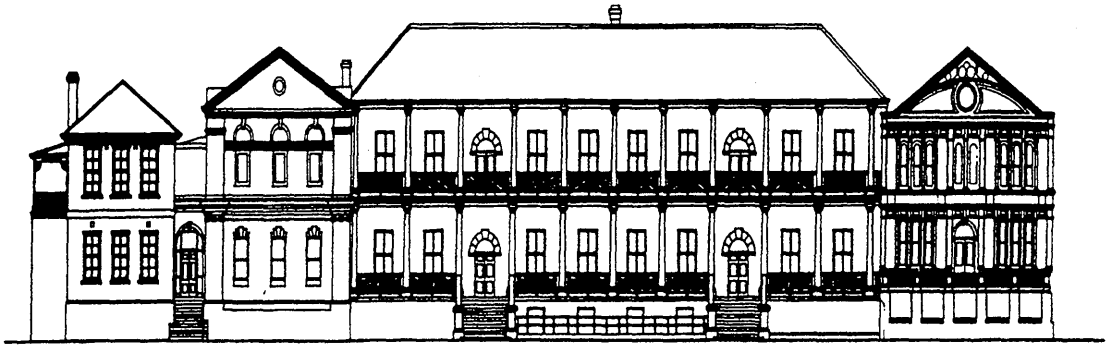
LEGISLATIVE ASSEMBLY

STANDING COMMITTEE ON PUBLIC WORKS

REPORT

THE TILT TRAIN



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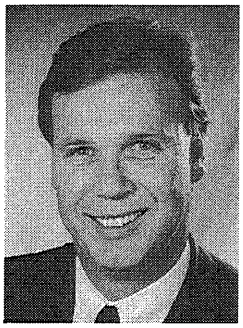

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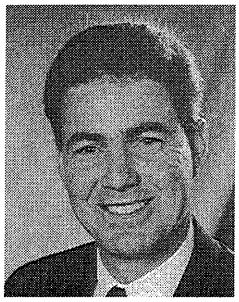

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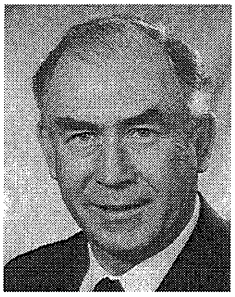

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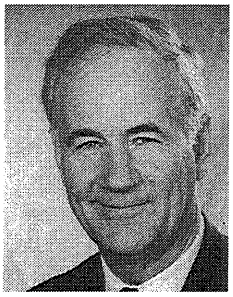

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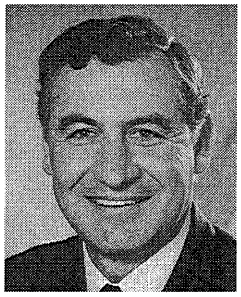
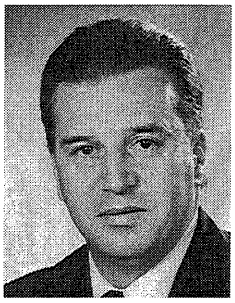


The Hon George Souris MP



Mr Tony Stewart MP
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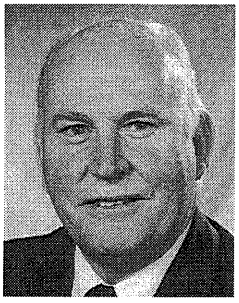
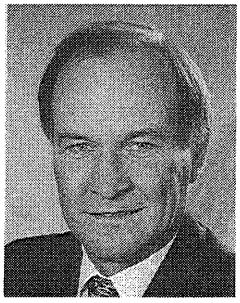


Mr Gerry Sullivan MP



Mr Tony Windsor MP

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CHAIRMAN'S FOREWORD

The Report on the Tilt Train is an important inquiry into the New South Wales rail system and its place in the national rail network.

The Committee began its work with a very limited focus on tilt train technology. However, it soon became obvious that issues of rolling stock cannot be disassociated from the quality of infrastructure.

There is a tendency to seek quick-fix solutions to infrastructure shortcomings. The potential of tilt trains to reduce journey times using existing tracks makes them very appealing for a rail system like that in New South Wales, which is characterised by tight curves and steep grades.

However, it is clear from the evidence of key stakeholders that the combination of poor track alignments and difficult geography in New South Wales will significantly reduce the capacity of tilt trains to make a real difference.

Fast train options, therefore, should be discounted until rail infrastructure has been upgraded to a standard where optimal travel times can be achieved. This will benefit both passenger and freight users by making rail genuinely competitive again as a transport mode. The only exception to this strategy should be specific routes such as Sydney-Canberra where the private sector is prepared to put up the money to operate a commercial service with no cost to taxpayers.

The responsibility for achieving the goal of better track quality is largely in the hands of the Commonwealth Government.

Successive Commonwealth Governments have abetted the creation of an uneven playing field between road and rail transport through disparities in investment levels. It is time for the Commonwealth Government to redress this imbalance with significant investment in rail.

However, the New South Wales Government still has an important part to play.

New South Wales is the epicentre of the national rail network with most major passenger and freight services passing through the State. The recent consolidation of roads and transport under a single Minister by the New South Wales Government offers an opportunity to make a genuine impact on the relative investment in transport modes. This challenge should not be declined.

A renaissance of rail services is potentially crucial in rebuilding relationships with regional New South Wales. Rail represents both a physical and symbolic link with the city and with government.

The capacity to make rail competitive will eventually influence a whole range of important economic and environmental issues for both New South Wales and Australia. As an alternative to road-based freight and passenger services, rail has the potential to be safer and cleaner by reducing traffic congestion, pollution levels and the number and cost of serious accidents. As an

alternative to air travel, rail could reduce congestion at Sydney Airport if very fast trains operated to Canberra, Melbourne, the North Coast and Brisbane.

What is required urgently is a national strategic vision that cuts across state agencies and borders.

In this regard, the Committee is endorses the recommendations of the recent report, "Tracking Australia," by the House of Representatives Standing Committee on Communications, Transport and Microeconomic Reform.

The call to establish a National Land Transport Commission to correct "chronic deficiencies" in the national track network and preside over all land transport infrastructure decisions is long overdue. It supports the Committee's findings in this Report.

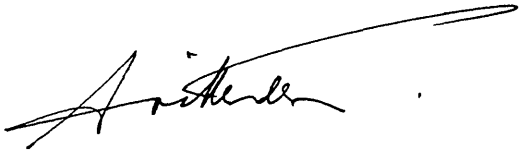
Further, the recommendation that the Commonwealth Government "undertake responsibility for "investment in the declared national track" (xxx) to the tune of $2.75 billion to the year 2010 is welcomed. This recommendation acknowledges that investment in rail infrastructure of national significance is a Commonwealth responsibility.

The only caveat that the Committee places on its support for this recommendation is that Commonwealth investment should be allocated strictly according to the highest cost-benefit ratios. Investment must be targeted at rail corridors where track improvements will significantly enhance the national economy. Experts agree that the Melbourne-Sydney and Sydney-Brisbane corridors as well as access into Sydney warrant major investment. Upgrading these corridors should become a national priority.

The road industry has proven that it is not necessary to privatise transport systems to get results. What is required is a secure funding stream and unity of purpose across both the public and private sectors.

Rail planners in this State must get ready for change so that they can dictate the manner and pace of that change. The history of rail planning in New South Wales is one of lost investment opportunities and infrastructure projects which have delivered very limited benefits because they occurred in isolation. It is time to position New South Wales for a new era of investment in rail.

The Committee has made a valuable contribution to this process by consolidating data and offering constructive suggestions for future action. The strategic overview contained in this Report will set New South Wales rail on the right course to achieve solid future improvements.



Paul Crittenden MP
Chairman

The History and Functions of the Committee

The Standing Committee on Public Works was originally established in New South Wales in 1887. Its operations were suspended in 1930.

It was re-activated by Motion of the Legislative Assembly on 25 May 1995 with the following principle Term of Reference:

> That a Standing Committee on Public Works be appointed to inquire into and report from time to time, with the following terms of reference:
>
> > As an ongoing task the Committee is to examine and report on such existing and proposed capital works projects or matters relating to capital works projects in the public sector, including the environmental impact of such works, and whether alternative management practices offer lower incremental costs, as are referred to it by:
> >
> > - the Minister for Public Works and Services, or
> > - any Minister or by resolution of the Legislative Assembly, or
> > - by motion of the Committee.

The Committee comprises 10 members of the Legislative Assembly, six members representing the Government, three members representing the Opposition, and one Independent member to be nominated in writing to the Clerk of the Legislative Assembly.

The current Members of the Committee are:

- Mr Paul Crittenden MP, Chairman
- Mr Tony Stewart MP, Vice Chairman
- Mrs Diane Beamer MP
- Mr Andrew Humpherson MP
- Mr Jeff Hunter MP
- Mr John Price MP
- Mr Bill Rixon MP
- The Hon George Souris MP
- Mr Gerry Sullivan MP
- Mr Tony Windsor MP.

The Committee has the power to make visits of inspection within New South Wales and other states and territories of Australia.

The Committee's intended role was clarified in a speech given to the Parliament by the Hon Paul Whelan, Minister for Police and Leader of the Government in the House, on 25 May 1995:

> The Committee may inquire into the capital works plans of State-owned corporations and joint ventures with the private sector. The Committee will seek to find savings in capital works programs whilst achieving a net reduction in environmental impacts by public sector developers. The Committee's work is expected to provide incentives to the public sector to produce more robust cost-benefit analyses within the government budgetary process and to give more emphasis to least-cost planning approaches. The Committee will be sufficiently resourced to enable it to conduct parallel inquiries into specific projects and capital works programs generally.... it will have sufficient resources to inquire into the capital works program of all government agencies whose capital works programs affect the coastal, environmental and transport sectors.

The Standing Committee on Public Works absorbed the functions of the Standing Committee on the Environmental Impact of Capital Works.

The Committee has tabled the following Reports:

- State Infrastructure Requirements for Sydney West Airport (Report No.1, December 1995)
- First Report on Development and Approval Processes for New South Wales Capital Works (Report No.2, October 1996)
- Report on the Lake Illawarra Authority (Report No.3, November 1996)
- Report on Wyong Station Interchange (Report No.4, April 1997)
- Report on the National Conference of Australian Parliamentary Public Works and Environment Committees, Brisbane 1997 (Report No.5, October 1997)
- Report on New South Wales School Facilities (Report No.6, November 1997).

The Committee is completing the following inquiries and reports (as at September 1998):

- Joint Inquiry with the NSW Public Bodies Review Committee on the Regulation of Competitive Tendering and Contracting in the NSW Public Sector.
- Proceedings of the 1998 National Conference of Parliamentary Public Works Committees.
- Proceedings of the 1998 National Conference of Parliamentary Environment Committees.
- Proceedings of a seminar, "Land Transport in the Twenty-First Century."

THE CURRENT INQUIRY

The Inquiry into the Tilt Train arose out of the Committee's attendance at the National Conference of Parliamentary Public Works and Environment Committees in Brisbane in July 1997.

Delegates to the Conference received a briefing from Mr Vince O'Rourke, Chief Executive Officer of Queensland Rail, on the Queensland Tilt Train which was being built at a cost of $106 million to operate between Brisbane and Rockhampton from late 1998.[1]

The application of tilt train technology to Australian conditions for the first time prompted the Committee to examine the feasibility of tilt and other advanced train technology for New South Wales rail services.

The Committee initiated the Inquiry into the Tilt Train at its meeting of 14 October 1997 (Meeting No.35) with the following Terms of Reference:

> That the Standing Committee on Public Works conduct an inquiry into and report on the feasibility of tilt train technology for New South Wales inter-urban and regional rail services.

The Committee adopted the following procedures to ensure that the inquiry was widely-publicised:

- Calling for submissions in major newspapers.
- Targeting key stakeholders.
- Conducting site inspections. The Committee inspected the tilt train manufacturing plant at Maryborough, Queensland and attended a trial of the tilt train between Brisbane and Nerang on the Gold Coast.
- Holding public hearings. The Committee received evidence in Sydney and on the New South Wales North Coast.

It is important to note that the inquiry does not impinge on the delicate commercial negotiations over Very High Speed Train (VHST) proposal between Sydney and Canberra. The Committee has been monitoring the progress of the VHST proposal since 1996 but determined that it should be quarantined from the inquiry.

The structure of the report is dictated by the Terms of Reference, which require the Committee to concentrate on tilt and other fast train technology for the New South Wales rail network. However, these matters cannot be disassociated from nationwide rail issues.

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[1] The full text of Mr O'Rourke's briefing as well as a report on the project by the Queensland Public Works Committee (Report No.35) is contained in the Committee's Report on the National Conference of Parliamentary Public Works and Environment Committees Brisbane 1997 (Report No.5, October 1997).

Chapter One provides an overview of the New South Wales rail network examining its history, the topography of the state, planning, investment, track capacity and traffic congestion as well as freight issues.

Chapter Two examines the concept of tilt technology, the 1995 New South Wales trial and the Queensland tilt train.

Chapter Three looks at current New South Wales rail services and compares the XPT fleet with tilt technology. The Committee reaches its conclusions on the feasibility of tilt technology for New South Wales in this Chapter.

Chapter Four assesses the administrative structure for rail in Australia including the different regulations and standards adopted by state and national jurisdictions. It identifies an urgent need for a national strategy which will provide clear long-term goals for upgrading rail infrastructure. Consolidation of all land transport matters and funding into a single national body is recommended as the best means of achieving genuine reform. Investment and relative funding disparities between road and rail are addressed as part of this strategy.

Chapter Five addresses major New South Wales corridors which should become priority for targeted infrastructure investment in the national interest.

In summary, the Report consolidates the huge amount of documentary material on fast train technology and the New South Wales rail network into a single, public document.

The Committee's recommendations deal with specific train technologies and routes in New South Wales as well as related infrastructure and administrative matters of national significance which affect the performance of the State network.

The Committee is particularly concerned with advancing cooperation and coordination across state borders and at a national level through the establishment of a National Land Transport Commission to promote the concept of a National Rail Highway to direct funding to those corridors which will deliver tangible benefits to all rail users across the nation.

EXECUTIVE SUMMARY

Tilt train technology was developed as a way of reducing travel times on existing rail tracks. By tilting as they travel around corners, trains are able to travel faster while maintaining passenger comfort. They are modern, adaptable, comfortable and well-appointed passenger trains able to travel at speeds of over 200 km/h on good quality track.

The introduction of tilt technology in Queensland prompted the Committee to assess its feasibility for regional and inter-urban services in New South Wales. There are obvious attractions for New South Wales in links with the Queensland Tilt Train if possible. At the same time, Countrylink has been considering future options for its XPT fleet: either a half-life refurbishment or replacement with new rolling stock.

The Committee took up the challenge of determining whether tilt trains could cost-effectively reduce travel times on the New South Wales rail network.

The starting point for this inquiry was an examination of the history of the New South Wales rail network. Rail developed in New South Wales last century as a consequence of, firstly, economic pressure - the need to link coastal ports with the resources (mineral and agricultural) in the hinterland - and, secondly, political pressure - the desire for all communities to be connected by rail with major centres.

The vital role of rail in the burgeoning economy of the State enabled profitable, efficient services to subsidise inefficient ones in support of the "greater good." However, capital was limited and efforts to hold down costs meant that track standard sometimes suffered.

When a competitor did emerge after World War Two in the form of road transport, the rail industry was neither equipped to compete nor provided with the resources to do so. The expanding road transport industry was supported by huge injections of investment from successive Federal Governments, which did not have to be repaid. Rail consequently lost profitable market share while being obliged to maintain unprofitable activities in keeping with its responsibilities as a government-owned community service. Not surprisingly deficits grew. Limited investment in rail had to be justified on the return it could generate on assets.

A rapidly modernising national highway system has enabled road transport to become dominant over a rail industry starved of infrastructure investment. The differing treatment of the two modes is curious for, as it was put to the Committee, "no one complains that the Hume Highway doesn't make a profit."

It is acknowledged by experts that rail has an essential part to play in a modern economy. In the transport of freight, rail has many economic and environmental advantages over road if the two modes are able to compete on equal terms. It is the natural mode for large, long distance freight tasks. The competitive advantages of fast passenger train journeys have also become obvious and many countries now possess fast train services.

Today, the New South Wales rail network is at the crossroads. It is unable to provide the passenger and freight service levels demanded by a modern, technologically-advanced society. It suffers from a lack of investment and poor long-term planning; deficiencies that its competitor - the road industry - does not suffer. A first generation rail system (19th century) is trying to compete with a third generation road system (21st century) which is conquering the difficult terrain along the State's seaboard.

The introduction of the tilt train in Queensland has been made possible by a long-term planning approach to track improvements backed by secure government investment levels. The aim of this policy has been to improve the rail network for the freight industry. The tilt train passenger service is a beneficiary of this work, effectively "piggy-backing" on track improvements. The outcomes are impressive. Passenger travel times have halved and freight loads doubled in Queensland in the last twelve years.

In New South Wales, Countrylink operates XPT and Xplorer fleets (as well as some old locomotive hauled rolling stock to Broken Hill and Griffith). The Xplorer fleet is relatively new and specialised in its use because it can be divided into two separate trains. The XPT fleet is the backbone of Countrylink services. Their design life is 20-25 years. The oldest cars are now 15 -16 years old.

Countrylink has reached the point where it must choose between refurbishing the XPT fleet to extend its life by a further 15 years or replacing it altogether. The estimated refurbishment cost of the XPT fleet is $33 million while a replacement tilt train fleet would cost upwards of $250 million.

Estimates varied but generally tilt trains would enable travel time savings of around 10% on the existing New South Wales rail network. These time savings are not sufficient to enhance rail's competitiveness with other transport modes. All experts advised the Committee that significant travel time savings would only be achieved if major track improvements were carried out on the New South Wales rail network. Furthermore, tilt trains were likely to contribute to congestion on the current network by consuming train paths.

Given the high cost difference between XPT refurbishment and new tilt train rolling stock, the Committee concluded that the limited gains from introducing tilt trains on existing infrastructure would not justify the expenditure.

The Committee, therefore, recommends refurbishment of the XPT fleet with capital investment focused on improvements to rail infrastructure.

The nature of the inquiry also brought the quality of the national rail network to the attention of the Committee. Much of this network is in poor condition. None of the major rail corridors reach world's best standard. Indeed, six of the nine corridors are rated at or below 60% of world's best standard. This performance is projected to deteriorate even

further over the next twenty years by the National Transport Planning Taskforce. The proliferation of State and Federal agencies - each with their own pricing regimes, operating requirements and technical standards - is contributing to this decline.

The interstate rail network should be consolidated under the control of a national body with power over all land transport modes.

A National Land Transport Commission should be established to develop and coordinate transport linkages across Australia through a National Land Transport Master Plan. Investment should be directed to the most effective transport mode for each given task. The appropriate choice of fast train rolling stock must be an integral part of the Master Plan.

The Commission should control competition policy, regulation, access, maintenance and management issues as well as investment in new infrastructure. It should introduce an equitable system of cost recovery from road and rail transport modes (as in New Zealand) to assist in correcting problems caused by the imbalance in investment over the last fifty years.

Its first task should be the definition of a National Rail Highway with priority corridors designated as Rail Links of National Importance. Uniform technical and safety standards for rail should be developed as a matter of urgency.

The first steps in this process were taken at the National Rail Summit in September 1997. Further progress has been made in the recent report, "Tracking Australia," by the House of Representatives Standing Committee on Communications, Transport and Microeconomic Reform (July 1998). This report is crucial because it acknowledges that investment in rail infrastructure of national significance is a Commonwealth responsibility.

Commonwealth investment of $2.75 billion to the year 2010 is recommended by the House of Representatives Standing Committee.

The Committee supports investment of $2.75 billion by the Commonwealth Government in national rail infrastructure. This investment should be allocated strictly according to the highest cost-benefit ratios.

Experts agree that the Melbourne-Sydney and Sydney-Brisbane corridors - as well as access in Sydney - warrant the major share of investment in national rail infrastructure.

Both the Bureau of Transport and Communications Economics (BTCE) and National Rail have developed infrastructure packages which direct the vast majority of investment to major New South Wales corridors.

Over 80% (or $494 million) of the National Rail proposal for $621 million in urgent works and over 60% (or $2 billion) of the BTCE proposal for $3.2 billion investment over the next

twenty years are directed at the Sydney-Melbourne and Sydney-Newcastle-Brisbane corridors. Upgrading these corridors should become a national priority.

The Committee analysed track quality on major New South Wales corridors to develop a framework for identifying and prioritising track improvements. The most urgent areas for investment are those sections of track which contain both tight curves (less than 800 metres in radius) and steep grades (more than 1:66).

The Sydney-Newcastle corridor (151 km) carries large volumes of daily commuter traffic. It is congested and suffers from poor track alignment. It is rated at only 50% of world's best standards. Fifty-five kilometres of the route has tight curves. There are 30 km of steep grades. Almost 14 km (or 10%) of the route has both tight curves and steep grades.

The North Coast Line from Maitland to Brisbane (782 km) is simply a string of connected branch lines. There are almost 350 km of track with tight curves. Almost 18 km of track suffer from both tight curves and steep grades.

The financial viability of rail freight and passenger services on this corridor are under serious threat from the considerable investment in the Pacific Highway. For example, a tilt train on existing track might reduce the Sydney-Brisbane trip to 12 hours. This would not be competitive with bus travel times of 10 hours upon completion of the upgrading of the Pacific Highway.

Only a strategic approach to reduce the end-to-end route length of the Sydney-Brisbane corridor will effectively assist the competitiveness of rail. A number of options exist and a final choice of options should be based on a complete Cost Benefit Analysis (CBA) which includes the impacts of fuel savings, pollution and car emissions, congestion and accidents and fatalities.

The New South Wales section of the Sydney-Melbourne corridor (586.2 km) is the busiest and most congested in Australia. Currently, it is rated at 60% of world's best standard by the BTCE but this is predicted to fall to 50% by 2014/15. The proportion of the freight market share carried by rail along this corridor dropped from 57% to 23% between 1964 and 1985/86.

This vital corridor for the national economy contains sectors of poor alignment and geometry which would greatly benefit from a long-term program of track upgrades. Almost 61 km of the New South Wales section are subject to steep grades. There are 139 km of tight curves (over 20% of its course). Steep grades and tight curves affect 17 km of the corridor. Low clearance means that containers cannot be double-stacked.

The track improvement options outlined by the Committee should be developed into a properly prioritised and costed plan by the New South Wales Department of Transport to take advantage of increased Commonwealth investment in the future.

FINDINGS & RECOMMENDATIONS

Chapter 3

1. **Tilt technology is not feasible for the New South Wales rail system at the moment. It would not produce substantial journey time savings on major New South Wales rail corridors. The full benefits of expenditure on tilt technology will only accrue with substantial investment in rail infrastructure.**

2. **The Committee supports the refurbishment of the XPT fleet so that it can continue to operate reliably with an acceptable level of comfort and presentation.**

3. **The New South Wales Rail Access Corporation and the Australian Transport Council continue to work towards a long term solution to congestion problems in Sydney, particularly when they hamper the movement of freight. In the short term, the elimination of specific bottlenecks will reap significant efficiencies. However, track improvements must be compatible with a strategy to construct a separate freight corridor through Sydney with double stack clearance.**

4. **The introduction of the Queensland Tilt Train was facilitated by a long-term program of track improvements which effectively prepared the State for high speed passenger trains. The far-sighted planning approach in Queensland was assisted by secure investment levels.**

Chapter 4

5. **The establishment of a National Land Transport Commission with wide powers to develop transport linkages across Australia and determine relative levels of investment across land transport modes.**

   The Commission will control the following elements:

   - **Application of competition policy**
   - **Competitive neutrality**
   - **Effective regulation (including uniform technical, performance and safety standards)**
   - **Investment in new infrastructure**
   - **Access to the interstate rail network**
   - **Maintenance and management of network assets**
   - **Development of multi modal transport corridors.**

   The Commission must complete the following tasks as a priority:

- **Formal definition of a National Rail Highway**
- **Formulation of a National Land Transport Master Plan**
- **Establishment of uniform mass/speed and dimension performance standards**
- **Formulation of an infrastructure maintenance program**
- **Identification of rail corridors for immediate investment (these corridors should be designated 'Rail Links of National Importance').**

6. **The National Land Transport Commission to introduce an equitable system of road and rail charges to correct the historic imbalance in investment between road and rail infrastructure. This imbalance alone is largely responsible for an uncompetitive land transport industry, which is detrimental to the economic and environmental prosperity of the nation. A rational system of cost recovery will lead to the revitalisation of the rail transport industry, as demonstrated by the example of New Zealand.**

7. **A hypothecated portion of the Fuel Excise Levy (currently 18 cents per litre) is currently directed to road infrastructure. This portion of the levy paid by the rail industry should be dedicated to rail infrastructure projects.**

8. **The New South Wales Department of Public Works and Services to continue to pursue methodologies to fully quantify environmental and social costs and benefits in economic appraisals for road and rail infrastructure projects. Factors to be quantified should include fuel consumption, greenhouse gas emissions, air pollution, traffic congestion, accidents and fatalities and related infrastructure demand. The Total Asset Management Manual should be updated to include this material and these developments should be identified in Treasury Guidelines.**

9. **The Minister for Roads and Minister for Transport to direct transport agencies to quantify the global impact of different land transport modes in the Integrated Land Transport Plan to guide future planning and investment on a "preferred modal" basis. Factors to be considered should include relative levels of fuel consumption, greenhouse gas emissions, air pollution, traffic congestion, accidents and fatalities as well as related infrastructure demand.**

10. **The Urban Infrastructure Management Plan be extended to cover all land transport infrastructure projects in the State in recognition of the essential inter-relationship of urban and regional New South Wales. The notion that urban and regional infrastructure are somehow disconnected is impractical for land transport. By definition, land transport crosses the State and connects the city with the country. On this subject, the Committee restates its comments of 1996 on the need to "establish a statewide system of scrutiny for all proposed public works projects and capital works programs" (Report No.2, p.93).**

11. **The Committee fully supports the recommendation of the House of Representatives**

Standing Committee on Communications, Transport and Microeconomic Reform in its report, "Tracking Australia," that the Commonwealth provide investment in rail infrastructure totalling $750 million over three years to 2001 and a further $2 billion from 2001 over ten years.

12. **The BTCE rail infrastructure investment package - which forms the basis of the investment program recommended by the House of Representatives Standing Committee on Communications, Transport and Microeconomic Reform - directs almost $2 billion (or two-thirds) of total funding to New South Wales corridors. The integrity of the BTCE package should be maintained by the National Land Transport Commission in apportioning investment for future rail infrastructure projects around Australia.**

Chapter 5

13. **The New South Wales Minister for Roads and Minister for Transport to direct that preparatory planning commence immediately for track improvements to major New South Wales corridors, prior to the establishment of a National Land Transport Commission. New South Wales sections of the Sydney-Melbourne and Sydney-Brisbane railway corridors should be aerial-surveyed, mapped and computer-formatted to improve knowledge of existing track alignments and allow for proper planning of track deviations.**

14. **A full Cost Benefit Analysis (CBA) of upgrading the Sydney-Melbourne and Sydney-Brisbane corridors to Fast Freight Train (FFT) standards with 1:66 minimum ruling grades, no curve tighter than 800 metres and clearance for double-stacked containers.**

The following factors should be assessed in the CBA:

- **Modern high voltage electrification**
- **All options for the New South Wales North Coast corridor**
- **Inclusion of all Melbourne-Brisbane freight**
- **Diversion of all East-West (Perth/Adelaide to Sydney/Brisbane) interstate freight from haulage through Broken Hill to Melbourne**
- **Minor improvements to enable one-and-a-half container stacking**
- **Potential benefits for passenger train operations, including the use of tilt and other fast train technologies.**

The CBA should use two methodologies:

- **Commercial rates of return only**
- **A full assessment of improved passenger train operations, reduced road**

maintenance costs, reduced demand for new road construction, improved road safety, reduced road congestion (including the benefit of improved road travel times) and reduced energy use (for both existing rail transport and road freight diverted to rail) with subsequent reduction in air pollution and greenhouse gas emissions.

The Committee considers that the BTCE (now the Bureau of Transport Economics) should be commissioned with this task by the New South Wales Minister for Roads and Minister for Transport.

Chapter 1

New South Wales Rail Infrastructure

The quality of New South Wales rail infrastructure is a crucial issue in determining the feasibility of introducing tilt train technology. Fast train services are vitally dependent on factors like track alignment and gradient, the condition of structures such as bridges and tunnels, the weight of rails and the type and condition of sleepers and ballast.

New South Wales does not have a uniformly modern, efficient rail network. One expert examined by the Committee summarised its condition succinctly: "it is an adequate and competent network but it is not a fast network" (T1, 39).

New South Wales secondary lines west of the Great Dividing Range generally have good alignment. There are good sections of track formation, sleepers and rails particularly in the Hunter Valley, which offers the best axle loadings (35 tonnes) in Eastern Australia. There is also considerable potential for rail in New South Wales given its strong base. ARUP/TMG wrote in its submission that "rail is in a unique position in and around Sydney in that it is the largest suburban, interurban and long distance public transport travel provider" (S11, 1-2).

Yet overall descriptions of both the New South Wales and interstate rail networks presented to the Committee ranged from critical to scathing, particularly for major inter-urban corridors.

The following comments give a good overview of the opinions of experts and stakeholders:

- "Sydney's and New South Wales' geography has resulted in a basic rail infrastructure of steep gradients and tight curves. While this resulted in a service which was acceptable in times past, that is now no longer the case." (ARUP/TMG - S11, 1)
- "Every path out of Sydney by rail [has] curvy and windy steam age tracks built in the last century with pick and shovel..." (Campbelltown and Districts Commuter Association - S6, 2)
- "The present alignment of the mainline track prevents any train from reaching its potential. This includes the XPT, which is capable of speeds approaching 200 km per hour, and probably the tilt train. Thus, a tilt train, with no track upgrading, will not offer significant time savings." (Associate Professor Philip Laird - S7, 2)

The critical issue for the Committee in this report is determining whether a prima facie case exists for the replacement of rolling stock such as the XPT fleet with tilt trains.

The State Rail Authority (SRA) recognised some potential for tilt technology to improve journey times on existing New South Wales track alignments. Like Associate Professor Laird, the SRA also identified a number of factors which would determine whether the tilt train's potential could be translated into outcomes:

> Most of the track in New South Wales dates from earlier in this century when slower, less powerful steam trains were the norm. To minimise cost, the track was built to follow the ridges and is therefore very curved. As a consequence, there is potential for tilt trains to reduce journey times. However, there are more factors to achieving faster journey times on any given route than simply the type of rolling stock which is operated viz:
>
> - the top speed at which the train can operate on straight and curved track alignments (from both a technical point of view and a passenger comfort and safety perspective);
> - the number of stations at which the train stops on the route;
> - the condition of the track (its geometry - i.e. its curvature and vertical alignment, its performance standards and the number of tracks that exist on the line...);
> - the speed of other trains using the line; and
> - pathing and congestion on the line... (S28, ii)

In considering the potential of tilt trains to create a faster, more efficient inter-urban and regional rail network in New South Wales, it is necessary to bear in mind all these factors. Later in this Report, the Committee examines individual New South Wales rail corridors to determine their suitability for tilt technology. First, however, the Committee examines the following factors affecting the quality of the New South Wales rail system:

- History
- Topography
- Rail planning
- Track capacity and congestion
- Freight issues
- Investment.

The Committee also compares the quite different development of road and rail infrastructure in New South Wales through the notion of "generational" standards which evolve with time and technological advances.

1.1 History

Rail has gone through periods of expansion and decline internationally since its inception and its role has changed dramatically as other transport modes such as cars and aircraft have been developed to meet the needs of human and freight movement.

The Industry Commission reported in 1991 that:

> World-wide, railways are servicing a declining share of the transport market. Their function is quite different from 100 years ago; now cars, buses, trucks and

> aeroplanes offer a greater range of choices in speed, price and service. The general decline of rail has continued over the past 20 years, but overseas there has been a revival of high-speed long-distance passenger trains, and there is a growing need for efficient urban rail systems. Rail freight is increasingly concentrated on long-distance unit trains and heavy hauls, where currently rail has a comparative advantage. (Industry Commission, Rail Transport, Report No 13, Vol 1, August 1991, p.xiii)

In Australia, rail was introduced and developed during the colonial era with some unfortunate results. Whereas most countries have nationwide railway systems running on tracks of uniform gauge and owned by a national government, each Australian colony established its own railway system. The rivalry and fragmentation which such a system fostered remains essentially in place today.

Rail in Australia commenced in Sydney during the 1850s with the construction of a track between Sydney and Parramatta. The track was subsequently expanded to meet the developing needs of the colony. Rail became the backbone of transport infrastructure and contributed significantly to the agricultural wealth of the country. There is no doubt that access to resources and economic development were the driving factors for new lines and that the benefits of investment in rail were assessed in the broadest of senses:

> The Australian railway systems were laid down mainly in the latter part of the 19th century, and were built largely to allow the opening up of land for agricultural purposes. Many lines were constructed, often to a quite low standard, and the railways became major employers. Because of their development role, railways were never expected to show a profit; Australia's railways were state-owned almost from the start, and economic returns stemmed primarily from the sale of land near railway lines (especially in the cities) and the ability to get rural production to world markets.[1]

While the introduction of railways in Australia in the 1850s was at first an initiative of the private sector, governments soon became involved because investors demanded that governments guarantee dividends and provide additional capital to complete lines. When entrepreneurs were confronted by difficulties, governments gradually assumed ownership of the rail network to protect themselves from financial exposure. In broad financial terms, railways operated as a benevolent monopoly and there was ample scope for cross-subsidising unprofitable segments of the business by those segments which made money.[2] In this regard, the Industry Commission agreed that "the early railways generally proved to be marginally viable, though their financial performance was dependent on the economic prosperity of the regions they served." This financial viability "encouraged governments to expand their systems because they were regarded as

[1] Ogden, "Putting Australia's Railways on the Right Track," *Policy*, Autumn, 1990, p.20.

[2] Williams, "Rail faces dinosaur's dilemma - adaptation or extinction," *Australian Transport*, Aug 1987.

important to the development of the colonies" (37-8).

From capital cities and major coastline cities, lines radiated inland to provincial cities and centres of agricultural production.[3] The burgeoning community expectation that a rail service would be provided at a convenient location lead to the first attempts to create a comprehensive New South Wales network. The Industry Commission has argued that the political pressure to construct lines to every settlement forced the railways to:

> ... build lines cheaply in order to maximise network coverage. Most of the lines were a financial burden from the outset because of low levels of traffic and, because of cheap construction, very high maintenance costs.

This uncoordinated and ill-funded expansionary strategy created the kernel of later more serious financial problems. It also raised a major policy debate which has continued to dominate thinking on railways: should they operate like all commercial concerns and earn a return on capital investments or should the State treat them as public works necessary for the proper workings of industry and commerce.

The same debate applies to the New South Wales rail network today and it has been largely responsible for the withdrawal of government funding for rail over the course of the twentieth century in Australia. The outcome is that New South Wales railway lines today reflect the transport imperatives of a different era.

Rail's pre-eminent position in both freight and passenger transport gradually changed after the Second World War. Its decline can be attributed to two primary factors:

- The rundown in infrastructure quality during the War without adequate investment afterwards because Commonwealth Governments could not fund the substantial renewal programs required to rectify the ongoing deferral of maintenance
- The emergence of road transport as a powerful and influential competitor.

The sudden, ready availability of mass road transport at the end of the war enabled it to step into the breach and power national reconstruction programs:

> ... the trucks and truck drivers released from military service provided the foundation for a dynamic private enterprise road freight industry. The embryo road freight industry burgeoned. At the same time private cars, buses and newly formed airlines began to make inroads into rail passenger patronage. (Williams)

Legislation protecting State rail monopolies was also removed as a result of constitutional battles over interstate transport from 1954 onwards.

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[3] Schrader, "Outdated perceptions trap rail in a fight it cannot win," *Australian Transport*, June/July 1985.

Increased funding of roads came at the expense of rail infrastructure. During the post-war period, rail's main competitor was underwritten by huge investment in road construction and modernisation with no expectation of a return on the capital costs from the road transport industry or cost recovery through user charges. The Committee discusses this issue in detail in a later section of this Report.

These inroads into the core business of rail meant that it was left with an increasingly disproportionate mix of commercial and non-commercial services. Its flexibility to cross subsidise services was seriously eroded because it was not relieved of its traditional obligations to provide the non-commercial or social services.

In *Along Parallel Lines*, Gunn summarised the difficult financial position facing rail in New South Wales in the 1960s:

> ... the Commissioner's three core constituencies were the public, his employees and his political masters. He had to provide... unprofitable and occasionally free services and to pay interest on a capital debt that included assets that had long passed their economic life...

The result was that deficits emerged and then grew alarmingly until the combined loss on all railway services exceeded $1.5 billion in 1985/86.

In this environment, the difficulties inherent in a state-based approach to railway ownership and operations became glaringly apparent. Separate bureaucracies resulted in many different gauges, standards and other vital characteristics. Major diseconomies included duplication of facilities and administration, inefficient operating procedures, poor use of available resources, limited standardisation of equipment and a lack of uniform approach to railway policy.

The Whitlam Government attempted to address the problem but failed because it could not gain support from all the States. The breakdown in unification efforts at such a critical point in Australia's history effectively consigned rail to the backburner for 25 years.

The rationalisation of New South Wales rail services in the 1980s met short-term budgetary imperatives of addressing the ongoing damage of loss-making rail agencies. However, it did not weigh-up the long-term economic and environmental consequences of diminished rail services.

There has been particular concern expressed to the Committee from regional New South Wales about the closure of long-established services, which many people recognised as a physical or symbolic link with the outside world. The submission of the Lachlan Regional Transport Committee exemplified this attitude:

> Over the past 22 years there has been significant changes to the way in which Rural Rail Passenger Services have operated. In the mid 70s we saw the introduction of Road Coach services in the Western area of New South Wales.

> Since then we have seen the gradual phasing out of passenger rail services and increasing use of road coaches. In September 1988 we saw the axing of many night trains to country areas and the abolishing of the Bathurst and Mudgee day train service to Sydney, allowing country people to spend 7 hours in Sydney to do their business and return home that evening. (S27, 1)

The financial grounds on which rail services were curtailed may have been - and may still be - valid. However, the total costs and benefits need to be assessed. The Committee will highlight some of the areas which need to be considered in a broader cost-benefit approach to transport infrastructure investment at Section 4.8 of this Report.

Poor track quality through large sections of the New South Wales rail network - especially on major interstate corridors - is the outcome of years of neglect of rail infrastructure. Submissions and evidence to the Committee continually returned to this problem.

The Federal Government's One Nation Program between 1992 and 1995 was the only major attempt to inject funds into the nation's rail system with $450 million of investment. However, this major policy shift had a number of limitations. Firstly, it was announced so suddenly that it caught rail authorities by surprise, meaning that the projects completed were not necessarily top priorities. Rather, they tended to be whatever was in the pipeline at the time. Further, rail infrastructure investment by the Commonwealth Government has since returned to zero. Therefore, benefits have been eroded by lack of follow-up works.

This overview of the history of New South Wales rail infrastructure identifies some of the fundamental structural problems which continue to frustrate reform to this day.

There was considerable investment in building a rail network to the overall advantage of the New South Wales economy. It reflected wider social goals as well as pure economic ends.

However, rail infrastructure was not always constructed to optimal standards. There was also the problem of different States developing rail systems which were not compatible.

These factors sowed the seeds of later difficulties for rail at a State and Federal level.

