



11 May 2021

OC210362

Hon Michael Wood
 Minister of Transport

T2021/1216

Hon Grant Robertson
 Minister of Finance

Action required by:
 Monday 17 May 2021

NZUP – ADVICE ON THE REMAINING PROGRAMME OPTIONS

Purpose

Provide advice in response to your letters to Waka Kotahi NZ Transport Agency (Waka Kotahi) and KiwiRail setting out your expectations and further information requirements for a reprioritised New Zealand Upgrade Programme (the Programme).

Key points

- The projects that you have agreed in principle to progress in your letter of 3 May 2021 will cost between \$4,228 million (P50) and \$4,793 million (P95) to complete. This includes \$40-\$43 million of cost for additional KiwiRail items required to deliver on the original scope of the projects you have agreed in-principle
- The funding allocated to complete the projects should reflect your preferred level of risk, and your preference to not exceed the Programme funding (\$6,800 million).
- Relying on the P50 cost estimates leaves a greater level of funding available for allocation, but provides a lower level of contingency and a higher risk of not completing the projects without additional funding. Allowing for P95 cost estimates (and/or holding an additional Programme-level contingency) reduces the residual funding to be allocated to other projects, but gives a greater level of certainty of delivery within the \$6,800 million envelope.
- Cost estimates for the projects will become more firm as the Programme progresses. It remains important to have an element of contingency given the potential uncertainty for some of the projects. Ministers could take decisions now as to how any contingency is allocated if it becomes available. For the projects you have agreed in-principle, Waka Kotahi recommends working to P50 estimates, KiwiRail recommends P95 estimates, and the Ministry of Transport (the Ministry) and Treasury recommend using P95 estimates plus a 5 percent additional Programme-level contingency.
- Depending on decisions around the cost estimates used to allocate funding, and whether the funding for Northern Pathway is ring-fenced or made available for other projects, there will be \$1,400–\$2,570 million available to progress the remaining three projects (the South Auckland projects, Ōtaki to North of Levin, and Whangārei to Port Marsden). The original Programme allocation for these three projects was \$2,465 million. This means it may not be possible to proceed with all three projects based on their initial allocations.

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- Waka Kotahi and KiwiRail have prepared Strategic Assessments of the options for the three corridors/areas. Many of the options that could be taken forward as part of each project are in very initial stages and require further work (i.e. business case processes). Officials have therefore had limited time and information available to make recommendations as to preferred alternative options. Any costs that have been identified are broad estimates only.
- Waka Kotahi's view is that all projects in the original Programme are still credible network improvements that will be required as part of the strategy required to realise required outcomes for communities. The key reason for changes to the Programme is the increase in costs beyond the Programme funding envelope. Waka Kotahi is willing to assist in any forward consideration of other funding options to address this funding shortfall.
- We are seeking your direction in terms of which parts of projects are to be progressed for inclusion in the upcoming Cabinet paper.

Recommendations

		Minister of Finance	Minister of Transport
We recommend you:			
1	direct the Ministry of Transport and the Treasury to draft a Cabinet paper on behalf of the Ministers of Finance and Transport (Joint Ministers) that is consistent with the following recommendations	Yes / No	Yes / No
	<i>Projects to be put forward to Cabinet for approval to progress with implementation</i>		
2	agree to seek Cabinet approval to progress the project's Joint Ministers have approved in-principle in the letter of 3 May 2021	Yes / No	Yes / No
3	agree to include in the projects sought for approval an additional \$40–\$43 million of funding for elements of the KiwiRail projects that are required to deliver on the initial project scopes	Yes / No	Yes / No
	OPTION 1:		
4	agree to fund this set of projects at their P95 cost estimates (\$4,793 million), and retain a 5 percent (\$240 million) contingency across these initial projects that can only be accessed via the oversight process (Ministry and Treasury preferred approach); and	Yes / No	Yes / No
5	note that there is a likelihood that this conservative approach may result in future underspend, which, once costs are more certain, can be prioritised towards the three projects that are undergoing further development		
	OPTION 2:		
6	agree to fund this set of projects at their P50 cost estimates (\$4,228 million), which includes some level of contingency that would be held at a combination of project and Programme-level (Waka Kotahi preferred approach); and	Yes / No	Yes / No

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- 7 **note** that this option would include a higher future risk of overspend that may not be able to be managed across the Programme, thereby requiring further funding decisions

Northern Pathway funding

- 8 **agree** to ring-fence the initial \$360 million allocation for the Northern Pathway for the future project (pending separate Cabinet consideration) Yes / No Yes / No

Projects to be put forward to Cabinet for approval to be further developed before committing to implementation

- 9 **note** that Waka Kotahi's view is that all projects in the Programme are still credible network improvements that will be required as part of the long-term strategy for these corridors/areas, and that route protection of the initial projects will still be required
- 10 **note** that the remaining three projects (South Auckland projects, Ōtaki to North of Levin, and Whangārei to Port Marsden) are at earlier stages of development and have more uncertainty, and a greater cost risk
- 11 **note** that there is insufficient funding remaining in the Programme to progress alternative options for each of the projects at their original cost allocations, and there is a risk additional Crown funding may be required
- 12 **agree** which of the following options you wish to seek Cabinet approval for officials to further develop for the Mill Road and Papakura to Drury South (Stage 2) projects:
- a) Option 1: Addressing safety issues on Mill and Redoubt Roads, through providing a four lane northern end of the road (within the existing designation), along with a targeted safety treatment on the adjacent existing road through Takaanini (medium confidence of delivery within the \$956 million remaining from the initial funding allocation) Yes / No Yes / No
- b) Option 2: Rescoped/scaled new northern end of Mill Road (two lanes rather than four), providing partial funding for supporting investment in the wider Drury network for local infrastructure, including active modes and public transport (low-medium confidence of delivery within the \$956 million remaining from the initial funding allocation) Yes / No Yes / No
- 13 **agree** which of the following options you wish to seek Cabinet approval for officials to further develop for the Ōtaki to North of Levin project:
- a) Option 1: Proceed with the currently proposed option (very low confidence of completion of the full project within the \$817 million initial funding allocation) Yes / No Yes / No
- b) Option 2: Short term safety improvements along the existing state highway, further state highway upgrades, and no rail Yes / No Yes / No

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improvements (medium confidence of delivery within \$817 million initial funding allocation)

- c) Option 3: Safety improvements along the existing state highway, and electrifying the rail network from Waikanae to Levin (medium confidence of delivery within \$817 million initial funding allocation) Yes / No Yes / No

14 **agree** which of the following options you wish to seek Cabinet approval for officials to further develop for the Whangārei to Port Marsden project:

- a) Option 1: Proceed with the currently proposed option (very low confidence of completing the full project within the \$692 million initial funding allocation) Yes / No Yes / No
- b) Option 2: Safety improvements along the existing state highway, and the completion of the first (urban) stage of the current state highway project (medium confidence of delivery within the \$692 million initial funding allocation) Yes / No Yes / No
- c) Option 3: Safety improvements along the existing state highway, and Northport Rail upgrades (medium confidence of delivery within \$692 million initial funding allocation) Yes / No Yes / No

15 **note** that each of the options above includes route protection for the initial scope agreed as part of the Programme

- 16 **agree** to seek agreement for officials to continue developing the preferred options with revised project cost, scope, and schedule to be agreed by Joint Ministers before inclusion within the overall Programme Yes / No Yes / No

Tim Herbert
Manager, Investment (Ministry of Transport)

11 / 05 / 2021

David Taylor
Manager, National Infrastructure Unit (The Treasury)

11 / 05 / 2021

Bret Gliddon
General Manager, Transport Services (Waka Kotahi)

11 / 05 / 2021

Hon Grant Robertson
Minister of Finance

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Hon Michael Wood
Minister of Transport

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- Minister's office to complete:
- Approved
 - Declined
 - Seen by Minister
 - Not seen by Minister
 - Overtaken by events

Comments

To protect the privacy of individuals

Contacts

Name	Telephone	First contact
Tim Herbert, Manager, Investment (Ministry)	[REDACTED]	✓
Mark Hodge, Senior Analyst, Treasury	[REDACTED]	
Brett Gliddon, General Manager, Transport Services	[REDACTED]	

Proactively released
Ministry of Transport, Treasury,
Waka Kotahi

NZUP – ADVICE ON THE REMAINING PROGRAMME OPTIONS

You have made some in-principle decisions and requested further information on the Programme

- 1 On 3 May 2021, you jointly sent a letter to the Chairs of Waka Kotahi and KiwiRail regarding the prioritisation advice you had received. In the letter, you:
 - 1.1 confirmed in-principle decisions for some of the projects to be delivered
 - 1.2 requested further information about three projects
 - 1.3 requested advice on the full range of options for three projects.
- 2 This briefing responds to your request on behalf of both Waka Kotahi and KiwiRail, who have had extensive input into this paper.

You have confirmed, in-principle, a list of projects to be delivered

- 3 You have confirmed in-principle that you wish for the following projects to be delivered as per their most recently agreed specifications. These projects, with baselined P50 and P95 cost estimates, are detailed below in Table 1.

Table 1: In-principle confirmed projects

Project	Cost P50 (\$m)	Contingency component of P50 estimate (\$m)	Cost P95 (\$m)	Contingency component of P95 estimate (\$m)
SH58	105	30 (28%)	130	54 (41%)
SH1/29	40	5 (13%)	50	14 (28%)
Takitimu North Link Stage 1	655	77 (12%)	740	153 (21%)
Papakura to Drury South Stage 1	655	106 (16%)	720	166 (23%)
Canterbury Package	218	34 (16%)	300	91 (30%)
Queenstown Package	115	17 (15%)	145	44 (30%)
Wiri to Quay Park	305	32 (10%)	318	44 (14%)
Papakura to Pukekohe electrification	356	49 (14%)	375	68 (18%)
Wellington Railway Station safety	69	20 (29%)	74	25 (34%)
Wairarapa Rail Upgrades	118	27 (23%)	127	36 (28%)
Capital Connection Interim replacement rolling stock	24	4 (17%)	26	6 (23%)
Drury Rail Stations (three stations)	413	94 (23%)	495	177 (36%)
Melling	375	72 (19%)	420	112 (27%)
Penlink	740	100 (14%)	830	179 (22%)
Total	4,188	667 (16%)	4,750	1,169 (25%)

KiwiRail additional scope items

- 4 You advised in your letter that KiwiRail's scope options were unable to be funded at this time. KiwiRail has advised that three of the projects were not "additional" as they

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were within the original Establishment Report scope and are required to deliver in full two projects that you have approved in-principle.

- 5 The Ministry and Treasury consider that these projects are equivalent to some Waka Kotahi projects that had scope changes since the Programme was announced. In those cases, the additional costs have been added to each relevant project's overall cost rather than being considered as new projects or additional scope items.
- 6 We recommend that these items are reinstated and included as part of the approved in-principle Programme works. For the remainder of this briefing, we have assumed that these are part of the in-principle approvals, and have added these costs to the forecast estimates of the respective projects.

Table 2: KiwiRail 'additional' items that are required to deliver projects' original scope

Project	Cost P50 (\$m)	Cost P95 (\$m)
Wellington Station Safety – East Yard	13	14
Wairarapa Rail Upgrades – Masterton Yard Changes	12	13
Wairarapa Rail Upgrade – Carterton Loop	15	16
Total	40	43

The projects approved in-principle, plus the Kiwi Rail projects referred in Table 2, will cost at least \$4,228 million, creating choices about Programme structure going forward

- 7 Based on the list of projects in Tables 1 and 2 above, the total cost will be \$4,228 million (P50) –\$4,793 million (P95).
- 8 The initial Programme allocation for the same projects was \$3,080 million. This means costs have increased by \$1,148–\$1,713 million for the set of projects you have agreed in-principle.

The increased costs for the projects approved in-principle mean there is limited funding to progress funding for remaining projects at initial Programme allocations

- 9 You have choices regarding how to progress further projects. In your letter, you indicated that the funding for the projects that are not yet approved in-principle should reflect the initial funding allocations. These are set out in Table 3 below.

