Additional Investigation Report for a Second Bridge Across the Ashburton River

Contract C554



Additional Investigations for a Second Bridge Across the Ashburton River

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Prepared By	Bill Rice Principal Transportation Engineer	Opus International Consultants Limite Christchurch Office 20 Moorhouse Avenue PO Box 1482, Christchurch Mail Cent Christchurch 8140, New Zealand	
Reviewed By	Jo Chang Senior Transportation Planner	Telephone: Facsimile:	+64 3 363 5400 +64 3 365 7858
		Date: Reference:	February 2011
		Status:	Final
Reviewed and Approved for Release By	Simon Robertson, Civil Engineering Manager		

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- APPENDIX F Option Assessment (bound separately)

Glossary of Abbreviations

The following abbreviations are used in this document:

- ADC Ashburton District Council
- BCR Benefit Cost Ratio
- CO2 Carbon Dioxide emissions
- CRLS Canterbury Regional Landscape study
- GPS Government Policy Statement
- HCM Highway Capacity Manual
- LGA Local Government Act
- LTCCP Long Term Council Community Plan
- LTMA Land Transport Management Act
- LTNZ Land Transport New Zealand
- NZTA New Zealand Transport Agency
- NZTS New Zealand Transportation Strategy
- RLTS Regional Land Transport Strategy
- RMA Resource Management Act
- SH 1 State Highway 1
- SH 77 State Highway 77
- SIMT South Island Main Trunk railway



1 Executive Summary

Opus International Consultants Ltd (Opus) has been commissioned by Ashburton District Council (ADC) to undertake a technical investigation for a second bridge across the Ashburton River for the purposes of lodging a Notice of Requirement and Designation of Land. An Issues and Options report was prepared in January 2010. Following presentation of this report, Council adopted the Chalmers Avenue to Grove Street option as their preferred option with the Chalmers Avenue to east of Tinwald option as their second option. Following receipt of Community feedback on those options, Council then commissioned further investigations. This Report presents the results of this work.

Eight options for a second route across the Ashburton River, and an option for signals at an intersection in Tinwald were investigated further. These investigations were conducted in conjunction with Taylor Baines and Associates, who have prepared a separate Social Impact Assessment. A Community Reference Group has been set up to inform these investigations. They have met on a total of five occasions, and their inputs are reflected in the contents of this final report.

Concept drawings of the eight options are included as Appendix E (bound separately).

The options were assessed against a set of criteria agreed at a workshop involving project team members from ADC, Taylor Baines and Associates, and Opus. The assessments were revised following inputs from the Community Reference Group. Two possible sets of weightings were also applied to the assessments based on inputs from the Community Reference Group. The final assessments are included as Appendix F (bound separately). As a result of the additional investigation work and assessments, the following recommendations are made:

- 1. That public consultation on the results of these additional investigations, and on the options considered be carried out
- 2. That for the purposes of consultation the options be categorised as follows:
 - a. Likely:
 - Chalmers Avenue to East of Tinwald (rural)
 - Chalmers Avenue to East of Tinwald (urban)
 - Chalmers Avenue to Grove Street
 - b. Unlikely:
 - Outer Bypass
 - Inner Bypass
 - Melcombe Street (Railway level crossing)
 - Melcombe Street (Railway overpass)
 - SH1 Four Laning
 - c. That the possibility of traffic signals in Tinwald be pursued with NZTA in parallel with any second bridge project.



2 Introduction

Opus has been commissioned by Ashburton District Council (ADC) to undertake a technical investigation for a second bridge across the Ashburton River for the purposes of lodging a Notice of Requirement and Designation of Land. An Issues and Options report was prepared in January 2010. Following presentation of this report, Council adopted the Chalmers Avenue to Grove Street option as their preferred option with the Chalmers Avenue to east of Tinwald option as their second option. Following receipt of Community feedback on those options, Council then commissioned further investigations. This Additional Investigation Report presents the results of this work. In conjunction with the work carried out as part of the Social Impact Assessment, it also recommends options which are likely to proceed, for the purposes of public consultation.

The additional investigations commissioned include the following:

- Social Impact Assessment (carried out by Taylor Baines and Associates);
- Formation, facilitation and support for a Community Reference Group (carried out by Taylor Baines and Associates)
- Investigation of impacts on Tinwald School of some options`;
- Further detailed investigations, including traffic dispersion, local road / state highway interface, and cost estimates for the following options:
 - Eastern Bypass (two variations of this option have been investigated, an outer Bypass and an inner Bypass);
 - Chalmers Avenue to east of Tinwald (two variations of this option have been investigated, an option through the rural area east of Tinwald, and an option through the proposed urban area in the District Plan Review);
 - Chalmers Avenue to Grove Street; and
 - Melcombe Street (two variations of this option have been investigated, an option incorporating a level crossing across the railway south of Tinwald, and an option with an overpass over the railway);
- Liaison with New Zealand Transport Agency; and
- Prioritisation of Transportation Study projects with respect to the 2nd Bridge.

A further option of four laning State Highway 1 was added during the additional investigations, and for reasons of completeness, an assessment was also included for traffic signals in Tinwald. This is a short term option which may be pursued in parallel with the second bridge project.



3 Background

Ashburton town (the Ashburton District's largest population centre) is situated on the Canterbury Plains approximately midway between Christchurch and Timaru. The town straddles State Highway 1 (SH1) and the South Island Main Trunk railway (SIMT). The State Highway and the railway make up the primary South Island transportation corridor. The town is bisected by the Ashburton River, which runs more or less perpendicular to SH1 and the SIMT. A map of Ashburton is shown in Appendix A. The existing Ashburton river bridge is the only means of crossing the Ashburton River near to SH1. The nearest alternative route across the Ashburton River involves a detour of approximately 60 km.

Ashburton Transportation Study

In 2005 Transit New Zealand (now the New Zealand Transport Agency (NZTA)) and Ashburton District Council commissioned Opus to identify present and future transportation demands within the Ashburton urban area through to 2026, and to recommend measures to optimise the performance of the land transport system (the Ashburton Transportation Study).

The Ashburton Transport Study identified the main future issue to be the ability of State Highway 1 to cope with increasing traffic volumes, through the Ashburton urban area, particularly at the Ashburton River Bridge. It also identified route security issues if the existing bridge was closed for any reason, including isolated incidents on the bridge or wider natural disasters.

A strategy of actions was recommended in the Ashburton Transport Study. One of these recommendations is to provide a second bridge across the Ashburton River. The recommendations of the study have been adopted by the NZTA. The Ashburton District Council has also adopted the recommendations of the study excluding the site for the second bridge. This was to follow a separate consultation process.

Second Bridge Issues and Options Report

An Issues and Options Report For a Second Bridge Across the Ashburton River was prepared in January 2010. This report confirmed that the most significant issues for the existing bridge were its capacity to carry the future traffic demand, and route security issues should the bridge be closed due to an incident on the bridge or a wider event such as a flood or earthquake.

The Issues and Options Report identified the following twelve options for a second bridge route:

- Eastern Bypass;
- Trevors Road to East of Tinwald;
- Leeston Street to East of Tinwald;
- Chalmers Avenue to East of Tinwald;
- Chalmers Avenue to Grove Street;
- William Street to Grove Street;
- Cass Street to Thomson Street;
- 4 Lane Existing Bridge;
- West Street to Melcombe Street (one way northbound Existing bridge one way southbound);
- West Street to Melcombe Street (Relocate SH1 to new bridge, existing SH bridge to become local road);



- Park Street to Tarbottons Road;
- Oak Grove to West of Tinwald;
- Western Bypass; and
- Eastern Bypass.

These options were then assessed against the following criteria:

- Access and Mobility;
- Land;
- Engineering Technical;
- RMA;
- Policies, Plans and Strategies;
- Economics;
- Risks;
- Environmental Impacts; and
- Wider Outcomes.

The two options which best met these criteria were the Chalmers Avenue to east of Tinwald and the Chalmers Avenue to Grove Street options.

Consultation on the Options identified in the Issues and Options Report

Extensive public consultation, including a Public Meeting, Community Open Days, and a mail out to affected residents, was carried out following the release of the Issues and Options Report. The results of this consultation are detailed in the Consultation Report dated May 2010. In summary, the consultation confirmed a high level of opposition from the Tinwald community to the Chalmers Avenue to Grove Street option, and to a lesser extent the Chalmers Avenue to east of Tinwald option. The most common issues raised during the consultation included:

- Effects on residents of Grove Street including:
 - Increase in traffic down residential street(s)
 - Heavy vehicles using bridge/route
 - o Disturbance to residents
 - o Noise
 - o Increase in accidents (including children)
 - o Effects on retirement home
 - o Pollution
 - Reduction in property value
- Exit strategy onto State Highway?
- Consider options around the existing State highway / Melcombe Street
- Consider the need for a bypass rather than a local bridge.
- The effect of increased traffic on the Tinwald School.
- The need for a second bridge?
- Clarify the local traffic issue.



- Can traffic lights be put in first?
- The need to think long term and have the best solution for the future.
- Funding options from NZTA.



4 Methodology

Further investigations were conducted on the eight second bridge route options listed in section 2. The methodology for the investigations into each of the options is outlined below:

Social Impact Assessment

A Social Impact Assessment (SIA) has been produced by Taylor Baines and Associates. The SIA included data collection, (including document review, interviews with stakeholder groups), and inputs from the Community Reference Group. This information was then used to provide inputs into the Multi-criteria assessment of options from a Social Impact perspective.

Community Reference Group

A Community Reference Group was established and facilitated by Taylor Baines and Associates. Support and inputs were provided by Opus. Project team members from Opus attended Community Reference Group meetings to provide information and answer queries. The purpose of the Community Reference Group was to act as a sounding board for advice from the Tinwald and Ashburton community to the consultants carrying out additional assessment work on the 2nd bridge options, with particular attention to the scope of the assessment and the methods of consultation.

The Terms of Reference of the Community Reference Group are included as Appendix 3 of the Social Impact Assessment.

One key query arising from the Community Reference Group concerned the proportion of local traffic on the existing bridge. This is covered in some detail in Section 5 of this report.

The Community Reference Group provided inputs to the following stages of the additional option investigations:

- Factors they considered important to be considered in the option assessment;
- A "clean sheet" pros and cons assessment of each option based on the factors the considered important;
- Ranking of criteria suggested by the project team. This information was used to produce possible assessment weightings; and
- Comment on the 1st draft option assessment produced by the project team. Option scores and commentaries were amended as a result of these comments.

Reports to Council of the Community Reference Group meetings are included in Appendix 5 of the Social Impact Assessment.

Consideration of Feedback from Previous Consultation

Significant feedback was obtained as a result of the consultation following the completion of the Issues and Options Report. Issues raised in the consultation included:

- Effects on residents of Grove Street including:
 - Increase in traffic down residential street(s)
 - Heavy vehicles using bridge/route



- Disturbance to residents
- o Noise
- o Increase in accidents (including children)
- Effects on retirement home
- o Pollution
- o Reduction in property value
- Exit strategy onto State Highway?
- Consider options around the existing State highway / Melcombe Street
- Consider the need for a bypass rather than a local bridge.
- The effect of increased traffic on the Tinwald School.
- The need for a second bridge?
- Clarify the local traffic issue.
- Can traffic lights be put in first?
- The need to think long term and have the best solution for the future.
- Funding options from NZTA.

This feedback was further considered in the Social Impact Assessment, along with feedback from face to face interviews and meetings with key stakeholders.

The issues raised in the feedback were also incorporated into the comparative option assessment process, and addressed in the relevant sections of this report.

Geotechnical Study

Further desk top geotechnical investigations were carried out. These involved discussions with Opus and Ashburton Contracting staff who have been involved in excavations in the Tinwald area in recent years (including pipeline replacements, bore drilling and local and state highway roadworks), and a review of available literature. These investigations confirmed the assumptions which had been made regarding ground conditions during the Issues and Options phase of this project. The cost of carrying out specific on site geotechnical testing for each of the options being considered was not considered justified at this stage of the project. The risks associated with this approach have been considered in the preparation of the range of cost estimates for each option. The findings of the geotechnical investigations are included in Appendix B

Discussions with NZTA

Meetings have been held with Christchurch based NZTA staff. These meetings have covered the following issues:

- Appropriate design standards for new sections of road which will become State Highway 1
- Likelihood of obtaining NZTA funding to ADC's standard subsidy rate for each option;
- Likelihood of obtaining further financial assistance over and above ADC's standard subsidy for each option; and



• An informal opinion on the viability of each option

These informal discussions indicate the following:

- NZTA continues to stand by the strategy developed as a result of the Ashburton Transportation Study. A key part of that strategy was a 2nd bridge linking Eastern Tinwald with Chalmers Avenue. They feel that this route provides a good route between Tinwald and the rest of Ashburton, and makes good use of existing underutilised existing infrastructure (particularly Chalmers and Walnut Avenues);
- NZTA locally would be likely to support an application for funding of ADC's 57% funding subsidy for such a route, subject to project viability and funding availability at the time;
- NZTA may also be open to additional funding beyond ADC's subsidy to account for SH1 betterment resulting from one of these options proceeding. This would be subject to the same project viability and funding availability constraints above, and to reaching agreement on the value of any State Highway betterment;
- NZTA locally would be unlikely to support an application for funding for the bypass, Melcombe Street, or SH1 four laning options. They consider that these options are typically more expensive, and do not address the issues facing the existing network as effectively as the Chalmers Avenue options do; and
- NZTA consider that the standards adopted for the concept design and cost estimates for State Highway options considered in this report are likely to be no more than the minimum that NZTA would be prepared to accept. In fact they would prefer, and may insist on higher standards should a State Highway option proceed.



Preliminary Design

A concept design was prepared for each of the options. This consisted of a plan, indicating option alignment overlaid over property boundary drawings for the two bypass options, and over aerial photographs for all other options. Vertical design was carried out using Civil3D design software based on LIDAR levels provided by ADC. This enabled appropriate design gradients to be confirmed, depth and quantities of cut and fill, and extents of land required for cut and fill batters to be estimated. Option Concept Plan Drawings are included as Appendix E (bound separately). The specifics of each design are discussed in Section 6 below.

Cost Estimates

Rough Order of Cost estimates were prepared for each option based on the preliminary designs and the available geotechnical information. A number of assumptions have been made in the preparation of the estimates. These are discussed in Section 6 below. The cost estimates show a range of costs for each option. This range reflects a degree of uncertainty around some of the detail of each option, particularly regarding detailed design and ground conditions. Contingencies have been included for these uncertainties.

The level of confidence in the cost estimates is +/- 20%, which is reflected in the range of costs for each option.

More detailed cost estimates will not be possible until detailed design is complete.

Traffic Modelling

Traffic modelling was carried out for 2016 and 2026 traffic conditions as part of the Ashburton Transportation Study. The options modelled at that stage were a "Do Minimum" option (i.e. no change to the existing roading system), a bypass option from a point on SH1 south of Northpark Road to a point south of Fords Road, and an option linking Chalmers Avenue to east of Tinwald. Growth projections based on the Ashburton Development Plan were used for the 2016 and 2026 year models.

As part of the additional investigations, additional modelling was carried out to update the Chalmers Avenue to east of Tinwald option to reflect the changes in proposed development of east Tinwald in the District Plan Review when compared with the Ashburton Development Plan.

