

**Ashburton-Tinwald Connectivity**  
**Indicative Business Case**  
**Strategic Case and Options Assessment**

PREPARED FOR ASHBURTON DISTRICT COUNCIL | 23 SEPTEMBER 2021

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We design with community in mind

## EXECUTIVE SUMMARY

### OVERVIEW

This Ashburton-Tinwald Connectivity (ATC) Indicative Business Case (IBC) demonstrates the need to invest in the Ashburton transport network to improve connectivity across the Hakatere (Ashburton) River. This report captures the case for change (Strategic Case) and the assessment of options. The outcome is a **technically preferred programme** of interventions, which has been informed by detailed traffic modelling. The report demonstrates that there is a clear need for investment and provides a robust assessment of alternatives which allows Council to move forward with future planning.

#### Technically preferred programme

The technically preferred programme is:

- Minor upgrade to the South Street / SH1 intersection to extend the southbound merge (2022).
- Clip-on passing bays, for cyclists, on the existing SH1 bridge (2022).
  - *Waka Kotahi are currently undertaking a feasibility study for this intervention – however, no funding commitment has yet been made.*
- A new second bridge which will connect to Chalmers Avenue in Ashburton. A new road will connect the bridge through to Grahams Road in Tinwald. The bridge will include high-quality provisions (physical separation) for pedestrians and cyclists (2027-28).
  - *Completion of the Detailed Business Case (DBC) and design should be completed by 2024. The intent is that the project is 'shovel ready' by the start of the new National Land Transport Programme funding period of 2024-2027.*

The business case demonstrates that the impacts of having only one connection between Tinwald and Ashburton go beyond just traffic congestion. The wider effects on travel choice, resilience, severance, safety and freight movement are also significant. Taking the time to examine these factors and in particular, the impact of the May 2021 flood event, has allowed us to demonstrate that the timeframes for building a second urban bridge should not be purely driven by the 'congestion' argument and ultimately the project needs to be brought forward.

The 'technically preferred programme' will only progress to becoming the 'preferred programme' following engagement with iwi and the community.

#### Next step

This report has been reviewed by both Ashburton District Council (ADC) and Waka Kotahi, with joint agreement around the technically preferred programme. Following engagement, the next step for the project is the development of a Detailed Business Case (DBC) which focuses on progressing the design for the Chalmers Avenue bridge. Running in parallel should be the design and implementation of the improvements to the South Street / SH1 intersection and the SH1 passing bay clip-ons (both pending Waka Kotahi funding and approval)

In parallel to the DBC, the feasibility and economic viability of the following options should also be explored:

- Opportunity to introduce an on-demand public transport service.
- New walking/cycling bridge which connects Tarbottons Road and the Mountain Bike Park (Dobson Street West). This would be a long term (10 to 20 year horizon) intervention on that basis that the Chalmers Avenue bridge is constructed by 2027-28.

### PROBLEMS

State Highway 1 (SH1) is the key strategic transport route for the South Island linking Picton in the north with Bluff in the south via all major towns and cities along the east coast. Ashburton is located on the northern side of the SH1 bridge over the Hakatere River, with Tinwald on the opposite side (southern) side of the river.

The problem statements, prepared with input from key stakeholders, are provided below, and these remain relevant even after considering the effects of Covid-19 and the recent flood event:

