REPORT FOR

THE NEW ZEALAND BUSINESS ROUNDTABLE

Options for the Reform of Roading in New Zealand

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From the *Financial Times**

"Would the electorate rather pay road tolls or medical bills? This basic question is not, astonishingly, being asked in the [United Kingdom] government's new review of public spending priorities ... . Road tolls are being pushed onto the political agenda, but as a separate item promoted by the Transport Department. Yet, the provision of roads is as much part of the Welfare State as the provision of state pensions and schools. The German government has recognised the financial benefits of such a move, having just approved plans to privatise its autobahns and impose an annual fee.

Resource allocation on Britain's road system is one of the last great outposts of Soviet-style economics. Road usage in bigger cities and on many inter-city routes is limited by queuing rather than by pricing, as used to happen in Moscow's food stores. No attempt is made to charge for factors such as vehicle emissions, congestion, dirt or accidents, echoing the practice applied to East Germany's chemicals plants. There is a strong economic case for sweeping all this away and replacing it with electronic road pricing, especially in urban areas, with premium rates for the rush hour and discounts after midnight. For users concerned that the system might allow their movements to be tracked, technology exists for them to be charged anonymously.

Recent studies of road pricing do not give figures of probable revenues, so we have made tentative estimates. We reckon the annual toll revenues at £11.5bn, assuming a rate of 3p per kilometre for cars on motorways and trunk roads, close to the French level, and 8p in towns. This also assumes that tolls cut traffic volumes by one-fifth.

If the entire road network were privatised, the private sector would raise the capital to develop and install the toll collection systems, and to fund the existing roadbuilding programme. The flotation value would be very roughly £75bn, at a price-earnings ratio of 12, neglecting tax, if annual collection costs were 10 percent of revenues and if creation of the toll systems cost one year's revenue. The German government estimates that its motorways alone are worth over DM120bn (£50bn).

Road pricing offers a way of slashing the PSBR, while reducing congestion and pollution, and creating the base for a world-class high-tech industry in the UK. The economic arguments in its favour seem almost overwhelming compared to those for charges in other areas of the Welfare State, especially healthcare. Yet it is not even on the agenda. Something is wrong."

* Extracts from an article that appeared in the *Financial Times* in February 1993 by Giles Keating, Chief Economist, CS First Boston, London.

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SUMMARY

- The 93,000 kilometre roading network is one of New Zealand's most expensive assets. In the absence of any official estimate, informed observers put its depreciated replacement cost at around $60 billion. This figure is nearly half the value of the nation's dwellings and is around 81% of GDP. The 11,000 kilometre state highway network was officially valued, on a depreciated replacement cost basis, at $7 billion in the Crown's December 1992 Financial Statement.

- New Zealand's roading system has the capacity to take much higher average traffic volumes than at present (average density is around 680 cars per day, whereas densities above 10,000 vehicles a day are found on the busiest single-lane-each-way state highways in New Zealand) and the annual state highway construction programme is only 14% of annual expenditures. By international standards, congestion is not a widespread problem in New Zealand, even on city roads.

- Total road transport-related expenditure (excluding any capital charge for the roading network) is estimated to be approximately $10 billion per annum. This is equivalent to 14% of total GDP, larger than the contribution to GDP from the entire primary sector (agriculture, fishing, forestry, and mining together account for 11% of GDP). Much of this road-related expenditure represents personal consumption; with the transport sector itself contributing 5% to GDP.

- The road network is essential for personal mobility and the movement of freight. It is a critical part of the nation's infrastructure.

- New Zealand's state highway network is currently managed and operated by Transit New Zealand (TNZ), a state-owned and controlled corporate body with both commercial and non-commercial objectives. Local authorities are responsible for operating urban and rural roads, but receive from TNZ approximately half the funds they require for their construction and operation. Public expenditure on operating the roads in 1991-92 totalled around $840 million. TNZ's share being $610 million.

- The responsibility for making sensible roading decisions falls heavily on the government since the road system is entirely owned and operated by public agencies and the government controls all the key road pricing decisions.

- Road design, operation, and pricing decisions have the potential to profoundly influence business location decisions between suppliers, customers and ports; urban sprawl; and the balance between motor vehicles, bus and rail for commuter transport and between sea, rail, road and air for inter-urban freight and passenger transport. Environmental and fiscal effects could also be significant. For example, an under-priced and over-expanded roading system could result in more urban sprawl, less utilisation of other transport modes and a greater reliance on motor vehicles than individuals would prefer on the basis of true costs. Alternatively, an under-provided, under-priced system will impose great inconvenience and congestion costs on society. Economists use the concept of economic efficiency to discuss the issue of how to get the balance right.

- Efficiency is about best meeting consumer preferences at least cost. When users are confronted with the costs of their actions, their choices will reflect a balancing of benefits and costs. If prices reflect all costs and those costs have been minimised, for example because producers have been driven to trim costs and price competitively, then the chances are good that outcomes will be efficient. Most of the institutional reforms in New Zealand in recent years have been driven by this approach.

- However, in respect of roading, New Zealand has been relatively slow to debate the full range of roading reform options – as the *Financial Times* article cited at the front of this report illustrates.

- In this report, which should be seen as a preliminary investigation of the issue, we consider the case for more fundamental reforms to roading than have been implemented to date. First we review the current system of roading management from an efficiency perspective, using similar efficiency criteria to those used in the other public sector reforms. The incentives on current managers to identify consumer preferences and meet them at least cost are important, but so too are the constraints which could thwart their attempts to achieve such a goal. Questions of clarity of objectives and accountability, ability to obtain the necessary information and the extent of delegated authority to make capital asset, personnel and pricing decisions are all relevant.

- Given the roading network's pervasive importance, it is very concerning to find that despite many reforms in recent years, the resulting management system for public roading imposes conflicting objectives on TNZ, fails to adequately establish clear lines of responsibility and accountability among the various public authorities involved with roading, does not allow consumer preferences to be adequately revealed, requires TNZ to make decisions on the basis of impossibly inadequate information, is unduly complicated, and seriously limits

management flexibility, for example, by constraining TNZ's property rights in respect of the roading system. We believe that the core of the problem is the lack of a clear framework for determining the best ownership and institutional structures for the roading network.

- Options for improving the economic efficiency of the roading network include the commercial operation of publicly-owned roads through a state-owned enterprise (SOE) structure and private ownership and operation of roads. Issues of property rights, regulation (for safety and/or monopoly), billing systems and financial structure and monitoring arrangements need to be addressed. However, the scale of such far-reaching reforms is not beyond contemplation, especially in the light of the reform of telecommunications and aviation in New Zealand and the German government's announced privatisation of its autobahn system.

- We consider two options for commercialising the public road network. The first would assign ownership and commercial objectives to TNZ only for the current state highway network. The Crown would hold all shares in TNZ. The second, more complicated, option would extend this assignment to all roads. Both the Crown and local authorities would hold shares in TNZ in proportions reflecting their relative historical contributions to the road network.

- The more limited state highway option would be easier to implement in that the Crown is the dominant owner of the asset. Also, it may reduce concerns about monopoly power over the roading network, since monopoly power is a more serious problem for local roads and ownership of these roads would not have changed. One disadvantage is that it might be harder to introduce new technology (e.g. tolling systems) in a consistent fashion across the entire road network. Furthermore, it may lead to ongoing contractual problems between (non-commercial) local authorities and (commercial) TNZ. De facto corporatisation of local roads may result from the funding constraints faced by local authorities, and this may occur in a less consistent fashion than if commercial operation of all roads were undertaken within one institution.

- On balance, therefore, we suggest that further work should be undertaken on the more ambitious option of commercialising all roads. This option would provide markedly greater potential economic benefits from corporatisation, given that the value of the asset affected by the reforms would be much larger than under the more limited corporatisation option. Furthermore, the evolution of the most efficient industry structure (perhaps based on separate commercial operation of roads along regional divisions) would not be precluded by

this initial industry configuration. However, this approach may be harder to implement and would surely exacerbate concerns about monopoly operation of roads.

- As noted above, irrespective of the option adopted, the policy issues arising from a greater commercial emphasis in roading management include the need to collect a greater proportion of revenue directly from road users, the inconvenience of manual tolling, the possible reallocation of property rights, safety and environmental issues, the opportunities and incentives for efficient road management and investment, and concerns about monopoly power.

- Direct charging of road users, rather than using taxes, would be a crucial feature of both the SOE model and private operation of roads. Except as a transitional arrangement, neither the SOE nor private roading firms would have access to fuel tax revenue. The power to tax is inconsistent with competitive neutrality. Fuel taxes are a blunt charging instrument that do not facilitate the discovery of user preferences concerning such diverse roading attributes as congestion, safety and surface quality. They do not allow time of day, or route specific pricing. One of the key features of the SOE model is that the SOE, like any private business, must charge consumers directly for their use of the SOE's product or services. In this way the SOE can find out what users really value. In contrast, assuring a SOE of tax funding would reduce its incentives to search for billing systems which would facilitate discovery of consumer preferences.

- The practicality of direct charges is obviously a crucial issue. Fuel taxes are very economical to collect and do not impede the flow of traffic. The New Zealand experience has highlighted the inconvenience of paying manual tolls on roads (e.g. the Auckland Harbour Bridge).

- In our view the preferred approach in commercialising roading would be to seek to exploit the advanced electronic billing systems which have been developed in a number of countries in recent years. This new technology, which does not impede traffic flows, represents a massive change in the constraints facing societies in respect of how they choose to run road systems. Based on overseas comparisons, we estimate (very roughly) that an advanced electronic road pricing system could be introduced on New Zealand's state highway network for an annual cost (including capital, operational and enforcement costs) of NZ$100-150m. Because electronic billing has the potential to cater for route-specific and time-of-day pricing, it should greatly facilitate the task of finding out what attributes of roads users really value.

- From a commercial perspective, this cost must be put into context by considering it in relation to the value of the network. Rough estimates suggest that the annual cost of the billing system, if applied to state highways alone, could amount to around 12% of the total cost (including income forgone) of operating the network, or 2% p.a. of its $7 billion depreciated replacement cost. The cost per vehicle kilometre depends greatly on traffic densities and the degree to which heavy vehicles are charged for the disproportionate stresses they impose on roads.

- From an efficiency perspective, the case for incurring the costs of a billing system must be based on the likely savings from improved future expenditure decisions. Large benefits for society are likely to follow from the resulting improvement in the information upon which investment decisions are based, given the high value of the roading network and the importance of maintenance and investment decisions in managing this valuable capital asset. Direct measurement of consumer willingness to pay for different classes of roads and safety standards would provide a valuable source of management information that is not available under the present system of road management. Roading administrators currently rely on benefit-cost analysis in selecting investment projects. However, at present TNZ only undertakes investment projects with a benefit-cost ratio exceeding 5 (whereas a ratio greater than 1 implies that the project is worth undertaking). Either policy-makers do not believe the results of the cost-benefit analysis, or viable projects are being rejected. In a commercial environment, decision making would be more straightforward in that road usage patterns and willingness-to-pay would be directly linked. Road enhancements would occur when road users were perceived as being willing to pay for them. Improvements in road design and surface quality would be better tailored to users' willingness to pay for such attributes as safety, speed and comfort. Information gained about how users subsequently respond to enhancements in one part of the system could then be used to assist in decision making elsewhere. Peak-time charging could facilitate the achievement of such efficiencies on the (relatively few) roads on which congestion is a problem.

- Nevertheless, obtaining efficiency gains of the order of $125 million p.a. is a demanding target given that annual public expenditures are around $315 million p.a. for state highways and $840 million p.a. for the entire network. While we believe that the efficiency gains which would follow from the introduction of a billing system will be substantial, we suggest that a more detailed study should address whether or not they exceed the true costs of a billing system.

- In the event that the new billing technology was judged to be viable, it would be very important that all decisions concerning implementation should be as commercially-driven as possible. In the context of an SOE model, the SOE would be responsible. In this case, we

foresee a transitional period in which the SOE would be reliant on current systems of funding for road infrastructure (i.e. fuel tax) while it developed and implemented its preferred billing system. Such taxes could be phased out according to a timetable that was reasonable but pressured the SOE to develop a replacement billing system expeditiously.

- Commercial operation of roading might involve a reallocation of property rights which might be considered socially undesirable. For example, certain rural roads may not be commercially viable if maintained to their current high standards. However, rather than regulate the roading firm to force it to maintain these roads to uneconomic standards of quality, alternative policies and instruments could be both more effective and efficient in dealing with these outcomes (e.g. targeted income support to affected road-users).

- Current external regulation of road use and safety standards does not provide a basis for assessing what the optimal level and extent of safety regulation should be. Without external regulation, cost-effective voluntary monitoring and information disclosure by road users and commercial road suppliers would be more likely to provide the optimal level of road safety at least cost, provided road users and suppliers had some ability to sue the appropriate counterparty for breach of contract. Therefore, self-regulatory powers for road use could be transferred either to TNZ operating as an SOE or to private road operators.

- The regulatory structure for obtaining environmental clearance for roading projects in New Zealand is governed by the Resource Management Act (RMA). Theoretically, the provisions of the RMA would apply equally to all participants in the roading industry, whether public or private. However, in practice, planning agencies are unlikely to sanction widespread duplication of existing roading infrastructure, so this is likely to leave new entrants to the roading industry in an uncompetitive position relative to the existing road network. This situation is not unique to roading and could justify a general review of the economic impact of environmental legislation rather than specific legislation targeted at roading.

- Monopoly issues are likely to be a more serious problem for local roads. Monopoly power in the inter-urban highway market will be reduced by inter-modal competition (e.g. air, sea, and rail) and (depending in part on the RMA and local geographical factors), over time, by the emergence of competing rival motorways and bypasses in some locations. Opportunities for replicating local roads are clearly more limited, and only limited forms of inter-modal competition (e.g. urban rail) are available.

- Monopoly power does not necessarily justify regulation of roading suppliers. While unregulated monopoly operation can impose economic costs through restricted output and

higher prices, regulatory intervention may not provide benefits in excess of costs, because of the lack of information available to regulators and incentive problems created by external regulation. The choice between regulated and unregulated monopoly supply of roading services is a choice between two potentially inefficient outcomes.

- The Commerce Act provides a general structure for regulating monopoly power that may be used instead of industry-specific regulation of roading. Therefore, a "wait-and-see" approach to regulation could be employed for roading. The risk that could arise from adopting this approach could be greater uncertainty regarding the extent and the quality of regulation imposed by the Commerce Commission on the roading industry. If monopoly power did emerge as a significant problem, or regulatory intervention was adopted in a piecemeal fashion under the Commerce Act, then unified roading-specific regulation might be justified. Our preliminary view is that regulation should not anticipate the emergence of these problems, but this is an issue which would have to be considered very carefully in conjunction with decisions taken in relation to the reallocation of property rights more generally.

- Once commercial operation and the regulatory environment for roading were established, there might be no strong rationale for ongoing public ownership of roads. Internationally, there are longstanding examples of privately operated roads. Furthermore, increased private sector participation in roading is becoming more common in both developed and developing countries, although more often as a result of public sector funding constraints rather than efficiency considerations. In our opinion, the international evidence supports the conclusion that public sector intervention in the private operation of roading increases the risks of failure of privately-owned road infrastructure ownership as a result of reduced commercial flexibility. The greater commercial focus of private ownership and the enhanced monitoring of roading management under private ownership suggests that, as long as monopoly costs (including the costs of regulations) are not severe, corporatisation of New Zealand roading infrastructure would provide even greater economic benefits if it ultimately led to private ownership of the roading network.

- Since, in our view, the viability of electronic billing is crucial to the viability of the SOE model for TNZ, any decision that the current costs of such a system outweigh the likely benefits would turn attention to the options for reform based on separating the role of the Crown as a purchaser of roading services from its role as a provider. The difficulties here with specifying the detailed attributes of the roading service that the Crown would purchase, trying to ensure contestability in the provision of road network services and monitoring TNZ's performance in this respect, would then have to be addressed (although these difficulties have been addressed in other areas such as the Crown Research Institutes

and the Regional Health Authorities). However, this alternative "Crown agency" model may still provide some benefits relative to the current system of road management if the costs of electronic billing turned out to be prohibitively expensive.

- One possible means of ensuring some separation of commercial objectives from other political objectives under the Crown agency model would be to specify a transparent, arms-length funding arrangement. A commercial roading company, whether public or privately owned, could still generate revenue from its roads without reverting to electronic billing if the Crown paid a "shadow" toll to the company (i.e. a toll per vehicle using the company's infrastructure). Funds for the shadow tolls could still be provided from licence and registration fees, petrol taxes and road user charges. This approach would minimise the adjustment costs of moving to a new funding mechanism, but it would be unlikely to provide quite the same incentives or information necessary for commercial organisations to satisfy road user demands in the least cost fashion, as would be provided under elctronic billing.

1. INTRODUCTION

This report reviews the public provision and operation of roading infrastructure in New Zealand. It identifies deficiencies in current arrangements and considers the case for reform. Within the scope of this project it is not possible to provide definitive answers to all the questions raised. However, this report provides a preliminary analysis of the issues and suggests an agenda for further work.

The review is motivated by the value of the roading network, and its importance to the lives and livelihoods of all New Zealanders. Roads are one of the most valuable assets in New Zealand. Background statistical information on this network is provided in Appendix 1. In the absence of an official estimate, informed observers put the depreciated replacement cost of New Zealand roads at around $60 billion.

Expenditure on the road network from both public and private sources is estimated to be $10 billion p.a., larger than the combined contribution to overall economic activity from agriculture, fishing, forestry, and mining. Clearly, the roading system is a vital part of the nation's infrastructure. Every 1% improvement in the rate of return derived from this asset would be equivalent to an extra $175 per year in the hands of every New Zealand citizen[1].

Surprisingly, public debate on the state of roading infrastructure, both in New Zealand and internationally, has concentrated on the limits tight control of government expenditure[2] impose on construction and maintenance of roads. Less attention has been given to the efficiency of roading management.

A possible change in the institutional arrangements affecting the roading network raises a number of policy issues:

- concerns about monopoly power;
- safety and environmental issues;
- modification of property rights for landowners and road users resulting in income and wealth redistribution;
- the inconvenience of manual road toll collection and the costs of electronic billing systems;

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1 Calculated as 1% of $60 billion divided by the estimated mean population of New Zealand for 1991.

2 See, for example, Barber (1991), and Transit (1991, p. 3).

- the role of local government; and
- efficient road management and investment.

This report concentrates on these public policy issues in considering a restructuring of the current non-commercial system of public ownership and operation of the road network. It provides a detailed analysis of the current institutional framework for roading in New Zealand and evaluate alternative systems for public sector provision and operation, based upon the state-owned enterprise (SOE) model.

We focus on comparing the quality of the incentive structures provided by the existing and proposed systems. We favour, from an efficiency perspective, those structures which are most likely to motivate providers to discover and satisfy road user preferences at least cost.

We do not attempt to predict, in any detail, what decisions would be taken under alternative institutional arrangements. This is because the information currently available about user preferences (particularly on a willingness-to-pay basis) is too limited to allow us to predict with any precision the decisions concerning road quality, vehicle and driver safety, and billing systems that road managers with a very different information base and incentive structure might make.

In Chapter 2, we evaluate the current legislative environment for roading. We identify current objectives for public sector operation of the roading system. In addition, we consider the likely performance of the system in terms of its economic efficiency - that is, meeting the requirements of road users in the most cost-effective fashion. We consider the information available to public authorities that administer the roading network, and their ability and incentives to employ this information to meet their objectives.

In Chapter 3, we evaluate an alternative institutional structure for commercial operation of public roads. The analysis concentrates on the SOE model employed in New Zealand for other publicly-owned network utilities such as ECNZ/Transpower, Telecom (prior to privatisation), and NZ Rail. The SOE model is evaluated for its potential application to Transit New Zealand (TNZ), the Crown's principal agent responsible for the public roading system.

Certain factors are likely to complicate the strict application of the SOE model to TNZ. In particular, only a small portion of the funds used on the roading network is currently collected directly from road users (in contrast to the other government-owned utilities prior to corporatisation). Furthermore, the historical division of property rights to public roads between central and local government is not particularly well-defined, and is unlikely to facilitate the straightforward corporatisation of the road network. Other issues likely to arise from

corporatisation (e.g. the regulatory structure for roads and the property rights transferred to a commercial roading firm) are also considered.

In Chapter 4, we consider a public policy concern that is likely to arise if commercial organisations own and operate roads in New Zealand namely, the market power a roading firm could employ to increase road tolls to generate monopoly profits. This type of behaviour could result from the dominant monopoly position of a commercial roading firm in its operation of local or urban roads. We assess the different types of regulation that might be imposed on roading firms, and their relative costs and advantages.

In Chapter 5, we discuss the options for privatising TNZ. We briefly review the international experience with direct charging for road use and private sector provision of roading infrastructure. The environment that has led to the introduction of direct road charging overseas has obvious parallels with the current situation in New Zealand. As a consequence, the emergence of road tolling within New Zealand is a probable outcome of current funding constraints. However, the optimal institutional structure for roading (e.g. issues related to commercial vs. mixed/non-commercial objectives and public vs. private ownership) is far less certain, as are the long-term economic benefits from introducing road tolling independent of institutional change.

Chapter 6 draws together the conclusions of this report and presents an indicative plan for further work on these issues.

2. PUBLIC PROVISION AND OPERATION OF ROADS - THE CASE FOR REFORM

2.1 Introduction

This chapter describes the institutional structure for public operation of the road network, and its implications for efficient road use and investment. Appendix 2 summarises the current legislative environment governing the public provision and operation of roads in New Zealand.

This chapter demonstrates the lack of a clear and overriding objective for public sector involvement in the supply and operation of roading infrastructure. As a consequence, public managers of the roading network are assigned many different objectives, the simultaneous achievement of which may not be technically feasible. Furthermore, in situations in which a potential trade-off exists between different objectives, there is no guidance as to how the trade-off should be made. Management of the roading system is undertaken within what we believe is an unnecessarily complex and bureaucratic institutional structure that reduces the flexibility with which road management systems can respond to changing road user demands. Consequently, it is possible that greater clarity in management objectives and a less rigid institutional and regulatory structure could provide greater efficiency from the road network.

Of course no system is perfect. Current arrangements reflect many significant reforms in recent years and will continue to evolve. A catalogue of existing problems motivates consideration of more radical, less evolutionary reforms. But it does not justify such reforms; that is a topic for later chapters and further debate.

2.2 Profile of Transit New Zealand

TNZ is responsible for the roading network in New Zealand. It is a Crown-owned corporate entity established by legislation and accountable to the minister of transport. TNZ's primary objective, as defined in the Transit New Zealand Act 1989, is to "promote policies and allocate resources to achieve a safe and efficient land transport system that maximises national economic and social benefits." Its functions include:

- giving policy advice on roading to both central and local government;
- providing services to road users;

- overseeing the provision of road services by other public and private suppliers;
- managing Crown assets; and
- regulating the use of roading infrastructure.

In conjunction with regional councils and local authorities, TNZ is responsible for preparing an annual national land transport programme. This programme must be approved by the minister and must contain TNZ's recommendations on land transport priorities and the proposed funding of these recommendations. The minister has the right to alter any part of the plan or to require TNZ to redraft the plan either partially or entirely.

TNZ is funded from the Land Transport Fund. Certain types of revenue received by the Crown must be paid directly into this fund (e.g. road user charges, a fixed proportion of fuel tax, and licensing and registration fees), while disbursements from this account can only be made for projects contained in the current land transport programme. In addition to funds provided for projects under the direct control of TNZ, funds may also be provided to local authorities for passenger transport subsidies and for use on approved projects undertaken by these territorial authorities.

2.3 The Objectives of Transit New Zealand

TNZ's primary objective encompasses a number of different and potentially irreconcilable objectives. The simultaneous achievement of all of these objectives is neither straightforward nor guaranteed to be feasible in practice. In contrast, a single, clearly defined objective that is also feasible would both simplify and clarify the task facing TNZ's management. Under an SOE structure, TNZ's management would be solely interested in operating the road network profitably. A single objective would also provide a clear basis for measuring the performance of TNZ's management. This is not possible under the current system of road management given the diversity of and possible conflict between TNZ's current objectives.

The following points illustrate these possible conflicts. First, TNZ's primary objective includes achieving a safe land transport system. However, safety is merely one of a number of road characteristics that motorists desire. When travelling, motorists trade safety for speed. Car buyers trade safety features for price. It is impossible for TNZ to achieve a safe system in any absolute sense. All it can do is to attempt to make it more or less safe but this involves a trade-off with efficiency. The safest road system is hardly likely to be the most efficient road system. Since TNZ

does not have an accurate measure of consumer's willingness to pay for road safety[3], it cannot accurately judge whether a marginal dollar spent on making a road safer actually enhances economic welfare. A safer road may allow drivers to increase their driving speed and experience a lower accident rate, but this only improves economic welfare if the value placed on these benefits exceeds the costs.

Second, TNZ is required to achieve an efficient land transport system. As already noted, such a system is bound to be unsafe to some degree. Moreover, political constraints on TNZ's management may conflict with the achievement of this efficiency objective. The evidence that TNZ is not receiving sufficient funds to undertake all commercially viable projects is worrisome in this regard. Political constraints may impinge on such crucial entrepreneurial decisions as the optimal billing decision. Consider, for example, the problem that TNZ faces in dealing with a congested road. One possibility is for TNZ to increase the capacity of the road to allow faster traffic flows during peak hours. Alternatively, TNZ could explore the commercial costs and benefits of introducing a peak hour charge for motorists' use of the road when it is congested. Of these two options, TNZ has never, to our knowledge, introduced a peak hour charge on any road under its jurisdiction. However, there are many examples of new infrastructure constructed in response to increased traffic volumes. In many cases, this increased road capacity is underutilised except during peak hour traffic, in which case the increase in capacity may be a less efficient response than introducing peak-hour pricing. Expressing the point differently, motorists might prefer to have lower roading costs from smaller capacity roads in conjunction with peak-time pricing - but political lobbying to prevent the implementation of peak-time pricing and/or the imposition of capital charges could thwart the achievement of this efficient outcome. In this way, road management by a politically-controlled organisation such as TNZ may reduce the ability of management to achieve its efficiency objective.

Third, TNZ is required to maximise national economic and social benefits. In order to do this, TNZ must be assured that as a result of any new policy, gains outweigh losses in aggregate and a more desirable income redistribution will result[4]. In principle, this objective requires TNZ to:

- have sufficient information and incentives to assess accurately the economic and distributional impact of road management decisions on individuals - when those same individuals have good reasons to conceal the true impacts; and
- choose the particular configuration for the roading network that maximises aggregate benefits for society and achieves the most desirable income distribution, and reallocate resources to achieve this configuration.

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3 Road user surveys are at best an imperfect and potentially biased source of this information, given that respondents are likely to overweight the value of safety if they realise that, ultimately, the costs of providing safer roads will be spread diffusely across tax- and rate-payers, rather than borne directly by themselves.

4 Ng (1983, pp 59-78).

Social objectives, which can be thought of as a proxy measure of desirable income distribution characteristics, are determined by the government of the day. This raises a number of issues regarding:

- whether the objectives can be successfully described and communicated to TNZ in a manner that facilitates their achievement;
- whether manipulation of roading infrastructure is the best instrument for achieving social policy objectives; and
- the inconsistency between the (short) average life of social objectives (often linked to the political term) and the (long) economic life and lead time for construction of roads.

Currently, social objectives in respect of the provision of roads are not clearly articulated, nor are the costs of meeting those objectives carefully documented. For example, the quality of much of the roading structure in relatively under-populated regions is surely much higher than would be justified on a commercial (willingness-to-pay) basis. Those benefiting from the current arrangements might defend the situation using as a justification some combination of national economic and social objectives. For example, they might assert benefits to tourism, national defence, flexibility in the event of natural disasters to other parts of the network, regional development, the need to preserve infrastructure in rural communities and the like. There is no requirement on those who are responsible for tourism, national defence or other functions to quantify what the alleged benefits are worth to them and fund them explicitly, at the expense of other tourism or defence-related activities. How then can TNZ ascertain the true value to the community of such benefits?

In short, TNZ's primary objective requires TNZ to internalise conflicts between safety and efficiency and between economic and social benefits. Further, the focus on national cost/benefit considerations, rather than on commercial considerations (in which those who receive benefits must pay for them), exposes TNZ to a near-impossible evaluation task.

One could speculate on the efficiency arguments for maintaining the status quo. Two possible justifications could be given. First, as a method of funding, the current combination of an access charge (i.e. licensing and registration fees) and indirect charges correlated with road use and road wear (i.e. petrol taxes and road user charges) could arguably provide an economically efficient pricing mechanism, particularly if the costs of alternative direct charging mechanisms (e.g. electronic billing) turn out to be prohibitively expensive. Second, the efficiency costs of allowing unfettered monopoly provision of roading services may arguably justify the inefficiency costs associated with external regulation, and public ownership is one possible means of achieving this external regulation (although not necessarily the most efficient means).

Both of the preceding reasons may provide a rationale for maintaining the status quo of public ownership and operation of the roading network on the grounds of economic efficiency. Ultimately, the debate should focus on the empirical evidence on the relative costs and benefits of changing the status quo. Later sections question that the case for maintaining the status quo on the grounds of economic efficiency, and highlight the need for the collection of quality empirical data that would allow more definitive conclusions to be drawn.

Even if the status quo can be justified on efficiency grounds, the problems created by assigning multiple, potentially conflicting objectives to one organisation (in this case, TNZ) require consideration. While the objectives themselves may be individually laudable, the alternative approach of assigning a single objective to separate organisations would clarify the costs of achieving these objectives and improve both the focus and the accountability of public sector managers. Even apart from the issue of a continuing economic rationale for public sector involvement in the roading network, we believe that TNZ should be assigned a single objective designed to enhance the economic efficiency of roading provision and be clearly accountable for the achievement of this objective.

2.4 Demarcation of Powers over the Roading Network

Different public authorities (i.e. local authorities and TNZ) own and operate different parts of the roading network. The powers of TNZ and territorial authorities over roads in their jurisdiction are similar (i.e. they both have the power to regulate road use and safety standards, and to plan, design and oversee the construction of new roads). The reasons for delegating control of different classes of roads to different authorities are unclear. Yet this separation may impose considerable economic costs in terms of the reduced ability to manage the roading network efficiently (e.g. possibly because of higher transactions costs arising from the division of authority). The ability of TNZ to establish and to change the designation of roads, and change the authority under whose jurisdiction these roads fall, reduces the accountability of territorial authorities to the ultimate owners of these roads (i.e. tax- and rate-payers).

The division of control and ownership of roads between central and local government may reflect the historical development of the roading network in New Zealand, as opposed to any economic advantages arising from this split in responsibility. In the early stages of road development in New Zealand, limited investment by local authorities in inter-urban roads led to the central government taking over responsibility for this part of the road network. Similarly, the use of local roads by non-residents and business travellers was used as a justification for a government subsidy to local authorities for the development and maintenance of local roads. The split ownership of roads among different public authorities would be less of a problem for roading management if the

authorities had clearly defined rights and powers over the roads in their jurisdiction. In practice, this is not the case. TNZ has the power to regulate the construction and use of local roads. Conversely, local authorities can influence the allocation of TNZ payments to themselves through the political process. Ultimately, both groups are subject to control by the minister of transport, and various regulatory and enforcement authorities (e.g. MOT, Police).

The division of control of the roading network between TNZ and territorial authorities complicates any attempt to reform the public operation of the roading network. Effectively, any major reform of TNZ in isolation would be difficult. Reforming TNZ's role in providing road infrastructure also arguably requires reform of the role of territorial authorities in roading. However, there may be a corresponding increase in the benefits of coordinating reform across the different public authorities responsible for the roading network, given that overlapping and poorly defined lines of responsibility for the network is one of the problems of the current road management system.

2.5 Bureaucratic Structure

The bureaucratic structure within which control of the road network by TNZ and territorial authorities is undertaken appears to be very complicated. The requirement for TNZ, the Ministry of Transport and territorial authorities to individually prepare land transport programmes (or parts of them), to acquire the approval of the minister of transport and then to ensure coordination of these plans across different authorities leads to high transactions costs for making decisions. In practice, this process does not involve widespread duplication of planning across different public authorities but it does require considerable consultation and coordination between the diverse public authorities involved in the planning process. This is a costly and time-consuming exercise and may not be the most efficient means of achieving the original objectives for the process.

The adequacy of the information base used in this planning process, and the incentives for individuals in each of the various stages of this process to make sound commercial decisions and to be held accountable for their decisions, are not addressed in the legislation. Instead, the legislation concentrates on the mechanics for undertaking this planning, not the desired outcomes, and it does not consider the incentives or monitoring arrangements placed on individuals making these decisions.

An example of the problem posed by an inadequate commercial information base and/or inadequate incentives is the process for selecting investment projects undertaken by TNZ. The standard tool that TNZ uses for deciding on investment projects is the benefit-cost (BC) ratio test. Theoretically, if benefits exceed costs (i.e. the BC ratio exceeds 1), and provided all benefits and costs are accurately measured and incorporated into the analysis, the project should be undertaken.

However, at present, TNZ is only able to able to undertake projects with a BC ratio of 5.5 for state highway projects and 5 for local roads[5]. Such a wide margin implies that either policy makers do not have much faith in the information provided by the BC ratio test, or that viable projects are not being undertaken that would have been undertaken if roading were being managed within a different institutional structure.

Decentralised control of the roading network is less likely to occur under the present overlapping system of public roading management than if private firms were operating the road network. As a consequence, the responsiveness of the road management system to changing consumer demands is likely to be slower and less efficient. Since the mechanisms for planning and coordinating decisions across the road network are set by statute, there is little flexibility to deviate from the established planning process. Nor are there many incentives to do this (even if there were some flexibility), since the rewards from sound decision making are spread in a diffuse fashion across different authorities whereas the costs of change are often incurred by one particular authority. Furthermore, given that the costs of political interference are much harder to identify in a complex organisational structure, there may be a tendency for politically controlled organisations to favour a complex organisational structure for reasons unrelated to the organisational requirements of the business[6].

2.6 Regulatory Control of the Road Network

While TNZ is required to advise policy makers on land transport infrastructure use and regulation, ultimate responsibility for regulating road use does not lie with TNZ. For example, the Ministry of Transport[7] is currently responsible for licensing drivers, and for setting standards on the types of motor vehicles that may be used on roads.

This division of responsibility reduces the effectiveness of roading management. For example, if TNZ has no power to directly influence the type of vehicles that may be driven on roads under its control, it will not have as much incentive to consider the construction of purpose-built, high speed roads[8]. On the other hand, if the Ministry of Transport cannot directly influence the type of roads

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5 Barber (1991).

6 Some examples of this type of behaviour may include the lack of data on effective regional road subsidies (i.e. expenditure on the road network on a regional basis relative to regional populations).

7 These functions are expected to be taken over by the Land Transport Authority which will itself be separate from TNZ, the Ministry of Transport and the Police (who have been assigned the task of regulating road use).