It was assumed that traffic volumes carried by both the inner and outer bypass options considered in these additional investigations would be significantly less than those estimated for the short high speed bypass modelled, that the "do minimum" traffic volumes on SH1 would remain the same for the 4 laning option, and be split close to 50/50 between Melcombe Street and Archibald Street for the Melcombe Street options. The philosophy behind these assumptions is explained in Section 6

Option Assessment

Each of the options was assessed against a number of criteria. The criteria were identified, and a preliminary assessment carried out at a full day workshop by project team members from Opus, Taylor Baines and Associates, and ADC. This preliminary assessment was presented to the Community Reference Group. Their comments were considered, and modifications were made to



the assessment as appropriate. The final assessment is included as Appendix F (bound separately) and summarised in section 6.

Prioritisation of Transportation Study Projects

The Transportation Study included a suite of projects to address the transportation issues in Ashburton, including:

- Provide Traffic Signals in Tinwald;
- Four lane SH1 between Havelock Street and Moore Street;
- Revise Dobson Street / Kermode Street / SH1 intersection;
- Provide a second bridge across the Ashburton River;
- Upgrade Walnut Avenue / SH1 / East Street intersections;
- Provide safe pedestrian and cycle routes to schools;
- Improve pedestrian and cycle access across the Ashburton River

These projects have been considered in conjunction with each of the second bridge options to identify any synergies between the second bridge options and the Transportation Study projects.

Tinwald School

Impacts on Tinwald School have been assessed for options which change the roading network or traffic patterns in the vicinity of Tinwald School, particularly on Graham Street. Impacts on other schools have also been assessed for options which change the roading network or traffic patterns in the vicinity of those schools.



5 Local Traffic on Existing Bridge

One of the key determinants of the function (and therefore location) of a second bridge is the proportion of traffic using the bridge which is local rather than through traffic on SH1. Some members of the Community Reference Group queried the conclusion from the Ashburton Transportation Study, which was repeated in the Issues and Options Report, that approximately 30% of traffic on the existing bridge is inter district through traffic. It was felt that a one off survey in 2006 may not accurately reflect the current day to day situation.

Number plate surveys were conducted on February 15 2006 as part of the Transportation Study. These surveys recorded the last three digits of vehicle registration numbers travelling in both directions, and times, at nine locations in Ashburton, including on SH1 between South Street and the Ashburton River Bridge, and south of Jane Street. Number matching software was then used to compare registration numbers at different locations at similar times. This enabled the identification, and counting, of vehicles which passed one location and then another.

Results of these surveys indicated that overall less than 30% of traffic on the Ashburton River Bridge was state highway through traffic (i.e. traffic which was travelling from north of the Ashburton River Bridge to south of the Tinwald urban area or vice versa). The remainder left or joined the State Highway somewhere between the bridge and the edge of the Tinwald urban area.

The results of the number plate survey were compared with hourly NZTA tube counts from surveys in January and February 2008. These surveys give traffic counts in each direction every 15 minutes, 24 hours per day for 7 days immediately south of Wills Street and of South Street. The available counts south of Winslow Road are a combined two way total. The results of these counts were very similar to those obtained from the number plate survey.

The results of these two surveys have also been compared with daily NZTA tube count data between 2000 and 2010. These counts give a total two way average daily count for each of the years just south of South Street and at Winslow. These counts show results consistent with the hourly counts above, namely that consistently for the past 10 years the overall traffic volume at Winslow has been approximately 30% of the total traffic on the Ashburton River Bridge. Given that some of the traffic on SH1 at Winslow would have started or finished in Tinwald, this suggests that less than 30% of the traffic on the Ashburton River Bridge is State Highway through traffic.

The results of all three surveys are included in Appendix C.



6 Options

As noted in section 2 above, concept designs and Rough order of Cost estimates were prepared for a total of eight options. Plans of each of these options are included in Appendix E (bound separately). Each of these options was considered at a high level in the Issues and Options report. Some of the options are effectively sub options (e.g. Chalmers Avenue to East of Tinwald - Urban and Rural sub options, and West Street to Melcombe Street – Rail Level Crossing and Rail Overpass sub options).

In addition to the eight 2nd bridge route options, an option of traffic signals in Tinwald was also included. This is not, however, considered to be a long term option for a second bridge.

Each of the options is described in detail in the sections 8 to 16.**Error! Reference source not found.** on the following page summarises the key features of each option.



Description/assumption	Bypass: Fairton- Winslow	Bypass: Seafield Road- Laings Road	Chalmers Ave-East of Tinwald - rural option	Chalmers Ave-East of Tinwald - urban option	Chalmers Ave-Grove Street	Melcombe Street: Rail level crossing	Melcombe Street: Rail overpass	SH1 4 Laning	Tinwald Traffic Signals
Status of new route	State Highway	Local Road	Local Arterial	Local Arterial	Local Arterial	State Highway	State Highway	State Highway	State Highway
Total length of new route	26km	9.3km	2.3km	2.3km	2.3km	7.1km	6.8km	4.4km	N/A
Total length of new road	12.6km	6.2km	2.1km	2.1km	0.6km	3.1km	2.8km	0	N/A
Total length of existing road upgraded	13.4km	3.1lm	0.2km	0.2km	1.7km	4.0	4.0	4.4km	N/A
Bridge Length	360m	360m	360m	360m	420m	360m	360m	360m	N/A
# of properties likely to be purchased	42	47	6	10	4	21	14	14	4
% of new road in current urban area	0%	~40%	0%	0%	~20%	~25%	~25%	0%	N/A
Additional distance for SH through traffic	~6km	~2.7km	~1.6km	~1.4km	~1.2km	0km	0km	0km	0km
Traffic speed environment	100kph	100kph - rural 50kph - urban	100kph rural - 50kph Urban -	50kph	50kph	100kph - rural 50kph - urban	100kph - rural 50kph - urban	50kph	50kph
Proportion of SH through traffic likely to use new route	Small	Small	Small	Small	Small	Majority	Majority	Majority	N/A
Proportion of traffic between south of Ashbtn and north east Ashburton likely to use new route	Small	Small / Moderate	Moderate	Moderate	Moderate	Significant	Significant	Majority	N/A
Proportion of local traffic (~70% of total bridge traffic) likely to use new route	Small	Small	Moderate	Significant	Significant	Moderate	Moderate	Majority	N/A
Traffic reduction on existing bridge	Small	Small	Moderate	Significant	Significant	Moderate	Moderate	Significant	N/A
Expected Total Project Cost	\$69 - \$84M	\$48 - \$58M	\$27 - \$32M	\$30 - \$35M	\$25 - \$30M	\$36 - \$43M	\$38 - \$46M	\$41 - \$51M	\$1-2M
NZTA funding contribution likely	No	No	Possible	Possible	Possible	Unlikely	Unlikely	Unlikely	Likely
No of key transp Issues addressed	1	1	4	4	4	2	2	2	2

7 Option Assessment

Sections 8 to 16 also include comments on the comparative effects of each option. Most assessment work on effects to date has concentrated on the traffic impacts, and the extent to which each option meets addresses the issues associated with the Ashburton transportation system. These issues include the capacity of the existing bridge and associated roading network to meet future demand, route security issues, and the lack of quality pedestrian and cycle facilities on the existing bridge.

Changes in traffic (volume, nature / make-up) create the other environmental effects such as noise, vibration, air quality traffic safety on existing route, amenity, and streetscape.

The full option assessment is included in Appendix F (bound separately) and summarised in Section 17

A detailed assessment of effects on the environment (AEE) has not yet been undertaken for any of the options. However, a draft AEE will be undertaken for the recommended option and will be included as part of the final report to Council prior to a final decision on a preferred option. The draft AEE will be then finalised and will form part of the statutory application for the new designation.

Notwithstanding the above, a consideration of the potential effects of each of the route options is an important part of preliminary option assessment that has been undertaken. Two of the criteria used in the comparative option assessment are environmental criteria, namely: Environment – Water; and Amenity and Public Health.

The Environment – Water criteria considers the impact of a second bridge crossing on water quality and river hydraulics (i.e., increased flooding risk) within the Ashburton River as a result of any of the route options.

The Amenity and Public Health criteria considers the changes to amenity values (e.g., noise levels, air quality, vibration, visual effects and streetscape) of any of the route options.

It should be noted that effects on property values have not been directly considered. Property values may be influenced by such factors as the amenity effects, visual effects, noise effects, traffic effects etc of a proposal. Therefore, in terms of an AEE it is considered appropriate to consider these effects and implement appropriate mitigation measures where possible.

A preliminary AEE has been considered for each of the route options. It is considered there are some effects that will be the same or similar for all of the route options and these are described further below. Effects that are more specific to each of the route options are contained in the description of each option.

Effects on Heritage Values

All of the route options have been assessed in terms of the Ashburton District Plan, the NZ Archaeological Association Database and the NZ Historic Places Trust Register.

With the exception of a number of specific identified heritage buildings located along West Street, there are no other identified heritage values located along any of the other route options.



With regards to the identified heritage buildings along West Street, all road construction / reconstruction works associated with the specific options that include West Street can take place within the current road reserve. There is no requirement for any additional land to be taken. On this basis, there will be no adverse effect on the identified heritage buildings in West Street.

It is therefore considered there will be no adverse effect on heritage values for any of the route options.

Effects on Cultural Values

During the scoping of possible route options, the location of a second bridge crossing of the Ashburton River was discussed with Te Runanga o Arowhenua. Te Runanga o Arowhenua advised that once route options had been reduced to the likely possible option(s), they would then provide comment on cultural values that would need to be considered and provided for at the specific location. On this basis, no further comment has yet been sought from Te Runanga o Arowhenua, however this will be undertaken as the preferred route option(s) are identified through further consultation and will be included in the final AEE for the preferred route.

Notwithstanding the above, construction works may potentially unearth artefacts of cultural significance. Accidental discovery protocols will be in place for any construction activity on any of the route options.

Effects on Ecological Values

All options involve the construction of a bridge across the Ashburton River. It is considered that all options will likely have the same or similar effects on ecological values within the Ashburton River, regardless of its location.

Once a preferred route option has been identified, an ecology assessment related to the specific site will be undertaken.

Effects on Hydraulic Capacity

The construction of a bridge across a river has the potential to change the hydraulic nature of a river. Bridge abutments could 'narrow up' and create a constriction of the riverbed, thereby reducing the capacity of the entire riverbed to convey flood flows. Likewise, the height of a bridge above the riverbed can potentially reduce the conveyance capacity of a river.

It is considered that all second bridge route options will have the same or similar effect on the hydraulic capacity of the Ashburton River.

Discussions have been held with Environment Canterbury river engineers in relation to the placement of a second road bridge across the Ashburton River regardless of which route option becomes the preferred option. The design of the bridge in relation to its height above the riverbed and stopbanks is a factor for the bridge in any location and one which can be provided for during the detailed design and resource consenting process.



Construction Related Effects

Potential adverse construction related effects may arise during construction of the bridge and route construction / reconstruction. Construction related effects include construction noise, dust, and temporary traffic management. All options will likely have some construction related effects for the duration of the works however these effects will be temporary in nature, confined to the duration of the works and the effects can be mitigated.

Construction noise will be managed and controlled in accordance with the New Zealand Standard NZS 6803:1999 "Acoustics – Construction Noise", and which includes such matters as hours of operation and noise levels for construction machinery.

Earthworks have the potential to generate dust. This will be more of an issue for the route options located within residential areas, compared to options such as the bypasses. Standard construction practice is to use dust suppression methods such as damping affected areas with water in order to reduce dust nuisance.

The construction of the bridge (at any location) will not require specific traffic management given that there is no public traffic that needs to be managed at the crossing. Traffic management will be required for all of the route options during construction / reconstruction works.

On the basis of the above, there will likely be some adverse construction related effects at any of the route options, but these can be mitigated and would be of a temporary and short term nature. It is therefore expected that any of these construction related effects will be minor.



8 Outer Bypass – Fairton to Winslow

Description

A rural State Highway bypass on the following route:

- Fairfield Road
- Singletree Road
- Cochranes Road
- River crossing
- Boundary Road
- Winslow Willowby Road

The new road will become SH1, and the existing SH1 between the connections to the new route, and through Ashburton will become local road.

Design Standards

The concept design and cost estimates for this option are based on the following minimum design standards:

- Design speed of 110km/h with high speed flowing curves;
- Road cross section with the following features:
 - o 3.5m traffic lane both sides
 - 2.0m sealed shoulder both sides (this provides sufficient width for cyclists to travel clear of the traffic lane)
 - o Stormwater collected in swales on both sides
 - o 24m road reserve
- The new road will have priority at all intersections, with Right Turn Bays
- New road to seamlessly transition from State Highway 1 at both ends

These are considered the absolute minimum current standards for new road construction for a major State Highway. The above standards are lower than the standards adopted for the Roads of National Significance. If this section of SH1 is considered to fall under that category, then those higher standards may apply.

Rough Order of Cost Estimate

Total Cost	\$69M	to	\$84M
Land Acquisition	\$9M	to	\$11M
Construction Cost	\$60M	to	\$73M



Assumed NZTA subsidy \$0 to \$0

Total Cost to ADC \$69M to \$84M

The following items have been **included** in the above cost estimate:

- Construction of new road in "greenfields" locations
- Widening and strengthening of existing roads
- New major intersections at Fairton & Winslow
- Upgrade of local road intersections to right turn bays
- New rail crossing at Fairton
- New bridge (360m long)

The upgrade of local roads running east west between Ashburton and new road has been excluded from the cost estimate. It is assumed that there will be little increase in traffic on those routes due to the new road, and therefore no upgrade is required as a result of this road.

Traffic Effects

This route will be a rural State highway (100km/hr operating speed) designed and constructed to the appropriate NZ Transport Agency standards. It will require new road construction to provide high speed, sweeping curves to ensure a consistent speed of 100km/hr can be maintained.

This route involves an additional travel distance of 6km for SH1 through traffic bypassing Ashburton. The route is likely to be slightly quicker than the existing SH1 route when/if traffic in central Ashburton is severely congested, but slower when central Ashburton is free flowing.

Only some of the State Highway through traffic is likely to use the new route. This traffic currently makes up approximately 30% of peak hour traffic on the existing bridge. Traffic modelling for a bypass option from a point on SH1 south of Northpark Road to a point south of Fords Road, indicated that this option would reduce traffic on the existing bridge from 35,000vpd to 25,000 in 2026. A Chalmers Avenue option would reduce traffic to 21,000vpd.

The option modelled is a much more sweeping and direct route for through traffic than the Fairton to Winslow bypass option. Consequently the volume of traffic using the Fairton to Winslow bypass is expected to be considerably less than the modelled option. The option as modelled uses little or no existing roads, and bisects numerous lifestyle blocks. It was considered no further due to its likely construction and land acquisition costs being excessively high.

Heavy transport operators have indicated that the additional operating cost associated with the extra distance tends to be a more important consideration to them than comparatively small time savings. They would therefore be unlikely to use the new route until delays in central Ashburton become severe. Therefore, at night, heavy vehicles are unlikely to use the outer bypass route because the route through central Ashburton will not be congested, will be shorter and therefore a faster route.

Access to the Ashburton Business Estate from this route would be via Seafield Road and Company Road. The existing SH1 route through central Ashburton would be more direct than this



route. Heavy traffic between south of Ashburton and the Business Estate would therefore be likely to continue to travel through Ashburton rather than use this route.

Local traffic is unlikely to use the new route at all, because it involves a detour to travel from one side of Ashburton to the other.

This route is therefore unlikely to provide much relief to traffic volumes on the existing State Highway route. Consequently it is also unlikely to have any significant effect on road safety in Ashburton.

