This paper was prepared within the Ministry of Transport in 2020 as an internal reference source and thought piece. The main author was David Greig, formerly a Strategy Director at the Ministry whose previous infrastructure-related work was at the New Zealand and Victorian Treasury Departments and the economic consulting firm ACIL Allen (Melbourne). Staff from several teams in the Ministry provided inputs and peer review. It sets out the thinking of the individual participants at the time and has not been updated to reflect subsequent transport developments. It does not represent official policy.

5 August 2020

LAND TRANSPORT INFRASTRUCTURE FUNDING AND FINANCING

Purpose

This land transport funding system has been in place for many years and has a well-established infrastructure for its management (including a revenue system, an allocation system, and a decision-making system). Overall, this system works well, however, over time the Ministry of Transport (the Ministry) is seeing a number of emerging trends that challenge some of these foundations. These challenges are appropriate – as they reflect the ongoing policy priorities of Governments, and transport cannot be seen in isolation from other systems.

In the last two to three years (and earlier), substantial policy and programme decisions have been taken, and it is timely to reflect on the trends, opportunities and challenges facing our land transport[1] infrastructure funding and financing (IFF) system.

One significant theme is the growing recognition of the relationship between transport systems and urban development.

Different people see different things depending on their roles. This paper attempts to pull together our collective knowledge, make a systematic diagnosis of the issues and the opportunities, and to distil insights.

This paper does not attempt to recommend whether fundamental change is required, that is beyond its remit. But it does attempt to stimulate a set of discussions and some lines of inquiry for further work. This is consistent with the Ministry's role as a system leader and steward.

A secondary purpose of this paper is to provide an overview of the funding and financing system for Ministry policy, evaluation and research teams. This overview outlines the basis of the current system, including its key objectives and principles.

Introduction

This paper pulls together:

- an overview of the current state of and pressures on the transport funding system including:

[1] This paper does not focus on sea and air transport infrastructure, or COVID-19 related impacts.

- state: key policy settings that form the basis of the land transport investment system (including for example, the forms of investment commonly used such as the National Land Transport Fund (NLTF), direct government funding; the pay-as-you-go revenue system; and the key principles and conventions that form the basis of these systems (eg hypothecation)).

- pressures: key policy programmes which reflect Government priorities and wider external pressures such as demographics and changes in technology.

- a more in-depth overview of recent policy decisions taken relevant to the transport funding system. These include the Auckland Transport Alignment Project (ATAP), Let's Get Wellington Moving (LGWM), the Future of Rail, the Provincial Growth Fund (PGF), and the 2020 Infrastructure Upgrade Package. This will consider the context and objectives of each of these examples, key drivers and decisions, and the system challenges or opportunities that arose from each. It will show how the system is operating in the face of new pressures.

- an assessment of medium-term trends and opportunities that are likely to have some form of impact on the transport funding system.

- an overview of financing.

The second part of this paper draws on this overview material and starts to identify and consider key questions that help us unpack the challenges that the system faces.

Some preliminary thoughts are provided on each of these questions and others. These thoughts aim to draw out some insights on the overall resilience and health of the system and to prompt the Ministry to undertake further thinking.

The state of the land transport funding system

This section outlines the current key policy and legislative settings that form the base of the land transport funding system.

The Land Transport Management Act 2003 (LTMA) sets out the basic provisions for the land transport funding system, including broad objectives (contributing to an effective, efficient and safe land transport system), possible sources of land transport revenue, and an allocation mechanism through the Government Policy Statement on land transport (GPS). It also outlines the role of regional land transport planning, and the broad decision making roles of Waka Kotahi New Zealand Transport Agency (Waka Kotahi). More recently it has established a mechanism to include rail within the existing system in a way that allows Ministers to maintain some control and oversight of investment. The LTMA sets out a number of key foundations that must feature in the land transport funding system, but prohibits very few additions to these foundations. Therefore, it is generally seen as a fairly permissive regime, which has allowed for some adaptation in practices over time.

In this context, there can be debate about what was intended at the time and whether subsequent shifts in practice are consistent with that intent, and indeed what is deemed to be the reasonable degree of adaptation, recognising that legislation seldom exists in a vacuum.

Land Transport Management Act

The LTMA covers the funding and financing of land transport, defined broadly: transport on land by any means, coastal shipping, and associated infrastructure etc.

It defines the related NLTF revenue: Road User Charges (RUC), Fuel Excise Duty (FED), registration fees and, from July 2020, rail track user charges.

It sets out the mechanism for spending it, centred on the GPS. The GPS looks ahead 3+3+4 years. It contains the results that the Crown wishes to achieve, the Crown's land transport investment strategy, and the Crown's policy on borrowing. It sets the direction for the National Land Transport Programme, which in turn draws on Regional Land Transport Plans. The strategy links the amount of revenue raised with the planned levels of expenditure from the NLTF. For the first six years the GPS addresses the results, the activity classes to be funded and their funding ranges, likely revenue, an expenditure target, maximum and minimum expenditure for each year, allowable variations, the overall investment likely over 10 years and the likely or proposed funding sources. In addition, it may set out national land transport objectives, policies and measures, and specify any additional expected funding including Crown funding.

The LTMA underpins independent decision-making — one of the only things that it prohibits is "the GPS may not impose an obligation on [Waka Kotahi] to approve or decline funding for a particular activity or any combination of activities…"

State of transport funding

This section deals with funding. Financing is covered in a later section.

The main mechanisms for transport infrastructure funding and the principles underpinning them are as follows.

- ***Beneficiaries should pay.***

  User pays is the predominant way of funding. Road users (the owners or operators of road vehicles) pay for their use of roads - they fund road maintenance, road renewals and the construction of upgraded or new roads through RUC, FED, registration fees, public transport fares and, in a few cases, tolls, paid to the NLTF. However there are no explicit payments to offset external costs caused by road use such as emissions, noise, waterway pollution and safety.

  The funding is – or at least was until recently – hypothecated or "earmarked" for road-related expenditure and so can be seen as a proxy for a commercial model (users get a service and pay for it). Previously the revenue went to the Crown and the Crown made

appropriations to the Fund[2]. As these appropriations were time limited and capital focused they did not provide a long term funding solution and did not address the increasing cost of maintenance. To provide a more consistent approach for long-term funding, hypothecation was introduced in 2008. The Government no longer retained a portion for general use. The intention was that increases in future funding needs will be met through increasing fuel excise duties and road user charges. This is also consistent with an eventual move towards more comprehensive and sophisticated road user charges.

This is a "modified PayGo" model: customers and governments pay for road infrastructure (operations, maintenance, renewals and some construction) in the year in which the expenditure occurs. RUC and FED, though formally taxes, are seen as customer payments. Sometimes there is short term borrowing to smooth between years. Hypothecation and PayGo have evolved pragmatically over several decades but are substantial policy decisions about the whether there is a "social licence" (implying that road users pay and implicitly expect the money to be spent on roads). It is an historical carry-over from the period when the Government accounts were measured on a cash basis. Pay as you go systems may be incompatible with the objective of distributing the cost of an investment across generations. The timing of revenue receipts determines the ability to make payments.

Local access (local roads and footpaths) is funded locally - from local rates supplemented with NLTF payments (Funding Assistance Rates, FAR). Some new local roads are funded by developers.

Urban public transport infrastructure – rail and bus – is funded by passenger fares, regional authorities (hence local rates) and NLTF. Ratepayers receive benefits of having access to public transport services, while users that fund the NLTF have access to a greater number of travel options and less congested roads.

The Crown should pay where it judges that there are wider policy reasons that mean beneficiaries do not or will not pay the full cost.