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- 1. Connectivity (40%)** - An absence of route choice contributes to more traffic on SH1. This discourages, or stops people being able to, make journeys they otherwise would, creating social disconnect and lack of a 'one community' feeling.
  - This is about ensuring that local education, health care, employment, recreation, and shopping trips can always be made. "Resilience" ties into this problem statement, as does "severance" because not only is there difficulty travelling north to south across the river, but also east to west across the state highway. The higher weighting reflects the fact that most (approx. 80%) trips across the Ashburton River are local journeys, and so good connectivity is vital.*
- 2. Travel choice (30%)** - Limited (or poor quality) facilities for sustainable modes makes it difficult to achieve long-term environmental and liveability objectives.
  - This is about a) allowing people to choose their mode of travel between Ashburton and Tinwald, where currently the car is the only option; and b) giving people the choice of alternative routes.*
- 3. Safety (20%)** - High traffic volumes make it difficult for people to travel along, across, or onto SH1. This increases the likelihood of injury crashes and delays emergency services.
  - This is about reducing the risk of injuries occurring because as the roads get busier, it becomes increasingly difficult to turn onto or get across the state highway.*
- 4. Economic prosperity (10%)** - Increasing traffic and constrained capacity on SH1 results in worsening travel time reliability between Tinwald and Ashburton. This impacts freight connections and economic prosperity.
  - This is about delivering reliable journeys for people and freight passing through Ashburton.*

### Alignment with Government Strategies

The problem statements align strongly with all five of the enduring outcomes within the Ministry of Transport's Transport Outcomes Framework; namely 'Inclusive access', 'Economic prosperity', 'Healthy & safe people', 'Resilience & security' and 'Environmental sustainability'.

The Government's Policy Statement on Land Transport 2021 sets out strategic priorities of resilience and security, inclusive access, healthy and safe people, economic prosperity, and environmental sustainability. Addressing the problem statements would strongly deliver upon the first four of the desired transport enduring outcomes.

## NETWORK RESILIENCE

There is only one practical connection between Tinwald and Ashburton, which is via the SH1 bridge. This means that network resilience is a very poor, and the *connectivity* and *economic prosperity* problems (in particular) would be significantly impacted by any event that either closes the SH1 bridge or restricts vehicle movements.

### May 2021 Flood Event

Although events such as earthquakes and floods have low probabilities, they have high consequences. The May 2021 flood event highlighted how susceptible the transport network and economy are to any event that either closes the SH1 bridge, even for a short period of time, or restricts the types of vehicles that can use the bridge.

The nearest possible alternative river crossing involves an 80km diversion along rural roads. If that detour route is open and all trips currently using the SH1 bridge diverted to the detour route, the additional economic costs due to increased travel time and vehicle operating costs impact could be more than \$1.6m per day. However, in the May 2021 event, this alternative route was not open. This meant that either people took a detour that involved a trip via the west coast of the South Island, or in most cases, the trip simply did not take place<sup>1</sup>. The cost to travel time and productivity is therefore likely to have significantly exceeded \$1.6m a day. Added to this, is the \$1.3m cost directly attributed to repairing the bridge. In the weeks following the event, traffic across the bridge dropped by around 20%, which has a direct bearing on social and economic activity.

The impact of the bridge closure and vehicle weight restrictions in the subsequent weeks also resulted in further indirect economic costs to the local community. These include loss of revenue as businesses were unable to operate normally, disrupted travel requiring temporary accommodation and effects on supply chains, e.g. deliveries to supermarkets in Dunedin.

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<sup>1</sup> The actual economic cost of the May 2021 event is difficult to quantify as the cost of a trip not happening depends on several factors (e.g. how productive an employee is working from home).

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If the SH1 bridge was closed again for any significant amount of time (three days or more), the effects on the local community and wider South Island economy would be significant. The bridge represents a critical lifeline for the Tinwald community to key facilities on the northern side such as health care, schools and supermarkets. It also is a critical link in the goods supply chain, with much of the South Island (including Dunedin) dependent on the connection remaining open. Any closure of the bridge presents a risk that emergency services are unable to attend incidents in Tinwald in time. The Hospital, St. Johns Ambulance Service and Police are located in Ashburton, and whilst there is a second fire station in Hinds, access to that service is reliant on the Hinds Bridge being open during the same event that would have closed the Ashburton Bridge.