8 In an ideal world, with a known regulatory environment, TNZ would be able to minimise roading construction costs even if separate public authorities were responsible for regulating road use and construction standards. However, there would be no information on the relative costs of this external regulation and as a consequence, no means of assessing

that are constructed or does not bear the costs of maintaining these roads, then the Ministry may not have as much incentive to regulate the type of vehicles that may be driven on roads.

Within the current legislation:

- there is no real basis for assessing the benefits and/or costs of existing regulation, and no definition of, or basis for deciding on, the optimal level of regulation; and
- there is no clear rationale for assigning this regulatory role to an authority not directly involved in operating the roading network, nor any recognition of the costs of maintaining this division of authority.

2.7 Impact of the Planning Environment

The process of obtaining environmental clearance for roading projects in New Zealand is governed by the Resource Management Act (RMA). As the description of this Act in Appendix 2 demonstrates, the bureaucratic structure for securing environmental clearance is daunting. Furthermore, as with the legislation governing the operations of TNZ, the RMA concentrates on the processes for obtaining environmental clearance rather than the objectives for this legislation. Little, if any consideration appears to be given to the information available to the individuals responsible for administering the process, and their incentives to make sound decisions. Furthermore, roading administrators consider that the costs of obtaining planning approval for roading projects have risen since the RMA came into force, irrespective of the prospective environmental impact of a particular project.

In theory, the provisions of the RMA would apply equally to all participants in the roading industry, whether public or private. However, in practice, the costs of obtaining environmental clearance for roading projects might leave new entrants in an uncompetitive position relative to the incumbent public authority operating an existing highway corridor. As such, environmental constraints represented by the RMA are likely to threaten the establishment of competing private firms in the roading industry if these firms must build new infrastructure rather than take over existing publicly-owned infrastructure[9]. However, this situation is not unique to roading and may be

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whether the costs imposed on road users by this regulation were unnecessarily high. In contrast, if competition emerged in the provision and operation of roading infrastructure and different firms had the ability to set their own standards for road use and construction safety, competition would lead to the minimisation of any costs borne by road users.

9 If these environmental restrictions were justified, this would not be an argument for their removal (although there may still be grounds for reviewing the current administrative process involved in acquiring planning clearance). Unfortunately, there is very little information available to policy makers on the costs imposed by environmental legislation and no framework for measuring the benefits that this legislation is thought to provide.

used as partial justification for an overhaul of the RMA rather than justifying specific exemptions in the case of roading.

2.8 Legislative and Institutional Barriers to the Roading Industry

As a result of both explicit legislation and the institutional arrangements for funding public roading infrastructure, there is very little prospect of TNZ facing any competition in the provision and operation of roading infrastructure. This is likely to result in less efficient management of the roading network and raises the possibility that TNZ's management may allow (perhaps inadvertently) the diversion of resources into non-productive areas of the business.

Under the RMA, a private firm can be designated as a requiring authority for the purposes of a roading project, and may use this authority to acquire access rights and possible use of private land for the purposes of constructing a new road. Prior to the RMA, a private firm could not have done this without explicit legislation. Therefore, in this regard, the RMA does provide consistent treatment for both the incumbent public roading authorities, on the one hand, and private roading suppliers on the other hand. However, the constraints imposed by the RMA on the commercial operation of roading would ultimately be determined in the courts, with considerable uncertainty regarding the impact of this legislation in the intervening period.

In addition to the constraints imposed by the RMA, TNZ is effectively a statutory monopoly. By virtue of its empowering legislation, TNZ has the power to declare any road or planned road, whether vested in the Crown or not, to be a state highway and therefore subject to control by TNZ. As such, any private firm contemplating the construction of a new privately owned and operated road could only do so with the consent of TNZ[10]. In return for granting this consent, TNZ might be able to influence the nature of the road constructed, its route, its funding arrangements, and so forth. Therefore, TNZ could acquire a regulatory role over private infrastructure that was not explicitly detailed in any legislation. Furthermore, if the private firm did not abide by TNZ's directions, TNZ has the power to appropriate the relevant roading assets. The same powers extend to the local authority level as well[11].

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10 No criteria are given for a private firm to acquire this approval, and no major projects have been undertaken by private firms to date. However, the conditions that are likely to be applied to private sector participation include the acquisition of planning approval for the project by the private firm, construction standards that meet or exceed TNZ's standards, passing a benefit-cost ratio test, and limitations on the potential for the public sector to be required to underwrite the construction and ongoing operation of the road.

11 In practice, TNZ and local authorities would have to publicly justify their reasons for appropriating private assets in this fashion, would be subject to political constraints, and would have to pay compensation to the affected private party.

Finally, the funding arrangements for public provision of roading infrastructure provide some protection to TNZ. Access to fuel tax and licence fee revenue is only available to TNZ. A private firm considering operating its own roading network would not currently be able to offer users of its network the ability to opt out of paying fuel tax and licence fees under current funding arrangements. In effect, these charges would be incurred by road users whether they decided to use the public road network or not, so a private road user would be paying twice for the use of an alternative private road. This is likely to reduce the number of road users willing to use private roads, and therefore reduce the incentives of private firms to consider building roads.

2.9 Summary

The institutional structure for public provision of roading infrastructure is notable for its lack of a single overriding objective. There is no clearly articulated rationale for the public sector supplying and operating road infrastructure instead of the private sector. For example, TNZ may have acquired statutory monopoly powers over the roading network because policy makers perceived roads to be a natural monopoly, but this is not obvious from either TNZ's empowering legislation or the institutional structure within which TNZ operates.

It is not clear under the current system whether TNZ should be managing the road network in the interests of road users (i.e. customers) or tax- and rate-payers (i.e. the owners). There is no criterion given for measuring the performance of TNZ in meeting its diverse objectives. These diverse objectives reduce TNZ's ability to simultaneously meet all of its targets and reduce accountability to the ultimate owners of the roading network (i.e. tax- and rate-payers). In order to meet potentially irreconcilable safety, efficiency, economic and social objectives, TNZ must trade-off at least some of these various objectives, but it has no clear guidelines for making these trade-offs. The confusion created by a number of different and potentially irreconcilable objectives impairs the management function and focus, diverting costly resources into non-productive areas. The lack of focus may also make it more difficult for TNZ to make tough management decisions. For similar reasons, monitoring agencies are unlikely to have sufficient information to be able to evaluate the efficiency of the organisation.

Inadequate consideration appears to have been given to the feasibility of TNZ acquiring the information it requires to meet its objectives. The benefit-cost ratio approach taken by TNZ in making investment decisions demonstrates that much of the information that private firms would employ in making a similar decision (e.g. projected earnings from the new asset based on revealed willingness to pay by consumers) is not available under public management of the roading network.

Furthermore, inadequate consideration appears to have been given to the incentives for TNZ or local authorities to make commercially sensible decisions in relation to the roading network. Instead, the empowering legislation concentrates on the processes for making decisions, and this reduces the flexibility for responding to changing demands on the road network. In fact, if the benefits from a successful decision are dispersed across a range of public authorities and users, whereas the costs are borne disproportionately by one group of users or public authorities, public management of the roading network may actively discourage commercially-oriented decisions.

Joint control of the road network by both central and local government authorities reduces their ability to manage the road network efficiently. We are not aware of any attempt to measure the economic costs of adopting this division of authority, or to measure the corresponding benefits.

Furthermore, regulation of road use and road safety standards is undertaken by public authorities that do not own or operate the road network. Division of ownership and regulatory power over the road network between different public authorities would complicate any restructuring exercise, but is also likely to enhance the potential benefits of reform.

The current public road management system appears to be unnecessarily complicated. TNZ, the Ministry of Transport, and territorial authorities are all required to individually prepare annual plans for roads in their jurisdiction, and to acquire approval for these plans from the minister of transport. This process requires extensive coordination and consultation between the diverse public authorities and may not be the most efficient system for managing the road network.

Due to current legislative barriers to entry and funding arrangements that would penalise potential private entrants to the roading industry, TNZ is protected from competition. This is likely to further reduce the incentives for TNZ to manage the roading network in an efficient manner.

For these reasons, savings might be available from greater clarity in management objectives, clearer demarcation of powers over the roading network, a more decentralised and less rigid planning process, and removal of legislative and funding barriers to private entry in the roading market. In this paper, we attempt to provide a sound and clearly articulated objective for public sector operation of roading. In order to ensure the greatest possible benefits to road users at the least possible cost to society, we suggest that the sole objective for public policy in relation to the ownership and operation of road infrastructure should be to maximise economic efficiency (i.e. to provide the scale and quality of roading services that best meet consumer needs at the lowest cost). Other objectives (e.g. social objectives) would be best dealt with through other policies.

3. REORGANISATION OF TRANSIT AS A STATE-OWNED ENTERPRISE

3.1 Introduction

In this chapter, we consider the applicability of the SOE model to the operation of publicly-owned roads in New Zealand. We also address the issues that would be raised by the commercial operation of roading infrastructure and possible strategies for restructuring public roading along the lines of the SOE model.

Certain features of roading and the current structure of TNZ imply that some innovations to the basic SOE model may be required if it were to be applied to the corporatisation of TNZ. The two most fundamental problems that would arise are the lack of a direct charging system for road users under the current public operation of roading and the ambiguous division of ownership of the roading network between central and local government. The time required for TNZ to introduce a direct road pricing system means that some form of interim funding arrangement between the Crown and TNZ would have to be established. Furthermore, the extent to which any commercial road operation encompassed roads owned and operated by local authorities would have to be addressed as part of the corporatisation process.

Other issues that will arise from the establishment of TNZ as an SOE concern the extent to which commercial roading operators, and in particular TNZ, would be allowed to set and enforce their own rules for road use and road safety standards, be able to charge directly for road use, and dispose of surplus assets or assign their use to other individuals. This chapter will conclude by summarising a possible programme for establishing TNZ as an SOE.

3.2 The SOE Framework

The Structure of the Model

SOEs are commercial businesses owned by the government. In New Zealand, the objective of the State-Owned Enterprise Act 1986 is to provide a structure that:

- provides incentives to SOE management for successful commercial operation of these businesses by requiring them to be as profitable as comparable businesses in the private sector;
- facilitates accountability by removing competitive advantages or disadvantages faced by SOEs, in so far as this is practicable;
- separates the Crown's ownership of these firms from the Crown's regulation of the industries in which they operate;
- explicitly defines the property rights of these businesses;
- identifies and facilitates the management of commercial risk borne by the Crown through the continued ownership of these businesses; and
- enables separate financing of non-commercial activities.

Clearly defined, commercial objectives are set for SOE management. Within the SOE structure, the overriding objective is for management to operate the business successfully. The extent to which this objective is met is generally determined by whether the SOE generates a profit, and by the size of this profit relative to the Crown's equity stake in the business.

SOE boards describe their detailed objectives for the coming year in an annual Statement of Corporate Intent that must be approved by the shareholding ministers. In order to meet their objectives, SOE managements are given a high degree of autonomy over the operation of their business. The performance of SOE managements is assessed relative to their Statement of Corporate Intent. They are accountable to a board of directors, who are appointed on the basis of their commercial expertise. The board represents the interests of the shareholding ministers, and is responsible for establishing the strategic business objectives of the SOE.

SOEs must present half-yearly reports and annual accounts, with the latter being audited by the Audit Office. SOE performance is independently monitored by the Treasury, the State-Owned Enterprises Advisory Unit attached to the office of the minister of state-owned enterprises and the State-Owned Enterprises Steering Committee (on behalf of the shareholding ministers).

The SOE model attempts to replicate the incentives and constraints of private business ownership. One obvious area where it is not easy to replicate this constraint is in the equity market. The information provided by share prices and the threat of takeover, and the disciplines thereby imposed on the performance of management, are not easily reproduced in the SOE structure. In addition, creditors may not be as diligent in their monitoring of SOE operations, given their perception of an implicit Crown guarantee on SOE debt. There are a number of possible, if imperfect, solutions to these problems. The easiest solution, and as experience has shown, the most effective means of ensuring sound commercial performance of the SOE over time, is for the government to credibly commit itself to selling the SOE. A less satisfactory approach that may be used in

conjunction with the first option is to employ a tighter set of accountability and control mechanisms (e.g. monitoring by the SOE steering committee and advisory unit) than would generally apply in the case of a privately owned business.

The SOE model also attempts to establish the same incentives and constraints as private commercial ownership in the regulatory environment. This does not imply a lack of regulation. Rather, a consistent regulatory environment is put in place to apply equally to all participants in the industry in which the SOE operates. In particular, legislative and regulatory barriers to entry to the relevant market are removed. In establishing a neutral regulatory environment, the adverse effects on economic efficiency and commercial incentives provided by industry-specific regulation are also taken into consideration.

Crucial Features of the Model

Experience to date with the SOE model in New Zealand suggests that, as an organisational structure, it provides sustainable benefits in the management of publicly-owned businesses only if the integrity of the overall model is maintained. While any softening of the basic provisions of the SOE model is likely to generate an inferior commercial performance over time relative to the core model's performance, it is useful to describe the key features of the model that, if diluted, would seriously impair the performance of the SOE.

The critical features of the model are that the SOE should have an undiluted commercial focus and decision-making freedoms similar to private sector businesses, that the monitoring mechanisms and board personnel should be of the highest calibre, and that the separation of political considerations from commercial objectives should be maintained at all times.

Diluting the commercial focus of the SOE distorts the incentives of SOE management to operate the business as a successful commercial enterprise, and typically hides the economic cost of achieving non-commercial objectives. It is difficult to measure the performance of SOE management in achieving non-commercial objectives and these non-commercial objectives may require different skills from those required to run a successful business. Diluting commercial objectives also hides the cost to taxpayers of achieving non-commercial objectives, allows the SOE to introduce cross-subsidies across the business, and cannot be applied to rival private firms operating in the industry. This leaves the SOE in an uncompetitive commercial position, or is used to rationalise action to protect the SOE from competition. There is nothing fundamentally wrong with the SOE providing non-commercial services, but the nature of the contract or structure whereby the SOE is induced to provide these services matters. Provided these services are separately contracted for and

purchased competitively from the SOE by the Crown, distortions in the incentives of the SOE management to operate the business successfully will be minimised.

Given the importance of monitoring arrangements to the performance of the SOE over time, SOE board members should be appointed on the basis of their commercial expertise. The monitoring arrangements for SOEs are ultimately designed to protect the Crown's equity in the SOE. Therefore, the selection of personnel involved in monitoring the performance of the SOE and their commercial ability and experience are vital in safeguarding the Crown's interests. Part of the success of this process will depend on the incentives for SOE board members. Ultimately the Crown retains the ownership of the SOE, and must therefore bear the risks associated with its equity stake. However, there are some mechanisms for ensuring that the incentives provided to SOE board members coincide with the owner's interests. For example, SOE board members could be rewarded on the basis of the commercial performance of the SOE, and promptly removed from office in the event of inept performance.

Various components of the SOE model are interdependent. Diluting the commercial objectives of the organisation, specifying conflicting objectives for management or board members, and not maintaining the arm's length relationship between management and politicians are all likely to reduce the incentives of commercially oriented individuals to seek appointment as SOE board members or to accept SOE management positions. Furthermore, even if commercially-skilled individuals decide to offer their services, diluted commercial objectives make it much harder to measure their performance and to reward or sanction them accordingly. This situation would, in turn, undermine the commercial performance of the SOE and adversely affect the monitoring arrangements for SOE management that are designed to protect the Crown's interests in the ownership of SOEs.

Problems with the SOE Model from a Conceptual Perspective

One of the key problems with the SOE model, which is a general problem of the model itself rather than a problem arising from its application in any particular industry, is the lack of an effective capital market constraint. Ultimately, there can only be one owner of an SOE (the Crown). In contrast, a private firm can be owned by many different private investors, with all of them having the right to alter the level of their shareholding in the firm. The consequences of an ineffective capital market constraint on the long-term performance of the SOE could be significant for a number of reasons.

A lack of tradeable equity in the SOE means that there is no share price information available to indicate how financial markets rate the firm's commercial performance. Also, because large

institutional investors and equity analysts do not have an incentive to monitor the commercial performance of the SOE, these sources of information will not be available to the management and owners of the business (i.e. the Crown).

The lack of tradeable equity may also make it easier for SOE management to utilise scarce capital reserves in non-productive areas of the business. A private firm that was utilising scarce financial resources inefficiently would sooner or later suffer a declining share price and a reduced ability to raise equity capital in the future. The same penalties cannot be imposed on an SOE for its use of capital, given that the ability to raise capital does not depend on share price performance.

Finally, the lack of tradeable equity in the SOE implies that the incumbent managers are largely protected from the threat of a hostile corporate takeover. In a private firm, such a takeover would be likely to result in redundancies for executive staff within the companies and a substantial reorganisation of the structure of the business. The same threat cannot be imposed on SOE managers and this may make them less inclined to protect the interests of the owners of the business (i.e. the Crown).

Problems with the Practical Application of the SOE Model

In the light of the experience to date in applying the SOE model in New Zealand, it is obvious that while the commercial performance of SOEs is initially markedly better than under alternative forms of public ownership, eventually political considerations re-emerge for SOE management and board members. In part, this may reflect the softening of political commitment to the underlying principles of the SOE model as the business objectives of the SOE impinge on political considerations. In part, this experience may also reflect the propensity for the public to associate politicians with the performance and operating decisions of SOEs even though the responsibility for these decisions lies with the management and board of the company.

The extent to which any form of departure from the SOE model would not affect the overall viability of the basic SOE structure but would reduce the risk of political interference needs to be considered. In particular, given the lack of a contestable ownership constraint on SOE management, modifications to the basic SOE model may be justified if they force greater attention to be given to the capital investment plans of the SOE. These might enhance the incentives for commercial performance facing SOE management without threatening the overall integrity of the SOE model.

A number of mechanisms could be used to tighten the capital constraint facing a government-owned commercial roading firm, for example. One possibility would be to enforce a high leverage ratio, thereby restricting the level of free capital reserves that could be employed by SOE management.

In practice, this leverage ratio would be set at a higher level than the 'normal' leverage ratio for a comparable private firm operating in a deregulated market. If international comparisons were not immediately available, it may be necessary to employ similar leverage ratios for other New Zealand network operations such as telecommunications, natural gas and electricity distribution.

Another possible requirement would be for the SOE to declare major investment projects in the annual Statement of Corporate Intent. Increasing the resources devoted to independent monitoring of the SOE through the use of a specialist monitoring agency (e.g. by increasing the resources available to the SOE Steering Committee) would be a complementary means of enhancing the viability of this monitoring mechanism and for reducing the scope of political intervention in the commercial operations of the SOE. Independent commercial audits of the viability of investment decisions undertaken by the SOE in the recent past could be used to augment the information available to the Crown in monitoring the performance of the SOE, assessing its future strategic plans and, ultimately, in deciding whether the Crown should retain ownership of the firm.

3.3 Applicability of the SOE Model to Transit New Zealand

The purpose of this section is to assess the extent to which the basic SOE model would need to be modified if it were to be applied to TNZ. The particular problems that arise in the case of TNZ can be classified under two main headings. The first set of problems arises predominantly from the current organisational and regulatory arrangements for roading, discussed in Chapter 2. A test of the applicability of the SOE model to roading will arise from considering the extent to which these problems are likely to be resolved simply by moving to an SOE structure and modifying the regulatory environment. These problems include:

- the absence of tightly-focused, use-related billing systems for roads and the need for access to tax revenue in the intervening period during which separate funding systems are established by TNZ;
- the uncertainties involved in valuing roading assets given that little direct revenue is currently derived from roads; and
- the lack of a clear division of ownership of the roading network between TNZ and territorial authorities.

The second group of problems does not necessarily arise from the institutional and regulatory environment, although their effects may be compounded by the current organisational structure for roading. These problems include:

- the high capital intensity of roading; and

- the large amount of Crown equity tied up in roading infrastructure.

The following sections discuss each of these problems in turn.

Access to Tax Revenue

One of the key features of the SOE model is that the SOE should be responsible for generating its own revenue from the operation of its business, without access to taxation revenue. This will present a considerable problem in establishing TNZ as an SOE given that motor spirit duties account for around half of TNZ's revenues and over two thirds of the direct payments by road users itemised in table A1.3 in Appendix 1, and also because of the time required to establish a direct billing system across the entire roading network.

One possibility would be for TNZ to negotiate with oil companies for the operation of TNZ's billing system (i.e. TNZ may pay oil companies to collect funds for TNZ through the sale of motor fuel). In order to avoid violating the provisions of the Commerce Act, TNZ would have to pay the oil companies to collect this revenue. The negotiations would be difficult, since all petrol outlets would have to agree. Furthermore, TNZ would then have to monitor and enforce the collection of this revenue by oil companies (over which TNZ have no direct control), imposing additional enforcement costs on TNZ. Nor would such a billing system help reveal consumer preferences for decisions of a route-specific or time-of-day specific nature. In practice, this is unlikely to be the most efficient means for TNZ to gather revenue from road users, and may not be a feasible revenue collection system if alternative private roading suppliers emerged.

In order to allow sufficient time for TNZ to establish its revenue base, it may be necessary to allow the SOE limited access to Crown revenue in its establishment phase. In order to motivate the SOE management and board to introduce a direct revenue collection system in as short a time as feasible, a limited period for this continued access to Crown revenue could be set. In order to clearly signal the new commercial focus of TNZ from the initial stages of commercialisation, one possibility would be to establish a contract for TNZ to provide current roading services on behalf of the Crown for a fixed period of time at a fee determined by negotiations between the Crown and TNZ. The duration of this contract could be set to reflect the expected time required for establishing a direct tolling system. A fixed price for providing roading services would provide certainty for the Crown in respect of its commitment to the business operations of TNZ during its establishment phase. This approach would still impose monitoring costs on the Crown in assessing the level of roading services provided to the Crown by TNZ during this establishment phase. However, this monitoring cost would only be incurred during the establishment phase. Furthermore, this arrangement would

establish an arm's-length relationship between the SOE and the Crown from the very first stages of commercialisation.

The establishment of an interim contract between the Crown and TNZ for the provision of roading services would raise the type of issues that have arisen in other situations where the Crown is the primary purchaser of goods or services provided by another organisation owned by the Crown (e.g. the Crown Research Institutes and the Regional Health Authorities). The crucial issues that are likely to arise are the degree of separation and autonomy of the two Crown agencies and the incentives for both the publicly-owned agencies to respond to consumer demands in an efficient manner. Provided a direct road pricing system can be implemented by TNZ, these problems are only likely to be of concern for a short period. However, their importance in the interim period will imply that the resulting contract between the Crown and TNZ is likely to be superseded in terms of economic efficiency by the eventual move towards a strict SOE structure.

Valuation Uncertainties

In establishing TNZ as a commercial business, road network assets would have to be transferred from the Crown to the new SOE. In establishing a balance sheet for this new firm, a valuation methodology would have to be established. This valuation would be useful for monitoring the commercial performance of the new SOE. Given the capital-intensive nature of roading, the valuation process is likely to be a complicated and protracted affair.

The valuation should be based on the company's ability to generate future cash flows, taking into account the reduced value, in today's terms, of risky cash flows occurring in the future. Applying this approach to the road network would be especially problematic at present because direct charging for road usage is not widespread. A commercial valuation of the road network might reflect the potential for a commercial roading firm to establish a direct tolling system on roads. In practice, given the considerable uncertainties in measuring potential tolls, it is likely that initial valuations of roading assets transferred to TNZ would be subject to a wide error margin. Other valuation complications may arise from the regulatory environment, for example separating the roading network for regulatory reasons may affect the value of the assets transferred to the SOE.

The preferred approach might be to conduct a series of valuations, continuing beyond the establishment of the SOE and the establishment of a separate revenue base. These valuations would be designed to modify the initial asset values in TNZ's balance sheet, and to refine the monitoring arrangements for SOE management. This process could be overseen by the SOE establishment board. While non-market valuation of TNZ's assets would involve subjective judgments (resulting in potentially biased rate-of-return indicators for the SOE), in the absence of

tradeable equity for the SOE such performance indicators may be the only information available to the Crown to assess the financial performance of the SOE. In this case, biased information may be better than no information at all.

Separation of Local Roads from State Highways

A further complication in the application of the SOE model to TNZ is the split ownership of the roading network between the Crown and territorial authorities. At present, the Crown owns most, but not all[12], of the state highways both in terms of land and improvements. TNZ operates the state highway network on behalf of the Crown whereas territorial authorities own and operate local roads. However, TNZ provides a proportion of the funds used for approved projects on local roads (averaging out at approximately 50%), and can determine whether any road should be classified as a local road or a state highway.

The SOE model generally envisages that one entity (i.e. the Crown) owns the assets of the government trading enterprise in the first place, and commercialisation does not involve any change of ownership structure. Two possibilities exist for dealing with the current overlapping ownership of the roading network by central and local government. The first option would involve only those roads currently owned by the Crown being operated on a commercial basis. An alternative option would be to modify the basic SOE model. For example, TNZ could be assigned ownership and commercial objectives for all roads, with shares in TNZ issued to central government and local authorities to reflect the relative contributions of these different public authorities to the historical construction and maintenance costs for the roading network.

The advantages of restricting corporatisation to Crown-owned roads would stem from the relative ease of implementing corporatisation. Only one public authority (i.e. the Crown) would be directly involved. This should reduce the time required to establish TNZ as an SOE.

On the other hand, the limited scale of the corporatisation exercise would also limit the potential economic benefits. In practice, to disentangle the state highway network from local roads would be a complicated exercise. Even if it could be achieved, such a separation may increase the costs of operating the road network by increasing the contracting costs between the (commercial) TNZ and (non-commercial) local authorities. Furthermore, it may be difficult to introduce new technology (e.g. electronic billing systems) in a consistent fashion across the entire road network and it would be inconsistent with its commercial focus as an SOE for TNZ to continue to provide funds for local roads if this separation did occur. Faced with a funding shortfall, local authorities would be inclined to

12 In some areas, particularly where borough councils existed prior to the 1989 reform of local government structures, the local authority owns part of the network.

introduce their own systems of road pricing, and would be required to negotiate with TNZ on the introduction of tolling technology and for interconnection between local roads and inter-urban highways. In effect, commercialisation of TNZ might force de facto commercialisation of local roads, and it would make sense for this to occur across the entire roading network in a consistent fashion.

One option would be for TNZ to own the entire roading network (including local roads), with the division of shares in TNZ kept separate from the corporatisation of TNZ. The division of shares between central and local government could be made on the basis of the ongoing valuation of assets vested in TNZ throughout the establishment phase, with any subsequent dividend provided by TNZ being apportioned on the basis of individual shareholdings.

Along with the allocation of shares in TNZ would go the right for shareholders to appoint directors to the board of TNZ. In practice, given its current ownership of the state highway network and its provision of 50% of the funds for local roads, the Crown would remain the majority shareholder in TNZ following share allocation. Therefore, appointment of all board members to TNZ by the minister in the establishment phase would not seem inconsistent with the initial ownership structure. However, in order to account for the eventual role that local authorities would have as minority shareholders in TNZ, the initial contracts for board members appointed by the minister might be for short periods of time (e.g. one or two years). The ability to influence board appointments once shares in TNZ were allocated might provide some incentives for local authorities to ensure the successful and timely resolution of the share allocation process.

A situation may arise in which a local authority wanted new road infrastructure to be built, or for local roads to be maintained to a higher standard than was commercially viable. Following corporatisation, neither local authorities nor central government should be able to force TNZ to provide these services simply by virtue of their shareholding in TNZ, but they could negotiate the terms of a contract required for TNZ to provide these services in the local region. In this case, the issues that have already been raised with regard to the purchase of goods and services from a Crown-owned agency by another publicly-owned institution would need to be dealt with. In particular, the arm's length relationship between the local authority and TNZ would have to be maintained at all times or else the strict commercial orientation of TNZ would be threatened. Public disclosure of the contractual arrangements between TNZ and local authorities in these cases may impose some constraint on the ability of TNZ and local authorities to circumvent the arm's length relationship with the Crown. In dealing with these negotiations, TNZ would need to be mindful of the sanctions that could be imposed on it under the Commerce Act through its dominant position as existing supplier of local roads. The same provisions would be less likely to apply in the case of new roading infrastructure (whether local or private), given the possibility of rival firms supplying competing private infrastructure.

An issue would arise, following the division of shares in TNZ between the Crown and various territorial authorities, concerns the extent to which any of the eventual shareholders in TNZ could sell their shares. We defer further discussion of this topic until Chapter 5.

Capital Intensive Business

The capital-intensive nature of the roading business (as in the electricity industry) has implications for the SOE model because of the lack of capital market constraints. As a consequence, there is reduced monitoring of investment decisions, which is particularly worrying for a business that is both capital intensive and very large relative to the rest of the economy. This may justify some extra attention to the nature of the monitoring arrangements placed on the SOE's investment.

One possibility already noted would be to require TNZ to operate with a high leverage ratio. This would restrict the ability of its management to access free capital reserves for new investment. However, this would not necessarily prevent the SOE from financing new capital construction if it could convince creditors about the economic viability of its proposal.

To enhance the incentives of creditors to monitor the commercial performance of TNZ's management, TNZ would be required to issue its own debt as an SOE without the benefit of a government guarantee. This might impose a higher funding cost on TNZ than if the Crown raised the debt on TNZ's behalf, but the cost disadvantages of this policy should be offset by the improved incentives to more accurately balance the risks and returns from roading. The higher funding cost may simply reflect greater industry-specific risk associated with the roading asset, and the inability of TNZ to rely on general tax revenue to repay this debt. In this case, the higher funding cost would reflect the business risks of TNZ rather than the risk of default by the Crown. This is likely to reduce the implicit Crown guarantee that creditors perceive to apply in the case of the SOE, and is therefore likely to enhance rather than hinder the commercial focus and incentives for managerial performance provided by the SOE structure. Allowing TNZ to access credit at the same cost as the Crown would reduce the incentives of management to be as mindful of risk considerations specific to roading in their appraisal of investment projects and would impose a barrier to entry for competing private roading firms that would face a higher capital funding cost.

Finally, the SOE might be required to describe major investment projects in its annual Statement of Corporate Intent. In turn, this would allow independent appraisal of the planned investment decisions and strategic direction of the SOE. Also, an independent commercial audit of the SOE's investment decisions after they were implemented might provide useful information to monitoring agencies on the commercial performance of the management and board. This would provide a

further independent check on investment decisions of a more stringent - albeit less focused - nature than in a private business, but could be justified by the lack of a capital market constraint (i.e. arising from the lack of tradeable equity in the SOE) on SOE management.

Crown Equity

The significance of roading assets in the Crown's overall balance sheet might also lead policy makers to be relatively cautious in advocating widespread reform within this industry, when this reform could have potentially unforeseen implications for the value of this asset. The extent to which the Crown might be imposing greater risks on taxpayers by separating the roading assets of the SOE from the overall assets of the Crown might therefore be a public policy issue. However, experience has shown that the maintenance of a commercial focus for SOEs enhances rather than detracts from the protection of owners' equity in these businesses. The separation of political and commercial objectives would therefore be crucial for maintaining this protection. The importance of the roading asset in the Crown's balance sheet should be reflected in the commercial calibre of appointments to SOE board and management positions.

Summary of SOE-Related Issues for TNZ

The following factors lead us to believe that the corporatisation of TNZ (whether applied to Crown-owned roads in isolation or to local roads as well) would require some innovations to the basic SOE model:

- the fact that TNZ does not receive a large part of its current revenue directly from road users; and
- the time required to establish a direct billing system.

In both cases, the Crown would be the main client of another Crown-owned agency (in this case, TNZ) during the interim period in which a separate, direct billing system was established. This situation has been encountered in other circumstances (e.g. the Crown Research Institutes and the Regional Health Authorities). The potential problem is that the commercial focus of the Crown-owned supplier of roading services may be distorted if the arm's-length relationship between the Crown's purchasing agent and TNZ were not maintained. In practice, it would be difficult to ensure that this arm's-length relationship was strictly maintained. However, some constraints on the ability of TNZ and the Crown's purchasing agent to actively subvert the separation of commercial business activities from political objectives may be provided by the nature of the contract between the Crown and TNZ. For example, the terms of the contract might be publicly disclosed, measures of

services provided by TNZ could be specified, and the terms of the contract would need to be strictly enforced.

The problem arising from joint purchase and supply of roading infrastructure by Crown-owned agencies would only be a long-term problem if TNZ could not implement a direct road pricing system within a reasonable time period. This issue might arise as a result of technical problems with the road pricing system. It could also arise in situations where the direct charging of road users was not impossible, but political resistance prevented a move to direct billing (similar to the problems faced in moving to an insurance-based system of private health care). If the Crown continued to be the major purchaser of roading services from TNZ over a long period of time, then much greater emphasis would need to be given to the nature of the contract between the Crown and TNZ.

Certain other features of the SOE model may need to be modified in the case of roading because of problems in the underlying model. These arise from the ability of SOE management to exploit the lack of a contestable ownership stake for the SOE in managing capital resources. This consideration leads us to recommend a policy of tightening the constraints imposed on SOE management in their investment decisions to maintain the strictly commercial focus for the SOE. The specific recommendations to emerge from this analysis as worthy of consideration are:

- to impose a high leverage ratio on TNZ's operations;
- to establish a separate Treasury function within TNZ to facilitate the issuance of TNZ debt securities;
- to require disclosure of major investment projects in the annual Statement of Corporate Intent;
- to require independent commercial audits of the investment projects undertaken by the SOE;
- to place overriding emphasis on the commercial calibre of appointments to SOE management and board positions; and
- to undertake a series of independent valuations of the roading assets transferred to the SOE during the establishment phase in order to facilitate the construction of a balance sheet for the new SOE, and to enhance the monitoring of SOE performance.

3.4 Public Policy Issues Arising from the Establishment of Transit New Zealand as a SOE

Initial Regulatory Structure

From the point of view of a commercial roading operator, the major unwanted regulatory constraint will be the regulation of monopoly power. Regulation of monopoly potentially constrains the value of the business. In practice, the monopoly problem may turn out to be overstated given the ability of

road users to enforce political constraints on the commercial operation of TNZ. The problem may not be one of protecting consumers from TNZ but rather one of preventing political interference in the commercial decisions of TNZ. Nevertheless, inevitable public concern about monopoly power needs to be addressed prior to corporatisation. Other regulations, such as efficient safety standards, monitoring and enforcement may be consistent with value maximisation.

In New Zealand, the general regulation of market power is covered by the Commerce Act. In Chapter 4, we analyse the case for industry-specific regulation and the possible forms that this regulation could take. In general, we conclude that the costs imposed by industry-specific regulation of roading might prove to be greater than the purported benefits of reducing the monopoly power of TNZ. Furthermore, there is a real concern that roading-specific legislation could be used to subvert the commercial objectives of TNZ. Therefore, on balance we favour reliance on the general application of the Commerce Act for setting the initial regulatory environment in establishing TNZ as an SOE.

Three components of the Commerce Act relevant to establishing TNZ as an SOE include restrictive trade practices (sections 27-29), abuse of a dominant position (section 36), and business acquisitions (section 47).

