

MINISTERIAL BRIEFING NOTE

Subject	State Highway Asset Condition and Maintenance
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Contact(s) for telephone discussion (if required)				
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Action taken by Office of the Minister

- Noted
- Seen by Minister
- Agreed
- Feedback provided
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- Needs change [please specify]
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30 November 2023

Hon Simeon Brown – Minister of Transport

STATE HIGHWAY ASSET CONDITION AND MAINTENANCE

Purpose

1. This briefing provides you with an update on the State Highway network's asset condition and maintenance, including the summer maintenance programme for 2023-2024.
2. There has been significant pressure on the National Land Transport Programme (NLTP) State Highway Maintenance Activity Class over the last three years with contractor negotiations, contractor capacity, price escalation and the frequency and severity of weather events impacting on the delivery of the New Zealand Transport Agency (NZTA) maintenance programme, particularly in 2022-23.

Background and context section

3. The state highway network consists of a range of different assets (such as roads, bridges and culverts) which are owned by the Crown. NZTA controls and manages these assets on behalf of the Crown.
4. The state highway network is New Zealand's largest-value social asset, with a current replacement value of \$90 billion.
5. Approximately 90 percent of the state highway network continues to meet minimum asset condition requirements and is performing as expected. The other ten percent is near or below the level of what is considered acceptable. This impacts on the level of service to users through increased exposure to uneven road surfaces, potholes, and journey disruption. When lifeline routes are affected, significant detour routes can be required and, in some cases, no alternate route is available. See Appendix 1 for the proportion of the state highway network that meets acceptable standards for skid resistance, rutting and roughness, one of the Statement of Performance Expectations (SPE) measures that NZTA reports on.
6. The NLTP State Highway Maintenance Activity Class is funded for the maintenance, renewal and operation of the existing state highway network, to deliver an appropriate level of service. It includes funding for urgent response to emergency event disruptions of the network and restoration of the network.
7. The State Highway Maintenance Activity Class has \$3.1 billion committed for 2021-24. This was increased from the original allocation of \$2.8 billion to fund additional emergency works required because of the abnormal scale of storm events.

Factors affecting asset condition

8. The state highway network carries 50 percent of New Zealand's general vehicle traffic and 72 percent of road freight. The state highway network comprises approximately 11,000 km of road (12 percent of all roads, which totals approximately 99,000 km).
9. Total vehicle kilometres travelled (VKT) on state highways has increased in line with population growth by 16 percent from approximately 19.3 billion in 2009 to 23 billion in 2021. The heavy vehicle VKT component of this figure grew by 28 percent over this period. The additional 3.7 billion kilometres travelled has had a significant impact on the network, as has the growth in heavy vehicles, resulting in degraded surfaces and pavements.
10. Degraded road surfaces and increased rainfall makes it more likely for water to enter the pavements making them weaker and more vulnerable to damage from heavy vehicles and increasing the rate at which potholes form and greater decay occurs.
11. The freight model from the Ministry of Transport shows that the upper North Island freight task has grown substantially since 2018 and is expected to keep growing to a 45% increase by 2033.

The increasing maintenance task

12. The growing size and complexity of the maintenance task for the state highway network brings added challenges and increased costs.
13. In the past ten years, the state highway road length has expanded from 22,138 lane kilometres to 24,297 lane kilometres, an approximate ten percent increase¹. There have been increases in safety infrastructure such as roadside safety barriers to support the growing network, requiring ongoing maintenance.
14. The maintenance activity class was expanded in 2018 to include footpath maintenance and will be expanded again in 2024 to include bridge renewals. Bridges add approximately \$120 million over three years on top of the usual \$75 million (five percent) per annum increase.
15. There are increasing regulatory requirements related to waste management, biodiversity and water quality. These change the cost and scope of activities to reduce environmental damage from maintenance. Initial costs are approximately \$30 million over three years but will depend on the stringency and rapidity of new requirements.
16. See Appendix 2 for details of the 2023-24 summer maintenance and renewal programme.

Increasing input costs of labour and materials

17. Maintenance costs from one three-year period to the next typically require a 15 percent increase in the three-year total expenditure to sustain service levels. This addresses input price change that is typically three percent per annum and provides for additional maintenance activities required to maintain the increasing scale and complexity of network infrastructure as the network services are improved and extended, and to meet the increasing rate of decay from increasing freight.

