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The Bulletin Kaikōura earthquake update

Enjoy your Christmas travel



December the 15th marked the two-year anniversary of our biggest milestone to date - the re-opening of State Highway 1 north of Kaikōura, resulting in the reconnection of the coastal corridor to neighbouring communities that had been separated since the November 2016 earthquake.

This Christmas, it looks like we're on track to open two lanes all the way through, with reduced road cones and speed restrictions to help with the holiday flow of traffic. We hope you'll enjoy driving this beautiful piece of coastline and stopping at some of the newly opened safe stopping areas. Public parking is now available at Rākautara, Te Ana Pōuri, Ōkiwi Bay, Raramai and Toka-ānau. Paparoa Point is still under construction and will open in early 2020, along with the amenity block at Raramai.

Take some time to have a look at the pieces of cultural artwork, designed in collaboration with Te Rūnanga o Kaikōura, that are being installed at the stops. This includes information panels that explain the cultural and historical significance of the symbols used at each location. The safe stops will be formally 'opened' in 2020 when they are all complete, with artwork installed.

Most of the NCTIR crew will be taking a well-deserved break over Christmas, and will be off the roads by midday Thursday 19 December, returning on Monday 6 January 2020. From all of us here at NCTIR we hope you have a safe and happy Christmas!

A motorist's Christmas message to NCTIR



Hi there all you wonderful guys and gals,

Just been down and back to Kaikōura from Blenheim. So totally impressed by the work you have done, the care you have taken to protect and preserve wildlife, and your amazing interface with travellers. It was a pleasure to drive through, even though there were holdups. You are all so cheerful, friendly and responsive to travellers, even though we are probably a bit of a pain. It was a fantastic experience and I just wanted you to know that your efforts are truly appreciated and greatly admired.

Thank you all so much. You are stars.

I wish all of you a very Merry Christmas, and a Happy New Year.

Warmest greetings

Jackie Roberts



Artwork by Julia Lewis (Archaeology)

Three years on for NCTIR

December 2016 - 2019

It's been three years since the earthquake changed the landscape in Kaikōura and our work to repair the road and rail networks began. 2020 will be our final year on the project as we build safety and resilience into everything we do. Here is a look at how far we've come.



Jacob's Ladder temporary rail bridge removed

2016	
DECEMBER	The NZ Transport Agency and KiwiRail formed the NCTIR Alliance with four construction partners to restore the road and rail networks
2017	
JUNE	Access reinstated south of Kaikōura on SH1 First work train travelled the Main North Line from Christchurch to Kaikōura
JULY	\$231 million funding package announced to improve safety and resilience of SH1
AUGUST	
SEPTEMBER	Night rail freight open
NOVEMBER	
DECEMBER	SH1 reopened to connect north to south during the day
2018	
APRIL	SH1 opened 24/7
OCTOBER	Freight trains operating 24/7 Both Raramai tunnels opened for two-way traffic
NOVEMBER	
DECEMBER	Both Paritahi tunnels opened for two-way traffic
2019	
SEPTEMBER	SH1 through the Hundalees opened for two-way traffic
OCTOBER	Tunnel 11 and 19 rockfall protection extension slides complete Blue Duck road sealing and stabilisation complete
DECEMBER	All ex-cyclone Gita repairs in the Hundalees complete



AUGUST At Ōhau Point a construction access platform was cut around the hillside allowing crews from both sides to work together for the first time



NOVEMBER Kaikōura harbour reopened



OCTOBER Ōhau Point safe stopping area opened



NOVEMBER Coastal Pacific relaunched with a special service



OCTOBER Last sea wall block for the whole project placed at Half Moon Bay



OCTOBER Te Ana Pōuri and Rākauara safe stopping areas opened

ASK AN ENGINEER:

Why wasn't the seawall at Ōhau Point built higher, so the waves don't come over?



A number of options were considered for the reinstatement of the road around Ōhau Point including bridges and a viaduct. When assessing

the options the key considerations were:

- how quickly it could be constructed
- how much it would cost
- how it would perform in a future earthquake (reducing damage and making repair easy), and
- how likely is it to overtop (when waves come over the top)

The seawall option was selected as it was the quickest to construct, could provide access prior to being completed, was cheaper, and can be reinstated faster in the event of another earthquake. It also met the required overtopping frequency based on the survey and modelling which had been done at the time.