Table 3: Initial Programme allocation for projects not yet approved in-principle

Initial Programme allocations (\$m, pre recent baseline exercise)	
Whangārei to Port Marsden	692
Ōtaki to North of Levin	817
South Auckland area remaining funding for options (excluding in-principle funding allocation for Papakura to Drury South Stage 1 and three Drury Rail Stations)	956
Total initial Programme allocations	2,465

- 10 A decision is still required on whether to ring-fence the \$360 million initial allocation for the Northern Pathway (and to fund the additional amount to deliver the new preferred option from the Crown's capital allowance). Alternatively, you may wish to

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consider the project separately to the Programme in terms of cost, and allocate the \$360 million across the remaining projects.

- 11 Table 4 shows the available Programme-level funding, which will vary depending on the decisions you make in relation to this paper.

Table 4: Programme-level funding

	P50 (\$m)	P95 (\$m)
Total Programme funding available	6,800	
In-principle approved projects (baselined amount)	4,228	4,793
Programme-level contingency (as per paragraphs 16–21 below, the Ministry and Treasury recommend a 5 percent contingency for in-principle approved projects at P95)	0	240
In-principle approved projects (with additional contingency at P95)	4,228	5,033
Funding available after in-principle approved projects and contingency	2,572	1,767
Initial programme funding allocations for projects not approved in-principle (as per Table 3)	2,465	
Northern Pathway (initial Programme allocation)	360	
Funding shortfall (assuming initial Programme allocations for projects not yet approved in-principle, and an additional 5 percent contingency)	253	-1,058

Overview of contingency management

- 12 Contingency management is an important element in successful delivery of projects within a fixed funding envelope.
- 13 The Ministry, Treasury, KiwiRail and Waka Kotahi all agree that a portion of the contingency allowance be managed at a programme level. This will provide additional controls and support decisions on the basis of what is best for the overall Programme.
- 14 Overall, three levels of contingency should be considered:
- 14.1 project level contingency held by projects (the scale of this is dependent on individual project risk profiles, as is standard practice).
 - 14.2 programme level contingency held by Waka Kotahi and KiwiRail
 - 14.3 portfolio level contingency held by Ministers.
- 15 Reporting requirements and protocols will be defined and monitored subsequent to this briefing, jointly by the Oversight Group, KiwiRail, and Waka Kotahi. Once Cabinet has agreed to the approach for costs and contingency, officials will provide you with further advice around these requirements.

The Ministry and Treasury’s approach towards contingency

- 16 The Ministry and Treasury consider that the risk of cost increases remains, due to the early stage of many of the projects in the Programme and the considerable work

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required to confirm uncertainties for some of the projects (especially for Penlink, Melling, and the Drury rail stations).

- 17 It is a different exercise to manage risks within a fixed envelope than it is within the National Land Transport Fund (NLTF). The NLTF has ongoing revenue to manage cost increases, which includes delaying delivery to spread costs (against additional NLTF revenues) over time. Conversely, for the Programme, any cost increases will have no future funding source other than the Crown through future Budgets. The best way to mitigate the need for future funding is by taking a conservative approach to contingency.
- 18 Your choice will depend in part on how much risk you are comfortable with. Given your expectation that the Programme is delivered within the agreed funding envelope we recommend planning on the basis that agreed projects will be delivered at P95 estimates.
- 19 It would also be prudent to hold a 5 percent contingency in addition to this for the case where actual costs may exceed the forecast cost estimates. Given the early stage of some projects, the need to undergo a more robust costing exercise, and the significant residual risk identified in the baseline exercise, officials consider that at least some of the five percent may be needed.
- 20 This approach mitigates the future risk of needing to decide to commit further funding, or to reprioritise within the Programme again, but does have a trade-off of not providing full certainty to some communities and the sector now, as to the projects that will proceed.
- 21 Taking this approach may mean there is a possibility of funding remaining after the completion of all projects. If you wish to pursue this option, we could advise on how any remaining funding could be allocated in the case it becomes available. For example, you could commit to a lower cost 'first stage' option for an additional project, with a higher-cost option progressing only if funding becomes available. We can also advise on a process should costs increase above the level of contingency available, ranging from seeking additional funding through to another reprioritisation process.

Waka Kotahi's approach to contingency

- 22 Waka Kotahi's preferred approach to contingency is:
 - 22.1 Waka Kotahi have included contingency in their P50 and P95 cost estimates for projects and would allocate varying portions of that contingency to project, programme or portfolio level based on specific project risk profiles.
 - 22.2 As reflected in Table 1 above, contingency levels vary for Waka Kotahi in-principle approved projects, depending on project phase and risk level. Overall, the P50 estimates include approximately 15 percent of the total budget for these in-principle approved projects. The P95 cost estimates have a higher level of contingency included (about 24 percent). Most of these projects agreed in-principle have a higher degree of cost certainty than the remaining projects.
 - 22.3 Waka Kotahi will manage its programme dynamically, including establishing contingency access protocols for its programme, including significance thresholds for the three levels of contingency being considered, i.e. project, programme, and portfolio.

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22.4 Waka Kotahi notes that this is the same approach applied to projects in the NLTF and acknowledges there is still a risk some projects may need additional funding in future years.

22.5 Any further contingency funding added (whether at a portfolio, programme or project level) would reduce the level of funding available to deliver the alternative options for Mill Road, Papakura to Drury South Stage 2, Whangārei to Port Marsden and Ōtaki to North of Levin.

KiwiRail's approach to contingency

23 KiwiRail's preferred approach to contingency is:

23.1 KiwiRail also has P50 and P95 estimates for each project. It considers that the full P95 should be approved at this time. It does note that except for Drury Stations the difference between the P50 and P95 values totals only around \$50 million across the projects, which will have less influence on the remaining sums to allocate for the overall Programme.

23.2 KiwiRail's approach will be different for each project, but in principle will involve allocating a budget value between P50 to P80 to each individual project and holding the remainder centrally within its Capital Programme Office. Potential use of the contingency will be reported to the Oversight Group according to agreed threshold levels.

You requested further information on three projects

24 You requested further information on Penlink and Takitimu North Link Stage 2. You also asked officials to produce an options paper for Northern Pathway to put forward to Cabinet for separate consideration to the remainder of the Programme projects.

25 Any projects that are not included in the Programme can be considered for future funding through the NLTF. The Government Policy Statement on land transport 2021/22–2030/31 (GPS 2021) sets the funding ranges for State Highway Improvements for the next 10 years. Within those funding ranges, there is limited flexibility beyond like y commitments. Given a high level of existing commitments, any projects that are not funded through the Programme will not be progressed in the next 3 years. In addition, they are unlikely to be fully funded in the next 10 years unless the GPS is significantly amended to provide additional funding for state highway improvement projects.

Penlink

26 You requested that officials provide further advice on the rationale for recommending that the project does not proceed to construction, and any alternatives to this project that officials would recommend in this corridor.

27 The Ministry and Treasury advice [OC210276/T2021/1002 refers], as well as Waka Kotahi's advice [BRI-2158 refers], recommended not proceeding the Penlink project to construction.

28 Waka Kotahi's advice was based on a relative assessment of the project's contribution to outcome priorities:

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- 28.1 In order to prioritise the projects within the Programme, Waka Kotahi assessed them relative to each other against outcome criteria, including housing, safety, better transport options and improving freight connections. While Penlink was favourably assessed in terms of housing, against the other criteria, it was less favourably assessed in comparison to the other projects.
- 28.2 Given the significant cost pressures on the programme and a need to make choices about funding allocation, Waka Kotahi recommended completion of property purchase only (in addition to route protection already completed) for Penlink, in order to be able to progress other projects assessed more favourably across the range of outcomes.
- 29 The Ministry and Treasury's advice made similar considerations. While its potential housing benefits were identified, Penlink was ultimately given a lower priority compared to other projects due to its likely emissions impacts.

Takitimu North Link Stage 2

- 30 Your in-principle decision was to progress the Stage 2 business case, but not provide further funding, with the expectation it will be considered through the NLTF in future.
- 31 The implications of this decision would include:
- 31.1 **NLTF funding** — as per paragraph 25 above, beyond potential targeted safety improvements, GPS 2021 does not have sufficient flexibility or direction to fund projects such as this one within the next 10 years.
- 31.2 **Safety outcomes** — significant safety concerns will remain on this corridor. Alternative funding is not currently allocated to address these issues in the next 3 years. Future funding through the Road to Zero activity class would need to be considered against other priorities across the country and would only deliver safety improvements, not multi-modal and access benefits. In the five year period between 2016 and 2020 there were 25 deaths and serious injuries on this stretch of the corridor (it is estimated that if the project were to proceed, this number would reduce by 21 over a 5 year period).
- 31.3 **Growth outcomes** — this project delivers planned transport corridor improvements that support the region's coordinated investments (through the Smart-Growth planning framework and the Urban Form and Transport Initiative (UFTI) Connected Centres Programme) for the Ōmokoroa area. Ōmokoroa is identified as a short-term priority growth area. These current and earlier investments include utilities, local roading and other social infrastructure to support and encourage growth in these specific areas. Western Bay of Plenty District Council has enabled this development on the basis of our commitment to the corridor. The Smart-Growth planning framework is a long-term partnership between the councils of the region and central government investments including education, transport, water and other social infrastructure.
- 31.4 **Stage 1 extension** — this section is currently planned to be funded from Stage 2 of the project, but if delivered as part of Stage 1, would provide a safer tie in location on State Highway 2. There are some properties that are impacted by both Stage 1 and the extension, so having certainty on progressing (or not) the extension will reduce the potential for property purchase related delays to the Stage 1 project.

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31.5 **Reputation** — there is strong partner, stakeholder, and community support for this project. Over a number of years there have been several changes in the funding/timing of this project, and a further change will create uncertainty and frustration for landowners and the community.

Northern Pathway

32 As the original concept for Northern Pathway is not able to be delivered, you requested an options paper setting out the key choices for Government for you to submit to Cabinet. On 14 April 2021, you received a comprehensive briefing outlining the options explored and identifying a preferred option [BRI-2118 refers]. A further briefing summarising this information has been provided to you on 11 May 2021 [BRI-2174 refers].

Strategic assessments of the projects for which you have requested further information on the options are attached

- 33 You requested that Waka Kotahi and KiwiRail work with Ministry and Treasury officials to provide further information on the options for Mill Road and Papakura to Drury South Stage 2, Ōtaki to North of Levin, and Whangārei to Port Marsden.
- 34 Waka Kotahi and KiwiRail have prepared high-level options for the projects and corridors requested in your letter. Due to the short timeframes and the high-level nature of the Strategic Assessments, the cost estimates for options contained in the Strategic Assessment cannot be considered robust. The approach taken in the Strategic Assessment is to provide confidence assessments relative to initial cost allocations, but this is not intended to inform purchasing arrangements.
- 35 Further to the above, any alternative options have not been subject to the rigorous review undertaken as part of the baselining. They, therefore, have a much greater risk profile from an outcomes, scope, cost, and schedule perspective comparative to baselined projects.
- 36 From an outcomes perspective, this advice is also challenging where a wider systems assessment and stakeholder engagement would be beneficial but has not been possible within the timeframes available. For example, advice on freight investments relating to Port Marsden is difficult without consideration in the context of a wider national freight strategy. Similarly, passenger rail services for Levin should be considered as part of wider thinking on mass transit and public transport for the region.
- 37 How options perform from an overall carbon perspective (i.e. taking into account embedded carbon from building the project), has also not yet been considered.
- 38 Using initial cost judgements from this paper as a firm basis for purchase advice would have significant risk. It is also likely that the Waka Kotahi and KiwiRail Boards will not be in a position to agree to accept any cost risk that may result from a direction to deliver the projects at this point in time. While it is important to provide cost estimates to inform prioritisation, these cost indications should be significantly caveated to manage risks to you as purchasers and to Waka Kotahi and KiwiRail. We recommend that:

38.1 Ministers are clear on commitment of funds for early planning and investigation, and on the broad level of cost relative to the initial Programme allocation

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38.2 for some projects or scope choices, Ministers will be in a position to confirm commitment to fund the next stage of investigation and evaluation, but should exercise caution when confirming or making decisions based on total project cost estimates as they are not reliable at this stage

38.3 as work progresses, cost ranges from more detailed business cases (embedding revised outcomes and objectives, reflecting your priorities) can be used to inform purchase arrangements and public commitments.

