantify the expected traffic generation of the rural residential development, a range of information related to residential subdivision developments from around the country has been collated, including numerous fringe urban residential areas in Christchurch, Selwyn District and Waimakariri District.

Surveys of typical suburban household traffic generation rates have resulted in an average trip generation rate between 8 and 10 movements per day per household (vpd/hh), with a peak hour rate of between 0.6vph/hh to 1.0vph/hh. In the suburban traffic environment, the ease and convenience of vehicle travel between households, work places, recreation venues and social destination are such that a series of individual vehicle trips is commonly made by residents of these areas.

Rural residential developments have lower traffic generation than suburban developments, and rates typically vary between about 6vpd/hh and 8vpd/hh. This lower traffic generation rate is because of the increased trip linking that is practised by residents in developments located further from urban destinations. During the peak hour there is less variation between residential traffic generation rates associated with the proximity to wider urban development.

For the evaluation of the traffic effects of the proposed rural residential development, a rate of 8vpd/hh has been adopted as the generation rate for households. During the peak hour a traffic generation rate of 1vph/hh has been assessed. It is considered that the adopted rates are suitably conservative estimate to ensure that the maximum traffic impact of the potential development is evaluated.

The parallel Plan Change application by SPBL for the Skellerup block to the south of the site involves the development of 125 rural residential lots, also developed from 2011. Although the development of the Skellerup block is not committed, the analysis of the cumulative traffic effects of the site and the Skellerup block together ensures a suitably conservative assessment of the potential effects of development of the site. On this basis analysis of the traffic generation of both the site and Skellerup block has been considered in this assessment.

The following table summarises the traffic generating potential of the site and Skellerup block based on the assessment outlined above.

Block	Lots	Daily Traffic Generation (vpd)	Peak Period Traffic Generation (vph)
Site (Holmes Block)	160	1,280	160
Skellerup Block	125	1,000	125
Total	**285**	**2,280**	**285**

Table 4: Traffic Generation

At the adopted traffic generation rate of 8vpd/hh, the potential 160 sections anticipated within the site and further 125 lots within the Skellerup block would generate 2,280vpd onto the road network daily and 285vph during each of the morning and evening peak hours.

7.2 Traffic Distribution Overview

The distribution of traffic from the site and Skellerup block can be considered in terms of both the origin and destination distribution within the wider area, and the routes that are used between the site and those origins and destinations. At a broad level, the following distribution of traffic is expected:

- 35% within Rolleston urban area;
- 15% to/from the Rolleston Industrial area;
- 45% to/from the Northeast (Christchurch, Lincoln, Prebbleton); and
- 5% to/from the Southwest.

As indicated earlier, existing traffic patterns indicate that traffic from existing residential property fronting Dunns Crossing Road in the vicinity of the site prefer to utilise the high capacity signal controlled access at Rolleston Drive via local roads for access to SH1 or Selwyn Road and Shands Road for movements to and from Christchurch. Development on the Skellerup block is likely to follow a similar pattern. However, with the site being located closer to the Dunns Crossing Road and SH1 intersection than the existing residential development it is likely that there will be a higher utilisation of the SH1 route for generated traffic from the site.

As with typical residential subdivisions, it is expected that 75% of the traffic generated in the morning peak will be exiting the site and Skellerup block, and in the evening peak it is expected that this proportion would have dropped to 35% exiting.

7.3 Proposed Development Traffic Distribution

7.3.1 Site (Holmes Block)

At the adopted traffic generation rate of 8vpd/hh, the 160 sections anticipated within the site would generate 1,280vpd onto the road network daily and 160vph during each of the morning and evening peak hours.

In terms of route choice between the site and the Rolleston Drive / SH1 traffic signals it is effectively equidistant using either Dunns Crossing Road and the SH1 route, or the local road route via Brookside Road and the Brookside Road extension. Travel time surveys and assessment indicate that as a result of the higher speed on SH1, the SH1 route is approximately one minute quicker than the local road route. Subsequent analysis has indicated that average delays for the right turn onto SH1 from Dunns Crossing Road are likely to be some 30 seconds greater than occur at present for SH1 traffic flows in 2026. On this basis the Dunns Crossing Road / SH1 route would be used predominantly for travel north from the site, but with some use of the alternative local road routes also likely given the current use of these routes and ability to use the signal controlled access to SH1. It is predicted that traffic will distribute itself over the network as follows:

