

Memorandum

To	All workshop attendees
From	9(2)(a)
Date	20 June 2017
Subject	Specialist briefing for Mt Messenger multi-criteria analysis: Workshop 2 (Shortlist)
Reference	MMA-ENV-MEM-494-MCA 2 briefing package

Purpose

This memorandum describes the range of alignment options and assessment approach for New Zealand Transport Agency's (NZTA) Mount Messenger Bypass Project. This information is presented ahead of the second (shortlist) Multi-Criteria Analysis (MCA2) workshop on 26-27 June 2017 for analysis by experts prior to that workshop. The workshop forms part of the options and alternatives assessments phase of the Project.

This memo provides background information on the five potential alignment options to be assessed during the workshop. The memo also provides the structure and assumptions for development of sub-criteria and scoring for each option.

MCA workshop

The MCA workshop will take place from 26 – 27 June 2017. The purpose of the workshop is to test and confirm scoring for each alignment. Prior to this workshop, specialists are expected to:

- Review this memorandum and the attached information.
- Advise 9(2)(a) y 22 June 2017 if any additional information is required in order to score each option.
- Develop an understanding of each option.
- Review the MCA recording and scoring template.
- Score each of the 5 options on the MCA criteria and record reasons for scoring as per the template.

The reasons provided for scoring are anticipated to be high level only for the purposes of the workshop next week, however detailed reporting of each specialist assessment will be required to support the shortlist report.

Draft reports are required to be provided by 10 July 2017. This is a critical deadline – if you think you will have any issues meeting it (or have any clarifications about reporting requirements), please advise 9(2)(a) immediately.

Information provided

The following documents are provided in this briefing document to inform technical specialists during the MCA shortlist workshop:

Appendix A:	Overall schematic of shortlisted options
Appendix B:	3D views of options
Appendix C:	Quantity summary (spreadsheet)
Appendix D:	Indicative borrow and disposal sites
Appendix E:	MCA criteria and specialists
Appendix F:	MCA recording and scoring
Appendix G:	Reporting template

Mt Messenger location

The general project area is located adjacent to State Highway 3 (SH3) in the vicinity of Mt Messenger, in North Taranaki. Mt Messenger is located approximately 58 km northeast of New Plymouth and 183 km south of Hamilton (see Figure 1 below).

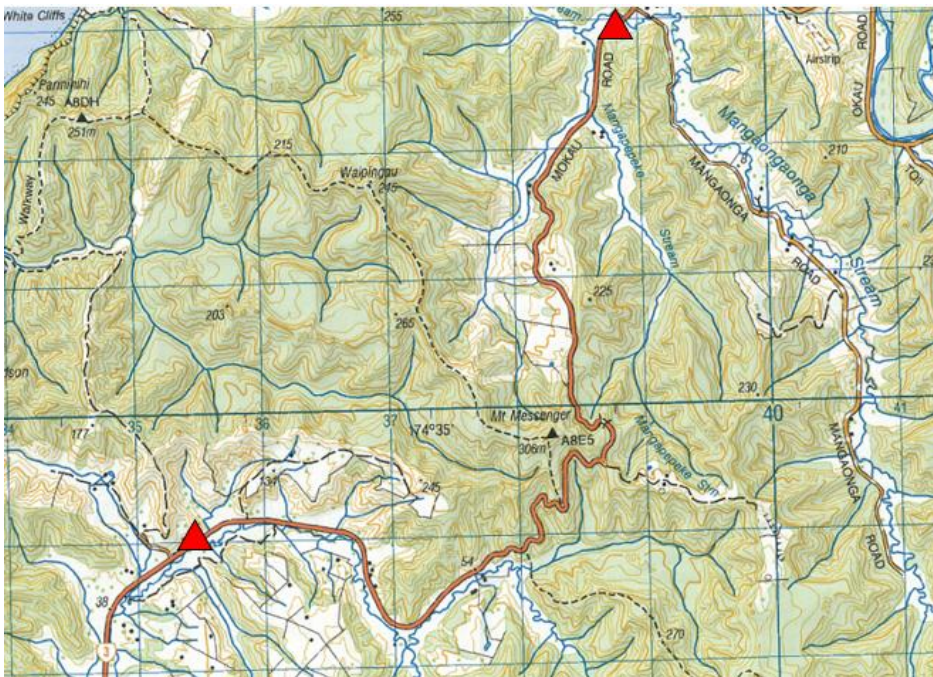
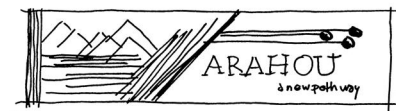


Figure 1: Mt Messenger Bypass location



Background

The Mt Messenger project is focused on improving or bypassing the existing section of SH3. The Mt Messenger bypass forms part of the wider Awakino Gorge to Mt Messenger programme being progressed by NZTA. The existing section of SH3 at Mt Messenger is characterised by a steep, narrow and winding road which NZTA has concluded requires upgrades to improve safety and travel times.¹

A range of options have previously been considered by the NZTA for the Mt Messenger Bypass prior to the current MCA process, including an MCA process undertaken in 2016. As a result of additional information now available, including feedback received from public consultation undertaken at the end of 2016, the NZTA is conducting further investigations into possible options, including this additional MCA process.

The first MCA workshop (MCA1) took place on 11 – 12 May 2017. Specialists assessed and scored 24 longlisted options against nine criteria, including constructability, transport, resilience, landscape, heritage, community, property, ecology and cultural heritage. Following the completion of the workshop, weighting of the scores was carried out by 9(2)(a). The weighted final scores were reported to the Project Advisory Board, which approved the progression of the following options to further design development and then consideration during the second MCA workshop:

1. Option A1
2. Option E1/E2
3. Option F1
4. On-line Option (Z2 and Z4 with some elements of D1/D2)
5. Option P (a hybrid option suggested by Ngāti Tama, a combination of the B, F and G corridors).

Appendix A shows the indicative locations of these corridors.

Design work has progressed following MCA1 workshop, and the alignments of some these options has slightly changed in the interim period. In addition, additional specialists have joined the team. As such, specialists should approach their scoring of the options with an open mind, whilst acknowledging that assumptions and issues discussed in the MCA1 workshop provide a helpful initial basis for assessing and scoring leading in to the MCA2 workshop.

¹ NZTA (2015): SH3 Awakino Gorge to Mt Messenger Programme Business Case, released 30 March 2015.

Options presented

As set out above, five corridors are being considered as part of the MCA shortlist, including works within the existing corridor (the 'online option') and four alternative corridors ('offline options').

Table 1 below outlines the changes that have been made to the alignments of the five shortlisted corridors since they were presented at the MCA1 workshop.

Table 1: Changes to the alignments between the MCA1 and MCA2 workshops

Alignment	Key changes
Across all corridors	<ul style="list-style-type: none"> Removal of a 7 m wide berm at the soil/rock interface in cut slopes; Using rock bolts to steepen soil slopes in cuttings and reduce earthworks volumes; Providing a 3 m rock fall collection verge in lieu of 7 m; While curve radii permit the road to be driven safely at 100 kph the above changes reduce the cross section of the road. As a result sight distance in some cuts is restricted to that appropriate for a design speed of 70 kph. Sight distances are to be considered further when the preferred route is identified.
Option A1	<ul style="list-style-type: none"> The south end of Option A1 has been realigned westwards onto rock cuts in the side of the valley to avoid expensive ground improvement works in alluvial deposits under a high fill. A site visit identified a potential landslide to the north of the southern ridgeline, so the bridge over the Waipingao Valley was lengthened to approximately 600 m. Due to constructability questions around the length of this bridge, an earthworks solution is being considered. North of the tunnel under the northern ridgeline the route has been realigned to the west with cuttings in rock, to avoid ground improvement works in alluvial deposits. Towards the northern tie-in with the existing road, bridges are now considered a better option (both cost-wise and environmentally) than fills.
Option E1/E2	<ul style="list-style-type: none"> The key change has been shifting the alignment westwards away from the ecologically valuable swamp forest. To reduce the cost of the option, the route has been realigned onto rock spurs to minimise ground improvements which were previously necessary along the valley floor. Some fills have been replaced by bridges where cost comparisons demonstrated this was beneficial. Fill volumes have been reduced by using Mechanically Stabilised Earth (MSE) in some locations.



Alignment	Key changes
Option F1	<ul style="list-style-type: none"> The difficult to construct and expensive curved bridge south of the cut in the central ridgeline has been replaced by fill. North of the tunnel, instead of earthworks on an alluvial valley floor, the route follows a similar route to the upgraded Option A1 involving rock cuts and bridges over streams towards the northern tie in.
Online Option (Z2 and Z4 with some elements of D1/D2)	<ul style="list-style-type: none"> These options have changed significantly after MCA1, and are much shorter with more of the existing SH3 route at the southern end being used. The number of bridges has been reduced from 5 and 4 (Options Z2 and Z4 respectively) to 2 or 3 on both options. Constructability has been improved significantly by realigning the route south of Mt Messenger to the west, so it is now clear of the existing SH3, either laterally or vertically. However north of Mt Messenger there is still a major construction challenge with the new alignment being over the existing in an area bounded by a steep scarp to the west and land that falls away sharply to the east.
Option P	<ul style="list-style-type: none"> A new option put forward by Ngāti Tama, based approximately on a hybrid combination of Corridors B, F and G. Option P is similar to Option F, but aligned further west across the Waipingao Catchment. Earthworks volumes are similar to F while the tunnel is slightly shorter and the option requires shorter bridgeworks.

The table attached in Appendix B (and also provided in Excel format) summarises quantity information in respect of each option, including length, area, grades, cut and fill, streamworks, bridges, tunnels, retaining walls and pavement area.

At the workshop, the 3D model ('Humphrey') will be utilised to examine all options. Appendix C includes representative figures of each option taken from Humphrey. Note that you can zoom into these figures to view the options in more detail. A review of the complete model for each option will take place at the start of the workshop, before scores can be finalised.

Experts are instructed to assign scores (and explanations) for each option ahead of the workshop, based on the information being provided now. However, you will need to approach the viewing of the 3D model (and the workshop generally) with an open mind, so that if necessary you are in a position to update your scores and / or accompanying descriptions.



Appendix D shows indicative locations of potential borrow and disposal sites. Note these are indicative locations only. Fill disposal is an issue that will be considered in due course, and at this stage, experts are instructed to not factor the need to dispose of fill (and any potential environmental effects of that) into their scoring of the options. However, if there are any significant concerns, please identify these for discussion.

Methodology for criteria development and scoring

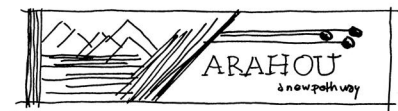
Nine criteria have been developed in total, including transport, resilience, constructability, landscape and natural character, historic heritage, community, property, ecology and cultural heritage. These criteria, along with example/draft measures for scoring and the overall owner of each of the criteria are set out in the table attached in Appendix E.

The effects of each option in relation to these criteria will be scored by the relevant specialists. The scoring and recording templates are attached in Appendix F, and are also provided in Excel format.