After the Second World War, a fundamental national policy shift from rail to road investment exacerbated these factors. This seriously eroded rail's competitiveness as a transport mode.

Rail became such a serious loss-making enterprise for the New South Wales Government that its community importance became overridden by purely financial imperatives.

In the next section, the Committee considers how the topography of New South Wales has affected the quality of rail infrastructure.

1.2 Topography

In New South Wales, the topography has been a perpetual physical hindrance to the development of efficient transport networks.

Rail links between coastal ports and rural centres were confronted from the outset with engineering difficulties brought about by the terrain. This was explained to the Committee at public hearings:

> **Mr WARDROP:** Effectively, the New South Wales railway system is a colonial railway network. It was built to connect the rural hinterland to the ports of Sydney, Newcastle and Wollongong.... The bulk of the population of New South Wales is on this coastal strip, and it runs from south to north. The bulk of the agricultural activity occurs to the west of the Great Dividing Range, so there is a natural impediment to the flow, whether by road or by rail, from the hinterland to the seaboard....For want of a better description, maybe 200 kilometres inland could be described as tiger country. It is steeply graded, it is not suitable for agricultural development and it is not particularly suitable for residential development. So that the railways in New South Wales have a 200 to 300 kilometres penalty between the agricultural and mineral wealth of the State and the seaboard. (T1, 39)

Mr Wardrop concluded in his evidence: "you cannot escape having to climb out of Sydney" (T1, 40).

Unlike highways, which can be constructed on steeper grades and have had the advantage of a considerable injection of funds over the last thirty years, the Committee heard that rail has not been able to overcome the topography surrounding Sydney in every direction:

> **Mr THORNTON:** If you think about the Sydney to Newcastle freeway and think that freeways are graded more steeply than our railways, and look at the engineering that was required to create a high speed road system to the north, or in fact if you look to the south or south-west of Sydney, those are the conditions that a railway has to tackle to gain an exit from Sydney. Those conditions continue for considerable distances. The diagram will show that contrary to the perceptions that Australia is a flat country the piece in which we choose to live is extremely difficult for the development of transportation networks.
> **Mr WARDROP:** Rugged is the best description. (T1, 40)

Options to overcome this problem have been cost prohibitive in the past and, even with state of the art tunnelling technology, would require concerted government investment. The end result is that the physical barriers surrounding the New South Wales capital have never been adequately overcome by the rail network, particularly with regard to the speed requirements of a network serving a developed society heading into the twenty-first century.

1.3 Planning

The historical standard of rail planning at both a State and Federal level has been criticised in evidence received by the Committee.

The Committee was offered some examples of how poor planning or the lack of an overall strategy had affected rail infrastructure projects in New South Wales. This aspect of project development is particularly important because lack of a long-term strategy can result in the misallocation of scarce resources. It is essential that the limited funds obtained by rail agencies be put to the best use. Yet the Committee has heard that this is not necessarily happening.

The Committee examined the north coast as a case study of planning approaches in New South Wales.

The New South Wales North Coast is an area undergoing considerable population growth and internal population relocation with all the social change that comes from these developments. The rail alignment is basically 19th century standard with curves of 400 metres radius or less and steep grades which fail to meet the most basic freight train standards. It is basically a string of connected branch lines from Maitland to Brisbane. The Committee has considered options for this line in detail in Section 5.2.

Until recently, rail agencies seem to have given little thought to the long-term needs of the area and the best way that rail can deliver those needs. Instead, the limited resources made available have been used to simply prop up an outmoded rail corridor rather than plan for the future. Funding limitations obviously encourage such short-term thinking. However, the truth is that investment on bad lines decreases the likelihood that they will ever be replaced.

The Committee heard evidence from the current General Manager of Countrylink, Mr Poulter, that infrastructure items had been reconstructed on the existing alignment without consideration of track improvements:

> **Mr RIXON:** There have been major improvements north of Grafton, not so much to the alignment but to the quality of the track.
> **Mr POULTER:** The point being made in that submission was that a lot of money has been spent on re-bridging, re-sleepering, re-ballasting and those sorts of things but the alignment did not change. They rebuilt the alignment that was there. The inference is that with better preplanning it might have been smart to realign if you were going to spend that money. (T1, 25)

At the public hearing on the north coast, Dr Weatherby was asked for his comments on this action:

> **CHAIRMAN:** At a previous hearing in respect of this matter the Committee heard that State Rail had spent money on infrastructure such as bridge

> strengthening on the north coast line. Do you think that is a justifiable or worthwhile investment at this point?
> **Dr WEATHERBY:** One of the things they have done is to strengthen many of the timber bridges which were, I guess, almost in danger of falling down. But, unfortunately, they have replaced them on the existing alignments. So, while they have got some very nice concrete bridges built, they are on fairly curvy existing alignments. To some extent that has kept rail traffic going, but it has blocked off future investment; or, if you like, it has wasted potential for actually putting in some minor straightening. If they could just do some minor straightening, and keep repeating that sort of work year after year, over a number of years they will have a reasonably straight line. I think it is an example of poor planning to not spend more money to get a better alignment where they have replaced some of those bridges that are on quite poor alignments. (T2, 13)

Associate Professor Laird supported this evidence adding that One Nation funds were used to repeat the error elsewhere on the north coast:

> ... State Rail was busily building bridges on concrete on tight radius alignments, including the worst sort—the reverse curve which goes one way, then the other. At one location, Craven, that was done despite questions being asked in State and Federal Parliaments. Regrettably, the practice was continued in part with some "One Nation" funded bridges, I think south of Grafton. (T1, 35)

Mr Wardrop also commented on the quality of investments in the north coast corridor, acknowledging that funding constraints limited the extent of track improvements:

> **Mr RIXON:** Grafton has been the only real realignment of any track in New South Wales for the last 50 years. What was your opinion of those deviations? Could that money have been better spent up there?
> **Mr WARDROP:** I was disappointed because the pay offs in overall travel time have been very slight. On the other hand, if you only have $90 million to spend it is hard to spend it in a way that you get really big savings. If you want to make worthwhile reductions in travel time you have to spend considerable amounts of money in improving the alignment of the railway, and that means that you have to do more than realign maybe 10 or 15 kilometres of track; you have to think of realigning a couple hundred kilometres of track. That is when you get the right order of improvement. (T1, 44)

This problem is by no means confined to the North Coast. One of the Committee members identified a worse example on the Illawarra corridor:

> **Mr SOURIS:** Probably a worse example was when the electrification of the Wollongong line took place. It was a tragedy that not enough, if any, straightening took place then. It was literally the wires on the existing line. (T1, 25)

The tragedy of this type of investment is that it effectively entrenches the existing track alignment.

This evidence reasserts the need for major, sustained investment in New South Wales rail corridors backed up by good, long term planning. Indeed, there is a symbiotic relationship between them. Planners act with certainty when they have confidence that the funding stream is secure.

Yet the Committee heard that when there was the chance to secure Commonwealth Government funding for the New South Wales rail network, a lack of preparedness cost us dearly. Investment opportunities were canvassed across the nation by the Commonwealth Government as part of the One Nation program in 1992. However, New South Wales lost out on possible investment according to Associate Professor Laird:

> We have to avoid a repetition of the situation that happened in 1992 when no less than $50 million of Federal funds under the "One Nation" program were diverted from New South Wales to Victoria simply because the New South Wales authorities said they had plans. Prime Minister Paul Keating found out that they did not have proper plans and that the project was grossly under costed. A lot of planned works in the Sydney region did not proceed and the money was reported by the *Sydney Morning Herald* as going to Victoria. (T1, 37)

The Committee was very concerned about the record of rail planning in New South Wales, particularly when compared with the approach of road agencies:

> **Mr SULLIVAN:** You suggest that track alignment is more the issue than whether we do or do not have a tilt train. That leads to another question: what has been going on in the State Rail Authority for the past three or four decades?
> **Mr RIXON:** What has been going on since 1910?
> **Mr SULLIVAN:** Leaving that aside, in the past three decades, given modern technology, the changed perception of rail needs and the efficient or optimal road and rail system, nothing effectively has happened in New South Wales by way of long-term planning to address any of these issues....
> **A/Professor LAIRD:** The State Rail Authority has very good strengths, and the CityRail system is the largest urban double-deck system in the world. It has done a reasonable job with Hunter Valley coal traffic, although interstate main lines have not been well served. This problem is not confined to the railways. The State highway from Campbelltown to Albury was a basic two-lane road in 1970 and had been pounded to pieces. It linked the cities of Campbelltown and Picton and the small towns of Goulburn and Yass. It took Federal intervention and funding to convert this basic two-lane highway, linking the two largest cities in Australia, to something approaching reasonable world standards. (T1, 36)

Associate Professor Laird defended the performance of rail agencies to some extent. However, he noted that the New South Wales Roads and Traffic Authority (RTA) and its predecessors had shown the way in long-term planning. By looking ahead and making improvements as funding

permitted, the road network had been systematically upgraded across the State. Furthermore, good pre-planning means that when funds suddenly become available, work is ready to commence.

Current projects being developed by the RTA were presented by Associate Professor Laird as examples of the kind of long-term approach needed by rail agencies:

> **A/Professor LAIRD:** We have to impress upon the rail authorities the need for forward planning at which the Roads and Traffic Authority and the former DMR (Department of Main Roads) had been so good.
>
> For example, the two-lane Sheahan Bridge at Gundagai will eventually be four lanes. I am told by the RTA that it has its plans ready to roll and it has probably done the environmental impact assessment and all the necessary community consultation for the future work. For the Goulburn bypass the EIS was on display in 1985 and the bypass was commissioned in 1992. I suggest that the Committee could well consider suggesting the need for the rail authorities to be much better at forward planning than they have been in the past, including community consultation.
>
> Another example involves Motorway Pacific. Approximately 10 years ago the concept was for a four-lane highway from Sydney to Brisbane; yet five years ago, when it became apparent that State funds were not there, the Roads and Traffic Authority developed the concept of Motorway Pacific with a series of tollways. That proved to be not viable and now, because the planning was done and the concept was promoted, we have a tri-government agreement that will see that highway upgraded by 2005. If the railways could be encouraged to act in a similar way as the State road authorities we would all be much better off. (T1, 37)

The benefits of long-term planning are exemplified by these examples.

The Committee was told that expenditure on planning now would prepare the ground for future investment. What was needed in the first instance was more comprehensive data on the actual state of New South Wales rail networks, traffic movements and likely deviations:

> **CHAIRMAN:** In your submission you recommend an extensive data collection program and analysis of that data. Can you elaborate on what detailed analysis of that data would be required?
>
> **A/Professor LAIRD:** I refer to a recommendation on page 7 of the submission which was made five years ago. Firstly, the existing main lines should be aerially surveyed, mapped and computer formatted to improve the accuracy of the existing computer databases. Potential deviations should then be planned. Sometimes one might select a deviation but the costs of that deviation are so high or there are problems with land acquisition that you may have to shift it slightly. Secondly, we need much better information on freight flows.
>
> The most recent data on Sydney to Melbourne intercity freight flows that

> were not projections date back to 1992-93 simply because the Australian Bureau of Statistics has declined effectively to collect interstate freight data. We cannot answer with certainty such simple questions as whether the Queensland rail main line upgrade has improved the modal share of road freight versus rail freight because we simply do not know intrastate freight movements. Thirdly, we need better passenger rail data—not only who is going by what mode at the moment but where we would be going if improved options were available or pricing changed.
> **CHAIRMAN:** So is it not basically a survey of potential customers?
> **A/Professor LAIRD:** Yes, plus a much better understanding of existing infrastructure to the nearest metre, whether it climbs up or down, its curve radius, the length of crossing loops and so on. This applies not only to the State but across the nation. (T1, 31)

Mr Poulter of Countrylink argued that good, detailed planning had occurred on the Sydney-Canberra corridor where a VHST was now being proposed. This level of planning now needed to be undertaken on other corridors. It would deliver better journey times for a reasonable investment:

> **CHAIRMAN:** The tilt train could operate on major lines such as the north coast, Sydney to Canberra and Sydney to Albury. What sort of work would be required on those tracks before a tilt train could operate efficiently and effectively on them?
> **Mr POULTER:** ... If the objective was to have the fastest possible journey time, say going to Brisbane, huge amounts of work would need to be done. I am not aware of any study that looks at the main north line in anything like the detail that has been applied to the Sydney-Canberra line, where that has been looked at inch by inch over the whole track. It is very easy to look at the dollars required to make incremental improvements and the minutes saved on journey time because of those improvements, and therefore, the minutes-to-dollars relationship. The initial relationship between minutes saved and dollars spent is quite good, and obviously you get a law of diminishing returns as you go further and further down with improvements. (T1, 17-8)

This evidence is significant because it notes that there is a ceiling on practical investment levels, after which the high cost of track improvements would not deliver the time savings that made them worthwhile on a cost-benefit basis. However, this is just as valid for road investment and suggests the need for coordinated funding so that the taxpayer gets best value for this investment across the full range of environmental, economic and social factors. The Committee makes recommendations on this matter at Section 4.8 of this Report.

Better long term planning is the key for improvements to rail infrastructure:

> **Mr SULLIVAN:** ... What would you suggest to be a more effective way of strategically planning to meet the needs of the rail upgrade and continual improvement in the State?
> **A/Professor LAIRD:** It may well need some Federal assistance but I feel that there is a

> role for the State rail authorities to be given a very clear direction by government that they really have to start planning ahead a lot more seriously. A heap of work is to be done and that cannot be done overnight or even in a year or five years. We have to start planning now and start reserving land for future deviations before it is covered with houses. That is what is happening now in Queensland for the Toowoomba-Helidon upgrade. (T1, 36)

Once again, Queensland has shown the way with its strategic planning for rail in Australia. Associate Professor Laird pointed out to the Committee how New South Wales could benefit from the Queensland strategy:

> ... by reconstruction of the worst 10% to 20% of the track we could get the benefits of the tilt trains, and also the existing freight trains and existing passenger trains would benefit. Let me give you an example in Queensland. Twelve years ago Brisbane to Rockhampton trains took 14 hours. Later this year they will take seven hours. For the freight, the weight behind the locomotive was 760 tonnes 10 years ago; now it can be 1500 tonnes. In other words, with quite a modest investment and realigning in two stages of 120 kilometres of track, we have doubled the speed and also doubled the weight for the freight trains. (T1, 31)

The key to this positive outcome is good planning and secure investment levels.

There are valid reasons for some of the planning problems with the New South Wales rail system.

The cause of these problems must be understood and corrected if rail planning in New South Wales is to deliver better outcomes.

In particular, a long term strategy is required in which projects are developed on the basis of a rail infrastructure master plan which is integrated into national rail objectives. Placing individual projects into such a structure will ensure that the limited investment in rail is put to best use. In tandem with secure investment levels, this would avoid mistargeted expenditure; for example, the practice of large investment on new bridges and electrification for poor track alignments that should be replaced.

Furthermore, planning for road and rail should not be conducted in isolation. The best and most cost effective transport mode should be chosen for each individual corridor across the full range of environmental, economic and social factors.

The Committee agrees with Mr Poulter that a targeted program of essential rail infrastructure projects will deliver significant time savings for reasonable investment in the shorter term. Such a program would be more useful and effective than some unrealistic wish list.

In the final chapter of this Report, the Committee tests major New South Wales rail

corridors to provide a template for track improvements that will deliver significant time savings.

1.4 Investment

The Committee received strong evidence about an imbalance in investment between road and rail infrastructure since the end of the Second World War, particularly over the last twenty five years. There is no doubt that, over the more recent period, "preference was given by Governments to road construction rather than rail reconstruction" (Williams).

The Committee looks at this issue from a national perspective later in the report but makes the following points by way of introduction and as background to its analysis of New South Wales issues.

The blatant disparity in funding since the early 1970s from Federal governments was confirmed for the Committee from a number of sources and estimated variously as being from $26 billion to $36 billion on roads to $2.3 billion to $1 billion on rail, respectively. BRW reported in 1990 that "this lopsided largesse" was "almost putting the railways out of business."

Max Walsh argued in 1992 that "rail investment has been the stepchild of the Australian transportation system since the advent of the motor vehicle because it has never been allowed to compete with other transportation on fair, comparable terms."[4]

Macquarie Corporate Finance agreed that the imbalance in funding made it impossible to establish fair competition between road and rail:

> The impact of this funding imbalance has been to create a self-perpetuating "vicious cycle" for Australian rail investment. Bearing in mind that modal preference is driven by price but also by service characteristics such as transit time, reliability, frequency of service and security - the duration and magnitude of the funding imbalance has resulted in a rail system which is poorly equipped to compete against a well maintained and frequently upgraded road network system.[5]

There appears to have been almost a hand-out mentality with roads.

Max Walsh has pointed out that "road investment is not really determined by cost-benefit: at least with nowhere near the discipline that railway investment has to be justified."

Walsh added that the current investment ratio between road and rail "clogs up our highways with

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[4] Walsh, "Keating Rail Plan Delivers the Goods," *Sydney Morning Herald*, 14.2.92.

[5] Macquarie Corporate Finance,Submission to the Inquiry into the Role of Rail in the National Transport Network, House of Reps Standing Committee on Communications, Transport & Microeconomic Reform, pp.7-8.

18-wheelers and fleets of competing buses while our railway lines are under-utilised by freight and largely shunned by passengers."

This view was supported by Dr Weatherby in evidence:

> **Dr WEATHERBY:** If one looks at the economics of running a truck, and the kind of damage to a road that a B-double does, a B-double causes the equivalent amount of damage to a road that 20,000 cars would cause. You have really got an issue of the inequality between road and rail funding, and of course of the road charging regime that takes place. In terms of cost recovery for use of the road that trucks are making, they are in fact being heavily subsidised, whereas rail is not being heavily subsidised. In fact, with the diesel fuel excise - and I realise this is a Federal issue - rail is in fact partly subsidising road. So we have a problem in terms of the true economic cost. (T2, 17)

With regard to capital expenditure, governments have different expectations from rail agencies than road agencies. Essentially, governments require rail operations to recover the cost of infrastructure, something not expected of road investment.

As Mr Alchin from the Rail Access Corporation (RAC) explained in public hearings:

> **Mr ALCHIN:** ... These significant investments would have to be made ultimately by governments. Governments will expect RAC or anyone else to demonstrate that they are getting the maximum back for their money, that passenger services could derive improvements from these works. (T1, 7)

Unlike rail, there is no expectation of a return on investment for road infrastructure. As the submission from AdTranz put it: "no one complains that the Hume Highway doesn't make a profit" (S20, 3).

In New South Wales, RAC advised the Committee that there were four ways it could finance "capital expenditure on the New South Wales network." These were:

i. RAC internal funds. That is retained earnings or borrowings,
ii. Operators can fund works directly by an up front capital contribution,
iii. Government payment directly to RAC for Government initiated projects, and
iv. Private sector funding mechanism, via access fees and/or capital contribution. (e.g. BOOT schemes).

Obviously, the State government makes contributions to the rail agency for capital works ("Government initiated projects") and likewise to road agencies. Yet the means by which the government has made these contributions to road and rail projects is different.

The capital works budgets for the last few years is summarised in the following table.

Table 1: New South Wales Capital Payments (Budget Paper No. 4) - Land Transport Infrastructure ($m)

Year	**ROADS** Total Capital Expenditure *Note 1* $m	**ROADS** % of Total Capital Expenditure *Note 2*	**RAIL** Total Capital Expenditure *Note 3* $m	**RAIL** % of Total Capital Expenditure *Note 4*	**ROADS** % of total capital payments including maintenance works *Note 5*
1995	1,449.5	23.8 % ($1,449.5m)	676.8	**12.5%** ($761.3m)	**23.8%** ($508.2m)
1996	1,611.5	17.1% ($862.0m)	582.6	**12.6 %** ($637.2m)	**32.0%** ($728.4m)
1997	1,593.0	16.2 % ($830.1m)	535.3	**15.0 %** ($769.9m)	**31.1%** ($762.9m)
1998	1,698.7	17.1% ($962m)	732.9	**19.1 %** ($1,073m)	**30.2%** ($737.0m)

Notes

1 *This is the total of all RTA programs (both capital and maintenance) identified in Budget Paper No 4.*

2 *This is the percentage of the overall State capital program payments allocated to the roads policy area (Fig 1.2 Budget Paper No 4). From 1996 onwards this proportion has not included maintenance programs even though the Maintenance Works is allocated through the capital program payments.*

3 *This is the total of all rail related expenditure identified in Budget Paper No 4. It includes SRA commercial and non-commercial and more recently, RAC and RSA.*

4 *This column shows the percentage of the overall State capital program payments allocated to the transport policy areas (Fig 1.2 Budget Paper No 4). The quantum (shown in brackets) also includes capital works allocations for the Dept of Transport and State Transit Authority.*

5 *This column shows the total RTA expenditure, as identified in Budget Paper No 4, as a proportion of the overall State capital program payments. It includes the maintenance works payments (the quantum of which are shown in brackets).*

A number of points are worth noting from this table and Budget Paper No 4.

First, while the proportion of investment in roads and rail is shown in summary form to be fairly similar, the reality is that roads receive almost twice as much funding through the capital works program as the maintenance element of their capital works allocation is not included in the

summary table.

The second point is that the roads capital works program is funded as a budget item while rail is dealt with as a non-budget item. The State Capital Program Budget Papers note that Non Budget Sector agencies gain funds in the following manner:

> the State Capital Program comprises capital payments of both the Budget and Non Budget Sectors... The Non Budget Sector agencies provide major economic infrastructure assets such as water, power and public transport, and operate in markets ranging from monopolistic to competitive... [and] covers those agencies funded from own source revenues or borrowings... Non Budget Sector expenditure is funded from the revenue and accumulated reserves of Non Budget Sector agencies, borrowings, and grants from the Budget... [but] is primarily funded from internal agency sources. It is, therefore, mainly driven by commercial considerations including the anticipated rate of return of the acquired assets.[6]

On the other hand, "Budget Sector capital payments are financed from Commonwealth specific purpose capital payments and hypothecated road revenues, with the balance funded by the remaining current surplus and financing transactions" (5).

Government expenditure on rail infrastructure is deemed to be "non budget sector" and, accordingly, capital works (from non-private sources) are funded from agencies' own revenues or borrowings. In reality, this does not mean that rail does not receive any contributions from the Government, for the budget papers note that "in the rail sector, funding is largely derived from the Budget for passenger services, reflecting a view that due to reasons of externalities, the general community should contribute towards these costs" (5).

The reason for the treatment of the road capital investment (clearly providing "economic infrastructure") as a budget item, and, therefore, funded from the consolidated fund, is that roads are funded mainly by hypothecated revenue. The State Capital Program states: "both fuel levies and motor vehicle taxation are dedicated to the roads program in accordance with Government policy. Consistent with the principle of all taxation being appropriated by Parliament, fuel levies and motor vehicle taxes are passed to the Roads and Traffic Authority through the Consolidate Fund" (6).

While this might be a technical explanation for the difference, road infrastructure funding is certainly in a better position than rail for a number of reasons.

Firstly, road has a guaranteed source of regular income from hypothecated revenues such as motor vehicle tax and fuel levies. In the New South Wales State Capital Program for 1997/98, hypothecated roads revenue was budgeted at $1.25 billion.

[6] New South Wales Budget Paper No 4, State Capital Program, Budget 1997-98, pp.1, 5, 8.

Secondly, it receives annual substantial grants from the Federal government. In the 1998/99 Commonwealth budget, New South Wales received $545 million in roads funding out of a total national outlay of $1.6 billion. By contrast, the new and much lauded Australian Rail Track Corporation received only $35 million for rail infrastructure across the whole of Australia.

Thirdly, road agencies do not have to fund associated infrastructure. This has been a heavy burden on rail agencies until recent times. As Max Walsh pointed out in 1992 when citing the lower cost of bus travel from Sydney to Brisbane in comparison with rail:

> ... the basic reason for these differentials is that the cost of a railway ticket takes into account the total investment in the rail system - the laying and maintenance of tracks, the shunting yards, the total rolling stock and operational charges. Your bus ticket reflects only a small portion of the public investment in roads.

In a sense, Countrylink has come to feel that it is a poor cousin in negotiations with RAC:

> **Mr POULTER:** It is the other side of the question. Countrylink is a marginal user in regard to its payment to Rail Access Corporation. We exist because there is an existing rail structure. You would not build a rail structure with Countrylink's current operating pattern in this State just for passenger trains. We really exist on the back of an existing freight structure, and our capacity to pay is obviously limited. We are a subsidised business; clearly our position with RAC is that we are a marginal operator and have to ask for priorities. (T1, 19)

RAC acknowledges that State Rail is not in a position to fund major new works or substantial improvements to infrastructure:

> **Mr ALCHIN:** There have been suggestions that State Rail may be funding minor improvements on the suburban network—for example, high-speed turnouts here or minor improvements to signalling there—and in a sense paying for that in its own way. But, on the whole, those improvements are relatively small; they are not large investments. I suppose it reflects the fact that passenger rail transport tends not to be profitable; that governments fund passenger operations for wider social policy reasons. So there are not a lot of those. (T1, 6)

The flow-on of this lack of profitability has been disastrous for rail, according to AdTranz:

> Australian rail transport suffers from low patronage not only because or our low population, but because of low investment compared to road. The comparison is an unfair one because while modern rail systems are far more efficient than road, Australia has a 19th century rail system in terms of track quality. Until the disproportionate difference in spending between road and rail is redressed, low patronage levels are something that a tilt train will not be able to provide a 'quick fix' to. (S20, 3)

Clearly, governments put considerable funding into roads with little or no expectation of a direct financial return. Why? Because there is an expectation of a broader economic benefit in the hope of improving congestion and thus freight and passenger travel times and reducing the possibility of accidents.

Whether these objectives for road investment are ultimately achieved is not a matter for discussion in the current report but this broader approach begs the question: why is the same approach not adopted with rail infrastructure funding?

Not only is funding for roads disproportionately high and not competitively neutral, but the Committee heard evidence that expenditure on roads was not likely to produce significant relative improvements. Investment in roads could be reflecting the law of diminishing returns. BRW reported in 1990 on funding of part of the Tullamarine Freeway as follows:

> This misallocation of resources is illustrated by a sign on the Tullamarine Freeway north of Melbourne, which boasts that an eight-kilometre stretch of ring road being built costs $140 million. That is equal to more than half the cost of building a standard-gauge line from Melbourne to Adelaide, something the country has needed for the past century.[7]

The Committee received evidence of a similar attitude in New South Wales.

Mr Spragg pointed out in evidence regarding the Pacific Highway in the Tweed Shire that there has been no problem securing roads investment:

> **Mr SPRAGG:** We seem to have no difficulty in obtaining funds for road upgrading. The stretch of 30 kilometres of proposed new Pacific Highway in the shire will cost between $200 million and $250 million to achieve a 15-minute reduction in journey time... (T2, 22)

The Tweed Shire Council submission argued that this road investment would "not increase average speeds by more than 20 km/h (from around 90 km/h to 110), whereas the scope for rail speed increases by use of tilt trains and track upgrading could be 100 km/h or more (from around 80 km/h to 180)" (S22, 3).

On the other hand, the Tweed Shire Council was unable to obtain $45,000 for a feasibility study into public transport options in an area with a large proportion of the population dependent upon public transport (T2, 19-23).

As Dr Weatherby explained to the Committee:

> **Dr WEATHERBY:** The National Transport Planning Task Force has done a

[7] Thomas, "Getting the railways back on track," *BRW*, 24 August 1990.

> number of studies about mainline rail infrastructure projects. Their view is that the economic benefits from track infrastructure are somewhere between one and a half and five. That means that if you take one as the amount of cost that you put in, the actual economic benefits that you are getting from that expenditure are 50% higher and up to five times the actual amount. So, in terms of that cost, you actually reap benefits up to 10 years or more after that. (T2, 12)

Dr Weatherby also questioned the effectiveness of road expenditure with regard to the Pacific Highway telling the Committee that the north coast rail line could be substantially improved for a quarter of the $4 billion earmarked for the Pacific Highway upgrade:

> **Dr WEATHERBY:** ... In terms of actually constructing the road, we have this enormous cost of building the road. For a quarter of that, we could fix up the railway line. So as to the actual cost comparisons between the railway line and road, it is more expensive to build the roads, and it is very expensive to maintain the roads.... (T2, 17)

While the Committee does in no way oppose road funding, particularly in the interests of safety and economic efficiency, it does question the need to develop high speed roads around New South Wales when greater returns could be gained for smaller outlays on rail investment.

1.5 Track Capacity and Congestion

Congestion is a major problem in some New South Wales corridors. This affects track capacity because of:

- The number of trains competing for access to the track
- The speed at which they can travel on poor alignments
- The differentials of different trains (e.g. slow freight trains inhibit the potential speed of faster trains by effectively blocking their path).

These factors reduce the potential time savings of any fast train - including the tilt train - on existing infrastructure. They already affect the reliability and financial viability of rail services.

Mr Alchin of the RAC - which manages access to the New South Wales rail system - acknowledges the limitations of rail networks in terms of capacity:

> **Mr ALCHIN:** The first issue is clearly the capacity of the rail network. It is fair to say that railways have a finite capacity, just as roadways do—you can get congestion on railways. One of the critical things about capacity is that it diminishes to the extent that you have widely different operating speeds on the network—fast trains will run up the back of slow freight trains. That is critical in determining the capacity of an existing network. There is a mix of traffic on the network—freight traffic versus passenger traffic.(T1, 3)

The SRA noted in its submission that congestion in and around Sydney had reached a point where no train could travel at anything like its potential speed:

> Looking at the metropolitan area, there is little scope for journey time savings through tilt technology or indeed, any type of faster train which uses the existing track, because of the difficulty of ensuring an uninterrupted path through very heavily trafficked areas which cater for mixed traffic operations ie both passenger [all stops and limited stops] and freight operations.(S28, ii-iii)

Mr Poulter of Countrylink added that corridors such as Sydney-Newcastle are feeling the strain of congestion. The impact of a tilt train here might mean that there were less overall track paths available and that other passenger services would therefore have to be cancelled, decreasing the actual number of seats available to the public:

> **Mr POULTER:** Certainly congestion exists in the system now. The Sydney-Newcastle sector is already congested, and strategies need to be put in place to mitigate that congestion. (T1, 19)

The Committee examines the Sydney-Newcastle corridor in Chapter Five including targeted infrastructure projects that could improve journey times.

Submissions to the Committee particularly referred to the problem of managing slow freight trains and faster passenger services if tilt trains were introduced without good timetable planning and improved infrastructure. There was concern that faster trains would "eat up" capacity to the detriment of slower freight trains. Stakeholders in the rail freight industry argued that raising the speed of all trains across the network through track improvements was the best way of maintaining equity and efficiency in the system. This was a particular concern to National Rail, which used the example of the Sydney-Goulburn corridor:

> Considering the train paths on the Sydney to Goulburn corridor are approaching capacity, the addition of up to 40 tilt train trips on the corridor will severely compromise freight train operations.... The joint use of a railway is optimised when freight and passenger trains travel at comparable speeds. However, because of the steep gradients and sharp curves between Sydney and Goulburn, high powered tilt trains would travel considerably faster than freight services. This would have a detrimental effect on rail freight operations. (S14, 3)

Issues such as track capacity and congestion are relevant to the Committee's assessment of the feasibility of introducing the tilt train into New South Wales. The Committee examines them in Chapter Three.

In the next section, the Committee deals with issues affecting the freight industry including options to relieve congestion in Sydney.

1.6 Freight Issues

Freight is the profitable arm of the Australian rail network and a vital component of any rail revival. In fact, a British transport consultancy has predicted that long-distance rail freight "will be the awakening transport giant of the 21st century" (*The Economist* 21.2.98, p.21). However, freight competitiveness with road transport has been held back in the eastern corridors of Australia by out-of-date rail infrastructure.

The push for better passenger services and faster trains must acknowledge this fundamental fact about the rail industry and work towards developing infrastructure programs that benefit both freight and passenger services.

Mr Alchin of RAC stated in evidence that "for much of the interstate network the dominant traffic will remain freight, at least in the short to medium term" (T1, 7). The backbone of any track improvement program is to enhance the effectiveness of freight services. Such works can induce significant economic and environmental benefits according to Dr Weatherby:

> ... there are quite significant advantages from track upgrading for freight. It cuts down on fuel consumption because of the obviation of slowing for curves and then having to accelerate again. Also, crossing loops are another problem with track upgrading. The longer the trains, the greater is the amount of freight that you can carry, and therefore your cost per train for carriage of freight goes down. (T2, 14)

Associate Professor Laird put the issue in a nutshell:

> The main economic reason for doing rail deviations is rail freight. In the Queensland case the Government did rail deviations for the more densely populated sections and made a further investment in the tilt train. The combination of the tilt train and upgraded track would provide an attractive travel option if managed well. (T1, 32)

The Committee will examine the Queensland model of track improvements for freight services followed by enhanced passenger services in the next chapter.

The Committee received evidence that suggested mistrust from freight operators and agencies about any proposal to improve passenger services, particularly through the introduction of fast train technology. There was a general perception that, once again, the needs of the freight industry would be shunted to the back of the queue. This is particularly galling for the industry because it is the profitable arm of the rail network and therefore the natural mode to generate infrastructure investment.

Passenger services still possess absolute priority when paths are allocated for trains in New South Wales. This has created considerable unease amongst freight operators and administrators about the introduction of high speed trains. It is argued that the introduction of tilt trains on existing

alignments would create a serious disparity in freight and passenger train speeds, resulting in either passenger trains travelling at reduced speeds behind slower freight trains or else these freight trains being removed from the track.

National Rail argued in its submission that "this would have unacceptable impact on the transit times and reliability of rail freight services" (S14, 3). AdTranz also noted this potential problem in its submission: "other services may conceivably prove an obstacle to smooth operation of the tilt service.... To accommodate a fast and regular VHST service, freight and other services on existing track may be compromised" (S20, 4)

National Rail expressed the view that "massive additional infrastructure enhancements will be needed to ensure adequate joint passenger/freight passage into the next 50 years." This could be justified by community recognition of "the advantages of rail freight in fuel efficiency, environmental suitability, public safety and cost efficiency." However, as National Rail put it, one huge question still remained: "who pays for this infrastructure?" (S14, 3)

In considering this issue, it would be necessary to bear in mind the potential savings to the freight industry from improved infrastructure; for example, from reduced maintenance and running costs.

National Rail was particularly concerned about a lack of consultation with the freight industry when infrastructure was upgraded:

> The treatment of freight trains during "track possessions" for major works has been considered poor. Track work significantly alters trains operations.... Recent experience with blending major passenger train movements with long trains has shown that pressure will be exerted to "put away" the freight trains. (S14, 4)

National Rail identified three major issues about track improvements that need to be resolved:

1. The impact that will occur during the construction phase.
2. The priority that will be given to current freight services.
3. Cost allocation - determining who will pay for the additional resources required to maintain current paths during track works. (S14, 4)

The Committee acknowledges these concerns.

Another factor brought to the attention of the Committee was freight access to and through Sydney owing to congestion over the urban network, the priority given to CityRail passenger trains (which have absolute right-of-way) and a curfew on freight operations during commuter times.

The New South Wales Government and the Commonwealth Government have begun to address the issue of freight access to Sydney in recent years.

The One Nation rail infrastructure program included a series of projects to ease freight access in Sydney at a total cost of $44.7 million. The following projects were completed:

- Flemington-Rhodes freight line
- Six kilometre loop between Glenfield and Ingleburn
- Loop extension at Cowan
- Bypass loop at Macarthur Station
- Installation of high speed turnout at Sefton Park Junction
- Signalling upgrades at Wyong and Hawkesbury/Cowan.

Funding for the first stage of a major piece of freight infrastructure has been announced by the New South Wales Government in the 1998 Budget.

The Flemington Junction grade separation will enable the efficient separation of freight and passenger services along the Western Line, particularly near the busy Flemington Markets and Olympics sites. It will also improve the priority freight path through the suburban network.

The State and Commonwealth Governments will both contribute $15.5 million to this project, a total of $31 million in 1998-99.

Mr Alchin of the RAC also told the Committee that the Australian Transport Council of State and Commonwealth Ministers had targeted congestion in Sydney and improving freight access as a national priority:

> One of the conclusions of that exercise was that there was a significant bottleneck for moving freight through Sydney. Subsequent to that, the Rail Access Corporation has identified a range of projects within Sydney to provide essentially a priority freight route through Sydney over several stages. Those works amount to several hundreds of millions of dollars, but once completed they would essentially provide an almost completely separate freight route through Sydney that would be available for freight operations and potentially available to passenger operations in discrete times. The ATC met again in November 1997 and endorsed that basic direction. We are now pursuing economic and financial appraisals so that we can present a case to secure some of the Commonwealth funding that is available for the interstate network at the April 1998 ATC meeting. (T1, 5)

The New South Wales Urban Infrastructure Management Plan 1998 outlines the development of an Integrated Freight Strategy (20-1). Treasury, the Department of Transport, RAC, the RTA and the Office of Marine Administration are working together to provide a framework with multi-modal solutions to freight problem areas. The creation of regional inter-modal terminals is being considered to achieve a reduction in road transport levels. The major rail initiative to be completed over the next five years is "investigating a dedicated freight line through the Sydney metropolitan area, in line with the commitment by Commonwealth and State Governments" (21).

The Committee supports the work of the RAC and the Australian Transport Council - in consultation with relevant New South Wales agencies - in developing a long term solution to rail congestion problems in Sydney, particularly where the movement of freight is hampered.

In the shorter term, the elimination of specific bottlenecks will reap significant efficiencies. However, such track improvements should be designed so that they are compatible with a long term strategy to construct a separate freight corridor through Sydney.

The ultimate goal must be the separation of the freight and passenger networks in Sydney with freight using a designated corridor with double stack clearance (ie. no overhead electric wires).

1.7 The "Generational" Concept of Transport Infrastructure

The factors described by the Committee above have led to and are symptomatic of a rail system which is antiquated and unable to provide the economic and social services expected of a contemporary industrial society.

The New South Wales rail network has not overcome the physical constraints along its seaboard nor the various relatively recent reversals in its fortunes as road transport has received favoured and less rigorous treatment by governments. A shortage of investment capital and the inability to plan strategically (possibly also due to a lack of funds) has led to it being uncompetitive with roads transport with the result that the rail system is congested and slow. Rail freight in particular is suffering. Compared with the road system, the current rail system is somewhat of a dinosaur.

This can be easily and tangibly demonstrated by considering the evolution of road and rail systems in a "generational" sense as Associate Professor Laird explained to the Committee. Using the example of road and rail infrastructure projects in the Cullerin Range between Yass and Goulburn he was able to chart the generations in each mode of transport:

> Between Goulburn and Yass one can see three generations of roadworks: pre-1930, then 1930 to 1990, and now the four-lane dual carriageway, and one can see the two generations of rail track. We now need a third generation of rail track. (T1, 30)

This example can be seen in the aerial photograph reproduced at the end of this Report.

The fact is that roads in New South Wales have been greatly regenerated so that it is possible to identify extensive networks of "third generation" roads (the contemporary expressway) while rail is still only, at best, second generation. Indeed, some of these second generation rail works are actually worse than the original track alignments and detrimental to travel times. One famous example is that the travel times of passenger train services to Newcastle have virtually remained unchanged over time, even with improvements such as electrification. The City of Newcastle

submission pointed out that "the fastest scheduled rail journey between Sydney and Newcastle has not improved since the 1930s" (S26, 1). Mr William Sutton confirmed this fact in a letter to the *Sydney Morning Herald* (9 June 1998): "today the Newcastle Flyer takes 2 hours 24 minutes.... My copy of the 1937 New South Wales Railways timetable outlines a trip of two hours twenty-six minutes." This is a reduction of two minutes in 68 years! This lack of progress comes despite electrification and more modern rolling stock.