¹ Lane kilometres is a measure of each lane of road rather than the overall length of road. For example, if a four-lane highway is extended by one kilometre, there will be four kilometres of road added.

18. We planned and adopted the 2021-24 NLTP allocation of \$2.8 billion for state highway maintenance based on Treasury inflation forecasts as shown in the green line on the graph below. Actual inflation has followed the red line due to significant increases in international oil and bitumen prices, plus increases in costs of labour, plant and other construction materials. An allocation of about \$3.5 billion would now be required to implement the original planned programme. Because that was not affordable, we have adapted the originally planned programme. Further changes have also been required to respond to the scale of storm events.



19. As a result of budgetary and storm related issues we expect the network condition to continue to decline over 2021-24. Had inflation and weather been as assumed when the programme was proposed, the decline in network condition would have been more gradual because it was proposed to build the pavement rehabilitation towards the sustainable level. However, it is likely that only half the targeted works quantities will now be delivered.

20. Current predicted spend in both local roads and state highway maintenance activity classes is sitting at, or near, the top of the funding range in the Government Policy Statement on land transport 2021, and emergency works are consuming more than all available headroom. There is considerable uncertainty in future prices. Recent contract tenders and negotiations are showing upward pressure on prices greater than forecast inflation.

Overview of maintenance and renewal activities

21. Our maintenance and renewals activities are delivered in line with design standards and guidelines that are updated regularly to reflect changes in demand, technologies, and external drivers such as changing climate patterns. For this reason, they are not just about renewing assets 'like for like' – replacement bridges and culverts are built to withstand modern climate forecasts.
22. We routinely collect asset condition data and model the expected deterioration of roads and the impact of planned works across a range of scenarios. Annual state highway road surveys are undertaken that provide network condition reports for pavement and surfacing. Regular inspections of other asset classes including structures, drainage and signage are undertaken by consultants and contractors along with ongoing Geographic Information Systems (GIS) network hazard mapping.
23. We run continuous programmes of work to operate, maintain and renew roading assets, including multimodal paths and busways. These programmes are primarily contracted through Network Operating Contracts (NOCs). Councils manage their own procurement of maintenance and renewal works (the exception being Marlborough where there is a joint venture between NZTA and Marlborough District Council). These programmes are designed to ensure that roading assets deliver essential levels of service for safety, access, and resilience.
24. Our asset management modelling is calibrated against about 120 pavement deterioration calibration sites across the local and state highway network, and against the impact of past maintenance programmes compared to forecasts. State highway and urban data and modelling is more extensive than that for rural roads where there are smaller changes in demand year on year.
25. We have put considerable resource and focus into improving emergency response over the past five years. Under the current NLTP, \$480 million has been budgeted for response and recovery works on state highways and local roads. This budget has been topped up by \$250 million (response) and \$842 million (recovery) due to the severe weather events that affected the upper North Island at the start of 2023.

Constraints on industry capability and capacity

26. A period of flat-line funding for road maintenance between 2010 and 2017, compounded by more recent disruption caused by COVID-19, has led to supplier under-investment in plant (such as bitumen sprayers) and the loss of skilled crews. Consequently, there has been a loss of expertise and capacity in the sector.
27. Improved health and safety expectations, particularly for traffic management requirements to protect those working and travelling on roads, have reduced maintenance productivity due to the time and resource required to safely manage traffic and workers. We are looking to improve both health and safety outcomes and productivity through our new risk-based approach to temporary traffic management.