Origin / Destination	Traffic Distribution Percentage	Vehicle Movements per day (vpd)	Route	Vehicle Movements per hour (vph)			
				AM		PM	
				In	Out	In	Out
Rolleston Town Centre	35%	448	via local roads	14	42	36	20
Rolleston Industrial	15%	192	via SH1/Dunns Crossing	5	14	12	7
			via local roads	1	4	3	2
Christchurch, Northeast other (Lincoln, Prebbleton)	45%	576	via SH1/Dunns Crossing	7	22	28	15
			via other (Rolleston local, Selwyn /Shands)	11	32	19	10
Southwest (Ashburton)	5%	64	via SH1/Dunns Crossing	2	6	5	3
Total	**100%**	**1,280**		**40**	**120**	**103**	**57**

Table 5: Site (Holmes Block) Traffic Distribution

It has been assessed that 80% of travel between the site and the Rolleston industrial area will occur via Dunns Crossing Road and SH1, while the remaining 20% will use local roads within Rolleston to cross SH1 at the Rolleston Drive signals. For travel to and from the northeast it has been assessed that 60% will occur via Dunns Crossing Road and SH1 with the remaining 40% occurring via the local road network within Rolleston and southeast on Dunns Crossing Road for travel to areas such as Lincoln and Prebbleton.

7.3.2 Skellerup Block

At the adopted traffic generation rate of 8vpd/hh, the potential 125 sections expected to be developed within the Skellerup block are predicted to generate 1,000vpd daily and 125vph during the morning and evening peak hours. The expected distribution of traffic onto the road network is as follows:

Origin / Destination	Traffic Distribution Percentage	Vehicle Movements per day (vpd)	Route	Vehicle Movements per hour (vph)			
				AM		PM	
				In	Out	In	Out
Rolleston Town Centre	35%	350	via local roads	11	33	28	15
Rolleston Industrial	15%	150	via SH1/Dunns Crossing	1	2	2	1
			via local roads	4	11	10	5
Christchurch, Northeast other (Lincoln, Prebbleton)	45%	450	via SH1/Dunns Crossing	3	8	7	4
			via other (Rolleston local, Selwyn /Shands)	11	34	30	17
Southwest (Ashburton)	5%	50	via SH1/Dunns Crossing	2	5	4	2
Total	**100%**	**1,000**		**32**	**93**	**81**	**44**

Table 6: Skellerup Block Traffic Distribution

The distribution of traffic from the Skellerup block is expected to represent high utilisation of the supporting Rolleston township network for access to and from SH1 via the strategic SH1 access points given its location in relation to the exiting Rolleston Township. In this regard, limited use of the SH1 / Dunns Crossing intersection is expected. On this basis it has been assessed that 80% of travel between the Skellerup block and the Rolleston industrial area will occur via local roads through Rolleston. For travel to and from the north and east it has been assessed that 80% will occur via the Selwyn Road and Shands Road north, to areas such as Christchurch, Lincoln and Prebbleton and also through local roads through Rolleston to connect with the SH1 and Rolleston Drive signals for travel to Christchurch.

7.3.3 Combined Development Traffic Distribution

Based on the predicted traffic patterns in the Rolleston area outlined above for the site and Skellerup block, the combined traffic will distribute itself over the network as follows:

Origin / Destination	Traffic Distribution Percentage	Vehicle Movements per day (vpd)	Route	Vehicle Movements per hour (vph)			
				AM		PM	
				In	Out	In	Out
Rolleston Town Centre	35%	798	via local roads	25	75	64	35
Rolleston Industrial	15%	342	via SH1/Dunns Crossing	6	16	14	8
			via local roads	5	15	13	7
Christchurch, Northeast other (Lincoln, Prebbleton)	45%	1,026	via SH1/Dunns Crossing	10	30	35	19
			via other (Rolleston local, Selwyn /Shands)	22	66	49	27
Southwest (Ashburton)	5%	114	via SH1/Dunns Crossing	4	11	9	5
Total	**100%**	**2,280**		**72**	**213**	**184**	**101**

Table 7: Site + Skellerup Block Traffic Distribution

The proposed number of lots within the site is under the rural residential thresholds set by the Variation 1 to PC1 and therefore the effects of development on the strategic road network will have been taken into account in the strategic infrastructure planning provided for by TRIP. Further, even if the Holmes Block was fully developed by 2016, the proposed 160 lots on the Holmes block only equates to an increase of approximately 5% to the expected number of households in Rolleston at 2016 based on the RPS PC1 (Variation 1) projections. This percentage will halve by the year 2026 as rolleston continues to expand. On this basis the key locations for assessment of the proposed are on the road network in the vicinity of the site. Taking account of the expected distribution of traffic and consideration of existing traffic volumes, the key location within the existing road network for assessment of potential effects from development of the site is the intersection of Dunns Crossing Road, Walkers Road and SH1.