39 Waka Kotahi's view is that all projects in the original Programme are still credible network improvements that will be required as part of the strategy required to realise required outcomes for communities. The key reason for changes to the Programme is the increase in costs beyond the Programme funding envelope. As such, it intends to include route protection (such as property purchase) in each option.

Mill Road and Papakura to Drury South Stage 2 (South Auckland projects)

40 You requested that officials reconsider the South Auckland investments as a package alongside the Drury Stations investment. You have sought a reconfigured option for consideration that:

40.1 works within the original funding envelope (\$2,024 million) across the three projects, and;

40.2 supports increased housing supply in the area in a way that is consistent with the Government's decarbonisation objectives, and;

40.3 improves safety outcomes

41 We have looked at package options which provide some balance across the specific outcomes you have requested above

42 Two options have been developed. Both options deliver safety improvements, and both result in better climate outcomes than initially proposed in the Programme. In addition option two supports expected growth (and housing supply).

43 **Option 1:** focusses on addressing safety issues in the north on the existing Mill and Redoubt Roads, providing a four lane northern end of the road (within the existing designation), along with a targeted safety treatment on the adjacent existing road through Takaanini.

44 **Option 2:** delivers a slimmer version of the northern end of Mill Road, two lanes rather than four, still addressing existing safety concerns.

44.1 With savings from not proceeding with the initial northern full Mill Road build, funding can be reallocated to support investment in the wider Drury network for local infrastructure. These infrastructure projects were identified as part of the initial Drury Transport Infrastructure Programme (DTIP) work in 2019/20 as necessary to facilitate a full network of transport modes in and around the south.

44.2 This would allow for a Frequent Transport Network (FTN), strategic cycling and walking connections to support development around rail, therefore increased mode shift.

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- 44.3 This will also support housing supply in Drury. This option does involve moving funding to fund local infrastructure, delivered by Auckland Transport. This expenditure was ineligible when the Programme was developed, due to the capital expenditure only requirement of the Programme.
- 45 Both options deliver safety improvements. There is more certainty around the engineering feasibility of option one due to work that has been completed to date. Option two requires further scoping work.
- 46 In terms of decarbonisation, both Option 1 and Option 2 have significantly less induced emissions than the full Mill Road proposal, with an expected net reduction in CO₂ when combined with the rail package. Option 2 has the potential for marginally enhanced outcomes over Option 1 due to less induced vehicle demand and enhanced mode shift potential in the new growth areas
- 47 In terms of housing supply, both options include rail as the foundation for sustainable development. However, Option 1 leaves key gaps in the local walk/cycle and frequent bus networks intended to complement the rail elements, particularly in Drury West. Option 2 provides a potential mechanism to complete those gaps and support release of more extensive parts of Drury West. Under both options significant growth in Drury East would remain constrained due to insufficient connections to SH1 and north through to Papakura
- 48 Option 2 has had lesser investigation than Option 1, and therefore higher uncertainty in terms of engineering feasibility and delivery mechanisms. However Option 2 provides opportunity for a greater level of housing yield, and enhanced decarbonisation outcomes.
- 49 The rapid rates of growth both in the corridors and inter-regionally on the existing corridors mean it is important to prevent build-out of the new corridors and to provide flexibility for future options how those corridors are used to improve mode share and accessibility. Route protection of the full Mill Road and Stage 2 of Papakura-Drury Projects is assumed under both options. Neither option would be able to fully fund the potential property liability associated with route protection. This would mean additional NLTF or other funding sources are required in the future.
- 50 The mode shift and decarbonisation benefits anticipated would also require complementary land use decisions and investment to support the transport provision. Achieving this land-use response is currently uncertain and could benefit from large-scale, 'catalyst' development, rather than being reliant on ad-hoc private developers.

Ōtaki to North of Levin

- 51 You requested that officials provide advice on the full range of options for this project, including whether there are lower cost rail and targeted safety and congestion relieving road projects that could deliver good transport outcomes for residents along the corridor, consistent with the funding envelope for the project of \$817 million and the Government's decarbonisation objectives.
- 52 State Highway 1 (SH1) is New Zealand's primary national corridor, but the section between Ōtaki and Levin is afflicted by a number of serious safety, efficiency, and resilience problems. In the five year period between 2015 and 2019 there were 63 deaths and serious injuries on this stretch of the corridor. It is estimated that this project would reduce this number by 45–50+ over a five year period.

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- 53 Waka Kotahi has previously investigated road safety improvements for the SH1 corridor and can confirm there are options available, which would involve speed management, enforcement, and educational interventions wire rope median along sections of the corridor where possible. Only a portion of these improvements currently has construction funding.
- 54 The extent of wire rope barriers that can be implemented is only feasible along some sections of the corridor given frequency of site access to properties. Given this issue, as well as bridge constraints, it is not possible to upgrade the existing corridor to a level appropriate for SH1. The constraints have been a key reason for the need to progress an off-line corridor.
- 55 It is important to note there are significant resilience issues associated with reliance on the existing SH1 corridor, noting the current alternative route involves a 3+ hour journey, via SH2. Given both this and the constraints on safety upgrades outlined above, it is considered that an essential part of the forward strategy is route protection and building of a new corridor.
- 56 KiwiRail has also produced a full electrified rail commuter option that could be a building block of a longer-term strategy to fully electrifying the Main Trunk Line and Hamilton to Tauranga. It does not recommend extending the existing Wellington 1600V DC system further to Otaki/Levin, but if electrification for commuter rail is to proceed, then KiwiRail has recommended that it should be a 25kV AC system which is the same as that in the Auckland Metro Area and the Main Trunk Line.
- 57 Overall, given the expected growth in travel between Otaki and North of Levin, carbon emissions are expected to increase for at least the short-term future, under any investment option (whether on-line, off-line or through rail investments).
- 58 Considering the above, and the direction to remain consistent with the funding envelope there are several investment packages that could be progressed. Common to these options are safety improvements on SH1 and progression of planning and route protection for the longer-term upgrade
- 59 There may be options to also progress either enhancements to the Capital Connection rail service, providing targeted upgrades to the state highway to facilitate housing growth or stage the implementation of the current scope. These may provide modest outcomes in terms of mode shift and housing supply respectively but will not address the resilience challenges of the corridor.
- 60 In either instance, they present risks to the funding envelope, are substantially less developed as concepts comparative with the existing scope and further work is needed to better understand benefits, and costs for these options.
- 61 Ultimately, Waka Kotahi considers that the alternative corridor is required at some point in the future, irrespective of the rail improvements. It is considered that investment options are more a question of timing and relative prioritisation, rather than reflecting a change to the long-term strategy for the area.
- 62 Waka Kotahi advises that partners (including councils), many stakeholders, and the community are strongly supportive of the current Programme option, and are expected to have concerns over alternative options. Landowner engagement is already well underway (over \$30 million of property has already been purchased) and changes to the current project will create uncertainty and stress for many of these landowners.

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Whangārei to Port Marsden

- 63 You requested that officials provide advice on the full range of options for this project, including whether there are lower cost rail and targeted road safety projects that could deliver similar outcomes for the corridor, consistent with the funding envelope for the project of \$692 million and the Government's decarbonisation objectives.
- 64 The Whangārei to Port Marsden project is part of a wider long term plan to improve the SH1 corridor between Whangārei and Auckland, improving safety, building greater resilience into the transport system, and supporting economic development. State Highway 1 (SH1) is New Zealand's primary highway, but the section between Whangārei and SH15 is afflicted by a number of serious safety, efficiency and resilience problems. In the five year period between 2015 and 2019 there were 56 deaths and serious injuries on this stretch of the corridor.
- 65 The importance of this section of SH1 is characterised by its function in connecting Northland to the rest of the North Island, where no other resilient route exists. It also provides an essential economic connection to Northport, the largest freight node in Northland.
- 66 To respond to these issues, a long term plan to improve the SH1 corridor between Whangārei and Auckland has been developed, improving safety, build greater resilience into the transport system, and supported economic development. The Whangārei to Port Marsden project is an integral part of this wider strategy.
- 67 Waka Kotahi has previously investigated road safety improvements for the SH1 corridor and can confirm there are viable options within the funding envelope. These safety improvements would include wire rope medians and limited local widening in addition to the Safe Networks upgrades that are currently partially funded. These improvements will provide no value to non-safety related outcomes.
- 68 Completing the Marsden Port rail line extension will allow the transfer of freight movements from heavy vehicles on SH1 (this transfer was estimated in the 2018 North Auckland Freight Demand Review to be up to 500-600 trucks a day, which is approximately 25 percent of current HCVs and less than 4 percent of total traffic volumes). Further work is needed to confirm benefits, as well as costs and timeframes.
- 69 KiwiRail has produced a concept that encompasses the extension to Marsden Point, coupled with axle weight upgrades to the section from Otiria to Whangārei and creation of road rail interchanges at strategic points on the North Auckland Line. KiwiRail believes there is a real opportunity to increase volume on rail through the expansion of the port and servicing further container ship calls. This has been seen through recent experience with the role of rail in responding to the disruption to the New Zealand supply chain. Commitment from Northport and key stakeholders would need to be tested as part of a next stage.
- 70 Overall, given the expected growth in travel between Whangārei and Auckland, carbon emissions are expected to increase for at least the short-term future, under any investment option. Options do however exist to limit this increase, through more carbon efficient freight movement (i.e. via rail), providing mode choice options for local communities (in the order of 50 percent of trips in the corridor are longer distance trips) and avoiding capacity increases for single occupancy vehicles. There is also a need for climate adaption of the SH1 corridor improvements to mitigate sea level rise.

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- 71 Considering the above, and the direction to remain consistent with the funding envelope, there are several investment packages that could be progressed. Common across these options are safety improvements on SH1 and progression of planning for the longer-term upgrade.
- 72 There may be options to also progress either the rail extension or a partial upgrade on the longer-term state highway project. These may provide outcomes in terms of freight movement and mode shift/ housing support respectively. In either instance, they present risks to the funding envelope as they are substantially less developed as concepts compared with the existing scope. Further work is needed to better understand relative benefits costs and timeframes for these options.
- 73 Waka Kotahi considers that the more substantial SH1 corridor upgrade is required at some point in the future, irrespective of the rail improvements. It considers that investment options are more of question of timing and relative prioritisation, rather than reflecting a change to the long-term strategy for the area.
- 74 Waka Kotahi advises that partners (including Northland Councils, Northport), many stakeholders, and the community have strongly supported the current Programme option, and been consistent in this support for a number of years. They will be opposed to alternative options.

Pathway to making decisions on the three additional projects

- 75 The Ministry and Treasury are preparing a Cabinet paper seeking approval for the projects that you have approved in-principle to progress. Following a further steer from you, we can include in this paper options around progressing the additional projects. You have indicated that you wish to take a paper to Cabinet in late May 2021, which leaves little time to further develop options and detailed information for the paper.
- 76 As outlined above, there are a number of options for improvements to the South Auckland projects, Ōtaki to North of Levin, and Whangārei to Port Marsden corridors. There is insufficient certainty across these options for Waka Kotahi and KiwiRail to be in a position to agree to implement the additional projects within a fixed envelope until further work is complete.
- 77 The extent of work required to achieve this varies depending on the option taken forward, but would likely involve:
- 77.1 further engagement, including with Iwi, Councils and Northport
 - 77.2 substantial business case type work for options that have less substantial previous investigation
 - 77.3 further investigations on staging options (where relevant), including benefits, scope, costs, and deliverability.
- 78 Given the potential significance of further work required, across a broad range of options, officials are interested in which elements that Ministers and Cabinet would like to pursue before undertaking further work.
- 79 Cabinet could agree to the initial projects, and give further direction around the remaining funding envelope and the priorities within it to progress the additional projects towards options development. There would still be a need for further

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Ministerial decisions to proceed to investment e.g. once detailed business cases are completed.