For the majority of the 3.2km, the wall has matched the modelling - but there is a 50m section at Ōhau Point which has proven to be affected by strong 3D wave effects, generating the few 'overtopping' events that we have seen.

The seawall has been constructed close to the maximum height possible, as to go higher meant that the wall would have needed to go further out into the sea. While there is a long term provision to increase the current wall by 1m, going any higher in the current location would make the wall too tall and skinny and it would not survive well in an earthquake.



July 2017

To mitigate the effects of waves coming over the road along that short section of seawall a number of measures are being taken. These include:

- Installing and testing a temporary steel wall with a wave return in place of the hand railing, which will be monitored to measure performance - this is reliant on further wave events, so may take some time for results to come through. This will be used to develop a permanent wall.
- Installing a monitoring buoy and camera and correlating the observations with weather patterns to develop a Trigger Action Response Plan (TARP - see page 5) with warning thresholds - this information gets fed back to Waka Kotahi NZ Transport Agency allowing them to make the call to manage traffic or close the road for a short period of time, until the event passes.
- Undertaking physical model testing at a hydraulics laboratory in Sydney to supplement the onsite observations and provide further certainty over the events which cause overtopping. The model testing will also assess whether a rock revetment or armour unit type solution at the base of the wall could be effective for consideration into the future.

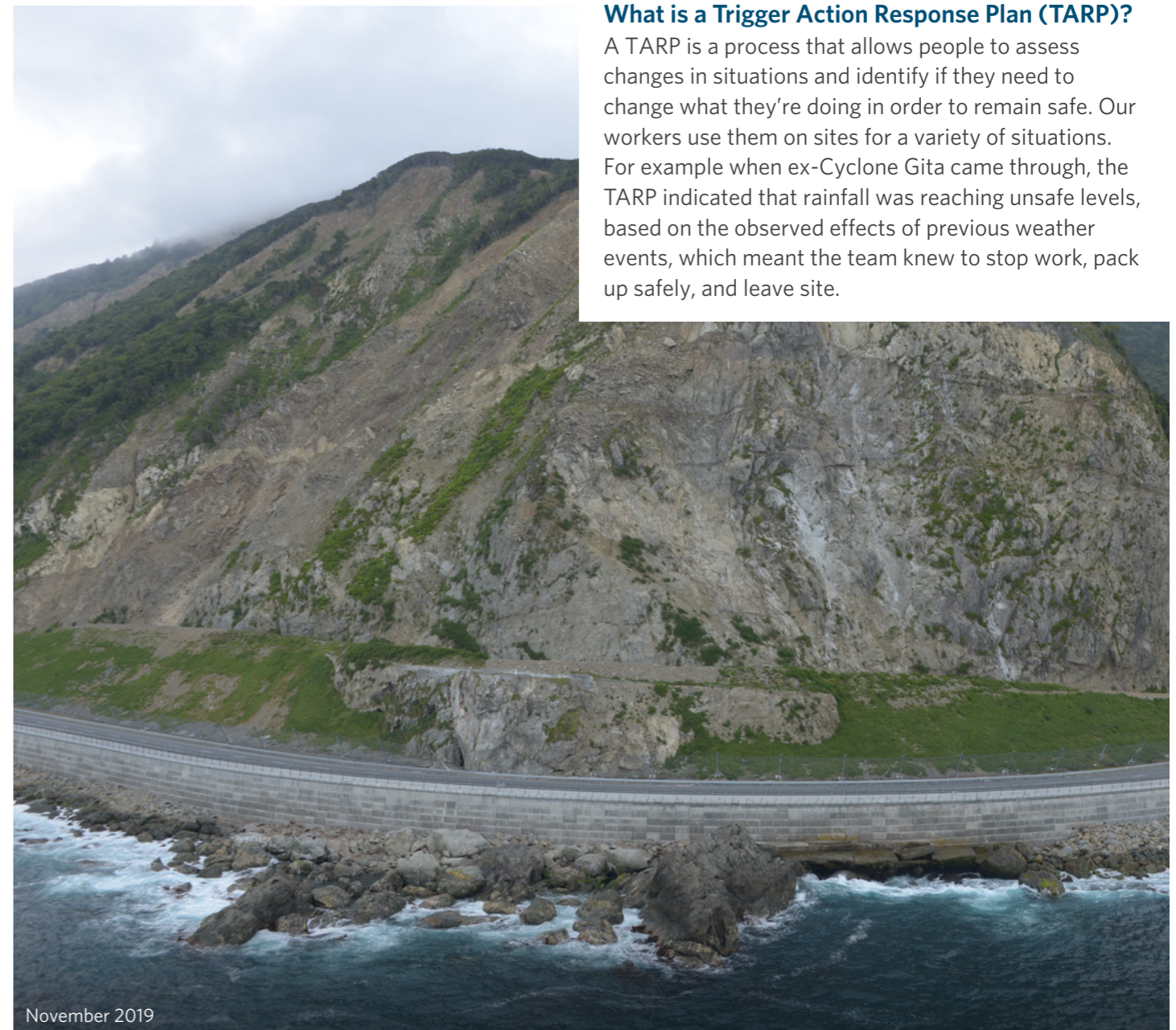
The end result, when our testing is complete, will be a permanent, low-cost mitigation improving the situation for that short section of wall that can be manufactured locally.