The traffic increases on Rolleston SH1 intersections associated with the completed development of the zoned township have previously been considered by Traffic Design Group as part of the Industrial Park zoning and based on a Rolleston population of approximately 14,000 people. In the case of the SH1 / Walkers Road / Dunns Crossing Road intersection, a small amount of increased traffic will be expected to be generated by development within the north-western part of

Rolleston. Traffic growth has also been allowed for on the SH1 through movements and movements to and from Walkers Road.

As the remainder of the Rolleston area is already zoned for development and will take some time to fully develop, assessment of the traffic impacts of the SPBL development has been undertaken for a future year of 2026, at which time Rolleston as currently zoned could be expected to be fully developed. This is also consistent with the end of the second development staging period within the PC1 (2017-2026). The year 2026 traffic forecasts both with and without development for the morning and evening peak hours at the intersection of Dunns Crossing Road, Walkers Road and SH1 are shown in Figure 12.

7.4 Other Modes of Travel

The LTSA 'National Travel Survey' identified the modal split of travel for home based trips. The proportions identified for all trips were as shown in the table below.

Mode	Percentage
Vehicle driver	50%
Vehicle passenger	27%
Walk	17%
Bicycle	2.5%
Bus	2.5%
Taxi	0.5%
Other	0.5%
Total	**100%**

Table 8: LTSA National Survey Modal Split

The location of the development on the fringe of the urban area will result in higher use of motor vehicle travel compared with the national surveys, although a small demand for walking, cycling and public transport will be generated.

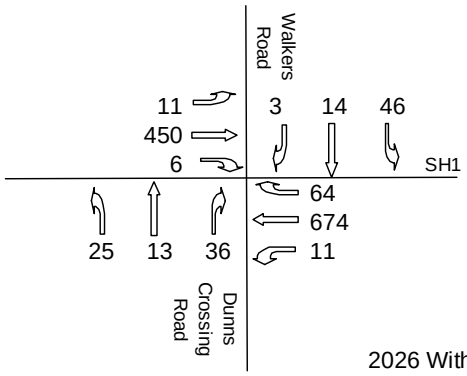
8. Impacts of Proposed Development

8.1 SH1, Dunns Crossing, Walker Road Intersection

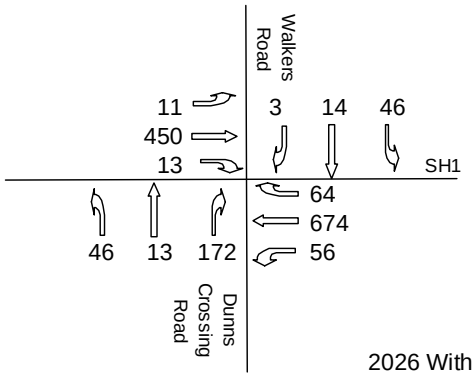
8.1.1 Level of Service

As indicated earlier, the distribution of traffic generated from the site shows that the key location where the traffic generated may have a potential effect is at the SH1 / Dunns Crossing / Walkers Road intersection. This intersection does not currently have any traffic capacity or reported road safety issues.

AM PEAK

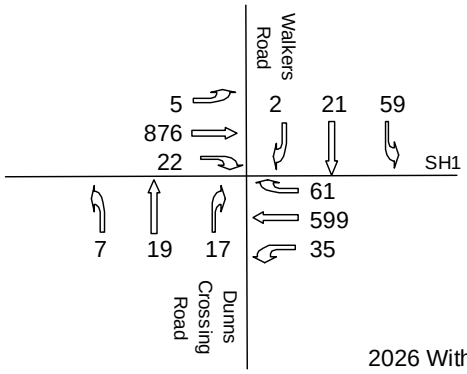


2026 Without CDL Development

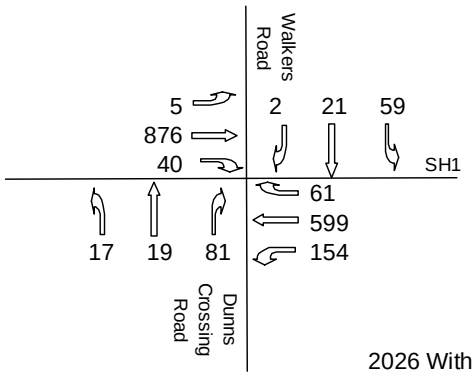


2026 With CDL Development

PM PEAK



2026 Without CDL Development



2026 With CDL Development

Friday, 17 April 2009

SPBL Rural Residential Plan Change

Future Traffic Distribution

Traffic Design Group

12

SCALE: NTS

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As Rolleston grows, it can be expected that the traffic volumes on Dunns Crossing Road will increase as it provides increased access to SH1 for the south-western areas of Rolleston, and forms the western boundary of the residential zoning. These traffic volumes have been previously anticipated as part of the development of the District Plan, and it is noted that the CRETS recommendations for the road network at the western end of Rolleston maintain the priority control of the SH1 / Dunns Crossing Road / Walkers Road intersection, indicating it is expected to operate at a satisfactory level of service even with Dunns Crossing Road forming part of an outer Rolleston ring route.

