



State highway 1 Clarence to Oaro safety and amenity improvements

Business case for implementation executive summary overlay

NZ Transport Agency

27 June 2017

Revision: 1.0

Reference: 255928

*Bringing ideas
to life*

aurecon

commute
TRANSPORTATION CONSULTANTS

 **NZ TRANSPORT AGENCY**
WAKA KOTAHĪ

Document control record

Document prepared by:

Aurecon New Zealand Limited

Level 4, 139 Carlton Gore Road
Newmarket Auckland 1023

PO Box 9762

Newmarket Auckland 1149

New Zealand

T +64 9 520 6019

F +64 9 524 7815

E auckland@aurecongroup.com

W aurecongroup.com

A person using Aurecon documents or data accepts the risk of:

- a) Using the documents or data in electronic form without requesting and checking them for accuracy against the original hard copy version.
- b) Using the documents or data for any purpose not agreed to in writing by Aurecon.

Document control		aurecon				
Report title		Business case for implementation executive summary overlay				
Document ID		Project number		255928		
File path		N:\Admin\Transportation\TRANSPORT PLANNING\Proposals\NZTA - SH1 Clarence DBC\FINAL\FINAL REV 2 ISSUED 260617\NZTA SH1 Clarence to Oaro business case executive summary overlay.docx				
Client		NZ Transport Agency				
Client contact		Michael Blyleven		Client reference		
Rev	Date	Revision details/status	Author	Reviewer	Verifier (if required)	Approver
1.0	27 June 2017	Final for issue	M. Taylor/ T. Innes	S. Dudley		G. Wemyss
Current revision		1.0				

Approval			
Author signature		Approver signature	
			
Name		Name	
Mel Taylor/ Tony Innes		Gordon Wemyss	
Title		Title	
Senior Planner/ Director		Transport Leader - New Zealand, Aurecon	

NZ Transport Agency approval

Endorsed by
Steve Mutton
Proposal sponsor
Date:

Executive summary overlay

1.1 Overview

The State highway 1 (SH1) Picton to Ashley River programme business case (PBC) identified a programme of investment along the corridor that included improvements to SH1. This business case for implementation ('business case') identifies the recommended activities on the section of SH1 between Clarence and Oaro (including Kaikōura) to deliver the outcomes identified in the PBC. The recommended option achieves the investment objectives by improving safety, resilience, trip reliability and amenity levels of service along the corridor. A key aspect of the recommended activities on this route is supporting and enabling tourism growth and development as part of the reinstatement and recovery following the Hurunui/Kaikōura earthquake.

This business case has been undertaken in a compressed timeframe and the design of the recommended option will be further progressed before implementation.

