

# The Bulletin Kaikoura earthquake update

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SH1 NORTH



SH1 SOUTH

## WE'RE BACK ON THE ROAD

### Plan ahead and expect delays

After the road re-opened on 15 December, most crews stood down for a well-deserved break, helping traffic flows during the busy Christmas-New Year period. By Monday (15 January), the work programme will be back in full operation and this will have a significant effect on the coastal corridor.

'It's a balancing act to schedule work to have a minimal effect on travel time while also ensuring the work gets done,' says Transport Agency Journey Manager Tresca Forrester, 'Drivers should expect to take at least 5 ½ to 6 hours to drive between Picton and Christchurch on SH1, but should allow plenty of extra time in case of delays.'

The two most earthquake-damaged sections will continue to be closed at night (8.30pm to 7am) as a safety precaution. These are north of Kaikoura, between Clarence and Mangamaunu, and south of Kaikoura, between Goose Bay and Peketa. There will also be multiple worksites in these sections during the day operated by Stop/Go controls. Drivers should take extra care, drive to the conditions and adhere to all speed limits.

As experienced over the past fortnight, the opening hours are subject to change due to adverse weather. 'If there is a lot of rain or another significant event, we may have to close the road again for short periods of time for safety reasons,' says Tresca.

The alternate Picton to Christchurch route (via Lewis Pass) remains a reliable 24/7 option for travel between Picton and Christchurch. However, roadworks on this route – and on the Inland Road (Route 70) to Kaikoura – will also ramp up again from mid-January as the warmer, dry weather enables the extensive summer maintenance and improvement programme of work to be completed. 'Although road works can be inconvenient, drivers will have a better, safer journey once the work is done,' says Tresca.

Whichever route you take, the Transport Agency advises drivers to allow plenty of time for their trip, especially if catching a ferry or on a tight schedule, and to take regular breaks and share the driving if possible. Police will be working along both corridors to help road users stay safe.

For real-time travel information and details on SH1 and the alternate route go to [www.nzta.govt.nz/p2c](http://www.nzta.govt.nz/p2c) or call **0800 4 HIGHWAYS (0800 44 44 49)**. The Transport Agency recommends drivers check information at least two hours before travel and at key route decision points. Electronic signs displaying real-time information will also be positioned at important locations.





## THE LOGIC OF A ROAD CLOSURE

Safety of road users is paramount in our decision making about closing the road north and south of Kaikoura. This coastal route has always been vulnerable to high seas and weather conditions, and continues to be so as we reconstruct the road. Since the road opened on 15 December we have had four closures.

The weather has been a key reason for these closures. The MetService forecast stormy weather for 5 to 6 January so in the calm before the storm our teams met to plan ahead.

Once the storm hit, everyone reconvened early on 5 January. The decision was made to keep the road closed from the evening before as there was flooding on the road north of Kaikoura and the single-lane section, which retains slip 9 north of Kaikoura, at Waipapa Bay, had become unstable behind the block protection wall. South of Kaikoura rock and debris had fallen on the road and rail making it unsafe for public use.

Our team monitored the situation regularly over the day while following the weather report closely. 'After the 5.30am daily road inspection we realised that the predicted strong winds and rain had had an impact on the road and we had to keep it closed for safety reasons,' says Transport Agency Journey Manager Tresca Forrester.

Gathering at 6am, on 6 January further road assessments were made. Our teams started cleaning up windblown signs, bollards, road cones and trees from the Hundalees through to Ward and the road was reopened by 7am. 'We were relieved to have the road reopened as we want everyone to get to where they need to go and stay connected,' says Tresca.

But, by 2.30pm a truck got stuck north of Kaikoura near Waipapa Bay. A road closure followed as work got underway to remove the truck. The road reopened at 4.45pm and traffic started flowing again.

On 8 January, the road was closed as large overnight sea swells pushed seawall blocks onto the road near Ohau Point. The road was assessed at 7am and then again at 11am. Once the high tide had passed the blocks were slotted back into place with reinforcements and the road reopened at 12.18pm. We again briefly closed the road on Friday, 12 January in the morning due to the weather.

Managing the road during such events means planning ahead and working with key partners such as the NZ Police. Thank you to everyone involved in the process and clean ups, and to the public for their patience as we make sure the road is safe to use.



Our live action cameras show the height and force of the sea.

For up-to-date information on SH1 road open/closures call **0800 44 44 49** or visit [nzta.govt.nz/p2c](https://nzta.govt.nz/p2c)



Our teams replacing the seawall once the sea swells and the high tide had dissipated.



## RECONNECTED COMMUNITIES



Leo Kapp collects his daily dose of sushi from local sushi maker Kim Zen.

### Road opening boosts local businesses

Last summer in Kaikoura it was eerily quiet following the November 2016 earthquake. Now, with State Highway 1 re-opened, the town is bustling. At the top of the Esplanade in Kaikoura, Kim Zen prepares fresh sushi every day of the week. 'I am usually pretty busy, but this summer has been incredible,' says Kim, as customers flow in to choose from the bento boxes and assorted rolls that are on display.

'I've been here seven years running this business,' says Kim, from behind the counter where she continues to work, 'And there are lots of tourists since the road has re-opened. People are on their way to the beach or exploring, visiting shops in town. It's been very good for business.'

Another customer enters and Kim jokes with him that he comes in for sushi every day. He laughs and lifts his salmon avocado roll in the air, 'Of course I come in every day, the best sushi in the world is here!'



## TRADITIONS RETURN

The Laugesen family traditionally drive north on State Highway 1 from Kaikoura during the Christmas week to pick cherries at Cherrylands in Blenheim. Last year was one of few times in 20 years that Symonde and her family couldn't do this. This year with SH1 re-opening, she was thrilled to be able to rekindle their tradition and begin to have normality return to their lives. Two of their seven children went along for the journey to experience the new coastline and the new road. While driving over the Irongate Bridge, Symonde had a few facts and figures thrown at her via Google 'Mum, it's the fastest built seven span bridge in New Zealand,' her 19-year-old daughter explained from the backseat.

Symonde was shocked to see the change and in some parts couldn't look; it made it real for her and she now feels 'reconnected'.



Symonde Laugesen selling her homemade bread at the Kaikoura Farmer's Market.



## WAIAU FERRY BLUFFS

After 17,500 work hours, the project stabilising the Waiiau Ferry Bluffs, near Hanmer Springs with anchored mesh and installing a gabion retaining wall and guard rail was completed just before Christmas. Well done to the teams who worked on the project for six months and thanks to the local community and visitors for their patience during this time!



## INLAND ROAD (ROUTE 70) WORK UNDERWAY

The Inland Route between Culverden and Kaikoura has been improved and repaired during the past year. Because of the increased traffic using the road in 2016, combined with a wet and snowy winter, crews will be back from next week working on the road again. This means there will be some delays along the route, but ultimately it will mean a safer, smoother ride at the end of the summer season. Contact [southernlink@downer.co.nz](mailto:southernlink@downer.co.nz) for more information or with any queries.



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## OUR 2018 AGENDA

We are back working on the road and railway for 2018 to complete the reconstruction of these corridors and delivering a range of improvements along the corridor.

Last year we opened the harbour, the highway and the rail line to a limited service. This year our work will be quite different with our crews sharing the highway with those making their journey between Picton and Christchurch.

'Our priority is to continue to deliver high-quality work, while keeping our crews and travellers safe,' says NCTIR Project Director David Loe.

'We are working in a dynamic environment which can be unpredictable. Some areas have proven tricky, such as site 9 at Waipapa Bay, north of Kaikoura, which has an unsettled slip,' says David. 'In the year ahead we will be concentrating on delivering the solutions we have come up with for these areas, while also continuing to monitor and respond to them as required.'

Reconstruction work along the corridor will focus on completing rockfall protection on the coastal cliffs using a variety of methods, including mesh and fences, installing more-permanent protective walls and further developing rockfall catchment areas.

'On the coastal side of State Highway 1, we will be finishing the seawalls and bringing the road up to full height.'

On the rail network, bridges such as the one at Tirohanga, north of Kaikoura, will be completed. Once this happens, crews will be lifting the rail line off temporary structures and placing it onto repaired or new permanent structures.

State Highway 1 improvements are also on the agenda. Improved amenity areas such as toilets, stopping bays, information boards and the cycleway are being investigated (and this work will extend beyond 2018).

'This year's work programme will continue to meet safety, environmental, cultural and planning requirements, and we expect weather and sea conditions to continue to present challenges.'

'There's a lot of work ahead of us, and we're committed to communicating about what is happening and working with affected communities.'



Crews are back on the road sharing it with travellers





## TRACKING ROCKFALL



On-the-go data collected about rockfalls is providing a better understanding of how the slopes along State Highway 1 north and south of Kaikoura are performing. The road and rail infrastructure north and south of Kaikoura is vulnerable to rockfall from the 40-plus slips along the road.

To better understand the slips and rockfalls, our geotech teams have been feeding data about rockfall activity into an app by Fulcrum, which records the location and key information.

This includes the type of event (e.g. rockfall, landslide, etc), its cause, the amount of material involved, the size of fallen rocks, and whether the fallen material was caught by protective structures (if present) or if it landed on the road and/or rail corridor. The app automatically records the GPS location so the geotech crew can see where things are happening. More than 450 events have been recorded since we started using the app in late July.

'The earthquake has changed the hillsides, which means we are essentially dealing with new slopes,' says Geological Engineer Rori Green. 'There is a lot we don't know about them and how they will act in different circumstances'.

'By tracking the size, location, cause and effect of rockfall, we can better understand the behaviour of the slopes and how well protection measures are working.'

Rockfall causes can include rainfall, wind, earthquakes and even goats! Heavy rain is a particular trigger point for some of the slips, which is why the NZ Transport Agency and Kiwirail may decide to close the road and rail during some weather events.

The data collected helped inform our decision-making about opening the road last December. It will also help mitigate risks along the transport corridor. As more data is collected, the understanding of earthquake-affected slopes improves, allowing us to plan accordingly.

'This contributes to our efforts to protect the road and rail infrastructure, as well as the people working and travelling along these corridors,' says Rori.



Rockfall on the road after caused by rainfall last year



## SHARING THE ROAD

You wouldn't generally pass dozens of work sites on your morning commute, travellers are now sharing the road with NCTIR's crews as work along SH1 ramps up once more.

After a summer holiday break, NCTIR's crews are refreshed, recharged and ready to tackle months of work ahead to complete construction while also starting work on the new \$231m improvements package later this year.

Four retired American biologists who drove through a series of active worksites on their way into Kaikoura stopped for a bite at Nin's Bin. Glen Collier was impressed by how crews kept road users safe.

'The stop/go points were well marked and visible, everyone we passed waved and was very friendly. We felt very safe and other drivers were also cautious - there were no speed demons out on the road today,' says Glen.

Nancy Armstrong, also part of the visiting group, was impressed by the condition of the road.

'Due to the speed restrictions, this road was safer to drive on the left than other highways in New Zealand,' says Nancy.

Safety of people is NCTIR's number one priority. Health, Safety and Quality Manager, Stephen Bell says a strict safety plan had to be implemented before State Highway 1 could reopen.

'We needed to assess the entire corridor and make sure it was ready for traffic. We have reduced the speed across the route and have fenced off our worksites to keep them separate from the road,' Stephen says.

Crews working south of Kaikoura are used to traffic running through their sites, however this will be the first time workers in the north have had to share the road.

'More than a thousand NCTIR workers have taken part in a series of workshops during the last fortnight to make sure they're ready for traffic to start running through their sites.'



Retired American biologists and friends are all smiles after enjoying the delights of Nins Bin



Workers and road users share the coastal corridor

# ROAD REBUILDING AT OHAU POINT

## WHAT HAPPENED?

During the November 2016 earthquake, the largest and most complex slip occurred at Ohau Point. It took 8000 truckloads to remove 160,000m<sup>3</sup> of slip material before construction crews could even access the site to start rebuilding the highway. And although design work for the road rebuild began soon after the 2016 November earthquake, plans could not be finalised until the slip was cleared in winter last year and the site could be fully investigated.

## WHY DID WE MOVE THE ROAD CLOSER TO THE COASTLINE?

Rebuild options such as a tunnel, reinstating the former road, and a bridge, were investigated. The earthquake pushed the land up by up to seven metres, so there was more terrain to use for the rebuild. Moving the road and protecting it with a seawall was chosen as the most suitable solution because it included protection from further rockfall and could be designed to resist earthquakes and coastal weather. The seawall option was also flexible - the highway being able to be opened while construction was completed.



## WHAT THE FINISHED ROAD WILL LOOK LIKE

The road, now open to the public, is still 'under construction'. Once completed it will be, on average, five metres higher than it currently is. It will be wider than the old road, making it safer and more enjoyable to drive.







## OLD ROAD AND THE SLIP

Above the current road, the barrier of the old road is twisted and mangled by the fallen material, which came down in the earthquake and subsequent weather events. The old road is now being used as a protective catchment area for future falling rocks, using new rock protection structures.

## INNOVATION ON THE ROAD

With cliffs on one side, the sea on the other and a road susceptible to coastal weather and earthquakes, our design team made innovative use of state-of-the-art construction materials to ensure robust construction. This tested technology means the road has been designed to perform better during seismic and storm events and would be quicker to repair and reopen.



## EXPECT TRAINS AT ANYTIME

For the first time in more than a year trains and vehicles are sharing the coastal corridor.



## KAIKOURA CONTAINER MALL

Amazing spaces keep popping up in Kaikoura. Visit our transport recovery hub in Paper Plus at the new communal green and container mall area in the heart of Kaikoura to discover more about the NCTIR project - rebuilding the Kaikoura's harbour, reconnecting the Main North railway and reopening State Highway 1. If you are in Kaikoura, pop in for a visit, enjoy the outdoor green space, and have a go at the supersized version of Connect Four!





## HI HIGHWAY HELPERS

Donning a high-viz jacket, NCTIR's Highway Helpers have been travelling State Highway 1 since the reopening.

The face of the NCTIR rebuild, Highway Helpers have been providing support to road users between Picton to Christchurch. The eight-person strong team has travelled thousands of kilometres over the last month and will continue to be helping out on the roads until the end of the January.

For 22-year-old Liz O'Connor, the job has been fun, varied and extremely rewarding. The bubbly Kaikoura local is spending her summer holiday sharing advice with road users.

'It's great fun; it's awesome to be able to help motels, businesses and travellers, making sure they have up-to-date information about the road and leaving them with smiles on their faces.'

Dutch tourists Dylan and Aienke Otto spent three days holidaying in Kaikoura, enjoying the coastal life and sampling some of the seafood. Dylan says the information from the Highway Helpers was much appreciated.

'It was great to help us plan our journey, it's always good to have the most up-to-date news about the road.'



Highway Helper Liz O'Connor shares State Highway 1 information with tourists Dylan and Aienke Otto in Kaikoura

### HIGHWAY HELPER HOT TIPS:

**Q:** How can I find out if State Highway 1 north and south of Kaikoura is open today?

**A:** For real time travel info visit [www.nzta.govt.nz/p2c](http://www.nzta.govt.nz/p2c) or freephone **0800 4 HIGHWAYS**.

**Q:** How long will it take me to get from Picton to Christchurch if SH1 is open?


**A:** Plan for the journey to take a minimum of five and a half hours.

**Q:** Can I camp within the closure areas north and south of Kaikoura?


**A:** Clarence to Mangamaunu and Peketa to Goose Bay are two sections of SH1, which were badly affected by the earthquake and it is unsafe to camp in these areas overnight until all reinstatement work is complete.

## HOW DO I STAY UP-TO-DATE WITH INFORMATION THAT MAY AFFECT MY JOURNEY ON SH1?\*

The NZ Transport Agency is the best place to get the latest details 24/7. Get information on delays, travel times and road closures from the following ways:

 Sign up to automatically get emails about major events (or issues that require caution) which could affect your journey at [www.onthemove.govt.nz](http://www.onthemove.govt.nz)

 Visit [www.nzta.govt.nz/p2c](http://www.nzta.govt.nz/p2c)

 Phone **0800 4 HIGHWAYS**  
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\* The Transport Agency recommends you check your journey two hours before you travel as things can change quickly.



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SH1 NORTH



SH1 SOUTH



RAIL

## INNOVATING ON THE JOB

Geotech teams working on State Highway 1 (SH1) and the Main North

Line railway have been breaking ground developing a new type of rockfall protection wall.

The 2016 Kaikōura earthquake caused over 50 landslides along SH1 and the railway, to the north and south of Kaikōura. As our geotech, earthwork and abseiling teams removed landslip material and stabilised rock faces they began to investigate and install rockfall protection. While many protection options are available, including installing mesh, fences, and earthen walls, a protection wall was needed to suit narrower parts of the corridor.

'Using a bit of number eight wire thinking, we had to come up with a new design which would work in tight spaces and could withstand relatively higher energy rockfall impacts. The solution needed to suit the changed environment north and south of Kaikōura and protect key transport routes from future rockfall events,' says lead geotech Charlie Watts.

The newly designed modular wall has a narrower footprint than traditionally used reinforced soil walls, but can still withstand enough of an impact to protect infrastructure to required standards.

Large five-tonne blocks, which are being used to build seawalls on the coastal side of the corridor, have been repurposed and used for the modular wall. These are being reinforced by two closed metal cage baskets known as gabions. One of these baskets is filled with sand, and the other basket with rocks. The two gabions are attached to the front of the sea blocks and positioned towards the rock face lessening the force of falling rocks.

'Taking up less space in a tight corridor is not the only advantage of the modular walls,' says geological engineer Rori Green.

'They are also quicker to build and require a smaller crew to install. As a result, workers spend less time working in rockfall zones and the disruption to the transport network is shorter.'

The new modular wall will be able to be used further afield in New Zealand and we expect it will be of great interest internationally.

*Continued on page 2*



Standing proud as the new modular rockfall protection wall holds up in testing.



This weekly 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.

## Testing the modular wall

Full-scale physical testing was carried out in order to show the wall is up to the job. To do this, NCTIR joined forces with Stahlton NZ (which design the concrete blocks) and Holmes Solutions (which is renowned for its impact testing capabilities).

Together, they created a test 'bogie' to crash into the wall simulating a rock impact. The bogie hit the wall with energies up to 750 kJ, which is about 2.8 tonnes travelling at 90 km/h. The rockfall protection wall held up, proving it a viable option.



## STABILISING AND PROTECTING

A variety of tools in the rockfall protection toolkit are available to the geotech team. They generally fall into two categories: those which aim to stop rocks from falling (stabilising the slope) and those which act to catch falling rocks before they reach the road and rail (protecting the important things at the bottom of the slope).

One of the main stabilisation techniques we have used to stop rocks from falling is simply to remove the loose ones from the slope. This has been done by sluicing (using helicopters to drop buckets of water on loose rock), using abseilers to push and blast rocks from the slope, and using excavators to carve out more stable slopes. Another method used is to hold damaged rock in place by using a combination of rock bolts and mesh.

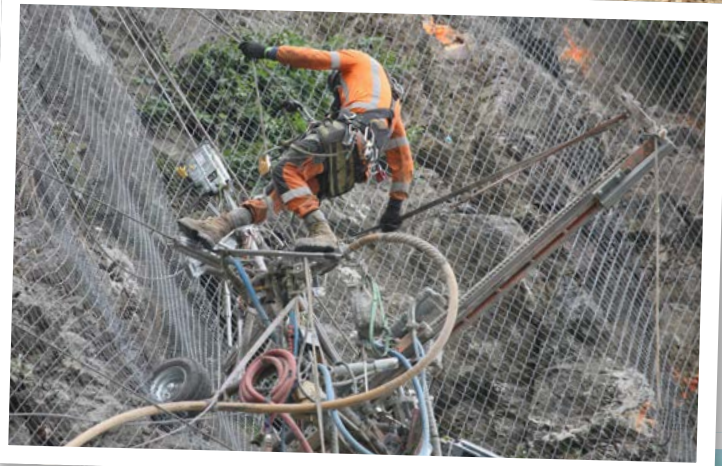
On the protection side, the design team is using flexible attenuator fences installed on the slope faces to slow falling rocks and reduce them bouncing. Catch ditches, net fences and walls are also constructed at the bottom of slopes.

The choice of the rockfall protection tool depends on a number of factors:

- what is on the slope
- how much material is left on the slope
- how big the rocks are, how high the slope is, and
- how much space is available at the bottom.

We have run rockfall models in the computer to help us understand the behaviour of the falling rocks so we can select and design the appropriate protection measures.

We will often use a combination of methods to create the safest outcome for our crews, the public and our transport infrastructure.





## ROAD USER NUMBERS

In the first month of State Highway 1 reopening, 139,000 vehicles used the route between Picton and Christchurch. Before the 2016 Kaikōura earthquake the daily average number was 3500 vehicles, although numbers usually spiked at between 5500 to 6000 vehicles per day during the holiday period.

After the highway reopened, the daily number of vehicles using the road has been between 3500 to 4000.

This varies day-to-day, with more than 5000 vehicles using the road on 22 December 2017 and 5650 on 29 December 2017. In terms of freight, there are an average of 600 to 800 freight movements each day.



## SIFTING AND SORTING

A special on-track 'ballast cleaner' machine was spotted on the Main North Line railway recently doing an important job of cleaning and screening the railway track ballast (stones). Ballast is the proper term used for the coarse stones, which form the bed of the rail tracks and support the track structure.

This ballast cleaner is an impressive machine – the specialist equipment is hooked together to create a train which is 230m long.

It works as a mobile screening plant and sieves out the 'good' stones from the 'bad' ones. It also removes any problematic vegetation, which can trap mud and dust and prevent the ballast from freely draining.



The ballast cleaner lifts the sleepers while sucking up and sifting through the ballast, disposing of the 'bad' stones, and redistributing the 'good' ones back on the track.

# WHAT HAPPENED AT OKIWI BAY

Okiwi Bay has significantly changed because of the 2016 Kaikōura earthquake. In the bay the beach has doubled in size and a more rocky shoreline is now exposed by seabed uplift. In the south of Okiwi Bay the earthquake triggered a landslide which covered the rail and road. Our teams had to remove 137,000m<sup>3</sup> of slip material and form a stable slope profile.



## THE LANDSLIDE

The earthquake triggered a landslide where weak rock collapsed along with the layers of loose gravel sitting above this rock. Our geotech and earthworks teams removed landslide material and reshaped the slip face to create flatter and more stable slopes giving it a carefully carved look. This new profile includes benches and catch ditches, and rockfall fencing will be put in to reduce the risk and impact of future rockfall.

To remove landslide material our earthworks crew created a route up the slip for diggers, which moved the slip material down to the base of the site. From the north side of Okiwi Bay a 3km access track was formed so machinery could get to the top of the hillside. From here, the earthworks team reshaped the loose gravel to reduce the upper slope height and to unload and improve the stability of the gravels.

The landslide wiped out much vegetation, but this should re-establish itself in time. On either side of the slip, the slopes withstood the earthquake because of the strength and quality of the rock present in these sections.



## CHANGES TO THE RAILWAY

Because of the slip, we moved the railway 7m out from the hillside to protect it from further rockfall. This year our geotech team will be replacing the containers, which are providing temporary rockfall protection at the base of the hillside, with permanent protection in the form of bunds and fences.







## CHANGES TO THE BEACH

The earthquake raised the beach by three metres, which is why there is additional seashore compared with before the earthquake, providing more space for beachgoers.

## WHERE IS IT SAFE TO STOP AND SEE THE CHANGES?

Here is a safe stopping area at the north side of the bay to stretch the legs and view the changes in the beach area. For safety reasons, please do not stop in any undesignated areas along this part of SH1.





## CONNECTING THE DOTS WITH LITTLE ONES

Since re-opening in December, SH1 from Picton to Christchurch has been bustling with travellers.

As of 8 January 2018, work has ramped up along the route as well. Kaikōura's Highway Helpers have been out and about informing visitors and residents of road conditions, estimated journey times, and sharing the [www.nzta.govt.nz/p2c](http://www.nzta.govt.nz/p2c) link for real time travel information. Last week they made some special visits to preschools to share messages with children and educators too.

Little Tamariki Montessori Preschool head teacher (albatross class) Judi Goff says the Highway Helper's visit was timely.

'It is current for what's happening in our town at the moment. The children have been talking about coming back on the roads from their holiday, and today at circle time we can come back to this. They can relate to the information they were getting as it was presented well.'

While adults plan and estimate travel times on SH1, children buckled into back seats make memories and form impressions of their own. Highway Helpers Liz and Tamara explained some of the basics of traffic safety and personal protection equipment and asked if the children had any questions, or if anyone had anything to share.

'I know what happened,' said one little girl, hand held high; 'they're doing lots of work on the roads because of an earthquake!'



## BACK TO SCHOOL ROAD SAFETY

When school is out traffic volumes traditionally drop off on most roads, but with the kids heading back to school next week the roads will be busier in townships along SH1, the alternate route and Inland Road.

### Tips for motorists:

- **Plan ahead and allow more time for your journey.**
- **Remember there will be more pedestrians and cyclists about, many of them young - and they can be unpredictable.**
- **Be especially careful around schools and watch your speeds.** Even small increases in speed result in a much greater increase in stopping distance, which can mean the difference between life and death for pedestrians.

If you're a parent or caregiver then it's also worth checking in with your kid - especially if they are going to be travelling to school on their own.

### Tips for parents and caregivers:

Help your kids choose the safest route to get to school and do a few practise walks or bikes with them so they're familiar with the route and the safest places to cross

- Remind them that any time they are crossing the road they must stop, look, and listen for any cars, bikes or cyclists before they step out.
- Set a good example and stick to the road rules. If you break the rules, kids can think it is okay to do it themselves.

**For educators wanting to teach road safety, check out these resources:**

<http://education.nzta.govt.nz/resources/primary>

<http://education.nzta.govt.nz/resources/secondary>



## THIS TIME LAST YEAR

North of Kaikōura, just past Halfmoon Bay, the 2016 earthquake triggered slip covered the road and pushed the rail line off its tracks into the sea. Since then, our crews have cleared 140,000m<sup>3</sup> of slip material from the road, rail and hillside, and restored the transport links at this location. Our earthworks and geotech teams created benches on the hillside to capture any landslide or rockfall. Hydro sprayed grass seed onto the hill has taken root and started to grow. This vegetation will help reduce erosion on this site.





## SAFETY AND AMENITY IMPROVEMENTS ON SH1 BETWEEN CLARENCE AND OARO

While work continues on SH1 to bring it back to its pre-earthquake state, the NZ Transport Agency and NCTIR are now looking at the detailed scope of the Safety and Amenity Improvements Package announced last year. The cost estimates for the package of improvements between Clarence and Oaro are being reviewed and more information is expected in March after the NZ Transport Agency Board meets. The delivery of the Safety and Amenity Improvements Package is expected to extend beyond 2018.

## SH1 DEVIATION THROUGH KAIKŌURA UPDATE

The NZ Transport Agency has deferred a decision on the Kaikōura Urban Access Improvement (SH1 deviation) until March 2018 to enable it to fully consider all the feedback and potential impacts of the proposal.

For example, the project consultation has raised flooding and geotechnical issues.

There are also social and cultural sensitivities within the designated corridor being assessed, along with other suggested opportunities for concept design refinement.

The Transport Agency is also reviewing the cost estimates for the project and will consider this alongside all of the SH1 safety improvements between Clarence and Oaro. There are many competing factors in this proposal, which leads to a complex decision-making process, currently underway. The final decision is therefore expected around March. The Transport Agency understands this may be a stressful time for affected parties and thanks everyone for their patience.



## EXPECTS DELAYS ON SH1 SOUTH AND NORTH

Over the next month, between 7am-11am (excluding weekends), we will be operating stop/go traffic at Parititahi Tunnel (south of Peketa) and north of Kaikoura at Ohau Point. This will mean delays of up to a maximum of 10 minutes at each site. The NCTIR team will be using helicopters to move high risk heavy loads over and above the road.

We appreciate everyone's patience while this work is underway. For travel journey information please check [www.nzta.govt.nz/p2c](http://www.nzta.govt.nz/p2c) or call 0800 4 HIGHWAYS (0800 44 44 49).

**Driven along SH1 north or south of Kaikoura since 15 December 2017?**

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## DRIVE SAFELY OVER THE WEEKEND

Expect larger traffic volumes on State Highway 1 (SH1) and other roads for Waitangi break. Depending on your journey plans, you may drive

through roadworks – possibly in scorching hot days or wet and windy weather. All these factors add to travel times and emphasise the importance of driving to the conditions.

### Summer is roadworks season

SH1 continues to have a number of earthquake rebuild work sites. Wherever you drive this weekend, you'll likely see some summer roadworks. While many work sites will be pulled back or packed away over the long weekend to help holiday traffic flow, some crew will still be working - sometimes in very hot conditions and often within inches of moving vehicles.

This is where temporary speed limits can save lives. Drivers who ignore these limits not only put themselves and other road users in danger, but also endanger the lives of our road crew who regularly report near misses. Everyone has family and friends to get home to at night. Please play your part and stick to speed limits.

### Hot weather can mean surface problems

Recent hot temperatures have been causing 'bleeding seal' or sticky surfaces on roads where the bitumen melts and rises above the chip seal road surface.

Crew travel up and down the roads laying small chip on top of affected areas to help absorb the bitumen. This could mean you drive through short sections where there a restricted speed limit but no crew in sight. If crew have been through laying fresh chip it may still be bedding in and speeding on this loose surface will flick gravel and bitumen up to damage your vehicle and other vehicles. You can also slip and lose control.

### Cold, wet weather can mean more slippery surfaces

Despite crews working hard to keep on top of melting surfaces, cooler wet weather dries the sticky black mess into a smooth slippery driving surface. This can be dangerous for speeding drivers who need to brake suddenly so drive carefully on black patches in wet or dry weather.

Plan ahead: check travel times and SH1 road status before you start your journey through [www.nzta.govt.nz/p2c](http://www.nzta.govt.nz/p2c) or phone **0800 4 HIGHWAYS** (0800 44 44 49).



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## LONG WEEKEND DRIVING TIPS

- If you see a black road surface ahead – slow down, follow posted speed signs, and drive to the conditions.
- Expect extra traffic and allow plenty of time to get to your destination this weekend, especially if you're catching a ferry.
- Drive prepared with water and food. Plan to take regular breaks.



## OUR PEOPLE ALONG THE CORRIDOR

When travelling through Kaikōura or along the alternate route (via Lewis Pass) over Waitangi weekend, spare a thought for the men and women

standing for long hours in hot temperatures.

Husband and wife Jill and Ray Taylor will be doing just this along the stretch of work sites south of Kaikōura between Peketa and Goose Bay. The two Spray Marks employees have been on the job for the past seven months.

They and the rest of their traffic management team have an important role. Not only are they keeping the travelling public safe, they also need to look after the crews working around traffic who can be vulnerable.

Their message for the traffic lining up at the stop/go signs is simple. 'Stay calm, be patient and observe the speed restrictions. There are a lot of people on the road and we're all trying to get somewhere at the end of the day,' says Ray.

While it can be frustrating passing through road works, Jill believes patience is key. 'I like to think that if I'm standing out in the hot sun and managing to be happy and smiley then it's going to have a flow on effect for other drivers - they too will wave and smile back and I'll help to make their journey just that little bit easier,' says Jill.

During the summer months hot weather is a challenge which comes hand in hand with the role. Covering up and keeping cool with fresh water is essential.

'The heat can also make drivers frustrated so we will talk to them and reassure them the wait time will only be a couple of minutes,' says Ray.

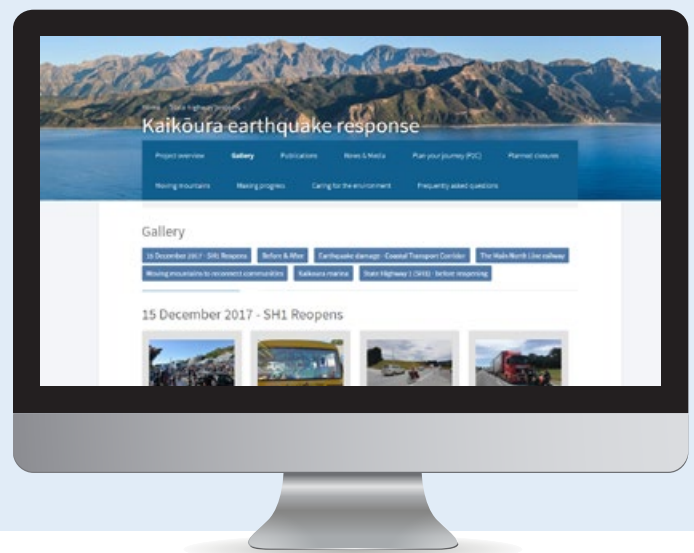
Despite the heat, the pair says the coastal experience is worth it. 'We saw whales and dolphins the other day - it's just amazing,' says Jill.



## FAQ

**Q:** Where can I find videos and photos which show the work NCTIR has done?

**A:** You can find all our videos and a selection of photos at [www.nzta.govt.nz/projects/Kaikōura-earthquake-response/gallery](http://www.nzta.govt.nz/projects/Kaikōura-earthquake-response/gallery). You will also find more information about the recovery and rebuild programme as well as view previous copies of The Bulletin at this site.



## WHILE YOU WERE SLEEPING...



You may not notice, but every night while State Highway 1 is closed the road around Ohau Point and Ohau Stream is slowly being built up millimetre by millimetre. By day it's a busy state highway, but by night numerous machines have taken over - turning the normally busy road into an even busier construction site.

By 10pm when darkness would normally cover the coastal highway, the site is bathed in light from numerous portable lighting towers, with trucks backing up and dropping off structural fill. A team of graders smooth the material out, slowly raising the level of the road.

Over the next few months the road around Ohau Point will swell another five metres as the road is built up 250 millimetres each night. For project manager Clark Butcher the challenge is ensuring the road is ready for traffic by 7am the next morning when SH1 reopens.

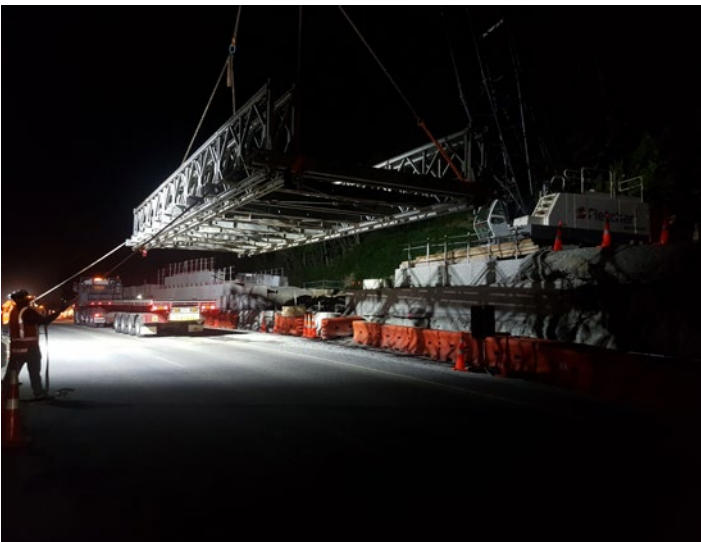
'There is a great deal of skill in time management to have the route ready for traffic. Between 5.30am and 7am our crews are tidying up the night's work, packing up the site and getting machinery off the road in time for it to reopen,' he says.

Each night a crew of 51 work on the 1900 metre stretch from south of the Ohau Point seawall to north of the Ohau Stream section around the Site 7 landslide.

'It's a logistical exercise. You're working at night under the cover of darkness and you need to be on your game to make sure you're not only doing your job but also keeping each other safe,' says Clark.

A seawall between five and ten metres high will stretch around the famous landmark of Ohau Point once complete. The coastal edge of the road will be sectioned off as a shared access path for cyclists and pedestrians with an up close view of the seal colony below.

'It will be a spectacular scenic ride that's for sure,' says Clark. Like many of NCTIR's team members, Clark is also looking forward to sharing the route with his young family. 'When my boys are bigger I'll take them for a drive around the coast or a cycle ride and I'll point out the seawall and say 'I helped to build that'. It will be a very proud moment.'



# FACTS TO PONDER ON YOUR JOURNEY



Mangamaunu



Irongate



Half Moon Bay



Ohau Stream



Waipapa Bay



Mangamaunu Slip 1B



Half Moon Bay



Ohau Point



Okiwi Bay

## Slips 1 - 9 BETWEEN MANGAMAUNU AND WAIPAPA BAY

There were 10 major slips north of Kaikōura.

### Site 1: Mangamaunu

- SH1 and the railway have been moved seaward, away from the cliff face. You are travelling on what was beach!

### Site 2: Irongate

- The fastest seven span 144 metre long bridge built in New Zealand's history - built in just 14 weeks!

### Small rail fences along the coastal corridor

- Purpose built fences and rockfall retention structures with remote monitoring can be seen along the Main North Line railway. These operate day and night to detect any material dislodged from slope faces that could fall onto tracks.

### Site 3,4,5 Half Moon Bay:

- Six rail and road debris bridges have been constructed (the last one to be finished this month). These allow debris flows to run underneath the road/rail without disrupting traffic or trains.
- The earthquake also lifted new rocks in the bay. These 'new' rocks are whiter, and sometimes covered in algae.

### Site 6: Ohau Point

- This is where the most complex and largest landslide fell.
- At its peak 14 abseilers worked on this site. The abseilers working to stabilise the cliff face have a camp at the top of the slip, some 300m up, which includes a helicopter landing pad.
- This is where the Ohau New Zealand Fur Seal Sanctuary and breeding colony is - seal handlers working with construction crews moved seals more than 11,000 times in 2017.

### Site 7: Paparoa south

- 241,000m<sup>3</sup> of slip material removed.
- One large rock has been blasted and the other will be blasted this year.
- The seawall being built will be 600 metres long averaging 4-5 metres high.

### Site 8: Okiwi Bay

- The earthquake raised the beach by 3 metres and the beach has doubled in size exposing a rocky shoreline.
- This slip is the one that looks the most man-managed of all - with earthworks having created visible 'terraces'.

### Site 9: Waipapa Bay

- 11,000m<sup>3</sup> of slip material removed.
- A piece of coastline rose about 5.5 metres during the earthquake.
- The Papatea fault line is clearly visible from the road and runs along the shore. It has created a lagoon.





## BRIDGE BACK IN ACTION

On Sunday 28 January at 5.00am, trains were stopped for a 40-hour window so a new permanent bridge could be brought into action at Tirohanga, north of Clarence. The works to connect the three span Bridge 129 included installing and aligning 800m of rail track.

In addition, within this 40-hour timeframe more than 1000m<sup>3</sup> of fill was used to build up the rail embankments leading to the new bridge.

A temporary bridge had been built at this location, replacing the existing severely damaged bridge so the rail line could be reopened. Structures Delivery Manager David Wyeth says leading up to the pre-approved 40-hour period, crews were working hard to complete all bridge concrete work and ensuring sleepers and track were laid ready to be connected.

On the Friday before the 40-hour timeframe, the 600 metres of rail embankment were completed. By Monday afternoon sleepers were laid, followed by rail, welding, ballast (stones), and then levelling.

Tamping to settle the ballast will be carried out within the next week. 'It's been awesome seeing it come together,' says Mike Smith of Titan Contracting, who is assisting KiwiRail in the project. The 40 hours of project work was a huge success.

Site Engineer Miki Schmidt says, 'We stuck to our programme to ensure no delays. Sunday at 6.00am works started, and by Monday at 8.00pm, the rail switchover had occurred. There is still some fine tuning to be done, but the track is ready for trains to go over the new alignment, and we are very happy with the work the crews were able to accomplish.' The first train used the new embankment alignment and bridge at 9.30pm Monday evening.





# TRUCK DRIVERS PLEASED TO HAVE TWO TRAVEL OPTIONS AGAIN

Keeping South Islanders stocked with everyday goods – from groceries to cars – was tough last year. Truck drivers were down to one route between the Picton ferries and Christchurch via the challenging, windy and narrow alpine Lewis Pass.

As truck drivers can only be on the road for a maximum of 13 hours before taking at least a 10 hour break, they could no longer complete a return day trip between Christchurch and Picton.

Having to reorganise business models - including hiring extra drivers - to meet daily demand was tough and costly for many business owners. So it's no surprise the freight industry has been one the most enthusiastic since the re-opening of the shorter coastal SH1 road.