- 80 Officials have provided advice previously on governance and oversight controls that could be applied to help to manage the Programme. Previous advice will need to be refreshed in light of any changes made to the Programme. However, we expect that Ministers will need to give Waka Kotahi and KiwiRail certainty about where they have discretion, and clear expectations for where they need to seek further guidance and approval from Ministers. The Ministry and Treasury will provide further advice as part of the Cabinet paper development.

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PROJECT: OTAKI TO NORTH OF LEVIN— STRATEGIC ASSESSMENT

Context

Palmerston North continues to grow as an economic and freight hub for the lower North Island and the population in the Horowhenua and Kāpiti area is increasing. Both are increasingly putting pressure on the transport connections to Wellington

Road

State Highway 1 (SH1) is New Zealand's primary national corridor, but the section between Ōtaki and Levin is afflicted by a number of serious safety, efficiency and resilience problems. The importance of this section of SH1 is characterised by its function in connecting Wellington to the North Island, where no other resilient route exists. It also provides an essential economic connection to Palmerston North (via SH57), the largest freight node in central New Zealand.

In 2018, an Indicative Business Case (IBC) was endorsed by the NZ Transport Agency Board, which included endorsement for an offline highway, from Taylors Road in the south to north of Levin. This Project was subsequently included in the NZ Upgrade Programme to *"improve safety and access, support economic growth, provide greater route resilience, and better access to walking and cycling facilities"*

There has been substantial previous investigation and engagement with the community in this area, including:

- From 2012 there have been a number of studies into the transport requirements of this corridor, including strategic studies and a PBC
- Re-evaluation • Building on past investigations, the re-evaluation of the Ōtaki to north of Levin project in 2018 identified an approach comprising:
 - delivering short- and medium-term safety improvements
 - designating for a new route which will have allowance for four lanes in the future and
 - working to enhance public transport options and improve amenity within Levin.
- Since 2020 and the announcement of NZUP the business case for the project has been progressed, including the identification of a preferred option and further engagement with the community

Rail

Currently the electrified commuter railway ends at Waikanae and is a 1600-volt DC system. Greater Wellington Regional Council's (GWRC) has a fleet of 83 Matangi units that can only operate within this system.

KiwiRail also operates a daily PN-WGTN-PN service "The Capital Connection" which uses diesel hauled carriages. The renewal of this fleet (an interim solution) is a separate and approved NZUP project.

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The rest of NZ's electrified network (Palmerston North to Hamilton and within Auckland Metro) is a 25,000v AC network (25kV AC).

GWRC is progressing a Business Case – “Lower North Island Rail Integrated Mobility” - proposing investment in new rolling-stock for both the Wairarapa and Horowhenua/Manawatu commuter services. GWRC's Matangi Fleet is fully employed on the current and planned timetable.

These trains are not suitable for longer duration journeys, and would need seating of a higher comfort level, and toilets. This means that irrespective of the choice of motive power, new trains will be necessary for an Otaki/Levin service extension.

Since the Wellington system was specified in the 1930's, 25kV AC systems have become preferred throughout the world for longer distance electrification on the grounds of economics and capacity. As noted above the North Island Main Trunk and Auckland systems are both 25kV AC systems and they now represent the standard for New Zealand.

Aside from very local infill extensions, KiwiRail (and most railways) would adopt 25kV AC electrification for any new or significantly extended systems.

KiwiRail's view, which is shared with advisers to GWRC is that if a decision is taken to extend electrification beyond Waikanae, then it should be at 25kV AC and **not** be the 1600V DC system.

Outcomes sought

The key outcomes sought by the investment in this project are:

- **Safety** – to save lives and to reduce the risks of deaths or serious injuries
- **Resilience** – to enhance the resilience of the state highway network by reducing the number and duration of journeys affected by closures and delays
- **Regional Growth** – support inter regional growth and productivity through the efficient movement of people and freight (and improving reliability of journey times)
- **Provide connections** that integrate the state highway and local road network which serves the growth in urban areas
- **Mode shift and mode choice** – prioritise public transport, higher occupancy vehicles, freight vehicles and access to multi modal connections.

Counterfactual/do nothing

The significant impacts for the road options of doing nothing in relation to this project are:

- **Safety** – there have been 58 DSIs in the corridor (including 11 fatalities) in the last five years (2016-2020). This would continue (if not increase, given forecast flow increases) if nothing was done.
- **Unplanned delays** - this section of SH1 has experienced 33 unplanned closures a year due to unplanned incidents. This would continue (if not increase given forecast flow increases) if nothing was done. The length (and duration) of detour journeys from Wellington to Levin is 229km (3.25 hours), compared to 135km (1.25 hours) if the project were to progress as planned.

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- High risk assets - there are four high resilience risk structures on the corridor (including rail over-bridges), with no alternative route available to high-risk impact events. The remaining life of these high risk assets is becoming critical due to the growth in heavy goods vehicles on the network.
- Accessibility – this would continue to get worse, particularly for freight users.

At this point, there has not been sufficient work completed on the potential rail options to enable a full evaluation. It is inherent that without investment, accessibility (particularly for public transport and freight users) would continue to worsen and the identified outcomes would not be realised.

Investment options

There are a number of investment choices available that will respond to some or all of the outcomes sought.

The investment areas available include both rail and road options:

Rail*Electrification using 25kV AC*

The GWRC business case is determining the most appropriate propulsion mode for these new trains, (technical, environmental, and economic) for travel beyond the current electrified network (north of Waikanae and north of Upper Hutt).

Due to the high capital cost for the network, electrification of the route is unlikely to be economically viable, if specified solely for this passenger service so it needs to be considered in the context of a longer-term low carbon railway.

Without consideration for the matter below, it is likely these trains would be bi-mode which means:

- electric under the existing Wellington wires and (until these routes are electrified)
- use of some on-board propulsion system when operating beyond the electrified area.

In parallel, KiwiRail is studying the viability of extending the North Island electrified rail network to cover the routes Auckland – Hamilton – Tauranga and Palmerston North – Waikanae. Over time, if this proceeds it would provide shared user infrastructure that would support both freight and passenger services on these new end-to-end electrified corridors.

The features of modern train drive systems make equipping new trains for operation on both 25kV AC and 1600V DC (dual voltage) relatively straightforward and economical.

This means that the new trains required to serve Otaki or beyond and can easily be specified for dual voltage AC/DC operation and GWRC is taking this into consideration in their business case.

KiwiRail's estimate of costs for the electrified network is under development at present with a report due by the end of May.

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KiwiRail's view is that electrification using 25kV AC is the best technical solution and we believe this is shared by advisers to GWRC.

More diesel hauled services

The once a day Capital Connection service is a bare minimum and falls well short of a convenient service connecting Levin/Otaki to Wellington that would encourage mode shift.

While it is possible to conceive of a rail shuttle service running up and down from Levin to Waikanae and transferring passengers it will still be expensive to create a terminus and stabling at Levin and an exchange at Waikanae. Further, KiwiRail does not currently have the locomotives or carriages to service this, and as each service would require 2 locomotives (one at each end) it would be very expensive with likely limited attraction to commuters.

KiwiRail's view is that we should not pursue this option.

Public Transport (Bus) feed to Waikanae Station

This would be a more cost-effective holding position than a diesel shuttle and able to be introduced almost immediately. Improvements to the SH1 corridor would likely include benefits to this bus service.

Road – SH1 Corridor*Focussed safety interventions along the existing SH1 route*

This option would include limited localised widening, providing a wire rope median along the length of the route, combined with speed restrictions and educational and enforcement initiatives that are effective and appropriate ultimately for a revoked state highway. As noted elsewhere, use of median barriers along this corridor is limited by frequent property access points as well as bridge constraints.

Route protection of the long-term strategy

The long-term scheme will still be required in the future and protecting the route now will provide stakeholders with some confidence that the safety measures are interim. Property developers and District Councils would also gain confidence for their long-term plans

Current NZUP scope

Would provide an upgrade transport corridor along the length of the entire route, including the urban and rural sections of the state highway. Is well outside current funding envelope. The additional lanes would likely be used as a managed lane for HOV and or freight only.

Growth focussed progression of longer term corridor sub-options

There are a number of smaller interventions along the route that could be undertaken to facilitate the staged delivery of the long term solution over time. These could be location specific (with options outlined below) or simply commence delivery of the southern section of the long term upgrade.

SH1 corridor

- This would implement the four lanes and interchange in the urban section of Levin to facilitate access to the growth in industrial and Horowhenua District housing areas such as Tara-ika (2,500 housing units)

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- Implement two lanes between Ōtaki and Levin, with future proofed bridges (four lanes) and local road connections
- Implement the shared user path along the entire length
- Allow public transport lanes to be provided in urban Levin to improve public transport viability and mode shift of short trips and to/from the Levin rail station
- Upgrade of the SH1 / Tararua Road intersection (rail level crossing) to serve the increase in traffic expected from the Tara-ika housing development

SH57 corridor

- Short term focussed safety interventions along the existing SH57 route – Including limited localised widening, but essentially providing a wire rope median along the length of the route, combined with speed restrictions
- Growth investment - intersection upgrades – anticipated along SH57 at Queen Street and Tararua Road to serve the growth in urban Levin (residential and industrial)
- Growth investment - Multi-modal connections (east-west) to serve the growth in urban Levin (Tara-ika residential)

Investment packages and appraisal

Taking into account the above options, there are several packages of investment options for consideration. These packages, and how they respond to outcomes and the cost envelope are summarised in the table at the end of this assessment.

Key conclusions of this further analysis**Road**

The Original scope delivers fully against the project objectives and also achieves the wider housing outcomes, but does not decrease carbon (due to the growth forecast). However, the project is well outside of the current budget allocation. Some staging options of the longer-term strategy would return a large proportion of benefits for less cost

Option 3 only marginally reduces the carbon impacts on the corridor, however there are still a net carbon increase due to the growth forecast. This option only marginally addresses broader housing outcomes. Corridor and network resilience remain significant risks by retaining high risk structures and not having an alternative route available.

Option 2 has the potential to increase housing supply and also would result in a reduced carbon increase as a result of forecast growth. The Safety component of this would return smaller safety benefits due to traffic volumes remaining high and increasing. Corridor and network resilience remain significant risks by retaining high risk structures and not having an alternative route available. The level of wire rope able to be installed is also limited due to the level of access off the highway, which was a big factor in moving towards an off line solution.

Rail

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Option 3 reduces the carbon impacts on the corridor, however there is still a net carbon increase associated with the growth forecast. This option only marginally addresses broader housing outcomes.

There is not sufficient quantitative analysis performed to date to evaluate this option fully and accurately determine expected patronage, relative benefits and overall carbon impacts.

Within the timeframes we have also been unable to evaluate the operating model for this service, the ongoing costs of operation, maintenance/renewal etc and how these items may be funded (noting there would be an NLTF impact). These aspects would all need to be considered as part of next steps.

We would also need to engage with key stakeholders, including GWRC, if this proposal was progressed to a more detailed assessment.

Status of current information

As outlined above the previous work provides substantial inputs into this advice but also presents several limitations to advice on next steps. These include:

Carbon – We have undertaken analysis of the potential carbon performance of the road project, however detailed carbon modelling has not yet been undertaken for either road or rail options.

Operating model – further work is required to evaluate the operating model for the service and potential ongoing funding requirements.

Benefits, scope, cost and timeframes for alternatives investments – The existing information is generally dated and would need further work to provide an equivalent level of confidence to scope/ projects in the recently baselined NZUP option

Stakeholder input – this has not been possible within the timeframes

Next steps

If there is support for Safety/Growth or Rail options, then over the next 3 months the following work is suggested to provide greater certainty of the likely outcomes.

Interim Safety Works

Development of enhanced (where possible) medium term safety works (through extending return period of Safer Networks works as an example), including updating costs and benefits to the same level as the recently baselined information

There is not sufficient quantitative analysis performed to date to evaluate this option fully and accurately determine expected patronage and relative benefits.

Rail

If Option 3 is to be progressed, the following work is suggested to provide greater certainty of the likely outcomes:

- Further understanding of demand, and confidence levels that this will meaningfully reduce number of vehicles on SH1

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- Assessment of the operating model for the service and confirmation of funding thereof
- Updated and more detailed cost estimates for rail works
- Engagement with key stakeholders, including GWRC

Route Protection

Continue to complete the business case for the long term solution and continue with route protection only for the long term solution

Route Protection of SH1 long term upgrades

In the event the options above are progressed, work should still continue to complete the business case and route protection for the long term solution.

