

KAIKOURA EARTHQUAKE UPDATE

KAIKOURA EARTHQUAKE UPDATE - no. 28

4 August 2017

This weekly bulletin provides the latest information about the rebuild of road and rail networks damaged by the Kaikoura 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. We're keen to hear your questions about our work, or any feedback on this bulletin. Drop us a line via email at info@nctir.com or give us a call on **0800 NCTIREQ** (0800 628 4737) – we'd like to hear from you.

MILESTONE: RAIL LINE COULD OPEN WITHIN THE MONTH

Work on repairs to the Main North Line railway following November's Kaikoura earthquake has progressed quickly in recent weeks and the first freight trains may run within a month.

The initial opening will be a restricted one, with low-speed, low-frequency services. A sizeable amount of work remains to return the line to its pre-quake state.

However, work on critical projects has already progressed to a point where work trains are able to move between sites carrying rail and ballast. Pictured below is a work train coming through Half Moon Bay north of Kaikoura.

Every week we publish an information graphic (see page 3) showing the steady progress trains have been making towards the goal of reconnecting the Main North Line as soon as is safely possible.

There were close to 60 major damage sites including tunnels, bridges, embankments, and the line had been buried under more than 100 slips and landslides. Approximately 60 bridges were damaged and repairs are being carried out at more than 750 sites.

Reflecting on some of the major projects completed since those early post-earthquake days the work teams are proud of what has been achieved in such a short period of time. While the selected summary of achievements to date is by no means exhaustive, it does illustrate the large amount of work that has happened to get the rail to where it is today.

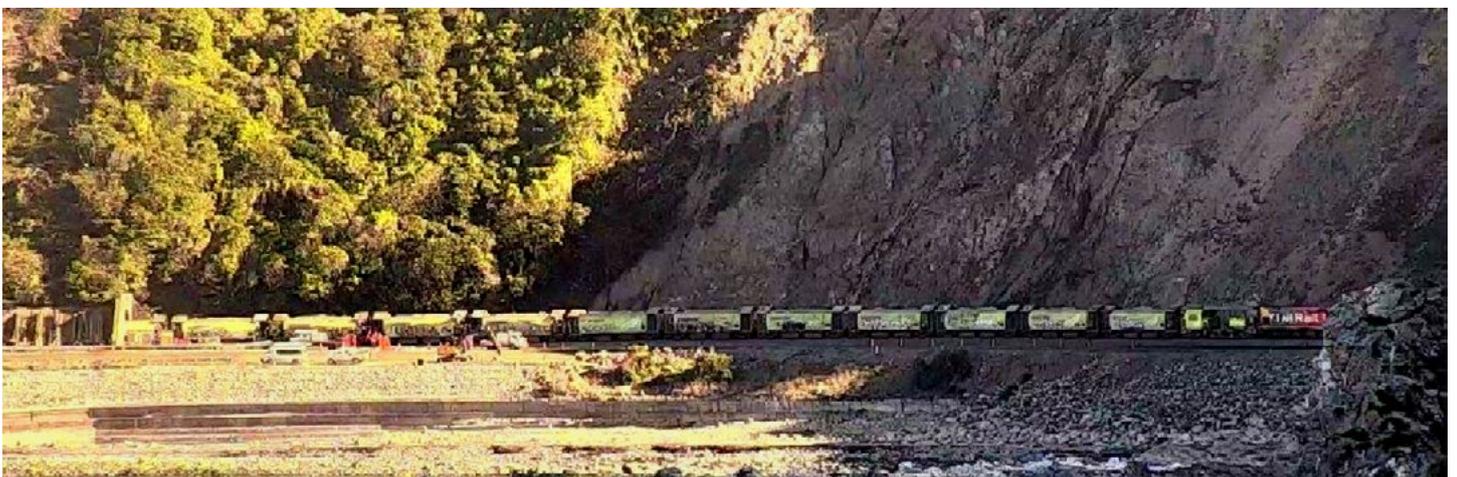
Some highlights to date

In the north the teams worked to realign 700m of track that moved at Tar Barrel south of Mirza in April.

Around the same time, work was happening on the bridge at Wharanui – the graffiti'ed temporary bridge – to enable the work train to get through this critical point on the MNL.

Bridge 129 at Tirohanga, which was extremely damaged with vertical and horizontal displacement has also been adjusted with rail tracks laid on its eastern side to allow the work train to pass through.