Road Safety

This route is likely to result in little change in road safety through Ashburton due to the likelihood that it will have little effect on traffic patterns in the town.

Amenity Effects

The outer bypass option will require the construction of some new road, and the widening and strengthening of existing roads on the route. There is the potential for some negative impact on rural amenity values due to the presence of a State highway, although it is noted there are relatively few dwellings along the route and expected traffic volumes will be comparatively small (refer to traffic effects above).

Noise Effects

This bypass option would mean there is some additional traffic that would use the route compared to the volume of traffic that currently uses the existing roads. This additional traffic would only be some of the state highway through traffic.

There is the potential for some negative impact relating to changes in noise levels associated with traffic using this route. However, it is noted there is likely to be a relatively small volume of traffic using the route and there are relatively few dwellings affected.

It is further noted that traffic noise generally is more noticeable at night. Heavy vehicles are a major contributor to traffic noise. These vehicles are more likely to use the more direct route through the centre of Ashburton at night as there will be little or no congestion and it is a shorter route.

• Air Quality Effects

Changes in air quality are related to the additional volume of traffic. There is the potential for some negative impact relating to changes in air quality associated with the additional traffic using this route. However, it is noted there is likely to be a relatively small volume of traffic using the route and there are relatively few dwellings affected.

• Vibration Effects

Vibration effects are usually associated with both the volume of traffic, the number of heavy vehicles using the route, and the roughness of the road surface.



The outer bypass option will require all of the identified roads to be both widened and strengthened to rural state highway standard. Given that state highways are expected and required to carry heavy commercial vehicles, the carriageway will be strengthened accordingly.

There may be some negative impact relating to vibration, although it is noted there is likely to be a relatively small volume of traffic using the route and there are relatively few dwellings on this route.

It is noted that, from a disturbance point of view, vibration from traffic may be more noticeable at night. Heavy vehicles are a major contributor to traffic vibration. These vehicles are more likely to use the more direct route through the centre of Ashburton at night as there will be little or no congestion and it is a shorter route.

• Visual Effects

The outer bypass route will have a visual effect due to the wider carriageway and upgraded intersections that will be required. These intersections will be lit at night. There will also be the visual effect associated with a new bridge located in the rural environment where there are no other structures in the vicinity across the Ashburton River.

• Streetscape Effects

The route of the outer bypass option would be constructed as a standard rural State highway with grass berms / swale drains. This is little different to what currently exists along the route of the outer bypass option.

Property Effects

This option would require the acquisition of land from 42 properties, and would involve significant property severance at the curves.

Relationship to Other Transportation Study Projects

This option would do little to relieve congestion on SH1 through Ashburton. Therefore, the projects to improve capacity through Ashburton (four laning of SH1 between Havelock Street and Moore Street, Dobson Street / Kermode Street / SH1 intersection, and Walnut Avenue / SH1 / East Street intersections) would need to be progressed sooner rather than later.

The majority of any safe pedestrian and cycle routes to schools would be separate from the second bridge project, apart from the section across the Ashburton River. This section is discussed below. This option will not connect to any route to schools within Ashburton.

The outer bypass may be able to improve pedestrian and cycle facilities across the Ashburton River. However, its remoteness from Ashburton town would make it inconvenient for most local pedestrians and cyclists to use it. Consequently a project to upgrade pedestrian and cyclist facilities across the river would be required in conjunction with this project.

Comments / Notes

1. Local NZTA staff have indicated that this option would be less effective at addressing the transportation issues in Ashburton than other options considered, and is significantly more expensive than those options. It would therefore be unlikely to obtain funding from NZTA.



- 2. Maintenance of this option would be the responsibility of NZTA if the option were to become a SH1. Maintenance of the existing SH1 route along West Street and Archibald Street (including the existing bridge) would then become the responsibility of ADC.
- 3. NZTA funding is unlikely for this option.
- 4. This option only addresses the key issue of route security if the existing bridge is closed.
- 5. The community Reference Group produced the following list of Pros and Cons for this option.

Pros	Cons
If (majority of) heavy traffic taken out of town. Why would heavy traffic use this route?	Loss of customers for local businesses if through traffic misses town
Considers future growth in traffic	Greater cost for longer distance travelled - (therefore truckies unlikely to use this route)
Safer for schools and students driving to/from school	High land cost of new roads High construction cost - length of road
Heavy traffic flow from n/e to s/e corner may use this route	No advantage to local commuters
Connects with Northern Industrial Park to a high speed southern arterial route	NZTA funding untimely local residents pay
Trucks from Boundary Road crusher plant could use new road and not Grove Street	Limited use by pedestrians and cyclists
	Tinwald-Ashburton utility connection still insecure
	Does not address West Street intersection issues



9 Inner Bypass- Seafield Road to Laings Road

Description

A combined urban and rural bypass on the following route:

- Seafield Road (urban)
- New link to end of Trevors Road (urban)
- Trevors Road (urban)
- River crossing (urban)
- New link from river crossing to end of Gartartan Road (rural)
- Gartartan Road (rural)
- New link to end of Laings Road (rural)
- Laings Road (rural)

The existing East Street/State Highway 1 intersection will be relocated to Seafield Road, with the existing State Highway 1 to have priority.

Laings Road / State Highway 1 intersection will be upgraded to include right turn bay.

The new road will be a local road.

Design Standards

The concept design and cost estimates for this option are based on the following minimum design standards:

- Design speed of 60km/h on urban sections and 110km/h on rural;
- Road cross section with the following features (urban section:
 - o 3.5m traffic lane both sides
 - o 2.0m cycle lane both sides
 - o 2.0m parking lane both sides
 - Kerb & Channel both sides
 - 1.5m footpath both sides
 - \circ 3.0m grass berm / stormwater treatment both sides
 - o 24m road reserve
- Road cross section with the following features (rural section):
 - o 3.5m traffic lane both sides
 - o 1.5m sealed shoulder both sides
 - o Stormwater collected in swales on both sides
 - o 24m road reserve



Rough Order of Cost Estimate

Total Cost to ADC	\$48M	to	\$58M
Assumed NZTA subsidy	\$0	to	\$ O
Total Cost	\$48M	to	\$58M
Land Acquisition	\$9M	to	\$11M
Construction Cost	\$39M	to	\$47M

The following items have been **included** in the above cost estimate:

- Construction of new road in "greenfields" locations
- Widening and strengthening of existing roads
- New major intersections at Seafield Road & Laings Road
- Upgrade of local road intersections to right turn bays
- New rail crossing at Seafield Road
- New bridge (360m long)

Traffic Effects

This route will be a combination of urban (50km/hr operating speed) and rural (100km/hr operating speed) local road designed and constructed to the appropriate ADC roading standards. It involves an travel distance of 2.5km for SH1 through traffic bypassing Ashburton. The route may be slightly quicker than the existing SH1 route when/if central Ashburton is severely congested, but is likely to be slower at all other times.

Little State Highway through traffic is likely to use the new route. This traffic currently makes up approximately 30% of peak hour traffic on the existing bridge.

Heavy transport operators have indicated that the additional operating cost associated with the extra distance tends to be a more important consideration to them than comparatively small time savings. They would therefore be unlikely to use the new route until delays in central Ashburton become severe. Therefore, at night, heavy vehicles are unlikely to use the inner bypass route because the route through central Ashburton will not be congested, will be shorter and therefore a faster route.

Other through traffic is unlikely to detour off the existing State Highway route. Some local traffic between east Tinwald and east Ashburton may use the new route. This route is therefore unlikely to provide much relief to traffic volumes on the existing State Highway route. Consequently it is likely to have little or any impact on road safety in Ashburton.

3.5m lane widths & 2.0m cycle lanes may result in higher speeds on urban sections. Narrower traffic lanes may be more appropriate if the road is to serve "local" purpose rather than "bypass" traffic.



Road Safety

This route is likely to result in little change in road safety through Ashburton due to the likelihood that it will have little effect on traffic patterns in the town.

Amenity Effects

The inner bypass option will require the construction of some new road, and the widening and strengthening of existing roads on the route. There is the potential for some negative impact on both rural and urban amenity values. These impacts are minimised by the low traffic volumes likely to use this route, although there are a greater number of dwellings affected compared to the outer bypass route option.

Noise Effects

This bypass option would mean there is some additional traffic that would use the route compared to the volume of traffic that currently uses the existing roads. This additional traffic is expected to be a small portion of the State highway through traffic, plus some local traffic.

There is the potential for some negative impact relating to changes in noise levels associated with traffic using this route. However, it is noted there is likely to be a relatively small additional volume of traffic using the route, although there are a greater number of dwellings affected compared to the outer bypass route option.

It is further noted that traffic noise generally is more noticeable at night. Heavy vehicles are a major contributor to traffic noise. These vehicles are more likely to use the more direct route through the centre of Ashburton at night as there will be little or no congestion and it is a shorter route.

• Air Quality Effects

Changes in air quality are related to the additional volume of traffic. There is the potential for some negative impact relating to changes in air quality associated with the additional traffic using this route. However, it is noted there is likely to be a relatively small volume of traffic using the route, although there are a greater number of dwellings affected compared to the outer bypass route option.

• Vibration Effects

Vibration effects are usually associated with both the volume of traffic, the number of heavy vehicles using the route, and the roughness of the road surface.

The inner bypass option will require all of the identified roads to be both widened and strengthened to the standard to cater for the total number of vehicles (including heavy vehicles) expected on the route.

There may be some negative impact relating to vibration, although it is noted there is likely to be a relatively small volume of traffic using the route, although there are a greater number of dwellings affected compared to the outer bypass route.

It is noted that, from a disturbance point of view, vibration from traffic may be more noticeable at night. Heavy vehicles are a major contributor to traffic noise however these vehicles are more likely to use the more direct route through the centre of Ashburton at night as there will be little or no congestion and it is a shorter route.



• Visual Effects

The inner bypass route will have a visual effect due to the new roads that will be required to be constructed. The upgraded intersections within the rural section will be lit at night.

There will also be the visual effect associated with a new bridge located in the rural environment where there are no other structures in the vicinity across the Ashburton River.

• Streetscape Effects

The rural section of the inner bypass option would be constructed as a standard rural road with grass berms / swale drains. The urban section would be constructed as a standard urban road with kerb and channel, footpaths and amenity planting.

Property Effects

This option would require the acquisition of land from 47 properties, and would involve significant property severance at the curves.

Relationship to Other Transportation Study Projects

This option would do little to relieve congestion on SH1 through Ashburton. Therefore, the projects to improve capacity through Ashburton (four laning of S1 between Havelock Street and Moore Street, Dobson Street / Kermode Street / SH1 intersection, and Walnut Avenue / SH1 / East Street intersections) would need to be progressed sooner rather than later.

The majority of any safe pedestrian and cycle routes to schools would be separate from the second bridge project, apart from the section across the Ashburton River. This section is discussed below. Inclusion of pedestrian cycle facilities on Trevors Road as part of this project may be able to link into a pedestrian and cycle route to Hampstead School

The inner bypass may be able to improve pedestrian and cycle facilities across the Ashburton River. However, its remoteness from Tinwald and location on the edge of the Hampstead area would make it inconvenient for most local pedestrians and cyclists to use it. Consequently a project to upgrade pedestrian and cyclist facilities across the river would be likely to be required in conjunction with this project.

Comments / Notes

- 1. Local NZTA staff have indicated that this option would be less effective at addressing the transportation issues in Ashburton than other options considered, and is more expensive than those options. It would therefore be unlikely to obtain funding from NZTA.
- 2. Maintenance of this option would be the responsibility of ADC since this would be a local road. Maintenance of the existing SH1 route along West Street and Archibald Street (including the existing bridge) would remain the responsibility of NZTA.
- 3. NZTA funding is unlikely for this option.
- 4. This option only addresses issue of route security if the existing bridge is closed.

5. The community Reference Group produced the following list of Pros and Cons for this option

Pros	Cons
Does not impact on Tinwald urban area	Not a true bypass
Provides route from Lake Hood north	Limited use by locals
Possibly used by more trucks	SH1 egress/entry difficult; truck use north/south minimal
Small cost of land purchase	Limited use by pedestrians and cyclists
Separate from most residential properties	Large amount of new roading
Possible increase in Tinwald-Ashburton utility connection security	Purchase of properties, cost?
Trucks from Boundary Road crusher plant could use new road and not Grove Street	Impacts on urban dwellers - along Trevors Road
Allows for new rest home development	No advantage to locals



10 Chalmers Avenue to east of Tinwald (Rural)

Description

A local road on the following route:

- New roundabout at Chalmers Avenue / South Street intersection
- Extension of Chalmers Avenue
- River crossing
- New rural road on eastern edge of Residential D zone proposed in District Plan review
- New cross road intersections at Carters Terrace, Wilkins Road, and Johnstone Street
- New Tee intersection at Grahams Road

Design Standards

The concept design and cost estimates for this option are based on the following minimum design standards:

- Design speed of 60km/h on Chalmers Avenue extension and 110km/h on rural section;
- Road cross section with the following features (Chalmers Avenue extension between South Street and the River):
 - Similar to the cross section on the remainder of Chalmers Avenue, namely:
 - Solid median
 - 3.5m traffic lane both sides
 - 2.0m cycle lane both sides
 - 2.5m parking both sides
 - Kerb & Channel both sides
 - 1.5m footpath both sides
 - 3.0m wide grass berm / stormwater treatment both sides
 - 40m wide road reserve
- Road cross section with the following features (rural section):
 - o 3.5m traffic lane both sides
 - o 1.8m cycle lane both sides
 - o 0.5m sealed shoulder both sides
 - Stormwater collected in swales both sides
 - o 24m road reserve
- New road to be local arterial road



- New road to have priority at Carters Terrace, Wilkins Road, and Johnstone Street intersections

 all to have right turn bays on new road
- Grahams Road to have priority, with right turn bay
- Intersections with SH1 to remain unchanged see note 2 below

Rough Order of Cost Estimate

Total Cost to ADC	\$11.3M	to	\$13.6M	
Assumed NZTA subsidy	\$15M	to	\$18M	(57% subsidy rate)
Total Cost	\$26.3M	to	\$31.6M	
Land Acquisition	\$1.3M	to	\$1.6M	
Construction Cost	\$25M	to	\$30M	

The following items have been **included** in the above cost estimate:

- Roundabout at Chalmers Avenue / South Street intersection
- Chalmers Avenue extension to river
- New bridge (360m long)
- New road to Grahams Road
- Allowance for minor works (\$100k) on Graham Street near Tinwald School (see notes 4 & 5 below)
- Land acquisition costs

The following items have been **excluded** from the above cost estimate:

- Upgrades to Chalmers Avenue north of South Street Road has adequate capacity & already carries significant traffic volumes
- Upgrades to Bridge Street Upgrade is planned independent of this project
- Upgrades to Carters Terrace, Wilkins Road, Johnstone Street & Grahams Road between new road and existing urban area. It is assumed that this work will be done in conjunction with future residential development on these streets.

This option will provide access to potential new lots in the proposed Residential zones. Some funding from the developers of these lots may be available via developer contributions. This has not been included in the calculation of cost to ADC above.

Traffic Effects

This route will be a combination of urban (50km/hr operating speed) and rural (100km/hr operating speed) local road designed and constructed to the appropriate ADC roading standards. This is a high speed route with minimal delays. It will reduce local traffic volumes on SH1 through



Ashburton. Local traffic constitutes the bulk of the traffic on the Ashburton River Bridge (as noted elsewhere).