Prior to scoring, please note the following:

- Some disciplines may find it helpful to develop sub-criteria, in order to clearly differentiate between effects. When developing sub-criteria, reasons for their inclusion should be recorded. Particular emphasis should be placed on reasoning for any sub-criteria added in addition to those used at the longlist stage. It is important that sub-criteria are developed in a robust manner so that there are no gaps in the assessment.
- Where sub-criteria are used, an overall, single criterion score is arrived at by combining the sub-criteria scores.²
- For all criteria/sub-criteria, measures for scoring, information sources and key assumptions should be recorded as shown in Appendix E, prior to scoring being undertaken. If multiple people have provided scoring, this should also be recorded.
- Scoring is based on the following assumptions:
 - Scores are based on the level of effects (adverse or positive) of each option for each specialist criteria.
 - One score will be provided for every criteria (or sub-criteria if these have been developed).
 - Reasons for scoring will be recorded, including if there are particular components of the option which have a significant influence on the scoring.

² At the longlist stage, the briefing memo recorded the possibility of sub-criteria becoming full criteria, represented with individual scores in the overall MCA table. Following discussions at the MCA1 workshop, it has been decided not to adopt this approach.



- The final score for each option should include standard/expected mitigation e.g. mitigation in accordance with NZTA or Council guidelines/technical papers. Bespoke mitigation and offsetting should not be considered in the final score however, the potential for further mitigation / offsetting of identified effects should be recorded. Experts are instructed to record what mitigation they have factored into their scores (and what additional mitigation might be possible), to allow for those assumptions to be tested.

§ The exception in respect of mitigation is the "fatal flaw" score, as explained below.

- All options should be scored on the 9-point (plus "fatal flaw") scale set out in Table 2 below, along with reasons for the given score. This scoring scale has been adopted partly in order to provide greater scope for differentiation between options. However, experts are instructed to score each option by applying their expertise and against the description of the scores provided below. Scoring should be carried out on an absolute rather than relative basis. In other words, experts should not seek to create an artificial distinction in scores between options.
- The scoring scale provides for a "fatal flaw" negative score. This score should be used where the expert considers that there are unacceptable adverse effects associated with the option – and that there is no reasonable way to appropriately avoid, remedy or mitigate those effects.³ Before assigning an "F" score, experts should use their expertise to think about whether it would be possible, in the context of a resource consent application, to propose a solution that would address that effect. That includes reasonably available offsetting.
- Please provide as much information as possible in respect of "F" scores (and how those scores could be avoided). Where relevant, experts should record the type of measures they would propose in avoiding an "F" score for an option; or alternatively why they consider there is no reasonably available measure to avoid an "F" score.

³ The "F" score can helpfully be viewed as a proxy for determining the option is "unconsentable" in respect of the relevant criterion.

Table 2: Scoring scale

Scoring	Level of effect
F	Fatally flawed - unacceptable adverse effects, that cannot reasonably be appropriately avoided, remedied or mitigated (including via offsetting).
-4	Very high / very significant adverse effects
-3	High / significant adverse effects
-2	Moderate / medium adverse effects
-1	Low / minor adverse effects
0	Neutral / no change
1	Low / minor positive effects
2	Moderate / medium positive effects
3	High / significant positive effects
4	Very high / very significant positive effects

Secondary assessment

As explained above, scores on the 9-point scale should be assigned on an absolute basis. This may create a situation where there are a number of options that receive the same score.

If that occurs, experts should provide information as to the relative merits of those options that receive the same score. Experts should use their professional judgment as to how to provide that information, and tailor the information provided to the circumstances. That should then be set out in more detail in your report on the options due on 10 July 2017.

Shortlist report

A template for the shortlist report, due on 10 July 2017, is attached in Appendix G. As set out in the template, this report should include detail on:

- A description of any sub-criteria applied;
- Assumptions applied when scoring; and
- Detailed scores and reasons for scoring.

The report should provide a level of detail which allows a layperson to pick up the report at a later stage in the project, and understand the methodology and reasoning behind the scoring given to each option.



Other matters and conclusion

It is important that information is shared effectively between the experts, and with the project team, through this process. In particular:

- Please proactively ask any questions you have in advance of the workshop; and
- Please discuss your assessments ahead of the workshop with other experts as appropriate.

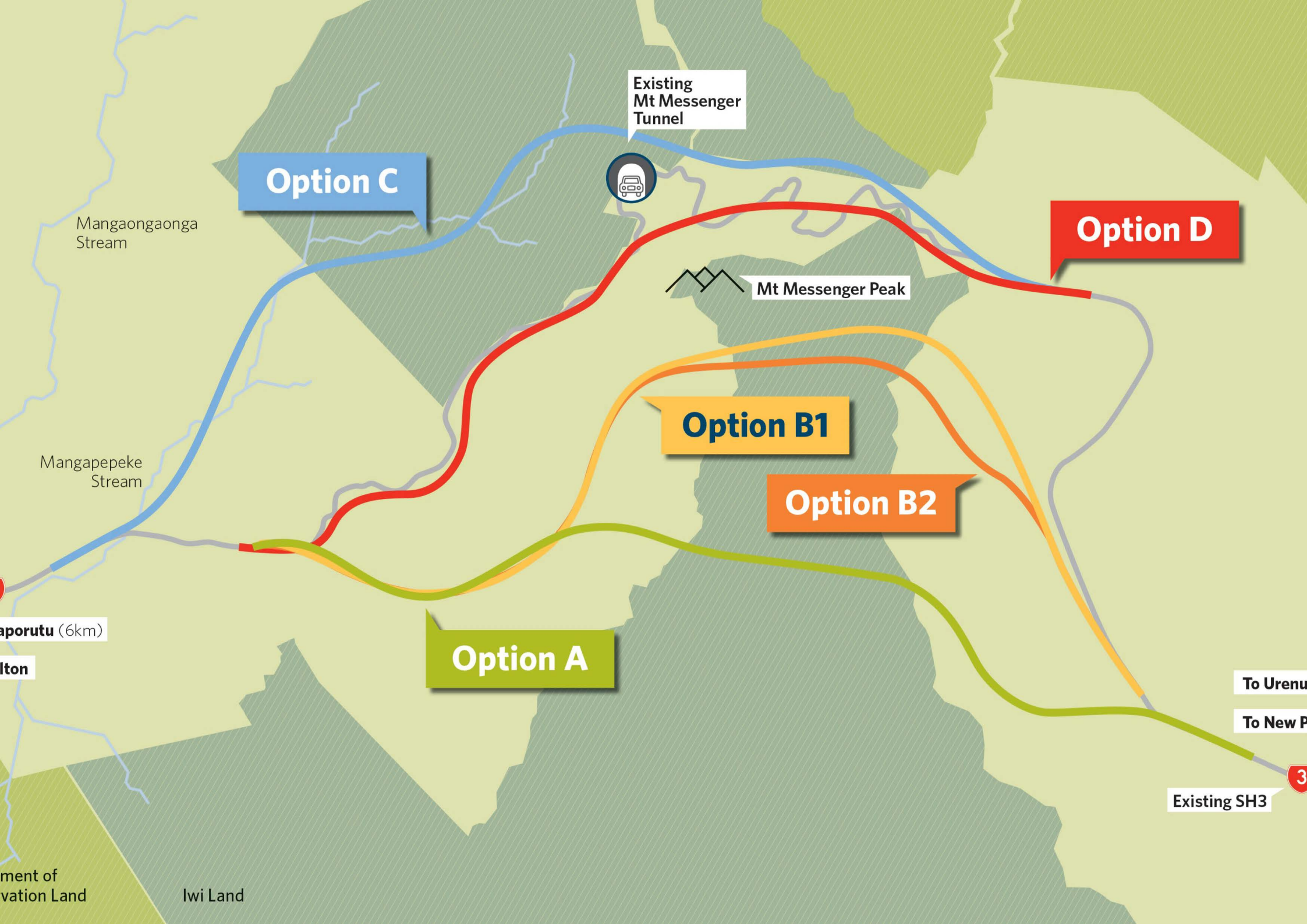
If you require any further information, please do not hesitate to contact me.

9(2)(a)

Planning and Consenting Manager



Appendix A: Overall schematic of shortlisted options



Existing
Mt Messenger
Tunnel

Option C

Option D

Mt Messenger Peak

Option B1

Option B2

Option A

To Urenui

To New P

Existing SH3

Mangaonga
Stream

Mangapepeke
Stream

aporutu (6km)