At Bridge 129 earthworks were completed to form a new embankment at a higher level to negotiate the changed water levels caused by the earthquake. Clarence Bridge (Bridge 120) which was impacted by the fierce



shaking during the earthquake has also been repaired to state to enable limited train services to resume.

Since late April bulk earthworks have been undertaken at The Pines to enable the tracks to go up and over a large block of land thrust up by movement of the Papatea Fault. A worktrain was able to pass through the site a couple of weeks ago.

Other activities completed to get the trains moving has included a large amount of slope stabilisation works, repairing tunnels, installing tracks, repairing the train control radio system and installing remote monitoring on landslides.

To the south, work has been equally busy and challenging with rebuilding Bridge 90 at Ferniehurst and the structural strengthening work at Bridge 95 near Claverley in May.

Tracks also had to be laid around the toe of slip 29a at Rosy Morn. Much of the work in the south culminated with the arrival of the first moving train into Kaikoura since the earthquake which was achieved on 9 June.

Getting the train to Oaro Loop was a critical path milestone - the train reached here on 9 June, same day it reached Kaikoura.

A LARGE SECTION OF RAIL TRACK HAS BEEN UNCOVERED SOUTH OF OHAU POINT.

Almost like an archaeological project, 150m of rail track has been carefully dug out after being intentionally hidden underground for a month.

Last year's earthquake and the rains that followed caused the rail track leading to tunnel 19 at Ohau Point to be buried in landslide material.

Because of the risk of more material falling, the rail tracks needed to be shifted out four metres to a safer location before trains could run again. There was, however, a problem. The new location of the tracks would be directly in the way of hundreds of trucks moving tonnes of material from Ohau Point during July.

To deal with that situation, a 20 person team from KiwiRail worked overnight to excavate a new formation trench, 150m long, one metre deep and five metres wide. Structural fill was laid and railway ballast placed on top before being protected with a layer of geofabric cloth and covered in a thick layer of dirt.

Site Engineer Holly Janssen says without someone knowing the exercise had taken place, there was no evidence left the next morning to show for the rail crew's hard work.

"You would have no idea we had done it, we covered it up and hid it from the world," she says.

Over the next month that night of hard work remained buried while a continuous stream of trucks drove over it hauling material from Ohau Point.

"Meanwhile our new section of rail was lying underground waiting to be uncovered," says Holly.

With the earthworks on the south side of Ohau Point now complete the new rail formation could finally be uncovered allowing for track to be installed and work trains to move along this section of the corridor for the first time since the earthquake.

"It's exciting seeing work trains running again, it's what we have worked so hard to achieve," says Holly.

A row of shipping containers has also been placed on top of the old section of rail. This will act as a temporary rock fall protection measure until permanent works are completed.



THE EXTRAORDINARY CREW AT TUNNEL 13 WORK HARD AND WORK SMART TO ACHIEVE THEIR GOALS

For nearly three months a team of about 20 people (pictured) have been working day and night to fix Tunnel 13 just south of Kaikoura beyond the Kahutara River Bridge.

NCTIR's tunnel manager Rafael Ballen says the priority has been to stabilise the tunnel so that work and freight trains can pass through them safely. The team set milestones to keep them on track and so far they have met every single one of them.

Listening and getting to understand each person's strengths and potential has been key to creating a strong team that achieves its goals, says Rafael.

Since the last updates on work at Tunnel 13 a couple of months ago, temporary works have been completed and permanent repairs are now underway.

"The biggest challenge for this project has been ground conditions," says site engineer Innes Duncan.

"Highly fractured rock is not good for tunneling as it makes it difficult to drill through and install anchors," Innes says.

The team met the challenge head on with innovation; a propping system was put in place to keep the fragile tunnel from collapsing.

The propping system has since been removed after 800 tonnes of grout was injected via tubes through the tunnel walls into the adjacent hillside to improve the rock mass surrounding the tunnel. These improvements to stabilise the tunnel has allowed 150 rock anchors to be installed with more to be installed in the coming weeks.

The best proof of progress for this tunnel was, however, was seen when a work train drove through it earlier this week (pictured right).



FIRST VEHICLES OVER THE OARO BRIDGE

The first vehicles travelled over the Oaro Bridge last week following months of work to restore this critical piece of infrastructure on State Highway 1 south of Kaikoura (see before and after photos below).