This route is likely to attract some through traffic between SH1 south and north-eastern Ashburton. Traffic signals at Grahams Road / SH1 would make it easier for this traffic to use this route. Signals have therefore not been included so as to encourage through traffic to use State Highway 1 as much as possible.

Traffic volumes on Carters Terrace, Wilkin Street, Johnstone Street and Graham Street are likely to increase as a result of proposed zone changes and associated development east of Tinwald, and growth at Lake Hood, regardless of a second bridge.

Traffic from those developments is likely to use the new route to access Ashburton. This will result in a reduction in traffic using the above streets to access SH1. However, traffic from the existing urban area east of Tinwald, and some traffic from SH1, but increase volumes from the existing urban area and State Highway.

As noted above, traffic volumes on Graham Street are likely to increase as a result of growth at Lake Hood and in the proposed residential zones east of Tinwald. Much of that traffic is likely to use this route to access Ashburton and other locations north of the Ashburton River rather than using Graham Street and SH1 across the river. However, some traffic between north-eastern Ashburton and south of Ashburton is likely to use this new route, and Graham Street. These two traffic sources will tend to cancel each other out, and the result is expected to be little change in the overall traffic volumes on Graham Street.

Allowance has been made to provide traffic calming, such as raised platforms, near Harland Street and Thomson Street. This will slow traffic past Tinwald School, and improve the pedestrian crossing facilities at these locations. It will also encourage traffic from east of Tinwald (including Lake Hood) to use the new route to access Ashburton, and discourage State Highway traffic from using the new route to access the north-eastern Ashburton area. This in turn is likely to reduce traffic volumes on Graham Street.

The 2010 District Plan review proposes to rezone an area east of the existing Tinwald urban area, to enable future residential development. This option will enhance access to the wider eastern Tinwald area, including the area proposed for rezoning, by providing a collector route along the edge of the proposed Residential D zone. Any future residential development in this area would also require a network of new local roads connecting to this collector route.

The model predicts AADT in 2026 at Chalmers Avenue, south of Victoria Street will increase from 8,000 vehicles/day to 14,000 vehicles/day, as a consequence of implementing a Chalmers Avenue option.

This route will result in an increase in traffic numbers along Chalmers Avenue particularly near to the second bridge. While the majority of this traffic is expected to dissipate over the length of Chalmers Avenue, there will be a residual increase in traffic along Bridge Street. Chalmers Avenue is already a 'high capacity' road readily able to cope with the additional traffic volume. Chalmers Avenue from South Street to Walnut Avenue is identified in the Ashburton District Plan as a Principal Road. Bridge Street is currently not constructed as a high capacity road but is also identified as a Principal Road. Bridge Street is expected to take increased traffic due to the



Ashburton Business Estate and is therefore already identified in the LTCCP for upgrade regardless of the second bridge.

There is likely to be little advantage to heavy vehicles travelling from south of Ashburton to the north-eastern areas of town in using this route at night. This is because there will be few delays through central Ashburton and there is little or no difference in the total distance travelled. Therefore they are less likely to use this route at night than during the day.

Road Safety

This route is likely to result an improvement in road safety on SH1 in Tinwald as a result of the reduction in Tinwald traffic turning right across SH1. It also provides a safer route for cyclists and pedestrians across the river than the existing. However the lack of pedestrian facilities and higher speeds on the rural section between the river and Graham Street make this section less safe for pedestrians and cyclists than options in the urban area.

Effects on Schools

As noted above, there is expected to be little change in overall traffic volumes on Graham Street near Tinwald School. This route is located beyond the existing or proposed urban area of Tinwald. It is therefore unlikely that students travelling to or from Tinwald School will need to cross the new urban road on this route. Consequently the overall impacts on Tinwald School are assessed as being small.

Hampstead and Netherby Schools are both located remote from this route. Therefore this option is likely to have little impact on the immediate environs of these schools. Some pupils may need to cross Chalmers Avenue, Walnut Avenue or Bridge Street to access these schools. Each of these roads is likely to experience additional traffic volumes as a result of this option. All three roads are currently identified as principal roads in the Ashburton District plan, and carry significant traffic volumes.

The solid median on Chalmers and Walnut Avenues provide a safe refuge for pedestrians crossing the road. However, the width of carriageway on each side of the road means that pedestrians are exposed to traffic for longer periods of time when crossing. Consequently these roads are likely to be intimidating for some pedestrians, especially if crossing remote from the pedestrian facilities provided. The impacts of the comparatively small increase in traffic volumes on school pedestrians on these roads is likely to be smaller than a similar increase on a low volume local road.

Ashburton Intermediate School and Ashburton College are both located on Walnut Avenue. Both schools will face some increase in traffic on Walnut Avenue outside the schools, with the College facing a much smaller increase. As noted above, Walnut Avenue is a high capacity road. It is a divided road outside the Intermediate School, and undivided outside the college. The impacts of a small increase in traffic outside both schools are expected to be small.

Effects on Proposed Riverview Retirement Village

This option does not directly affect the proposed Retirement Village on Carters Terrace opposite Grove Street. The possible increase in traffic volumes on Carters Terrace outside the proposed complex may have some negative impacts on amenity of the complex. However, a second bridge


and alternative route across the Ashburton River is likely to result in significant improvements in accessibility for the retirement village.

Amenity Effects

This option increases the traffic volumes on existing urban roads within Ashburton. It also requires the construction of a new road in rural Tinwald.

There is likely to be some negative impacts on both rural and urban amenity values. While there is expected to be a small improvement in amenity on SH1 through Ashburton, this is offset by a reduction in amenity on the southern section of Chalmers Avenue.

There will also be some reduction in rural amenity on the greenfields route east of Tinwald. This affects a small number of larger sized properties. It is noted the nature of this area is likely to change to smaller sized properties with the proposed zone changes under the District Plan review. Any future development to smaller properties would be undertaken in the knowledge of this route. Furthermore, any future residential development will require additional roads over and above the existing road network in order to service these developments. There is going to be a change in the amenity of the area east of Tinwald if the proposed district plan changes proceed, regardless of which route option is chosen for the second bridge.

Noise Effects

There will be a change in traffic noise on Chalmers Avenue (particularly the southern end) and Bridge Street resulting from the increase in traffic volumes.

Both of these roads are currently designated as Principal Roads. As such, they are already expected to carry a significant volume of traffic. The District Plan signals therefore that residents should expect the resultant noise levels associated with that level of traffic.

In relation to the new section of road east of Tinwald, traffic noise levels will increase generally within the area. This will likely have an effect on the amenity values for the existing dwellings adjacent to the road, although these are only relatively few in number. Any future residential development arising from the District Plan review will be undertaken in the knowledge of this route option. Likewise, people purchasing newly developed residential land will also be aware of this route option and can design their houses accordingly.

As noted above, heavy vehicles are less likely to use this route at night than during the day. This will reduce the noise impacts of heavy vehicles on this route.

• Air Quality Effects

Changes in air quality are related to the additional volume of traffic. However, as noted in the section immediately above, both Chalmers Avenue and Bridge Street are identified in the District Plan as Principal Roads.

In relation to the new section of road east of Tinwald, there is potential for an impact on air quality as a result of this option. However this needs to be seen in the context of the impact on air quality associated with the general development of this area as a result of any changes to the District Plan



zoning. There will be an increase in people living in the area and a potential impact on air quality, regardless of where the second bridge is located.

• Vibration Effects

Vibration effects are usually associated with both the volume of traffic, the number of heavy vehicles using the route, and the roughness of the road surface.

Bridge Street is already identified for widening and strengthening regardless of the second bridge location. This upgrade will reduce vibration effects over the upgraded length of road.

There is potential for some increased vibration along Chalmers Avenue as a result of this route option.

The new road east of Tinwald will be constructed to the standard required to cater for the total number of vehicles (including heavy vehicles) expected on the route. This new road construction will minimise vibration effects on this section of road.

It is noted that, from a disturbance point of view, vibration from traffic may be more noticeable at night. As noted above, heavy vehicles are less likely to use this route at night than during the day. This will reduce the potential vibration impacts of heavy vehicles on this route.

• Visual Effects

There is likely to be little visual effect along Chalmers Avenue and Bridge Street as a result of this route option because there will be little change to the road layout and cross section through these areas.

There will be a potential visual effect associated with a new bridge across the Ashburton River in this location. The existing road and rail bridges are reasonably close to this bridge location.

There will be visual effect associated with the new road through the east Tinwald greenfields. However, as above this needs to be seen in the context of the potential urban development in this area and the future need for a local road network to support future residential growth.

• Streetscape Effects

There is likely to be little change to the streetscape along Chalmers Avenue and Bridge Street as a result of this route option because there will be little change to the road layout and cross section through these areas.

The new road through the east Tinwald greenfields will be consistent with the other rural roads in the vicinity. Therefore, it will not be out of place within this environment.

Property Effects

This option would require the acquisition of land from 6 properties. Severance effects may be able to be minimised by running the new alignment along existing property boundaries wherever possible.



Relationship to Other Transportation Study Projects

This option is expected to provide significant relief to traffic congestion through central Ashburton. Therefore, there is likely to be some inter-relationship between the projects to improve capacity through Ashburton (four laning of SH1 between Havelock Street and Moore Street, Dobson Street / Kermode Street / SH1 intersection, and Walnut Avenue / SH1 / East Street intersections), and this 2nd bridge option. Advancing the State Highway projects plus the traffic signals in Tinwald would be likely to enable the second bridge between Chalmers Avenue and east of Tinwald to be delayed. Conversely, advancing the second bridge would be likely to allow the State Highway projects in central Ashburton to be delayed, and possibly negate the need for traffic signals in Tinwald.

The majority of any safe pedestrian and cycle routes to schools would be separate from the second bridge project, apart from the section across the Ashburton River. This section is discussed below. Inclusion of pedestrian and cycle facilities on this route would be able to be linked to pedestrian and cycle routes to Ashburton Intermediate and Ashburton College. However the absence of pedestrian and cycle facilities on the rural section between the river and Grahams Road limits the effectiveness of this route for pupils living in Tinwald.

The Chalmers Avenue to east of Tinwald (rural) route is likely to improve pedestrian and cycle facilities across the Ashburton River. However, the lack of dedicated pedestrian and cyclist facilities and location on the edge of the Tinwald urban area reduce its convenience for Tinwald residents. Consequently a project to upgrade pedestrian and cyclist facilities across the river would be likely to be required in conjunction with this project.

Comments / Notes

- 1. Local NZTA staff have indicated that this option would be likely to be one of the options which most effectively address the transportation issues in Ashburton. They would therefore be likely to support a funding application for this option assuming all other funding criteria were met.
- 2. Maintenance of this option would be the responsibility of ADC. Maintenance of the existing SH1 route along West Street and Archibald Street (including the existing bridge) would the responsibility of NZTA.
- 3. NZTA funding is possible for this option.
- 4. Because this option provides significant benefits to SH1, it may be possible to get additional funding from NZTA for this option (over and above the 57% subsidy). This will need to be negotiated with NZTA, and has not been included in the NZTA subsidy above.
- 5. This option addresses the following key issues
 - a. Road safety through Tinwald, and for pedestrians and cyclists crossing the river
 - b. Future congestion on the existing bridge and associated road network.
 - c. Accessibility between Tinwald and key destinations within town
 - d. Route security if the existing bridge is closed.
- 6. The community Reference Group produced the following list of Pros and Cons for this option.



Pros	Cons
Southern end of Tinwald would access it, local use	50 kph would be better than 100 kph less friendly for car, bike, pedestrian use
Speed /faster	Potential for more truck use along Chalmers Avenue
[Some]cycle and pedestrian use, safer	Intersections would need to be difficult for truckies
Least costly	Noise and pollution in town with the extra heavy traffic
Tinwald urban amenity maintained	Safety of schools impacted
Scope for southern extension to Fords Road	No exit strategy
Developers would be aware of the possibility of a road and bridge when buying	Too close to scout park
Good access for Lake traffic	
Possible NZTA funding	
Possible increase in Tinwald- Ashburton utility connection security	
Trucks on Boundary Road crusher plant could use new road and not Grove Street	
Allows new rest home development	
May partially address some of the West Street intersection issues	



11 Chalmers Avenue to east of Tinwald (Urban)

Description

A local road on the following route:

- Roundabout at Chalmers Avenue / South Street intersection
- Chalmers Avenue extension to river
- New bridge (360m long)
- New urban road between Ashburton River and Johnstone Street through Residential D zone proposed in District Plan review.
- New urban road along edge of proposed Residential C zone between Johnstone Street and Grahams Road.
- New cross road intersections at Carters Terrace, Wilkins Road, and Johnstone Street. The form of these intersections to be confirmed. Could either be roundabouts or right turn bays.
- New Tee intersection at Grahams Road, with right turn bay on Grahams Road.

Design Standards

The concept design and cost estimates for this option are based on the following minimum design standards:

- Design speed of 60km/h;
- Road cross section with the following features (Chalmers Avenue extension between South Street and the River):
 - Similar to the cross section on the remainder of Chalmers Avenue, namely
 - Solid median
 - 3.5m traffic lane both sides
 - 2.0m cycle lane both sides
 - 2.5m parking both sides
 - Kerb & Channel both sides
 - 1.5m footpath both sides
 - 3.0m wide grass berm / stormwater treatment both sides
 - 40m wide road reserve
- Road cross section with the following features (between bridge and Grahams Road):
 - o 2.0m Flush (painted) Median
 - 3.5m traffic lane both sides
 - o 1.8m cycle lane both sides
 - 2.0m parking both sides



- Kerb & Channel both sides
- 1.5m footpath both sides
- o 2.7m wide grass berm / stormwater treatment both sides
- o 25m wide road reserve
- New road to be local arterial road
- Grahams Road to have priority, with right turn bay
- Intersections with SH1 to remain unchanged see note 2 below

Rough Order of Cost Estimate

Total Cost to ADC	\$12.7M	to	\$15.1M	
Assumed NZTA subsidy	\$16.8M	to	\$19.95M	(57% subsidy rate)
Total Cost	\$29.5M	to	\$35M	
Land Acquisition	\$2.5M	to	\$3M	
Construction Cost	\$27M	to	\$32M	

The following items have been **included** in the above cost estimate:

- Roundabout at Chalmers Avenue / South Street intersection
- Chalmers Avenue extension
- New bridge (360m long)
- New road to Grahams Road
- Allowance for minor works (\$100k) on Graham Street near Tinwald School (see note 5 below)
- Land acquisition costs

The following items have been **excluded** from the above cost estimate:

- Upgrades to Chalmers Avenue north of South Street Road has adequate capacity & already carries significant traffic volumes
- Upgrades to Bridge Street Upgrade is planned independent of this project
- Upgrades to intersections of local roads with State Highway 1 see note 2 below
- Upgrades to Carters Terrace, Wilkins Road, Johnstone Street & Grahams Road between new road and existing urban area. It is assumed that this work will be done in conjunction with future residential development on these streets.

This option is identical to the Chalmers Avenue to east of Tinwald (Rural) option north of the river. It is also similar to that option south of the river, except that this option will include an urban road running more or less central through the proposed Residential D zone between the river and Johnstone Street, and between the proposed Residential C and D zones between Johnstone and Graham Streets.



Most of the effects of this option will be the same as those of the Chalmers Avenue to east of Tinwald (Rural) option. Only those effects which differ from that option have been considered below. However, it is worth repeating that there is going to be a change in the amenity of the area east of Tinwald if the proposed district plan changes proceed, regardless of which route option is chosen for the second bridge.