On this subject, Ms Grimson of Countrylink conceded that in general "timetables are not reflecting hugely different journey times" to the past (T1, 25).

Another example is the second generation rail constructed along sections of the southern line at the turn of the century by re-aligning the existing rail track to accommodate heavily laden, slow moving goods trains which were using the system at that time. However, this re-alignment produced a paradoxical result in later years as Associate Professor Laird explained:

> The grades that were being laid down by John Whitton in the 1870s, of one in 40, were found to be a bit steep. So they eased the grades, but they added many more miles of tight-radius curvature. It did not bother steam trains, but today these tight-radius curves just get in the way of the modern high-powered diesel electric locomotive. Computer simulation done for the university a few years ago showed that what is between Goulburn and Yass today is far worse than what was built in the 19th century. It is not only longer in distance but it uses more time and more fuel. If we were to... go along this old alignment and just ease the grades and the curves that he built in the 19th century a little more, we would save half an hour off Goulburn to Yass transit times and 25% fuel use... (T1, 29-30)

It would seem then that a return to the older, more direct alignment with some modifications would be a more suitable alignment than that currently in use. This again highlights the need for a sustained long-term planning approach with secure investment levels that matches rolling stock with infrastructure needs.

Other examples can be found. Transport arteries in the Cowan region - which link Sydney with the Central Coast and Newcastle - show second and third generation roads alongside a first generation rail corridor. A map of the Cowan region is contained in maps at the end of this Report.

Such a comparison is staggering. The sleek lines of the modern, third generation freeway stand in stark contrast with the winding alignment of both road and rail alignments in the previous generation. These third generation roads are characterised by substantial funding, long-term planning, high-speed travel and lack of congestion (except in and around urban areas).

This generational aspect to poor road and rail alignments was discussed implicitly during public hearings.

The Committee found that it highlights the need to compare "apples with apples" when examining different eras of infrastructure:

> **Mr THORNTON:** If you think about the Sydney to Newcastle freeway and think that freeways are graded more steeply than our railways, and look at the engineering that was required to create a high speed road system to the north, or in fact if you look to the south or south-west of Sydney, those are the conditions that a railway has to tackle to gain an exit from Sydney.
> **Mr SOURIS:** That was a high speed road compared with a slow speed rail.
> **Mr THORNTON:** It is a high speed road compared with a slow speed road, the old Pacific Highway.(T1, 40)

The net result is that third generation roads provide a fast, efficient modern service which old generation rail cannot match.

All rail corridors are still first or second generational in New South Wales. The failure to maintain investment parity for rail has meant stagnation and potential financial unviability in some corridors. Rail thus cannot fully contribute to the needs of a late 20th century economy.

Substantial investment in infrastructure will be required to bring them up to world's best standards. The most likely prospect for introducing third generation rail into New South Wales is the current Sydney-Canberra VHST proposal.

1.8 Comments

The problems with the New South Wales rail system are endemic and long-standing. Topography and history have conspired with poor planning and low investment levels to create bad track alignments, traffic congestion and an uneven playing field within the transport industry.

These factors have resulted in the rail network in New South Wales (and Australia) becoming badly run-down and costly even to maintain at its current standard. These factors, in turn, have had a stagnating effect on the government agencies that administer the industry. The result is a lack of strategic vision.

The depletion of the ability of rail to compete fairly with other transport modes is hindering Australia's economic performance and reducing services to its citizens.

First generation rail cannot attract passengers or freight from third generation road systems.

The situation is critical. The rail network in and around Sydney has reached saturation levels. The considerable advantages of rail are not being fully utilised.

The loser is the New South Wales economy and the New South Wales taxpayer.

One of the principles of economic activity today - the "level playing field" - certainly has not operated in land transport funding. Much of the problem with the effectiveness and efficiency of rail today can be attributed to long term investment neglect.

The Committee is convinced that the situation must be redressed and considers whether new technology such as tilt trains is the appropriate way to initiate this policy reversal.

In Chapters Two and Three of this Report, the Committee examines the state of New South Wales rail services and the feasibility of introducing tilt technology into the existing network.

Recommendations for the first three chapters are consolidated at the end of Chapter Three.

In Chapter Four, the Committee assesses national rail issues which impact on the quality of the New South Wales network including administrative structures and major investment programs proposed by National Rail and the National Transport Planning Taskforce.

Finally, the Committee matches proposed investment programs to specific New South Wales rail corridors in Chapter Five.

Chapter 2

Tilt Technology

The Committee was prompted to examine the feasibility of tilt train technology after receiving briefings on the Queensland Tilt Train, which is due to commence operations in late 1998.

This specific starting-point for the Committee's inquiry does not exclude the consideration of other forms of very high speed train (VHST) technology. The Committee received submissions or evidence from many of the major stakeholders in VHST technology in Australia. These organisations advocate a range of train options.

It is important not to lose sight of the ultimate goal for rail transport in weighing the relative merits of various VHST options. ARUP/TMG summarised the challenge which faces the rail industry throughout Australia:

> If rail-based public transport is to successfully compete with private transport in a range of travel markets, it has to serve passengers total travel needs and service expectations. The service provided must be that which can deliver a patronage base which will yield a sustainable financial position. The key issue is that rail has to reduce its travel times to be competitive. (S11, 1)

The Committee has been very mindful of the potential benefits both to citizens and the economy of New South Wales of improved rail journey times. In this modern age, time seems to be in critical supply and journey times will need to be reduced if rail is to survive as a viable land transport mode, let alone realise its potential as a more sustainable mode than roads.

The Western Sydney Regional Organisation of Councils Limited noted in its submission that while better highways had significantly lowered road journey times in recent years, train travel took just as long as ever:

> UK-style "InterCity" and more recently Xplorer diesel trains have been introduced on country services, but these achieve low average speeds because of poor alignments and track conditions. Services to Newcastle, Wollongong and the Blue Mountains are provided by special interurban electric trains, but these are also slower than their Queensland counterparts. The result is that travel times for inter-urban, regional and country services have remained relatively static for the past two decades.
> This puts rail in a poor position compared to road travel where there have been major investments in new motorways over the same period. (S29, 4)

One factor which significantly limits the speed at which trains can travel is the maintenance of

passenger comfort. Trains capable of high speed are often forced to travel at slower speeds to limit the stress of movements due to acceleration, braking, rounding curves and track irregularities.

2.1 The Tilt Concept

Tilt technology enables trains to tilt into curves, increasing speed by 25-45% while preserving passenger comfort levels. This enables them to deliver improved travel times, running up to a third faster on existing track by using suspension systems that lean into bends. This capacity to use existing tracks is one of the primary attractions of tilt technology because it avoids the high cost of identifying and purchasing a dedicated corridor and then constructing completely new track.

The tilt train operates by rollers attached to the bogey, which in turn are supported by curved transverse beams attached to the car body. In this way, the car is free to tilt from side-to-side within controlled limits. The distribution of mass in the car body is carefully designed to be distributed about the "rolling centre" so that the car will always remain stable like a pendulum and will accelerate to the upright position. An air pressure actuated control system is added to control the tilting movements. Onboard computers can store information about the track and curves to control the tilt angle. It is activated by compressed air cylinders located between the train body and the bogies. Gyroscopes and accelerometers give advance warnings of curves, thus ensuring a smooth ride for passengers.[1] Any failure of the tilt system results in an automatic shutdown of the powered tilting operation into a failsafe mode.

Tilt technology is currently used in countries such as Italy, Sweden, Japan, Spain, Canada and Germany. These trains all use standard or broad gauge track. Spain's Talgo service commenced in 1980, Italy's Pendolino ETR 450 in 1987 and Sweden's ABB X2000 in 1990. This train "has cut the 285 mile journey from Stockholm to Gothenburg by nearly a quarter and lifted rail's share of the market compared with air from 41% to 55%."[2] Other countries are introducing tilt services. In Britain, Virgin is spending nearly £1 billion on a 140mph fleet of tilting trains that will cut the journey time from London to Glasgow by more than a third. In the United States, Amtrak has ordered 150mph tilting trains for the Washington-New York-Boston route, cutting journey times from eight to five hours. Even France, the champion of high-speed trains on dedicated track, is now testing tilt for use on both its high-speed and conventional tracks. Japan is the only country to have a narrow gauge (1067mm) tilt system. It was built by Hitachi and commenced operations in 1973 and is operated by JR Shikoku. Technical problems initially experienced because of the narrowness of the gauge have been resolved. This Japanese gauge is practically the same as that used in Queensland. and this technology is now directly transferrable to Queensland's rail system.

[1] On a lighter note, *The Economist* reported this year that "a recent four-hour journey from Milan to Basle on a Pendolino tilting train built by Fiat Ferroviaria proved exceptionally smooth. At lunch, the wine hardly moved in the glass as the train snaked through the Alps at speeds up to 30% faster than a normal train." (21 Feb 98, p.20)

[2] *The Economist* 21 February 1998, pp.20-1.

A full list of international tilt train operations is contained at Appendix 1.

An excellent definition of why tilt trains were developed and how they work was offered by Mr William Craig in a submission to the Committee:

> Most of the world's rail lines are freight tracks. This means that the super elevation on a curve is limited to five degrees. Passenger trains can go faster around curves but tend to throw the passengers out the windows and produce excessive rail wear. With the vehicle "tilting" to overcome the cant deficiency and steering axles to reduce rail wear, curving can be increased to about 40% above normal and appear to passengers as gentler curves. They improve transit time by removing the dips in the speed profile. (S6, 2)

AdTranz emphasised the comfort and additional services offered by VHST/Tilt carriages, and hence their attraction to travellers:

> High speed trains are at the very least as comfortable as jet airliners, and generally more so. Seating is better because space is at less of a premium, and a greater variety of facilities are available to passengers. The use of laptop computers, mobile phones and other electronic equipment is not restricted at all, and business travellers have the option of using on-board phone and fax services. (S20, 3)

The Committee can attest to the high standard of fit-out after its inspection of the Queensland Tilt Train. The option of maintaining business productivity while travelling between destinations is one of the attractions of fast trains when competing over short distances with aircraft.

Submissions to the Committee from proponents of tilt trains sought to dispel the notion that tilt technology was somehow 'second rate' in comparison with other VHST options. AdTranz stated that the record speeds achieved by some fast trains were irrelevant to commercial performance: "speeds of 500 km/h plus are often quoted in the sensationalist press for non-tilt VHSTs such as the GEC-Alsthom TGV or the JR Shinkansen, but these are unladen and stripped down vehicles with minimum consist" (S20, 2). AdTranz suggested that performance of some VHSTs was exaggerated by "comparison of the service speeds of say TGV vehicles, with those of a **lower powered** tilt train" (S20, 1). Tilt trains were, in fact, capable of a 300 km/h service, which was comparable with the "absolute maximum speeds achieved by non-tilt VHSTs on special track *in revenue service*" (S20, 2).

The very high additional infrastructure costs of introducing VHST technology - particularly on dedicated tracks - was raised by numerous stakeholders. There was particular concern about the cost effectiveness of such expenditure. AdTranz emphasised this issue in its submission:

> For the small amount of extra speed achieved by these vehicles, considerably more needs to be spent on infrastructure. For this reason, SNCF (French Railways) have decided to abandon TGV development in favour of tilt trains, which can reduce

travel times by 25% over conventional trains. (S20, 2)

Mr Vince O'Rourke, CEO of Queensland Rail, told the National Conference of Parliamentary Public Works Committees that the tilt train had been chosen for Queensland because it represented the best outcome in faster journey times for dollars invested:

> I guess the issue then is: why tilt trains? Why not the TGVs from France or the ICEs from Germany? The real issue is cost effectiveness - the expense - of these trains. A tilt train can provide high-speed rail services at much lower cost than the dedicated trains. To run the TGV-type train between Brisbane and Rockhampton would require a completely new alignment at the expense of probably some $4 billion - it would be $4 to $5 million per kilometre - with all those issues of track resumption. This train is sharing track with freight trains. So it is a compromise...[3]

On this subject, the SRA confirmed that standard VHSTs would need major track work to achieve optimal performance in New South Wales: "in all cases the introduction of such technology has been accompanied by large civil engineering works to produce high standard and mostly dedicated railway infrastructure" (S28, 2).

The cost of upgrading rail infrastructure in general will be considered elsewhere in this report including sections on individual New South Wales rail services and the Queensland infrastructure upgrading program.

In the context of advances in rail technology, ARUP/TMG noted that manufacturers were beginning to combine the best elements of both tilt and high speed trains:

> ... tilting capability is but one key characteristic of a modern high technology train. Tilting capability, high top speed, high installed power, superior braking performance and other characteristics are all relevant to selecting the right equipment for the task. While formerly tilt and high speed were perceived as different solutions, these technologies are converging. Trains with tilting capability are now able to operate at speeds up to 300 km/h and manufacturers of trains which were very high speed only are now installing tilt capability. This is particularly the case where governments are no longer able to afford the investment needed to create wholly new and very straight alignments for very high speed but non-tilting trains. (S11, 4)

The convergence of tilting capability with VHST power cars recognises the high cost of dedicated rail infrastructure to the community, on all but the most populous of routes.

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[3] The full text of Mr O'Rourke's speech is contained in Appendix 2 (p.25) of the New South Wales Standing Committee on Public Works, *Report on the National Conference of Parliamentary Public Works and Environment Committees, Brisbane 1997* (Report No.5, October 1997).

It is this potential advantage of tilt trains to improve travel times on existing infrastructure which may be crucial to enhancing New South Wales rail services given the poor track alignment for most major routes.

The SRA submission emphasised this particular aspect of tilt trains: "running on existing track avoids the delay, disruption and expense associated with building new, high speed track" (S28, 3). However, tilt trains do not come free of their own additional costs. Mr Tim Poulter, General Manager of Countrylink, stated in evidence to the Committee that tilt trains cost more to purchase and maintain than conventional trains and would also require a purpose-built maintenance facility (T1, 26).

A critical question, therefore, is whether the cost of buying tilt trains would reap commensurate benefits in improved journey times and patronage or whether targeting funds at track upgrades would enable conventional rolling stock to achieve acceptable performance. Clearly, the performance of all types of rolling stock cannot be disassociated from the state of the tracks on which they must operate.

The evidence of Rail Access Corporation (RAC) is very significant given this equation. RAC is responsible for building and maintaining the track system for both freight and passenger rail operators. While passenger services naturally capture the attention of commuters, it is important to remember that freight services are the profitable arm of the rail industry.

Mr Stephen Alchin, Asset Planning and Development Manager of RAC, raised some fundamental questions about the applicability of tilt trains in New South Wales during his evidence to the Committee:

> Specifically, in evaluating tilt trains the obvious question is: is the corridor suitable for tilt operations? If an operator were to replace existing rolling stock with tilting rolling stock, or if a new operator were to purchase tilting rolling stock, would the infrastructure permit the tilting rolling stock to be used to its best effect? (T1, 4)

Mr Alchin also addressed the potential problem of integrating tilt trains into the existing rail system and timetable:

> The more complex issue is: will the other traffic accommodate higher operating speeds? We would need to evaluate specific proposals. If CityRail or some other passenger operator chose to introduce a tilt train service, we would need to look at the operator's service proposals, evaluate them against the existing timetable and see how they could be accommodated, or indeed whether changes to the infrastructure would be needed to accommodate the new or faster service. (T1, 4)

Mr Alchin made it clear that just purchasing a tilt train and dropping it into the existing network would not necessarily produce journey time savings because it would get trapped behind other

trains:

> **Mrs BEAMER:** What if it is behind another train?
> **Mr ALCHIN:** If it is behind another train it will not actually meet those targets. It would probably be a mistake to conclude for the sake of $100 million in the purchase of tilting train rolling stock that it would consistently and reliably deliver a 55-minute service to Gosford, for example. Realistically we would need to do a detailed review of the timetables and the capacity of the network to accommodate those faster tilting services into and out of Sydney. (T1, 12-3)

The issue of track congestion is critical to any estimation of the viability of fast train technology. The Committee has considered track capacity and congestion in New South Wales at Section 1.4 of this Report.

Mr Alchin placed the possible introduction of tilt trains into a holistic context:

> ... the Corporation sees tilt trains as an opportunity to provide some investment in the rail infrastructure, to improve the nature of the infrastructure and thereby to generate benefits not only for tilt train operators but also for other users of the network. You will see from our submission that we take the view that a sound approach to tilt trains is to look at a mix of infrastructure improvements and rolling stock changes. (T1, 3)

This evidence recognises that the various rail technologies are not ends in themselves. Rather, they are the means to obtain some social or economic objective and should be used as appropriate for a given situation and set of circumstances. Mr Thornton from ARUP/TMG summarised the issue for the Committee in evidence:

> **Mr THORNTON:** We are saying: just think about trains and then work out what it is that you need to travel quickly. Tilting capability is only like the suspension on a motor car; it allows it to corner well. There are other parameters which are just as important if you are thinking about trying to specify rolling stock. The issue is to provide a service that people will want to use. People will want to use it only if they can derive travel time saving, if the access is convenient, and if the service is reliable. The manufacturers of rolling stock are using all of the things available to produce trains that meet the needs of the market. It is not a question of tilting capability, it is a question of the power of the train, how well it brakes, all of those sorts of things. All of the things that we look for in our motor cars we look for in other forms of transportation. The message is: do not think about tilt trains; just call them trains and decide what it is you want that train to do. (T1, 42-3)

The tilt train concept offers potential benefits to New South Wales because of its capacity to reduce travel times on existing infrastructure. This fact is acknowledged by the widespread use of tilt technology overseas.

This may cut the cost of expensive track improvements on some major New South Wales routes. However, significant track improvements may still be required to create the journey time savings which will attract enough passengers to make the service financially viable.

In the next section, the Committee examines the 1995 tilt train trial which represented the first step in determining the overall viability of this technology for New South Wales rail services.

2.2 New South Wales Tilt Train Trial 1995: Sydney-Canberra

Countrylink conducted a limited commercial trial of the Swedish X2000 tilt train on the Sydney-Canberra route for six weeks from late April 1995 to test the operational viability of a tilt train on New South Wales track alignments. XPT power cars were used to pull X2000 trailer cars that had not been customised to New South Wales conditions.

The service made two return Canberra-Sydney trips each day. A total of 18 762 seats were sold on the X2000 with a seat utilisation rate of 84 per cent. Normal Xplorer services were maintained during the trial period.

On existing track, the X2000 completed the Sydney-Canberra journey in 3 hours 25 minutes with 90% punctuality. The performance compared favourably with the Xplorer journey time of 4 hours.

The General Manager of Countrylink, Mr Tim Poulter, explained the rationale for the trial to the Committee:

> **CHAIRMAN:** The State Rail Authority conducted a tilt train trial in 1995 between Sydney and Canberra. What were the results of the trial?
> **Mr POULTER:** The purpose of the trial essentially was to do two things: firstly, to evaluate tilt technology as an appropriate long-term replacement for the XPT fleet technology; and, secondly, to get some measure of customer reaction to that style of technology. The outcome showed that tilt trains can run very well in New South Wales. Customer reactions were generally good... It would not be fair to say that the trial was conclusive, but it was the beginning of a demand forecast study to show if the patronage would warrant the investment. (T1, 16)

Studies of public reaction to the tilt train were conducted by AGB McNair and Quadrant Research. Both surveys found very high levels of user satisfaction in terms of passenger comfort, travelling time, staff service, toilet facilities, leg room, seating arrangements and decor.

Interestingly, the tilt train service appeared to attract a different clientele to the normal Xplorer service. The total number of rail passengers in the corridor rose by 65% over the trial period. However, demand for Xplorer seats was not affected by the trial. This outcome suggested that passengers who would normally travel by car or plane were switching to rail although they may

have been attracted by the novelty of the tilt service.

The Committee received evidence in submissions that the Swedish X2000 was not suitable for New South Wales conditions. The Campbelltown & Districts Commuter Association (s.6) noted "problems with platform and other clearances of the wide body."

Mr Poulter affirmed these difficulties but stated that they would be overcome by customised train set construction to meet New South Wales conditions:

> **CHAIRMAN:** What problems emerged during the trial?
> **Mr POULTER:** Very few serious problems; the train was leased for a short period from Swedish Rail and was built to a different envelope, which is the descriptive shape of the train, than standard.... Occasionally we had to be careful that it did not crash into platforms. That was the main operating issue. That would not be an issue if we bought tilt trains, because they would be built to the specification relevant to the State. (T1, 16)

In evidence, Mr Peter Thornton of ARUP/TMG supported Mr Poulter's evidence about the flexibility available in making train designs fit existing infrastructure:

> **Mrs BEAMER:** You make the point that high-speed trains are very fast trains that are using tilt technology.
> **Mr THORNTON:** We are saying: just think about trains and then work out what it is that you need to travel quickly.... The manufacturers of rolling stock are using all of the things available to produce trains that meet the needs of the market.... All of the things that we are look for in our motor cars we look for in other forms of transportation. The message is: do not think about tilt trains; just call them trains and decide what it is you want that train to do. (T1, 42-3)

According to Associate Professor Philip Laird, the outcomes of the tilt train trial were best summarised by the *Sydney Morning Herald*:

> The 1995 New South Wales tilt train experiment I think is well summarised by the *Sydney Morning Herald* headline: fast train, slow track. It did not really mix or gel. I think it is fair to say that the benefits of the tilt train on existing track would be very limited. (T1, 30)

In short, this evidence concluded that there was no real benefit in putting any type of fast train on existing New South Wales tracks, an issue which the Committee will consider in the next chapter.

Associate Professor Laird cited Queensland as an example of how to upgrade a rail system to make it suitable for fast train technology:

> Let me give you an example in Queensland. Twelve years ago Brisbane to

> Rockhampton trains took 14 hours. Later this year they will take seven hours. For the freight, the weight behind the locomotive was 760 tonnes 10 years ago; now it can be 1500 tonnes. In other words, with quite a modest investment and realigning in two stages of 120 kilometres of track, we have doubled the speed and also doubled the weight for the freight trains. (T1, 30)

The 1995 tilt train trial achieved time savings on the Sydney-Canberra service in optimal conditions. However, these time savings were not of the order to make rail competitive with either road or air transport.

The capacity of the existing rail infrastructure in New South Wales to handle fast train technology - and the scale of any track upgrades that may be required - is a central subject for the Committee in this report.

Fortunately, there is already a precedent in Australia when considering this matter.

In the next section, the Committee examines the Queensland Rail strategy of incremental track improvement programs over a long time-frame to ready the rail system for the introduction of tilt trains in 1998.

2.3 The Queensland Tilt Train

The Committee was briefed by Mr Vince O'Rourke, Chief Executive Officer of Queensland Rail, about the new Queensland tilt train at the National Conference of Parliamentary Public Works Committees, held in Brisbane in July 1997.

The Committee subsequently conducted a site inspection of the tilt train manufacturing plant at Maryborough, Queensland. It also attended a trial of the train between Brisbane and Nerang, near the Gold Coast. A public hearing at Tweed Heads on 20 February 1998 received evidence from Mr Ross Hunter, General Manager, Project Services, Queensland Rail.

The background to the introduction of the Queensland tilt train has important implications for the goal of enhancing the speed and competitiveness of New South Wales passenger rail services.

There has been a long term strategy in place to improve rail infrastructure in Queensland since the 1980s at a cost of $5 billion. The program has been principally designed to enhance the performance of the freight network. However, the intention was always to enable passenger services to "piggyback" on track upgrades.

The tilt train was chosen ahead of a TGV-style train because it could provide significantly improved transit times without the enormous upfront cost of VHST infrastructure, estimated by Queensland Rail at over $4 billion without including land resumptions.

The Committee will examine both the Queensland tilt train and the Queensland infrastructure

upgrading programs in subsequent sub-sections.

2.3.1 Queensland Rail Infrastructure Upgrading Programs

The origin of the tilt train project in Queensland has been two substantial rail infrastructure upgrade programs: the Main Line Electrification Program (MLE) and the Main Line Upgrade Project (MLU).[4]

During the 1980s, the MLE involved extensive electrification of new lines (and upgrading of existing electrified lines) to the modern high voltage standard of 25 000 volts AC, which compares favourably with the New South Wales standard of 1 500 volts DC.

Major track realignments also took place. Over 80 km of deviations on the Brisbane-Rockhampton line were completed including four significant track relocations: Eumundi Range, Gympie, Maryborough West and Benaraby Bank (just south of Gladstone).

Associate Professor Philip Laird's response to Questions on Notice from the Committee (3 February 1998) compared the electrification program in Queensland with New South Wales:

> Questions have been raised about the extension of low voltage electrification (1500 volts DC as opposed to the modern 25 000 volts AC as used by Queensland and WA) to Newcastle in 1984 and to Port Kembla in 1985. One may question the failure to realign any of this track with electrification (except for one curve north of Bellambi Station) and it is of note that in Queensland, significant realignment proceeded in the 1980s as part of their Main Line Electrification program. In short, Queensland gained both mainline realignment and modern high voltage electrification during the 1980s, whilst New South Wales had settled for no realignment and outmoded low voltage electrification.

In June 1992, the MLU was approved with a five year budget of $580 million[5] to upgrade infrastructure, motive power and rolling stock on the Brisbane-Cairns route as well as two western rail links (Roma-Charleville and Goondiwindi-Thallon).[6]

The MLU initiated major projects costing $526 million, which are summarised in the following table.

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[4] These programs are also referred to as the Mainline Electrification Program (MEP) and the Mainline Rail Upgrade Project (MRUP).

[5] The Committee received evidence that the MLU program has been further expanded with total investment now reaching $590 million.

[6] An excellent analysis of the MLU by John Hoyle including a breakdown of individual projects can be found in *Railway Digest*, May 1995, pp.28-31.

Table 2: Queensland Main Line Upgrade - List of Major Projects

PROJECT	COST
Acquisition: - 40 diesel electric locomotives (114 tonnes) - 250 container wagons of 20 tonne axle load (TAL) & 100 km/h capacity	$145M
Upgrading Queensland North Coast line: - eliminating the majority of timber bridges - upgrading steel bridge spans to accommodate a minimum 20 TAL - curve and grade easings to improve transit times - resleepering with 385 900 steel sleepers (1-in-3 sleepers from Rockhampton-Townsville and 1-in-4 from Townsville to Cairns)	$369M
Upgrading Queensland South Western lines: - Roma-Charleville: strengthening bridges and steel sleepering (1- in-4) - Goondiwindi-Thallon: relaying 108 km track with heavier rail and steel sleepering (1-in-4)	$12M
TOTAL	**$526M**

The centrepiece of the MLU was approximately 114 kilometres of deviations on the Brisbane-Cairns line to straighten some of the worst sections of track. This will enable trains to achieve a maximum speed of 160 km/h from Brisbane to Rockhampton and 120 km/h north from Rockhampton.

Track grading was also improved to ease train handling and enable heavier loads.

The Committee received evidence from Mr Hunter of Queensland Rail that the original goal was to enhance the performance of the freight network with passenger services also to benefit:

> **CHAIRMAN:** Was the work on the line between Brisbane and Rockhampton undertaken primarily for freight?
> **Mr HUNTER:** Yes. We are upgrading our freight train speeds from 80 kilometres to 100 kilometres (per hour) between Brisbane and Townsville, and some of that re-aligning was done to replace bridges that were on poor alignments, and also we needed to increase the bridge strength for higher axle load, and also to increase the train speeds and improve train handling. So the MLU was primarily to do with freight, and obviously the passenger trains that run on it get the benefit of that. But the main beneficiary was freight. (T2, 5-6)

It should be noted that travel time savings for freight trains have also significantly reduced fuel consumption, maintenance costs and crew costs.

The following table outlines the Brisbane-Cairns deviations with an example of time savings for a freight train running at 100 km/h to Townsville and 80 km/h thereafter.

Table 3: Brisbane-Cairns Deviations and Time Savings

SECTION	DEVIATIONS	LENGTH OF DEVIATIONS	TIME SAVING
Brisbane-Bundaberg	11	29.2 km	30 mins
Bundaberg-Gladstone	19	50.9 km	30 mins
Rockhampton-Mackay	5	9.4 km	20 mins
Mackay-Townsville	11	19.8 km	23 mins
Townsville-Cairns	5	5.3 km	19 mins
TOTAL	**51**	**114.6 km**	**132 mins**

The majority of timber bridges were also replaced with concrete box culverts or prestressed concrete bridges which could accommodate a 30-tonne axle load (TAL).

The following table shows bridge replacements on the Brisbane-Cairns line as part of the MLU:

Table 4: Brisbane-Cairns Line - Bridge Replacements

SECTION	Replaced on Alignment	Replaced by Diversion
Brisbane-Bundaberg	11	15
Bundaberg-Gladstone	9	16
Rockhampton-Mackay	157	4
Mackay-Townsville	242	23
Townsville-Cairns	175	4
TOTAL	**594**	**62**

The remaining 123 timber bridges on the Brisbane-Cairns line were located on alignments that will be by-passed with future deviations. Therefore, these bridges were only modestly upgraded so an not to invest funds on a new bridge located on a sub-standard alignment. This responsible planning approach demonstrated confidence in future funding streams to further enhance the Queensland rail network.

Associate Professor Philip Laird noted that one outcome of the MLU was that Queensland possessed better track alignment than both the major interstate lines in New South Wales:

> ... post MLU, the Queensland mainline track alignment is better than either Sydney-Albury (which is characterised by 'a curve for every kilometre') or Sydney-Brisbane (with even poorer curvature than the Main South Line). (S7, 2)

The overall enhancements to the Queensland rail network in turn paved the way for the tilt train, according to Associate Professor Laird:

> The Queensland tilt train performance is vitally dependent on reasonable track alignment.... The combined length of MLE and MLU rail deviations between Brisbane and Rockhampton was about 128 km, or some 20% of the original 640 km of track. As well as eliminating the sections of track with the worst curvature and/or grades, there was a reduction in distance of some 14 km. As a result, passenger train transit times have been able to be halved from about 14 hours in 1986 to 7 hours in 1998. As well, locomotive trailing loads for freight trains have near doubled from 760 tonnes in 1986 to 15 000 tonnes in 1996. (S7, 4)

Track improvements therefore have facilitated reduced travel times and increased freight loads, assisting Queensland Rail in achieving a 12% per annum productivity increase over the past 10 years.

2.3.2 Queensland Rail: Proactive Planning

The performance of Queensland Rail demonstrates that a sound planning approach over a realistic time frame can achieve outstanding results for both freight and passenger trains.

The key to this success is that Queensland Rail plans well ahead with genuine confidence in its funding stream. One example is the public exhibition in 1996 and 1997 of plans for a new tunnel under the Toowoomba Ranges. Land reservation is due soon to prepare for later construction of the project.

The evidence of Mr Hunter of Queensland Rail also reaffirmed the fundamental importance of good planning working in tandem with a political commitment to rail:

> **Mr STEWART:** The Committee has been told that Queensland adopts a long-term management approach to its rail infrastructure. That is not very evident in other jurisdictions. Could you outline to the Committee any longer term strategies that Queensland Rail has?
> **Mr HUNTER:** ... for our commercial business, planning is very much long term. We have a five-year capital plan that we have control over. For some other things it is much longer term, say 10 or 15 years. For the CSO (community service obligation) side of the business, it is very much driven by political considerations in terms of the inner-city train network and whether a new line is to be built, on the Gold Coast railway or a railway through to Coolangatta. (T2, 6-7)

This proactive approach enables Queensland Rail to be prepared should additional funding become available. Queensland Rail was therefore able to take advantage of the sudden availability of Commonwealth Government funds in the early 1990s to build the Gold Coast railway:

> **Mr SULLIVAN:** Going back to the planning phase adopted by Queensland Rail.

> You seem to have a specific objective of being proactive in terms of developing programs so that, should the money come through - as it did with One Nation - you can whip out the plan and be ready to start. Is that the sort of approach you are looking at, as well as the general upgrade of existing infrastructure and new structures?
> **Mr HUNTER:** We would try to have that approach.
> .....
> **Mr SULLIVAN:** Were you caught on the back foot, or were you well advanced in planning?
> **Mr HUNTER:** That was planned well in advance of it becoming available. The Gold Coast railway started in about 1980, in terms of planning. It was approved by the State Government at the end of 1984, in terms of identifying the route, approving the route, and allowing us to go and acquire land. But they never allowed us any funding to do that. So we acquired some land during the late eighties, but it was not until the Commonwealth Government came along with the Better Cities money as a catalyst to convince the State to divert the money to allow us to start construction. (T2, 8-9)

The nearest equivalent to such a capital works planning approach in New South Wales is the Roads and Traffic Authority. The Committee looked at its methodology in Chapter 1 when it examined planning issues.

The submission from the Lachlan Regional Transport Committee succinctly summarised the difference in approach between Queensland and New South Wales and the consequent outcomes achieved:

> Unfortunately successive Governments in New South Wales have neglected to upgrade and develop the rural New South Wales network and to keep up with World's Best Practice. For example, we see Queensland Rail spending $420 million over five years to upgrade the main line (Brisbane-Cairns). This program includes 118 kilometres of high quality deviations to allow for faster and heavier freight trains. North of Albury on the Main Southern Line we see track of steam age alignment with a curve for every kilometre. In rural New South Wales we see all sorts of track ranging from Pioneer line on branch lines to lines that are suitable to carry coal traffic. (S27, 1)

It should be noted that the MLU process is yet to be completed and that more rail deviations are planned. For example, track realignment with duplication from Caboolture to Landsborough was funded in the 1997 Queensland Budget.

In addition, Queensland Rail is already planning to extend the tilt train service to Coolangatta on the New South Wales border. The Committee received evidence that a complementary planning approach is needed in New South Wales to take advantage of extension to the service:

> **Mr STEWART:** In your submission you state that Queensland Transport is not considering rail connections beyond the Gold Coast. Firstly, how important is the need to develop rail connections to New South Wales? Secondly, what initiatives have been undertaken to establish public transport links across a border which I think you described in your submission as an anachronism?
> **Mr SPRAGG:** There is currently a study being conducted by Queensland Transport, called the Southern Gold Coast-Tweed Corridor Study, which looks at proposed road and rail alignments really in the Gold Coast and just coming over the border in the Tweed Heads area. But that is really looking at solving problems, say, between Beenleigh and Coolangatta. It probably allows a further opportunity to go further over the border, but it does not look at the options for linking Coolangatta to Murwillumbah or roads further south.... So there will be improved access to the Gold Coast and Brisbane. But there really is a need also to connect the two ends in the rail structure, and that is not being looked at I do not think. (T2, 24-5)

The MLE and MLU effectively prepared Queensland for the introduction of high speed passenger trains because track alignment was improved so that higher operating speeds could be sustained.

The original focus of reform was faster freight train transit times but passenger services were also advantaged. The introduction of the tilt train was the natural culmination of this process.

Queensland Rail is now planning to extend the tilt train to the New South Wales border. Other infrastructure upgrades have also been approved such as the Gold Coast rail link. The extensive program of track upgrades also shows a political commitment to rail from successive Queensland Governments - a commitment which recognised the economic advantage of modern rail transport.

It is essential for rail planning in New South Wales to take advantage of the extension of the tilt train to the New South Wales border so that maximum pressure can be exerted to increase rail funding. The Committee examines rail planning on the New South Wales North Coast in a separate section.

The far-sighted planning approach in Queensland - for example, with regard to bridge replacement and electrification - can be tellingly contrasted with New South Wales where very poorly aligned sections of track have been re-sleepered and electrified. This action effectively entrenched the existing track alignments and limited future planning options. The Committee will examine the reasons for this outcome in New South Wales in a separate section.

In the following sub-sections, the Committee examines the Queensland tilt train operation.

2.3.3 Design Features, Performance and Cost

The Queensland Tilt Train will operate over the Brisbane-Rockhampton corridor from late 1998, replacing the Spirit of Capricorn service.[7] One daily service is planned in each direction over the 638 kilometre route.

The Tilt Train will travel at speeds of up to 160 km/h, compared with the 120 km/h speed of the current service. It will cut travel time between Brisbane and Rockhampton from nine and a half hours to seven hours. That is an average of 91 km per hour.

The following table provides a comparative timetable for existing and tilt train services:

Table 5: Qld Tilt Train - Comparative Timetable for Existing and New Services

DESTINATION (Brisbane to)	TILT TRAIN (hours : minutes)	SPIRIT OF CAPRICORN (hours : minutes)
Nambour	1 : 20	1 : 35
Gympie	2 : 19	2 : 50
Maryborough	3 : 19	4 : 12
Bundaberg	4 : 05	5 : 20
Gladstone	5 : 47	7 : 55
Rockhampton	6 : 58	9 : 25

Two six-car tilt trains are being constructed by Walkers Ltd (the EDI-Hitachi-Itochu consortium) at Maryborough, Queensland in a contract valued at $62.5 million. Construction will employ about 80 workers for 18 months.

The train design will feature state-of-the-art communication technology and provide maximum comfort for passengers.

Each tilt train will consist of one first class carriage with 30 person capacity and five economy carriages with total capacity of 280 passengers.

The first class carriage will feature dual and single seating, catering services, a service call button, videos, radio and CD music, headphones, hearing aid loops and access to telephones and faxes.

Each economy carriage will contain two seats on either side of the central aisle with luggage storage racks located above seats and at each end of the carriage. It will be possible to access the

[7] The current targeted date for the tilt revenue service is October 1998.

same range of services as contained in the first class carriage.

The Queensland Tilt Train is able to operate on the existing narrow gauge track with only minor modifications.

By comparison, dedicated high speed track would cost between $4-5 million per kilometre excluding land acquisition costs. At this rate, a new track between Caboolture and Rockhampton would have cost almost $4 billion before any rolling stock was included.

In summary, the Tilt Train project will deliver:

- 2 x 6 car 25kV electric tilt trains
- Track upgrading and realignment works reducing sharp curves
- Installation of 6 high speed turnouts
- Walkways on selected bridges to provide additional safety
- New support facilities at Rockhampton station
- Alterations to current power signalling systems, upgrading protection at level crossings
- Provision of dynamic speed indicators
- Introduction of an automated train protection system

The total budget for the Tilt Train Project is $106 million.[8]

A breakdown of this capital cost estimate is contained in the following table:

Table 6: Qld Tilt Train Project - Capital Cost Estimate

ITEM	COST
Rolling stock	$72.2 million
Signalling upgrade and level crossing protection	$27.9 million
Track upgrade and curve easings	$2.0 million
Walkways on bridges	$1.2 million
Rockhampton Terminal	$0.2 million
Contingencies/Project Management	$2.5 million
TOTAL	**$106 million**

Spare parts stock, training and provision of train operating manuals are included in the rolling stock contract. Servicing and maintenance will be carried out at Mayne.

[8] The Committee received evidence that the final cost of the project is $107.6 million. In addition, some track upgrading works are being funded as part of Queensland Rail's MLU and the Bundaberg-Gladstone Prestressed Concrete Re-Sleepering Project.

Driver, onboard crews and maintenance personnel will be trained out of normal operating budgets. Ongoing costs are expected to be comparable with current Inter-City Express costs.

2.3.4 Project Delivery and Private Sector Involvement

Project delivery has been in accordance with the Queensland State Purchasing Policy Guidelines which requires competitive tendering including a publicly-advertised pre-registration process.