1.2 Context

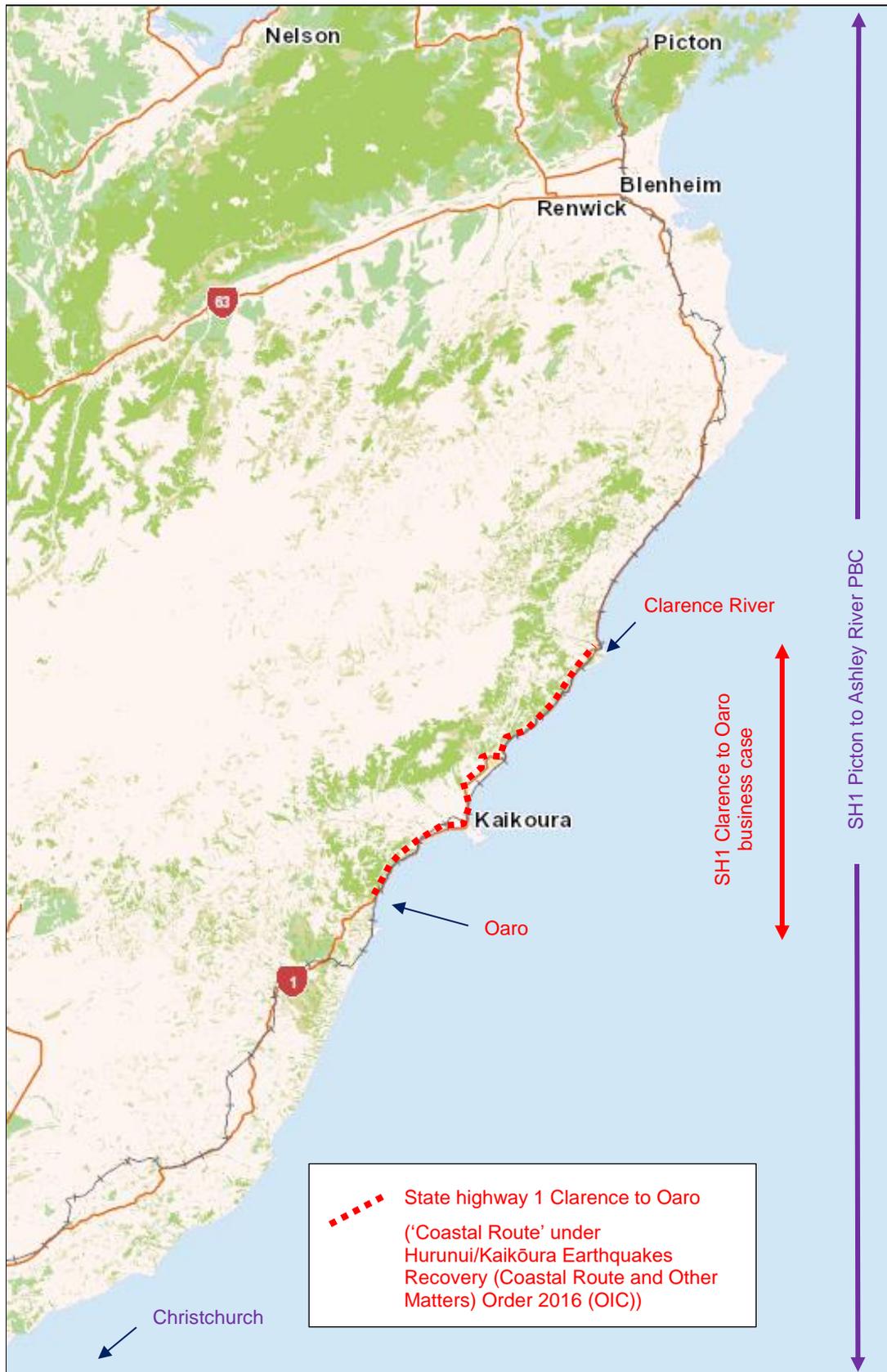
The North Canterbury Transport and Infrastructure Recovery (NCTIR) Alliance is undertaking the design and delivery of a number of critical emergency reinstatement and resilience works on SH1 in order to address earthquake damage and re-open SH1. This work is due for completion over the next six to 12 months. A number of safety, reliability, economic, accessibility, resilience, tourism and amenity works have been identified to be delivered in parallel that will improve levels of service (LOS) and enhance the journey experience for customers. The improvements will align this section of SH1 to a level more commensurate with the National Route classification under the One Network Road Classification (ONRC) system. This is a once in a lifetime opportunity to realise these improved outcomes with minimal disruption (and increased efficiency) to the customers of the routes, if the works are completed in parallel with the NCTIR reinstatement works.

Key customers along this route include freight travelling between the North and South Island, domestic and international tourists, and local journeys (including commuters) accessing services and facilities on route.

Using the safe systems approach to highway corridors, a suite of infrastructure improvements and speed management interventions which as a package, will achieve a 'self-explaining' and consistent corridor that responds to customer driving behaviour, while achieving safety benefits. Taking a whole-of-corridor perspective, these safety improvements are also being supported with interventions that enhance the corridor's travel time reliability, resilience and visitor amenity for other modes of travel, including walking and cycling. It is recognised that supporting tourism in the post-earthquake recovery environment is a key component of the business case.