An analysis has been undertaken of the SH1 / Dunns Crossing Road / Walkers Road intersection utilising the widely adopted intersection analysis package Sidra Intersection. The performance of the intersection has been modelled for the following scenarios; existing, year 2026 without SPBL development and year 2026 with SPBL development. The average delay and level of service (LOS) have been reported in the tables below. The LOS is a criterion that categorises traffic performance into a scale of LOS A to LOS F. LOS A represents free flow conditions, where as LOS F indicates heavily congested conditions. The LOS criteria have been adopted from the USA Highway Capacity Manual, which is a widely referenced document.

APPROACH	EXISTING (2008)			FUTURE (2026) – WITHOUT DEVELOPMENT			FUTURE (2026) – WITH SPBL DEVELOPMENT		
	Volume (vph)	Average Delay (sec/veh)	LOS	Volume (vph)	Average Delay (sec/veh)	LOS	Volume (vph)	Average Delay (sec/veh)	LOS
SH1 East	544	1.1	A	749	1.4	A	765	1.7	A
Dunns Crossing Road	37	17.9	C	74	24.1	C	132	30.3	D
SH1 West	348	0.4	A	467	0.7	A	471	0.9	A
Walkers Road	40	14.0	B	63	16.1	C	63	16.5	C
Intersection	**969**	**2.0**	**A**	**1,353**	**3.1**	**A**	**1,431**	**4.7**	**N/A**

Table 9: SH1 / Dunns Crossing / Walkers Intersection Performance - AM Peak

APPROACH	EXISTING (2008)			FUTURE (2026) – WITHOUT DEVELOPMENT			FUTURE (2026) – WITH SPBL DEVELOPMENT		
	Volume (vph)	Average Delay (sec/veh)	LOS	Volume (vph)	Average Delay (sec/veh)	LOS	Volume (vph)	Average Delay (sec/veh)	LOS
SH1 East	495	1.1	A	695	2.4	A	745	3.1	A
Dunns Crossing Road	23	17.9	C	43	40.5	E	75	57.0	F
SH1 West	677	0.4	A	903	0.8	A	912	0.9	A
Walkers Road	51	14.0	B	82	24.4	C	82	25.9	D
Intersection	**1,246**	**2.0**	**N/A**	**1,723**	**3.6**	**N/A**	**1,814**	**5.3**	**N/A**

Table 10: SH1 / Dunns Crossing / Walkers Intersection Performance - PM Peak

The LOS for SH1 traffic through its intersection with Dunns Crossing Road will be maintained at LOS A in the future. The intersection analysis shows that the additional traffic associated with the development will have an effect on turning delays and level of service for side road vehicles at the intersection, particularly Dunns Crossing Road. Dunns Crossing Road is expected to be upgraded to a District Arterial Road, as recommended by CRETS. Based on the intersection analysis, movements from the Dunns Crossing Road approach to the SH1 intersection will operate with 40 seconds delay (LOS E) in the future without the Plan Change development and 57 seconds (LOS F) with the development in the PM peak period. As described previously, the ability to conveniently access the higher capacity strategic SH1 access points to the east, will enable generated traffic to have flexibility in route choice and not rely on the Dunns Crossing Road intersection for providing access from the site onto SH1 to the east.

The Regional Land Transport Strategy (RLTS) provides some guidance as to minimum acceptable levels of service. The classified road network (ie SH1 and in the future Dunns Crossing Road) have a minimum recommended LOS C during a peak period. As the overall traffic volumes on the side roads will be low, it is unlikely that the delays will be addressed through a change of intersection control, such as to signals or a roundabout. The expected level of delay (even without development) may require NZTA to consider options to restrict movements in the future if the high delays result in unsafe driving conditions as part of corridor access management measures for SH1. Initial discussions with NZTA indicated that this may be a long term possibility.

Not withstanding this, before corridor access restrictions may occur it will be common for priority controlled intersections on SH1 throughout Rolleston to provide less than LOS C from the side road approaches during peak periods. The recently completed intersection of the south-western section of Rolleston Drive with SH1 is a good example of this where right turning demand would be higher than at Dunns Crossing Road and through traffic volumes will also be higher. Therefore, the potential changes in delays are considered acceptable given the alternative access provisions available to the east.