Over 90% of the project cost is being provided directly by the private sector including:

- Design and manufacture of the tilt train
- Signalling alterations, enhancements and automatic train protection system
- Materials pre-purchased for signalling alterations
- Materials for trackwork upgrade and bridge walkways
- Construction of walkways to bridges
- Consultancies

Queensland Rail is providing:

- Design, contract administration, project management, procurement, survey and testing services ($7.7 million)
- Minor trackworks ($0.8 million)
- Research and development on overspeed issues ($0.25 million)
- Construction of bridge walkways ($0.6 million)
- Curve easings ($0.5 million)

Queensland Rail is responsible for:

- Project planning and implementation including procurement strategy
- Project control including schedules, budget and quality issues
- Project safety and compliance validation
- Ensuring life-cycle cost effectiveness
- Design of miscellaneous works
- Specification of works for design and provision by the private sector
- Administration of contracts
- Commissioning and testing of works
- Administration of defects liability and works reliability periods

The development, approval and construction processes for the project have all been carefully structured and monitored to enhance speed and cost efficiency. Documents produced during these phases to assist Queensland Rail in meeting its responsibilities include Scope of Works, Project Master Schedule, Project Budget (including cash flow and funding procurement arrangements), Tender Evaluation Reports, Contracts, Progress Certificates (which are tied to progress payments) and Project Progress Reports.

2.3.5 Social and Environmental Benefits

The Tilt Train is designed to have a positive impact on tourism, transport accident rates and the environment.

A study undertaken in Europe in 1991[9] indicated that rail had the lowest relative external costs for each type of passenger transport (such as accidents, noise, pollution and climate change). Bus external costs were twice those of rail while private motor car were more than five times higher.

It is projected that demand for this service will increase by 15% in provincial cities and that total passenger patronage can be expected to grow from the current 175 000 passengers to 220 000 passengers each year.

Increased patronage may have the following positive impacts:

- Reduction in road maintenance costs and traffic congestion
- Reduction in road accidents
- Reduction in petroleum-based fuel consumption
- Reduction in greenhouse gas emissions
- Employment generation (both direct and indirect)

The Committee examines these issues in Section 4.8 of this Report in the context of national rail issues.

One of the potential attractions of the tilt train project for the Queensland Government was the prospect of a significant future export market in South-East Asia. The project is designed to establish Queensland as a base for innovative rail technology. Walkers Ltd will be the first tilt train manufacturer in the southern hemisphere.

2.3.6 Report of the Queensland Public Works Committee

The Queensland Public Works Committee conducted an inquiry into the Tilt Train Project in late 1996 and tabled its Report in March 1997 (Report No.35).

The Report contained eight recommendations which focused on the sub-standard quality of the economic and financial evaluations, patronage forecasts and market research used to justify this major infrastructure project.

The Committee was particularly concerned about the lack of:

- Genuine CBAs (or equivalent)
- Assessment of operating costs
- Environmental impact studies
- Performance evaluation process

[9] Source: Queensland Public Works Committee, Inquiry into the Tilt Train (Report No.35).

- Safety monitoring at level crossings
- Public consultation.

Upgrades at two stations were recommended where facilities were patently sub-standard.

2.4 Comments

Evidence received by the Committee is consistent that tilt technology can enable trains to operate at faster speeds on existing tracks with significant journey time savings.

However, the extent of these time savings - which ultimately determines the competitiveness of the service - depends on overall track quality.

The Committee has already identified serious problems with track quality in New South Wales in Chapter One of this Report.

The New South Wales tilt train trial in 1995 did achieve time savings on the Sydney-Canberra corridor in optimal conditions. However, these time savings were not of the order to make rail competitive with either road or air transport.

The Sydney-Canberra corridor is currently being developed as a corridor for very fast train technology. Proposals range from running high speed trains on dedicated tracks to infrastructure upgrades which will enable the introduction of tilt train services.

The Committee has quarantined the Sydney-Canberra route from its inquiry so that this process can proceed without hindrance.

However, the clear message from the current VHST proposals on the Sydney-Canberra corridor is that track improvements are necessary to make the service viable. All proponents would either enhance the existing track lay-out or construct a brand new dedicated rail corridor.

The example of the Queensland Tilt Train supports this conclusion.

Queensland Rail executed long-term track improvement programs which effectively prepared the State for the introduction of high speed passenger trains.

The far-sighted planning approach in Queensland - for example, with regard to bridge replacement and electrification - can be tellingly contrasted with New South Wales where very poorly aligned sections of track have been re-sleepered and electrified.

In the next chapter, the Committee examines New South Wales rail services and reaches conclusions about the feasibility of introducing tilt technology onto the existing New South Wales rail network.

Chapter 3

Assessment of Tilt Technology for New South Wales

In this chapter, the Committee examines New South Wales rail services as the final step in determining the feasibility of introducing tilt technology into the existing rail system.

Current rolling stock in New South Wales ranges in age and type with different stock servicing different corridors.

Each type of rolling stock performs specific tasks and replacing any type with tilt technology must be considered on a case-by-case basis.

The Committee begins this chapter by looking at existing rail services and rolling stock.

3.1 Current New South Wales Rail Services

In order to understand the condition and needs of specific New South Wales rail corridors on which tilt or other fast train technology may be employed, it is first necessary to examine the existing passenger rail services.

The State Rail Authority (SRA) has inter-urban trains, which are operated by CityRail. Country trains are operated by Countrylink on a reserved seat basis.

CityRail's electric inter-urban train services operate to Newcastle in the north, Lithgow to the west and the Illawarra region on the south coast. Diesel (Endeavour) train services operate local, suburban-style services beyond the limits of electrification to Dungog and Scone in the north, Goulburn and Moss Vale to the south and Nowra on the south coast.

Countrylink operates return train services between Sydney and ten different interstate and intrastate destinations:

- Daily connections to Brisbane, Murwillumbah, Grafton, Armidale, Moree and Dubbo
- Three times daily connections to Canberra
- Twice daily (day and overnight) connections to Melbourne
- Weekly services to Broken Hill and Griffith.

Connecting coach services extend the Countrylink passenger transport network throughout New South Wales. The Department of Transport estimates that some 80% of the State's population has access to Countrylink's services.

CityRail and Countrylink services perform very difficult functions in the New South Wales

transport task and cater for very different markets.

CityRail's services are vital to the support of Sydney. The road system could not cope with the commuter traffic that is carried by CityRail on a daily basis. Some 900 000 commuters are transported to and from work each weekday.

Countrylink services are essentially provided to improve community mobility, particularly for disadvantaged groups, through the government's concession fares program. Some 57% of all passengers on Countrylink travel on government-sponsored concession fares, while a further 9% travel on child fares. The primary purpose of travel on Countrylink services is "visiting friends and relatives" (58%) or for a "holiday/short break" (35%). The majority of passengers (70%) travel somewhere between every few months to less than once a year.

ARUP-TMG provided the Committee with a breakdown of track capacity and volumes on major New South Wales corridors. All interurban rail corridors out of Sydney are double track with levels of rail traffic ranging as follows:

- 120-160 trains per day between Cowan and Broadmeadow
- 50-90 trains per day between Emu Plains and Lithgow
- 60-80 trains per day between Menangle and Goulburn
- 90-120 trains per day between Helensburgh and Wollongong.

Double track gives way to single track and total passengers and freight traffic levels fall below 40-50 trains per day at:

- Telarah (194 km) on the North Coast Railway
- Antiene (274 km) on the Main Northern Railway
- Wallerawang (171 km) on the Main Western Railway
- Junee (486 km) on the Main Southern Railway
- Joppa Junction (230 km) on the Canberra Branch
- Unanderra (88 km) on the Illawarra Line.

The current rail system has reached the threshold of its capacity in and around Sydney. The submission of National Rail stressed that tilt trains would be using corridors that are already congested:

> Rail corridors in New South Wales likely to be used by tilt trains are currently being used close to capacity. This is especially the case for corridors into and out of Sydney from the north and south. These corridors are currently shared by freight trains (operated by National Rail and FreightCorp) and by passenger trains. Growth in demand for rail freight will inevitably result in a requirement for more train paths.... To ensure the viability of rail freight services, any introduction of tilt trains must be on a basis which has no detrimental effect on existing and future rail freight services. (S14, 2)

The Committee considers the specific requirements of the rail freight industry in a separate section of this Report.

3.2 New South Wales Rolling Stock

The option of introducing tilt technology on New South Wales rail services depends on timing and an accurate assessment of costs and benefits across the entire rail system.

The fleet of powers cars and rolling stock which operate on the New South Wales rail system range widely in age and capacity.

CityRail's inter-urban fleet comprises both inter-urban electric and diesel-propelled Endeavour trains. The economic life of the electric fleet is over 35 years. It still has a relatively long operating future. The Endeavours are only 4-5 years old.

Countrylink's fleet is comprised of:

- XPT power cars and trailers used for long distance major routes (Brisbane, Murwillumbah, Grafton, Dubbo and Melbourne)
- Xplorer diesel multiple units to service medium distance routes (Canberra, Armidale and Moree). The Xplorer is a versatile train which goes up to the tablelands then splits at Werris Creek. On the Armidale route, there are two driving cabs with seats and two carriages in between. On the Moree route, two driving cabs with seats. The train re-meets and reforms at Werris Creek then returns to Sydney.
- Old locomotive-hauled rolling stock used for the recently reintroduced weekly services to Broken Hill and Griffith.

In evidence, Mr Poulter told the Committee that Countrylink's rolling stock was being used at maximum capacity:

> We have one of the highest operating levels—as in on the road—for trains of any passenger railway in the world, almost to the point that our maintenance people are saying can we cut it back a bit. (T1, 22)

The Committee notes the lack of leeway for Countrylink in providing rail services when all rolling stock is being utilised almost all of the time. There is very little margin for error or accident in this equation.

It was argued by some that the introduction of tilt trains may release existing train sets to take on new roles in the New South Wales rail network. Mr Hunter noted that this situation prevailed in Queensland:

> A major benefit of the tilt train project is the release of the existing train sets that currently operate the service between Brisbane and Rockhampton. There are 16

> electrified cars that do that, and they are 10 years old, being of 1988 vintage. They currently operate a daily service in the form of the Spirit of Capricorn, and that will be replaced by the tilt train. Those cars will be utilised between Brisbane and the Sunshine Coast, enhancing services there. The replacement value of those cars is approximately $40 million. (T2, 3)

The crucial consideration in this regard is whether the existing train sets possess much more operating life and whether existing congestion problems were solved.

The Committee examined rolling stock used on corridors which may be candidates for the introduction of tilt technology.

Xplorer rolling stock is very early in its working life, being introduced in late 1993. The Canberra corridor is one of only two corridors on which it is currently deployed. The VHST proposal may impact on Countrylink's future services in this corridor with possible impacts ranging from "business as usual" to complete withdrawal from the corridor. The SRA noted in its submission that "the latter option would release Xplorer rolling stock for disposal or deployment on other routes" (S28, 9).

The Committee did not consider tilt trains as a feasible replacement for the Xplorer fleet because of:

- The relative youth of the fleet
- The specific functions which it currently serves on the Armidale/Moree route (which could not be replicated by tilt)
- The fact that the VHST proposal may, in fact, make more Xplorer services possible by removing them from the Sydney-Canberra corridor.

The old locomotive-hauled rolling stock must be replaced. Countrylink has earmarked $8 million in its forward capital program (in 2000/01) for replacement of these cars with a similar vehicle type.

The XPT fleet is ageing and suffering wear and tear from its high workload. It is due for mid-life refurbishment. The Committee, therefore, considered the future of the XPT fleet because it is the likely candidate for replacement with tilt technology.

3.3 The Condition of the XPT Fleet

The future of the XPT fleet is of considerable interest to the Committee because it is reaching the point where it must either undergo half-life renewal or be replaced. This is the obvious moment for the introduction of tilt technology if considerable journey time savings will be achieved. Otherwise, the focus should shift to track improvements. This would mean minimising investment in rolling stock to maximise investment in infrastructure.

The XPT fleet provides services for long distance routes to Brisbane, Murwillumbah, Grafton, Dubbo and Melbourne. It is used on interstate and intrastate services, meaning that its performance depends on infrastructure quality in different State jurisdictions.

This can create problems when States have different administrative or ownership structures and there are different government priorities on rail investment.

For example, XPT travel times over the Sydney-Melbourne corridor are governed by track quality in both New South Wales and Victoria. Victoria has the worst record in Australia for speed limits imposed due to track deterioration with 267 km (or 29.4% of the national total). Two major train derailments in Victoria during 1997 were attributed to track failure.

Further, Victoria has the lowest standard of track structure in Australia in terms of weight of rail, type of sleeper and fastening, and depth and quality of ballasts while New South Wales has the highest standards.

The rundown of Victorian rail services and infrastructure acts as a disincentive for New South Wales to invest in rail infrastructure that is linked with Victoria. The BTCE reports that the Sydney-Melbourne corridor is only at 60% of world's best standard and will deteriorate to 50% in the next 20 years. The very poor track quality in Victoria is reviewed in a specific chapter on national rail issues.

The SRA submission disclosed the potential working life of the XPT fleet as well as the cost of half-life refurbishment:

> The XPT fleet forms the backbone of Countrylink's rail services. Their estimated design life is 20-25 years and the oldest vehicles in the XPT fleet are now 15-16 years old. While there are no plans to replace the current XPT fleet in the immediate future, options are being examined to upgrade or renew the XPTs. A half life refurbishment has been identified as the minimum cost options for XPTs. Reflecting this, $33 million has been earmarked in Countrylink's forward capital program (over the period 2000/01 - 2002/03) for work to allow the XPT fleet to continue to operate reliably, within acceptable cost levels, and with an adequate level of comfort and presentation. (S28, 9)

Capital expenditure for refurbishment of $33 million from 2000 will enable the XPT fleet to continue in service for a little over 10 years after that (2010-13).

However, the high workload imposed on the XPT fleet has resulted in an accelerated aging process which calls into question its longevity. The SRA submission to the Committee stated:

> ... planning has commenced for fleet renewal and upgrading options because of (a) the long lead time involved in acquiring a new fleet and (b) the fact that the XPT fleet may be more worn than its nominal age given that utilisation levels have been

> twice that originally anticipated following implementation of a new operating pattern in 1990. (S28, iii)

This evidence acknowledges the high levels of usage which New South Wales has gained from the XPT fleet.

Mr Poulter of Countrylink outlined the options when the XPT fleet reached the end of its working life. He stressed that fleet replacement planning must commence now but it should retain some leeway to take advantage of technological developments over the next 15 years:

> **Mr POULTER:** ... Somewhere along the line XPTs will no longer be viable. They will reach an end of life. We are in the process of starting—I say starting because we are yet to get really seriously into this—to look at whether the end of economic life of an XPT is still another 15 years away, and to get it that far you might have to spend X amount of capital in three years time and another X amount of capital in another five years time, but you would not do anything after that. You would plan your fleet replacement 15 years out, in which case you do nothing in the short term because in 15 years time technology is going to be very different again. In doing that analysis the end of life for the XPT is in 2005, if we want to spend as little as possible in capital now to maintain the quality, integrity and safety of the train, instead we would be looking at what the replacement vehicle would cost in 2005. That is a straight business decision with respect to the best use of capital.
> **CHAIRMAN:** Is that study commencing now?
> **Mr POULTER:** We are working on that with regard to rolling stock. We have to emphasise that there are various types of rolling stock that can replace the XPT, one of which is tilt, which would lead to a second financial debate about whether you replace XPT rolling stock with rolling stock that will manage the existing schedules or whether you look for rolling stock that will give you better travel times. However for that, you would need to invest in more than rolling stock, such as capital for infrastructure. (T1, 25-6)

The wear and tear from high usage levels on an ageing XPT fleet have prompted rail authorities in New South Wales to begin planning for their replacement.

Tilt technology has obvious advantages because it can improve travel times on existing track.

The Committee, therefore, considered tilt technology as a likely candidate to replace the XPT fleet. The question is whether these time savings will be enough to make passenger services more competitive and justify the outlay in investment.

The Committee considers the potential of tilt technology in the next section.

3.4 The Feasibility of Tilt Technology in New South Wales

The Committee deliberated upon the feasibility of tilt trains in New South Wales.

In considering this issue, the Committee noted the question posed by State Rail in its submission:

> What is the potential for tilt trains to make a difference to reducing journey times and hence, increasing revenue, on inter-urban and regional rail services in New South Wales?

Today, railways operate in a completely different commercial and economic environment to the past and the Committee does not for a moment suggest that the clock should be turned back.

The Committee has no objection to public transport agencies - such as State Rail - increasing revenues and therefore making an important contribution to the operating costs of such a capital intensive operation as a railway.

However, the Committee did not feel that revenue raising should be the only priority imposed on such agencies at this time.

Convincing evidence of the relatively poor condition of the New South Wales rail network compared with both modern overseas networks and the State's own road network - as well as the potential impact on rail profitability in the future - necessitates decisive action on investment, given the vital role of rail in the State's economy.

Mr Wardrop of ARUP/TMG made the point that rail services had to generate enough business to make them a feasible competitor with other transport modes. This was the method by which they would gather funds for track improvements. However, he also made the point that rail travel times first must be reduced right now to achieve competitive service levels in Australia. This suggested that a degree of government investment was warranted to give rail a kickstart:

> The real issue is whether the rail industry is in a position to provide a competitive service in the haulage of both passengers and freight. It is whether travel times are competitive, and whether it is possible for all rail services to be sufficiently competitive against road to earn enough to upgrade services. The way to improve travel times is through a mixture of infrastructure improvement and rolling stock improvement, and that applies equally to freight and passenger services. Without reducing travel times rail cannot provide a competitive service, and if it does not provide a competitive service it cannot contribute to the national economy. (T1, 39)

Central to the deliberations of the Committee was a concern that the New South Wales economy was being held back by the failure of the existing rail network to be truly competitive with the road network and thus fully utilise its inherent advantages.

This lack of competition between road and rail did not reflect on the quality of rail as a transport mode but rather on the lack of a level playing field in capital investment. Furthermore, wider social benefits and cost savings from rail - such as environmental sustain ability and public safety - were not being considered.

Rail has to become genuinely competitive with road transport but it cannot achieve this goal at the moment. First generation rail just cannot compete with third generation road.

The tilt train has been suggested as a "quick fix" solution to the problem of relatively slow passenger train speeds.

The Committee had to consider two questions in determining the feasibility of the tilt train to improve travel times in New South Wales:

1. What is the potential for tilt trains to make a difference to reducing journey times on existing inter-urban and regional rail services in New South Wales?
2. If significant savings cannot be made with tilt alone on existing track, are other investments justified?

The Committee has looked closely at all of the material put before it regarding the ability of the tilt to reduce travel times on the current New South Wales network.

At first glance, the evidence on the effectiveness of tilt technology in reducing travel times was contradictory. Submissions and evidence indicated that tilt trains introduced onto existing track would reduce time by 10% to up to 40% in some corridors. On the other hand, there was a view put that the tilt technology alone would provide only marginal improvement and that infrastructure upgrading would really be necessary.

The Committee has examined this apparent contradiction.

Firstly, it considered the potential journey time savings from using tilt technology alone. In theory, the immediate apparent advantage of tilt train technology is that it can be used on existing track so that travel time savings can be made without the considerable expense of dedicated track required for TGV or MagLev technology. *The Economist* has noted this potential cost advantage:

> ... a tilt train may be less glamorous than ultra-high speed trains but it is distinctly cheaper. Track suitable for tilt needs only modest upgrading, costing about [US] $500,000 a mile, a twentieth of the cost of new dedicated high speed track. The new tilting trains are also relatively cheap to buy; they cost about [US] $24m, roughly a third more than the price of a conventional train. (21.2.98, p.21)

Evidence to the Committee asserted that immediate time savings are possible. Estimates of these time savings varied with the corridor being considered.

Mr Poulter of Countrylink claimed a consistent 10-15% time saving for the Sydney-Canberra trial. Mr Hunter of Queensland Rail estimated potential savings in time of up to 25% on its new Brisbane-Rockhampton tilt service: "we have areas where the curves limit the train speed to 50 kilometres an hour. The tilt will allow you to go through there at 25% more than that, so you are going through that area at 62 or 65 kilometres an hour" (T2, 5-6). The Campbelltown and Districts Commuters Association argued that a tilt train would provide a cost effective solution, improving speed by as much as 40 per cent (S6, 2). Another view of the potential for improved travel time on current track was given by ARUP/TMG:

> **Mr SOURIS:** Compared to the Xplorer, the tilt train would achieve a 20% improvement in the arrival time?
> **Mr WARDROP:** Yes, I believe so. (T1, 44)

However, not all evidence was categorical. RAC told the Committee that the tilt technology is really only effective within a certain band of track geometry:

> **Mr ALCHIN:** We have stated in our submission that it is necessary to have minimum radius curves of probably 800 metres up to 2,000 metres for tilt trains to show themselves to their best effect. Beyond curves of 2,000 metre radius, the benefits from the use of tilting rolling stock tend to diminish.(T1, 7)

Mr Hunter from Queensland Rail agreed with the assessment that tilt technology has little impact in areas where the track geometry is very good - that is, on curves greater than 2000 metres radius:

> **Mr STEWART:** You mentioned that with infrastructure improvements there is not a need for the tilt train at all.
> **Mr HUNTER:** In the areas where we have upgraded we decided on some strategic standards for the alignment, and the standard that we adopted between Brisbane and Rockhampton was to have 160 kilometres alignment standard, which is 2.2 kilometres radius curves. There are some areas where you could not achieve that, such as built-up areas in the city, where you would go at a slower speed anyway. But, in open and hilly country, we have tried to achieve, and have achieved, 160 kilometres alignment standard where we have been building new works.
> **Mr STEWART:** But do you need the tilt train facility if you upgrade your tracks?
> **Mr HUNTER:** No. (T2, 5-6)

This, of course, does not mean that tilt trains could not operate effectively on tracks with this type of high standard alignment. Trains with tilting capability are now able to operate at speeds up to 300 km/h (S11, 4) and the tilting function would be available for relatively tighter track sections. Clearly this is an example of the convergent nature of fast train technologies.

It should also be noted that diesel tilts have limitations and that the regional New South Wales network is essentially unelectrified:

> **Mr HUNTER:** Are all tilt trains electric?
> **Mr ALCHIN:** No. Some will be diesel powered.
> **Mr HUNTER:** So they could go past Newcastle?
> **Mr ALCHIN:** Yes. Having said that, it should be recognised that diesel-powered tilt trains tend to have a top speed of about 200 kilometres an hour, and you need electrically powered trains to consistently provide operating speeds above 200 or 225 kilometres an hour. (T1, 9)

Of greater concern to the Committee, given the difficult nature of much of the New South Wales rail network, was just how effective tilt train technology would be in reducing travel times at the other end of the band: that is, on poor tracks below 800 metre radius curves. Such track might be considered as first generational, according to Associate Professor Laird's assessment. This is a standard which, according to evidence before the Committee, afflicts much of the network in New South Wales.

Most submissions and evidence argued that tilt trains alone would not provide significant savings on the existing New South Wales track network. To achieve this there is a need to improve the rail infrastructure which would support any tilt operation in New South Wales.

For example, the Talgo Consortium offered a qualified claim for the potential of tilt in its submission: "the Talgo system is an inexpensive modern train enabling an immediate increase in travel speeds of 20%, **track conditions permitting**..." (emphasis added). This evidence suggests that there is a bottom limit below which tilt technology will not provide an effective remedy to poor quality track.

In the same vein, ARUP/TMG stated in evidence:

> **Mrs BEAMER:** Do you believe that the tilt trains offer a quick-fix solution?
> **Mr WARDROP:** Tilt is an interesting and cost-effective technology. It offers you the practical prospect of a 30% reduction in travel time **with comparatively small infrastructure changes**. (T1, 42 - emphasis added)

AdTranz advised the Committee in its submission that a modern train really needed modern track to be effective:

> Tilt train technology requires less infrastructure upgrade than any other HST system, but in the Australian context it still requires some upgrade.... Even for a tilt train, a great deal of money has to be spent simply bringing track up to 20th century standards. (S20, 3)

Dr Weatherby made the same point in evidence:

> Although you would actually have some improvements by using tilt trains... it would not be cost effective given the expenditure that you would make on a tilt train and the actual and minimal time savings. So, really, it boils down to having a track upgrade if you are to make effective use of tilt train technology. (T2, 11)

Associate Professor Laird also stated the case most directly in his submission: "just a tilt train, with no upgrading, will not offer significant time savings" (S7, 2).

Once again, the parlous state of the nation's rail infrastructure was emphasised as an impediment to the introduction of tilt technology - a technology which is specifically designed to minimise infrastructure costs. AdTranz concluded:

> A tilt train can improve performance on poor quality track, but it cannot 'magically' compensate for the condition of much of the track in regional New South Wales and other areas of the country. (S20, 3)

Mr Alchin of RAC supported this argument:

> ... for significant parts of the network, where there are fairly tight curves, the reality is that the speeds, even with tilting rolling stock, may not be such that they can be used to any great effect; one will not get significant speed or time savings. (T1, 4)

Countrylink General Manager, Mr Poulter, agreed in evidence that state-of-the-art technology (such as tilt rolling stock) would not improve New South Wales rail journey times without significant infrastructure upgrades:

> **Mr RIXON:** What could the time be cut down to on the present track with the best of tilt trains?
> **Mr POULTER:** We did a couple of speed trials before we went into commercial testing. We got down to about 3 hours 10 minutes, which is an hour quicker than the current timetable. If we had a dedicated train on the current track that might get down to 2½ or 3 hours. An upgrade in technology—because there are other ways of doing it—will not in itself give improvements to the journey times that are needed in this State. We will always need infrastructure improvements to get significant benefits in journey time. (T1, 17)

Given this evidence, the Committee examined the reasons why tilt technology alone will not provide significant time savings on the existing infrastructure and just what type of track improvements will be required to justify its introduction.

It would seem that the critical factor in significantly reducing track times is the ability of the rolling stock to achieve a high average speed for the whole of its journey. While a tilt train can increase the speeds through poor curves by significant amounts, it cannot increase the overall

average speed by enough to significantly reduce the journey time.

For example, the Queensland tilt train has attained high average speeds on track sections which have been rebuilt but it will not substantially increase speeds in other sections. Mr Wardrop explained this issue to the Committee:

> **Mr WARDROP:** The main thrust of what has been going on in Queensland—I presume that you are referring to the main line upgrade—has been to improve the operations of freight trains, and in that respect it was spectacularly successful. It has effectively doubled the loads of freight trains by reducing grades and easing curves. It has an incidental benefit to passenger trains. However, the travel times being achieved at the moment in Queensland are no better than the travel times being achieved in New South Wales. The proposed tilt train in Queensland will result in very little incremental improvement. Queensland will be able to raise the average speed between Brisbane to Rockhampton to about 80 to 85 kilometres an hour.[1] At the moment the existing Xplorer service to Canberra, for example, probably achieves 75 to 80 kilometres per hour—I would have to check my numbers, but it is in that order. (T1, 43)

Queensland Rail acknowledged that some compromises were made because of the high cost of track improvements. It sought to make up time through sections of substandard alignment by means of tilt technology. However, the benefits seem to be marginal:

> **Mr HUNTER:** ... the cost of upgrading track is very expensive. Of the 635 kilometres between Brisbane and Rockhampton we actually rebuilt 80 kilometres. So there are more than 100 kilometres of substandard alignment. We have areas where the curves limit the train speed to 50 kilometres an hour. The tilt will allow you to go through there at 25% more than that, so you are going through that area at 62 or 65 kilometres an hour. But that is still a slow speed compared with the straight-line speed of 160 kilometres an hour. (T2, 5-6)

Increasing speeds from 50 km/h to 62 km/h over 100 kilometres of track does not make significant inroads into the overall travel time. In other words, without some overall track improvement across substandard sections of track, the "dips in the speed profile" cannot be fully removed.

So, the main objective - a substantial reduction in travel time - will only be achieved with a significant increase in the total average speed across any corridor. It would seem that Queensland Rail has not yet fully achieved its goal with the tilt train, which lends credence to the view that the return from tilt technology will only be maximised with infrastructure upgrades to specified standards. Mr Wardrop stated this argument clearly to the Committee:

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[1] Data provided to the Committee indicates that the average speed of the Queensland Tilt Train is 91 km/h from Rockhampton-Brisbane.

> **Mr SOURIS:** I refer to the 100 kilometres an hour versus 75 to 80 kilometres an hour.
> **Mr WARDROP:** We are talking about average speeds. To achieve an average speed of 120 kilometres an hour you have to have a cruise speed of at least 160 kilometres an hour. You have to raise your cruise speed, you have to be able to travel for an extensive period of your journey at or close to your maximum speed to get an average speed of something like 120 kilometres an hour.

Even with the Queensland model, relatively slow sections of track will slow the average speed for the whole corridor and hold back journey time savings.

Furthermore New South Wales is hampered in many places - the Blue Mountains, the North Coast - by reverse curves, which are the worst type of track alignment across which tilt technology is of little benefit.

In summary, serious problems with travel times and track quality across New South Wales and Australia rule out the introduction of fast train technology at this time. The Committee received consistent evidence from stakeholders that the best outcome for New South Wales rail services would be a long term strategy of track improvements to benefit both freight and passenger services followed by the introduction of new, faster rolling stock. Witnesses referred to the New South Wales Roads and Traffic Authority (RTA) as a model for a targeted, long-term rail infrastructure program because of its success in planning for the future and generating investment. ARUP/TMG argued for a holistic, inclusive approach to upgrading the rail network:

> In our view, the goal should be the strategic development of selected replacement railway infrastructure which can improve the performance of **all** existing train operators as well as yielding significant travel time reductions for passenger train services. (S11, 2)

ARUP/TMG noted that targeted infrastructure programs would deliver the critical improvements that make faster trains feasible. The key to faster trains was a clear and comprehensive vision of what planners wanted the New South Wales rail network to become in the future:

> There are considerable rail travel time improvements to be had through the implementation of carefully targeted packages of infrastructure and rolling stock measures.... Effective rail infrastructure cannot be planned in isolation from knowledge of the range of rolling stock which is intended to operate on it. Likewise, rolling stock cannot be chosen without designing its performance in the knowledge of the environment in which it must operate. (S11, 3)

The State Rail Authority submission agreed. It argued that - based on international experience - tilt technology would provide significant time savings if it was combined with a range of infrastructure improvements from track upgrades to better signalling and crossings:

> ... the overseas experience shows that with **favourable operating conditions**, 20-30% reductions in journey times are generally achieved where tilt train technology is applied together with **strategic improvements to track**. For example, upgrading of signal and safety at unprotected level crossings would be required to fully exploit the faster operating speeds of tilt trains. Notwithstanding, while the top speeds for tilt trains range from around 160-250 km/h, operation at speeds of 250 km/h would not be possible in New South Wales without significant investment in track infrastructure. (S28, iii)

Mr Alchin of the RAC pointed out that this range of track improvements covered everything from simple and inexpensive crossing loops to major deviations:

> The cost of any infrastructure upgrades will vary. For example, on the north coast we are currently pursuing discussions with one of the freight customers about the provision of a series of passing loops to allow longer freight trains to be installed. They are at the low cost end of infrastructure improvements, they allow longer trains and they may do something to help the capacity. Much of the north coast line is single-track operation. That is probably at the low end. Up from that you go to curve easings or grade easings where you increase the radius of existing curves. Regrettably, much of the New South Wales network—especially the north coast—is 19th century with curves of 400 metres radius or less and there are steep grades. Significant investment of many hundreds of millions of dollars will be required from all sorts of sources, whether from government or private parties. (T1, 3-4)

Mr Alchin also noted that some track improvements may render tilt technology irrelevant by improving journey times sufficiently using conventional trains (T1, 4-5).

The other factor to carefully consider is the congestion on the existing network, which the Committee described in Chapter 2. Because of this existing problem the introduction of higher speed trains can create more congestion.

Mr Thornton of ARUP/TMG told the Committee that passengers would quickly abandon a service that could not achieve significant time savings or meet its timetables:

> That is the issue for any high-speed train: its ability to run on its merits. In order to deliver travel time savings there has to be a timetable and there has to be a train path through the existing traffic to allow that to occur. If it does not occur, patronage will fall away very smartly if one has an unreliable service. (T1, 46)

In the end, the solution to improved rail travel times needs to provide a solution for all stakeholders.

The capacity of tilt technology to make a real difference in journey times must be balanced against

the need for track improvements which would benefit all rail users. As the SRA stated in its submission: "the huge cost involved in track improvement would tend to rule out that option from a cost-effectiveness viewpoint unless it was of benefit to FreightCorp or National Rail." (S28, 10)

The Committee accepts that tilt technology can significantly reduce travel times on existing infrastructure but it can only do so on reasonable quality track; that is, modern track in good condition with curves radii greater than 800 metres.

The New South Wales rail network is characterised by 19th century track in poor condition with many curves less than 800 metres in radius and in many places reverse curves.

Tilt trains do not, therefore, offer worthwhile time savings on the New South Wales rail network.

Furthermore, given the current levels of congestion, relatively faster tilt trains would compound this problem.

If time savings are to be achieved - and the Committee acknowledges their supremacy in increasing patronage - track improvement has a higher priority than high speed rolling stock.

This would be the most sensible, rational strategy.

3.5 XPT Refurbishment versus Tilt Technology

A critical question facing the Committee has been whether it is more cost effective to invest money in refurbishing the current XPT fleet as outlined in the previous section or to seek additional funds to introduce tilt technology into New South Wales.

The Committee examined the current condition of the XPT fleet in Chapter Two.

The XPT fleet has been subjected to very high workloads and is due for half-life refurbishment from 2000.

The SRA submission noted that Countrylink's forward capital program included the following indicative costings for XPT refurbishment:

- $33 million to allow the XPT fleet to continue to operate reliably within acceptable cost levels and with an acceptable level of comfort and presentation. (S28, iv)

The SRA noted that total replacement of the current fleet with new tilt trains could cost up to $250 million.

In the previous section, the Committee looked at rolling stock planning and lead times. Currently,

Countrylink are looking at fleet replacement options. Mr Poulter told the Committee about the complexities of this process:

> ... With the tilt train we really looked at the appropriateness of the technology and at some customer reactions. A full fleet replacement study is yet to be carried out on the XPTs. We need to make decisions about whether to reinvest in the XPT as it reaches a certain age and needs to be upgraded, or whether the money would be better spent on new technology. That work has not been done. Clearly, in the evaluation criteria for a new technology you would have to consider whether it means you can operate less trains or you can use the same number of trains to provide a better range of services, better timetabling options, and all those sorts of things. You are quite right, it is not a like-for-like comparison; you have to look at the operating costs, the number of journeys, the number of trains you would need, and therefore your asset base. All those things would come into it. (T1, 18)

The SRA stated that the final decision on rolling stock will look at a variety of options but will ultimately be decided according to strict financial parameters:

> Recommendations arising from Countrylink's fleet upgrade and renewal strategy will be based on a detailed capital investment appraisal including considerations of operating and capital costs (faster journey times could reduce the number of trainsets required) and demand (based on assessments of the market, competition and overall traffic mix on the line). Other issues to be considered in this study include the saleability and opportunity for disposal of these assets shortly versus further down the track, and the financial impact of leasing options versus purchasing options. (S28, 10)

Mr Poulter noted that the SRA made the final decision and must look at system-wide issues when investment priorities were determined. A holistic outlook was particularly important given the limited funds available to the SRA. This could mean that rolling stock expenditure lost out to infrastructure:

> **Mr HUMPHERSON:** What is the priority as far as capital investment vis-a-vis upgrading and maintaining XPTs versus acquisition of tilt trains, or alternatively investing in infrastructure upgrades and straightening alignments on rural routes?
> **Mr POULTER:** The answer is that State Rail and all government businesses have got to become more and more businesslike. Capital is a scarce resource. When State Rail, not Countrylink, looks at what its capital bid needs to be then there needs to be a business case. The best use of funds from State Rail's point of view might be to relieve congestion points within the CityRail network because that would give the greatest benefit to the greatest number of people. (T1, 25)

The SRA ultimately recommended investment in infrastructure in its submission:

> Whilst tilt probably represents the most appropriate investment if additional or replacement rolling stock is required in the future, refurbishment of the existing XPT fleet almost certainly provides the most cost effective means of maintaining existing service levels. (S28, 10)

The Committee supports this strategy so long as investment in infrastructure is maximised.

The message to the Committee from stakeholders was clear. If New South Wales rail is to become more competitive in the future then it needs to improve its rail infrastructure so that high average speeds are attained, congestion is reduced and both freight and passenger patronage can burgeon.

This will be the moment when fast train technology should be contemplated, according to experts such as Mr Wardrop:

> The real issue is whether that will place passenger rail services in a sufficiently good competitive position to win enough traffic back from the roads. The tilt alone does not provide that competitive advantage. If you do tilt with a selected and focussed infrastructure improvement you get the double whammy—you get some worthwhile travel savings, savings that make passenger rail times highly competitive when compared with the road. (T1, 42)

The General Manager of Countrylink, Mr Poulter, agreed:

> **Mr POULTER**: If you want to go beyond that and start to see serious improvements in running times you only get those if you get—
> **Mrs BEAMER:** Serious money spent on infrastructure.
> **Mr POULTER:** That is right. (T1, 26-7)

Associate Professor Laird outlined the type of infrastructure works required to achieve this goal:

> **A/Professor LAIRD:** ...In order to be effective, the tilt train requires not only the rolling stock but also good track, and that is not only good weight of rail on high-quality wood or concrete sleepers but also the track alignment or geometry. The horizontal alignment with the curvature and the vertical alignment with the grades have to be much better than what we have at the moment. (T1, 30)

RAC agreed that "tilt trains will require significant track investment if they are to fully realise their potential" (S30, 7).

In this regard, the SRA noted that the XPT had been unable to achieve its potential due to poor track alignment:

> While Countylink's XPT trainsets have a nominal top speed of 160 km/h, the trains are rarely able to achieve this potential in practice due to the curvilinear and

> steep grades of the track. As a result journey times are not significantly better than competing coach times... (S28, ii-iii)

Poor track alignment would also partly explain the high levels of wear and tear which the XPT has suffered over its working life.

3.6 Conclusion

There is no doubt that almost all evidence before the Committee was premised on the need for - and benefits of - introducing high speed rail operations in Australia.

However, simply achieving high speeds on isolated sections of each corridor will not dramatically reduce travel times. To achieve more significant reduction in travel times, it is essential to ensure an overall increase in average speed for the entire journey along any particular corridor.

The Committee concurred with experts and stakeholders that tilt technology would produce some gains on existing - or partially improved - track in New South Wales but that these gains were not substantial. The full benefit of expenditure on tilt technology would only accrue with investment in network infrastructure.

On balance then, tilt technology on its own does not appear to be a cost effective way of reducing train travel times on poorly aligned sections of the New South Wales network.

The Committee believes that it would be better to complete the XPT half-life refurbishment program and direct capital works investment towards improvements to rail infrastructure which would benefit all users of the New South Wales rail network.

This strategy would resolve congestion issues in the worst areas of the network (especially Sydney) and improve CityRail's inter-urban services across the board.

Careful assessment of tilt and other fast train technology should follow.

The SRA has already committed $33 million in Countrylink's forward capital program (over four years from 2000/01 - 2002/03) to refurbish the XPT fleet so that it can continue to operate reliably within acceptable cost levels and with an acceptable level of comfort and presentation.

The Committee supports this SRA policy as sound.

However, the refurbishment of the XPT fleet is not an excuse for inaction.

Given the poor condition of sections of major New South Wales rail corridors, an initial program of fundamental track improvements is required as part of a formal, ongoing

master plan to reach - and remain at - world's best standards of rail infrastructure. The role of high speed rolling stock would form an integral part of this master plan. In addition, any New South Wales master plan must be fitted into a national context.

The Committee has therefore chosen to make further comments on aspects of the national rail network because the problem of poor infrastructure is a national issue requiring a national consensus and Commonwealth Government investment.