Building on prior recommendations contained in the corridor-wide assessment previously undertaken and endorsed by the NZ Transport Agency (Transport Agency) Board for the entire 331km section of SH1 Picton to Ashley River programme business case (PBC), this business case considers the approximately 60km section of SH1 between Clarence and Oaro (refer to Figure 1 below).

Figure 1 Location plan of business case corridor



1.3 The recommended option

The PBC reviewed a number of safety, reliability, resilience and amenity improvements in its assessment of potential programmes. A programme of safety, reliability, access and amenity improvements along the Clarence to Oaro section were identified to be undertaken in the short term.

This business case has identified a recommended option for the Clarence to Oaro section that responds to and achieves the investment objectives of the corridor PBC, providing a balance of safety, resilience, trip reliability and amenity interventions to achieve an enhanced outcome for the customers of this section of SH1.

The recommended option introduces safety, reliability, resilience and amenity components that are over and above a pre-earthquake level of reinstatement to achieve the investment outcomes identified in the PBC.

The recommended option includes:

- North of Kaikōura, between Okiwi Bay and Mangamaunu there is a new off line cycle way (shared use path) on the sea-ward side of the state highway and rail corridor;
- North of Waipapa additional passing lanes are provided on new road realignments;
- Wider shoulders will be provided to provide opportunities for vehicles to pull over to let people pass;
- Out of context curves are realigned and reduced where practical;
- New technology will be used to improve incident response and to “tell the story” of the corridor for visitors;
- South of Kaikōura there is shoulder widening to Peketa but then thereafter generally remains at the existing cross section to reduce reclamation;
- Additional barriers and a wider centreline are provided where necessary to increase safety;
- The Parititahi and Raramai tunnels will have one of the twin tunnels enlarged to 5m by 5m to allow more over-dimensioned vehicles to use the entire route;
- Existing 80km/hr speed limits are extended in Oaro and introduced between Mangamaunu and Waipapa to enhance safety; and
- Visitor facilities are upgraded with improved access and parking and new amenity and toilet facilities at key destinations along the route.

Figure 2 to Figure 5 below show the safety, reliability, resilience, visitor amenity (destination/ tourism upgrades), walking and cycling works and outcomes proposed as part of the recommended option.

Figure 3 Recommended option reliability and resilience outcomes



Figure 4 Recommended option amenity outcomes – key destinations and tourism upgrades

