



# Hinekura Road Realignment

*Project Brief (5-C4072.01)*

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*27 March 2023*



# Background

Following several severe weather events, Hinekura Road was impacted by a series of major slips that made the road impassable on several occasions in 2020 and 2021. The landslide had likely been active for many years and was prone to ongoing movement and instability following heavy rain. In June 2022, a significant landslide had left the road substantially damaged.

Following are WSP previous engagements with SWDC at Hinekura Road:

- An inspection and UAV survey of a landslide was carried out in June 2020 and a geotechnical memo was supplied to SWDC included recommendations for mitigating the movement and monitoring the landslide.
- In August 2021, WSP carried out an initial assessment of the reactivated landslide affecting Hinekura Road and the property number 1673 Hinekura Road, 15km east of Martinborough. Assessment summarises landslide displacement data especially from UAV surveys and provides some recommendations to assist SWDC in mitigating the risk at the site.
- SWDC initiated a plan to consider an alternative route for Hinekura Road as a long-term solution. In August 2022, WSP provided a suite of options to SWDC for discussion. In September 2022, the options report was finalised.
- In August 2022, instrumentation to monitor the landslide were installed.



# Hinekura Road Landslide (Sep 2022)







*Location plan at Landslide site*

# Sensor map on the landslide

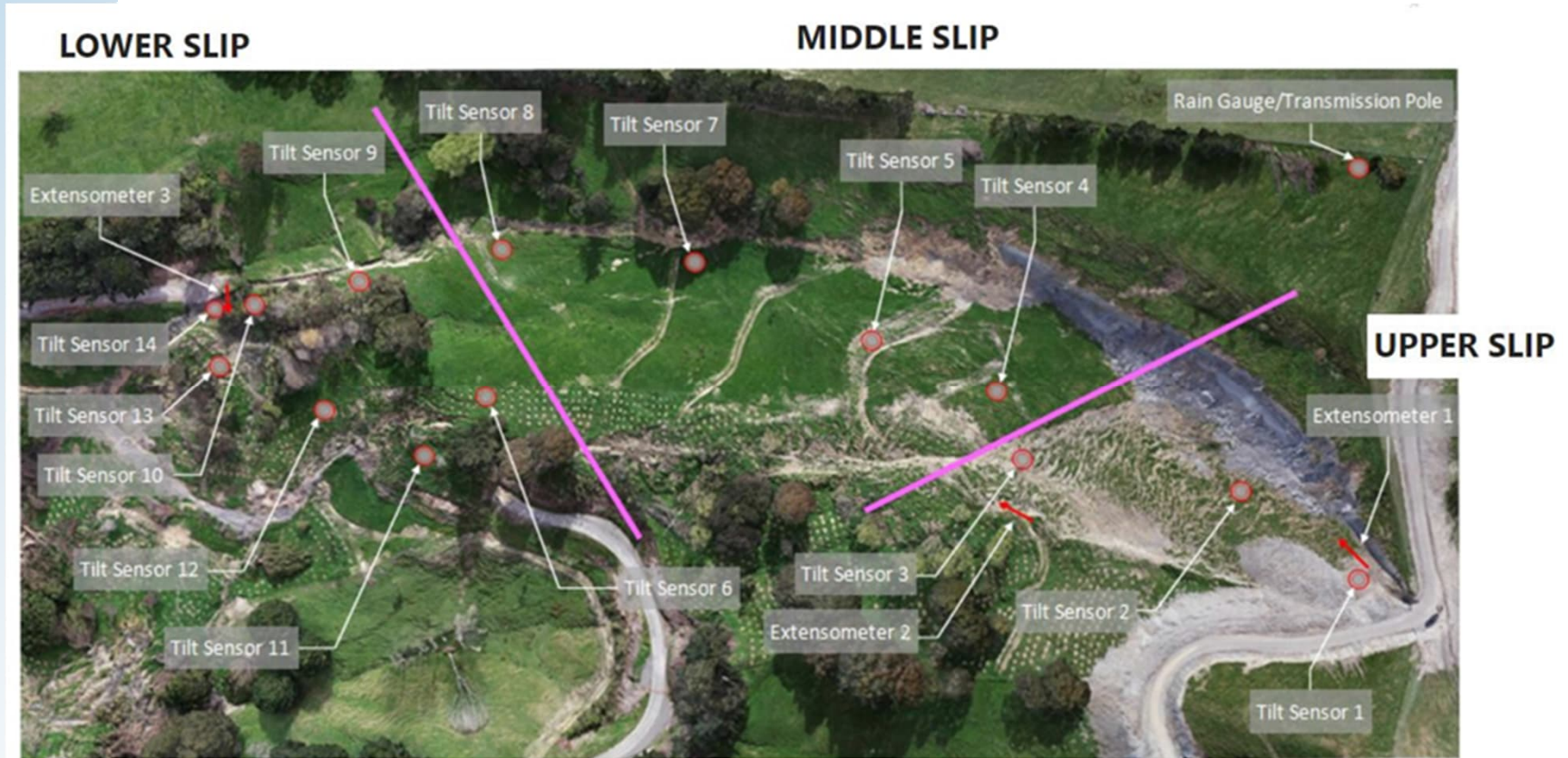






Photo-6: Upper-landslide-with-top-of-Extensometer-1-visible-1

## wsp Slope Monitoring - Hinakura Rd

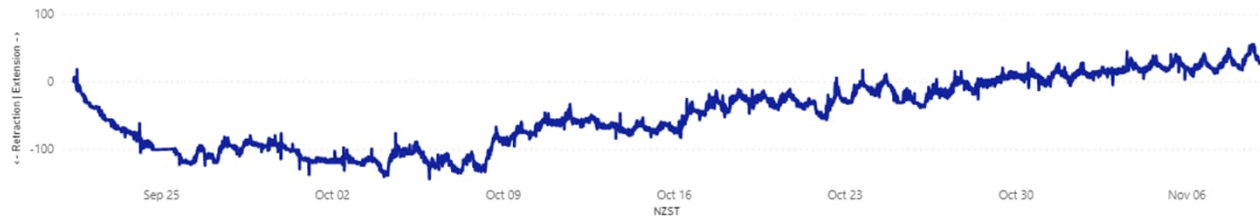
8/1/2022 11/8/2022



Extensometer 1 (mm) vs NZST



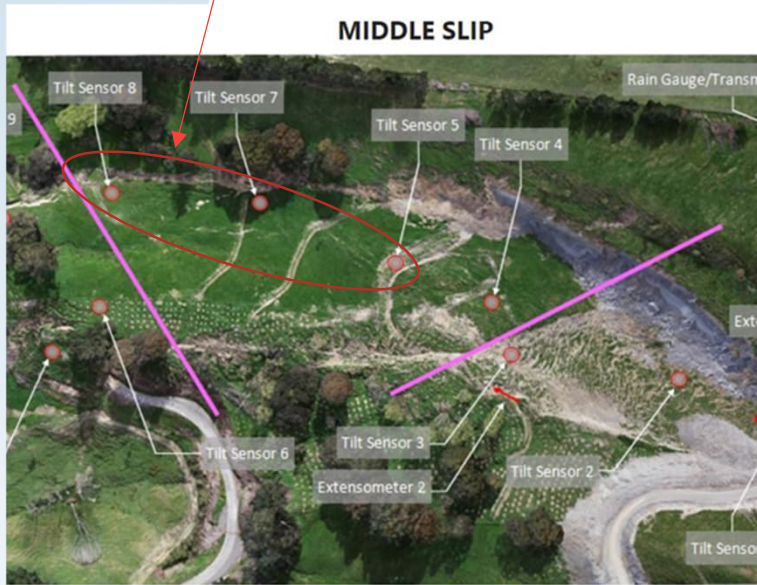
Extensometer 2 (mm) vs NZST



# Middle Section

Stable til Dec 2022

Tilting from December 2022 (restocked paddock)?