Impact of stretching the asset

28. Ongoing under-investment in preventive measures is resulting in repeated cycles of damage and repair. While we are managing the asset well overall and within funding constraints, a lack of preventive investment on items such as subsoil drains or culverts means that infrastructure such as pavements deteriorate faster and the cost of recovery from extreme weather events and other disruptions is higher.
29. Due to funding constraints, we are unable to fund sufficient preventive activities to reduce risk from future events or slow the decay on infrastructure under normal conditions.
30. Fewer roads have been rehabilitated² since 2009 than before 2009. We need to replace nine percent of road surfaces each year and rehabilitate two percent of the pavements, on average, to cost-effectively sustain access. We also need to undertake more preventive works, such as drainage maintenance and bank stability. Partial fixes are sub-optimal and we are experiencing repeat failures over some corridors, meaning lengthy, recurrent closures are becoming more common.
31. The NZTA State Highway Investment Proposal (SHIP) for the 2024-27 NLTP has been predicated on a significant funding boost for renewal activity towards the sustainable level. An increasing proportion of that funding is programmed to be allocated to rehabilitation activity to move the proportion of rehabilitation to two percent of road pavements (or 500 lane kilometres per annum instead of the 130 lane kilometres currently) over the next ten years. This will help return the state highway network to an acceptable level of service (comparable to that last achieved in 2014) reducing the number of potholes experienced and contractor re-work required.

Investment is not keeping pace

32. Investment is not keeping pace with the amount of work required to restore service levels and restore asset condition to a satisfactory condition.
33. While nominal investment increased 28 percent from 2018-21 into 2021-24, we saw a 20 percent decline in purchasing power to that expected, because the \$2.8 billion funding allocation can now only buy 80 percent of the work in a programme that now costs \$3.5 billion due to the higher-than-budgeted inflation. We have lost the ability to deliver \$700 million work over 2021-24.
34. In real terms, this represents a decline in investment, as we are playing catch-up with work that was unable to be delivered in previous periods and it cannot fund the increasing level of work required (at greater cost due to inflation and other drivers) in the current period.
35. The real level of expenditure on state highway maintenance has not increased since a high point in 2009/10. Once the impact of inflation, traffic growth and increases in network length and complexity are accounted for, the level of expenditure on maintenance is relatively flat.
36. Over the past ten years, annual renewal expenditure across the total asset stock has been approximately half the annual depreciation expense. In general, spending less on renewals compared to the rate of depreciation indicates a potential 'gap' in investment that increases the

² Rehabilitation involves the removal of the existing road surface and underlying road structure (pavement) and replacing it with new or recycled materials. Preventive works such as drain clearing drain water away from pavements, so they last longer.

level of risk to our long-term ability to maintain the condition of the state highway network. Over the 2018-21 funding period there was a \$1.08 billion gap between how much we spent on depreciation compared to how much was invested in renewing the asset stock (excluding new builds).

37. Over the past ten years the length of state highway has grown by ten percent, increasing the assets being maintained and traffic by 15 percent which has increased the load and rate of deterioration of infrastructure.

Future plans

38. We have based our proposals for state highway maintenance over 2024-27 and out until 2034 on the condition of the network and the level of service now expected at the commencement of the period.
39. We propose increasing preventive maintenance works such as roadside drainage maintenance to improve durability of pavements and increasing pavement rehabilitation works to the level required to sustain service levels and asset condition, to at least cover the lifecycle cost over the next ten years (\$240 million). We propose working with maintenance contractors over 2024-27 to restore their capacity to the level required.
40. The future equivalent cost of the planned 2021-24 \$2.8 billion programme is forecast to be \$3.8 billion over 2024-27. We are proposed to do additional work through this activity class which takes the cost of the proposed programme to \$4.45 billion. That additional work includes:
- a. replacing 13 end-of-life bridges through a new \$120 million budgetary provision in the maintenance activity class, noting that in the past these works have been funded through the improvements activity class
 - b. increasing the provision for bridges and geotechnical structures maintenance by \$100 million to extend service lives (including partially repainting the Auckland Harbour Bridge³)
 - c. increasing pavement rehabilitation by 300 lane kilometres compared to the 2021-24 proposal, a total of 1,035 lane kilometres or an average of 1.1 percent⁴ of the network per annum, plus changes to the quantities of chipseal and asphaltic concrete within the resurfacing programme at a net cost of \$210 million, and increase drainage works by \$30 million to improve the durability of pavements
 - d. increasing the allocation for emergency works by \$70 million
 - e. meeting our new regulatory requirements \$20 million
 - f. increasing the maintenance and renewal of safety infrastructure and traffic control devices by \$70 million to replace the end-of-life traffic control devices on Auckland's motorways and elsewhere, and replace old unobtainable light fittings with LEDs.