lton

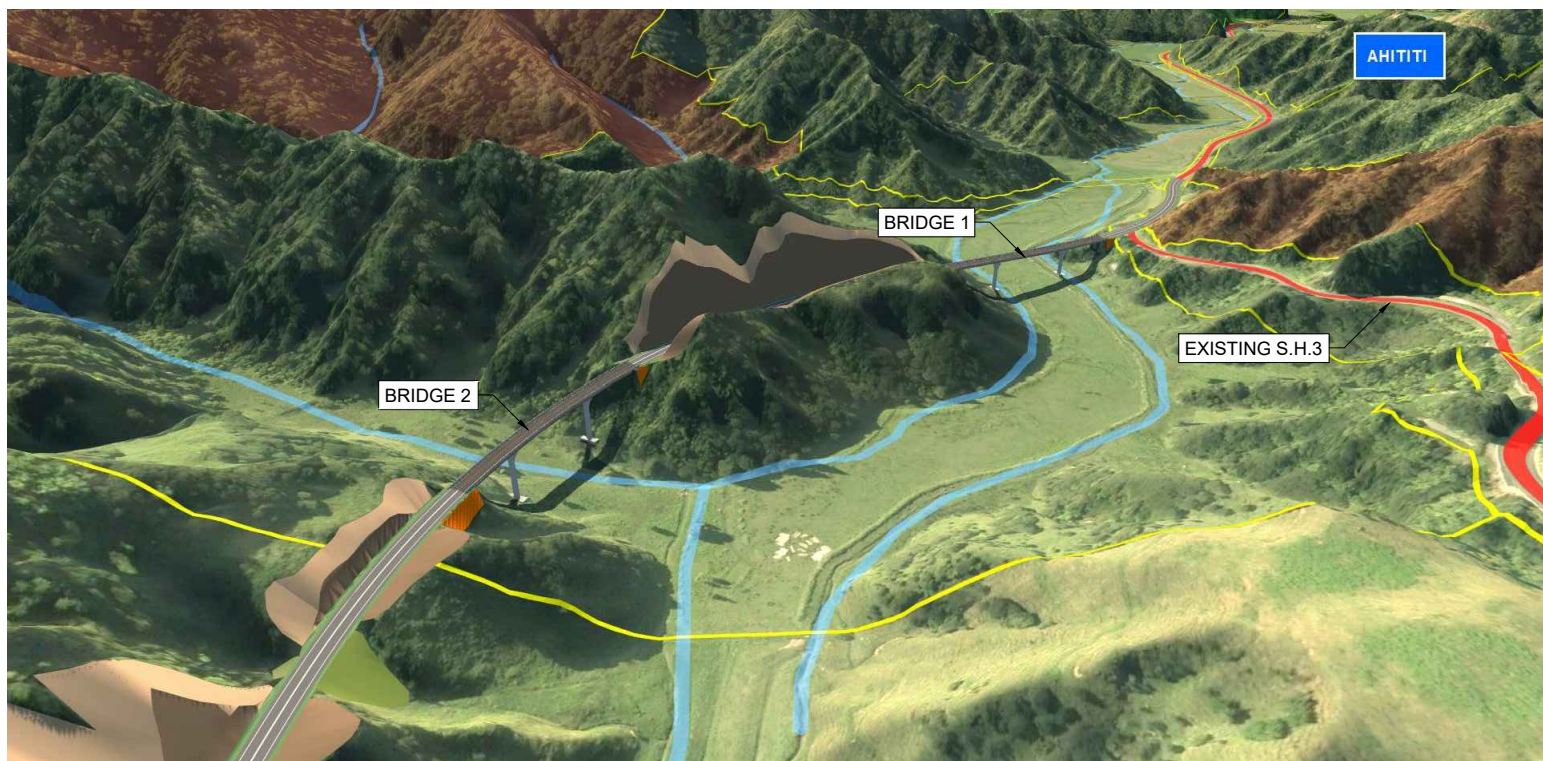
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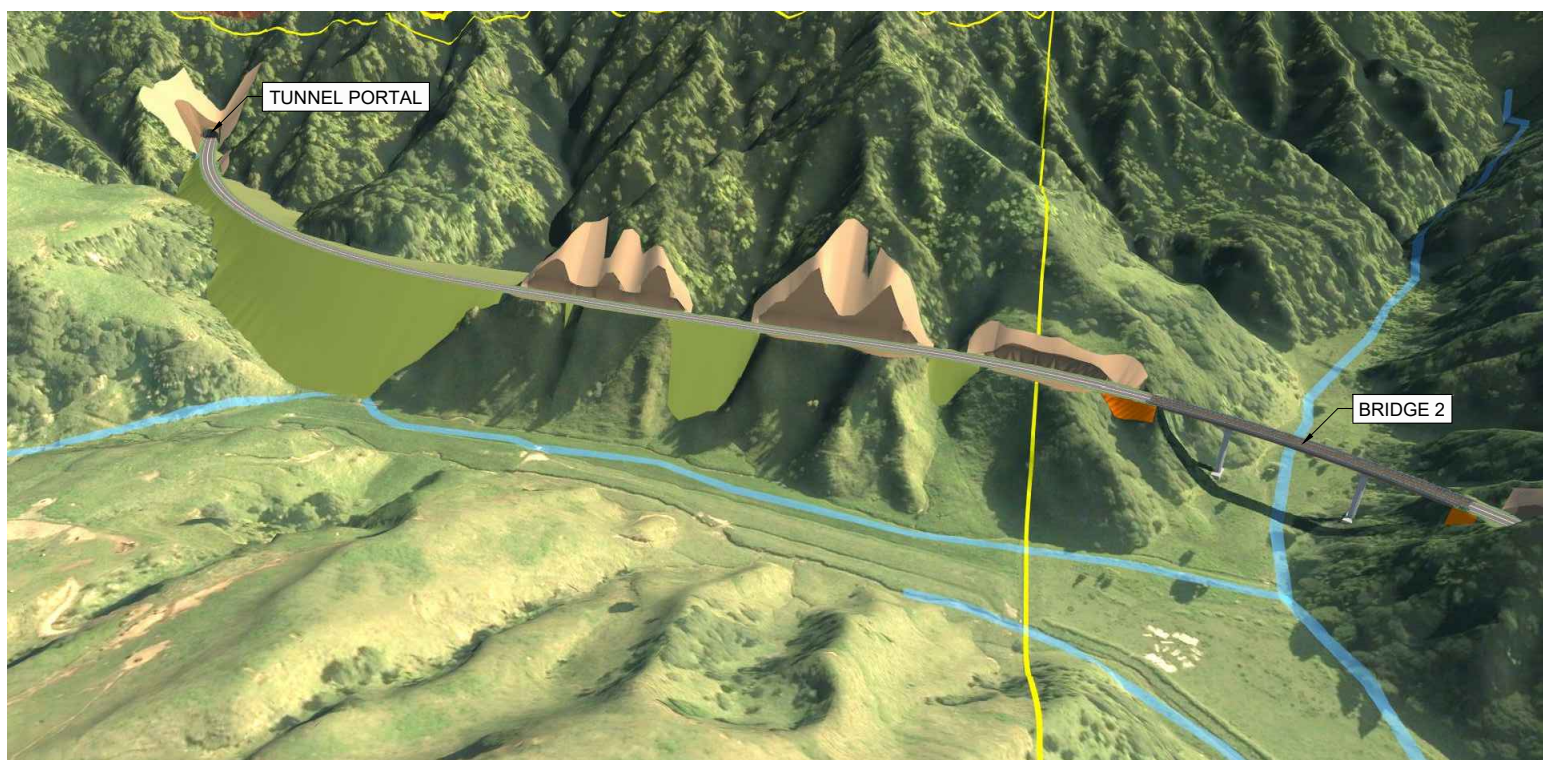