The GPS seeks to progress the Government's priorities for land transport. Sometimes there are wider priorities — economic development, regional development — that might not be deliverable through the funding available in the GPS. More generally such reasons (reflected in the outcomes framework) include reduced congestion, economic stimulus, employment, and regional development. This could include a specific project that the Crown considers should be funded where there is insufficient funding within the NLTF. It could be argued that there are always wider policy reasons – it's just the Crown tends to pay where the wider benefits are disproportionate compared to the quantifiable

[2] The New Zealand experience with hypothecated user levies, Marian Willberg Ministry of Transport, paper presented to the International Conference on Funding Transport Infrastructure, Paris, June 19-20 2008

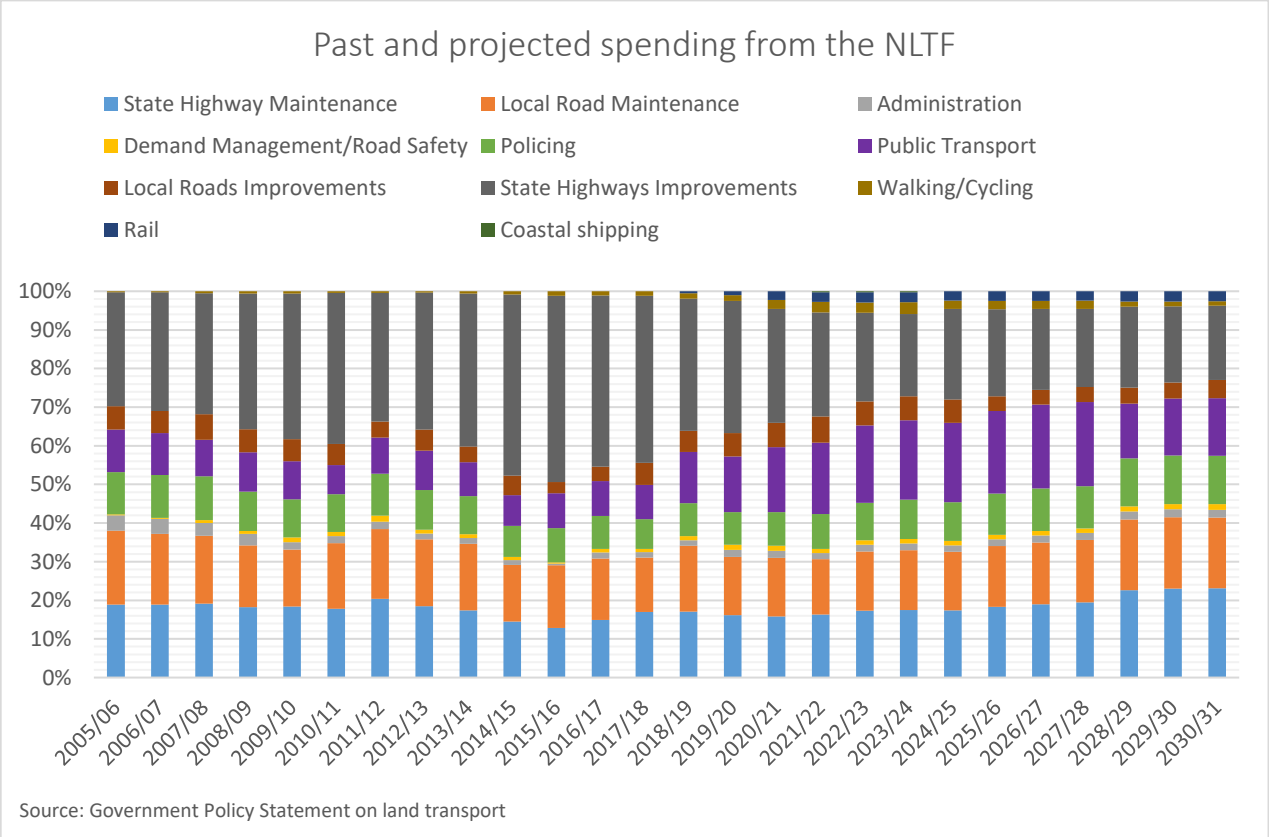
benefits captured in a benefit cost ratio (BCR). It's not a black and white principle and like most of the others there is grey area.

Most railway infrastructure is funded by customers, local government (for urban passenger services) and the Crown. In New Zealand most rail services make losses, but the Government has determined that there is a public benefit.

Other transport infrastructure - ports and airports (not the focus of this paper) - is funded by customers. The Crown pays for some regional airports where commercial revenue is not sufficient to maintain them, but wider policy considerations justify keeping them funded.

GPS 2021 spending

The modelling behind GPS 2021 identifies that around 70% of the NLTF will be required to maintain existing levels of service of the land transport network (i.e. not just road maintenance). In the past there was a higher percentage going towards State Highway and local road improvements, so there is a trend that is moving more towards maintaining rather than improving. This is largely due to reversing previous decisions to limit road maintenance and renewals spending – which increased significantly for GPS 2018 and will do so again in GPS 2021. We are moving towards recommended levels of renewals (~8-9% of the network resurfaced every year and 1-2% of the network undergoing pavement rehabilitation — around 5% and 0.5% respectively over 2013/14–2017/18).



Source: Government Policy Statement on land transport

Changes in the last year or so have generally modified or added to these mechanisms rather than supplanting them. The main changes have been:

- direct Crown funding for the $6.8 billion New Zealand Upgrade Programme, to be implemented by Waka Kotahi and KiwiRail over the next 10 years. It will be invested across road, rail, public transport (PT), walking and cycling infrastructure. It aims at more frequent PT, safety, shorter journey times, access to housing developments, a shift of freight from trucks to trains and reduced emissions.
- direct Crown funding of $1 billion per annum to the PGF, some of which is being spent on regional transport improvements, complementing the NLTF. It can help local authorities that face difficulty in meeting their local share and bring forward projects that raise a region's productivity potential.
- direct Crown funding for a programme of shovel-ready projects (ready to go in 6-12 months) to reduce the economic impact of the COVID-19 pandemic. The $3 billion programme included transport projects – those announced so far are road improvements and an inland port.

Three immediate questions include:

- do we have a clearly articulated set of principles for the role and use of the NLTF and other sources of funding?
- what should be our principles for the funding and financing of major intergenerational transport projects that have multiple objectives?
- what should our principles be for the funding and financing of 'city deals'/'packages'?

The earlier principles have been in place for many years and remain in place. The new funding policies described below largely supplement them.

Building blocks behind the funding and financing principles.

- A decision-making regime based on principles of transparency about government policies; notably a GPS – see the LTMA section above. The GPS covers funding of transport networks, safety, environmental impacts, regional connections, value for money and priorities (funding ranges for defined activity classes). It informs decision-making and priority setting at the national level and aims to assist local government in their planning. The priorities can and do change according to Government priorities. The project decision making criteria align with the GPS, effectiveness (i.e. how well does it work?) and efficiency (essentially value for money).
- Value for money (VFM), stressed throughout the GPS, which is based on cost benefit analysis (CBA) in Waka Kotahi's Economic Evaluation Model (EEM), effectively a detailed application of Treasury CBA guidelines to transport. It includes direct costs (e.g. construction and operations) and external costs (e.g. environmental impacts); also, direct benefits (e.g. journey time savings, safety) and external benefits. The EEM's

coverage is broader than traditional CBA and continues to evolve. CBA is usually project-by-project and needs to be supplemented in wider, multi-outcome cases, especially in urban settings. Other types of analysis may be needed when income distribution (equity) issues arise including Social Impact Analysis (SIA) and the Improving Transport Appraisal Project (ITAP) – see appendix 1.