NZ Trucking Association CEO Dave Boyce says while industry praise the \$60m improvement programme - which saw extra passing bays, pull-over areas and widening of the more narrow parts on the alternate route via Lewis Pass - ultimately it is still a longer and more challenging drive than SH1.

He says drivers now have two options again. And while there is still plenty of ongoing work to complete on SH1 with delays and less reliable travel times, 'day to day the crews on the ground are very helpful to drivers, and we particularly want to acknowledge the stop/go operators.'

NCTIR journey manager Tresca Forrester says the volume of freight drivers returning to SH1 has continued to steadily increase since it reopened, removing a lot of that traffic during the day from the alternate route.

While SH1 still closes in two sections each night 8.30pm to 7am and is susceptible to being closed in large weather events, freight will continue to use the alternate route for overnight travel and deliveries at this time.



Dave Boyce, CEO of NZ Trucking Association cutting the ribbon at the launch of the Safety MAN Safety Truck last year as part of an ongoing road safety programme.

## THIS TIME LAST YEAR

The Whales Back dip slip on the Inland Road (Route 70) meant in order to remove slip material we had to divert the road. Eventually the road will be moved back to its original route.





## MOULD YOUR OWN MOUNTAINS

Head along to the Kaikōura Museum and have a go in the Augmented Reality Sandbox set up by the NCTIR visualisation team. Part of the exhibit 'New Normal - the Kaikōura Earthquake Exhibition' the sandbox lets you experiment with the impacts of changing landscapes.

You can mould your own mountains in the sand and watch the landscape come to life with real-time augmented topographic contour lines and an elevation colour map.

You even have the power to make it rain - holding out your hand with spread fingers creates a virtual raincloud and adds water to the simulation - and the water flow simulation creates rivers and lakes of the runoff.

This 3D visualisation tool is created using a basic box of sand, a 3D camera, powerful simulation and visualisation software, and a data projector.

Pop along to create mountains and make it rain.



Footnote: The exhibit was built by Aurecon using Augmented reality Sandbox technology developed by the UC David Keck Centre for Active Visualisation in the Earth Sciences (KeckCAVES, [www.keckcaves.org](http://www.keckcaves.org)), supported by the National Science Foundation under Grant No. DRL 1114663. For more information, please visit [arsandbox.ucdavis.edu](http://arsandbox.ucdavis.edu)

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## CLEANING UP

Our crews are working to reopen State Highway 1 (SH1) and the Main North Line north and south of Kaikōura after the extreme weather this week.

Ex-cyclone Gita caused 60 slips along the corridor from the Hundalees, through to south of Clarence on Tuesday, with 302mm of rain falling in 24 hours at Rosy Morn south of Kaikōura.

‘Our priority is to make sure affected communities are not isolated. The Inland Road (Route 70) via Waiau and Mt Lyford remain opens and our earthworks, geology and engineering teams are working swiftly to restore access north and south of Kaikōura along SH1,’ says NZ Transport Agency earthquake recovery manager, Tim Crow.

Crews assessed the damage along the corridors first thing on Wednesday, 21 February following the cyclone; our teams on the ground clearing material as soon as it was safe to do so.

Clean up work is not limited to the Kaikōura coastal area, but also extends to the Hundalees with about 300,000m<sup>3</sup> of slip material needing to be cleared along the road and rail corridors. Temporary emergency access has been provided to residents of Oaro while the slips are being cleared.

‘We are a couple of days on from the event and have multiple crews out along the corridor to get the transport networks up and running,’ says Tim.

‘We do not expect the road to open until at least mid-next week and we will give an update on progress on the clean-up and road opening on Monday.’

The alternate route via Lewis Pass remains open between Picton and Christchurch.

‘We thank people for their patience as we work to reopen SH1,’ says Tim.

‘Whatever open routes people are taking in the upper South Island we encourage you to allow for extra time and to drive carefully and safely.’

Meanwhile, our crews are also working on reopening the Main North Line.

‘While there has been considerable damage, we have also noted many areas where the rail network stood up very well to the extreme rainfall,’ says KiwiRail Main North Line earthquake project director Walter Rushbrook. ‘We are in regular contact with our customers, keeping them updated on our progress.’

**Ex-cyclone Gita caused 60 slips along the corridor from the Hundalees, through to south of Clarence on Tuesday, with 302mm of rain falling in 24 hours at Rosy Morn south of Kaikōura.**



**TO STAY UP-TO-DATE**  
 Call **0800 4 HIGHWAYS**  
 Visit [www.nzta.govt.nz/p2c](http://www.nzta.govt.nz/p2c)

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# CLEAN UP PHOTOS FROM ALONG THE CORRIDOR





## UPCYCLING SLIP MATERIALS

Next time you are travelling State Highway 1 (SH1) north of Kaikōura you may notice a large number of earthmoving trucks carrying stockpiled slip material from north of Ohau Point to Waipapa Bay.

Over the past month, 20 trucks have been carrying 15 to 20 loads of slip material originating from three slips in and around Ohau Point up to the Waipapa Bay site each day.

The repurposed slip material is being used to build the foundation of a new road and rail alignment away from the slip at Waipapa Bay.

Known as slip 9, this site has proved itself troublesome.

‘It’s the slip that just keeps on giving,’ says project manager Zach Knuston (pictured right). ‘For long-term protection of the transport infrastructure and the people who use this we decided to move the road and rail closer to the coastline.’

‘So once this project is finished you will be driving further to the east and closer to sea bed rise of the Papatea fault line.’

Once complete, the team will have moved 80,000 cubic metres of repurposed slip material, which they are aiming to complete by the end of March. Work will then begin on moving the rail and then the road.

‘This is our second time round working with this slip material so you could say we are rather familiar with it – old friends even,’ says Zach.

‘We are pleased to be able to be reusing it to rebuild another section of the corridor.’

Once the road has reopened and while this work is being undertaken traffic will be down to one lane at Waipapa Bay. Thank you for your patience and consideration as you make your way through this section of the corridor.



Project manager Zach Knuston on site





## DIGGING IN

Driving north from Kaikōura at site 1 in

Mangamaunu there is new work going on. Preparations are being made for a concrete retaining structure, which will catch material from movement on the slip.

Site engineer Jordan Smith says, 'we are digging out the toe of the hill in order to create more room to place the L shaped concrete panels that will make up this structure'.

The panels range from one to three metres in height, and they will be placed at the end of the terra mesh bund south, all the way to the culvert - just before the start of the site.

'This work needs to be done because the road is so close to the slip. There is no room to put any other kind of structure there so the design team came up with this innovative solution, and we are doing our part to get this structure installed in the space we have,' says Jordan.

'Once the panels are placed, we will backfill behind them with no-fines concrete, which is the same material used on the seawall.'

The concrete will come up to the level of the panels. When that is completed, a rock anchor will be drilled through the concrete into the face of the slip to lock it into place.

Finally, a mix of gabion baskets and seawall blocks will be placed on the top of the wall to complete the structure.



## IRONGATE BRIDGE WORK

On the fastest seven span bridge build in New Zealand at Irongate Bridge our crews are working on the shared pedestrian cycle pathway. This pathway will eventually connect to the top of the seawalls. You might see our teams working along this section of State Highway 1 once the road reopens - please drive safely around these construction sites.





## CLOSURES IN THE SOUTH

Kaikōura's State Highway 1 (SH1) south of the town between Peketa and Goose Bay, closed around 9am on 14 February 2018 after a hiab (truck with a lift/crane attached to the deck) hit the left corner of the Parititahi Tunnel portal, damaging the entrance.

The NZ Transport Agency temporarily closed the road as a result.

'The tunnel portal had a small crack in the same area but this latest hit caused more damage which required stabilising,' says Transport Agency earthquake recovery manager Tim Crow.

A tunnel crew hand scaled the tunnel entry point that morning to break off loose and broken pieces of concrete. The team removed loose material and stabilised the tunnel entrance and then used reinforced shotcrete to help hold the entrance together. Mechanical bolts were inserted to further secure the tunnel portal.

'We are really pleased with the response from our teams to this incident,' says NCTIR network operations manager Tresca Forrester.

'The tunnel team were on site quickly, traffic management plans were put into place. We assessed the situation, responded appropriately to make the SH1 safe and had the road open relatively quickly considering the work.'

The work was completed that afternoon and the road was reopened at 4.30pm.

On 15 February 2018 SH1 south of Kaikōura was again closed. This closure was because of an accident, which occurred in the early evening. Traffic was flowing on the road from 7.30pm with one lane open.

Route 70 (Inland Route) remained open providing access in and out of Kaikōura to the south in both cases.



**THANK YOU FOR YOUR PATIENCE DURING THESE ROAD CLOSURES.**



**Always take care when driving through road work sites and follow the temporary speed restrictions to ensure everyone stays safe on our roads.**







## KAIKŌURA A&P SHOW ALL GO

The 105th Kaikōura A&P show is on this Saturday, 24 February at South Bay Domain in Kaikōura. If you are travelling to the show from out of town you will need to take the Inland Road (Route 70) as State Highway 1 north and south is expected to be closed at least until mid-next week. Please drive carefully and safely. Thank you for your patience and enjoy the show.



## SAFER AND STRONGER ROADS

Our teams are busy south of Kaikōura along the Inland Road (Route 70) replacing a culvert and widening the road to make it safer.

Working since early September 2017 to replace the existing culvert, which had cracked and collapsed during the 2016 earthquake, the crew built a temporary road diversion around the site to allow traffic to keep flowing while construction got underway. Water from the creek, which flowed through the culvert, was dammed and pumped at low levels through piping downstream of the new structure and all fish were relocated before the piping began.

‘We have been provided with an opportunity to not only rebuild the culvert to the current water catchment requirements, but to also improve the road geometry and to include new guard railing making improvements for the travelling public,’ says project manager Keith Larson.

Parts of the job have been challenging, such as working in such a narrow section of the route, but the end product will be an improvement for road users in terms of travelling more safely, greater capacity for water flow in storm events and consideration for the creek population with a fish friendly design.

The team is expecting to finish the work in early March.



The earthquake damaged culvert



The culvert being replaced on the Inland Road (Route 70)





## THIS TIME LAST YEAR

This time last year we had dredged more than 10,000 cubic metres of material from the main marina channel. We used this material to construct a watertight enclosure area which was pumped dry. This allowed construction work to get underway to deepen the marina basin below the waterline within the harbour. In July 2017, we handed back the Coastguard ramp and by October 2017 the boating ramp and berth piles were installed.

Ninety per cent of the work was completed and Whale Watch was welcomed home as two of the four berths were finished. The fully restored Kaikōura harbour opened on 14 November 2017 – one year from the earthquake.

### What the restoration took:

- More than 20,000 cubic metres of dredging
- 132 pile holes
- 850 cubic metres concrete
- 31,000 person hours
- Clear safety record with no accidents.

THEN



NOW



Photo credit: Dennis Buurman



SH1 NORTH



SH1 SOUTH

## HAVE YOU USED STATE HIGHWAY 1 NORTH OR SOUTH OF KAIKŌURA?

Have you driven along State Highway 1 north or south of Kaikōura since 15 December 2017? Take our quick survey and be in to win a \$200 Prezzy card! The final draw will take place on 15 March 2018.

Enter at [nzta.govt.nz/p2cjourney](http://nzta.govt.nz/p2cjourney)



## SEAWALL CONSTRUCTION CONTINUES ALONG STATE HIGHWAY 1 JUST SOUTH OF OHAU POINT



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## COORDINATING WORK

It is back to business as usual along the State Highway 1 transport corridor.

While the transport corridor was closed for ex-cyclone Gita clean-up work, we also undertook some planned work on the road and Main North Line railway, which was considered too unsafe to carry out when the road is open.

'We said goodbye to a large boulder known locally among our geotechnical team as Rocky,' says networks operations manager Tresca Forrester. 'It was blown up while the highway and rail were closed to remove any potential risk it posed if it came loose in the future.'

By undertaking this work as well as some critical rail work (see page 3) it has reduced the likelihood of having to close the road again in these areas. Our earthwork teams continued to remove the 300,000 cubic metres of debris material that came down in the cyclone and to make the road safe to reopen.

The Hundalees were particularly impacted by Gita. Along a few sections of the route, parts of the road have dropped away and the road is down to one lane as crews work to reopen two lanes. We have been continuing with our earthquake repair and improvements work along areas of the corridor, which were not so affected by ex-cyclone Gita.

## IN THIS ISSUE

- NCTIR transitions to a new project director
- Performing as designed
- Goodbye rocky
- Rail Bridge 131
- Alternate Route via Lewis Pass
- Where to expect delays



Kostatino Mua and team are busy on the Hundalees fixing the road

### Road opening need to know

- Expect extra delays as long stretches of highway will be single-lane because of ongoing repairs. SH1 new opening hours are 7.30am - 7.30pm (previously 7.00am to 8.30pm) because of fading light.
- The closure point south of Kaikōura has moved to the SH1/Leader Road intersection, extending north to Peketa. People living within this area are allowed access from the south side, but there will be no through traffic to Kaikōura outside the opening hours. This closure point will be reviewed once work has been completed on areas of highway in the Hundalees north of Leader Road.
- No change to the overnight closure point on the north side of the town - it remains closed between Clarence and Mangamaunu.
- Expect trains at any time from any direction along the rail corridor adjacent to SH1. Cross only at the level crossings and watch out for rail vehicles that are working across the line as part of the recovery.

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# LEADERSHIP HANDOVER

NCTIR project director David Loe has hung up his NCTIR hard hat for the final time passing the leadership of the project to Brian Kirtlan, NCTIR's construction manager for the past year. Brian brings with him 30 years of experience in construction, maintenance and supply chains.



## Passing the baton - David Loe

As I pass on the baton to Brian I have mixed emotions - this project has been my life since coming joining the team in November 2016 and then becoming project director in June last year. I have concentrated my personal and professional energy into moving mountains to reconnect communities. It has been challenging work, but hugely rewarding and I am sad to have hung up my hard hat and taken off my steel caps for the final time.

It was a massive target to get the highway open before Christmas - an ordinarily unachievable target, but we kept our promise. The highlight was 15 December 2017, road opening day. From driving over Irongate Bridge before dawn with the stars still hanging in the sky, lighting up the stillness of the beautiful Kaikōura coast to later in the morning joining the Kaikōura community to celebrate.

Other highlights herald from the early days of the recovery when we were housed in Portacombs known as the chicken coop and forming a team on the go who didn't know each other, but all had the focus of restoring the transport infrastructure. As NCTIR quickly expanded, it drew thousands of people from all over New Zealand and internationally. This diversity and gathering of expertise has resulted in an amazing team and innovative approaches. We also have had a number of young graduates starting out with us on this career-defining project.

I acknowledge we have all been on a journey, which has not been marked out clearly for us; we have had to feel our way and make a plan out of nothing. I want to thank the NCTIR board, KiwiRail and NZ Transport Agency as we have worked through these challenges to meet the needs of New Zealand's communities.

Many of our crew who have been working away from their homes and families during this project will understand my reasons for departing - to return to my family after they have kindly lent me out for over a year now. It won't be a complete cheerio as I will be keeping in contact to see how progress is going as the team completes its work. As I hand over the project to Brian's management I know I am leaving it in safe hands.

## Continuing the race - Brian Kirtlan

I am excited to be stepping into David's boots, leading a world-class project rebuilding and strengthening our transport infrastructure. As NCTIR's construction manager, I have spent the past year in spectacular Kaikōura, working along the phenomenal coastline where the mountains meet the sea with our 1,300 team members on the ground reconnecting our coastal communities to the rest of the country.

It has been an incredible and an emotional year too. When the first train rolled into town last September, it was a feeling like no other. Then it was an absolute highlight to watch the aftermath of the road opening and to see Kaikōura's streets transition from high viz crews to a thriving tourism hub. And, it's been terrific to see the harbour being used by tourists and locals.

As I take over from David we are moving into a new phase of the project, focused on making sure the corridor is reliable and can withstand the forces of nature. We will also provide a fabulous legacy with the shared use pathway, amenity areas, and safety improvements. What a treat to be able to cycle or walk along one of the most stunning sections of State Highway 1.

My team and I are also focused on delivering value to New Zealanders, KiwiRail and the NZ Transport Agency - for us this means being efficient and effective. Goals we will be aiming to deliver this year include increasing the level of freight service to 24/7, having the Coastal Pacific passenger service up and running again, and fully opening State Highway 1 - 24 hours a day, seven days a week.

We will continue to get our workforce home safely to their loved ones while also developing the next generation of the engineering industry.

I am looking forward to working alongside our teams, the NCTIR board, the NZ Transport Agency, KiwiRail and the communities as we work through this next phase of the project.



## GOODBYE ROCKY

Our geotechnical team blew up 'Rocky' while the road was closed because the Gita clean-up. The 700-tonne boulder, just north of Kaikōura near Ohau Stream, had ninety-two holes drilled into it. These were loaded with a combined total of 32kg of explosives. Visit <https://goo.gl/FuvkP4> to view the video of Rocky being blown up.



## MAKING THE MOST OF THE WEATHER AT BRIDGE 131

Rail Bridge 131 in Wharenui, north of Kaikōura was built before 1915 and sustained irreparable damage in the November 2016 Earthquake. After evaluating options, a temporary graffiti'd span nicknamed, 'the ugly bridge' was installed in May 2017 to allow the Main North Line from Picton to Christchurch to reopen.

This temporary fix allowed freight trains to use the bridge, but a permanent concrete ballast deck was required for the return to full line speed. 'It was a priority that this work happened quickly and efficiently to minimise interference with KiwiRail's scheduled services,' says site engineer Sarah McCallum.

Preparations were made to lift the temporary span out and to push the new deck, which was fabricated off site into position on 4 March 2018, during the 40-hour closure of the line. But when ex-cyclone Gita came through causing unexpected closures, the team worked quickly to use the closure, and completed the permanent repairs at Bridge 131 ahead of schedule.

'It was an awesome effort,' says Sarah, 'from preparation and design through to the team making the most of the unplanned closure; this was a job well done.'

This completes work at another major damaged site on the Main North Line, and contributes to reducing the transit time of trains in the network.



The temporary 'ugly bridge'



The new bridge 131 being installed



## PERFORMING AS DESIGNED

Slopes engineered over the past year to reduce the risk of slips, performed as expected despite the force of ex-cyclone Gita.

Heavy rain brought 300,000 cubic metres of material down by the way of debris flows along State Highway 1 north and south of Kaikōura. 'In engineering terms, what we are dealing with because of ex-cyclone Gita are not slips,' says project director David Loe.

'These debris flows are made up of unreachable material on steep coastal cliffs, loosened by the earthquakes and flushed out by the force of the rainfall.'

The intense rainfall flushed the debris along already established creeks or streams up the hillsides.

'What we are pleased about is that where we had undertaken remediation work along the coast on slips caused by the earthquakes, by using water or earthworks to remove loosened material, by cutting benches, planting vegetation and putting in rockfall protection, these slips performed as expected, despite the high rainfall,' says David.

'This is good news to the ears of our geology and engineering crews who have been working over the past year to protect the road and rail infrastructure along the corridor.'

All this work meant crews could quickly access sites where the rain has caused debris flows to come down and get started on clearing it away.

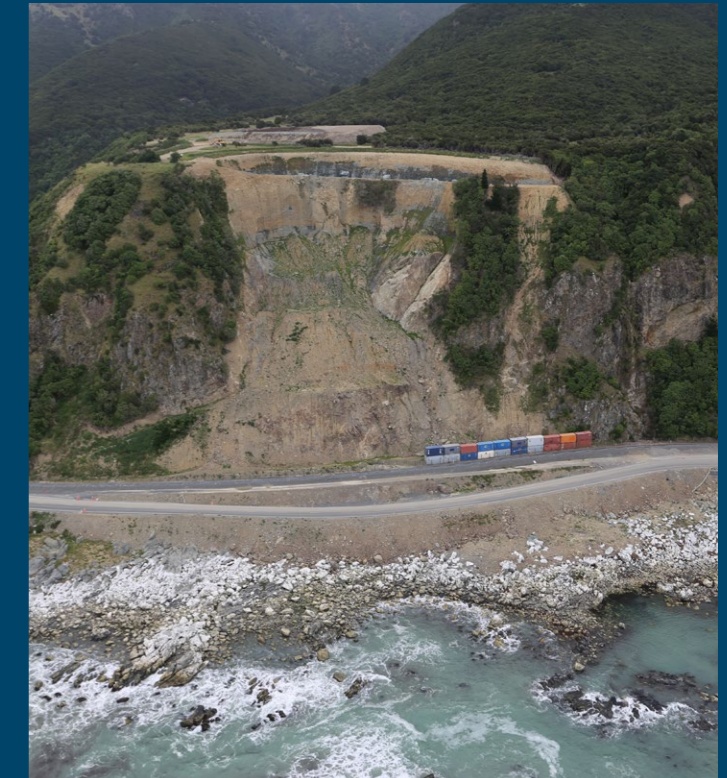
Our engineers are analysing new debris flows and reviewing how to mitigate the risks posed by these to protect State Highway 1 and the Main North Line, as well as those who use these corridors in the future.

'This event was a great test of our new defence systems. We're confident as time goes on and our work is completed that the route will be more resilient during future weather events,' says David.

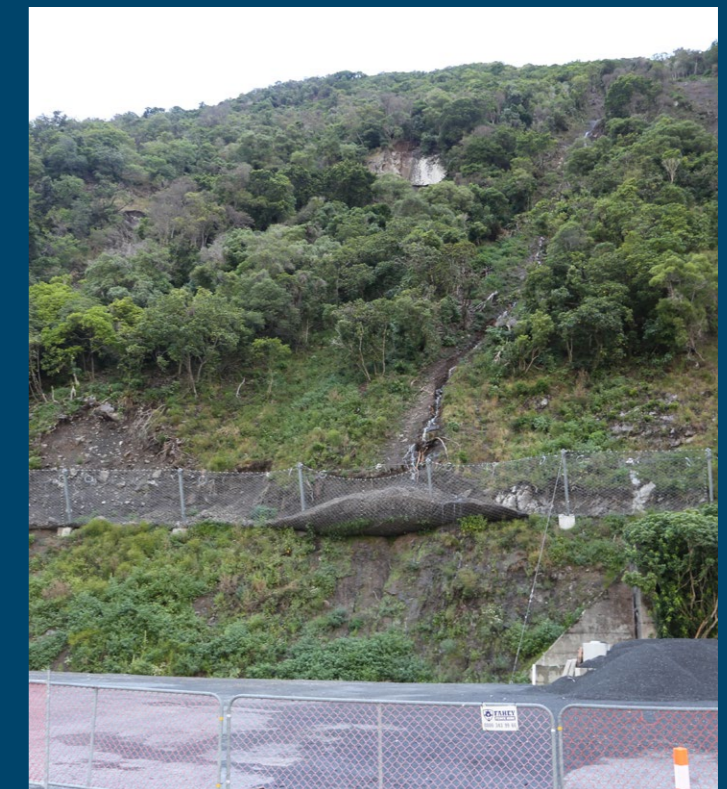
### Rockfall protection wins



At Site 1 near Mangamaunu a new gabion basket rockfall protection wall stood up strong, on one side sat an untouched road and rail line, and on the slip side, fresh material was piled up ready to be collected and removed.



Earthquake slips at site 4 and site 8 were cleared last year and the slopes were scaled back to reduce risk of further slips. Benches were cut into them and seeds were sprayed at Slip 4, all of these factors stabilised these slopes which performed as expected in the weather.



Adjacent to Raramai Tunnels, south of Kaikōura the rockfall fences have collected material, keeping it from falling on the rail below. The material collected has been emptied safely.



## LEAVING A SAFER LEGACY

When the 2016 earthquake closed State Highway 1 north of Kaikōura, the commuter, tourist and freight traffic shifted on to what was the only major economic lifeline for the upper South Island – the alternate route.

This Picton to Christchurch route, via Lewis Pass, was narrow, winding, challenging and never designed for this level and type of traffic. Virtually overnight, the highway began deteriorating requiring an immediate programme of road reconstruction, resurfacing and repair works. It was a concern for those living along the route, those driving it, and the NZ Transport Agency to keep it safe and open for drivers.

The NZ Transport Agency committed \$60 million for improving the route and a hi-viz roading crew quickly ramped up along this 398km stretch to deliver:

- Safety work, improved road markings, additional signage and guardrails, improved approaches to the small townships, and temporary reduced speed limits through high-risk areas.
- Bailey bridges and traffic signals at the higher risk one-lane bridges.
- Improved network resilience where slips and river scour were occurring.
- Around 40 new slow vehicle bays for slower vehicles to safely pull over and let others pass.
- Mobile phone hotspots installed in areas with poor or no coverage.
- Additional facilities for travellers and freight needs, such as parking and trailer swap areas.

In total, more than 70km of the road was widened, and about a third of the entire route was resealed or rebuilt.

The reopening of SH1 via Kaikōura on 15 December 2017 saw alternate route traffic levels reduce, back towards pre-earthquake levels. Recent SH1 closures have reinforced the vulnerability of the yet to be completed parts of the coastal SH1 route and how important the alternate route remains.





## IT'S NOT OVER YET - WORK IN YEARS TO COME

While the \$60 million funding has been fully allocated and drivers will shortly see a drop-off in the number of road sites and activities with the seasonal change to cooler, wetter conditions, there is still much to do. As crew start switching to 'winter maintenance' mode next month to keep the road safe and serviceable, there will be much planning in readiness to restart and continue an important improvement and maintenance programme in summer 2018/2019, and for many summers to come.

## COMMUNITY AND POLICE MAKE IT POSSIBLE

So much has been built and improved in such a short time on this route. And with sometimes 30-plus stop/go sites to navigate adding travel delays, anxiety and frustration, community and road user patience has played a big part in what the crew has been able to deliver. Dedicated police teams have also been crucial to keep this busy road safe for drivers and work crews. It has been a huge and collaborative work programme to leave this vital upper South Island lifeline in much better shape, creating a future legacy for years to come.

## SPOTLIGHT ON HOWARDS NARROW

North of St Arnaud a 4km previously narrow 5.8m strip of road navigating between a sharp cliff and a steep drop-off would see passing trucks clip each other's wing mirrors. All that extra traffic made it a frightening and dangerous section to drive, and this section of the alternate route became the single largest improvement project within the \$60m programme. After many months and a massive facelift, the now at least 7m wide road is no longer so narrow - another lasting improvement.



## BEFORE AND AFTER

At Jacob's Ladder north of Ohau Point the force of ex-cyclone Gita brought down 200,000 cubic metres of material, which went across the road and rail. In less than two weeks the material had been cleared and the road and rail were back on track with KiwiRail freight services resuming on the evening of Monday, 5 March. A big thank you for the huge effort put in by KiwiRail and NCTIR crews in restoring the transport infrastructure.



# WHERE TO EXPECT DELAYS ALONG THE CORRIDOR

In red on the map below are delay hotspots along State Highway 1. Please drive safely through these areas - some of which are single lane. Thank you for your patience.



**Thank you for your patience.**

For further updates on the condition of State Highway 1 both north and south of Kaikōura please visit here [www.nzta.govt.nz/p2c](http://www.nzta.govt.nz/p2c) or call 0800 44 44 49.

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## SEAWALL FOUNDATIONS POURED

Our team working at Site 7 just north of Ōhau Point are near finishing the road realignment and geometry for State Highway 1.

The November 2016 earthquake caused a massive slip at Ōhau Point blocking road access completely. In April 2017, work on the seawalls north of Kaikōura began. Some of the crew working at site 7, found accommodation in Kaikōura and flew in to site via helicopter. Most commuted from as far north as Blenheim each day as housing in Clarence and Kaikōura, became fully booked.

Project engineer Tomislav Diklan says the difficulty in getting to the site made it hard, but it did not set the team back.

In fact, the team exceeded expectations and reached milestone after milestone. From preparations which enabled rail to open on time, to getting the seawall up to a safe height in order for the road to reopen on 15 December 2017, the teams on the ground have been successful.

The latest achievement happened on 7 March 2018, when the last footings for the remaining 35 metres of seawall were poured. 'Connecting this seawall has been the goal since the NCTIR project began, and this was a momentous occasion,' says project manager Clark Butcher.

Now the last seawall footings have been poured, the team is working on pouring the remaining footings for the retaining wall and lifting layers to get to road level. 'As we are going up, the team is also working on the capping blocks, shaping the edge of the seawall.

'You can start to envisage how State Highway 1 will look when we get to this point,' says Tomislav. 'I'm very proud of the work this team has done. We haven't really stopped to look back on all that we've achieved.

'We have been working hard to complete this, and when it is finished it will be amazing. At the moment we are still in there fighting to meet our deadlines and deliver on the design.'



### IN THIS ISSUE

- Reconnecting communities
- Easter travel
- Ecological principles at work
- Open for business
- Connecting the pieces

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.





## RECONNECTING COMMUNITIES

The 14 November 2016 earthquake affected and disconnected three districts on the east coast of the South Island – Marlborough, Kaikōura and Hurunui. We talked to each of the districts' mayors about what the reopening of State Highway 1 (SH1) on 15 December 2017 has meant for their residents and economies.



### **Mayor John Leggett, Marlborough District Council**

'The re-opening of State Highway 1 is already having a positive effect on Marlborough's east coast communities and our tourism sector. Marlborough lost many of its regular Canterbury visitors; those were hard months after the earthquake and, unsurprisingly, our domestic visitor numbers were down. But this summer, with State Highway 1 open again, our southern neighbours have been returning.

'At a personal level, it has meant a great deal to South Island families, who were able to reconnect easily at Christmas time rather than face the arduous inland journey. It has been great to welcome back all our visitors who spend time in the Sounds sailing, fishing and relaxing, or sampling food

and wine at our vineyards and wineries.

'The road itself is now a dramatic drawcard; people are fascinated to see the incredible engineering work, as well as the amazing changes the earthquake has made to our coastline.

'The prospect of a coastal cycle trail holds real promise for regenerating our east coast communities' fortunes and creating long term opportunity for Marlborough and Kaikōura.

'On behalf of everyone in Marlborough, thank you NCTIR for the massive effort you made to re-open the road – you literally moved mountains.'



### **Mayor Winston Gray, Kaikōura District Council**

'What a turn around when the road opened! It has been great to see the numbers of visitors coming through Kaikōura and feel the buzz coming back to town.

'That said, weather events like Cyclone Gita show us how vulnerable State Highway 1 still is and how important it is that the highway's resilience is improved as part of the rebuild work.

'The highway is part of the lifeblood of our district, connecting families and communities as well as businesses and customers. It is critical to all our residents that the rebuild of State Highway 1 is done with speed but also with thought, sensitivity and foresight. We need a road that is a joy

to travel on, that enables access to the ocean, that protects our natural environment and that stands up to the tests of weather and natural hazards. We look forward to continuing to work with the NCTIR team to make this vision a reality.

'Now is also the time to take a serious look at the work Council has left to do. We're developing a three year plan which will build on our recovery plan - Reimagine Kaikōura – to make sure Council is working towards what the community wants and needs.

The plan will be out for consultation in May and we look forward to working with our community and partners like NCTIR to make sure our future is just as impressive as the achievements so far.'



### Winton Dalley, Mayor Hurunui District Council

'For the Hurunui District, State Highway 1 is much more than a road - it is a critical artery which connects our communities with each other and to the wider world. It provides a crucial transport link that is important to our districts and the national economy.

'For individual business communities such as Cheviot, and all of our State Highway 1 businesses, which were savaged by the instant loss of custom when the earthquake destroyed the road, the re-opening has been particularly meaningful and welcome as it has substantially restored the traffic flow which was their life blood.

'Many of them derive their major custom from serving tourists and the travelling public, so these small towns and businesses benefit immensely from being on the State Highway 1 route.

'Another important result of State Highway 1 re-opening is the return to more normal traffic patterns on the stressed State Highway 7 route and across our local road network, enabling a redistribution of heavy traffic and travellers.

'While our community is grateful for the initial return of the State Highway 1 route, we are looking forward to having the road restored to its pre-earthquake reliability.'



## EASTER HOLIDAY TRAVELS - PLEASE TAKE TIME TO PLAN YOUR JOURNEY

Easter long weekend is the busiest time on our roads.

While many sites will be pulled back or packed up for the Easter break to help with holiday traffic flow, some sites will still be one-lane and stop/go traffic in place. There will be delays, so remember to build in plenty of time along the route. Please drive to the conditions and follow on site traffic signage.

Check travel times and SH1 status through [www.nzta.govt.nz/p2c](http://www.nzta.govt.nz/p2c) or phone **0800 4 HIGHWAYS** (0800 44 44 49).

### Reminders for travelling between Christchurch and Picton:

- There are two routes to choose from: SH1 via Kaikōura (allow up to 5.5 hours) or the alternate route via Lewis Pass (allow up to 6.5 hours).
- **Two sections of SH1 are closed overnight due to ongoing repair work: 7.30pm - 7.30am between Mangamaunu and Clarence in the north and SH1/Leader Road to Peketa in the south.** We cannot allow access through these checkpoints any earlier than 7.30am as from 6.30am to 7.30am we are undertaking geotechnical inspections.
- Inland Road (Route 70) and alternate route via Lewis Pass is open 24 hours a day

If you have any questions or wish to raise any safety issues with us, we would really like to hear from you as part of our commitment to keeping everyone safe in the community. Please contact us on **0800 NCTIREQ** (0800 628 4737) or email [info@nctir.com](mailto:info@nctir.com).

Wherever you are travelling in New Zealand, plan ahead and check out where the hotspots are at [www.nzta.govt.nz/hotspots](http://www.nzta.govt.nz/hotspots)

## DAYLIGHT SAVINGS ENDS SOON

Remember to put your clocks back one hour on Sunday 1 April for the end of daylight savings.



# OUR ECOLOGICAL PRINCIPLES AT WORK

Taking care of the environment during the design and construction of State Highway 1 (SH1) and the Main North Line railway is important — while infrastructure can be replaced, the natural setting cannot be. The Kaikōura coast is internationally renowned for its landscapes, ecosystems and tourism experiences. The ocean is biologically-rich, there are many rivers and streams, and the native forest cloaking the hillsides is home to various native flora and fauna.

These are the ecological principles that guide our project:

- 1 Avoid as far as practicable, or minimise permanent habitat loss (including coastal, terrestrial and freshwater habitats).
- 2 Avoid as far as practicable, or minimise loss of rare ecosystem types and habitats for Threatened, At Risk, taonga and marine mammal species.
- 3 Avoid as far as practicable, or minimise habitat fragmentation/barriers (including coastal, terrestrial and freshwater habitats).
- 4 Avoid as far as practicable, or minimise impacts on habitat connectivity (including coastal, terrestrial and freshwater habitats).
- 5 Avoid as far as practicable, or minimise impacts on Threatened, At Risk, taonga and marine mammal species.
- 6 Create safe habitats, especially for Threatened, At Risk, taonga and marine mammal species. For example, where possible build in habitat creation/improvement opportunities for species such as seals, penguins and significant plants.
- 7 Avoid as far as practicable, or minimise effects on water quality and sediment – including kai moana and mauri.
- 8 Avoid as far as practicable, or minimise alteration of natural hydrology patterns to the extent practicable.
- 9 Avoid as far as practicable, or minimise the potential for the spread and/or establishment of pest plants or animals (including coastal, terrestrial and freshwater habitats).
- 10 Avoid as far as practicable, or minimise impacts on habitats that play an important role in the life cycle and ecology of native species. For example, seal breeding colonies, shag roosts/nesting sites, gull breeding colonies.



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## ROAD SAFETY FOR SEALS

NCTIR has worked closely with the Department of Conservation to manage impacts on seals during the coastal road and rail reinstatement works. Last year, the Seal Team moved seals out of harm's way more than 11,000 times. Now seawalls and temporary fences near the Ōhau Point NZ Fur Seal Sanctuary keep seals clear of the highway, railway and construction sites. 'Seal-proof' measures are being incorporated as designs are finalised to help keep seals off of the road and rail in the future.

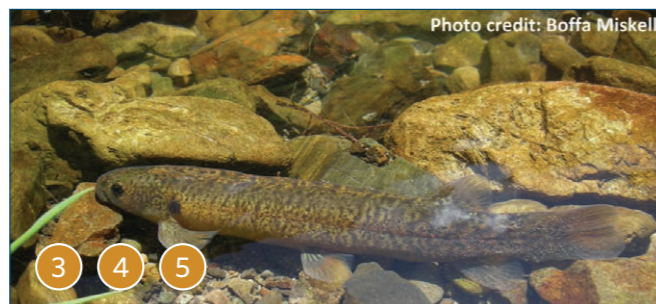


Photo credit: Boffa Miskell

3 4 5

## FISHING'S HARD WORK, BUT SOMEBODY'S GOT TO DO IT

Koaro, an *At Risk* species, was one of several types of native fish captured and then released by hand at Hewson's Stream, near Cheviot, where currents were chewing away at the concrete piers of a bridge. Rocks were being placed to act as a buffer, so part of the stream was 'de-fished' during the work. At least 20 species of native freshwater fish and freshwater crayfish (kōura/kēwai) can be found in the waterways within NCTIR's work areas. These include *Threatened* or *At Risk* species, and taonga species. Thousands are being moved while bridges and culverts are repaired.



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## EVERY RARE BIRD COUNTS

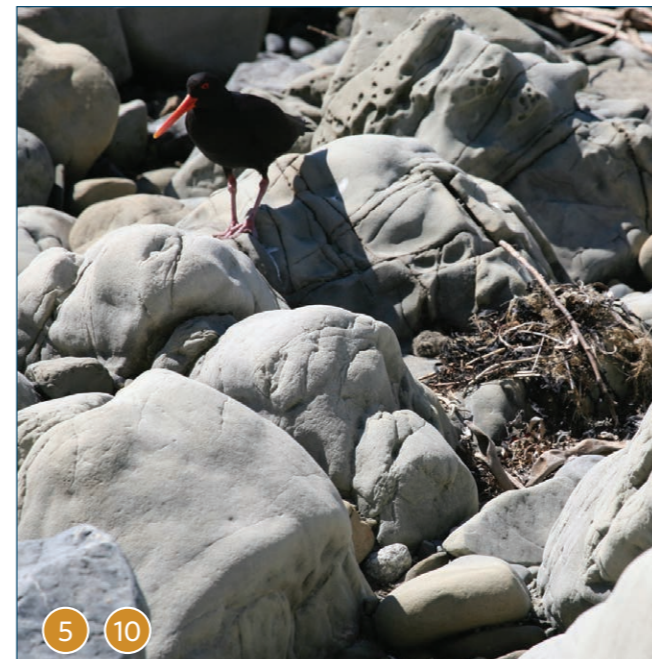
Having systems in place for situations which may arise is a key part of environmental management. It's known that *Threatened* Hutton's Shearwaters can be disorientated by and attracted to artificial lighting. When one landed on a SH1 construction site during night works, the team knew what to do. Traffic controllers carefully placed the bird in a cardboard box and kept it in a Portacom until the morning when the environmental team collected it and successfully released it at sea. Every one of these rare birds count - they are the only New Zealand seabird to breed in the mainland mountains, and they only breed in the Kaikōura district.



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## HAPPILY, THE EARTHQUAKE COULD NOT CHANGE THIS

These white-fronted terns, an *At Risk* species, have long nested at Sail Rock, a distinctive triangular pinnacle just north of Ōhau Stream. It was an important location for the terns before the earthquake, and that hasn't changed despite the heavy-duty construction taking place beside it. Spotted shags were nesting there too — close enough to the shore you can glimpse down-covered chicks. The opportunity to view the coast's wildlife has been preserved. Sail Rock's still a landmark whether you're travelling by car or train, and it'll be magical to see if you're on a bike.



5 10

## CAN YOU SPOT THE OYSTERCATCHER CHICK?

It's there, though it's not glossy black like its parents. Sometimes bird nests are in work areas and need to be moved out of harm's way by the environmental team, which has a Department of Conservation permit to do so. A pair of variable oystercatchers, an *At Risk* species, laid an egg right next to a haul road, not far from Irongate Stream north of Kaikōura. The road needed to be removed before SH1 could open, so the nest was moved a short distance. As you can see — the chick's fluffy bottom is right in the middle of the photo — the egg did indeed hatch.



3 4 5 10

## DID YOU KNOW THAT NATIVE FISH AREN'T THE GREATEST OF SWIMMERS?

Some species struggle in swift currents. A rocky stream bed can help them a lot, because they navigate through nooks and crannies, and pockets of quieter water between rocks.