³ Painting steel bridges stops the loss of strength as rust reduces the size of structural bridge elements such as beams.

⁴ Note that this is 55 percent of the average sustainable level of two percent per annum.

Of the items above, \$410 million is for additional works, this is 60 percent of the planned work for 2021-24 not affordable in that period.

Work underway to strengthen our approach to maintenance and renewal

41. We are reviewing our current maintenance delivery model. It has been a decade since we introduced the Network Outcomes Contracts (NOCs). These were introduced at a time when there was pressure on our maintenance spend, with the objective of our contractors taking a stronger asset management lead in optimising the level of renewal works on an as-needed basis within available funding. While many NOCs have worked well others have not delivered as well as expected, especially where increased freight and weather damage, and constrained budgets limiting renewals work have required repairs at a quantity beyond the level provided for in the lump sum repair elements of the NOC contracts. The objective of the current review is to better-balance renewal and repair. To achieve this, the contract review is considering the commercial form of the contract, how maintenance works are specified, how quality is managed, and the related roles of the parties in planning work and managing risk.
42. We are researching improved asset management practices, often at higher initial cost, to realise long-term gains. For example, we have trialled using epoxy modified road surfaces at twice the conventional treatment cost for four times the service life and using structural pavements instead of unbound gravel pavements for three to four times the cost but two to four times the service life, and 25-35 percent less traffic disruption from roadworks.
43. We are collaborating with local government through Te Ringa Maimoa Transport Excellence Partnership, formerly known as the Road Efficiency Group. This collaboration works to lift asset management capability and efficiency across the sector. We support Road Controlling Authorities (RCAs) to understand the requirements of the Government Policy Statement (GPS) on land transport and to become 'smarter buyers' by creating tools and providing guidance to improve performance.
44. We are planning to trial and then implement the use of larger pavement rehabilitation work sites with more comprehensive treatments targeting ten percent productivity gains. We are considering the potential for including drainage renewal works, local cost low risk improvements, and potentially resilience works to strengthen steep slopes, and safety works where the need for these exists and their priority warrants their implementation at the time of the rehabilitation works.

Strengthening the strategic approach to asset management

45. NZTA is currently developing the State Highway Plan which sets the overall direction for how we manage the asset. It covers all activities involved with operating, maintaining and improving the state highway network. The strategy guides all input into state highway improvement and management decisions from policy advice, and asset lifecycle planning through to operating, maintaining, and renewing the state highway.
46. We are also reviewing our asset management plans to provide for greater agility as technology and conditions change, to move beyond a reactive approach bound by funding cycles.
47. We are planning for a more climate-resilient land transport system. In partnership with councils, communities, iwi/Māori, and government agencies, we are refining our approach to reducing risk so that we are right sizing our resilience activities and investment in the future.

- 48. Tiro Rangi, the NZTA Climate Adaptation Plan, has now been published. This will help shape our response to the changing climate and describes the role we will play in supporting adaptation objectives for the land transport system.

Conclusion

- 49. We have a mature asset management regime which continues to evolve to maintain effectiveness and efficiency.
- 50. Up to 90 percent of New Zealand’s state highway network is considered to meet minimum asset condition requirements and provides an acceptable level of service to users. The remaining ten percent requires catch-up works in addition to the 90 percent of the network that will require resurfacing over 2024-34, and the 20 percent requiring rehabilitation over the ten year period to bring it up to an acceptable level of service and sustain that.
- 51. NZTA has developed a ten-year programme that will gradually increase the level of rehabilitation (alongside other renewal activity) to achieve an acceptable level of service across the entire state highway network by 2033. This programme is subject to the funding level provided for the State Highway Maintenance Activity Class over the next three NLTPs.
- 52. The current maintenance and renewal programme for 2023-24 is already targeting an increased quantity of rehabilitation alongside additional maintenance and renewal activity required because of the under-delivery in 2022-23 due to Cyclone Gabrielle.

