

MEMORANDUM

Date: 2 March 2023

To: Graeme Carroll

Of: Global Reach Associates Ltd

For: Kuru Contracting Ltd

SUBJECT: SH 35 – HIKUWAI BRIDGES
TEMPORARY ROAD DIVERSION

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Introduction

A temporary road is being constructed by Kuru Contracting Ltd (Kuru) to circumvent the Hikuwai Bridge No. 1, as a bridge span collapsed in the recent storm from cyclone Gabrielle. A bailey bridge temporary structure would take months to construct, given the bridge site and logistics to the site. Tokomaru is cut off from both the north and the south, thus the temporary road would provide a connection to the south.

I have been asked to undertake a professional engineering review of the temporary road, for an application for funding from the storm emergency funds of Waka Kotare/New Zealand Transport Agency (WK/NZTA).

I am well acquainted with the landscape of the area, the nature of the catchments and the behaviour of waterways and rivers in the area. I was first involved with road structures, improvements, repairs and protection measures along SH 35 when I worked for the Napier Office of the Ministry of Works and Development in the 1980s. Following the 1988 storm of cyclone Bola I undertook a wide range of investigations and design work as a consulting engineer. This included river management and flood mitigation measures, as well as highway reinstatement, protection and repair.

As a consultant, I work throughout New Zealand on storm hazard management and the mitigation of storm hazards from erosion, landslides and flooding. This has included for roading authorities (WK/NZTA and its predecessor state highway authorities, as well as local authorities), and other infrastructure providers, in particular natural gas pipelines. For around 15 years I presented training workshops on the protection and repair of roads, bridges and culverts from flood flows and storm water runoff, for roading engineers and asset managers.

I was in Tokomaru just before the Gabrielle storm assisting Gisborne District Council (GDC) design and cost bank protection measures along the lower Mangahauini River through Tokomaru. This work resulted from the previous storms, and is to enable an application to central government for funding based on the cost estimates.

This memo summarises my assessment of the temporary road option. Given time constraints and the logistics of getting to the site, it is a desktop review. However, I am well aware of the nature of the site, the highway bridges and the surrounding landscape.

What would, though, be very helpful is the high-resolution satellite imagery that is available to government authorities, which show the post-storm conditions. This vertical aerial imagery would give me a very good picture of the storm impacts on the landscape of the temporary diversion as well as the Hikuwai River. It is a very cost efficient way of providing a post-storm update.

Background

The Hikuwai River beside SH 35 follows a winding path through a narrow valley within the confining hill country landscape. The river is deflected from side to side by relatively hard hillside material, and has a particularly pronounced meandering channel at the Three Bridges, with over-tight bends from the deflecting hill bluffs.

The temporary road follows farm tracks, which have been present for a long time and are sited on relatively low hazard alignments, along spurs and on the harder material of a bluff when beside the Hikuwai River.

There is one main stream crossing of the Katikati Stream, which has a significant catchment, but not that large relative to the valley side tributaries along the Hikuwai River valley.

The road is being constructed by contractors for forestry roading, and the standards for this roading is attached to the Kuru documentation for the emergency road.

Assessment

The alignment of the emergency road is appropriate to the landscape and follows the best route on the hills around the loop of the river to the Hikuwai No. 3 bridge. It is being constructed by a contractor very knowledgeable of the terrain and the construction of roadways through such land. The forestry roading standard is also appropriate for a temporary emergency access.

However, the fragility of the landscape following a series of storms, with Gabrielle being especially severe, must be considered in the construction and the methodology used. The cyclone season has not ended, and another severe storm is still possible in autumn. The road will also be for public traffic and not just forestry machines. This traffic will mostly be local and long-distance truck drivers, who will be aware of the nature of the temporary road.

This means that extra care should be taken at the road edges and water table drainage for runoff, and protecting cross road and stream culverts at their entry and exit. At the Katikati Stream crossing a defined overflow length would be worthwhile, with compacted base course on the formation sides and then rock armouring, and a defined lower area to allow flood overflows where the road sides are armoured.

Conclusion

The temporary diversion road is a good option to reinstate traffic connection at the Three Bridges site, and will be the quickest way of achieving it. The forestry contractors can be put to good use to construct this temporary road. Normal roading practices for gravel roads can be used, with consideration of the fragility of the landscape follow the recent storms and the public use of the road.