Understanding how fish travel is essential to design during the transport rebuild, because many of New Zealand's freshwater fish need unimpeded passage between streams and rivers and the sea to complete their lifecycles.

Hundreds of bridges and culverts have been damaged in the earthquake, and it will take a good while to repair them all. In the meantime, the fish need to keep moving — or their numbers will drop, impoverishing ecosystems.

This photo of a new culvert being built at the mouth of Ōhau Stream helps explain how 'thinking like a fish' has been incorporated into design and construction. While the new culvert was being built, Ōhau Stream was temporarily diverted through a pipe and channel, which kept the stream safe from the construction project.

Our construction crew and environmental team worked hard to place rocks in the diversion channel to create the areas of quiet water that the migratory fish need to swim upstream. They also laid strands of mussel spat rope to help some fish species 'climb' uphill; fish use their fins to propel themselves along the rope. The fish really do this! Of course, the rocks would shift in the rising stream after rain, so the diversion channel needed to be monitored and fixed up now and then.

Last month Ōhau Stream was returned to its original course without a hitch. But fish-friendly design will be a lasting feature of the rebuild there. The floor of the new culvert has been covered with rocks, rather than being smooth concrete. It's a small helping hand for nature.

Respect for the environment is an important aspect of modern-day construction - work must be carried out in an environmentally-sound way and effects on the environment are monitored. The project has achieved 100% environmental compliance to date.



## OPEN FOR BUSINESS

Customers are flocking back to businesses along State Highway 1 (SH1), following extensive work to clear material brought down by ex-cyclone Gita.

With more than 300,000 cubic metres of material sprawling across the road and rail because of the major rain event, it was a case of 'deja-vu' for the owners of Fossil Point Café and Gallery, south of Cheviot.

'It was like turning off the tap,' says Kerry Henderson. He and his wife, Kim, had already struggled through 13 months of road closures, only for the road to close again because of the ex-cyclone.

'We are so thankful for our regular weekend crowd - despite the road shutting, they've kept us going,' he says.

Kim Henderson is also feeling positive. 'It can only get better. This is a long term investment and we're in it for the long haul,' she says.

As well as supplying food and drinks, the café also features a gallery showcasing Kim's artwork. The couple spent 18 months tidying up and fitting out their new business before officially opening March 2016. The earthquake later that year stopped all traffic to Fossil Point.

'We were busy and then overnight we didn't see one campervan, and if they did turn up they were lost,' says Kim.

SH1 is a lifeline for this café and others like it right along the route, from Blenheim to Christchurch. As the rebuild progressed Kaikōura visitors kept telling the couple about 'the amazing progress being made.' 'I turned my feelings into a creative outlet, designing cartoons reflecting how I felt. When the road opened we literally jumped for joy,' says Kim.

Her cartoons will feature in an upcoming art exhibition held in Hurunui. The upbeat couple have been so busy with customers they haven't had a chance to drive the reopened highway to check out progress.

'We plan to hire more staff and I want to focus on creating more mosaic art and running my gallery,' says Kim.



Kerry and Kim outside Fossil Point Café



One of Kim's cartoon



The first new seawall to be constructed around a landslide north of Kaikōura will be complete by the end of next month.

A series of small slips and a major landslide came down on top of the Irongate road and rail line during the earthquake. Crews spent month's clearing material, first building a temporary access track around the base of the landslide for vehicle access before demolishing the big slip.

Since last April, crews have been building a 550m long seawall on top of the seabed. Teams worked through the harsh winter with a tight four-hour window to pour concrete footings during low tide.

The seawall connects to the new 144m long Irongate Bridge, which is finished, sealed and line marked, complete with a shared access path along the coastal side of the bridge.

Crews are completing another section of the shared access path on the seaside of the seawall. A series of capping blocks are being placed on top and concrete will then be poured to create the new path. A pedestrian fence and a guard rail will complete the seawall, ready for cyclists, walkers and runners.

'A project such as this would generally take two years, to design and build a bridge and seawall in just one is absolutely fantastic,' says project manager Greg Burns.

Greg's road crews are now constructing the final road seal on top of the seawall, with the road down to one-lane here until the end of the month. Design is also underway for a permanent rock fall structure around the Site 2 landslide, protecting the road and rail line from any future movement.





## WHERE TO EXPECT DELAYS ALONG THE CORRIDOR

In the red on the map below are delay hotspots along State Highway 1. Please drive safely through these areas - some of which are single lane. The closure point for 7.30pm to 7.30am in the south will remain at Leader Road/State Highway 1 as repair work continues in the Hundalee Hills because of damage caused by ex-cyclone Gita.



**Thank you for your patience.**

For further updates on the condition of State Highway 1 both north and south of Kaikōura please visit here [www.nzta.govt.nz/p2c](http://www.nzta.govt.nz/p2c) or call 0800 44 44 49.

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# The Bulletin Kaikōura earthquake update

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## CORRIDOR MILESTONES

A final push is underway along the Kaikōura coast with 24 hour access to State Highway

1 (SH1) just weeks away. Since SH1 reopened in December last year the road has had restricted hours for travellers and has been closed every night for essential work to be carried out. Now, four months after the road opening, some travelling restrictions are about to be lifted with road users being able to drive the route 24 hours a day from the end of April.

More than a thousand people have been working along earthquake-damaged sites north and south of Kaikōura in the lead up to this major milestone. While work will continue over the next year, the opening signals the wind down of some core-recovery work.

For the more than 100 abseilers who have been working south of Kaikōura, their work to stabilise the coastal mountainside is nearly complete.

Project engineer Melissa Sheridan says crews have been working on more than 30 slips, bringing down loose boulders and material as well as installing 2600 rock bolts and more than 30,000 square metres of steel mesh to lock the once-fragile hillsides in place.

'It's been a massive job, teams of abseilers have been working for up to 10 hours a day on the ropes to get it done.'

Progress is being made along the Main North Line railway with repairs being completed at many sites since the line reopened. Trains are completing the trip between Picton and Christchurch more quickly and it is expected there will be fewer instances of the line needing to be closed on a precautionary basis because of heavy rainfall.

Work undertaken has improved services significantly for KiwiRail's customers and KiwiRail expects the return of the passenger Coastal Pacific rail journey in time for the peak summer season towards the end of the year.

A short closure of SH1 south of Kaikōura is planned for Wednesday, 18 April so essential work can be undertaken to prepare the road for its 24 hour opening. Travellers will still be able to use the Inland Route (Route 70) to access Kaikōura and the alternate route via Lewis Pass between Picton and Christchurch remains open.

## IN THIS ISSUE

- FAQs about road opening 24/7
- Working under the moonlight
- Up to height at Ōhau Point
- Getting to know KiwiRail
- Tech savvy construction
- Getting accredited



To all the communities we have been working alongside to get the road open 24/7 - thank you to all for your patience and support

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.





## FAQS FOR STATE HIGHWAY 1 OPENING 24/7

**Q:** Will there be any future closures once the road opens 24/7?

**A:** Crews will continue to monitor State Highway 1 (SH1) at all times and in the event of persistent heavy rainfall we may close the road as a precautionary measure – this can happen day or night.

**Q:** Does this mean the closure points will disappear all together?

**A:** Yes, however if there is adverse weather, which means we have to close the road, it is likely we will use closure points at Mangamaunu and Clarence in the north and at Leader Rd/SH1 and at Peketa in the south.

**Q:** Can you stop and camp along the route?

**A:** When SH1 reopens at night there will continue to be no stopping or camping allowed in the two most earthquake-damaged areas just north and south of Kaikōura – stopping is only allowed where signposted as a 'safe stopping' zone. Also, the multiple sections where traffic moves to a single lane will be controlled by traffic lights at night rather than current stop/go controls.

**Q:** How can I find out if SH1 has been closed?

**A:** Drivers need to allow plenty of time for their trip and can stay up-to-date on real-time travel information through [www.nzta.govt.nz/p2c](http://www.nzta.govt.nz/p2c) or by calling **0800 4 HIGHWAYS** (0800 44 44 49). We recommend checking at least two hours before travel and at key decision points on the route.

**Q:** What do I need to be aware of as a driver along this route?

**A:** Please drive to the conditions taking in to account the weather, speed restrictions, the road you are on, the vehicle you are in, other drivers around you and your driving experience. Drivers should also continue to take care at level crossings as trains and other rail vehicles can run at any time and from either direction on the line between Picton and Christchurch. Trains travel faster than they appear and cannot stop quickly. Drivers should always check both ways at level crossings before proceeding.

**Q:** Will there still be one-way sections along the route and how will these be controlled?

**A:** Yes there will still be some one-way sections along the route, which will be controlled by mainly traffic lights and occasionally stop/go controls.

**Q:** Will I continue to experience delays during the day and night?

**A:** Yes, work is continuing along SH1 north and south of Kaikōura so there will be some delays.

**Q:** What are the expected journey times?

**A:** We recommend you allow a minimum of 5.5 hours for the journey between Picton and Christchurch along SH1 and a minimal allowance of 6.5 hours along the alternate route via Lewis Pass. You can stay up-to-date on real-time travel information through [www.nzta.govt.nz/p2c](http://www.nzta.govt.nz/p2c) or by calling **0800 4 HIGHWAYS** (0800 44 44 49). We recommend checking at least two hours before travel and at key decision points on the route.

**SH1 south of  
Kaikōura will be closed  
on **Wednesday, 18 April**  
to undertake work to  
prepare the road for  
opening 24/7.\***

Be prepared for extra traffic on State Highway 1 this weekend between Christchurch and Blenheim as the Forrest GrapeRide event is taking place. Please take care and drive safely.

\*This work relies on good weather. If there is adverse weather on 18 April we will instead close the road and do the work on Thursday, 19 April. We will confirm this at the beginning of that week.



## COMMITMENT TO MINIMISING EFFECTS ON THE ENVIRONMENT

In early March, a minor amendment to existing consents at Mangamaunu, Okiwi Bay and Half Moon Bay was lodged under the Hurunui/Kaikōura Earthquakes Recovery (Coastal Route and Other Matters) Order 2016 (OIC). The vast majority of restoration works along the coastal corridor had already been consented under the Order in Council in July 2017. That includes the overall consent 'footprint' in the corridor, and the proposed amenity area and shared path at Mangamaunu.

Minor amendment in March sought greater room alongside the new road and rail corridor alignments to provide the proposed amenity area and safety improvements, and enhance access and safety to the nationally-significant surf break at Mangamaunu. At Half Moon Bay and Okiwi Bay South consent amendments addressed the need for more space to improve safety for drivers around corners.

As part of the proposed amendment detailed ecological assessments into the possible environmental effects on the area - including the surf break - were carried out. While there has been some speculation that the work on this coastal area will damage the surf break - the ecological assessments do not make that conclusion. The full reports can be read here: <https://www.ecan.govt.nz/do-it-online/resource-consents/notifications-and-submissions/current-consent-projects/>

Great care will continue to be taken by the NZ Transport Agency and KiwiRail team to build safe and resilient road and rail networks, balanced with minimising the impact on the environment, cultural landscape, and important wildlife along the coastal route.



## UP TO HEIGHT AT ŌHAU POINT

The site 6 seawall around Ōhau Point is up to full height, as of 15 March 2018 - a massive achievement for everyone involved. Work on this seawall began in June 2017, and the footings at this site were the most challenging of all the seawalls.

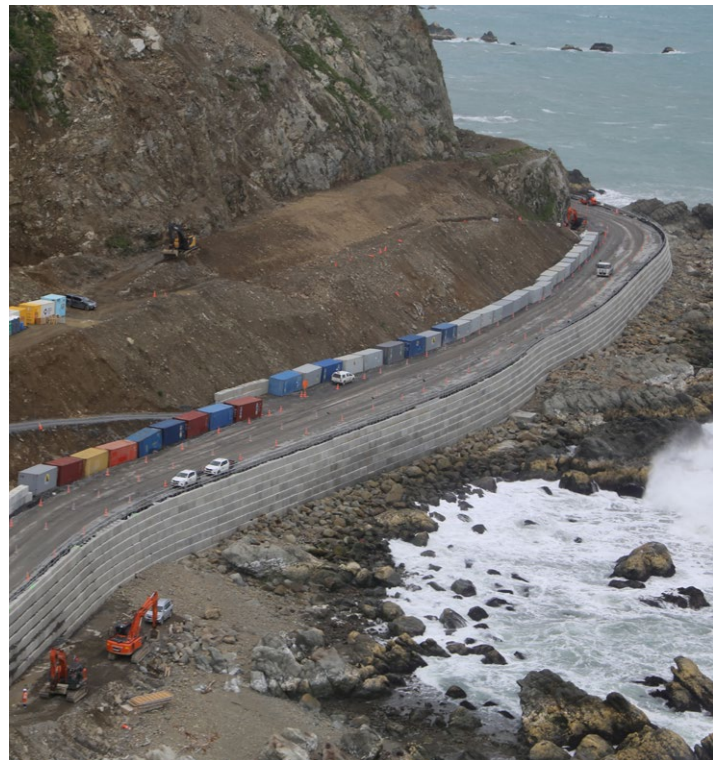
When the alignment was dug for the seawall, the bedrock was found to have very uneven ridges throughout it. 'We needed to get it level and to a certain height for our foundations,' says project manager Clark Butcher. 'The uneven bedrock meant that pours for each 12 metres length of footing ranged from 160 metres cubed to 800 metres cubed.'

Another major obstacle was the footings, which were located right on the tideline in places - so the works were constantly being flooded with seawater, even while the crews were working between tides. The job had to be done though, and the team proved they were up to the challenge. 'The full blocks are all in and we are now placing facing panels on top of the seawall,' Clark explains.

A facing panel is a narrow concrete block, which is connected along the entire wall length by pouring a reinforced concrete beam on the back of it. This allows the team to secure the capping beam on top, which locks it on to the wall with reinforcing steel. 'Getting the seawall up to height was a significant milestone, there was a real sense of achievement, the crew felt they'd finally achieved what they had worked so hard for,' says Clark.

There is still a lot of work to be completed at site 6. Along with the capping system, the road has to come up about 700 millimetres and a protection fence needs to be installed around Ōhau Point between the road and the slope.

'It was good feelings all around,' says Clark, 'and in achieving this hurdle and feeling good, the crews are now energised to push on and finish off well.'





Rail is critical to New Zealand's transport infrastructure moving freight and people across our diverse landscapes. Before the earthquake KiwiRail

moved about 1 million tonnes of freight along the Main North Line between Picton and Christchurch – equating to nearly 70,000 truck journeys – each year. The November 2016 earthquake disrupted the railway with landslides and damaged infrastructure. The freight rail network began running in September 2017 after months of hard work to get it back operating. Work continues to complete permanent repairs of bridges, tracks and tunnels to get the network operating at its pre-earthquake reliability.

For 2018, the focus for the Main North Line is to reduce journey times so trains arrive in Christchurch earlier in the morning, a return to 24/7 rail operations, making sure the network is more reliable in adverse weather, and having the Coastal Pacific passenger train operating again along the spectacular coastal journey through Hurunui, Kaikōura and Marlborough.

## SAFETY ON THE RAIL

Health and Safety for those working on the rebuild has been a top priority for KiwiRail, the NZ Transport Agency and NCTIR. We have employed a well-developed safety programme throughout the project to make sure everyone goes home safe at the end of each day. Rail protection rules are in place to keep staff working on or next to the railway safe from trains or rail vehicles. The 'lock on and lock off' process is a system, which accounts for any person working within four metres of the rail. We also use safety barriers called Vortok fences, which are quickly installed and clipped alongside the rail line. These protect our crews working alongside the rail as trains can still pass safely by.



Trains are fast, surprisingly quiet, take a long time to stop and cannot swerve. **Drivers and pedestrians need to expect trains at any time, from either direction.**

Trains are fast, surprisingly quiet, take a long time to stop and cannot swerve. **Drivers and pedestrians need to expect trains at any time, from either direction.**



## WHAT'S IN A CONTAINER?

Rail freight containers carry everyday items we all use from our spuds to barbeques and groceries, carpet, and building materials – just to name a few. Freight trains connect with our ports and logistic centres to move these goods around New Zealand delivering them as part of regional and national economic activity and growth. The return of freight by rail on 15 September last year, even in a limited capacity, took about 2000 trucks off the road each week, between Picton and Christchurch via the Lewis Pass. The return of the cost-effective service also meant fewer emissions as every tonne of freight moved by rail delivers a 66 percent reduction in emissions for New Zealand

## WHAT IT TOOK

To get the Main North Line operating again temporary repairs were undertaken with permanent repairs still underway. As these are completed the rail continues to become more resilient, operating at a more efficient level. Since reopening on 15 September, KiwiRail has moved more than 180,000 tonnes of freight on the Main North Line, meaning at least 13,000 fewer truck journeys.



Three rail bridges needed to be replaced with two being completed, three brand new bridges have been designed and built, and about 40 bridges needed repair with 50 percent of these repairs complete.



Twenty rail tunnels along the route needed repairing from earthquake damage. We have repaired 15 of these and are continuing to work on the final five.



We're protecting the rail network by installing rockfall protection to stop rock or other material falling onto the tracks. We have installed in some areas detection fences, which automatically let train control know if any material has fallen on the track so we can respond as quickly as possible.



As the rail line became functional again, it was used to assist the road rebuild moving supplies and equipment – including five-tonne seawall blocks to site. KiwiRail has only been running trains at night so road and rail works can be done quicker.



The final weld reconnecting the Main North Line between Picton and Christchurch on 8 August 2017 near Half Moon Bay was an emotional moment for the NCTIR and KiwiRail teams, as it signified the hard work, sweat and tears to get the route reopened and operating within a target timeframe.



We celebrated the first freight train coming into Kaikōura in September last year alongside the community. It was a highlight of 2017 and we could not have completed the work reconnecting New Zealand's supply chains without the patience and support of our local communities.



## TECH SAVVY CONSTRUCTION

The NCTIR visualisation team has recently trialled a new app to assist construction teams with pre-planning and visualisation. The augmented reality app has been used for a tunnel-widening project at Raramai South, a road tunnel on State Highway 1 south of Kaikōura. The tunnel is being enlarged to improve clearance and safety for compliant vehicles.

Digital visualisation lead Kat Salm says 'the visualisation tool is another way technology can support the engineered designs'. 'It can help with context and project discussions and for briefing crew. The app brings designs to life in front of clients or other interested people, without the need to be on-site. 'It's an actively engaging, simple to use app and can be viewed on iPads.'

This innovative tool is a great example of 'safety in design' as teams can plan works in more detail well before getting to site. The risks can be fully outlined and tweaks of design can be made having all the methodologies sorted beforehand. 'We hope this also means a quicker, more efficient and better value project as the team can understand the risks fully before being on site,' says Kat. It was created using information from surveying, design and analysis. A heat map is then formed from the analysis.



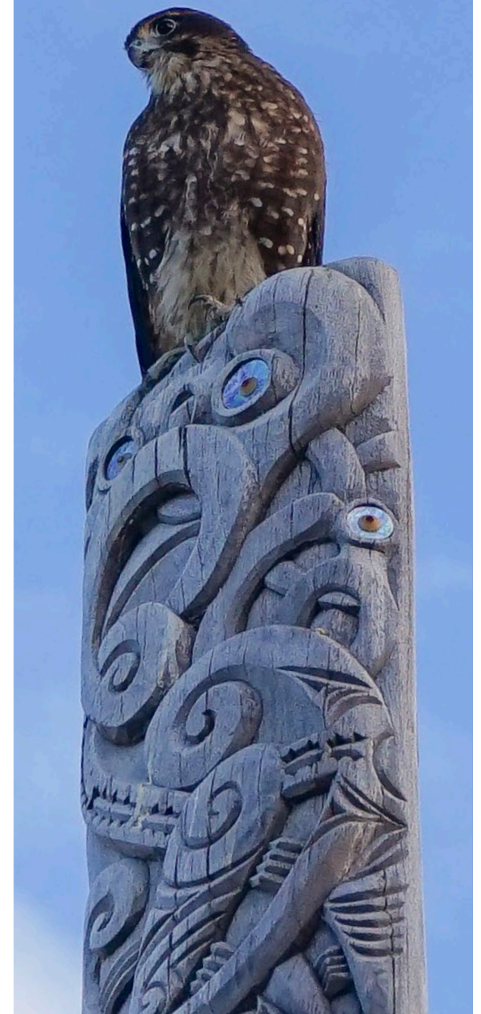
Pictured is Chris Souter, viewing the app in the Raramai South tunnel. The colours represent the amount of material, which needs to be removed from the existing tunnel surface to reach the desired 'new' designed dimensions (ranging from no colour, which is already wide enough, through a range all the way to red - which is more than a metre to remove).



## ON WATCH

Working next to the coastline alongside mountains our crews get to observe some spectacular scenery and wildlife. Engineering geologist, Sarah Jones spotted a Kārearea at Rakautara last week. This New Zealand falcon is classified by the Department of Conservation as At Risk. Falcons breed in a wide variety of habitats from the coast to above the tree line, including native podocarp and beech forest, tussocklands, roughly grazed hill country and pine forest. Sarah reported the sighting and photo to the Wingspan Birds of Prey Trust, which reported it was a female Kārearea.

If you sight a Kārearea please let the NCTIR ecology team know via [Leigh.Bull@nctir.com](mailto:Leigh.Bull@nctir.com) or 027 643 2185.





## GETTING ACCREDITED

In 2017 as State Highway 1 was taking shape and getting ready to open to the public, the Road Science laboratory in Kaikōura was facing its own deadline in the form of an audit by the International Accreditation New Zealand body.

The audit assessed the laboratory's ability to perform field and laboratory testing for NCTIR in accordance with the International Organisation for Standardisation requirements. Previously the Kaikōura team had been operating under the accreditation of the Christchurch Laboratory. In January this year accreditation of the laboratory was formalised and put into effect. This meant faster turnaround times for test results and the usual high level of confidence in the results. 'It's important for laboratories to achieve and maintain their own accreditation status as it gives our clients confidence in the test results we produce - as well as confirming we operate to the highest international industry standards,' said Road Science laboratory manager, Richard Carter.



Road Science has been working for NCTIR in Kaikōura since April 2017 providing a construction materials testing facility responsible for carrying out field-testing, quarry quality assurance testing, and concrete testing. The accreditation of the Kaikōura mobile facility compliments Road Science's four accredited base laboratories and other mobile facilities operating around New Zealand and the South Pacific.

The testing of construction materials is important as it ensures compliance with the NZ Transport Agency's road building specifications, allowing engineers to produce more accurate designs and ensuring a higher quality end product for all involved.



## UNDER THE MOONLIGHT

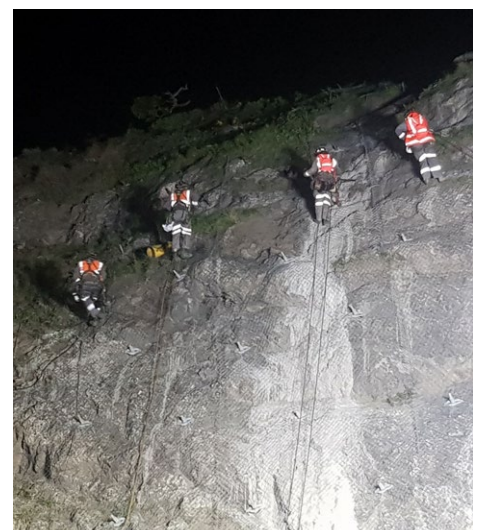
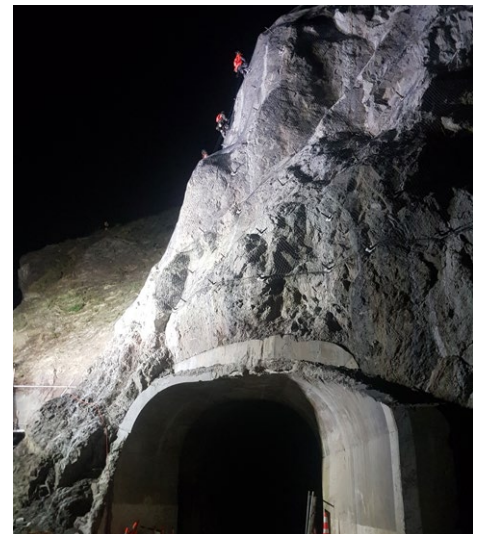
While the coastal road has been closed at night, crews have been taking advantage of the closure to carry out essential work. Recently an abseiling team also took the opportunity to carry out work directly over the road, which would normally be too dangerous during the day due to vehicles travelling below. Geovert abseiling supervisor, Chris Black says his team of 12 were working above the Parititahi road tunnels for around four months before the road re-opened in December.

The 70 high and 30 metre wide site originally came down during the 2016 earthquake and has required strengthening. 'A lot of work was completed last year; we installed more than 300 rock bolts into the hillside and secured steel mesh to the rock face,' he says.

With the road now open during the day, seven days a week, the only time the crew could access the cliff face to carry out final work was at night. 'It would have been impracticable to work during the day with a live lane of traffic running. We would have had to stop work every five minutes to let vehicles through and it would have taken weeks to get the job finished,' says Chris.

The alternative was to get clearance to work at night. With strict health and safety conditions met, the crew recently spent two nights working 40 metres above the road. 'Working at night was only possible because of the huge amount of work we had already put in strengthening the site,' says Chris.

The crew worked under floodlights to carry out final pieces of work on the site, checking the last 70 rock bolts, which had recently been installed. 'It's relaxing working at night - you don't need to worry about traffic movements, other contractors or helicopters. It's just you, your gear and the ocean,' Chris explains. 'And, it's soothing hearing the sounds of the ocean as you go about your work.'





## WHERE TO EXPECT DELAYS ALONG THE CORRIDOR

In the red on the map below are delay hotspots along State Highway 1. Please drive safely through these areas - some of which are single lane. The closure point for 7.30pm to 7.30am in the south will remain at Leader Road/State Highway 1 as repair work continues in the Hundalee Hills because of damage caused by ex-cyclone Gita.



**Thank you for your patience.**

For further updates on the condition of State Highway 1 both north and south of Kaikōura please visit here [www.nzta.govt.nz/p2c](http://www.nzta.govt.nz/p2c) or call 0800 44 44 49.

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## 24/7 ROAD READY

With just days left until State Highway 1 (SH1) north and south of Kaikōura reopens to traffic 24/7, construction crews are putting final safety measures into action. Following an extensive year of construction the route is now a lot safer than it was this time last year. More than 30,000 square metres of steel mesh has been wrapped around slips in the south and new infrastructure, such as seawalls, have been built in the north.

Network operations manager Tresca Forrester says opening the road to traffic day and night is the right decision. 'This is really important for our customers and stakeholders and it has been our focus since the road initially opened in December last year to get to this point,' she says.

Part of the reason the road can now open 24/7 is because major construction activities are now complete. 'Crews building the seawall at Ohau Point couldn't work during the day because of the narrow corridor. Instead they carried out key work at night which meant we couldn't consider reopening the road to the public,' she says.

When the road reopens 24/7, crews will carry out regular observations and inspections of the route and nine sets of traffic lights will replace the ever-friendly stop/go workers at night. Signage along the route is being upgraded ahead of the road opening with new signs highlighting no stopping areas because of rockfall danger.

Rockfall signs can be unnerving to come across when travelling, but they are there to protect road users and alert them to potential danger. 'These signs are located along the route where we know rocks are continuing to make their way down the hills,' says Tresca. 'We have put prevention measures in place such as mesh and physical barriers to stop the rockfall reaching the road, but we will never be able to eliminate the movement altogether, it's the reality of having a road at the base of steep slopes.'



## IN THIS ISSUE

- Safety on the road
- Temporary to permanent
- Destressing the rail
- Freight industry - road 24/7
- Working from above

## BY THE NUMBERS: STATE HIGHWAY 1 NORTH AND SOUTH OF KAIKŌURA



2500 vehicles currently travel the route during the day with 500 projected to travel at night



50 percent of all traffic travels between the hours of 8pm - 9pm and 6am - 7am



An average of 30 vehicles an hour travelled on the road between 10pm and 5am before the earthquakes



60 percent of total traffic pre-quake was heavy traffic



Nine sets of traffic lights at night over nine sites at night

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Principal geotech Greg Saul agrees, and says there will always be movement along the corridor so it is important the right mitigation tools have been put in place. 'The Kaikōura earthquake has shaken up a lot of material. The coast is a lot more active than it once was and we know historically debris flows and slope instabilities are more frequent after a big event like this,' he says.

Ex-cyclone Gita brought down more than 300,000 cubic metres of fresh material because of the intensity of the rain event. This is why the NZ Transport Agency will be more proactive with road closures when heavy rain events are forecasted.

Tresca says: 'it's not black and white but we will be changing our approach. If the projected rainfall and the intensity per hour is high enough we will close the road in advance and we will try to give people as much notice as possible before we do this.'



## TAKING THE STRESS OUT OF THE TRACKS

Crucial destressing rail maintenance work to increase railway line speeds in all weather is heating up across the Main North Line between Waipara and Oaro. Steel rail can be susceptible in summer warm temperatures to expanding and potentially buckling and in cold weather contracting leading to rail fractures.

To prevent this from happening KiwiRail is using an engineering process called 'destressing' whereby rail tracks are cut, stretched and re-welded to reduce the risk of excessive expansion and contraction of continuously welded track. 'By working out the neutral temperature, we can adjust the rail, making it resilient for all weather conditions,' says KiwiRail Track Access Manager Steven Crump. 'Basically, we end up removing excessive rail so it removes the ability for the rail to expand or contract. This reduces track movement and means we can reduce temporary speed restrictions.'

The first part of the process, which was completed last week, was to lift the rail and measure the temperature. 'Every 250 metres of rail we tested the temperature with specialised equipment. We use the temperature to calculate the adjustments that we need to make to the rail,' says Steven. 'It's quite a technical process involving a number of different machines and devices such as thermometer, hydraulic jacks and pullers. By taking out any slack in the track lines we remove any opportunity for the tracks to buckle in the warmth or contract in the cold.'

Ultimately, the process results in the reduction of transit times for trains so KiwiRail can provide an efficient reliable service for its customers.



## DIGGING ARCHAEOLOGY

Want to know what archaeologists do once an excavation is over? And what happens to all the things they dig up? Join archaeologist, Jean Spinks, and Kaikōura Museum manager, Stephanie Lange for a look at what happens behind the scenes, once all the digging is done.

**Where:** Kaikōura Museum

**When:** Saturday 28 April  
Session 1, 10.30am -11.30am  
Session 2, 12 noon - 1pm

**Who for:** Children aged 7-14  
(children under 10 must be accompanied by an adult)

NCTIR and Kaikōura Museum are hosting a talk series about the cultural landscape of Kaikōura and an introduction to archaeology. The archaeology of the area represents the enduring connections local communities have with the past, and the coast is considered by archaeologists to be among the richest and most interesting parts of the country. The talks will cover an introduction to archaeology, how the earthquake affected archaeology, and how NCTIR is managing the impact of the works on local heritage. A brief history of whaling and the whaling stations in Kaikōura will be included, and the speakers may field questions from the audience.

**Where:** Kaikōura Museum

**When:** Wednesday 2 May, 6pm

**Admission:** Free

**Booking essential:** Book your places on 03 319 7400.



## SLIP 23 - TEMPORARY TO PERMANENT



Safety and value for money are winning out at slip 23 south of Kaikōura as temporary rockfall protection is being made permanent. Mesh installed on the slip last year to get the road open safely before Christmas will remain as a permanent protection feature. At 45 metres high the mesh drapes over the cliff face having two functions:

- slowing falling rocks keeping them close to the slope face (preventing them from bouncing out over the road); and
- catching and holding larger rocks (also stopping them from damaging the corridor).

‘The draped mesh has performed exceptionally well over the past three months, through earthquakes and some pretty fierce weather, like ex-cyclone Gita,’ says site engineer for earthworks Jonathan Armstrong. ‘It makes sense to continue using it because of its performance.’ Another advantage of the mesh is it can easily be moved and rock collected in it can be emptied.

Site supervisor Christophe Bourgeois says: ‘it’s a great system whereby a loop of rope can be released at the bottom of the drape, you can move the mesh letting any rockfall out, which can then be collected and removed’. The mesh is secured to the hillside by 40 anchors and was transported by helicopter to the slopes, where a team of five abseilers positioned it correctly. Jonathan says it’s a ‘win-win’. ‘There are two advantages of keeping the mesh permanently at this site – the road is well protected and we are saving money continuing with a protection, which works.’



## WHAT DOES ROAD OPEN 24/7 MEAN FOR THE FREIGHT INDUSTRY?

Drivers can continue to expect sharing the road with freight trucks along both routes – the alternate route via Lewis Pass, and State Highway 1 (SH1) between Picton and Christchurch – when SH1 opens 24/7. While freight industry representatives were happy to hear the road was opening 24/7 at a recent NZ Transport Agency and NCTIR forum, there were some reservations.

Some say for pre-planned freight movements the alternate route is likely to remain the preferred option due to its reliability. ‘It will really depend on the freight company and their operations,’ says NZ Trucking Association chief executive officer Dave Boyce. ‘Often companies have to do planning and scheduling weeks in advance so until SH1 is back up to pre-quake reliability, some companies have said they will be sticking with the alternate route, which is less prone to unexpected closures. ‘The work that has been done on SH1 so far is impressive and it’s certainly good to have the two options available day and night for all drivers, but for the freight industry and its clients it’s going to be even better once that pre-quake reliability is there.’

Sharing both routes with freight traffic means both truck drivers and other vehicle drivers need to be conscious of each other. ‘No matter what route you are on all drivers need to be patient using their common sense to take precautions to keep each other safe on the road,’ says Dave.

### SHARING THE ROAD WITH TRUCKS SAFELY

- Keep well back when following trucks.
- Keep out of a truck’s blind spots – remember: if you can’t see the truck driver in their side mirror, the truck driver can’t see you!
- Watch out for blind spots at the sides – trucks have large blind spots on both sides – but especially on their left. On multi-lane roads or when overtaking, try to avoid these blind spots, or keep the time you spend in them to a minimum.
- Be patient when waiting to overtake a truck. It takes several seconds longer to pass a truck on a level road than it does to pass a car, so it’s more important than usual to make sure there’s plenty of clear road ahead so you can safely complete the overtaking manoeuvre.
- Remember: it takes a truck longer to stop. At 90km/h, it will generally take a truck-trailer unit more than twice as far to stop as it would take a car. This is because of the truck-trailer unit’s weight and the design of its brakes.



**The tunnels team**

Tunnels manager Rafael Ballen has been making history with the tunnels team for NCTIR since the start of 2017. After a year of hard work, critical problem solving, and team building, the team was honoured with an award for Achieving Excellence in Innovation for the Tunnel Support System by HEB construction and Vinci as part of the Business Innovation Excellence Awards 2017.



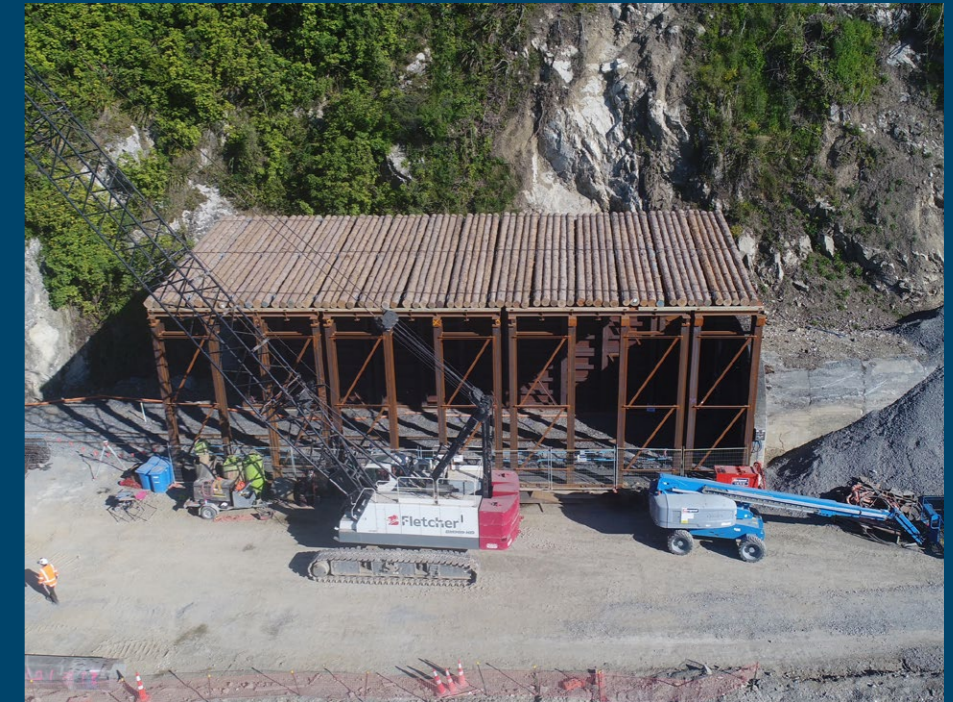
**Innovation 1**

The **propping system** implemented in Tunnel 13 was the first of its kind to be used in New Zealand, and serves as a prime example of the type of innovation and excellence that earned this award. This innovation was born out of necessity, to prevent the collapse of damaged rail tunnel sections while enabling crews to safely clear slip material and excavate on top of the tunnel, a temporary support structure was required. A collaborative effort between the site team and temporary works designer created and implemented this Tunnel Propping system to provide the required support at high-risk areas of the damaged tunnels, while keeping simple assembly and easy relocation in mind.



**Innovation 2**

The **grouted anchor support plates** were another applauded innovative solution. They not only worked as temporary mechanical anchors (creating a self-supporting roof) to hold the lining in place while the void between the rock face and lining could be filled, but they also made it possible to grout the anchors afterwards, turning temporary works into permanent solutions. The cost effectiveness over time was remarkable. These plates supported the roof and maintained the integrity of the structure lining, keeping our crews safe at all times. This enabled feeding tubes and breathing tubes to be kept in place for grouting. These grouted anchor support plates were designed, fabricated, and used to stabilise five KiwiRail tunnels. They also prevented grout loss, and maintained a small enough profile so that they did not interfere with train clearance.



**Innovation 3**

The **rock fall shelter** designed and fabricated in response to the high risk of rock fall area adjacent to Tunnel 19 at Ōhau Point, was yet another example of innovation. The multiple steel shield units were assembled on site, a safe distance from the hazardous area, and provide adequate shelter for the future works here. The shelter protects the crews working as well as the rail corridor.



**Motivating factors**

Reconnecting earthquake affected communities drove the commitment shown by Rafael and his team and encouraged them to think outside the box in order to meet their goals. 'This was a huge team effort,' says Rafael. With 16 of the 20 damaged rail tunnels already completely repaired, the tunnels team are well on their way to completing the task at hand. They will finish the four remaining rail tunnels, and works are already underway to complete the Raramai and Parititahi twin road tunnels.



## OUR PEOPLE: ON THE ROPES

When State Highway 1 (SH1) opens to 24/7 traffic you can thank a huge team of abseilers for their work which has helped to enable night time restrictions to be lifted.

Angela Buunk has been one of more than 100 abseilers who has been working over the past year to make the slips safe. She first started clearing loose boulders and rocks when she arrived on site January 2017. Focusing solely on the shattered hillsides south of Kaikōura, Angela has been busy – she’s worked on more than 30 of the slips.



We found her half way up slip 3 operating a drilling rig, installing massive rock bolts – each six to nine metres long into the hill side. ‘I’m on the ropes around eight hours a day, I’m quite relaxed and comfortable but it’s still a work out,’ says Angela. Working up to 150 metres above ground may be a challenge for some, but not Angela or her team. ‘You definitely think about what you’re doing but you won’t find many people in the industry scared of heights,’ she laughs. ‘There is a rush of adrenaline when you’re on the ropes, it keeps you on your toes.’

Working as a guide at Fox Glacier, Angela took up the challenge of industrial abseiling work after the Christchurch earthquake. But this is just her day job, as well as being qualified for rescue work, each week she spends one shift as a volunteer for St John in Kaikōura as a first responder. ‘I love it; it keeps your mind active. The Kaikōura station has really good people and this is a great community to live and work in.’

The station is helping her work towards a qualification as an emergency medical technician and she sees this as her future fulltime job. ‘There will be a day when I’m older and my body won’t let me work anymore when I’ll switch to full time medical work,’ she says. Until then Angela will continue abseiling and making the landslides more resilient. ‘It’s such a beautiful place to work, you can see the whales in the ocean too, what a cool place.’