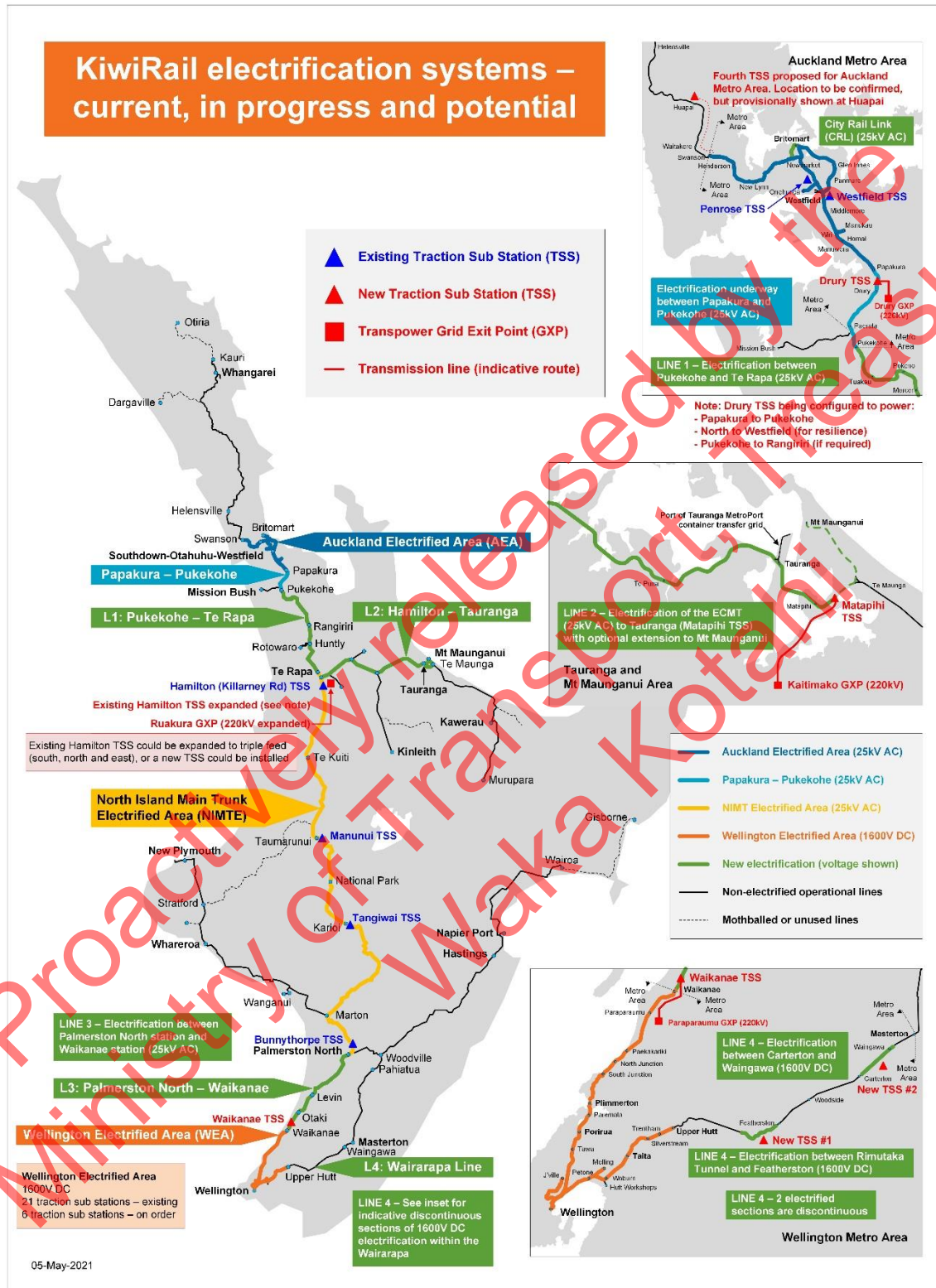
Staging approach to SH1 improvements

Develop a staging plan that sits within the allocated budget and delivers the most benefits

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Diagram 1 – KiwiRail potential long term electrification systems and Waikanae to Levin’s alignment with this



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Investment packages and appraisal

Taking into account the above options, there are several packages of investment options for consideration. These packages, and how they respond to outcomes and the cost envelope are summarised as follows:

Criteria	Option 1 – Original Scope	Option 2	Option 3
Description	<p>Road</p> <ul style="list-style-type: none"> Substantial upgrade to SH1, between Otaki and North Levin comprising: Four lanes, two of which will be for general traffic and two lanes to be considered for prioritisation of public transport, high occupancy vehicles and potentially freight Separated walking and cycling path <p>Rail</p> <ul style="list-style-type: none"> No rail component 	<p>Road</p> <ul style="list-style-type: none"> Short term focussed safety interventions along the SH1 and SH57 routes Route protection of the long-term SH1 strategy. Levin growth (SH57 improvements and congestion relief including interchanges at Tararua Road, Queen Street) <p>Rail</p> <ul style="list-style-type: none"> No rail component 	<p>Road</p> <ul style="list-style-type: none"> Short term focussed safety interventions along the SH1 and SH57 routes (refer limitations description below) No shared walking and cycling path Route protection of the long-term transport strategy <p>Rail</p> <ul style="list-style-type: none"> The full concept covering: <ul style="list-style-type: none"> A 25kV AC traction system (the same as that for the rest of NZ) Ideally fully electrified between Palmerston North and Waikanae (81kms) but in the first instance from Waikanae to Levin (35kms) accompanied by re-signalling New dual voltage trains also capable of operating under their own power for the non-electrified sections Development of platforms and park and ride stations While in an ideal world this should be double tracked, there would be no need to do this for day one and at most the option should involve route protection To the extent there are State Highway resilience or safety works, these should not preclude double tracking sometime in the future. This is particularly the case for the Ohau and Manukau road over rail bridges. The interim operation should be: <ul style="list-style-type: none"> The refurbished Capital Connection service Regular public transport (bus) shuttles between Levin and the Waikanae Railway station
Achieve Original Project Outcomes	<ul style="list-style-type: none"> High - This option would deliver all of the original project outcomes 	<ul style="list-style-type: none"> Low - This option would only address safety improvements in the short term (note significant impacts of these works below), with no increase in resilience (by retention of four high resilience risk structures), or mode shift and there would be some localised accessibility improvements to some growth areas. 	<ul style="list-style-type: none"> Low - This option would only marginally enhance the mode shift outcomes for the corridor. This option would only address safety improvements in the short term (note significant impacts of these works below), with no increase in resilience (including retention of four high resilience risk structures), or mode shift and there would be some localised accessibility improvements to some growth areas. Unknown for Rail – Until there is a proposed timetable, it is not possible to accurately estimate patronage of the service. We would also need to seek GWRC input.

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Criteria	Option 1 – Original Scope	Option 2	Option 3
Achieve Broader Outcomes Increased Housing Reduced Carbon	<ul style="list-style-type: none"> • Medium - This option would provide increased multi-modal accessibility to growth in the area, supporting an increase of an estimated 2,500 more houses over the next 5-10 years as part of the Tara-iki development east of Levin. • This option contributes to a significant reduction in fuel usage (in-corridor and network) and associated vehicle operating costs and carbon emissions on the new SH1, however overall the option does have the highest Vkt, providing the largest increase in carbon of the options due to there being two routes 	<ul style="list-style-type: none"> • Low - This option would provide the opportunity for housing growth in the corridor. • The option would increase Vkt in the corridor, albeit less than the original option. 	<ul style="list-style-type: none"> • Medium – This option would enable some of the growth forecast in the corridor. • This option would provide the opportunity for increased rail patronage, reducing the carbon footprint. Given the growth there would still be an increase in carbon forecast <p>This option would provide the opportunity for increased rail patronage, reducing the carbon footprint.</p> <p>Ultimately (but not part of this exercise) this option could become a building block for an electrified freight and passenger network (see Diagram 1):</p> <p>North Island Main Trunk</p> <ul style="list-style-type: none"> • Within Auckland Metro Area – current and being extended to Pukekohe • Between Pukekohe and Hamilton – future (86kms) • Between Hamilton and Palmerston North – existing (306kms) • Between Palmerston North and Waikanae – future (81kms) • Within the Wellington Metro Area – existing (55kms) <p>Auckland to Tauranga</p> <ul style="list-style-type: none"> • Between Pukekohe and Hamilton – lisper above • Hamilton to Tauranga – future (97kms)
Confidence in delivering within budget allocation	<ul style="list-style-type: none"> • Very Low 	<ul style="list-style-type: none"> • Medium 	<ul style="list-style-type: none"> • Medium
Deliverability	<ul style="list-style-type: none"> • This option traditional project complexity 	<ul style="list-style-type: none"> • These works would be largely online, creating delays and challenges during implementation. There would be significant dis-benefits in terms of reducing accessibility, restricting speeds and vehicle loads across critical bridges, whilst improving safety 	<ul style="list-style-type: none"> • This option has traditional project complexity and the rolling stock has specific procurement lead times and issues with asset ownership.
Supporting investment	<ul style="list-style-type: none"> • Rail investment as per the rail package in this table 	<ul style="list-style-type: none"> • Resilience – investment in bridge strengthening / replacement (four high resilience risk structures including rail overbridges) 	<ul style="list-style-type: none"> • Supporting timetable refinements (potentially) • Resilience – investment in bridge strengthening / replacement (four high resilience risk structures including rail overbridges)

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Criteria	Option 1 – Original Scope	Option 2	Option 3
Other Implications	<ul style="list-style-type: none"> While there is increasing public interest in commuter rail, patronage outside of the main centres is still a work in progress. Option strongly supported by partners and most stakeholders 	<ul style="list-style-type: none"> There is likely to be stakeholder and landowner concerns over this package \$30M property already purchased 	<ul style="list-style-type: none"> The scaled down road scope is likely to have limited stakeholder and landowner support \$30M property already purchased There is a parallel exercise - Lower North Island Rail Integrated Mobility (LNIRIM) - already underway for regional rail services on this corridor and the Wairarapa Line. It is running under Waka Kotahi processes in the sense that the ultimate objective is a funding submission to Waka Kotahi for NLTF funding. <p>It is being led by GWRC and has both KiwiRail and Waka Kotahi representation.</p> <p>KiwiRail strongly recommends that the exercise be held “whole” as the rolling stock solution for the Wairarapa Line must be the same as that for the NIMT. In practice this means that consideration should be given to how to best integrate the investment decisions for the above and below rail components, whilst acknowledging the different funding sources.</p>

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COMMERCIAL IN CONFIDENCE**PROJECT: SOUTH OF AUCKLAND TRANSPORT PACKAGE****Context**

This corridor is physically constrained by the typography of Auckland but comprises both the key strategic transport links entering Auckland from the south (being SH1 southern motorway, Gt South Road and the NIMTR), as well as including the largest proportion of the planned greenfield growth outlined for future development within the Auckland Unitary Plan. Auckland Council's Structure plan envisages a three decade development in the Drury-Opaheke and Pukekohe-Paerata Structure Plan areas with land use yields accommodating almost 100,000 people.

There are significant growth pressures on this corridor from both brown fields intensification live-zoned growth areas, inter-regional growth (including rapid growth in the adjacent northern Waikato), and new growth areas, including 7 Private Plan Changes in the Drury Area about to be considered for approval by an independent hearings panel.

In 2019 an Indicative Business Case (IBC) was approved by the Boards of both Auckland Transport and Waka Kotahi for a full-system response that included extensive upgrades to the rail system, complementary frequent transit bus networks, a full network of separated walk and cycle facilities and new or upgraded corridors to address safety, provide wider network resilience and improve accessibility to social and economic opportunities. This work included extensive collaboration with Auckland Council on identifying integrated and mutually supportive land use and transport outcomes. This full-system response requires coordinated, multi-jurisdictional interventions from strategic elements right through to local street design to achieve the desired transformation in mode shift and travel behaviours.