- A Cost Allocation Model is used to attribute the cost of different types of road investment to different users (in turn informing advice about how much they should pay through RUC or FED). It is based on accounting, economic and engineering principles. Costs are attributed based on vehicle weight, type and axle configuration. This results in the heaviest vehicles paying for most weight-related damage costs (such as road resurfacing and pavement rehabilitation costs). General costs such as emergency works (such as reinstating roads after flooding), safety installations, drainage and signage are allocated evenly across all vehicles.

A comment on the key issues on the state of the land transport funding system

One challenge that the Ministry has noted is that around 70% of the NLTF annually is allocated towards the ongoing running costs of the system. This includes maintenance and renewal needs of the current network, basic improvements and other less discretionary commitments such as road policing. A question that has arisen is whether the priority for NLTF spend should favour keeping the system running and meeting those costs, which are expected to be relatively stable over time (noting that significant new infrastructure or increases in service levels increase the ongoing costs). Given this level of pre-commitment, questions have arisen over whether high-cost or long-term investments should be funded via other sources. An issue to explore is whether this differentiation could potentially be tied to different ways of raising revenue.

To illustrate this point, there seems to be a trend that, with increased Crown funding of infrastructure investment (road and rail), the NLTF is becoming more of a maintenance fund.[3] The previous government directly funded its share of the large Auckland City Rail Link (CRL) project, the Accelerated Regional Rating Package, and Urban Cycleway Programme. The current government has added Crown funding for rail improvements, large state highway projects and, through the PGF, regional transport projects.

In January 2020 the government announced the New Zealand Upgrade Programme, of which $6.8 billion is for transport infrastructure over several years. It covers investment in road, rail, PT and active modes. It will be funded by the Crown through grants to Waka Kotahi and KiwiRail and will not require future repayments from the NLTF. The rationale for the programme includes increased capacity, safety, serving economic growth, a solid construction pipeline, and exploiting the favourable circumstances for Crown borrowing.

[3] A greater reliance on decisions by the government rather than by the arms'-length Waka Kotahi has in the past lead to expenditure volatility, particularly given the long-term nature of infrastructure investment and needs versus the relatively short-term electoral cycle.

The New Zealand Upgrade Programme is in effect added on top of the existing pay-go funding regime, with a different funding source and decision making (and assessment) processes.

The Government has also announced that it will fund a $708 million programme of “shovel-ready” transport infrastructure projects, in response to the economic impact of COVID-19.

We are seeing a tension between a constrained NLTF and demands for large transformational projects that are increasingly reliant on discretionary funding. This tension first showed up with the Roads of National Significance (RoNS) projects, which were funded from the NLTF. Funding them required increasing the size of the NLTF by steadily increasing RUC and FED rates, and by reducing other demands on the NLTF (such as by ‘sweating the asset’ to save on maintenance costs).

The New Zealand Upgrade Programme could not have been funded from the NLTF without major changes in priorities unless a decision had been made to substantially increase RUC and FED, or with alternative funding or financing (such as borrowing or Public Private Partnerships (PPPs)).

The NLTF is needed for business as usual, in order to maintain a system that delivers a steady level of service. It is also needed for smaller projects and enhancements, and for progressing the Government’s priorities for safety and increasing the use of alternative modes of transport.

However, the NLTF also provides an opportunity to progress well-conceived transformational and multi-outcome projects, in a non-politicised way. Not having sufficient funding for this has potential negative implications for urban form, wider network performance, safety and resilience.

Funding decisions - examples

The table below summarises of the context and objectives, and the system challenges and opportunities, in several major government decisions relating to infrastructure funding. A broad trend that emerges is that of the integration between transport and urban or regional development. We are moving towards the co-design of programmes of activity that have high level buy-in at the political and technical levels. Long-term thinking about how to get better outcomes for cities will move us beyond the traditional project or programme focus.

Other themes emerging (but with individual exceptions) are:

- **context:** new or strengthened government objectives, past underinvestment, new or broader emphasis on urban development, easier conditions for Crown borrowing
- **objectives:** regional development, safety, access, social inclusion, resilience, employment, reduced congestion, construction pipeline, reliable and resilient railways, recognition of wider economic and social benefits
- **challenges:** agreement on funding responsibilities, limited construction and management resources, governance, transparency, policy trade-offs

- **opportunities:** alignment between central/local government with packages and clearer thinking about funding responsibilities (e.g. Crown where there are wider public benefits), greater long term funding because of cheaper borrowing, deeper and shared understanding between local regional and central governments, increased patronage following urban rail investment (in turn requiring more investment).

Decision	Context and objectives	System challenges and opportunities
Provincial Growth Fund (PGF)	Declining regional employment and opportunities, infrastructure run down PGF a step change towards increased jobs, economic development, social inclusion and Māori development.	The PGF supplements the NLTF under certain circumstances, or acts as a separate funding stream where a project would not otherwise be funded (now or in a timely way) by the NLTF.
Future of Rail	Rail is considered important for freight and urban passenger services. Low past investment meant managed decline. Aiming for upgraded reliable and resilient rail services, with wider benefits for the economy and society (e.g. congestion and safety)	Traditional funding sources were inadequate. Ability of KiwiRail to manage the increased expenditure. Opportunity taken to develop wider funding principles (from users, NLTF and Crown)
New Zealand Upgrade Programme	Increased Crown borrowing capacity, hence increased Crown funding for transport infrastructure. Opportunities relating to safety, access, resilience, employment, pipeline, congestion	Ability to secure additional construction resources. Integration with normal GPS program and new COVID-19 related public works. Opportunity due to stronger Crown borrowing capacity. Opportunity to counter economic downturn. COVID-19 effects may reduce this, but a recession will free up construction resources.
Let's Get Wellington moving (LGWM)	Congestion on main routes through Wellington. Aim is to improve PT/mass transit, access, liveability, with fewer cars and improved safety.	A collaborative plan between regional and central government, a broad package with co-benefits
Auckland Transport Alignment Project (ATAP)	Strong Auckland growth added congestion and strained infrastructure. Past misalignment between local and central government expectations for infrastructure development. Aim to improve understanding of the problems, understanding and shared objectives between governments, better data and modelling.	A major alignment exercise between Auckland and Wellington. Trade-offs between transport efficiency and public amenity. Opportunity for an agreed plan with deeper and shared understanding, and broad agreement on funding.

Pressures on urban transport systems

There has been a growing interest in opportunities to better integrate urban development and transport. The land use and urban form that facilitates agglomeration is largely shaped by transport and patterns of mobility. The spread of a labour market is closely linked to the quality and reach of a transport network, which affects businesses' ability to connect with each other and their workforces. This has reflected a number of key trends, including a greater understanding of the roles that cities play in a country's economic performance, and a greater focus by governments, both local and national, on realising the benefits of agglomeration.

Urban transport investments are sometimes part of large scale urban spatial initiatives. The outcomes sought are some or all of inclusive access, economic prosperity, security and resilience, healthy and safe people and environmental sustainability. Examples are connecting people to jobs and social opportunities, increasing density and attractiveness in urban areas, reducing reliance on cars and supporting mode shift.

Traditional funding tools will be strained where there are large, 'inter-generational' projects. Although modern cost-benefit analysis incudes wider benefits and costs, this is done project-by-project and increasingly needs to be supplemented with other types of analysis[4] such as social impact analysis and real options analysis. Indirect effects of different forms of transport on land use, urban form and resulting travel patterns, amenity, equity and customer behaviour need to be considered (for example, only investing in roads favours dispersed urban form which in turn leads to more demand for road investment). There has been a shift to a package approach to find desirable transport systems that improve outcomes in a city, with an agreed understanding between central and local government for the investment needs of the area. Previously the RLTP process was seen as sufficient to ensure that the Government and the region's priorities were aligned, with a consistent investment approach. Recently we have had more bespoke deals with different funding arrangements.