## WORKING FROM ABOVE



It was just another day in the office for our abseilers, 35 metres up on a hillside for a five-hour session as they emptied material caught by a debris flow barrier and removed unstable rock around it. The debris flow barrier, south of Kaikōura, performed exactly as designed during the intense rainfall of ex-cyclone Gita – collecting falling material and protecting the road and rail below. ‘The fence had been placed at an angle up the hillside where water flows as we knew this area was susceptible to having material come down during intense rainfall,’ says site engineer Florence Blondeau. ‘We are really pleased that it performed as it was intended during such an intense weather event.’

After Gita passed, our abseiling team set out to empty the fence while protecting infrastructure below. They ascended the slope, using natural anchor points, such as trees, to safely hold and position themselves so they could release the barrier from its frame, allowing the material collected in it to fall below and be cleaned up.

The on-the-ground team had earlier moved ballast rock over the rail tracks protecting them from the falling material. Once the abseiling team had emptied the barrier, loosening and removing material began. ‘We moved ourselves to a safe point on the slope so we could begin sluicing with water brought in by helicopter,’ says site supervisor Christophe Bourgeois. ‘This flushed and loosened off any unstable rock and material. Once the helicopter was gone we moved back onto the rock face to hand remove loose material which remained.’ The team then secured the barrier back to its frame. ‘It wasn’t a bad day in the office – we did the work in a much quicker timeframe than expected. And, we can’t complain while getting to work along such a stunning part of the Kaikōura coastline, arguably we get the best office views in the country,’ says Christophe.

# 24/7 SAFETY



As we prepare for State Highway 1 (SH1) to open 24/7 on Monday 30 April safety is our number one priority. In the event of predicted heavy rainfall the NZ Transport Agency may close the road as a precautionary measure - this can happen day or night. For real-time travel information about SH1 visit [nzta.govt.nz/p2c](https://www.nzta.govt.nz/p2c) or call **0800 4 HIGHWAYS (0800 44 44 49)**.

## What to expect when travelling SH1 at any time:

- Passing by or travelling through construction sites where works continue
- Stop/go areas controlled by traffic lights
- Single lanes in place with speed restrictions
- Unsealed road and loose gravel in places
- Trains travelling in either direction from Picton to Christchurch
- 'Danger - rockfall zone - no stopping' signage for safety
- Signposted stopping areas - the ONLY places to safely pull over for a break
- Sharing the road with freight vehicles and construction vehicles



Watch out for cones and reflectors when travelling at night.

## Here's what you can do to make sure your journey is safe:

- Obey all instructions, signage and only travel in designated areas
- Drive to the conditions: the weather, the road you're on, the vehicle you're in, the traffic around you, and your level of experience
- Obey traffic lights
- Make sure everyone in your vehicle is wearing their safety belt
- Check weather and travel conditions before you start on your trip
- Be prepared when travelling with warm clothes, food, water, and a charged cell phone
- Be aware of your environment:
  - Be patient, cautious and courteous
  - Follow all traffic signs and any instruction given by road crew
  - Obey speed limits to keep all road users and workers safe
  - Keep fresh by taking breaks and supporting communities on the route

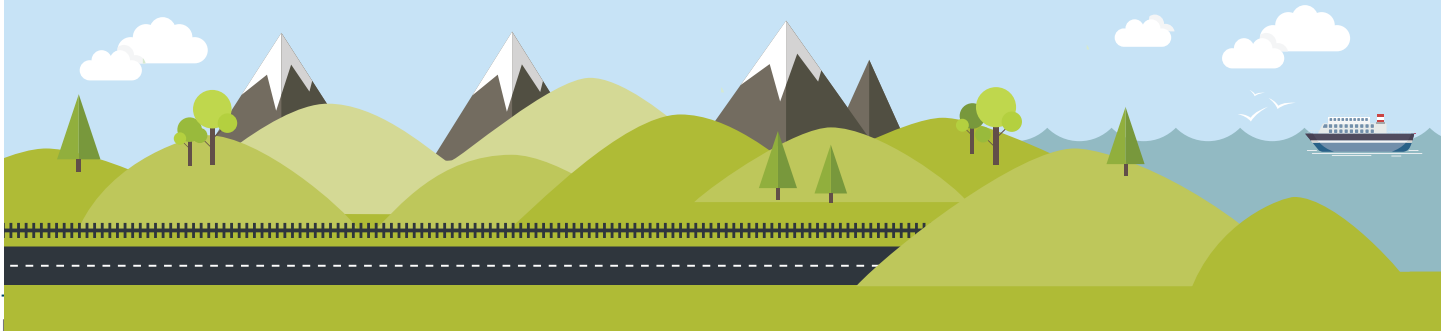


If you're cycling, travel during the daytime for your own safety

## Rail safety for drivers and pedestrians:

- ✓ Expect trains at any time, from either direction.
- ✓ Take extreme care when approaching a railway level crossing
- ✓ Obey the warning signs and look carefully in both directions for trains
- ✓ Listen, be aware and pay careful attention to your surroundings
- ✓ If there is a queue of traffic, before you drive over a railway crossing always ensure there is space on the other side for your vehicle to fully cross the tracks
- ✓ Trains travel faster than they appear and can't stop quickly. Always check both ways at level crossings before proceeding

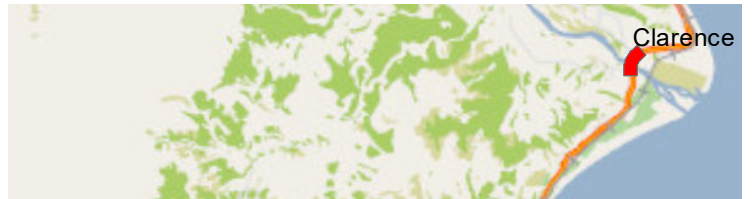
Allow plenty of time for your trip and check the status of the road by visiting [www.nzta.govt.nz/p2c](https://www.nzta.govt.nz/p2c) or calling **0800 4 HIGHWAYS (0800 44 44 49)** at least two hours before travel.





## DELAY HOTSPOTS

In the red on the map below are delay hotspots along State Highway 1. Please drive safely through these areas - some of which are single lane.



**Thank you for your patience.**  
For further updates on the condition of State Highway 1 both north and south of Kaikōura please visit here [www.nzta.govt.nz/p2c](http://www.nzta.govt.nz/p2c) or call 0800 44 44 49.

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# The Bulletin Kaikōura earthquake update

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## IN THIS ISSUE

- Kaikōura ANZAC day connections
- Temporary to permanent - Bridge 90
- Putting in permanent protection
- Digging in for Archaeology Week
- Site 9 then and now
- Road open 24/7



## THE HUNDALEE HILLS

The Hundalee Hills are a hot spot for one-lane sections along State Highway 1 (SH1) south of Kaikōura as the road and its structural foundations are being rebuilt.

This rebuild has three aspects: constructing the final three structural walls damaged by the 2016 earthquake, rebuilding four sections washed out by ex-cyclone Gita, and road maintenance and improvements.

Work continues on the walls and washed out sections resulting in four one-way sections between the Leader Road/SH1 intersection and Oaro.

'As anyone who has driven the route will know, it is winding, narrow and carved out of steep hillsides,' says zone manager for existing infrastructure Keith Larson.

'To even bring in the equipment where we need to do this work in we have to do a lot of preparation work to safely fit our cranes, machinery and workers on the road while also allowing traffic to continue to flow.'

'The good news is the delays drivers are experiencing are for a relatively short timeframe when compared with the

design plan for the road as we have incorporated where possible, vertical and horizontal alignment improvements enabling an improvement in travelling enjoyment and safety.'

Construction has begun on two of the Gita wash-out areas, while work for the other two sites are in the design phase, but fixing these areas is complicated by the topography of the landscape.

'The one positive from Gita was that the areas of the Hundalee Hills where we had completed work held up perfectly in the extreme weather event,' says Keith.

The three structural walls needing to be built are also complex because of the winding, steepness and narrowness of the road, but once completed will ensure a road better built to withstand future natural disasters.

'We are trying to find the best fit for what is a tricky route, to provide for a safer and more enjoyable drive over the Hundalee Hills on the stunning Picton to Christchurch journey,' says Keith.

SH1 over the Hundalee Hills has undergone an upgrade

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.





over the past 17 months with better road alignment, more guardrails, the height of the road being lifted in places for an improved driving experience, and new road seal.

During the next six months, while drivers are sharing the road with work sites, it is critical to drive to the speed restrictions and follow all instructions given by our crew and road signs.

'As always, we remind drivers to plan ahead for their journey by checking [www.nzta.govt.nz/p2c](http://www.nzta.govt.nz/p2c) or calling **0800 4 HIGHWAYS (0800 44 44 49)**,' says Network Operations Manager Tresca Forrester.

'And we thank everyone for their patience as they share the road with our crews undertaking the rebuild work.'



## OUR COMMITMENT TO A BETTER TRANSPORT NETWORK.

There have always been two clear goals for those restoring State Highway 1 (SH1) and the rail way line through Kaikōura.

The first, and most immediate priority, was reconnecting communities by reopening the transport networks as quickly as possible. That has been achieved.

The second is to leave behind something that is better than what was there before the devastating earthquake.

While work continues to finish restoring the road and rail line, we are also focussing on delivering the Government's \$200+million safety and amenity improvements package for SH1 users between Clarence and Oaro.

The package of improvements will help the economic recovery of the region by supporting tourism growth. The planned changes include wider

shoulders, more safety barriers and passing opportunities, and improved stopping areas – all contributing to safer and more reliable travel along the Kaikōura coast.

A shared pedestrian and cycle path is planned from Okiwi Bay to Mangamaunu to allow people to safely enjoy the iconic coastline at a more leisurely pace. There will be improved parking and access as well as public toilets for those who want to stop and linger at some of the key attractions.

One of these proposed areas is at Mangamaunu where the railway line runs between the road and the beach.

Currently beach goers and surfers use an 'informal' parking area at the southern end of Mangamaunu. They cross both SH1 and the Main North Line railway to view the surf and get to the beach. This poses significant safety risks and the proposed new shared path and amenity area on the

seaward side of SH1 and the railway are intended to provide safer access options.

Kaikōura's special environment and natural resources, and people's enjoyment of them, is of utmost priority and has underpinned our approach throughout all of the recovery and reinstatement work.

As with rebuilding the road and rail networks, great care will be taken to build these public assets in a way that minimises the impact on the environment, cultural landscape, and important wildlife along the coastal route. At Mangamaunu we are looking for the least intrusive way to achieve the necessary outcomes of safety and amenity.

Residents can find out more about the improvements works and let us know what is important to them at an information evening planned for June. We will advertise this details of this event, once they are confirmed.

In the meantime, to find out more about the rebuild, visit: [nzta.govt.nz/Kaikōura-earthquake-response](http://nzta.govt.nz/Kaikōura-earthquake-response)

### What is the proposed design for Mangamaunu?

The design is still a work in progress. The broad footprint was consented by Kaikōura District Council and Environment Canterbury Regional Council in July 2017. An amendment in March 2018, was a result of design refinement of possible works and included the provision of coastal protection (ie sea defences) adjacent to the proposed shared path.



## How will the community be involved in the design?

In January 2017, NCTIR, the NZ Transport Agency and KiwiRail established the Restoration Liaison Group to provide a forum to inform the design, management and monitoring of all works. The group has been meeting for over a year and is made up of representatives from Te Runanga o Ngai Tahu, Te Runanga o Kaikōura, Department of Conservation, Kaikōura Marine Guardians, Heritage New Zealand, Kaikōura District Council, Hurunui District Council, Marlborough Council, Environment Canterbury, the Transport Agency and KiwiRail.

This group has been briefed on the improvements package and associated consenting.

The next step is to work with key stakeholders who visit this spot regularly to get their insights to

help develop a detailed design of what might work to enhance this area. In order to achieve this a focus group is planned this month. It will include representatives from the Te Runanga o Kaikōura, Kaikōura Board Riders Association and the Surfbreak Protection Society and will work through the challenges and priorities at Mangamaunu.

## Why was the emergency legislation used for the Mangamaunu shared path/amenity area?

In simple terms, the Hurunui/Kaikōura Earthquakes Recovery Act wasn't a piece of legislation just about reinstatement of what existed prior to the earthquake, but also allowed for something better to be left behind.

The consents are consistent with the intent of the emergency legislation, and consistent with the approach to consenting throughout 2017.

## Are you building a seawall?

A seawall, generally a vertical structure, is not being considered. The advice from NCTIR's coastal processes experts is that a sloped protection structure will have less potential impacts on the surf break than a vertical seawall by mitigating wave refraction.

## Will there be any effects on the surf break?

We are committed to undertaking a surf break assessment. In the first instance, this assessment will investigate how the nature of the surf break has changed as a consequence of the earthquake (and any coastal uplift) and any changes that may have occurred. The surf break assessment can then assist the designers in ensuring that any effects of the works on the break area are avoided.



## TEMPORARY TO PERMANENT – BRIDGE 90

The Main North Line (MNL) railway is getting a permanent upgrade at Bridge 90 south of the Hundalee Hills.

The earthquake-damaged bridge at this site was demolished in March 2017 with a temporary bridge installed using KiwiRail emergency bridge spans so the MNL could start running again.

'The temporary bridge meant we could get the rail system up and running again quickly. The permanent bridge will mean trains can run through this area at higher speeds and is another important step towards rail operating 24/7,' says project manager – rail, Sam Powrie.

Construction on the bridge will begin in late May.

The new build will include constructing embankments, putting in piles, installing abutments to hold the bridge at each end, and fitting four 30m-long beams across the bridge.

'It's a pretty standard rail bridge' says project engineer James Kelly. 'Our biggest challenge will be getting the materials to site as it is quite remote. The 50 tonne beams in particular will require a high level of planning



and preparation before they can actually make it to site to be installed. Coming into winter, the weather will also play a part. The area is prone to flooding in heavy rain so conditions will need to be constantly monitored, and the works progressed around this.'

The rail line will be moved onto the new bridge before the temporary bridge is deconstructed.

James, who has worked on the project since its inception, is looking forward to being there for the completion of the bridge.

'It's great to be returning to one of the first sites we worked on after the earthquake back in February 2017, and seeing it through to the end,' he says.



## PUTTING IN PERMANENT PROTECTION

A permanent design for one of the more challenging landslides south of Kaikōura is underway.

Site 29A didn't fail in the original Kaikōura Earthquake, however ex-cyclones Debbie and Cook brought down 232 mm of rain on top of the slope over 10 days in 2017, causing it to slump 12 metres into the transport corridor.

The road was blocked for more than a week while crews attempted to stabilise the 90-metre-long slip. Fifteen thousand cubic metres of material were removed in the process.

To avoid removing the toe of the slump and risk de-stabilising the slope further, the rail and road were rebuilt further out towards the foreshore, curving around the toe of the slip.

When this year's ex-cyclone Gita hit in February, 300 mm of rain fell at this site in just one day. This saturated and reactivated the remaining slump material causing a 30,000 cubic metre landslide to bury the rail line and State Highway 1.

The failure exposed the rockface behind the material which meant it was considered safe to remove the remainder of the original slump material.

Geotechnical engineer William Marshall says right now both the rail and road are protected from any further loose material.

'Without vegetation cover there is a risk of rock fall and minor debris avalanches from the exposed slope, so we have constructed a 4m-high bund at the base of the slope to protect the road and rail,' explains William.

Ex-cyclone Gita had the same effect on the site as a large scale sluicing operation. Now the displaced material has been removed, the design team can consider improvements to the transport corridor alignment as part of the permanent design.

'In an ideal world we would like road and rail to be as straight as possible, but to achieve this we need to shift the transport corridor closer to the slope.

We need to build a rock fall protection barrier for this to happen and the design for this has just begun,' explains William.

While the design of the alignment and slope protection will be finalised over the next few months, the barrier is likely to resemble the structure at the base neighbouring Rosy Morn slip. At 29A, a 5.5m-high barrier is being built which includes a 3.5-metre-high gabion wall with a 2m-high debris fence on top.

Construction will start later this year.



Slip 29A not long after ex-cyclones Debbie and Cook in 2017



Site 29A with the road realigned



NCTIR archaeologists Tristan Wadsworth shows Barry Dunnett, Murray Darling, Sue Jarvie and Jenny Dunnett an artefact previously sourced from the area.



## SHARING HISTORIES

PEOPLE  
Kaikōura TOWNSHIP

Kaikōura residents and visitors of all ages got a chance to step back through time at the Kaikōura museum this week as part of the annual New Zealand Archaeology Week.

NCTIR archaeologists joined forces with Kaikōura Museum to present two events delving into the distinctive archaeological history of the coastal area for the nationwide archaeological week organised by the New Zealand Archaeological Association.

‘The archaeology of the area represents the enduring connections local communities have with the past, and the coast is considered by archaeologists to be among the richest and most interesting parts of the country,’ says NCTIR archaeologist Cathleen Hauman.

On Wednesday 2 May sixty people gathered to learn about the cultural settlement of Kaikōura, what archaeology is, how NCTIR is managing the impact of its work on local heritage and a brief history of whaling in the area from NCTIR archaeologists Tristan Wadsworth,

Jeremy Habberfield-Short and Kathy Davidson.

Kaikōura resident, Barry Dunnett, says the evening was ‘very informative’ and helped him feel more connected to the local history of their home town and its surrounds.

‘It was of great interest to us locals and we’re very much looking forward to the next instalment!’

On Saturday 28 April the next generation of archaeologists aged 6 to 13 were taken on a learning journey by NCTIR archaeologist Jean Spinks through what happens with archaeological materials once the excavations are complete.

‘National archaeology week is a chance to kindle interest in a fascinating subject while helping connect us all to our histories, to the landscape, and here, to the coast and to the people who went before us,’ says Cathleen.

The NCTIR project has had an archaeological team since its inception and is committed to increasing our knowledge and understanding of this incredible area and its people.



## SITE 9 THEN AND NOW

Check out Waipapa Bay at this time last year and how it looks today. The crew at Site 9 are well underway completing the road and rail realignment.

Eighty thousand cubic metres of recycled slip material has been laid to build up the base of the new site. Right now crews are building up the rail embankment. In just over a week, rail crews will begin laying new track here. Once the rail is complete, the crew will begin building a Terramesh rock fall protection wall and the new road.



Site 9 then



Site 9 now



# MAKING THE MOST OF A ROAD CLOSURE

State Highway 1 south of Kaikōura was closed on Wednesday 18 April to undertake necessary work to complete the final preparations for re-opening the highway to 24/7 traffic. We had to keep the road closed until 3pm on Thursday 19 April because high winds on the Wednesday prevented us from completing our work. During the two-day closure we managed to remove loose rock from seven sites in the south and install guardrails to improve safety. Our crews also took advantage of the road closure to undertake other work, which required there being no traffic on the highway. Thank you to everyone affected for their patience as we undertook this work.



**1**  
**Open 24/7**

ANZ TRANSPORT AGENCY  
New Zealand Government



## OPEN 24/7

It's happened! On Monday, 30 April at 7.30am State Highway 1 north and south of Kaikōura was opened to 24/7 traffic. Thank you to everyone who helped make this happen and to all the local communities for their patience as we got the road to the point where we could safely open it to around-the-clock traffic.





## FIRST SECTION OF THE SHARED ACCESS PATH COMPLETE

One of NCTIR's hard working teams chalked up a milestone last week - they finished laying the first 560m section of the shared walk and cycle path at Irongate Stream north of Kaikōura.

This part of the shared path is being constructed as part of the seawall structure built to realign SH1 seaward and away from the landslide. Once handrails are added, this section of the path will be one small part of the rebuild job that's finished, offering a glimpse of what SH1 will look like in the future.

The 'final pour' was also special for the team because some of the crew, led by foreman Vili Takai, had built the foundations of the same seawall a year ago. They have worked together on seawalls at various sites along the coast - often in cold, wet conditions.

Site engineer Wendy Heynen says the crew started concreting the path on 5 April. They lost a week because of bad weather but made up the time, even pouring 96 metres in one day.

'I'm so proud of what they've achieved,' Wendy says. 'This type of work is often done by specialist crews but the guys wanted to do it and I knew they could. We set up a test site and they nailed it.'

The concrete is 50mPa, a super strong structural concrete, and has a micra silica additive to prevent the steel reinforcement from corroding in the marine environment. This makes it a challenging product to work with as it sets very fast.



## ROAD SAFETY WEEK

Keeping people safe while travelling on New Zealand roads - including State Highway 1 north and south of Kaikōura, on the alternate route via Lewis Pass and on Route 70 (the Inland Road) is a priority for all communities.

Road Safety Week is an opportunity for communities to get involved in promoting road safety. It will be held 7 to 13 May this year and is coordinated by Brake, a road safety charity.

Road Safety Week is organised to inspire communities to take action on road safety and promote life-saving messages. Schools, organisations and communities who would like to get involved can visit [www.roadsafetyweek.org.nz](http://www.roadsafetyweek.org.nz) to learn how they can participate.

Everyone who registers will receive a downloadable action pack containing guidance and resources.

## Road Safety Week





Mounted Rifle Sentries silhouetted on the beach



PEOPLE



Kaikōura  
TOWNSHIP

## KAIKŌURA ANZAC DAY CONNECTIONS

NCTIR was honoured to be invited to participate in this year's ANZAC Day dawn parade in Kaikōura.

Marc Parsons laid a wreath on behalf of the team during the ceremony, which was held at the Garden of Memories Memorial on the waterfront. 'It was dropped on me out of the blue and was quite unexpected. I was honoured to take part in such moving occasion,' he says.

Local farmer Marc, whose father Geoff fought at the Battle of Guadalcanal in the Pacific during World War II, came out of retirement to help with the transport rebuild. He's spent the past year refuelling trucks, machinery and helicopters.

'It's often seven days a week, starting and finishing in the dark during winter. I'm happy to help out for as long it's needed.'



**Above:** Railway men Frank Flynn, a former ganger, and Barry Butcher, who drove steam engines, at the community breakfast in the Memorial Hall supper room after the ceremony.



**Below:** NCTIR's Marc Parsons laid a wreath on the team's behalf.



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# The Bulletin Kaikōura earthquake update



## A LASTING IMPRESSION

A new feature to the Kaikōura coastal route is edging closer to completion. From Irongate Bridge to just north of Ōhau Stream, 2.5 kilometres of seawalls are being built – more than 10 metres high in places. Work started on the seawalls in March 2017 when crews had to work around the tide to construct the foundations.

Over the past year the seawalls have been built on top of the foundations; capping blocks are now being placed to top off the walls and a durable structural concrete shared pathway is being poured adjacent to the walls. 'We completed the shared pathway a couple of weeks ago at Site 2, just north of Irongate Bridge,' says coastal route alignment construction manager, David McGoey. 'It was a proud moment for all of us involved. We are pushing ahead with the rest of the sites and are looking forward to being able to use the route as motorists, cyclists and pedestrians when it is all finished.'

Along the seawalls, the road remains unsealed at the moment but drivers can expect to be driving on a sealed road by the end of July. 'It's a weather dependent goal, but we are hoping to have the seawalls completed by June, the road sealed and rockfall protection fence installed by the end of July,' says David.

Having been designed and built for the unique coastal and mountainous environment, the seawalls offer long term sustainable protection to the road and rail transport corridor north of Kaikōura from the coastal elements and seismic activity. 'We have designed the seawalls to last 100 years and withstand the predicted natural events, which they could face,' says senior geotechnical engineer Charles McDermott.

Designing the seawalls was not just limited to pure structural engineering – it was also about creating an experience using the natural curvature of the coastline for a safe, enjoyable trip along this world class scenic route. 'The seawalls are now a feature of the drive, offering a new experience with the coastline and once completed will offer drivers, cyclists and pedestrians an opportunity to experience the beauty of this part of New Zealand,' says Charles.

**Learn more about the design and build of the seawalls on page 4 and 5.**



The seawall and shared pathway taking shape at Site 2 north of Irongate Bridge

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.







## ON TRACK TO WIN

The reopening of the Main North Line railway between Blenheim and Christchurch in just under ten months after the Kaikōura earthquake has taken out a prestigious trans-Tasman award.

The Main North Line Earthquake recovery project was announced winner of the Rail Technical Society of Australasia's Biennial Project Award for its work reinstating the line following the 7.8 November 2016 quake.

The judging panel described the KiwiRail led project as an 'inspiring example of how railway people respond energetically and successfully to the most severe challenges.' They also noted that the line was opened for freight trains three months ahead of schedule, reconnecting communities and taking heavy trucks off vulnerable inland routes while work on State Highway 1 continued.

KiwiRail's Earthquake Recovery Project Director Walter Rushbrook, who accepted the award, says the win is recognition of the determination and dedication of all those involved. 'We are enormously proud to be recognised by the Australasian rail profession for the tremendous work that was done.

'This is the result of an outstanding team effort by our KiwiRail team, our project partners the New Zealand Transport Agency and the NCTIR Alliance, central and local government and the local community, who were incredibly supportive and patient while the work was carried out. 'As we head into the second winter since the earthquake, the award is just the boost we need to finish off the remaining recovery works on both road and rail.

'The earthquake recovery project was the fastest paced and largest job any of us were ever involved in, with more than 1700 people involved at the peak. Not only did we 'move mountains to reconnect communities' but we managed to get the rail line operating again three months ahead of schedule.'

The RTSA is a joint technical society of Engineers Australia and Engineering New Zealand (formerly IPENZ), established to further the interests of the railway industry and advancement of railway technology and management in Australasia.



Rail Design Manager, Daniel Headifen and KiwiRail's Earthquake Recovery Project Director Walter Rushbrook accept the award in Australia



***'The earthquake recovery project was the fastest paced and largest job any of us were ever involved in, with more than 1700 people involved at the peak. Not only did we 'move mountains to reconnect communities' but we managed to get the rail line operating again three months ahead of schedule.'***

Some of the team behind the rail rebuild project gathered for the final weld reconnecting the Main North Line in 2017



## REAPING 24/7 REWARDS

On 30 April 2018, for the first time since the November 2016 earthquake, full access from

Picton to Christchurch was given, and along the corridor local businesses and residents were delighted.

David and Jo Gilmore are especially happy about the 24 hour access to State Highway 1. 'It is an amazing achievement in such a short time,' says David, 'and we are grateful to all the people involved. It is a truly incredible engineering achievement.'

The couple travel from their home in Ward to Christchurch farmers' markets, where they sell their home grown, hand-crafted Flaxbourne olive oil and hazelnut pesto. 'We won't have to rush home from Christchurch at lunchtime any more, says Jo, 'we can have a rest after the market and take our time.'

The Gilmores have 400 olive trees and 180 hazelnut trees, and they were hit hard by the earthquake.

Having the road re-open in December 2017 was a huge relief to them, as it reduced their travel time from over seven hours to three, and now that travellers can journey anytime day or night, they look forward to many of their customers stopping by to see them. 'We are just picking up our feet again. We have had a very good year so far, and we've got a good harvest coming on,' says Jo.

Full access from Picton to Christchurch offers travellers flexibility which has not been available for over a year, and the Gilmores are excited about what it means for business.

'We sell from our door, and lots of our customers from Christchurch will call in when they come to visit friends and family in Marlborough, so for us, the more people who are travelling on SH1, the better.'

## UPCOMING NIGHT CLOSURE, SOUTH OF KAIKŌURA



Our team will be removing up to 16 of the temporary shipping containers near the Parititahi Tunnels overnight on Monday, 28 May. Crews have been working on widening the southbound tunnel at this location. To enable us to finish the northbound tunnel, the containers need to be removed so we have access to finish the widening work. Further night closures are planned in June to move more containers and concrete blocks that have been serving as rockfall protectors. Closure dates will be publicised as soon as they are confirmed to give as much notice as possible to drivers and the community.

SH1 between the SH1/Leader Road intersection (north of Cheviot) and Peketa will close **at 10pm on Monday 28 May and reopen at 6.30am on Tuesday 29 May.**

During this time access to and from Kaikōura from the South will be via Inland Road, 24/7.

SH1 north of Kaikōura will be open.

For more information please visit [www.nzta.govt.nz/media-releases/night-closures-planned-for-sh1-south-of-kaikoura/](http://www.nzta.govt.nz/media-releases/night-closures-planned-for-sh1-south-of-kaikoura/)

To stay up-to-date with real-time travel information please visit [www.nzta.govt.nz/p2c](http://www.nzta.govt.nz/p2c) or call **0800 4 HIGHWAYS** (0800 44 44 49). Thank you for your support and patience.

# SEAWALLS: REBUILDING A COASTAL ROAD

State Highway 1 and parts of the Main North Line railway, between Irongate Stream and Ōhau Stream, were decimated by the 2016 earthquake when about 350,000 cubic metres of material fell onto the transport corridor. The steepness of the Kaikōura ranges and the swells of the Pacific Ocean presented constraints and challenges which needed us to design a sustainable solution for protecting the transport corridor. The earthquake pushed up the ground along the coastal route providing more land on which to rebuild the road away from the vulnerability of slip prone slopes. Different design solutions for the narrow corridor able to withstand the natural elements were investigated, including bridges, embankments and seawalls. We went mainly with seawalls and embankments which we decided were more suitable for the coastal environment we were working in.



ŌHAU POINT: September 2017



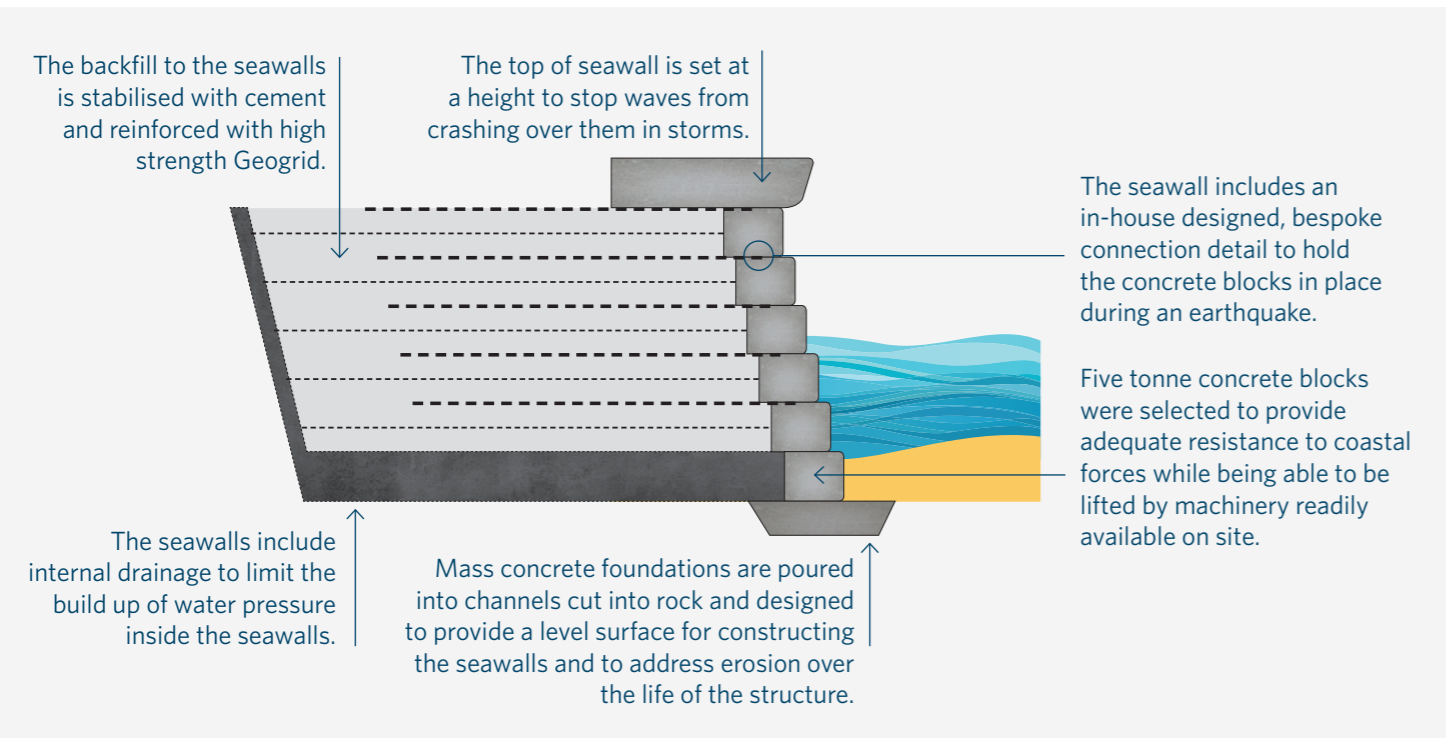
ŌHAU POINT: May 2018

## Why seawalls?

The seawalls fit within the surrounding environment, are made from locally sourced materials where possible and have a reduced impact on the ecology of the coastal marine area when compared with other solutions. Seawalls also fit the narrow space in which we were working while offering protection to our crews who were working in what was at times an aggressive environment. It is also possible to retrofit the seawalls in the future to address additional sea level rise.

## What do the seawalls do?

Seawalls protect the newly built transport corridor from the erosion forces of the Pacific Ocean and are engineered to move as one withstanding seismic activity minimising travel disruptions. The coastal protection provided by the seawalls, in the first instance, protects the road but is, by extension, a defence for the railway too.



## Constructing the seawalls

Many of the foundations for the seawalls sit under the high tide mark along the coast. This meant timing the pouring of the concrete foundations with the changing tidal movements took perfect planning. The seawalls have stretched resources across New Zealand with the concrete blocks being made in Christchurch and Blenheim before being transported to site. Cranes were unsuitable for the narrowness of the corridor, so the five-tonne concrete blocks were designed to be put in place by 20-tonne diggers.



## A drive to remember

The seawalls meant we could open SH1 on 15 December 2017. If you drove over the unsealed road across the seawalls before Christmas you were driving at a lower height than if you were to drive the same part of the road today. We have continued building the seawalls up since the road opened.

Behind the design of the seawalls is a focus of creating a safe and pleasurable journey along this stunning part of New Zealand's coastline, whether driving or using the yet-to-be-completed shared path.





## WINTER IS COMING

It's time for drivers to start preparing for winter driving, says NZ Transport Agency Network Operations Manager, Tresca Forrester.

Before travelling on State Highways between Picton and Christchurch, drivers should plan ahead to stay safe. Both available routes can become treacherous in extreme weather conditions and this means pre-planning is essential. Extreme weather conditions, such as ice, snow, fog and wet weather, can hit quickly so people need to be prepared and keep up-to-date with the latest weather reports.

'In the event of adverse weather, we may close the road as a precautionary measure – this can happen day or night. Drivers need to allow plenty of time for their trip and check on real-time travel information through [www.nzta.govt.nz/p2c](http://www.nzta.govt.nz/p2c) or by calling **0800 4 HIGHWAYS** (0800 44 44 49). We recommend checking at least two hours before travel and during your trip,' says Ms Forrester.

### SIMPLE RULES FOR SAFE WINTER TRAVELLING:

- allow extra time
- ensure your vehicle is safe for winter driving
- drive to the road and weather conditions
- slow down and be prepared for unexpected hazards
- allow greater following distance between you and the vehicle ahead
- make sure your cell phone is well charged, check the car charger too
- have blankets, snacks, bottles of water ready in case of emergency or a breakdown

### HOW TO STAY UP TO DATE:

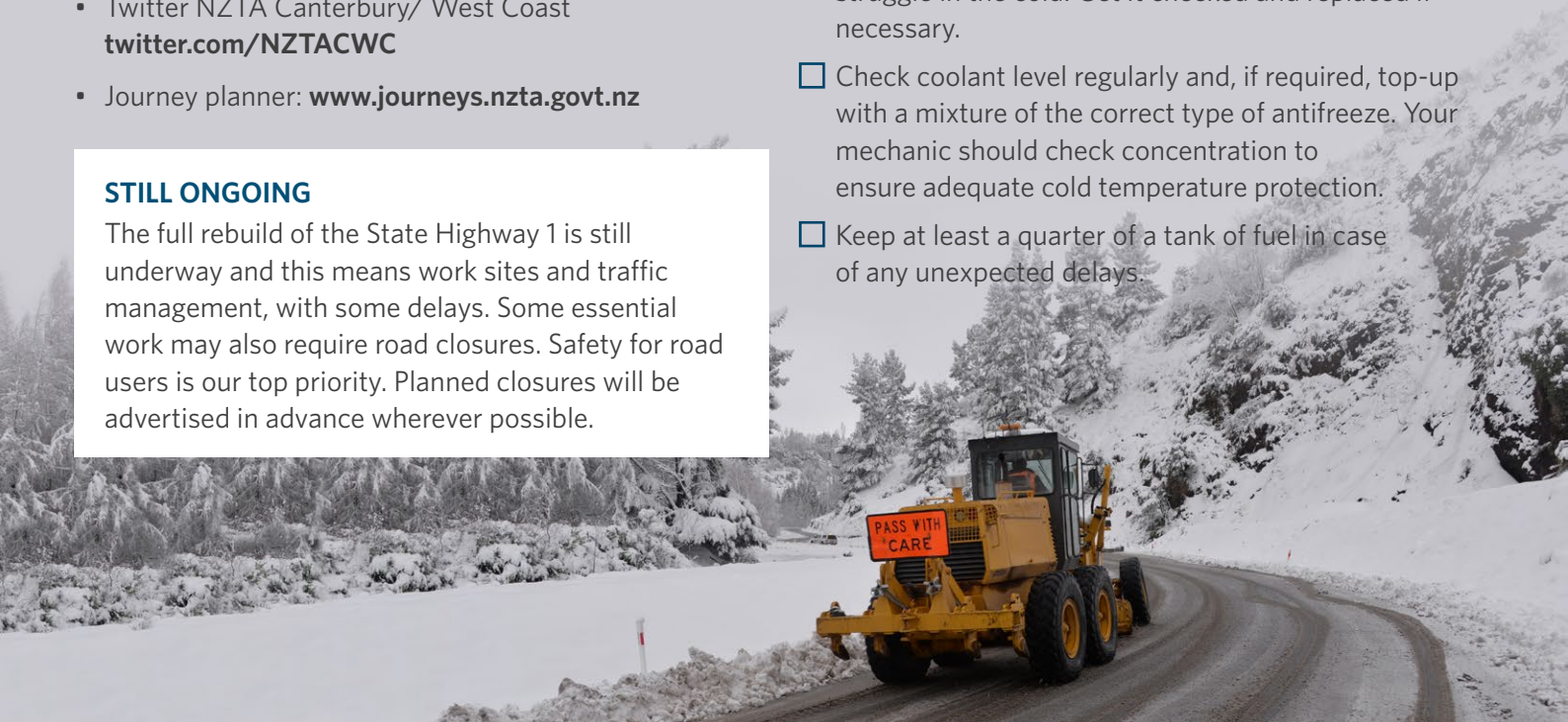
- **0800 4 HIGHWAYS** (0800 44 44 49)
- Picton to Christchurch route and Kaikōura [www.nzta.govt.nz/p2c](http://www.nzta.govt.nz/p2c)
- [www.nzta.govt.nz/traffic](http://www.nzta.govt.nz/traffic)
- Facebook [www.facebook.com/nztasouthisland](http://www.facebook.com/nztasouthisland)
- Twitter NZTA Canterbury/ West Coast [twitter.com/NZTACWC](https://twitter.com/NZTACWC)
- Journey planner: [www.journeys.nzta.govt.nz](http://www.journeys.nzta.govt.nz)

### STILL ONGOING

The full rebuild of the State Highway 1 is still underway and this means work sites and traffic management, with some delays. Some essential work may also require road closures. Safety for road users is our top priority. Planned closures will be advertised in advance wherever possible.

### VEHICLE CHECKLIST GUIDE:

- Check tyre treads. You should have at least 3mm of tread for winter driving. Consider winter tyres for improved safety. Check pressures at least every fortnight.
- Check brakes are in good running condition.
- Check your lights all work – low and high beam. Check and clean all lights regularly to make sure you can see and be seen clearly.
- Check your windscreen wipers and replace worn wipers.
- Clean windscreens, inside and out, to reduce dazzle from the low sun and ensure you have good visibility.
- It is recommended you carry snow chains and go to [www.nzta.govt.nz/winterjourneys](http://www.nzta.govt.nz/winterjourneys) website which has a video link to show you how to put them on your tyres. In some areas chains cannot be used and the road will either be open or closed until it can be cleared.
- A flat battery is the most common cause of winter breakdowns. If it's more than five years old it may struggle in the cold. Get it checked and replaced if necessary.
- Check coolant level regularly and, if required, top-up with a mixture of the correct type of antifreeze. Your mechanic should check concentration to ensure adequate cold temperature protection.
- Keep at least a quarter of a tank of fuel in case of any unexpected delays.