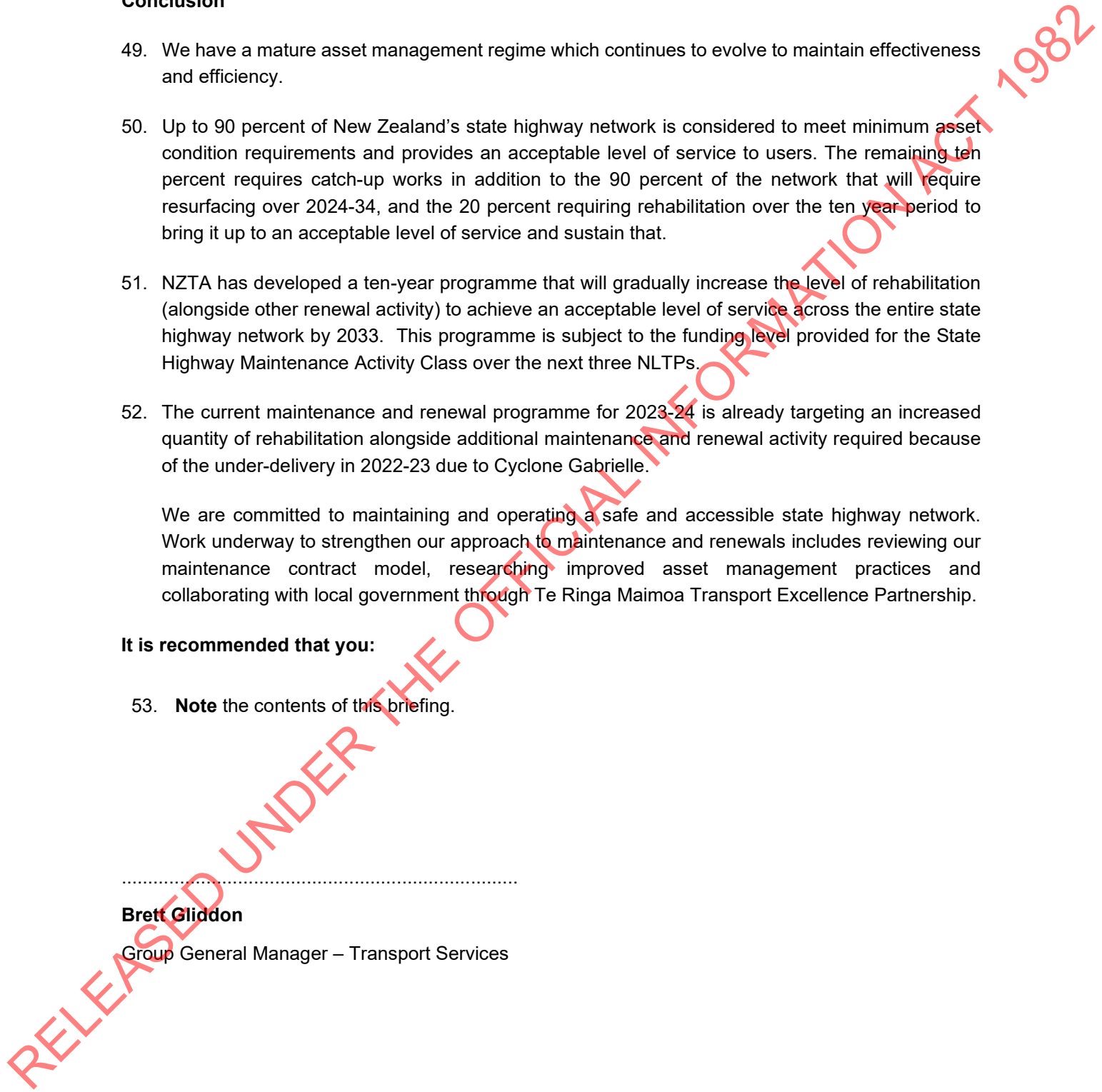
We are committed to maintaining and operating a safe and accessible state highway network. Work underway to strengthen our approach to maintenance and renewals includes reviewing our maintenance contract model, researching improved asset management practices and collaborating with local government through Te Ringa Maimoa Transport Excellence Partnership.

It is recommended that you:

- 53. **Note** the contents of this briefing.