The following chapters examine the structure of national rail administration in Australia, its impact on individual State systems and road and rail funding issues. Finally, track improvements required to bring major New South Wales corridors closer to world's best standards are considered in Chapter Five.

The Committee's recommendations for the first three chapters, which deal specifically with the New South Wales rail system, are contained below.

Findings and Recommendations

1. **Tilt technology is not feasible for the New South Wales rail system at the moment. It would not produce substantial journey time savings on major New South Wales rail corridors. The full benefits of expenditure on tilt technology will only accrue with substantial investment in rail infrastructure.**

2. **The Committee supports the refurbishment of the XPT fleet so that it can continue to operate reliably with an acceptable level of comfort and presentation.**

3. **The New South Wales Rail Access Corporation and the Australian Transport Council continue to work towards a long term solution to congestion problems in Sydney, particularly when they hamper the movement of freight. In the short term, the elimination of specific bottlenecks will reap significant efficiencies. However, track improvements must be compatible with a strategy to construct a separate freight corridor through Sydney with double stack clearance.**

4. **The introduction of the Queensland Tilt Train was facilitated by a long-term program of track improvements which effectively prepared the State for high speed passenger trains. The far-sighted planning approach in Queensland was assisted by secure investment levels.**

Chapter 4

National Issues

Providing convenient access to the national interstate rail network has been an ongoing problem since railways were first introduced in pre-federation Australia. Today, there remain different state jurisdictions with different technical and safety standards as well as a proliferation of state and national agencies with often overlapping areas of responsibility. The final product could hardly be called a 'system' in any true sense of the word.

The structural and microeconomic reforms which have taken place in Australia over the last 25 years have included efforts to address some of the most glaring inefficiencies and rail agencies have been subjected to varying degrees of reorganisation.

However, progress has been too slow especially in an environment where high levels of government investment in roads is affecting the competitiveness of rail as a supplier of passenger and freight services.

The National Rail Summit of the Australian Transport Council of Ministers in September 1997 represented the most recent effort to make a genuine impact on this archaic and inefficient administrative structure.

The Committee examines the administration and quality of Australia's interstate rail network in this Chapter offering recommendations for reducing red tape, centralising rail administration and consolidating infrastructure investment. The relationship of rail and road investment is also addressed because it is central to creating a more competitive transport system.

4.1 The State of Australia's Track System

The Committee examines specific New South Wales rail corridors in this Report in order to determine their longer term suitability for the introduction of fast passenger train services. However, it is important not to consider the New South Wales track system in isolation. It is part of an interstate rail network that covers Australia and is overseen by numerous State and Commonwealth authorities.

Cross-border rivalries since the birth of railways in Australia have hampered the development of a truly national rail system. The arguments over which jurisdiction should pay for new infrastructure continues to this day. The same problem has been resolved for national roads.

As a result, Australia's rail infrastructure is in a parlous state.

A recent Business Environment Survey conducted by the Economic Intelligence Unit ranked the

quality and extensiveness of Australia's rail network as the joint worst feature of our domestic business environment.

There have also been warnings about further deterioration in rail infrastructure.

The Bureau of Transport and Communications Economics (BTCE) ranked Australia's intercity rail infrastructure against world's best standard in 1995 today and 2014.

The results were an indictment of the long term rundown of Australia's major rail corridors as the comparison with world's best standard rail infrastructure in the table below indicates.

Table 7: BTCE - Australian Intercity Rail Infrastructure Ratings

Corridor	Physical Deficiency: 1995-96	Physical Deficiency: 2014-15
Melbourne - Adelaide	0.6	0.6
Sydney - Melbourne	0.6	0.5
Sydney - Brisbane	0.5	0.5
Brisbane - Cairns	0.7	0.6
Adelaide - Perth	0.9	0.8
Hobart - Burnie	0.5	0.5
Sydney - Adelaide	0.6	0.5
Adelaide -Alice Springs	0.8	0.8
Canberra - Goulburn	0.5	0.5

Note: a rating of 1.0 denotes world's best standards

These results indicate that six out of nine major Australian rail corridors are ranked at 60% or below and that no corridor reaches world's best standard.

Worse still, this performance is likely to deteriorate without significant investment in rail infrastructure.

In 2014-15, it is estimated that a further down-rating in four of the nine corridors is likely. That would mean that seven out of nine corridors is ranked at 60% or less against world's best standard.

Considering the determination of the Commonwealth Government to achieve world's best practice on the waterfront, it is shortsighted to neglect the vital arteries which service the ports of Australia.

The BTCE technical assessment also highlighted some other serious existing problems:

- Rail weights across all corridors was below the world best benchmark
- Most corridors still have wooden sleepers which necessitate speed restrictions and create high maintenance costs
- All eastern corridors are deficient in clearance heights which restrict loads (especially where doubling containers would be possible)
- Steep grades on all eastern corridors necessitate greater locomotive power, restrict trailer loads and increase fuel consumption
- Tight curves on the Brisbane - Cairns, Sydney - Brisbane corridors and the Sydney - Junee section of the Sydney-Melbourne corridor. These restrict speed and increase resistance and damage to tracks and rolling stock
- Out-dated train control and signalling systems on several corridors.

The various State rail systems have been constructed without a national perspective, without uniform performance criteria and are clearly in a very rundown condition. They cannot meet the standards expected by a modern society and economy.

Associate Professor Laird expressed his opinion on the national track system in the strongest terms:

> What we have at the moment is described by me elsewhere as a national disgrace. Well over 30% of the interstate mainline track running from Albury to Sydney and up to Brisbane fails to meet the most basic of fast freight train standards of having a ruling grade of 1:66 and no curve tighter than 800 metres, to allow through-running trains to travel at over 100 kilometres an hour. The north coast line from Maitland to Brisbane is basically a string of branch lines, which after 1930 reached South Brisbane and then in 1932 a bridge was built across the river at Grafton. The main south line from, say, Campbelltown down to Cootamundra was rebuilt in the 1910s as a program of duplication and deviations. (T1, 29)

The Committee notes that these comments are directed at specific New South Wales rail corridors which are among the most vital in Australia.

There is also evidence of deterioration in track quality because of insufficient investment in infrastructure maintenance.

The best and simplest measure of track quality problems is the number of temporary speed limits placed on trains by such factors as poor sleeper quality, poor substructure (drainage), rail fatigue, poor surface and unreliable signalling. These factors are separate to speed limits caused by alignment such as tight curves or steep gradients.

In September 1997, 535 km (or 7%) of the national track network (excluding Queensland) is subject to temporary speed limits. Fortunately, only 82 km (or 3.2%) is in New South Wales.

Of concern is the fact that Victoria has the worst record in Australia with 267 km (or 29.4%). Two major train derailments in Victoria during 1997 were attributed to track failure (heat buckles). Further, Victoria has the lowest standard of track structure in Australia (in terms of weight of rail, type of sleeper and fastening, and depth and quality of ballasts) while New South Wales has the highest standards.

Expert assessment of Australia's rail network has identified glaring deficiencies which are hampering national economic performance.

This is cause for serious concern right now.

What is worse is that there is also considerable evidence of track deterioration because of low levels of investment in infrastructure maintenance.

The existence of different state jurisdictions exacerbates this problem.

For example, the Victorian Government policy of running down rail services and infrastructure has a serious flow-on impact on New South Wales services, especially the premier Sydney-Melbourne corridor.

In particular, it acts as a disincentive for New South Wales to invest in rail infrastructure that is linked with Victoria.

This example of discontinuity between State rail services reinforces the need for a national body to lift the rail system above the level of competing fiefdoms.

The Committee examines reform of rail administration in Australia in subsequent sections of this Chapter.

4.2 Recent Reform History

The recent history of rail administration in Australia shows some movement in the right direction, albeit at a snail's pace rather than that of a very fast train. A historical perspective also highlights some of the endemic problems in the rail system.

The Whitlam Government originally developed the concept of a single national rail carrier; a policy partially implemented by the Fraser Government from 1975-78. The Commonwealth Railways, South Australian Railways and Tasmanian Government Railways were merged under the banner of Australian National Railways (AN). Other states refused the Commonwealth offer to take over their systems.

The role of AN in freight increased with the extension of standard gauge to Alice Springs. AN became the industry leader in locomotive and wagon design. It also completed significant work practice reforms which lifted freight tonnage moved per employee by a factor of six between 1978

and 1994. There was major investment on an ongoing mainline track upgrading program installing concrete sleepers. The number of maintenance facilities on the Nullarbor was reduced from thirteen to one by the 1990s.

The formation of National Rail Corporation in 1993 was intended to reduce the proliferation of State agencies who handled freight with different locomotives, work practices, technical and safety standards and even track gauges.

The total loss of these State agencies was estimated at $350 million per year by this time.

In its submission to the Committee, National Rail stated that it was:

> ... formed to create a competitive and commercially viable Australian interstate rail freight business. Its shareholders are the Commonwealth Government of Australia and the States of New South Wales and Victoria. The company commenced operations in April 1993. National Rail purchases access to tracks owned by five rail authorities and obtains a large part of its business through freight forwarding companies. (S14, 1)

National Rail was given a mandate to take over these systems and create a profit within five years. It stripped AN of its profitable core business: interstate freight. AN was left servicing the debts for this infrastructure and suffered a reputed loss of $779 million.

This loss is symptomatic of what happens when agencies do not receive a regular, adequate revenue base (such as hypothecated road tax).

The subsequent restructuring of rail administrations only created destructive competition in which one rail agency effectively cannibalised another rail agency.

The sale of AN is designed to arrest the consequential decline in the South Australian and Tasmanian intrastate networks.

National Rail has instituted more uniform operating practices across Australia as well as workplace reforms and some rolling stock and infrastructure upgrades. However, it is hampered by obligatory negotiations with several State authorities on access pricing, safety standards and operational matters.

In this regard, the administrative system for interstate rail access remains doggedly attached to an era when individual colonies maintained their own rail systems and jealously guarded their patch.

There has never been a national consensus on rail and, therefore, there has never been a genuine national rail system.

4.3 Current State Agencies

The problem of a large number of competing authorities governing individual sections of track along a single corridor is not unique to Australia. Currently, Europe would be considered the epicentre of international rail operations. However, it shares the same structural administrative problems as Australia. *The Economist* has written:

> ... the key to unlocking Europe's rail freight potential lies in co-ordinating its Byzantine network of 30 national railways, each with its own standards, fare structure and regulations. So serious are these hurdles that it takes six days for a rail-freight wagon to get to Milan from London, twice as long as a heavy lorry. (21.2.98, p.21)

The situation in Australia is potentially less problematic because we are a single nation, not many nations.

Management of track across the Australian interstate network is currently controlled by the following State authorities:

- Queensland Rail - Network Access Unit
- New South Wales Rail Access Corporation (RAC)
- Victorian Rail Track corporation (VicTrack)
- AN Track Access (South Australia, Western Australia from Kalgoorlie to border, and Northern Territory)
- Westrail.[1]

To operate trains across the entire national track system, it is necessary to negotiate access contracts separately with each of these five different authorities. Each authority has its own terms and conditions. The sale of SA Freight may even create a sixth access management entity.

Only RAC and AN Track Access have formal track access regimes.

There are six separate pricing policies (South Australia requires a separate payment for using the Belair-Keswick corridor) veiled in secrecy. Only AN Track Access has a publicly available tariff.

By contrast, road transport firms pay one price for access to the entire Australian road network and pay through the simple mechanisms of vehicle registration and fuel excise.

Within these five State-based rail jurisdictions, there is a proliferation of agencies with responsibility for different aspects of the system. For example, New South Wales rail regulation is summarised in the following table.

[1] Management structure in place at time of writing.

Table 8: New South Wales Rail Regulation

<table>
<tr><th>Access Provider</th><th>Network Control</th><th>Infrastructure Maintenance</th><th colspan="3">Operators</th><th colspan="2">Regulator</th><th colspan="2">Rolling Stock Maintenance</th></tr>
<tr><td rowspan="4">RAC</td><td rowspan="4">SRA</td><td>RSA</td><td>National Rail</td><td colspan="2">FreightCorp</td><td>DOT</td><td>RAC</td><td>National Rail</td><td colspan="2">FreightCorp</td></tr>
<tr><td rowspan="3">Others</td><td rowspan="3">Countrylink</td><td rowspan="3">BHP</td><td rowspan="3">RSA</td><td rowspan="3">State OH&S</td><td rowspan="3">Comcare</td><td rowspan="3">SRA</td><td rowspan="3">BHP</td><td rowspan="3">AN</td></tr>
<tr><td>CityRail</td></tr>
<tr><td>Other</td></tr>
</table>

To complicate matters still further, new players like the Great Southern Railway have recently commenced operations.

Technical, performance and safety standards vary across jurisdictions. National operators cannot operate equipment at the same mass limits, train lengths and height across the network. The lowest limit therefore prevails. For example, Sydney-Perth trains cannot usually double-stack containers because of clearance restrictions east of Parkes: in other words, in the final 10% of the journey. Some double stacking is occurring from Perth to Parkes but freight originating in Sydney is restricted to single containers. The same situation applies with freight entering or leaving Melbourne.

Examples also exist of States where high operating standards preclude the use of rolling stock from other jurisdictions.

There are twenty-two safe working and signalling systems across the interstate network. Radio systems and frequency allocations vary across the country. Locomotive driver licences - known as certificates of competency - must be obtained separately in each state where the driver is to work. Drivers in National Rail depots in Melbourne and Adelaide are certified by three different states. By contrast, road motor vehicle registration and driver licensing has national uniformity.

The 1993 Intergovernmental Agreement on Rail Safety was designed to achieve practical uniformity across mainland states and the Commonwealth. An Australian Standard (AS 4292) has been developed for rail safety but it is only a benchmark for best practice at this stage.

National Rail was originally formed with a mandate to unify control and management of the interstate network including the development of uniform standards for infrastructure performance. This mandate was subsequently withdrawn.

The Committee received evidence that this proliferation of agencies - both within New South Wales and across Australia - had created a bureaucratic morass which had created notable financial inefficiencies and acted as a serious disincentive to new operators entering the rail industry

Associate Professor Laird stated in evidence:

> It is... doubtful if the proliferation of rail agencies in Australia is in the national interest. Within the current arrangements, it is all too easy for one agency to offer to upgrade track only if another agency will pay for it - so essential work is delayed. (S7, 6)

Mr Alchin of RAC argued in evidence that his organisation went to great lengths to maintain good communications across the vast range of State and national rail agencies when planning capital works. Importantly, Mr Alchin's extensive evidence also highlighted just how many different organisations are involved in this planning process and hinted at the huge amount of red tape:

> **Mr RIXON:** I have heard a fair bit of criticism from many people I have talked to. Once upon a time there was the New South Wales Railways. Now there is a host of bodies, such as the Rail Access Corporation, State Rail, Countrylink, FreightRail and National Rail, and so it goes. If all these individual groups are suddenly running on the one line, what mechanisms do you have in place to co-ordinate them?
> **Mr ALCHIN:** That is a reasonable question. We have a number of customers—some are State-owned entities, some, such as National Rail, are national bodies and there are new private bodies. The privatisation of Australian National led to the Great Southern Railway. The basic process is to step through our access agreements with the operators. They provide varying or tiered layers of participation in our asset management planning. It would be stupid for us to go off with wild ideas about what we will do in particular sections of the network without consulting with our customers. It is fair to say that our customers are seeking further and closer consultation with us to that end, in particular our major customers which are State Rail, National Rail and FreightCorp.
>
> This time around we have been having a close series of consultations, negotiations, meetings and discussions about the sorts of things that we are planning to do, where we see the network needs further maintenance or potential upgrades because of capacity limitations. Conversely, the operators have their views and they provide us with information about how they see their services changing. They may provide new services, cut back on additional services or provide faster services with different stopping patterns. The freight operators may say that there is a growing market for general freight and that they expect over the next five to ten years they might need to run two or three additional services per day or per week. So there is a process of basically ongoing discussion with the operators so that we know what they need, and our asset management plans and bids to government for non-commercial funding reflect that. (T1, 13-14)

It is patently clear from this evidence that the complex grid of consultation and negotiations which must take place to process capital works projects, longer term plans and services encourages buck-passing and inertia.

The outcome can only be a tortuously slow process which lends itself to inter-agency and cross-border disputes over relative levels of track investment and responsibility for funding.

On the issue of cross-border rivalries, Associate Professor Laird offered a telling example of wasted rail infrastructure investment in Victoria in his evidence:

> In my view, an example of the proliferation not working well is demonstrated in Victoria where three years ago concrete sleepers for a section of track between Geelong and Ararat were supplied by the Federal Government under the "One Nation" program. Almost three years later these concrete sleepers are still sitting by the side of the track at Maroona and a place called Inverleigh. The reason is that the Victorian Government takes the view that it wonders whether it really should incur the expenditure of inserting the sleepers, which are valued at about $3 million, when it might be taken over by the Commonwealth. The main freight operator, National Rail, has asked that someone insert these sleepers because it is a very slow section averaging about 60 kilometres an hour between Melbourne and Adelaide and the sleepers have been there for three years. This is one instance where proliferation of rail systems is not working very well at all. In New South Wales questions could be raised about the length of time it has taken to get some enhancement of the Parkes junction to assist the passage of interstate freight.(T1, 32-3)

The proliferation of State and Commonwealth rail agencies - each with their own prices, terms and conditions - is a major reason why rail has been unable to remain competitive with road transport.

The huge quantity of complex negotiation and paperwork with five separate State authorities as well as national bodies is a disincentive to operators and a significant inefficiency.

The system needs consolidation and a single focus.

One national body should manage access to the network, maintenance of network assets and investment in new rail infrastructure.

However, this body needs to be more than just a rail organisation.

A national land transport organisation should be established to produce a national transport plan which sets priorities across transport modes. This organisation must also have the financial clout to implement its plan.

Commonwealth Government support and funding is, therefore, essential if such an entity is to be viable and achieve successful reform.

In following sections, the Committee examines recent movements towards the creation of such a national land transport organisation.

4.4 National Rail Summit - September 1997

The Committee acknowledges recent attempts to make constructive progress in unifying the Australian interstate rail network. There has been significant recent progress towards creating a national body or commission to develop and maintain a national interstate track system.

At a National Rail Summit of the Australian Transport Council (ATC) in September 1997, Federal and State Ministers responsible for transport matters signed an Agreement for Interstate Rail Reform.

The Communique from the Summit stated:

- There will be a designated national interstate track system for the first time. It is the track joining the mainland State capital cities and their ports, with connecting lines to Whyalla, Port Kembla, Newcastle, Alice Springs and Westernport. Investment and management will be concentrated on this network
- The most urgent need is for the interstate rail network to be operated as a single network with respect to investment, access and pricing
- Safety, operational practices and standards on that network will be developed in a way that achieves uniformity over time
- Operators will be able to access the network through a single point of entry (one-stop shop) providing seamless access and operations across the network
- New infrastructure and access arrangements will include commercial principles, mechanisms and incentives in the relationship between track management and operators. These incentives should include performance obligations on operators and track/access managers
- There will be binding arbitration processes with defined time periods to resolve disputes quickly and fairly
- The aim of these reforms will be to maximise the benefits to the transport industry including inter and intrastate rail operators and the community.

National Rail summarised the outcomes of the ATC Summit in its submission to the Committee:

> In September 1997, Transport Ministers of the Commonwealth and the five mainland states agreed to actions aimed at improving the quality of the national track network, including an investigation of how to provide track access as a single service across the interstate track system, relevant financing for maintenance and upgrading, competitive neutrality issues affecting rail and other competing modes, and organisational arrangements required to achieve these objectives and harmonisation of technical and operational standards. (S14, 2)

Performance goals for a national track network were also set at this meeting.

The performance goals for the national track network within 5 years are:

- Less than 2% of track subject to temporary speed restrictions
- At axle loads up to 21 tonnes, a maximum speed of 115 km/h and average speed of 80 km/h
- At axle loads between 21 and 25 tonnes a maximum speed of 80 km/h and average speed of 60 km/h
- Train lengths of 1 800m on the east-west corridor and 1 500m on the north-south corridor.

In the longer term, the system should deliver:

- At axle loads up to 21 tonnes, a maximum speed of 125 km/h and average speed of 100 km/h
- At axle loads between 21 and 25 tonnes a maximum speed of 100 km/h and average speed of 80 km/h
- Increased clearances to allow double stacking.

One major priority targeted at the National Rail Summit was a plan for a dedicated freight track through metropolitan Sydney to deal with the current difficulties with traffic movements, which will increase in future years.

The next meeting of the ATC on 14 November 1997 agreed to make access to the network available through a single point of entry and confirmed the establishment of the Australian Rail Track Corporation (ARTC).

In the first step in this process, the Commonwealth agreed to place its 4 400 km of track from Wodonga and Broken Hill to Kalgoorlie under a single management entity. Extension of the network to Perth will be considered in due course.

This means that 54% of the system has been committed to unification.

However, some 3 800 km of national track remains to be unified. This figure does not include the 1 680 km of narrow gauge track in Queensland, which serves key industrial and population centres.

A further ATC meeting in April 1998 considered the creation of a single body to control reform for both road and rail: the National Land Transport Commission.

The establishment of such a Commission offers the possibility of a more equitable investment distribution including the application of competitive neutrality between the major ground transport modes at last.

The Committee looks at the goals of this commission in the next section.

4.5 A National Land Transport Commission

A National Land Transport Commission will provide direction and impetus for the long term development of Australia's transport needs. It will focus and prioritise transport infrastructure investment finding the most appropriate and cost effective transport solution for each corridor and linkage in the national transport web.

One of its first priorities should be the completion of a National Land Transport Master Plan. This master plan will remedy the dislocated and duplicated investment in competing transport modes. The Committee believes it is long overdue given the huge investment that is made in transport infrastructure each year.

Tom Burton wrote in the *Sydney Morning Herald* on 14 November 1992 that over $8 billion was being invested in transport infrastructure each year. This represented "the biggest single area of government capital investment." According to Burton:

> ... despite transport's pivotal role in economic performance and its huge call on national savings, Canberra has flatly refused to establish any overall national transport plan.

The article was titled "Transport Planning Splutters Along." Burton went on to list a number of projects which were evaluated, not as part of an overall transport strategy, but purely on political grounds. For example, the merits of investing in the original Very Fast Train project were not assessed "against a national transport plan" but on a short-term political perspective which gave no consideration to the appropriateness of this train project to national transport needs. It should be noted that Burton did not confine his comments to rail. Road and airport projects were also criticised for being approached in an isolated, purely political manner.

This commentary on the paucity of macro-level planning is still valid today despite the recent moves by the Australian Transport Council to establish the Australian Rail Track Corporation to coordinate the interstate rail network.

Critical elements of national transport policy need to be formulated into a National Transport Plan. The National Land Transport Commission needs to have the power to prioritise and direct funding according to both full economic criteria and the national benefit.

The National Land Transport Commission should control the following elements:

- Competition policy
- Competitive neutrality
- Effective regulation including uniform technical, performance and safety standards
- Frameworks for infrastructure investment, access and asset management
- Development of multi modal transport corridors.

It should complete the following tasks as a priority:

- Formal definition of the National Track System
- Formulation of the National Land Transport Master Plan
- Establishment of mass/speed and dimension performance standards
- Formulation of an infrastructure maintenance program
- Formulation of a network upgrading program.

There is enough passenger and freight volume across all of Australia's transport corridors for genuine competition to be possible and to reap significant savings and efficiencies. The Committee stresses again that competition on a level playing field between rail and road will provide the best outcomes for consumers.

The Committee supports the establishment of the National Land Transport Commission with wide powers to develop transport linkages across the nation and determine relative levels of investment.

To be effective, the Commission will require adequate funding from the Commonwealth Government and access to existing sources of revenue, particularly those sources currently dedicated to roads.

One of the first priorities of the National Land Transport Commission should be the completion of a National Land Transport Master Plan. This master plan will remedy the dislocated and duplicated investment in competing transport modes.

4.6 A National Rail Highway

One of the outcomes of dislocated rail administration in Australia is that there has never been agreement on corridors which have national significance and should be an investment priority. This situation is very different to that pertaining to roads where national consensus was reached long ago.

Thus, there is no defined national rail track system to compete with the 18 500 km designated as the National Highway System.

The strength and influence which government organisation at a national level has given roads - and the road transport industry - has enabled aims to be refined and new goals set as current goals are achieved. For example, a special category of roads called Roads of National Importance has recently been created and has already achieved special status in eligibility criteria for Commonwealth road funding.

The National Rail Summit of the Australian Transport Council - whose members include the Commonwealth and State Ministers for Transport - in September 1997 agreed that a national interstate track system should be developed.

The Summit Communique defined the national interstate track system as "the track joining the mainland State capital cities and their ports, with connecting lines to Whyalla, Port Kembla, Newcastle, Alice Springs and Westernport." A copy of this system is contained in the Maps at the end of this Report.

This definition is restrictive. It is limited to the existing network and to coastal centres, bypassing critical freight and passenger links with regional Australia. For example, the Brisbane-Cairns corridor - on which the Queensland Tilt Train will operate - may be excluded.

It also underestimates the critical role played by ancillary lines and services which enable the major lines to function properly. This infrastructure includes crossing loops, sidings, shunting and marshalling yards and other facilities. Maintenance on this supporting infrastructure is a large investment.

The Committee welcomes the decision to define a National Rail Highway. It will act as a focal point for investment to repair historical funding disparities with road infrastructure.

However, the current definition is somewhat restrictive because it focuses primarily on the existing rail network. It should be expanded so that it is flexible enough to embrace - and positively impact upon - emerging centres and industries.

The National Rail Highway should be promoted as part of a National Land Transport Master Plan developed by the National Land Transport Commission with priority corridors for investment designated as "Rail Links of National Importance."

4.7 Rail and Road Transport: Creating a Level Playing Field

The success of rail in Australia in becoming a genuinely competitive transport mode again depends on repairing the damage caused by historically low investment levels. In this era of very restricted government funding levels, it is easy to say that calling for more investment is an unrealistic option. However, analysis of the $8 billion (1992) invested in transport infrastructure each year in Australia demonstrates that money is available. It only requires political will at a national level to address the disparity in investment with regard to rail.

Rail and road transport are competitors for passengers and freight with proponents of each mode seeking influence with all governments in Australia to advance their economic interests.

In this regard, the road transport lobby has been particularly successful in gaining funds for improved infrastructure. While there is no doubt that there has been a critical need to improve the nation's highways, this policy has gone unchallenged in terms of its economic and environmental costs until recent years.

One serious by-product of the success of the road transport industry in attracting investment has been a deterioration in the competitiveness of rail.

However, an increasing awareness of the environmental fragility of the planet has focused attention on alternatives to road-based transport. The real economic costs of roads are also coming under closer scrutiny. The high costs of fuel and road maintenance for trucks, the high levels of pollution and greenhouse gas emissions and the emotional and financial expense of accidents are all beginning to be factored into CBAs of transport infrastructure investment projects.

4.7.1 Improving Freight Performance

The viability of the rail freight network in Australia is crucial to any plans to upgrade rail infrastructure and pass on benefits to passenger services. Freight is the profitable arm of the rail business, whereas most passenger services are subsidised by the relevant State government. Indeed, most recent rail infrastructure programs in Australia have been carried out to enhance freight services with passenger services occasionally able to "piggyback" on track improvements. The upgrading of the Queensland rail system is a prominent - and often cited - case in point.

Yet rail has been gradually losing market share of the non-urban freight task over the past two decades falling from 70% in 1976 to 56% in 1995. Overall, rail now accounts for about 46% of Australia's total land freight task compared with 63% in 1974-5. Given rail's superior safety and environmental record - with all its hidden economic and social savings - a continuation of this decline is very undesirable.

Rail's declining market share has been driven by three primary factors:

- Inadequate government investment in rail infrastructure and maintenance, especially given the dramatic increase in spending on roads
- Antiquated administration and cross-border rivalries
- Inequitable cost recovery policies in relation to rail and long-distance articulated trucks.

Inter-modal competition between road and rail has been seriously affected by this state of affairs.

This outcome is exacerbated as the road transport industry systematically achieves its goals of national uniformity in charges and regulations, more generous vehicle load limits and ongoing funding for the National Highway System.

These goals are laudable and should be embraced by rail authorities for the good of their own industry.

The current dilemma facing the nation is that the worthwhile campaign to improve Australia's roads has overshot its mark and is negatively affecting the capacity of rail to remain a viable competitor.

Despite these handicaps, rail remains the preferred carrier for long distance freight with an average haul length of 261 km, which is more than twice that of road. The following table outlines the current performance of road and rail freight.

Table 9: Current Performance of Road and Rail Freight

Mode	Billion Net Tonnes-km	% share	Average jay length (km)
Rail	99.7	46	261
Road	114.4	54	94

Given the size of Australia, rail should be considered the natural mode of transport for long distance freight with significant potential to regain market share provided that the investment imbalance is corrected.

Both the economic and environmental costs of moving long distance freight overwhelmingly favour rail over road transport. The following table discloses the extent of rail's superiority.

Table 10: Land Transport Modal Comparison (based on 3,000 tonne of freight between Melbourne and Perth)

Mode	Rail	Road
Vehicles	1 train	150 semi-trailers
Labour	250 hours	19 000 hours
Engine Capacity	6 000 KW	45 000 KW
Fuel Consumption	180 000 litres	1 192 000 litres

This table shows that rail requires less than 2% - literally a fraction - of the labour costs of road freight over a long distance haul and consumes only 16% of the amount of fuel.

The historic decline in market share by rail freight must be redressed if passenger rail services are to be improved.

Rail freight offers significant economic and environmental benefits to Australia which must be utilised.

4.7.2 Investment Levels in Australia

The disparity between road and rail investment by successive governments was highlighted by most stakeholders to the Committee as a primary reason for increasingly uneven competition for both freight and passenger market share. This disparity stretches from investment in infrastructure to unfair tax regimes.

The figures provided to the Committee vary, although they all indicate a gross disparity in relative investment levels. Associate Professor Laird provided the Committee with some startling figures:

> The Federal outlay of over $36 billion on roads since 1974 to 1997... contrasts with a net outlay on rail capital works over this time of about $1 billion. (S7, 37)

Macquarie Bank has estimated that for the period 1975-97, the Commonwealth Government invested over $26 billion in roads but only $2.3 billion in rail. (Submission to the House of Representatives Standing Committee on Communications, Transport and Micro-Economic Reform, October 1997).

With regard to the National Highway system, Associate Professor Laird pointed out that between 1974 and 1995 the Federal Government funded the National Highway System with about $13 billion while net funding of rail capital works was about $1 billion (S7, Attachment 3, 9).

The overall situation was described by Business Review Weekly in 1990:

> The Federal Government ... has poured money into roads during the past decade to catch votes but has effectively paid nothing towards national rail needs. The main beneficiaries of this lopsided largesse have been truckies who, in almost putting the railways out of business, are causing congestion, pollution and carnage on interstate highways. State railways are even paying more than $130 million a year in fuel excise to help road funding. (24 August 1990)

The City of Newcastle, in a submission to the Committee, expressed "great concern" that this imbalance in funding had frozen rail travel times between Sydney and Newcastle to those of the 1930s while "large investments in road infrastructure has significantly reduced road travel times between the two centres, thus favouring a less environmentally sustainable transport mode" (S26, 1). The environmental consequences of the competitive disparity between transport modes is a matter of concern to the Committee.

Unfortunately, this historical funding disparity of at least 10:1 has not been corrected - let alone compensated - in recent years. For example, the 1997-98 Commonwealth budget contained $2.3 billion for roads and no investment for rail. The most recent Commonwealth budget allocated $1.6 billion for roads with $545 million allocated to New South Wales alone. By comparison, rail received $62.5 million.

The submission of AdTranz to the Committee encapsulated the anachronism in road and rail investment levels:

> Rail is certainly a better long-distance transport option than road, but despite their obvious greater efficiency (no-one complains that the Hume Highway doesn't make a profit), railways in Australia have been neglected by comparison. (S20, 3)

The reality that "no-one complains that the Hume Highway doesn't make a profit" was contrasted by witnesses to the Committee with the expectation that rail services will make money.

Associate Professor Laird took up this issue:

> ... road and rail are funded on a completely different basis. For example, the rail systems not only pay Federal fuel excise, and probably another State one as well, they also have to make loan repayments. Although occasional loan repayments are made by road authorities, most of the construction is funded by grants. We have now run up to the situation where some policy issues on infrastructure funding between road and rail have to be addressed at a high level by the Federal Government. There would be a very useful role for the State Government to play in trying to formulate a national policy.
>
> At the moment, as a nation we are happy to spend about $6 billion a year on road construction and we do not ask for a return on the capital at all, whereas the expectation is that the rail track, particularly that bearing freight, ought to be able to pay its way. It is tearing the system to pieces because it is simply unrealistic. New Zealand, which has a very small freight traffic base, has been able to make it work because it has finetuned the road pricing for heavy trucks to include a mass distance component, which has been in place for 20 years now. (T1, 34)

The New Zealand example was investigated by the Committee.

New Zealand's road funding model since the 1980s has ensured that heavy road vehicles pay a true share of road construction and maintenance costs through a system of mass distance charges. Pavement costs are allocated according to the "fourth power rule" so that articulated vehicles pay for 99% of all pavement costs. The registration fees for these vehicles are therefore a function of the distance travelled, the maximum weight limit and the axle configuration spreading the nominated weight over the pavement.

Detailed CBA is also completed in New Zealand prior to road infrastructure improvements to ensure that there is an appropriate return on investment. This provides the competing private rail operator with an equitable funding environment. This policy is similar to Sweden, where railways have gained a distinct advantage because transport taxes are based on maintenance and environmental costs, such as pollution and noise.

Associate Professor Laird elaborated on the benefits for rail profitability when a level-playing field was created as in New Zealand:

> The net consequence for New Zealand rail, which was privatised in 1993, is, firstly, it pays dividends to shareholders, secondly, it pays taxes to government, thirdly, it does not need a CSO for long distance passengers and, fourthly, as you may well be aware, it is now a part-owner of the former Tasmanian Government railways which was sold off by the Commonwealth. (T1, 34)

Profitability has increased from $44 million to $111 million between 1992/93 and 1995/96. At the

same time, real rail freight charges have declined by 50% over the past decade.

The historic imbalance in government investment between road and rail transport in Australia has produced an unlevel playing field.

It has created an uncompetitive land transport industry in which rail is being slowly bled to death to the economic and environmental detriment of the nation.

This imbalance is no longer supportable.

Equitable road and rail charges must be introduced. They will redress the imbalance, as demonstrated so vividly by the example of New Zealand.

Ironically, a rational system of cost recovery from trucks in New Zealand has enabled its national rail operator to buy into the Australian rail network for the first time. This is an indictment of the manner in which rail has been treated in Australia.

4.7.2.1 Cost Recovery Strategies

The disparity in road and rail investment by the Commonwealth Government is the clearest example of the way in which the 'playing field' for freight and passenger transport has been skewed. However, the very different cost recovery strategies applied to both transport modes has also had a serious impact.

The situation in Australia is not unique. Europe shares the same problems:

> Rail freight may revive in the 21st century; but it will not prosper against its road competitors until prices are properly adjusted to reflect environmental and other costs. One heavy lorry, with its weight distributed over five axles, does as much damage to the road surface as 10,000 cars, according to a study published by the Adam Smith Institute, a right-wing think tank.
>
> One reason why European and, in particular British, motorways are continually having to be repaired is the damage caused by super-heavy traffic. The proposed introduction of 44-tonne lorries in Britain is likely to require another £1-2 billion for stronger bridges. Sweden and New Zealand charge vehicles according to the damage they cause. The sooner countries follow their examples and base transport taxation on total costs, the sooner rail freight will be able to compete. (The Economist 21.2.98, p.21)

The discrepancy in investment and charges makes a mockery of the goal of competitive neutrality advocated by the Hilmer Report (1993) and subsequently implemented in whole or in parts by Australian governments.

Competitive neutrality aims to create a level playing field for all competitors. The Hilmer Report stated that competitive neutrality does not exist where "firms in the same market face different

regulatory or other requirements, potentially distorting competition and raising efficiency and equity concerns." This is clearly the case where road and rail compete for market share.

Road and rail compete in long-distance land freight and inter-urban passenger services.

Ideally, the principles of competitive neutrality should ensure that charges for both transport modes are equal (ie. one side should not receive special subsidies) and that full cost recovery is in place. There should also be an analysis of all economic and social costs for road and rail infrastructure decisions.

Four areas stand out for consideration:

- **Diesel Excise Levy.**
  Presently, both road and rail users pay 34.7 cents per litre of diesel by way of an excise levy - 18c of which is dedicated to road infrastructure investment. The rest goes to consolidated revenue. The rail industry, therefore, pays for the upkeep of roads which it does not use. This payment amounts to $85 million per year. Prior to August 1982, 'off road' users of diesel were exempted from the diesel fuel excise. However, the exemption was abandoned because of the administrative difficulties of ensuring that excise exempt fuel was used solely for off-road purposes. Since 1982, all diesel users purchase diesel at 'excise inclusive' prices. However, certain categories of users, for example mining operations and primary producers, received rebates. Railways are not among those users entitled to a rebate. One consequence is that part of the excise paid by rail is being diverted into road works.
- **Cross-subsidisation of Long-Distance Trucks.**
  Taxes for heavy vehicles are based on a fixed annual registration fee based on capacity. The fee is the same regardless of how many kilometres are travelled. It has been estimated by the Australasian Railway Association that short haul trucks (30 000 km p.a.) effectively subsidise long-haul trucks (200 000 km p.a.) by 6.7 cents per kilometre. The only method of correcting this bias would be to introduce a mass-distance charge as in New Zealand, where a vehicle like the B-Double would pay 4-5 times the road use charges of Australia.
- **Pricing Externalities.**
  Australian governments have traditionally omitted any valuation for externalities in assessing the relative efficiency of rail and road freight. The rationale for this decision is the difficulty of accurately assessing these costs. However, they are the type of costs in which rail has an overwhelming advantage over road freight: accidents and fatalities, pollution and energy consumption, traffic congestion and infrastructure maintenance. The Committee has examined the costs of road in relation to the benefits of rail according to these criteria in a separate section.
- **Relative Fees and Charges.** The Australasian Railway Association has estimated that road access charges are about 20% of corresponding rail charges. National Rail pays over $100 million each year to move 10 million tonnes of freight. Articulated trucks performing the same freight task would pay only $17 million in registration fees.

Two Industry Commission Reports have recommended amendments to this regime to redress the imbalance against rail:

- The 1991 report, *Rail Transport*, recommended that rail operators be exempt from paying fuel excise on diesel used for freight purposes on the basis that the price of export commodities would be adversely affected
- The 1994 Report, *Petroleum Products*, argued "that the 18c/ litre road user charge should not be levied on rail because it distorted transport decisions" as well as noting the "inequity of taxing rail to fund road infrastructure".

The National Road Transport Commission (NRTC) has recommended an Australia-wide user charge regime for heavy vehicles as a means of reflecting the true cost of their use of roads.

The NRTC methodology involves a cost allocation model based on the masses and distances travelled by average vehicles in each class. This annual cost is then recouped through two charging instruments: a road user charge (currently 18 cents/litre) and a fixed vehicle registration fee.

4.7.3 Environmental and Health Costs

Submissions to the Committee called for a comparison of the full costs of rail and road transport modes including health, accidents and environmental impacts.