## BRIDGING OUT

While full access was restored to State Highway 1 between Picton and Christchurch on 30 April, works continue full steam ahead to finish required repairs on the rail, road, tunnels, and bridges along the corridor.

The 43m-long Needles Bridge and the 65m-long Flaxbourne Bridge are located one and two kilometres, respectively, north of Ward. Both bridges were built in 1952 and sustained substructure damage during the November 2016 earthquake requiring pier bolstering and abutment retrofitting.

Repairs on the bridges started in October 2017 and have continued to be used safely during most of the works with restricted speeds of 30km/h. With closures required during the Needles Bridge abutment repairs, the team built a temporary structure spanning the river that is being used to detour traffic. For the Flaxbourne Bridge the abutments were excavated from the top down leaving a large hole at the beginning and end of the bridge. Crane mats were placed across the holes and allowed vehicles to cross them.

Hard work and dedicated planning have kept the teams on schedule and the Flaxbourne Bridge is now operational at full speed, with Needles Bridge expected to be operational at full speed by 1 July.



## MADE AND MINTED IN HISTORY

Re-establishing State Highway 1 and the Main North Line railway has made its mark with NZ Post launching a stamp collection dedicated to the rebuild project.

Following a site-visit in September last year, NZ Post Head of Stamps Simon Allison says the work that was done to reconnect the South Island was almost Herculean. He was awed by the scale of the operation, the feats of engineering being used and the incredible resilience shown by the workers and community alike.

Like so many businesses, NZ Post experienced the immense challenges caused by the shattered transport infrastructure, both immediately following the earthquake and during reconstruction. To combat a broken highway and rail corridor, NZ Post chartered flights to restore mail and courier services to Kaikōura so essential items could be delivered. With SH1 and the rail out of action, all mail travelled the alternate route adding an extra 280 kilometres to the journey.

The Reconnecting New Zealand commemorative series illustrates the determination behind the NCTIR project to literally move mountains and reconnect communities across Hurunui, Kaikōura and Marlborough after the 14 November 2016 earthquake.

Six stamps have been designed featuring the new seven-span bridge over Irongate Stream, geotech teams and abseilers working on cliff faces warning crews below of landslides, earthworks teams moving landslide material, the building of seawalls, KiwiRail's temporary rail bridge 131, and the first freight train travelling the Main North Line.

The stamps are on sale now at [www.nzpost.co.nz/reconnectingnz](http://www.nzpost.co.nz/reconnectingnz)



# 24/7 SAFETY



State Highway 1 (SH1) is now open 24 hours a day and safety is our number one priority as vehicles use the route 24/7. In the event of predicted heavy rainfall the NZ Transport Agency may close the road as a precautionary measure – this can happen day or night. For real-time travel information about SH1 visit [nzta.govt.nz/p2c](http://nzta.govt.nz/p2c) or call **0800 4 HIGHWAYS (0800 44 44 49)**.

## What to expect when travelling SH1 at any time:

- Passing by or travelling through construction sites where works continue
- Stop/go areas controlled by traffic lights
- Single lanes in place with speed restrictions
- Unsealed road and loose gravel in places
- Trains travelling in either direction from Picton to Christchurch
- 'Danger - rockfall zone - no stopping' signage for safety
- Signposted stopping areas - the ONLY places to safely pull over for a break
- Sharing the road with freight vehicles and construction vehicles



Watch out for cones and reflectors when travelling at night.

## Here's what you can do to make sure your journey is safe:

- Obey all instructions, signage and only travel in designated areas
- Drive to the conditions: the weather, the road you're on, the vehicle you're in, the traffic around you, and your level of experience
- Obey traffic lights
- Make sure everyone in your vehicle is wearing their safety belt
- Check weather and travel conditions before you start on your trip
- Be prepared when travelling with warm clothes, food, water, and a charged cell phone
- Be aware of your environment:
  - Be patient, cautious and courteous
  - Follow all traffic signs and any instruction given by road crew
  - Obey speed limits to keep all road users and workers safe
  - Keep fresh by taking breaks and supporting communities on the route

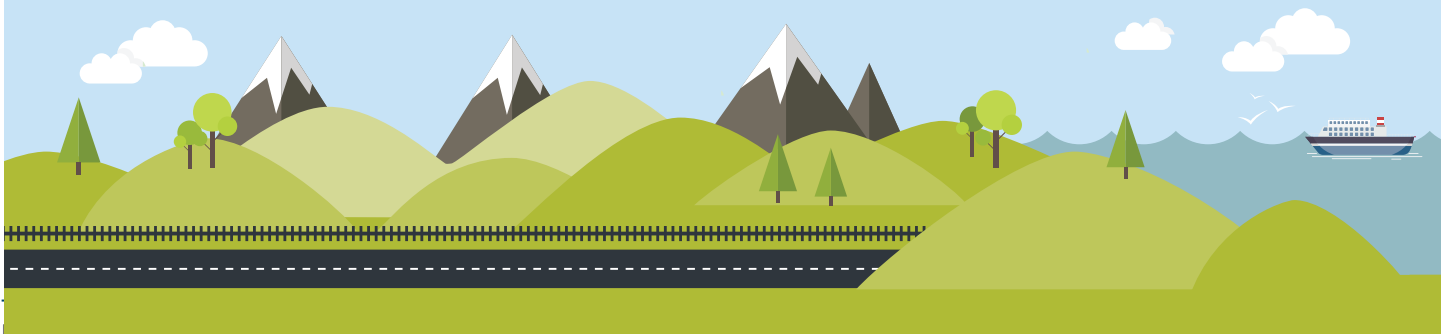


If you're cycling, travel during the daytime for your own safety

## Rail safety for drivers and pedestrians:

- ✓ Expect trains at any time, from either direction
- ✓ Take extreme care when approaching a railway level crossing
- ✓ Obey the warning signs and look carefully in both directions for trains
- ✓ Listen, be aware and pay careful attention to your surroundings
- ✓ If there is a queue of traffic, before you drive over a railway crossing always ensure there is space on the other side for your vehicle to fully cross the tracks
- ✓ Trains travel faster than they appear and can't stop quickly. Always check both ways at level crossings before proceeding

Allow plenty of time for your trip and check the status of the road by visiting [www.nzta.govt.nz/p2c](http://www.nzta.govt.nz/p2c) or calling **0800 4 HIGHWAYS (0800 44 44 49)** at least two hours before travel.





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# The Bulletin Kaikōura earthquake update



## PILING UP

Just south of Ōhau Point, our crews, piling rigs and cranes are constructing a 300-metre-long retaining wall to realign the Main North Line railway.

As a colony of seals laze on the coastline below and traffic rumbles by, our teams have been busy repetitively inserting casings 200 times over and up to 21 metres deep into hillsides created from landslide material.

Material captured inside the casings is then bored out, round steel cages inserted into each of them, concrete poured in and the casings extracted. Then once a reinforced concrete beam is built on top of the piles, the ground in front is excavated and the end result is a bored pile retaining wall.

Design engineer Ryan D’Souza says the retaining wall acts as a supporting system for the future rail realignment and will provide better protection for the road and rail.

‘These piled walls are designed and constructed to move as one, so any loads applied are spread over the entire structure,’ he says.

‘At this site we are highly constrained by space which leads to a lot of congestion as we are rebuilding the road below at the same time, but the beauty of this structure is we can build it efficiently within those constraints.’

On site project engineer Olga Joensuu, who has been working on the project since August 2017, says it has been challenging at times - but rewarding.

‘It’s a pretty unique spot - we’re exposed to the elements and the beauty of this coastline,’ she says.

‘The changing weather is always a challenge while getting resources to site, and making space for the heavy equipment we use can be difficult, but we’re hitting our targets and looking forward to seeing the end product.’

The wall is expected to be completed by the end of July, with the rail then being realigned behind the wall and over a debris flow bridge (which allows any debris coming off adjacent cliff faces to flow underneath the road and rail).

Once the wall is complete, passing traffic will not be able to see the piles and capping beam which make up the wall. Naturally weathering materials able to withstand coastal elements will be used as a finishing over the wall, and will leave a more pleasing, reflective view of the natural environment.

## IN THIS ISSUE

- Shipping containers on the move
- Widening tunnels
- Monumental week at site 7
- Winter is here
- Safety this Queen’s Birthday Weekend
- Smooth riding
- 24/7 crewing
- Hidden heroes at site 30



The team on site at Ōhau Point

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.





A section of State Highway 1 south of Kaikōura between Peketa and SH1/Leader Road was closed this week for the removal of 16 shipping containers. The move took place on Monday and Tuesday from 10pm to 6.30am.

The containers had been in place since the early stages of earthquake recovery to protect the road from rockfall. They had to be removed for the tunnels team to complete the widening of the Parititahi tunnel portals, allowing the switching of traffic between north and south-bound lanes.

During the night, Hiab trucks and a 25-tonne crane moved the 16 containers from the north-bound lane south of the Parititahi Tunnels. Reflectors were also fixed on the scaffold around the tunnel.

Site engineer Liam Mulvihill says there was a lot of pre-planning and work undertaken before the containers were moved.

‘Because these shipping containers were in place to protect the road from rockfall where the abseilers were working above, alternative protection was needed,’ he says.

‘In the week before the closure we installed new protection of a 5.5 metre high meshed scaffold fence at the toe of the slope and a MacMat geomat mesh drape that hangs within 20 metres of the road.’

This new rockfall protection is temporary to protect the road until the mesh and anchoring of the slip above it is complete.

Further night closures in the south are being planned for July to move the rest of the containers and concrete blocks. Closure dates will be announced as soon as they are confirmed to give as much notice as possible to drivers and the community.

‘For safety reasons, the work we were doing could only be undertaken during a road closure, so to provide minimal disruption to the travelling public we did this work during the night,’ Liam says.

We understand these closures are inconvenient - thank you to those affected by this closure for your patience and support.







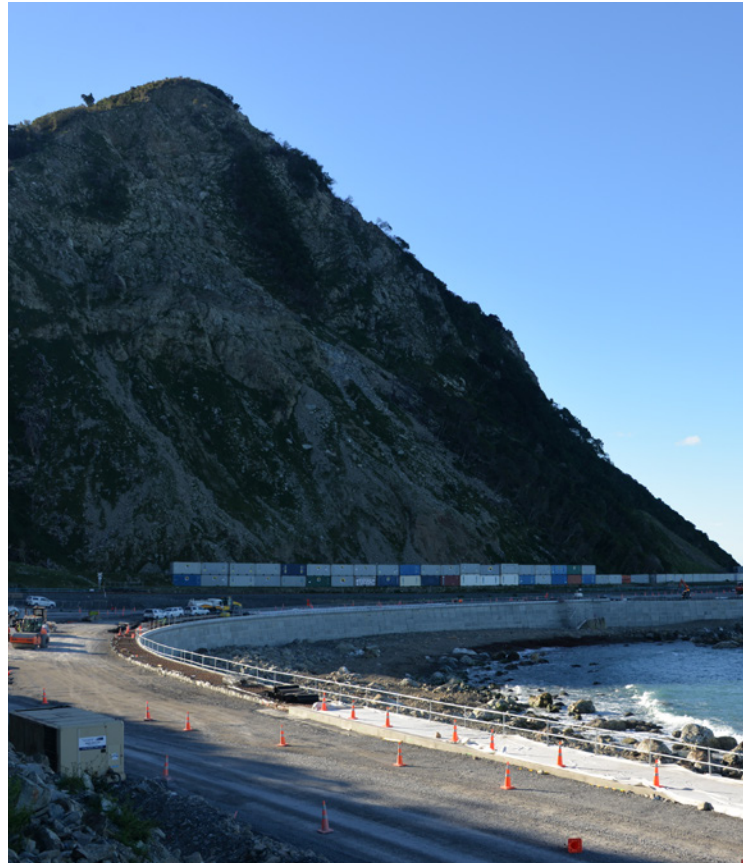
## MONUMENTAL WEEK AT SITE 7

Our site 7 team has been celebrating their achievements just north of Ōhau Point.

Project manager Clark Butcher says last week was a very significant week for the crew because of the culmination of three significant events. 'We have completed our construction up to a standard where the seals' environment is able to be returned to them, and our interaction with the seals will be minimal moving forward,' says Clark.

The team also finished night works this week. Clark explains: 'Some activities were only able to be undertaken at night, such as the import of materials at volumes which weren't able to be brought in during the day, along with the removal of slip materials that would have caused significant traffic interruptions. And, these have now been completed'.

But it is the finishing of the seawall which Clark says is the most significant of these events. 'On 24 May, the last of seawalls required to open the road for Christmas finally reached its full height. This has been both an impacting and emotional experience for our staff who have made many sacrifices along the way while investing in this community,' he says.



## WINTER IS HERE

As cooler winter weather was felt across the country in the past couple of weeks the Inland Road (Route 70) received a dose of fresh snowfall. Driving in winter can pose some challenges – visit

[www.nzta.govt.nz/winter-driving](http://www.nzta.govt.nz/winter-driving) for information about how to safely prepare for journeys in wintery conditions.





# GOING AWAY THIS QUEEN'S BIRTHDAY WEEKEND?

For those of you heading off for a break this long weekend please take the time to check real-time travel information before you head off and be prepared for increased traffic volumes.

Drivers have two options for travel in the upper South Island between Picton and Christchurch.

- SH1 via Kaikōura is now open 24/7 but construction is ongoing (north and south) with delays and some single lanes.
- The alternate Picton to Christchurch route via the Lewis Pass is open 24/7.

Both routes will be busy so whichever one you choose the NZ Transport Agency advises you allow plenty of time for your trip, especially if you are catching a ferry or are on a tight schedule.

The NZ Transport Agency encourages everyone heading off for a break to 'know before you go' and check the holiday hotspots map: [www.nzta.govt.nz/hotspots](http://www.nzta.govt.nz/hotspots). The map collates data from previous Queen's Birthday Weekend journeys and advises on the best time to leave to avoid the rush.

With the change in season it is also time to prepare for winter driving to stay safe:

- Take the time to check your vehicle is in good condition - tyres/spare tyre, indicators, windshield wipers, lights.
- Be prepared when travelling with warm clothes, food, water and a charged cell phone.
- A flat battery is the most common cause of winter breakdowns. If it's more than five years old it may struggle in the cold. Get it checked and replaced if necessary.

And remember, over holiday periods many drivers are on unfamiliar roads, so please be patient as we are all in this situation at some stage.

## How to stay up to date:

- Plan your journey between Picton and Christchurch and get real-time information via [www.nzta.govt.nz/p2c](http://www.nzta.govt.nz/p2c) or call **0800 4 HIGHWAYS** 0800 44 44 49. We recommend checking at least two hours before you travel and while on your trip
- Check the **MetService** weather forecast before you head away





## WIDENING TUNNELS

The Raramai and Parititahi Road Tunnels to the south of Peketa were built over a century ago. These road tunnels were not significantly damaged in the November 2016 earthquake, but were in need of improvements. The NZ Transport Agency's plans to upgrade and enlarge this row of tunnels is now underway.

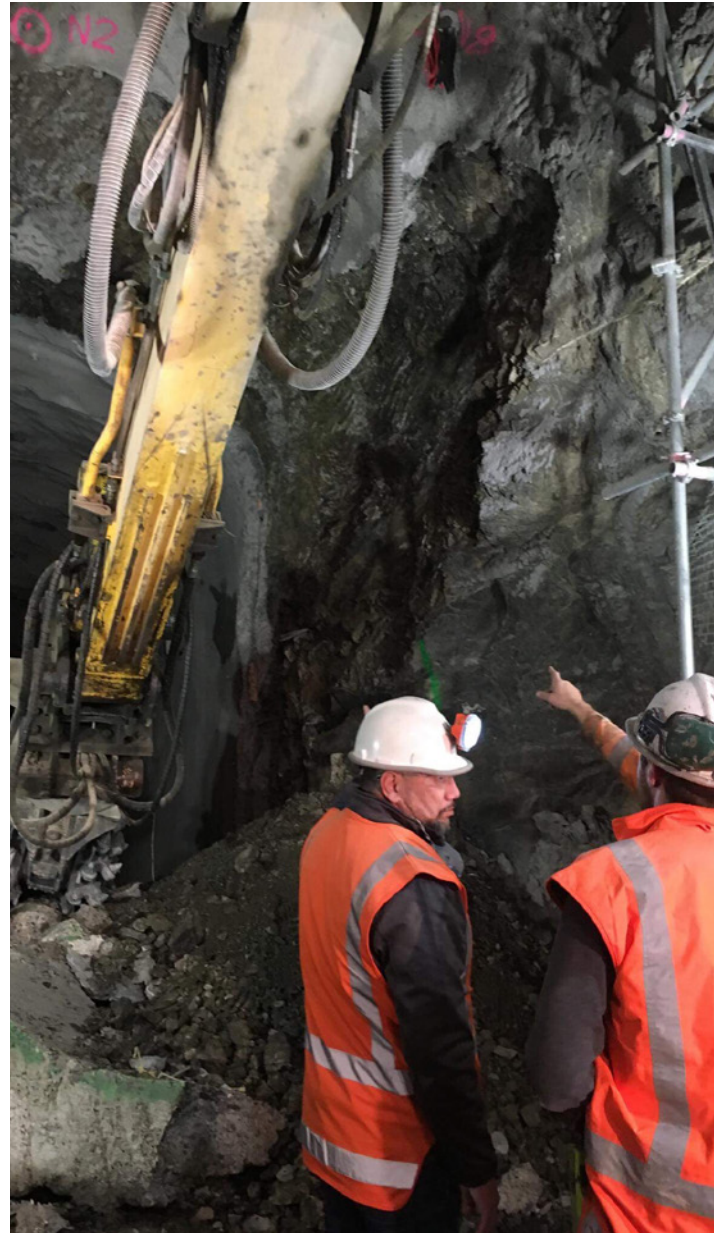
In order to complete works on the tunnels, without causing further delays to traffic, the tunnels team proposed a construction methodology allowing traffic to flow freely through one tunnel while the other tunnel undergoes improvements.

'The upgrades require the use of special equipment, including milling heads, which are double-barrel rotators that reshape the surface of the tunnel, and a shotcreting robot. This milling and shotcreting of walls, shoulders and crown [100mm] of the existing tunnels will complete Stage 1,' says tunnels manager Rafael Ballen.

'Stage 2 will include a further 150mm layer of concrete to finish the walls and 150mm of shotcrete to finish the shoulders and crown, which will complete full ground support. These processes will bring the Raramai and Parititahi Tunnels up to their new specifications. In order to achieve this amount of work by the set deadline, the tunnels teams are working both day and night shifts,' says Rafael.

'Getting up to speed and setting up the site for mining regulations was a great challenge that we overcame,' says site engineer Innes Duncan.

The widening of the tunnels will improve the clearance and safety inside the tunnels for vehicles - particularly large freight trucks. And will allow for a new fibre optic cable route through the tunnels.





## FINAL PIECE OF THE PUZZLE

At Punchbowl, just south of the Parititahi Tunnel, a final piece of mesh has completed a full protective wraparound of the point's rock face.

Abseilers have installed 9250 square metres of mesh and more than 400 anchors across Punchbowl's two sites - 22 and 23 - since November last year to slow falling rocks and prevent them from falling on State Highway 1 below.

Site engineer Florence Blondeau says the job was made easy by having the same Avalon abseiling crew on the two sites.

'Managing one team on two sites has been time efficient and I'm really proud of what we've achieved together.'

Site supervisor Christophe Bourgeois says installing the connecting piece of mesh was a great moment for his crew of 10 abseilers.

'It was a bit of a jigsaw puzzle putting in the final missing link, but it's now completed and looking good.'

Site engineer Florence Blondeau and site supervisor Christophe Bourgeois in front of the joining piece of mesh.



## SMOOTH RIDING

Drivers can expect a smoother ride through Jacob's Ladder, which was damaged by 200,000 cubic metres of material coming down off the neighbouring hillside during the intensity of ex-cyclone Gita in February this year.

Our crews, with their high-vis winter layers, were out on the road last week laying down 100mm of roading gravel. Once the team had distributed the gravel across the road a roller soon followed compressing it tightly to create a smooth top layer.

'We got the roading gravel down in two days and then it is just a matter of waiting for a solid section of dry weather to lay the chip seal,' says roading supervisor Glenn Cattermole.

The team is expecting to have it completed by next week. Glenn says the difference in the quality of the drive will be significant. 'I travel this road nearly every day and it will be much smoother going and much more enjoyable.'

## 24/7 CREWING



It's been over a month since State Highway 1 (SH1) has been open 24/7 and thanks to the mild, calm weather conditions, traffic has been running smoothly.

With worksites along this stretch of state highway and night-time traffic, it is essential safety controls and inspections are in place - not only for the crews, but also for the travelling public.

Grant Keeble, who has eight years working along the route, is one of the supervisors responsible for the patrols which monitor the area along SH1 north and south of Kaikōura.

'It's all about keeping the traffic flowing and safely between the Picton and Christchurch route,' says Grant.

'We have two patrols operating, one in the north and one in the south of Kaikōura. The teams of two work shifts between 6pm and 6am, 24/7.'

These patrol trucks are the 'eyes and ears' undertaking a variety of jobs including pothole repairs, maintaining culverts, attending to traffic incidents, cleaning traffic signage and clearing roadkill off the road.

The patrol teams keep in close contact with the traffic supervisors, monitoring the traffic lights across the network.

For those travelling at night please be patient, follow all traffic signs, instruction and light signals.



Patrol crews fix a variety of issues along the route.

**We have 11 sets of night time traffic lights operating north and south of Kaikōura along State Highway 1. Manual traffic control changes to a lights system when light fades around 5-5.30pm. These lights control traffic through one-lane sections. All the lights are either vehicle activated or use timers. The two longer sites in the Hundalee Hills are on timers with an approximate eight minute delay. Please do not run any red lights as it is dangerous for oncoming traffic and there is limited space to turn around.**



Be prepared for delays over the next week near Ōhau Point as we undertake sluicing work. For more information please call **0800 628 4737** or visit **[www.journeys.nzta.govt.nz](http://www.journeys.nzta.govt.nz)**





## HIDDEN HEROES AT SITE 30

Looking up from the passenger seat driving south of Rosy Morn, it is impossible to see the top of one of the largest sites on State Highway 1 south of Kaikōura; Site 30. From the road, only the lower section is visible, but above, there is a bigger slip area, where the works are mostly happening.



Each morning, crew members take four-wheel drive vehicles up the steep path to the top of the escarpment, and unbeknownst to travellers below, head down by foot to a bench before putting on their harnesses for work to begin.

Abseilers work down the sides of the damaged mountain to install anchors using drill rigs, then apply mesh netting lowered down in pieces by helicopters, and finally, nuts and plates secure the mesh to the anchors so any material which might be prone to come loose is secured to the cliff face. While completing the work, quality checks on the cables and all of the components are ongoing, to ensure the work will last.

The geometry of the actual site is varied and complex. It is a very large area and as well as a steep slope, the surface is very uneven.

‘Safety is a huge priority,’ says site engineer Florence Blondeau.

‘A lot of thought and planning went in to making this a safe work site. They’ve even carved a bench at the top for the team to have a flat area to have lunch and be able to prepare material without having to be in their harnesses.’

‘The site includes the largest area we’ve meshed south of Kaikōura, about 8900 metre squared,’ says Florence.

‘Work has been underway here since June 2017, and today is the last day on site for the team of abseilers. It’s an exciting day!’





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# The Bulletin Kaikōura earthquake update



## NEW WORKS AT ŌHAU POINT

The crews at site 6 and 7 around Ōhau Point recently achieved a massive goal of getting the seawall up to height, as well as shaping it to accentuate the surrounding reef and beach, and they are already hard at work on their next project.

Around Ōhau Point, the new alignment of State Highway 1 (SH1) has been lowered by 14 metres at the Ōhau Point corner, and shifted about 30 metres away from the cliff face. It is difficult to imagine the old alignment, which was almost entirely covered by the massive slip caused during the November 2016 earthquake.

Project engineer Tomislav Diklan says the crews will be busy clearing slip and debris material from the old alignment of SH1 as well as shaping and trimming an earth bund to three to four metres high as protection against any future movement.

One team will be forming a green terramesh bund 80 metres long, south of Ōhau Point, just before the tunnel. At the same time a shotcrete crib wall north of Ōhau Point about 60 metres long will be constructed to blend in with the surrounding landscaping just below the earth bund. Crews working from both ends of the slip will meet in the middle as their projects near completion.

An 800 metre long rockfall catch-fence will be installed as primary road protection, while the roading team works to complete the sealing of the road and streetscaping of the new SH1 alignment. Embankments between the old and new culverts at Ōhau Stream require completion.

'It's a very exciting time for us. Last year we were working from both sides of Ōhau Point, putting in a work track and clearing material in order to get the road open, and now the road is open and each day as we work, we are visibly closer to what this area will look like when the project is finished,' says Tomislav.



## IN THIS ISSUE

- New works at Ōhau Point
- Alternate Route – traffic volumes back to near pre-earthquake levels
- Always plan for an emergency
- Rebuilding a road: what lies beneath?
- Improving train speeds
- Wrap up Harbour work
- Site 9 temporary protection holding up
- Highway heroes



The pre-earthquake SH1 alignment

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.





## ALTERNATE ROUTE - TRAFFIC VOLUMES BACK TO NEAR PRE-EARTHQUAKE LEVELS



With the reopening of State Highway 1 to 24/7 operation, traffic volumes on the alternate route are back to near pre-earthquake levels.

The NZ Transport Agency is expecting to soon hand the alternate route from Picton to Christchurch, via the Lewis Pass, back to the maintenance contractors to manage as 'business as usual'.

The alternate route has proven to be a resilient route with more than \$65 million of improvement works undertaken since November 2016. The Government's \$60 million of funding was used for essential safety improvements including widening, slow vehicle bays, bailey bridges, additional safety barriers and rock fall protection, and road renewals (resurfacing and reconstruction).

There are still improvements and maintenance work to be completed along the route, which has been deferred to the summer 'roading season' in 2018/2019. Drivers can expect to still see maintenance work as the winter programme begins ensuring the road is safe over winter.

Network operations manager Tresca Forrester says the past 18 months has been challenging for drivers with the sheer intensity of so many stop/go sites on this route, but overall people have been supportive and provided positive feedback around the long term benefits of this work.

'With more than 30 worksites in its peak and traffic from the closure of SH1 using this route it was a challenging and intensive time.

'Special thanks to the Police who have had a dedicated team supporting road safety along this route over the past 18 months which has been critical for keeping our teams, the community and road users safe.'

Tresca added; 'as well as acknowledging the patience and support of the residents and driving community, we also want to recognise our road crews who have worked on a tough and considerably accelerated programme to achieve so much and keep the road open'.

'Many lived away from family to be on call 24/7 over winter to keep the road safe and open as much as possible.'

Like last year, this winter the Lewis Pass will continue to be either open or closed, and this is expected to remain in place until the work on SH1 is complete.

### CHECKING ON ROAD STATUS

The winter months for June to August can provide challenges to road users. As we have experienced this week weather can cause road closures or delays.

Travel information, journey times and road conditions can change at short notice.

It is important to plan ahead and stay safe by staying up-to-date with conditions and road status by:

- Call **0800 4 HIGHWAYS** (0800 44 44 49)
- Visit **[www.journeys.nzta.govt.nz](http://www.journeys.nzta.govt.nz)**

Check at least two hours before you travel in case you need to change your route.

To check whether State Highway 1 north and south of Kaikōura is open or closed always check **[www.nzta.govt.nz/p2c](http://www.nzta.govt.nz/p2c)** for the live status of the road.



## BAILEY BRIDGES TO BE DECOMMISSIONED

Three Bailey bridges on SH63 at Upper Buller, Homestead and Speargrass that were installed next to permanent one-way bridges to help manage the increase in traffic volumes on the alternate route, will be decommissioned later this month as traffic volumes have now returned to pre-earthquake levels.

Once these bridges are decommissioned, signage will be in place to clearly identify the give-way rules returning to the permanent one-way bridges that are alongside them.





PEOPLE

## ALWAYS PLAN FOR AN EMERGENCY

Safety of our teams has always been a top priority for the Kaikōura earthquake recovery and rebuild programme. Last week as part of our efforts to be prepared for any emergency we undertook a collaborative and evolutionary practice scenario between NCTIR, Helicopter Suppliers, Abseil Contractors, Mines Rescue Services and specialist ropes rescue advisor Over the Edge Rescue. Together we safely carried out a practice rescue scenario requiring the evacuation and treatment of an injured abseiler from the slope at Slip 6 at Ōhau Point.

The response included initiating the site emergency response plan by the scene controller, incident control through KERC (Kaikōura Emergency Recovery Centre), mobilising the on duty Abseil Rescuer to site with first response equipment, and the deployment of the Human Sling Load rescue helicopter and crew.

‘It’s one thing to talk about something, it’s another to do it in practice,’ says safety, health and environmental advisor Ryan Sutherland.

‘Our abseiling crews are working on steep and unstable terrain which provides unique challenges in preparing for and responding to an emergency. The rescue scenario was an opportunity to build confidence in our abseiling teams so if something was to go wrong they know what we can do to help and how they can help themselves in the immediate. ‘These efforts have also afforded us with the ability to launch a timely response to emergencies in the difficult access work areas we are working in.’

In addition, the exercise provided insight to our teams for how to improve preparedness and response so the safety of our crews is guaranteed.



Join us for an **information evening** for a project update and find out more about the improvements work of the Kaikōura coastal corridor

**When** Thursday 28 June 2018, 5.30 – 7.30pm

**Where** Kaikōura Museum, 96 West End



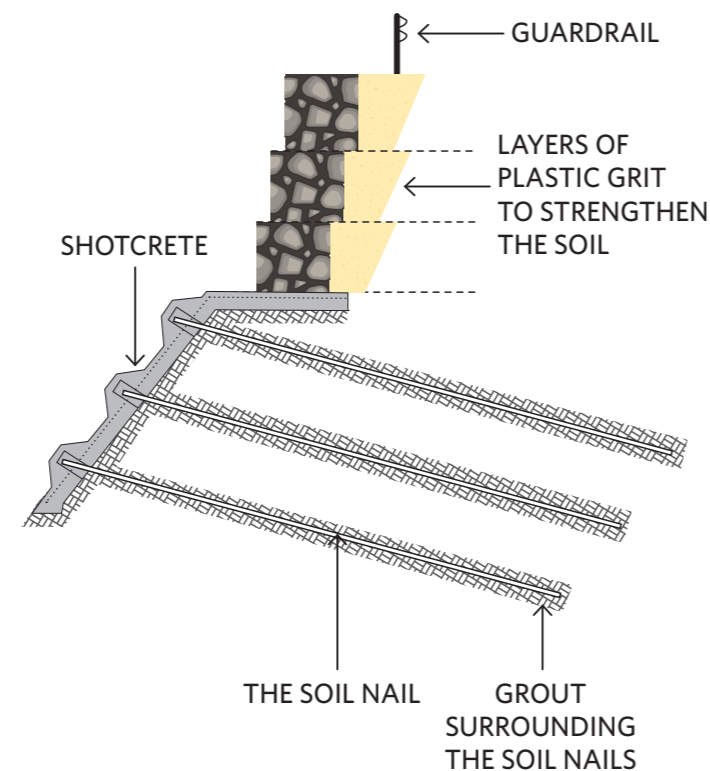
## REBUILDING A ROAD: WHAT LIES BENEATH?

Many considerations are taken into account when designing and building highways. It's a balance of finding the best fit for the topography of the landscape, the geology of the site, the safety of the construction crews, and minimising environmental impacts while creating safe and enjoyable journeys and aiming for ongoing low cost maintenance.

Our designers, engineers and construction crews have incorporated these factors into the design and rebuild of State Highway 1 after the 2016 earthquake. On the Hundalee Hills, part of the highway slumped down the hillside in the earthquake. In one area we are using four different types of retaining walls to stabilise the natural geological material beneath the road. While not visible to drivers these retaining structures will support their vehicles as they drive along the route.

## Soil nails

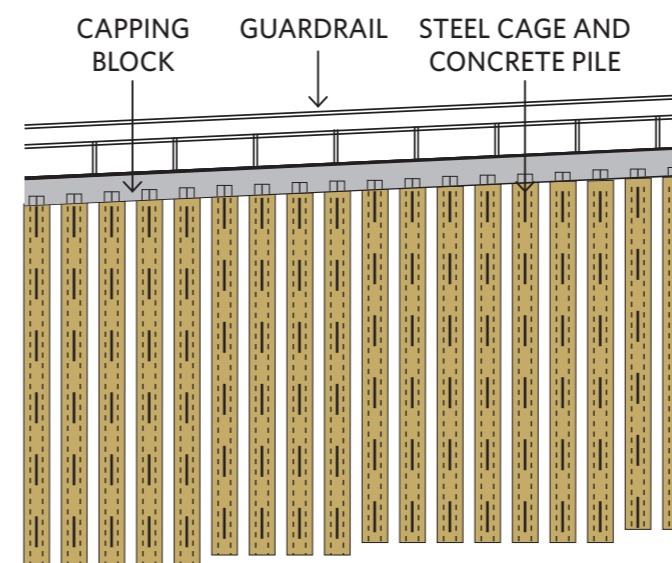
Soil nails stabilise the hillside lying under the road. Typically six to nine metre long steel bars are drilled into the hillside slope. Grout is pumped into the drill hole with the steel bar to fill voids and surround the nail. How many nails used at any given site will depend on the stability of the soil and the site topography. Steel reinforcing mesh is laid over the surface of the slope over the tops of the nails. Then a layer of shotcrete – a spray on concrete – is applied on the exterior over the nails to create extra stability and protect the slope. The road is then rebuilt over the newly stabilised earth below it. At the area on the Hundalee Hills gabion baskets have been used on top of the soil nail sections to build up the road height to achieve the required road ride improvements.



## Bored concrete pile retaining walls

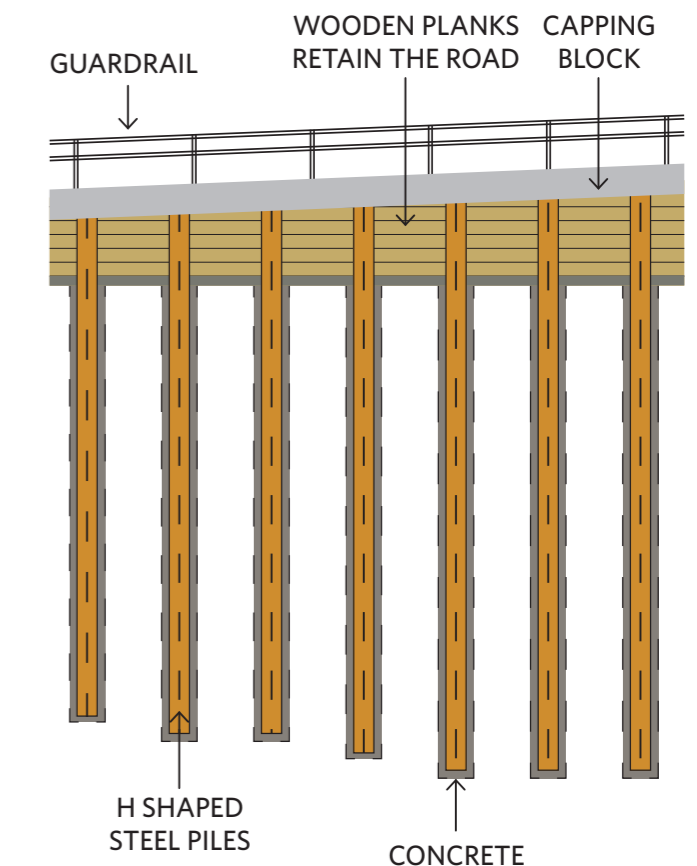
Another structure designed to bring stability to the Hundalee Hills route and the traffic which moves over it are bored concrete pile retaining walls. The cranes, diggers, and rigs drivers and passengers can see on the side of the one way sections over the Hundalee Hills are being used to build two of these walls. Metal tubes, called casings, up to 800mm wide are pushed into the ground 12 metres deep. The material captured inside the casing is bored out, circular steel cages are inserted inside the now empty holes, and concrete is poured in with the steel cages, the casing is then removed. The concrete sets around the cage with the soil surrounding it. On one of the walls anchors are used near the tops of the piles and are placed horizontally under the road. Capping blocks are put on top of the piles before the road is built across the top of the piled walls.

Before work could begin at this site our crews had to do temporary works so the heavy machinery could fit. Sheet piling holds up the side of the hill so work can be done. Once the retaining walls are completed the sheet piling will be removed and reused as part of the walls creating extra stability.



## King post walls

These walls are often built using H shaped steel piles. As with the bored concrete pile walls metal casings are pushed into the ground. The material captured inside the casings is bored out, the H shaped steel beams are placed inside the now empty holes, and concrete is poured around the beams, the casing is then removed. Treated wooden planks are placed between these steel piles in the top three or so metres of the wall to retain the road. The balance of the structure is below ground. The retaining wall holds the soil behind it in place – this type of wall is relatively easy to build and have been built where there is suitable geology and the safety of crews constructing them could be guaranteed.



## Designing a safe system

### New Zealand roads are designed to create safer, enjoyable journeys.

The NZ Transport Agency has been committed to a 'Safe System' on New Zealand roads since 2010 to reduce fatalities and serious injury. The Safe System focuses on safe speeds, safe vehicles, safe road use, safe roads and roadsides. It acknowledges drivers make mistakes and accidents will occur, however the key is to reduce the risk and likelihood of serious injury or death.

Throughout the design process many factors are taken into account with the aim to provide drivers with a self-explaining road. Factors include the shape of the corners and how they are coordinated with the vertical profile to avoid 'hidden' elements.

Other items like painted lines, edge markers and signs are used to guide a driver along the road. Where there are hazards along

the side of the road which cannot be removed barriers are positioned to protect drivers from these objects.

Drivers may not consciously be aware of it, but these parts of the Safe System communicate how to navigate safely along the route they are travelling. Speed is one of the biggest considerations in road design; the shape of the road is determined by an ideal speed, which keeps vehicles on the road, passengers travelling comfortably, and the possible outcome of a collision at the given speed. For example, speeds given around corners are calculated to keep you and other drivers safely on the road.

Our engineers and safety auditors have brought these elements into the design and rebuild of State Highway 1 north and south

of Kaikōura. When looking at the road through the Hundalee Hills and the topography of the landscape – windy, narrow, and along hillsides – our teams are designing and building a transport system to keep people safe and on the hillside road. The road has been built up, the geometry of it attuned to ensure a safe drive, guardrails are being installed.

We're also aiming to improve the resilience of the road so it reduces the need for maintenance and thus exposing road crews to risk of working on the road, while ultimately providing New Zealand with a safe and cost effective State Highway network.

Check out this great video into the science of the Safe System: <https://youtu.be/mFcLUCtUAzc>



## IMPROVING TRAIN SPEEDS

Trains will soon be able to travel faster through an area north of Kaikōura as repairs of Rail Bridge 113, just south of Irongate Bridge, are getting underway.

Trains have had to slow down considerably to cross the bridge because its piers were cracked in the 2016 earthquake.

‘While the cracks are significant trains have still been able to use the bridge, but at a reduced speed to minimise vibrations,’ says structural engineer, Fabrizio Biserna.

The team on-site has repaired the cracks and will now build intermediate pier infill walls, filling the existing gap between the columns. This will make the cracked piers redundant as it will shift the load onto the pier infill.

At the same time work is being done to the track just south of the bridge, which will also improve train speeds through the area. New rail tracks will be laid to replace older rail tracks initially laid in order to get the line open again as quickly as possible.

‘Completing both of these jobs will enable one of our most onerous speed restrictions on the Main North Line to be removed. Removing it will make a decent difference to the speeds at which trains operate in this area and will help us to increase our reliability for our customers,’ says KiwiRail asset owner representative, Daniel Headifen.

Our design and construction crews on this project are working closely with our environment team to ensure Blue Duck Steam flowing under the bridge is well protected from the construction work.