Detailed investigation and route protection of the approved IBC is ongoing via Te Tupu Ngatahi (Supporting Growth Alliance). Project implementation decisions occur via national level programmes (such as NZUP), regional planning (such as ATAP) and local network solutions agreed between Auckland Transport and land developers.

Auckland Council are considering opportunities for significant developer and/or land-owner contributions to the needed upgrades, however such commitments are often determined through the RMA land use planning process, for which infrastructure funding is rarely a consideration. This means that there remain a number of significant gaps in the local network that would either constrain the planned new developments or compromise the desired transformation to more sustainable travel and urban forms.

A key component of the Council's land use planning remains the objective of a quality, compact urban form, with significant priority to intensification of existing urban areas and careful sequencing of release of the identified greenfield areas. Provision of significant transport provision has a significant role in supporting that planned sequencing of new growth.

The four NZUP projects in this area are all part of this wider system-response to growth in the South of Auckland, albeit with different roles addressing the various outcomes.

Outcomes sought

The key outcomes sought by the overall system response for Southern Auckland are:

- Safety – to significantly reduce existing deaths or serious injuries and provide new infrastructure designed with safety as a core objective [a key focus for the Mill Road element of NZUP]

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- Mode shift and mode choice – support decarbonisation via significant enhancement to the rail system (along with supporting transit-orientated land use planning), complementary frequent and reliable bus corridors and an extensive, end-to-end network of separated walk and cycle facilities [the focus of the rail elements of NZUP]
- Resilience – to enhance the capacity and resilience of the strategic network to accommodate the planned growth, provide local community connections to reduce the reliance on the single SH1 corridor and provide corridors resilient to emerging climate change impacts, including sea-level rise and increased flooding risk [contributions from all the NZUP projects]
- Regional Growth – support the development of quality, compact urban form in the new urban areas and their interface with existing urban areas [all the NZUP projects]
- Improve Accessibility of the growth areas to social and economic opportunities [all the NZUP projects]

Counterfactual/do nothing

The significant impacts of doing nothing beyond the specific commitments include:

Papakura-Drury South (Stage 2): Omitting the additional SH1 capacity in this section would not be felt immediately, as it is associated with medium-term growth and also an interface with the Mill Road project. If this southern part of Mill Road was not provided, the immediate need for the extra vehicle lanes in Stage 2 is diminished. However, Stage 2 included further southern extension of the strategic cycleway and included new east west cycle crossings such as on Quarry Road overbridge. Quarry Road will fulfil an important role connecting eastern and western Drury leaving a critical gap in this cycleway if not implemented.

Drury Stations: Either constraint on planned high-density planned growth or continuation of auto-dependent development with subsequent impact on strategic corridors, urban form and environmental outcomes. The wider, rural fringe areas of Pukekohe and the north Waikato would remain without effective access to the rail network. The greatest immediate impacts would be for existing growth area and wider western rural catchment of the Paerata station, and the existing urban and north-Waikato catchments served by Drury Central station. Omitting just the Drury West Station would have less immediate impact on mode shift from car to train due to the park and ride provision of the other two stations. However, the early delivery of Drury West Station would ideally act as a catalyst for, and be accompanied by, initiatives (from both the public sector and developers) to advance the timing of the new developments planned to occur close to this station.

Mill Road North (Manukau to Papakura): Constrained growth (or growth with poorer access and safety outcomes) in existing growth areas such as Flat Bush, continuation or growth of significant serious crash issues in the existing Redoubt Road and Mill Road corridors connecting Manukau to Papakura, continuation of very poor north-south walk and cycle networks connecting existing and new communities. Over the last 10 years there have been 64 DSI's recorded along the Mill Road corridor.

Central Mill Road(Papakura): This section is primarily to accommodate the movement between the adjacent northern and southern sections, hence omitting it would not create adverse impacts unless the sections north and south were implemented without it

South Mill Road: (Papakura-Drury): This section provides connectivity between Papakura and Drury, Papakura and SH1 to the south and supports development of the Opaheke

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growth area that would otherwise be 'land locked'. It allows access between these communities east of SH1 to without needing to rely on the over-saturated SH1 corridor.

The Drury South Interchange (SH1-into Drury East): This connection provides both additional access into the Drury East growth area and forms the southern connection of the Mill Road corridor into the strategic SH1 network. A proportion of the Drury East development is considered feasible to be accelerated without this connection (subject to other local upgrades), however full development of Drury East would be constrained without the interchange and the connection to Papakura

Full Mill Road: Without the full, connected Mill Road corridor there would be poor access into Papakura, including the existing and planned industrial areas, all the communities east of SH1 (Flat Bush, Takaanini, Papakura, Opaheke and Drury) would need to continue to rely on the SH1 strategic corridor for connectivity and access to the wider network. This reliance on SH1 for short connections would continue to conflict with the strategic function of SH1, significantly extending the duration of the congested periods, constraining inter-regional reliability and productivity and providing no resilience to events on the strategic corridors, such as increased flooding, serious crashes or major incidents impacting the limited number of north-south corridors.

Investment options

As advised, the following elements of the South of Auckland package are to be progressed:

- Rail electrification
- Three rail stations, including interim connections
- Papakura-to-Drury Stage

	(\$m)	
Establishment Report funding for Papakura to Drury South, Drury Rail Stations and Mill Road	\$2,024	
In principle approved funding for Papakura to Drury South Stage 1 and 3 Drury Rail Stations	-\$1,068m	-\$1,215m
Funding available for options	\$956	\$809

From the original \$2.024 commitment this is estimated to leave some \$950-\$800m (P50-P95) of residual funding, to be prioritised for projects that:

- *Supports increased housing supply in the area in a way that is consistent with the Government's decarbonisation objectives, and;*
- *Improves safety outcomes*

The existing safety issues are predominantly in the northern parts of the corridor (on Redoubt Road and Mill Road), whilst the most significant opportunities to support new housing supply consistent with decarbonisation objectives is in the south, based around the three new stations at Drury and Paerata. Within the fiscal envelope available, this means a potential trade-off between the two objectives.

In considering the options for the residual \$1b investment, two strategies were identified:

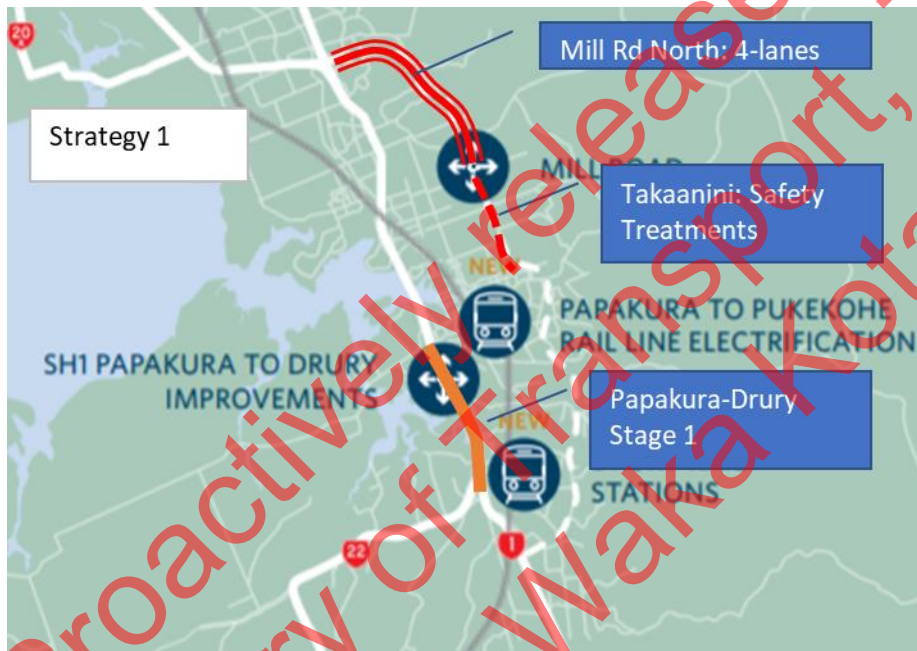
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Strategy 1: The residual spend is allocated to staged investment of the scope of the original NZUP projects

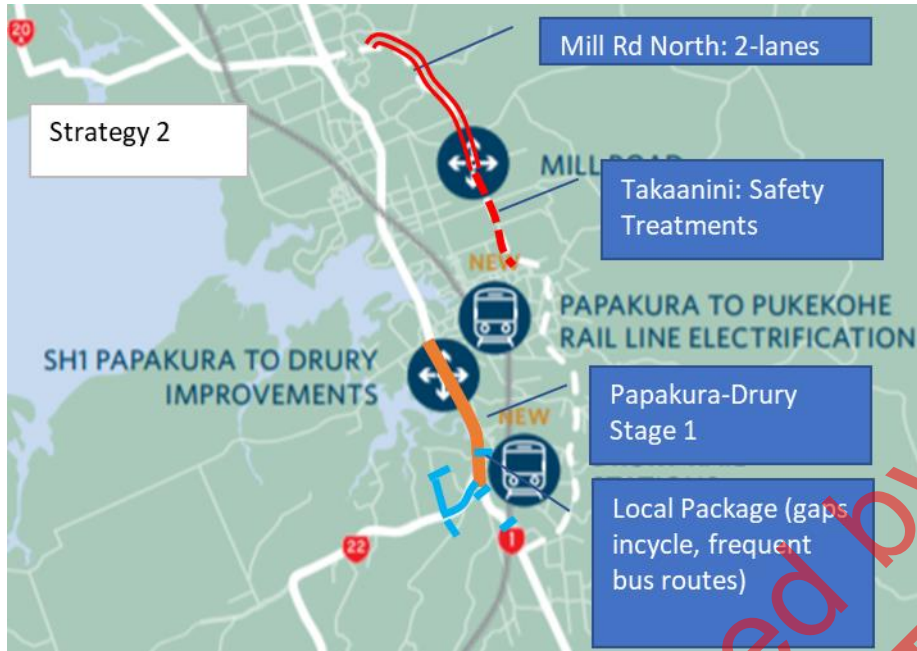
Strategy 2: A Mix of investment within the NZUP scope (mostly targeted at safety outcomes) and elements outside the defined scope of NZUP projects that seek to support supply of sustainable development in Drury

Strategy 1 involves the northern parts of Mill Road to address the existing safety issues. It includes the 4-lane facility within the existing designation between Manukau and Alfriston, as well as targeted safety works on the existing 2-lane section of Mill Road through Takaanini and into Papakura. This strategy is estimated to utilise effectively the full residual \$1b.

Strategy 2 involves a truncated, 2-lane upgrade in the north, comprising tie-in to the existing dynamic lanes on Redoubt Road, construction of a 2-lane, divided facility between Redoubt Road and Alfriston (within the designation and with future proofing of significant infrastructure like bulk earthworks) and the same targeted safety treatments through Takaanini. This reduced scope opportunity is estimated to provide up to 30% saving on the full northern option in Option 1, potentially releasing some funding for targeted investment in Drury (potentially of the order of \$250m).



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Options for the allocation of that investment have been based on the two objectives noted above, along with:

Priority to growth areas scheduled for earliest release in Councils growth strategy

Targeted at projects that support decarbonisation objectives, including:

Likely gaps in the Frequent Transit bus network

Strategic active-mode corridors

Likely gaps in the walking/cycling network on arterial roads

Additional southern access to Drury West station to support accelerated growth around the station to achieve TOD

Note: "likely gaps" refers to parts of the network anticipated to face challenges in getting developers to provide for or contribute towards. This strategy has therefore identified a Local Package comprising the following candidate elements:

- East-west cycleway connections over SH1 included as part of stage 2 of the Papakura to Drury Project (note: this element is on the local network but was to be delivered through the NZUP programme)
- SH22 intersections and urbanisation to accommodate new development
- Jesmond Road –2-lane urbanisation over greater extent than proposed by ATAP
- Bremner West link to accelerate growth within Drury West station catchment
- Bremner Road East – Removal of one-lane bridge and flooding constraints to strengthen east-west frequent bus network

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- Regional Active mode corridor beside NIMTR between Drury Central and Gt South Road to provide direct access between growth areas that avoids need to traverse through the motorway interchange and perhaps extend on the North Side of NIMT to Jesmond
- South DW Station access to Burt Road to support accelerated growth around station and access from east

Note the SH22 and Jesmond Road elements were partially covered in the ATAP Drury allocation, but this additional package is to support accelerating growth. Stage 2 of the Papakura to Drury Project was not seen as a priority in meeting the stated priorities. A variant was considered involving development of the Drury South Interchange with interim connection into Drury East to support proposed development in that area, however this was not included as Council sequencing priorities Drury West development of the east, and because a motorway interchange solely for access into a new development area was not considered aligned with the decarbonisation objective.