Transport 2000 summarised these concerns:

> There needs to be proper and full consideration of the costs and benefits in terms of safety for the community, environmental concerns, fuel usage and other concerns. There is now irrefutable scientific evidence that the continued growth patterns in motor vehicle use are unsustainable, undesirable, unhealthy and unsafe for the Australian community, and are a great burden to the Australian Health System, our Occupational Health and Safety System, and the taxpayer. (S19, 2)

The Committee examined available data on the relative costs of pollution, greenhouse gas emissions, energy consumption, maintenance and accidents across land transport modes.

Usually, these factors have not been considered in economic appraisals of the costs and benefits of land transport projects due to difficulties in quantifying them in dollar terms. However, the gathering international acknowledgment of the costs of unsustainable transport modes has resulted in new efforts to quantify such factors for inclusion in appraisals.

An additional problem has been the application of this data. In the past, investment in land transport projects has not been consolidated under one authority and considered as part of a total picture. Road and rail infrastructure projects have generally been developed in isolation.

A bigger brush is necessary if new environmental targets are to be met.

Therefore, the following sub-sections should be read in conjunction with the Committee's recommendations for a National Land Transport Commission and with the final sub-section in 4.7, which summarises recent New South Wales Government initiatives to improve the environment including the development of economic appraisals that quantify the impact of transport modes on environmental targets.

4.7.3.1 Pollution and Energy Consumption

Pollution from motor vehicles is the overwhelming cause of photochemical smog, oxides of Nitrogen (NOx) and volatile organic compounds (VOC) in the Sydney airshed.

The Metropolitan Air Quality Study (MAQS) for Sydney, which was commissioned by the current New South Wales Government, disclosed that "motor vehicle emissions contribute approximately 56% of total anthropogenic emissions of VOCs, Nox, CO and TSP in the MAQS area and 81.5% in Sydney."

In particular, heavy vehicles using diesel fuel produce a disproportionate level of emissions: 39% of total emissions; 30% of NOx; and 28% of VOC.[2]

These road freight vehicles are of the kind which have increasingly replaced rail freight as rail has fallen behind as an efficient form of transport infrastructure.

The pollution problems arising from increased motor vehicle use are of serious consequence to the entire Sydney region. Emissions created is some areas cause problems in other areas. For example, a plume of ozone produced in the Newcastle region during summer flows south towards Sydney overnight, is blown inland by morning sea breezes and then trapped beneath the Blue Mountains in Western Sydney.

This occurrence reinforces the need to consider Sydney's airshed as an inter-related unit which requires a regional air quality strategy.

Urban transport is also a major contributor to the greenhouse effect of global warming. Carbon Dioxide is the chief cause of this problem.

In 1991, Australia ranked sixteenth in total carbon dioxide emissions and third highest contributor **on a per capita basis** after Canada and the United States.

The BTCE has estimated that road transport accounts for 79% of transport-related carbon dioxide emissions whereas rail contributes only 2.5% of total emissions.

The following table summarises this data.

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[2] Standing Committee on Public Works, *Report on State Infrastructure Requirements for Sydney West Airport*, Report No.1, November 1995, pp.267-72.

Table 11: Transport Modes - Relative CO Emissions

Mode of Transport	%
Cars and motorcycles	52.2
Trucks and buses	27.1
Air	11.3
Water	6.6
Rail	2.5
Pipelines	0.3

Source: BTCE Report 88 (1995)

The New South Wales Environment Protection Authority estimates the financial cost of air pollution caused by private motor vehicles and buses (excluding greenhouse gases) at $415 million per annum in Australia.[3]

Energy consumption data also clearly demonstrates the superiority of rail over road as a form of land transport.

The Committee offers this data to support investment in rail infrastructure where appropriate, not to criticise road transport which performs a crucial - and irreplaceable - function within the land transport industry and, therefore, the national economy.

The BTCE (1991 & 1993) estimated that cars use five times - and that light commercial vehicles use eight times - the amount of energy as trains.

Table 12: Urban Transport Modes - Relative Energy Usage

mode	billion passenger km	energy (PJ)	energy use per urban passenger km
car	137.49	370.20	2.69 MJ
light commercial vehicle	6.52	26.0	3.99MJ
motorcycle	1.09	1.91	1.75 MJ
bus	4.72	6.92	1.47 MJ
train	6.58	3.73	0.57 MJ

[3] Ibid., p.25.

In non-urban areas, energy consumption data tells a similar story:

Table 13: Non-Urban Transport Modes - Relative Energy Usage

mode	billion passenger km	energy (PJ)	energy use per urban passenger km
car	55.9	143	2.6 MJ
light commercial vehicle	5.2	19	3.6 MJ
bus	11.8	9	0.8 MJ
train	2.4	4	1.6 MJ
air	13.3	50	3.8 MJ

The inter-urban freight transport industry of about 250 billion tonne-kilometres per year in Australia is divided between road, rail and ship.

The energy consumption of these major freight transport modes in non-urban areas was estimated by the BTCE (1991).

The following table ranks the BTCE findings in order of ascending emissions:

Table 14: Non-Urban Freight Transport Modes - energy consumption and carbon dioxide emissions

Mode	**MJ/t-km**	**gm CO/t-km**
Rail: private bulk freight	0.13	10
Sea freight	0.18	13
Rail: government bulk freight	0.40	29
Sea: non-bulk freight	0.70	51
Rail: non-bulk freight	0.80	60
Trucks: articulated	1.42	104
Trucks: rigid	3.21	237
Light Commercial Vehicles	20.2	1440

Rail freight in all its forms consumes substantially less energy than road freight. The most efficient form of road freight (articulated trucks) uses five times more energy than the rail bulk freight

average.[4] Light Commercial Vehicles use 25 times more energy than non-bulk rail freight.

Carbon dioxide emission levels for rail freight are also a fraction of those of road freight.

A report in 1997 by J McRoberts and B.Tapp titled, *Comparative Resource Consumption for the Total Transport Task: The Roads Component in Perspective*, compared direct energy use and emissions by non-urban freight transport modes in Europe and Australia. The following table from that report demonstrates that carbon dioxide emissions by road freight are between 4-7 times greater than those by rail.

Table 15: Non-Urban Freight - Carbon Dioxide Emissions (gm CO/t-km)

Study	Road	Rail	Ratio
UK 1990 (diesel rail)	275	38	7.2
UK 1990 (electric rail)	275	50	5.5
Germany 1990	220	50	4.4
Transnet 1990	220	50	4.4
Australia 1 (McRoberts & Tapp)	113-150	25-42	3-4
Australia 2 (Lumb and Pears)	90-220	24	4-8

Clearly, rail freight is a superior land transport form across all environmental factors from fuel consumption to emission levels.

In the next sub-section, the Committee examines accidents and fatalities associated with land transport modes and their relative costs to the community.

4.7.3.2 Accidents and Fatalities

The cost of accidents and fatalities caused by the operation of different land transport modes in Australia has been difficult to quantify, particularly when individual road and rail infrastructure projects are being assessed. However, economic appraisal methodologies such as the CBA are gradually being refined to include these factors, which have a significant impact on the global costs and benefits of different transport modes.

The BTCE Report, *Social Cost of Transport Accidents in Australia*, contained a comprehensive analysis of total costs of accidents across major transport modes in 1993. The figures are summarised in the following table.

[4] The difference in performance between government and private bulk rail freight is due to the fact that the private task consists almost entirely of shifting large mineral loads downhill from mines to the coast. This significantly reduces energy consumption and emissions.

Table 16: Comparison of Accident Costs Across Transport Modes (1993)

Costs Caused by Accidents ($m)	Total Road	Trucks Only	Rail	Air	Sea
Loss of Earnings	829	70	24	30	25
Family & Community	588	50	12	16	14
Property Damage	1,868	159	22	16	157
Insurance Administration	571	49	n/a	7	57
Pain and Suffering	1,463	124	6	4	58
Other	816	69	5	2	5
TOTAL	**6,135**	**521**	**69**	**69**	**316**

Source: BTCE Report No.79. Truck accidents costs are based on Federal Office of Road Safety figures indicating 8.5% involvement in all total road fatalities in Australia in 1996.

These figures demonstrate that rail is the transport mode which is most sensitive to health and well-being of human beings. The level of pain and suffering caused by rail is minuscule compared with that of road transport.

Road accidents account for over 90% of the total cost of transport-related accidents in Australia at a cost of over $6 billion each year.

These costs have been updated recently by the SRA, which found that road accidents now cost $7.67 billion per annum across Australia.[5] By contrast, rail accounts for only 1% of accident costs or $69 million.

Although road freight accounts for only 54% of total land freight, it is responsible for 88% of total accident costs. A Monash University Study in 1993 estimated that safety costs translate to a surcharge of 7.6c per kilometre on articulated trucks.

The evidence is conclusive that rail is the safest and least costly land transport mode across all accident and fatality factors.

4.7.3.3 Congestion and Maintenance

Like accidents and fatalities, the cost of traffic congestion and maintenance costs for transport modes are factors which have only recently been quantified and factored into economic appraisals.

The problem of transport congestion is endemic to major cities around the world. Sydney has

[5] Source: SRA, Submission to the Independent Pricing and Regulatory Tribunal, contained in the *Inquiry into Pricing of Public Passenger Transport Services: CityRail*, Transport Interim report No.3, March 1996, p.24.

congestion problems across all transport modes: road, rail, air and sea. Ironically, many of the measures taken to relieve traffic congestion on roads have actually increased traffic volumes. In short, better roads attract more traffic. During the period from 1981-1991, road infrastructure in Sydney was improved to enhance its capacity and, as a result, total car trips increased by 13 per cent. Total vehicle kilometres in Sydney are projected to increase by 35% over the thirty years from 1991-2021.

Further increasing the market share of road freight by articulated trucks will inevitably create greater traffic congestion which reduces average speeds, increases journey times, reduces fuel efficiency, exacerbates pollution and, ultimately, increases pressure for new funding to further expand the road network.

The BTCE report (1995) estimated that traffic congestion in Australia's capital cities cost $5.2 billion in operating and travel time costs. Of this amount, trucks account for about $1.3 billion (as they constitute about 19% of total kilometres travelled). By contrast, surplus capacity exists on most rail networks.

Infrastructure maintenance costs for road freight should also be assessed.

Mr John Kirk, Director of the Australasian Railway Association, told the Committee's Seminar, "Ground Transport in the Twenty-First Century," that everyday motorists contribute disproportionately to road funding because roads have to be built to a significantly higher standard for articulated trucks. Mr Kirk stated that a fully-loaded B-double truck causes the same damage as 20 000 cars and noted that in the first year after B-doubles were introduced into Victoria, bridge replacement and rehabilitation costs increased 150% from $7 million in 1993-94 to $18 million in 1994-95. Similarly, Austroads (1996) estimated that cars constitute over 80% of road traffic but contribute only 0.1% to pavement loading. The other 99.9% is caused by trucks.

In evidence, Dr Weatherby summarised the high cost of maintaining roads that are consistently used by trucks:

> If one looks at the economics of running a truck, and the kind of damage to a road that a B-double does, a B-double causes the equivalent amount of damage to a road that 20,000 cars would cause. You have really got an issue of the inequality between road and rail funding, and of course of the road charging regime that takes place. In terms of cost recovery for use of the road that trucks are making, they are in fact being heavily subsidised, whereas rail is not being heavily subsidised. (T2, 17)

The cost of constructing and maintaining highways to a high standard for articulated trucks has not been factored into economic appraisals of the relative merits of transport modes.

There is a price to pay for road freight's pre-eminent (and increasing) market share over

rail. This price is paid by the community in the form of taxes being diverted to build and maintain roads at the additional standard required by articulated trucks.

4.7.3.4 Summary of Costs

Across a range of significant indicators, rail freight is the pre-eminent transport mode for a large country like Australia. It causes less accidents and fatalities, creates less air pollution and greenhouse emissions and costs less to maintain.

McRoberts and Tapp developed a telling comparison of road and rail freight across these factors:

Table 17: Rail Freight - Superiority over Road Freight by Factors

Task	Factor
Operating Energy	3:1
Energy for Supporting Infrastructure	2.4:1
Vehicle Manufacture and Maintenance	1.7:1
Displacement of Other Land Uses	2:1
Life-cycle Carbon Dioxide Emissions	3:1
Fatalities associated	7:1

This table demonstrates that rail is a superior land transport mode across a range of factors.

Any effective national transport system requires the optimal use of all transport modes to maximise economic and social benefits.

Road freight is a vital land transport mode in any national transport system, particularly by virtue of its flexibility.

Rail freight also possesses significant advantages.

A sensible balance between road and rail infrastructure investment is essential to delivering benefits to the nation. The disparity in investment between road and rail in Australia over the last fifty years has affected the capacity of rail to compete and thereby harmed the national economy and environment.

Rail and road freight should be engaged in competition but not destructive competition. More multi-modal projects should be developed to harness the benefits of both transport modes.

A major problem in economic appraisals of road and rail infrastructure projects is the difficulty of quantifying external factors such as accidents and fatalities, pollution levels

and maintenance costs.

These factors should be incorporated into economic appraisals so that they can influence decisions on infrastructure investment for individual transport corridors.

In the next sub-section, the Committee examines New South Wales Government initiatives to enhance economic appraisal methods for land transport infrastructure projects.

4.7.3.5 New South Wales Government Initiatives

The New South Wales Government has been developing integrated transport planning and implementation policies through the Urban Management Committee of Cabinet, which produces an Urban Infrastructure Management Plan. The first plan was released in 1998.

The Committee examined this new concept in coordinating government infrastructure management in its First Report on Development and Approval Processes for New South Wales Capital Works (Report No.2, October 1996).

The Urban Infrastructure Management Plan 1998 addresses the need for an integrated approach to transport planning and infrastructure delivery across all transport agencies to "ensure that the best transport infrastructure is designed and delivered to meet community needs and address community concerns" (24).

A Transport Plan is to be provided to the New South Wales Government by November 1998.

The Transport Plan sets environmental targets which can only be achieved by changes to the balance between road and rail transport.

The Transport Plan will:

- Set directions for public transport and road development in conjunction with related land use issues
- Include the Government's goal of stopping the per capita growth of Vehicle Kilometres Travelled (VKT) by 2011 and stopping the growth in total VKT by 2021
- Build on existing policies, plans and projects across the planning and transport agencies.

The imbalance in rail and road infrastructure investment will have to be assessed in light of these new targets.

However, some of the criteria which provide rail with a competitive advantage as a transport mode are difficult to quantify in economic appraisals. These advantages have been examined in previous sections and include reductions in fuel consumption, emissions, air pollution, traffic congestion, accidents and fatalities.

The New South Wales Government's *Guidelines For Economic Appraisal* stress the need for the

inclusion of such factors in any economic appraisal. For example, they state that environmental impacts should be "part of the normal appraisal process."

The *Guidelines* acknowledge the difficulty in ensuring these non-quantifiable factors are given due weight in any economic appraisal.

Cost Benefit Analysis (CBA), which quantifies in money terms all the major costs and benefits, is regarded as the "most comprehensive of the economic appraisal techniques" (3). It is, therefore, the most favoured technique because its "key strength" is that it "considers on a consistent basis the benefits and costs of alternatives" (3). The result is that evaluation and decision making is enhanced by having a range of options in an easily comparable form.

Unfortunately, CBA has limitations with regard to non-quantifiable factors. Although it does allow for the impact of non-quantifiable factors, the *Guidelines* point out that "the concentration on valuation of impacts can sometimes lead to the overlooking of impacts which cannot be valued quantitatively".

Recent developments suggest progress in this area.

The Committee notes that the current edition of the *Guidelines* has been strengthened by a section specifically to "assist in the incorporation [of] environmental impacts into appraisals" (43). This has been made possible by "substantial advances in the technique of valuing environmental impacts" (43).

The Committee also understands that the Department of Public Works and Services is currently collaborating with Standards Australia to update the Economic Appraisal section of the Total Asset Management Manual, which provides further guidelines for infrastructure management and construction by the New South Wales Government agencies. Methodologies are being developed to quantify these factors as part of an appraisal of life-cycle costs and benefits.

The recently published report of the House of Representatives Standing Committee on Communications, Transport and Microeconomic Reform, "Tracking Australia," addressed the same issues. It noted that:

> ... in assessing the efficiency of freight services provided by rail and long distance trucks, Commonwealth and State governments have tended to underestimate, or omit to value, relevant externalities, on the grounds that such factors are often impossible to quantify accurately. However, omission of such costs implies that they are of neutral of little value, which may distort total cost benefit analyses of road and rail development proposals, potentially to the detriment of rail. (p126)

The report recommended (Recommendation 13) that the National Land Transport Commission advise Government on the allocation of funds for rail and road projects on the strict basis of highest Cost Benefit Ratios addressing all relevant externalities including accidents, congestion,

pollution, greenhouse gas emissions and noise.

Rail transport has considerable potential environmental and economic advantages over road transport in terms of reductions in fuel consumption, pollution levels, traffic congestion (for both modes) and accidents and fatalities.

There is, as yet, no mechanism to analyse the global impact of proposed infrastructure projects particularly in terms of assessing the merits of alternative land transport modes.

In addition, there is no global assessment of the costs and benefits of different land transport modes to direct the State's planning systems on a "preferred modal" basis.

To be truly valid, assessment of various modal options for a particular transport solution needs to incorporate all the environmental and social costs and benefits for each option under consideration.

New South Wales is being poorly served by this shortcoming.

The land transport infrastructure dollar should be directed to the most cost effective mode across the state by including all relevant economic and environmental factors in the decision-making process.

Better methodology needs to be developed as quickly as possible both for individual projects and at a statewide planning level.

The Urban Management Committee of Cabinet should have such tools at its disposal in order to set priorities for the best land transport option.

On this subject, the Committee restates its earlier comments on the need to "establish a statewide system of scrutiny for all proposed public works projects and capital works programs" (Report No.2, p.93).

The notion that urban and regional infrastructure are somehow disconnected is impractical for land transport.

By definition, land transport crosses the State and connects the city with the country.

The Committee believes that the Urban Infrastructure Management Plan should be extended to all major infrastructure projects in the state in recognition of the essential inter-relationship of urban and regional New South Wales.

The Committee also believes that investment in road and rail projects should be allocated on the strict basis of the highest Cost Benefit Ratios, addressing all relevant externalities.

Therefore, it endorses Recommendation 13 of the Report, "Tracking Australia," by the House of Representatives Standing Committee on Communications, Transport and Microeconomic Reform.

Further, the Committee believes that - at a State level - it is vital that these externalities form an integral part of the land transport assessment process.

4.8 Recent and Proposed Rail Infrastructure Investment Programs

The historical disparity in road and rail funding over the last quarter of a century in Australia has prompted proposals for a coordinated national strategy of rail infrastructure upgrades.

The Committee heard much anecdotal evidence about the level of investment in rail infrastructure that is required to make it genuinely viable as a competitor with road transport for both freight and passenger services.

There have been two major investment proposals for rail infrastructure in the past five years:

- In 1995, the National Transport Planning Taskforce commissioned the BTCE to prepare a comprehensive list of projects on major rail corridors that would bring them up to world's best standards by 2014-15. Indicative costings were included which totalled $3.2 billion. Over $2 billion (or 62.5%) of this investment was targeted at major New South Wales corridors.
- National Rail followed up the One Nation program by engaging Symonds Travers Morgan to target investment opportunities in the interstate rail network that would yield the most benefits. The list of projects originally totalled $722 million. However, recent revisions by National Rail has seen this figure consolidated to $621 million in 1997. Almost $500 million (or almost 80%) of this investment was targeted at New South Wales corridors.

The focus of both proposals has been major investment in the Melbourne-Sydney-Brisbane corridor, which is the major economic artery of Australia.

Before examining these proposals, it is worth comparing recent funding commitments by the Commonwealth Government with these proposals as they demonstrate the gap between actual funding levels and necessary investment.

4.8.1 The One Nation Program

The Commonwealth Government provided investment of $450 million over four years for rail infrastructure as part the One Nation program in 1992.

This represented the first substantial injection of investment in rail infrastructure for many years.

A summary of works is contained in Table 18.

Table 18: One Nation Program - Rail Infrastructure Investment

Project	Funding ($m)
Fisherman Islands Line	30.00
Sydney-Brisbane	85.90
Sydney Freight Access	45.80
Sydney-Melbourne	40.90
Melbourne Rail Terminal	21.30
Melbourne-Adelaide gauge standardisation	184.40
Adelaide Outer Harbour	8.00
Adelaide-Fremantle upgrade	12.70
Other	24.50
Total	**453.50**

Improvements were made to most corridors.

The first North Coast deviations (Lawrence Road and Rappsville) were completed but the Committee received evidence that these small, isolated works were not particularly effective because they did not form part of an overall track improvement program.

The sudden nature of this policy shift by the Commonwealth Government in 1992 meant that rail planners were under-prepared to begin new projects in some cases. The outcome was waste and inefficiency at times.

For example, the cornerstone of the program - Melbourne-Adelaide gauge standardisation - commenced procurement and construction before the master plan was signed off. This resulted in insufficient funds being allocated to the project. Piles of concrete sleepers are still lying alongside the track awaiting installation to this day. Speed restrictions, insufficient crossing loops and safe working limitations in Victoria meant that transit times have not improved. In some cases, they are worse. The lack of follow-up investment after One Nation has seen some of these gains eroded. In particular, the failure to create a single national track access authority has enabled both the Commonwealth and the States to dodge responsibility for further investment.

Rail 2000 has argued that the One Nation Program - its limitations notwithstanding - at least did "not discriminate between investment in Federal and state controlled interstate tracks." Rail 2000 considers the current Commonwealth Government's inaction "over the last two years in addressing and acting upon the unfinished work on the Melbourne to Adelaide corridor is nothing short of incompetent" (Rail 2000, Submission to the Commonwealth, p.7).

4.8.2 The 1998 Commonwealth Budget

The 1998 Commonwealth Budget announced $250 million investment over four years in the interstate rail network after two successive budgets of zero rail funding. This equates to $62.5 million per year. However, only $35 million of this amount has been allocated in the 1998 budget.

This level of investment does not acknowledge the damage caused to the competitiveness of rail by 30 years of neglect.

It is worthwhile to compare spending on roads in the same Budget.

By way of stark comparison, the Commonwealth Government announced $1.6 billion in roads funding in the 1998 Budget with $545 million specifically allocated to New South Wales.

The largest single item of expenditure is $76.6 million on the Pacific Highway, part of $3.1 billion being spent over 10 years with the New South Wales and Queensland Governments. Major improvements in New South Wales are also planned to the Hume, New England, Sturt and Newell Highways at a cost of $230 million.

Over the four years to 2002, the Commonwealth plans to spend $1.3 billion on New South Wales roads.

4.8.3 The BTCE Proposed Investment Program

The Bureau of Transport and Communications Economics (BTCE) released a study commissioned by The National Transport Planning Taskforce in January 1995 titled "The Adequacy of Transport Infrastructure."

The study examined the adequacy of road, rail, air and sea transport infrastructure to meet Australia's transport needs over major corridors for the next 20 years. It sought to identify projects which were economically justifiable although the study was not intended to be a recommended investment program. The BTCE stated that its techniques were "designed to highlight areas where a full scale CBA would most probably indicate that investment in additional infrastructure is warranted within the 20 year period" (3).

National Rail Corporation's package of $722 million in rail infrastructure projects was presented to the BTCE. However, the BTCE did not consider it an acceptable basis for an economic assessment over 20 years because it only represented a 5 year strategy. A much more extensive list of projects was therefore developed.

The BTCE undertook benefit-cost analyses of these projects to determine the investments required in rail infrastructure to bring individual corridors up to standards of technical adequacy. An 8% discount rate was employed. Analysis was confined to estimated operating cost savings which, as the BTCE indicated, was a "rudimentary" yardstick (71). The BTCE concluded:

> Only taking into account operating cost savings will usually lead to an

> understatement of benefits since the values of improvements in transit times and reliability are not taken into account. (71)

Other measures not considered included gains from improved service levels and possible price reductions.

Two performance goals were set by the BTCE.

Goal 1 projects would achieve:

- Transit times and delivery days matching road as at 1995-96
- Average train speed of 80 km/h
- Reliability based on 5 minutes deviation per 100 km
- Average total cost of production of 3 cents per net tonne kilometre.

The total investment required to achieve Goal 1 targets was estimated at $1.643 billion.

Goal 2 projects attempted to match prospective improvements in road freight by achieving:

- Transit times and delivery days matching road at 2014-15
- Average speed of 100 km/h
- Reliability based on 5 minutes deviation per 100 km
- Increase in axle loadings to 25 tonnes on most corridors
- Average total cost of production of 2 cents per net tonne kilometre.

The total investment required to achieve Goal 2 targets was estimated at $2.4 billion.

The BTCE rated all Goal 1 and most Goal 2 projects with a "plus one" benefit to cost ratio. Some Goal 2 projects were subsequently removed from the program as economically unviable. The BTCE ultimately considered an investment of $3.2 billion could be justified on major rail corridors. The following table details this investment.

Table 19: BTCE - Estimate of Required Rail Infrastructure Investments 1995-2015

Corridor	Investment ($m)
Sydney-Melbourne	980
Sydney-Brisbane	970
Melbourne-Adelaide	540
Brisbane-Cairns	445
Adelaide-Perth	288
TOTAL	**3 223**

The BTCE noted that the recommended rail infrastructure program could be implemented with funding of $160 million per annum over the next twenty years.

It is a modest investment compared with annual road funding levels over $6 billion.

The impact on maintenance costs was also considered. The BTCE estimated that the $3.2 billion rail investment program would reduce maintenance costs from $220 million to $130 million per year; that is, by $90 million each year.

If the program was not undertaken, the BTCE estimated that maintenance costs would be $1 billion greater over the twenty year life of the program.

The BTCE analysis of rail infrastructure for the next 20 years produced an investment package of $3.2 billion. For $160 million per year, therefore, Australia can bring its rail system up to standards of technical adequacy. It must be remembered that none of the 9 corridors currently reach that standard.

Unfortunately, the Commonwealth Government is offering investment funds of only $250 million over 4 years; or $62.5 million per year.

This lack of investment in rail infrastructure means lost opportunities and significant additional costs for Australia.

By the BTCE's own acknowledgement, it could not consider all the possible benefits from better rail services or the reduction in the costs of road congestion, pollution and accidents.

The BTCE did, however, estimate that the rail maintenance costs of not undertaking the package is $1 billion.

The BTCE also charted the decline in Australia's rail system if remedial works were not completed: that 5 out of 9 corridors would be operating at only 50% of technical adequacy by 2014-15.

4.8.4 The National Rail Proposed Investment Program

In the wake of the One Nation program, National Rail engaged Symonds Travers Morgan to examine investment opportunities in the interstate rail network. Their report demonstrates that the greatest net returns come from integrated corridor investment programs which combine a number of projects. Many of these projects achieve very high benefit-cost ratios and rates of return.

National Rail submitted a $722 million program to the BTCE. This program was later revised to $621 million for the current inquiry by the House of Representatives Standing Committee on Communications, Transport and Microeconomic Reform. The Committee uses the current proposal and its figures in this Report.

The current program includes $112 million of immediate investments in Victoria, some of which would provide direct benefits to New South Wales. For example, extending crossing loops at six locations in Victoria at a cost of only $6 million would enable 1 500 metre trains to run from Melbourne to Albury.

Overall, $621 million of investment is recommended for what has became known as the "Son of One Nation" program. The program would achieve an internal rate of return of 18% with an overall benefit-cost ratio of 3.0.

Almost $500 million of this amount (or 80%) is designated for the Sydney-Melbourne and Sydney-Brisbane corridors.

Table 20: National Rail Proposed Investment: Melbourne - Sydney - Brisbane

Corridor	Capital Cost ($m)	Financial Evaluation (7% real discount rate)				Economic Evaluation - incl. externalities (7% real discount rate)			
		NPV ($m)	CBA Ratio	Return Rate (%)	Payback Period (yrs)	NPV ($m)	CBA Ratio	Return Rate (%)	Payback Period (yrs)
Acacia Ridge - Telarah (NSW)	164	102.3	2.4	17.4	10	155.0	3.1	18.8	10
Joopa Junction - Albury (NSW)	221	43.8	1.4	10.7	14	144.7	2.2	15.3	11
Albury - Melbourne	109	48.4	2.2	14.0	11	85.0	3.1	16.7	10
TOTAL	**494**	**194.5**				**384.7**			

National Rail estimates that the completion of its entire program would cut journey times by an average of 30 minutes across the entire Australian rail network.

The National Rail program of high priority track improvements is a crucial first step in infrastructure investment. It offers the opportunity to make a real difference in the short term.

However, such a program must be integrated into a genuine vision for rail and all transport modes.

The BTCE and National Rail investment programs can act together as a frame of reference for developing such a long term strategy of rail infrastructure investment in Australia.

The immediate impact to be gained from the National Rail proposal at a cost of $621 million should be balanced by the longer term objectives in the BTCE proposal.

The development of a National Land Transport Commission to oversight the interstate track network should act as the catalyst for investment. It is imperative that this body develop a comprehensive National Rail Highway to target investment opportunities at priority corridors.

The Committee believes that the first priority in the National Rail Highway should be track improvements to the Melbourne-Sydney and Sydney-Brisbane corridors.

These corridors have the largest volumes of rail traffic in Australia and suffer serious congestion problems, particularly into and out of Sydney. They have been targeted by both the BTCE and National Rail as the most important and worthy corridors.

In the next section, the Committee examines the most recent and comprehensive rail infrastructure investment program, recommended by the House of Representatives Standing Committee on Communications, Transport and Microeconomic Reform in July 1998.

4.8.5 The House of Representatives Standing Committee on Communications, Transport and Microeconomic Reform Investment Program

The House of Representatives Standing Committee on Communications, Transport and Microeconomic Reform released a report, "Tracking Australia," on the role of rail in the national land transport network in July 1998.

The sixteen recommendations in this bipartisan Commonwealth report develop a comprehensive vision of how rail administration and the national rail network can be restructured and rehabilitated to enhance competitiveness and make fast train technology feasible on major interstate routes. Most of these initiatives reflect same conclusions reached by the Committee in this Report.

Major recommendations of the Commonwealth report (xxvii-xxxi) include:

- Completing an integrated national transport strategic plan by 1 July 1999
- Declaring a national track for interstate services from Brisbane to Perth, controlled and managed by the Australian Rail Track Corporation
- Addressing "chronic deficiencies" in the interstate national track
- Adopting agreed national standards for the condition of national track
- Providing consistency in rail safety standards
- Developing a "more consistent, equitable approach" to transport infrastructure charges to ensure competitive neutrality between modes
- Establishing a National Land Transport Commission.

The National Land Transport Commission will provide "advice" on a national transport plan and funding allocations for road and rail projects on the "strict basis of highest benefit cost ratios" including such externalities as accidents, congestion, pollution, greenhouse gas emissions and

noise (xxx).

An important recommendation of the Report relates to Commonwealth responsibility for increased investment in rail infrastructure.

The Report urges the Commonwealth to "undertake responsibility for investment in the declared national track" (xxx) with the following short and medium term investment allocations:

- $750 million over three years to 2001
- $2 billion over ten years from 2001.

This investment program accepts the findings of the BTCE in its 1995 report and calls for "a more substantial commitment on the part of the Commonwealth towards funding for infrastructure investment" (139).

The Commonwealth report acknowledges that rail infrastructure investment should be targeted at major New South Wales corridors particularly the Sydney urban area, Sydney-Melbourne and Sydney-Brisbane.

The following urgent priorities involving New South Wales corridors are identified:

- The Sydney urban area requires the "removal of bottlenecks at key junctions, through selected bypasses, construction of bidirectional freight tracks, grade separation and removal of speed restrictions on freight traffic"
- The Newcastle to Acacia Ridge section of Sydney-Brisbane corridor needs work on "curve and grade easement, resleepering, drainage and level crossings".

In the longer term:

- The Sydney-Melbourne corridor requires "additional and longer crossing loops, completion of concrete resleepering, removal of clearance constraints and partial regrading" (137)
- The Sydney-Brisbane corridor needs "improvements to track curves and gradient (for example between Chullora and Newcastle), rerailing (from 53 to 60 kilograms) to allow for heavier trains, completion of concrete resleepering and removal of crossing loops and clearance restrictions" (137).

The Committee believes that the report of the House of Representatives Standing Committee on Communications, Transport and Microeconomic Reform, "Tracking Australia," represents an important step in rail reform in Australia.

In particular, the Committee fully supports the recommendation that the Commonwealth provide investment in rail infrastructure totalling $750 million over three years to 2001 and a further $2 billion from 2001 over ten years.

The macro focus of the Commonwealth report is appropriate for a national planning document.

This Report complements that work by offering a program of targeted rail investment in New South Wales.

It should be noted that the infrastructure investment package developed by the BTCE - which forms the basis of recommendations in the Commonwealth report - directs funding to New South Wales corridors.

The BTCE focus on New South Wales rail corridors is appropriate because they have the largest volumes of freight and passenger rail traffic in Australia.

The integrity of the BTCE package should be maintained in apportioning investment in future rail infrastructure projects.

The BTCE recommended that almost $2 billion (or 62.5%) of its national investment package be concentrated on New South Wales corridors. Similarly, National Rail earmarked $494 million (or almost 80%) of $621 million of urgent works on New South Wales corridors.

The Committee's major area of concern is that works designated as "urgent priorities" should not patch-up sections of poor quality track that ought to be replaced altogether.

Short term investment must be integrated into a long term plan for the national rail network.

Findings and Recommendations

5. **The establishment of a National Land Transport Commission with wide powers to develop transport linkages across Australia and determine relative levels of investment across land transport modes.**

   The Commission will control the following elements:

   - **Application of competition policy**
   - **Competitive neutrality**
   - **Effective regulation (including uniform technical, performance and safety standards)**
   - **Investment in new infrastructure**
   - **Access to the interstate rail network**
   - **Maintenance and management of network assets**
   - **Development of multi modal transport corridors.**

   The Commission must complete the following tasks as a priority:

   - **Formal definition of a National Rail Highway**
   - **Formulation of a National Land Transport Master Plan**
   - **Establishment of uniform mass/speed and dimension performance standards**
   - **Formulation of an infrastructure maintenance program**
   - **Identification of rail corridors for immediate investment (these corridors should be designated 'Rail Links of National Importance').**

6. **The National Land Transport Commission to introduce an equitable system of road and rail charges to correct the historic imbalance in investment between road and rail infrastructure. This imbalance alone is largely responsible for an uncompetitive land transport industry, which is detrimental to the economic and environmental prosperity of the nation. A rational system of cost recovery will lead to the revitalisation of the rail transport industry, as demonstrated by the example of New Zealand.**

7. **A hypothecated portion of the Fuel Excise Levy (currently 18 cents per litre) is currently directed to road infrastructure. This portion of the levy paid by the rail industry should be dedicated to rail infrastructure projects.**

Findings and Recommendations (cont.)

8. **The New South Wales Department of Public Works and Services to continue to pursue methodologies to fully quantify environmental and social costs and benefits in economic appraisals for road and rail infrastructure projects. Factors to be quantified should include fuel consumption, greenhouse gas emissions, air pollution, traffic congestion, accidents and fatalities and related infrastructure demand. The Total Asset Management Manual should be updated to include this material and these developments should be identified in Treasury Guidelines.**

9. **The Minister for Roads and Minister for Transport to direct transport agencies to quantify the global impact of different land transport modes in the Integrated Land Transport Plan to guide future planning and investment on a "preferred modal" basis. Factors to be considered should include relative levels of fuel consumption, greenhouse gas emissions, air pollution, traffic congestion, accidents and fatalities as well as related infrastructure demand.**

10. **The Urban Infrastructure Management Plan be extended to cover all land transport infrastructure projects in the State in recognition of the essential inter-relationship of urban and regional New South Wales. The notion that urban and regional infrastructure are somehow disconnected is impractical for land transport. By definition, land transport crosses the State and connects the city with the country. On this subject, the Committee restates its comments of 1996 on the need to "establish a statewide system of scrutiny for all proposed public works projects and capital works programs" (Report No.2, p.93).**

11. **The Committee fully supports the recommendation of the House of Representatives Standing Committee on Communications, Transport and Microeconomic Reform in its report, "Tracking Australia," that the Commonwealth provide investment in rail infrastructure totalling $750 million over three years to 2001 and a further $2 billion from 2001 over ten years.**

12. **The BTCE rail infrastructure investment package - which forms the basis of the investment program recommended by the House of Representatives Standing Committee on Communications, Transport and Microeconomic Reform - directs almost $2 billion (or two-thirds) of total funding to New South Wales corridors. The integrity of the BTCE package should be maintained by the National Land Transport Commission in apportioning investment for future rail infrastructure projects around Australia.**

Chapter 5

Strategic Track Improvements to New South Wales Rail Corridors

The Committee examined key New South Wales rail services which would be candidates for a fast train service to determine the costs and benefits of such investment.

Central to this analysis is an estimation of the standard of existing rail infrastructure on each corridor and the extent of any track improvements which would be required to make such a service feasible.

Specific projects must form part of any long-term strategic plan to improve the New South Wales rail network.

Evidence to the Committee consistently stressed the need to consider corridors on which high volumes of freight and passenger traffic combined to optimise the benefits of track improvements. Stakeholders also focused on problems getting into and out of Sydney. The topographical barrier surrounding Sydney had combined with track congestion to seriously slow train speeds.

Focusing on track which linked Sydney with other major urban and industrial centres - especially within 200 kilometres of the city - was seen as one priority:

> **Mrs BEAMER:** In New South Wales which lines would you see as a priority for improvement?
> **Mr WARDROP:** I would suggest the four main lines out of Sydney because of the population and industry that they serve. If you fix up the main lines at least within a radius of 200 kilometres, for example, you will then be in a position to better serve the major passenger flows in and around Sydney and New South Wales and you will make a start in improving freight operations. (T1, 42)

The Committee agrees that access to Sydney is crucial for people and freight. However, a concerted plan to improve track quality along each major New South Wales corridor will produce the strongest overall benefits to all rail services.

Given this evidence, the Committee concentrated on major inter-capital corridors where there was a high volume of passenger and freight services. The Committee will consider freight access to Sydney in a separate section.

The first corridor examined in this section is the Sydney - Newcastle - Brisbane corridor.

5.1 The Main Northern Line: Sydney - Newcastle

This corridor serves two essential purposes for passengers:

- To link Sydney with large, nearby population centres in the Central Coast and Newcastle
- To link Sydney with the North Coast and Brisbane.

Thus, the passenger service must cater both for daily commuters to Sydney from the high urban growth areas of the Central Coast as well as long distance intrastate and interstate travellers. This places quite different pressures on the rail network. The large volume of freight traffic along this corridor - including coal from the Hunter Valley - must also be factored into any analysis.

The Main Northern Line travels via Strathfield and Hornsby to Berowra, where the CityRail suburban service terminates. After crossing the Hawkesbury River, it enters the Central Coast region where Woy Woy, Gosford and Wyong are the major stations. From Wyong, the line travels inland around Lake Macquarie through Morisset before reaching the rail centre of Broadmeadow in Newcastle.

The North Coast Line leaves Maitland and travels through Taree, Kempsey, Coffs Harbour and Grafton to Casino, where it branches either towards Murwillumbah or Brisbane. Journey time for existing XPT services are 13 hr 36 min (989 km) for Sydney-Brisbane and 13 hr 25 min (935 km) for Sydney-Murwillumbah. Average speed to Brisbane is 73 km/h and 70 km/h to Murwillumbah.

5.1.1 The Central Coast: an Urban Growth Centre for Sydney

The Central Coast represents a major residential growth corridor for the Sydney region.

The Urban Development Program (UDP) for 1995/96 - 1999/2000 states that Gosford LGA and Wyong LGA will provide 15 % (10 620 potential lots) of Sydney's available urban release landstock.