# Edge of landslide at old Road level



Photo 1: East end of landslide

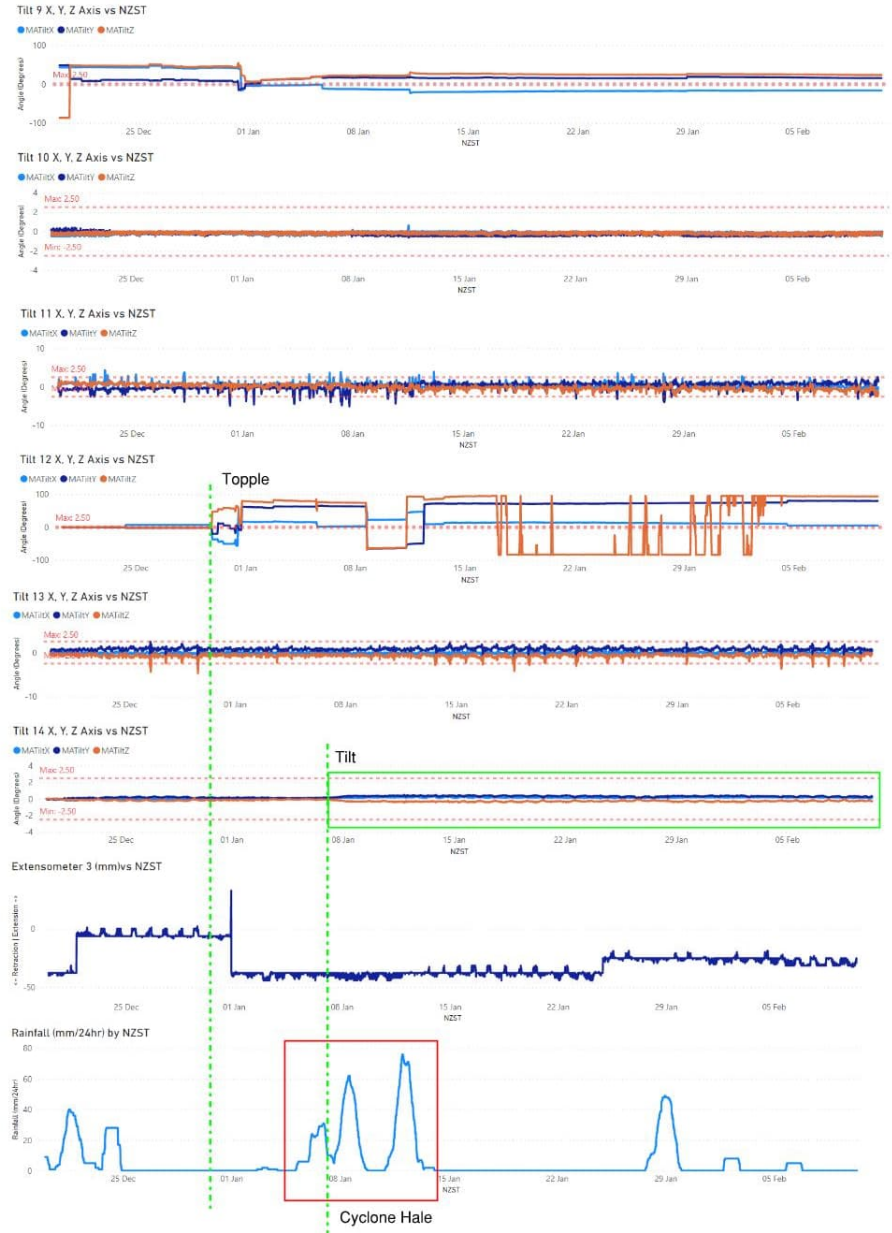


Extensometer 3 location