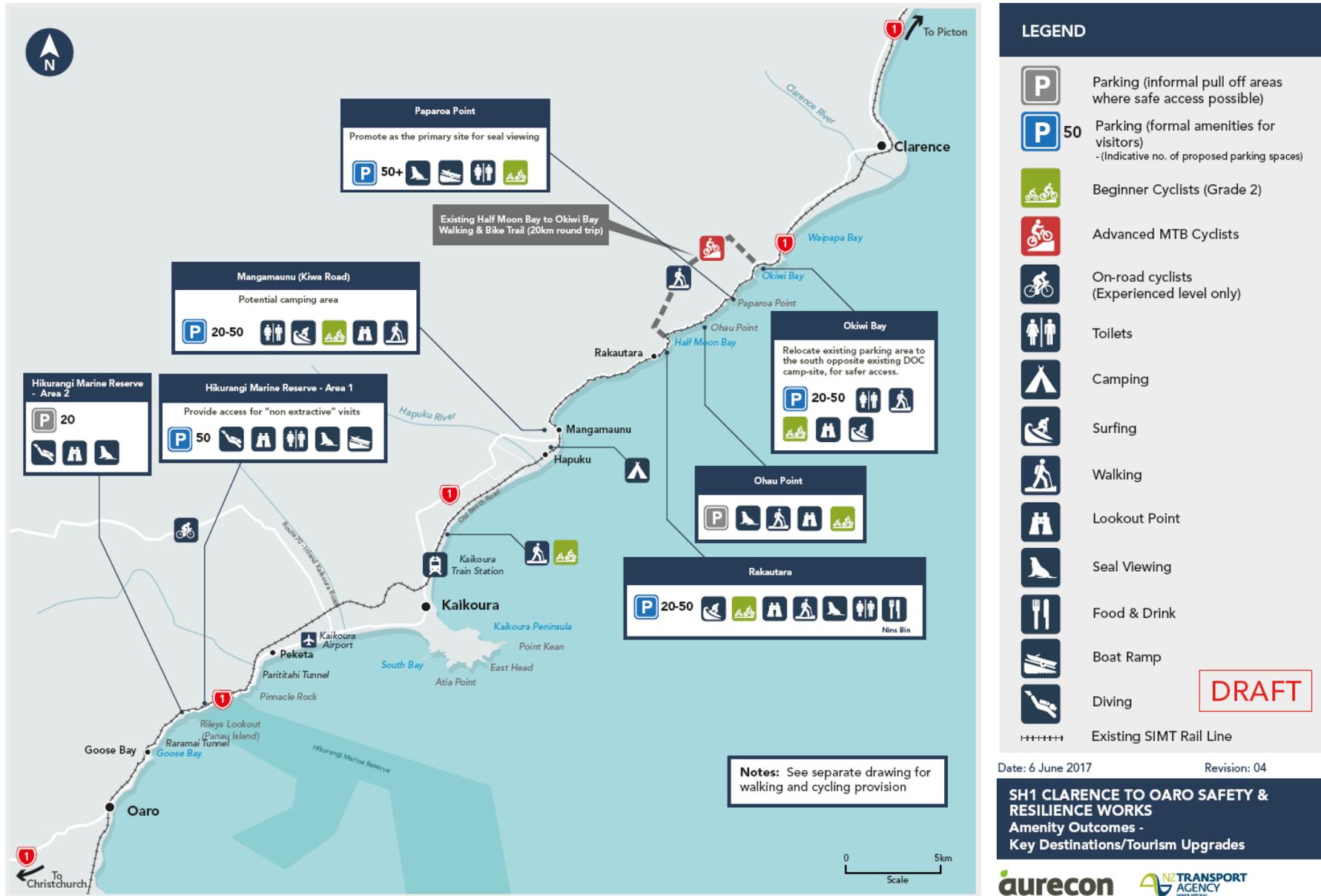


Figure 5 Recommended option amenity outcomes - walking and cycling works



LEGEND

- On-road cycling suitable for experienced cyclists only, some pinch points
- Shared use path - Off-road cycle track suitable for grade 1-2 cyclists (including families & day trips) and walking. (Narrow with many pinch points)
- Not recommended for cycling. Cyclists encouraged to use public transport connections or other routes
- Existing track
- Typical user groups:
- Road Cyclists within road shoulders (Experienced Cyclists)
- Beginner Cyclists (Grade 1-2)
- Advanced MTB Cyclists
- Track suitable for walking
- Existing SIMT Rail Line
- S Stopping places

Note:
- Localised stopping points/lookout areas for walkers and cyclists along off-road track

DRAFT

Date: 6 June 2017 Revision: 04

SH1 CLARENCE TO OARO SAFETY & RESILIENCE WORKS
Amenity Outcomes - Walking and Cycling



The recommended option delivers a safer, more resilient, more predictable experience for customers travelling along the routes. These transport outcomes are complimented by enhanced visitor amenity and facilities that deliver improved amenity experiences for tourists and provide opportunities for enhanced economic activity for the area.

Safety

The recommended option will provide an overall corridor 3-Star KiwiRAP rating. This is improved from the current predominant 2-Star rating and provides a safety level of service more commensurate with the ONRC of the corridor as a National Route.