Appendix B: 3D views of options

NORTHERN TIE IN




NORTHERN APPROACH



BRIDGE FROM WEST

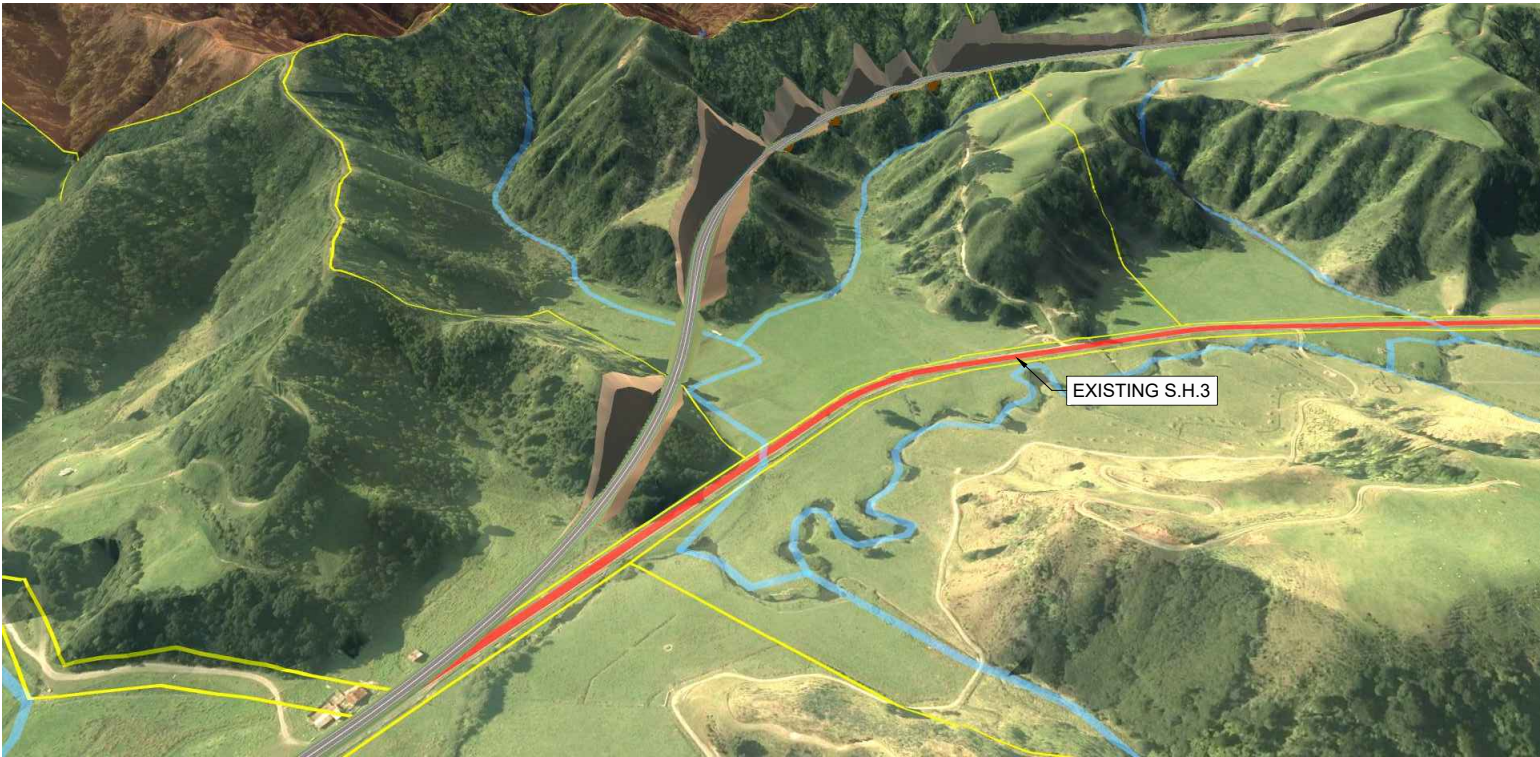



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SOUTHERN APPROACH

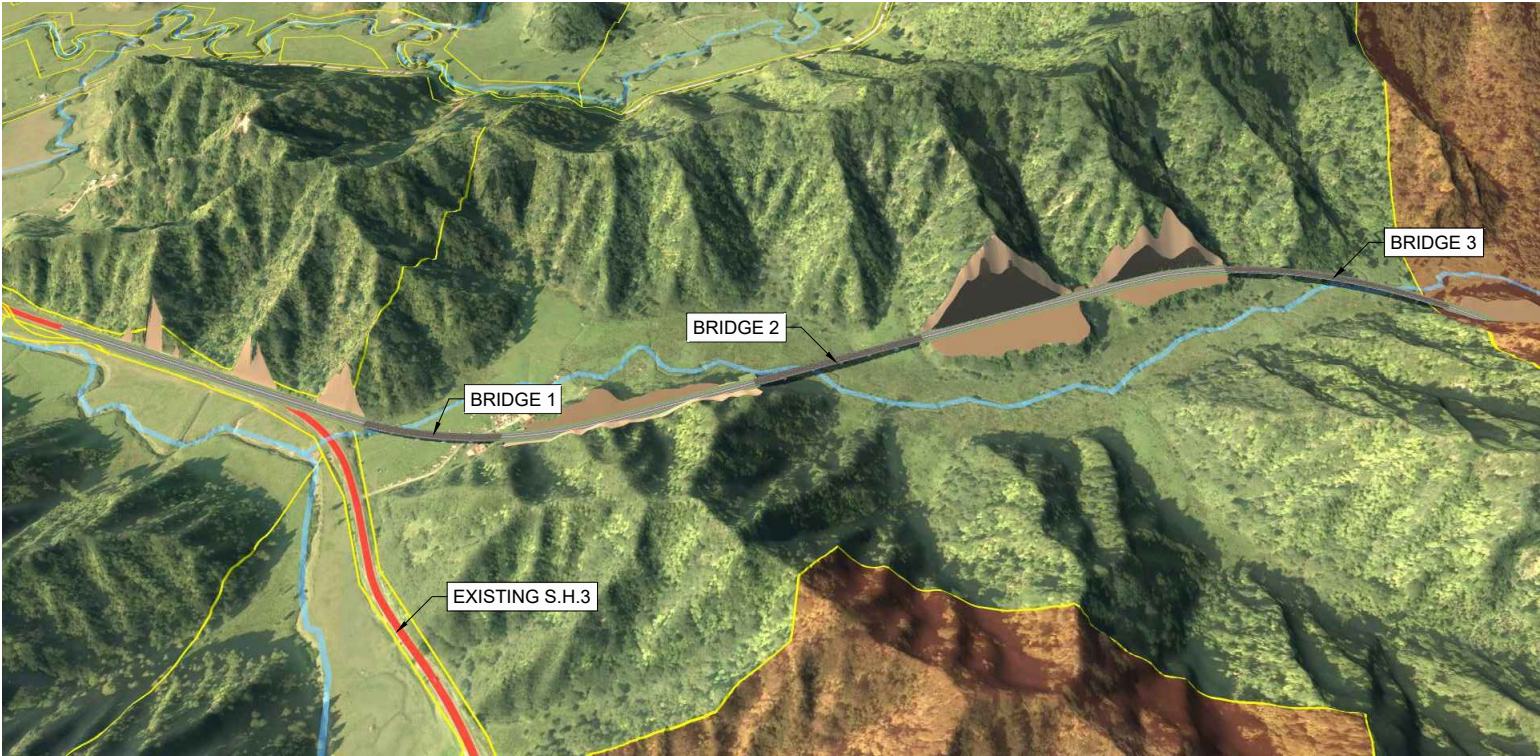


SOUTHERN TIE IN



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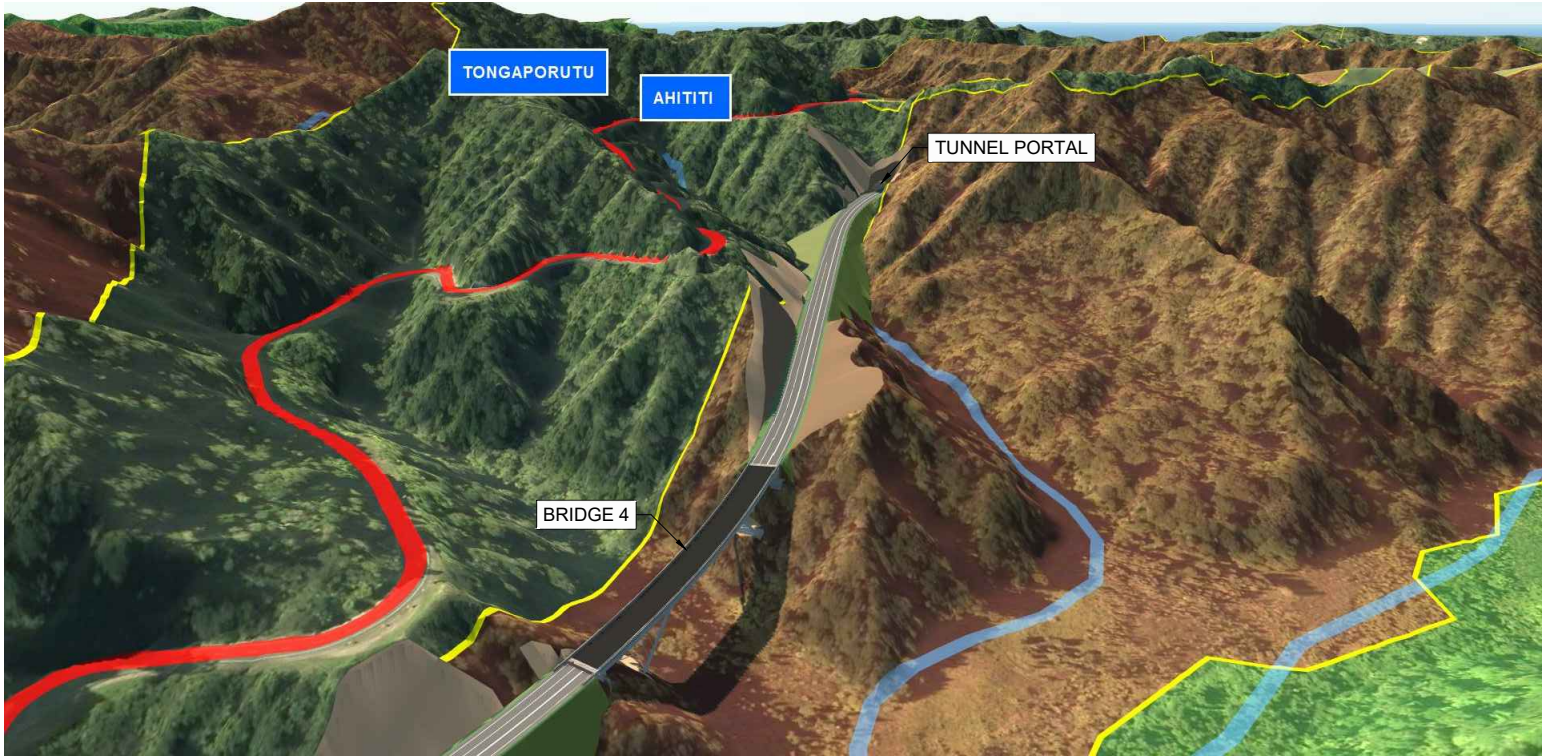


NORTHERN APPROACH

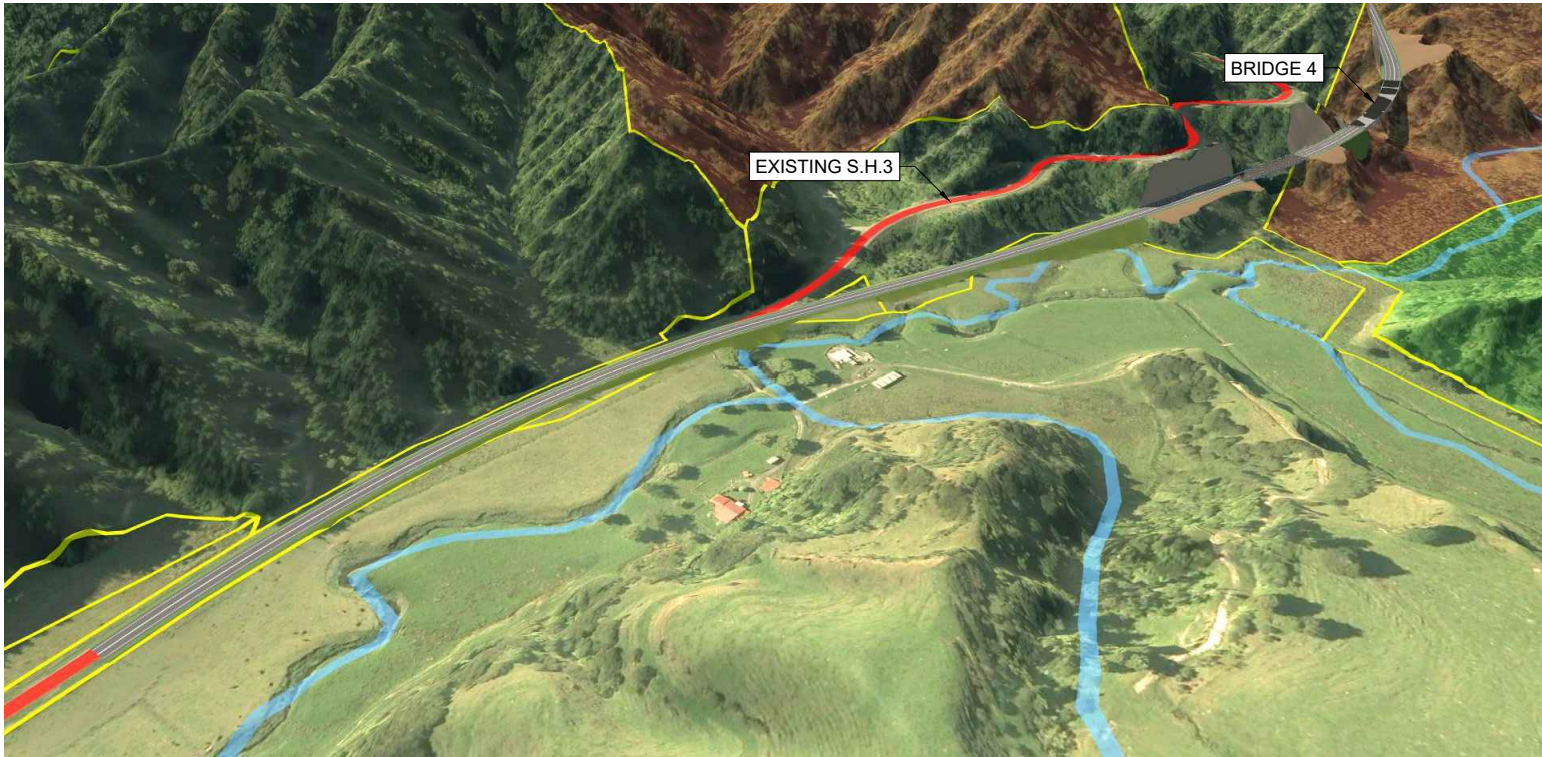


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		This drawing is not to be used for construction purposes unless signed approved and issued For Construction					