### Relative scale of the resilience issue at the Ashburton bridge

The resilience issue at the SH1 Ashburton bridge is not new. Over the last 20-30 years, it has been known that a major event such as an earthquake or flooding could potentially result in the closure or decommissioning of key infrastructure such as the Rakaia River and Ashburton River bridges. One of the effects of climate change is an increasing frequency of severe weather and major flooding events<sup>2</sup>. Recent examples on the South Island include the storms in February 2019 that washed out the SH6 bridge at Franz Josef and in December 2019 when the Rangitata bridge was closed. As major weather events become more common (recognised by NIWA<sup>3</sup>), there will be an increased probability of bridge closures. With many ageing bridges in the district, there will also be an increasing potential for a bridge failure.

There are several bridges in the region including the Rakaia bridge that are of a similar age to the Ashburton Bridge and are equally important parts of the supply chain. It is also acknowledged that the Government has limited funding as New Zealand recovers from the effects of the Covid-19 pandemic. However, it is considered that the scale of the resilience issue at Ashburton is greater than elsewhere in the region because:

- Ashburton and Tinwald function as a single community. The bridge not only facilitates regional through traffic, but also functions as the only practical connection between the two areas for social and economic activity. No other river between Christchurch and Dunedin severs a community in this way. This is evidenced by recent traffic counts which identified around 15,000 local trips per day across the bridge.
- The bridge carries around 24,000 vehicles per day which is 2.5 times more traffic than any other SH1 bridge south of Christchurch (10,000 vpd cross the Rakaia River bridge). This alone means that the economic cost of any closure is higher at the Ashburton bridge when compared to any other crossing.
- For an urban bridge, it has very poor existing walking and cycling provisions which discourages travel by active modes between Tinwald and Ashburton. This has created a situation where travel by motor vehicle is preferred for personal safety reasons even for only short trips across the river.

The impact on this large Ashburton community, and not just freight/vehicle movement, is what differentiates the resilience issue at the Ashburton Bridge from any other bridge in the South Island. If the bridge were closed for more than three days for any reason, the impacts could be long term.

Given that the bridge is already 80 years old, it is a case of 'when' rather than 'if' the bridge needs to be replaced. The only available solution for ensuring that long-term and resilient connectivity between Ashburton and Tinwald is a new bridge that would be designed to withstand major flood events. The Waka Kotahi National Resilience Programme Business Case also recommends a second urban bridge.

There is a strong case, based purely on resilience (a GPS priority), for a second bridge to be constructed now.

## INVESTMENT OBJECTIVES

The Investment Objectives were developed with the project partners and reflect evidence obtained through traffic modeling. An Investment Logic Map, presented within this business case show how these link to the identified problems. The Investment Objectives are:

1. Connectivity and severance
  - a. Ensure residents of Tinwald can always easily access key community facilities in Ashburton by a variety of modes, even during a major event (such as a flood) by 2031.

<sup>2</sup> NIWA report which notes how floods are expected to become larger for many parts of Canterbury, with some increases exceeding 100%

<sup>3</sup> <https://niwa.co.nz/sites/niwa.co.nz/files/ClimatechangeprojectionsfortheCanterburyRegionNIWA.PDF>

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- b. Improve travel time reliability for journeys within Ashburton and Tinwald so that weekday peak-hour journey times do not exceed off-peak journey times by more than 2 minutes.
  2. Travel choice
    - a. Increase the number of peak hour active mode journeys across the river to 50 per hour by 2026.
  3. Safety
    - a. Improve the safety level of service (LOS) for cyclists crossing the Hakatere (Ashburton) River from LOS C to LOS B or better by 2026.
    - b. Reduce the risk of crashes at intersections by reducing the demand for right turn demands by 2031.
  4. Economic prosperity
    - a. Improve travel time reliability for journeys along SH1 through Ashburton and Tinwald so that weekday peak-hour journey times do not exceed off-peak journey times by more than four minutes by 2031<sup>4</sup>.

## OPTIONS AND ALTERNATIVES

The identification and assessment of options was informed by the evidence base, an engineering review of bridge options, and feedback from ADC and the wider stakeholder group (gathered through workshops and meetings). All options broadly fitted into categories of 'bypass', 'walking/cycling bridge', 'all modes bridges' and 'non-infrastructure options'.