Traffic Effects

This is an urban route with 50km/h operating speeds throughout. It is therefore likely to attract less through traffic between SH1 south of Ashburton and north-eastern Ashburton than the Chalmers Avenue rural option

This option will pass through the centre of the proposed Residential D zone. This will enable more of any new Residential D lots to have direct access to this route, and the remainder of the roading network than the rural option. This option also runs between the Residential C and D zones. This location will enable it to provide direct access to a number of the higher density Residential C lots.

Road Safety

This route is likely to result an improvement in road safety on SH1 in Tinwald as a result of the reduction in Tinwald traffic turning right across SH1. It also provides a safer route for cyclists and pedestrians across the river than the existing. The provision of purpose built pedestrian and cycle facilities on the new road south of the river will improve pedestrian and cyclist safety over this section.

Effects on Schools

As noted above, there is expected to be little change in overall traffic volumes on Graham Street near Tinwald School. This route is located beyond the existing or proposed urban area of Tinwald. It is therefore unlikely that school travelling to or from Tinwald School will need to cross the new urban road on this route. Consequently the overall impacts on Tinwald School are assessed as being small.

Hampstead and Netherby Schools are both located remote from this route. Therefore this option is likely to have little impact on the immediate environs of these schools. Some pupils may need to cross Chalmers Avenue, Walnut Avenue or Bridge Street to access these schools. Each of these roads is likely to experience additional traffic volumes as a result of this option. All three roads are currently identified as principal roads in the Ashburton District plan, and carry significant traffic volumes.

The solid median on Chalmers and Walnut Avenues provide a safe refuge for pedestrians crossing the road. However, the width of carriageway on each side of the road means that pedestrians are exposed to traffic for longer periods of time when crossing. Consequently these roads are likely to be intimidating for some pedestrians, especially if crossing remote from the pedestrian facilities provided. The impacts of the comparatively small increase in traffic volumes on school pedestrians on these roads is likely to be smaller than a similar increase on a low volume local road.

Ashburton Intermediate School and Ashburton College are both located on Walnut Avenue. Both schools will face some increase in traffic on Walnut Avenue outside the schools, with the College facing a much smaller increase. As noted above, Walnut Avenue is a high capacity road. It is a divided road outside the Intermediate School, and undivided outside the college. The impacts of a small increase in traffic outside both schools are expected to be small.



Effects on Proposed Riverview Retirement Village

This option does not directly affect the proposed Retirement Village on Carters Terrace opposite Grove Street. The possible increase in traffic volumes on Carters Terrace outside the proposed complex may have some negative impacts on amenity of the complex. However, a second bridge and alternative route across the Ashburton River is likely to result in significant improvements in accessibility for the retirement village.

Amenity Effects

• Noise Effects

The lower traffic speeds through the Tinwald section of this option are expected to result in lower traffic noise levels through the residential area. It is also likely that this option will include quieter surfacing, such as Asphaltic Concrete in the residential area. Consequently the noise levels are expected to be lower than for the Chalmers Avenue to east of Tinwald (Rural) option. However, its location through the proposed Residential D and between the Residential C and D zones will result in more future dwellings being affected by the noise generated. As noted under the rural option, any future residential development arising from the District Plan review will be undertaken in the knowledge of this route option. Likewise, people purchasing newly developed residential land will also be aware of this route option and can design their houses accordingly.

• Air Quality Effects

It is considered that any changes in air quality as a result of this option will be similar to those as a result of the rural option, but may potentially affect more dwellings in the proposed Residential C and D zones. This will happen as part of air quality changes associated with a possible greater residential density in this area.

• Vibration Effects

Lower traffic speeds are likely to result in an overall reduction in vibration effects when compared to the rural option, but as noted in the noise section, these may affect a larger number of future dwellings

• Visual Effects

The visual effects of this option are very similar to those of the rural option

• Streetscape Effects

The new road through the Tinwald greenfields section will be an urban road which is significantly different to the existing roads currently in the area. However, should the District Plan review proposals proceed, any new roads in this area are likely to be urban roads, and the existing rural roads are likely to become urban roads. This option would therefore be consistent with the proposed urban environment in this area.

The Tinwald section of this option would become an extension of Chalmers Avenue. This section could be constructed with a streetscape similar to the existing streetscape in Chalmers Avenue... This would create a wide avenue with a solid planted median right through the urban area from Walnut Avenue to Grahams Road.

This approach would have positive effects on the streetscape and general amenity of this area, but comes at a higher cost and has few transportation impacts. It has therefore not been costed or considered when comparing options. The option which has been costed and used for comparison



of options is fit for purpose as a high capacity arterial urban road, but would not result in as high a quality urban environment as currently exists on Chalmers Avenue, Walnut Avenue and Oak Grove.

Property Effects

This option would require the acquisition of land from 10 properties. It is likely to require the demolition of homes and / or property severance depending on final chosen alignment. Property severance is unlikely to result in lot sizes smaller than the minimum lot size proposed under Residential D of $4,000m^2$

Relationship to Other Transportation Study Projects

This option is expected to provide significant relief to traffic congestion through central Ashburton. Therefore, there is likely to be some inter relationship between the projects to improve capacity through Ashburton (four laning of SH1 between Havelock Street and Moore Street, Dobson Street / Kermode Street / SH1 intersection, and Walnut Avenue / SH1 / East Street intersections), and this 2nd bridge option. Advancing the State Highway projects plus the traffic signals in Tinwald would be likely to enable the second bridge between Chalmers Avenue and east of Tinwald to be delayed. Conversely, advancing the second bridge would be likely to allow the State Highway projects in central Ashburton to be delayed, and possibly negate the need for traffic signals in Tinwald.

The majority of any safe pedestrian and cycle routes to schools would be separate from the second bridge project, apart from the section across the Ashburton River. This section is discussed below. Inclusion of pedestrian and cycle facilities on this route would be able to be linked to pedestrian and cycle routes to Ashburton Intermediate and Ashburton College. This would be a particular advantage to pupils of these schools living in eastern areas of Tinwald.

The Chalmers Avenue to east of Tinwald (rural) route is likely to improve pedestrian and cycle facilities across the Ashburton River. The provision of purpose built dedicated pedestrian and cycle facilities within the proposed new Tinwald urban areas will provide a safe and convenient pedestrian and cycle route to and from eastern Tinwald. However, this route would be less convenient for pedestrians and cyclists in the western and, to a lesser extent, central, areas of Tinwald. Consequently a project to upgrade pedestrian and cyclist facilities on or near the existing bridge would be likely to be required in conjunction with this project.

The provision of cycle and pedestrian facilities along a new road in the proposed extended urban area of Tinwald may be able to be linked to a pedestrian and cycle route to Tinwald School. This route may more appropriately use low volume local roads such as Grove Street and Thomson Street.

Comments / Notes

1. Local NZTA staff have indicated that this option would be likely to be one of the options which most effectively address the transportation issues in Ashburton. They would therefore be likely to support a funding application for this option assuming all other funding criteria were met.



- 2. Maintenance of this option would be the responsibility of ADC. Maintenance of the existing SH1 route along West Street and Archibald Street (including the existing bridge) would the responsibility of NZTA.
- 3. NZTA funding is possible for this option.
- 4. Because this option provides significant benefits to SH1, it may be possible to get additional funding from NZTA for this option (over and above the 57% subsidy). This will need to be negotiated with NZTA, and has not been included in the NZTA subsidy above.
- 5. This option addresses the following key issues:
 - a. Road safety through Tinwald, and for pedestrians and cyclists crossing the river
 - b. Future congestion on the existing bridge and associated road network.
 - c. Accessibility between Tinwald and key destinations within town
 - d. Route security if the existing bridge is closed.
- 6. The community Reference Group produced the following list of Pros and Cons for this option.

Pros	Cons
Takes traffic away from urban residential areas like Grove Street	Shortest route will attract heavy vehicle traffic
Provides cyclists with safe route	Exit issues
Shorter bridge	Issue for Tinwald primary school
NZTA funding likely	Congestion on Chalmers Avenue/ Moore Street roundabout - upgrading necessary of streets to cope with traffic increase
Not taking existing residential land	Fewer streets to filter traffic through
Allows for future growth	Too close to scout park
Fewer land owners affected	Why put a road through future residential; depreciation of land sales
Utilising rural land which can become residential	Land cost
New road provides access/frontage to future residential subdivision east of Tinwald	Crossing of main high way an issue
Affected land owners have right to negotiate full compensation	
New road close enough to Tinwald to provide most advantages of direct urban connections without residential conflicts	
Increase in Tinwald- Ashburton utility connection security	
Trucks from Boundary Road crusher plant could use new road and not Grove Street	



.

Traffic from rural area east of Tinwald does not have to go through existing urban area	
Scope for southern extension to Fords Road	
Allows development of new rest home	
Assists West Street intersection issues	



12 Chalmers Avenue to Grove Street

Description

An urban local road on the following route:

- Roundabout at Chalmers Avenue / South Street intersection
- Extension of Chalmers Avenue
- New river crossing
- New road to link to end of Grove Street
- Upgrade of Grove Street (new kerb and channel, reconstruction of road)
- Intersection layout at Carters Terrace, Wilkins Road, and Johnstone Street intersections to be confirmed either roundabouts or new road to have priority with right turn bays on new road.

Design Standards

The concept design and cost estimates for this option are based on the following minimum design standards:

- Design speed of 60km/h;
- Road cross section with the following features (Chalmers Avenue extension between South Street and the River):
 - Similar to existing Chalmers Avenue
 - Solid median
 - 3.5m traffic lane both sides
 - o 2.0m cycle lane both sides
 - o 2.5m parking both sides
 - Kerb & Channel both sides
 - 1.5m footpath both sides
 - \circ 3.0m wide grass berm / stormwater treatment both sides
 - \circ 40m wide road reserve
- Road cross section with the following features (Grove Street):
 - o 2.0m Flush (painted) Median
 - o 3.2m traffic lane both sides
 - 2.8m combined parking and cycle lane both sides
 - Kerb & Channel both sides
 - 1.5m wide footpath both sides
 - 1.5m berm both sides
 - Existing 20m wide road reserve
- New road to be local arterial road
- Grahams Road to have priority, with right turn bay
- Intersections with SH1 to remain unchanged see note 2 below

Rough Order of Cost Estimate

Total Cost to ADC	\$10.65M	to	\$12.8M	
Assumed NZTA subsidy	\$ 14M	to	\$17M	(57% subsidy rate)
Total Cost	\$24.7M	to	\$29.8M	
Land Acquisition	\$0.7M	to	\$0.8M	
Construction Cost	\$24M	to	\$29M	

The following items have been **included** in the above cost estimate:

- Roundabout at Chalmers Avenue / South Street intersection
- Chalmers Avenue extension
- New bridge (420m long this bridge is at a skew to the river, and is longer than bridges for other options)
- New road to Grove Street / Carters Terrace intersection
- Reconstruction of Grove Street
- Allowance for minor works (\$100k) on Graham Street near Tinwald School (see note 5 below)
- Land acquisition costs

The following items have been **excluded** from the above cost estimate:

- Upgrades to Chalmers Avenue north of South Street Road has adequate capacity & already carries significant traffic volumes
- Upgrades to Bridge Street Upgrade is planned independent of this project
- Upgrades to intersections of local roads with State Highway 1 see note 2 below
- Upgrades to Carters Terrace, Wilkins Road, Johnstone Street & Grahams Road between new road and existing urban area. It is assumed that this work will be done in conjunction with future residential development on these streets.

This option is identical to the Chalmers Avenue to east of Tinwald (Rural) option north of the river. It is also similar to that option south of the river, except that this option will include a new urban road between the river and the intersection of Carters Terrace and Grove Street, and would continue along Grove Street to Graham Street.

Most of the effects of this option will be the same as those of the Chalmers Avenue to east of Tinwald (Rural) option. Only those effects which differ from that option have been considered below.

Traffic Effects

This is an urban route with 50km/h operating speeds throughout. It is therefore likely to attract less through traffic between SH1 south of Ashburton and north-eastern Ashburton than the Chalmers Avenue rural option

This option will result in a significant increase in traffic on Grove Street. Grove Street is classified in the District Plan as a local road. Traffic modelling indicates that traffic on Grove Street will increase from 600 to 700 vpd to 10,000 to 15,000 vpd adjacent to Carters Terrace. Much of this is expected to dissipate down Wilkin, Manchester, Johnstone, Agnes, and Graham Streets. Traffic volumes on these streets are expected to increase as a result of any residential development



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arising from the proposed District Plan review changes to Residential C and D east of Tinwald. Much of the traffic which currently uses these streets to access SH1 to travel across the river is expected to use the new route. These streets are therefore likely to experience an increase in traffic near Grove Street, and a slight reduction near SH1.

Grove Street will be widened and strengthened to cope with the additional traffic volumes. It is intended that the final road and intersection layouts will be decided following inputs from local residents. A 17m wide carriageway plus two 1.5m wide footpaths can be accommodated in the existing 20m wide road reserve. This would provide the following:

- 2m wide painted flush median;
- Two 3.2m wide vehicle lanes (one each way);
- 1.8m wide cycle lanes each side
- 2.5m wide parking each side
- 1.5m wide footpath each side

This layout meets the minimum standards for a significant urban road, but is less than the current desirable standards, and there is no room for landscaping or grassed berms. It is likely to result in a functional, but constrained, road environment. Additional lane widths could be provided by restricting parking to one side, providing staggered parking bays, or omitting the flush median.

Effects on Proposed Riverview Retirement Village

This option would require a significant area of land from the proposed site of the retirement village (on Carters Terrace, opposite Grove Street). This may affect the viability of the retirement village at this location.

Amenity Effects

This option is likely to have significant negative impacts on the existing residential amenity of Grove Street. These impacts will be felt by a large number of existing dwellings over the length of Grove Street, but particularly near Carters Terrace. The constraints associated with fitting a major road into an existing 20m wide road reserve limit the options available to mitigate these effects.

Noise Effects

A preliminary noise assessment has been carried out on the Grove Street option. This assessment concludes that, with quiet road surfacing (such as Asphaltic Concrete), it is likely that the noise generated by the expected traffic volume on Grove Street will just meet the NZTA acoustic guidelines. However, this is a significant change from the traffic noise levels currently experienced in Grove Street.

The full preliminary noise assessment is included in Appendix D.

• Air Quality Effects

It is likely that any changes in air quality as a result of this option will be similar to those as a result of the rural option, but will affect many more existing dwellings along Grove Street.

• Vibration Effects

Lower traffic speeds are likely to result in an overall reduction in vibration effects when compared to the rural option, but as noted in the air quality section, these will affect many more existing dwellings



• Visual Effects

The visual effects will be similar to the rural option apart from the Grove Street streetscape, which is covered in the section below.

• Streetscape Effects

The Grove Street streetscape currently consists of a 14m wide carriageway with 3m wide footpaths in some locations, and 1.5m wide footpaths and 1.5m wide grass berms in other locations. As noted above, the constraints associated with fitting a major road into the existing 20m wide road reserve limit the options available to mitigate effects and to provide a streetscape that reflects the level of amenity that would be expected. The finished Grove Street streetscape would need to be decided following inputs from Grove Street residents. Options to improve the streetscape could include:

- Staggered parking bays with alternating parking bays and landscaped berms on each side of the road. Parking would not be available outside at least 50% of the properties in Grove Street under this scenario;
- Limiting parking to one side only and providing a 1.25m wide landscaped berm on both sides of the road. Parking would not be available outside at least 50% of the properties in Grove Street under this scenario also;
- Not providing a flush median, and providing a 1.0m wide landscaped berm on each side. This has potential safety impacts with vehicles stopping in the through lane to turn right into private properties.
- Providing a 3.0m wide combined parking and cycle lane, with a 3.5m wide vehicle lane, and a 1.0m wide landscaped berm. However, even with a small number of vehicles parked on the road, cyclists will need to enter a reasonably busy traffic lane to pass parked vehicles. This is a potential safety hazard for cyclists.