The investment needed to fully fund this Local Package is likely to exceed the available funding package. However, there is significant scope to utilise developer contributions (either financial or through them undertaking direct construction), with the Local Package funding filling in gaps such as 3rd party property and the 'extra-over' investment to support developer-provided strategic FTN and cycleway elements and future-proof for the longer-term growth.

Key conclusions of this further analysis

The Original strategy has good (but incomplete) rail and mode shift outcomes but **cannot be provided within the committed funding envelope**. As a combined package (Road+Rail) it has an expected slight increase on operational vehicle carbon and key gaps remain in delivering mode shift objectives in Drury.

Option 1 enhances the rail and mode shift elements and has potential to remain within budget envelope (although dependent on how contingencies and property liability risks are accounted). Its focus on safety treatments in the north mean land release in Drury remains constrained or with poor outcomes

Option 2 has the same core rail and mode shift elements but provides a more balanced approach with a reduced scope of investment in addressing safety issues in the north to provide funding to support enhanced yield and mode shift outcomes in Drury.

With both options, the objectives related to enhanced accessibility and network resilience for the growth areas east of SH1 remain unaddressed.

Status of current information

The engineering feasibility of interim options (especially Option 2 and the Takaanini safety works) and related costs estimates are conceptual only, and would require more detailed investigation

The feasibility of the alternative funding/delivery philosophy for the Local Package within Option 2 is conceptual and would require further investigation

The requirement and implications of accelerated growth around the Drury West station to support the accelerated provision of the station would need to be investigated by Council

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The implications of revised NZUP priorities and potentially new delivery mechanisms (Option 2) on ATAP partners would require investigation

The land use planning decisions in Drury are to be made by independent commissioners hearing the various Private Plan Changes, meaning that the specific scale, location, timing and restrictions of new development is not known

Operational (vehicle emission) assessment of climate change impacts have been undertaken on the key transport elements, but not detailed carbon assessments of a confirmed investment package.

Benefits, scope, cost and timeframes for alternatives investments – The existing information is often dated and would need further work to provide an equivalent level of confidence to scope/ projects recently baselined NZUP option.

Next steps

Potential Next Steps following Ministerial direction on preferred investment option: include:

- Progress detailed engineering investigation of the preferred options
- Progress conversations on delivery/funding mechanism with key ATAP partners if Option 2 is selected
- Confirm investment decisions to allow their consideration in the independent land use planning processes scheduled to commence imminently
- Proceed with Route Protection of the Full Mill Road corridor
- Proceed with Route Protection of the Stage 2 of the Papakura-Drury Project
- Cooperate with Council (and other agencies) on master and land use planning to optimise outcomes around the Drury West Station
- Proceed with route protection of Drury-Paerata corridors – Active Mode and Urban Connectors (noting protection associated with third and fourth main is a key dependency).

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Investment packages and appraisal

The two strategies identified above are summarised below, along with the original NZUP scope for context.

Criteria	Original NZUP Scope	Option 1: 4-lane Northern Safety project + Southern Growth within NZUP scope	Option 2: 2-lane Northern Safety project + Drury Local Package to support planned growth
Description	<ul style="list-style-type: none"> Corridor Protection (via SGA) Rail electrification Stage 1 and 2 of Papakura to Drury Two rail stations at Drury Full implementation of 4-lane Mill Road corridor and cycleway 	<ul style="list-style-type: none"> Corridor Protection (via SGA) Rail electrification Stage 1 only of Papakura to Drury Three rail stations at Drury and Paerata Implementation of 4-lane northern section of Mill Road corridor (within designation) Safety treatments on the existing Mill Road through Taakanini to Papakura 	<ul style="list-style-type: none"> Corridor Protection (via SGA) Rail electrification Stage 1 of Papakura to Drury Three rail stations at Drury and Paerata Implementation of staged 2-lane northern section of Mill Road corridor (within designation) Safety treatments on the existing Mill Road through Taakanini to Papakura Drury Local Package filling gaps in cycling and frequent bus network and additional access to Drury West Station to maximum TOD opportunity Critical cycle crossings of SH1 included in stage 2 of Papakura to Drury
Achieve Original Project Outcomes	<ul style="list-style-type: none"> Medium/High This option would deliver all of the sought NZUP project outcomes but not all of wider system solutions, especially in local cycling and PT connections between Drury East and Drury West Implementation of central and southern parts of Mill Road ahead of growth planning could compromise Council growth sequencing and undermine mode shift/climate outcomes 	<ul style="list-style-type: none"> Medium significantly assist with the key safety improvements in the north provides the core elements of the PT mode shift strategy. Growth sequencing would remain constrained due to lack of key elements of the mode shift solutions on the local network Network resilience and improved accessibility objectives would not be fully addressed. Negative climate and mode share impacts from new road capacity would be significantly less than the complete Mill Road option. 	<ul style="list-style-type: none"> Medium significantly assist with the key safety improvements in the north provides the core elements of the PT mode shift strategy. Growth sequencing would be supported via filling gaps in local cycling and PT networks. Network resilience and improved accessibility objectives would not be fully addressed. Negative climate and mode share impacts from new road capacity would be significantly less than the complete Mill Road option.
Achieve Specific Outcomes: Increased Housing Reduced Carbon	<ul style="list-style-type: none"> Medium This option would release some housing in Drury East (albeit ahead of Council sequencing), but constraints on Drury West in local cycle/PT networks would remain. In isolation, the Papakura-Drury and full Mill Road projects expected to increase vehicle climate impacts, however when considered as a package with the rail elements would be close to net zero (+1 tonne CO₂ per day increase 2038). 	<ul style="list-style-type: none"> Medium This option would release some housing in Drury East (albeit ahead of Council sequencing), but constraints on Drury West in local cycle/PT networks would remain. In isolation, the Papakura-Drury and Northern Mill Road projects expected to increase vehicle climate impacts, albeit significantly less than the full Mill Road project. When considered as a package with the rail elements expected to be a net reduction in operational transport emissions. (2 tonnes CO₂ per day decrease 2038). 	<ul style="list-style-type: none"> Medium/High This option would release some housing in Drury East (albeit ahead of Council sequencing), and release the bulk of in-sequence Drury West growth. In isolation, the Papakura-Drury and Northern Mill Road projects expected to increase vehicle climate impacts, albeit significantly less than the full Mill Road project. When considered as a package with the rail elements expected to be a net reduction in operational transport emissions. (>2 tonnes CO₂ per day decrease 2038)
Confidence in delivering within budget allocation	<ul style="list-style-type: none"> Not achievable 	<ul style="list-style-type: none"> Medium Depends on feasibility assessments on the interim/partial schemes and treatment of contingencies and property liability risks 	<ul style="list-style-type: none"> Low/Medium Depends on feasibility assessments on the interim/partial schemes, treatment of contingencies and property liability risks and feasibility of 3rd Party inputs to Local Package

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Criteria	Original NZUP Scope	Option 1: 4-lane Northern Safety project + Southern Growth within NZUP scope	Option 2: 2-lane Northern Safety project + Drury Local Package to support planned growth
Deliverability	<ul style="list-style-type: none"> This is the most complex and timely option to implement. The scale of work could be impacted by industry capacity 	<ul style="list-style-type: none"> Lesser scale but complex decisions on balancing interim works versus future proofing/redundancy, especially on Takaanini section 	<ul style="list-style-type: none"> Lesser scale but complex decisions on balancing interim works versus future proofing/redundancy, especially on 2-lane northern Mill Road and Takaanini sections. The Local Package has potential to significantly assist leveraging developer inputs but is unlikely this package could be delivered by Waka Kotahi or Kiwirail and would require a new approach to funding and delivery with Auckland Transport/Council and a different financing approach to the existing upgrade programme.
Supporting investment	<ul style="list-style-type: none"> The full system solution to southern growth area includes requirement for additional strategic and local upgrades, most of which are not funded. Significant contributions from developers and/or land owners would be required. The full system solution also requires complementary land use decisions, that could benefit from large-scale, centralised leadership rather than reliant on ad-hoc private developers 	<ul style="list-style-type: none"> The full system solution to southern growth area includes requirement for additional strategic and local upgrades, key local parts of which this option could address. Significant contributions from developers and/or land owners would be required. The full system solution also requires complementary land use decisions, that could benefit from large-scale, centralised leadership rather than reliant on ad-hoc private developers 	<ul style="list-style-type: none"> The full system solution to southern growth area includes requirement for additional strategic and local upgrades, key local parts of which this option could address. Significant contributions from developers and/or land owners would be required. The full system solution also requires complementary land use decisions, that could benefit from large-scale, centralised leadership rather than reliant on ad-hoc private developers
Other Implications	<ul style="list-style-type: none"> The investment focus on eastern side of SH1 could further accelerate out of sequence growth whilst continuing to constrain in-sequence growth in the west 	<ul style="list-style-type: none"> The in-sequence growth in Drury west could remain constrained or with sub-optimal outcomes. Independent land use decisions in Drury may not align with this strategy. 	<ul style="list-style-type: none"> Independent land use decisions being pursued by developers in Drury may not align with this strategy

Proactively released to the
Ministry of Transport, Treasury
Waka Kotahi

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PROJECT: WHANGĀREI TO PORT MARSDEN— STRATEGIC ASSESSMENT

Context

Northland is one of the fastest growing regions in the country, due in part to its proximity to Auckland. It is also one of the most deprived regions in the country.

Road

State Highway 1 (SH1) is New Zealand's primary highway, but the section between Whangārei and SH15 is afflicted by a number of serious safety, efficiency and resilience problems. In the five year period between 2015 and 2019 there were 56 deaths and serious injuries on this stretch of the corridor.

The importance of this section of SH1 is characterised by its function in connecting Northland to the rest of the North Island, where essentially no other route exists. It also provides an essential economic connection to Northport, the largest freight node in Northland.

The upgrade is part of a wider programme of improvements to improve safety, access, and reliability between Whangārei and Auckland.

Further investment in the rail corridor is also envisaged as part of this wider corridor plan.

Together, these projects aim to improve safety, build greater resilience into the transport system, and improve the connection and access to Northland.

There has been substantial previous investigation in this area that have informed this position, including:

- In 2015 the Connecting Northland Strategic Case identified the importance of the State Highway 1 corridor and the case for investment in the corridor.
- In 2016 the Whangārei to Auckland Programme Business Case was endorsed by the Waka Kotahi Board that set out the long term strategy for this critical transport corridor, which identified the current NZUP project.
- Re-evaluation – the re-evaluation of the project in 2018 identified an approach comprising:
 - deliver short term safety improvements and more reliable access on the existing state highway
 - continue to plan and protect land for a new route in the long term.

Since 2020 and the announcement of NZUP the business case for the project has been progressed, including the identification of a preferred option and engagement with the community. The current timeline is for the business case to be complete in mid 2021, with Notice of Requirement lodgement in early 2022.

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Despite its proximity to Auckland, Northland is poorly connected to the rest of NZ with low service levels and lengthy journey times. Because of this poor connectivity, the region is not fulfilling its potential as a place to invest.

The existing rail network had been poorly integrated into the wider transport system and was a clear example of “Managed Decline”. There was no rail connection to Northport.