SOUTHERN APPROACH

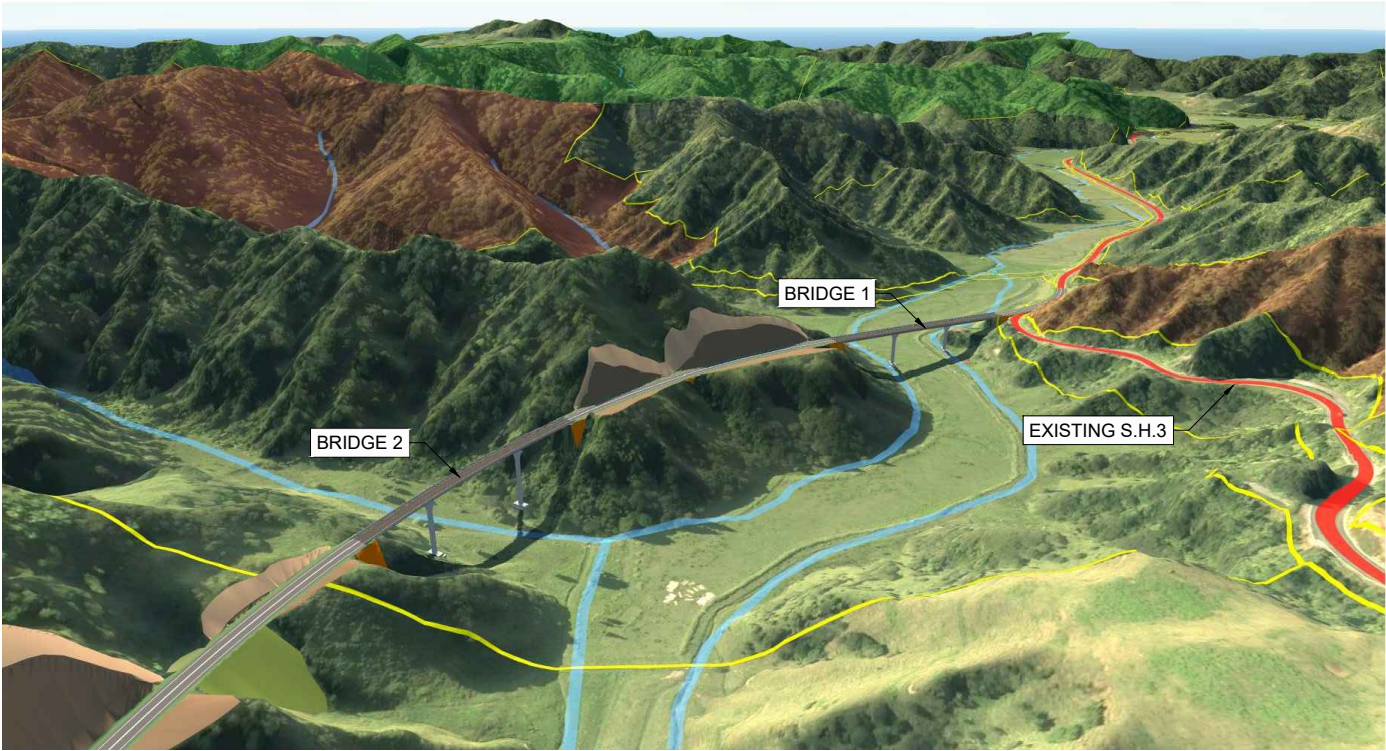


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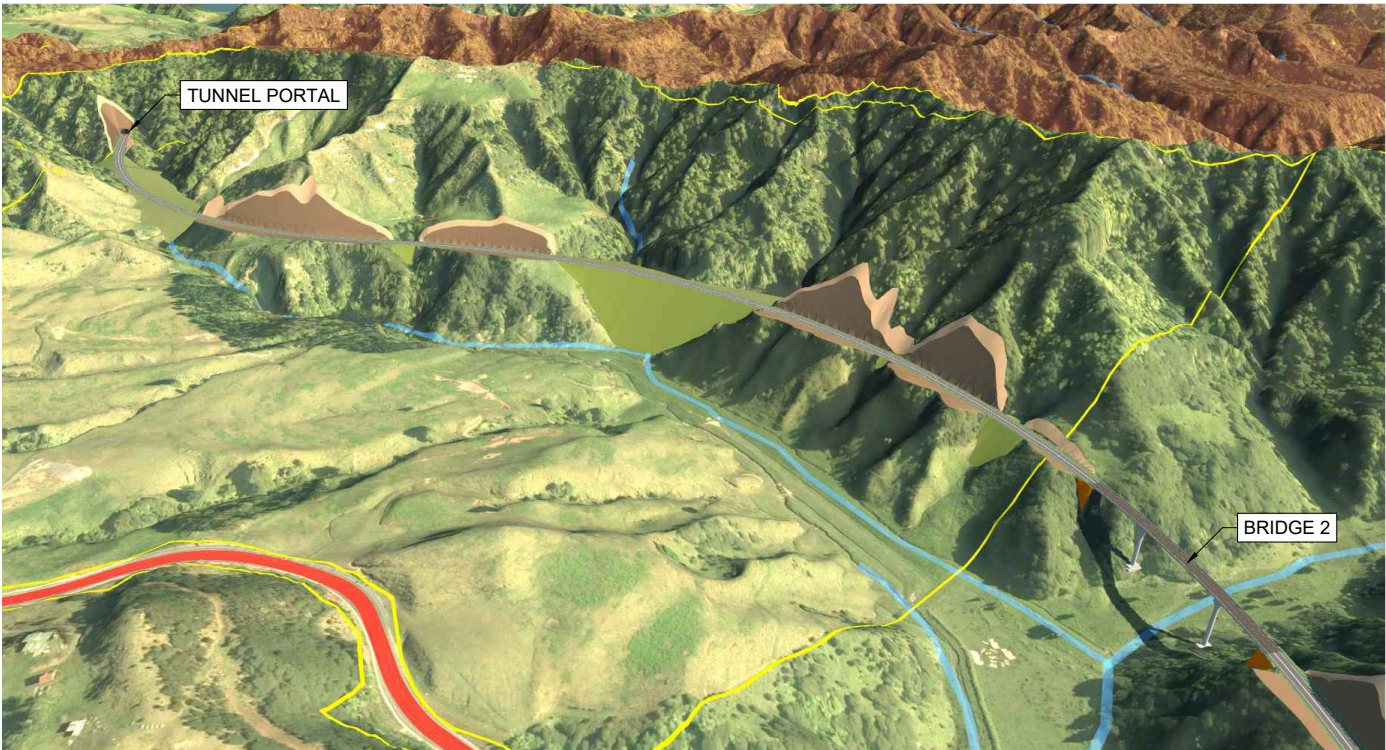


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NORTHERN APPROACH



BRIDGE FROM WEST

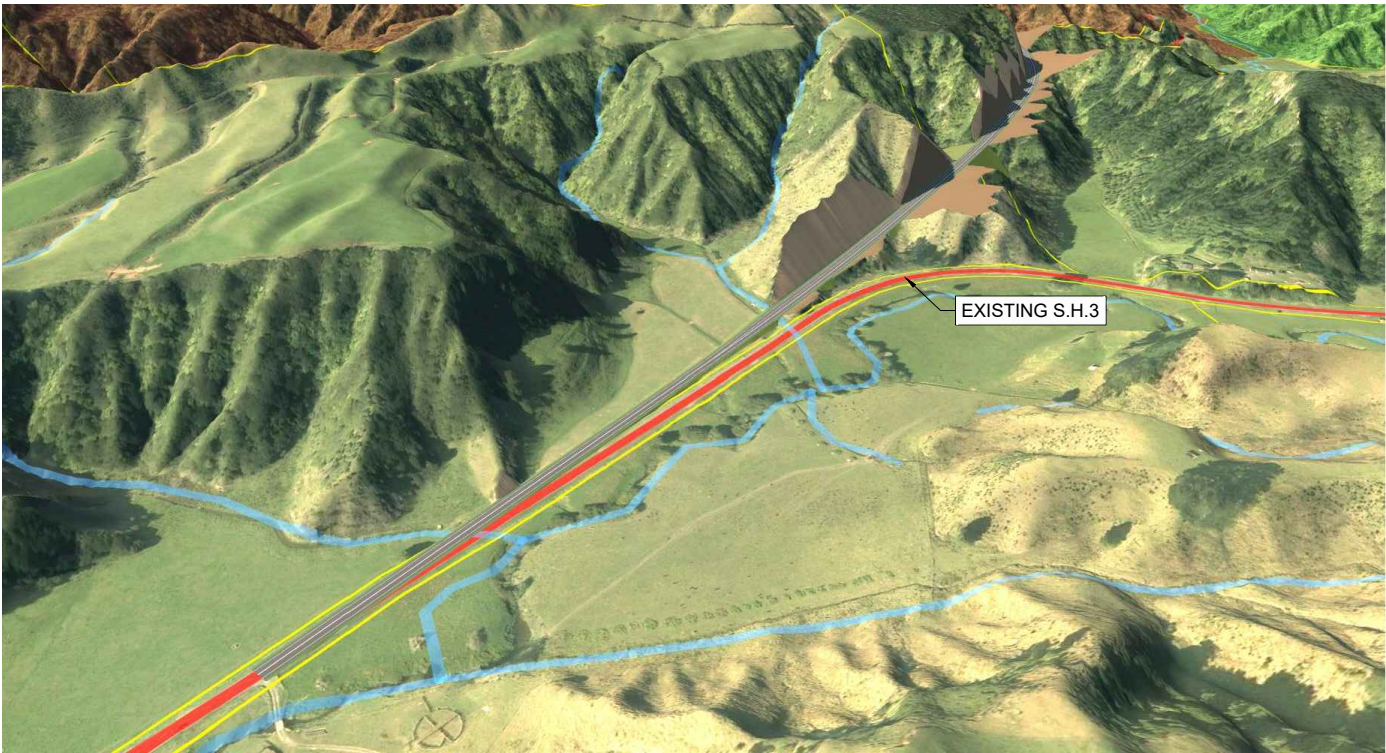



Tab	F1-FIG-0101						Approved		
Scales	NOT TO SCALE						NOT FOR CONSTRUCTION		
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			GEOMETRICS CORRIDOR F SHEET 1				MMA-DES-GEM-F1-FIG-0101		A

