

21.7.9 MANIOTOTO BRIDGES AND DISTRICT WIDE BRIDGE STRATEGY UPDATE

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1. Purpose

To provide an update for the three Maniototo Bridges currently closed to traffic, along with an update on the development of a district wide bridge strategy.

Recommendations

That the report be received.

2. Maniototo Bridges

After the significant weather event in January 2021, three bridges in the Maniototo were closed to traffic. This was due to damage caused by the weather event accelerating pre-existing deterioration on the old timber structures that were already nearing the end of their useful life.

The bridges are:

- Bridge no. 121 - Scott Lane, Kyeburn River
- Bridge no. 145 - Maniototo Road (Halls Ford), Taieri River
- Bridge no. 160 - Linnburn Runs Road, Taieri River

The three bridges were closed in early January 2021. Council do not have in-house staff that can undertake structural inspections and outsource this work to specialist engineering consultants.

Beca were engaged to undertake general inspections on bridges that had likely suffered damage as a result of the significant weather event in January.

A general inspection involves a visual check of everything that a structural engineer can assess from either the bridge itself or any areas that are easily accessible around the structure. A general inspection is a good starting point to determine if there is any obvious damage or issues that need a more detailed principal inspection.

Due to the issues found on the Maniototo Road (Halls Ford) and Linnburn Runs Road structures during their general inspections, Council have engaged Beca to undertake a more detailed principal inspection of them.

The principal inspections of these two structures will involve specialty access (ropes, boat access and physical material sampling). This will determine the overall existing condition of the structure by assessing all of its structural components. Having the information of its current condition will aid to determine what loading (if any) each structure may be able to withstand.

Scott Lane had four sections physically swept away during the January weather event, so there was no point in undertaking a principal inspection at this location. This bridge was in poor condition and weight restricted prior to the January weather event.

The structural inspections have taken longer to complete than originally anticipated. This has been due to vacancies within the roading team and demand on a small resource pool of structural engineers in the South Island. This has been further impacted by the significant weather events in Canterbury and Marlborough in recent times.

Principal inspections were programmed in July but had to be delayed due to high flow in the Taieri River and then the second COVID-19 national lockdown.

Inspections are programmed to resume on 20 September.

Scott Lane

The 13-span timber bridge at Scott Lane was significantly damaged in the weather event, with four of its 13 spans being physically swept away.

The Scott Lane timber bridge is 91 years old and was at the end of its economic life. It was heavily restricted to heavy vehicles prior to this weather event and subsequent closure and repair of the existing bridge is not a viable option.

Beca are investigating more cost-effective options that may service this area. While the bridge has been closed, road users have been utilising an existing ford crossing point. Council's contractor has been undertaking basic maintenance on the ford crossing point and this has provided access under the normal low flow conditions of the Kyeburn.

A more permanent option is being investigated for this location, and it is possible that a concrete wash over box culvert may be able to service Scott Lane users - with the exception of high flooding situations when an alternative route is available.

A concrete wash over box culvert would be a much more cost-effective and resilient solution compared to a new replacement bridge. Although the investigation phase is well underway, it is too early to estimate costs involved.

A report will be provided to Council outlining available options and the costs involved when the investigation is completed.



Scott Lane bridge damage

Maniototo Road (Halls Ford)

This bridge was closed to traffic because at least one of the primary load bearing timber beams is showing significant longitudinal cracking. It was also noted that other timber components were in poor condition due to their age (warped primary load carrying beams, deep cracking, bowed beams etc.).

At 91 years of age, the Maniototo Road bridge was nearing the end of its useful life and was already heavily restricted to large vehicles prior to this flood event. There was already existing deterioration occurring in most of its structural timber components.

This bridge will have a principal inspection undertaken by Beca in September, from which will determine what loading this bridge is capable of in its current condition or if moderate repairs (if possible) were made.

There is a possibility this bridge could be opened to light vehicles (<3500kg) with moderate repairs, but this cannot be confirmed until the principal inspection and site testing have been undertaken. The overall deterioration of this structure (due to its age) may also make reopening challenging if further significant issues are found during the inspection.