Restrictive trade practices fall into two classes. The mere existence of price fixing, resale price maintenance, and collective boycott agreements is unlawful unless otherwise authorised. If any other form of action substantially lessens competition, then it may also be unlawful. Section 27 of the Act provides that no contract may substantially lessen competition in a market, although it can be authorised if there are offsetting public benefits. Similarly, section 28 of the Act prohibits covenants relating to land that substantially lessen competition in a market. These provisions may be of concern to TNZ given that they could prevent TNZ (or any other commercial roading operator) from selling franchises to roadside facilities, since these franchises would have most value if they were awarded on a mutually exclusive basis. In turn, this restriction on the ability to raise revenue from the sale of franchises could prevent the efficient operation of the existing roading network or investment in new roads. This is an example where the promotion of competition per se could be at odds with efficient resource allocation.

In order to establish that a breach of the Act's restrictions on the use of a dominant position (section 36) has occurred, it must be established that a firm used or threatened to use its dominant position within a market for one of the following purposes:

- restricting entry to a market;
- eliminating a firm from a market; or
- otherwise restricting competition in a market.

Exceptions to this section within the Act include, inter alia, any purpose specifically allowed by other legislation, and service contracts.

The exemption for service contracts would be important for TNZ in establishing the form of contract between itself and road users. One possibility would be to establish a contract whereby TNZ agreed to allow motorists to use TNZ's road network in return for payment of prescribed fees. This would establish a contract for services between TNZ and road users[13].

Finally, section 47 of the Act prohibits the acquisition of assets by a business if this results in the acquisition or strengthening of a dominant position in any market in New Zealand. In establishing TNZ as an SOE, it would be necessary to include provisions within the enabling legislation similar to those contained in the State-Owned Enterprise Act 1986, allowing the initial exclusion of TNZ from the business acquisition provisions of the Commerce Act. However, once TNZ was established as an SOE, it should be subject to these provisions.

Property Rights for the Roading Network

If the road network was owned by a private individual or firm, then under the normal definitions of private ownership, the 'owner' could:

- decide how the road network might be used;
- establish the mechanism for charging users of the road network, set the prices for road use, and retain any income derived from the road network; and
- sell parts of the road network, retain and use the proceeds from the sale of assets for any purpose, and assign the use of the network to other private individuals or firms.

Ultimately, government intervention defines the system of property rights that apply in respect of any resource. The current system of mixed central and local government ownership of the roading network is a form of government intervention in which the property rights listed above are not well defined. For example, TNZ has only limited powers to exclude motorists from its roads, has only limited access to revenue derived from the use of the road network, cannot sell parts of the road network and retain the proceeds from the sale, and must obtain ministerial approval for new investment. Therefore, we need to consider the extent to which well-defined, enforceable property rights for the road network should be transferred to TNZ.

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13 An example of this type of contract is Telecom's contract with phone users.

The absence of such property rights for roads has important implications for the management of this resource. In particular, the capacity and incentives for Crown-appointed "agents" (e.g. TNZ) to manage this utility effectively on behalf of the owners (i.e. tax- and rate-payers) is likely to be weaker than under a system of private ownership. Under public ownership, the ultimate owners of the road network delegate their monitoring of TNZ management to their political representatives. Therefore, public ownership breaks the accountability of management to the ultimate owners of the business. Since the management of a public enterprise are accountable to politicians, they will be assessed at least in part on their ability to meet political objectives, rather than their ability to perform commercially. Where political objectives conflict with sound commercial decision making, the former are likely to dominate.

The nature of property rights assigned to TNZ will therefore have an important impact on the performance of the SOE. The case for privatisation of TNZ and the mechanisms for doing this are discussed in the next chapter. At this stage, we need to consider the property rights that must be assigned to TNZ in order for it to meet its principal objective as an SOE, namely to operate as a successful business.

Where the Crown desires to continue to confer particular rights on road users and/or property owners (e.g. the right of access), it will be important to ensure wherever possible that TNZ is permitted to charge for the provision of such services on a fully commercial basis. Of course, central or local government could still choose to subsidise any such services, ideally in an arm's-length, transparent manner.

Regulating the Use and Safety of Roads

The primary concern in this section is to establish the boundary point between a corporatised TNZ setting its own standards for use and construction of the road network and an outside regulatory agency (e.g. the Ministry of Transport) prescribing standards for road use and construction for TNZ and other private road suppliers. The types of issues to be addressed are whether TNZ should be allowed to regulate the use of motor vehicles, set standards for driving ability, and set its own construction and safety standards for new and existing roads and associated infrastructure.

These issues arise because a commercial organisation that could charge for road use would be able to offer and market services distinguished by the quality dimensions of the roads it operated. For example, TNZ may be able to offer motorists a road designed specifically for high speed travel if it also had the power to vary road design and safety standards, ban alcohol use, and impose limitations on vehicles that could be used on this particular road. The incentives to undertake the construction of this road would be stronger if TNZ received the benefits of higher toll revenue as a

result of its investment in this particular type of road. As another example, heavy vehicles, in particular, may be prepared to pay more for higher quality roads - because of the offsetting savings in vehicle maintenance and depreciation costs. If TNZ could charge users more for higher quality roads, TNZ might have a greater incentive to undertake their construction.

Outside regulation of road use and road safety standards is justified if it provides benefits in excess of the information and monitoring costs imposed by the regulatory regime. The regulatory mechanisms and the need for them depend on the institutional structure for providing road infrastructure. The present form of regulation, which is undertaken by institutions that do not have a direct commercial interest in the roading network, may not yield benefits in excess of costs.

The reason for current external regulation of road use and road safety standards is presumably because of a problem that cannot be adequately dealt with through private negotiation and agreement between the affected parties. One problem with road use is that one person's safety on the road depends, at least partially, on the behaviour of other road users, and the condition of the road. It is impractical for road users to contract with each other on an individual basis for their driving behaviour. The right to sue reduces this problem, but prevention is obviously better than redress when human life is at stake. Therefore, some form of contract is likely to impose lower transactions costs on road users. This form of contract could take the form of a driving licence whereby drivers demonstrate their ability to meet a certain driving standard, and in return they are assured that other road users have met the same standard for driving ability. Irrespective of their demonstrated driving ability, a conflict may arise in the incentives for individual drivers to obey road rules. If every other driver obeys the road rules or if roads are designed to be safer (e.g. through the use of median barriers), the individual driver faces less risk from other drivers, and may therefore be willing to take more risk in his or her own driving while imposing greater risks on other motorists. Therefore, a contract among road users on driving behaviour may have to be enforced if it is to prove effective and worth the costs involved in negotiating it.

A case for outside regulation does not follow from the fact that an individual road user does not know the driving ability or intentions of other motorists. Without government-imposed regulation, a range of self-regulatory mechanisms for handling information disclosure and monitoring road use are likely to evolve. Where road users benefit individually from a collective code of conduct for driving behaviour, they may be willing to pay for this service. In other words, they may pay TNZ a higher fee in order for TNZ to enforce the provisions of this contract. Alternatively, groups of road users (e.g. the Automobile Association) may collectively agree among themselves to regulate their own driving behaviour and may contract with road suppliers to allow for some policing functions on roads by voluntary groups. However, they would not be able to control non-members' driving behaviour, in which case the roading operator may be left to carry out this residual enforcement task, perhaps charging a higher fee to other drivers to reflect the higher costs that

they imposed on the roading operator. TNZ should have reasonable incentives to discover road users' preferred safety standards because this would maximise road usage and consumer satisfaction.

To reiterate, just because a road user cannot contract with all other road users on driving ability and intentions on the road, outside regulation of driving behaviour or road safety standards is not necessarily the most effective means of reducing the problem. Voluntary and cost-effective systems for signalling driving ability to other road users (e.g. acquisition of a standard licence) and enforcing driving behaviour are likely to evolve in the absence of outside regulation. Furthermore, private individuals are more likely to be able to assess the costs involved in different licensing and enforcement mechanisms and have a greater incentive to reduce these transactions costs than under a system of external regulation. A more fundamental issue is whether the proposed commercialisation of roading infrastructure would alter the underlying incentives and information flows surrounding road use, thereby altering the need for outside regulation of driving and road safety standards.

The ability and incentives of road users and the supplier(s) of road infrastructure to obtain and transmit information depend on the institutional and contractual arrangements for the funding and provision of roading infrastructure. Corporatisation of roading infrastructure will increase the demand by TNZ for information on the cost and quality of providing different standards of roads, and the impact of driving behaviour on roads. Corporatisation would also enable TNZ to confront road users with the differential costs that they impose on the road network. Following corporatisation of roading, information flows and institutional structures (e.g. direct billing systems) are likely to be much richer. Therefore, while outside regulation of road use and road safety standards might have been required when information flows and institutional structures were relatively poor (e.g. under the current system), it may not be required in a system where an SOE with a strictly commercial objective provides roading infrastructure. Consequently, in assessing the need for external regulation of motorist behaviour and road safety standards, it would be important to consider the impact and ongoing need for external regulation under the reformed system rather than the current system of provision and funding of road infrastructure[14].

While the need for external regulation of roading is likely to be reduced following corporatisation, the costs of incorrect regulation are likely to increase. In particular, commercial investment decisions will be determined at least in part by the regulatory power transferred to TNZ through

14 The voluntary enforcement of driving behaviour by both road users and the commercial roading operator would need to be clearly distinguished from the enforcement and punishment of criminal behaviour performed in or associated with motor vehicles. Various driving offences are currently treated as criminal offences and offenders are subject to sentencing within the justice system. The powers that the police currently have to enter private property and arrest individuals could still be applied to TNZ operating as a commercial organisation. There would have to be a clear distinction, however, between criminal acts and breaches of contractual obligations for road use.

the corporatisation process. The commercial incentives for TNZ to construct roads designed for high-speed driving, for example, will depend as much upon the ability of TNZ to regulate driving speeds as on the demand for this type of infrastructure by road users. If TNZ is established as an SOE but cannot regulate motorists' use of the road network, it might make decisions that reflect possibly perverse commercial incentives created by the current regulatory structure. This may not be as likely to happen under TNZ's current mode of operation given that it is subject to direct political control, and would not receive any direct benefits from exploiting the commercial incentives (if any) provided by the current regulatory environment.

The degree of competition in the roading industry would also have an important influence on the extent to which external regulation of road use and safety standards was warranted. If competing road suppliers were able to enter the market and set their own standards for road use and safety, there would be less risk that rules would be set in a way that imposed undue costs on motorists. The extent to which roading suppliers were able to regulate their own behaviour (in terms of construction and safety standards) and the behaviour of road users would also be likely to influence the decision of private firms to enter the roading market.

In summary, as information flows improved following corporatisation, and as competition emerged in the roading sector, the economic costs imposed by external regulation of road use are likely to rise and the benefits are likely to decline. Furthermore, the transfer of regulatory power to TNZ is unlikely to generate markedly different regulation of road use behaviour in the short term, and the emergence of competition in the roading market would reduce the possibility that self-regulation by roading suppliers would lead to adverse consequences for motorists. Therefore, there does not appear to be a compelling case for delaying the transfer of regulatory control of road use and road safety standards to TNZ following corporatisation.

Establishing a System for Efficient Pricing of Road Use

Among the key features of the SOE framework is the requirement for an SOE to establish its own revenue collection system and be able to set its own prices for use of the facility by consumers. There are a number of possible mechanisms for charging consumers for use of the roading network. At present, the Crown obtains revenue from road users through a variety of mechanisms, including licence and registration fees, excise duties on new vehicles and parts, fuel taxes, and direct road user charges on heavy vehicles. Of these mechanisms for extracting revenue from road users, fuel tax revenue and excise duties will not be available (even in a modified form) for use by TNZ if it becomes an SOE (although tax revenue may be available under imtermediate SOE-type options that will be discussed later). Given the importance of fuel tax revenue in meeting, at least partially, the capital and maintenance costs associated with the roading network, TNZ will

inevitably have to introduce new forms of direct charging for road use, and possibly supplement this by indirect collection mechanisms (e.g. negotiation with oil companies for collection of revenue from motorists).

The mechanisms adopted for charging road users will depend on relative costs and the institutional and regulatory framework governing the supply of roading infrastructure. The choice between different mechanisms will depend in part on the information available to TNZ concerning road use, the access to capital resources, the costs of the alternative systems and the incentives to undertake risky investments in order to establish a road pricing system. The more focused the commercial objectives assigned to TNZ, and the more control that TNZ has over the use of roads, the greater is the likelihood that the system of road pricing eventually adopted will be economically efficient. Therefore, the focus on establishing an efficient billing system should be one of establishing commercial incentives for TNZ, rather than requiring that a particular billing system be adopted from the start of the commercialisation process. The recommended process of the Crown contracting for the provision of existing road services during the establishment phase would provide a window of opportunity within which the relative costs of alternative billing systems could be established.

While the focus on revenue collection systems should be on the need for unfettered commercial incentives for TNZ, some criteria for a 'good' road pricing system may be established from the outset. For road users, the system should[15] :

- be simple and easy to use;
- inform motorists of the price to be paid ahead of time;
- have safeguards that are capable of assuring their privacy; and
- provide pre- or post-payment options.

For TNZ, in order to promote efficiency, the road pricing system should[16]:

- enable direct charging for road use rather than indirect charging;
- provide for flexibility in pricing the usage of roads at different times, in different locations and by different modes of transport;
- operate reliably irrespective of environmental conditions and traffic intensity;
- be secure from theft of proceeds by private individuals and operations staff, and provide safeguards against fraud and abuse by individuals and operators;
- be enforceable;
- be capable of handling an infrequent road user or tourist;

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15 Hau (1992).
16 *Ibid.*

- provide signals for the need for investment and the improvement of roading infrastructure; and most importantly
- be commercially viable.

From the point of view of society as a whole the road pricing system should[17]:

- require a minimum of traffic disruption and environmental intrusion;
- allow for the gradual introduction of the system over a transitional period;
- be compatible with other international road pricing systems;
- provide modularity for add-on options and services such as payment for parking and automatic route guidance; and
- be publicly perceived as 'fair' (i.e. related to costs of usage) and therefore politically acceptable.

The advantages of an efficient road pricing system are most likely to be derived from the increased information available to TNZ's management for road maintenance and investment decisions. Under the current system of indirect revenue collection (primarily fuel tax and road user charges), TNZ must rely on imperfect information (i.e. surveys) to assess the willingness to pay of road users for such attributes as road surface quality, safety and peak carrying capacity. Since respondents to such surveys know that the costs of any adjustments to the roading system as a result of their responses will be spread widely across the community, they have an incentive to exaggerate the value of the benefits which they would personally derive from particular enhancements. Given this bias, a more direct and reliable source of this information would be provided by a road tolling system. Not only would TNZ be able to monitor the number of cars travelling on certain routes (which is all they can do with the current system without undertaking expensive surveys), but they would also be able to measure the willingness of road users to pay for certain roading services. For example, TNZ's management could assess the willingness of road users to pay for a new lane on a congested highway, or a particular safety standard for motorway construction allowing high-speed driving. In turn, the increased information would allow improvements in the efficiency of investment and maintenance decisions for a very valuable asset. Based on a replacement value of at least $7 billion (i.e. the current depreciated value of state highways and associated infrastructure, excluding the value of local roads), even minor percentage gains in the efficiency of asset maintenance and investment would lead to material economic benefits for all New Zealanders.

The benefits of an efficient road pricing system would also be noticed in the management of congested urban rush-hour traffic. Urban traffic in some areas (notably Auckland and Wellington) is characterised by twice-daily peak-hour congestion on some roads. This congestion is often used as

17 *Ibid.*

partial justification for expansion of roading capacity in urban areas (e.g. Wellington's proposed urban motorway extension). However, expanding capacity may not solve the congestion problem because motorists' behaviour would be likely to change following increases in roading capacity. Even if increased capacity did solve the congestion problem, if only temporarily, it may not be efficient because of the costs of increased roading capacity not being utilised during off-peak times of the day.

Congestion imposes costs on private car use during peak hour traffic whereas additional free road capacity reduces these congestion costs, making it less costly for the private motorist to travel during rush hours. Faced with a lower 'price' for using the congested road, motorists increase their demand for use of the roading network during rush hours. Consequently, whenever new roads are added in previously congested areas, crowded conditions quickly reappear as commuters switch their previously deferred travel back to peak hours, or switch back to travelling in private cars. This phenomenon is known as Downs' Law[18] of peak-hour expressway congestion.

Nor can traffic management systems such as carpooling and park-and-ride schemes provide permanent solutions to this problem. If these schemes succeed they usually become victims of their own success; if they reduce congestion during rush hours, they create incentives for motorists to switch back to their preferred travel time or mode. Furthermore, there is some debate about whether these schemes are successful. For example, motorists found it costly to switch transport modes near the edge of Singapore's restricted zone despite the provision of shuttle bus services[19]. Nor are restrictions on the supply of cars, inner-city access, or carparks as flexible as road pricing in curtailing the use of vehicles. For example, restrictions to the supply of parking space in Boston, Massachusetts (US), led to motorists incurring higher costs in searching for off-street parking as well as generating large windfall capital gains for private carpark operators[20].

Although the particular system for imposing charges on motorists for road use is best left to the management of TNZ to ascertain once they are subject to commercial incentives, the types of options that will need to be addressed are covered in Appendix 3.

To summarise the analysis in Appendix 3, the advantages of electronic versus manual toll collection are:

- the collection of electronic tolls does not create congestion for motorists;

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18 Downs (1962).
19 Watson and Holland (1978).
20 Hau (1992, p. 10 footnote).

- vehicles may travel at desired speeds, with instantaneous debiting of accounts undertaken with reliability and accuracy levels exceeding 99.9%[21];
- the system allows high vehicle throughput of 1200 to 2000 vehicles per lane-hour;
- no stopping means less fuel consumption, lower accident risk, and less road damage and pollution (especially caused by braking and acceleration of heavy vehicles at manual toll booths); and
- state of the art forms of automatic vehicle identification (AVI) do not require extensive road work or impose high installation or operating costs on motorists.

Potential disadvantages with electronic road pricing include enforcement problems and problems with gaining public acceptability for this form of road management. In the light of overseas experience[22], the quid pro quo for introducing this form of electronic road pricing should be a reduction in the general level of petrol taxes. That portion of petrol taxes currently earmarked for transfer to the Land Transport Fund could be eliminated without necessarily having any adverse consequences for other items of government expenditure.

Automatic Vehicle Identification toll collection is employed in a number of sites in the US, Spain, France, and Italy[23]. One particular example of the application of this technology is the 'closed' toll network[24] implemented by Autostrade S.p.A. in Italy's motorway network connecting Milan, Florence, Rome and Naples. This system ensures the privacy of users by debiting a smart card with a toll when vehicles are driven past two charging points - an entry to the network and an exit point.

In assessing the costs of introducing an electronic road pricing system in New Zealand, we rely on overseas comparisons. For example, an advanced 'smart-card' based system designed to serve 4 - 5 million drivers across a network comprising four Dutch cities had an all-inclusive annual cost (including capital, operational, and enforcement costs) of US$63m in 1990 figures and a benefit-cost ratio of 4.5[25]. This system is designed to handle a wide range of traffic flows and vehicle speeds (from 0 to 160 kilometres per hour in six undivided lanes), a road capacity of 2000-2400 vehicles per lane-hour, a transmission error rate of less than one in a million, and a smart card based in the vehicle capable of recording up to 200 transactions. The system allows road tolling without requiring the driver to stop to pay tolls, and preserves motorist's privacy through the 'smart-card' system (similar to Telecom's phone cards which assure anonymity for public phone users).

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21 Hau (1992, p. 23).

22 Hau (1990) describes how trebling annual licence fees on private cars led to markedly reduced support for the introduction of electronic road pricing in Hong Kong.

23 *Ibid.*

24 Under an 'open' barrier-type system, the motorist pays a toll to enter the network. Under a 'closed' network, the toll rate is calculated as the distance between two pricing points.

25 Hau (1992, p. 37).

We would expect that an advanced electronic road pricing system could be introduced into New Zealand (possibly initially restricted to the state highway network) for an annual cost of NZ$100-150m.[26]

This amount is clearly significant. For example, the mid-point of this estimates represents:

- 40% of the $314 million 1991-92 public expenditure on state highways and 15% of the existing $840 million annual public expenditures on roading.[27] ;
- the cost of constructing 140 kilometres of new state highway roads p.a.;
- 1.8% p.a. of the $7 billion depreciated replacement cost of the state highway network or 0.21% p.a. of the possible $60 billion depreciated replacement cost of the entire road system;
- 1.25% of the (very crude) estimate of $10 billion a year in private roading-related expenditures;
- 12% of the annual capital charge-inclusive cost to the public sector of providing and operating the state highway system (based on the data in the first column of table 3.1) or a lesser amount, assuming economies of scale, if the system also encompassed rural and urban roads; and
- 10% of the $1,280 million currently paid by road users in road user charges, fuel taxes and motor vehicle fees and duties.

Table 3.1 illustrates the last two points above by putting the costs associated with such a billing system into the context of other roading expenditures. The cost per vehicle kilometre of a billing system is very dependent on traffic densities, but is shown in the table at 1.2¢ per kilometre for a density of 2,500 vehicles per day. (In Appendix 1 we provide an indicative calculation which suggests that the average traffic density over the state highway network may be around 2,500 vehicles per day. We understand that new state highway construction may be considered at present at traffic counts of 5-10,000 vehicles a day.)

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26 This figure is derived by converting the US$63m cost of the Dutch system to New Zealand dollars using the 26 February 1993 exchange rate of NZ$1=US$0.523 (i.e. approximately NZ$120m). We have not scaled this cost to reflect the smaller number of drivers in New Zealand, since economies of scale are possibly quite high for an electronic tolling system.

27 Refer to Table A1.2 in Appendix 1.

Table 3.1
Indicative Annual Cost
of a Billing System in
Relation to State Highways

	Total Cost $ million	Average Cost per km [1]	Average Cost vehicle km [2]
1991 - 92 Expenditures	314	$28,500	3.2¢
Billing System	125	$11,400	1.2¢
Total Costs (Rounded)	**440**	**$40,000**	**4.4¢ [3]**

Notes:

1. Assuming an 11,000 km network.
2. Assuming a traffic density of 2,500 vehicles per day, 365 days a year. The figures in this column are very sensitive to this parameter.
3. This figure can be compared with an average cost of 3.3¢/km of petrol and lead duties (on a per litre basis) for the average private car, but the share of the capital charge which might be allocated to heavier vehicles is an important factor to consider in making such a comparison.

The imposition of such a cost can only be justified if the system allows equivalent efficiency gains to be achieved. If they can be achieved, such gains would arise from the better information about willingness-to-pay provided by such a system, combined with the incentive structures necessary to enable this information to be put to good use.

Areas in which efficiency gains should be found include:

- an ability to defer capital expenditures by route-specific and/or time of day pricing;
- reassessments of current expenditures which maintain road quality in under-utilised roads; and

- improved decisions in respect of road safety.

The mix of savings among these three types will vary between city roads (in which congestion savings may feature relatively highly), state highways, rural roads and suburban roads. Given that the costs of the billing system should not increase linearly with its scope (e.g. because the costs of installing kits in motor vehicles are a given), it would be desirable in principle to allow electronic billing to be applied as widely beyond the state highway system as can be justified by the efficiency savings.

At present, New Zealand's roading system has the capacity to take much higher average traffic volumes (the average density is around 680 cars per day, whereas densities above 10,000 vehicles a day are found on the buisiest single-lane-each-way state highways in New Zealand) and its annual state highway construction programme is only 14% of annual expenditures. Congestion is not a widespread problem by international standards, even on city roads. In such an environment, efficiency gains would be expected to generally take the form of reduced and/or more effective expenditures rather than from reducing traffic densities through higher charges per trip.

In considering the scale of the potential efficiency gains it is relevant that:

- the required efficiency gain of up to 0.25% p.a. across the network as a whole is not large in relation to the increased rates of return on assets which have been achieved by other governmental activities that have been undertaken by SOEs;
- there is direct evidence that our roading system may, depending on the demand elasticities, be markedly over-built from an efficiency perspective. For example:
  - road user charges do not embody any capital charge element - encouraging road users to lobby politicians for roading enhancements as if capital is costless;
  - private motorists are induced to behave similarly because motor spirits duties are not directly related to the changing level of the state's investment in roading; and
  - in combination it appears that road users are currently only paying around 20% of the opportunity-cost-inclusive costs of the roading system[28]; and
- the potential fiscal risks from a system that is based on indirect charging may have been underestimated in a volatile political environment - for example, the length of sealed highways in New Zealand was doubled during the 1960s.

We believe therefore that the adoption of a billing system, in conjunction with the need to recover long-run marginal costs from new construction expenditures, would have the potential to markedly alter expenditure decisions in respect of parts of the system which have low traffic densities. Road

28 See Appendix 1.

managers would be better able to relate roading decisions to willingness-to-pay. Other transport modes and the environment could benefit. To the degree that taxes could be reduced either because of privatisation or because future capital charges from new capital expenditures fall on road users rather than the taxpayer, society would also benefit from the reduced deadweight losses associated with taxation.

If a direct road pricing system could not be established, then the Crown would be involved in both the supply and purchase of roading services on a long-term basis. In this case, the SOE model is unlikely to provide a solid basis for ongoing public management of the roading network. It is unlikely that strict separation of the commercial incentives of the SOE and the political incentives of the Crown agency in charge of purchasing roading services would be maintained. Neither of these institutions would have an interest in maintaining this separation. In this type of situation (which has also been encountered in the case of the Crown Research Institutes and the Regional Health Authorities, and which we refer to as the 'Crown agency' model), an SOE model for roading would not be appropriate, and much more attention would have to be given to the contract between the Crown and TNZ regarding the monitoring and enforcement costs associated with this contractual arrangement.

The mechanics of the revenue collection system could be modified to reflect the change in corporate structure away from a strict SOE structure towards a Crown agency model. One possibility which preserves the current indirect charging system based on fuel excise taxes, but can potentially alter the incentives for roading operators to more efficiently reflect the desires of motorists is through the use of 'shadow tolling'[29]. Under this system, the roading supplier is paid a fixed toll per car using a particular part of the road network. The payment is made by the Crown (or the Crown-appointed purchasing agent) from funds provided within the current combination of licensing, fuel taxes and direct road user charges. If the roading supplier is a private organisation, or a Crown-owned agency with a strictly commercial focus, it will have as its primary objective the maximisation of profit subject to the constraint imposed by the fixed price reflected in the shadow toll.

As a consequence of the constrained profit maximisation problem underlying shadow tolling, the outcome of this scheme is likely to be less efficient than an entirely unencumbered commercial operation. However, it may potentially be more efficient than heavily regulated private operation of roading infrastructure. Another problem with the scheme is that road users can only express relative preferences for different roading services (e.g. safety, speed) by use of the network, rather than through their willingness to pay more for particular services. As a consequence, the quality of information that could guide roading investment and maintenance decisions (which has

29 See Michie (1991) for more details.

been identified as the primary reason for reforming public sector provision of roading services) would be diminished relative to the information available from direct tolling operations. Furthermore, given that a shadow toll will be paid on the basis of a contract that is likely to be very close to a franchise agreement between the Crown and the roading company, all of the problems with this type of agreement (to be discussed in Section 4.4) will also apply to a shadow toll, and to the Crown agency model, more generally.

Divestment of Assets by TNZ

Flexibility on the part of TNZ's management to manage assets would be necessary for TNZ to fulfil its primary objective as an SOE of operating as a successful business and for TNZ to be able to compete with private roading firms in the future. Road infrastructure assets that would potentially be owned by TNZ as an SOE represent a substantial capital investment and involve an ongoing commitment of funds by TNZ. Capital invested in roads in certain areas ties up resources that might be more usefully employed elsewhere or for different purposes. As a result, it is essential that TNZ be given flexibility to dispose of or lease surplus assets and to rationalise the usage of existing resources. Unless TNZ has this flexibility, it will be subject to ongoing costs and capital will be locked into resources that may be underutilised[30].

Given that the major objective of the reform process is to allow the transition from the current system of providing and operating roading infrastructure to a new system designed to more efficiently meet the needs of road users, the ability to rationalise the use of assets following the initial reform process is crucial, whereas the starting configuration of assets and road pricing mechanisms, for example, is less important. Without flexibility in managing the rationalisation of asset usage, much greater attention would have to be given to the initial configuration of assets transferred to TNZ. Furthermore, initial decisions on resource configuration would have to be made without as much information being available to those managing the transition and without the same commercial incentives as those imposed on TNZ's management.

If the objectives set for TNZ's management are purely commercial, and their remuneration is tied to SOE performance, this will provide incentives for these managers to operate TNZ's roading business efficiently. Provided that there are no constraints on management's ability to respond to these

30 Although there is no conclusive evidence on the matter, there appears to be a wide dispersion in road quality relative to traffic density throughout New Zealand. Therefore, it seems likely, and has been suggested by informed external commentators, that commercial operation of the roading network would lead to a much closer calibration of roading standards with traffic density across the roading network than under the current non-commercial operation of TNZ.

incentives, then in addition to incentives provided by the emergence of competition, this would encourage TNZ's management in an SOE structure to:

- sell surplus assets (with the SOE retaining proceeds from the sale of these assets);
- contract out services and inputs (e.g. operation of billing systems, maintenance etc) to be provided by outside parties;
- engage in joint ventures (e.g. Build-Operate-Transfer (BOT) schemes for the provision of new road infrastructure by private firms with TNZ retaining ultimate ownership of the asset); and
- expand the scope of TNZ's operations where this would allow customer demands to be met more efficiently.

While these incentives are likely to be strong enough to motivate rationalisation and divestment of assets at the fringes of TNZ's operations, they are unlikely to motivate widespread divestments of operating assets beyond an initial period in which the new SOE sets out to prove its commercial credentials. Although a reform process can unleash remarkable initial gains there are generally very few enduring incentives for SOE management to curtail the size of their business organisation or to sustain any other action that reduces their managerial power. Conversely, SOE management have strong incentives to expand the size of the business, in order to increase their managerial power and prestige, in some cases to the detriment of the interests of the owners[31].

If SOE management were subject to the disciplines imposed by private ownership, they could not succumb to these pressures to the detriment of shareholders without facing a declining share price and possibly losing their jobs in the process. Under public ownership, however, these same constraints are substantially reduced. In addition, ad hoc political interference is likely. The lack of tradeable equity, in particular, allows an SOE's management to expand the size of the business, often to the detriment of the ultimate owners of the business (i.e. tax- and rate-payers) while concealing the value consequences of political interference in management decisions. Therefore, the incentives for SOE management to undertake and/or sustain widespread restructuring and rationalisation are likely to be reduced under an SOE structure relative to private ownership.

To some degree, the weak incentives for TNZ's management, in an SOE structure, to initiate rationalisation and divestment of operating assets may not prove to be a long-term problem if:

- competition emerges for the provision of roading infrastructure; and

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31 This incentive can vary depending on how management's remuneration is determined and/or the information available to those persons responsible for determining this remuneration.

- ownership of shares in TNZ by central and local government were to provide a greater constraint on SOE management than sole ownership by central government under the normal SOE structure (i.e. possibly because it would allow the introduction of minority private shareholding more rapidly than under the normal SOE structure).

Nevertheless, the process of rationalisation is likely to be slower and less likely to involve radical restructuring of TNZ's core assets so long as TNZ remains in public ownership.

The problems arising from the incentives for TNZ's management to invest in infrastructure to the detriment of the interests of owners are the same as those that have been mentioned in section 3.3 in respect of modifying the SOE model for application to TNZ. The particular options relevant to the present problem are to require:

- that TNZ operate with a relatively high leverage ratio, thereby reducing the free capital reserves available to SOE management;
- disclosure by SOE management of major investments in the annual Statement of Corporate Intent; and
- independent audits of major investment projects after their implementation, to assess the economic feasibility of the projects and provide guidance for both SOE board members and monitoring agencies.

Financing of New Infrastructure

As an SOE, TNZ would be able to finance new investment more flexibly. At present, funds are provided for the road network out of fuel taxes, licence fee revenue, road user charges and local authority rates. Any debt finance that must be raised in order for TNZ or local authorities to carry out new investment is currently raised by the Crown or local authorities. However, under an SOE structure, TNZ would have its own balance sheet and would be able to access debt markets directly, without requiring government approval for debt issues and without being subject to the constraints imposed by the government's broader fiscal position. TNZ would be able to issue debt, securing the debt with its physical assets and its ability to derive revenue directly from road users through tolls.

An SOE structure would allow road investment decisions to be made that did not rely solely on the government's current revenue or indirect charges on road network users. This would increase economic efficiency given the constraints that may arise from current government control of TNZ's funding, and the inefficiency of constraints imposed on investment projects by reliance on current tax revenue and indirect fees to road network users.

Summary of Public Policy Issues

One of the key issues that will arise in the commercialisation of TNZ is the extent to which fully defined, enforceable property rights for the roading network are granted by the Crown to TNZ. Where, to the contrary, particular rights are conferred on road users or property owners, TNZ should be permitted to charge on a fully commercial basis for any services it is required to provide. Central or local government can explicitly subsidise such services if they so desire.

The case for outside regulation of driving behaviour and road safety standards would be less compelling if suppliers of roads were given commercial objectives. A range of self-regulatory arrangements between road users and suppliers are likely to evolve to satisfy the public's desire for coordination and monitoring of road use that would, at the same time, minimise transactions costs imposed on road users. Private individuals will have greater information and incentives to minimise these transactions costs than would an outside regulatory agency. Furthermore, the justification for outside regulation may not be as compelling as information flows and institutional structures (e.g. direct road pricing) become more sophisticated following corporatisation of TNZ. However, in the early stages of the commercialisation process, there is unlikely to be much difference between the type of regulation imposed on road use and construction by either an outside regulatory agency or TNZ itself. Therefore, there does not appear to be a compelling reason for delaying the transfer of regulatory power to TNZ during commercialisation.

The ability of TNZ to charge directly for use of the roading network, and to set prices for road users, will also need to be addressed. From the point of view of road users, roading suppliers, and society as a whole, the most efficient mechanism for collecting this toll is likely to be via electronic means. This type of system would not lead to increased congestion or higher operational costs for motorists, nor would it impose prohibitively high construction costs on the roading supplier. From the point of view of society, this form of direct road pricing may provide benefits in excess of costs because it provides clear signals guiding investment and maintenance of road infrastructure and would reduce congestion on urban roads. The exact form of road pricing that should be adopted and the prices that should be set are best left to those most likely to have the information and incentives to make these decisions (i.e. TNZ's management, once this organisation is operating as a commercial business). Therefore, there is no real need to specify the type of road pricing mechanism ahead of corporatisation, provided TNZ is given unfettered commercial objectives, and the flexibility to achieve these objectives, and provided a direct tolling system is feasible.