Property Effects

This option would require the acquisition of land from 4 properties, including those associated with the River View Retirement Village. Severance effects on individual properties associated with this complex are small. However, the Retirement Village owns adjacent properties on either side of the proposed alignment. This is likely to result in significant severance effects on the complex as a whole.

Relationship to Other Transportation Study Projects

This option is expected to provide significant relief to traffic congestion through central Ashburton. Therefore, there is likely to be some inter relationship between the projects to improve capacity through Ashburton (four laning of S1 between Havelock Street and Moore Street, Dobson Street / Kermode Street / SH1 intersection, and Walnut Avenue / SH1 / East Street intersections), and this 2nd bridge option. Advancing the State Highway projects plus the traffic signals in Tinwald would be likely to enable the second bridge between Chalmers Avenue and east of Tinwald to be delayed. Conversely, advancing the second bridge would be likely to allow the State Highway projects in central Ashburton to be delayed, and possibly negate the need for traffic signals in Tinwald.

The majority of any safe pedestrian and cycle routes to schools would be separate from the second bridge project, apart from the section across the Ashburton River. This section is



Ashburton 2nd Bridge Additional Investigations

discussed below. Inclusion of pedestrian and cycle facilities on this route would be able to be linked to pedestrian and cycle routes to Ashburton Intermediate and Ashburton College. This would be a particular advantage to pupils of these schools living in eastern areas of Tinwald.

The Chalmers Avenue to east of Tinwald (rural) route is likely to improve pedestrian and cycle facilities across the Ashburton River. The provision of some pedestrian and cycle facilities along Grove Street will provide a reasonably safe and convenient pedestrian and cycle route to and from eastern Tinwald. However, this route would be less convenient for pedestrians and cyclists in the western and, to a lesser extent, central, areas of Tinwald. Consequently a project to upgrade pedestrian and cyclist facilities on or near the existing bridge would be likely to be required in conjunction with this project.

The provision of cycle and pedestrian facilities along Grove Street may be able to be linked to a pedestrian and cycle route to Tinwald School. This route may more appropriately use low volume local roads such as Thomson Street.

Comments / Notes

- 1. Local NZTA staff have indicated that this option would be likely to be one of the options which most effectively address the transportation issues in Ashburton. They would therefore be likely to support a funding application for this option assuming all other funding criteria were met.
- 2. Maintenance of this option would be the responsibility of ADC. Maintenance of the existing SH1 route along West Street and Archibald Street (including the existing bridge) would the responsibility of NZTA.
- 3. NZTA funding is possible for this option.
- 4. Because this option provides significant benefits to SH1, it may be possible to get additional funding from NZTA for this option (over and above the 57% subsidy). This will need to be negotiated with NZTA, and has not been included in the NZTA subsidy above.
- 5. This option addresses the following key issues:
 - a. Road safety through Tinwald, and for pedestrians and cyclists crossing the river
 - b. Future congestion on the existing bridge and associated road network.
 - c. Accessibility between Tinwald and key destinations within town
 - d. Route security if the existing bridge is closed.
- 6. The community Reference Group produced the following list of Pros and Cons for this option.

Pros	Cons
Uses existing roads	More cost with longer bridge
Shortest route	Residential street
Possibly cheapest option	Width of road for parking and pedestrians
Fewer properties needed in purchase	Heavy traffic south bound in residential street
NZTA funding possible	Safety for residents



Local traffic would use it from below the main road	Noise
Significant reductions in traffic on existing bridge	Pollution
Increase in Tinwald -Ashburton utility connection	Property devaluation
Assists West Street intersection issues	No exit option on to Graham Street; controls at Grahams Road and Grove Street
	Impact on Tinwald School
	No compensation to Grove Street residents
	Impacts on many Tinwald residents
	Severance of Grove Street from side to side
	Grove Street not wide enough for modern design of high volume traffic
	Trucks from boundary Road crusher plant would use Grove Street to get to retail yards
	Too close to Scout Park
	Prevents development of the Rest home



13 West Street to Melcombe Street (rail level crossing)

Description

New State Highway on following route:

- Extension of State Highway 1 (West Street) from Moore Street to river
- New river crossing
- New link from river to Melcombe Street
- Melcombe Street
- Maronan Road
- New curved connection to rail level crossing south of Laings Road
- New curved connection to State Highway south of Thews Road

East Street to be upgraded between Moore Street and Walnut Avenue as follows:

- Intersection upgrades at Moore Street, Havelock Street & Walnut Avenue
- Removal of pedestrian platforms and traffic calming.
- Refer notes 1-4 below for discussion of option of encouraging traffic to use West Street rather than East Street.

All Existing rail crossings in Tinwald to be closed (refer Note 4 below)

New rail level crossings and signalised intersections at the Graham Street / Shearer Street and at Wilkin Street / Millichamp Street intersections with Archibald Street and Melcombe Street.

Design Standards

The concept design and cost estimates for this option are based on the following minimum design standards:

- Design speed of 60km/h on urban sections and 110km/h on rural. State Highway design speeds are typically 10km/h higher than the posted speed limit in flat open terrain. This provides a margin of safety for the large number of motorists who travel up to 10km/h above the speed limit;
- Road cross section with the following features (4 lane section of SH1 Walnut Avenue to Moore Street)
 - o Solid median
 - \circ 2 x 3.5m traffic lanes both sides
 - 1.8m cycle lane both sides
 - 2.5m parking both sides
 - Kerb & channel both sides
 - 2.5m footpath west side
 - o 1.5m footpath east side
 - o 5m berm / stormwater treatment east side
 - 40m road reserve



- Road cross section with the following features (urban section Moore Street to Maronan Road):
 - Flush median
 - 3.5m traffic lane both sides
 - o 2.5m parking west side
 - Kerb & Channel west side
 - o 1.5m footpath west side
 - Stormwater swale east side
 - Possible off road cycle path and footpath between road and railway
 - o 28m wide road reserve
- Road cross section with the following features (rural section Maronan Road to Link with State Highway):
 - 3.5m traffic lane both sides
 - 2.0m sealed shoulder both sides this provides adequate room for cyclists to travel clear of the traffic lane
 - Stormwater collected in swales on both sides
 - 24m road reserve
- 30m stacking distance between railway and intersections at railway level crossings to allow a car and a truck to stop clear of both the railway line and the through road.
- Road to cross railway at a maximum of 20 deg either side of a right angle (i.e. between 70 and 110 degrees)
- First curve at end of long open road straight south of Tinwald to be a high speed flowing curve with 110km/h design speed.
- Design speed of subsequent curves to be reduced in 15km/h increments (i.e. 2nd curve to be 95km/h, 3rd curve 80km/h etc)

These are considered the absolute minimum current standards for new road construction for a major State Highway. Higher design standards have been adopted for the Roads of National Significance. If this section of SH1 is considered to fall under that category, then those higher standards may apply.

Rough Order of Cost Estimate

Total Cost to ADC	\$36.1M	to	\$43.4M
Assumed NZTA subsidy	\$0	to 0	\$
Total Cost	\$36.1M	to	\$43.4M
Land Acquisition	\$5.2M	to	\$6.4M
Construction Cost	\$31M	to	\$37M

The following items have been **included** in the above cost estimate:



- Widening of West Street (SH1) between Moore Street and Walnut Avenue
- New link between Moore Street and river
- New bridge (360m long)
- New road to Melcombe Street
- Reconstruction of Melcombe Street
- New rail level crossings and signalised intersections
- Reconstruction of Maronan Road
- New curved alignment across railway line to connect to State Highway
- Land acquisition costs
- Minor improvements on East Street

The following items have been **excluded** from the above cost estimate:

- Four laning between Moore Street and Havelock Street and associated intersection upgrades. These upgrades have been identified in the Ashburton Transportation Study as possibly being required regardless of which bridge option progresses. The transportation study recommends further investigations into this option;
- Widening of West Street between Walnut Avenue and Racecourse Road. This may be required at some stage in the future; and
- Upgrade of level crossing for Plains Historic Railway. Refer comments below on this level crossing.

Traffic Effects

This route will be a combination of urban (50km/hr operating speed) through the Ashburton urban area and rural (100km/hr operating speed) beyond the urban area to the link with the existing State Highway. It will become the new SH1, and be designed and constructed to the appropriate NZTA State Highway standards.

Archibald Street through Tinwald will become a local road.

Under this option the vast majority of existing through traffic on SH1 is likely to use Melcombe Street rather than Archibald Street. This State Highway through traffic includes a high proportion of heavy vehicles. NZTA tube counts indicate that 18% of the total daily traffic on the State Highway at Winslow, on weekdays during the week of 10th to 17th January 2008 was heavy vehicles. 48% of the traffic between 10:00pm and 6:00am, and 67% between 2:00am and 4:00am was heavy vehicles. A full hourly breakdown of the percentage of heavy vehicles on SH1 south of Wills Street, south of the Ashburton River Bridge, and at Winslow is included in Appendix C.

Local traffic between west Tinwald and north-western Ashburton is likely to use the new State Highway on Melcombe Street. Local traffic between east Tinwald and north-eastern Ashburton is likely to use Archibald Street. Local traffic between west Tinwald and north-eastern Ashburton, and between east Tinwald and north-western Ashburton is likely to be split between the two routes.

Under this option, it is expected that traffic volumes on Melcombe Street, south of Buckleys Terrace will increase from 500 vpd to between 10,000 and 15,000 vpd. Archibald Street volumes are expected to decrease from 20,000 vpd to between 5,000 and 10,000.

Relocating the State Highway to Melcombe Street and a new bridge west of the existing rail bridge will provide relief to traffic congestion on Archibald Street and the existing bridge. However, it will



not address the growing traffic volumes on SH1 north of Moore Street. Three options have been identified to address this traffic, namely:

- 1. Widen SH1 between Moore Street and Walnut Avenue to accommodate four lanes plus parking and a solid median;
- 2. Provide four lanes within existing carriageway width this would require the removal of parking on both sides of the road, removal of the flush median, and prohibition of right turns into and out of Burnett Street, Tancred Street West Street carpark, and accesses to businesses; or
- 3. Encourage traffic between Tinwald and north east Ashburton to use East Street by removing existing speed platforms on East Street and reducing conflict between parking vehicles and through traffic by either removing parking or widening East Street.

It was considered that the total loss of parking on SH1 or significant increase in traffic on East Street would have severe adverse effects on adjacent businesses and amenity, and were not considered further.

Even with an increased capacity on SH1, the closure of the existing State Highway level crossing south of Moore Street is still likely to result in more local traffic between Tinwald and north-eastern Ashburton using East Street rather than turning left onto Moore Street, crossing the railway line, turning right onto West Street (SH1), and then turning right and again crossing the railway line at either Havelock Street, Walnut Avenue, East Street or Northpark Road. This increased traffic volume on East Street is likely to have negative impacts on amenity values on East Street and result in increased conflicts and accidents between through traffic and traffic accessing car parking.

The intersection of Moore Street with both West Street and East Street would require significant upgrades to cope with the significant additional traffic crossing the railway line at that point. There is very little room for large volumes of right turning traffic to queue clear of the railway line at either West Street or East Street.

Melcombe Street is close to the railway at the locations of the existing level crossings. There is inadequate room for vehicles to wait at these intersections clear of the railway. It is therefore proposed to replace these level crossings with crossings in locations where there is more room between Melcombe Street and the railway.

Converting Melcombe Street into SH1 is likely to result in a significant increase in traffic (including heavy vehicles) through the existing rail underpass opposite Carters Terrace. This structure is currently too low for heavy vehicles. Lowering the road under the railway to achieve adequate headroom would require lowering both Melcombe Street and Archibald Street. This would have flow on effects on Carters Terrace and on accesses to private properties in the vicinity.

Similarly, raising the road to enable a level crossing at this location would require raising of both Melcombe and Archibald Streets, with similar impacts on Carters Terrace and private accesses. It is therefore proposed that the underpass be formed into a pedestrian and cycle route. Consequently the closure of the existing underpass to traffic, and its conversion to a pedestrian and cyclist facility has been included in this option.

The Plains Historic Railway branch line crosses Melcombe Street near the intersection of Bryant Street & Ann Street. Significant work would be required to bring this rail crossing up to a standard suitable for SH1. This would include significant property purchase to enable the new State Highway to cross the railway line at no less than 70 degrees. This is not considered justified for



the small number of train movements at this location. It is recommended that an option of implementing a temporary traffic management plan for train movements be considered. This would likely involve restricting Historic Railway movements across Melcombe Street to times of low traffic volumes, and the use of "Stop / Go paddles to stop State Highway traffic for train movements on this line. This approach would require agreement of NZTA, KiwiRail, and the Plains Historic Railway.

The intersection of Bryant Street and Ann Street with Melcombe Street is unsuitable for the increased traffic volumes associated with SH1, particularly so close to the branch line rail crossing (albeit a rarely used crossing). Providing an acceptable approach angle for either of these intersections would require the acquisition of significant private land. It is therefore recommended to link Bryant Street and Ann Street, and close the intersection with Melcombe Street.

The layout of the proposed rail level crossing south of Tinwald is designed to meet current State Highway design standards. The first curve encountered by northbound traffic at the end of a long high speed straight will have a design speed of 110 km/h. Such curves at the end of long high speed straights typically experience comparatively high numbers of high speed loss of control type crashes. Because of the high speeds involved these crashes are often serious.

Road Safety

This route is likely to result an improvement in road safety on SH1 in Tinwald as a result of the reduction in through traffic making it easier for local traffic turning across and onto Archibald Street. It also provides a safer route for cyclists and pedestrians across the river than the existing. However, as noted above,, it also likely to result in an increased risk of severe high speed loss of control crashes at the reverse curves at the end of the long high speed straight south of Tinwald .

Amenity Effects

This option significantly increases the volume of traffic, including a large proportion of heavy vehicles, on Melcombe Street. At the same time it reduces traffic volumes on Archibald Street.

There are likely to be significant negative impacts on residential amenity values on Melcombe Street, and corresponding positive impacts on Archibald Street. There are more commercial, and fewer residential properties on Archibald Street than on Melcombe Street. Therefore the positive impacts are likely to affect fewer dwellings than the negative ones.

Melcombe Street, from Lagmhor Road to the railway crossing south of Manchester Street is classified as a Collector Road in the Ashburton District Plan. This section carries approximately 1000vpd. The remainder of Melcombe Street is classified as a Local Road, and carries between 500 and 2000 vpd.

Noise Effects

This option is expected to have little impact on traffic volumes on SH1 north of Moore Street. It is therefore also expected that the noise effects on properties adjacent to this section of road would be minimal.

There is likely to be some increase in traffic, and a corresponding increase in noise levels on East Street. The majority of properties adjacent to East Street are commercial properties with few, if any residential properties. The effects of that increase in noise levels are therefore expected to be small.