## HARBOUR FOLLOW UP WITH WRAP UP WORK

The weather isn't making it easy, but NCTIR is working towards putting the finishing touches on repair works at the South Bay marina. The distinctive specialist dredging vessel (pictured) arrived at Queen's Birthday Weekend to do a final sweep of the harbour to confirm the basin's depth. The final work will be the installation of navigational aids to mark the approach to the marina.

The marina sustained extensive damage in the November 2016 earthquake when the seafloor under it lifted by about one metre, resulting in significant new navigation hazards. The marina, and Coastguard Kaikōura's neighbouring boat ramp, were largely unusable outside of high tides.

Both the inner and outer harbour required excavation, in particular the breaking up and removal of limestone bedrock. This work had to be completed before the replacement structures such as the mooring piles, vertical seawalls and jetties were constructed.

Close collaboration with tourism operators and key stakeholders meant improvements were incorporated into the final marina design to facilitate future growth and prosperity, such as the ability to berth larger vessels and the safe transfer of tourists from cruise ship tenders.



## SITE 9 TEMPORARY PROTECTION HOLDING UP

Intense rainfall brought down rockfall at site 9 near Waipapa Bay last week, and again this week during the wet weather. A temporary concrete wall, installed last year, provided the necessary rockfall protection doing exactly what it was intended to do in such a situation - stop the falling rocks from reaching the rail and road. This temporary rockfall protection wall is due to be replaced by a higher bund offering permanent protection to the road and rail, both of which will soon be realigned closer to the coast line and further away from the vulnerable hillsides.

### WAIPAPA BAY - SLIP 9 Between Mangamaunu and Clarence





## HIGHWAY HEROES

We had some lovely feedback recently from Nell Mooney about our traffic control people along the State Highway 1 route.

'It rained all the way as I drove from Blenheim to Christchurch today down State Highway 1 but that didn't prevent the stop/go workers from smiling and waving repeatedly at the long lines of passing traffic. This is not an unusual experience when travelling that coast road since the 2016 earthquake. From the day the road was reopened to Kaikōura and then further onto Blenheim those workers have continued to make the trip quite an enjoyable novelty. I can't express how valuable that is for Cantabrians who are so tired of facing road works. I know I'm not alone in this opinion as everyone I speak to is equally impressed. So massive kudos to everyone who is working to fix our beloved east coast road but a special thanks to the traffic controllers who warmly accept and return our appreciative waves and smiles no matter the conditions. Keep up the great work!'

Spray Marks traffic controllers, Laura and Koha were out managing traffic this week during the wet weather. Local resident Koha has been managing traffic along the coastal route for over a year now.

'I love my job and love seeing the progress along the route. We are a friendly bunch and keep warm with hot soup daily with warm gear to protect us. Depending on what we are doing we may need to use umbrellas.' Koha says.

Spare a wave and a thought for our staff in their high vis layers as they take in the fresh winter air!





# The Bulletin Kaikōura earthquake update

**SIGN UP**

To receive fortnightly updates online here

[bit.ly/NCTIRBulletinSignUp](http://bit.ly/NCTIRBulletinSignUp)



## CRANES RISE OUT OF THE COUNTRYSIDE - BRIDGE 103



New piles and beams are being installed at Bridge 103

### IN THIS ISSUE

- Wild weather and SH1 closures
- Information evening
- Proving the effectiveness of the geotechnical work at Whale's Back
- NCTIR by the numbers
- Bridge 90 - one of the transport rebuild's most remote work sites
- Sunshine after rain - Kaikōura Rugby Club Open Day
- Virtual field trip for young Kiwis
- Bringing design to life - visualisation specialists in action
- A peek behind the scenes this week

Permanent repairs to rail Bridge 103 over the Kowhai River, just south of Kaikōura, are getting underway - if you're passing Kaikōura's golf course on SH1, you may see cranes rising out of the countryside.

New piles and a crosshead beam will be installed and fixed to the existing bridge to allow trains to pass over the bridge at higher speeds. Giving the bridge its 'new legs' is expected to take about six months, with the team working from one end of the bridge to the other.

Each pier will have two new 900mm diameter piles with a crosshead beam connecting the two. The piles will be about 20m deep and will be constructed using a steel case with reinforced concrete. The beam between the piles will also be reinforced concrete.

Bridge 103, a 12-span bridge, sustained damaged to its piles in the November 2016 earthquake. Last year temporary repairs were carried out to enable trains to pass over the bridge under a 25km/hr speed restriction. This involved injecting epoxy resin into the cracked piles. Damage to the northern abutment was also repaired with core drilling work and a new concrete collar.

Once the new piles and beams have been constructed, the existing piles will be cut away from the bridge. This is done to transfer the load from the bridge through the new piles instead of the old ones.

The repair work means a walking and cycle track, the Kowhai Trail, will be closed at the site as it passes beneath the bridge on the river's northern bank. When work is finished on first piles, the team will assess whether the track can be safely reopened while work continues on the bridge.

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# WILD WEATHER AND STATE HIGHWAY 1 CLOSURES



Please ensure you keep up to date with the latest travel conditions

Challenging weather conditions can affect anyone at anytime

For the first time in many months, Kaikōura recently had no road access overnight with winter weather closing State Highway 1, north and south of Kaikōura and the Inland Road (Route 70) to Kaikōura. Decisions to close the highway and the Main North Line railway are never taken lightly.

The NZ Transport Agency and KiwiRail place top priority on the safety of the travelling public and the crews working along the coastal route, as well as ensuring freight is not stranded in an inaccessible location. The Kaikōura coastline is still fragile and the area is vulnerable to severe weather with rain increasing the risk of rockfalls, surface flooding and small slips.

Decisions to close the highway are based on forecasted rainfall, using a range of predictive tools, and geo-tech inspections. One tool used is the Trigger Action Response Plan (TARP). The rainfall TARP is a risk management predictive tool that uses real-time monitoring of rainfall and forecasted wet weather events to determine the likely impacts on Kaikōura’s fragile landscape.

Forecasting of expected rainfall volumes in relation to previous rainfall conditions enabled the development of this predictive tool. Probable thresholds were established based on the rainfall-slope failure relationship that was found for the Kaikōura area.

Once a decision to close the road is made, it doesn’t stop there. There is a huge amount of logistical organisation and co-ordination required. For example, communications to the travelling public via the VMS signs and other supporting channels are updated to provide the public with real-time information and emergency services advised.

It is important to remember that a significant amount of construction work continues along the coastal corridor. Much of this is aimed at making many of the temporary measures put in place to reopen the road the public in December 2017, more durable and resilient over the longer term.

Much of the construction work you see along the coast today focusses on improving slope stability, and as this work is completed, adding more resilience to the hillsides, TARP thresholds will continue to adapt. This means over time we will have more confidence in how the coastal corridor will perform when tested by Mother Nature.

We understand these road closures and diversions can cause frustrations and changes to travel plans. Everyone travelling along this route has a destination – whether that’s a doctor’s appointment, a ferry to catch, a freight delivery or to attend a concert. These closures mean changes to plans, but the safety of travelling this route has to be balanced against getting to a destination.

Thank you for your on-going patience as we continue on improving the resilience and the speed at which the corridor recovers after major weather events on SH1.

## WHERE TO FIND REAL-TIME INFORMATION?

- Call **0800 4 HIGHWAYS** (0800 44 44 49)
- Visit [www.nzta.govt.nz/p2c](http://www.nzta.govt.nz/p2c)
- Visit [www.journeys.nzta.govt.nz](http://www.journeys.nzta.govt.nz)
- Check [www.facebook.com/nztasouthisland/](https://www.facebook.com/nztasouthisland/)
- Follow [twitter.com/nztatots](https://twitter.com/nztatots)



# SAFETY AND RESILIENCE WORK ALONG THE KAIKŌURA COASTAL CORRIDOR

On Thursday 28 June the NCTIR team hosted a project update information evening at the Kaikōura Museum. It was great to have so many people attend and talk to our team of experts about the draft concept designs for the safety and resilience work. Thanks to everyone that came along.

## What is the safety and resilience work?

This work signifies a \$200million investment along the Kaikōura coast that will make it safer for everyone travelling in the area. It will also provide better and safer access for enjoying the coastal environment.

Residents and visitors to the area will be able to enjoy improved and enhanced parking, and access to key visitor destinations along the route. There will also be better amenities such as public toilets and panels telling stories about this iconic stretch of coastline.

While our teams are working along the coastal corridor to rebuild the transport networks, it's a great opportunity to deliver work in a way that minimises impact and maximises potential.

## What will the safety and resilience work achieve?

Safety is a top priority for this work which includes widening shoulders, putting up safety barriers, creating safe stopping areas, and separating cyclists and pedestrians from road traffic where possible.

As well as making the road safer and improving journey time reliability, the work will also bring benefits to the region by supporting tourism growth, and encouraging people to stay for longer.

## When will work be completed?

We're currently in the design stage. At this stage work will begin later in 2018 and will finish in late 2019. The first area we expect to complete is Ōhau Point in October 2018.

For more information and to see concept designs go to: [www.nzta.govt.nz/kaikoura-earthquake-response/safety](http://www.nzta.govt.nz/kaikoura-earthquake-response/safety)



Artist impression of Okiwi Bay



Artist impression of Kie Kie



Artist impression of Paparoa Point



Artist impression of Ōhau Lookout



# NCTIR BY THE NUMBERS

May 2018



## GEOTECHNICAL

HEAVILY LOADED  
RETAINING WALLS,  
UP TO 5M ABOVE THE  
ROAD, ARE MADE UP OF  
**200+** PILES  
WHICH ARE DRILLED  
10M BELOW THE ROAD

**MORE THAN  
33,000M<sup>2</sup>**  
OF ROCKFALL  
PROTECTION MESH  
HAS BEEN WRAPPED  
AROUND 7 SLIPS  
SOUTH OF KAIKOURA  
PROTECTING THE ROAD  
AND RAIL BELOW

**MORE THAN  
2700**  
ROCK  
ANCHORS  
HAVE BEEN  
INSTALLED ACROSS  
**7 SLIP SITES**  
SOUTH OF KAIKOURA

## ENVIRONMENT

**210**  
ARCHAEOLOGICAL  
SITES IDENTIFIED

**50** CONSENT  
APPROVALS

PROFESIONAL  
SEAL HANDLERS  
HAVE PERSONALLY MOVED  
**13,200+ SEALS**  
(ADULTS AND PUPS)  
SINCE FEBRUARY 2017

DURING CONSTRUCTION,  
**2350 FISH**  
FROM 13  
NATIVE SPECIES  
HAVE BEEN MOVED INTO  
A DIFFERENT SECTION OF  
THE SAME STREAM

## SEAWALLS

**2.5KM**  
OF SEAWALL  
BEING CONSTRUCTED

**7500**  
BLOCKS PLACED  
TO BUILD SEAWALLS  
NORTH OF KAIKOURA

EACH SEAWALL  
BLOCK MAKING  
UP THE BASE OF THE  
STRUCTURE WEIGHS  
**5 TONNES**

THE TALLEST SEAWALL  
TOWERS TO  
**10M**  
ABOVE SEA LEVEL

## EX-CYCLONE GITA

**THE ROAD REOPENED  
EIGHT DAYS AFTER IT SHUT**

FREIGHT STARTED  
MOVING JUST  
**13 DAYS**  
AFTER EX-CYCLONE GITA  
BURIED RAIL TRACKS

**300 MLS**  
OF WATER  
FELL OVER 24 HOURS AT  
ROSY MORN CAUSING  
MATERIAL TO BURY A  
HOUSE AND SECTIONS  
OF RAIL & ROAD

**300,000 M<sup>3</sup>**  
OF MATERIAL CLEARED  
FROM 60 SITES  
BOTH NORTH  
AND SOUTH OF  
KAIKOURA

## PEOPLE

NCTIRS WORKFORCE  
**1100 PEOPLE**



**1,700 AT THE PEAK  
OF THE PROGRAMME  
DECEMBER 2017**

MORE THAN  
**226**   
ORGANISATIONS  
HAVE WORKED WITH NCTIR  
AS SUBCONTRACTORS

MORE THAN  
**4,500 PEOPLE**  
HAVE BEEN  
INDUCTED   
INTO THE PROGRAMME

CREWS HAVE WORKED  
  
MORE THAN  
**3 MILLION**  
HOURS, CURRENTLY AVERAGING  
**200,000**  
HOURS EVERY MONTH

MORE THAN  
**2500**   
SAFETY   
LEADERSHIP CONVERSATIONS  
WITH **700+**  
HAPPENING EVERY MONTH

**300 PEOPLE**  
LIVING IN THE TEMPORARY  
ACCOMMODATION  
VILLAGE   
IN KAIKOURA

KAIKOURA CAFES AND RESTAURANTS  
HAVE SUPPLIED MORE THAN

**100,000**  
LUNCHES & DINNERS  
FOR THE WORKERS AT THE  
VILLAGE - HELPING TO KEEP  
THEM IN BUSINESS WHILE  
THE ROAD WAS CLOSED

## THE EARTHQUAKE



**7.8 MAGNITUDE**  
KAIKOURA EARTHQUAKE

THE SOUTH ISLAND MOVED  
**6M CLOSER**  
TO THE  
NORTH ISLAND



RUPTURES OCCURRED ON  
**21 FAULT LINES,**  
ACROSS **170KM**  
IN A COMPLEX SEQUENCE THAT  
LASTED FOR ABOUT 2 MINUTES

THE EARTHQUAKE  
GENERATED A  
**TSUNAMI** OF NEARLY  
**7 METRES** IN PLACES

## HARBOUR

**MARINA**  
**REOPEN**  
TO THE PUBLIC ON  
**14 NOVEMBER**

**22,000M<sup>3</sup>**   
OF MATERIAL  
DREDGED FROM  
KAIKOURA HARBOUR

## RAIL

**RAIL REOPENED  
TO RESTRICTED  
RAIL SERVICES  
10 MONTHS**  
AFTER THE EARTHQUAKE

TRANSIT TIME OF  
TRAINS REDUCED BY  
**1 HOUR**   
SINCE REOPENING

MNL OPEN  
**90%+**   
(EXCLUDING CYCLONE GITA)

**21,000+**  
FEWER TRUCKS  
  
ON UPPER SOUTH ISLAND  
ROADS BECAUSE OF THE  
FREIGHT MOVED BY RAIL

**DAYTIME TRAIN  
SERVICES AND  
COASTAL PACIFIC**  
EXPECTED LATER IN 2018

## ROAD

SH1 NORTH AND SOUTH  
OF KAIKOURA REOPENED  
**15 DEC 2017**



**DURING DAYLIGHT  
HOURS TO SUPPORT THE  
TRAVELLING PUBLIC**

SH1 NORTH AND SOUTH  
OF KAIKOURA REOPENED



AFTER THE EARTHQUAKE

BETWEEN CHEVIOT AND  
CLARENCE THERE WERE  
**1,500+**   
DAMAGED SITES  
**200+ WITH  
MAJOR ISSUES**

**100+**   
ORIGINALLY  
DAMAGED  
STRUCTURES  
OF THOSE NEEDING  
REPAIRS WE ARE  
MORE THAN   
**70%** OF THE WAY THROUGH

**85**   
LANDSLIDES

**184KM**  
OF ROAD AFFECTED  
BETWEEN WAIPARA  
AND PICTON

## NCTIR



THE TOTAL ESTIMATED  
COST TO REPAIR THE  
DAMAGE TO THE SOUTH  
ISLAND TRANSPORT NETWORKS  
CORRIDOR REMAINS AT  
**\$1.3 BILLION**

SEPARATE TO THIS IS THE  
**\$65 MILLION**  
**DOLLAR**  
ALTERNATE ROUTE  
IMPROVEMENTS PACKAGE

AS OF APRIL 2018  
**\$591 MILLION**  
  
HAS BEEN SPENT ON CORE  
EARTHQUAKE RECOVERY  
WORK INCLUDING CLEARING  
LANDSLIDES AND BUILDING  
NEW INFRASTRUCTURE

## BRIDGE 90 – ONE OF THE TRANSPORT REBUILD’S MOST REMOTE WORK SITES



Work is getting underway to build a permanent rail bridge over a tributary of the Conway River. It is at one of the transport rebuild’s most remote work sites, accessible only by a farm track on the southern flank of the Hundalees. And although few people will ever see the bridge, its story gives insight into necessary infrastructure recovery works after a natural disaster.

The piers of the original bridge, known as Bridge 90, were so severely damaged in the November 2016 earthquake, it had to be demolished.

KiwiRail needed to get its specialised construction work trains to the Kaikōura coast, so a temporary bridge was built in the early months of 2017. The bridge was able to be built quickly because KiwiRail keeps bridge spans on hand, precisely for the purpose of emergency repairs.

The use of those ‘spare parts’ is an example of the ‘fast but sometimes ugly’ approach which enabled freight trains to return to the Main North Line just 10 months after the earthquake.

A permanent replacement bridge will now be built adjacent to the temporary structure, enabling trains to travel faster along this stretch of the railway. The temporary bridge will then be dismantled. The construction team aims to finish this work by November.



## PROVING THE EFFECTIVENESS OF THE GEOTECHNICAL WORK AT WHALE’S BACK

Work at Whale’s Back dip slip on the Inland Road (Route 70) is gathering pace now the area underneath the slip – the original road alignment – is safe to work on.

In the months since the November 2016 earthquake, geotechnical work has included placing a number of large rock bolts into the hillside rock to secure it. A large amount of debris were also removed from the area.

Route 70 Area Manager Doug Dold says the work to secure the site had to be complete before any other work on the 800-metre stretch of road could begin.

‘Proving the effectiveness of the geotechnical work required time, and once we were confident the area was safe, we could get on with work on the road,’ he says. This all-clear was given seven weeks ago and work has progressed steadily since, despite serious weather events.

The work includes 280m of fences and 280m of gabion baskets (cages filled with rocks used in road building).

There will also be 800m of new overlay over the stretch of road, although this work will have to wait until later in the year.

Doug says the road stabilisation work should start in September and all going well, the new road should be built in October.



## SUNSHINE AFTER RAIN - KAIKŌURA RUGBY CLUB OPEN DAY

For the past 18 months more than 1000 workers have been engaged on the recovery of the road and rail – each of them calling Kaikōura ‘home’ for a period of time. For NCTIR workers, being part of the community and supporting local events such as Kaikōura Rugby Club’s Open Day is a demonstration of that commitment.

On Saturday 16 June the Kaikōura Rugby Club at Takahanga Domain was full of muddy rugby players and smiling faces. For the 2018 annual Club Day, NCTIR road logistics manager Kevin McGrath took his post at the BBQ, serving up lamb lollipops, pork belly and a whole rump steak donated by Titan Contracting to support the community. ‘The highlight for me was connecting with the locals and seeing all the kids having such a great day,’ says Kevin.

Rail protection supervisor Liza Vergottini and rail protection planner KC Van Der Merwe also pitched in to make sure everyone enjoyed the feast during the game. ‘It was awesome,’ says KC, ‘I loved seeing everyone gathered together.’

For NCTIR village facilities maintenance manager, Mikaere Brand, Club Day is all about family. He and his wife helped out with the free sausage sizzle in the morning, while their two sons played rugby, and then it was dad’s turn to hit the field for his third year on the Kaikōura Senior Rugby team. ‘Club Days are all about bringing the community together, and having the BBQ really added to the atmosphere,’ says Mikaere.

Titan Contracting track worker Matt Wickliffe and possession interface manager Kenny Down both moved from Auckland to Kaikōura a year ago and decided to join the Kaikōura Rugby Club. ‘Sport is a great way to meet people,’ says Kenny, ‘and I knew I was going to be living here, so I wanted to be a part of what’s going on. Being part of the community, makes it feel a bit more like home, and rugby keeps me fit, which contributes to health and wellbeing on the work end, so it’s a win-win.’ The day ended well with the Kaikōura Seniors winning against Glenmark Cheviot, 48-19.



Great competition on the field all day!



Kevin McGrath cooks up a storm for hungry players and avid supporters

## TAKING YOUNG KIWI'S ON A VIRTUAL FIELD TRIP



NCTIR people and culture manager Belinda (B) de Zwart talks with members of the Virtual Field Trip team outside the NCTIR Village

This week, from all over New Zealand, 1500 young Kiwis were ‘virtually transported’ from their classrooms to Kaikōura, and then up to Ōhau Point as part of the LEARNZ virtual field trip (VFT) programme.

NCTIR partnered with New Zealand Red Cross and Core Education to facilitate the online series Adapting After Emergencies. The NCTIR Village in Kaikōura and the iconic slip 7, near Ōhau Stream were also featured.

The students from 56 classrooms logged in for the experience and learned how NCTIR looks after its’ 1700-strong workforce at the award-winning NCTIR Village - the result of a partnership with Kaikōura District Council and the Kaikōura business community. The VFT toured the Village learning all about the special features designed to support workers, many of who have moved to Kaikōura to support the region in the rebuild and are away from family and friends.

The story of the incredible feats of engineering required to move the more than 1 million m3 of material from the Kaikōura coastal corridor was also shared. On site at Ōhau Point students discovered how a mountain literally had to be moved to reopen the road to the public on December 15, 2017, just one year, one month, and one day after the November 2016 earthquake.

Watch the videos here: [www.learnz.org.nz/redcross182/videos](http://www.learnz.org.nz/redcross182/videos)



## BRINGING DESIGN TO LIFE – VISUALISATION SPECIALISTS IN ACTION

Visualisation plays a number of roles in the work NCTIR does and in this interview, we talk with the person leading the team doing this work, Dr Kathryn Salm.

### How many people are on the visualisation team for the project?

We currently have a core group of three, with another three to four specialist resources available as needed.

### How is visualisation used and why is it so important?

The benefit of visualisation is that it allows a view of the designs in a real life three-dimensional context, in a way that people can understand and identify with. In the design phase, it supports collaboration between designers and constructors (especially in a project such as NCTIR where there are multiple project sites and interfaces, multiple different areas of design, and complex environments), design review (internally and with NCTIR stakeholders), value engineering (understanding how and where designs can be streamlined for cost savings) and Safety in Design (to ensure the design and planning has safety at the forefront). Once the designs are progressed, it supports further communication of the designs to stakeholders, the community and public.

### How long has the technology been around?

Making better use of digital information in the industry has been happening over a number of years. The technology itself is changing all the time and making it more effective to do visualisation – and I imagine that will only continue to improve.

### What was used before the development of visualisation technology?

2D drawings mainly! We are definitely quite different from those traditional outputs of technical designs printed out on pieces of paper.

### How does visualisation save time on a project?

In many ways. In the design phase, it can help to identify any design interface issues early, so they can be fixed before it goes too far down the track. It also helps to communicate the design, so that helps reduce misunderstanding/miscommunication and prevents rework. The value engineering aspect is an obvious area where it can support cost and time savings. Because we are creating a 3D model, it also means we can use and reuse the model to produce a number of different types of outputs relatively quickly, rather than having to start from scratch every time.

To see what our visualisations look like please check out page 3 of this issue.

## TAKE A PEEK BEHIND THE SCENES THIS WEEK



While traffic flows south of Kaikōura, work continues at Sites 16 and 17 above the Parititahi Tunnels, and at Sites 18 and 19, south of the tunnels.



The crown of mesh adorning the Punch Bowl helps to prevent rock fall and slip movement, keeping the road below safer for travellers.



Tunnel 13 just south of the Kahutara Bridge is being transformed by the hard work of the tunnel crews involved.



Crews are pouring concrete for the shared path at Ōhau Point north of Kaikōura – this will also act as the capping beam for the seawall. This is the location of one of the massive slips that cut off Kaikōura from northern access to State Highway 1 last year.



The hydroseeding on Site 8 at Waipapa Bay is proving successful as it's looking less like the site of a major slip and more like an integral part of the scenic coastal route.



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# The Bulletin Kaikōura earthquake update



## MILESTONE IN THE SOUTH: PARITITAHU TUNNEL OPEN FOR THE FIRST TIME SINCE THE NOVEMBER 2016 EARTHQUAKE

Traffic was sent through the inland Parititahi tunnel on the Kaikōura coast on 5 July for the first time since the November 2016 earthquake.

The tunnel was completely buried by a landslide and the team has been working to repair it to the point where it is safe to use. Traffic is now using the inland tunnel enabling its seaward, twin tunnel to be repaired.

Both tunnels are also being widened to accommodate larger freight vehicles. This section of SH1 will continue to be one-lane and under traffic management, but completion of the inland tunnel is another step towards the full recovery of SH1.

### IN THIS ISSUE

- The Ōhau rock daisy story
- Planned three day, daytime closure for State Highway 1 north of Kaikōura
- Answering your questions on: Ōhau Point safe stopping area
- Tunnel safety shotcreting activity



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.





## COMING HOME - THE ŌHAU ROCK DAISY STORY CONTINUES



Ōhau rock daisy

The outlook is looking brighter for the native Ōhau rock daisy on its earthquake-damaged Kaikōura coastal home with new plantings and new growth emerging. The Ōhau rock daisy only grows on the Ōhau Point coastal bluffs; but a landslide in the November 2016 Kaikōura earthquake hit its habitat hard. Department of Conservation (DOC) staff estimated only 80 to 100 plants remained and an estimated 95% of its habitat had been wiped out when they checked the plants by helicopter after the earthquake.

Seed from six surviving plants on the steep slope were collected by abseilers last year and taken to Titoki Nursery, near Nelson, where rock daisy seedlings were grown from the seeds to restore the population. Last month DOC staff planted 50 of the propagated rock daisy plants back on the Ōhau Point bluff home and abseilers another 12.



Simon Litchwark of DOC planting Ōhau rock daisy

DOC South Marlborough senior biodiversity ranger Jan Clayton-Greene said NCTIR staff had also reported seeing rock daisy plants on the bluff resprouting from stumps of damaged plants. 'The new plantings and regrowth give us hope of rebuilding the Ōhau rock daisy population but it is early days yet for knowing whether these rock daisies will survive. We will monitor them to determine how well they fare.

'The Ōhau rock daisy population was perilously at risk of extinction because of the sudden drop to such low numbers and in a location where further landslides might occur.

'We now want to get as many rock daisies growing there as we can as the more plants there are, the more seeds will be dispersed into the landscape to help the population recover quicker.'



Ryan Sutherland of NCTIR planting Ōhau rock daisy

'The Kaikōura abseiling teams were pleased to be involved in retrieving the daisy seeds and we hope to use the plants grown from them in new places around Ōhau Point,' says Tim Crow, the Transport Agency's earthquake recovery manager. 'It is great to not only retain this pre-earthquake uniqueness but give the daisy the best opportunity to thrive in its changed home.'

NCTIR plans to put 67 of the propagated rock daisy plants in amenity plantings along the rebuilt transport route at Ōhau Point and some seeds from these are also expected to blow onto the bluffs to create new growth. Another 36 of the propagated plants will remain at the nursery as an insurance population so Ōhau rock daisy plants continue to exist should there be a threat to the survival of those in their natural environment.



## PLANNED THREE DAY, DAYTIME CLOSURE FOR SH 1 NORTH OF KAIKŌURA - EARLY AUGUST

To stabilise a rockface north of Kaikōura at Ōhau Point, there will be a scheduled three-day, daytime closure from Monday, 6 August to Wednesday, 8 August. The section of State Highway 1 between Clarence and Mangamaunu will be closed each day between 8am and 4pm. During this time, any traffic travelling between Picton and Christchurch will need to use the alternate route via Lewis Pass and Murchison. The work involves drilling rock anchors into a 1000-tonne rock above the road to stabilise it, followed by grouting.

### WHERE TO FIND REAL-TIME INFORMATION?

- Call **0800 4 HIGHWAYS** (0800 44 44 49)
- Visit [www.nzta.govt.nz/p2c](http://www.nzta.govt.nz/p2c)
- Check [www.facebook.com/nztasouthisland/](https://www.facebook.com/nztasouthisland/)
- Follow [twitter.com/nztatots](https://twitter.com/nztatots)

Tresca Forrester, network operations manager at the North Canterbury Transport Infrastructure Recovery (NCTIR) alliance, says this closure is essential to carry out work that can't be completed safely with vehicles travelling on the highway below. 'A closure is necessary as it's dangerous work happening right above the road; strict safety precautions must be put in place. The highway will be open outside these hours - 4pm to 8am each evening and overnight - unless there are any weather events or other reasons for overnight closures. We will keep road users well-informed with progress.'

State Highway 1 south of Kaikōura and the Inland Road via Waiiau and Mt Lyford (Route 70) will remain open. 'If bad weather is predicted before the planned closure, this work will be postponed to the following week. We will do everything we can to avoid SH1 and the Lewis Pass being closed at the same time,' Ms Forrester says.

'We understand that these day closures will have an impact on the community, the freight industry and all road users. We are all committed to getting this highway safely rebuilt and making the coastline safe and resilient for the future.'

#### NEED TO KNOW

- SH1 north of Kaikōura daytime closure from 6 August to 8 August
- Closure between Clarence and Mangamaunu
- Closure times between 8am - 4pm daily
- SH1 south of Kaikōura and Inland Road (Route 70) will remain open
- Closure is subject to favourable weather



## FINDING OUT THE FACTS - ANSWERING YOUR QUESTIONS ON: ŌHAU POINT SAFE STOPPING AREA

Thanks for the great feedback we received at the NCTIR information evening on 28 June - our team is currently working through all the comments. This is the first in a series of myth busters on safe stopping areas along the Kaikōura coast. Please continue to give us your feedback. Most designs for the safe stopping areas are only at the draft concept stage (around 10% complete) and we're still working on them. For more information and to see concept designs go to: [www.nzta.govt.nz/kaikoura-earthquake-response/safety](http://www.nzta.govt.nz/kaikoura-earthquake-response/safety)

### CONCERN: There will be no access to the waterfall at Ōhau Point

The Ōhau Stream walk remains closed at this time and until further notice because it is unsafe due to earthquake damage. Public access is also currently restricted in this area due to the SH1 reconstruction work.

The Department of Conservation together with the owners of the private land that contains the waterfall pool is assessing the feasibility of repairing the earthquake damage and reinstating the track.

### CONCERN: There will be no access down to the sea at Ōhau Point

We heard strong views on access along the coastal corridor, and are currently investigating options on this matter, we will share information on this when we can.

### CONCERN: Work is about to start on Ōhau Point lookout

To ensure value for money we started on the base foundations as part of the seawall production but overall we are still in the design stage. We expect Ōhau Point to be the first safe stopping area completed - by October 2018.

Work on the other areas will also begin later in 2018 and will finish in late 2019.

### CONCERN: The sea wall is really high

To protect the new road and the people travelling on it from extreme coastal weather and earthquakes, the seawall at Ōhau Point is a maximum of 9 metres high (from foundation level).

Following the earthquake, many rebuild options were investigated for Ōhau Point such as building a bridge or a tunnel, or reinstating the former road.

Moving the road onto land the earthquake had pushed up, and protecting it with a seawall was chosen as the most balanced solution because it also included protection from further rockfall as well as being designed to be responsive to earthquakes and extreme coastal weather. Plus, we could re-open SH1 while construction was completed.



Artist impression of Ōhau Lookout





# TUNNEL SAFETY SHOTCRETING ACTIVITY

'Safety in tunnels is our number one priority,' says tunnels manager Rafael Sierra Ballen. Every member of the tunnels crew has to go through a Tunnel Operations Safety course before entering any tunnel worksite. And also 7146 US (unit standard) is required for anyone working at the Raramai and Parititahi road tunnels (for milling and shotcreting activities) to comply with the Mining Regulations Act.

Working in the tunnels requires the highest standards of safety and awareness. On approaching any tunnels site, your first stop is the sign-in kiosk. This is where you report your presence on site. Before signing in each person must be inducted and learn the site specific hazards as well as be informed of current works. They must also show evidence of having completed all required courses and training necessary before entering the site.

'NCTIR practice is to always know who is working in the tunnel,' says Rafael, 'so we also created a board where each crew member's name and number as well as visitor tags, are placed to show if they are in or out of the tunnel. It's a procedure to mitigate risk and have oversight on who is in the tunnel during any given time.'

After signing in and placing name tags in the correct position, work begins. In the Raramai north bound tunnels 4782 16mm diameter holes are being drilled through shotcrete and the rock, before placing the 16mm L bars and reinforcement mesh for the new concrete lining. This type of work requires further safety measures. 'Because of the dust that is created, we require full cover and masks be worn inside the tunnel. When we are drilling into shotcrete, the masks prevent us from breathing in airborne fibres', says Rafael. 'Working in the tunnels is a particular skill set that requires specific training and knowledge, but it is well worth the effort each time we get a job well done.'



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# The Bulletin Kaikōura earthquake update



## CLARENCE RIVER BRIDGE REPAIRS PASS IMPORTANT MILESTONE



Jordan Judge



Clarence Bridge after the earthquake

No one was more relieved than Jordan Judge to see 'normal service' resume at the Clarence River bridge with the reinstatement of the 100km/h speed limit. Judge, a white-water river rafting guide, lives just north of the bridge, which until 18 July, was under traffic management controls with one lane and speed restrictions in place. The completion of repairs to the 304-metre long State Highway 1 bridge was a welcome development for the Clarence resident.

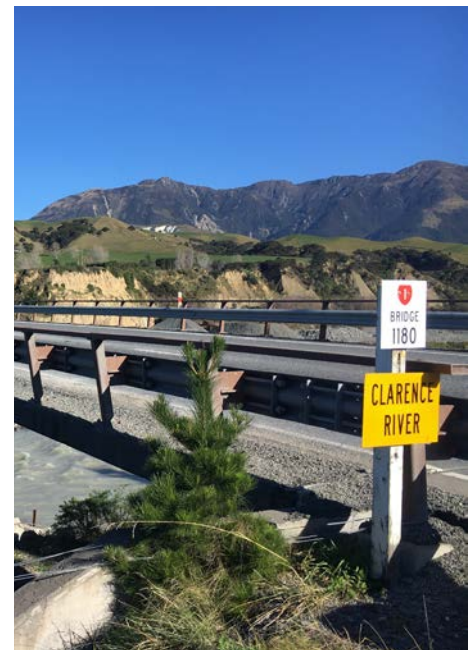
'I have watched the repair work closely and I think this final step will now make it easier for customers to come from Kaikōura to the Clarence to go rafting. I have a fairly relaxed view to life and comparatively speaking we were not badly affected by the quake. But it did create some financial and logistical issues,' he said.

Judge regularly drives south over the bridge to popular rafting rivers in Hanmer Springs. The repair meant 'every time I went across the bridge I could see progress and feel the connection back to Kaikōura being made. Some of my friends also worked on the repair so the connection to the community has been more than just a road.'

Judge now awaits peak summer tourism season with renewed interest. There will be no stop-go station to contend with and he will get a bird's eye view of the bridge from the water. 'I can't wait' he said. 'I know the river well having spent my entire life here and I always knew it was a big job and would take time and it's a great feeling to see it get ticked off and things return to normal.'

### IN THIS ISSUE

- Waipapa Bay track connected
- Business is good at Poppy's Café
- Rail repair work gets moving
- Safe speed reminder for State Highway 1
- Delay hot spots



Clarence Bridge on State Highway 1 had been under one lane with speed restrictions since the Kaikōura earthquake but structural repairs have now been completed. For the engineering buffs among you - built in the 1970s this bridge was the first box girder, balanced cantilever bridge built in New Zealand!

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# NEW ALIGNMENT NEXT STEP IN RETURNING SH1 TO TWO LANES AT WAIPAPA BAY



Slip 9, the first of 10 massive slips south of Clarence, buried State Highway 1 and part of the Main North Line railway.

The Papatea Fault uplifted the seabed and created new lagoons on the foreshore alongside the site. After the slip was cleared, the slope continued to fail in rainfall events and survey monitoring indicated the upper slope was moving. It was decided to move the road and railway more than 20m seaward away from the slip face and onto a safer alignment less affected by further instability.

Filling for the new realignment started mid-2017 and work to lay the new track began at the end of June 2018. New rails and new sleepers have been laid in place and the new piece of track was connected to the existing track in time for the first train to pass over it early July. Work has begun to remove the now disused section of old track allowing work to start on the new road alignment and returning it to two lanes.



## ROAD CLOSURE REMINDER- STATE HIGHWAY 1 NORTH OF KAIKŌURA

A scheduled road closure is planned for State Highway 1 north of Kaikōura from Monday 6 August to Wednesday 8 August to stabilise a rockface at Ōhau Point.

- Closure between Clarence and Mangamaunu
- Closure times from 8am to 4pm daily
- SH1 south of Kaikōura and Inland Road (Route 70) will remain open
- Closure is subject to favourable weather

Stay up to date at [www.nzta.govt.nz/p2c](http://www.nzta.govt.nz/p2c) or call **0800 4 HIGHWAYS** (0800 44 44 49)

### SH1 planned closure between Clarence and Mangamaunu for essential work

**3 days: Monday 6 August to Wednesday 8 August**

Daytime only:  
Closed 8am to 4pm





## NIGHT AND DAY - WHAT HAS HAVING THE ROAD OPEN MEANT

In November 2016, Karen and Bruce Barwick lost almost their entire life savings in the Kaikōura earthquake.

Yet, in the face of this hardship, they still managed to dip into their own pockets and cash register to give what little they had to help visitors stranded in the town after the earthquake. 'We did what we had to and what was right,' says Karen (Poppy) from inside their cozy café on the main street of town.

Fast forward to July 2018 and the couple continue with their spirit of kindness and generosity towards many of the NCTIR workers who regularly eat dinner at Poppy's Café savouring dishes like lamb shanks and their world-renowned handmade ice-cream. 'Many of these men and women have become like family to us and we do what we can to make their life away from home just a little bit more pleasant,' says Karen.



Bruce and Karen (Poppy) Barwick

Poppy's café is one of a number of Kaikōura restaurants that were able to survive throughout the recovery and rebuilding process via the Kaikōura District Council's innovative and award winning project - The Hospo Project: Feeding the Village People - that brought local businesses together to feed infrastructure recovery workers.

So what has having the road open since 15 December meant for the Barwicks?

'It's been amazing, we did not think they would get it done but those men and women worked day and night and they did it,' says Karen. 'It was like a light going on, it was like dark and then all of a sudden it was light,' she adds.

The couple worked 14 hours a day during a very busy summer season employing more people and clawing back some of what they had lost after the quake. Both agree it is an exciting time for Kaikōura as the planned safety and resilience work gathers momentum.

The highlight after the road opened for Bruce was the fact the town no longer felt like it sat at the end of a cul de sac. 'That was a real highlight for me,' says Bruce who looks forward to seeing the benefits and opportunities all the new features along the coastline will bring. 'It's going to be awesome,' he says.



## RAIL REPAIR WORK GETS MOVING



Repairs are underway on a landmark rail bridge which passes over State Highway 1 on the southern approach to the Hundalees in the Hurunui District. This work is part of larger programme of work to complete repairs on the Main North Line railway to enable the resumption of day-time freight and passenger services by the end of the year. Crews are also working at the Kahutara and Kowhai Rivers, Stony Creek and Morimurimu Stream on the Kaikōura coast - with further repairs starting elsewhere soon.



# SAFE SPEED REMINDER FOR SH1 BETWEEN PICTON AND CHRISTCHURCH

The NZ Transport Agency is urging people travelling on State Highway 1 (SH1) between Picton and Christchurch to stick to the temporary speed restrictions in place through several worksites on the route for their own safety as well as for the safety of road workers.

The North Canterbury Transport Infrastructure Recovery Alliance's Network Operations Manager, Tresca Forrester, says it's important for drivers need to stay safe by paying extra attention on this stretch of road.

'Several parts of the coastal highway are still having significant work carried out. Driving through a work site is not business as usual, and the lower speed limits which are in place on these sites are there to keep both workers and road users safe. Even at times when no workers are present, the conditions through these work sites are not suitable or safe for normal open road speeds.'

Ms Forrester says construction work is continuing along the Kaikoura coastal corridor to complete the restoration of road and rail links following the November 2016 earthquake, and make them more resilient for the future. 'The coastal corridor is very narrow which restricts the way we can move our equipment on the open road. We have a challenging work programme so this can sometimes cause delays. The journey between Picton and Christchurch still takes an average of 5 ½ hours on SH1, but people should allow plenty of time in case of unexpected delays.'