Finally, the ability of TNZ to dispose of surplus assets or assign their use to other individuals or organisations, and the ability of TNZ to apply the proceeds from these divestments to other

purposes, will also need to be considered. Flexibility in rationalisation will be required in order for TNZ to be able to meet its commercial objectives. Any constraints on this ability are likely to hinder the commercial performance of the SOE. However, the incentives for SOE management to undertake widespread rationalisation of the operational assets of TNZ are likely to be weak, since this would lead to a reduction in their managerial power and influence. On the other hand, the constraints preventing management of the SOE from expanding the operational base of the business to the detriment of its ultimate owners (i.e. tax- and rate-payers) are likely to be weaker than in the case of a private business. Both of these considerations lead us to believe that outside monitoring of the SOE's performance should focus on the application of funds to new investment rather than place too much emphasis on divestment and rationalisation.

3.5 Possible Structure of the Commercialisation Process

In order for the Crown to establish TNZ as an SOE, the first tasks would be to:

- obtain expert opinions on the feasibility of introducing a revenue collection system;
- redefine the property rights in respect of roads that TNZ will own (e.g. the right to collect tolls, the right to regulate road use and safety, and the right to divest assets) to allow TNZ to achieve commercial objectives;
- decide on the initial regulatory environment for TNZ (e.g. structural separation of local roads from state highways, price regulation or reliance on the Commerce Act); and
- respecify the objectives of TNZ[32].

All of the tasks listed above could be dealt with in the empowering legislation.

The next step would be for the Crown to appoint members to the TNZ Establishment Board (TEB). The TEB would:

- recommend the appointment of members to the TNZ Board (TB) to shareholding ministers;
- oversee the independent valuation of assets vested in TNZ;
- oversee the establishment of a business structure for TNZ; and

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32 The role of distributing public transport subsidies is currently undertaken by TNZ. As a commercial organisation responsible for the commercial operation of the road network under an SOE structure, TNZ would no longer have a direct interest or necessarily have the requisite skills for managing the distribution of these subsidies. Possibilities for reallocating this task, if central government continues with these subsidies in the new road-pricing environment, include reassigning it to another government department, contracting the management of this programme out to private organisations, or decentralising management of this subsidy scheme to the local government level.

- oversee the development of a plan for implementing a commercially viable revenue collection system for TNZ.

The TB would:

- appoint the Chief Executive of TNZ and negotiate his or her contract with the TB; and
- in conjunction with the Chief Executive, draft the initial Statement of Corporate Intent for TNZ covering the establishment period.

During this period, the Crown would:

- negotiate with the Chief Executive and the TB on TNZ's provision of roading services during the establishment phase;
- set up a unit to monitor the performance of TNZ in meeting its commitments under this contract;
- establish mechanisms for monitoring the performance of TNZ through the SOE advisory unit and steering committee; and
- establish the framework for ongoing regulation (including establishing the agency assigned the task of monitoring these regulations) that affects the operation of TNZ (e.g. the road safety and licensing regulatory environment).

Finally, an Ownership Negotiation Committee (ONC) would be established to supervise the division of TNZ shares between the Crown and territorial authorities. Appointees to the ONC should be determined by the shareholding ministers and local government representatives. No conflict or overlap between the ONC and the TEB, TB or TNZ management should exist.

In order to deal with the division of shares in the new SOE between central and local government, we would recommend:

- that the valuation of local roads be undertaken as part of the exercise of valuing the assets transferred to the SOE, and that local road assets be valued on the same basis as the rest of the roading network; and
- the ONC be entrusted with arbitrating and allocating shares between the Crown and territorial authorities on the basis of the assigned values for local roads and the historical division of funding for local road construction and maintenance.

4. MONOPOLY ISSUES IN ROADING

4.1 Introduction

One key public policy issue that may arise from the commercial operation of the roading network is the concern about monopoly power. If a single firm owned and operated all roads, road users and policy makers may be concerned that, in the absence of government regulation, the firm would be able to generate monopoly profits by restricting road usage and charging road tolls in excess of marginal costs. This monopoly power would reduce the efficiency with which resources were allocated between alternative uses, and might result in significant wealth transfers to the detriment of road users. However, irrespective of the arguments demonstrating the economic costs of monopoly power, experience shows that regulation of business activities by politicians and bureaucrats imposes its own economic costs. The benefits of regulation may not outweigh the costs imposed on the business by outside interference in the management of road infrastructure.

Road networks and, in particular, local roads, might be monopoly or natural monopoly industries. Over time, under a system of commercial operation of the roading network, competition in the highway market would emerge from new privately-owned highways, or from other transport modes (e.g. air, sea or rail). However, the opportunities for replicating the roading network in urban areas are limited, as are the opportunities for utilising alternative transport modes. Therefore, concerns about monopoly power are most likely to remain a problem for local roads. In turn, this characteristic has been used to justify regulation of the operation of roading infrastructure by private firms, statutory protection of a roading supplier, and public ownership of the roading network.

A related issue is whether the most efficient form of business enterprise for operating the roading network is a single firm. This situation of 'natural' monopoly could arise if roading were an industry subject to economies of scale (in which case an increase in the scale of production would lead to a reduction in average production costs), or if increasing the output of one product of the roading firm led to a reduction in costs for other products and services provided by the firm. According to this argument, without some form of regulation protecting the single firm from competition, the cost efficiencies resulting from operation of the roading network by a single firm might not be realised.

These issues are of interest because they influence the type of restructuring exercise that might be undertaken in respect of the provision of road infrastructure; they also influence the nature of the regulatory regime that might be imposed on road infrastructure suppliers.

4.2 Monopoly and Market Power Problems

The major regulatory issue that will arise from the commercial operation of road infrastructure is the potential for a firm to use its position of market dominance to the detriment of consumers. A firm with market power may increase prices and restrict output to increase profits or reduce losses. This can cause a misallocation of resources and may also lead to a transfer of wealth from consumers to the monopoly firm.

In practice, the degree of market power is likely to depend on the circumstances prevailing in a particular market. The market power problem in any market is unlikely to be great if any of the following conditions hold:

- there are reasonably similar alternative suppliers or substitute products that can satisfy consumer demands at a comparable price. For example, the goods may be internationally traded or new domestic firms can readily enter the market;
- sunk costs are low; or
- consumers are in a strong position (either economically or politically) to negotiate over the division of monopoly profits between the monopoly firm and themselves, or to negotiate to increase output (thereby reducing monopoly profits) and to negotiate over the division of the increase in overall economic welfare.

We consider each of these properties with regard to their application to roading.

Substitute Products or Services

Competition from different products or services will constrain prices for any dominant firm's product and curb market power and corresponding economic costs. Although roads are essential for road transport and for consumers in situations in which there is no alternative to road transport, there are different modes of transport for many customers (e.g. rail, air, or sea). Therefore, the relevant market for analysis of monopoly power problems would be the transport market, rather than the

road transport market[33]. Of course, for some customers there may not be a reasonable alternative to using a road. In this case, there are different road transport modes available (e.g. buses vs. cars) and motorists can choose to use roads at different times of the day (if there are different prices for different times of the day). In these cases, the constraint imposed by alternative forms of transport on the abuse of market power is more limited, but the need to attract the marginal road user will still keep prices down for all road users[34].

Alternative Suppliers

The existence of actual or potential competitors constrains the incumbent firm's ability to use market power to set prices in excess of marginal costs. For example, different private firms may compete to provide alternative motorways or highways.

Although roads are not an internationally traded commodity, given New Zealand's reliance on exports and foreign investment the influence of infrastructure costs - both direct and indirect - will be an important consideration in the decisions of some businesses regarding whether or not they invest in New Zealand, or in which part of New Zealand they choose to locate their business operations. In turn, road network operators will forgo or lose business if they ignore this constraint[35].

Sunk Costs

The constraint imposed by potential competition is reduced if an industry is characterised by high 'sunk' costs (i.e. an investment that has little resale value if the entrant subsequently leaves the market). High sunk costs are thought to deter investment by new entrants.

The concept of sunk costs clearly arises in respect of roading. While roads may have some residual value if the entrant decides to leave the market, there are not many alternative uses for a roading network if it is not profitable in the first place, and there is no possibility of shifting an unprofitable road to a more profitable location once it is built.

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33 In the end, it would not matter how the market was defined, since the relevant criterion would be the extent to which different transport modes provide an effective constraint on the ability of firms to abuse market power to the detriment of consumers.

34 This is true provided the firm cannot discriminate in pricing between different customers, or else the firm may be able to charge a higher price to those without choices.

35 In practice, local authorities devote considerable attention to this constraint under the present system of public road management.

The question of how serious sunk costs are as a constraint on competition in roading is more open. One point here is that the very long engineering lives of roads, bridges and tunnels means that, once the new entrant has made the investment, that asset is going to exist for a very long time. Such knowledge will reduce the existing operator's incentive to react very aggressively after the new entrant's infrastructure has been built - for example, even if the existing operator did manage to put the new entrant out of business, the receiver would simply sell the infrastructure to the highest bidder, so the existing operator may have lost money to no good effect. New entrants will be aware of this factor and may not therefore be put off by the sunk costs associated with the infrastructural development they are considering.

Of course the 'sunk cost' and long-term nature of roading investments means that any new entrant will have to think very carefully about likely future traffic flows and the possibility that some competitor might subsequently observe those traffic flows and try to capture them by building competing infrastructure. However, these factors are not different in kind from the normal business considerations which motivate new entrants and existing operators to do their best to ensure that their investments are well-designed to meet potential customer's future needs.

Our major conclusion here is that any regulatory solution to perceived monopoly issues in roading may not be appropriate if it either impedes the emergence of competition or if it reduces investors' incentives to make sure that new infrastructure is well-designed to meet potential customers' future needs. Current arrangements are worrisome in both these respects.

Consumer Power - Threat of Regulation

If a firm has a monopoly position in a market with no threat of competition and no external regulation, the incentives for the firm to exercise this market power to raise prices (or in the case of a public firm, to raise costs) and generate monopoly profits (or provide poorer quality service) may still be limited by its perception of likely consumer reaction. For example, if by raising prices the firm motivates road users to lobby politicians for tighter regulation of the industry, the firm may actually end up with less profit or greatly reduced scope for business expansion than if it had not attempted to raise prices in the first place.

A firm's perception of the chances of successfully raising profits by exploiting market power therefore depends on the cohesion of consumer groups and the precedents set for pricing behaviour in the past. In roading, for example, the existence of well-coordinated and effective road user organisations (e.g. the Automobile Association), and the fact that roads have historically been provided free of charge in New Zealand, are likely to limit a firm's perception of the opportunities for profiting from anti-competitive behaviour.

This constraint could end up being so effective that it actually worked to the detriment of the commercial performance of the roading firm. Increased prices for services raise the incentive for suppliers to increase the capacity of the infrastructure that they operate. If prices could not be increased in response to an increase in demand, this may prevent the construction of new infrastructure[36]. In practice, a trade-off exists between the inefficiency resulting from unregulated monopoly operation of roads and the inefficiency resulting from interference in the pricing and investment decisions for roads. Ultimately, this balance will be influenced by the relative political power of road users, tax- and rate-payers.

4.3 'Natural' Monopoly

A natural monopoly exists if one firm can produce the output of the entire industry more cheaply than two or more firms operating separately[37]. If the firm produces only one product or service, it will be a natural monopoly if it possesses economies of scale over the relevant range of output[38]. However, if the firm produces more than one type of product or service, it may still be a natural monopoly even if none of the individual products supplied by the firm is characterised by economies of scale. In this case, a natural monopoly may exist if, by increasing the output of a particular product, the firm is able to reduce the costs of providing other products or services. For example, a new motorway may allow a private roading firm to reduce congestion charges on alternative urban commuter routes.

Two concerns that are thought to arise from a natural monopoly are that new investment in roads may not be possible unless the firm responsible for the investment is given government protection from competition, and that once a statutory monopoly is created, it may be tempted to increase prices above marginal costs and generate monopoly profits. This argument is sometimes used to justify regulation of the monopoly's business activities by government agencies.

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36 An example of this type of constraint is provided by the recent political decision to prevent ECNZ from increasing electricity prices. This is likely to prevent or delay the construction of new electricity generation capacity and will eventually lead to power rationing if this situation continues.

37 This condition is equivalent to stating that the cost function for the industry is sub-additive.

38 That is, an increase in the scale of production reduces unit production costs.

Regulatory Protection of a Natural Monopoly

Where natural monopoly reflects increasing returns to scale, the presumption that the firm may be unable to recoup capital costs presumes that there is no opportunity for Ramsay pricing or any of its variants. In particular, where the owner of a network has the ability to charge for access separately and additionally to charges for use (as occurs in New Zealand with the telecommunications, natural gas and electricity networks), there may be no need for regulation to protect the single firm from competition. The single firm may be able to both service its fixed costs out of the access charge and charge marginal costs for use of the network, thereby maintaining competitiveness with potential new entrants.

A further reason for discounting this type of concern in respect of the current roading network is that there is no need, in terms of economic efficiency, to price the network so as to recoup past capital costs. There is no cost to future economic efficiency if the market value of the network is much lower than its depreciated replacement cost. Since the investment in the existing network has already occurred, ensuring that road tolls are high enough to encourage someone to construct the network is irrelevant. Therefore, monopoly problems of this type are only potentially relevant in respect of future investments.

In respect of the possible need to introduce regulation to provide sufficient incentives for investment in the future, the first problem is the difficulty of identifying whether an industry is a natural monopoly. It is likely to be costly to acquire information on optimal production techniques and organisational structures. If an incumbent firm is unable to lower prices to prevent entry by a competing firm, entrants may find it attractive to enter an industry that is a natural monopoly. The most efficient way of determining whether an industry is a natural monopoly may be for the regulatory authority to allow entry of a rival firm to the industry. Of course, it may be difficult and costly for a regulatory authority to force the rival firm to subsequently leave the industry if the entry of a rival firm demonstrates that the industry is really a natural monopoly (i.e. this cost is equivalent to the information cost that must be incurred in order to assess whether the industry is a natural monopoly). Therefore, the costs of identifying a natural monopoly potentially outweigh the benefits of protecting the incumbent firm from competition, even if it is a natural monopoly.

Even in situations where competition is destructive, and entry by rival firms prevents minimum cost production, it is not certain that protecting the incumbent firm from competition would guarantee lower production costs. A protected firm, whether it is a natural monopoly or not, has an ability to raise prices and restrict output that is not enjoyed by an unregulated firm. History indicates that statutory protection is often provided to firms in industries where destructive competition is not a problem (e.g. in New Zealand, this was the case prior to reorganisation of the public rail, telecommunications, and postal networks). In spite of any short-term advantages, protecting a

natural monopoly may not turn out to be the best long-term strategy once technological change, evolving consumer preferences and the possibility of incorrectly providing protection for a firm that is not a natural monopoly are taken into account. Over time, evolving preferences and technology may move the optimal industry structure away from a natural monopoly. A firm that has been granted statutory protection may respond by increasing its demands for state funds, as opposed to scaling down its operations in an unprotected industry. In this situation, the original reason for protecting the monopoly becomes subsumed into the objective of ensuring the ongoing survival of the incumbent firm, whether or not this is justified on economic grounds. Also, because protection is granted by the government, a protected firm would be susceptible to political interference. Therefore, the choice between allowing potentially destructive competition or providing protection for the incumbent monopolist is a choice between two potentially inefficient outcomes.

Given the information costs involved in determining whether an industry is a genuine natural monopoly, allowing entry by rival firms may be a cost-effective mechanism for determining whether the incumbent firm is achieving lower production costs as a result of its natural monopoly position. If the firm is a natural monopoly and is performing efficiently, then entry by a rival firm would lead to higher overall prices for consumers and might lead to losses or reduced profits for the incumbent and/or the new entrant, one of which would be forced to leave the industry. On the other hand, if the incumbent firm is underperforming, then allowing entry by a rival firm might lead to lower prices for consumers, whether or not the industry is a natural monopoly.

In practice, a natural monopoly is a rare form of industry structure, and difficult and costly to identify. Even industries that are cited as examples of natural monopoly (e.g. electricity distribution) are often competitive at the margin (i.e. for some part of the industry, the lowest cost form of organisational structure is provided by a competitive market)[39]. In contrast, the economic costs imposed by industry-specific regulation and government ownership are often high and relatively easy to identify. Therefore, considerations of natural monopoly do not necessarily provide a justification for regulations preventing the emergence of competition within an industry or for government ownership of the monopoly firm.

4.4 Regulatory Responses to Market Power

If a firm is a monopoly, whether a natural monopoly or otherwise, it has the potential to exercise market power to the detriment of consumers and overall economic efficiency. In assessing whether government regulation is an appropriate response to the existence of market power, the following factors should be considered:

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39 For example, competition may emerge in the provision of new electricity lines to new suburbs or major new industries.

- while monopoly pricing can impose a cost through lost allocative efficiency, industry specific regulations impose their own efficiency costs. They do this by interfering with the pricing, purchasing and investment decisions of the regulated firm;
- in industries subject to increasing returns to scale for some part of their operations, average costs exceed marginal costs. Therefore, setting prices above marginal costs may be necessary for some services in order to ensure the continued operation of the business;
- allocative efficiency may be improved if the monopolist is allowed to and can feasibly set prices to discriminate between individual customers. Such pricing does, however, entail a greater wealth transfer away from consumers than when the monopolist sets a single, uniform price; and
- income redistribution effects (i.e. from customers to the monopolist) do not, of themselves, impose costs in terms of lost economic efficiency. Similarly, methods of alleviating the income redistribution effects arising from market power need not involve major efficiency costs. For example, providing targeted income support to road users may alleviate income redistribution effects at lower cost than regulating the operation of a monopoly roading supplier.

Arguments in favour of regulation are usually put forward on the grounds that regulation can reduce the adverse consequences of 'market failure' for economic efficiency. Contrary to this positive view of regulation is the observation that, in practice, regulatory decisions often reduce overall economic welfare (e.g. various forms of regulatory intervention in the finance sector in New Zealand during the early 1980s led to widespread credit rationing). A view of regulation that is consistent with this adverse empirical evidence suggests that instead of being solely influenced by 'market failure' considerations, regulatory decisions are influenced by different interest groups, politicians and regulatory agencies. Each group involved in the decision-making process attempts to influence the final decision to meet its own objectives. This environment does not necessarily mean that regulatory decisions never increase economic efficiency. However, it does imply that the diversity of individuals' objectives and their influence on the regulatory process should be taken into account when considering the merits of regulatory intervention.

In terms of its impact on economic efficiency, the net effect of regulation can be either beneficial or detrimental depending on whether, in net terms, it enhances economic welfare relative to the situation that would arise without regulation[40]. For regulation to be beneficial, therefore, two conditions must be fulfilled. First, there must be some loss of economic efficiency in allowing unregulated business operation. Second, regulation must not only reduce these problems in theory but

40 Noll (1983).

also improve outcomes in practice, in spite of the existence of various interest groups and the difficulty of controlling the activities of regulatory agencies.

The influence of interest groups on the regulatory process can be significant. Interest groups can use the regulatory process or lobby politicians and regulatory agencies to introduce regulations that provide disproportionate benefits to themselves. In turn, politicians may use regulation or the public ownership of commercial business activities as a means of satisfying political objectives[41]. The possibility of regulatory capture by either interest groups or politicians raises the prospect that regulation could have a long-term detrimental impact on economic welfare in certain cases.

If policy makers decide that the benefits of regulation outweigh its potential costs, there are seven main regulatory options for dealing with market power. These are:

- creating competition for the monopoly market;
- regulation of ownership structure;
- a universal access requirement;
- club ownership;
- cotenancy regulation;
- rate-of-return regulation; and
- price-cap regulation.

Each of these approaches may be supplemented or superseded to some degree by reliance on the Commerce Act and by the threat of regulatory intervention.

Competition for the Market

Franchising is a mechanism for creating competition for a monopoly market without regulatory intervention. Rival companies bid for the right to become the monopoly supplier[42]. The company offering to provide the service at the lowest price to customers wins the right to become the monopoly supplier. The contracted price is likely to be forced down to average production costs. The

41 This may be especially relevant in the case of roading given the wide diversity of roading quality throughout New Zealand and the anecdotal correlation between the locality of road construction and maintenance expenditure and marginal electorates (although we cannot provide definitive proof of this relationship).

42 For example, in the case of roads a new motorway link (e.g. Transmission Gully) may be offered for franchise. Private firms would then bid for the right to build and operate this new infrastructure, with the winning bid being the one that (adjusting for quality differences) offered to provide the service at the lowest cost to road users.

lowest price, therefore, will not be a monopoly price[43], but need not equate to marginal costs, either[44].

A number of problems exist with franchise bidding, to be weighed against the efficiency costs associated with allowing unregulated operation of the monopoly:

- with uncertain cost and demand conditions, the winning bid may not turn out to be the most efficient, especially if the franchise holder is forced to close down[45]. Alternatively, the initial bid may reflect the franchisee's expectations of successfully renegotiating the terms of the contract with the regulatory agency in the future;
- the government's threat to enforce the letter of the contract will not be credible. The regulatory agency will presumably award a long-term franchise if it wants to provide greater incentives for long-term capital investment by the successful franchise bidder. If, after obtaining such a contract, the franchisee deviates from the strict terms of the contract, the regulatory agency is unlikely to discipline the franchisee by nullifying the contract[46];
- the quality of the franchised product or service is variable, and must therefore be specified in the contract. This makes it subject to monitoring and enforcement costs. Furthermore, once the franchise has been obtained, the franchisee may be in a position to lobby the regulator for changes in technical standards or in service quality;
- some factors related to quality will not be foreseeable[47], and given the many dimensions to the measurement of quality and the different types of products delivered by the franchisee, the regulatory agency will generally have to evaluate a wide range of bids for different services[48];
- if the initial franchise is for a fixed term, the initial franchisee might enjoy a substantial advantage in the renegotiation stage. These advantages may include familiarity and possible influence over the regulatory agency. However, if renewal appears unlikely, the initial operator might fail to maintain the facility properly[49], or may not invest in the facilities in the first place;
- sunk costs may also favour the existing franchisee. To avoid this problem, the regulatory agency may require the outgoing franchisee to sell capital assets to the new franchisee and may also require the new franchisee to pay compensation for any non-recoverable costs. However, this will inevitably involve protracted negotiation between the two firms, and possibly the regulatory agency, on the valuation of these assets; and

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43 See, for example, Demsetz (1968).
44 Telser (1969).
45 Fielding and Klein (1992).
46 Williamson (1976).
47 Fielding and Klein (1992).
48 Williamson (1976).
49 *Ibid.*

- franchise bidders may lobby the regulatory agency for protection from new competition[50].

In summary, franchising may require as much administration as any other form of 'hands-on' regulation. It does not prevent the risk of capture of the regulatory agency by the incumbent firm, and it does not necessarily avoid the evolution of a complex regulatory structure. The severity of these problems will depend on the methods used to produce and award the contract. Fielding and Klein (1992) suggest that if franchises are to be awarded for highway services, three main components of the franchise contract and regulatory environment will minimise the problems highlighted above:

- the public sector agency responsible for awarding the franchise should select the relevant project, define the terms of the franchise contact and obtain all planning and environmental consents prior to putting the project out to bid. Bidding competition would be enhanced and post-contractual administration reduced by these arrangements, although this assumes that the public agency has a comparative advantage in carrying out these functions;
- contestants in the bidding process should compete for a single project. Bids take the form of a marginal rate of return schedule, corresponding to the allowable rate of return on the capital employed in the project (rate of return regulation is discussed later). This is purported to provide strong incentives for cost control, allow flexible pricing, and require little post-contractual administration[51]; and
- a state agency should handle all of these steps. This agency should be independent of other state agencies and private business interests, but able to purchase services from both.

Although Fielding and Klein do not claim that their structure is better than any other form of regulation (in fact, they start from the assumption that franchises will be awarded, and set out to provide some recommendations on an appropriate contract structure), there are a number of problems with their franchise proposal. The role of the state agency in selecting and clearing highway projects assumes that the relevant state agency has a comparative advantage in this process. This presumes that the state agency has sufficient information and incentives to select between competing infrastructure projects in an efficient manner. However, given that the state agency does not get rewarded through higher profits from the selection of more successful projects, and given that the agency still carries considerable risks in the planning stages, it must presumably use some other allocative processes (e.g. cost-benefit analysis) for deciding among projects.

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50 Goldberg (1976).

51 These advantages are thought to follow from the preservation of head-to -head competition which would tend to select the most efficient contestant. Unlike traditional franchise schemes, pricing would still be flexible. Furthermore, relative to traditional rate-of-return regulation, Fielding and Klein claim that marginal-return bidding does not lead to 'gold-plating', since the operator still has an incentive to achieve performance specifications at lowest possible cost.

Consequently, while Fielding and Klein's proposed structure may not require as much post-contractual monitoring as other forms of franchising, the gains may be somewhat superficial and may be achieved (possibly) through greater public sector involvement in the planning and construction stages of the project than with other forms of regulation. Most of the present public roading administration would still be required under their proposed structure[52]. The role of the private sector would be much more limited under this proposal than under other, more obvious, 'heavy-handed' forms of rate-of-return or price-cap regulation.

Regulation of Ownership Structure

Requiring separate ownership of different parts of the network might potentially reduce market power by preventing the owner of one part of the network from extending this power to other parts of the network[53] and simplify the monitoring or regulation of the owners of the highway network.

However, if a firm has monopoly power at one level of the market (e.g. local roads), then increasing its control at another level (i.e. highways) does not necessarily increase the monopoly profits that the firm may generate. In principle, it may extract all of the available monopoly profits (both at the national and local level) through the pricing of local road services. This weakens or removes its incentives to prevent an independent firm connecting to its own local road network. In fact, entry of a competing firm in the highway market may increase profits for the vertically integrated road network operator by generating more business on local roads for which it is the monopoly supplier. Similarly, a separated local road firm would have the same incentives to encourage entry to the highway market. However, a separated highway network operator would have no incentive to encourage entry by a rival firm, although its direct influence over this decision would be limited if it could not influence the terms of the agreement between the rival highway network and the separate local road network.

These conclusions need to be modified to the extent that the vertically integrated road firm is subject to price or rate-of-return regulation. If road tolls are constrained at the local level, for example, the vertically integrated roading company may be unable to extract monopoly profits from the local market, and monopolisation of the highway network may allow the firm to generate additional profits. Therefore, there may be incentives for a vertically integrated road network firm that is subject to price-cap or rate-of-return regulation to discriminate against competing firms

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52 This does not discount the worth of this analysis, however. In particular, these recommendations could be applied to the 'competitive tendering' procedures currently employed by TNZ.

53 Semmens (1987) and Glaister, Starkie, and Thompson (1990).

in the highway market. However, any discrimination would need to be relatively subtle and limited in its impact to escape detection by the regulatory agency.

In summary, the incentives of a vertically integrated roading firm to extract additional monopoly profits are limited in practice. In any case, separation of local roads and highways does not, of itself, reduce the market power possessed by the local roading firm. If the local firm is unregulated, it can continue to earn monopoly profits through monopoly pricing. The monitoring and regulation of local roading firms may nevertheless be simplified by separation.

Separation of state highways from local roads could be achieved either by ring fencing (an accounting separation without separate ownership) or breakup. If separation was deemed to be desirable, breakup might be preferred to ring-fencing on the following grounds:

- it would reduce concerns about the use of local roads as a means of preventing entry into the state highway network (e.g. a vertically integrated firm might refuse interconnections between a competing firm's highway and its own local roads)[54]; and
- it may reduce the need for costly monitoring and simplify any regulation that was deemed to be necessary.

There are a number of factors that suggest that separation may be costly in terms of economic efficiency. These include:

- technological interdependencies across the entire road network (e.g. road safety standards and electronic billing technologies);
- existing capital resources that are specific to the maintenance of the relationship between highway and local road networks (e.g. motorways that rely on local roads to act as feeder routes and vice versa); and
- long asset life and long planning periods, so that contracts between highway and local roading firms may involve considerable uncertainty and involve contingencies that cannot be adequately covered in a contractual agreement. This might be a problem for roading given that roads, once built, cannot be redeployed for more profitable use in a different location (i.e. because of potential sunk costs).

These factors suggest that integrated ownership may be more efficient than enforced separation, even if it means incurring possibly greater regulatory or monopoly inefficiency costs.

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54 Although there may be a simpler way of preventing this problem, as our discussion of other regulatory options (e.g. reliance on the Commerce Act) will demonstrate.

Universal Access Requirements

This form of regulation might require the owner of the infrastructure to provide universal access to the road network by all road users (both actual and potential) at a 'reasonable' price. The universal access requirement attempts to safeguard the interests of consumers confronted with a monopoly owning and operating certain essential infrastructure. In applying this form of regulation to roading, the definition of a 'reasonable' price would provide an avenue for regulatory oversight and control of the pricing structure of the roading firm and proponents of this form of regulation would argue that this feature would prevent abuse of market power.

The universal access requirement is part of the generic family of price or rate-of-return regulation without clearly defined limits on the extent of regulatory control. In practice, the degree of regulatory intervention in the business operations of the roading firm would depend on the personnel in the regulatory agency, political pressure from influential road user groups, the case history of regulatory intervention, and the degree to which the universal access requirement explicitly defined a price control mechanism. The level of uncertainty created by this form of regulation is likely to be greater than alternative, explicit forms of price and rate-of-return regulation, and may therefore reduce incentives for private sector investment in roading. Consequently, this form of regulation might act as a barrier to entry in the roading market. Alternatively, it may only be applied to the incumbent road network operator, in which case it would not provide a uniform regulatory environment across the industry, if competition subsequently emerged in the industry.

With regard to existing roading firms, a universal open access requirement would, like other forms of price control, interfere with pricing and investment decisions. A 'reasonable' price could be interpreted by the regulatory agency to be an equal price for all road users. This could interfere with the ability of roading firms to introduce congestion pricing, for example. Efficient road pricing may require that distinctions be made for different types of vehicle, as in the present system of road user charges. However, this could be seen to be at odds with a universal access requirement. Regulators might require road tolls to be equal for rural and urban users, leading to cross-subsidies and distorted price signals to road users on the true costs of providing road services to them.

Investment decisions could be distorted because of the inability of the roading firm to restrict access to associated road infrastructure. For example, roading firms may not be able to set differential tolls that recover the costs of new road construction. In turn, this may prevent the development of certain roads and highways, even though their development and successful commercial operation may have otherwise proceeded without the universal access requirement.

Club Ownership

The case for club ownership rests on the idea that if an organisation's customers are also its owners, the organisation will not have incentives to charge monopoly prices. Also, since road network owners will all be users of the facilities (i.e. roads), they would have incentives to minimise the costs of providing the service. In addition, because of the users' knowledge of how the roading network operates, they would be well placed as investors to monitor the management of the facility.

However, there are a number of reasons why club ownership may not be practical. These include:

- difficulties in reaching agreement among club members, given the incentives for strategic behaviour. Coordination problems are likely to be great given that the number of members in the club would be large if all road users were given membership. Alternatively, club membership could be restricted to major road users and political appointees (to represent other users), in which case problems would arise in selecting members and from the presence of explicit political incentives in roading management (which is, after all, one of the problems we have highlighted with the current road management system);
- the unwillingness of club members to take any significant equity stake in a club if they do not believe that they will be able to influence costs[55]. If separation of local and national highway systems occurred, local road networks may not have much incentive to invest in electronic vehicle billing systems if the least cost alternative within their local region was to institute some form of manual toll-ring[56]; and
- the inadequacy of using detailed rules and structures as a means of dealing with these problems. At best, an elaborate structure may lead to a minimisation of conflicts among club members, but possibly only at the expense of more dynamic management under unfettered private ownership of the infrastructure.

Overall, the problems of club ownership relative to the potential benefits suggest that club ownership might not be a preferred structural ownership option.

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55 An example is provided by the club ownership of Databank in the New Zealand banking industry.

56 While this may be the least cost method of tolling from the point of view of local authorities, it may impose higher indirect costs on road users due to the lack of consistent tolling technology across the entire road network.

Cotenancy Regulations

Competitive cotenancy agreements are a form of club ownership of infrastructure that is designed to promote competition. Where this form of regulatory structure differs from a club structure is in the type of ownership rights conferred on participants (i.e. ownership of specific infrastructure capacity rather than a general share in the company owning the infrastructure).

The idea with this form of regulation is that each of the club members acquires a share in the overall capacity of the infrastructure (e.g. the share could be specified in terms of kilometres of travel on the roading network). The owners of the shares then compete to sell the services provided by the infrastructural assets to customers. Collusion among club members is controlled by membership rules rather than through price-cap or rate-of-return regulation. Each co-owner pays an agreed share of the variable costs associated with operating the infrastructure, whenever it or one of its customers uses capacity. Any club member or outside organisation can increase the capacity of the infrastructure by undertaking unilateral investment in new capacity.

There are different examples of competitive cotenancy arrangements that have emerged in an unregulated business environment. The development of this form of organisation is more a function of its efficiency for the individual parties involved in the contract (e.g. morning and evening newspapers often share the same capital equipment through a cotenancy arrangement), rather than because of its pro-competitive effects (although this is a beneficial joint outcome). The importance of this form of organisational structure for roading is perhaps best illustrated by the use of cotenancy arrangements for the ownership and operation of other network assets (e.g. pipelines and electricity generation lines in the United States).

Despite the potentially pro-competitive aspects of cotenancy arrangements and the potential benefits of applying this form of ownership structure to a network asset such as roads, it does not necessarily follow that cotenancy arrangements should be imposed as a regulatory structure for an industry. If cotenancy is an efficient industry structure, it is likely to emerge within an unregulated industry. However, if it is imposed on the industry by an outside regulatory agency, it may result in a comparatively inefficient industry structure, either because the rules in the cotenancy agreement are not the same as those that would have been agreed under a voluntary structure (and in the absence of a voluntary agreement, there is no way of ensuring that this is not the case), or because the 'owners' of the infrastructure are not the same as those that would have emerged under a voluntary agreement (e.g. for publicly owned roads, the 'owners' of the infrastructure are likely to be central and local government authorities, and without a strictly commercial objective for these participants the cotenancy agreement may not deliver the purported efficiency gains). Furthermore, the lack of flexibility once the cotenancy arrangement is in place may preclude other, possibly more efficient, forms of industry structure from evolving over time. Therefore, we would not

favour this form of regulatory structure as a starting point for regulating monopoly power arising from the operation of roading networks.

Rate-of-Return Regulation

Under this form of regulation, in general terms, the regulatory agency sets the maximum rate of return that may be earned by the business, with any residual profit turned over to the regulatory agency. This form of regulation reduces the incentive for the monopoly to raise prices above marginal costs in order to generate monopoly profits, since any excess profits will be appropriated by the regulatory agency. The theoretical advantage of this type of regulation is that it reduces the extent to which prices deviate from marginal costs (and therefore reduces the monopoly efficiency costs), without explicitly interfering with the monopoly's price setting behaviour.