The noise generated by traffic on SH1 and by the railway already affects dwellings on Melcombe Street. Moving the SH1 from its present location to Melcombe Street will result in those noise sources being much closer to the dwellings on Melcombe Street. This will have significant noise impacts on those dwellings. Traffic noise is generally perceived as more noticeable at night than during the day, and heavy vehicles make a major contribution to traffic noise. As noted above, a very high proportion of the through vehicles on SH1 during the night are heavy vehicles. This would result in greater noise impacts on Melcombe Street dwellings than would be the case if the increase in traffic was made up of local traffic.

• Air Quality Effects

Changes in air quality are related to the additional volume of traffic. Relocating SH1 to Melcombe street is likely to result in air quality effects associated with the State Highway traffic also relocating from Archibald Street to Melcombe Street.

Increasing traffic volumes on East Street may result in some deterioration in air quality on East Street.

• Vibration Effects

Vibration effects are usually associated with both the volume of traffic, the number of heavy vehicles using the route, and the roughness of the road surface.

The road surface on the widened section of SH1 between Moore Street and Walnut Avenue will be a high quality smooth surface. This will reduce the vibration effects over this section

Melcombe Street will be subject to a significant increase in traffic, particularly heavy vehicles travelling at night. This has the potential to result in an increase in vibration effects felt at the dwellings on Melcombe Street. However, Melcombe Street will be widened and strengthened to urban State Highway standards. This will result in a good quality smooth surface, which may mitigate some of the vibration effects here.

• Visual Effects

The four laning of SH1 north of Moore Street will result in some visual effects on this section as a result of this option.

There will be a potential visual effect associated with a new bridge across the Ashburton River in this location. The close proximity of the existing road and rail bridges will largely mitigate that effect.

The Melcombe Street section will have a visual effect due to the wider carriageway and upgraded intersections that will be required.

The construction of a new section of road looping between the Melcombe Street / Maronan Road intersection, across the railway line and linking to SH1 will result in some visual effects in this area.

• Streetscape Effects

SH1 between Moore Street and Walnut Avenue is bound on one side by the Main South railway Line (MSL), and by commercial properties on the other. A four lane urban state highway will change the streetscape here, but is not inconsistent with this environment.

Melcombe Street is bound on one side by the railway, and largely by residential properties on the other. An urban state highway will result in a significant change to the streetscape in this location.



Some of the effects of that change will be mitigated by the fact that part of Melcombe Street is currently classified as a Collector road, and that it is located on one side of an existing major transportation corridor.

The new section of State Highway south of Maronan road will have a rural type cross section which includes grass berms / swale drains. This will be generally consistent with the other rural roads in the vicinity. Therefore, it will not be out of place within this environment.

Property Effects

This option would require the acquisition of land from 21 properties. Severance effects are likely due to the curves across the railway line at the south end of Tinwald. It is possible that one or two homes may need to be demolished to accommodate these curves.

Comments / Notes

- 1. The approaches to the level crossing at the south of Tinwald include very large curves in this option. Current State Highway design standards require a number of features which have contributed to the design of these curves. These include:
 - a. The angle between a road and railway at a level crossing should be between 70 and 120 degrees
 - b. Curves at the end of long high speed straights (such as the one south of Tinwald) should have an absolute minimum design speed of 110km/h. This will reduce (but not eliminate) the incidence of high speed loss of control crashes when compared to more severe curves.
 - c. The design speeds of subsequent curves are to reduce by no more than 15km/h at each curve. This enables drivers to progressively slow down as they proceed through a series of curves. Consequently the design speeds for the northbound curves at the end of the straight entering Tinwald are to be:
 - First curve (right hand at end of straight) 110km/h
 - Second curve (left hand before rail crossing) 95km/h
 - Third curve (right hand after rail crossing)
 80km/h
 - Fourth curve (left hand to rejoin Melcombe Street) 65km/h
- 2. Local NZTA staff have indicated that this option would be less effective at addressing the transportation issues in Ashburton than other options considered, and is more expensive than those options. It would therefore be unlikely to obtain funding from NZTA.
- 3. Maintenance of this option would be the responsibility of NZTA if the option were to become a SH1. Maintenance of the existing SH1 route along West Street and Archibald Street (including the existing bridge) would then become the responsibility of ADC.
- 4. NZTA funding is unlikely for this option.
- 5. This option addresses the following key issues:



- 6. Road safety through Tinwald, and for pedestrians and cyclists crossing the river
- 7. Future congestion on the existing bridge and associated road network.
- 8. The community Reference Group produced the following list of Pros and Cons for this option.

Pros	Cons
East Tinwald easier access to roads	Major urban impact (i.e. within Ashburton)
Both options have least socio-economic effect on current and future residents	Loss of green urban area
Result in minimum congestion in the urban areas (congestion of cycles, cars, students)	Splits Ashburton and Tinwald in two
Shortest route for traffic	Does not solve traffic issues between bridge and Walnut Avenue
Least costly as council owned ???? who does own it? Council? Rail?	Rail reserve area affected
Favoured by trucks??? who says it is the truckies? Or who	Need controlled lights
Scout park unaffected	Costly extensions to West Street
Allows for rest home development	Concerned about the 'high-speed' corners proposed near Maronan Road and several sports facilities (velodrome, playing fields)
	Length of room between railway line and roads , turning bays, overpass
	Future limited for freight movement
	Less appeal to cyclists and pedestrians
	Established businesses on Archibald Street no longer exposed to SH1 traffic
	Trucks from Boundary Road crusher plant will still use Grahams Road to access Archibald Street
	Traffic from rural east of Tinwald [including Lake Hood] have to go through existing urban area [mostly Grahams Road]



14 West Street to Melcombe Street (rail overpass)

Description

This route is identical to the West Street to Melcombe Street (rail level crossing) route except that the curved alignment and rail level crossing between Maronan Road and State Highway 1 is replaced with a rail overpass (road passes over the rail) between Maronan Road and Laings Road. The design standards and Notes / Comments below only reflect those areas where this option differs from the level crossing option.

Design Standards

The concept design and cost estimates for this option are based on the following minimum design standards:

- As per rail level crossing option plus
- KiwiRail minimum clearance from structures.

Rough Order of Cost Estimate

Total Cost to ADC	\$37.6M	to	\$45.9M
Assumed NZTA subsidy	\$ 0	to	\$ 0
Total Cost	\$37.6M	to	\$45.9M
Land Acquisition	\$5.6M	to	\$6.9M
Construction Cost	\$32M	to	\$39M

The following items have been **included** in the above cost estimate:

• As per the rail level crossing option except that the section from Maronan Road to State Highway is replaced with new road and overpass structure

Traffic Effects

The layout of the proposed rail overpass south of Maronan Street is designed to meet current State Highway design standards. The first curve encountered by northbound traffic at the end of a long high speed straight will have a design speed of 110 km/h, and be on an incline. Such curves at the end of long high speed straights typically experience comparatively high numbers of high speed loss of control type crashes. Because of the high speeds involved these crashes are often serious.

Amenity Effects

The amenity effects of this option are expected to be little different to the level crossing option.



• Noise Effects

Vehicles (particularly heavy vehicles) are likely to generate more engine noise when climbing over the rail overpass than when on flat level terrain. This noise is likely to be more noticeable when the vehicles generating it are above the surrounding ground levels. The high proportion of heavy vehicles at night at this location is likely to result in an increase in night time noise levels.

Consequently, this option is likely to result in negative noise effects in the vicinity of the overpass. However, there are currently relatively few dwellings in this location likely to be affected

• Air Quality Effects

The air quality effects are likely to be little different from the effects of the level crossing option.

• Vibration Effects

Vibration effects are expected to be little different from the effects of the level crossing option

• Visual Effects

The presence of a 6m high overpass and associated approach roads will have a significant visual impact on the generally flat rural environment south of Maronan Road.

• Streetscape Effects

The streetscape of the roadway over the overpass and associated approach roads will take the form of an elevated roadway, including guardrails. This is less consistent with the existing flat rural roads in the vicinity than the level crossing option.

Property Effects

This option would require the acquisition of land from 14 properties. Some Severance effects are likely due to the new access onto SH1 from south Tinwald.

Comments / Notes

1. As per the rail level crossing option



15 4 Laning of State Highway 1

Description

Widen the existing State Highway to four lanes over its existing route between Walnut Avenue and the edge of the Tinwald urban area.

A second bridge to be built adjacent to the existing bridge.

The new State Highway to pass over the railway line south of Moore Street via an overpass.

Design Standards

The concept design and cost estimates for this option are based on the following minimum design standards:

- Design speed of 60km/h on urban sections;
- Road cross section with the following features (4 lane section of SH1 Walnut Avenue to Moore Street)
 - Solid median
 - 2 x 3.5m traffic lanes both sides
 - 1.8m cycle lane both sides
 - o 2.5m parking both sides
 - Kerb & channel both sides
 - o 2.5m footpath west side
 - 1.5m footpath east side
 - 5m berm / stormwater treatment east side
 - 40m road reserve
- 30m stacking distance between railway and intersections at railway level crossings to allow a car and a truck to stop clear of both the railway line and the through road.
- If road crosses railway at a level crossing, then road to cross at a maximum of 20 deg either side of a right angle (i.e. between 70 and 110 degrees)

These are considered the absolute minimum current standards for new road construction for a major State Highway. Higher design standards have been adopted for the Roads of National Significance. If this section of SH1 is considered to fall under that category, then those higher standards may apply.

Rough Order of Cost Estimate

Assumed NZTA subsidy	\$ 0	to	\$ 0
Total Cost	\$41 M	to	\$51 M
Land Acquisition	\$4M	to	\$5M
Construction Cost	\$37M	to	\$46M



Total Cost to ADC \$41M to \$51M

The following items have been **included** in the above cost estimate:

- Widening of West Street (SH1) between Walnut Avenue and Moore Street
- New overpass over railway line between Moore Street and river
- Closure of Dobson Street, Kermode Street and West Street, west of SH1, and East Street east of SH1.
- New link between Dobson Street and Kermode Street at Park Street
- New bridge (360m long)
- Widening of Archibald Street (SH1) between river and edge of Tinwald urban area
- New rail level crossings and signalised intersections
- Land acquisition costs

The following items have been **excluded** from the above cost estimate:

- Four laning between Moore Street and Havelock Street and associated intersection upgrades. These upgrades have been identified in the Ashburton Transportation Study as possibly being required regardless of which bridge option progresses. The transportation study recommends further investigations into this option.
- Widening of West Street (SH1) between Walnut Avenue and Racecourse Road. This may be required at some stage in the future.

Traffic Effects

This route will be an urban four lane state highway between Walnut Avenue and Graham Street. It will have a 50km/h operating speed through the urban area. It is also expected that an extension of the four lane section beyond Walnut Avenue to Racecourse Road at some stage further in the future.

An option of maintaining a level crossing for SH1 south of Moore Street was considered. However, a new four lane State Highway would need to meet the current design standard of an approach angle not exceeding 20 deg from perpendicular to the railway. In order to meet this standard, and maintain a 60 km/h design speed for the approach curves, the purchase of significant areas of private property, and the demolition of a number of commercial buildings in the vicinity of the intersections of SH1 with Moore and South Streets would be required.

It was considered that the costs involved in acquiring the land, including compensation for a number of substantial commercial buildings would far exceed the additional cost of a rail overpass. The level crossing option was therefore not considered any further.

A rail overpass, and associated approaches prevents access between SH1 and East Street, Dobson Street and South Street on east, and West Street, Dobson Street, and Kermode Street on east side of SH1.

The current standard for major four lane roads is to have a solid central median to separate opposing traffic flows. This would effectively limit the access into minor side roads and all private



properties, including businesses, along the four lane section, between Walnut Avenue and Graham Street, to left in, left out only.

Under this option, all traffic crossing the Ashburton River will use the widened existing route.

Traffic which currently uses the East Street / SH1 intersection would need to cross the new rail overpass, and access eastern Ashburton via Moore Street, Havelock Street, Walnut Avenue, Seafield Road or Northpark Road. This will place additional pressure on the intersections of SH1 and East Street with Moore Street, and to decreasing extents with the other streets mentioned above.

There is limited room between the railway line and SH1 and East Street to provide safe stacking distance for increased numbers of vehicles stopped at these traffic signals to be clear of the railway line.

Traffic which currently accesses SH1 from West Street (including Dobson and Kermode Streets west) would need to use Park Street and Moore Street under this option. A new link between Dobson Street and Kermode Street would also need to be provided.

The maximum gradient on the overpass approaches is expected to be in the vicinity of 5%. Light vehicles are expected to cope with that gradient comfortably. Heavy vehicles which enter the gradient at 50km/h are expected to maintain that speed over the comparatively short length of gradient. Some fully-laden heavy vehicles which start from a standstill at the base of the gradient may struggle to accelerate beyond a crawl speed until they are over the top of the gradient. This may result in delays and frustration for following vehicles.

Road Safety

The railway overpass would provide improved safety compared to the existing level crossing. However, there are likely to be negative safety effects associated with vehicles and pedestrians crossing four lanes of traffic.

Effects on Schools

The only expected changes in traffic patterns associated with this option are related to the road closures associated with the rail overpass and approaches. This is likely to result in additional traffic using the Park Street / Moore Street intersection opposite the Ashburton Borough School as a result of this option.

Amenity Effects

This option has little impact on traffic volume or distribution along SH1. Consequently there are likely to be few impacts due to increased traffic volumes along the State Highway arising from this option. There are, however likely to be changes in amenity in the area between Moore Street and the bridge due largely to the 6m high rail overpass and approaches, and to the changes in traffic distribution resulting from the inability of local roads to access SH1 over that length.



Noise Effects

There is likely to be little change in traffic generated noise effects over most of the four laned section of SH1.

However, vehicles climbing the gradient to cross the railway overpass are likely to generate higher levels of engine noise than vehicles on a flat surface. This is particularly true of heavy vehicles which are climbing the gradient from a standstill (such as vehicles stopped at the Moore Street signals). The elevated nature of the overpass is also likely to make such noise more noticeable than that generated by vehicles on a flat gradient.

This area is currently subject to significant traffic noise, including vehicles accelerating away from traffic signals, and noise from the railway. Furthermore, the area is surrounded by commercial properties, which tend to be less sensitive to noise effects than residential properties.

There is potential for some change in noise effects on Park Street, Moore Street, and East Street as a result of the redistribution of traffic accessing SH1. As noted above, Moore Street and East Street are located in reasonably noisy environments, and are surrounded by commercial properties. Park Street, however is in a quieter environment, and has dwellings on the west side of the road, and is adjacent to Ashburton Borough School on the north to north-western side of the Park Street / Moore Street intersection.

• Air Quality Effects

This route has little effect on overall traffic volume and distribution, apart from changes to access between minor roads and SH1 between Moore Street and the bridge. Traffic from minor roads to the east of SH1 is likely to remain in the same general area as present. Traffic from minor roads to the west is likely to use Park Street. There is therefore a potential for a small reduction in air quality in the Park Street area as a result of this option. There is expected to be little other change in air quality resulting from this option.

• Vibration Effects

Removing the existing rail level crossing, and providing a new four lane road with smooth surfacing is likely to reduce the vibration effects on the existing State Highway route. Increasing the traffic volumes (particularly heavy vehicles accessing the commercial areas south of Moore Streets) on Park Street is likely to result in an increase in vibration effects on Park Street. This is likely to affect mainly commercial properties plus a small number of dwellings on Park Street, and Ashburton Borough School.

• Visual Effects

The four laning of SH1 through the urban area of Ashburton will result in some visual effects as a result of this option.

There will be a potential visual effect associated with a new bridge across the Ashburton River in this location. The close proximity of the existing road and rail bridges will largely mitigate that effect.