Drivers should continue to take care at level crossings as trains and other rail vehicles can run at any time and from either direction on the line between Picton and Christchurch as the recovery works continue. 'Trains travel faster than they appear and can't stop quickly. Drivers should always check both ways at level crossings before proceeding, day and night,' Ms Forrester says.

To plan your journey and for updates on delays, roadworks and road closures go to [www.nzta.govt.nz/p2c](http://www.nzta.govt.nz/p2c) or call **0800 4 HIGHWAYS** (0800 44 44 49). Check at least two hours before travel and when you're on the road.

## DELAY HOTSPOTS

Marked in red on this map are delay hotspots along State Highway 1 where construction work is currently underway to make the road safe and resilient for the future. Please drive safely through these areas - some of which are single lane.

### Kaikōura coast safety and resilience work

This work along the Kaikōura coast will make it safer for everyone travelling in the area. It will also provide better and safer access for people enjoying the coastal environment. Concept designs and more information can be found here: [www.nzta.govt.nz/projects/kaikoura-earthquake-response/safety/](http://www.nzta.govt.nz/projects/kaikoura-earthquake-response/safety/)

If you have any feedback please email [info@nctir.com](mailto:info@nctir.com)

**Thank you for your patience.**

For further updates on the condition of State Highway 1 both north and south of Kaikōura please visit here [www.nzta.govt.nz/p2c](http://www.nzta.govt.nz/p2c) or call **0800 44 44 49**.

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## COASTAL PACIFIC IS COMING BACK THIS SUMMER

The iconic Coastal Pacific scenic train will roll again between Picton and Christchurch from 1 December this year, two years after the service was put on hold because of the devastating Kaikōura earthquake. The service will operate for an extended summer season from 1 December 2018 until late April 2019.

KiwiRail is looking forward to seeing the well-loved service run again, and expects it to fill up fast, with many people keen to support the local community and see the dramatic changes to the coastline and the work done to restore the road and railway line through this area.

KiwiRail is also working closely with the local tourism industry to encourage visitors to the area and to stay awhile and enjoy all that Kaikōura has to offer.

As a tribute to those communities most directly affected by the earthquake, and the people who have worked so hard to restore the road and rail line, KiwiRail is offering a special 'locals' discount rate.

The Coastal Pacific will depart Christchurch at 7am every morning from 1 December with stops at Rangiora, Kaikōura and Blenheim. The train will leave Picton at 2.15pm to head back to Christchurch.



Sue McInnes

### Looking forward to the Coastal Pacific returning to Kaikōura

Kaikōura local Sue McInnes joined others who gathered outside the i-SITE last Thursday to check out a promotional event held with The Breeze to celebrate the announcement of the Coastal Pacific returning on 1 December.

Sue runs Guided Walks Kaikōura and used to work around the Coastal Pacific visits, meeting daytrippers for one-hour guided walks.

Sue says the town is very excited about the return of passenger trains.

'Tourism in Kaikōura is very seasonal, so it will be a great boost and we are looking forward to it starting back,' she says.

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. Please note the next edition of The Bulletin will be published on Monday, 27 August

### IN THIS ISSUE

- Sophisticated technology is speeding up repair
- Design on the Okiwi Bay safe stopping area
- Using sound and light to map the foreshore and seabeds



## SH1 DAYTIME CLOSURE

The NZ Transport Agency scheduled a three day, daytime closure from 6-8 August in order to stabilise a rock face at Ōhau Point.

Unfortunately weather conditions have meant the last part of this work, grouting the rock anchors into the cliff face, was unable to be finished in the road closure time. As a result, State Highway 1 between Clarence and Mangamaunu will be closed on Monday 13 August from 8am to 4pm.

During this time any people travelling between Picton and Christchurch will need to take the Lewis Pass/ Murchison route.

### How to stay up to date:

Call **0800 4 HIGHWAYS** (0800 44 44 49)

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The KiwiRail and NCTIR teams continue to make tremendous progress rebuilding the Main North Line to improve its reliability and resilience.

KiwiRail continues to run freight services at night to enable uninterrupted works to road and rail during the day but work trains are operating day and night. Take care at level crossings and expect trains, at any time from either direction.



## SOPHISTICATED TECHNOLOGY IS SPEEDING UP REPAIR OF STATE HIGHWAY 1

If you drive along the highway you may notice several innocuous looking survey stations along the way. However, these tools are anything but mundane.

Laser technology, much of it known as LiDAR or similar, is being used to project beams of light onto hard-to-reach places like rock faces to provide accurate measurements and images.

Earlier this week a section of State Highway 1 north of Kaikōura was closed while strengthening work was completed at Ōhau Point. With a survey station set up at the base, several sensors were placed on the rock stabilisation work with many of them in the vicinity of a huge boulder within the wall that needed to be worked on. Heavy steel rods were drilled into it and then grouted in place to anchor it to the face.

The survey station was used to monitor the rock face in real time and detect even the slightest movement – an important safety measure for workers suspended by ropes working on the rock.

Paul Horrey is geotechnical engineer working on Ōhau Point.

‘To have the data collected in real time rather than having to stop and measure things speeds things up,’ he said.

It also means they can access detailed 3D models of the rock face quickly and efficiently. ‘That gives us a really accurate and detailed understanding of how the face is behaving and any natural movements.’

NCTIR delivery survey manager Philip Orr said ‘The survey team get to work in an all-encompassing environment using cutting edge technology and recognise the work they are doing delivers a big part in keeping the construction teams safe and the project on track carving enduring connections.’

The detailed three dimensional maps and models of key sections of State Highway 1 which this technology helps to produce will become important sources of data for road engineers for decades to come.





# DESIGN ON THE OKIWI BAY SAFE STOPPING AREA IS GOING FULL STEAM AHEAD

Okiwi Bay is located 30 km north of Kaikōura and there will be one purpose built safe stopping area at the bay.

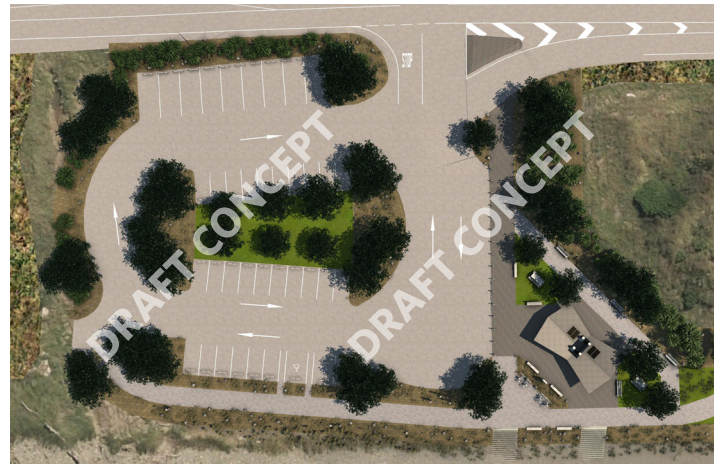
Derek Watson is NCTIR's project engineer for the safe stopping areas. He said the design would introduce some changes to how people access the bay while maintaining its low key character.

'The current car park to the north of the bay will be closed. The new amenities and access to the bay will be shifted south to a more suitable area, opposite the neighbouring Department of Conservation picnic and camping area. There will still be an access point to the northern headland and surrounding land and the slow vehicle bay is staying.'

The bay changed considerably after the 2016 earthquake. It was transformed into a larger sandy beach and it has become even more popular with locals and visitors in the summer months.

'The new car and bus park area will be softened by using landscaping and natural stormwater treatment areas which are planned to enhance the area by introducing more local planting. All work will be set back from the edge of the current vegetation line and will not encroach onto the beach itself. Simple timber or concrete tables and seating will enhance the aesthetics of the bay and provide a more sheltered and relaxing rest area.'

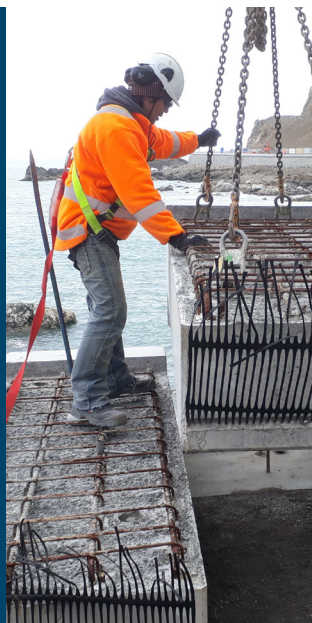
The headland look-out points have been identified as an opportunity for walkers and provision has been made in the design plans for signage to inform drivers of the safe stopping area ahead. Universal access principles for the disabled will be incorporated into the design where possible.



For more information and to see draft concept designs go to: [www.nzta.govt.nz/kaikoura-earthquake-response/safety](http://www.nzta.govt.nz/kaikoura-earthquake-response/safety).

Please continue to give us your feedback at [info@nctir.com](mailto:info@nctir.com), we're still working on them.

It was a monumental day for Dennis Temo recently. Dennis helped to lay the first seawall block at Site 7 north of Ōhau point. Twelve months later Dennis was photographed recently helping to lay the last capping block which was a significant milestone in the completion of the seawall. It was not only a landmark to be proud of for Dennis, but all the hardworking team at Site 7.



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# USING SOUND AND LIGHT TO MAP THE FORESHORE AND SEABEDS

After the Kaikōura earthquake we could see that land levels had changed significantly but any changes in seabed levels were more difficult to assess. Understanding these changes is important, not only for navigation, but also for the planning and design of coastal works.

As early as December 2016, surveying and engineering company Eliot Sinclair was engaged to carry out a survey in South Bay, to determine navigable depth for Whale Watch, and the extent of the tectonic uplift of the sea bed and surrounding peninsula. They've since completed coastal profiling all the way from the Raramai tunnels through to Waipapa Bay as part of the NCTIR project.

Processes for mapping the seabed and shoreline have changed over the years. Historically, crew used a lead line over the side of a ship to measure ocean depth. This wasn't reliable, as it only captured depth at one point in time – and if the ship moved, that measurement could be inaccurate.

Fortunately, technology has come a long way. To map the seabed around Kaikōura, local cray fishing boats are used with single beam or multibeam echo-sounding systems. Instruments attached to the boats bounce a sound wave off the bottom of the ocean floor to measure depth.

The foreshore itself can be mapped using a high-tech drone and photogrammetry or laser scanners which measure the profile and shape of the area and this helps to develop a 3D model.

However, there's a tricky bit between the foreshore (land) and the open sea, where it is impossible to access by walking or by boat due to shallow depths and waves. This is where old and new technology meets with the team adding a lead line to a drone which has a video feedback system to the pilot.

By flying the drone along a specific line, and dropping the lead weight at selected way points the pilot can get an accurate measure of sea bed depth.

Combining all the data from these different measurements with GPS technology helps to create a map which can be used to measure navigable depth for boats and also develop wave models to predict how waves will break on the coastline.



A KiwiRail team has placed railway track onto the third and final debris-flow rail bridge between Half Moon Bay and Ōhau Point, north of Kaikōura. A channel is now being dug under the bridge, which will allow material from the hillside above to pass underneath. After those earthworks are complete, the next step is concreting the channel.

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# The Bulletin Kaikōura earthquake update

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## BURIED TREASURE

NCTIR's Daniel Headifen wasn't sure he'd ever get to take this photograph but the rail engineer captured a very tangible example of the progress the rail team is making. Tracks at Rosy Morn were buried by a massive slip during Cyclones Cook and Debbie in April last year. Temporary tracks were put in place around the slip until it was able to be moved. Clearing work continued and reached a milestone in early August when the original tracks were unearthed. It was a significant milestone. 'I wasn't sure we'd ever see them again which shows the amazing amount of work that's happened over the last year moving about 50,000 cubic metres of dirt. The next step in the coming weeks is to put the track back close to where it originally was.'

Don't miss out! Scan this QR code to watch a great KiwiRail safety awareness story.



## EXPECT TRAINS

The 'Expect Trains' warning will take on even greater importance from 1 October.

That's because daytime freight trains will be back in service for the first time since the 2016 Kaikōura earthquakes.

NCTIR Project Director Brian Kirtlan said it was an important milestone for the organisation.

'For rail it is very significant and the change to a daytime freight train will enable improved utilisation of locomotives and freight wagons,' he said. 'This is important as the peak rail freight season ramps up from October and it is also extremely important that people hear about this change.'

Kirtlan called for extra vigilance from local residents and travellers.

'People will have become accustomed to not having regularly scheduled trains on the tracks during the day. They need to mentally prepare now and heed our safety warnings. 'They need to, "Expect Trains".'

NCTIR Health and Safety manager Stephen Bell said there would be a concerted effort to inform people about the start of day trains before 1 October.

'We want to keep the public and our workers safe so expect to hear a lot more about this in the coming weeks.

'Our staff are already talking about day trains and we encourage everyone to begin the same conversation.'

### IN THIS ISSUE

- NCTIR back new book by Maria Gill
- Surplus sandwiches donated to school
- NCTIR design NZ first tunnel safety system
- Residents take drive down memory lane

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. Please note the next edition of The Bulletin will be published on Monday 10 September.





Wordsmith: Maria Gill has written over 100 children's books. In the photo (above) she reads her latest to an audience at Kaikōura Library.

## A LEGACY FOR LITTLE ONES



**NCTIR has donated eight books to Kaikōura's schools, library and two lucky children.**

The book *Earthquakes! Shaking New Zealand* was written by award-winning author Maria Gill.

She conducted a book tour of Kaikōura, Ward and Seddon during August and read to audiences of children who still have vivid memories of the 2016 Kaikōura quake. NCTIR Project Director Brian Kirtlan said NCTIR decided to donate the book to 'inspire children to read'.

Mr Kirtlan's inscription in the book read, 'On behalf of the staff on the North Canterbury Transport Infrastructure



**Budding engineers:** Some of the toothpick and marshmallow competition entries.

Recovery (NCTIR) project, we'd like to donate a copy of this book to your library. We hope you enjoy this book, and that it inspires you to learn more about earthquakes.'

Gill's book tour was well supported by the local community. It also included a question and answer session and NCTIR-inspired exercise.

The tiny engineers at the book readings knuckled down with marshmallows and toothpicks to create structures designed to hold up if the foundations beneath them were to move. Their tools included a tray of jelly shaken for 60 seconds, the amount of time that the Kaikōura quake lasted.



## ROCKSTARS AT ŌHAU POINT



It took a team effort and months of detailed planning but NCTIR completed the first stage of one of its biggest rock stabilisation jobs recently at Ōhau Point, north of Kaikōura. The team drilled two rockbolts into a massive 1000 tonne, 18 by 6 metre rock on a cliff face above the Point.

It was a challenging job, which required State Highway 1 north of Kaikōura to be closed during the work for safety reasons. The team had to contend with heavy sea mist and strong winds during the programmed road closure.

Mat Avery from Hiway Geostabilization said before the work could take place the cliff face above the rock had to be secured. Over 500 rockbolts and 6000sqm of mesh drape was installed on the top half of Ōhau Point.

'We had stringent emergency procedures in place and a developed a TARP (triggered action response plan) specifically for the work. It involved a lot of people and co-ordination with the traffic team, emergency services, surveyors and seismic monitoring'. Work continues with the remainder of the rock bolting over the next few weeks.

# MYTH-BUSTING ALONG THE KAIKŌURA COAST



NCTIR answers questions about safety and resilience work beside State Highway 1.

**Q. What is the latest thinking about placement of toilets at the safe stopping areas?**

**A.** We have listened to community feedback on this and have been adjusting the designs. At this stage the only toilet blocks we now plan to install along the coast are at Okiwi Bay and Rosy Morn (Hikurangi Marine Reserve). That gives people travelling along the road or shared pathway access to public toilets both north and south of Kaikōura.

**Q. Can you explain more about the route of the shared path (walking and cycling) at Ōhau Point?**

**A.** Sometimes work can look a bit odd while it's in the middle of construction. On the seawall at Ōhau Point for example, it looks like the shared path just stops. However, the shared path will actually break away at Shag Rock and go over a debris flow bridge. Just a bit further north on site 7 (north of Ōhau stream) it looks like the seawall ends again and that the path drops off, but the path will be diverting again while the seawall continues and then ends.

**Q. Can you tell us more about access to the DOC track at the Rakautara North safe stopping area?**

**A.** The old car park will be closed as it is not the safest place to stop. We'll provide a safe crossing point at the new safe stopping area for pedestrians to access the Department of Conservation (DOC) walking track by providing a gap in the guard rail at a suitable location. This will be matched by providing pedestrian access on the other side of the road. The new safe stopping area on the east side of the road could be used by hunters, hikers, walkers and bikers to access the Okiwi Bay to Halfmoon Bay track in the future. The track is currently closed due to earthquake damage.



Safety first: The tunnel propping system can be rolled into place to keep tunnel repair workers safe.

## TUNNEL PROPPING SAFETY SYSTEM A NEW ZEALAND FIRST

NCTIR construction staff need to be able to work safely under a supported roof when repairing damaged tunnels.

So they have come up with a novel tunnel propping system – the first of its kind in New Zealand – which has improved safety and created time and cost savings.

It might look like a large-scale Meccano but this design can be assembled safely outside of a tunnel then simply rolled on train tracks into place.

It can be adjusted to move up and down within a tunnel and can be removed in a short timeframe to allow work trains to pass through.

Once it is no longer needed at a site it can be easily moved and modified to suit the dimensions of the next. WorkSafe said it was a great example of a safety innovation on the NCTIR project.

For more information on the safe stopping area concept designs go to [www.nzta.govt.nz/kaikoura-earthquake-response/safety](http://www.nzta.govt.nz/kaikoura-earthquake-response/safety) Please give us your feedback via [info@nctir.com](mailto:info@nctir.com)

## NCTIR REDUCES FOOD WASTE

NCTIR is donating sandwiches for its workforce to a Kaikōura school. The idea to feed hungry school pupils with sandwiches surplus to requirements came from the NCTIR accommodation team and was endorsed by Compass Group who manage the workers' village. The team knew through work and community contacts that there were kids going to school hungry and that there were leftover sandwiches at the village. After workers have left the village for their shifts unclaimed sandwiches are collected and temperature tested to see if they pass food safety standards. If they do they are delivered to the school in a chilly bin. NCTIR's accommodation team said they had received emails from the school saying the sandwiches were proving popular.



Daytrippers: Kaikōura Hospital rest home residents get ready for their road trip.



Great view: One of the vistas that proved a winner with the residents.

## A DAY TRIP TO REMEMBER



### Kaikōura residents take a drive down memory lane.

With the Kaikōura ranges dusted white and the sky pristine blue, the Kaikōura Community Trust van pulled away from the Kaikōura Hospital rest home and onto State Highway 1. The van headed north, filled with residents, community activities coordinator Carol Cumpstone, and NCTIR tour guide for the day communications advisor, Amy Leigh Wicks.

As the driver, Christine O'Connor, approached Irongate Bridge, Graham Davey in the front seat beside her marvelled at the work. 'It's amazing what they've done,' Graham says. 'Just a remarkable amount of work.'

Further north nearing Ōhau Point, Paul Harnett said when he was young he used to graze cattle around the point. 'It looks different now. They've done good work, and it looks like there is a lot more to be done.'

Paul is right. There is still months and millions of dollars worth of work to be done along the corridor, and some of that critical work will take place at Ōhau. Driving across the Ōhau stream, the residents were shown where the first safe stopping area of the safety and resilience package will be.

The Ōhau lookout is due to be completed by October 2018 and will include a viewing platform where visitors can enjoy the spectacular rocky coast that many fur seals call home, as well as the grandiose Ōhau Point.

All along the journey, eyes shift to register the effects and response to the 2016 earthquake on both the coastline and the road. As the van pulled back into town Carol said, 'This has been a very special trip, some of these residents have not been out of the town in more than a year, and this opportunity to see the corridor and learn more about the NCTIR project has been incredible.'

## DID YOU KNOW?

A global audience is reading this newsletter, which updates readers on NCTIR's road and rail repair after the Kaikōura earthquake. It's emailed to 2000 subscribers, with the vast majority living in New Zealand. However, you may be interested to know that our second largest audience is in the United States - we email 287 copies to the USA. We send 87 to Australia, 48 to the United Kingdom and 6 to Canada. We also have subscribers in France, India, Indonesia, Italy, Thailand and Switzerland.

### NCTIR's newsletter goes global



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# The Bulletin Kaikōura earthquake update



## Ōhau viewing platform taking shape

NCTIR's first safe stopping area at Ōhau Point is scheduled to be completed by 18 October and Project Manager David McGoey is confident the team will meet that deadline. The 8.3 metre wide, 4 tonnes cantilever that travelled up the coast and recently arrived at Ōhau Stream serves as the base for the viewing platform.

The arrival of the cantilever was poignant for many of the crew members who joined NCTIR when access to site was limited to helicopter or escorted passage through Tunnel 19, which runs through Ōhau Point, due the massive landslide.

'A lot of us have been working here together from the start,' says foreman Cam Brockie of Site 7. 'Last year it was a race to the finish, as we were the last section of road to be joined up around Ōhau Point in order to get the road opened by 15 December. We built the seawall, and now we get to create this beautiful viewing platform. It's a place where we can look back on all that's been done.'



Great teamwork at Site 7 as the crew lowers the 4 tonne cantilever into place as the base for Ōhau's viewing platform.

### IN THIS ISSUE

- Take your breath away
- NCTIR innovation goes global
- Road rebuilding at Whale's Back underway
- Your Kaikōura questions answered
- Rob's head for high places

## Expect delays SH1 south of Kaikōura



**Monday 10 September to Friday 14 September**

Please allow up to 5-5.5 hours for travel between Christchurch to Picton via SH1. Remember to check [www.nzta.govt.nz/p2c](http://www.nzta.govt.nz/p2c) or phone **0800 4 HIGHWAYS** (0800 44 44 49)) for travel information.

Thank you for your on-going patience.

If you have any questions or wish to raise any safety issues with us, we would really like to hear from you as part of our commitment to keeping everyone safe in the community. Please contact us on **0800 NCTIREQ** (0800 628 4737) or email [info@nctir.com](mailto:info@nctir.com).

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. Please note the next edition of The Bulletin will be published on Monday, 24 September.



## Take your breath away

Kaikōura's views are world famous. And this picture adds to the region's catalogue of great shots and also provides a unique perspective on one of the region's biggest projects. NCTIR took to the air to capture this image of the new safe stopping area at Ōhau Point. The project is 50% finished and the image provides a bird's eye view of the shared path which will open up the coast to walkers and cyclists. The viewing platform that overlooks Ōhau point and Ōhau's famous fur seals is due to be completed by 18 October. The seawall at Ōhau Point is a maximum of 9 metres high to protect the new road from extreme coastal weather.

## NCTIR innovation goes global

NCTIR is taking one of its most innovative designs international. NCTIR Geological Engineer Rori Green will present a paper she co-authored to some of the best minds in highway geo-engineering. She's been given a presentation slot at the Highway Geology Symposium in Portland, Maine, USA. The paper is titled the Development of a Modular Rockfall Protection Wall to Mitigate Earthquake-Induced Slope Hazards.

The co-authors include Cedric Lambert, Charlie Watts, Daniel Kennett (Stahlton Engineered Concrete) and Emerson Ryder (Holmes Solutions). Geofabrics and Eliot Sinclair also made some key contributions to the work. Giving a presentation at a gathering of engineers from all over the world is a daunting task. Rori's task has been made doubly difficult by the already considerable interest in the innovation and the fact she has just 20 minutes (including questions) to describe it and the context in which it was designed and tested.

To the uninitiated the wall looks like many others. However, Rori and her team are understandably proud of it. It is made up of interconnected concrete blocks with an energy-absorbing layer of sand-filled and rock-filled gabions to take the initial brunt of the rock impact.

The key advantages of the wall are its versatility due to its narrow footprint, low deflection and a relatively fast installation time, the latter an important health and safety construction feature given these walls are to be built in rock falls zones. Two versions of the wall - one 40 metres long, the other 70m - are currently planned just south of Ōhau Point and south of Blue Duck Creek.

The design was tested at a vehicle impact facility at Ruapuna Raceway on the outskirts of Christchurch. Holmes Solutions designed a 'rolling bogie' which is effectively a vehicle chassis with a spherical impacting head that serves as a battering ram and mimics the impact of a rock hitting the wall at different loads and impact energy levels.

The footage of the experiment is spectacular. Suffice to say the wall passed with flying colours and was approved for use on site. In its development, the design team took some recent research on the use of gabions and concrete for rockfall protection, combined them, added some Kiwi ingenuity (and a few big smashes) to come up with a solution that can be used in tight spaces where other protection methods like nets not so practical.

Green said early feedback from colleagues going to the conference was positive. She added: 'Lots of people have been looking for low-deflection solutions for some time. It'd be a great legacy for NCTIR to contribute a new rockfall protection solution to the international community'.





## Road rebuilding at Whale's Back underway



Since geotechnical work was completed and given the all clear back in May this year it's been all systems go at Whale's Back on the Inland Road (Route 70). Work to stabilise 900 metres of the road at Whale's Back hill is now halfway through cement stabilising. The road stabilising process involves milling out the existing road surface, cement stabilising and the final resurfacing.

Site Engineer Jordan Smith says other work that is also near completion is the installation of 280 metres of 100 kJ rockfall catchment fences and 280 metres of gabion baskets (cages filled with rocks used in road building). The fences require installing four metre anchors for the fence posts then netting and cable. The rockfall catchment low energy fence is capable of stopping approximately 500 kg at 100 km/h. 'We are expecting by the end of October traffic will no longer need to travel the diversion road along this section and can return to the pre-earthquake route,' he says.

## Your Kaikōura questions answered

We take down the questions you ask us at information events and our helpline, if you have a question or want to see other answers, visit [www.nzta.govt.nz/projects/kaikoura-earthquake-response/frequently-asked-questions/](http://www.nzta.govt.nz/projects/kaikoura-earthquake-response/frequently-asked-questions/)

### Q: Why do I have to wait at a stop/go when it looks like there's no cars coming?

There are many reasons we set up stop/go controls at work sites although they may not always be obvious to drivers. It could be that we're moving large construction vehicles within the work site, using a helicopter or that crew are working on a rock face. We know it can be frustrating when you can't see what's happening but we try to keep stoppages to a minimum.

### Q: What is that ute with the flashing light that leads cars through some stop/go locations?

Pilot vehicles are used to keep traffic moving at a safe and appropriate speed through the site. They're used at locations where additional support is needed such as if crew are working close to the road and excessive speed could pose a safety risk.

### Q: Are you planning to close State Highway 1 again?

There are no planned closures at the moment as our work can currently be safely progressed while the road is open. Closure dates are publicised as soon as they are confirmed to give as much notice as possible to drivers and the community. We also post information about planned closures here: [www.nzta.govt.nz/projects/kaikoura-earthquake-response/planned-closures/](http://www.nzta.govt.nz/projects/kaikoura-earthquake-response/planned-closures/)

Sometimes the road needs to close unexpectedly such as in adverse weather or following a crash.


Visit [www.nzta.govt.nz/p2c](http://www.nzta.govt.nz/p2c) to stay up-to-date with real-time travel information.

### Q: Will the roads be busier over summer?


Yes. Traffic volumes increase over summer as people head off on holidays and we have more international visitors. Summer is also the season when we get the best results from maintenance and repairs because the weather is warmer and the air temperature is drier, so the seal sticks more effectively to the road surface. There is also a range of work that NCTIR will need to complete while the weather is fine.

### Q: Are the trains back during the day?

Yes, work trains and high rail vehicles are running during the day so you must slow down as you're approaching a level crossing and be prepared to stop. Trains can come at any time, from either direction. Freight trains will also start running every day from 7 October, the day after the clocks go forward for daylight saving.



## Rural Community Meetings



**Help your neighbourhood prepare for an emergency.**

**Clarence:**  
Thursday 13 September 7pm, Woodbank School

**Inland Road:**  
Monday 17 September 7pm, Lynton Downs School

**Kēkerengū:**  
Tuesday 18 September 7pm, Kēkerengū Community Hall

**Goose Bay & Omihi:**  
Saturday 22 September 10am, Goose Bay Rural Fire Shed

**Oaro & Waitane:**  
Sunday 23 September 2pm, 2 Te Keepa Road

**Contact Kd on 03 319 5026 ext 237 or  
[kd.scattergood@kaikoura.govt.nz](mailto:kd.scattergood@kaikoura.govt.nz) for more info**





## Rob's head for high places

Rob Roche is many things. NCTIR Wellness and Rehab advisor. Dad. Kaikōura institution. General all round good bloke. Others will add to the list. But no one could call him a quitter. Rob recently returned from a fund-raising climb of Mt Kilimanjaro which turned into a test of his determination.

Unfortunately, he got sick two days into the six-day climb and could not eat. Rob likes to eat so that was a problem. 'I could drink water though,' he explained. 'But to not be able to eat made it tough... but there was no way I was going to chuck it in.'

Rob's mission to the 5895 metre summit of Kilimanjaro was for a good cause: the restoration of the Kaikōura Scout Hall (also known as Drill Hall). The hall, near and dear to Rob's heart, is an important community asset but has seen better days so he set up a Givealittle page to collect funds to go towards a restoration. To prove his commitment to the cause he climbed Kilimanjaro with his now Dubai-based daughter Kimberley. Rob's back in Kaikōura a few pounds lighter and yes, the page is still open to anyone wanting to donate to the cause (see link below). Despite getting crook Rob said the experience was 'amazing' and well worth the months of planning, preparation and training.

'And my thanks goes to all my NCTIR workmates and Kaikōura locals who supported me. It was a really rewarding experience.' A committee has been set up to restore the hall and they will decide how the funds are spent. It will probably go towards cladding and wiring,' he said.

[givealittle.co.nz/cause/kaikoura-drill-hall-aka-scout-hall-upgrade](http://givealittle.co.nz/cause/kaikoura-drill-hall-aka-scout-hall-upgrade)



## RUGBY FEAST

There was plenty of sizzle at Kaikōura Rugby Club recently. The NCTIR team and our trusty community BBQ was pressed into action to feed the masses at a representative rugby match. Graeme Tiltman, northern zone design lead, was an interested spectator. His son played in the match which, for the record, the Canterbury Country U48kg team won, beating Marlborough U48kg 40-10. NCTIR's Lisa Branton and Leah Te Moananui fed the boys and their supporters. Well done team.

## VOTE NOW

NCTIR has been shortlisted in a People's Choice Awards run by the international Institution of Civil Engineers. Hundreds of different projects from across the globe were whittled down to 10 with the full list of finalists to be revealed on September 10. The awards are prestigious and you can help our 'moving mountains' entry by visiting and voting at [ice.org.uk](http://ice.org.uk). Voting closes on September 28.

## WALES ARE WATCHING

The Bulletin's international appeals shows no signs of abating. A story in our last edition about our large international readership triggered this message from Mandy Broadbent in Wales. 'Many thanks once again for producing such a useful, informative newsletter that allows us to keep up to date with what is happening. Hopefully we will be visiting again and will enjoy driving down SH1. What you have achieved is nothing short of amazing, or as you might say - awesome!' Nice one Mandy.

## CRAY CRAY

A Kaikōura icon has gained some priceless publicity. Nin's Bin was recently named one of the world's top food experiences by Lonely Planet. The Kaikōura fresh crayfish eatery was ranked seventh out of 500 in the travel guide's Ultimate Eatlist. Nin's Bin, an iconic blue and white caravan parked 20 kilometres north of Kaikōura, has been serving crayfish along the rugged South Island coastline since 1977. Johnny Clark, who took the company reins from his father Rodney after the 2016 earthquake, said he was blown away with the top 10 placing.

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## Rail gears up for busy summer season

From 7 October freight trains will once again be rolling along the Main North Line during the day. KiwiRail's acting Chief Executive Todd Moyle says, 'Moving back to a 24/7 operation means we will be better able to serve our freight customers. We have been operating services only at night since the line reopened so repair work on both road and rail can continue during the day.'

'The months leading up to Christmas are some of the busiest for ourselves and the wider freight industry, so now being able to run trains 24/7 on the Main North Line means we keep the freight flows moving into and around the South Island. Rail freight benefits everyone - fewer trucks on our roads means cleaner air, less greenhouse gas emissions, less congestion and safer roads.'

A significant amount of work has been undertaken to improve the reliability and resilience of the rail line and reduce transit times. Recent milestones include a safer rail realignment at Waipapa Bay away from the slip face, and completion repairs to the many tunnels along the line. From 1 December the Coastal Pacific passenger service will also resume with daily trains running throughout the summer season.

## Clint gets ready to roll

KiwiRail train driver Clinton Levick says - without a hint of hesitation - the Main North Line is his favourite track to drive on. Clinton can't wait to do so from 7 October when KiwiRail resume day time freight trains to boost their current night time service offering. 'The change is significant', says Clinton.

Although there has been plenty of activity on the Main North Line during the day, all of it has been from work trains rather than the flagship freight trains that Clinton drives. He says it's only natural that people may have become unaccustomed to freight trains during the day, so he wants everyone to know that they are making a comeback.

'I have been driving the line, which I love, at night. Day time trains mean a lot more people will be near the Main North Line when we drive through,' Clinton explained. 'We want as many

people as possible to know that we are

going to be back. Everyone should expect trains anytime. That includes road users, farmers and users of crossings in isolated rural areas, and pedestrians - particularly those in the busier urban areas. They need to take the time to check before crossing the line and expect trains anytime.' Clinton has been a KiwiRail train driver for five years. He constantly marvels at the progress being made along the Kaikōura coast. 'The rebuild team has done a great job rebuilding the track and making constant improvements. Our travel times are steadily reducing as a consequence. I can't say enough about what they have done and how safe the track and how safe the workers doing the work have made us drivers feel. They've set a great example for the rest of us to follow.'



KiwiRail train driver Clinton Levick

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. Please note the next edition of The Bulletin will be published on Monday, 8 October.





## Visual symphony

In the last edition of The Bulletin we brought you a stunning image of Ōhau Point. This time it's the turn of Half Moon Bay to be shown in its full glory. The NCTIR team recently took to the air to survey the extensive geo-stabilisation work that is taking shape along the coastline north of Kaikōura. As you will note there is a conspicuous pattern in the landscape in the centre of the image. NCTIR Principal Geotechnical Engineer, Greg Saul, describes this as a debris flow diversion system that was sculpted by diggers and dump trucks. It picks up water and rock debris flow from the steep hillside slopes above and steers them into gullies either side of the ridge. Clever stuff to keep people safer. The flows continue under the road and railway debris flow bridges that can be seen in the bottom left and right hand corners of the image. Other stabilisation



work including earthworks and drainage is planned for the face of Slip 5 immediately above the railway line and the lowest bund will be planted to improve its resilience. The sculpting work was carried out in January 2017 and the other works are planned for completion next year.

## Your Kaikōura questions answered

We take down the questions you ask us at events and our helpline, if you have a question or want to see other answers, visit [www.nzta.govt.nz/projects/kaikoura-earthquake-response/frequently-asked-questions/](http://www.nzta.govt.nz/projects/kaikoura-earthquake-response/frequently-asked-questions/)

### Are trains back 24/7?

Yes. Trains are operating on the Main North Line at all times. Work trains and other rail vehicles currently use the line during the day to help with the earthquake recovery with freight running at night. Daytime freight trains start in early October and the Coastal Pacific starts in early December.

You and the people you know may have become used to quieter tracks and level crossings since the earthquake, but from now everyone should expect trains again at any time. Please take extra care to keep you and your family safe. Trains can come at any time, from either direction.

### Is the rebuilt railway vulnerable to future damage?

A core part of the recovery work is ensuring that what we rebuild is fit for the future. We've been stabilising the slopes above the rail line. Fences and other structures are now in place to protect both the rail line and road from further slips. Repairs to rail bridges and tunnels are being completed and some of the rail tunnels are also being extended with rock fall shelters. Rebuilding the rail line is an enormous body of work and we're still working hard to

finish carrying out all the repairs.

### Why is rail so important to the region?

The rail network is a critical part of New Zealand's transport networks. Before the Kaikōura earthquake more than one million tonnes of freight for customers around the South Island was being moved along the Main North Line. Without rail, this freight was moved by trucks on our roads. Rail reduces congestion on our roads by reducing the number of trucks, reducing emissions, improving safety and minimising road maintenance costs.





## NCTIR doing the heavy lifting

A key rail bridge on the Main North Line is nearly finished. Bridge 90 is a railway bridge that spans a tributary into the Conway River just south of the Hundalee Hills. In early September the NCTIR bridge building team reached a significant milestone in the bridge's construction. They lifted into place four, 33-metre long bridge beams each weighing 62 tonnes.

Site engineer Tom Keith oversaw the placement of the four Super Tee beams which were made by Stahlton Engineered Concrete in Christchurch. They were transported to Bridge 90 by Fulton Hogan Heavy Haulage using a specialised truck and extended jinker trailer unit. A 300-tonne Smith Crane was used to lift the beams into place.

Tom says a temporary steel bridge had been constructed to replace the original which was damaged beyond repair in the 2016 Kaikōura earthquake. 'We're here to put in a permanent bridge that will last for the next 100 years or more,' he says. It seems that it's all about giving the community something fit for the future.

Site supervisor Stefan Hurley began work on the four-month project in early June.

He said abutments and wing walls were anchored to four piles, each 1300mm in diameter, and driven to a depth of 20 metres. The beams were then carefully placed on bearing pads and soon a top deck will be laid in place using in situ concrete. The finishing touches will include parapets and safety handrails. Stefan said it was the first time a rail bridge had been built using this method in the South Island.



← See the beams going in here



## Expect delays on SH1 south of Kaikōura

**On Monday 24 September, between 7am & 5pm** abseilers will be undertaking scaling work on the slip between Punchbowl and Rosy Morn. Please expect delays of up to 10 minutes during this work.

Depending on the outcome of the scaling work we may require further work on the slip which would involve helicopter sluicing. If required, this work would take place on **Tuesday 25 September, between 9am-12pm**. The section between Peketa and Raramai Tunnels would need to be closed in 30 minute sections from 9am but will be open to clear waiting traffic on every hour and half hour. Scaling work will also take place between Thursday 27 and Sunday 30 September. Please expect delays for up to 10 minutes between Paratitahi Tunnels and Peketa.

Work is subject to weather conditions. We appreciate everyone's patience while this work is underway. Please allow up to 5-5 ½ hours for travel between Christchurch to Picton via SH1. Remember to check [www.nzta.govt.nz/p2c](http://www.nzta.govt.nz/p2c) or phone **0800 4 HIGHWAYS** (0800 44 44 49) for travel information.

If you have any questions or wish to raise any safety issues with us, we would really like to hear from you as part of our commitment to keeping everyone safe in the community.

Please contact us on **0800 NCTIREQ** (0800 628 4737) or email [info@nctir.com](mailto:info@nctir.com).



Our efforts to recover the transport networks in Kaikōura after the November 2016 earthquake have been nominated for a world-wide award and we need your support to win!

We're the only Southern Hemisphere finalist in the Institution of Civil Engineers People's Choice Award - so help us take on the rest of the world by voting now.

**Voting closes 28 September**  
Vote at: <https://bit.ly/2Mm8Nsa>



### Reaching for safety

There is a very good reason the NCTIR crew at Bridge 103 are doing star jumps at 7am - and that reason is safety. Each morning after their pre-start meeting, and before work is underway, the team takes part in a pre-shift warm-up. That includes star jumps, full body stretches and jogging. Warming up before starting work for the day not only helps to



Stretching the hamstrings at Bridge 103

increase blood flow and optimise performance, stretching also reduces fatigue and improves muscular balance and posture. Being alert and focused can help to prevent injuries and enhance performance and

with a pre-shift routine that only takes about five minutes, it is well worth the effort. Well done to the team at Bridge 103 for doing their part to keep safety as their number 1 priority.

### Community cleans up

NCTIR staff joined over 100 others for a community clean-up of the Lyell Creek/Waikōau and surrounding beach last week. The event was organised by the Kaikōura



Clean-up at Lyell Creek

Water Zone Committee in partnership with Environment Canterbury and Kaikōura District Council. Students from surrounding schools scoured the beaches collecting rubbish in large

bags while many of the adult volunteers wandered the banks of the creek collecting rubbish and pulling some of the larger weeds that were growing on the path. NCTIR receptionist Debby McGrath waded into the creek hip high and retrieved a ceramic bowl, plastic bags, a shoe, two traffic cones, said: 'I was so grateful to get to be a part of this,' said Debby, 'it was fun, and it felt good to be out there helping in the community.'