In practice, there are a number of problems with rate-of-return regulation. Regulators face high information costs in assessing the capital basis on which to calculate the rate of return, and in measuring profits. Also, the regulatory process can become highly political, as has occurred in the United States. In representing the interests of consumers, regulators may make decisions that are detrimental to the viability of the affected firm. Because the information requirements for this type of regulation are large, the resource requirements for the regulatory agency are usually also large and high costs are likely to be incurred by the parties involved in the regulatory agency's decisions.

A problem with this type of regulation is that, after a certain point, the firm has no incentive to control costs and increase efficiency. Since the firm is a monopoly, costs may be passed on to the consumer, and the firm may follow a policy of maximising benefits to employees, rather than turn over residual profits to the regulatory agency. Given the high costs of obtaining the information needed to detect this type of behaviour, the regulatory agency may be unable to penalise the management of the monopoly for anything but grossly deficient investment and managerial decisions.

Depending on the level of return that regulators allow the monopoly to earn, and the corresponding differential between the allowed rate of return and the firm's cost of capital, the regulatory agency may create perverse[57] incentives for the monopoly to over- or under-invest in capital. Furthermore, accurately establishing the firm's cost of capital (if this is possible at all) imposes high information costs on the regulatory agency, with the need for dynamic adjustment of the allowable rate of return creating an ongoing regulatory problem. If the industry is subject to increasing returns

57 In the sense that the allowable rate of return set by the regulatory agency will be an important determinant of investment by the regulated firm.

to scale, excessive capital investment will result in lower prices to consumers and is therefore unlikely to be resisted on political grounds. However, if the firm faces increasing costs, prices will rise, and the firm may face political constraints forcing it to earn a rate of return less than its cost of capital.

Aside from the various incentive and information problems already highlighted with this type of regulation, it is doubtful whether it greatly reduces the efficiency costs caused by the divergence between prices and marginal costs associated with unrestricted operation of the monopoly. Since the information used by agencies undertaking this type of regulation is based on historical costs, actual prices are likely to deviate substantially from forward-looking, marginal costs. The treatment of depreciation and allowance for capital costs demonstrates this point. High capital costs in the early years of an asset's life mean that the price for the service significantly exceeds marginal costs. The opposite situation occurs towards the end of the asset's life, when prices are too low, and 'rate shock' - sharp increases in prices - can occur when new investments are subsequently brought on stream.

In theory, rate-of-return regulation ensures that marginal cost pricing is achieved in a monopoly industry. Unfortunately, the incentive and information costs imposed by this type of regulation mean that it is doubtful whether this aim is realistic in practice. In particular, extensive US experience with this form of regulation has shown that it involves inefficient pricing, high administrative costs, and distorted incentives to waste scarce resources. In practice, therefore, we would favour a more light-handed approach to regulation.

Price-Cap Regulation

The best known form of price-cap regulation is the RPI-X (Retail Price Index - X) rule, applied extensively to privatised monopolies in the United Kingdom (e.g. British Telecom, British Gas and the British Airports Authority). Under RPI-X, the regulated firm's prices may not increase faster than the retail price index minus X%, with the level of X based on the firm's expected productivity growth. Under other forms of price-cap regulation, the firm's prices may be allowed to increase according to any formula that is not connected to the firm's internal cost characteristics or efficiency. This type of regulation is designed to avoid the cost-plus syndrome associated with rate-of-return regulation.

Compared with rate-of-return regulation, RPI-X regulation (and price-cap regulation more generally) works best if it is only applied for a short period of time, during which competition for the monopoly market is expected to emerge. If competition does not emerge, or for some other reason

price-cap regulation continues, then RPI-X regulation is essentially the same as rate-of-return regulation.

To demonstrate this, consider the impact of a particular highway project on the value of a monopoly roading firm, for example. It is obvious that the level of X is an important determinant of the profitability of the roading firm. Fixing X at the "right" level would generate the most efficient investment path for the industry as a whole. However, if the particular features of the investment undertaken by the roading firm are taken into account in the determination of X, then price-cap regulation collapses to rate-of-return regulation, with a lag[58].

The major apparent advantage with RPI-X regulation is that it avoids the incentives for cost-plus pricing provided by rate-of-return regulation. Also, it does not impose high information costs on the regulatory agency. The most complicated problem of determining whether a firm is satisfying the requirements of this type of regulation occurs in the case of multiple products. In this case, the regulatory agency may require that every product or service price satisfies the RPI-X formula. Alternatively, the regulatory agency may require that a weighted average of all prices for the firm satisfies the formula, in which case an individual price may exceed the allowable rate of growth in prices only if some other price rises at a slower rate than RPI-X.

In practice, the longer the period over which the regulation remains in place, the less certain regulators can be that the regulated price reflects underlying marginal production costs. If the rule is to be employed for a lengthy period of time, some other rule must be developed for revising X. At this point price-cap regulation collapses to rate-of-return regulation, because in order to equalise prices and marginal costs the firm's internal costs and productivity must be taken into account. Anticipating this, the management of the monopoly will be subject to the same incentive problems as under rate-of-return regulation. In turn, the regulatory agency will incur higher costs in determining an appropriate level of X, and will have to monitor the operations of the regulated monopoly if this form of regulation is expected to continue indefinitely.

As ongoing control mechanisms, therefore, price-cap and conventional rate-of-return regulation employ the same basic mechanisms, and are subject to similar information and incentive problems. Over extended periods of time, price-cap regulation does not generate significant advantages over traditional rate-of-return regulation.[59]

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58 Helm and Thompson (1991).

59 Nevertheless, it does appear to have been successful in alleviating transitional concerns in the case of Telecom in New Zealand. One possible approach would be to use this form of regulation as a transitional safeguard, with some set of sunset structure (e.g. one that inflation and/or technological change undermines over time).

Reliance on the Commerce Act and a "Disclosure" Regime

Under the operation of the Commerce Act in New Zealand, a firm may not use its dominant position within a market to:

- restrict entry into a market;
- prevent or deter competitive behaviour in a market; or
- eliminate a firm from a market.

Therefore, under this Act, an incumbent roading firm may be required to allow interconnection between its own road network and a road owned by a competing firm. Physical access to the roading network is therefore likely to be guaranteed under this arrangement. However, there would be no interference in the ability of any roading firm to charge tolls for road use and prevent vehicles from using roads if the requisite toll was not paid. To date, the provisions of this Act have not been fully tested in situations such as roading. The experience of the New Zealand telecommunications industry with the Commerce Commission may provide some guidance as to the likely application of these provisions of the Commerce Act to the roading industry.

This type of arrangement does not interfere as obviously with the ability of a roading firm to price road services efficiently, and is therefore markedly different from a universal access arrangement or other forms of price regulation. Nor does this type of arrangement interfere with efficient investment decisions.

A question arises as to whether this type of regulation actually solves or curbs market power problems, given its 'light-handed' nature. Arguably it would solve any problems associated with the extension of monopoly power at the local level to the highway level[60] without requiring separate ownership or ring-fencing of these different types of roads. It would also prevent a monopoly roading firm from charging exorbitant prices for franchises to roadside facilities. Faced with exceptionally high franchise costs, for example, a petrol retailer could purchase land adjacent to the road, and then construct a crossing place from a petrol station built on this land to the road.

Reliance on the Commerce Act may not prevent monopoly pricing, however, unless this type of pricing restricted, prevented or eliminated other firms from the roading or any other market. Therefore, a disclosure regime may complement the provisions of the Commerce Act in this regard. The regulatory regime that would apply to roading would presumably reflect the regulatory regime in other network industries (e.g. telecommunications, electricity and gas). The 'light-handed' disclosure regime currently employed in these industries could potentially be applied to roading as

60 Even though there may not be much chance of this occurring given the lack of incentive for road operators to extend monopoly power at the local level to the highway level.

well. Although this disclosure regime would not be costless, and may have to be reassessed if competition emerged in the roading industry, it could provide a low cost means of reassuring those who were concerned about monopoly pricing in the meantime.

However, reliance on the Commerce Act does have some disadvantages. Using the Commerce Act to curb the abuse of monopoly power in the roading industry implies reliance on the Commerce Commission to administer the Act. This approach does not imply a lack of regulation or even that there would be less regulation than under alternative regulatory approaches. Instead, the extent of regulation and its efficiency will evolve over time as a case history of regulation relevant to the roading industry emerges. While the broad parameters of this regulation are set by the Commerce Act, in practice interest groups, politicians and regulators would all have an influence over the roading industry. Whether this approach would result in a better or worse outcome for the roading industry in comparison to more explicit, clearly defined regulation cannot be determined ahead of time. However, just as the emergence of monopoly problems is only one possible outcome of unregulated operation of the roading industry, so is poor regulation merely one possible outcome of a loosely defined regulatory structure provided by the Commerce Act. In both cases, we would initially advocate a 'wait-and-see' approach to the introduction of more explicit forms of regulation. Only if monopoly problems become obviously costly or an ad hoc regulatory structure emerged would we advocate departing from the Commerce Act approach.

In summary, reliance on the provisions of the Commerce Act, supplemented with a disclosure regime if necessary would appear to curb the blatant abuse of market power by a monopoly road supplier without necessarily requiring a large and complex regulatory agency or enforcement structure. Furthermore, it would not interfere with efficient pricing and investment decisions by roading suppliers. Therefore, we would initially favour this light-handed form of regulation over other alternatives.

4.5 Summary

The issue that would face policy makers in considering the regulatory environment for roading is whether, in the absence of legislative and funding barriers to entry in the roading market, they should be concerned about monopoly power in roading. First, policy makers may be concerned with the dominant market position of a roading supplier leading to higher prices for road use than under a competitive industry structure. Second, policy makers may be concerned that the cost structure for the supply of roading infrastructure implies that the lowest cost form of industry organisation is a single firm operating all road infrastructure (i.e. natural monopoly).

There are very few examples of 'natural' monopoly, and there is nothing particularly special about roading that leads us to believe that it would be more likely to be a natural monopoly than many other industries that are, at least partially, competitive. Furthermore, for most 'natural' monopolies, destructive competition is not a problem. Therefore, 'natural' monopoly issues are unlikely to provide sufficient justification for protecting a roading firm from entry by rival firms supplying roading services. If the costs of supplying roading services are minimised by having a single firm operate all of the roading infrastructure, this monopoly is likely to be sustainable in the face of competition. The interests of road users are likely to be served best by the removal of all legislative and regulatory barriers to entry to the roading market.

In relation to possible concerns about the abuse of market power, a single roading supplier could potentially generate higher profits by raising prices and restricting output. In order to address this concern, we must define the level of the market at which the monopoly problem is likely to be a long-term problem, and assess the issues underlying this public concern. The monopoly problem is most likely to be a long-term problem at the local level. One can foresee a situation where any firm attempting to charge monopoly prices on highways and other inter-city roads would, over time, merely encourage other firms to construct competing roads, enhance competing secondary routes, or provide greater opportunities for other transport modes (e.g. rail, sea, or air). However, it is difficult to envisage the replication of roads in a major city, for example. Nevertheless, the emergence of widespread monopoly problems at the local level is not guaranteed either, given the possibility of competing transport modes (e.g. urban rail) and the possibility of alternative road transport modes (e.g. buses, cars and taxis).

In assessing whether a local road monopoly justifies some regulatory response, a number of factors need to be taken into consideration. Although monopoly pricing imposes inefficiency costs, regulatory interference in the operation of a roading firm would impose its own inefficiency costs. These occur because of non-commercial influences on the management and investment decisions of the roading firm.

If the underlying problem is seen as being the possible redistribution of income from local residents to the roading firm, there are less costly means (in terms of economic efficiency) of dealing with this situation (e.g. targeted subsidies). If it is the inefficiency costs imposed by monopoly pricing that is the major public policy concern, policy makers must satisfy themselves that regulation will reduce these costs to a greater extent than any inefficiency costs imposed by the regulatory regime itself.

We have considered a continuum of possible regulatory strategies for dealing with a perceived monopoly problem. Our preferred option is for a relatively light-handed regulatory approach, relying on the application of the existing Commerce Act (or desirable improvements to it) to the commercial operation of the roading network. This could be expected to curb the worst excesses of

market power by a roading firm, would prevent a single road network operator from extending the monopoly at the local level to the highway level of the roading market (even though they are unlikely to have much incentive to do so), and would not provide perverse incentives to the management of the roading firm or impose high information costs on the regulatory agency. A single road network operator would be forced to allow interconnection between its roading network and that of its competitors. Furthermore, we could rely on the threat of further regulatory intervention to prevent the monopoly firm from engaging in any blatant abuse of remaining monopoly power.

A more heavy-handed approach would be to enforce structural separation of local roads from the highway network. Local ownership of the monopoly portion of the roading network would reduce the incentives for monopoly pricing at this level of the market. However, this may come at the expense of greater contracting problems between local roading and highway firms and might prevent technology being introduced uniformly across the entire roading network. Faced with the threat of forced divestiture of the local road monopoly, a single road network operator could be expected to curb the abuse of market power.

If these regulatory options were still not sufficient to allay public concerns, other strategies could be employed. One possibility would be a competitive cotenancy arrangement, whereby 'owners' of the network would be allocated tradeable rights to the capacity of the existing roading network. Alternatively, price-cap regulation could be introduced to cover the intervening period in which competition for the roading market was expected to emerge. This form of regulation would probably only be required for a fixed time period, and would only be warranted at the highway level of the market. Local ownership of local roads would have removed the incentives for monopoly pricing at this level of the market. At this stage, we would only be concerned with the possible time delay involved in the establishment of credible competition for highways.

Overall, we would favour a 'wait-and-see' approach to the application of regulation to roading firms (either public or privately owned). If monopoly inefficiency costs did emerge, regulation might need to be employed to deal with this problem, but this regulation should not pre-empt these problems given the inefficiency costs that the regulatory regime would itself impose.

5. OPTIONS FOR PRIVATE SECTOR PROVISION OF ROADING

5.1 Introduction

This chapter considers the advantages of privatisation relative to corporatisation. This analysis would apply to a situation in which the Crown was the sole owner of assets controlled by the SOE, and the Crown decided to sell its stake in the SOE. We then consider the opportunities for privatisation under the more complicated joint ownership of TNZ by central and local government.

Relative to corporatisation, where ownership of commercial businesses is retained by public authorities, private ownership could provide greater long-term benefits from the enhanced commercial performance of the privately-owned firm. In particular, private ownership would be likely to provide more effective monitoring and commercial incentives for the firm's management than public ownership. Private investors would be placing their own wealth at risk by investing in the firm, and would therefore have more incentive to monitor and take an active interest in the commercial performance of the firm and its management. Furthermore, the management of a private firm would have a greater incentive to heed the interests of its shareholders given that it would face the threat of hostile takeover otherwise, and would possibly face the threat of redundancies if a takeover occurred. This same constraint does not exist in the case of public ownership of a firm.

Information available to private investors would be enhanced and more diverse than under the SOE structure. As well as the personal incentives that private investors would have to monitor the performance of their firm directly, share analysts would have incentives to monitor the commercial performance of the firm on behalf of large groups of private or institutional investors, and to distribute the results of this research. Investors would be able to respond to this information by changing the level of their shareholding in the firm. Any resulting adjustment in the firm's share price would provide information to the firm's management on financial markets' assessment of their commercial performance.

An adjustment in the share price would also enhance or reduce the constraints placed on a firm's management to expand the scale and scope of a business. A declining share price would limit the ability of the firm's management to expand a business that the market perceived to be value-destroying. In contrast, an increasing share price would enhance the ability of the firm's management to expand a business that financial markets perceived to be value-enhancing.

Private ownership of a firm would also reduce the possibility of indirect political interference in the management of the firm's activities. This would not necessarily stop politicians or public agencies from more direct interference in the firm's operations, possibly to the detriment of the ongoing commercial operation of the firm, but it would change the mechanism by which this influence was likely to be exercised. For example, if politicians or public agencies wanted to control the activities of a privately-owned firm, they would be more likely to have to do this in a public and transparent fashion (e.g. through explicit changes in the regulatory environment facing the firm), rather than through indirect, private consultation and persuasion or direction of SOE management. This difference increases the likelihood that the true costs of political influence would be monitored and communicated to the owners of the firm and the public at large, relative to the situation that is likely to occur under state ownership of the business.

Privatisation of the roading network could, for the purposes of this report, be treated as a separate issue from corporatisation. If, in the course of establishing TNZ as an SOE, it became obvious that parts of the existing roading network could be sold off to private investors or firms, privatisation could be undertaken as a separate exercise. Ultimately, we believe that the scale of the roading network, its pervasive influence on the lives and livelihoods of New Zealanders, and current inadequacies in its mode of operation and in the information available to public sector roading managers suggest that substantial benefits could be achieved through a clearer commercial focus provided by an SOE structure. We do not advocate corporatisation simply as a means of implementing eventual privatisation - rather, we believe that corporatisation could provide substantial benefits in its own right relative to the status quo system of roading management, even if further reform allowing private ownership of the existing road network was not possible.

Nevertheless, the benefits derived from corporatisation may not be as great or as permanent as under private ownership. Also, the opportunities for extending corporatisation to eventual privatisation would be likely to influence the commercial operation of TNZ as an SOE. The division of ownership in TNZ between central and local government, the nature of any shares issued in TNZ as part of the corporatisation process, and their ability to be traded among the various public authorities or to be transferred to private individuals, would clearly signal the Crown's intentions with regard to future privatisation of TNZ and would also narrow the range of options available for future ownership. Alternatively, if TNZ was owned solely by the Crown, the political commitment to eventual privatisation would also influence the commercial performance of TNZ as an SOE.

Under the corporatisation option involving joint ownership of TNZ by central and local government, the nature of the shares issued in TNZ would influence the performance of TNZ's management under the SOE structure. For example, if the Crown issued shares in TNZ that did not impose limitations on ownership or trading, some of the benefits associated with private ownership such as increased

accountability of management to shareholders might also apply in the case of TNZ operating under public ownership. Effectively, TNZ's management would have to take into account the increased likelihood of eventual private ownership in their current decision making, even though they were still publicly owned. Furthermore, the clear signal that the process could easily be extended to allow full privatisation would provide credibility to any other monitoring arrangements imposed by public authorities on TNZ's management. On the other hand, if TNZ's shares were subject to restrictions on ownership and trading opportunities, this would reduce the credibility of any other monitoring mechanisms, and would consequently reduce the accountability of TNZ's management under the SOE structure to the ultimate owners of the firm (i.e. tax- and rate-payers).

Following its establishment as an SOE, partial privatisation of TNZ could occur if either the Crown or any of the local authorities, after having acquired shares in TNZ, decided to sell them. In practice, it may not be possible to coordinate the complete sale of the shares in TNZ in one transaction, and for some period of time joint public and private ownership of TNZ may occur. Under this arrangement, the capacity of private investors to acquire a controlling ownership stake in the firm may be limited, which may depress the price that private investors might be willing to pay for TNZ's shares. On the other hand, if partial privatisation of TNZ did occur, it may allow the introduction of commercial experience to the management of the company that might not otherwise be available to TNZ[61]. Private owners may also discipline public shareholders in maintaining the commercial focus of the business. Private owners would also have greater incentives to monitor the performance of TNZ given that their individual wealth would be at risk, and may impose greater constraints on the performance of SOE management than under the normal SOE structure.

However, benefits obtained through partial privatisation have typically fallen far short of those achieved through full privatisation. The effects of a partial privatisation on the performance of TNZ would depend to a large extent on whether a private or public shareholder ended up with a controlling stake in the company. If public shareholders retained a controlling stake, many of the problems of public ownership would continue in spite of the presence of private shareholders. In particular, management of the SOE would be protected from takeover and would still be subject to the threat of political interference.

A share allocation from local authorities to rate-payers would be an attractive mechanism for privatising local authority shares in TNZ. Although rate-payers do not currently have legal title

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61 To some extent, the appointment of commercially-oriented members to TNZ's board under the current non-commercial structure is designed to achieve similar results. However, the extent to which these members can influence commercial performance of the roading network at present is limited. Also, the incentive to take a strong supervisory role, given that no immediate increase in personal wealth is likely to occur, may not be as strong as under private ownership.

to the roads in their district, in the past they have contributed to a proportion of the capital and maintenance costs for these local roads through the payment of rates and, therefore, have borne a proportion of the risk associated with ownership of these assets along with central government. Providing rate-payers with shares in TNZ might reduce the incentives for TNZ to exercise market power on local roads. At the same time, ownership of shares in TNZ would reduce the incentives for rate-payers to exercise political influence on TNZ's management or to lobby regulatory agencies for special treatment through the regulatory process.

In contrast, allocation of shares to major road users would not make as much sense from an equity perspective as allocating shares to rate-payers, because in the past road users have not borne the majority of risks associated with ownership of roads[62]. For example, when new infrastructure was constructed, only in very limited cases (e.g. the Auckland harbour bridge) were users of the facility required to directly contribute to its construction and maintenance costs.

In addition to the other benefits derived from the allocation of TNZ shares to private individuals, the ability to raise new finance through subsequent share issues would reduce the artificial constraints imposed on capital raising by TNZ through continued public ownership under the SOE structure. In this context, limitations on either ownership or transfer of shares issued to private investors would reduce the ability to raise new equity capital.

Therefore, it would be desirable for any shares issued to local authorities and central government as part of the commercialisation process to satisfy requirements for eventual listing on the stock exchange. This would allow the option of privatising TNZ in the future and would provide credible constraints and incentives for performance on the part of TNZ's management under the SOE structure.

The division of shares in TNZ among central and local authorities would pose problems for the operation of the SOE monitoring arrangements if partial privatisation occurred. In particular, the monitoring arrangements designed to protect the Crown's stake in the SOE, and the conflicts that this may pose for a substantial but still minority private shareholder or local authority, would need to be addressed if a conflict arose. In this case, public disclosure of corporate statements of intent may not be in the interests of private shareholders, and some allowance for private shareholders appointing directors to TNZ's board would also need to be considered.

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62 Note that this is not the case with Electric Power Boards (EPBs) where, historically, electricity consumers have borne many of the risks associated with ownership, and have been required to finance new investment and maintenance indirectly through their electricity payments. Rate-payers have not, historically, been the 'owners' of EPBs whereas they are more easily classified as the 'owners' of local roads.

5.2 Overseas Experience with Private Provision of Roading

In this section we review the practicality of private provision of roading services from an international perspective. Although substantial portions of roading infrastructure within certain countries are being operated by commercial or semi-commercial organisations, there are no examples that we are aware of where the complete roading system is operated on a commercial basis. Also, there are no examples of commercial operation of roads whose main purpose is to provide access to private property (e.g. rural and urban access roads) rather than to allow the passage of freight or people (e.g. highways). Therefore, on both counts corporatisation of the entire roading network, as opposed to simply the highway network, would be unique.

The cited international evidence suggests that the primary factor behind the divergent ownership of roading infrastructure has been the political climate existing at the time major development or modification of the roading network was undertaken, rather than any economic rationale for different forms of ownership structure. Another distinguishing feature is that private ownership of the roading network has only emerged through the addition of new infrastructure, rather than through the sale of existing publicly-owned roads to private investors. On both of these counts as well, the suggested approach for commercial operation and subsequent (possible) privatisation of the road network discussed in this report would be unique.

Nevertheless, New Zealand is not in the forefront of the debate or of international practice on these issues. Many countries are familiar with state-owned toll roads. A smaller number of countries, particularly in Europe, have privately-built and privately-operated toll roads. Although none has, as yet, privatised all or part of its national road network, it is noteworthy that recent announcements in the United Kingdom and Germany demonstrate that the privatisation of highway systems is being seriously considered by policy makers.

The European Motorway Network[63]

Historical Development

The European motorway network has both free and tolled motorways. By December 1988, 34% of the total European motorway network was subject to tolling. The most important tolled motorway systems are in France, Italy, and Spain, together accounting for 88% of all tolled motorways in Europe. An indicative average unit toll rate in late 1989 in these countries was 4p/km (equivalent to NZ10.7¢/km[64]. Within these countries, two methods have been employed to manage the

63 Munro-Lafon, Mussett and Kirkpatrick (1990).

64 Calculated using the 30 November 1989 exchange rate of 0.3745

development and operation of motorways. Either the state has financed motorway construction and maintenance itself with management undertaken directly by state agencies, or the state has granted a franchise for a private firm to build and operate the motorway, and to cover its costs by charging tolls. Typically long-term leases, often for 30 years, have been provided by the state to private companies which allow the state to retain ownership of the road and to resume control of it on expiry of the lease. The latter approach has been the more common in the development and operation of tolled roads. It is the method adopted in France, Italy and Spain.

Financing motorway construction by tolling was employed in France and Italy due to limited state budgets following the Second World War. In both countries, the first concessions were awarded to publicly-owned motorway companies[65] in the 1950s. In Spain, the first concessions were awarded to private companies in the mid-1960s. Once again, budget constraints were the primary factor motivating this form of financing for motorway construction and operation. A general move away from state intervention led to the establishment of four private concession motorway operators in France in the 1960s, and a greater degree of autonomy being given to French motorway companies, SEMs - the publicly-owned motorway companies.

The oil crises in the 1970s had a detrimental effect on motorway development in all of these countries. Traffic growth slowed with a corresponding negative impact on actual and predicted revenue from tolled motorways. Eventually, this led to the collapse of 75% of the private motorway sector in France. Heavy state grants were used to support motorway companies in Italy, and all new motorway construction was frozen during this period. In Spain, three private concession companies collapsed over this period.

By the start of the 1980s, the French SEMs received advances from the state to cover deficits. Meanwhile, private companies were forced into invoking state guarantees and were subsequently taken over by the government and assimilated into the SEMs. Similarly in Spain, the collapse of three private companies (comprising 15% of the motorway sector) led to the assets of these companies being acquired by a new state-owned holding company.

During this period, variable performance by SEMs in France led to the creation of the public entity, *Autoroutes de France*, which managed operating surpluses and deficits among the SEMs for the purposes of balancing financial performance. In 1987, as part of an expansion of the motorway network, the French government injected capital into *Autoroutes de France*, with this organisation acquiring shares in the SEMs and undertaking management of advances to SEMs previously managed directly by the government. The French government then withdrew from direct financial

65 In France, to *Societies d'Economie Mixte* (SEMs), and in Italy to Autostrade S.p.A.

involvement in the motorway system although it still had an indirect influence through its ownership of *Autoroutes de France.*

Present Situation

In Germany, the 8,500 kilometre autobahn system is free of user charges. As noted in the next section, this is due to end in 1994.

In France, by the end of 1988, 72% (i.e. 5,005 kilometres) of the motorway network (6,940 kilometres in total) was operating on a tolled basis. Of these tolled motorways, 87% were operated by SEMs, with the remainder operated by the sole remaining private firm, *Cofiroute.* By 1988, there were nine SEMs, which are limited liability companies subject to private company law but owned by public authorities. The state owns at least 51% of the shares in each of these companies through two national organisations *Caisse des Depots et Consignations* (CDC) and *Autoroutes de France,* which is a subsidiary of CDC. Other major shareholders are regional and local authorities and chambers of commerce. *Autoroutes de France* is responsible for balancing the financial results of the SEMs while another subsidiary of CDC, the *Caisse Nationale des Autoroutes,* raises and manages the loan finance of the SEMs.

In Italy, 81% (i.e. 5,025 kilometres) of the motorways (6,171 kilometres in total) are tolled. Of these tolled motorways, 97% are run by publicly-owned companies, with the remaining 3% run by a single private company. The largest concession company is Autostrade S.p.A., accounting for 60% of the tolled motorway network. This is owned entirely by public authorities, with 85% of its shares held by the Institute for Industrial Reconstruction (IRI), formed shortly after the Second World War. Fourteen other smaller concession companies are controlled by public bodies, which own at least 51% of the shares in these companies. Although some of these companies have a small private shareholding, they effectively operate as public authorities. A further three concession companies operating in Sicily are owned entirely by regional authorities.

In Spain, 80% (i.e. 1,839 kilometres) of the motorway network (2,313 kilometres in total) is tolled. Of these tolled motorways, 83% are run by seven private companies, which are in turn owned by banks and construction companies. Three state-owned companies operate the remainder of the tolled motorways, and are grouped under the single publicly-owned holding company.

In the United Kingdom, the roading system is toll free, (although an electronic toll collection technology, the Dart-Tag System) is used on the Dartford river crossing. Hesitant steps have recently been taken to encourage the private sector to design and build toll motorways, but so far only one project, in the Birmingham area, has been agreed to - but it has still to go through the

planning process. However, as shown in the next section, the government is taking seriously proposals to introduce tolls on motorways and perhaps trunk roads.

Government Policy for Roading

Government policy in France and Italy was generally interventionist over the period in which their respective motorway networks were developed. This led to widespread public ownership and control of the motorways in these countries. In contrast, government policy in Spain under General Franco was oriented towards private enterprise. Consequently, the motorway sector in Spain has been largely retained within the private sector. In all of these countries, public funding constraints were the primary factor motivating the development of tolled motorways.

Motorway development in these countries is covered by a National Highways Plan prepared by the relevant state highway authority. This document is the only mechanism available for the identification of new motorway projects in each of these countries. All of them, to varying degrees, view roads as public utilities justifying state management and intervention for the purposes of meeting public policy objectives. Concession companies are granted fixed term concessions, allowing regulatory control of the concession system. Financial performance of all motorway companies is heavily influenced by the state, particularly through regulatory control of toll levels. State grants, advances and loan guarantees are the trade-off for state intervention.

Since concession companies are owned by public authorities in France and Italy, concessions are usually granted to these companies following direct negotiation with the highway authority. However, because concession companies are largely privately owned in Spain, concessions are granted through a competitive tendering process.

In France, road users are assured the right of free passage for people and goods. This provision ensures the maintenance and operation of an alternative network of untolled, national roads. No such guarantee is provided to road users in either Italy or Spain, and no practical alternatives to tolled motorways exist in these countries. None of these countries provides assurances to concession companies regarding improvements to the quality of alternative free roads and the consequent adverse effects that this would have on tolled motorway traffic.

All of these countries exercise state control of concession companies through government ministries and departments. These authorities are responsible for:

- preparing their respective National Highways Plan;
- carrying out route location and preliminary design studies;

- awarding concessions and having the power to terminate them in the case of non-performance;
- supervising the hand-over of roads to the state at the end of the concession period;
- monitoring design and construction, and the operating performance of the companies; and
- monitoring and influencing the financial management of these companies.

In all countries, the preliminary studies for the construction of a motorway are undertaken by state organisations. Property acquisition is undertaken after the line order is made, with tribunals settling disputes between property owners and the state. This negotiation process does not impinge on road construction and operation, however.

In all of these countries, loan financing is the primary source of funds for new construction of motorways. The ability of concession companies to raise funds depends on their credibility, the viability of the individual projects and the extent of government support. State guarantees, non-repayable grants, and repayable state advances have been used to varying degrees by each of these countries in the development of their motorway networks. Furthermore, systems allowing cross-subsidisation of unprofitable sections of motorways have been developed. In return for government assistance, concession companies have been required to submit to different forms of controls and regulation.

Tolls generally account for 95-97% of the revenues for concession companies in these countries with the remaining revenue provided by the sale of franchises for roadside fuel stations and service areas. In all of these countries, toll levels have tended to lag behind general inflation. Toll rates for private cars ranged from 3.5 UK pence/kilometre in France and Italy to 5.1 UK pence/kilometre in Spain in 1989.

In France, state guarantees for up to 70% of all loan financing were provided to new companies. Up until the 1970s, advances were made to SEMs for 30-40% of construction costs. The lack of interest or indexation on these advances and long-term repayment schedules made them nearly equivalent to outright grants. After 1970, indexed but non-interest bearing advances for 20-25% of construction costs were made to both public and private companies. In addition, existing roads and structures were incorporated into the new tolled roads, with a repayment schedule agreed upon with the concession company. The state also made repayable advances to SEMs to cover their operational deficits. Toll levels are set by the state, the SEMs may not distribute a dividend representing more than a 7% yield on equity, and excess profits must be turned over to the state-controlled *Autoroutes de France* for distribution among the other SEMs. The private French motorway company, *Cofiroute*, is comparatively free of state interference. However, it must still have a state inspector present at its board meetings and must present annual accounts and financial plans to the government.

In Italy, the major network concession company, Autostrade S.p.A., has all loans guaranteed by its parent company, the state-controlled IRI. The government was authorised to make grants covering up to 40% (with actual grants varying between 10-30%) of the construction costs for tolled motorways. In addition, in the early stages of development of the Autostrade, the deficit between construction costs and state grants was covered entirely by grants from IRI. The construction of unprofitable links in the motorway network was one of the primary factors leading to the creation of Autostrade S.p.A. The government sets toll levels even though the enabling legislation for this regulation contravenes the conditions of many of the original concession agreements. Financial plans must be approved by the government, and dividends are limited by law to 8% of share capital. Excess profits are paid to the Central Guarantee Fund and are then used as collateral for loan financing.

In Spain, concession companies are required by the government to raise 45% of their finance in foreign markets, with the state providing repayment and exchange rate guarantees for these loans. No outright grants appear to have been made by the Spanish government to concession companies. Repayable advances were made to publicly-owned companies to cover operating deficits and advances were made to one private company when traffic volumes fell below a specified level. The finances of the small public sector concession companies are managed by the national highway company, ENAUSA, allowing cross-subsidisation within this part of the motorway network. Because it does not have widespread public sector provision of roading, Spain has the most stringent and explicit monitoring arrangements for concession companies. Both public and private companies must submit monthly accounts for approval by the Ministry of Public Works, obtain authorisation for loan proposals, and may only distribute dividends after government approval of their annual accounts.

Germany[66]

On 9 February 1993, the German government announced the following intentions in respect of its autobahn system:

- the imposition of a new road tax on autobahn users in 1994 of up to DM200 (NZ$230) a year as a prelude to the introduction of a toll system; and
- the eventual privatisation of the construction and maintenance of its super highway network.

66 *Financial Times*, 11 February 1993 and *The New York Times*, 10 February 1993.

A poll of business opinion shortly after this announcement had 46% of Germans saying they would stop using the autobahns, 12% said they would take public transport and 37% said they would carry on using them regardless of the new charges.

United Kingdom[67]

In February 1993, the United Kingdom government was reported as considering:

- the transferral of its 6,000 mile (10,000 kilometre) national road network to a new agency, Highway Command, as a prelude to privatisation; and
- the introduction of tolls on trunk roads as well as motorways to offset the £2bn pa cost of road construction and repairs. Although these roads only account for 4% of the network, by length, they carry 32% of all traffic and 56% of goods traffic. Currently these roads are toll free.

Californian and Virginian Private Toll Roads[68]

In contrast to the experience of Europe, toll roads in the United States have been quite a rare phenomenon over the past 100 years or more[69]. Although private toll roads are not without historical precedent in the US, virtually all of the present US highway system is publicly owned and operated on a non-tolled basis. Even publicly-owned and operated toll roads are relatively rare in the US. Nevertheless, as in Europe, the revival of interest in both road tolls and private sector provision of highways has arisen because of government budgetary pressures.