8.1.2 Turning Lane Provisions

Figure 6.41 – 'Warrants for Rural Turn Lanes' of AUSTROADS Guide to Traffic Engineering Practice Part 5 ('Intersections at Grade') has been adopted to assess the requirements for a left turn lane on the north-eastern SH1 approach of the intersection. The requirements for turning lanes are a function of the number of left turning movements compared to the overall approach volume. The width of the north-eastern SH1 approach of its intersection with Dunns Crossing Road is such that left turning vehicles from SH1 can do so partially from the shoulder, creating minor delays to following through vehicles. The NZTA have noted the lack of separated left turning lanes at the intersection during recent consultation, but do not have upgrades to the intersection specifically scheduled within the Canterbury State Highway Plan and Forecast for 2007/8 to 2016/17.

The AUSTROADS warrant for a left turn lane is met once the volume of traffic turning left from the north-eastern approach exceeds some 10vph to 15vph at the present peak hour volumes on SH1. Surveyed peak hour volumes at the intersection indicate a total of 10vph currently turn left from the north-eastern approach during the peak hour, which is below the warrant level. However, development of land within Rolleston to the east of Dunns Crossing Road, which is zoned for residential purposes, could trigger the left turn lane warrant within the near future.

Dunns Crossing Road is recommended to be upgraded to a District Arterial between SH1 and Lowes Road within the CRETS study and form part of an outer ring road of the township. CRETS recommends road widening of Dunns Crossing Road in conjunction with the higher road classification. Whilst not explicitly recommended within CRETS, it is considered that the intersection of Dunns Crossing Road and SH1 should be upgraded to reflect the higher classification of Dunns Crossing Road and include the provision of a separated left turning lane from the east. The "Rolleston Arterial Roading and Intersection Upgrades" project within TRIP is expected to include widening of Dunns Crossing Road and consequently provision of a left turn lane at the intersection of SH1, Dunns Crossing Road and Walkers Road could be anticipated within 10 years.

Whilst development on the west side of Dunns Crossing Road would benefit from the provision of a left turn lane at the intersection, the expected timing of development of the site would have negligible effect on the timing of the project.

8.2 Cycling and Walking

The development has the potential to generate some pedestrian and cycling movements.

The volumes of traffic projected for Dunns Crossing Road will not form a barrier to sustainable transport modes between the site and the township. It is proposed to amend Table E13.9 - Roading Standards of the District Plan as part of the Plan Change to require footpaths to be provided on roads within the Living 3 zone.

It is consider that cycling movements could readily be accommodated on-road within the site given the scale of the development. The site is within a comfortable cycling distance to central Rolleston, and Burnham School Road and Brookside Road provide a convenient low speed local route to the town centre for cyclists. Therefore, it is considered that the development of the site would not preclude cycling as a viable mode of transport and in comparison with development of rural residential lots detached from the urban area, there are positive benefits in being able to encourage alternative modes of travel with the proposed site.

8.3 Public Transport

The development will not generate a large additional demand for public transport. The section of the bus route within Rolleston (ie on Rolleston Drive) is located approximately 1.5km from the eastern boundary of the site. This is considerably more than the 500m distance typically used as the limit of appropriate accessibility, although it is noted that other parts of Rolleston will have similar levels of accessibility.

The route passes through the SH1 / Walkers Road / Dunns Crossing Road intersection. However, this section of the route is not practically accessible due to the absence of bus stops and the barrier to pedestrians posed by the presence of the open road section of SH1.

The Canterbury Regional Council at this stage do not anticipate the bus services to travel down Dunns Crossing Road in the future, however such decisions are regularly reviewed and given there will be large portions of Rolleston not within 500m of the route, some changes could be contemplated. As Dunns Crossing Road forms part of the outer ring road, it is possible that the bus route could be deviated via this route to increase accessibility to the western areas of Rolleston Township and the proposed development area. No specific public transport provisions are considered necessary within the Plan Change site.

As an alternative to extending the route to ensure all of Rolleston is within walking distance of a bus route, provisions for a 'park-and-ride' scheme in Rolleston are included in the TRIP. This enables residents who are beyond walking distance of the bus route to drive to a centrally located parking area on the bus route and then utilise the bus service for access into Christchurch City. Given the site's location adjacent to the proposed urban area, such a service could be utilised by commuters from site assisting in the management of travel demand.

9. Planning Requirements

9.1 Canterbury Regional Policy Statement

The Canterbury Regional Policy Statement (RPS) has been prepared to meet the requirements of the Resource Management Act 1991, and aims to promote sustainable management of natural and physical resources.

Chapter 15 of the RPS outlines four transport related policies, as outlined below:

Policy 1: *"Protect Canterbury's existing transport infrastructure and land transport corridors necessary for future strategic transport requirements by avoiding, remedying, or mitigating the adverse effects of the use, development or protection of land and associated natural and physical resources on transport infrastructure."*

It is considered that the proposed Plan Change will have little effect on the future transport requirements for key infrastructure. With relevance to the site, it is recommended under CRETS that Dunns Crossing Road is upgraded to the standard of a District Arterial between SH1 and Lowes Road to form an outer ring road of Rolleston, and a Collector Road southeast of Lowes Road. The proposal would not prevent the upgrading from occurring, and access can be limited to protect the arterial function.