The bridge is under stop/go traffic management while work still continues on the new retaining structures and road approaches.

This challenging project has involved the reinstatement of gabion basket retaining walls, reinforcement of retaining structures and laying down of new road. The last stage of this project will be installing guard rails in late September.



CHEWING THROUGH THE 'GRANDDADDY' OF THE LANDSLIDES

Site 8 north of Ohau Point is swarming with machinery, biting chunks out of the monster landslide that towers above the excavators (see photos next page).

Earthworks Project Manager, Mike Reilly calls it the 'granddaddy' of the northern slips.

"It's just enormous, the first time I saw it was a mess of debris, rocks and trees covering the road and rail," says Mike.

Site 8 has been busy all year. It was one of the first landslides to be benched so heavy machinery could move further south to access damaged sites south and to rescue stranded campervans at Paparoa Point after the earthquake.

An old overgrown farm track leading to the top of the landslide was used so an excavator and bulldozer could begin to cut a deep bench into the centre of the site in a horse shoe shape.

This week machinery was back at the top of landslide and extra material was being taken out and stockpiled at the top.

As the weather warms up work at the top of the slip will ramp up. A huge amount of material will be taken out of the top section over the next eight weeks. Special Hydrema dump trucks will be used to move the material. They are smaller with a lower centre of gravity and wider tyres, ideal for the working conditions at the top of the slip.

A container wall has been installed around the northern section of the bottom of the landslide until the full bench is cut in at the top. This will protect the construction access track around the base of the slip which is being widened to two lanes to remove the risk of a bottle-neck forming.

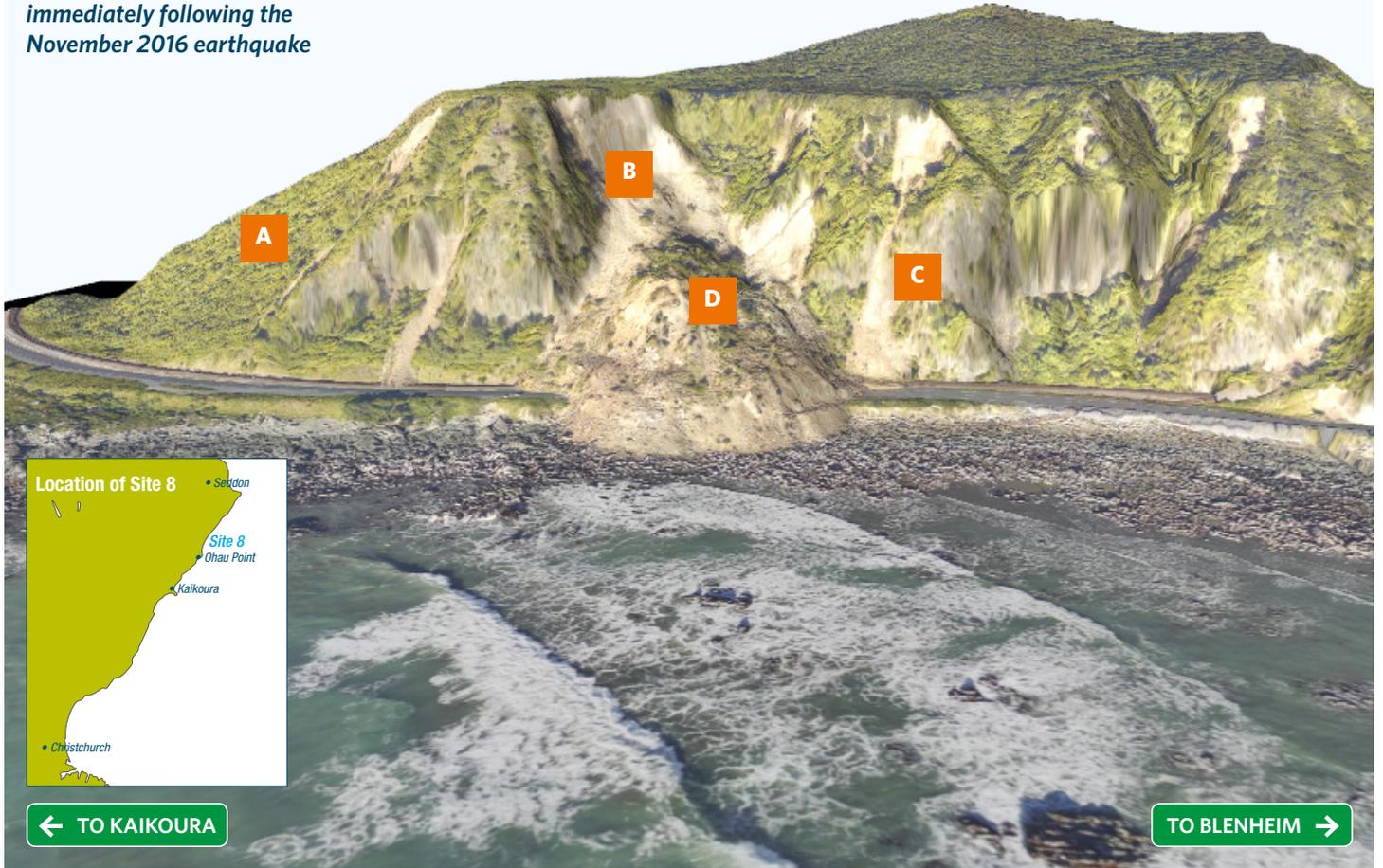
"This will make truck movements heading north more productive as trucks will be able to safely pass by each other" says Mike.