The presence of a 6m high overpass and associated retaining walls and approach roads will have a substantial visual impact on the on the area between Moore Street and the bridge.

• Streetscape Effects

SH1 through the urban area of Ashburton is bound on one side by the Main South railway Line. The other side is bound by commercial properties north of the river, and by a combination of commercial and residential properties south of the river. A four lane urban state highway will change the streetscape here, but is not generally inconsistent with this environment.

The streetscape of the roadway over the overpass and associated approach roads will take the form of an elevated roadway, including guardrails. This is less consistent with the existing flat urban roads in the vicinity than the existing level crossing.

Property Effects

This option would require the acquisition of land from 14 properties. Of these 9 are private properties, with the remainder in public ownership (either Rail or Council land). Little property severance and no demolition of homes or commercial buildings is identified at this stage.

Comments / Notes

- 1. Local NZTA staff have indicated that this option would be less effective at addressing the transportation issues in Ashburton than other options considered, and is more expensive than those options. It would therefore be unlikely to obtain funding from NZTA.
- 2. Maintenance of this option would remain the responsibility of NZTA.
- 3. NZTA funding is unlikely for this option.
- 4. This option addresses the following key issues:
 - a. Road safety at the rail overpass
 - b. Future congestion on the existing bridge and associated road network.
- 5. This option was introduced after the community Reference Group produced their list of Pros and Cons for the options being considered. They have therefore not had the opportunity to comment on this option as a group.



16 Traffic Signals in Tinwald

Description

This option involves the construction of traffic signals at the Graham Street intersection with SH1 in Tinwald. It also involves the construction of a new railway level crossing opposite Graham Street to join with Melcombe Street at the intersection with Shearer Street. This option is not a long term option for a second bridge across the Ashburton River. It has been included in the assessment for comparison purposes only.

Design Standards

The concept design and cost estimates for this option are based on the following minimum design standards:

- Austroads intersection design guidelines
- 30m stacking distance between railway and intersections at railway level crossings to allow a car and a truck to stop clear of both the railway line and the through road.
- Road to cross railway at a maximum of 20 deg either side of a right angle (i.e. between 70 and 110 degrees)

Rough Order of Cost Estimate

Total Cost to ADC	\$0	to	\$0
Assumed NZTA subsidy	\$ O	to	\$0
Total Cost	\$1M	to	\$2M
Land Acquisition	\$0.2M	to	\$0.4M
Construction Cost	\$0.8M	to	\$1.6M

The following items have been **included** in the above cost estimate:

- Construction of new signalised intersection
- Construction of new railway level crossing and link to Melcombe Street.
- Closure of existing railway level crossing

This is not an option which will address the road capacity issues on SH1 through Ashburton. It is therefore not an alternative to a second bridge. Rather it is a short term option to address issues safely and conveniently accessing SH1 in Tinwald.

Traffic Effects

Traffic signals at an intersection in Tinwald will make it easier for local vehicles to enter or cross SH1 at that intersection particularly at peak times. The gaps in traffic provided by the signals will also make it easier for traffic to enter or cross SH1 at adjacent intersections.



Traffic signals are likely to result in delays for traffic on SH1.

At off peak times signals may result in delays for turning traffic waiting for the signals to change compared to waiting for a gap in light traffic volumes. It is therefore possible that some drivers (particularly more confident drivers) may use the signals at peak times, and adjacent intersections at off peak times.

Traffic signals tend to result in a reduction in crashes involving turning vehicles, but an increase in nose to tail crashes.

As noted in the Chalmers Avenue options, the presence of traffic signals in Tinwald may make it easier for vehicles to access these routes to and from SH1. This may result in more traffic between south of Ashburton and north-eastern Ashburton using the Chalmers Avenue route should one of those go ahead as well as a signalised intersection in Tinwald.

Amenity Effects

The amenity effects resulting from the installation of traffic signals at an intersection in Tinwald are likely to be limited to the area immediately surrounding the intersection, with the possibility of some effects extending to a possible Chalmers Avenue route should that proceed as well as a signalised intersection in Tinwald. These effects have been considered in the Chalmers Avenue route sections, so will not be addressed in this section.

• Noise Effects

There may be some increase in noise effects at the signalised intersection as a result of State Highway through traffic (particularly heavy vehicles) stopping at the signals and accelerating away from the a standstill

• Air Quality Effects

Traffic signals in Tinwald, on their own, are expected to have little or no impact on traffic generation or distribution. It is therefore likely that they will have little or no impact on air quality in Ashburton.

• Vibration Effects

Traffic signals in Tinwald, on their own, are expected to have little or no impact on traffic generation or distribution. It is therefore likely that they will have little or no impact on vibration effects in Ashburton.

• Visual Effects

The presence of traffic signals may have a slight visual effect at the signalised intersection. They will have little or no impact elsewhere.

• Streetscape Effects

The presence of traffic signals my change the streetscape of the affected intersection when compared to its current layout. However, traffic signals are entirely consistent with the streetscape of a major urban State Highway.



Property Effects

This option would require the acquisition of land from 4 properties.

Comments / Notes

- 1. Maintenance of this option would be the responsibility of NZTA.
- 2. NZTA funding is possible for this option if it meets NZTA's funding criteria.
- 3. This option addresses the following key issues:
 - a. Road safety through Tinwald,
 - b. Improved access to SH1 for Tinwald motorists.



17 Comparative Option Assessment

A multi criteria assessment was carried out on each option. The criteria were agreed at a full day workshop attended by project team members from Opus, Taylor Baines and Associates, and ADC. A preliminary assessment of each option against the criteria was also agreed at the workshop.

Criteria

The following criteria were agreed at the workshop:

Criteria	Exemplified by
Safety	Pedestrian, cyclist and motorist safety.
Personal Security	Safety of people in public places by ensuring public places are well lit and
	able to be observed by nearby residents and or passers by. In this context,
	'public places' refer to the public road reserves and adjacent places where
	members of the public are entitled to be. (as in "Crime Prevention Through
	Environmental Design" (CPTED))
Emergency	Ability of emergency services to respond quickly to emergencies in all parts
Services	of the district, but with a particular emphasis on urban areas where events
	are more common. Influenced by distance of travel, number of intersections
	to cross and traffic density
Lifeline	The bridge carries utilities (water supply, electricity, telecommunications)
	across the river. Ability to maintain essential utilities to communities in the
	event of a civil defence emergency (flood, earthquake etc). Most effectively
	achieved through duplication.
Route Security	Ability to provide reasonable access in the event of a local incident
	(breakdown, accident etc), or major emergency (natural hazard) closing the
A	existing bridge or approach
Accessibility	Ability to get to key destinations within town, including nomes, employment,
	education, medical, recreation, and snopping. Includes walking, cycling,
	private motor venicie, public transport, freight. Often a particular issue at
Community	The colitting of eactors of a community by a physical 8 perceived barrier
Soverance	(includes read & traffic). At town lovel & street lovel
Active Transport	Promoting active transport (e.g. walking and eveling as means of travel to
Active mansport	school and workplaces) by improving and extending walking and cycling
	infrastructure, and improving environmental conditions for walking and
	cycling (i.e. a safer, more pleasant environment with good quality surfaces).
	often involves increasing the separation between vehicular traffic routes
	(particularly those involving heavy vehicles) and pedestrian/cyclist routes
Land	Ease of land acquisition Number of properties requiring partial or full
	acquisition. Houses and other buildings requiring demolition. Dislocation of
	property owners
lwi	Impacts on local and regional lwi. Culturally important sites. Accidental
	discovery of culturally important artefacts
Heritage	Impact on heritage sites, buildings etc & archaeology


Environment –	Impact on water Quality, and river hydraulics
Water	
Amenity & Public	Changes to amenity values, e.g. noise levels, air quality, vibration, visual
Health	effects and streetscape. In severe cases has impacts on personal health
Cost	Total cost - Land & construction. Whole of life cost. Local ratepayer share
Economic	Impact on local businesses operating in Ashburton and Tinwald. Cost to
Development	users, including freight operators (including flow on effects)
Planning for the	Addressing short, medium, and long term transportation issues throughout
Long Term	the next 50 years
Sewer	Existing sewer siphon under Ashburton River near the oxidation ponds is
Replacement	likely to need replacement in the medium to long term. A new bridge may
Opportunity	provide a viable route for the sewer, and thereby reduce some of the costs
	of sewer replacement.

Assessment

Each option was given a score between -2 to +2 for each criteria, where:

- -2 indicates the option has significant negative impact
- -1 indicates the option has moderate negative impact
- 0 indicates the option has little or no impact
- +1 indicates the option has moderate positive impact
- +2 indicates the option has significant positive impact.

The preliminary assessment was then presented to the Community Reference Group, and reviewed and refined in light of the Reference Group comments. A total of 24 scores were changed as a result of the Reference Group inputs.

The full assessment is included in Appendix F (bound separately). A summary of the assessment scores is shown on the following page.

Total scores for each option have been calculated as a "raw total" (i.e. a weighting of 1 for each criteria), and as two weighted totals. Weighting Version 1 was established following an exercise with the Reference Group to identify the most important factors from their perspective. These weightings reflect the importance placed on each of the criteria by the Reference Group, with weightings from 1 to 3, and with 0.5 increments.

Weighting Version 2 is a simplified version of Version 1. It only uses two weightings (1 or 2), compared to the five weightings in Version 1. This results in less distinction between the weightings applied to the assessment.



		Social									Cultural		Enviro		Economic					
Weighting Version 1	25	1	1.5	1	2	2	1	1	2	1	1	1	2	3	2	2	1			
Weighting Version 2	2	1	1	1	2	2	1	1	2	1	1	1	2	2	2	2	1			
Option	Safe ty	Personal Security	Emergency Services	Lifeline	Route Security	Accessibility	Community Severance	Active Transport	Land	iwi	Heritage	Environment - Water	Amerity & Public Health	Cost	Economic Development	Planning for the Long Term	Sever Replacement Opportunity	Flaw Total	Weighted Total- Version 1	Weighted Total- Version 2
Outer Bypass	0	0	0	0	2	0	0	1	-2		0	0	0	-2	0	0	1	0	-4	-2
Inner Bypass	0	0	0	1	2	0	0	1	-2		0	0	-1	-2	0	0	1	0	-5	-3
Chaimers - Rural	1	0	1	2	2	2	1	1	0		0	0	-1	1	1	2	0	13	23	21
Chaimers - Urban	2	1	1	2	2	2	1	2	-1		0	0	-1	1	1	2	0	15	26	23
Chalmers - Grove	1	2	1	2	2	2	-1	1	0		0	0	-2	1	1	1	0	11	19	17
Melcombe - level xing	0	0	1	1	1	1	-1	1	-2		0	0	-2	7	-1	0	0	-2	-7	-6
Melcombe - Rail overpass	1	0	1	1	1	0	-1	1	-1		0	0	-2	7	-1	0	0	-1	-4	-4
4-laning SH1	0	-1	1	0	1	-2	-2	1	-1		-1	0	-1	-1	-2	0	0	-8	-15	-14
Traffic Signals in Tinwald	1	0	0	0	0	1	1	1	0		0	0	0	2	0	0	0	6	13	10

Assessment Summary

Using the Raw Total or either weighted version results in similar rankings of the options, with the three Chalmers Avenue options scoring significantly higher positive scores than the other options. This reflects the underlying fundamental premise of the assessment team that the bulk of the traffic on the existing bridge is local traffic; therefore options which take local traffic off the State Highway will best address the issues on the existing bridge. It also reflects the fact that Chalmers Avenue is an existing high capacity road which links well to east Ashburton, and currently has significant excess capacity.

The Tinwald Traffic Signals option scores fourth behind the Chalmers Avenue options, with comparatively moderate positive scores. This is a short term option. It may address some of the issues of turning right onto SH1 in the short term. However, it will not address the medium to long term capacity issues of the existing bridge, and it may result in increased traffic between SH1 and north east Ashburton using any future second bridge east of Tinwald.

The scores for the bypass options were close to zero or slightly negative. These options do not address the issue of providing access between north and south Ashburton for local traffic, and impose additional travel distance for State Highway inter district traffic. The outer bypass in particular is a high cost option due to the significant upgrades required of existing roads to bring them up to State Highway standards These may be viable options in the very long term once inter district through traffic on SH1 has grown to the point of causing significant congestion in central Ashburton.

The Melcombe Street and State Highway four laning options all had significant negative scores. All of these options continue to concentrate all north-south traffic in Ashburton at one location. They do not address the issue of providing access between north and south Ashburton for local traffic as effectively as the Chalmers Avenue options, and come at a significantly higher cost. The total length of upgraded route, and the costs associated with providing a railway crossing which meets current design standards contribute to the high cost of these options.

Current design standards require roads to cross railway lines at no more than 20 deg from perpendicular. In order for the State Highway to be free flowing, approach curves would need to have a design speed equivalent to the operating speed of the road or greater. This results in large reverse curves on both sides of rail level crossings in urban areas. These curves are very large in rural areas where high approach speeds are likely, such as at the south end of Tinwald.



18 **Public Consultation**

The next phase of this project is public consultation on the outcomes of these additional investigations. As noted above, a total of nine options (including Tinwald traffic signals) have been considered in this phase of the project. Most of these options have significant impacts on private property owners, and on the community. Public consultation on the basis that any one of these options is likely to be the final choice is likely to cause significant concern amongst affected property owners and communities.

In order to minimise unnecessary concern and stress amongst affected property owners and communities it is recommended that for the purposes of consultation the options are ranked in two categories, namely "Likely", and "Unlikely"

Likely

The "Likely" category will include those options which are considered to most effectively meet the assessment criteria. It is likely that one of these options will be the option which proceeds to land designation. It is recommended that the likely category consist of the following options:

- Chalmers Avenue to East of Tinwald (rural)
- Chalmers Avenue to East of Tinwald (urban)
- Chalmers Avenue to Grove Street

Unlikely

The unlikely category will include those options which are considered to not effectively meet the assessment criteria at this stage. It is unlikely that any of these options will proceed to land designation. It is recommended that the unlikely category include the following options:

- Outer Bypass
- Inner Bypass
- Melcombe Street (Railway level crossing)
- Melcombe Street (Railway overpass)
- State Highway 1 Four Laning.

It is further recommended that further investigations into the option of installing traffic signals in Tinwald progress in parallel with a second bridge option. These investigations would consider the following:

- The viability of signals as an interim measure;
- The possible long term impacts of signals on the preferred second bridge option; and
- The optimum location for signals in Tinwald.



19 **Recommendations**

The following recommendations are made as a result of these investigations:

- 1. That public consultation on the results of these additional investigations, and on the options considered be carried out
- 2. That the options be categorised as follows for that public consultation:
 - a. Likely:
 - Chalmers Avenue to East of Tinwald (rural)
 - Chalmers Avenue to East of Tinwald (urban)
 - Chalmers Avenue to Grove Street
 - b. Unlikely:
 - Outer Bypass
 - Inner Bypass
 - Melcombe Street (Railway level crossing)
 - Melcombe Street (Railway overpass)
 - SH1 Four Laning
- 3. That further investigations into the suitability and location of traffic signals in Tinwald proceed in parallel with a second bridge project.



APPENDIX A

- Ashburton Street Map
- Google Map of the Ashburton River











APPENDIX B

- Geotechnical Investigation Results





APPENDIX C

- Traffic Count Summary



APPENDIX E

- Option Drawings (bound separately)



APPENDIX F

- Option Assessment (bound separately)