As the site is located adjacent to the planned urban limits of Rolleston, the effects of development in Rolleston have already been considered in terms of access to the strategic transport network, and therefore the proposed provision of rural residential development on the immediate fringe is efficient in terms of making use of already planned upgrades to the transport network.

The widening designation for SH1 (TR3) that runs along the north-western boundary of the site will be included within a landscaping strip where other forms of development are precluded, protecting the corridor from possible development.

Policy 2: *"Promote the use of transport modes which have low adverse environmental effects."*

The proximity of the rural residential development to the urban area enable the use of the existing and proposed walking, cycling and public transport infrastructure within Rolleston ensuring that alternative modes can be promoted from this site equally as they will be from the rest of the urban area. Specific provisions will be made for pedestrians within the site, while it is anticipated that cyclists will be accommodated on-road given the expected traffic volumes and vehicle speeds.

Policy 3: *"Promote changes in movement patterns, travel habits and the location of activities, which achieve a safe, efficient and cost-effective use of the transport infrastructure and reduce the demand for transport."*

Rolleston will gradually become more self-sufficient as the business and industrial areas expand and will enable new residential development to have less reliance on the transport connections to Christchurch. The location of the site promotes efficient and cost-effective use of transport infrastructure by being located adjacent to the existing residential zone and will have direct connectivity with Dunns Crossing Road, which will be a future District Arterial / Collector Road. There are multiple routes connecting the site with the township and wider areas, which will allow traffic to distribute over the most efficient routes. Therefore, there will be minimal impact on the ability to maintain a safe, efficient and cost effective use of the transport infrastructure.

Policy 4: *"Ensure that in the provision, realignment or maintenance of transport infrastructure, adverse effects on natural resources that meet the criteria of sub-chapter 20.4 are avoided, remedied, or mitigated."*

Sub-chapter 20.4 of the RPS outlines matters of "regional significance" from an environmental conservation (plant, wildlife, and heritage) view point, for which there are no known conflicts with the transport infrastructure proposed for the Plan Change.

9.2 Proposed Change No 1 to the RPS

Proposed Change No.1 (PC1) to the RPS introduces a new Chapter, 12A (Development of Greater Christchurch), which provides direction for the growth, development and enhancement of the urban and rural areas of the Greater Christchurch area. It identifies and maps a number of greenfield areas for residential and business growth. Variation 1 to PC1 includes urban limits as indicated previously on Figure 2 for the Rolleston area.

Policies 7 (Development Form and Design), 9 (Transport Effectiveness), 10 (Strategic Transport Infrastructure and Reverse Sensitivity) and 13 (Rural Residential Development) of the PC1 are relevant to this Plan Change proposal from a transportation perspective. The relevant elements of these policies are discussed below.

9.2.1 Policy 7: Development Form and Design

Policy 7 stipulates that activities in greenfield sites should provide for the following:

- *good safe connectivity within the area, and to surrounding areas, by a variety of transport modes, including motor vehicles, cycling, pedestrian and public transport, and provision for easy and safe transfer between modes of transport,*
- *being located within walkable distance to community, social and commercial facilities,*
- *provide effective, efficient and attractive walking paths and cycleways, preferably integrated with open space and stormwater detention areas, within, across and linking beyond the areas.*

As indicated by Figure 2, the site is located a distance that is similar to the Town Centre and the Rolleston Industrial Zone to areas that are undeveloped, but included within the proposed Urban Limits. It is therefore considered that the transport related attributes of the rural residential site in regard to Policy 7 will be similar to those of development areas included within the proposed Urban Limits.

9.2.2 Policy 9: Transport Effectiveness

Policy 9 requires that development of greenfield sites shall not result in overloading the existing transport network infrastructure, in particular strategic roads, and avoid detracting from the primary through-traffic function of state highways and arterial roads. It also states that territorial authorities should ensure that transport networks provide for safe, sustainable, integrated movement of goods and people both within the sub-region, and to and from locations outside the sub-region.

It is considered that the development of the subject site on a rural residential basis will not result in the overloading of the existing transport network (as discussed in earlier sections of this report), and will not detract from the primary function of SH1 as no new connections to SH1 are proposed. While delays on Dunns Crossing Road are expected to be high for traffic turning right onto SH1, these do not have an effect on through traffic on SH1 and its arterial function. Development of the site would not affect the ability of the Road Controlling Authorities' ability to upgrade the Dunns Crossing Road and SH1 intersection as part of the creation of an outer ring road utilising Dunns Crossing Road, as recommended within CRETS.