Responding to budgetary and environmental pressures, the California Department of Transportation (Caltrans) has initiated a novel form of private sector franchising. While ownership of the franchised facility remains with the state, the franchised party is required to propose, design, gain approval and construct the facility, and operate it for 35 years. The novel feature of this approach is the freedom for private firms to propose any transportation project throughout the state, with only broad criteria required to be satisfied. In contrast to the California projects, the Virginia toll road will operate much more like a regulated utility.

In total, eight proposals were submitted to Caltrans, which was then required to make comparisons between completely separate projects. Of the eight proposals, Caltrans chose four, one of which was chosen because it satisfied regional constraints in the enabling legislation (i.e. it was in

67 *Financial Times*, 12 February 1993.
68 Fielding and Klein (1992); and Klein and Fielding (1992).
69 Gomez-Ibanez, Meyer, and Luberoff (1991).

Northern California), not because it was ranked in the top four on Caltrans' project assessment criteria. These four projects can also be divided into two groups: those providing greater capacity on existing congested corridors (i.e. the Route 91 and Route 57 projects), and those providing subdivision opportunities in ranching land (i.e. the San Francisco Mid-State project and Route 125 project).

Having decided on the projects, Caltrans then began the negotiations on the franchise agreements. After three months of intense, difficult and costly negotiations, all four agreements were signed by January 1991. These agreements specify basic service options, design and construction standards and rate-of-return ceilings for the franchise holders; toll levels are otherwise unregulated. Various forms of incentive bonus based on vehicle occupancy, vehicle throughput and other objectives allow the returns to exceed the rate ceiling. With the agreement finalised, each franchise-holder must now complete the project. The most formidable part of the project is gaining environmental clearance. However, Caltrans anticipated difficulties in this area if it undertook the work itself, and therefore opted for private sector involvement, correctly surmising that private sector participants would have greater incentives to gain the requisite clearance than a public agency. Nevertheless, as of June 1992, only one project which did not have significant environmental effects (i.e. involving the construction of new lanes on an existing motorway) had made significant progress.

California's State Route 91

This project involves the addition of 10 miles of new lanes on the median of an existing highway, with an estimated cost of $US 88 million. The existing highway is in Orange County, connecting Riverside County and Route 55. The franchise for this project was awarded to the California Private Transportation Corporation for a period of 35 years. The base rate of return for the project is 17%, toll levels are unregulated and congestion pricing is planned. To date, few environmental problems have been encountered given that this project does not involve the construction of a new highway corridor. Local public agencies have had mixed reactions to the project with Orange County favouring the project and Riverside County objecting to it.

California's Route 57 Extension

This project involves the construction of a new 11-mile viaduct highway running down a seasonal riverbed in Orange County linking Route 57 and Route 73. The franchise was awarded to the National Tollroad Authority Corporation. The cost of the project is estimated to be $US 700m with a 35 year franchise term. The base rate of return for the project is 20.25%, toll levels are unregulated and congestion pricing is planned. Environmental problems are likely to arise with this project, in

particular wildlife, wetland and growth issues. However, local public agencies have been receptive to the project so far.

California's State Route 125

This project is for a 10-mile freeway through undeveloped private lands in San Diego, connecting San Diego and the Mexican Border. The franchise was awarded to California Transportation Ventures for a period of 35 years. The estimated cost of the project is $US 400 million with a base rate of return on the project of 18.5%. Tolls are unregulated and congestion pricing is planned. Once again, environmental issues are likely to arise with this project, in particular wildlife, wetland, and growth issues. Furthermore, local public agency resistance to the project has been encountered with the cities of Chula Vista and San Diego suing for concessions.

California's Mid-State Project

A franchise for an 85-mile route through both developed and undeveloped lands in Alameda, Contra Costa, Solano, Yolo and Sacramento Counties was awarded to the California Toll Road Company. To date, the exact route for the new freeway has not been decided, but the cost of the project is estimated at $US 1.2 billion. The franchise was awarded for two overlapping 35 year terms. Toll levels are unregulated, congestion pricing is not planned at this stage, and the base rate of return for the project has been set at 21.25%. Environmental problems for this project are likely to be extreme, with the US Sierra Club already having filed an environmental suit. Local public agency support for the project has not been determined to date.

Virginia's Dulles Airport Toll Road

The Toll Road Corporation of Virginia obtained a franchise to build a 14-mile highway between Dulles Airport and Leesburg in early 1992. This is a new route through undeveloped public and private land that has received support from local communities and public agencies alike (private landowners donated some of the land for the project). Environmental clearance problems have not been encountered to date. The estimated cost of the project is $US 300m, with a franchise term of 40 years. The Virginia State Corporation Commission will regulate the base rate of return (varying between 14% and 30% depending on the schedule approved by the Commission) and toll rates (initially set at US 12 cents/mile with no congestion pricing in the initial years).

The Sydney Harbour Tunnel[70]

The New South Wales Department of Main Roads (DMR) began planning for new harbour crossings to augment the existing Sydney harbour bridge in 1982. The original proposals involved new public bridges, sited some distance from the original bridge. All of these proposals met public opposition due to the proposed construction of major new traffic routes through local urban areas. In 1986, a private consortium undertook a feasibility study for a private road tunnel. At the time, the government announced that it would not invite tenders for the project from any other company, and instead accepted the original consortium's offer on organisation, finance, ownership and operation of the tunnel subject to satisfactory agreement on design and other features.

The tunnel, which was opened in September 1992, has two tubes, each accommodating two lanes of traffic. The northern access to the tunnel is part of the freeway approach to the original bridge, and the southern end is 0.8 kilometres to the east of the southern end of the original bridge. The tunnel company will operate the tunnel until 2022, when it will revert to state ownership. In return, the tunnel company has access to toll revenue until 2022.

Although the empowering legislation for the tunnel does not set the level of the tunnel toll, the toll cannot be increased without government approval and the tunnel company cannot charge a toll higher than that on the harbour bridge. At its opening, the toll on both the bridge and the tunnel was $A 2[71].

The joint venture partners are Transfield (SHTJV) Pty Ltd, an Australian engineering and manufacturing company, and Kumagai Gumi Co. Ltd, a Japanese engineering and construction company. These two companies hold all of the shares in Tunnel Holdings Pty Ltd, which is in turn the sole shareholder in Sydney Harbour Tunnel Company Ltd (SHTC - the 'Tunnel Company'), which is responsible for both construction and operation of the tunnel although much of the construction is subcontracted, especially to the main shareholders.

A loan was provided by the NSW government to the tunnel company during the construction period. Although the payment was meant to reflect net bridge revenue during the construction period, in fact the payments were specified in the Act independently of actual bridge revenue. The loan provided for monthly instalments of approximately $A 2.5 million between July 1987 and January 1989, thereafter rising from approximately $A 3.5 million in February 1989 to $A 4.25 million in September 1992. This resulted in a loan to cover construction costs of approximately $A 223 million. The loan is interest-free, repayable in 2022, and subordinated to all other debt of the tunnel company. The 1980 net present value of the loan was estimated to be approximately $A 40 million.

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70 Mills G. (1991).
71 *Sunday Age* (1992).

The rest of the construction costs were covered by inflation-linked bonds issued by the Tunnel Company ($A 394 million), a loan from the holding company Tunnel Holdings Pty Ltd ($A 40 million), and equity provided by the joint venture partners ($A 7 million). Therefore the financing of the tunnel's construction is provided by a non-repayable government grant of approximately $A 180 million, a subordinated government advance of $A 40 million, non-government advances of approximately $A 430 million and a small equity contribution by the joint venture partners.

The NSW Government has provided financial guarantees to the tunnel company through the Ensured Revenue Stream Agreement. This agreement ensures that the entire toll revenue from both the bridge and the tunnel is used to support the tunnel. The aggregate gross receipts of the tunnel company are defined to be gross receipts from tolls on both bridge and tunnel (defined in the Act), less bridge toll collection costs (also defined in the Act). No allowance is made for bridge maintenance costs within this calculation. The provisions in the Act defining these two amounts do not necessarily bear any relation to actual traffic or toll levels. Bridge collection costs are calculated by inflation-indexing 1986 bridge toll collection costs. Similarly, gross toll receipts are defined as the product of projected traffic volumes and an indexed toll. The inflation indexing reflects operating costs for the tunnel company (i.e. wages and electricity). Payments to the tunnel company under the agreement can be adjusted if operational costs change in an unforeseen fashion, if the company fails to claim a tax deduction for depreciation on the tunnel (in which case the government will reimburse the tunnel company for the extra tax paid), and if at any time over the construction period or 30-year term of the lease the CPI falls outside a pre-specified range.

Despite the presence of a private sector company in the tunnel project, the government still bears the major part of the residual risk for the project, with the tunnel company effectively acting as an agent for the NSW government. Because the tunnel company's actual revenue stream is independent of traffic volumes, the company does not have any incentive to carefully assess the financial viability of the tunnel. Only if construction costs exceeded expectations would the tunnel company have borne the additional costs. Therefore, while the tunnel company had a strong incentive to minimise construction costs, this incentive would have been stronger still if it also lost revenue through construction delays. While the tunnel project gives the appearance of being an infrastructure project with greater incentives for effective planning and management through the involvement of private enterprise, in practice it is not too different from a situation in which the government accepted a fixed-price private tender for the construction of the tunnel.

5.3 Summary

The opportunities for extending the reform of the roading industry beyond corporatisation of TNZ would depend on the nature of the corporatisation process undertaken. If the corporatisation process

extended to all roads, both state highways and local roads, the allocation of shares in TNZ between central and local government could provide the possibility of widespread privatisation of roading, but complicate the corporatisation process. The nature of the shares issued, their ability to be traded and any limitations on ownership of these shares will establish the feasibility of future privatisation of the existing roading network and, at the same time, will influence the commercial performance of the publicly-owned roading firm. On the other hand, if commercial operation of roads only applied to the highway network, the process of privatisation would be less complicated, since it would only involve the sale of the Crown's stake in the highway network, but the benefits of reform would be more limited.

If any shares in TNZ allocated as part of the corporatisation process imposed limitations on either trading or ownership the incentives for sound commercial performance by the management of TNZ would be reduced relative to those for a private firm. Imposing limitations on TNZ shares would also reduce the credibility attached to any commitment by policy makers to eventual privatisation of TNZ. In short, limitations on share trading and ownership would threaten the long-term commercial viability of TNZ if it were operating as an SOE.

Internationally, the establishment of private roading firms has not generally occurred through direct sale of the existing public road network. Instead, the private sector has often been involved in the construction of significant new road infrastructure. A primary consideration leading to the introduction of road tolling in all of the cited international examples has been the funding constraints imposed on new road construction by limited state budgets. In contrast, the particular ownership structure adopted for tolled infrastructure has been largely motivated by the political environment existing in the country at the time the construction began (for example Spain opted for largely private ownership of the motorway network whereas France, and to a greater extent Italy, opted for public ownership).

The oil crises of the 1970s led to the collapse of several private roading companies in Europe and the takeover of their assets by public authorities. However, the problems differed markedly between countries, with widespread collapse of private sector firms in countries with the more pervasive form of regulatory intervention (e.g. Italy and France). In normal business conditions, regulation has a profound impact on the profitability of a private firm, let alone in the conditions of extreme uncertainty that would have faced private roading firms during these periods of rising oil prices. Therefore, it would appear that some reduction in the profitability of private roading firms and perhaps even the exit of some firms from the industry could have been reasonably expected during these oil crises (neither of which could be viewed as unusual in the light of the experience of private firms in other industries during this period). However, regulation appeared to compound the problems facing these private firms, and in many countries the tendency for state

intervention may have reinforced the implicit state guarantees that private roading firms perceived in their own commercial activities.

Indeed, the international experience with provision of roading services by private firms illustrates the many problems that can arise from deficient regulatory structures and poor risk-sharing mechanisms. A heavily-regulated private firm does not necessarily perform better than a better-structured publicly-owned firm. Arrangements that ostensibly involve private ownership on roads may, on closer examination, leave so many risks with tax-payers that they really amount to an arrangement whereby the private sector recoups operating and/or financing costs, in addition to a margin, and leaves most ownership risks with the state.

In none of the cited international cases has the operation of tolled roads for the purposes of enhancing economic efficiency been a motivating factor. As a consequence, less attention has been placed on the incentives provided to both public and private sector participants through the form of the contracts and the allocation of risks between the different parties involved in the operation of roading infrastructure (the Sydney harbour tunnel is an example of this). In this sense, the commercialisation of TNZ suggested in this paper would be novel, since the motivation would be to enhance economic efficiency in road use and investment, rather than necessarily allowing any major new investment to proceed.

Other differences between international roading experience and the possible reform process in New Zealand arise from the fact that major overseas toll roads often form part of a motorway network, with higher traffic volumes than are likely to be found in New Zealand. This does not imply that commercial operation of roads in New Zealand is necessarily infeasible, but it might point to some reduction in either capacity or the quality of roading infrastructure provided in different parts of New Zealand following corporatisation. Maintenance of the quality of roading services in certain areas might still be possible under an SOE structure if either local residents or road users were willing to pay for this quality. The point is that under an SOE structure, road users and local residents would be able to signal their preferences for road quality, and balance their decision to purchase roading services against the acquisition of other consumer goods and services.

A problem that would emerge as a result of the introduction of toll roads in New Zealand concerns the payment by motorists for both the existing public roading network and toll roads. Overseas experience has demonstrated that this double payment has restricted the economic viability of tolled roading infrastructure, even in countries with much denser traffic flows than New Zealand. As a consequence, the viability of tolled roads in New Zealand is likely to be critically dependent on the extent to which motorists can opt out of payment for public roading infrastructure.

If TNZ operated all roads on a commercial basis, so that motorists would be paying directly for the public roading network, petrol taxes could be reduced to reflect the reduced public funding requirement. Otherwise, motorists are likely to feel that they are paying twice for existing roading infrastructure and resist the introduction of tolled roads. If ownership of only a part of the roading network was transferred to TNZ (e.g. highways), the situation would be complicated by the need to finance the remaining part of the public roading network from public funds while at the same time providing road users with the opportunity to opt out of the payment for public roads if they did not choose to use them. If only local roads required funding, this may not prove to be much of a problem if the source of their funding was rates paid by local residents. In any other situation in which fuel or general tax revenue was used to finance non-tolled roads, some form of tax deduction may have to be used as a means of reimbursing tolled road users for not using public roads. However, this would be considerably more complicated than the other proposals.

Finally, given that international experience of roading privatisation has not involved an extensive sell-down of the existing publicly-owned road network, we could not find any examples of a country in which the entire roading network (in particular, local roads) was operated on a commercial basis. However, there are examples of extensive motorway networks being operated on a commercial basis by private firms (e.g. Spain has 1,839 kilometres of motorways operated by private firms; in contrast, New Zealand has 158 kilometres of motorways operated by the public authority, TNZ) and recent developments in Germany and the United Kingdom indicate that there is increasing interest in a more commercial approach to roading issues.

While a move to operate the entire roading network within New Zealand on a commercial basis would be unique by international standards, we expect growing interest in such options internationally as advances in billing system technologies reduce their cost.

6. CONCLUSIONS

This report has demonstrated that the current institutional structure for public ownership and operation of roads in New Zealand is unnecessarily complicated, lacks a clear demarcation of powers and responsibilities between the different public organisations involved in operating the network, lacks flexibility in management processes, lacks clear accountability to the ultimate owners of the roading network (i.e. tax- and rate-payers), and does not necessarily generate the information required by management in meeting their statutory objectives. Most disturbing is the lack of a clearly articulated framework for determining the best ownership and institutional structures for the operation and regulation of the roading network. All of these comments relate to a roading asset that has a replacement cost of perhaps $60 billion and materially affects the lives and livelihoods of all New Zealanders.

Having failed to identify a consistent underlying rationale for current public sector involvement in New Zealand roading, this report has considered the case for commercial operation of the public roading network. Two possible options have been identified. The simplest option involves assigning TNZ the task of operating the current state highway network on a strictly commercial basis. This is the least complicated option, because the current state highway network is owned largely by the Crown. The advantages of this option in terms of its relative ease of implementation must be balanced against the fact that it may be harder to subsequently extend electronic billing technology in a consistent fashion across the entire road network, may lead to greater contracting problems between TNZ and (possibly non-commercial) roads controlled by local authorities, and may lead to funding problems for roads operated by local authorities.

The alternative would be to assign ownership of all roads to TNZ from the outset, and to issue shares in TNZ to the Crown and various local authorities to reflect their relative historical contributions to the financing and construction of local roads and state highways. The advantages of this option are that it may be easier to implement new technology in a consistent fashion across the entire roading network, and the economic benefits from adopting this approach are potentially greater given that control of a more valuable asset would be transferred to a strictly commercial institution. Also, from an evolutionary point of view, if the most efficient industry structure turned out to be one involving the division of the roading network along regional lines, this option would not be ruled out by assigning TNZ initial ownership of the entire roading network. In fact, the evolution of an efficient industry structure is arguably more likely to occur if all roads are operated on a commercial basis than if an initially arbitrary division of the roading network leads to some roads being operated on a commercial basis whereas other roads continued on a non-commercial

basis. The disadvantages of this approach are that it would be more complicated to establish TNZ as an SOE given that a large number of public authorities would need to be involved in the implementation process.

Overall, in spite of the greater complications of commercialising the entire roading network, we suggest that further work should focus on the more ambitious approach. The value of the roading network is so large that the pressures for increased efficiency would eventually emerge at the local level as well as at the state highway level. In effect, corporatisation of TNZ may force de facto corporatisation of local authority operation of roading as well, given that local authorities would face funding constraints following the removal of TNZ's subsidy to local authorities. In order to minimise transitional costs, and to allow a flexible structure following corporatisation, it would therefore seem logical for TNZ to be assigned ownership and control of all roads, both highways and local roads, with the establishment of ownership claims in the new corporate entity and the division of these shares between central and local government occurring in a fashion that would not interfere with the commercial operation of TNZ. This initial structure would not require one firm to continue the operation of the entire roading network indefinitely, but it would ensure that the breakup of the roading network into separate business units, if it did occur, was for commercial reasons. Furthermore, if breakup did occur, it would be undertaken in an environment (i.e. following corporatisation) in which more information was available to assess the relative benefits and costs of decentralised operation of the roading network.

Another complication likely to arise in establishing TNZ as an SOE concerns the establishment of a billing system for direct charging of road users. One of the cornerstones of the SOE structure is that TNZ should not have access to general tax revenue but should instead be required to obtain its revenue directly from road users. In practice, TNZ would require time to test and establish a direct billing system for road users, and would therefore require limited access to government funds during this establishment phase. One possibility would be for the Crown to negotiate a contract with TNZ for the purchase of existing roading services for a specific period of time and for a fixed price. During this time, TNZ would be required to introduce its own direct billing system, with incentives for efficient and timely introduction of this system provided by the fixed duration of the initial contract and the lack of a guaranteed follow-up contract.

The economic viability of tolled road operation and its acceptability to the public will depend critically on the extent to which existing public road users can opt out of the payment for public roads if they use tolled roads. If TNZ were assigned ownership and control of the entire roading network there would be no need for public funding of roads except in respect of social objectives, and the corresponding reduction in petrol tax could be timed to coincide with the introduction of direct road pricing across the road network. In this case, coordination between the Crown and TNZ of a change in funding arrangements for road infrastructure would be critical to gaining public support for

road tolling. However, if TNZ were only assigned ownership and control of the highway network, the need for public funding for non-tolled roads would have to be dealt with in some other way.

If local residents paid for local roads through their rates or regional fuel taxes, complicated mechanisms would not be required to allow road users to opt out of public road funding. However, this funding arrangement would increase the financial burden placed on local authorities given that they currently receive 50% of their funds for local roads from central government. Instead, if central government continued to provide a substantial proportion of funds for non-tolled roads through the collection of petrol tax and other tax revenue, some form of tax rebate may have to be introduced in order to provide road users with an unbiased choice between public and tolled roads.

The technology for introducing comprehensive electronic road pricing across the entire road network is currently available and we estimate, on the basis of comparable costs for overseas systems, that a comprehensive electronic billing system could be introduced into New Zealand for an approximate annual cost (including capital costs, operational and enforcement costs) of $100-150m. The introduction of electronic road pricing could be combined with current systems of direct road use charging (e.g. road user charges for heavy vehicles) if TNZ decided that such systems were a viable mechanism for allocating the costs of road wear directly to users. If TNZ were operating all roads on a commercial basis, the costs of introducing and operating an electronic road pricing system would not appear to be unreasonable relative to the revenue that TNZ could potentially generate from the road network.

The benefits from moving to a system of direct road tolling can be illustrated most clearly in the maintenance and investment decisions facing road managers. Savings would come from deferring investment and maintenance decisions on roads for which the benefits being derived by road users were not commensurate with current and future costs. In the case of those (relatively few) roads in which congestion was a problem at particular times of day, these savings could be facilitated by peak-time charging. In the more common case of roads which have very low traffic densities, savings could occur by some combination of reducing road quality (by reducing future expenditures on those roads) and/or by requiring users of those roads to pay a commensurately higher access and/or usage fees. More generally, the flexibility for trial and error experimentation concerning willingness to pay which would be provided by electronic billing should also help ensure that expenditures related to improvements in road design and surface quality will be better tailored to users' willingness to pay for such attributes as safety, speed and comfort.

While the degree to which the revenue increases and expenditure reductions and/or deferrals which would follow from the introduction of a billing system would justify its costs is a matter of judgment, the following factors lead us to believe that this approach is worthy of more detailed consideration:

- the billing system's costs of, say $125 million p.a., should be put in the context of annual public sector roading expenditures of around $315 million p.a. for state highways and $840 million p.a. for the total network, and of road user payments of $1,280 million p.a. (refer to tables A1.1 and A1.3);
- technological change should progressively reduce the unit costs of electronic billing systems, increasing the viability of this approach and reducing the risks that further development work on this option would be unfruitful; and
- the alternatives appear to be markedly less satisfactory in that there appears to be no other option for putting TNZ on to a fully commercial basis and therefore no other means of requiring it to match the provision of services to willingness to pay. Other approaches which would have TNZ tender for the provision of road network services to a Crown purchaser suffer from the difficulty of determining what combination of roading attributes the Crown desires to purchase (in the absence of willingness-to-pay information about user preferences concerning trade-offs in attributes) and from the probable lack of contestability in the provision of road network services.

A complication that would arise from establishing TNZ as an SOE is the valuation of assets employed by TNZ. This will be useful for monitoring the performance of TNZ's management and for establishing the division of shares in TNZ between central and local government (if this occurs). Given that this valuation should rely on the future stream of earnings derived from these assets, it would be subject to considerable uncertainty in the initial stages of corporatisation since there would be no direct billing system for roads and corresponding uncertainty about the cash flows that might be generated from roading assets. Consequently, a sequential series of valuations, each refined in the light of new information on the ability of the roading network to generate cash flows, could be employed.

Irrespective of the extent to which TNZ acquires ownership of the roading network, the process of establishing TNZ as an SOE raises issues concerning the property rights that TNZ might acquire. The three key areas of concern are the right to regulate road use and safety, the right to set and collect tolls for road use, and the right to dispose of surplus assets or assign these assets to other users. No compelling reasons were found for delaying the transfer of any of these property rights to TNZ following its establishment as an SOE.

In the case of road use and safety regulation, the justification for current external regulation is unlikely to be as compelling if TNZ is given the flexibility to determine its own standards for driving behaviour in consultation with road users, thereby minimising transactions costs. Furthermore, as a result of enhanced information and institutional structures (e.g. resulting from direct road tolling systems) following corporatisation, the need for external regulation may not be as

compelling as under the current comparatively information-poor system. Furthermore, the costs that this type of regulation imposes on society are likely to increase over time if investment decisions are made by a commercial roading operator largely as a consequence of a distorted regulatory environment. Finally, the costs that might be imposed on road users through inadequate or incorrect regulation of road use and safety standards may be minimised by the emergence of competition in the supply and operation of roading infrastructure.

The ability to charge consumers directly for road use would be one of the critical features for the application of the SOE model to roading. Not only would this requirement be crucial for allowing TNZ's management to attain their primary objective, namely to operate as a successful business; it would also provide the information necessary for increasing the efficiency of operation of the roading system. First, consumers would be forced to confront the relative costs of their travel decisions, and would adjust their driving behaviour in order to promote more efficient use of the existing roading infrastructure. Second, the information provided by the tolling system would provide TNZ's management with a basis for making efficient road maintenance and investment decisions.

While the ability to impose tolls on road users exists under the current system of public management of roading, the incentives for introducing tolling may not be as strong as under a SOE structure (since TNZ would not necessarily gain the benefits of any increased revenue), and the introduction of tolling by a politically-controlled organisation may not be perceived to be politically acceptable.

The incentives for TNZ to rationalise the operational core of its roading business are unlikely to be as great under SOE management as they would be under private ownership. Conversely, the ability for TNZ's management to increase the size and scope of TNZ's operations beyond the point where this expansion was justified on commercial grounds would be greater than for a private firm. This problem is a feature of the underlying SOE model rather than any particular characteristic of TNZ's structure. These problems arise from the lack of a capital market constraint on SOE performance and the increased opportunities that this provides for SOE management to indulge their natural preferences for increasing their own power and prestige at the expense of the ultimate owners of the business. While these incentives are unlikely to be stronger for TNZ's management operating under an SOE structure than for any other SOE, the size and national importance of the capital assets managed by TNZ would require policy makers to place greater emphasis on this aspect of the SOE's operations. The focus of monitoring arrangements in this regard should not, therefore, be on the divestment decisions of TNZ's management but on the application of funds by TNZ's management to new investment.

Public policy issues may arise from concerns about monopoly power over the roading network. In terms of adverse consequences for economic efficiency, monopoly power over roads is most likely to be

a problem at the local or urban level. Over time, constraints on the abuse of market power over the existing state highway network are likely to arise from the emergence of competing inter-urban roads or by-passes and from existing and/or enhanced intermodal competition (e.g. sea, air, or rail). However, the same inter-modal competition is not possible at the local level, and the possibilities for replicating existing urban roading infrastructure are limited. Therefore, the commercial operation of local roads constitutes a greater long-term threat to allocative efficiency than the corporatisation of inter-urban highways. In this case, the choice between commercial operation of state highways in isolation or commercial operation of state highways and local roads would have a direct bearing on the extent to which monopoly problems were likely to arise.

Having identified the relevant part of the roading network in which competition is unlikely to emerge, it then becomes an issue for policy makers to decide whether the costs of allowing monopoly operation of local or urban roads are greater than the inefficiency costs incurred through external regulation of the monopoly. In terms of assessing the costs of monopoly, the existence of a dominant position in a market is a separate issue from the actual abuse of that position. While there is little doubt that a local road-owning firm will have a dominant local market position, in practice there will be constraints on the ability of the firm to exploit this position to the detriment of local road users. The threat of external regulation, and the likelihood that this would apply not only to the affected local market but also to other elements of the firm's operations, are likely to limit the extent to which a firm responsible for operating local roads would abuse any market power that it might have. In contrast, the costs imposed by various forms of external regulation could be considerable, particularly with respect to their impact on the investment decisions of the commercial roading firm.

The process of putting TNZ on to a fully commercial basis would require the government to clarify its social objectives and negotiate with TNZ concerning the explicit funding of the required services. We would be surprised if this process did not alter outcomes as the government decided that it could better meet its many social objectives through other means once the costs of pursuing them through the roading system became apparent. On the other hand, we note that the process of negotiating with TNZ for the provision of such services is likely to be onerous and contentious. However, governments are seldom bereft of bargaining power and we are of the view that the benefits from the greater transparency and accountability of this approach would exceed the costs.

Ultimately, the value of the roading network and the current paucity of information and lack of flexibility in managing this asset imply that corporatisation of TNZ is likely to provide material economic benefits to all New Zealanders. If this is as far as the process of reform can be advanced, notable gains would have been achieved relative to the status quo system of roading management. However, the benefits may not be as great or as long-lasting compared with a situation in which corporatisation eventually led to a greater role for private ownership of the road network. Greater

private sector involvement could emerge either as a result of private ownership of new infrastructure or through the sale of parts of the current public road network to private investors.

The joint ownership of the roading network by both central and local government introduces further complications for enhancing the reform of roading infrastructure beyond corporatisation. Issuance of shares in TNZ to both central and local government as part of the corporatisation process would allow the possibility of partial privatisation of the existing roading network through the sale of shares in TNZ to private investors. Allowing private ownership of TNZ would enhance the commercial incentives and accountability of TNZ's management and reduce the need for enforced monitoring of the application of funds by the SOE. However, the benefits of partial privatisation have generally fallen far short of those arising from complete privatisation, particularly if private investors remain in a minority position following the sell-down of the public stake. Furthermore, the coordination of a complete sale may prove more difficult as a result of diffused public shareholding. Other complications would arise in the early stages of the corporatisation process relating to the type of shares issued for TNZ and any restrictions that might apply to the ownership and trading opportunities for these shares. Furthermore, the nature of the shares issued, and the signals provided to TNZ's management on future privatisation opportunities, have the potential to influence the commercial performance of TNZ as an SOE.

No credible economic rationale can be given for the state retaining ownership of the existing roading network following corporatisation and restructuring of the regulatory environment for roading. International experience and case studies cited in this report suggest that private firms can successfully operate roading infrastructure on a commercial basis, with varying degrees of public sector involvement. This evidence suggests that the less onerous the regulatory environment, the more likely it will be that private ownership of roads is sustainable without public sector guarantees and financial support. This report concludes that corporatisation of TNZ, while providing marked benefits over the current system for managing New Zealand's roading infrastructure, would provide even greater benefits if it led to eventual private ownership of the roading network.

In expressing this conclusion, we acknowledge that the task of moving from existing institutional arrangements towards the proposed SOE structure is a major one. Many matters would need to be explored in greater depth than has been attempted. The following is a suggested indicative work plan to enable firmer judgments to be made on the options we have identified:

Billing Systems

Expert opinions and costings need to be obtained on the feasibility and costs of electronic billing.

Assessment of the Efficiency Gains

These costs must be balanced against likely efficiency gains. The current lack of information concerning road user preferences on a willingness-to-pay basis makes it difficult to predict what billing decisions a commercial operator would make and therefore what efficiency gains would be achievable.

Nevertheless, Crown ownership of the roading network makes it a government responsibility to balance the possible efficiency gains against the billing system costs. We believe that experts in the commercial operation of roading systems and in the operation of billing systems in commercially-operated networks such as electricity and telecommunications would be able to contribute to the assessment of the likely gains from introducing a commercial billing system for the roading network.

Since, in our view, the case for reform along SOE model lines is critically dependent on the magnitude of these potential gains, we believe that further work involving such expertise will almost certainly be required.

Alternatives to the SOE Model

Since in our view the viability of electronic billing is crucial to the viability of the SOE model for TNZ, any decision that the current costs of such a system outweigh the likely benefits would turn attention to the options for reforms based on separating the role of the Crown as a purchaser of roading services from its role as a provider.

The issues of specifying the detailed attributes of what the Crown wanted to purchase, trying to ensure contestability in the provision of road network services and monitoring TNZ's performance in these respects would then have to be addressed.

Safety Regulations

If TNZ is to take responsibility for determining safety aspects of its roading network, including the safety aspects of vehicles and drivers that it permits to use its roads, then the ability of road users to sue TNZ for breach of its safety arrangements would be important. It is possible that to make its commitment to road safety credible, TNZ would wish to have its safety-related rules and procedures vetted and monitored by an independent body. One issue here is to harmonise safety arrangements across transport modes so that inter-modal competition is not distorted.

Land Use Regulations

To the extent that monopoly issues are a concern, land use regulations would need to be reviewed to ensure that barriers to competitive entry in the provision of alternative roading routes were not unduly high.

Review of Monopoly Issues & Local Roads

In our view, public concern is inevitable about the monopoly implications of a commercial approach to the provision of local roads. This concern will also be a threat to potential investors in local roads. As with other network-related activities, official decision makers will need to give very careful consideration to the question of the optimal regulatory structure and the question of whether or not it would be better to commercialise only the state highway system in the initial stages.

Social Policy Issues

We expect major efficiency gains from the proposed reforms. The effects on resource use might be considerable, implying the need for significant adjustment in the community as the real cost of providing roading services (at the margin) becomes apparent. Decision makers and their advisors would need to give careful consideration to transitional arrangements and to ongoing funding for any social (non-commercial) objectives that the government wishes to continue to provide through the road system.

In respect of local roads, there will be a strong feeling among some members of the community that they have already paid for local city roads through the costs borne by the subdividers who built the surrounding houses. Consideration would need to be given to the best mechanism for communicating the reality of the situation which is that the ongoing costs associated with such roads must be funded by them one way or another. Currently, they are paying these costs in good part through local body rates and road user payments.

Environmental Issues

The ability to implement route-specific pricing facilitates the introduction of charges for air pollution as well as other forms of pollution, where this is seen to be a location-specific problem. For example air pollution may be more of a concern in the cities, particularly those in which temperature inversion is a problem. Such issues are also worthy of attention.

Treaty of Waitangi Issues

Treaty of Waitangi issues may arise in respect of the corporatisation of existing roads. These would need to be identified and addressed.

Fiscal Considerations and Road User Taxation

Innovations which facilitate user pays in roading offer the prospect of reduced reliance on general taxation, bringing benefits to society associated with the reduced deadweight losses from taxation. In the case of roading, it appears that road users have not been required to bear much of the burden of the capital charges associated with the provision of the existing roading network. These costs are therefore falling on taxpayers through the need to service the public debt. Changes which ensure that road users will bear the costs of capital charges in respect of future capital expenditures and/or which involve asset sales which reduce the public debt will therefore also have favourable fiscal effects. Further research could be done on the magnitude of these effects.

As road users pay for the roading network more directly through electronic billing, it is likely to be important for presentational reasons that government taxes on road users are reduced back to levels which can be justified on the basis of special factors such as environmental externalities. Otherwise, the gains hoped for from the reform could be put at risk by the perception of road users that the new system was in reality an unfair form of double taxation.

Research would therefore need to be done on the optimal level of taxation to apply to road users when road user charges were in place on a fully commercial basis.

Financial Considerations

The feasibility of establishing TNZ as an SOE would depend on an appropriate financial structure being established beforehand. This would require, inter alia, a scoping study on the appropriate level of gearing for the new SOE; attainment of a credit rating to facilitate issuance of TNZ debt securities; feasibility studies on the appropriate treasury function within TNZ; and the independent valuation of assets transferred to the new SOE.

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APPENDIX 1. BACKGROUND DATA

Kilometres of Roading[107]

The 92,962 kilometres of developed roads in New Zealand at 30 June 1992 include 15,612 bridges and comprise 66,671 kilometres of rural roads, 14,796 kilometres of urban roads and 10,469 kilometres of national and provincial highways. The last of these categories, the state highway network, includes the major routes which carry the greatest volume of traffic between residential communities, commercial and industrial areas. Over 95% of urban and state highway road kilometres are paved or sealed; for rural roads the comparable figure is 42%.