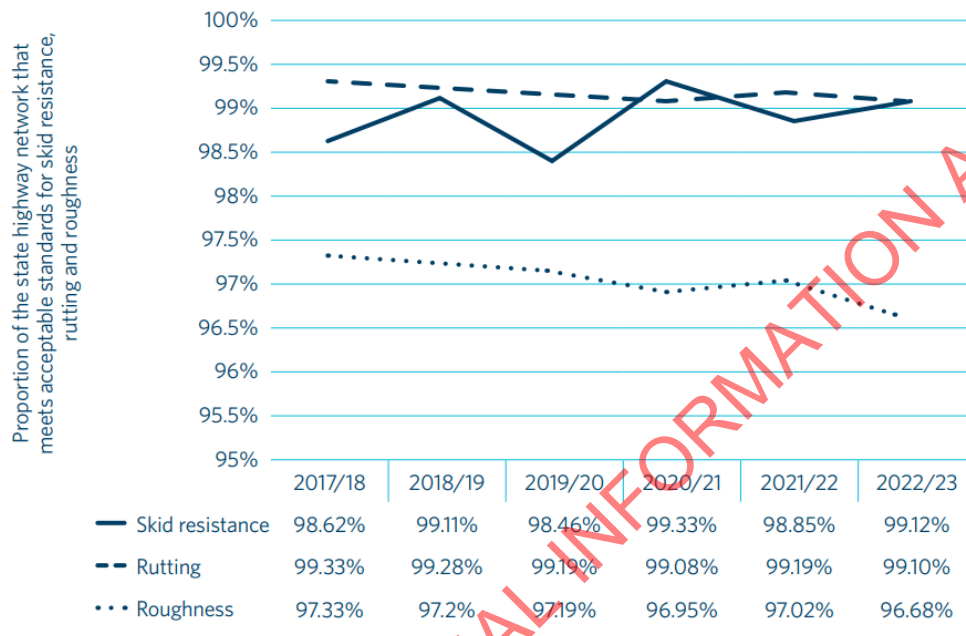
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Brett Gliddon
 Group General Manager – Transport Services

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Hon Simeon Brown, Minister of Transport
 Date: 2023



Appendix 1

Figure 23 – Proportion of the state highway network that meets acceptable standards for skid resistance, rutting and roughness



^A We have retrospectively calculated the prior period ratio following the same methodology but using the actual results from our published financial statements as the inputs.

^B A result for MEET1 above 75% creates risk that Waka Kotahi may not have sufficient funding headroom to respond to weather events and complete planned capital investment works. In absence of price or funding interventions we would be looking closely at our discretionary programme of work to ensure the NLTF is no overcommitted. If the result for MEET1 exceeds 75%, changes to FED and/or RUC pricing would be needed to bring the result within the target of $\leq 75\%$ ("Recommended price intervention" on the graph). If the result reaches $\geq 100\%$, a price intervention would be needed to avoid cuts to continuous programmes, so that Waka Kotahi does not become insolvent ("Price intervention to avoid essential service cuts" on the graph).

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Appendix 2

2023-24 summer maintenance and renewal programme

1. We are scheduled to deliver our largest-ever maintenance programme during the 2023-24 construction season (see table below).

Paving & Surfacing Renewals	2021/22	2022/23	2023/24 (programmed) Subject to affordability, weather, resource availability
Pavement resurfacing (lane km)	2,012	1,861	2,348
Pavement rehabilitation (lane km)	106	99	199
SCRIM – surface friction (lane km)	66	78	57
Total Programme (lane km)	2,184	2,038	2,604
Plus			
Audio Tactile Profile - Rumble Strips (lane km)	263	270	491

2. The severe weather events of 2022-23 meant that we were unable to complete a significant amount of the renewal programme. While 98 percent of the programmed maintenance and renewals were completed in the South Island, only 70 percent of the programme was delivered in the North Island.
3. The reduced delivery in 2022-23 has resulted in a much larger programme for 2023-24 and this will be a stretch-target for us and our contractors. Risks to full delivery include severe weather events, a constrained budget (year three of the NLTP), cost escalation and contractor capacity.
4. The construction season for state highway renewal activity generally occurs between October and March each year. Warmer spring and summer months are the best time for resurfacing as daylight hours are longer and the warm temperatures and dryer air help the new seal stick to the road surface. In some parts of the country, renewal activity may start before October and run later than April, depending on weather conditions.