Other pressures

Other pressures on land transport investment (besides urban), or responses to perceived pressures, are:

- Upgrading KiwiRail to a reliable and resilient state, in turn encouraging a shift from trucks to trains. This has raised issues on the scale of funding required, funding source, and funding certainty.
- Pressure for greater road safety to advance a vision that no-one is killed or seriously injured while travelling. This includes infrastructure aspects, focused on the most dangerous parts of the network, regulatory measures, and encouraging use of safer modes.

[4] See appendix 1 for a discussion of analytical techniques.

- New roads and road improvements, both urban and non-urban, in response to public demand for quicker, more reliable, resilient and safer journeys, and pressure to maintain a construction industry pipeline.
- Inter-city and regional links
- Exploring options for port configuration in the upper North Island.
- Maintaining the real value of the NLTF. Revenue does not naturally increase with inflation (construction costs). Explicit decisions are needed on RUC/FED levels, which are often politically influenced.

Assessment of medium-term <u>trends</u> likely to impact on the transport funding system

Transport is generally an established and mature sector, but there are both outside trends that are forcing it to adapt and other trends that are opening up opportunities.

Trends from outside the transport system

Medium term trend	**Impact on transport system**
New Zealand's population has been growing, with external and internal migration	Pressure on infrastructure funding, particularly in and around Auckland
Low interest rates and strong Crown balance sheet	Improved the Government's ability to fund infrastructure
COVID-19 impacts, such as more working from home and less access to social and economic opportunities	Fewer vehicles on roads (resulting in less damage to roads, but also less revenue)
Local government funding pressures due to COVID-19, some declining rating bases, and other infrastructure requirements (e.g. water)	Transport investment competing with other infrastructure demands
Weather-related events are increasing in frequency and severity	Increased resilience investment required to mitigate, and emergency works to respond
Increasing concern about climate change is applying political pressure to reduce emissions through technology and infrastructure	Improved technology could improve fuel efficiency and electric vehicles are becoming more common — these could reduce FED revenue[5],
IT and "big data" developments are opening up opportunities to improve efficiency, reducing the need for physical infrastructure	Examples include: • traffic light coordination and bus priority • overall traffic management • congestion pricing • bus fleet management • real-time passenger information • train control and driverless trains (increased speed/volume)
Improving technology for funding and financing opportunities	Opens up congestion pricing for demand management and revenue and allows

[5] Previous efficiency improvements have been offset by increasing average vehicle size but there will be limits to that (real-world fuel economy across the fleet is only decreasing only very slightly). FED rates could be increased to compensate, though impacts on vehicle markets and low-income consumers would have to be considered. The RUC system is well equipped to mitigate improvements in fuel efficiency or moves to other fuels, including to electric vehicles.

	charging to better reflect the costs caused by road users (including pricing for externalities).

Trends inside the transport system

Transport area	Medium term trend
Public transport	Steady increases in its share of urban passenger transport, reflecting improved services/investment, increasing congestion, and changing attitudes
Active modes	Steady increases in its share of urban passenger transport (starting from a low base), reflecting changing attitudes and improved networks/facilities
Urban congestion	Getting worse despite improving infrastructure, but attitudes towards congestion charging and using other modes of transport may result in improvements
Rail	Investment in infrastructure, rolling stock and rail ferries will likely result in future growth, particularly in urban rail transport
Aviation and shipping	Aviation expected to continue to dominate long-distance domestic travel and international travel, and shipping dominating international freight. Government interest is in the 'landside' links to airports and ports.

Assessment of medium-term <u>opportunities</u> likely to impact on the transport funding system

Land-use is a major determinant of demand for travel. Co-locating commercial and residential activities can reduce the need to travel, hence there is a case for mixed use developments, with shops and services close to where people live. The nature and design of urban form influences demand for travel. If we feel unsafe because of poor lighting, lack of 'active frontages' or insufficient walking/cycling facilities, we may be encouraged to drive. The design, land-use mix and overall look and feel of our towns provides the opportunity to question whether we need investments in the first place.

The government has the ability to fund substantial amounts of transport infrastructure, but in doing so it should always seek value for money, as there are always opportunity costs. Major infrastructure funding is not always the best solution to transport problems, even if funding is available. An alternative may be to make better use of existing assets:

- demand management (including congestion pricing) and behavioural change delays the need for new infrastructure and provides more information about demand and willingness to pay. If travel demand can be managed, either through mode shift, carpooling, staggering journey times away from peak periods, reducing the need to travel (e.g. through integrated land use planning) and/or greater working from home, the pressure on the network will reduce. There are also wider benefits (e.g. environmental and health from reduced car use and increased walking).

- IT innovations provide the opportunity to:

    - increase effective rail line capacity
    - improve bus fleet performance and utilisation
    - increase effective street capacity through traffic light coordination
    - improve the attractiveness of PT through better real-time passenger information
    - facilitate working from home
    - improve the use of the freight fleet by matching supply and demand across multiple customers and carriers

- Infrastructure choke points can be eased more cheaply than constructing major facilities. Opportunities include improvements to key rail junctions in Wellington and Auckland, intersection and other modest road improvements, bus priority at intersections, removal of on-street car parking from busy parts of arterial roads.

Transport system funding

It is generally best to use a range of options/tools, as individual tools do not always offer a solution to fit all needs. It is through a planned combination that they begin to work. A range of issues such as effectiveness, efficiency, uncertainty, public support and fairness are relevant to identifying the range of tools – see Appendix 3.

The available funding tools are discussed below.

Increasing RUC and FED

Cases could be made for increases to cover good value-for-money projects that are not yet proceeding, IT applications and choke point investments as discussed above, setup costs for congestion pricing, and to contribute to projects currently being funded by the Crown.

A broadening of the current principles could see FED and RUC incorporating externalities, rather than just the costs imposed on the system. This could include safety, emissions, and amenity, and local extra RUC for large trucks impeding other traffic on difficult roads where there is a feasible alternative (e.g. log trucks across the Remutuka Ranges or through the Karangahake Gorge). This could be broadened to highway congestion generally (cars facing longer journey times from having to queue behind trucks) though the argument weakens where there is no viable rail alternative.

Other funding sources (value capture, Special Purpose Vehicles (SPVs), targeted rates)

As recommended by the Productivity Commission in its 2020 Local Government Funding and Financing report, funding methods can require those that benefit from a service or asset to pay for it. Examples of funding methods available in New Zealand that reflect this principle are targeted rates (which can operate as a blunt value capture instrument), the Betterment Levy[6], the special purpose vehicle approach[7], tolls, regional fuel taxes, user charges and business improvement districts.

[6] Local Government Act (LGA) 1974, s326
[7] This will be made possible through the IFF Legislation set to be finalized in 2020

Other funding sources based on the principle of beneficiary-pays can provide an opportunity for nearby business/landowners to contribute to the cost of transport infrastructure improvements (e.g. a new bus/rail interchange). There is interest in how can greater use of these can be encouraged. The GPS provides a lever – some of the spending it covers is dependent on how much effort has been and will be made to find other sources, and other projects are not affordable without alternative funding sources.

Targeted rates are not used much by local authorities. Special purpose vehicles (SPVs) (through the IFF Bill) enable central government to mandate a targeted rate in a local area and raise finance against the future levies.[8]

Another method is developer agreements, which are a more flexible approach that can be used in lieu of funding works though developer contributions.

The potential to increase the use of beneficiary-pays funding methods may need to be considered alongside a party's ability-to-pay, especially with regard to value capture approaches where beneficiary contributions may be significant.

The Productivity Commission proposed a nuanced value capture method using targeted rates. The Department of Internal Affairs has responsibility in the area, and has decided instead to focus on making better use of existing tools first.