Cost of the Network

No official estimate exists for the value of the entire network of developed roads, but the state highway network was valued at $7 billion on a depreciated cost basis at 30 June 1992 in the Crown's Financial Statements. Informed observers mention a figure of around $60 billion for the entire network, presumably also on a depreciated replacement cost basis. This figure, amounting to perhaps 50% of the value of the private homes in New Zealand, demonstrates the scale of past investments in the network.

Annual Public Sector Roading Expenditures

Public sector roading expenditures in the year to June 1992 probably totalled around $840 million (see table A1.1), or about $9,000 per kilometre.

107 The data in this paragraph are from page 359 of the 1992 Official Yearbook.

Table A1.1

Public Sector Roading Expenses

(Year to June 1992)

		$ million
Expenses by Transit New Zealand		
Local Roads (includes safety)	228	
State Highways (includes safety)	314	
Passenger Transport	42	
Administration and Research	25	
		610
Presumed expenses by Local Roading Authorities[1]		228
Total Expenses (rounded)		840

Notes:

1. Simply assumes that TNZ is 50% of the total.

State Highway Expenditures

Better information is available on state highways than on the total system. Expenditures on state highways totalled $263 million in 1991-92 ($25,000 per kilometre based on 10,469 kilometres of roads after allowing for some reallocations to local roads). Table A1.2 provides a breakdown of these expenditures. It excludes safety-related state highway expenditures of $51 million and Ministry of Transport enforcement and education expenses (on all roads) of about $120 million.

Table A1.2

State Highway Expenditures 1991-92[1]

	$m	(%)	$/km
Routine Maintenance	107.3	41	10,200
Reseals (1,378km)	47.3	18	35,300
Rehabilitation (160km)	35.4	13	220,900
Construction	42.4	16	900,000[2]
Emergency Work	10.7	4	NA
Property	14.1	5	NA
Bridge Renewals	6.5	2	NA
TOTAL	**263.45**	**100**	**25,000**

Notes:

1. TNZ 1992 annual report, excludes safety expenses of $51 million.
2. Indicative figure only.

Increased expenditures on routine maintenance and rehabilitation in recent years have helped reduce the percentage of lane kilometres of sealed state highways whose roughness exceeds an international standard of 130 NAASRA counts/km, from a surveyed 3.1% in 1990 to 2.8% in 1991 and 2.8% in 1992.

The capital intensive nature of the roading system is indicated by the relatively small annual expenditures on the roads, at $25,000 per kilometre, in comparison with the opportunity cost of road construction. For example at a 10% discount rate, the opportunity cost of constructing roads at $900,000 per kilometre is $90,000 p.a..

Funding of Roading

TNZ is primarily funded from the Land Transport Fund. Typically the amount of such funding is slightly less than TNZ's total expenditure and markedly less than the total amounts paid to the Crown by road users.

For example, in 1991-92, TNZ received $592 million from the Land Transport Fund and supplemented this with investment income and other smaller revenue items, to produce a total general revenue of

$614 million and an overall surplus of $4 million. (We understand that under current policies the gap between total TNZ revenue and Land Transport Fund funding will diminish.)

In contrast, road users paid the Crown an estimated $1,280 million in 1991-92 though of licence fees, petrol taxes and road user charges (see table A1.3). Annual licence fees apply to around 2.3 million vehicles in New Zealand including 1.45 million cars, 235,000 light trucks, vans and utes, 64,000 heavy trucks and 369,000 trailers.

Road user charges apply to all vehicles over 3.5 tonnes and smaller vehicles powered by a fuel not taxed at source. They are based on the number of axles, number of wheels, vehicle weight and distance travelled. The intention under the Road User Charges Act 1977 is to collect approximately 50 percent of the revenue required for the maintenance and construction of roads from road user charges.

The remaining 50 percent was to come from motor spirit excise duty which is paid on all petrol, LPG and CNG used on journeys on the roading network. Motor spirit excise duties in 1992 were 30.2¢/litre on petrol, plus another 2.8¢/litre in respect of the lead content of petrol; 8.4¢/litre on LPG and $3.17 per gigajoule on CNG. The total excise duty on LPG and CNG, but only 7.1¢/litre of petrol duty, was transferred to TNZ. This 7.1¢ litre amount was abnormally low. In 1993 the figure is 9.4¢ litre and the average during the last five years has been around 10-11¢ litre.

Table A1.3
Direct Payments by Road Users to the Crown
(Year to June 1992)

	$ million
Road User Charges	285
Motor Vehicle Fees & Duties	161
Petroleum Duties	835
Total Direct Payments (Rounded)	**1,280**

Source: NZ Government 1992 Budget Statements

In addition to these direct payments, local authorities collectively also fund out of rates the 50% of local road maintenance and construction expenditures not funded by TNZ. Note that local authorities also fund 100% of roading projects which have not qualified for TNZ funding. However,

we understand that the total amounts involved in such projects are relatively small. Based on the data in table A1.1, it would appear that ratepayers would be funding around $230 million of annual roading expenses.

Road User Payments and Roading Costs

Road user payments markedly exceed annual public sector roading expenses. For example, payments totalled around $1,280 million in 1991-92 (see table A1.3) while expenses totalled $840 million (see table A1.1).

The opposite conclusion holds when the opportunity cost of road construction is taken into account. For example, if the depreciated replacement cost of the network is around $60 billion, then road users would need to be paying around $6,000 million p.a. in addition to the $840 million of expenses identified in table A1.1. This implies that road users are currently funding less than 20% (1,280/6,840) of the cost of the current network on an opportunity cost basis.

Of course, the existing network is largely a sunk cost, so this 20% figure tells us little about the appropriate future capital charge. Marginal cost is the relevant concept here. The following calculation illustrates this approach. To justify *new* state highway construction, at $900,000 per km, road users would have to be willing to pay, collectively, $90,000 p.a. per km at a 10% required rate of return. Repairs, and maintenance and other expenses would be additional. Based on the data in table A1.2, these could amount to $25,000 p.a. per km.

If such a cost were proportioned on a 50:50 basis between road user charges on heavy vehicles and fuel taxes on private motorists, the latter would have to pay around $57,000 p.a. per km. Assuming a traffic count of 7,500 vehicles per day to justify new roading construction (2.7 million vehicle trips p.a.), this would mean that 2.1¢ would have to be collected from each vehicle kilometre. This is below the 3.3¢ per kilometre in petrol and lead duties paid by the average car (which, according to the 1992 Official Yearbook, page 358, averages 10km/litre of petrol). However, based on 1990 data, such densities only prevail on the state highway system around the greater Auckland and Wellington regions and close to Christchurch (see table A1.4).

This calculation is very sensitive to the assumed traffic density. For example, if the density drops to around 4,000 vehicles per day the amount to be collected from motorists in order to justify new road construction would rise to 3.9¢ per vehicle/kilometre travelled. In addition, the assumption that heavy vehicles should pick up 50% of the capital charge is open to question (see below).

Another perspective is provided by the much lower average road count on the network as a whole. For example, if the 1.45 million licensed cars average 16,000 kilometres per year over the 93,000

kilometre network, the average density is (1.45m x 16,000/(92,962x 365)) = 680 cars per kilometre of network per day, or 250,000 cars per year.

Table A1.4
Indicative 1990 State Highway
Traffic Densities/Day

State Highway Number	Region	Average Vehicles per day
North Island		
1	South of Warkworth	7,520
1	Dairy Flat	12,500
1	Auckland Harbour Bridge	120,000
1	Southern Motorway: Wiri-Manurewa	56,800
1	Desert Road	2,930
1	Bulls Bridge	9,960
1	Otaki Bridge	12,500
1	South of Pukerua Bay	19,800
1	Ngauranga Gorge	53,800
2	Waihi	4,870
2	South of Wairoa	1,090
2	Dannevirke - Woodville	2,830
2	Rimutaka Hill	3,420
2	Petone - Ngauranga	56,000
South Island		
1	North of Kaikoura	1,160
1	Christchurch: North of Belfast	18,100
1	Burnham	6,630
1	Waitaki River Bridge	3,320
1	Dunedin, Northern Motorway	5,950
1	North of Gore	3,260
6	Whangamoa Saddle, East of Nelson	1,650
6	Haast River Bridge	280
7	Lewis Pass	650

At such a low density, the capital charge per kilometre of new road construction would be an enormous 36¢ per vehicle kilometre for state highways (10% of construction cost of $900,000/km

divided by 250,000 vehicles) or 22¢ per kilometre for other roads (assuming a typical construction cost of $550,000/km). *If* heavy vehicles picked up 50% of this cost, then the capital charge per private motorist would be halved.

However, these figures overstate the per vehicle cost on state highways and understate the cost for other roads because we know that traffic densities are markedly higher along state highways. To illustrate the point since accurate information is not available, suppose that 40% of all travel is on the state highway system. This implies an average traffic density of (1.45m x 16,000 x 0.4/10,469) = 890,000 car trips per year per kilometre on the state highway system (2,500 cars per day) and (1.45 x 16,000 x 0.6/ (92,962 - 10,469)) = 170,000 car trips per year per kilometre on other roads (460 cars/day). In the extreme situation in which private motorists bore the full capital charge[108], the cost would be 10.1¢ per kilometre on the state highway system and 32.4¢ on other roads. Even if heavy vehicles paid half this capital charge, the remaining liability of private motorists would substantially exceed the estimated 3.3¢/kilometre currently paid in petroleum and lead duties.

These calculations indicate that the revenue currently derived by the government from road users falls far short of what would be required to justify a network valuation based on depreciated replacement costs. Hence the present value of current revenues, less annual public expenditures, would be well below the depreciated replacement cost of the network. Superficially, the calculations also imply that a commercially-oriented operator of the network would only undertake new capital expenditures, at current charges, on the highest density routes, and would require much greater revenues per vehicle kilometre on less dense routes.

However, given the joint product nature of feeder roads and the state highway system, any commercial operator is likely to take a quite sophisticated approach to road maintenance and capital expenditure decisions in relation to feeder and access roads. Further, evidence of low price elasticities of demand for petrol suggest a very considerable 'willingness' by private motorists to pay more at the margin for roading services than they are currently funding directly. In addition, it is important to note that arguments for declining marginal cost in the construction of a roading network do not preclude the commercial operation of an existing network. What such arguments suggest is that the market value of such a network (where prices are set according to marginal cost) will be less than the network's depreciated replacement cost. Since the latter is now purely a sunk cost, this is of no concern from an efficiency perspective.

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108 The suggestion that half the capital charge would fall on heavy vehicles may be highly contentious since shares based on annual maintenance costs need not be the same as shares in capital charges. To the extent that roading system capital costs would not be markedly lower if most inter-city heavy traffic went by rail, road or sea, a higher proportion of the capital charge burden could fall on private motorists. The problem of how to allocate common costs is well-discussed in the economic literature, and it is difficult to predict what solution competitive market-driven operators would arrive at.

APPENDIX 2. LEGISLATIVE ENVIRONMENT

A2.1 Introduction

The purpose of this Appendix is to describe:

- the empowering legislation for the public authorities responsible for operating New Zealand's publicly-owned road network;
- the regulatory environment governing the use of the public road network by motorists;
- the environmental constraints governing construction and use of roading infrastructure; and
- the legislation allowing public authorities to take private land for roading and provide compensation to the affected property owners.

The Acts of Parliament (and subsequent amendments) covered in this Appendix include:

- Transport Act 1962;
- Transport (Driver Licensing and Vehicle Registration) Act 1987;
- Transport Services Licensing Act 1989;
- Local Government Act 1974;
- Road User Charges Act 1977;
- Public Works Act 1981;
- Transit New Zealand Act 1989; and
- Resource Management Act 1991.

A2.2 Transit New Zealand

The Transit New Zealand Act 1989 established the authority known as Transit New Zealand (TNZ) as a corporate entity with perpetual succession and common seal. TNZ's board has at least seven and no more than ten members appointed by the Governor-General on the recommendation of the minister of finance and the minister of transport [S 4].

Objectives, Functions, Powers and Responsibilities

The principal objective of TNZ is to promote policies and allocate resources to achieve a safe and efficient land transport system that maximises national economic and social benefits [S 5].

The functions of TNZ are:

- to prepare a national land transport programme;
- to manage the implementation of land transport programmes for local roads, safety, passenger transport, state highways, and administration;
- to assist and advise local authorities in relation to their functions and powers under this Act;
- to develop guidelines for design, construction and maintenance of roads;
- to advise the government in respect of the land transport system in New Zealand;
- to assist and advise local authorities on special land transport needs for disadvantaged persons;
- to maintain contacts with other land transport organisations, both domestic and foreign; and
- to monitor the collection of revenue for the Land Transport Fund [S 6].

The powers of TNZ include the ability:

- to authorise payments from the Land Transport Account;
- to review and revise the approved national land transport programme;
- to present proposals to the minister of transport (the Minister) for funding outside the approved programme;
- to control the state highway system;
- to audit the performance of every local authority in relation to their role within the relevant land transport programme;
- to conduct or engage persons to research land transport and associated matters; and
- to undertake any other activity considered necessary or desirable to achieve its principal objective [S 6].

TNZ is responsible to the Minister for meeting its financial and management reporting obligations, and must comply with any written, lawful direction from the Minister in relation to these obligations [S 4]. TNZ is required to follow the policy of the government in relation to land transport, and must comply with any written directions from the Minister relating to that policy [S 7].

Interaction with Local Government

Every regional council is required to appoint a regional land transport committee for its region [S 23]. There are eleven members in each committee:

- three are appointed by the regional council, one of which is appointed chairperson;
- four are appointed by territorial authorities whose districts are within the region;
- one person who is not a member or employee of any local authority is appointed by the regional council to represent private road users in the region;
- similarly, one person is appointed by the regional council to represent commercial road users in the region;
- one person is appointed by the Secretary for Transport; and
- one person is appointed by TNZ.

Every territorial authority must submit a district land transport programme for the coming year to the relevant regional land transport committee. This programme constitutes the territorial authority's recommendations on the land transport requirements for the district [S 24].

Every regional land transport committee must submit a regional land transport programme for the coming year to the regional council. This programme constitutes the committee's recommendations on the land transport requirements of the region. Every submission received from territorial authorities must be attached as an appendix to the regional land transport committee's land transport programme [S 25].

The contents of land transport programmes are set out in the Transit New Zealand Act. These include:

- the priority of projects requiring financial assistance;
- the costs and schedules for projects;
- the financial assistance sought from TNZ;
- the objectives of the project and evaluations for each project required by TNZ; and
- a list of projects approved in previous national land transport programmes for which financial assistance is still required and the level of that assistance [S 26].

Any project that significantly affects Maori land, cultural or spiritual interests can only be included in a land transport programme if every iwi or hapu affected by the project has been consulted.

TNZ must submit an annual national land transport programme for ministerial approval. This programme comprises TNZ's recommendations on national land transport needs (including an

assessment of the separate safety (administration) programme submitted to the Minister by the Secretary for Transport), proposed funding of these recommendations, and a Statement of Intent [S 29].

The Statement of Intent for TNZ includes:

- the basis for evaluating individual projects;
- the method for determining the budget of outputs to be included in the next national land transport programme;
- the method for approving competitive pricing procedures;
- the management and financial systems under which TNZ will undertake its functions;
- the safety and construction standards to be applied to projects;
- the objectives of TNZ for the next five years;
- TNZ's evaluation of the land transport needs and the transport issues likely to arise over the next five years; and
- a measure of performance by which TNZ will be judged [S 30].

If the Minister considers that a national land transport programme should be varied, he or she may amend and approve the revised programme. Alternatively, where the Minister declines a programme, TNZ must make any amendments necessary to obtain the approval of the Minister [S 33].

Every local authority must submit a land transport annual report to TNZ comparing the performance of the local authority with its statement of intent. In turn, the Secretary for Transport must submit a land transport annual report to the Minister [S 41]. Finally, after consulting with the Secretary for Transport and the local authorities within its region, every regional council must prepare an annual report on road safety within its region [S 42].

Financial Provisions

The Land Transport Fund is a credit sum within the Crown Bank Account. It represents all excise duty determined by this Act in respect of motor fuels and gases; all road user charges; and all vehicle registration and licence fee revenue [S 8]. Of the money paid into the Crown Bank Account as excise duty, after deducting refunds, the amount of funds credited to the Land Transport Fund is set by statute (e.g. see [S 100]). The amount of excise duty and refunds may be altered by the Governor-General by Order in Council [S 103]. Payments from the Crown Bank Account may only be debited to this Fund if these payments are authorised by this Act [S 8].

Each year, the total cost of the approved national land transport programme is debited to the fund and credited to the Land Transport Account [S 10]. Payments from this account may only be made on behalf of TNZ and only for projects approved by this Act [S 13]. TNZ may approve any project if it has been evaluated to the satisfaction of TNZ in accordance with its statement of intent and is included among the list of outputs for the most recent land transport programme [S 14].

When sufficient funds are available and in the opinion of TNZ are required, TNZ may provide financial assistance to local authorities from the Land Transport Account for approved projects [S 16]. Local authorities must record the receipt of money from TNZ in a separate account known as the Land Transport Disbursement Account, funds from which may only be used for approved projects [S 18]. When funds in this account are not used in the year for which they were provided, the remaining portion must be refunded to the Land Transport Account, unless TNZ agrees otherwise [S 16]. If, in the opinion of TNZ, the standards applied in the project are excessively high or unsatisfactory, TNZ may withhold financial assistance to any local authority for any approved project [S 21].

All payments made by TNZ from the Land Transport Account or made from the Land Transport Disbursement Account of any local authority for projects approved after 30 June 1991 are subject to a competitive pricing procedure [S 20]. In applying the competitive pricing procedure, TNZ may specify terms and conditions that will be included in or excluded from the resulting contract. In applying the competitive pricing procedure, TNZ must encourage competition in the provision of goods and services to the project concerned [S 19].

When a surplus exists or is likely to occur in the fund, TNZ may submit a supplementary funding request for ministerial approval [S 36]. At the same time, the Secretary for Transport may submit a supplementary safety (administration) programme for ministerial approval [S 37].

A2.3 Government Roads, State Highways, and Motorways

All government roads and state highways, including the soil and materials comprising these roads are vested in the Crown [S 44].

Government Roads

The Minister may, by notice in the *Gazette*, declare any road to be a government road. In a similar manner, the Minister may declare any road under his or her control to be under the control of the relevant local authority. The Minister has full powers of control over all government roads [S 46].

For roads under his or her control, the Minister is entitled to:

- restrict vehicle speeds either temporarily or permanently;
- stop, divert or control traffic temporarily while work is undertaken for the structural protection of a road;
- close a road for a period of time required to repair a road or remove obstructions;
- enter on to any land and construct and maintain ditches, drains and conduits to drain water away from a road; and
- enter any land and remove from any water-course any obstruction that may damage a road.

The Minister must follow a specified procedure for notifying the owner of the land of the intention to enter the land. In turn, the owner must follow a specified procedure for applying to the District Court for judicial review of the decision to enter the land in question. These ministerial powers do not derogate from the provisions of the Resource Management Act 1991 [S 48].

A person who damages or obstructs a road, bridge or any other roading structure commits an offence under the Act and is liable upon summary conviction to a fine not exceeding $500. The person may also be required to cover the costs of removing the obstruction or repairing the damage [S 51].

The responsible authority (either a Minister of the Crown or the local authority with financial responsibility for the work) may require the owner of land adjoining a road to carry out a number of tasks related to vegetation and structures on the adjoining land. Furthermore, if the owner refuses to comply with TNZ's request and a consequent judicial request, he or she may be liable on summary conviction to a fine not exceeding $500. The power of entry to private land may also be exercised in respect of this work [S 55].

State Highways

TNZ may declare any road, whether constructed or not, and whether vested in the Crown or not, as a state highway [S 60]. TNZ has sole powers of control of all state highways [cf. S 46(4)]. However, these powers do not derogate from the provisions of the Resource Management Act 1991 [S 61]. Any or all functions, duties and powers conferred on TNZ with respect to state highways may be delegated to a territorial authority at TNZ's discretion, subject to the consent of the territorial authority [S 62].

Any territorial authority may request that TNZ exercise its delegated authority for state highways (excluding motorways) in its district. TNZ must take account of a variety of factors in responding to the request, including:

- the differential costs of agreeing to the request;
- the capacity of the territorial authority to exercise its delegated authority; and
- the extent to which such powers have been delegated to other territorial authorities [S 62].

A territorial authority may subsequently relinquish its delegated authority to TNZ [S 64], and TNZ may require the territorial authority to relinquish property in state highways [S 65]. Irrespective of any delegated authority, TNZ retains full control over state highway policy, and every territorial authority must comply with this policy [S 66].

The entire costs of construction and maintenance of state highways (including those parts subject to delegation), are met by TNZ out of the Land Transport Account [S 67]. If any territorial authority chooses to exceed TNZ standards in exercising delegated powers with regard to state highways, TNZ may provide further funds to the territorial authority out of the Land Transport Account. This allocation is subject to the provisions of the Transit New Zealand Act in respect of financial assistance to territorial authorities [S 16], and any additional costs not covered by TNZ must be met by the territorial authority. These provisions do not relieve any territorial authority from a liability or obligation outstanding on a road at the time the road was designated a state highway [S 67].

TNZ may construct and operate any facility or service it considers will improve public safety or be of benefit to state highway or land transport users. Alternatively, TNZ may allow the construction and operation of any such facility. Furthermore, TNZ may lease or grant a licence to operate any such facility, on terms and conditions that TNZ thinks are justified [S 68].

Motorways

At the request of TNZ, the Governor-General may authorise the construction of a motorway, and declare any land, airspace and subsoil, or road to be a motorway [S 71]. TNZ may exercise the same authority over motorways as the Minister has with respect to government roads [S 73], or TNZ has with respect to state highways [S 80]. The only distinction that applies is that territorial authorities may not request that TNZ exercise its delegated authority over a motorway in its region [S 80].

The provisions applying to the financing of state highways apply equally to motorways. In particular, no local authority is required to contribute to the cost of any motorway [S 81]. However, any local authority may include a proposal to construct a motorway as part of its land transport programme, and TNZ may delegate powers in response to this proposal as it sees fit [S 81].

The Transit New Zealand Act explicitly restricts:

- the entry of people and animals to the motorway [S 82];
- the vehicles that may be operated on motorways [S 83]; and
- the points at which a vehicle may enter, cross or leave a motorway [S 84].

Furthermore, any person contravening these provisions of the Act is liable on summary conviction to a fine not exceeding $500 [S 87].

Limited Access Roads

TNZ may declare any state highway or part thereof to be a limited access road. Similarly, TNZ may revoke the status of any limited access road [S 88].

A parcel of land next to a limited access road that has no other legal access to some other road is entitled to at least one crossing place for vehicular access from the limited access road. The location of the crossing place is determined by TNZ. A parcel of land is defined to be land that can be legally transferred to someone other than a neighbour without the dedication of any further land as a public road. However, TNZ may regard two or more adjoining parcels of land to be a single parcel of land for the purpose of applying these provisions [S 90].

Except in circumstances specified by the Transit New Zealand Act or at the discretion of TNZ, no person can drive a vehicle or allow an animal to move along a limited access road [S 92]. A person commits an offence if these provisions are ignored, and is liable on summary conviction to a fine not exceeding $500 [S 97]. However, every person having an estate or interest in land affected by the creation of a limited access road shall be entitled to compensation [S 98].

A2.4 Local Roads

All roads (excluding government roads, state highways, and regional roads), including the soil and materials comprising these roads, vest in fee simple in the local authority of the district in which they are situated [S 316, Local Government Act, 1974].

At the request of TNZ, a local authority may accept or relinquish the property of any state highway [S 316]. All local roads in the district are controlled by the local authority. A state highway is controlled by the local authority only if TNZ has delegated responsibility to the local authority. Likewise, a regional road is controlled by the local authority only if the regional council has delegated this authority to the local authority. Finally, a government road is under the control of the Minister of Transport [S 317].

Formation, Alteration, Stopping and Closing of Roads

The ability of local authorities to close local roads is more limited than the ability of TNZ to close state highways. In particular, local authorities may not close roads, either wholly or in part, in a rural area without the permission of the Minister of Lands [S 342].

Every allotment of land that does not have a frontage to an existing road or private road for vehicular access must have one provided by the owner [S 321]. An exception applies when vehicular access is unnecessary or impractical (in which case pedestrian access is required). Other exceptions apply in cases where:

- the allotment is intended to be transferred to an adjoining land owner;
- the local authority is satisfied that the land will not be used for a dwelling;
- the local authority is satisfied that access may be provided over other land by an easement or right of way;
- the allotment borders a navigable body of water;
- the allotment is to be used for a public utility; or
- the allotment is to be used for sporting, social or community purposes and is located on or adjoining a public reserve [S 321].

The local authority may form or upgrade footpaths on one or both sides of any road, and may impose a charge of no more than half the costs of this construction on the owners of land and buildings fronting the roads [S 331]. Where vehicles move on to private land across any footpath or water channel adjoining the road, the local authority can require the occupier or the owner of the land to pay the cost of the local authority constructing a crossing [S 335].

The local authority may grant the right to lay pipes along or under roads (including private roads) via an easement or other right for a period not exceeding 50 years and on such terms as the local authority sees fit. No such grant will exclude any other person from a similar right [S 338].

The local authority may also grant a lease of the airspace above the road, or the subsoil beneath the road, provided that the local authority does not contravene any provision of the Resource Management Act 1991. The local authority must also ensure that sufficient airspace remains above the road for free and unobstructed passage of vehicles along the road [S 341].

Limited Access Roads

The local authority may declare any local road to be a limited access road. Similarly, the local authority may revoke the status of a limited access road [S 346A].

The provisions relating to access to and from private land from limited access roads under the control of the local authority are basically the same as those applying to TNZ [S 346D]. There is one notable exception. For a parcel of land without alternative road access, if a crossing place cannot be practically specified, and unless the local authority has purchased, acquired or otherwise taken the affected land, then the local authority may not declare the affected road to be a limited access road [S 346A]. The same provision does not apply to TNZ (e.g. see S 90, Transit New Zealand Act, 1989).

Private Roads and Private Ways

No one may create any private road or way without the prior permission of the local authority. Any such permission expires after three years if the work has not been completed to the satisfaction of the local authority [S 348]. Subject to the Resource Management Act 1991, the provisions of the Local Government Act 1974 relating to construction standards and building lines apply to private roads as they apply to other roads under the control of the local authority [S 347].

The local authority may declare any private road to be a public road, once it is properly formed. Every private road declared to be a public road shall vest in fee simple to the local authority [S 349].

Any person who constructs any unauthorised private road or way, or neglects the duties imposed by the provisions of the Local Government Act, commits an offence and is liable to a fine not exceeding $50 for every day the offence has continued beyond the receipt of notification from the local authority [S 350].

Safety Provisions for Roads

The local authority is required to ensure the general safety of the public, traffic and workmen employed on or near any road. In order to do this, the local authority may erect barriers on roads to cause traffic to slow down [S 353].

The local authority must be notified of any excavation within 20 metres of any road within its jurisdiction. With local authority approval, the construction may proceed provided that the excavation does not become a pool of stagnant water [S 354].

The local authority may require the removal or alteration of overhanging trees, hedges, fences or walls on any land adjoining a local road. When the owner or occupier does not comply with a notice from the local authority to this effect within one month, an offence is committed and a fine not exceeding $5 for every day during which the failure has continued may be imposed. The local authority may remove the obstruction if life, property, or any road is in imminent danger [S 355].

Any person or persons commit an offence if they damage or alter a road without the authorisation of the local authority. They are liable to a fine not exceeding $200 and, if the offence continues, are liable to a further fine not exceeding $20 for every day thereafter. Furthermore, the offender may be required to pay the costs of repairing the damage [S 357].

Privately Constructed Bridges and Ferries

The Minister of Transport may authorise anyone to construct a bridge or operate a ferry across any river, the bed of which is vested in the Crown. This authority may be subject to conditions and terms determined by the Minister and every such bridge or ferry will be deemed to be respectively a public bridge or ferry, shall be open to use by the public at all hours, and subject to any regulations governing their use [S 358].

In particular, with regard to the bridge or ferry, the Minister may regulate:

- management and maintenance;
- the fixing of tolls and fares;
- exemptions allowed in the payment of tolls and fares;
- the collection of any such tolls or fares; and
- the prevention of evasion of payment [S 359].

The Minister may delegate all or any of these powers to the local authority, or authorise the local authority to make bylaws on all or any of these matters [S 360].

Tolls at Bridges, Tunnels, and Ferries

The Minister of Transport may authorise a local authority to establish toll gates and collect tolls at any bridge, tunnel or ferry under the control of the local authority. Similarly, the Minister may abolish any toll gate or reduce the level of the toll if he or she decides that the toll gate is not necessary, or the tolls collected are excessive. Any limitation or interference with rights that have been granted to an individual to levy tolls must be accompanied by adequate compensation [S 361].

A2.5 Regional Roads

With the written consent of TNZ, a regional council may declare any road to be a regional road [S 363]. Similarly, the regional council may revoke the status of a regional road [S 363, 369].

The regional council cannot declare a road to be a regional road unless the road is part of a system of arterial and regional traffic routes (including motorways and state highways) and is of material benefit to the region. No declaration can be made without prior consultation with the constituent local authority for that district [S 363]. A constituent local authority may request the regional council to declare a road to be a regional road [S 364].

The regional council has the same powers and responsibilities in respect of a regional road as a local authority has in respect of a local road. However, the soil of a regional road shall not vest with the regional council. No rates are payable by the regional council on any regional road. No rates are payable on land purchased or otherwise acquired for the purposes of a regional road unless the land is let or leased by the regional council [S 366].

Constituent local authorities have the power to object to TNZ on the priority given to the formation or upgrading of regional roads, or the proposed design or specification of the regional road. The decision of TNZ on any such objection is final [S 367].

The regional council may, of its own accord, or upon application of one or more constituent local authorities, delegate its powers with respect to regional roads to the constituent authorities in whose districts the regional road is situated [S 368].

The regional council may declare any regional road to be a limited access road. The same provisions applying to limited access roads at the local authority level also apply at the regional level, with suitable modification [S 371].

The regional council may declare any land that is not part of an existing road to be required for regional road improvement. Road improvement land is, for the purposes of the Resource Management Act 1991, deemed to be a public work for which the regional council has financial responsibility. The regional council may dedicate as a road or a regional road any road improvement land vested in the regional council, without requiring the consent of constituent local authorities [S 373].

TNZ may declare what motorways or proposed motorways within a region are, in its opinion, regional in character and should be designated as regional motorways. All powers and responsibilities that may be conferred or imposed on constituent local authorities may also be imposed on the regional council. TNZ may revoke the declaration of a regional motorway, but this will not affect its status as a motorway [S 374].

A2.6 Registration and Licensing of Motor Vehicles

Under the Transport (Vehicle and Driver Registration and Licensing) Act 1986, no person is allowed to use any motor vehicle on any road unless:

- the motor vehicle is registered;
- registration plates and a licence to use the motor vehicle during the licensing year have been issued and are affixed to the motor vehicle; and
- the full amount of the accident compensation levy and indemnity surcharge (if any) payable for the licensing year has been paid.

Exemptions to these provisions may be granted under the schedules to this Act or by the minister of transport [S 6]. Any person operating a motor vehicle without a genuine registration plate or licence commits an offence [S 17].

All licensing and registration fees for vehicles used on roads received on behalf of the Crown are paid into the Crown Bank Account and credited to the Land Transport Fund [S 36].

The Registrar of Motor Vehicles keeps a general register of all motor vehicles, registration plates, and licences for motor vehicles [S 18]. Any person may obtain a certificate from the Registrar containing the name and address of the registered owner of a specified motor vehicle, the expiry

date of a warrant or certificate of fitness issued in respect of a specific vehicle, and any information regarding any requirement made for a vehicle standards compliance audit, upon payment of the prescribed fee [S 19]. Within seven days after the sale or other disposition of any registered motor vehicle, the person selling or disposing of it must give notice of the sale to a Deputy Registrar [S 20].

A person commits an offence and is liable on conviction to a fine not exceeding $1000 if, in applying for registration and licensing of a motor vehicle or in notifying a change of ownership, false or misleading information is knowingly supplied [S 26].

Regulations may be made for the following purposes:

- the registration of motor vehicles;
- providing for the recording of particulars in the register of motor vehicles;
- providing for exemptions to these requirements and delegating to the Minister the power to grant these exemptions; and
- providing for the general identification of motor vehicles [S 24].

Regarding safety standards for motor vehicles, regulations may be made under the Transport Act 1962 requiring the fitting and use of seat belts and child restraints in motor vehicles [S 77A, Transport Act 1962]. Furthermore, no person may manufacture, import or sell devices for use by drivers, or to be attached to motor vehicles for which authorisation is required from the Secretary for Transport and has not been obtained [S 77C].

Anyone using a motor vehicle must ensure that a current certificate of fitness or permit covering that vehicle is available for inspection by a traffic officer. In addition, a traffic officer may make a reasonable running test of the vehicle at the expense of the owner and require the owner or driver in charge of the vehicle to provide assistance in the conduct of any inspection or running test. A person commits an offence by failing to comply with these requirements [S 80].

No one may operate a heavy vehicle (i.e. one covered by the provisions of the Road User Charges Act 1977) on a road unless:

- a distance licence is displayed on the vehicle specifying the registration number of the vehicle, the serial number of the distance recorder fitted to the vehicle, and any other required information;
- the gross weight is less than the maximum gross weight specified on the licence;
- the motor vehicle has an authorised distance recorder that is attached to the vehicle in an approved manner, and is accurately recording travel distances; and

- the reading of the distance recorder is more than the minimum reading and less than the maximum reading as specified in the licence [S 5, Road User Charges Act 1977].

To apply for a licence to operate a heavy motor vehicle under this Act, the appropriate road user charge must be paid. Where the chief executive of the Ministry of Transport considers that the road user charge paid is excessive when compared with the road wear caused by the vehicle, he or she may, with absolute discretion, remit part of the charge [S 9].

No person may, without the written consent of the chief executive, fit a hubodometer to a vehicle if the vehicle has been operated with the hubodometer removed or the hubodometer has previously been fitted to another registered motor vehicle. Nor may any person other than the manufacturer, or a person approved in writing for this purpose by the chief executive, repair or modify any part of the hubodometer [S 22A].

A2.7 Licensing of Motor Vehicle Drivers

Under the Transport (Vehicle and Driver Registration and Licensing) Act 1962, no one may drive a motor vehicle on any road unless a driver's licence for that class of vehicle is held. Exceptions apply in the cases of a person learning to drive a motor vehicle who is accompanied by a licensed driver or is under the direction of a testing officer for the purposes of issuing or extending a driver's licence. A person commits an offence if these provisions are contravened [S 37].

Certain prohibitions apply to the granting of drivers' licences. For instance, a current holder of a driver's licence may not apply or obtain another licence while the first licence is in effect, and any licence obtained in this fashion shall have no effect. No person under 15 years of age may apply for or obtain a driver's licence, and one obtained in this fashion will have no effect. Likewise, the driver's licence obtained by any person who is a committed or special patient within the meaning of the Mental Health Act 1969 has no effect [S 40].