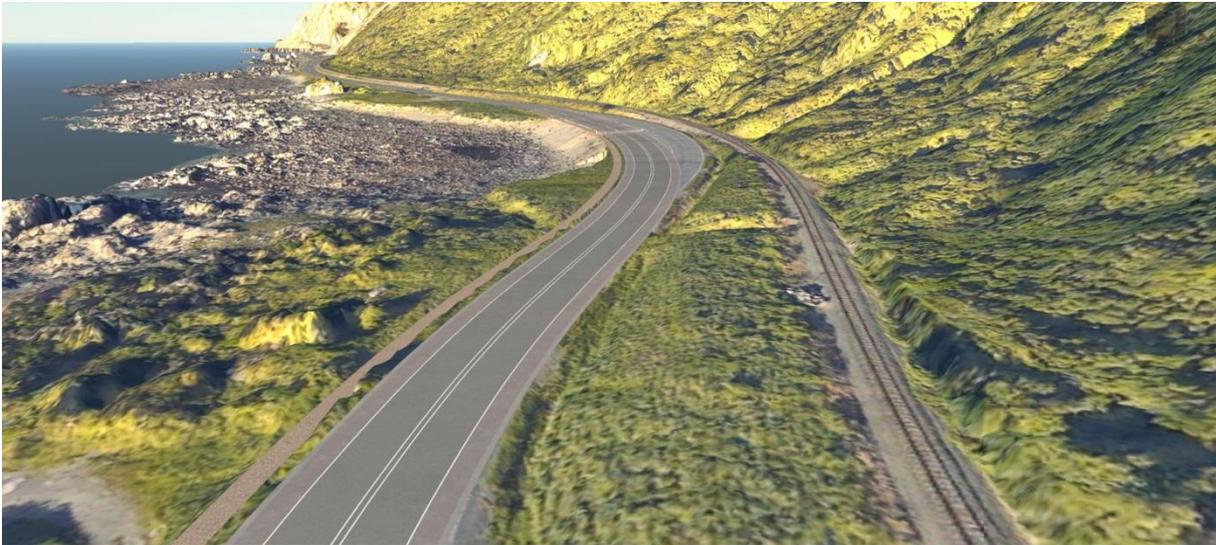
These safety improvements are forecast to deliver the following crash savings:

- 8 fewer deaths and serious injuries over a five year period, representing a 35% reduction.

The recommended option also provides for an enhanced safety outcome for walking and cycling users along the corridor, with generally an off line facility north of Kaikōura and widened shoulders south of Kaikōura.

Figure 6 provides an indicative perspective of the alignment in one section, conceptualised in 3D.

Figure 6 Typical alignment north of Kaikōura



Resilience

In undertaking the reinstatement works for the corridor, NCTIR are also enhancing the resilience of the route through increased slope protection works and other resilience enhancements. The resilience benefits of these works therefore largely lie with NCTIR's reinstatement package of works. However the recommended option provides greater separation from the rail corridor and wider shoulders generally that will result in a lesser risk of closures, further enhancing the corridor's resilience. There will also be improved incident management and response to reduce the risk and duration of closures.

Trip reliability

The overall corridor from Picton to Ashley River has a travel time reliability objective of +/- 30 minutes for this journey. To achieve this, the PBC identified passing lanes to be implemented between Clarence and Oaro. The recommended option provides a new passing lane just south of Clarence and shoulder widening throughout the corridor to achieve increased trip reliability for all customers. Given the number of freight users on the corridor, these measures are considered appropriate and necessary to ensure that the wider SH1 section of the Picton to Ashley River journey meets the trip reliability objective of +/- 30 minutes.

Visitor amenity and tourism

The recommended option will provide improved facilities for visitors to the area through enhanced parking and access to key visitor destinations along the route as well as better facilities at these locations (such as toilets and interpretation panels).

An example of the visitor amenity enhancements is included in **Error! Reference source not found.** below.

Figure 7 Example visitor amenity enhancements



This will greatly improve the experience for tourists to the area, encouraging them to stay longer in the Kaikōura District to enjoy more of the outstanding features of this section of the country.

The provision of an offline cycleway (shared use path) from Okiwi Bay to Mangamaunu (north of Kaikōura) will greatly enhance walking and cycling safety, accessibility and use. While the cycle connections north and south of this section will be developed by others over a longer time period, there is the opportunity for people to be transported to either end, and then cycle to enjoy the iconic coastline and view the seals around Ohau Point, combined with a “crayfish lunch” at Nin’s Bin in Rakautara to create a new day trip for tourists visiting Kaikōura. It is forecast that this facility could increase cycle usage in the area by approximately 20,000 people a year.