SOUTHERN APPROACH

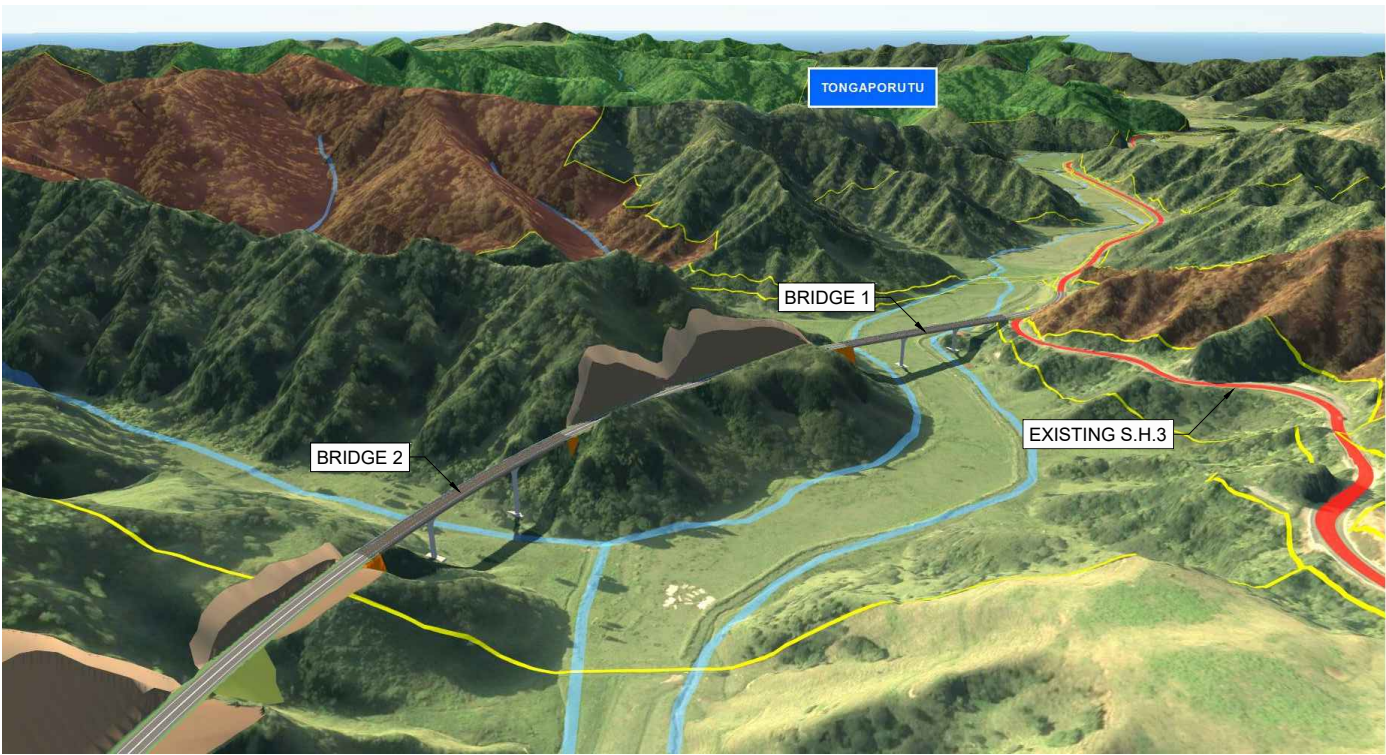


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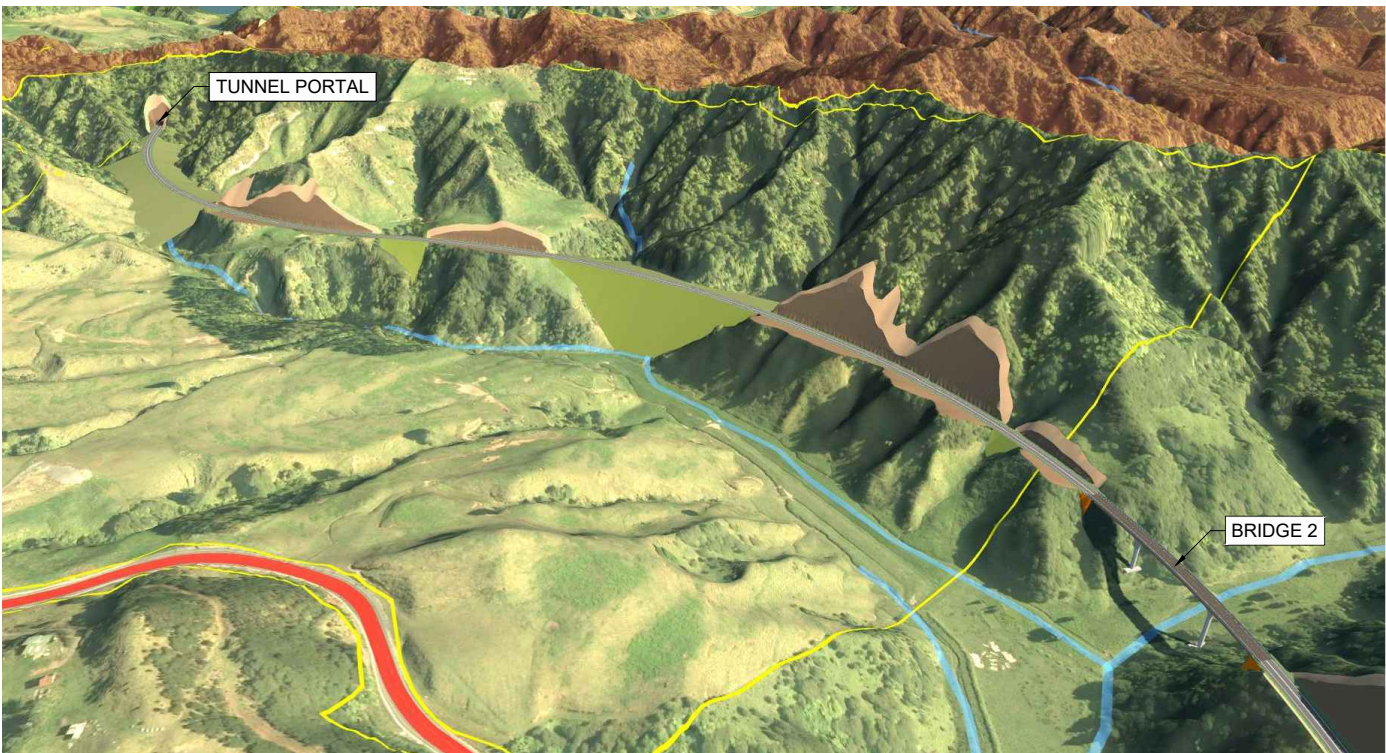


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NORTHERN TIE IN




NORTHERN APPROACH



BRIDGE FROM WEST

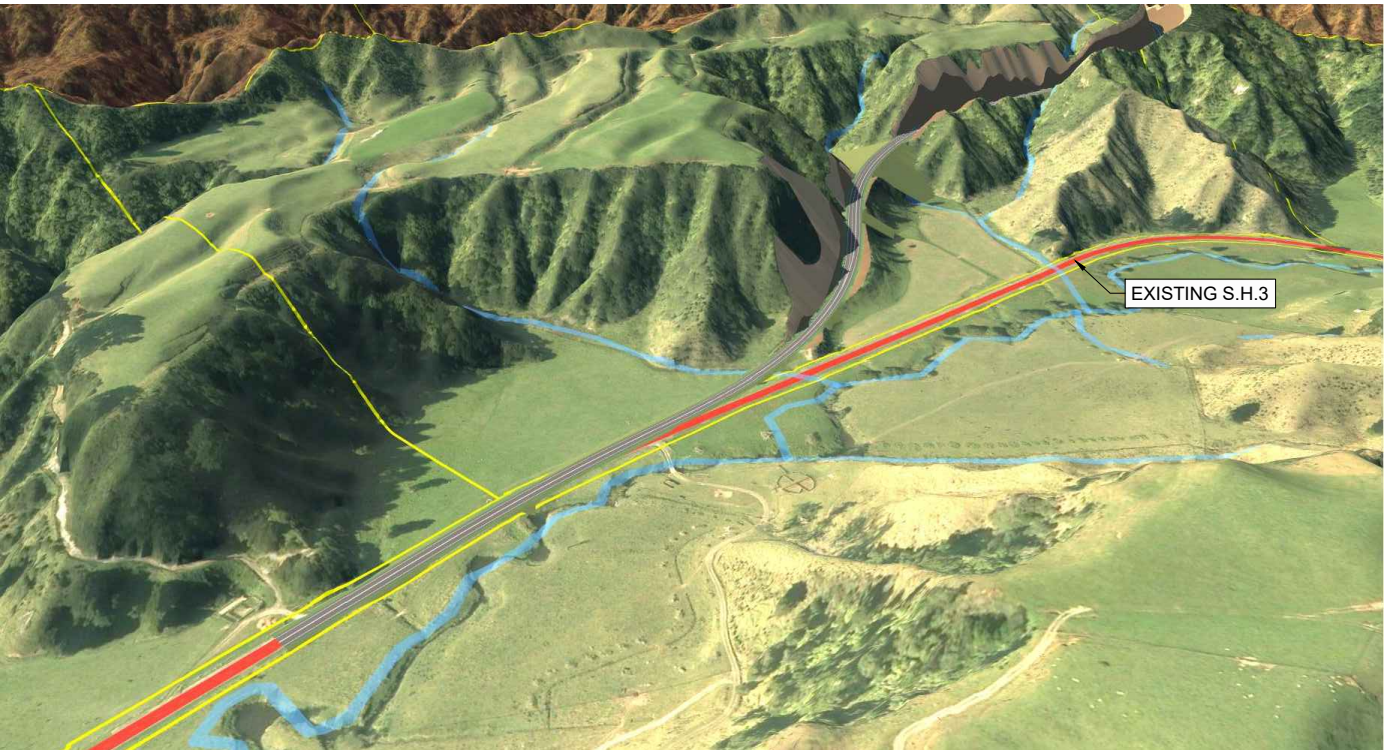



Tab	P1-FIG-0101				MT MESSENGER SH3 REALIGNMENT		Approved	NOT FOR CONSTRUCTION	
Scales	NOT TO SCALE				GEOMETRICS CORRIDOR P SHEET 1		Status	FOR INFORMATION	
Original Size	A1	Document Controller Check: _____ Date: _____			This drawing is not to be used for construction purposes unless signed approved and issued For Construction		Drawing Number	MMA-DES-GEM-P1-FIG-0101	Revision A

SOUTHERN APPROACH

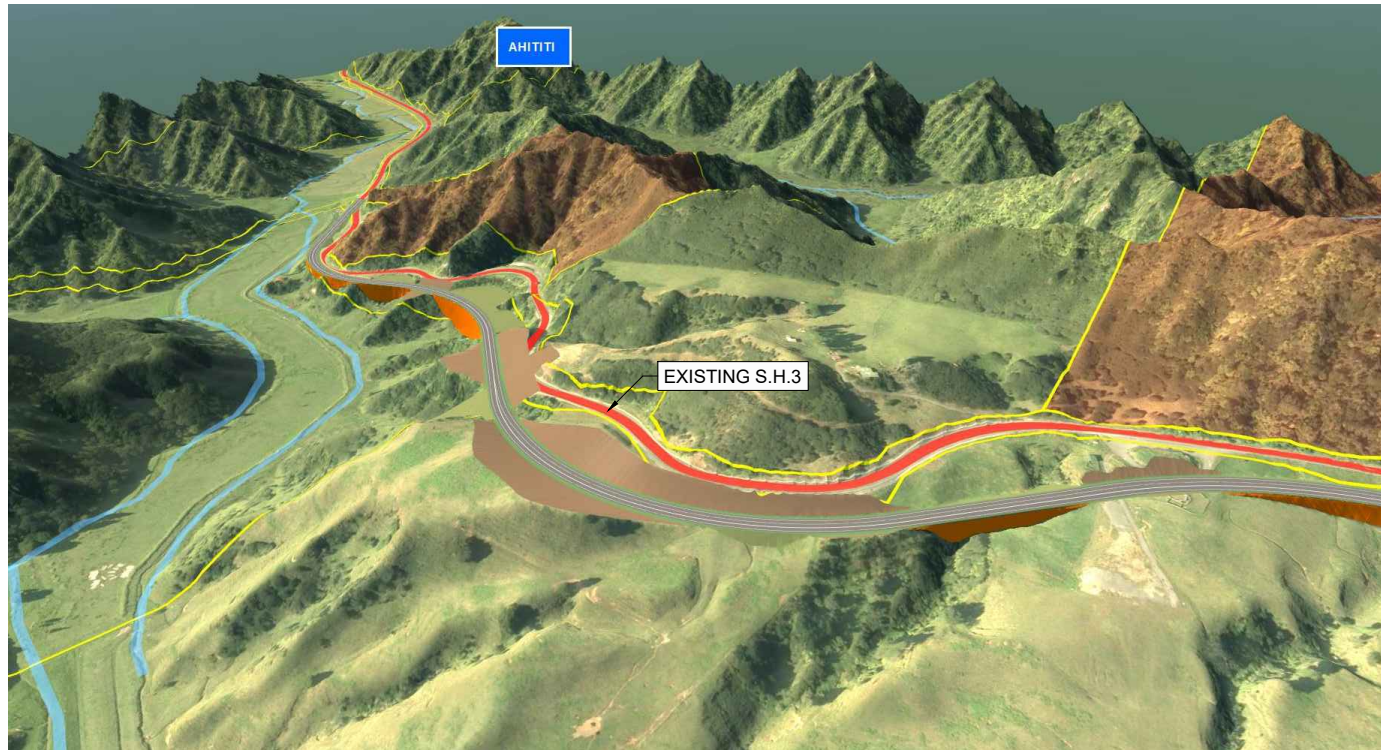


SOUTHERN TIE IN

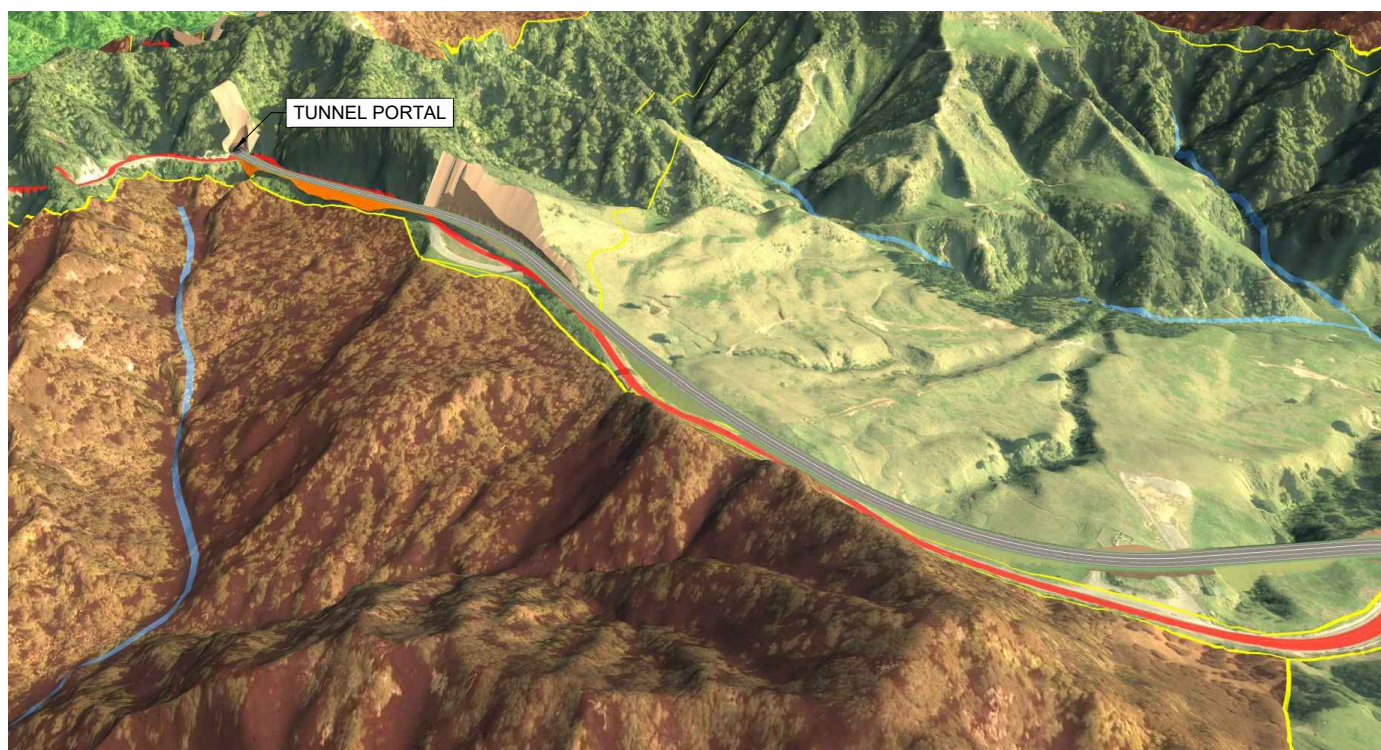



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Scales	NOT TO SCALE						NOT FOR CONSTRUCTION	
Original Size	A1		<div>This drawing is not to be used for construction purposes unless signed approved and issued For Construction</div>		GEOMETRICS CORRIDOR P SHEET 2		Status	
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					Drawing Number		Revision	
					MMA-DES-GEM-P1-FIG-0102		A	