Every motor vehicle driver must produce a driver's licence for inspection by a constable or traffic officer if requested to do so [S 41].

The Secretary for Transport maintains a national register of all drivers' licences issued under the Transport Act. Any person may apply for a certificate containing the details of any licence holder named in the application. This certificate contains the date of expiry of the licence, the classes of vehicles to which the licence applies and details of any disqualifications or suspensions covering the licence [S 45].

A2.8 Traffic Offences, Disqualification of Drivers, and Control of Road Traffic

Part IV of the Transport Act specifies penalties covering imprisonment, fines, and disqualification of drivers' licences for a range of traffic offences. The most serious offences specified within this Act include:

- driving while disqualified;
- causing injury or death through careless use of a motor vehicle;
- dangerous or reckless driving;
- driving under the influence of alcohol or drugs; and
- neglecting the duties of a driver in the case of an accident in which any other person is killed or injured [S 30].

It is important to note that the institution determining whether an offence has occurred, and responsible for sentencing the offender, is the Court, not TNZ or any other authority that owns or operates the road.

Furthermore, if it is satisfied that the safety of the public is unduly endangered, on application by a local authority, insurance company, the Commissioner of Police or the Secretary for Transport, the Court may make an order disqualifying any person from holding or retaining a licence for such period as the Court thinks fit [S 32].

As well as the more serious offences described above, the Transport Act specifies a range of infringement offences listed in the Schedules to the Act. Where a traffic officer has reason to believe that the user of a vehicle has committed an infringement offence, the driver may be proceeded against under the Summary Proceedings Act 1957 [S 42A].

All infringement fees received by an enforcement authority must be paid into the Public Account to the credit of the Consolidated Account. However, when the local authority is the enforcement authority, it will be entitled to retain all infringement fees received in respect of parking and towage, and a portion relating to enforcement costs and collection of fees [S 43].

Part V of the Transport Act covers the powers of constables and traffic officers to deal with traffic offenders and other road users. This Part of the Act sets out explicit procedures for the testing of breath-alcohol and blood-alcohol offences in particular.

A notable provision in this Part of the Transport Act relates to the duty of road users to provide assistance to road accident victims. Specifically, where an accident arises directly or indirectly

from the use of a motor vehicle, the driver of the vehicle must stop and ascertain whether any person has been injured, in which case the driver must render all practical assistance to the injured person [S 65].

A2.9 Road Transport Services

Under the Transport Services Licensing Act 1989, every type of transport service within the following categories must be licensed [S 4]:

- goods service;
- passenger service;
- rental service; and
- vehicle recovery service.

Except as provided in the Act, anyone commits an offence and is liable to a fine not exceeding $10,000 by operating any transport service without a licence granted by the Secretary of Transport [S 5].

In assessing the requirements of this Act in respect of the issuance of licences, the Secretary must be satisfied that the person applying for the licence is a fit and proper person. In making this determination, the Secretary may have regard to the person's criminal history, mental health, behavioural problems, and history of failure to pay fines for transport-related offences [S 24].

No transport service licence may be transferred, leased, or assigned to any person [S 26]. Every transport licence continues to be in force until it is surrendered or revoked under the Act, or if a vehicle has not been operated pursuant to the licence for two years [S 27].

In any case where the Secretary refuses a licence application, or revokes, disqualifies or suspends an existing licence, the affected person may appeal the decision to the District Court [S 42], and may subsequently appeal to the High Court [S 45] and the Court of Appeal [S 46] any decision of the District Court as being erroneous in point of law. However, the decision of the Secretary of Transport continues in force pending the determination of the appeal proceedings [S 44].

A2.10 Environmental Constraints

The stated purpose of the Resource Management Act 1991 is to promote the sustainable management of natural and physical resources. According to this Act, this means managing and protecting these resources to:

- sustain their potential (excluding minerals) to meet the foreseeable needs of future generations;
- safeguard the life-supporting capacity of air, water, soil, and ecosystems; and
- avoid, remedy, or mitigate any adverse effects of activities on the environment,

while allowing people and communities to provide for their social, economic and cultural wellbeing and for their health and safety [S 5, Resource Management Act 1991].

General Constraints

Unless expressly allowed by a rule in a regional coastal plan or a resource consent, in connection with a coastal marine area, no one may drain or reclaim any foreshore or seabed, construct or alter any structure connected to the foreshore or seabed or disturb this habitat in any way that is harmful either directly to the foreshore or seabed, or to plants and animals in this habitat [S 12].

Unless expressly allowed by a rule in a regional plan or a resource consent granted by a regional council, in relation to any lake bed or river bed use, no one may construct or alter any structure connected to the bed [S 13].

Similarly, no person may take, use, dam, or divert any water unless the activity is expressly allowed by a rule in a regional plan or a resource consent [S 14]. Nor may anyone discharge:

- any contaminant or water into water;
- any contaminant on to land which may result in that contaminant entering water;
- any industrial contaminant into the air; or
- any industrial contaminant on to or into land [S 14].

Similarly, no person may discharge any contaminant into the air or land from any place, or from any source in a manner that contravenes a rule in a regional plan unless the discharge is expressly allowed by a resource consent [S 15].

Any land occupier or anyone carrying out a water-based activity is required to adopt the best practicable option to ensure that noise does not exceed a reasonable level. This does not preclude the right of any local authority or consent authority to prescribe noise emission standards in plans made or resource consents granted [S 16].

Everyone has a duty to avoid, remedy, or mitigate any adverse environmental effects connected with an activity, whether or not the activity is in accordance with a rule in a plan, or a resource consent, or is protected or allowed as an existing lawful activity. This duty is not of itself enforceable against any person, and no person is liable to any other person for a breach of that duty. However, an enforcement order or abatement notice may be made or served on the person if, in the opinion of the Planning Tribunal or an enforcement officer, the activity is likely to have adverse environmental effects [S 17].

Administrative Functions and Powers

The minister for the environment may:

- recommend the approval of an applicant as a requiring authority;
- direct that he or she shall decide on any particular application, or all applications for resource consents in respect of a proposal that the Minister believes is of national significance;
- monitor the effect and implementation of the Resource Management Act (and regulations under it), national policy statements, and water conservation orders;
- monitor of the relationship between the functions, powers and duties of central government and local authorities under the Act; and
- consider and investigate of the use of economic instruments (including charges, levies, other fiscal measures, and incentives) to achieve the purpose of the Act [S 24].

The minister for the environment may make loans and grants as he or she thinks fit to any person to assist in achieving the purpose of this Act. All money spent or advanced by the Minister is paid out of department appropriations for this purpose [S 26].

The minister of conservation is responsible for:

- preparing and recommending a New Zealand coastal policy statement;
- approval of regional coastal plans;
- deciding on applications for coastal permits in relation to restricted coastal activities; and

- monitoring the effect and implementation of national coastal policy statements and coastal permits [S 28].

Every regional council has the following functions for the purpose of giving effect to the Resource Management Act in its region:

- establishing and implementing policies to achieve integrated management of regional natural resources;
- preparing policies for the use and protection of land that is of regional significance;
- controlling land use for the purposes of soil conservation, maintaining water quality, avoiding natural hazards, and controlling hazardous substances;
- controlling the taking, use, damming and diversion of water; and
- controlling the discharge of contaminants into the air, land, or water and discharges of water into water [S 30].

Every territorial authority has the following functions for giving effect to the Resource Management Act in its district:

- establishing and implementing policies to achieve integrated management of the district's natural resources;
- controlling land use for the purposes of avoiding natural hazards and controlling hazardous substances;
- the control and subdivision of land;
- the control and mitigation of the effects of noise; and
- the control of any surface activities on rivers and lakes [S 31].

In achieving the purpose of the Resource Management Act, the minister for the environment, the minister of conservation and every local authority must consider:

- the extent to which any policy is necessary in achieving the purpose of the Act;
- other means of achieving the purposes of the Act; and
- the reasons for and against the policy, the principal means available, and the consequences of taking no action where this Act does not require otherwise.

No one may challenge any policy expressed in any plan on the grounds that this duty has not been complied with except in a submission made on the proposed plan or proposed change of plan [S 32].

Environmental Standards and Policy Statements

The Governor-General may, on the recommendation of the minister for the environment, declare regulations called national environmental standards for either prescribing technical standards or methods of implementation for the use and protection of natural resources [S 43].

The purpose of national policy statements is to state policies on matters of national significance that are relevant to achieving the purpose of the Resource Management Act [S 45].

Upon receipt of a new or altered national policy statement, a local authority must alter any local authority statement or plan to remove any inconsistency with the national policy statement and will take any other action as may be necessary in order to implement the national policy statement [S 55].

The purpose of a regional policy statement is to achieve the purpose of the Act by providing an overview of the resource management issues of the region and policies for achieving integrated management of the natural regional resources [S 59]. At all times, one regional policy statement, prepared by the regional council, is effective for each region. A regional policy statement may be changed at the instigation of a Minister of the Crown, the regional council, or any territorial authority within or partly within the region [S 60].

The regional council must prepare its regional policy statement in accordance with its functions and duties taking account of:

- any management plans and strategies prepared under other Acts;
- any relevant planning documents recognised by an iwi authority affected by the regional policy statement;
- regulations concerning the conservation and management of taiapure or fisheries;
- regulations made under this Act that have an influence on resource management issues of the region; and
- the extent to which the regional policy statement needs to be consistent with the policy statements and plans of adjacent regional local authorities [S 61].

The purpose of a regional plan is to assist a regional council in carrying out any of its functions in order to achieve the purpose of the Act. The purpose of a regional coastal plan is to assist a regional council, in conjunction with the minister of conservation, to achieve the purposes of the Act in relation to the coastal marine area of that region [S 63].

A regional plan may cover any function for which the regional council is responsible and apply to the whole or any part of the region [S 65]. When preparing or changing any regional plan, the regional council must take account of those provisions applying in respect of regional policy statements (i.e. [S 61]), any regional policy statement, and the Crown's land and coastal marine interests [S 66]. For the purposes of carrying out its functions under this Act, and achieving the objectives and policies of the regional plan, a regional council may include rules in a regional plan that prohibit, regulate, or allow activities. Every such rule has the force and effect of a regulation under this Act [S 68].

The purpose of district plans is to assist territorial authorities to carry out their functions in order to achieve the purpose of the Act [S 72]. At all times, one district plan, prepared by the territorial authority, is in force for each district. Any person may request that a territorial authority change a district plan [S 73].

A territorial authority will prepare and change its district plan in accordance with its functions and duties, and any regulations in force under this Act. In addition, a territorial authority must take account of:

- any regional policy statement or regional plan that has a bearing on the local district;
- those provisions applying in respect of section 61 of this Act (with suitable modification); and
- the extent to which a district plan needs to be consistent with the plans or proposed plans of adjacent territorial authorities [S 74].

For the purposes of carrying out its functions under this Act and achieving the objectives and policies of the district plan, a territorial authority may include rules in its district plan that prohibit, regulate, or allow activities. Each of these rules has the force and effect of a regulation under this Act [S 76].

If there is any inconsistency between a policy statement, plan or conservation order, then any Minister, regional council, or territorial authority may refer the dispute to the Planning Tribunal for a decision resolving the matter. If the Planning Tribunal considers that the inconsistency is minor, it may allow it to remain. However, if the Planning Tribunal considers it necessary to change any regional policy statement (but not a national policy statement) or any regional or district plan, then the Tribunal must indicate the general nature of the change proposed and order the local authority responsible for the policy statement or plan to initiate the change [S 82].

Private Property Rights and Environmental Legislation

No one's interest in land is taken or affected by any provision in a plan unless otherwise provided for in this Act . However, any person having an interest in land to which any provision of a plan applies, and who considers that the provision would render that land incapable of reasonable use may challenge that provision on those grounds. Where the Planning Tribunal agrees with the challenge, the Tribunal may direct the local authority to change the provision [S 85].

A regional council or territorial authority may, while its plan is operative, acquire by agreement under the Public Works Act 1981 any land in its region or district to:

- terminate or prevent a prohibited activity in relation to that land; or
- facilitate activity in relation to that land that is in accordance with the objectives and policies of the plan [S 86].

The owner of land taken for any purpose under the Resource Management Act is entitled to compensation as if the land had been acquired for a public work under the Public Works Act 1981 [S 86].

Resource Consents

A resource consent is a consent to do something that would otherwise contravene the provisions of the Resource Management Act in relation to land use, subdivision, use of coastal marine areas, use of the beds of lakes and rivers, water use and the discharge of contaminants into the environment [S 87].

Any person may apply to the relevant local authority for a resource consent. No application may be made for a prohibited activity, but applications may be made for resource consents in relation to controlled, discretionary, or non-complying activities under a plan. An application for a resource consent for a controlled activity must include an assessment of any actual or potential effects on the environment and the ways in which those adverse effects may be mitigated [S 88].

When considering an application for a resource consent, the consent authority must consider any environmental effects of allowing the activity. If the written approval of any person affected by the activity has been obtained, the fact that the activity may have an adverse impact on that person is not sufficient grounds for declining the application. The consent authority does not take account of the effects of trade competition on trade competitors. The consent authority must take account of relevant plans, policy statements and any relevant regulations [S 104].

Either the applicant or any person who made a submission may appeal to the Planning Tribunal against the decision of a consent authority on a resource consent application [S 120].

A resource consent is neither real nor personal property. However, on the bankruptcy of an individual who is a holder of a consent, the consent vests with the Official Assignee as if it were personal property, and he or she may deal with the consent to the same extent as the holder would have done. The holder of a resource consent may grant a charge over a consent as if it were personal property. Subject to the provisions of the Resource Management Act, the Chattels Transfer Act 1924 and Part IV of the Companies Act 1955 apply in relation to a resource consent as if the resource consent were a chattel [S 122].

The duration of any coastal or land use consent for reclamation is unlimited. Any other land use permit is unlimited except those that would otherwise contravene the conditions of the Resource Management Act relating to use of a lake or river bed. For these and all other consents the term is 5 years if no term is specified in the resource consent, and no specified term may exceed 35 years [S 123].

A resource consent expires after 2 years (or that period specified in the consent) if the consent is not acted upon [S 125]. Where a resource consent has been exercised, but has not been exercised for a continuous period of 2 years, a consent authority may cancel the consent [S 126].

A land use or subdivision consent (except one that would contravene the conditions relating to the use of a lake or river bed) attaches to the land to which it relates. The holder of this type of land use consent may transfer the whole or any part of the interest in the consent to any other person unless the consent expressly provides otherwise. Any such transfer does not take effect until written notice of the transfer is given to the consent authority granting the permit [S 134].

A holder of a water permit granted for damming or diverting water may transfer the whole or any part of this permit to any owner or occupier of the site covered by the consent, but may not transfer the permit to any other person or from site to site. Any such transfer does not take effect until written notice of the transfer is given to the consent authority granting the permit [S 136].

The holder of a resource consent may surrender the consent, either completely or partially, by giving written notice to the consent authority. A consent authority may refuse to accept the surrender of a consent, if the authority considers that this surrender would:

- affect the integrity of the consent;
- affect the ability of the consent holder to meet other conditions of the consent; or

- lead to an adverse effect on the environment [S 138].

Requiring Authorities

A designation is a provision in a district plan that gives effect to a requirement made by a requiring authority. A requiring authority means a Minister of the Crown, a local authority, or a network utility operator approved as a requiring authority. A network utility operator includes a person who constructs, operates, or proposes to construct or operate, a road or railway line [S 166].

A network utility operator may apply to the Minister for approval as a requiring authority for a particular project or work. In turn, the Governor-General may, on the recommendation of the Minister, approve an applicant as a requiring authority for the purposes of that project. The Minister may not make such a recommendation unless he or she is satisfied that:

- the project or work is necessary for the purposes of the network utility operation;
- the project or work is in the public interest; and
- the applicant will adhere to the requirements of this Act, and will consider the interests of people affected by the project, and will consider environmental consequences [S 167].

Having obtained the status of a requiring authority in respect of a project, the network utility operator may, at any time, give notice to a territorial authority of its requirement for a designation for the project. Similarly, a requiring authority may at any time withdraw a requirement by giving notice to the territorial authority affected [S 168].

After considering a requirement for a designation, the territorial authority must recommend either that the requiring authority confirm the requirement with or without modification and subject to such conditions as the territorial authority considers appropriate or withdraw the requirement [S 171]. The requiring authority must then advise the territorial authority whether the recommendation is accepted or rejected, either in whole or in part. Any modification to a requirement by a requiring authority may only be made if it is consistent with the initial requirement or is recommended by the territorial authority [S 172].

Provided any appeals to the requiring authority's decision have been dealt with, the territorial authority must then include the designation in its district plan and advise the regional council of the designation and whether it makes the district plan inconsistent with a regional policy statement or plan. If this is the case, the regional council must amend its policy statement or plan to remove the inconsistency and make any other changes necessary to give effect to the designation [S 175].

Where a designation is included in a district plan, the requiring authority may do anything in accordance with the designation and no person may, without the written consent of the requiring authority, do anything in relation to the land that would prevent or hinder the project to which the designation relates [S 176].

Where a designation is included in a district plan for a public work, then all rights and responsibilities in relation to the designation transfer with any transfer of financial responsibility for the work. However, if the designation is for a network utility operator approved as a requiring authority, all rights and responsibilities in relation to the designation are personal to that network utility operator and may not be transferred except in accordance with the provisions of this Act. Where a network utility operator wishes to transfer such approval to another network utility operator, both operators must jointly apply to the Minister for approval [S 180].

A requiring authority responsible for a designation may at any time give notice to the territorial authority of its requirement to alter the designation. Similarly, a territorial authority may at any time alter the designation in its district plan if:

- the alteration involves no more than a minor change to the effects on the environment associated with the use or proposed use of the land or any water concerned;
- written notice of the proposed alteration has been given to every owner or occupier of the land directly affected and those owners or occupiers agree with the alteration; and
- both the territorial authority and the requiring authority agree with the alteration [S 181].

If a requiring authority no longer wants a designation it must give notice to:

- the territorial authority concerned;
- every person known by the requiring authority to be the owner or occupier of any land to which the designation relates; and
- every other person who, in the opinion of the requiring authority, is likely to be affected by the designation.

The territorial authority must then amend its district plan to remove the designation and advise the regional council of its removal, and whether it considers that the removal of the designation makes the district plan inconsistent with a regional policy statement or regional plan. If it does, the regional council must amend its policy statement or plan [S 182]. A designation lapses after 5 years if it is not acted upon [S 184].

Land owners affected by a designation or requirement may apply to the Planning Tribunal for an order obliging the requiring authority to acquire or lease all or part of the owner's estate or interest in the land under the Public Works Act 1981. The Planning Tribunal may make such an order if it is satisfied that the owner is unable to sell the land at a price not less than the market value of the land without the designation or requirement and either the designation or requirement prevents reasonable use of the land or the applicant was the owner of the land when the designation or requirement was created.

If the Planning Tribunal makes an order to take an estate or interest in land under the Public Works Act 1981, the owner of that estate or interest shall be deemed to have entered into an agreement with the requiring authority. Where this order applies in respect of a requiring authority that is a network utility operator, any agreement shall be deemed to have been entered into with the minister of lands on behalf of the network utility operator as if the land were acquired for government work. All costs and expenses incurred by the minister of lands in respect of the acquisition of the land are recoverable from the network utility operator as a debt due to the Crown. The amount of compensation payable is assessed as if the designation or requirement had not been created [S 185].

A network utility operator that is a requiring authority may apply to the minister of lands to have the land required for the project acquired or taken under Part II of the Public Works Act 1981 as if the project were a government work within the meaning of that Act. The effect of any proclamation taking land shall be to vest the land in the network utility operator instead of the Crown.

Any land held by the Crown or a local authority may, on terms agreed with the Crown or that authority, be set apart for a project by a network utility operator in the manner specified in sections 50 and 52 of the Public Works Act 1981 (with necessary modification). However, the setting apart is not subject to sections 40 and 41 of that Act (unless the network utility operator is the Crown). Any land set apart in this manner vests in the network utility operator. Any claim for compensation under the Public Works Act 1981 in respect of land acquired or taken in this fashion is made against the minister of lands. All costs and expenses incurred by the minister of lands are then recoverable from the network utility operator as a debt due to the Crown [S 186].

A2.11 Taking Private Land for Public Works

The minister of lands is empowered by the Public Works Act 1981 to acquire any land required for government work. Similarly, every local authority is empowered to acquire any land required for local work for which it has financial responsibility [S 16, Public Works Act 1981].

The Minister or local authority may enter into an agreement to purchase any land for any public work for which the Minister or local authority is responsible. The vendor under any such agreement is not entitled to claim compensation under Parts V or VI of this Act but is entitled to receive full consideration specified in the agreement. An agreement to sell land to the Crown may specify that part of the compensation be determined under Parts V and VI of the Act [S 17].

Before proceeding to take the land, the Minister or local authority must:

- serve notice on every person having a registered interest in the land;
- lodge a notice with the District Land Registrar who then registers it against the title affected;
- invite the owner to sell the land and advise the owner of the estimated amount of compensation to which he or she would be entitled under this Act or the betterment the owner may be liable to pay; and
- endeavour to negotiate with the owner to reach an agreement for the acquisition of the land.

If, after a period of 3 months, the owner fails to respond, or refuses to negotiate with the Minister or local authority, or the agreement for the sale of the land is not made with the owner, then after one year has passed the Minister or local authority may proceed to take the land [S 18].

Every person having any estate or interest in the land intended to be taken may object to the Planning Tribunal [S 23]. On completion of an inquiry, the Planning Tribunal prepares a written report on the objection and on whether the proposed taking is fair, sound and essential for achieving the objectives of the Minister or local authority. The report and recommendation of the Planning Tribunal are binding on the local authority. However, if the Minister decides not to give effect to the recommendations of the Planning Tribunal, he or she must send a statement of the reasons for his or her decisions to the objector and make copies of this statement available to the public. A copy of this statement must also be laid before parliament [S 24].

If no objection is made within the time allowed by this Act, or if made is resolved, then the land may be taken by proclamation of the Governor-General and vests in fee simple in the Crown or in the local authority [S 26].

Where part of the landholding of any person is taken compulsorily under this Act, he or she may require the Minister or local authority to take any other part of the holding that would become significantly more costly to retain at the same standard as previously or is significantly less useful to that person. Should any dispute arise, the owner of the land may apply to the Planning Tribunal for a determination on the matter, and the decision of the Tribunal is binding on both parties. The Minister or local authority may subsequently deal with the land as they see fit [S 34].

Land Held for Public Works

Where any land held for a public work is no longer required for that public work, the land may be sold. Unless the relevant authority in charge of the land decides that it would be impractical, unreasonable or unfair to do so, it must offer to sell the land by private contract to the person from whom the land was acquired or to the successor of that person, at a price fixed by a registered valuer or, if the parties agree, at a price determined by the Land Valuation Tribunal. If the responsible authority believes it would be unreasonable to sell the land to any person other than a neighbouring landowner, the land may be sold to the neighbour at a price negotiated between the parties [S 40].

Notwithstanding anything to the contrary in this Act or in any other Act, but subject to section 40 of this Act, any existing public work or part of a public work may be disposed of by the Minister to a local authority, or by a local authority to a Minister or another local authority for a public work, whether of the same kind or not, if reasonable provision for satisfying the requirements of the public interest in that work continues to exist [S 50].

Compensation

If any land is acquired for a public work or suffers any damage relating to a public work and no provision is made for compensation, the owner of that land is entitled to full compensation from the Crown or local authority [S 60].

The amount of compensation payable under this Act, whether for land taken, injuriously affected, or otherwise, is assessed in accordance with the following provisions. No allowance is made for the compulsory nature of the taking. The land is valued as if it were sold in the open market by a willing seller to a willing buyer on the specified date. If only part of the land is taken for which there is no general demand or market, the compensation for such land is assessed by determining the market value of the whole of the owner's land and then deducting the value of the remainder of the owner's land after the taking or acquisition. No account is taken of changes in the value of land taken that has been caused by the public work or prospect of work. The special suitability or adaptability of the land, or of any natural material acquired or taken, is not taken into account if that special purpose is solely a statutory purpose for which there is no market apart from the special needs of any government or local authority. The Planning Tribunal will take account of and deduct any increase in the value of the remaining land caused by the work or the prospect of the public work [S 62].

If the construction of a new public work substantially affects a person's land, but no land is taken, that person is entitled to compensation from the Crown or local authority. This provision does not apply in the case of changes in traffic flows arising out of the opening of any new road or motorway, or the widening, upgrading, or deviation of an existing road. In determining the existence of any right of action, the existence of any statutory authority or immunity that may be available to the Crown or local authority is not taken into account [S 63].

A compensation claim for land taken for public works must be made within two years of the execution of the public work [S 78]. If a person has not exercised the right to compensation within 3 months, the Minister or local authority may give notice of their intention to apply to the Land Valuation Tribunal to determine the amount of compensation payable [S 79].

The award of the Land Valuation Tribunal is final as regards the amount awarded, but is not final with regard to the title of the claimant or any other person to receive the amount awarded [S 95].

Non-financial Compensation

Where the amount of compensation to be paid has been agreed, the Minister or local authority may agree to grant an easement, right of way, or any other right, privilege, or concession in respect of any land taken for a public work, in complete or partial settlement of any compensation [S 103]. In any case where the amount of compensation is determined by the Land Valuation Tribunal, the respondent may offer and the Tribunal may award any such easement or right of way in complete or partial settlement of any claim for compensation [S 104].

APPENDIX 3. ELECTRONIC BILLING SYSTEMS FOR ROADS

Various charging mechanisms for road use are currently available. Their ability to confront motorists with the economic costs of their road use decisions, and the information that they provide to managers of roading infrastructure, differ markedly. Furthermore, the application of these different charging mechanisms depends, inter alia, on traffic density, the state of existing infrastructure, and whether the owners and/or operators of the roading infrastructure are public or private institutions. The purpose of this Appendix is to describe the key features of the different charging mechanisms (some of which are currently employed in New Zealand and some of which are only employed overseas, at present) and to assess the viability of these different mechanisms as an efficient means of charging for road use.

The key distinction is between direct and indirect charging mechanisms. It is clear that the opportunities for a private roading firm to exploit indirect charging mechanisms without breaching the provisions of the Commerce Act are limited. The indirect charging mechanisms are[145]:

- vehicle excise duties;
- annual licence fees;
- fuel tax and taxes on tyres and vehicle parts;
- regional fuel taxes;
- parking charges; and
- area licensing.

Of these types of indirect charging system, annual licence fees, parking charges and area licensing could, in an appropriately modified form (e.g. as a payment for a service provided by the roading supplier to the motorist), be used to raise revenue for TNZ operating as an SOE.

Annual licence fees raise ownership costs for private motor vehicles, and therefore can be effective in reducing the size of the vehicle fleet because they dampen the rate of acquisition of new motor vehicles. However, the resulting reduction in road usage across the entire roading network may not be efficient if parts of that network are under-utilised (i.e. the licence fee does not selectively reduce congestion costs). Also, licence fees are poorly correlated with road use.

145 Hau (1992).

Nevertheless, licence fees are simple to administer[146], and as part of a multi-tier charging structure (i.e. one involving a flat access fee and a charge or toll associated with road use), could potentially be an efficient form of road pricing. The incentives and information required to set licence fees and tolls at efficient levels are unlikely to be available under public operation of the roading network, however.

If TNZ were assigned property rights to the entire roading network, or if a private firm were providing road infrastructure in inner-city areas, parking charges would be another mechanism for charging road users. However, as with licence fees, parking charges would be indirectly related to use of the road network, but would be more closely related to the number of urban trips rather than the distance travelled. The disadvantage of this form of road charging as an efficient road pricing mechanism is that it can potentially increase congestion in suburban centres, and does not impose road use charges on through traffic and vehicle owners with off-street parking. Higher parking charges increase the benefits for motorists spending more time searching for cheaper parking. Furthermore, depending on the relationship between the level of the parking charge and commuting distances, 'kiss and ride' trips[147] may increase suburban roading congestion.

The most effective system for indirectly charging for use of roads at different times and places is through supplementary area licensing. This system involves the payment of an admission charge in order to be allowed to drive in certain areas, at different times of the day. Instead of paying a direct toll levied at the time of travel, motorists purchase a sticker that is attached to the windscreen of their car. Traffic wardens either patrol city streets taking the licence numbers of offending vehicles, or may observe the entry of cars to the city from gantries or stations on main arterial routes. As an efficient form of road pricing, area licensing suffers from abrupt boundary changes and may generate congestion at boundary points. Furthermore, as experience with carless days has shown, reducing the ability of motorists to drive certain vehicles at different times of the day may not necessarily reduce the number of trips made, if motorists have access to more than one car. Finally, the ability to deal with infrequent visitors or tourists is limited unless a tollgate option is also employed, thereby blurring the distinction between area licensing and other direct tolling systems.

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146 This statement is qualified by the observation that under current non-commercial objectives for TNZ, the annual licensing system appears to impose high costs on motorists and collection agencies relative to the amount of revenue generated. However, with a commercial focus for TNZ, we could expect that collection costs and costs imposed on motorists would both be minimised. Certainly, this would be more likely if competition between alternative road suppliers emerged over time.

147 That is, the non-working partner driving the partner to a suburban metro-station, and then driving back home again, thereby increasing congestion on suburban roads.

Despite the obvious shortcomings of indirect charging mechanisms, they could prove to be an effective means for TNZ to generate revenue from the roading network, and at the same time reduce congestion problems during rush hours, without requiring any great expansion of roading capacity and without requiring a large investment in direct tolling technology. This could be particularly useful in the case of Wellington, where the limited number of main routes into the inner-city area, the high costs of expanding the motorway network, and current rush-hour congestion all point to the viability of some form of congestion pricing. While a public authority could potentially introduce this form of pricing, it is doubtful that, without commercial objectives, it would have either the incentives or information to introduce and refine the scheme to establish an efficient road pricing system. The ability of TNZ to establish area licensing systems in urban areas (e.g. Wellington and Auckland) may be limited by political constraints on introducing regional road pricing structures, especially if this was done without some corresponding reduction in other forms of public charges on motorists (e.g. fuel taxation and excise duties).

In terms of direct charging mechanisms for road use, there are two main types - off-vehicle recording versus on-vehicle metering. All off-vehicle recording methods are based on point-pricing techniques, while on-vehicle methods rely on either point pricing or continuous metering.

The off-vehicle recording systems include:

- manual charging of admission fees via tollgates and reserved lanes;
- automatic vehicle identification (AVI); and
- a combination of the above schemes.

Manual tollgates are a well-established and understood system of directly charging road users, and are administratively straightforward. However, they suffer from low throughput of vehicles[148]. Compared with the low user and capital costs imposed by area licensing schemes, manual collection of tolls imposes costs on users due to the need to slow down to pay the toll. Manual tolls also require significant capital investment in land and construction of toll lanes and collection facilities. Finally, operations costs are non-trivial ranging from US 3.6 cents to US 7.5 cents (in 1983)[149] per transaction. The major problem with manual toll collection is that it increases traffic congestion. From the point of view of developing an efficient road pricing system, this is particularly troublesome, because if a road is already congested a toll booth will

148 For each toll lane, maximum vehicle throughput is 350-400 vehicles per hour (see Hau (1992, p. 14); and Hartje (1991)).

149 Wustefeld (1988).

increase congestion, whereas if a road is not congested no toll booth is required[150]. Like the area licensing scheme, the charging basis for manual tolls is point pricing (i.e. crossing a gantry point). However, manual tolls are inferior to area licensing schemes because they require vehicles to slow down in order to pay the toll.

If the number of entry and exit points to and from an inter-city area is limited, and the capacity of the road is not greatly constrained by the toll facility, manual toll booths, in conjunction with reserved lanes for pass holders, would be an effective mechanism for efficient road pricing. Furthermore, if a system of cordon pricing is introduced, manual tolling can provide a cost-effective temporary means of collecting tolls while electronic road pricing systems are installed.

Automatic vehicle identification (AVI) refers to the electronic identification of a transponder located on a moving vehicle. AVI has three components:

- a transponder (or 'tag') that stores the vehicle's identification code;
- an interrogator that 'reads' the tag and decodes its information; and
- a computer system that transmits, analyses and stores data[151].

The four main types of AVI technology are:

- optical and infra-red systems;
- inductive loop systems;
- radio frequency and microwave systems; and
- smart card systems.

Optical and infra-red systems are one of the oldest forms of AVI technology, involving a process similar to the screening of bar codes in a supermarket. There are a number of problems with this type of technology. This system is unreliable in certain weather or terrain conditions where visibility is restricted, counterfeiting of bar codes is possible, vehicle speeds must be lowered to allow accurate reading of the bar code, and the system is prone to operational errors in normal circumstances.

Inductive loop systems rely on an antenna loop located in the pavement being activated when a transponder located under a moving vehicle passes over it. The different types of systems are active, semi-active and passive. In an active system, the source of power is external (e.g. the vehicle). In contrast, a passive system relies on the transponder being activated when it passes

150 Hau (1992).
151 *Ibid.*, and Sommerville (1991).

a power loop beneath the road surface. The operational performance of these systems is sensitive to the type of road surface in which they are installed. Passive systems provide greater security and potentially greater reliability because the source of the power is not external to the system itself. However, only limited data can be transferred between the transponder and the reader, because of the limited field length in which they may operate. A semi-active system is powered by a small long-life battery located within the transponder, and is designed to overcome the problems with these other systems.

Radio frequency (RF) transmission is currently the most popular[152] form of AVI technology. The high frequency at which this system operates allows more data to be transferred between the moving vehicle and the stationary reader, relative to other types of system (e.g. inductive loop systems), thereby enhancing the security of this system. Also, these systems have a smaller and lighter transponder that is readily transferable between vehicles.

RF technology has largely superseded optical and infra-red AVI technology. A motorist driving past a reader mounted on a roadside signpost or gantry triggers the reader to search for the vehicle's transponder. The reader records such information as the vehicle's identification code, the date, time and place of the journey and transmits the data to a centralised billing computer for later billing. Potentially, the system can deliver the motorist a record of road use similar to that supplied by telephone companies in respect of phone calls. Alternatively, pre-paid accounts could allow the driver to preserve the anonymity of the vehicle's movements. Consequently, automatic vehicle identification would not necessarily infringe privacy because of a variety of payment options available.

Smart, card-based systems are the latest form of AVI[153], based upon a smart, vehicle-based unit and a roadside antenna. The smart transponder acts like a small computer, independently keeping a record of transactions, and capable of performing simple arithmetic (e.g. subtraction) when in operation. In this regard, these smart cards are similar to the phone cards currently available in New Zealand. The prime advantage of smart cards compared with microwave and RF technology is that anonymity and privacy is assured. Furthermore, because the charge is deducted automatically, the driver is made immediately aware of the costs of driving decisions (in contrast to either a pre- or post-payment system), without requiring expensive and potentially unsafe signposts on the sides of roads advertising toll costs.

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152 Hau (1992).
153 *Ibid.*