Assets Infrastructure

Tabled Documents

13 September 2018

Item 8	Chairs Report
Item 11	Options and costs of retaining the existing Mangaweka Bridge

Assets/ Infrastructure Chairs Report Sept

Firstly I'd like to thank Ruth for holding the fort and chairing the last two meetings for me. I think it was great that the Taihape hub, the abolition block and Grandstand discussions happened at the last meeting under your watch and hopefully some consensus happens shortly as to the finalisation of what will be done.
Big things have also happened with the green light on the Bulls Community Centre, and also the Marton/Bulls WWTP recently. It's now time to concentrate on the other major builds that seem to take forever to happen, namely the tiolets at Mangaweka along with the Bridge across the Rangitikei river also at Mangaweka.
I'm hoping the Otara bridge at Ohingaiti will have its 44 ton rating reinstated ASAP. While on bridges, it was a shock to see in our order papers that the Kakariki has to have something done. I'll certainly will be wanting a brief on this bridge today and are we in for more alarming stats on other bridges around the district.

Dean

Sent from my iPhone

TABLED DOCUMENT

Tabled at Assets Infrastructure.

on 13 Sept.

Report

Subject:	**Mangaweka Bridge Replacement**
To:	Christin Ritchie
From:	John Jones
Date:	5 September 2018
File Ref:	4/0006

RANGITIKEI DISTRICT COUNCIL

TABLED DOCUMENT

Tabled at:
Assets/ Infrastructure

on: 13 September 2018

Item No: 11

1 Executive Summary

1.1 Purpose of the report

To provide Council with a progress report on the Mangaweka Bridge Replacement Project.

1.2 Key issues

The lowest cost option for the Mangaweka Bridge Replacement includes the demolition of the existing bridge.

Demolishing the existing bridge will meet with opposition from some members of the public.

1.3 Major recommendations

Rangitikei and Manawatu District Councils proceed with the Pre-Implementation Phase for the construction of a new 132m long steel plate girder bridge, 30m downstream of the existing bridge, on the basis that the existing bridge will be demolished.

1.4 Rangitikei and Manawatu District Councils make the final decision on the future of the existing Mangaweka bridge after receiving feedback from affected parties during the Pre-Implementation Phase.

2 Context

2.1 Background

Mangaweka Bridge has provided a critical connection for the local and regional communities for over 110 years. It is an important road asset for the local community, and is maintained by two local authorities – Manawatu District Council and Rangitikei District Council. It has provided access for local communities to schools, employment, markets for produce and goods as well as a lifeline access to hospitals and emergency services. There are growing tourism and recreation related activities in the region.

A detailed inspection in 2016 revealed a large increase in deterioration of the structure. Some upgrade work was carried out in 2016, and during this bridge closure, further investigation revealed widespread deterioration. This resulted in the severe restriction of 6 tonne gross vehicle limit, with a maximum axle weight of 3 tonnes. This effectively restricted the bridge to cars, campervans and other light vehicles.

A Detailed Business was submitted to NZTA in June 2018.

The recommended option for the Mangaweka Bridge is to construct a new 132m long steel plate girder bridge, 30m downstream of the existing bridge.

An application for the funds to carry out the Pre-Implementation Phase was made to NZTA on 3rd September 2018. This was the first available opportunity following the announcement of the National Land Transport Programme on 31st August 2018.

The Pre-Implementation Phase will include detailed design, property acquisition, and consenting.

2.2 Long Term Plan

The proposal is consistent with Council's the Long Term Plan

2.3 Significance

The proposal is not considered significant in relation to the thresholds in Council's significance policy

2.4 Maori consultation

To date the following groups have been consulted.

Ngati Whitikaupeka, Ngati Tamakopiri, Ngati Te Ohuake, Ngati Hauiti, Ngati Apa, Ngati Raukawa, Ngati Hinemanu, Te Roopu Ahi Kaa, Nga Manu Taiko, and Ngati Tuwharetoa.

2.5 Legal issues

Legislation is established by Central Government and must be complied with at Local Government Level. Significant legislation and regulations affecting the Transportation activities are provided in the table below.

Legislation and Regulation	**Transportation Impacted Range**
Building Act 2004	*
Civil Defence Emergency Management Act 2002	**
Climate Change (Emissions Trading and Renewable Preference) Act 2008	*
Climate Change Response Act 2002 (and amendments)	*
Electricity Act 1992.	*
Health and Safety in Employment Act 1992	***
Land Drainage Act 1908	*
Land Transport Management Act 2003	***
Land Transport Act 1989	**

Local Government Act 2002	***
Local Government Rating Act 2002	*
Local Government Rating Act 1974	**
Public Works Act 1981 (and amendments)	*
Railway and Corridor Management and Safety Act 1992.	*
Reserves Act 1977 (and amendments)	*
Resource Management Act 1991 (and amendments)	**
Summary Offences Act 1991.	*
Telecommunications Act 1987	*
Transit New Zealand Act 1989.	*
Utilities Access Act 2010	***
Health and Safety at Work Act 2015	**

Different legislation has differing levels of impact on the Transportation activity; this is indicated under Impact Range (Broad ***, Moderate **, Limited *)

2.6 Approach

The Indicative Business Case investigated a variety of new alignments for Rangitikei River crossings near Mangaweka. It also considered the feasibility of constructing a new bridge with one lane or two lanes.