NORTHERN TIE IN

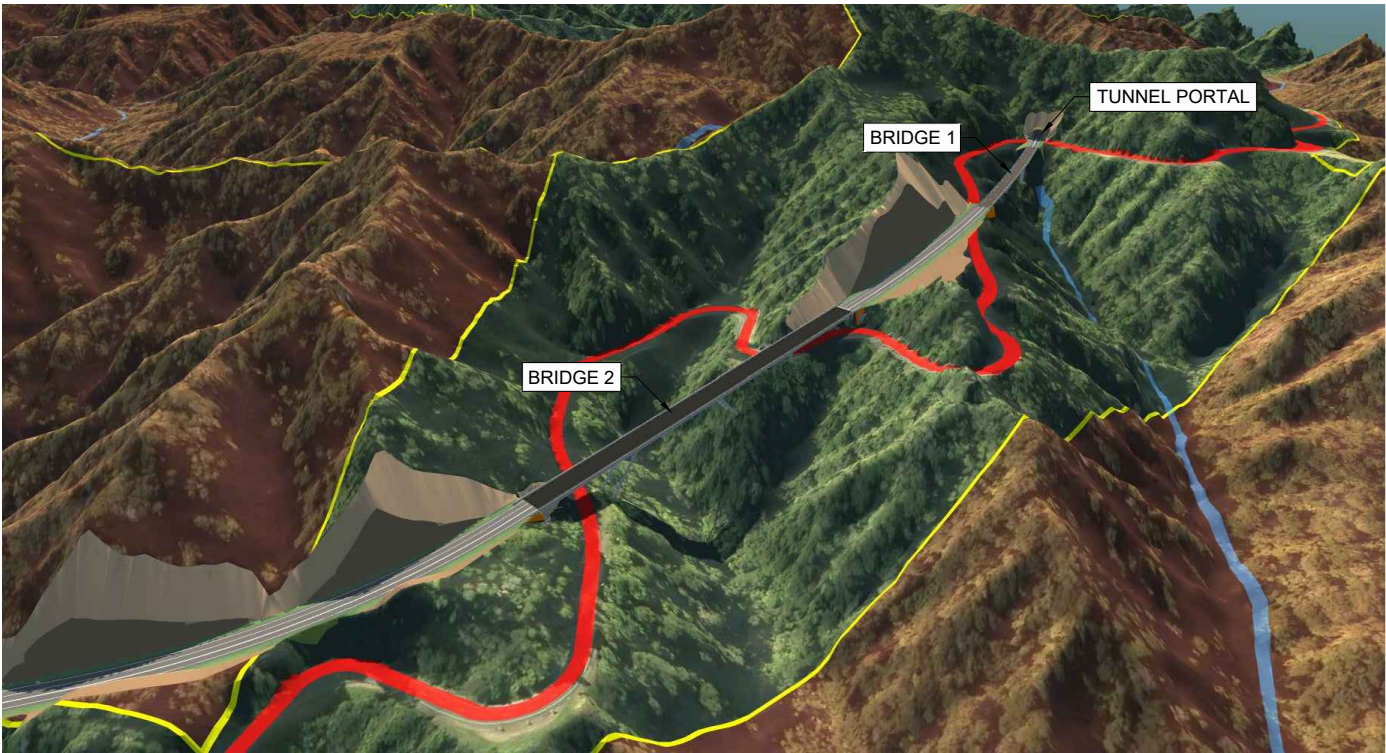


NORTHERN APPROACH

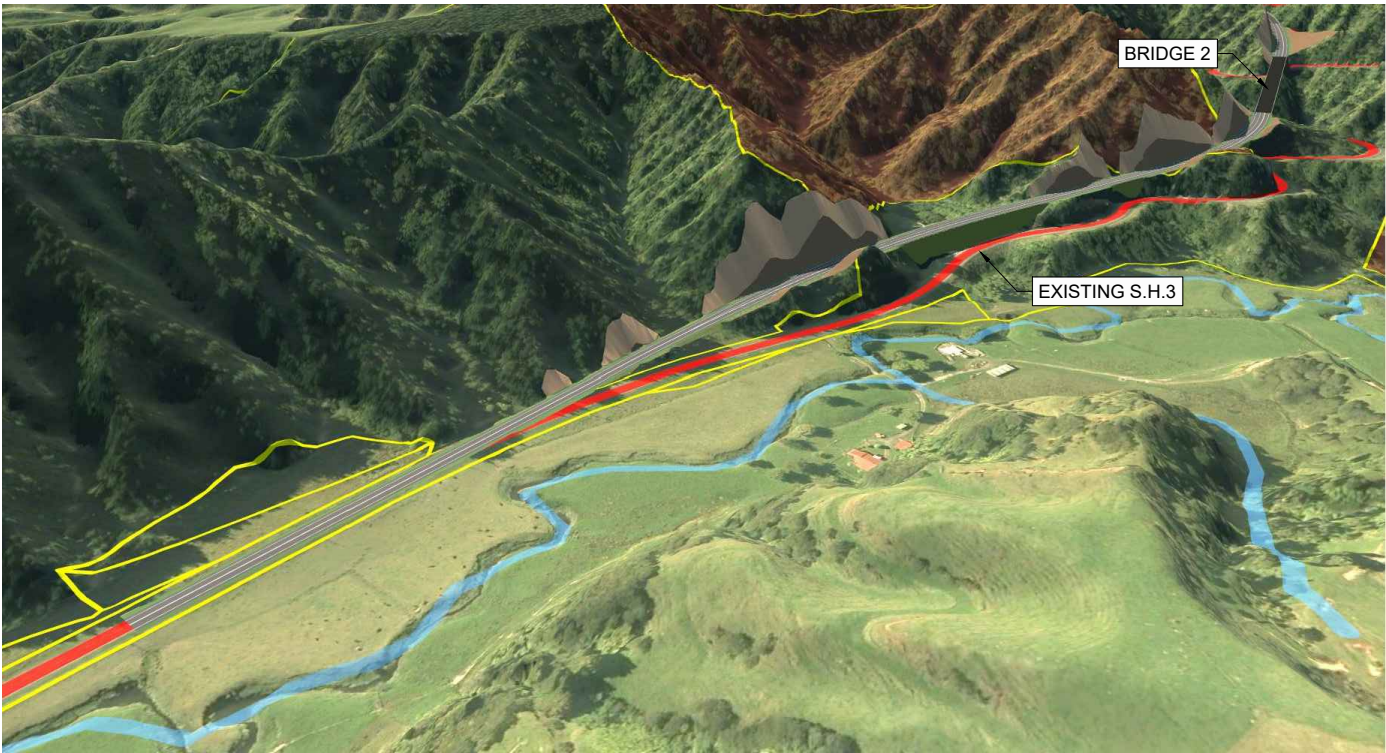



Tab	Z7-FIG-0101		<div>Document Controller Check: <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/></div> <div>Date: <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/></div> <div>This drawing is not to be used for construction purposes unless signed approved and issued For Construction</div>				MT MESSENGER SH3 REALIGNMENT		Approved NOT FOR CONSTRUCTION	
Scales	NOT TO SCALE						GEOMETRICS CORRIDOR Z SHEET 1		Status FOR INFORMATION	
Original Size	A1								Drawing Number MMA-DES-GEM-Z7-FIG-0101	Revision A

SOUTHERN APPROACH



SOUTHERN TIE IN



Tab	Z7-FIG-0102				MT MESSENGER SH3 REALIGNMENT		Approved	
Scales	NOT TO SCALE				GEOMETRICS CORRIDOR Z SHEET 2		NOT FOR CONSTRUCTION	
Original Size	A1		Document Controller Check: <div></div> Date: <div></div>				Status	FOR INFORMATION
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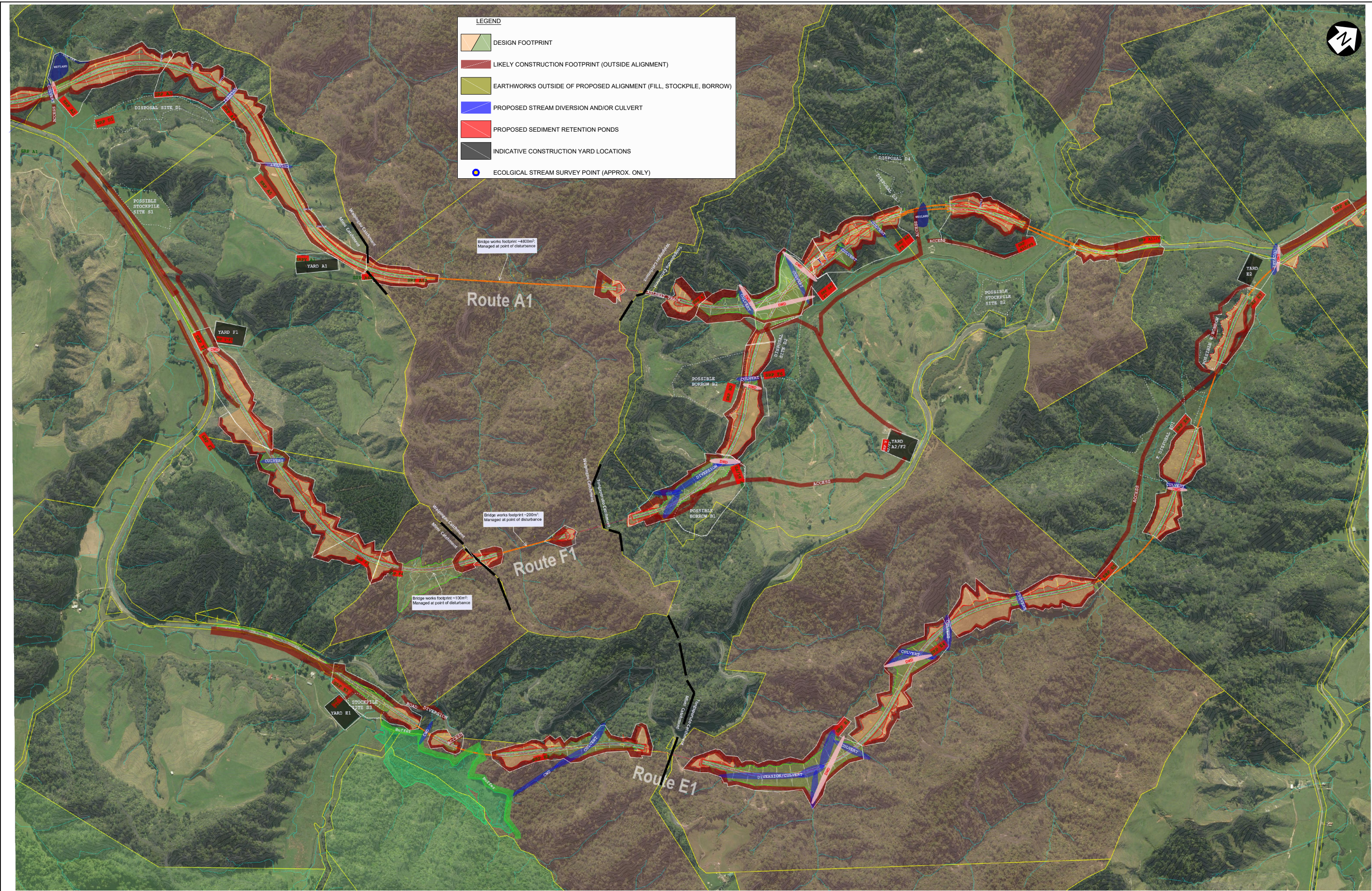