These works have the potential to increase the level of tourist activity in the area. There is an aspiration to have visitors stay an additional night in Kaikōura (and surrounds). Currently the average stay is approximately 1.75 nights. Increasing this by an additional night could increase the annual tourist spend in the area by approximately \$11M per year. It is anticipated that the increased amenity and accessibility that this project provides will assist in the realisation of this opportunity.

1.4 The problems

The study area for the business case was defined as the section of SH1 between Clarence and Oaro, including the urban area of Kaikōura, located on the east coast of the upper half of the South Island. The importance of the interconnections either side of this corridor have been acknowledged. Picton forms the gateway to the South Island, with the SH1 route down to Christchurch forming a key journey that customers, particularly tourists, undertake before travelling onward to other South Island destinations. Prior to the earthquake, Kaikōura was one of the South Island’s notable marine tourism destinations, offering both local and international visitors the chance to experience whale watching and seal viewing as notable examples. The community has aspirations to promote and realise Kaikōura and its surrounds as a significant tourist destination. This is particularly critical in the post-quake recovery environment.

SH1 presents some of New Zealand's iconic coastline, alongside high accessibility to the marine environment, as such, this route therefore has high appeal to visitors. There is a strong desire to develop this coastal route as an experience and 'great journey' as part of the region's tourism offering.

The pre-earthquake corridor did however suffer from a LOS that is not commensurate with the expectations of a National Route (which this section of SH1 is) as identified by the ONRC. The LOS deficiencies included:

- A KiwiRap star rating of less than 3, when a rating of 3 to 4 star is expected, which is resulting in a high level of deaths and serious injuries along the route;
- Travel time reliability is compromised by the lack of passing opportunities, with only one passing opportunity in the 60km length of the project. This lack of passing opportunity is compounded by the constrained geometry and volume of heavy vehicles along the route; and
- The route is closed (or partially closed) nearly once a week on average for unplanned incidents and therefore suffers from resilience risks (as demonstrated by the recent earthquakes which have closed the route for the last 6 months).

SH1 also represents a key freight corridor for the upper South Island. The volume of freight via truck is currently growing at 4% pa and this is forecast to continue. Currently, over-dimensioned trucks are unable to use this route and use the alternative inland route SH7, which takes an additional 2.5 hours. The proposed improvements will allow approximately 80 percent of over-dimensioned trucks to use the shorter and faster SH1 route in the future, representing a travel time saving with potential benefits to resulting in the cost of freight in the future.

Significant investment is required to reinstate SH1 as a result of the Hurunui/ Kaikōura earthquake, which is being undertaken by NCTIR (refer to Figure 8 below). As such the scale and nature of the NCTIR reinstatement works being delivered formed background considerations for the business case.

The NCTIR resilience and reinstatement works have been assumed to form the base case, or do-minimum option as outlined in Figure 9 below.

Figure 8 Example of reinstatement works (source: NZ Transport Agency Kaikōura Earthquake Update June 2017)



Figure 9 Kaikōura reinstatement works



The economic recovery of the Kaikōura District, including tourism, is an important consideration. There are affordability savings that can be achieved by undertaking additional safety, resilience and amenity improvements in conjunction with the NCTIR works. The NCTIR works represent a unique opportunity to capitalise on and leverage existing investment, to undertake some additional safety and amenity works at the same time, achieving value for money and increasing the benefits of investment from both packages of work.

1.5 Implementation

A total cost of \$224 million is the anticipated cost at this time. As the project develops the costs will be understood in more detail and value engineering applied to consider the most cost effective ways to deliver the project outcomes. Table 1 summarises the cost breakdown of the project.