9.2.3 Policy 13: Rural Residential Development

Policy 13 states that Rural Residential development, beyond areas already zoned in District Plans as at 28 July 2007, shall occur in accordance with Policy 6 (a).

The policy is accompanied by a range of methods in which Rural Residential development should occur. Method (iii) states:

- *Access is provided (legal and physical) to a sealed road, but not directly to a road defined in the relevant district plan as Strategic or Arterial Roads or which are State Highways under the Transit New Zealand Act 1989;*

Access from the site will be via roads that are currently defined as Local Roads within the District Plan. The CRETS study identified that the section of Dunns Crossing Road northwest of Lowes Road would become a District Arterial and therefore this is of relevance to access from the site. It is noted that there is already urban development on the north-eastern side of Dunns Crossing Road with direct access Dunns Crossing Road, and therefore less weight could be applied to this policy in this instance because the function of the road is already expected to include providing potential residential access. Some direct property access to Dunns Crossing Road can be provided in compliance with the District Plan rules for access separation distance with Dunns Crossing Road being assessed as an Arterial Road, as indicated within Section 9.4.

Method (iv) also includes:

- *where adjacent to or in close proximity to an existing urban or rural residential area, be able to be integrated into or consolidated with the existing settlement.*

The site is located on the proposed Rolleston urban limit boundary and therefore there are opportunities from a transport perspective to promote the integration of the site with Rolleston by way of providing appropriately located access roads and pedestrian connections that are consistent with the provisions in Rolleston.

9.3 District Plan Policies and Objectives

Section B2.1 of the Township Volume of the District Plan outlines the transportation related objectives and policies of the plan, along with the environmental outcomes expected as a result of their implementation. The following table discusses each expected outcome in relation to the development proposal.

Expected Environmental Outcome	Comments
Strategic Roads are safe and efficient transport routes for "through" traffic travelling across the District.	The through movement function of SH1 will not be compromised as no new connections to SH1 are proposed.
Other roads in the District serve all their functions safely and efficiently.	Assessment indicates that the potential Plan Change development would not overload the existing transport networks. Access to the development can be provided in accordance with the District Plan rules (See Section 9.4)
The visibility of roads, intersections, vehicular accessways and railway crossings is not impaired.	The layout of the site will be designed to provide good visibility at property accessways and intersections.
Roads are designed, maintained, and if necessary, upgraded to the standard required for their traffic volume, traffic type and the amenity values of the zone.	The roads within the site will be designed to a standard appropriate for their use. The proposal will not prevent future widening of Dunns Crossing Road when it is upgraded to a District Arterial.
Adverse effects of residential and business growth in Selwyn District on road links into Christchurch City are addressed.	The CRETS study has proposed the upgrading of routes to Christchurch, which would carry traffic associated with the site. These are generally scheduled for implementation within TRIP. The proposal would not prevent the recommended upgrades from being implemented, or the timing of those upgrades.
Heavy traffic bypasses townships, where practical.	The site will generate minor levels of heavy vehicle traffic.
An increase in separate cycleways and walkways in townships. The number of walkways and cycleways increase that are effective in providing alternative linkages within townships	Table E 13.9 – Roading Standards of the District Plan is proposed to be amended to include roads within the Living 3 zone. This includes the requirement of footpaths on Living 3 roads. It is considered that cyclists can be accommodated on-road within the Plan Change site given the low volume traffic environment
No increase in the extent to which main transport routes "bisect" townships.	The development of the subject site will not result in an increase to the extent to which SH1 bisects the residential portion of the Rolleston township from the industrial development.
Fewer impacts from the construction, maintenance and repair of roads or other utilities in road reserves, on people and the environment.	The site is a greenfield site, hence the construction of the project will have a minimal impact on the existing road network, and the local community.
New settlement and residential activities occur closer to places of work or existing townships.	The site is located adjacent to the existing residential zone of Rolleston.

Table 11: District Plan Policies and Objectives

As can be seen in the above table, the development proposal is expected to achieve the desired outcomes of implementing the transportation policies and objectives of the District Plan.