Value creation

This opportunity uses private instead of public funding. A developer takes charge, within a high-level framework, of a complex challenge and produces an innovative solution that is better than a piecemeal approach. An example is Denver Grand Union railroad station: a near-derelict station that was to be developed as a public transport interchange by a public authority. Instead, with a redesigned concept, private sector developers created a tram, urban train and bus interchange combined with shops, cafes and offices[9], at no cost to the state. (It was a concession model and a land trade was done to make it worthwhile for the developer). Other examples are Hong Kong and London stations.

Public transport operating funding

Funding comes from passengers, local authority rates and through the NLTF. The level paid by passengers can be adjusted, but must be considered alongside its impact on demand. There are arguments both ways about the portion of costs to be recovered from fares, especially in peak periods.

[8] For further discussion, see https://www.productivity.govt.nz/inquiries/local-government-funding-and-financing/ and Kemp, A, V Mollard and I Wallis (2012) Value capture mechanisms for funding transport infrastructure. Waka Kotahi research report 511.
[9] The Entrepreneur Rail Model: Funding urban rail through majority private investment in urban regeneration. Peter Newman, Sebastien Davies-Slate, Evan Jones. Research in Transportation Economics 67 (2018) 19 – 28.

Crown grants

Here the Crown borrows and appoints a delivery agent (typically Waka Kotahi or KiwiRail).[10] The Crown repays its borrowings from general tax revenue. Examples include the New Zealand Upgrade Programme, the Kaikōura coast rail and highway rebuild, and the Accelerated Regional Roading Package.

The New Zealand Upgrade Programme was promoted on catchup, pipeline, shovel-ready/economic stimulus, safety, urban development and inter-region connection grounds.

With good projects available (good BCRs, shovel-ready, often part of a bigger urban picture), low interest rates and a strong Crown balance sheet (low public debt compared with GDP, though subject to COVID-19 related impacts) there is a case for the government to borrow and invest more.

The New Zealand Upgrade Programme is being funded by the Crown – that is, the general population rather than road users. The two groups overlap but are not identical. For some of the projects, the main beneficiaries are road users. In cases where there is a poor BCR, the policy would in effect be a subsidy, best funded directly by the Crown). And there is a case for higher RUC and FED to fund projects with good BCRs.

Crown grants can simply be superimposed on the present PayGo arrangements. That is, road users continue to pay for roads to the extent that they are funded from RUC and FED, and others pay for the additional roads.

Financing

Funding and financing are fundamentally different concepts. Financing must be repaid, funding does not.

- Funding is the act of providing resources for a project or activity. In New Zealand transport, funding comes mainly from users and governments. Other sources include non-user beneficiaries (e.g. through value capture) and investors in cases where their role goes beyond financing (e.g. overseas development of combined commercial/transport hub).

Financing comes from lenders, governments (when in the form of a loan) and investors. It spreads payments over time, especially for larger projects, sometimes addresses inter-generational issues, and sometimes is packaged together with innovation[11]. In other words, finance is one of the better levers for facilitating risk transfer. In principle it all has to eventually be repaid from funding.

[10] The grant does not run through the NLTF and is not in a GPS activity class. Waka Kotahi does not have statutory independence over it like they do with the NLTF.
[11] An example is CityLink, the motorway that crosses Melbourne. Besides construction, the package (an early example of a PPP) included pioneering technology for electronic tolls and new insurance arrangements that protected that state from geotechnical and hydrological risks.

Some transport infrastructure investment is large, chunky expenditure that has benefits over generations and many users. The option of funding the construction of all transport projects without the use of finance (which is standard under a pure PayGo system) means a burden on current road users and a likelihood that fewer projects would be built due to affordability, and not being value for money (VFM). New Zealand could end up under-investing in important infrastructure which could become an obstacle to growth.

Potential uses of financing have not at this stage been fully explored in the New Zealand transport sector, and financing possibilities are not yet fully integrated alongside normal work on project development. Financing, as opposed to funding, is currently largely confined to:

- PPPs, notably Transmission Gully and Puhoi to Warkworth, which use private sector consortia where expected innovation and risk management advantages are expected to result in lower overall cost or higher quality outcome
- limited annual smoothing by Waka Kotahi through Crown loans, to cover variations in "lumpy" spending and seasonal revenue variations without disrupting the overall work programme and cash flow position

Urban bus services could be considered to be financed. Generally private operators own the assets and regional authorities pay an operating subsidy (which is priced to include the cost of the assets).

As discussed above, funding and financing are fundamentally different. Infrastructure investment cannot proceed without funding, which comes from some or all of customers, governments, and wider beneficiaries. Financing is essentially loans from financial institutions, investors, suppliers or others. It is optional (most Waka Kotahi projects have funding but no financing) and is always underpinned, directly or indirectly, by funding. The funding may come after the project has been built – such as loan:

- repayments or payments to a construction consortium for example – usage payments (government payments related to the extent to which the project is used, such as traffic counts)
- availability payments (government payments for the amount of time the facility is open for use as opposed to being closed for unexpected maintenance)
- tolls.

The main sources of infrastructure financing are banks, bonds (debt instrument), investors, infrastructure funds and pension funds.

The financing of infrastructure is a task well suited to pension/superannuation funds, as shown overseas. Compared to the alternatives, infrastructure is a long-term investment, usually has low risk, and provides a relatively low but relatively stable annual return – characteristics that match the needs of super funds. With economic growth and ageing populations, there are large pension funds seeking these kinds of opportunity.

Traditionally, pension funds have focused on investing in infrastructure that is already operational, rather than during the design and construction phase (e.g. an infrastructure fund may take the higher risk period and then sell down to a pension fund with the asset has a track record of good performance). In recent years governments around the world have been trying to attract pension funds into green-field infrastructure investment and there are now some examples of this, where pension funds partner with investment funds, for example in green energy, housing, and airports.

Although the interest rates sought by private investors are higher than interest rates on sovereign debt (government bonds), there are sometimes reasons for using private financing:

- Risk management. Use of private financing instead of direct government funding spreads risk and reduces the risk faces by the government. Although New Zealand's balance sheet is strong, it has been weak in the past (the 1930s and 1980s) and is under increasing pressure due to large COVID-19 related expenses. Private sector entities have skills in the management of the different components of project risk: design risk, construction risk, operating risk and, in some circumstances, demand risk.

  Private finance, when used well, means that a party outside the Crown is responsible for cost and time overruns. It can be an effective means of transferring construction and operation risk. In practice this means 1) the party will perform detailed due diligence over the project to understand and then manage the risks (generally bringing additional skills) 2) the party must pay for the cost of any overruns.

- True cost. The government can borrow at lower interest rates than the private sector can, but the gap is less that it first seems. The government can borrow at low cost because of guaranteed repayment, backed by its ability to raise taxes. If things go wrong, the government (unlike private lenders) can resort to its taxpayers to see that its commitments are met even if the project goes badly – that is, the true cost is higher than implied by the government's low cost of borrowing.

- Leverage off other services. An example is whole of project versus whole of life optimisation. The private finance incentivises the consortium to optimise costs within the scope of the project. The question is whether to spend more on construction to reduce maintenance costs over the contract life or if, on a whole of life basis, it is optimal to build a cheaper road and just pay more each year for maintenance.

Private finance is often offered as a package with design, construction, development of adjacent real estate and other outputs – the PPP model.

PPPs, or Public Private Partnerships

PPPs see several services, including financing, in a consortium package. Debt can be refinanced and equity sold but there are Crown controls over this.

The participants have different appetites for risks and abilities to manage them. PPPs can be worthwhile where the consortium members' skills reinforce each other, and where there is

scope for innovation, risk spreading and risk management. New Zealand is at an early stage in its experience with PPPs.

In New Zealand the main government advisor on PPPs is the Infrastructure Commission. The Treasury also has a role.