Wyong LGA contains 8 495 potential lots with 59% located in the Warnervale release area. Of particular importance, Wyong LGA possesses the largest number of low priced lots in the UDP (27% of total).

Gosford LGA contains 2,125 potential lots in the Kincumber, Narara West and Springfield release areas. The 1997 UDP Regional Consultations estimated that these Central Coast LGAs would contribute 4,200 lots or 13% of total lot production in the next five years.

The Central Coast has already experienced one of the highest rates of population growth in the Sydney Region in recent years.

Between 1991 and 1996, there was a 13% population increase (31,000 people). Population projections by the Department of Urban Affairs and Planning estimate that the population in Wyong LGA will grow by a further 50% by 2021. This data is contained in Table 21.

Table 21: Wyong LGA - Population Projections 1991 - 2011

Term	1991	2001	2011	2021
High	105 050	125 600	146 200	166 200
Medium	105 050	124 600	142 600	158 600
Low	105 050	123 600	138 800	150 300

Rail transport provides a significant travel mode for people living in the Central Coast for three main reasons:

- The majority of workers commute to Sydney or Newcastle as there are relatively few employment opportunities in local areas
- People prefer train travel for long distance journeys to Sydney
- There is a high dependency on public transport due to low average income.

The future pressure on public transport facilities from accelerated population growth on the Central Coast has been addressed by upgrading Gosford Station and programming works in the Urban Infrastructure Management Plan 1998 for both Woy Woy and Wyong Station Interchanges to a total value of $6.9 million.

The Committee conducted an inquiry on the Wyong Station Interchange proposal and released its Report in April 1997. The Committee supported the upgrading proposal. However, it found almost $1 million in possible savings on the $2.31 million project. The Department of Transport accepted the Committee's recommendations and amended the project accordingly.

The Sydney-Gosford rail service currently takes approximately 75 minutes followed by a further 56-63 minutes to Newcastle.

During the tilt train trial in 1995, Countrylink commissioned a report on "Commuter Reactions and Attitudes Towards a Central Coast Tilt Train Service." It found that about 85% of passengers commuted to Sydney on working days. Key Central Coast stations of origin were Gosford (32%), Woy Woy (27%) and Wyong (27%). The most frequent disembarkation point was Central (58%) followed by Hornsby (19%) and Strathfield (9%). The concept of a significantly faster train service generated a very positive response from users (91%). This level of support dropped during qualitative analysis with passengers who would be required to change trains or change their station of origin.

The Committee received an enthusiastic response to the possibility of improved rail services from Gosford City Council.

The following benefits of the tilt train were identified:

1. Improved travel times to Sydney and Newcastle with better service levels
2. Increased patronage on rail due to improved services
3. Possible reduction in pollution from reduced use of cars for commuting and tourist travel
4. Improved rail access for tourism
5. Reduction in traffic demand, congestion and accidents on the Pacific Highway, particularly during holiday periods
6. Reduction in long car journeys and the associated risks of driver fatigue
7. Improved access to employment for commuters. (S21, 2)

Gosford City Council identified the following possible problems with introducing a tilt train service:

1. Two Level Crossings in the LGA would need to be removed or have major safety improvements
2. Possible adjustments to stations
3. Safety improvements near schools where there is a likelihood of students crossing lines
4. Possible noise mitigation in suburban areas. (S21, 2)

In its submission, Newcastle City Council stated its objective of "turning around" central coast commuters from Sydney towards Newcastle with strategies to improve employment opportunities and transport services:

> Improvements to passenger rail have previously focused on improving the access of Central Coast domiciled commuters to the Sydney job market. This has tended to compound the growing congestion of the Sydney basin. There is considerable benefit in developing strategies to encourage commuting north from the Central Coast to Newcastle. (S26, 1)

The Committee discusses the current state of the Sydney-Gosford rail corridor in the context of services to and from Newcastle in the next section.

5.1.2 Newcastle: Closing the Gap with Sydney

The Main Northern Line from Sydney to Newcastle (popularly known as the Short North) is 151 kilometres in length with steep ruling grades and many tight curves. It has the heaviest tonnages of freight in New South Wales and intense passenger train activity with 120-170 trains per weekday including suburban, intercity and long distance services.

The Sydney-Newcastle passenger rail service currently takes 120-150 minutes depending on the number of stops.

There are numerous locations where steep grades and/or sharp curves significantly increase travel times. The alignment has not been improved in the twentieth century despite upgrading works to bridges, the replacement of old rail with heavy new tracks, the replacement of wooden with concrete sleepers and electrification. Funding spent on upgrading works of this kind effectively

entrenches the existing alignment.

The Hornsby-Newcastle highway suffered similar poor alignment until the 1970s.

However, there has been a very high investment by the Commonwealth Government in reconstructing the Pacific Highway (F3) section-by-section with four lanes and improved alignment at a cost of about $1 billion from Wahroonga to Newcastle as part of the National Highway system. Recently, connections to both Newcastle and Maitland were improved. A $50 million bypass/interchange is now being completed at Ourimbah.

No rail funding has been forthcoming over the same period.

Newcastle City Council identified the severe environmental consequences of improving highways:

> In contrast, large investments in road infrastructure have significantly reduced road travel times between the two centres, thus favouring a less environmentally sustainable transport mode. (S26, 1)

One serious consequence of upgrading highways while not improving rail alignments is that improved travel times encourage more vehicles onto the road. This increases pollution and accident levels with their high associated costs (which were examined in Chapter 4.8.3). In time, new road congestion creates additional pressure to further expand highways. Images of traffic congestion on the Pacific Highway near Hornsby during holiday periods have become a common news item. Better, faster rail services may alleviate this problem.

5.1.3 Current State of Track and Potential Upgrades

Stakeholders and experts acknowledge serious problems with track alignment and steep grades on the Sydney-Central Coast-Newcastle corridor, which impede transit times.

The SRA has further identified traffic congestion as a major impediment to any fast train service:

> Since this is a heavily curved track, on the face of it there would appear to be significant potential for tilt trains. However, the line is heavily trafficked by both passenger and freight trains with the requirement for some passenger services to stop at a lot of stations. In these circumstances, the tilt train could only operate as fast as other trains on the line would permit. Strategically located passing loops could not easily solve the problem of allowing the faster trains to overtake the slower trains because of the volume of traffic and delays this incurs. Further, while curved track generally lends itself to tilt train operations, some of the track geometry on this line is so tortuous - i.e. very tight reverse curves - that these sections are not suited to tilt operations. (S28, 7)

Limited spare track capacity and the standard of the line limit the benefits from any fast train service on this line without significant track upgrades.

The SRA stated that a tilt train would only reduce transit time from Sydney to Broadmeadow by "about 15 minutes without upsetting the other traffic on the line, resulting in a travel time of around 1 hour 50 minutes" (S28, 7-8).

Over a third of the rail route (55 km) has curves of less than 800m radius with nearly 20km being on 400m or less. The worst examples are 220m curves near the Hawkesbury River and 240m curves at Mullet Creek, south of Woy Woy tunnel. Some 30 km of the route has ruling grades of 1:66, of which 10.2 km are 1:40. Tight curves and steep grades affect about 14 km of the route. The following table provides an overview the problems with this corridor.

Table 22: Strathfield-Broadmeadow - Sections of Steep Grades & Tight Curves

Section	Length (km)	Grades more 1:66 (km)	Curves less than 800m (km)	Steep &Tight (km)	Steep or Tight (km)
Strathfield - Hawkesbury R	46.5	19.7	20.1	9.7	30.1
Hawkesbury R - Gosford	22.7	2.5	8.3	1.1	9.7
Gosford - Morisset	42.3	3.0	6.2	0	9.2
Morisset - Broadmeadow	39.8	5.2	20.4	3.0	22.6
Total	151.3	30.4	55.0	13.8	71.6

Urban development from Strathfield to the Hawkesbury River would significantly increase the cost of track upgrades as would the rugged surrounds of Cowan Bank.

The ARUP/TMG submission summarised problems standing in the way of a faster train service:

> Sydney-Newcastle could be a candidate interurban corridor in which limited-stops tilt trains could deliver, say, a 100 minute (eg 30+% reduction) journey time. Infrastructure costs may not be as favourable as Sydney-Canberra because of the urbanisation which reaches out beyond Hornsby, the severe climbs from the Parramatta and Hawkesbury Rivers and the rugged terrain south of Gosford. (S11, 4)

Any further reduction to the theoretical minimum transit time of 40 minutes on dedicated track could cost up to $5 billion, according to the SRA:

> To achieve spectacular travel time improvements in the corridor, two additional tracks would be required to deal with the capacity issues and to remove all speed restrictions. At the extreme, using TGV-style technology, travel times could theoretically reduce to 40 minutes. However, capital funding of some $5 billion would be required for a completely new railway. (S28, 8)

Clearly, the upfront costs of a VHST to Newcastle are prohibitive without the private sector.

An alternative strategy is to gain maximum time savings from a targeted program of track upgrades which would require realistic levels of funding. The SRA advocated such a program as the most cost effective means of improving the rail network for all parties:

> The most cost effective option for reducing travel times for all traffic on the line would be a relatively modest investment in the track that would remove some of the steep gradients and very tight curves... (S28, 8)

In evidence, Associate Professor Philip Laird proposed systematically addressing the worst sections of track between Sydney and Newcastle:

> ... the point I make is that rail deviations need not be expensive. Between Sydney and Newcastle there is a strong case for selected realignment—not rebuilding the whole thing but just the worst 10 to 20 per cent. (T1, 30)

According to Associate Professor Laird, the most cost effective section of track to upgrade would be north of Woy Woy, particularly the 4 km section between Fassifern and Booragul (south of Broadmeadow). There are 2.4 km of tight curves with radius 320-400 metres. A small deviation here would half the distance of this section to 2 km. The following table summarises the sections targeted for track upgrades.

Table 23: Sydney-Newcastle: Sections of Steep Grades and Tight Curves

km from Sydney	**Location**	**Length (Km)**
Strathfield - Hawkesbury River		
18.89 - 34.86	Nine isolated sections	3.77
48.98 - 57.29	Cowan Bank	5.48
47.55 - 58.1	North of River	0.41
Hawkesbury - Gosford		
66.0 - 69.2	Approaches to Woy Woy Tunnel	0.67
77.95 - 80.87	South of Gosford	0.42
Morisset - Broadmeadow		
129.55 - 132.39	North of Dora Creek (Hawkmount)	2.17
143.52 - 143.94	Fassifern - Booragul	0.43
157.64 - 161.1	Kotara - Adamstown	0.41
TOTAL		**13.76**

Clearly, the track upgrades proposed in the above table would improve journey times and reduce wear and tear from poor alignment for all trains.

The question of relative train performance along existing and enhanced infrastructure has been assessed.

The submission of Rail Access Corporation (S30) detailed results of a study completed in November 1997 on improving transit times between Sydney, Gosford and Newcastle. The following table outlines the targets and time savings on existing services.

Table 24: RAC Target Travel Times Sydney - Gosford - Newcastle

Route	Target Time	Saving over XPT (V-set)	Saving over XPT
Sydney - Gosford	50 minutes	19 minutes	16 minutes
Sydney - Newcastle	90 minutes	42 minutes	32 minutes

The study tested a combination of infrastructure upgrades and rolling stock enhancements to meet these targets, which are summarised in the next table.

Table 25: Sydney-Newcastle Travel Time Targets

Sydney to:	Current (XPT - V-set)	Target	Tilt Train (160 km/h)	VHST (250 km/h)	Infrastructure Only - Tangara	Infrastructure Only - XPT (160 km/h)	Combination: Infrastructure & Tilt Train
Gosford	75	50	54	41	55	55	47
Newcastle	122-132	90	101	65	98	91	84
COST	-	-	?	?	$1.1-1.7B	$1.1-1.7B	?

Note: the estimated cost of different rolling stocks was not considered.

The RAC study concluded that the tilt train could deliver a 20% reduction in travel times immediately.

5.1.4 Comments

The target times set by RAC for the Sydney-Gosford-Newcastle corridor can only be achieved by either a VHST - which would cost about $5 billion according to the SRA - or a combination of track upgrades and tilt trains.

The private sector may make a commercial decision to invest such an amount. It is unrealistic to expect such funding from the public sector either at a Commonwealth or State level.

The Committee believes that the best value for money in the Sydney-Newcastle corridor over the long term will be achieved by a targeted program of infrastructure upgrades to benefit both freight and passenger services.

Freight is the profit-making arm of the rail network but its position is being undermined by the Commonwealth Government emphasis on funding for highways, which directly benefits road freight. One outcome is that Australia's major rail corridors are now being ranked at well below world's best standard. The Sydney-Newcastle-Brisbane corridor is rated at only 50% of world's best standard with no significant plans to address this poor state. One disturbing prediction is that the Sydney-Newcastle rail freight link will become economically unviable in the near future because of the advantage given to road transport.

The priority in this corridor should be upgrading track infrastructure.

Enhanced rolling stock - such as a tilt train - should only be introduced after the poor alignment of this corridor has been improved.

It should be noted that a tilt train operating along the current track alignment would have much higher maintenance costs and a shorter working life due to the wear and tear of numerous curves and steep grades.

5.2 The North Coast Line: Maitland-Brisbane

The track alignment of the North Coast Line, both between Maitland-Brisbane and on the Casino-Murwillumbah branch line, severely impedes the performance of both passenger and freight rail services. Associate Professor Philip Laird told the Committee that the "the north coast line from Maitland to Brisbane is basically a string of branch lines, which after 1930 reached South Brisbane and then in 1932 a bridge was built across the river at Grafton" (T1, 29).

The large-scale upgrading of the Pacific Highway without any corresponding investment on the rail network will only compound this situation, possibly to a disastrous extent for freight and passenger services alike.

Geometric and infrastructure constraints limit freight productivity, the type of rolling stock that can be used, axle loads and therefore competitiveness with road transport.

The National Transport Planning Taskforce BTCE Report (1995, p.63) has reported that "transit times, reliability and costs are so poor that the corridor may not survive as a commercial freight alternative unless improvements are implemented."

Dr Robert Weatherby, Chairperson of the Public Transport Advisory Panel for Lismore City Council, noted that the Pacific Highway upgrade will effectively destroy the viability of rail freight along the corridor:

> ... it is estimated that if the $4 billion which is being spent on upgrading the Pacific Highway over the next ten years were completed and B-double trucks were allowed to operate on the Pacific Highway - which, if it is upgraded to dual carriageway or freeway type standards, we would expect that that would happen - it is likely that the carriage of freight on that Sydney-Brisbane line would be so uneconomic that it would probably fall into disuse, that is, if its existing alignment were maintained and there were no improvements. (T2, 15)

This outcome alone would have serious repercussions for passenger rail services, which rely on the profitable freight arm to justify costly track upgrades. However, bus services would also receive substantial benefit from the Pacific Highway upgrade.

For rail passenger services, a simple comparison of road and rail transit times demonstrates the ramifications.

Countrylink passenger trains currently take about 14 hours for the Sydney-Brisbane journey. A tilt train could reduce the journey time to 12 hours using the existing alignment with some basic curve straightening reducing this time to 11 hours.

By comparison, current bus services take 11-12 hours. The upgrading of the Pacific Highway will reduce the bus journey to about 10 hours.

The greatest reductions in rail passenger journey times between Sydney-Brisbane will come from an end-to-end reduction in route length.

For example, a new direct link through Bulahdelah would cut 80 km off the journey with its associated savings in maintenance and fuel costs. Such a deviation would require significant upfront investment that would prove to be cost effective only over the very long term. However, this is precisely the kind of investment that is required if problems such as pollution, greenhouse gas emissions and excessive fuel consumption are to be corrected.

There are a number of options being promoted for the North Coast Line at the moment. They were neatly summarised by Associate Professor Philip Laird in his evidence to the Committee:

> North of Newcastle you can take your choice: a new coastal route, upgrading the existing one, or going inland. (T1, 30)

The introduction of fast trains on existing track infrastructure would produce only small dividends in improved journey times for passengers. For example, Dr Weatherby estimated that a tilt train would only save about 30 minutes over a thirteen hour journey given the state of the Sydney-Brisbane corridor. (T2, 13-4)

Rail will only become competitive with other modes of transport with significant investment to address poor track alignments.

There are three basic options possible to improve services on the Sydney-Brisbane corridor:

- Systematically upgrading the North Coast Line to Brisbane and the Casino-Murwillumbah Branch Line with a possible extension to the Gold Coast and Brisbane to link with the Queensland Tilt Train
- A new, purpose-built rail corridor via coastal centres such as Woodburn, Broadwater, Ballina, Byron Bay, Mullumbimby and Tweed Heads/Coolangatta
- An inland Melbourne-Brisbane route maximising the potential freight traffic in regional Australia and avoiding rugged coastal areas.

The Committee considers these options in the following sections.

5.2.1 North Coast Demographics

The Northern Rivers region is experiencing significant population growth with an anticipated increase of 44% over the next 20 years.

Coastal towns such as Maclean, Byron Bay and Tweed Heads are growing at much faster rates than inland centres like Grafton, Lismore and Casino.

A similar surge in population growth is occurring in southeastern Queensland. It is estimated that the convergence of Brisbane and the Gold Coast will create the second largest city in Australia within 20 years.

In evidence to the Committee, Mr Robin Spragg, Convenor of the Public Transport Working Group of Tweed Shire Council, outlined the extent of this population growth:

> We are a rapidly growing community. In 1991 we had 55 000 people, and in 1996 we had 67 000 people. We are now around 70 000. We estimate that in approximately 15 years we will have about double the present population (140 000). We already have zoning for an extra 60 000 population available, and that is one of the features here: that there is rapid immigration. (T2, 19)

Of importance, an aging population was relocating from larger urban centres to the North Coast:

> In the introduction, I also highlighted the nature of the population coming here, with a strong emphasis of retired people over 60 years, and getting towards a third of the population being over 60 years. (T2, 19)

Data from the Australian Bureau of Statistics supports this evidence. The Northern Rivers region has a much higher percentage of population over 60 years old (0.6%) compared to Sydney and the State average. It also has a higher population of younger people under 15 years of age.

The following table summarises this demographic breakdown.

Table 26: Age Distribution - Northern Rivers, Sydney, New South Wales

Region	- 15 yrs	15-59 yrs	+ 60 yrs	Combined - 15 / +60 yrs
Northern Rivers	22.7%	56.7%	20.6%	43.3%
Sydney	20.4%	64.2%	15.4%	35.8%
New South Wales	21.4%	62.1%	16.5%	37.9%

The submission of the Lismore City Council Public Transport Advisory Panel noted that the combination of many young and older residents translated into high rail usage patterns:

> ... the travel patterns for residents of the Northern Rivers region due to family links and migration patterns of both young families and retirees to the North of the State create the need for travel to Sydney at high levels of patronage. (S15, 1)

This migration of many families and older people from Sydney and Brisbane to the North Coast has resulted in strong travel patterns with the capitals:

Dr Weatherby outlined the situation with regard to Sydney:

> ... there are strong links from the Northern Rivers region to Sydney: firstly, obviously, because it is the State capital, but also because a lot of migration has occurred and there are a lot of family ties, with a lot of people having to go south to Sydney for various reasons, such as health care and so forth. So there is a lot of travel in that region. (T2, 11)

Mr Spragg explained the reason for links with Brisbane and the need for better transport infrastructure in the corridor:

> The more immediate need that we see is a more local and regional link to the North Coast towns and to the Gold Coast, because we are functionally part of the Gold Coast accommodation really, and we need better links for employment and entertainment purposes, and to allow people from Brisbane and the Gold Coast to come down here and enjoy our area for recreation. At the moment, they are restricted to using the highway... (T2, 21)

Rail is the natural transport mode for this large proportion of the population if services and journey times are competitive. For example, Mr Spragg noted the very high cost of air travel in comparison with rail:

> You have already had a description of the cost of the alternative transport, which is air transport, at $250 return on 21 days notice; but, if you do not give 21 days notice, it is $600 return. (T2, 21)

Mr Spragg also identified driver fatigue as a major cause of road accidents on the Sydney-North Coast route and offered rail as a safer alternative:

> There is a similar time for private car journey or coach journey, with an emphasis on safety and trying to reduce road trauma. I do not think we are doing that by forcing people to use their cars when they go to Sydney. It is a 12 to 13 hour drive, and fatigue sets in, and a lot of the "accidents" that happen are not really accidents; they are the inevitable results of people trying to drive too far over too long a time. We do need alternatives to that, and I think we should upgrade the best alternative, which is your rail service. (T2, 21)

Clearly, North Coast demographics lend themselves to enhanced rail services. This is a population growth corridor where rail has a natural advantage over road if travel times are competitive.

The Committee examined the state of the track network to the North Coast and the standard of services.

5.2.2 Current State of Track

The existing North Coast Line north of Coffs Harbour and the Casino-Murwillumbah Branch Line were constructed during the late 19th and early 20th centuries.

Existing alignments severely impede the operation of mainline express passenger trains. For example, the line between Coffs Harbour and Border Loop (on the Queensland border) has significant speed restrictions because cost constraints necessitated the construction of a very circuitous path to create acceptable ruling grades without extensive tunnelling.

These geometric and geographical constraints limit operating speeds and the effectiveness of isolated track upgradings. The most circuitous routings are Casino-Murwillumbah in New South Wales and Wiangaree-Glenapp in Queensland.

Journey time for existing XPT services from Sydney-Brisbane is 13 hr 36 min (989 km) and Sydney-Murwillumbah 13 hr 25 min (935 km). Average speed to Brisbane is 73 and 70 km/h to Murwillumbah. The section between Coffs Harbour and Murwillumbah is particularly bad, averaging 65 km/h and taking 5 hours to travel 327 km.

On suitable track, the XPT could achieve an operating speed of 160 km/h, thus halving journey times.

Such operational speeds would require track infrastructure to be upgraded to Class 1XC standard. The existing North Coast Line is rated as Class 1 (except for a short section of Class 1XC between Maitland and Telarah). The Casino-Murwillumbah branch is rated Class 2.

Unfortunately, there have been very limited track upgrades on the North Coast Line.

Many sections of the North Coast Line involve tight-radius, reversing curves (ie. with no length of straight track between curves). Indeed, many curves fall between 240-300 metre radius north of Coffs Harbour, well short of the recommended 1-in-800 radius for a Fast Freight Train Standard. In total, the North Coast Line from Maitland to Brisbane contains 780 km of track of which 347 km (or 44%) is on curves of radius less than 800 metres.

There are 17.8 km of track between Grafton and Acacia Ridge with tight curves and steep grades.

South of Grafton, tight curvature is the most pressing concern. Near Tamban (north of Kempsey), a total of 9.6 km of track with 300 metre curves should be eliminated. This would cost about $10 million.

A major 26 kilometre diversion of Johns River, north of Taree, would eliminate tight curves and save seven kilometres. A Taree bypass is also worth consideration.

Table 27: Maitland-Acacia Ridge (Brisbane) - Sections of Steep Grade & Tight Curves

Section	Length	Grades more 1:66	Curves less than 800 m	Steep &Tight	Steep or Tight
Maitland-Taree	186.2	0	96.8	0	96.8
Taree-Kempsey	125.1	0	46.6	0	46.6
Kempsey-Grafton	195.1	0	94.1	0	94.1
Grafton-Border Loop	176.2	25.6	73.8	13.4	86.0
Border Loop-Acacia Ridge	99.3	17.9	34.2	4.4	47.7
Total	781.9	43.5	345.6	17.8	371.3

In the following section, the Committee examines a minimal program of infrastructure upgrades to improve journey times including an assessment of two deviations funded by the One Nation program.

5.2.3 Option 1: Minimal Track Upgrades to Existing Route

The most practical option for improving rail corridors is usually to concentrate investment on realignments to the existing track network. This is normally the most cost effective and convenient option.

The Committee examined its feasibility.

On the North Coast, there is a total of 17.8 km of track that is both poorly aligned and has steep grades, which could be eliminated for an investment of about $60 million according to indicative data provided to the Committee. The location of these sections of track is outlined in the following table.

Table 28: North Coast Line - Proposed Rail Infrastructure Upgrading Program

Km from Sydney	Location	Length (km)
704.6 - 724.7	7 isolated short sections north of Grafton	2.8
730.5 - 733.2	Gurraang (Little Lawrence)	1.6
734.2 - 737.7	Lawrence Road (COMPLETED)	2.4
741.5 - 771.00	5 isolated short sections	2.4
777.6 - 780.8	Rappville (COMPLETED)	1.6
782.1 - 786.8	2 short sections near Coombell	0.5
824.5 - 832.7	2 short sections Casino - Kyogle	2.1
885.5 - 970.3	11 isolated short sections Border Loop - Acacia Ridge	4.4
TOTAL		**17.8**

The One Nation program provided the first investment in the Sydney-Brisbane corridor for some time. A total of $55 million was invested in bridge replacements, more crossing loops, resleepering and two important new track deviations.

Table 29: Sydney-Brisbane - One Nation Projects

Project	Funding ($m)
31 replacement bridges	17.80
Crossing loops	25.10
Lawrence Rd / Rappsville deviations	12.30
Reconstruction Works	3.10
Resleepering	20.00
Other	7.00
Total	**55.90**

The package of One Nation infrastructure projects included construction of two deviations on the North Coast Line. The Lawrence Road and Rappville deviations removed 4.4 km of the worst sections of track north of Grafton at a cost of $13 million. These deviations will produce a net saving of about five minutes in travel time and 90 litres of fuel per locomotive as well as reduced maintenance costs.

The remaining 13.8 km would cost up to $45 million (given a rate of about $3 million per km).

The RAC has also identified 12 bypasses which would relieve congestion in the corridor:

> **Mr RIXON:** You mentioned earlier that you had a program of installing bypasses on the north coast line. How far have you progressed with that?
> **Mr ALCHIN:** Quite some way. In conjunction with our freight customer we have identified a series of 12 potential locations. We have been in discussion with that customer about five locations in particular, and latterly a sixth one in terms of a detailed design and cost of those and commercial arrangements for funding.
> **Mr RIXON:** How many have you actually built?
> **Mr ALCHIN:** To date, of those 12, none. We are just finalising the commercial arrangements.
> **Mr RIXON:** You are not including the ones that you have already done north of Casino.
> **Mr ALCHIN:** No, these are new. (T1, 13)

The Committee supports infrastructure upgrades on the Sydney-Brisbane corridor as long as they form part of a comprehensive strategy to improve alignment and journey times, rather than reflecting a piecemeal approach. For example, it is almost counter-productive to relieve congestion on the corridor with by-passes when poor transit times are also the product of poor track alignment.

The same argument could be levelled against upgrading works on poorly aligned track on the north coast. As the Committee discussed earlier in this Report, investment in concrete sleepers or new bridges on such tracks entrenches the existing alignment when planning should be directed at replacing these routes.

Clearly, the problems of the existing track alignment in North Coast New South Wales are so serious that investment may be better targeted in developing a new corridor.

The Committee considered the option of a new coastal route and the possibility of links with the Queensland Tilt Train.

5.2.4 Option 2: New Coastal Route

Serious problems with improving the existing corridor have encouraged planners to seek new routes for the Sydney-Brisbane rail service. In addition, the existing Casino-Murwillumbah Branch Line is poorly placed to service coastal growth centres. Direct rail access to the coast is limited to Byron Bay.

Two options are being canvassed:

- A major new coastal route from Coffs Harbour to Coolangatta (with a possible inland diversion to Grafton)
- A truncated coastal route to Coolangatta beginning at Brunswick Heads on the Casino-Murwillumbah Branch Line (and bypassing Murwillumbah).

The possible extension of the existing Murwillumbah Branch Line to Coolangatta is considered in the next section.

A report commissioned by the New South Wales Department of Transport titled "Public Transport in the Northern Rivers: A Strategic Review" by ODB Consulting (Sydney, 1996) proposed the following extension:

> ... to use the existing Casino-Murwillumbah rail line as far as Brunswick Heads then share a new alignment with a possible coastal route for the Pacific Highway to Tweed Heads. (S16, 2)

The Brunswick Heads option would involve a direct link with Coolangatta along burgeoning coastal routes rather than the current system which cuts back inland to Murwillumbah.

A far more ambitious scheme is to replace the existing corridor at Coffs Harbour with a dedicated coastal rail line which would shadow the coastline from Corindi to the east of Maclean then join the Pacific Highway corridor until Ballina, where it would return to the coast until it picked up the existing Casino-Murwillumbah Branch Line at Byron Bay. A further coastal segment would be added from Brunswick Heads to Coolangatta.

A new coastal route north from Coffs Harbour would:

- Tap high growth centres
- Avoid the geographical barrier presented by mountainous terrain on the North Coast
- Offer an alignment conducive to high speed passenger trains such as a link with the Queensland tilt train in the event of extension to Coolangatta
- Possibly provide a cheaper alternative to track deviations and upgrades (including costly land resumptions) along the existing line.

The problem with the coastal route is that it by-passes major inland centres such as Grafton, Casino and Lismore.

Grafton could be accessed by the new route without significant time penalties. This would require the route to be rerouted to Grafton via the Bucca Creek Valley and Glenreagh. North of Grafton, the line would return to the coastal route via Dilkoon and Tabbimoble.

The submission of the Public Transport Development Project (Social Development Council of Lismore) supported the coastal route on a number of grounds:

- The advantages of a tilt train services would be available to residents of the fastest growing part of the state outside of Sydney
- The patronage potential of the new alignment would be further enhanced by continuing the route through the Gold Coast and onto Brisbane
- The new alignment would also enhance the attractiveness of other rail services such as the

Great South Pacific Express from Sydney to Kurunda currently under construction; a joint venture of Queensland Rail and Venice-Simplon Orient Express. This service is designed to switch bogies at Brisbane from narrow to standard gauge and follow the inland route south

- If a coastal route were developed the tourist destinations of the Gold Coast and Byron Bay could also become features of the service thus enhancing the tourist industry in these areas and economic development in the Northern Rivers in particular.
- The new alignment would also mean the growing market of Southeast Queensland would become more accessible to rail freight services from New South Wales and help reduce the negative impact of road based freight through the Northern Rivers region. (S16, 2)

A coastal route would in part run parallel to the RTA's proposed upgrade of the Pacific Highway.

It is too early in the development process to give preference to either of the options outlined in this section.

However, the Committee does believe that coastal routes which link with the Queensland Tilt Train have immediate appeal as a means of improving track alignment, accessing better trains and therefore reducing travel times.

The possible extension of this coastal route to link with the Queensland Tilt Train is considered in the next section along with a more simple proposal to extend the existing branch line to Coolangatta.

5.2.5 Linking with the Queensland Tilt Train

The North Coast Line could be linked with the Queensland Tilt Train - if the service was extended to Coolangatta - by either of two methods:

- Creating a new coastal route (by-passing Murwillumbah altogether) or
- Extending the Murwillumbah Branch line to Coolangatta.

The potential for a new coastal route either to Brunswick Heads or Coffs Harbour (with possible inclusion of Grafton) was considered in the previous section.

The extension of the existing Murwillumbah Branch line is promoted as a cost efficient option for linking rail services with Queensland. The Queensland gauge line to Nerang and Robina has been engineered to standard gauge clearances and design specifications. An extension to the Coolangatta Airport and Tweed region is probable. This line is capable of handling 140 km/h tilt trains. The Queensland Tilt Train has already been trialed to Nerang (behind Southport and Surfers Paradise). The Murwillumbah branch line is standard gauge and returns from Murwillumbah via Mullumbimby, Byron Bay, Lismore to Casino, where it links with the North Coast Line. There is current minor upgrading on this line including the replacement of wooden trestle bridges with concrete structures.

Extension of the Murwillumbah Branch Line to Coolangatta would require:

- Construction of a link between the Murwillumbah branch line and the Gold Coast rail line
- Dual gauging of the Gold Coast rail line
- Electrification of the Murwillumbah branch line
- Regauging of Queensland Tilt Trains.

The evidence of Dr Weatherby was that the missing link between Murwillumbah and the Queensland border was only of the order of 20-50 kilometres:

> **Mr HUMPHERSON:** Dr Weatherby, first of all, how long is the missing link from Murwillumbah to Brisbane?
> **Dr WEATHERBY:** The existing missing link is about 50 kilometres, from memory. That is if it is Robina. As you have heard, Queensland Rail has now on the wall outside this room the route planning for potential extension as far as Coolangatta airport. So I would suspect that that will occur. So we are looking at a distance of about 20 kilometres or so through to just before Murwillumbah. In fact, the old line as far as the Condong sugar mill is still in place. That couple of extra kilometres past Murwillumbah would need a bit of reconditioning, but the gap is not all that large. There is a river in the way, so there is a fairly large bridge to build. It is not just flat land; there are some major geographical features that have to be overcome. (T2, 13)

The total cost of the link with Coolangatta and some track realignment was assessed at $1 billion by Dr Weatherby with the pay-off being reduced travel times of the order of 3-4 hours without a tilt train:

> **Ms BEAMER:** You spoke about the kilometres of railway line that were upgraded between Brisbane and Rockhampton. It costs an exorbitant amount of money to do only a few kilometres of track upgrading. You said that about 50% of the line between Sydney and this area would need realignment.
> **Dr WEATHERBY:** Yes, it is a lot.
> **Ms BEAMER:** Have you any idea what the cost of that would be?
> **Dr WEATHERBY:** It would be about $1 billion to have a reasonable standard rail link between Sydney and Brisbane, which of course would enable this area and the Gold Coast to be served via the Murwillumbah branch.
> **Ms BEAMER:** What would you end up with as the travelling time?
> **Dr WEATHERBY:** You would probably take three or four hours off the journey, which would start to make it quite a reasonable transit time. If you were then able to have some reasonable curves and tilt train technology - and you have heard that that increases the operating speed for a curve - on passenger trains, if you have the right path, you can have quite a significant decrease in travel times. (T2, 15-6)

The Committee examined Mr Ross Hunter, General Manager, Project Services, Queensland Rail, about coordinated studies by Queensland and New South Wales authorities on the possible extension of the Queensland Tilt Train to Nerang, Coolangatta and New South Wales:

> **Mr SULLIVAN:** In terms of the Gold Coast line that you are now constructing, and the branch line that goes along the coast from the main north line in New South Wales, has there been any consideration by Queensland Rail regarding working towards a link-up?
> **Mr HUNTER:** It was a political direction in the late eighties to investigate that. Queensland Rail, in conjunction with State Rail, did a number of studies looking at route identification, likely cost, and the operational issues. That was divided into Robina to Murwillumbah, and then State Rail did a study of Murwillumbah back to Casino as to what was needed to upgrade the line there. Then we looked at Robina and north to Brisbane, and looked at various options about whether that railway might be a narrow gauge commuter line, or whether it is dual gauge.
>
> There were a number of options where you might integrate the two systems. Reports were done on that and given to both governments. That was in abeyance for a number of years, and it has now been reactivated, looking at a passenger line south of Robina, whether it goes to Coolangatta or into Murwillumbah. Queensland Rail is not leading that; Queensland Transport is the planning body now in Queensland for passenger infrastructure and transport infrastructure. (T2, 10)

The extension of the Murwillumbah Branch Line to Coolangatta may be the easiest option in terms of creating a possible link with the Queensland Tilt Train.

However, the Committee questions if there would be any real benefits in such a link if the existing corridor remained. It is one of the worst stretches of track in New South Wales with steep grades and poor alignment.

The premise that travel times would be substantially reduced by tilt trains needs to be expertly assessed against the costs and benefits of a coastal route.

5.2.6 Option 3: Inland Railway

A more radical scheme is to augment the existing Sydney-Brisbane corridor with a new inland route from Melbourne to Brisbane through regional New South Wales along the basic alignment of the Newell Highway. It would by-pass Sydney and Newcastle. The corridor would be primarily used by freight traffic, relieving congestion on existing lines and removing the time consuming passage of freight through Sydney.

In 1995, Queensland Rail proposed an inland standard gauge freight railway between Brisbane and Melbourne using existing lines for most of its length with some complementary investment in connecting lines, particularly to link with Sydney.

Segments of acceptable track exist already. The cost of links between them would be minimised because of the lack of urban areas, easier and cheaper land resumption and the relative flatness of the topography.

Associate Professor Philip Laird outlined a possible route for the Melbourne-Brisbane corridor:

> **A/Professor LAIRD:** ... a lot more could be done on that line and it is an open question whether to build a completely new coastal line, upgrade the existing line or look seriously at an inland Melbourne-Brisbane route with a new tunnel under the Liverpool Ranges.
> **Mr SULLIVAN:** You are talking about the original Sydney-Brisbane line which went through the New England?
> **A/Professor LAIRD:** No, further west through Narrabri and Moree. To go through Armidale there is some very high country more than 1,000 metres tall. But a little further west of the Great Dividing Range is easy country.
> **CHAIRMAN:** What about the Nandewar Range near Narrabri?
> **A/Professor LAIRD:** There are some hills there but basically most Melbourne-Brisbane freight moves along the Newell Highway in less than 24 hours because it is a relatively direct and generally easy topography. To bring it through Sydney by rail the freight has to cross the Great Dividing Range once in Victoria, then again the other side of Goulburn, then wander through Sydney and up the north coast.

The route of the proposed inland railway from Melbourne-Brisbane is contained in the maps at the end of this Report.

From Brisbane, the proposed route travelled west to Toowoomba then turned south through Millmerran until it connected with New South Wales standard gauge track near Boggabilla, east of Goondiwindi. The route then followed the existing route via Moree to Bellata. A new line would be built from Bellata to Coonamble via Wee Waa. The existing line from Coonamble would complete the railway to Melbourne via Dubbo, Parkes, Cootamundra and Albury-Wodonga.

The following links with Sydney would be maintained:

- Sydney-Narrabri-Bellata (via Werris Creek, Maitland and Newcastle)
- Sydney-Cootamundra (via Moss Vale and Goulburn)
- Sydney-Parkes.

Two options were proposed:

- Basic option in which trains would travel at 100 km/h on existing lines
- Enhanced option in which upgrading works would enable them to travel at 115 km/h on existing lines.

New sections of track would be constructed to a standard capable of carrying interstate freight trains at 115 km/h using existing rolling stock.

The track distance between Melbourne and Brisbane would be cut by 182 km under the proposal from 1940 km to 1758 km.

The project would cost $1 269 million for the basic option. Only $5 million of this amount would be required for links with Sydney. The enhanced option would cost an additional $189 million: a total of $1 458 million.

Improvement in journey times and operating costs are contained in the following table:

Table 30: Proposed Melbourne-Brisbane Inland Corridor - Costs and Time Savings

	Current Route		**Basic Option**		**Enhanced Option**	
Link	Time (hrs)	Cost ($)	Time (hrs)	Cost ($)	Time (hrs)	Cost ($)
Bris-Melb	33	23.16	23	17.56	21.85	17.30
Bris-Syd	19	12.73	18	13.82	17.60	13.11
Bris-Adel	54	36.08	45	23.38	35	22.90
Bris-Perth	87	66.57	78	46.57	69	45.63
Syd-Melb	14	11.38	13.75	11.40	13.75	11.40

Note: Cost is $ per tonne Source: Queensland Rail, 1995

The primary advantage for New South Wales services in general would be the creation of an inland alternative to the current coastal route, reducing congestion on that line and consequent time delays.

The inland route would reduce Sydney-Brisbane freight times by about one hour by avoiding the poor track alignment on the North Coast but the journey would be 168 km longer. This would increase operating costs by about 9 per cent.