Multi-criteria analysis (MCA) was the primary tool used for evaluating the benefits and risks associated with each option. The purpose of the MCA was to narrow down the field of alternatives. An initial sifting of the options resulted in an agreed short-list, as shown in Figure 0-1.



Figure 0-1: Short list of alternatives

The short list assessment established that:

- The **Chalmers Avenue** and **duplication of the SH1** all-mode bridges scored notably better than alternatives. The Chalmers Avenue bridge option scored better than the SH1 bridge duplication option largely because of the technical difficulty involved in duplicating the SH1 bridge. The Chalmers Avenue bridge could largely be constructed offline with little impact to the transport network during construction.
- The **Tarbottons / Dobson active mode bridge** scores better than the alternative walking/cycling bridge options as it would provide better connectivity for multiple activities.
- Whilst not solving the problems independently, **improving the north and southbound merge at the South Street intersection** is a low-cost, low-risk option that would provide safety and travel time benefits.

<sup>4</sup> Between just north of Walnut Avenue and south of Lagmhor Road



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- A **bus service** that would operate with flexible routing, similar to the current Timaru services, should still be considered. Further investigation would be required to establish the benefits of this option, which would be informed once a review of the success of the Timaru bus trial has been established.

The 'all modes' bridge options scored much better against the project Investment Objectives than any other options and would deliver the highest benefits.

**Fundamentally, strongly delivering all the Investment Objectives is what the project is about. For this reason, a new all-modes bridge was agreed as being the vital component of a programme of investment.**

## DETAILED ASSESSMENT OF BRIDGE OPTIONS

### When does congestion trigger the need for a second bridge?

The traffic modelling identified that without a second bridge:

- During the weekday (Monday to Thursday) PM peak, travel time delays are expected to be about five minutes for northbound travel and over ten minutes for southbound travel.
- During the AM and interpeak periods, travel times could increase by about one minute by 2041. This reflects the relatively low traffic volumes using SH1 compared with the PM peak period.

To address typical Monday to Thursday delays, improvements to the transport network will be required sometime after 2031. However, to address congestion issues on a Friday, when traffic volumes are about 10% higher consistently throughout the day, improvements will be required prior to 2031.

### Why is a Chalmers Avenue bridge preferred to duplication of the SH1 bridge?

Both options would improve connectivity, address the resilience issue, improve reliability for freight movement and provide better travel choices. However, a Chalmers Avenue alignment is preferred for the following reasons:

- **Investment objectives** – the Chalmers Avenue option will more strongly deliver the Investment Objectives. At the core, this is why investment is being made.
- **Congestion and efficiency** - the modelling indicates that the Chalmers Avenue bridge will attract up to 500 vehicles per hour by 2041. This level of traffic diversion is enough to keep the state highway operating efficiently during all peak periods out to 2041 (and likely beyond).
- **Severance** - the Chalmers Avenue bridge reduces traffic on the state highway, whilst the SH1 duplication encourages more traffic through this single corridor. A Chalmers Avenue bridge will reduce, rather than increase, the east-to-west severance issues which are already an issue.
- **Safety** – the Chalmers Avenue bridge reduces the number of vehicles turning right onto the state highway from give-way controlled intersections in Tinwald and reduces the likeliness of turning related crashes. Some people might also choose to take a longer route via Chalmers Avenue because it would be a safer route rather than take additional risks by trying to turn onto the state highway from give-way intersections.
- **Land use** – the Chalmers Avenue bridge directly supports the council's future land use plan, with residential growth targeted for east Tinwald/Lake Hood and employment growth in the Ashburton Business Estate. The option will generally help to better the shape the town away from one that is long, thin, and follows the state highway corridor.
- **Construction impact** – the Chalmers Avenue bridge and new road through to Grahams Road can be constructed almost entirely offline, with minimal impact to the community. A SH1 bridge duplication would require some periods of temporary speed restrictions along the existing state highway.
- **Complexity** – the Chalmers Avenue bridge is technically less complicated to build, with fewer constraints (e.g. railway line) and limited property impacts. The SH1 option has potentially significant property and constructability challenges to overcome. Waka Kotahi have identified that it will be very difficult to build a new bridge on either the upstream or downstream sides of the existing bridge.
- **Consentability** – Since a designation for the Chalmers Avenue bridge was put in place as part of the 2014 Notice of Requirement, this will reduce some of the potential challenges associated with property acquisition and means that more information is already available in terms of potential effects on the environment for the resource consent application.
- **Alignment to strategies** – a Chalmers Avenue bridge directly aligns with council's walking and cycling strategy which promotes improved connections across the river at both SH1 and at Chalmers Avenue.