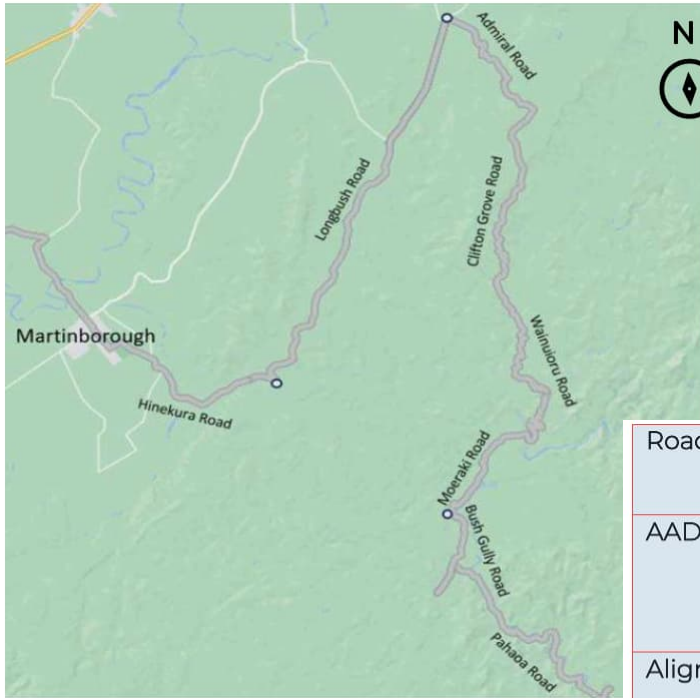


# Lower area data past 2 months

## LOWER SLIP



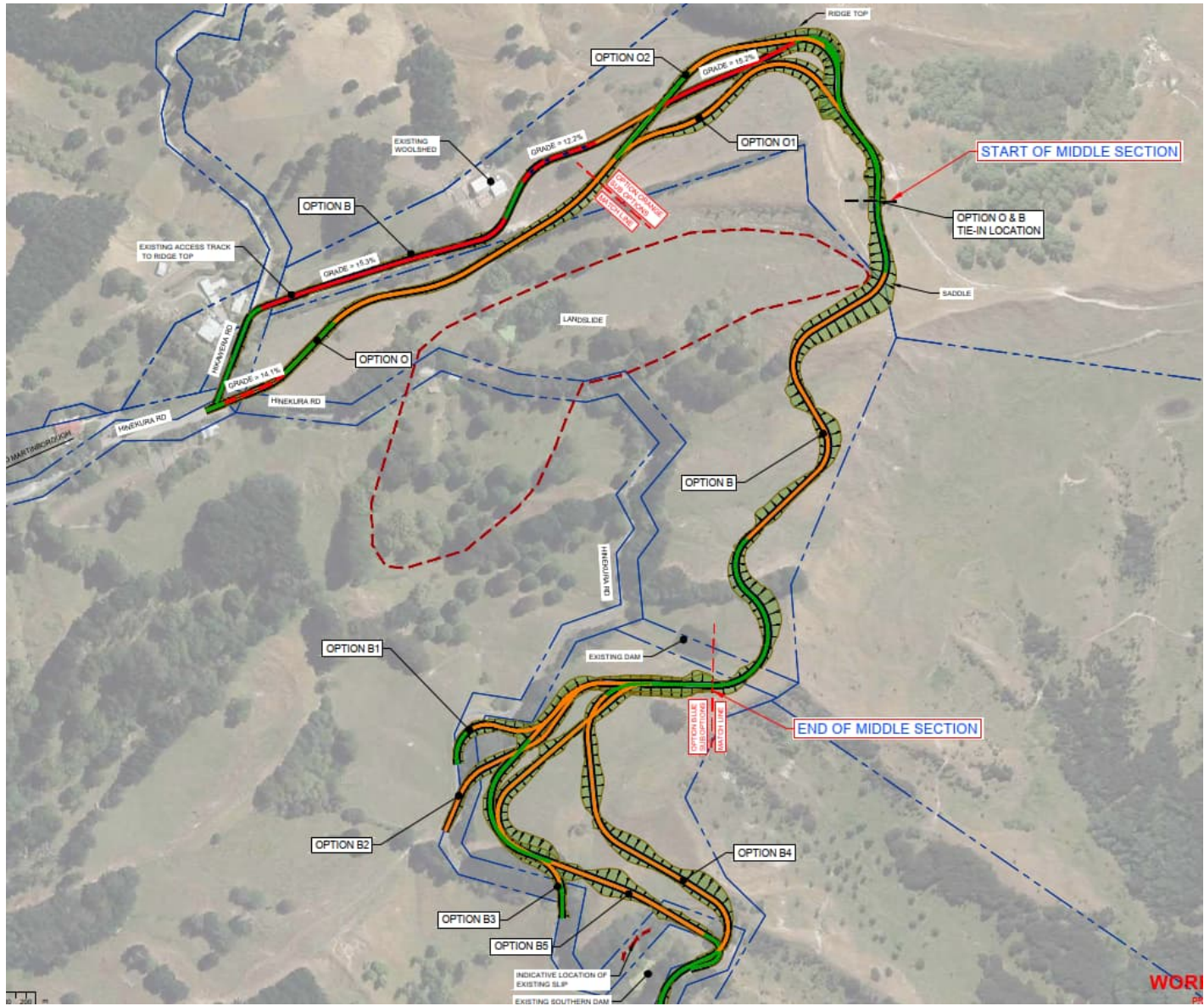
# Alternative Route (Detour)