It was determined that a new bridge adjacent to the existing bridge would be the most feasible option. This Detailed Business Case has further refined this assessment.

Six alignments in total were developed and subsequently assessed. These were:

- 40m upstream of the existing bridge
- 20m upstream of the existing bridge
- Existing bridge alignment (demolition of existing bridge)
- 20m downstream of existing bridge
- 30m downstream of existing bridge
- 40m downstream of existing bridge

Four bridges in total were considered. There were:

- Arch bridge
- Cable-stay bridge
- Box girder bridge
- Super-tee bridge

3 Analysis

3.1 The DBC recommended option for the Mangaweka Bridge is to construct a new 132m long steel plate girder bridge, 30m downstream of the existing bridge.

3.2 The estimated cost is $11,036,875, including demolition of the existing bridge and a 25% contingency. The cost is split into the following stages as follows:

- Property acquisition $ 100,000
- Pre-implementation $1,525,000
- Implementation $7,204,500
- 25% Contingency $2,207,375

3.3 Two options in total were developed and subsequently assessed regarding the future of the existing bridge. These were:

- Repair, strengthen and maintain for 100 years
- Demolish immediately after completion of the new bridge

Retain Existing Bridge

As part of the DBC, further investigation of the existing bridge was completed. Of particular focus was the western pier, which was reported to be scour prone. The investigation included an additional survey and a comparison with the historical construction drawings. It was concluded that the foundations of the western pier are likely to be embedded 3m into the papa rock. A seismic analysis of the pier was also completed and it was concluded that it is stable under an importance level I earthquake, which is suitable for a footbridge..

Despite the expected embedment, a significant risk remains which is the unknown extent of scour/abrasion on the outside face of the papa river bed/riverbank. This requires more specialist survey/investigation, to be carried out in the pre-implementation phase. To cover this risk, a sum has been allowed for underpinning this pier. This would involve temporarily shifting the river channel away from this pier (during low flows) then either sheet piling plus poured concrete or (preferred) a line of augured and driven heavy steel pipes with rock trapped behind, thus slowing the river flows and significantly reducing the scour rate.

Retention of the bridge would require a variety of upfront maintenance and repair work. This would include items such as bridge cleaning and handrail repairs. In addition to this, the above geotechnical works will also need to be completed and underpinning (to an extent to be determined). These works would bring the bridge to an acceptable footbridge standard and extend its lifespan for at least another 50 years. During this time, ongoing maintenance and inspection will be required, including replacement of the deck timbers as required. After 50 years, the bridge will likely require a repaint and a series of substantial repairs, especially with continued scour of the riverbed. These works are estimated at $3,800,000 and will extend the lifespan of the bridge by another 50 years. Demolition at this stage is estimated at $750,000.

Based on this, the future of the existing bridge will have to be reviewed again in 50 years. Despite this, 100 years of life has been allowed for in general maintenance, inspection and repairs, as the increase in net present value is marginal when compared to a 50-year lifespan.

3.4 Costs

An economic assessment for the retention of the existing bridge (as a footbridge) was conducted, based on an outlook of 100 years as follows:

Upfront repairs and strengthening

- Underpinning of true right pier
- Miscellaneous repairs and improvements
- Conducted as part of the new bridge works (year 0)
- Unsure if this would attract a subsidy from NZTA

Maintenance and inspection

100 years of maintenance and inspection considered, including:

- Yearly (every year) ongoing maintenance
- Biannual (every 2 years) engineering inspection
- Decennial (every 10 years) detailed inspection
- Unlikely to be subsidised by NZTA, as will not be a vehicle bridge.

End of life removal

- Demolition of the bridge at year 50 (2068 AD)
- Unlikely to be subsidised by NZTA, as will not be a vehicle bridge but it is difficult to predict policy this far in the future.

All future costs were converted to net present value using a discount factor of 6%. Based on this, the estimated 100-year cost of retaining the existing bridge is $949,000, excluding GST and contingencies. This cost is inclusive of professional services fees. Note that if major repairs were to be conducted instead of demolition at year 50, the 100-year cost rises to $1,139,500.

4 Conclusions

4.1 The lowest cost option is to demolish the existing bridge, making it the preferred option.

4.2 Demolishing the existing bridge will meet with opposition from some members of the public.

4.3 The final decision on the future of the Mangaweka bridge need not be made until the Pre-Implementation Phase is complete.

4.4 The Pre-Implementation Phase will include detailed design, property acquisition, and consenting. Consultation with affected parties will be ongoing throughout this phase.

5 Recommendation

5.1 That the report on the Mangaweka Bridge Replacement Detailed Business Case be received.

5.2 That Rangitikei and Manawatu District Councils proceed with the Pre-Implementation Phase for the construction of a new 132m long steel plate girder bridge, 30m downstream of the existing bridge, on the basis that the existing bridge will be demolished.

5.3 That Rangitikei and Manawatu District Councils make the final decision on the future of the existing Mangaweka bridge after receiving feedback from affected parties during the Pre-Implementation Phase.

John Jones
Roading Manager