This location is also known as *Halls Ford*, and there are suggestions this was historically a ford crossing point on the Taieri River. Assessment on site has determined a 'deep ford crossing' (600mm depth approx.) may be possible to construct on site.

Construction of a deep ford crossing would involve excavating suitable approaches on each side of the riverbank and placing rock stabilised platform across the bed of the river, to an estimated overall cost of \$15,000. This would only be suitable for the likes of farm equipment that is capable of crossing such a depth.



Maniototo Road bridge damage

Linnburn Runs Road:

This bridge was closed because it has unsupported beams at two locations resulting in an unsafe load path through the deck members. There was also severe decay present at various beam ends and visible sag on one span.

There is no definite age for this bridge recorded, but old plans suggest it is at least 70 years of age and is primarily constructed from timber with steel tramway rail piles.

This bridge will have a principal inspection undertaken by Beca in September, from which will determine what loading this bridge is capable of in its current condition or if moderate repairs (if possible) were made.

It is anticipated that this bridge may be possible to open to light vehicles (<3500kg) with moderate repairs, but this cannot be confirmed until the principal inspection and site testing have been undertaken. The overall deterioration of this structure (due to its age) may also make reopening challenging if unexpected results are found during the inspection.

This site was not deemed appropriate for a ford crossing due to the depth of the river. Cost-effective bridge alternatives are not considered favourable for this site, however Council will discuss this in more detail with the Structural Engineer when on site for the principal inspection.



Linnburn Runs Road bridge damage

3. District Wide Bridge Strategy Update

The Maniototo bridge closures, among other known bridge related issues have highlighted the importance of progressing an overall district wide bridge strategy.

Council has 179 maintained bridges within the district.

These bridges greatly vary in terms of:

- Condition
- Age
- Historical significance
- Type of structure
- Utilisation (i.e. current traffic volumes, are there alternative routes that could be/are used in lieu of the structure)
- Maintenance and renewal requirements going forward
- Physical location of structure (i.e. some extent of network bridges are not even on Council land or serve only one property)

Since March 2021, Council's Roading team have been putting together the early stages of an overall district wide bridge strategy.

This is a large piece of work and will take time to fully complete. There has never been an overall bridge strategy of this detail to date for the district and this will be a very comprehensive document.

Known issues relating to the bridge network include:

- There are many bridges coming to the end of their economic life or have significant component replacement imminent.
- Council do not know what will be needed in terms of renewals across the entire network for the next 1-30 years (or the priorities).
- There are some clear priority bridges that Council don't have enough information on to understand what future renewal cost and implications may apply.
- Council know about the short term/immediate bridging issues – such as the current Maniototo bridge closures – but do not have an understanding on how they should be prioritised against the remainder of the bridges in the district.
- Some bridges are not maintained, are not even located on legal road reserve or only serve one property.
- Expectation that total network costs to maintain the existing level of service for our bridges will exceed the community (and possibly Waka Kotahi) willingness and/or ability to fund.

A bridge strategy will provide Council with a plan for the replacement, renewal and disposal for all bridges in the district. This will include consideration of required levels of service and potential replacement of some bridges with wash-over structures.

Analysis will include:

- General inspection of all bridges – essentially a line in the sand of their current condition and immediate/upcoming maintenance requirements (to date approx. 45 of 179 bridges have had a general inspection since March 2021).

- Understanding the full renewal requirements, timing and costs
- Knowing what the absolute network need is from a public access and loading requirement. What bridges are essential lifelines, what bridges have alternative options/routes to consider.
- Knowing the options for bridges that require replacement
- Knowing what component renewals will provide a long period until the next significant renewal on each bridge is required (striving for value for money)
- A level of service statement – where, when and what.
- Inspection schedule – how often for each bridge (i.e. determine if/what historical bridges may need more detailed and frequent inspections)

Next Steps:

- Completion of full network inspections – Early/Mid 2022
- Draft Bridge Strategy – Late 2022
- Consultation – Early 2023
- Development of 2024 Long Term Plan funding requests – July-October 2023
- Final Bridge Strategy approved – Mid 2023

4. Attachments

Nil

Report author:



James McCallum
Roading Manager
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Reviewed and authorised by:



Julie Muir
Executive Manager - Infrastructure Services
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