Recent Crown investment of \$178.5m through the Provincial Growth Fund (PGF) has enabled the following areas to be addressed:

- From 11 January 2021 the line between Whangarei and Auckland can now take conventional 9’6” shipping containers
- Post Xmas 21/22 that same section of line will be able to take an 18-tonne axle load meaning KiwiRail’s standard North Island locomotive and wagon fleet can operate; whereas at present only use light axle locomotives can be used
- Post Xmas 22/23 the section of line from Kauri to Otiria will be re-opened for low speed operation of light axle locos

In addition, KiwiRail has been allocated \$40m from the PGF to purchase the land necessary for the connection to Northport.

The investment in the existing line helps the exporter connect to Ports of Auckland and Tauranga, but the absence of a rail connection to Northport means any export goods from Whangarei and north must either travel by road to the port, or by road/rail to ports to the south.

A number of studies have been completed on the potential for a rail spur. This includes the business case for the North Auckland Line and Marsden Point Rail link Single Stage Business Case completed by the Ministry in 2019 which concluded that the economic justification for expanding the rail line to Marsden Point would require Northport to significantly increase its usage.

KiwiRail believes there is a real opportunity to increase volume on rail through the expansion of the port and servicing further container ship calls. This has been seen through recent experience with the role of rail in responding to the disruption to the NZ supply chain.

Outcomes sought

The key outcomes sought by the investment in these improvements are:

- Safety – to save lives
- Resilience - to support growth in the Northland region.
- Economic growth – to enhance the movement of freight between Whangarei, Ruakaka and the rest of New Zealand and connecting growth areas of Whangarei and Ruakaka. Rail investment will contribute to reduction in the cost of moving freight (including increased productivity), employment and jobs, Northport throughput, business growth and number of new businesses
- Mode shift – particularly in the Whangārei urban area. Rail investment would increase the proportion of Northland freight moved by rail and

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reduce truck movements on constrained parts of the State Highway system.

Additional investment objectives if a rail component is included:

- To better connect Northland to Auckland and the rest of the upper North Island
- To better connect Northland to its Port at Marsden Point
- To improve the quality of service and choice for customers and enable better transport mode integration
- To reduce the cost and impact of transport for Northland-based businesses and New Zealand more generally
- To encourage better use of existing infrastructure.
- Emissions – Rail produces 70% fewer emissions than heavy road freight transport per tonne of freight carried.

Counterfactual/do nothing

The significant impacts of doing nothing in relation to this project are:

- Safety - there have been 56 deaths and serious injuries (DSIs) in the corridor (including 17 fatalities) in the last five years. This would continue (if not increase given forecast flow increases) if nothing was done
- Unplanned delays - this section of SH1 has experienced over 60hrs of delay a year due to unplanned incidents. This would continue (if not increase given forecast flow increases) if nothing was done.
- Accessibility – this would continue to get worse, particularly for freight users, with Northport continuing to be restricted to road options. This will mean emissions benefits would not be realised.

Investment options

There are a number of investment areas available that will respond to some or all of the outcomes sought. These include:

Rail

The rail option would be to complete the Marsden Point connection, noting Port Grid development would be required (co-funded by Port Company) as well as Rail Connections from the Far North to the Marsden Point Link and yard/CT sites/Log Loading areas.

1. Marsden Point Connection

The corridor must be delivered in full to have any value (i.e. there is no halfway option).

The most recent estimate KiwiRail has is \$289m (excluding land purchase) which was pre-Covid and based on an assumption of works commencing 1 July 2020. This estimate is from 2018 and would need to be updated, with escalation expected.

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It traverses some significant hilly terrain and coastal marine areas which will require specialist civil construction resources that are in short supply. In addition, parties would need to consider whether the causeway was developed solely for rail or to enable the future roadway.

2. Port Grid

The costs above exclude the on-port rail grid which is assumed to be funded by the Port Company as part of the development. [REDACTED]

This would need to be further tested.

3 Rail Connections from the Far North to the Marsden Point Link

To maintain the free and frank expression of opinions

The current Northland PGF project funds re-opening the section from Otiria in the Far North to Kauri as a minimum viable product, which translates to a slow moving low axle weight operation.

If the goal is to make a material shift of forestry and containerised export freight off SH1 and through the urban areas to connect to Northport, then this segment of the line needs to be upgraded to an 18-tonne axle. KiwiRail had previously advised the cost of this from Otiria to Kauri and then on to Whangarei yard would be c\$60m. Again, this cost estimate would need to be refined and updated for escalation.

4 Yards/CT Sites/Log Loading Areas

In addition, there are other system investments required. This includes basic log loading areas plus improvements to the Whangarei CT yard plus an expansion of the proposed Otiria Yard and other nodes on the corridor. Costing for these investments would need to be confirmed.

Road

SH1 corridor options include:

- **Focussed safety interventions along the existing route** – Including limited localised widening, but essentially providing a wire rope median along the length of the route
- **Route protection of the long-term upgrade** – The long-term upgrade will be required in the future and protecting the route now will provide stakeholders and landowners with greater certainty. If progressed alongside implementation of immediate safety measures, this route protection would still give some confidence that the safety measures are interim and the longer-term strategy will be progressed in the future.
- **Staged progression of longer term corridor:**
 - **Whangarei Urban Section upgrade** – This would implement the four lanes (two of which would be managed lanes for public transport/ higher occupancy vehicles) and walking and cycling path in the urban section of Whangarei. This would support the wider Waka Kotahi / Whangarei District Council one network strategy to encourage use of public transport and cycling.
- **Progress current NZUP scope** – which would provide an upgraded transport corridor along the length of the entire route, including the urban and rural sections of

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the state highway. Would include two managed lanes for public transport/ higher occupancy vehicles and walking and cycling path provide Is however well outside current funding envelope

- **Public transport services** – would be required to support proposed growth and mode shift focus.

Investment packages and appraisal

Taking into account the above options, there are several packages of investment options for consideration. These packages, and how they respond to outcomes and the cost envelope are summarised in the table at the end of this assessment.

Key conclusions of this further analysis

The original scope would fully meet the project objectives and achieves the wider housing outcomes but does not decrease carbon (due to the growth forecast). The project cost estimate is well outside of the current budget allocation.

The rail investment option is linked to broader supply chain considerations. It assumes the network investment is matched by investment in port infrastructure coupled with a shift of some Upper North Island containerised export traffics to enable benefits to be achieved.

With respect to traffics from the Far North, and in particular forestry exports there would need to be pricing arrangements or other commercial constructs that discouraged logging trucks from making the journey directly from cutting face to port. Updated work on commercials would need to be completed.

Under current commercial and economic settings direct road from cutting face to port, will be cheaper to the exporter on many occasions. The type of model that needs to be embedded if there is to be mode shift, reduce demand and improve safety on SH1 is:

- Truck – cutting face to rail head
- Rail – from railhead to port

For trucking operators to have a viable business operating a short haul business, capital investment in improvements outlined above will need to be matched with changes to operation and contract forms

Status of current information

As outlined above the previous work provides substantial inputs into this advice but also presents several limitations to advice on next steps. These include:

- **Carbon** – We have undertaken analysis of the potential carbon performance of the project, however detailed carbon modelling has not yet been undertaken.
- **Benefits, scope, cost and timeframes for alternatives investments** – The existing information is often dated and would need further work to provide an equivalent level of confidence to scope/ projects recently baselined NZUP option.
- **Economic Analysis** – operating model forecasts need to be updated to include future costs of managing maintenance on the extension to the rail network

Specific information issues of note include:

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- What is the likely uptake in road to rail freight trips if rail investment was made. Forecasts have been made, but these have uncertainty attached as it will be market driven
- What would the likely uptake of public transport patronage on services in the Whangarei urban section if bus services and lanes were provided
- Business case information would need to be updated with current market data and
- Partner and stakeholder commitment would need to be confirmed.

Next steps

If a decision that alternative investment options warrant further investigation, the following work is required to provide greater certainty of the likely outcomes:

Interim Safety Works

- Development of larger scale short term safety works, including updating costs and benefits to the same level as the recently baselined projects

Public transport services

- Undertake analysis to confirm likely public transport services and mode shift estimates

Rail

If Rail options are to be progressed, then work required to provide greater certainty of the likely outcomes would include:

- Further understanding of demand and supporting measures needed to achieve mode shift
- Updated assessment of the commercials for the service, including customer projections, ongoing costs to serve and expected renewals, noting that for KiwiRail as an SOE the service would need to be profitable.
- Updated cost estimates for rail works and potential future requirement for NLTF funding for renewal and maintenance
- Stakeholder engagement and commitment of Stakeholders such as Northport to support rail services

Route Protection of SH1 long term upgrades

- In the event the options above are progressed, work should still continue to complete the business case and route protection for the long term solution

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Investment packages and appraisal

Taking into account the above options, there are several packages of investment options for consideration. These packages, and how they respond to outcomes and the cost envelope are summarised as follows:

Criteria	Option 1 – Original Scope	Option 2	Option 3
Description	<p>Road</p> <ul style="list-style-type: none"> Substantial upgrade to SH1, between Whangārei and SH15 comprising: Four lanes, two of which will be for general traffic and two lanes prioritised for public transport, high occupancy vehicles and potentially freight Separated walking and cycling path Upgrading the SH1/SH15 intersection <p>Rail</p> <ul style="list-style-type: none"> No rail component 	<p>Road</p> <ul style="list-style-type: none"> Short term focussed safety interventions along the SH1 route Route protection of the long-term SH1 strategy. Whangarei Urban Section upgrade (to same standard as original scope, including new walking and cycling path) <p>Rail</p> <ul style="list-style-type: none"> No rail component 	<p>Road</p> <ul style="list-style-type: none"> Short term focussed safety interventions along the SH1 route No walking and cycling path. Route protection of the long-term strategy <p>Rail</p> <ul style="list-style-type: none"> Complete the Marsden Point connection, Port Grid development required (co-funded by Port Company), Rail Connections from the Far North to the Marsden Point Link plus required yard/CT sites/Log Loading areas.
Achieve Original Project Outcomes	<ul style="list-style-type: none"> High - This option would deliver all of the project outcomes, being safety, resilience, economic growth and accessibility. 	<ul style="list-style-type: none"> Low - This option would help address safety improvements (but to lower level than Option 1) and enhance the accessibility of public transport users in Whangarei 	<ul style="list-style-type: none"> Low - This option would address safety improvements (but to lower level than Option 1), and possibly enhance the accessibility of some freight movements
Achieve Broader Outcomes	<ul style="list-style-type: none"> Medium - This option would provide increased multi-modal accessibility to the Port Marsden/Ruakaka key growth node by supporting an increase of an estimated 3800 more houses by 2048. The option does however have the highest Vkt, providing the largest increase in carbon of the options 	<ul style="list-style-type: none"> Low - This option would not address the housing outcomes sought in a significant way. The option would increase Vkt in the corridor (in the urban section), albeit less than the original option 	<ul style="list-style-type: none"> Low – This option would not address the housing outcomes sought. This option would provide the opportunity for increased rail freight, reducing the carbon footprint for this freight. Based on the 2018 North Auckland Freight Demand Review this would reduce HCVs by 25% and overall traffic by less than 4%.
Confidence delivering within budget allocation	<ul style="list-style-type: none"> Very Low 	<ul style="list-style-type: none"> Medium 	<ul style="list-style-type: none"> Medium
Deliverability	<ul style="list-style-type: none"> This is the most complex and timely option to implement. There will be some complexity in delivering short term safety works and the long term solution. 	<ul style="list-style-type: none"> The urban section for Whangarei is very complex and will have some property risk in particular associated with timing of securing property. 	<ul style="list-style-type: none"> This option has traditional project complexity but not as great as the other two options. However, we note that the corridor to Marsden Point is consented, and the other rail works would be predominantly within the existing corridor. The work is mainly basic civil and rail construction.
Supporting investment	<ul style="list-style-type: none"> Public transport services 	<ul style="list-style-type: none"> Public transport Services 	<ul style="list-style-type: none"> Rail services and supporting measures to encourage mode shift
Other implications	<ul style="list-style-type: none"> Option strongly supported by partners and most stakeholders 	<ul style="list-style-type: none"> There is likely to be opposition from partner organisations (Northport, Councils) for this package, comparative to Option 1. 	<p>We do not yet know what support key stakeholders (Northport and Councils) would have for this package.</p> <p>If it is seen as an investment “instead of road” this could pose some challenge.</p>