Ōhau Point at the end of June 2017. Seawall design began in May-June 2017, while the slip was still being cleared.



Early stages of seawall construction, September 2017.



November 2019

What is a Trigger Action Response Plan (TARP)?

A TARP is a process that allows people to assess changes in situations and identify if they need to change what they're doing in order to remain safe. Our workers use them on sites for a variety of situations. For example when ex-Cyclone Gita came through, the TARP indicated that rainfall was reaching unsafe levels, based on the observed effects of previous weather events, which meant the team knew to stop work, pack up safely, and leave site.

Your questions answered

Why are debris flow bridges needed?

Along the Kaikōura coast, north of Rākautara, there are three debris flow bridge sites within a 1km area, as well as one at Jacob's Ladder just south of Ōkiwi Bay. They have been built at these locations because of the large quantities of natural debris material remaining on the hillsides, which will continue to wash down in heavy rain events.

The bridges prevent debris material from blocking the road and rail, causing a hazard and disruption. An advantage of this design is that it requires less regular maintenance than other options.

How do debris flow bridges work?

The debris flow bridges are built to an appropriate size to pass rock and other material under the road and rail corridors and allow that material to continue on its natural course. To direct flow from the hillside

under the bridges there is a need to construct and maintain channels, bunds and walls.

Was there additional debris to be managed after ex-cyclone Gita?

When ex-cyclone Gita hit in February 2018 it exposed an additional erosion path north of Rākautara which increased the quantity of debris material coming down. This material remains on the seaward side of the road and rail corridor.

A significant volume of material remains on the hillside that will likely pass through the debris flow bridges at some stage. To manage this greater quantity of material a larger inlet on one of the bridges has been constructed and is due to be completed this month.

What happens when the inlet construction work is finished?

During construction of the debris flow bridges, rock protection

in the form of a large bund was constructed at the outlets to retain the naturally eroded ex-cyclone Gita material and minimise sediment discharge into the sea. To ensure the debris flow bridge at this site performs as designed, the rocks, bund and temporary works will be removed when the inlet is completed.

This will then expose the natural ex-cyclone Gita material to the sea and allow nature to take its course. There will likely be some initial sediment discharge, and during rain events and high seas it is likely some of this material will be slowly eroded away.

Is this work consented?

Yes. NCTIR works closely with Environment Canterbury and the Department of Conservation to ensure all aspects of the relevant consents are adhered to. Our environmental team monitor all work and particularly have an oversight of the sediment discharge to ensure it complies with the consents.



December 2019. New road and rail bridges with debris flow outlet. Note rock protection and bund on sea edge yet to be removed.

Engaging youth in the rebuild



Over the last three years, primary and high school students from across the district have had opportunities to get involved in the NCTIR rebuild with site visits and activities.

Recently, teenagers from the Kaikōura Youth Council were given an overview of construction works and engineering design around Ōhau Point. Geotech Engineer Sam Glue met the group at the safe stopping area and gave them an insight into the project.