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- **Climate change** – the modelling has identified that the Chalmers Avenue bridge will help bring about an overall network reduction in vehicle km traveled and travel times. Both factors help reduce carbon emissions.
- **Recreation** – the location of the bridge means that recreational users of the river mountain bike trails no longer need to 'choose one side or the other' – the bridge will connect the two sides and significantly improve the cycling route between Ashburton and Lake Hood.
- **Creates new opportunities** – these include:
  - The Chalmers Avenue option opens the opportunity to make better use of the valuable natural asset that Ashburton possesses – the river.
  - It also opens the opportunity to work with developers to introduce amenities such as a small supermarket or pharmacy as part of new Tinwald developments.

### Addressing climate change

Addressing climate change through transport investment fundamentally relates to two factors – (1) how the project helps reduce carbon emissions; and (2) how the project supports a transport network that is safe, resilient and can withstand more regular and extreme weather events. The key component of the programme is a second bridge, which potentially raises concerns around the environmental impact of a new roading connection – i.e. potential induced traffic effects and embedded carbon of a new road and bridge.

For Ashburton, as evidenced by the recent flood event, the most critical factor is to deliver a transport network that always remains functional. A new bridge is a necessity for this. The next factor is how carbon emissions can be reduced and offset. The preferred programme does this by:

- Recommending a bridge alignment (Chalmers Avenue) that provides the highest benefits to CO2 emissions. Overall vehicle km and travel times are reduced when compared to a 'Do Minimum' or SH1 duplication.
- Providing new cycle and pedestrian paths along the new Chalmers Avenue corridor, connecting Ashburton to Tinwald and onto Lake Hood. This will make cycling into Ashburton a far safer and more appealing choice.
- Providing, as an interim measure, with SH1 bridge clip-on passing bays for cyclists.
- Recommending that another walking/cycling bridge at Tarbottons Road, which would provide a good connection between Tinwald and schools in Ashburton, is evaluated in the DBC phase.
- Recommending that the feasibility of an on-demand bus service is explored in the DBC phase.

### Timing

The following diagram explains why the timeframe for completion of the Chalmers Avenue bridge is 2027-2028.

The Notice of Requirement for the Chalmers Avenue bridge identified an indicative opening year of 2026, which was a timeframe that was informed by traffic modelling undertaken at that time (based on 2006 data). The updated modelling has identified that growth has not occurred as quickly as previously anticipated and upgrades to the state highway at Agnes Street and Walnut Avenue (not previously considered) will improve travel times when compared to existing conditions.

The NoR timeframe was one based purely on the 'congestion' argument. If we were to only focus on this factor, the recommended timeframe for the second bridge would be 2030-31. However, the business case process has meant that we have looked at the wider picture, and the evidence gathered (inc. data from the recent flood event) means that we have robust justification for recommending the earlier timeframe of 2027-28.