Crown lending

In this funding option the Crown lends to Waka Kotahi, which eventually pays it back. This option is used, sometimes interchangeably with non-repayable grants, depending on the particular circumstances at the time, and sometimes the principles of the borrowing. For example: Tauranga Eastern Link was brought forward through loan funding, to be repaid through tolling revenue; the Auckland Transport Package accelerated a defined programme of Auckland projects; the government provided loan to manage the impacts of lower revenue through the COVID-19 response period.

Pressure on the NLTF in its roles to maintain the system while progressing government priorities means it has limited capacity to repay loans. But RUC/FED could be increased gradually as needed – they would be paid by road users who benefit from the new investments through faster journeys and improved safety.

It remains modified PayGo in the sense that road users continue to fund the system from which they benefit. Financing repaid through the NLTF brings projects forward, with those benefiting from them in future contributing towards the repayments.

Concluding thoughts

New Zealand's land transport infrastructure funding regime had not for several decades, until the last few years. Road users have always paid FED and RUC to a fund run by an arm's length entity, which has used the money to maintain and build roads and support PT, and not much else. Until around a decade ago, it was all funding, with little financing.

Since then, successive governments have increased land transport infrastructure spending via the NLTF, on motorways, large scale programmes, resilience projects, rail and potentially light rail. Although RUC and FED have increased, the NLTF is under increased pressure. At various times, spending on road maintenance was reduced to free up room for larger infrastructure projects. Crown funding is being used increasingly, and the role of financing is increasing.

The Ministry faces a larger, more complex and more interesting array of tasks than it used to. Dealing with the pressures requires new types of funding (e.g. value capture) and financing (e.g. SPVs), new policy approaches (e.g. congestion pricing) and new analytical techniques (e.g. real options/adaptive management to address uncertainty). This paper brings them together. It is not necessary for any one individual to master every technique, but it is best to be aware of the range of issues, approaches to them, and broader insights.

Additional thinking on future developments in the system is set out in Appendix 3.

Appendix 1

Techniques for assessing long term investment proposals

The ways different proposals are assessed are important in the choosing process (prioritisation) and have broadened out in recent years. Investment decisions have consequences for the level and type of funding, and sometimes financing, needed. These consequences invariably affect investment choices – there is not enough funding for everything.

Straightforward types of transport investment, such as most non-urban roads, can continue to be evaluated with cost benefit analysis (CBA) in its wider form as contained in the EEM. Other types, especially those where a multi-outcome intergenerational view (30+ years) is needed, and which are now becoming more prominent need other types of evaluation to supplement this.

Cost benefit analysis

This long-standing technique has been formalized in Treasury and Waka Kotahi guidelines (the Waka Kotahi Economic Evaluation Manual, EEM, 2018). The gist is that the estimated costs of a project are compared with the estimated benefits, with allowance for timing. For roads, the benefits are usually savings in travel times, reductions in deaths and injuries, and improvements in reliability, calculated using standard values (being reviewed in a current Ministry-led study[12]).

Costs occur in early years and benefits later, so they are brought to a common dominator (net present value, NPV) using a discount rate, similar to an interest rate. A different way of presenting the same result is a cost benefit ratio, CBR (the ratio of benefits to costs, calculated using the discount rate). The current Waka Kotahi transport discount rate has recently been reduced to 4% pa, and the Treasury is also considering a reduction (from 6%). Subject to some caveats, a worthwhile project is one with a NPV well above 0 or a CBR well above 1. Funding limitations mean that projects are often ranked by NPV or CBR, with the higher ones likely to get priority over the lower ones.

CBA is now usually widened to include external costs, notably environmental (with guidance in the EEM for quantification). CBA does not address equity/income distribution impacts, but there is advice in the EEM about how to assess them[13]. The EEM, and its UK and Australian equivalents[14], also address Wider Economic Impacts.

Uncertainty and Real options

This is very useful where there is uncertainty and flexibility. Uncertainty is the word for situations where we simply do not know the likelihood of an event happening (e.g. of a resilience crisis if

[12] The Parameter Values Study. Also relevant is the Domestic Transport Costs and Charges Study. It is expected that both will be completed in 2021.
[13] Waka Kotahi Economic Evaluation Manual Section A 17, Equity impacts and external impacts 1 July 2018.
[14] UK Department for Transport, Transport Analysis Guidance (TAG) Unit A2.1, Wider Economic Impacts Appraisal, May 2018. Infrastructure Australia, Assessment Framework March 2018.

the Paekakariki Hill collapsed), as opposed to risk where we can estimate a probability (e.g. floods in valley X close the road every few years). In uncertain cases it is difficult to plan sensibly for transport infrastructure – the cost may be clear but the demand side is not. The project planner is a prisoner of the incomplete information available up-front.

One of the real options approaches sees each step (design, resource consent, land procurement, site preparation, foundations, etc.) as buying an option to proceed to the next step as originally envisaged – or to modify, delay or cancel in the light of new information obtained from the previous step and from external developments (demand, climate change etc.). That way, the cost of overinvesting in in a white elephant is minimized, while the option to build needed infrastructure is retained

Another approach is to design a project in modules to make it easier to scale up or down depending on how demand (not known at the outset) eventuates.

To incorporate this in a programme or in priority-setting, flexibility would be needed so that the programme could be modified during its course as new information came to hand – for example, to speed up or delay something.

See the Ministry[15] and Waka Kotahi websites for papers on the real options approach.

Social Impact Analysis

Social Impact Assessment (SIA) is useful to determine how a policy would impact on the existing distribution of transport opportunities (e.g. access) and risks (e.g. exposure to pollutants) among different segments of the population. Vulnerable groups (e.g. low-income households, the elderly, those with a disability, and those in remote locations) are likely to have relatively fewer transport opportunities and greater exposure to transport risks. Would the policy alleviate (or exacerbate) the existing levels of transport inequity? Note that policies that increase access (or decrease exposure to risks) for all groups equally are likely to prolong the existing state of transport inequity.

Improving Transport Assessment Project

The Ministry's ITAP (Improving Transport Assessment Project) is developing policy screening and impact scoping tools, which culminate in impact appraisal, whereby policy impacts across the five areas of the Transport Outcomes Framework are estimated. The five outcome areas are Inclusive Access, Economic Prosperity, Health and Safety, Environmental Sustainability, and Resilience and Security. There is also provision in ITAP for evaluating the distribution of impacts, which is where social impact assessment (SIA) fits in.

[15] https://www.transport.govt.nz/multi-modal/keystrategiesandplans/strategic-policy-programme/real-options/

The wellbeing approach (Treasury/government and OECD[16])

The government's well-being approach broadens the focus from economic growth to also include natural capital (including emissions, forests and water), human capital (education levels and skills, unemployment, and health), and social capital (including trust in others, in the police and in the government). Financial and physical capital includes the main economic indicators and R&D, intellectual property, and household debt.

The government's transport outcomes approach is consistent with these types of capital. At its centre is "a transport system that improves wellbeing and liveability" The outcomes the government is seeking to achieve through the transport system are healthy and safe people, environmental sustainability, resilience and security, economic prosperity and inclusive access, which readily map across to the types of capital in the wellbeing approach.

The portfolio investment approach

Transport issues, especially in urban areas, are complex and often a portfolio of levers must be used together to achieve multiple desired outcomes and deal with uncertainties, indirect effects and trade-offs – as the levers work across the system in many different ways. The levers include investment, pricing, regulation, technology, emissions policy, behaviour change, international links and coordination with other areas like tax, benefits and standards. The approach helps to:

- consider the combination of benefits (hard and soft), cost and risk;
- harness the differences of perspective that exist so we do not stifle innovation and foster groupthink;
- focus on a whole problem which is not necessarily about transport per se; and
- Join up short medium and long-term plans (5 to 50 years) – avoiding fragmented solutions and thinking about long term changes in technology, the natural environment and where people live and work.