The rail has been reinstated at the toe of the slip and fences with remote monitoring equipment has been installed.

Once spring arrives the bulk of the work at Site 8 should be complete.

WE ARE MAKING PROGRESS AT SITE 8 NORTH OF OHAU POINT

3D image of Site 8 immediately following the November 2016 earthquake



Looking north towards Site 8 you can see that much of the material has been cleared.



Looking face on to the slip face the bench and the container wall can be clearly seen.



The flat work site at the top of the slip is clearly visible from this angle.



Work is well underway on the road realignment around the toe of the slip. The construction access track is also being widened to two lanes.

SHALLOW LANDSLIDE BARRIERS IN THE SOUTH

Shallow landslide barriers are being used as part of a road and rail reinstatement project (pictured right).

The barriers are being used at three sites south of Kaikoura and three more are scheduled for installation. Engineering geologist Joe Kelly says the landscape is well suited to this type of barrier, which is rated to take the capacity.

So what exactly is a shallow landslide barrier? To put it simply, a shallow landslide barrier is made up of steel posts, covered with mesh, and anchored into the hillside; it is a sort of big strong fence meant to withstand high impact and velocity and keep rock and debris from falling onto the road or rails.

The installation of the barriers is truly an international effort, with the barrier design based in Switzerland, made in Australia and some ground engineering being done in New Zealand.

When material hits the barriers it absorbs the shock because it has some degree of expansion, not unlike a spider's web. The barriers have to be put together piece by piece on site, and access determines the length of time it takes to put it up.

One challenge in putting up these shallow landslide barriers has been traffic. From Friday to Monday the team is working with a 10 minute closures which can make things a bit tricky, but closing SH1 from Tuesday to Thursday each week, means they are able to get a great deal accomplished. The first shallow landslide barrier was finished this week and the remaining two barriers will be completed in the next two to three weeks.



PROGRESS CONTINUES ON SH1 SOUTH OF KAIKOURA

Work on slip material barriers near site 27 on State Highway 1 south of Kaikoura is nearly complete.

This particular form of protection is specifically designed for narrow gullies that run down the side of a cliff face and operate like a giant, hyper-strong, mesh bag.

The steel cable mesh is secured with rock anchors suspended flat across a gully. In this compressed form it is ready to catch any material moving down the channel, expanding and containing the landslide with its own momentum.

This work is just one of the many forms of engineered defences being installed to protect the road and rail corridor from future slips.



THE SANDPIT - UPDATE

Work to repair the road and reconstruct the five gabion retaining wall structures at the Sand Pit, just south of the Clarence River, started late last week (see photos).

The Sand Pit is a section of the State Highway 1 that was substantially damaged in the earthquake at which time the southbound lane and shoulder as well as the retaining walls failed because of the sandy nature of the surrounding area.

Work is currently underway to remove the guardrail barriers and the damaged gabion baskets.