Children from Kaikōura's primary schools have also been visiting sites to see the tile artwork they created earlier this year on display at three safe stopping area amenity blocks along the State Highway 1 coastal corridor.

Auckland artist Nicola Francis-Gibb and Rawiri Manawatu from Te Rūnanga o Kaikōura worked with the children to develop their designs, which followed a different theme for each safe stopping area.

Kaikōura Suburban School pupil Zara Smith said the whole process was special. 'It's pretty nice to have something like this, we don't get to do it very often and to have some art around our town. I really recommend people to come and see them, I think they'd really enjoy them.'

NZ Transport Agency Owner Interface Manager Colin Knaggs says involving the community is a key part of the NCTIR programme. 'We hope that by including projects for local children at the safe stopping areas we can help them to feel a part of the recovery efforts along the coastal corridor and give them a sense of ownership of these sites.'

Another school initiative, to mark the third anniversary of the November earthquake, was the delivery of a gabion basket and lots of rocks to each of the local primary schools. The students have decorated the rocks with their names and messages for the future and placed them in the baskets which will be displayed at each school.

Kaikōura Youth Council visit to Ōhau Point



Hāpuku School's completed gabion basket



Suburban and Hāpuku Schools visit their tiles at the new amenity block in Rākautara.

Culvert opening



Crews at Jacob's Ladder A celebrated the

early completion of their project, just south of Ōkiwi Bay, which wrapped up a month ahead of schedule. The temporary detour around this site has now been closed, with traffic returned to two lanes over the completed culvert on State Highway 1.

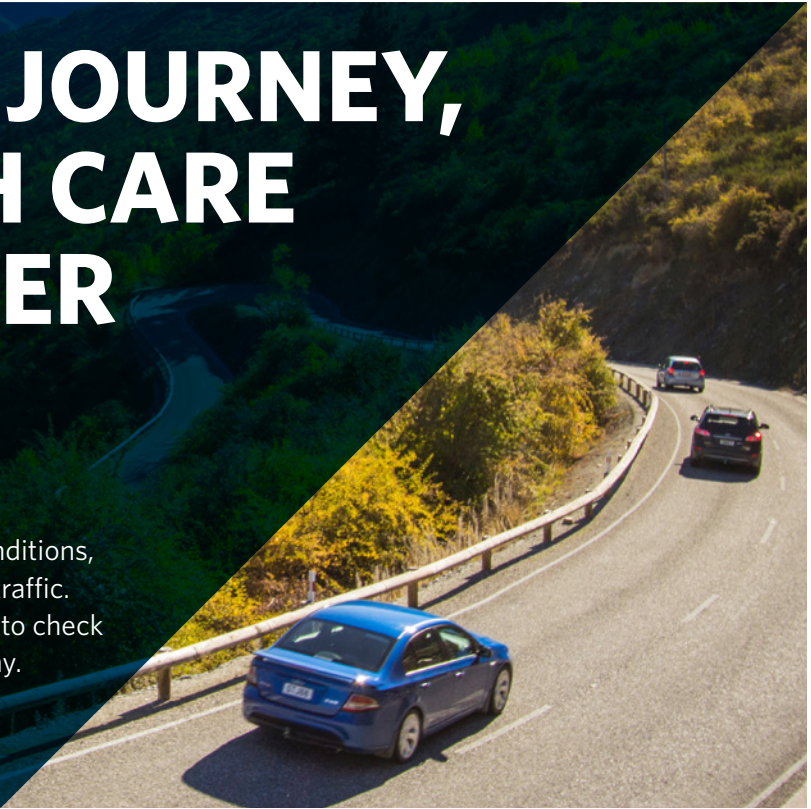


FOR A SAFE JOURNEY, DRIVE WITH CARE THIS SUMMER

STAY SAFE.
PLAN AHEAD.

This summer, take your time by driving to the conditions, keep a safe following distance, and be patient in traffic. For a safe enjoyable trip, use our journey planner to check real-time traffic information before you head away.

Check our journey planner tool at journeys.nzta.govt.nz



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This Bulletin provides the latest information about the rebuild of road and rail networks damaged by the Kaikōura earthquake in November 2016. The Bulletin is produced by the North Canterbury Transport Infrastructure Recovery (NCTIR) - an alliance representing the NZ Transport Agency and KiwiRail, on behalf of Government.