Road Name	Longbush Road	Admiral Road	Clifton Grove	Wainuioru Road	Ngakonui Road	Moeraki Road
AADT Band	<1,000 veh/day  (354)	<1,000 veh/day  (120)	<1,000 veh/day  (38)	<1,000 veh/day  (15)	<1,000 veh/day  (3)	<1,000 veh/day  (48)
Alignment	Winding	Tortuous	Tortuous	Tortuous	Tortuous	Winding
Lane Width	3.0m-3.5m	<3.0 m – narrow	<3.0 m – narrow	3.0m-3.5m	3.0m-3.5m	3.0 m – narrow
Shoulder Width	0m-<0.5m	0m-<0.5m	0m-<0.5m	0m-<0.5m	0m-<0.5m	0m-<0.5m
Roadside Hazards	High Moderate	Severe	Severe	Severe	Severe	Severe
Infrastructure Risk Rating Band	Medium	High	High	High	High	High
Collective Risk	Low	Low	Low	Low	Low	Low
Personal Risk	Low	Medium High	Low	Low	Low	Low Medium

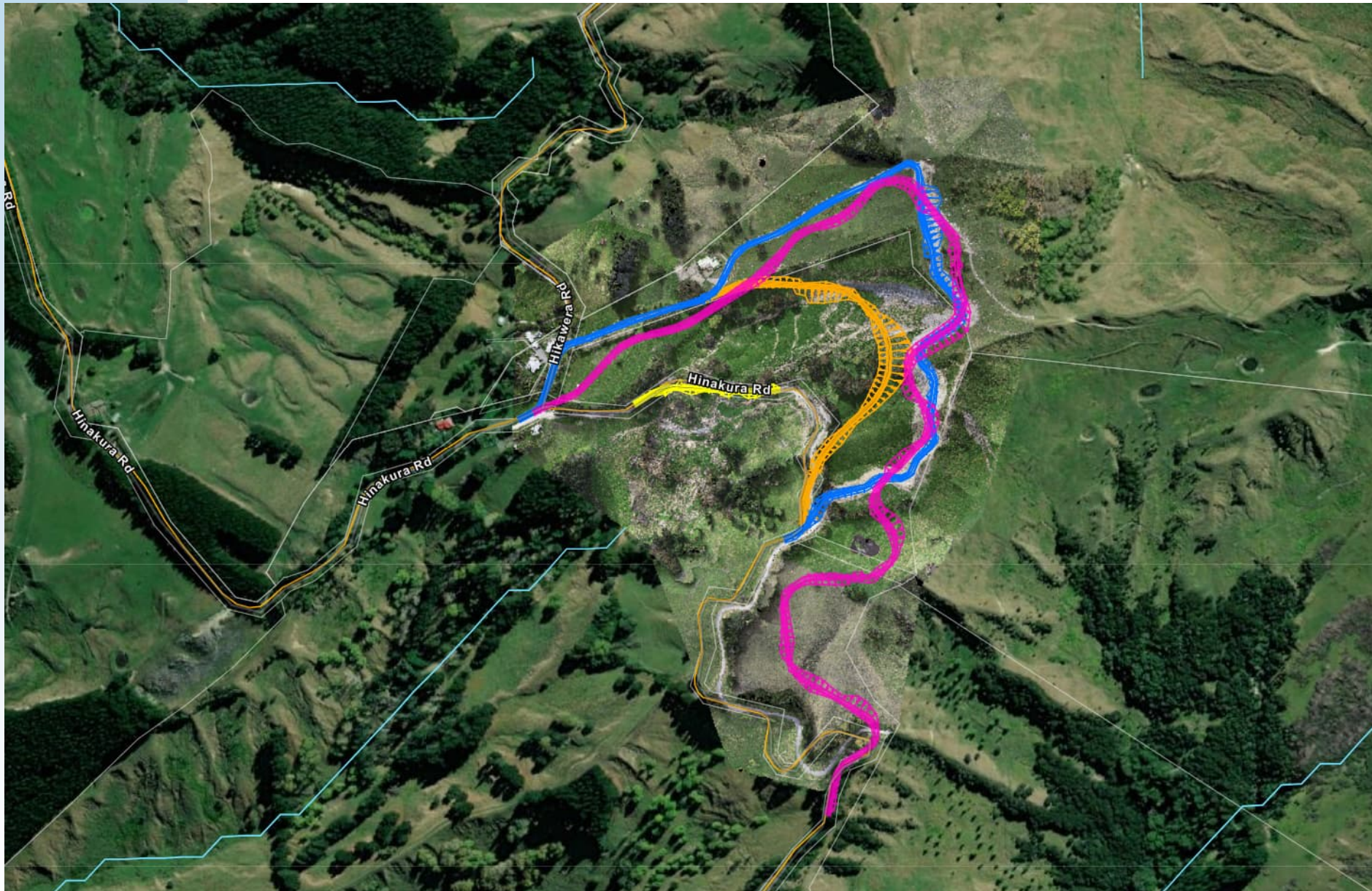


# Realignment Options (Sep / Oct 2022)





# Realignment Options - Shortlisted (Jan / Feb 2023)





# Summary of Options

Aspect		Option 1	Option 2	Option 3	Option 4	Option 5
Length		2.03 km	1.53 km	0.23 km	0.65 km	57 km
Horizontal Alignment	No. curves	19	28	2	4	Approximately 74 OCCC on the alternate route. Investigations required to identify if treatments are required and if so treatment type.
	% Of OCC	0%	25%	0%	0%	
	Min curve radius	32 m	15 m	100 m	80 m	
Vertical Alignment	No. of vertical curves	15	11	5	3	it was noticed that the vertical alignment was comfortable with only gradual inclines and declines
	% Of vertical grades $\geq 12\%$	33.3%	54.5%	20%	33.3%	
	Maximum Grade	14.15%	19.12%	12.0%	12.0%	
Earthworks	Predicted amount	Large amount	Earthworks may be required to bring the road to standard	Medium amount	Medium amount	Undefined amount
Slips/ Resilience		By passes the slip zone. Investigation and stabilisation work likely required	By passes the slip zone. Investigation and stabilisation work likely required	Traverses through current slip zone Stabilisation work will be required Underlips and over slips forming at the start of Hinekura Road so will require work there to stabilise	Traverses through the upper slip, if the landslide can be dug out to achieve stable ground	Various over slips and under slips and developing slips were identified during the site visit, however it was noted that these slips are not yet affecting the carriageway.
Infrastructure		Sealed road	Sealed road	Sealed road	Sealed road	24km of unsealed road 15 bridges which may require live load assessments Four one-way bridges that may need to be upgraded to two-way bridges

Assumptions and Inclusions

## Economics

- Option 1 - \$10M to \$11M
- BCR > 3

## Sensitivity Tests

- Option 1 - \$7M to \$11M
- Improvements along Detour Route - \$5M to \$10M
- BCR > 1



Thank you

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