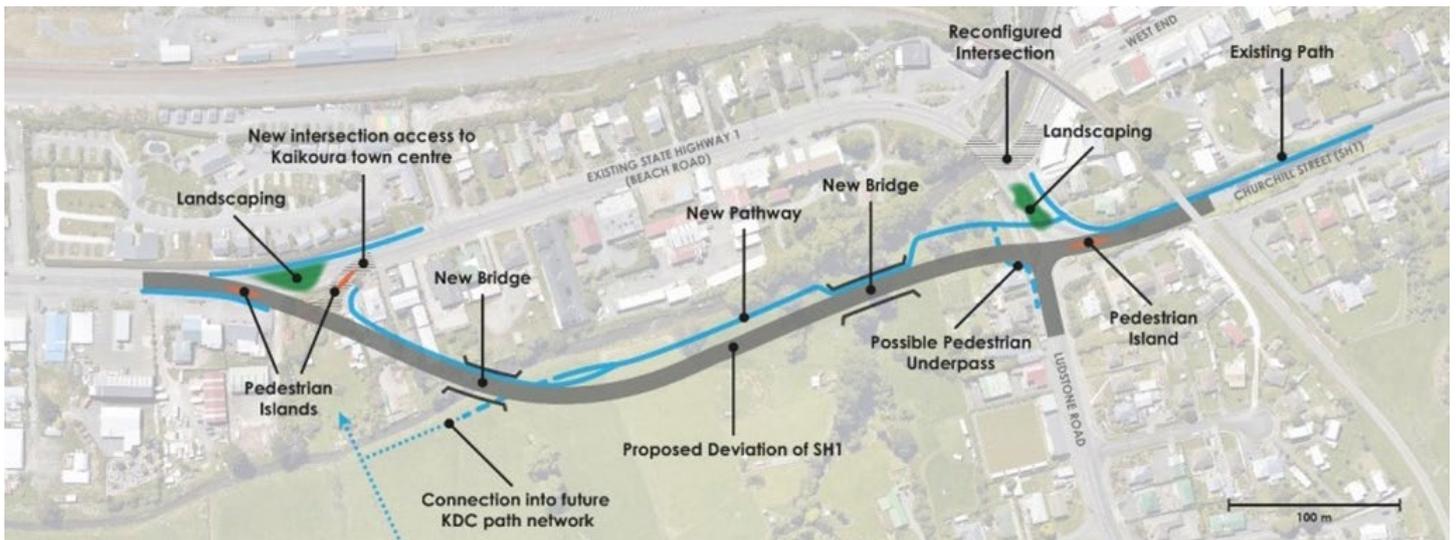
KAIKOURA STATE HIGHWAY 1 DEVIATION CONSULTATION

Last week the NZ Transport Agency started consultation on a proposal to address safety and accessibility issues in the centre of Kaikoura.

The recommended option is a deviation of State Highway 1 which uses an existing designation for 'State Highway Purposes' in the Kaikoura District Plan, which has been there for about 30 years. The recommended route allows for significantly improved intersections which address the safety and accessibility issues. The actual route of the designated deviation, as outlined in the District Plan, is not the subject of consultation.

What the NZ Transport Agency is keen to hear your feedback on is the recommended improvements shown on the map below. In particular:

- Do you support the overall proposal shown on the map?
- Do you think this provides a safer solution?
- Would you feel safe using a pedestrian underpass?
- Is there anything you would change?



There are many ways you can have your say about the recommended approach. Feedback can be provided online at www.nzta.govt.nz/picton2chch or via hard copy forms included in brochures available at Kaikoura's council office, library and i-SITE. A brochure (and form) will also be sent to all residents between Kekerengu and Oaro next week.

An open day will be held in the Supper Room at Kaikoura's Memorial Hall on Wednesday 16 August between 2 and 7pm. Please drop in any time to have a chat about the recommended option.

Alternatively you can email KaikouraSHdeviation@nzta.govt.nz. If you have any queries please call Michael Blyleven, Design Portfolio Manager, NZ Transport Agency on 03 9642834.

Please provide your feedback by 5pm Friday 25 August 2017

KEEP UP-TO-DATE

How to contact us and keep up to date with our road and rail projects:

- Subscribe to our weekly bulletin by emailing info@nctir.com, with 'Bulletin' in the subject line.
- Visit our website: www.nzta.govt.nz/kaikoura-earthquake-response/
- Call our freephone: **0800 NCTIR EQ** (0800 628 4737)
- Email us if you have a question: info@nctir.com
- Attend a community meeting - keep an eye on your local newspapers for details.
- Follow us on Facebook, see: NZ Transport Agency - South Island www.facebook.com/nztasouthisland/ and KiwiRail www.facebook.com/kiwirailNewZealand/
- For travel information about road conditions, see: www.nzta.govt.nz/traffic/regions/11

ALTERNATE ROUTE NEWS

The closure of State Highway 1 (SH1) and the Main North Rail Line between Picton and Christchurch following the November 2016 Kaikoura earthquake means traffic now needs to use an alternate route via the alpine Lewis Pass. This route is, in parts, winding, narrow and challenging and has seen a four-fold increase in traffic which it wasn't designed for. A \$60m Government investment has been made to make this route safer and more resilient.