### Watch this space

Following the earthquake, emergency speed limits were put in place for State Highway 1, north and south of Kaikōura. These limits expire later this year. The NZ Transport Agency will soon consult on

permanent speed limits. Watch this space for more information on how to have your say in the next edition of The Bulletin (8 October).

### Clive tackles McCaw

NCTIR's (unofficial) mascot has struck again. Former All Black captain Richie McCaw became Clive's latest victim posing last week for a photo with our furry sea creature. Clive the Seal was about to embark on annual leave taking a 1500km road trip around the North Island with NCTIR's Senior Project Manager, Peter Gibson. McCaw flies helicopters for Christchurch Helicopters of which he is a part owner. Just after the 2016 Kaikōura earthquake McCaw lent a helping hand as a helicopter pilot. After learning a bit about Clive's role with NCTIR - the well-travelled sea creature provides support and a good laugh to those who are working on the rebuild in Kaikōura - McCaw was happy to indulge Clive with a photo to commemorate a meeting of two great minds.



### NCTIR wins RMA award

NCTIR has won the 2018 Resource Management Law Association Project Award. The alliance was recognised for making a 'significant contribution to the advancement of best practice and the implementation of the Resource Management Act's purpose and principles'. NCTIR Environmental Zone Lead Daniel Murray accepted the award on 22 September at the RMLA's annual conference. Daniel said NCTIR's entry focused on the unique and innovative approaches taken to consenting.

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## Daytime freight trains return

On Tuesday 9 October the first daytime freight train in almost two years returned on the Main North Line between Blenheim and Christchurch.

The 375m long and 796 tonnes train left Christchurch early in the morning and arrived in Picton mid-afternoon in a major milestone for KiwiRail and NCTIR. Work undertaken to get to this point has been extensive, including slope work, tunnel repairs and ongoing bridge work and the milestone bring rail services another step closer to the return of the Coastal Pacific in December.

‘For the last 13 months freight trains have been only

running at night to enable the extensive repairs along the coast to continue,’ says KiwiRail’s Acting Chief Executive David Gordon. ‘While there have been some work trains and other rail vehicles using the line during the day, we are conscious that many people who regularly use level crossings along the line may have become used to the lighter levels of rail activity and need to be aware of this change.’

Please help us spread the safety message: always expect trains at any time, from either direction. Always obey signals at level crossings and look both ways before crossing tracks.

## The Great Wall of Ōhau

Technically speaking it’s a bund - but not as we know it - hence Mike Reilly isn’t surprised the nicknames have already started. Mike is project managing the construction of a 515 metre ‘wall’ that will protect motorists and the rail line from falling debris and is placed between SH1 and a rock face just north of Ōhau Point. It is truly massive in scale. A protection wall this long is a rarity, not to mention a considerable engineering feat, hence it will be built in two parts. The southern section is 220 metres long and an imposing 5.4m high. The northern end is 300m long and 3.6m high. The two sections - north and south - are connected by a 20m earth bund and there’s also a 20m earth bund

at the southern toe. So it’s big, really big. And Mike has about six months to build it. Work has already started on the foundations. In the coming weeks it will rise out of the ground in 600mm layers which will be tied together with Terramesh, a commonly used material in rock face reinforced soil walls and embankments. The bund means the current method of protection - a half a kilometre long row of shipping containers - can be removed resulting in a highly visible example of the progress NCTIR is making on the restoration of transport networks. ‘We have become so used to the container wall it will be strange when it is gone. But in its place will be something truly impressive in size and scale and in its engineering.’

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## Fish passage electrifying environmental work

This is the story of a culvert that resides under the Inland Road to Kaikōura. These waterways are where our native fish grow. The temporary culvert, of which there are many along the route, regularly undergo improvements which will enhance their ecological performance by creating better fish passage potential. How, you ask? That's the tricky bit. Culvert improvements require instream work that could potentially harm resident and migratory fish so a salvage operation is undertaken before improvement work starts. The photos to the right and below illustrate the moment of truth.

On the Electric Fishing Machine (EFM) is Greg Burrell, our intrepid new freshwater ecologist. His task as mission leader is to induce a current into the watercourse to promote the involuntary muscle movements of the target fish without causing undue harm to them (or his team members). The fish are collected and deposited to a safe part of the stream away from the works. The ecologists identify the species, measure, count, record and report the fish caught as part of our Ministry of Primary Industries permit requirements and monitoring programme. Other improvement work can include the placement of spat ropes within the temporary diversion road culverts and the construction of in stream pool and riffle steps. NCTIR's ecology team have saved or relocated over 3400 fish during the restoration of State Highway 1 and the Inland Road, many of them threatened and at risk species. Coastline and inland freshwater ecology has been a top priority during the repair works with fish recovery a routine occurrence on the NCTIR work programme.

Ryan Sutherland is a NCTIR Safety, Health & Environmental Advisor. He's also The Bulletin's latest correspondent. Ryan wrote this article which describes the great work he and the environmental team are doing to preserve the ecology and waterways along the Kaikōura coast.



Water works: The NCTIR team get their hands dirty finding fish at a culvert on the Inland Road. The team search waterways before culvert improvement work and relocate any fish found to ensure their safety.





## Signed, sealed and delivered

The finishing touches: State Highway 1 north of the new Inrongate bridge has had its first coat seal applied. The bitumen and road chip seal was constructed in late September. Senior Project Manager Peter Gibson said that the surfacing work was a success. It marked one of the final phases of reconstructing the highway on the site of slip 2.

## One small step towards the long task of selling the NCTIR Village in Kaikōura

The NZ Transport Agency has started the sale-by-tender process for the NCTIR Village and has called for registrations of interest from potential buyers. The full tender process will follow. But that doesn't mean the village will disappear any time soon.

NZTA earthquake recovery manager Colin Knaggs said: 'There's a lot of work to do before the village is officially wound down, and of course we still need a place for our team to stay in. The sales process is likely to take many months and by that time it is expected our worker numbers will be diminishing. When the village is disestablished we will need to find alternative accommodation for the remaining workers, which will include working with local Kaikōura accommodation providers in a continuation of our relationship with local business and social recovery organisations.'

When the Village is eventually sold, the site will be cleared and returned to its local owner. A second temporary Village located at the former Woodbank School in Clarence is being disestablished this November with many workers moving to the Kaikōura Village.

## How was your trip?

Win a \$50 prezzy card when you tell us about your journey on SH1 between Picton and Christchurch. There's one prize up for grabs each month.

[www.nzta.govt.nz/p2cjourney](http://www.nzta.govt.nz/p2cjourney)



## Subterranean splendour

Welcome to the equivalent of a backstage pass to a construction site. The photo was taken deep inside tunnel 16, a 123m long rail tunnel near Irongate. It depicts a construction method known as shotcrete which is being sprayed onto the walls of the tunnel between steel ribs, to reinforce the 262 rock anchors that were installed during stage one of the tunnel project. Underway now is stage two, a process which strengthens the existing concrete lining and improves tunnel resilience in the event of future seismic activity. 'This project faced many challenges,' says Tunnels Manager, Rafael Ballen. Site engineer Cassandre Gatineau added: 'The ribs were retrofitted into the concrete linings left buckled by the 2016 earthquake



and the team now needs to spray approximately 180 cubic metres of shotcrete. This work needs to be done within tight windows of time to fit around train movements. The team has made great progress, but there is still work to be done.'

## Have your say about speed limit changes

Following the Kaikōura earthquake, emergency speed limits were put in place for State Highway 1, north and south of Kaikōura. These limits expire in December this year, so the NZ Transport Agency is consulting on permanent safe and appropriate speed limits.

The proposals for consultation involve making the existing emergency 80 km/h along the northern coastal section a permanent speed restriction. To the south the proposal is to reduce the most demanding 10.4 km section through the Hundalees to 60 km/h and extend the existing emergency 80 km/h to include the curves south of the Conway Bridge. The current 80 km/h coastal section to the south is already a permanent speed restriction however the proposal includes extending this to include the entrance to the Peketa Beach Motor Camp.

Consultation is now open. You can find out how to have your say at:

[www.nzta.govt.nz/projects/sh1-picton-to-christchurch/proposed-speed-limits](http://www.nzta.govt.nz/projects/sh1-picton-to-christchurch/proposed-speed-limits)

## On the face of it



Valentina Piantoni and Mattia Belingheri make working at great heights look easy. The photo was taken and supplied by Nestori Virtanen

If you've noticed cliff-side abseilers working with an odd-looking piece of equipment and wondered what it was, wonder no more. Weighing in at 600kg, the large tripod is in fact a rock drill, and needs to be helicoptered into place due to its size. In this picture, the abseilers are working on slip 3 - just next door to Peketa - to drill up to six metres into the cliff face. A drill bit is attached to an epoxy-coated galvanised titan bar 40mm in diameter, so that the hole can be drilled and the bar inserted simultaneously. 300 bars like this have been inserted into the rock face at this site alone. Combined, the bolting and layers of mesh (also visible in the image) should stabilise the rock and prevent it from falling on passing traffic for at least 50 years. Handy!

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## Oh how wonderful

The public have spoken. Ōhau Point is a hit. The newly opened safe stopping area along State Highway 1 was a popular destination with motorists over the long weekend. Hundreds stopped to take advantage of the amenity area with the perfect view of Kaikōura’s world famous fur seal colony. And the seals, in the balmy weather, came to the party too.

Ōhau Point is the first in a series of new safe stopping areas to be completed along SH1, says Colin Knaggs, Owner Interface Manager for the NZ Transport Agency, who was heartened to see the public embrace the new facility.

‘This is part of a \$200 million package of works designed to improve safety, resilience, access and journey reliability between Clarence and Oaro, a 60km stretch of the Kaikōura coast. The Ōhau Point safe stopping area, with space for 20 cars, provides the local community and visitors with a safe place to stop and take a break while viewing the outstanding coastline and the famous home of Ōhau’s protected fur seals.

‘Ōhau Point was one of the areas most damaged by the Kaikōura earthquake in November 2016. The land was pushed up by seven metres. It’s been an incredible feat of engineering to get to this stage less than two years after the earthquake. Once the other safe stopping areas are built, people will be able to enjoy this beautiful coastline at a number of safe, well designed areas.’

The public can expect further exciting developments to come at Ōhau Point such as eco-sourced planting, including Ōhau Point rock daisies. Detailed cultural design elements will be completed in the New Year and iwi artists and carvers will be asked to be involved in the development of key designs across all the Transport Agency’s safe stopping areas to reflect the cultural significance of the Kaikōura Coast. ‘This includes pouwhenua and interpretation panels as well as detailed patterning to structures like furniture, handrails and barriers. Planting and other landscape design will help to integrate the safe stopping areas into the natural coastal environment,’ says Mr Knaggs.

For more information about safe travel between Picton and Christchurch along SH1 visit: [www.nzta.govt.nz/p2c](http://www.nzta.govt.nz/p2c)

### Points of interest



The new viewing platform at Ōhau Point is 8 metres in length and extends 1.1 metres beyond the seawall profile and features a spilt rock garden with two huge boulders sourced from the Ōhau slip. They each weigh 8 tonnes and are positioned either side of the northern footpath.

The safety rails are made of powder coated steel and are designed to naturally weather in the elements. They run the length of the seawall. Purple heart timber decking and limestone sourced from Waipapa Quarry adorn the pedestrian areas. The cycle stands (see below) are made of re-used rail sleepers.



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## Global innovation implemented to keep rail running like clockwork

An innovative Modular Rockfall Protection wall is becoming a reality to help protect the Main North Line and keep trains on schedule. The Modular Rockfall Protection wall is comprised of interconnected concrete blocks, sand and rock-filled gabion baskets. Now construction on a 40m long version has begun just south of Ōhau Point adjacent to the southern portal of rail Tunnel 19.

Project Engineer Tomislav Diklan says: 'This wall will stop debris going near the rail line. It's a great solution for this site. If the gabion baskets, which are closest to the hillside, get damaged or destroyed, they can easily be replaced, making it a great long term solution.'

A 126 metre long shallow landslide barrier is being constructed adjacent to the new modular wall to also prevent slip material from coming down onto the rail. The shallow landslide barrier is a Geobrugg patented fence consisting of two mesh parts. 'The primary SPIDER mesh is shackled to the top and bottom support rope to prevent most of the slip material coming onto rail,' says Tomislav. 'The secondary teco mesh is nailed into the ground with angular pins, and sits behind the primary SPIDER mesh to prevent finer grade material and sediments from coming onto the rail. The SPIDER mesh can stretch up to 3 metres, which is what dissipates most landslide forces, without reaching the important rail line.'

Both the Modular Rockfall Protection and the SL150 Geobrugg fence near Ōhau Point are essential rail protection solutions that must be completed before speed restrictions can be lifted and passenger trains arrive on 1 December. A paper on NCTIR's Modular Rockfall Protection wall was recently presented at the Highway Geology Symposium in Portland, Maine, USA.



### COUNTDOWN TRAFFIC LIGHTS GIVING TIMELY GREENS FOR GO

These new sets of countdown traffic lights (above) are now operating on SH1 north and south of Kaikōura. They count down the number of minutes left to wait until drivers can proceed through on a green light. The countdown is giving drivers the answer to the frequently asked question: 'how long will I be sitting here for?' They are operated day and night.





## Give me (tunnel) shelter

Passenger trains are scheduled to start running from 1 December and the tunnels team is doing its part to make sure it can happen. Just south of Peketa, the Tunnel 13 south portal was identified as a site where there was potential for rock fall from the slip above. A monitoring fence was installed at the site to raise the alarm in the event of a rockfall or slip, and there is a speed restriction for trains in this area.

The monitoring fence and speed restriction are temporary operational controls until the permanent rockfall shelter is completed, which will allow them to be removed.

Site Engineer Marion Guerreiro joined the tunnels team to help with the delivery of a 46 metre long permanent rock shelter at Tunnel 13. 'We had to construct different parts of the shelter separately, and then bring those pieces together like a puzzle,' says Marion. 'This was a real challenge. Each piece had to fit perfectly. As the shelter construction got underway, we started to build confidence and gained momentum on the job.'

'This team has to be really adaptable,' says tunnels manager, Rafael Ballen. 'We work closely with each other and with the designers on-site, so that any issues can be resolved immediately with design approval. This saves us from losing any time and keeps the whole team together to find



solutions and grow. The experience and teamwork during this process is incredible.'

Under the supervision of Cori Iaseto, the construction methodology was followed, with safety as a top priority. Stage 1 consisted of excavation, site concrete and installation of footings, and after it was completed, the crew began work on stage 2; placing the precast rock shelter. Once the shelter is complete, the crew will move to stage 3, backfilling, installing 32 anchors and water drainage.

## NCTIR workforce food is in the bag

From early November, packed lunches for people who stay at the NCTIR Village will be prepared at the Village by Compass Group staff, in addition to their existing breakfast preparation.

These lunches are currently prepared by five companies (four who make the food and one who delivers and provides water). They are Food Company, Why Not, Pot Belly, Dolphin Encounter, and Yvonne Mackles distributors. NCTIR would like to thank these suppliers for their support in keeping our team happy and well fed since the Village opened. We appreciate their support. Dinner will continue to be provided by a selection of 14 local restaurants. We're also planning to change from bottled water with team lunches to reusable aluminium bottles to eliminate plastic waste.



## A chance to win tickets on a special Coastal Pacific service

KiwiRail is running a special train service from Blenheim to Kaikōura on Friday 23 November to mark the return of the well-loved Coastal Pacific.

Kaikōura residents have the chance to win double passes to join the on-board celebrations. Simply drop in to see the friendly staff at the Kaikōura i-Site to enter the draw. Entries close 8 November. Proof of residency will be required. Winners will be advised by phone or email by 15 November.

The service will leave Blenheim at 10.15 am and arrive in Kaikōura at 12.30 pm for a celebration at Kaikōura Station. Winners must organise own transport to Blenheim. Children under the age of 18 will need to be accompanied by an adult.



## Seeing is believing

Another new highly visible landmark is taking shape along State Highway 1 south of Kaikōura.

28 large concrete slope stabilisation panels are being put into place adjacent to the highway just south of the Kahutara River. The precast concrete panels are big, 5.8 metres long and weigh 12 tonnes each.

Site engineer Benjamin Smith said the panels are being placed on a 45 degree angle to shore up the unstable slope surface. The panels are pinned into place with anchors that are drilled 7.5m to 11m into the slope until they hit rock. The work is expected to be completed before Christmas.

## Corners and delays cut with great idea

The team at Half Moon Bay have the job of cutting down a potential slip, with roughly 30,000m<sup>3</sup> of material to be removed from a site that crosses both road and rail. Ordinarily, traffic management and rail safety would be required, but some outside-of-the-box thinking led to a novel solution. Hydrema haulers – normally used in mining – are able to fit under the debris flow bridges, and can handle the steep site access when in their special drive. The steep site access and high potential for runoff meant that the team has to take care with things like runoff ramps and compacting of the road. Due to high brake and gearbox demands, as a precaution they're also safety checking each truck every two weeks.

Each truck handles over 100 loads a day, and the team further increases productivity by constant radio communication to keep traffic flowing. Getting this job done as efficiently as possible is important to making sure that the safer redesign of the slip face is done and dusted (so to speak) well before any passenger trains come through.



The set-up the team came up with is working well because it's safe for workers, and an efficient way of clearing the material. But it's also

good for those travelling through because it's meant that the stopping zone hasn't had to be extended to cover these works.

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# The Bulletin Kaikōura earthquake update

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PEOPLE

## Thanks for your support

The NZ Transport Agency, KiwiRail and the North Canterbury Transport Infrastructure Recovery alliance (NCTIR), are delighted to have won the Institution of Civil Engineers (ICE) People’s Choice Awards for 2018.

This global award, decided by public vote, is a benchmark of industry excellence in design and construction which recognises a project that transforms people’s lives.

‘We’re very thankful for everyone in the community and beyond who voted for our project – this is well deserved recognition of the hard work, dedication and determination of the thousands of people who so quickly rebuilt the rail line and roads, reconnecting communities and restoring critical New Zealand freight networks,’ says KiwiRail’s Acting Chief Executive Todd Moyle.

‘It was a collective effort that resulted in engineering excellence, and every crew member should feel proud of themselves,’ says the NZ Transport Agency’s Steve Mutton, Chair of the NCTIR Board.

This international competition compared our recovery work against a number of outstanding engineering projects from across the globe including The Tate Museum in St Ives, England; the Hyderabad Metro Rail Project, India; and The Forth Bridge Replacement Crossing, Scotland.

Brian Kirtlan, NCTIR Project Director said that the team’s work in Kaikōura couldn’t have been achieved without the dedication of the people on the ground.

‘The NCTIR team is a diverse and exceptionally talented team of professionals. We’d like to thank all our team members past and present for their efforts. We’re still working hard to complete the rebuild of the rail and road network and we couldn’t do this without the support of the community.’

ICE Director of Membership Sean Harris said: ‘One of many inspiring submissions this year, the project stands out globally as not only one of the finest examples of outstanding technical achievement but also highlights the importance of civil engineering in enabling social and economic progress.’

# WE WON!



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. Please note the next edition of The Bulletin will be published on Wednesday, 28 November.





## Pixel perfection

It wasn't until Craig Reyland was flicking through his phone that he realised he'd taken this rare and special image. The Rail Protection Officer working on the Main North Line was poised with his phone to capture an image of the resumption of day freight train services.

He snapped off half a dozen frames and thought nothing of it until he'd finished his shift. While reviewing the images he realised he'd captured a kārearea in full flight. New Zealand's only falcon - the country's most threatened bird of prey - is a more common sight on the reverse side of our \$20 bank note. There are only around 3000-5000 breeding pairs remaining in New Zealand.

The bird is known for its stealth, something Craig can attest to. 'I didn't actually see it at any stage during my shift including when I was taking the photos. It came as a complete surprise when I saw it on my phone.' A pleasant one at that.

The image has already had a thorough airing on social media. The feedback has been resoundingly positive. Craig, a keen amateur photographer, said a few media outlets had asked for permission to use it. He said it would be a treasured memento of his time in the NCTIR programme.



## Rail milestone on track

When normal Coastal Pacific services resume on 1 December, Justin Hall believes a small army will reflect on a job of national significance with justified satisfaction. Inevitably, the show-stealing scenery will grab the limelight. However the story of the Main North Line is deeply personal for many given the feats of engineering excellence that it took to reopen it. This is no more so than in the final phase of the restoration which Justin (NCTIR's Rail Delivery Manager) can speak ad infinitum about.

In recent weeks he's had plenty to reflect on - the construction of bridges, tunnels and crest repairs successfully underway and being

completed. Trains (notable work and freight) have been working the line for over a year now, but they have done so under speed restrictions. The Coastal Pacific is a different beast requiring few restrictions and greater journey certainty. To make the return journey from Christchurch to Picton, speed restrictions need to be lifted, and to achieve this requires bridges to be built and repaired, tunnels fixed and slopes stabilised.

Ferniehurst's Bridge 90, a single-span crossing of a Conway River tributary, is just one example. A temporary bridge was erected to reopen the line in 2017 but a permanent one with a better alignment has now been completed. Bridges 101 and 103

further North were refurbished. Justin says, 'We have also strengthened and in some cases extended many of the tunnels along the line. An example being Tunnels 13 and 14 of which have each been extended to the south by over 50 metres providing a rock shelter to the track and making for a very impressive structure. For me though the less conspicuous work is probably the most impressive part of the project. The thousands and thousands of hours of design, planning and labour, the skill and innovation of our staff, and the support of our customers and clients has been incredible and a career highlight for us all. We can't wait to see the Coastal Pacific roll again. It will be a proud day for the team.'



## Results trigger good news for motorists

Some clever data analysis has helped to shave off

valuable commuting time on State Highway 1. For several months now the NCTIR geotech team has been compiling and gathering rock-fall data north of Ōhau Point. NCTIR Network Operations Manager Tresca Forrester said it was a credit to the alliance’s safety and resilience work, which remains a work in progress, that key safety thresholds had already been met.

‘The impressive results mean we make a tangible difference for our customers - like reducing the length of the stop-go zone in place north of Ōhau Point from three kilometres to one. That means the wait time there has been reduced by an average 5-7 minutes.’ Both lanes on the highway north of Ōhau are open at night. This is when no construction work is taking place, meaning there are no delays at all and further reductions are in the offing. However, Tresca asked that the patience and understanding motorists have exhibited during the NCTIR project so far remains a little longer.

‘We plan to do a lot of construction and pavement work over the summer when drying conditions [for road seal] are best and that will add to journey times. But we think motorists, many whom will be using SH1 for the first time in many months, will be pleasantly surprised by the quality of the design making it truly a world class highway.’



## Rocking it, seawall-style

Sometimes, it’s not enough just to build a seawall – and that’s definitely the case at site 2, just north of the Irongate bridge. The seawall provides a stable platform for the new road.

Spotter Sarah-Jane Macmillan and excavator operator James Robinson (pictured above) have been out there adding an extra layer of protection in front of the wall: a 520m-long stretch of boulders, ranging in size from ½ a tonne to 10 tonnes. For the first three metres in front of the seawall, the rocks need to come about halfway up the wall. From there, for the next six metres, they gradually taper off to sea level. This breaks up the surf, protecting the sea wall, and prevents waves from crashing onto the road. An average of 28 truckloads of rocks arrives at the site every day, allowing the team to cover a stretch of 22-25 lineal metres. On arrival, James will carefully lift each boulder from the truck, lowering it onto the platform in front of the excavator. Sarah measures a percentage of the rocks to make sure they’re still meeting average size requirements: the wrong size can not only impact how long it takes to fill the space, but also how effective the surf break will be.

The large 9-10 tonne rocks will then be gently lowered into place; the smaller boulders can withstand a bit of a drop. Whatever their size, if a rock isn’t sitting quite right, James will grab it again in the excavator teeth and carefully nudge it into a better position. For the boulders going out beyond the reach of the excavator boom, he will literally fling them into place – and with all the practice he’s got, his aim is spot on.



## Wonder wall

The team at Ōhau Point is making steady progress on a new safety bund (pictured below). The 515 metre wall will protect motorists and the rail line from falling debris and is placed between SH1 and a rock face just north of Ōhau Point. The southern section of the potentially lifesaving feature is 220 metres long and an impressive 5.4m high. The northern end is 300m long and 3.6m high.



## Saving the day

NCTIR is famous for going above and beyond. But one of our crews earned the gratitude of some visitors to Ōhau Point recently the hard way. Erikka Helliwell, Kelly Agassiz and Lisa McLaren got their car stuck in a rock garden at the newly opened safe stopping area. No problem. A NCTIR construction crew lifted the vehicle off the garden with a bit of team muscle. The women said: 'it was amazing, we were pulled over when the NCTIR crew crossed the road to help us out and get us back on our way. Really fantastic.' Excellent work team.

## Events finder

A number of community events are being run to commemorate the second anniversary of the 2016 Kaikōura earthquake, including a night market at the West End container mall the evening of Friday 16 November. Another is a community planting on the peninsular. Members of the public are encouraged to meet at the Point Kean car park on 14 November at 10am. All are welcome, bring appropriate footwear, a spade and your lunch. There's also a community picnic planned on the same day for Churchill Park starting at 5-7pm. All are welcome. Bring your own picnics. There will be a variety of entertainment and activities on offer including a free sausage sizzle, music and games.

## Coastal Pacific celebration

Kaikōura residents can celebrate the return of the Coastal Pacific Train on Friday 23 November. The celebration at Kaikōura Railway Station between 12.30pm and 2pm includes formal speeches, a performance from Kaikōura Suburban School Kapa Haka group, followed by light refreshments. To minimise congestion, please park in town and walk to the Station.

## Tunnels open

The NCTIR team ticked off another milestone recently. The Raramai road tunnels are now open to traffic in both directions. The feedback from the public has been positive, particularly truck drivers who are enjoying larger clearances. The tunnels were ready for the long Labour weekend.


## Going national

Damian Christie has become a familiar face on NCTIR worksites while filming Kaikōura's recovery since the 2016 earthquakes. The award-winning film maker and his trusty sidekick Ben have captured some of the most visually stunning footage of NCTIR's work so he is already familiar to staff.

Now, all his hard work and story-telling prowess is about to culminate in a one-hour documentary called 'Kaikōura: a big year. It will air on TVNZ's current affairs show Sunday on 11 November. Damian, of production company Scifilms, says it tells the story of Kaikōura's quake recovery from 14 November, 2016, and ending with the opening of SH1 just over a year later. The film is a snapshot of the immense quake recovery effort told through the lens of a handful of Kaikōura residents and NCTIR workers. NCTIR's work on the road and rail network is a key plank to the story. Christie said: 'I don't want to give too much away but... you might need to have a hanky handy.' NCTIR are putting on a public viewing at the Groper Garage, kicking off with nibbles at 6.45pm on the night of the official broadcast (11 November). All are welcome.

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# The Bulletin Kaikōura earthquake update



## Coastal Pacific back on track

The Prime Minister, Government VIPs, tourism chiefs, earthquake recovery workers, Kaikōura locals and iwi celebrated a special commemorative train that arrived in Kaikōura on Friday 23 November. For the first time since it was devastated by the Kaikōura earthquake two years ago, passengers travelled on the Main North Line between Picton and Christchurch for the celebration event. At the event Prime Minister Jacinda Ardern, who travelled on the train, announced funding from the Government's Provincial Growth Fund that will allow KiwiRail to expand Coastal Pacific services.



Prime Minister Jacinda Ardern

'This [\$40 million] investment will bring thousands more high-value tourists into the Marlborough, Kaikōura and Canterbury regions, with additional capacity, platform upgrades and our first ever premium carriage,' KiwiRail Acting Chief Executive Todd Moyle says.

The investment means the Coastal Pacific will run all year round, add an additional 63-seat carriage to meet demand in peak season and add a new luxury premium carriage which will offer more space and high-quality food and beverages to go along with the spectacular views.

'The Coastal Pacific plays a critical role in the economies of towns along its route. Before the Kaikōura earthquake it brought about 42,000 passengers a year into Marlborough and Kaikōura alone. With this investment we will see double that number within a decade, creating more than 400 new local jobs. This is fantastic news for the people of Kaikōura and Marlborough and it highlights the Government's commitment to rail delivering economic benefits to the regions.'

To mark the occasion, KiwiRail hosted about 150 staff from NCTIR and KiwiRail, who helped put the road and rail back together after the earthquake, on the special service. Mr Moyle said: 'It has been a massive task getting the line ready to carry passengers again after the earthquake just over two years ago. I cannot praise highly enough those who made that possible, and it is fitting that members of the workforce that put the line back together were on the special journey.'



NCTIR project director Brian Kirtlan

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## Bill and Connie celebrate milestone

Locals and visitors gathered in front of the Kaikōura train station platform awaiting the arrival of the first passenger train since the November 2016 earthquake. Among them was Connie Hartley, who in December 2017 attended the community celebration of the reopening of SH1 with her husband, Bill. Bill and Connie were ecstatic about the road opening, and less than a year later, there is another major milestone to commemorate. But this time Connie is waving from the platform while Bill hits the tracks.

'It's a very exciting day. My husband Bill is on that train,' Connie says. 'I wasn't able to make the trip, so I got dressed up and came here with my friend Trish to welcome them instead.' Bill and Connie came to Kaikōura in 1982, not intending to stay for long, but found it easy to make friends, and fell in love with the town. It is easy to see why, looking out on the beautiful faces, listening to cheers and claps erupt for the Coastal Pacific as it rolls to a stop in front of Whale Watch Kaikōura, and Connie smiles at each passenger, waiting for Bill.



Bill Hartley, pictured right



Connie Hartley, pictured left



## A drive to remember



'Today is a bit emotional, to be honest,' said KiwiRail locomotive engineer, Kathy Tempelman, one of the key speakers at the Coastal Pacific Passenger Train arrival in Kaikōura, along with New Zealand Prime Minister Jacinda Ardern and Kaikōura Mayor Winston Gray. 'Seeing the train in Kaikōura got to me more than I thought it would.'

A day before the November 2016 earthquake, Kathy was driving a train through Kaikōura. The damage to the Main North Line was unprecedented, and promises that the rail would be restored seemed optimistic at best. 'It was hard to believe this could happen, that they'd be able to get train service back through. 'But amazing achievements should not come as a surprise to Kathy, whose journey with KiwiRail is remarkable in its own right, and started twelve years ago on the Main North Line. 'I was made redundant as computer technician and took a three month job making coffees for KiwiRail,' says Kathy. When a full time position became available, Kathy took it, and became train manager. Kathy said her dad often reminds her how she made a wish as a little girl to drive a train engine. 'I always wanted to know how a train drove,' Kathy says with a smile, 'and I got my certification when I was 50! I love that every day is different. I've got the best office in the world. I tell people I don't have a job, because what I do every day doesn't feel like work.' As the first Coastal Pacific passenger train in two years snakes through repaired tunnels and along breathtaking coastal views, Kathy smiles and shakes her head, amazed that this day has come.



# Smiles all round for the Coastal Pacific



## Planned Night closure for State Highway 1 south of Kaikōura



The scaffolding to be removed near Paratitahi Tunnels.

After many months of slope protection work, the scaffold tunnel near the Paratitahi Tunnels is now ready to be removed. The scaffold has been in place as a rock fall shelter protecting the road from the slope works above. For safety measures the removal of the scaffold requires the road to be closed and to reduce the impact for road users this will be undertaken at night. To minimise the disruption to the travelling public we will reopen the road every 90 minutes for 30 minutes during the night closure. Please refer to the timetable of openings and closures below.

The road will close from **9pm Thursday 13 December**, and reopen 6.30am on Friday 14 December. If required, a contingency day is planned for Friday 14 December. Traffic will be held between Peketa and south of the Raramai Tunnels.

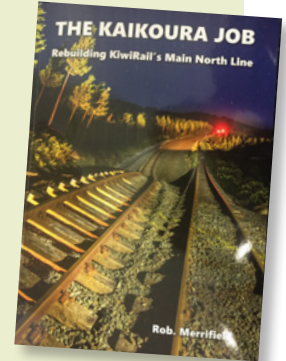
ROAD CLOSURE TIMES	ROAD OPENING TIMES
9pm - 10.30pm	10.30pm - 11pm
11pm - 12.30am	12.30am - 1am
1am - 2.30am	2.30am - 3am
3am - 4.30am	4.30am - 5am
5am - 6.30am	6.30am fully opened

While the road is closed and within the road closure the team will also mill a nearby rock on a tight bend that is overhanging the road. This milling will help with clearance for larger vehicles. Once the scaffold shelter is removed the team will be able to finish off slope work and aim to have the two Paratitahi Tunnels open before Christmas. Thank you to those affected by this closure for your on-going patience and support. We understand these closures are an inconvenience but also a must for everyone's safety. Things can change at short notice so please check real-time travel information:

- Call **0800 4 HIGHWAYS** (0800 44 44 49)
- Visit [www.nzta.govt/p2c](http://www.nzta.govt.nz/p2c)

## New book features Main North Line

NCTIR's work is featured prominently in a new book. Author and rail enthusiast Rob Merrifield took about 18 months to dream up and then publish *The Kaikoura Job*.



In the process Rob has forged close ties with several key NCTIR staff and with their help his book delivers an in-depth account of the science behind the earthquake, the clearing of slips, rebuilding of railway track, fixing of tunnels, repairing, demolishing or rebuilding of bridges, assisting the highway rebuild, and the re-opening of the line. Included also is a brief history of the origins and building of the line. This work is well illustrated with stunning images and is available for purchase at [www.railsoc.org.nz](http://www.railsoc.org.nz)

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## Meri Kirihimete & Happy New Year

It's the final NCTIR Bulletin for 2018, and I'd just like to say thank you for your ongoing support and patience over the past year. Saturday 15 December marked one year since the road reopened. Since then we've celebrated further milestones, including opening the road 24/7 in April, reintroducing daytime freight trains in October, opening the Ōhau Point safe stopping area later that month, and most recently getting the rail to a point where the Coastal Pacific could reopen for the summer. These milestones represent a huge amount of work put in by individual teams working on the many tunnels, bridges, seawalls, slip face remediation works, sections of road and rail that make up the overall project. They have done a fantastic job this year, and leave us in a good position going into 2019.

By and large we'll be taking a two week break over Christmas, with just a few crews remaining to provide essential services. In most places, roads will be opened in two directions over the Christmas period – in fact, our final opening for the year at Paratitahi tunnels is set for Thursday 20 December. Our traffic safety management team is one of the crews that will still be on the ground, so if you see them on your own travels, give them a friendly wave.

For everyone on the project, winning the Institution of Civil Engineers People's Choice Award for 2018 was particularly special – so thank you, once again, for taking the time to vote for us.

I hope you all have a safe and happy holiday, and enjoy spending time with your loved ones. Stay safe.

Brian Kirtlan, Project Director

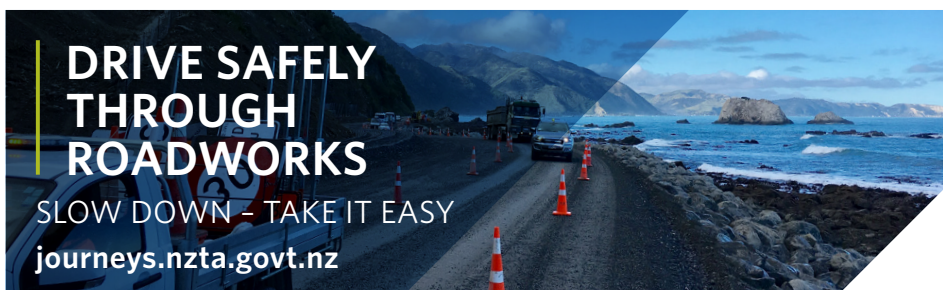


## Safety improvements

Safety improvements work along State Highway 1 will continue through to the end of 2019. This work will make the road safer for all traffic. In places the road is being widened, guard rails are being installed, safe stopping areas constructed and in a few areas the road is being realigned.

There will be increased activity on sections of the road between Clarence and Oaro where sections of road will have the seal widened and guard rails installed. Most of this work will start in late January and February.

Realignment work around Half Moon Bay and Rakautara will be starting early January 2019 when the crews return from a well-deserved Christmas break. In both cases the realignment is to smooth out the bends in the road to make them safer for cars and trucks. To do this the curves will be slightly straightened moving the carriageway towards the coastline and filling in the area between the existing road and the new alignment.



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## Permanent changes to speed limits: Kaikōura coast and Hundalees, SH1

The NZ Transport Agency is making the speed reductions near Kaikōura permanent, after they were put in place temporarily a year ago, when State Highway 1 reopened following the November 2016 earthquake.

‘Following consultation with the community, we have decided to continue these speed limit reductions and extend some areas for lower speeds in the interests of road safety for everyone using these winding sections of highway,’ says Transport Agency Director Regional Relationships Jim Harland.

The Police, AA, NZ Trucking Association and the three district councils (Kaikōura, Hurunui and Marlborough) were specifically included in consultation, covering from Waipapa Bay in the north to the Conway Bluffs in the south.

‘The reopening of the road last year really brought home to locals just how busy SH1 can be - I think we’d forgotten what peak traffic felt like,’ says Kaikōura Mayor Winston Gray.

‘All drivers have a responsibility to keep themselves, their passengers and other road users safe by driving legally, sensibly and safely. The new speed limits may take some time to adjust to but, at the end of the day if they help keep our community and visitors safer it’s an adjustment most people will understand the need to make.’

Between 2012 and 2016,\* four people were killed and 15 people were seriously injured on this road.

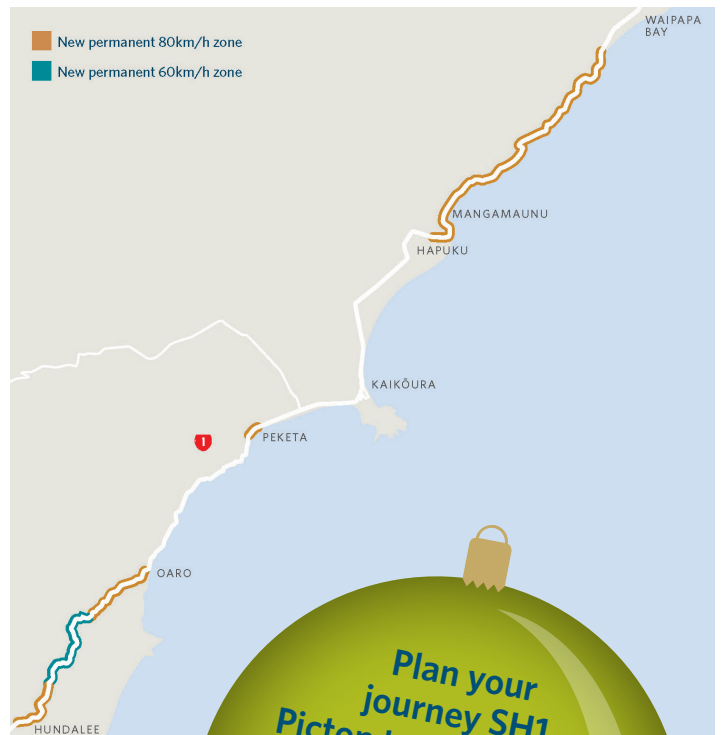
‘Reducing the speed limits will improve safety, and help make those crashes that do happen survivable,’ says Mr Harland. ‘Making one mistake on the road should not end a life. The lives changed when someone dies or is seriously injured on our roads extends to family and friends and impacts upon the whole community.’

‘Even when speed doesn’t cause the crash, it will determine whether anyone is killed, injured, or walks away unharmed. Higher speeds increase the risk of making mistakes, reduce time available to react and increase braking time, making severe crashes more likely.’

- The permanent speed limits will be 80km/h north of the town from Waipapa Bay to near Kiwa Road, Hapuku.
- SH1 south of Kaikōura, the 80km/h speed limit extends to Kaikōura airport, at Peketa, to the north and into the Hundalee Hills to the south.
- On the Hundalee Hills, the most winding section of the highway with limited visibility in a number of areas, the speed limit is reduced to 60km/h. Many of the curves in this section have speed advisory signs recommending between 25 and 45km/h.
- On the Hundalee Hills south of Claverley Road, Conway Bluffs, the speed limit will be 80km/h.

The consultation took into account the high numbers of visitors who stop along the highway north of the town and the narrow highway corridor in many places.

\*The highway to the north of Kaikōura was closed for a year after the November 2016 earthquake.



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