A portfolio view can be delivered through coordinated use of levers, using a structured group process assisted by modelling. The approach will help in choosing between options using agreed criteria and weightings, and transparently making trade-offs (e.g. relating to costs and risks). It will be repeatable for example changing criteria or weightings to reflect different viewpoints, or adding other options. The approach is being designed to allow for comparisons across the whole portfolio (i.e. across modes as well as intervention types), and also across Central government, local government and private sector investments.

Some early examples:

- 30-year programmes on PT and green freight, which mix different kinds of evidence and create influence through good long-term policy
- Hamilton to Auckland is about long-term projects and corridors

[16] OECD Economic Surveys – New Zealand, Focus: Well-being, June 2019

Funding toolkit

A key question is how to encourage greater use of these methods. One method is through the GPS which indicates that those seeking NLTF funding show they have considered, and used alternative sources where appropriate. Another method will be through the *Funding Toolkit* when it goes live. This toolkit will have a dual purpose:

- to provide practical information about the use of various tools and approaches for different contexts (the technical component of the toolkit); and
- to influence how local authorities fund infrastructure and services. The behaviour component of the toolkit will also help address political economy challenges.

More practically, the toolkit will encourage practitioners and funding decision-makers to maximise the effectiveness of existing funding tools and approaches, while also encouraging the use of new or innovative methods (including value capture). The toolkit will be an online resource providing a central point of information about how infrastructure (as well as some services such as public transport) can be funded in New Zealand.

The current development of the toolkit along with direction in the GPS21 are ways to encourage fresh thinking about funding rather than the old approach of just going to governments.

Analyses for complex urban situations

Funding decisions for urban situations will use, in addition to some of the above approaches, bespoke analysis - for example, of:

- Access at a high level. Access relates to journey times, frequency, reliability and cost. It is difficult to quantify in an overall sense, but partial indicators include the percentage of people within x minutes of travel to work and hedonic pricing (prices of properties with good vs poor access;
- Agglomeration benefits (see the EEM); and
- Amenity benefits: natural or physical qualities and characteristics of an area that contribute to people's appreciation of its pleasantness.

Agent Based Model

The Ministry and Arup are developing an agent-based model to support evidence-based decision making through incorporating better data, technology and innovation into the design and development process.

Agent based modelling (ABM) is a computational approach for simulating complex systems. The models seek to replicate the complexity that arises from the interaction of lots of individuals (agents), and are therefore very useful in helping us understand how complex systems function and evolve. Populations of agents are created to represent real people in a given area with daily activity plans i.e. New Zealanders with plans to travel for leisure, work, or other purposes. We also model the transport network. This representation of transport

infrastructure and services, defines where and how agents in our model can travel (where are the roads, what are the speed limits, which buses stop where and their timetables).

A simulation is then run to show how the agents interact with the network and with each other, as they try to fulfil their plans in competition with each other. As they learn and evolve they'll try different modes of transport, different routes and even different times of the day for different activities. In the field of transport modelling, current models predict the demand for travel by simplifying and aggregating demand into trips or tours. However, these trip and tour simplifications often struggle to represent the complexity of people's real daily lives. ABMs offer a framework for better considering the complexity of cities, as they are not built on aggregates or averages. People are unique in their behaviours, values, restrictions and needs and ABMs can allow for this.

Once developed, the simulation should allow for a range of policy questions to be explored – for instance, understanding the impact of new infrastructure or road pricing on travel behaviour, and looking at these in terms of their social and distributional impacts.

Appendix 2

DRAFT PRINCIPLES

This is a compendium of questions and suggested principles drawn from this and previous Ministry papers.

Do we have a clearly articulated set of principles for the role and use of the NLTF and other sources of funding?

- Users should pay (e.g. FED, RUC, passenger fares for part of PT cost)
- Local and regional government should contribute to recognise local access and wider regional benefits, including city plans. Funding Assistance Rate (FAR) payments and Crown payments assist local affordability.
- Crown funding should be used when there are wider national benefits, and also other non-transport outcomes (e.g. urban regeneration, macroeconomic stimulus, employment, regional access, regional development) that the Government wants to achieve. Reflected in the outcomes framework.
- Direct beneficiaries (other than users) should contribute – aligned with the type and scale of the expected benefits (e.g. value uplift).
    - *Other funding sources (value capture, SPVs, targeted rates)* – where nearby business/land owners contribute to the cost of transport infrastructure improvements (e.g. a new bus/rail interchange).
    - *Developer agreements* or developer contributions, are also based on the beneficiary-pays principle.
- NLTF funds should be spent on land transport activities that support GPS priorities and are efficient and effective (i.e. delivering land transport benefits) – required by LTMA
    - Part of the NLTF should be spent on roads: operating and maintaining them, and capital investment (rebuilding and/or upgrading existing roads and building new ones).
    - It should also cover related services whose costs are caused by road use, such as the road enforcement aspect of police costs, safety programs, and Waka Kotahi overhead costs.
    - It should also contribute to services that result in lower road congestion than would otherwise occur, to the benefit of road users: public transport (road and rail) operating subsidies and bike lanes.
- The NLTF should contribute to maintenance and operation of rail infrastructure (See below for more detailed rail principles).
- We are starting to move towards:
    - Charging users for additional wider benefits. NLTF is increasingly being used to fund safety, resilience, PT development of Mobility as a Service, and high BCR projects.
    - Charging users for external costs they impose – safety, emissions, and amenity

How do we currently think about business as usual (BAU) and transformational investments and the role of the NLTF as an investment tool? What should be our principles for the funding and financing of major intergenerational transport projects that have multiple objectives? What should our principles be for the funding and financing of 'city deals'/'packages'? What are the implications for the NLTF and for decision-making?

- Maintenance and operation of existing assets should have priority, and are covered by NLTF
- Wider BAU (e.g. upgrades, PT subsidies, rail) should follow the GPS and the evaluation it requires (VFM etc), and are partly covered by NLTF
- Transformational investments should normally require specific decisions – e.g. within the GPS or Crown expenditure decisions, and may be covered by NLTF or other sources
- City deals/packages consider the multiple outcomes, transport-land use and housing-transport interactions, VFM of components, funding identified (including non-traditional sources), sequencing, risks, uncertainty, and require bespoke consideration.

Wider principles for allocating across funding sources:

- fairness and proportionality
- incentivise maximum use of the funding sources available
- funding contributions from local government should come with some form of representation
- take account of broader government policies (macro stimulus, employment, shovel ready, regional development etc)

Financing

Do we see any constraints or issues with NLTF, or Crown funding being used to service the debt generated by financing arrangements? How would we take account of the impact on the NLTF and do we have any principles for ensuring that its contribution is proportionate across other national priorities?

- debt to be serviced by the Crown, proportionate to other national priorities: decision to be made by the government/Treasury
- debt to be serviced by Waka Kotahi (beyond smoothing): potential debt servicing costs should be evaluated against the implications for constraining future expenditure and/or for increasing future FED and RUC, and repayments consulted with Waka Kotahi.
- debt for longer term transformational projects should be considered alongside intergenerational equity – will future generations get enough benefits to justify the repayments they will be making?
- Waka Kotahi: borrow to cover variations in "lumpy" spending and seasonal variations without disrupting the overall work programme
- consider using private sector consortia where expected innovation and risk management advantages are judged to result in lower overall cost or higher quality outcomes

Appendix 3

HOW FAR TO GO?

This is a preliminary discussion question that emerged during the preparation of this paper.

How far does the beneficiaries pay principle go?