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**When is the earliest date the Chalmers Avenue bridge could be constructed?**

**2026-27**

**Timeframes required to get the project 'shovel ready' and constructed**

*DBC - start of 2022 to mid 2023*  
*DBC funding approval - mid 2023-end 2023*  
*Detailed design and consenting - start 2024 to mid 2025*  
*Procurement - mid 2025 to end 2025*  
*Bridge construction - 2025 to 2026 (potentially 2027)*

**To address the congestion issues - when is the Chalmers Avenue bridge required?**

**2030-31**

**Monday to Thursday congestion** - a significant issue every weekday sometime between 2031 and 2041.  
**Friday congestion** - likely to be a significant issue every Friday before 2031

*Taking a balance between resolving congestion issues for 1 day of the week vs 5 days of the week. It is reasonable to conclude that resolving the 'Friday effect' brings forward the timeframe by 1-2 years.*

*Note - the new signals at Agnes Street and Walnut Avenue will improve travel times in the short term*

**So, why not wait until 2030?**

**The resilience and active mode issues being experienced are critically poor**

**Resilience** - there is a need from a resilience point of view to have a second bridge now (2021). However, as above - the earliest a second bridge could realistically be opened is 2026/27.

**Poor quality active travel provisions** - The quality of the facilities for pedestrians and cyclists on the existing SH1 bridge is very poor. There is a clear government direction that investment should be made to encourage more people to walk and cycle.

**Should Council and Waka Kotahi 'live with' the significant resilience and active travel issues for the next 10 years?**

**No, for the reasons above. This then leaves open two options**

<p><b>1) Bring forward a walking/cycling bridge at Tarbottons Road</b></p> <p><i>This would provide excellent benefits only for pedestrians and cyclists (plus potentially emergency vehicles). This option would not resolve the resilience issues for vehicles - which currently accounts for near 99% of the users of the bridge.</i></p>	<p><b>2) Bring forward the construction of the Chalmers Avenue bridge</b></p> <p><i>The bridge will resolve both the active modes and resilience issues.</i></p>
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**Which option makes most sense?**

**Bring forward the construction of the Chalmers Street bridge**

**Value for money**  
*Knowing that a second vehicle bridge is required for congestion reasons by approximately 2030, it is likely to be far more economical to bring forward the construction of the Chalmers Avenue bridge than invest in two separate bridges during the same 10 year timeframe.*

**The customer base**  
*We need investment to benefit the largest possible number of customers and resolve the core issue - which is poor connectivity. Ashburton's catchment is very large, and for many people walking, cycling and public transport will never be options. Freight operators are also important customers and ensuring they can reliability transport goods along the state highway is a key government priority.*

**Responding to growth strategies**  
*East Tinwald, Hampstead and Lake Hood are key growth residential areas which would directly benefit from a Chalmers Avenue bridge.*

**What is the indicative timeframe for the Chalmers Avenue Bridge?**

**2027-2028**

Deliver all the pre-implementation work during the next NLTP funding period of 2025-27.

The timeframe for bridge construction is dependant on when funding is allocated, which is unknown at this stage. For this reason, a 2027-28 timeframe has been included as potentially construction may end up sitting within the 2028-2030 NLTP funding period.

Have the timeframes changed since the Notice of Requirement (2014)?



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### NEXT STEPS

The next stage of the project will be the DBC, where the detail of the programme will be established. Design and robust economic analysis will be required to provide assurance that the right option (and design) is being progressed at the right time at the right price. Iwi should also be brought on as a project partner.

The DBC will provide certainty around technical aspects and will reduce the risk profile (inc. cost estimate) for the project. The scope for the DBC will capture:

- Engagement with Iwi, local community, potentially affected landowners in relation to the detailed design
- Commercial, management and financial cases
- Road safety audits
- Scheme level design informed by technical assessments. Potentially including geotechnical, bridge design, hydrology, ecology, property, pavement
- Consenting and property strategies
- Cost estimate
- Economic analysis, capturing resilience (costs associated with bridge closures) and sensitivity analysis.
- Investigation into:
  - On demand public transport service
  - New walking/cycling bridge connecting Tarbottons Road and the Mountain Bike Park.