ACTION STATIONS AT THE READY TO KEEP THE ROAD OPEN

When there's a cold snap on the horizon, the 24/7 road maintenance crew on the alternate Picton to Christchurch route immediately switches to high alert mode.

NZ Transport Agency Journey Manager Tresca Forrester says, 'We have an extensive management plan covering the entire length of the route and everything from on the ground road crews, emergency services, such as police highway patrols, media and communications updates and, if necessary, civil defence. We all work together to provide the best and safest options for road users under all conditions.'

As part of their day-to-day monitoring, the crews are looking for any event, including snow, ice or flooding, that could potentially close the road and delay travellers. And if there's bad weather getting progressively closer, it's all hands on deck.

The focus on keeping the road open, or getting it reopened as quickly as possible, begins with some crews being stood down from their routine work schedule so they're well rested and ready for a long road clearing stint ahead - often through the night.

With military precision, others relocate the vital fleet of graders, ploughs and grit spreading trucks (as pictured) and a tow-truck along the network where they're most likely to be needed for quick and effective deployment.

As the weather builds, the 24/7 patrols continue to check and clear the road. If it gets too unsafe for travellers to continue, 'soft' road closures are set up. These are near facilities like food, toilets, parking and cellphone coverage so travellers can get information about the closures to decide if they should stay near the soft closure or delay their travel.

The actual road closures ('hard closures') are set up where the road is deemed too unsafe to go beyond. Usually in more remote areas, they have limited, if any, facilities and travellers need to ensure they are fully self-contained if they decide to wait for the road to reopen.

As the highway is closed, information alerts go out to let road users know as quickly as possible so they can plan for travel delays.

Once deemed safe again, the reopening is just as carefully rolled-out. Tresca says the plan then shifts to supporting safe travel for the sometimes long lines of traffic backed up both sides of the closures. As the road closure barriers are removed, work sites right along the route are, where possible, temporarily packed down to help clear the backlog of traffic, enabling them to get to their final destination with minimum additional delays.



ONGOING IMPROVEMENTS: SLOW VEHICLE BAYS UNDERWAY

Another slow vehicle bay project is underway near Howards Narrow (pictured) south of Blenheim. This is one of about seven slow vehicle bays currently programmed for this route to provide a safe place for slower traffic to pull over to let other drivers pass safely.

With up to a four-fold increase in traffic volumes in some parts of this route since the Kaikoura earthquake closed State Highway 1, traffic can quickly build up and drivers can become impatient. The alternate Picton to Christchurch route is narrow, windy and difficult to drive in parts so it doesn't take long for a tail of traffic to build up behind slower or less experienced drivers. That can lead to build frustration, poor decisions and crashes when impatient drivers decide to pass.

These bays are being installed as one of the many safety and efficiency improvements under the \$60m government improvement package for the route. While much of this type of work can only be done when it's warmer and dry,, the crews are still getting as much done as they can over winter, before leaving the final parts until conditions are right to complete the job.



MOBILE HAZARD ALERT ADDS ANOTHER LAYER OF SAFETY WARNINGS

Not all work sites are planned. Sometimes the 24/7 crew need to react to an issue, like flooding or falling rocks, which block the road. Others instances include a crash with vehicles suddenly closing the road or a lane.

To help everyone - traffic and road crew - stay safe while also alerting road users to a hazard ahead, a new VMS (Variable Message Sign) ute has been making its appearance along the alternate Picton to Christchurch route. This extra safety tool can be quickly deployed where and when it is needed and may become a more regular feature of your drive.



GET REAL-TIME TRAVEL INFORMATION FOR OUR ROUTE

On the NZ Transport Agency's website: www.nzta.govt.nz/traffic

By phoning **0800 4 HIGHWAYS** (0800 44 44 49)

On the Transport Agency's social media: www.nzta.govt.nz/contact-us/connect-with-us/