Table 1 Recommended option cost estimate

Item	Discussion	Cost (M)
Base estimate	<ul style="list-style-type: none"> Based on assumptions outlined above 	\$201
Property	<ul style="list-style-type: none"> Based on estimated area of 10 hectares and \$100,000/ha plus urban Kaikōura properties 	\$5
Kaikōura town centre works	<ul style="list-style-type: none"> Based on BondCM costs 	\$17
Improved technology	<ul style="list-style-type: none"> For improved incident management and “telling the corridor story” 	\$2m
Total		\$225

Further discussion is required between the project investment partners to apportion these total costs between the different partners.

Using traditional EEM methods (safety, travel time, and vehicle operating costs) the **economic benefit cost ratio for these works is in the order of 0.6**. However if the economic benefit to the tourism industry identified by the project investment objective was delivered, the benefits could increase significantly and **the benefit cost ratio increases to above 1.0**.

The project was assessed using the latest Transport Agency Investment and Revenue Strategy profiles. An assessment profile of **H / H / 0.6** has been determined for the project using the Transport Agency’s funding allocation process.

The Kaikōura earthquake in November 2016 saw the creation of the NCTIR Alliance to reinstate the affected state highway and rail networks. Taking a broader, corridor-wide view, the Transport Agency have looked at the opportunity for improving safety, resilience, reliability and amenity for its customers whilst undertaking the reinstatement works. This business case has identified the preferred form of these works.

From an implementation perspective, it is desirable that NCTIR undertake these works while completing the reinstatement works for the following reasons:

- Disruption to customers** – Undertaking works once will provide less disruption for customers. Returning to undertake the works once NCTIR had finished would disrupt customers twice. There would also be potential reputational risk given the new works would be undertaken in a number of locations that the NCTIR had just completed.
- Efficiency of delivery (time)** – There would be a saving in time by not having to undertake a tendering process but critically in the mobilisation of resources and equipment. Without this efficiency it is highly likely that no works would be undertaken this year and the remaining works would be delayed by many months.
- Efficiency of delivery (cost)** – There are efficiencies in delivery by constructing the NCTIR and preferred option works at the same time. NCTIR have the machinery, equipment and resources on site already, and undertaking this project would complement this existing work, providing efficiencies. These cost savings have been estimated at least 5 to 10 percent given the remote nature of the works area.

The NCTIR reinstatement works for this section of SH1 are due to open in December 2017 and the Alliance is due to finish all works by June 2018.

For this project it is anticipated that:

- Approximately 25% of works will be completed by December 2017; and
- Remaining 75% completed by December 2018.

This is considered an ambitious timeframe for completion.

The recommended option represents an opportunity to deliver improved outcomes to customers who travel along SH1 from Clarence to Oaro whilst the earthquake reinstatement works are being completed.

The Transport Agency Kaikōura District Council (KDC) and the Department of Conservation (DOC) are considering future responsibilities for implementing the amenity improvements (including toilets, carparks, and cycle ways/ shared use paths), with the split of responsibilities likely to consist of the Transport Agency designing and building the improvements, while KDC having responsibility for the ongoing operation and maintenance.

1.6 Summary

There is a unique opportunity to enhance the safety, resilience, reliability and amenity for a wide range of customers on SH1 between Oaro and Clarence while the corridor is being reinstated by NCTIR as part of the response to the Kaikōura earthquake.

The recommended option provides a balanced suite interventions and improvements to deliver a LOS more commensurate with a National Route, within the constraints of the challenging terrain and environmental constraints.



*Bringing ideas
to life*

Document prepared by

Aurecon New Zealand Limited

Level 4, 139 Carlton Gore Road
Newmarket Auckland 1023
PO Box 9762
Newmarket Auckland 1149
New Zealand

T +64 9 520 6019

F +64 9 524 7815

E auckland@aurecongroup.com

W aurecongroup.com

Aurecon offices are located in:

Angola, Australia, Botswana, China,
Ghana, Hong Kong, Indonesia, Kenya,
Lesotho, Macau, Mozambique,
Namibia, New Zealand, Nigeria,
Philippines, Qatar, Singapore, South Africa,
Swaziland, Tanzania, Thailand, Uganda,
United Arab Emirates, Vietnam.