9.4 District Plan Rules

The Proposed Selwyn District Plan sets out a number of Rules relating to the transport-related elements of any proposal. The following Design Standards from Appendix 13 Volume 1: Townships will be relevant during the development of an Outline Development Plan for the Plan Change:

E13.2.2	**Distances of Vehicle Crossings from Intersections:** Access to an Arterial Road (speed limit **>**50km/hr) (Dunns Crossing Road) shall be separated from its intersection with a Strategic Road (SH1) by 180m Access to an Arterial Road (speed limit **>**50km/hr) shall be separated from its intersection with a Local Road (Burnham School Road) by 90m Access to a Local Road (speed limit **>**50km/hr) shall be separated from its intersection with an Arterial Road by 75m Access to a Local Road (speed limit **>**50km/hr) shall be separated from its intersection with another Local Road by 60m	**Can be achieved for site**
E13.2.3	**Spacing between Adjacent Property Accesses** No separation requirement for accesses on non-State Highway Roads	**Yes**
E13.3.2	**Intersection Separation:** The minimum distance between intersections shall be as follows: 100km/hr – 800m 70km/hr – 220m 50km/hr – 125m	**Minimum spacing of 180m proposed (see below)**
E13.3.1.1	**New Roads:** Any new road shall be laid out and vested in the Council in accordance with the standards contained within Table 13.9	**Proposed amendment to Table E13.9 to provide for the Living 3 zone (see below)**

Table 12 : District Plan Rules

Development of the site can be provided in general accordance with the existing District Plan rules. However, the separation distance between several intersections as outlined on the Concept Plan are between the 125m and 220m separation requirements for roads within 50km/hr and 70km/hr speed limit areas respectively. It is considered that the speed environment within the site will similarly be between 50km/hr and 70km/hr and therefore any effects associated with the potential non-compliance will be minimal.

It is proposed to insert the following additional line into the Table E13.9 – Roading Standards of the District Plan. The section of the exiting District Plan table providing for existing rural residential activities (Living 2 and 2a zones) is included for a comparison.

Table E13.9 – Roading Standards

Type of Road	Legal Width (m)		Carriageway width (m)		Kerb and Channel	Footpaths
	Min	Max	Min	Max		
Local Roads – Living 2 and 2A Zones where allotments have an average area > 5000m2	15	20	7	8	-	-
Local Roads –Living 3 zone at Rolleston (as shown within the Outline Development Plan at Appendix 34)	18	20	6	8	-	One side only

Table 13 : Proposed Insertion to Table 13.9

A minimum carriageway width of 6m can be supported for Local Roads within the Plan Change site, and therefore is it proposed that a minimum carriageway width of 6m is included for roads within the Living 3 zone, which is consistent with the NZS4404:2004 roading specifications.

The existing rules for Local Roads within the Living 2 and 2a zones allow for a maximum carriageway width of 8m where the average lot size exceeds 5,000m^2. It is proposed that 7m wide carriageways are provided on the higher standard secondary road within the site and therefore an 8m carriageway would not be necessary under this Plan Change. However, allowing a maximum width of 8m within the Living 3 zone does not preclude the recommended 7m width from being provided, is consistent with the existing rules, and would allow for such a provision in any future Plan Change site adopting the Living 3 zone provisions where an 8m carriageway may be appropriate.

There is no requirement to provide a footpath on Local Roads within the Living 2 and 2a zones where the average lot size exceeds 5,000m^2 under the existing District Plan rules. Given the proposed average lot size, being greater than 5,000m^2, the existing District Plan roading standards would not require a footpath on roads within the Plan Change area. However, given that the site is located immediately adjacent to the zoned Rolleston Township it is considered that internal footpaths are necessary to promote walking between the site and the urban area. Therefore, it is proposed that Table E13.9 is amended to require a provision for footpaths on one side of all roads within the Living 3 zone. This requirement would extend to Burnham School Road and Dunns Crossing Road given that direct property access is proposed from these roads, although in the case of Dunns Crossing Road a footpath is expected to be provided with ongoing development of the permitted residential zoning on the north-eastern side of the road.

10. Summary and Conclusion

This Transport Assessment has identified, evaluated and assessed the various transport and access elements of the proposed Plan Change relating to land owned by SPBL on the western boundary of Rolleston from Outer Plains to a new Living 3 zone that provides for rural residential activities. It is considered that the additional traffic expected to be generated can be accommodated on both the local roading and State Highway networks without significant effect on the operation of the road network.

The location of the low density residential zones adjacent to the western boundary of the township will enable provisions for non-car modes of travel to be incorporated, especially for trips within Rolleston.

Development of the site on a rural residential basis is not considered contrary to the relevant policies of the Canterbury Regional Transport Strategy and Proposed Change 1 to the Regional Transport Strategy. Such development is also not considered contrary with the Environmental Outcomes anticipated from the transportation related Policies and Objectives of the Selwyn District Plan and compliance with the existing transportation related rules of the District Plan can be achieved.

Based on our assessment, we recommend the following:

- That the proposed roading standards are confirmed by the proposed amendment to Table E13.9 Roading Standings of the District Plan
- That the key details of the Concept Plan road network are shown on the Outline Development Plan to be included within the District Plan as part of the Plan Change

With the incorporation of the above recommendations it is concluded that the proposed Plan Change can be supported from a transportation perspective.

Traffic Design Group Ltd
16 April 2009