Appendix C: Quantity summary

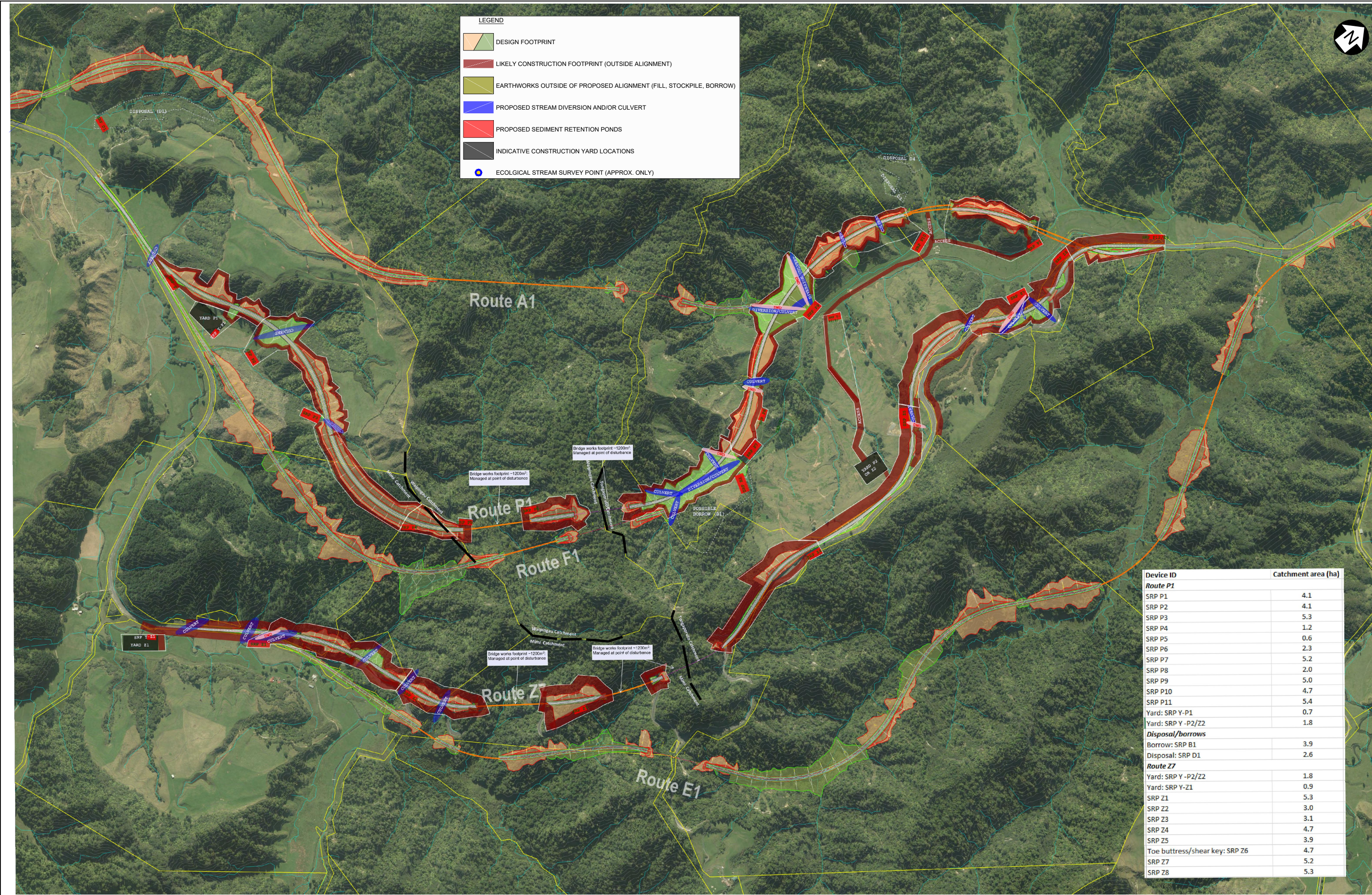
Corridor	Route Length	Length	Area			Grades (max)		Volumes	Ecology			Streams				Bridges										Tunnels	Pavement	Climbing Lane Notes
	Tongaporutu to Uruti (ex 21.4km)	(m)	(Plan - ha)	Cut (ha)	Fill (ha)	UP	DOWN	Total Earth Shifted (M m³)	Native Vegetation (Ha)	Exotic Forest (Ha)	Wetland (Ha)	Culvert Length (m)	Bridge Length (m)	Effected Stream (m)	Stream Diversion (m)	Bridge 1 (m)	Bridge 2 (m)	Bridge 3 (m)	Bridge 4 (m)	Bridge 5 (m)	Length of bridge above 30m high	No. of Piers	Construction method	Construction footprint (hectre)	(m)	A (sqm)		
A	17.9	5940	25.9	20.7	5.20	7.0%	-10.0%	1.78								179	158	610			330	15	Bridge 1&2 - B, Bridge 3 - A	1.5	235	45,550	SB Not Required <8% NB Ch 3900 to 5100	
E	20.4	5250	29.7	21.0	8.7	8.5%	-8.0%	2.05								180	224	270	134	54	0	23	Bridge 3 - B	2.3	230	49,790	SB Ch 2250 to 3315 NB Ch 3710 to 4600	
F	19	5030	32.3	23.4	8.9	7.15%	-9.0%	2.32								207	194	192			100	8	Bridge 1&2 - B Bridge 3 - A	1.3	250	45,570	SB Not Required <8% NB Ch 3280 to 4650	
P	18.8	4770	32.5	23.8	8.7	7.0%	-10.0%	2.48								215	182	234			200	10	Bridge 1&2 - B, Bridge 3 - A	1.3	220	46,010	SB Not Required <8% NB Ch 3050 to 4290	
Z	20.2	4230	17.8	13.0	4.8	8.0%	10.0%	0.80								182	254	144			0	7	Bridge 1&3 - B, Bridge 2 - A	1.2	240	43,810	SB Ch 735 to 1820 NB Ch 2750 to 3900	



Appendix D: Indicative disposal and borrow sites



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							Tab MMA-DES-DSM-00-FIG-0002	<div><div></div><div>ARAHOU</div><div>a new pathway</div></div>	MT MESSENGER SH3 REALIGNMENT		Approved	NOT FOR CONSTRUCTION	
							Scales		INDICATIVE FOOTPRINTS OPTIONS P AND Z FOR ECOLOGICAL SURVEYS ONLY		Status	FOR INFORMATION	
							NOT TO SCALE				Drawing Number	MMA-DES-DSM-00-FIG-0002	Revision
A	FOR INFORMATION	QDO'S	SP				Original Size	A1					A
Rev	Revision Description	Drawn	Drawing Checked	Designed	Design Checked	Approved	Date						



Appendix E: MCA criteria and specialists

Criteria	Sub criteria	Measures for scoring	Information Sources	Owned By
Transport	Road Safety Operational Efficiency Travel Time Operational Resilience.	As per longlist	As per longlist	9(2)(a)
Resilience	Instability [landslides, mudflows] Earthquake [excl. ground improvements] Liquefaction and lateral spread Flooding/storm damage	As per longlist	As per longlist	
Constructability	To be developed by specialists (if necessary)	As per longlist	As per longlist	
Landscape and natural character	To be developed by specialist (if necessary)	As per longlist	As per longlist	
Historic heritage	To be developed by specialist (if necessary)	To be developed by specialist	tbc	
Community	To be developed by specialists	To be developed by specialists	tbc	
Property	Maori Land Acquisition cost / Compensation Impact on individual properties Complexity of Acquisition	Degree of difficulty	As per longlist	
Ecology	<ul style="list-style-type: none"> Severance of the natural environment Removal of native vegetation Additional sub-criteria if necessary 	As per longlist	As per longlist along with additional field work	

Cultural heritage	Treaty settlement land Ara tupuna / pathways Kōkako Wāhi tapu Ngāhere / rakau (important bush and/or trees) Tihi maunga Awa Mauri (disruption / connection to place) Kaitiakitanga (whakama/riri/muru)	As per longlist	As per longlist	Ngāti Tama
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Appendix F: MCA scoring and recording

[illegible]



Appendix G: Reporting template

Report Name

Report Number

Date / description





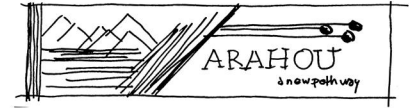
Contents

1. Chapter Name 1	#
2. Chapter Name 2	#
3. Chapter Name 3	#
4. Chapter Name 4	#



Date	Version no.	Checked by	Changes made





1. Introduction

Consistent text which will be provided to you

2. Background

- Summary of context e.g. landscape overlays, Parininihi biodiversity etc.
- Approximately ½ page except for ecologists. Ecology: approximately 1-2 pages with reference to the existing reporting.

3. Methodology

- Data/information used
- Sub-criteria and weightings (including justification)
- Scoring process including measures for scoring
- Key assumptions
- Mitigation assumptions
- What determines fatal flaws
- Approximately 1-2 pages in total

4. Scoring

See attached table. Include:

- Option number, who undertook scoring and the score
- Key reasons for score, including the standard mitigation taken into account (if required)
- Any bespoke mitigation or design opportunities

Scoring table

Scorer: {NAME}	A1	A2	B1	B2	C1	C2	D1	D2	E1	E2	F1	F2
Score {Include sub- criteria if necessary}												
Key reasons for score <i>e.g. corridor would have significant impact on a wetland of significant value</i>												
Potential opportunities to enhance outcome <i>e.g. avoidance of the wetland could improve score</i>												



Scorer: {NAME}	G1	G2	H1	H2	J1	J2	K1	K2	L1	L2	Z2	Z4
Score {Include sub- criteria if necessary}												
Key reasons for score <i>e.g. corridor would have significant impact on a wetland of significant value</i>												
Potential opportunities to enhance outcome <i>e.g. avoidance of the wetland could improve score</i>												

Appendices

- | | |
|----------------------|---|
| 1. Appendices Name 1 | # |
| 2. Appendices Name 2 | # |
| 3. Appendices Name 3 | # |
| 4. Appendices Name 4 | # |