Through most of the New Zealand economy apart from (broadly defined) social services, direct beneficiaries pay – people buy goods and services[17] they use. Indirect beneficiaries, such as workmates benefitting from a colleague's purchase of a flu injection, generally do not pay.

The same applies to indirect beneficiaries of transport services. Examples: employers benefit from employees buying PT rides to get to work on time, and property owners benefit from a value uplift when a new PT opens nearby – but they usually do not pay.

There is increasing interest in getting beneficiaries to pay in some circumstances:

- fairness – for example, should a property owner retain all of the windfall gain from improved roads or public transport in the area?
- to provide a source of funding that helps get a new project going that would otherwise not proceed.

However reasons they are usually not asked to pay are

- opposition from the potential payers. This can be strong given that payment by indirect beneficiaries is not the norm in New Zealand. It then becomes a political question as to whether they should be made to pay anyway.
- a view that the potential payers should be exempt because, for example, of low incomes.

If beneficiaries (direct or indirect) do not pay the alternatives are:

- someone else pays. For example general taxpayers rather than road users are paying for the New Zealand Upgrade Programme; some of the general taxpayers are not beneficiaries of it.
- the project does not get funding and so does not proceed. This is a problem if the potential beneficiaries would have been willing to pay for it – they are worse off (net) than they need to be.

An advantage of indirect beneficiaries paying is that they may provide a discipline on the project ("skin in the game") – they may find ways of pushing back if the service cost more than necessary or is poor quality.

[17] The amount that beneficiaries pay is often less than the maximum they would be willing to pay if they had to – this is the concept of consumer surplus. Example: I pay $4 for a coffee but would be prepared to pay $6, but no more, if I had to – in this case the consumer surplus is $2.

A disadvantage of indirect beneficiaries paying is administrative. It may be hard to define the beneficiaries, or to enforce the payment. This has been an element in New Zealand's slow progress with value capture schemes.

To sum up, the transport beneficiaries-pay principle normally applies to direct beneficiaries in New Zealand. There is sometimes a rationale for indirect beneficiaries being asked to pay – but in New Zealand it is less common than in some other countries.

Is there an optimal mix or approach to funding?

The following is suggested for discussion. It is similar to the status quo, with updating etc on the fringe, except for moving away from

- continuation of the current FED/RUC approach to funding but with updates for new technology, position-based charges, congestion charges etc. There is a solid rationale for FED/RUC[18] as the main source of land transport revenue.
- greater use of financing instruments for large long-term projects.
- increases in RUC and FED to cover the total program including the parts of it that are now Crown funded, and to service financial repayment obligations.
- Crown funding in cases where there are broader objectives, such as regional development and connections for isolated areas.
- development of new funding sources such as value capture, value creation, tolls on particular roads.
- application of the GPS approach to all the program including Crown funded aspects.
- payments from Kiwirail or the Crown towards rail components of the program.

What are the constraints (if any) on RUC and FED use – what is reasonable from a social licence perspective (noting that social licence is not fixed in stone).

It can be inferred from general acceptance of current policies that there is a social licence to make road users to pay the full cost of providing the roads – maintenance, renewals and some construction – as well as administration, enforcement and a contribution to PT in recognition of its benefit in reducing congestion.

The question of whether there is a social licence to also require road users to pay the cost of externalities has not yet been tested, though there is a case for it. Preparations are underway for charging for congestion externalities. A social licence may also be found for charging for environmental and safety[19] externalities, judging by the willingness to pay for other burdens such as the fire service levy and ACC levies.

Road users fund nearly all of the NLTF through RUC and FED; rail operators find only a small part of it through track access charges (which are, in effect, paid indirectly by the Crown). The

[18] In the longer term technology improvements may provide an opportunity to consider the replacement of FED by an electronic version of RUC.

[19] Investments in safer roads are covered by the GPS. Externalities here refer to the pain-and-suffering aspect of safety.

question of whether there is a social licence for road users to also pay part of the cost of running the freight rail system – for example, because a shift of freight from trucks to trains would reduce congestion/queuing on highways – is now being tested. It is not yet known how far this could go before causing a backlash. There might be general acceptance for charging higher RUC on difficult roads (e.g. Remutaka Hill) where trucks cause highway congestion – queues of other traffic form behind slow-moving trucks. But in many areas, there is no rail alternative to road freight.

A broader question is whether there would be a social licence to substantially increase RUC and FED. Up to the point where the increases covered road costs now being funded by the Crown (New Zealand Upgrade Programme and the shovel-ready programme) it can be argued that the user pays principle is still being observed. Once they became significantly higher than that, the hypothetical increase would in effect be a general tax. That in turn would raise the question of optimum tax policy. New Zealand from the 1980s has had a simple tax regime, easy to understand and administer and non-distortionary from an incentive point of view. The only significant indirect tax is the GST. A tax on road use would be a departure from the regime. There would need to be a clear rationale for that in itself, and for the complexities and inconsistencies it would lead to, compared with the use of other tax instruments.

Besides the tax type, there is also the question of the tax level. A substantial increase in RUC and FED, if not offset by other changes, would increase business costs and hence reduce output and employment. It would also increase personal travel costs with particular impact on those who have low incomes and few if any transport alternatives.

Is there a point that the system may lose coherence if we continue to take a supplementing approach?

Until a few years ago the system was simply one of road users paying for road expenditure, with a few exceptions. There was some Crown borrowing to bring projects forward (Tauranga Eastern Link and the Auckland Transport Package), to be repaid by the NLTF. There was also additional Crown funding for the Accelerated Regional Roads Programme and Urban Cycleways Programme, and more recently major supplementing with Crown payments for the New Zealand Upgrade Programme and the shovel-ready programme.

It can be argued that the Crown should pay for projects/programs aimed at wider outcomes than the traditional programme, and for general pump-priming during a recession. These arguments can be debated. The New Zealand Upgrade Programme projects relate to the same range of outcomes as previous projects and are generally too large and long-term to be simple counter-cyclical spending – there was a wider rationale.

The logic of the traditional system would have had the New Zealand Upgrade Programme paid for by road users, not general taxpayers. There has therefore been a reduction in coherence but is not clear that that will have negative impacts. The New Zealand Upgrade Programme is simply added in beside the NTLF and both are implemented by Waka Kotahi. The interactions do not create major difficulties:

- the extra Crown funding will in part advance projects that would otherwise have been in the queue for NLTF funding – thus allowing the NLTF to fund other projects.
- the extra Crown funding will add to demand for construction and other resources – but is part of a wider set of issues New Zealand is facing related to housing policy, immigration etc.

Broadly speaking there is a parallel with the health system: general practitioners are nearly all in the private sector and hospital services are mainly in the public sector, but coherence is maintained through long-standing relationships.

However, a missing element is that of overall discipline of the work programme. The traditional system uses the GPS to combine government priorities with rigorous project evaluation. Crown funding does not have this unless the Treasury imposes something. Future cases of Crown funding should be brought under the GPS umbrella.

Or alternatively if there isn't – how can we take a more principled and consistent approach?

It would be possible to move away from the supplementing approach and towards overall coherence by gradually removing the New Zealand Upgrade Programme funding from the Crown to the NLTF and replacing it with increased RUC and FED.

Where are the major stressors on the system? Do we need to take a different approach to handling these in the future?

There are external stressors on the transport system that the government cannot do much about such as weather and earthquake related damage, demographics (apart from immigration policy) and some new technologies. Other stressors are policy decisions to build more roads, cycleways, and railways and expand subsidised PT. The policy decisions in part address the external stressors and in part reflect wider priorities. Ways of handling these stressors include increasing traditional funding sources, exploring new ones, demand management, greater use of financing instruments (constrained by the ability of the NLTF to service them) and cutting expenditure elsewhere.