There would also be an impact on freight volumes. Dr Weatherby informed the Committee that double-stacking containers would become possible for the first time on an inland railway:

> The other issue of course for freight would be the clearance problems. Most rail operators now like the idea of double stacking of containers. To reorganise the North Coast line for double stacking would basically mean to rebuild it because of the number of tunnels and bridges involved. (T2, 14)

Sydney-Melbourne services would benefit from increased reliability and reduced congestion in the Sydney area, even though times and costs would not change.

As for the impact on regional development, the BTCE released a Working Paper on the "Economic Effects of a Brisbane-Melbourne Inland Railway" in 1996. The Paper examined the social costs and benefits of this project in terms of its capacity to stimulate regional economies in Northern New South Wales and southern Queensland.

The BTCE found that agricultural producers in northern New South Wales would benefit from direct access to the Port of Brisbane, rather than having to use more distant New South Wales ports. Freight costs for farm commodities would be reduced.

However, the scale of direct benefits was disappointing with only a 3% reduction in transport costs per tonne. As transport accounts for only 10-12% of production costs, the actual benefit was considered marginal by the BTCE for an investment of well over $1 billion.

There was also limited opportunity for increased agricultural production or direct competition with road transport. Benefits would be mainly directed towards producers who already used rail.

The key finding of the BTCE was that:

> ... the proposed inland railway emerges as an investment of uncertain economic merit for implementation in the near future. (xiv)

The BTCE also questioned whether the "inland railway makes more economic sense than the enhanced coastal investment option" (57).

There seems to be no clear-cut rationale for an inland railway at this time.

Such an option should be considered in the context of a complete review of rail services along the crucial eastern corridor involving Melbourne-Sydney-Brisbane.

5.2.7 Comments

There are significant economic and social benefits to be gained by track improvements on the Sydney-Brisbane corridor.

The Committee takes particular notice of the warnings of the BTCE that "transit times, reliability and costs are so poor that the corridor may not survive as a commercial freight alternative unless improvements are implemented" (p.63).

This is a very strong warning.

The collapse of the rail freight industry on this corridor would have dramatic repercussions for rail passenger services.

Action must be taken as a national priority. This corridor must be the first priority of the National Land Transport Commission.

However, selecting the right option for the North Coast corridor is a difficult task.

The changing demographics of the North Coast - especially migration to coastal areas not currently served by rail - mean that careful consideration has to be given to each of the options considered in this section.

The Committee believes that a complete CBA of all the options needs to take place prior to any final decision about project development. The benefits of decreased road traffic must be quantified in this analysis particularly the following factors: reduced fuel consumption; reduced pollution and car emissions; and fewer accidents and fatalities.

5.3 The Sydney-Melbourne Corridor

The Sydney-Melbourne rail corridor is the busiest and most congested in Australia, serving the two major cities with a combined population over 7 million people. The track system is severely hampered by steep grades, sharp curves and low clearances, all of which combine to render it uncompetitive with road transport on modern highway infrastructure.

Intercity land freight fell from 57% of market share in 1964-65 to 23% in 1985-86; although it has now stabilised and grown slowly. There are an average of 15 freight trains operating on the corridor per day with 10 of those trains travelling between Sydney-Melbourne. A total of 7.5 million tonnes of freight was moved in 1995-96 (this figure is based on distance weighted averages), of which 5.1 million tonnes travelled the entire length of the corridor. The freight volume is estimated to grow to 11.4 million tonnes by 2014-15, an increase of 52 per cent. The annual average growth rate is 2.4%, which is the highest rate of any rail corridor over the next twenty years.

It is possible that services in the corridor will be affected by the proposed Sydney-Canberra VHST, depending on the successful bid. For example, Speedrail's proposal to build what is basically a dedicated corridor from Canberra to Campbelltown would decrease use of the existing corridor, providing a particular benefit to freight services. Alternately, proposals using the existing track system may increase disruption to extant services. The most feasible track deviation from Menangle-Mittagong forms part of the proposed VHST corridor. The Committee heard evidence of its benefits from Associate Professor Laird:

> **CHAIRMAN:** This morning the representative from the Rail Access Corporation, Mr Alchin, referred to deviations, and you just mentioned them. Mr Alchin suggested that rather than concentrating on rolling stock, deviations should be carefully considered as a way of substantially improving the train service, especially on the Sydney to Albury line. What is your view on that?
> **A/Professor LAIRD:** I concur. Rail deviations are long overdue. For the main south line, the most inviting deviation would be from Menangle to Mittagong.... When completed it could save in the order of 18 kilometres of track. You would not only reduce the point-to-point distance but have easier grades and curves. Track maintenance would be reduced,

> as would locomotive and rolling stock maintenance because the brakes would not be used so much. (T1, 31-2)

In addition to this potential deviation, there are substantial track improvements which could be undertaken to ease curves and grades.

The corridor is approximately 960 km long with the New South Wales sector accounting for 646 km of the route. The current XPT service takes over ten hours. Major stops include Goulburn, Yass, Junee, Wagga Wagga and Albury before the Victorian border. There is double track from Chullora to Junee in New South Wales and single track over the remainder of the route. Crossing loops are up to 900 m in length spaced at 20 minutes of sectional running time. There is a major clearance constraint of 4.1 metres.

The track system is in poor condition. The BTCE ranked the Sydney-Melbourne corridor at only 60% of world's best standard in 1995/96. It considered that this rating would deteriorate to 50% over twenty years to 2014-15 if investment was not forthcoming. The upgrading of the corridor to Fast Freight Train (FFT) Standards is a worthwhile goal. However, it would require a systematic program of track improvements and genuine, ongoing commitment to investment by the Commonwealth Government.

Some remedial works have been completed through the One Nation program. One Nation provided $40.9 million for works such as the Bethungra spiral between Cootamundra-Junee, which was relaid in 60 kg rail on concrete sleepers. The allocation of One Nation funding to the Sydney-Melbourne corridor is contained in the table below.

Table 31: Sydney-Melbourne Corridor - One Nation Projects

Project	**Funding ($m)**
Crossing loops	0.90
Bridge replacement	13.70
Bethungra Spiral rectification	5.60
Bridge rehabilitation	2.10
Track upgrading	2.80
Rerailing	13.20
Other	2.60
TOTAL	**40.90**

Further investment was made available through the One Nation program to raise speeds and axle loads in the Victorian sector through re-railing and reballasting the track.

Unfortunately, Associate Professor Philip Laird reported to the Committee that many of these works remained incomplete in Victoria:

> ... some sections of standard gauge track in Victoria have old worn out wooden sleepers, whilst concrete sleepers have sat in piles by the track since early 1995. Also in Victoria, the Melbourne-Albury standard gauge track for most of its length is in need of rerailing and resleepering, or rationalising with the adjacent broad gauge track. (S7, 6)

The problem of individual State jurisdictions possessing conflicting policies which hamper national rail development is well demonstrated by this outcome.

However, there are serious problems with the track network in New South Wales which demand a systematic program of targeted track improvements. The New South Wales regional sector from Glenlee (south of Campbelltown) to Albury has steep ruling grades and many curves. In total, there are 61 km of track with ruling grades steeper than 1:66, which restricts locomotive haul loads. The Goulburn-Junee sector contains about 48 km of this total. There are also 139 km of track with curves less than 800m radius. Of this amount, 92 km is less than 600m radius. Remarkably, the current track network is much worse than the original track system laid down in 1867, which contained no curves beneath 600m.

Associate Professor Laird explained the reasons for poor curvature to the Committee and outlined how cost effective improvements could be completed:

> **A/Professor LAIRD:** ... The grades that were being laid down by John Whitton in the 1870s, of one in 40, were found to be a bit steep. So they eased the grades, but they added many more miles of tight-radius curvature. It did not bother steam trains, but today these tight-radius curves just get in the way of the modern high-powered diesel electric locomotive. Computer simulation done for the university a few years ago showed that what is between Goulburn and Yass today is far worse than what was built in the 19th century. It is not only longer in distance but it uses more time and more fuel. If we were to... go along this old alignment and just ease the grades and the curves that he built in the 19th century a little more, we would save half an hour off Goulburn to Yass transit times and 25% fuel use. We would also cut track maintenance costs a lot, and we would reduce congestion....
> **Mr RIXON:** Just in that distance?
> **A/Professor LAIRD:** Yes, about 90 kilometres. The whole thing would cost in the order of $100 million to bring it up to fast freight train standards, which is 20% of the Federal Government's outlay on the Hume Highway over the last 10 years between Goulburn and Yass and the bypass. (T1, 29-30)

Once again, the disparity in road and rail funding is evident.

Table 32 sets out sections of track on the Sydney-Melbourne corridor with alignment and/or grade

problems.

Table 32: Sydney-Melbourne Corridor - Sections of Steep Grades and Tight Curves

Section	Length	Grades more than 1:66	Curves less than 800 m	Steep grades & tight curves
Glenlee-Goulburn	164.9	2.1	49.9	0
Goulburn-Yass	93.1	17.1	30.9	5.5
Yass-Junee	167.5	30.9	56.1	11.5
Junee-Albury	160.7	10.9	2.2	0
Total	**586.2**	**61.0**	**139.0**	**17**

This Table demonstrates that there are 17 km of track on the Sydney-Melbourne corridor in urgent need of upgrading works. They are confined to the Goulburn-Junee section. A breakdown of the actual location of these sectors is contained in Table 33:

Table 33: Sydney-Melbourne Corridor - Priority Sections for Upgrading Works

km from Sydney	Location	Length (km)
Goulburn - Yass		
227.54 - 238.28	4 locations: Goulburn - Breadalbane Plain	0.89
253.17 - 255.74	Cullerin Range	1.14
271.38 - 272.98	Lerida Creek	0.46
278.07 - 281.68	Gunning (2 locations)	1.45
290.93 - 302.82	Jewrrawa (2 locations)	1.54
Yass - Junee		
324.58 - 331.24	Derrigullen & Bowning	1.51
348.44 - 349.29	Illalong Creek	0.64
356.65 - 360.49	Binalong Creek	1.36
374.64 - 378.03	Cunningar	0.92
388.62 - 391.41	Murrumburrah	1.53
395.64 - 402.92	Demondrille/Nubba	2.22
412.56 - 412.82	Morrison's Hill	0.26
431.63 - 439.79	Cootamundra - Frampton	3.13

Submissions to the Committee considered that the quality of data about the Sydney-Melbourne track system was insufficient to allow proper planning of track improvements.

Associate Professor Philip Laird, who assembled much of the data reviewed by the Committee, proposed a comprehensive survey of the New South Wales section of the corridor as the first step:

> That the Sydney-Albury railway line should be aerial-surveyed, mapped and computer formatted with a view to improving knowledge of existing track, and allowing for proper planning of track deviations (minor or major), as appropriate. In addition, land that is likely to be later used for track deviations should be reserved now for such use. (S7, 7)

In tandem with better knowledge about the corridor, Associate Professor Laird proposed that the BTCE should conduct a full CBA of upgrading the corridor to Fast Freight Train standards with 1:66 minimum ruling grades, no curve tighter than 800 metres and clearance for double-stacked containers.

The following options were also proposed for impact assessment in the CBA:

- Modern high voltage electrification
- Inclusion of all Melbourne-Brisbane freight
- Diversion of all East-West (Perth/Adelaide - Sydney/Brisbane) interstate freight from haulage through Broken Hill to Melbourne
- Minor improvements to ease 1 in 40 grades to 1 in 50/55 grades, selected tight radius curves, and allow one-and-a-half container stacking in well wagons
- Potential benefits for passenger train operations, including the use of tilt trains.

The CBA would use two methodologies:

- Commercial rates of return only
- A full assessment encompassing improved passenger train operations, reduced road maintenance, reduced demand for new road construction, improved road safety, reduced road congestion (with improved road travel times) and reduced energy use (for both existing rail transport and road freight diverted to rail) with subsequent reduced air pollution and Greenhouse gas emissions. (S7, 7)

There is consensus amongst stakeholders and experts that the Sydney-Melbourne corridor requires significant infrastructure investment prior to any decision to introduce new forms of rolling stock such as a tilt train.

The BTCE ranked the corridor at only 60% of world's best standard with the ominous warning that it would slip to 50% by 2014/15. Its Working Paper, "Adequacy of Transport Infrastructure: Rail," concluded that "the Sydney to Melbourne rail corridor is a prime candidate for infrastructure investment" (59).

The National Transport Planning Taskforce subsequently proposed investment of almost $1 billion on this corridor in January 1995.. Less ambitiously, National Rail proposed approximately $330 million of targeted investment in the corridor in 1995 to continue the work of the One Nation program.

The Committee's role in this report is not to identify and prioritise specific locations for track improvements or to recommend funding levels.

Clearly, there is a need for more detailed, technical information about this corridor so that an informed judgment can be made about exactly what is required to provide the groundwork for faster passenger and freight train services.

Equally, the disparity in investment between New South Wales and Victoria must be addressed so that funding can be delivered with confidence that the entire corridor is being improved. In this regard, the need for a single national body to control the interstate track system is epitomised by the problems of the Sydney-Melbourne corridor.

Properly mapping the Sydney-Melbourne corridor, developing a long-term program of track improvements and conducting CBAs to prioritise these works should be a priority with Commonwealth funding of $250 million over 4 years in the 1998 Budget.

Findings and Recommendations

13. **The New South Wales Minister for Roads and Minister for Transport to direct that preparatory planning commence immediately for track improvements to major New South Wales corridors, prior to the establishment of a National Land Transport Commission. New South Wales sections of the Sydney-Melbourne and Sydney-Brisbane railway corridors should be aerial-surveyed, mapped and computer-formatted to improve knowledge of existing track alignments and allow for proper planning of track deviations.**

14. **A full Cost-Benefit Analysis (CBA) of upgrading the Sydney-Melbourne and Sydney-Brisbane corridors to Fast Freight Train (FFT) standards with 1:66 minimum ruling grades, no curve tighter than 800 metres and clearance for double-stacked containers.**

    The following factors should be assessed in the CBA:

    - **Modern high voltage electrification**
    - **All options for the New South Wales North Coast corridor**
    - **Inclusion of all Melbourne-Brisbane freight**
    - **Diversion of all East-West (Perth/Adelaide to Sydney/Brisbane) interstate freight from haulage through Broken Hill to Melbourne**
    - **Minor improvements to enable one-and-a-half container stacking**
    - **Potential benefits for passenger train operations, including the use of tilt and other fast train technologies.**

    The CBA should use two methodologies:

    - **Commercial rates of return only**
    - **A full assessment of improved passenger train operations, reduced road maintenance costs, reduced demand for new road construction, improved road safety, reduced road congestion (including the benefit of improved road travel times) and reduced energy use (for both existing rail transport and road freight diverted to rail) with subsequent reduction in air pollution and greenhouse gas emissions.**

    The Committee considers that the BTCE (now the Bureau of Transport Economics) should be commissioned with this task by the New South Wales Minister for Roads and Minister for Transport.

Appendix 1: Worldwide Review of Tilt Train Operations

There are now many examples of the successful use of tilt trains around the world with plans for their future adoption announced regularly. The technology underpinning tilting train operations is now considered mature from an operational perspective. The key to success is route-specific tuning of the hardware and software.

A brief review of the actual or planned use of tilt trains around the world follows.

Spain
In the 1970's development of the first tilting trains took place with one prototype each for Italian Railways (FS) and Spanish National Railways (Renfe).

The Talgo company, which was formed in Madrid, Spain, now has trains running throughout Europe and in the north-west of the USA from Portland up to Vancouver in Canada.

The key difference between the Talgo Pendular tilt train and that of other manufacturers is that it is a 'passive' as distinct from an 'active' tilt train. It employs natural gravitational forces to reduce the centripetal forces acting on the passenger when the train moves through a curve. The major benefit of this is that there is substantially less that can go wrong with a passive system.

Spain has had tilting Talgo trains operating on its broad gauge line between Madrid and Seville since about 1987.

More recently, it has built an *Alta Velocidad* network of high-speed standard European gauge lines over which both TGV-style trains (300 kph maximum) and tilting dual gauge Talgo trains (220 kph maximum) can operate. Tilt trains have extended operations beyond the purpose-built, high-speed line in place.

Italy
Fiat Ferroviaria, Italy, is perhaps considered the most successful international supplier of tilting train bogies and equipment. It started theoretical and system studies for its Pendolino trains in 1967.

Fiat Ferroviaria has now built third-generation trains for Italian Railways (FS) and cross-border services between Italy and Switzerland. It has supplied tilting systems in Germany, Finland and the Czech Republic.

Both the second generation ETR 450 and the newer, third generation ETR 460 Pendolino trains are used to operate high-speed intercity services on Italian main lines.

Germany
The Italian Pendolino technology was adopted in 1992 by German Rail (DB) for the VT 610 diesel multiples units, which have been used with great success on the Nuremburg-Hof and Nuremburg-Bayreuth services in Bavaria, and now for the Inter Regio Electric Multiple Units.

Both the ETR 460 and the VT 610 have enabled journey time reductions of between 25-30% on substantially existing corridor alignments. Patronage levels have increased by 15-20%.

DB has also introduced four locomotive-hauled InterCity trains, using Talgo passive tilt technology specifically to improve comfort. They operate on the Berlin-Bonn and Berlin-Munich sleeper services. Orders have been placed for a further two InterCityNight trains for a Hamburg-Munich service.

Diesel VT 611 tilt trains using Adtranz technology have more recently been introduced on regional services radiating from the Rhine Valley (Baden Wurttemberg and Rhineland Palatinate). After early problems, they were reintroduced in September 1997 and are now operating smoothly at speeds up to 160kph.

Sweden
The ABB X2000 train forms the premium high speed link between Stockholm, Gothenburg and Malmo. Introduction of the train in 1992 resulted in journey times being reduced from 4 hours to 2 hours 55 minutes on the Gothenburg route. Patronage levels have increased by 30% with a sizeable proportion of travellers now choosing rail in preference to air. This train was used in the 1995 trial in New South Wales.

Finland
Finnish Railways (VR) conducted a two year trial of two Fiat S220 Pendolino tilting trainsets on the broad gauge railway between Helsinki and Turku in November 1995. The trial was used to:

- test the reliability of the trains and refine their technical systems; and
- develop the new service concept from a structured program of passenger attitudinal surveys.

The Helsinki-Turku route is mostly single track operation over its route length of 200km. The best train journey time using conventional trains was just under two hours. A 25% reduction to 1 hour 28 minutes is anticipated with tilt trains.

VR has placed an order for eight Pendolino trainsets to be phased in over the period 2000-2002, with an option for an additional 15 sets. The Pendolinos will eventually be introduced on all main rail routes.

Switzerland
Switzerland introduced Fiat Pendolino trains in 1996 on the train services that operate between Milan-Geneva, Milan-Zurich-Stuttgart and Milan-Bern.

Japan
The Shikoku railway is now operated by the Tilting TSE 2000 diesel multiple unit train, introduced in 1993/94. Journey times have been reduced by thirty per cent with an associated increased in patronage of approximately twenty per cent.

USA
Tilting Talgo trains have been operating for about five years in the North Western

corridor between Portland-Seattle-Vancouver.

Tilt train operations are planned for the North Eastern Corridor between Boston and Washington using TGV tilting trains. This follows one year trial of the X2000 tilt train during which a passenger revenue service operated between Washington and New York. The trial involved thorough assessment of the suitability of the technology, potential marketability and the interface with existing infrastructure.

Australia

Queensland Railways (QR) awarded a contract to Evans Deakin Industries, Hitachi and Itochu to supply two six-car tilting trains for operation on the *Spirit of Capricorn* service between Brisbane and Rockhampton.

The train will reduce current journey time of 9 hours 30 minutes to under 7 hours. It is anticipated that patronage levels will increase by approximately twenty-five per cent.

QR aim to achieve three key business outcomes from introduction of its tilting trains:

- to compete successfully against road transport from Brisbane to the tourist destinations of tropical northern Queensland;
- to emphasise the new market-oriented ethos at QR which was converted from a state government-owned enterprise into a corporation in mid-1995; and
- to open up new markets for tilting train contracts in Australia and South-East Asia.

UK

Two private railway operators in the UK have plans to introduce tilt trains by 2000. Virgin Trains intends operating tilt trains on the West Coast main line between London and Glasgow. Great Northern Eastern Railways intends operating tilt trains between London and Glasgow via Edinburgh (a 650-700 km length journey). The fastest journey time is currently 4 hours 20 minutes which will be reduced to around 3 hours 30 minutes (20% reduction).

Czech Republic

The Czech Republic placed an order with Fiat in early 1997 for Pendolino tilt trains which are due for introduction in 1999. These will operate on the very heavily curved route from Berlin-Prague-Vienna, reducing running times from about 6 to 4 hours.

France

The high speed TGV network in France will remain in operation. However, it is unlikely to extended given the costs associated with new purpose-built high speed lines. The French are now looking at tilt trains as an option for the future.

Appendix 2: Indicative Capital Outlays on Road and Rail in New South Wales and Queensland 1986/87 - 1995/96

TABLE 1: INDICATIVE NSW OUTLAYS ON ROAD AND CAPITAL WORKS			
YEAR	NSW ROADS	NSW RAIL	RATIO ROAD TO RAIL
1986-87	794	402	2.0
1987-88	819	393	2.1
1988-89	843	353	2.4
1989-90	985	419	2.4
1990-91	1174	483	2.4
1991-92	1235	511	2.4
1992-93	1385	640	2.2
1993-94	1587	685	2.3
1994-95	1619	678	2.4
1995-96	1673	831	2.0
Source: For total rail capital works to 1995-96, State Rail Annual Reports, then NSW 1997 Budget Papers. For road, from data given in Department of Main Roads and NSW Roads and Traffic Authority Annual Reports, with outlays for 1994-95 and 95-96 being net cash flow from Government.			

TABLE 2B: QUEENSLAND OUTLAYS ON ROAD AND CAPITAL WORKS			
YEAR	ROAD	RAIL	RATIO ROAD TO RAIL
1986-87	297.4	450.9	0.66
1987-88	311.8	443.0	0.70
1988-89	320.0	251.1	1.27
1989-90	325.3	224.9	1.45
1990-91	284.0	218.4	1.30
1991-92	540.0	303.5	1.78
1992-93	766.5	411.3	1.86
1993-94	690.1	635.0	1.09
1994-95	725.2	730.0	0.99
1995-96	899.8	660.0	1.36
Reference: Queensland Government Budget Papers rounded to nearest $0.1 million. The road data from 91-92 includes local roads, toll roads, and blackspot programs. The rail data includes borrowings as well as grants approved by Government but does not include passenger intermodal facilities, or other urban public transport.			

PROCEEDINGS OF THE COMMITTEE

The Proceedings of the Committee includes minutes of all meetings at which the inquiry was considered. These were meetings 35, 36, 38, 39, 44, 47.

Minutes of Meeting No.35 - Tuesday 14 October 1997 at 4.15 pm

1. Members Present

Mr Crittenden (Chairman), Mrs Beamer, Mr Hunter, Mr Price, Mr Rixon, Mr Souris, Mr Stewart, Mr Sullivan, Mr Windsor.

2. Apologies

Mr Humpherson.

3. Confirmation of Minutes

Resolved, on the motion of Mr Price, seconded Mr Sullivan, That the minutes of Meetings 32-34 of 17 April, 16 June and 25 June 1997 be received by the Committee.

4. Report on the National Conference of Parliamentary Public Works and Environment Conferences, Brisbane 1997

The Committee considered the draft report.

Resolved, on the motion of Mr Price, seconded Mr Rixon, That the draft report be the Report of the Committee and that it be signed by the Chairman and presented to the House, together with minutes of meetings and evidence.

Resolved, on the motion of Mr Stewart, seconded by Mr Windsor, That the Chairman and Director be permitted to correct any incidental stylistic or typographical errors that are identified while preparing the Report for printing.

5. Inquiry into the Tilt Train

The Committee considered the Queensland tilt train project in its Report on the National Conference of Parliamentary Public Works and Environment Conferences, Brisbane, 1997.

Resolved, on the motion of Mr Sullivan, seconded Mr Rixon, That the Committee conduct an inquiry into and report on the feasibility of tilt train technology for NSW inter-urban and regional rail services.

6. Regional Centres in Transition

The Committee considered options for a series of new inquiries which would focus on infrastructure priorities in regional NSW to meet the changing economic and employment landscape under the title "Regional Centres in Transition."

Resolved, on the motion of Mr Sullivan, seconded Mr Windsor, That the Committee defer

consideration of "Regional Centres in Transition" until current reports were processed.

7. Proposed Joint Inquiry with Public Bodies Review Committee

The Committee discussed correspondence from the Chairman of the Public Bodies Review Committee (27 June 1997) suggesting the possibility of a joint inquiry on contract tendering analysis by public bodies in NSW.

Mr Sullivan - as a Member of both Committees - outlined progress on this project and suggested that a briefing paper being prepared by the Public Bodies Review Committee be made available to the Committee prior to any decision to proceed.

The Committee discussed the feasibility of addressing the issue of security of payment for subcontractors in such an inquiry and requested that the secretariat prepare a briefing paper for the next meeting.

8. National Conference of Parliamentary Public Works and Environment Committees, Sydney 1998

The Committee discussed conference options including timing, structure and costs.

Resolved, on the motion of Mr Price, seconded Mr Sullivan, That the National Conference of Public Works Committee be held over two days and Environment Conferences be held over one day concurrently in the last week of July 1998, subject to consultation with other Committees.

9. Correspondence

The Committee noted incoming correspondence from the Minister for Urban Affairs and Planning, the Hon Craig Knowles MP, dated 7 July 1997.

The Committee noted outgoing correspondence from the Chairman to the Hon Elisabeth Kirkby MLA (9 May 1997) and the Minister for Urban Affairs and Planning, the Hon Craig Knowles MP (23 July 1997).

Resolved, on the motion of Mr Price, seconded Mrs Beamer, that incoming and outgoing correspondence be noted.

10. Report on NSW School Facilities

Mr Stewart took the Chair due to the Chairman's commitments in the House. The Committee considered the draft report.

Recommendations
Recommendation 5 - agreed to as amended

Resolved, on the motion of Mr Rixon, seconded Mr Price, That the Recommendations be adopted as amended.

Resolved, on the motion of Mr Rixon, seconded Mr Price, That the Executive Summary be adopted.

Resolved, on the motion of Mr Souris, seconded Mr Rixon, That Chapters 1-4 be adopted.

Resolved, on the motion of Mr Price, seconded Mr Rixon, That the draft report be the Report of the Committee and that it be signed by the Chairman and presented to the House, together with minutes of meetings and evidence.

Resolved, on the motion of Mr Price, seconded by Mr Souris, That the Chairman and Director be permitted to correct any incidental stylistic or typographical errors that are identified while preparing the Report for printing.

Resolved, on the motion of Mr Rixon, seconded Mr Sullivan, That the Chairman write to the DSE officers, Mr David Muddiman and Mr David Rowland, on behalf of the Committee thanking them for their assistance during the inquiry and commending them and their staff for their work.

The Committee thanked staff for their work on this inquiry.

Meeting adjourned at 5.45 pm

Minutes of Meeting No.36 - Tuesday 21 October 1997 at 4.30 pm

1. Members Present

Mr Crittenden (Chairman), Mrs Beamer, Mr Hunter, Mr Price, Mr Rixon, Mr Souris, Mr Stewart, Mr Sullivan, Mr Windsor.

2. Apologies

Mr Humpherson.

3. Confirmation of Minutes

Resolved, on the motion of Mrs Beamer, seconded Mr Price, That the minutes of Meeting No.35 of 14 October 1997 be received by the Committee.

4. Proposed Joint Inquiry with Public Bodies Review Committee

The Committee noted correspondence from the Chairman of the Public Bodies Review Committee proposing a joint meeting on Wednesday, 19 November 1997 from 12-2 pm to discuss the prospect of a joint inquiry on Contracting-Out and Competitive Tendering in the NSW Public Sector.

The Committee was informed that a briefing paper prepared by that Committee would be available for Members consideration prior to the meeting.

Resolved, on the motion of Mrs Beamer, seconded Mr Sullivan, that the Committee attend the joint meeting with the Public Bodies Review Committee on 19 November 1997.

5. Briefing - Security of Payment to Subcontractors

The Committee received a briefing from staff on recent initiatives on security of payment to subcontractors and noted the involvement of the Joint Standing Committee upon Small Business

in this matter.

The Committee requested a report at each subsequent meeting on any progress made by the Joint Standing Committee upon Small Business.

6. Proposed Inquiry: Regional Water and Sewerage Infrastructure Delivery

The Committee received a briefing on regional water and sewerage infrastructure delivery including the new Town and Country Sewerage Program and other potential innovations in this field. It agreed to look again at this issue in February 1998.

7. Site Inspection - Queensland

The Committee assessed options for a site inspection of the tilt train project and innovative waste/water recovery systems in Queensland.

Resolved, on the motion of Mrs Beamer, seconded Mr Rixon, That the Committee conduct a site inspection of the tilt train construction plant at Maryborough, Queensland, of Dowmus Waste Recovery Systems in and around Hervey Bay, Queensland and receive briefings on the new busway proposal in Brisbane, Queensland on 29-31 October 1997.

Meeting adjourned at 5.20 pm.

Minutes of Meeting No.38 - Friday, 30 January 1998 at 9.30 am

1. Members Present

Mr Crittenden (Chairman), Mrs Beamer, Mr Humpherson, Mr Hunter, Mr Rixon, Mr Souris, Mr Stewart, Mr Sullivan.

2. Apologies

Mr Price, Mr Windsor.

3. Confirmation of Minutes

Resolved, on the motion of Mr Rixon, seconded Mr Souris, That the minutes of Meeting No.37 of 11 November 1997 be received by the Committee.

4. Public Hearings

The public was admitted.

Mr Stephen Alchin, Asset Planning and Development Manager, Rail Access Corporation, affirmed and examined. Mr Bruce Simpson, Contractor, Rail Access Corporation, affirmed and examined. Evidence concluded, the witnesses withdrew.

Mr Timothy Poulter, General Manager, Countrylink, State Rail Authority, sworn and examined. Ms Jennifer Grimson, Strategic Planning Manager, Countrylink, State Rail Authority, affirmed and examined. Evidence concluded, the witnesses withdrew.

Associate Professor Philip Laird, sworn and examined. Evidence concluded, the witness withdrew.

Mr Peter Thornton, Principal Ove Arup and Partners, sworn and examined. Mr Alex Wardrop, Director TMG International, affirmed and examined. Evidence concluded, the witnesses withdrew.

5. Ord River Inland Water Diversion project - Site Inspection

The Committee considered options for the site inspection of the Ord River inland water diversion project. The Director presented the advice of the Hon E F Bridge MLA, Member for Kimberley and President of the Watering Australia Foundation, on the timing and duration of the tour.

Also discussed was the feasibility of meetings with the WA Department of Contracts and Management in Perth for the Joint Inquiry on the Regulation of Competitive Tendering and Contracting, which is being conducted with the Public Bodies Review Committee.

Resolved, on the motion of Mr Rixon, seconded Mrs Beamer, That the Committee conduct a site inspection from 2-5 March 1998 of the Ord River inland water diversion project followed by meetings in Perth for the Joint Inquiry on the Regulation of Competitive Tendering and Contracting.

6. Inquiry into the Tilt Train - Further Inspection and Public Hearing

The Committee was briefed by the Director on the invitation to a trial of the Queensland Tilt Train from Brisbane to the Gold Coast on 19 February 1998. The option of combining this tour with a public hearing at Tweed Heads on 20 February 1998 was considered. The high level of interest in the project from the NSW North Coast was noted.

Resolved, on the motion of Mr Humpherson, seconded Mr Hunter, That the Committee attend a trial of the Queensland Tilt Train on 19 February 1998 followed by public hearings at Tweed Heads on 20 February 1998, subject to Members availability.

Meeting adjourned at 4.15 pm.

Minutes of Meeting No. 39 - Friday, 20 February 1998 at 11.45 am

1. Members Present

Mr Crittenden (Chairman), Mrs Beamer, Mr Humpherson, Mr Stewart, Mr Sullivan

2. Apologies

Mr Hunter, Mr Price, Mr Rixon, Mr Souris, Mr Windsor.

3. Public Hearings

The public was admitted.

Mr Ross Hunter, General Manager, Project Services, Queensland Rail affirmed and examined. Evidence concluded, the witness withdrew.

Dr Robert Weatherby, Chairperson, Lismore City Council Public Transport Advisory Council affirmed and examined. Evidence concluded, the witness withdrew.

Mr Robin Spragg, Convenor, Tweed Shire Public Transport Working Group affirmed and examined. Evidence concluded, the witness withdrew.

Meeting adjourned at 1.15 pm

Minutes of Meeting No.44 - Wednesday, 22 September 1998 at 4.30 pm

1. Members Present

Mr Crittenden (Chairman), Mrs Beamer, Mr Price, Mr Rixon, Mr Souris, Mr Stewart, Mr Sullivan, Mr Windsor.

2. Apologies

Mr Humpherson, Mr Hunter.

3. Confirmation of Minutes

Resolved, on the motion of Mr Souris, seconded Mrs Beamer, that the Minutes of Meetings No.40, 41, 42 and 43 be confirmed without amendment.

4. Visit of inspection

Members discussed the proposed visit of inspection to New Zealand on 6-8 October 1998.

Resolved, on the motion of Mr Stewart, seconded Mrs Beamer, that the proposed visit of inspection to New Zealand be deferred.

5. General Business

The Committee discussed engaging a specialist consultant to review aspects of the draft Tilt Train Report. The Chairman advised that these services could be provided for approximately $1,200.

Resolved, on the motion of Mr Stewart, seconded Mrs Beamer, that a consultant be engaged to report to the Committee on the draft Tilt Train Report as a matter of urgency.

Members discussed some aspects of the draft report.

Meeting adjourned at 4:40 pm.

Minutes of Meeting No.47 - Thursday, 22 October 1998 at 10.30 am

1. Members Present

Mr Crittenden (Chairman), Mrs Beamer, Mr Humpherson, Mr Hunter, Mr Price, Mr Rixon, Mr Stewart, Mr Sullivan, Mr Windsor.

2. Apologies

Mr Souris.

3. Confirmation of Minutes

Resolved, on the motion of Mr Price, seconded Mr Rixon, That the minutes of Meeting No.46 of 15 October 1998 be received by the Committee.

4. Draft Report - Tilt Train

The Committee discussed the report generally and agreed on a number of minor amendments.

Resolved, on the motion of Mr Stewart, seconded Mr Sullivan, That the executive summary, as amended, be adopted.

Resolved, on the motion of Mr Sullivan seconded Mr Price, That the recommendations, as amended, be adopted.

Resolved, on the motion of Mr Rixon seconded Mr Price, That Chapter One be adopted.

Resolved, on the motion of Mr Humpherson, seconded Mr Hunter, That Chapter Two be adopted.

Resolved, on the motion of Mrs Beamer, seconded Mr Stewart, That Chapter Three be adopted.

Resolved, on the motion of Mr Price, seconded Mr Rixon, That Chapter Four, as amended, be adopted.

Resolved, on the motion of Mr Price, seconded Mrs Beamer, That Chapter Five, as amended, be adopted.

Resolved, on the motion of Mr Price, seconded Mr Humpherson, That the draft report, as amended, be the Report of the Committee and that it be signed by the Chairman and presented to the House, together with minutes of meetings and evidence.

Resolved, on the motion of Mrs Beamer, seconded Mr Rixon, That the Chairman and Director be permitted to correct any incidental, stylistic or typographical errors that are identified while preparing the Report for printing.

Meeting adjourned at 11.08 am

LIST OF SUBMISSIONS

1. Mr Brian Noad
2. Bathurst City Council
3. Mr Jim Nicholson
4. Richmond River Shire Council
5. Mr Terry Fernance
6. Campbelltown & Districts Commuter Association
7. Assoc Prof Philip Laird, School of Mathematics & Applied Statistics, University of Wollongong
8. Junee Shire Council
9. Talgo Consortium
10. Commuter Council of NSW
11. ARUP - TMG
12. City of Blue Mountains Council
13. City of Broken Hill Council
14. National Rail Corporation Ltd
15. Lismore City Council Public Transport Advisory Panel
16. Public Transport Development Project
17. Wyong Shire Council
18. Council of the City of Greater Lithgow
19. Transport Vision 2020 Project
20. Adtranz
21. Gosford City Council
22. Tweed Shire Council

23. Dubbo City Council

24. Blue Mountains Commuter & Transport Users Assoc.

25. Highway Safety Action Group of NSW Incorporated

26. The City of Newcastle

27. Lachlan Regional Transport Committee

28. State Rail Authority

29. Western Sydney Regional Organisation of Councils Limited

30. Rail Access Corporation

31. Singleton Shire Council

32. Freight Corp

33. Dr John Glastonbury

LIST OF WITNESSES

1. Mr Stephen Alchin, Rail Access Corporation, Asset Planning and Development Manager, Network Assets.

2. Mr Tim Poulter, General Manager, Countrylink.

3. Ms Jennifer Grimson, Manager, Strategic Planning, Countrylink.

4. Associate Professor Philip Laird, School of Mathematics and Applied Statistics, University of Wollongong

5. Mr Alex Wardrop, Director, Ovarup.

6. Mr Peter Thornton, Principal, TMG.

7. Mr Ross Hunter General Manager, Project Services, Queensland Rail.

8. Dr Robert Weatherby, Chairman, Public Transport Advisory Panel, Lismore City Council.

9. Mr Robin Spragg, Convenor, Public Transport Working Group of Tweed Shire Council, Murwillumbah.

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LIST OF TABLES

LIST OF ACRONYMS AND ABBREVIATIONS

AN	-	Australian National Railways
ATC	-	Australian Transport Council
ARTC	-	Australian Rail Track Corporation
BTCE	-	Bureau of Transport and Communications Economics
CBA	-	Cost-Benefit Analysis
EIS	-	Environmental Impact Statement
EPA	-	NSW Environment Protection Authority
FFT	-	Fast Freight Train
MLE	-	Queensland Main Line Electrification Program
MLU	-	Queensland Main Line Upgrade Program
NRTC	-	National Road Transport Commission
RAC	-	NSW Rail Access Corporation
RTA	-	NSW Roads and Traffic Authority
SRA	-	NSW State Rail Authority
TAL	-	Tonne Axle Load
VFT	-	Very Fast Train
VHST	-	Very High Speed Train

GLOSSARY

Australian Rail Track Corporation	Government business enterprise established in February 1998 to provide a single point of entry to the interstate rail network.
Australian Transport Council	Council of Federal and State Ministers responsible for transport matters.
CityRail	Division of the SRA. Principal urban provider of public transport passenger rail services in NSW including Sydney, the Hunter, Central Coast, Blue Mountains, Southern Highlands, Illawarra and South Coast.
Countrylink	Division of the SRA. Provider of long-distance passenger rail services throughout NSW and interstate.
FreightCorp	Corporation responsible for "above rail" freight operations in NSW.
National Rail Corporation (NR)	Established in April 1993 to administer interstate rail freight and standardise operating practices. Purchases access to track owned by State authorities. Originally intended to unify control and management of the interstate network.
NSW Rail Reforms 1996	The NSW Government separated the infrastructure and train management functions of the former State Rail Authority and established freight services under a separate corporation, FreightCorp, through the *Transport Administration Amendment (Rail Corporatisation and Restructuring) Act 1996*.
Rail Access Corporation (RAC)	Corporation with ownership of essential public rail infrastructure in NSW. Responsible for providing open access to accredited rail operators under the NSW Rail Access Regime.
Railway Services Authority (RSA)	Corporation supplying goods and services to the NSW rail industry including infrastructure (eg. Signals and track)
State Rail Authority (SRA)	Corporation responsible for the operation of all passenger rail services in NSW through its CityRail and Countrylink business units.

MAPS

CULLERIN RANGE

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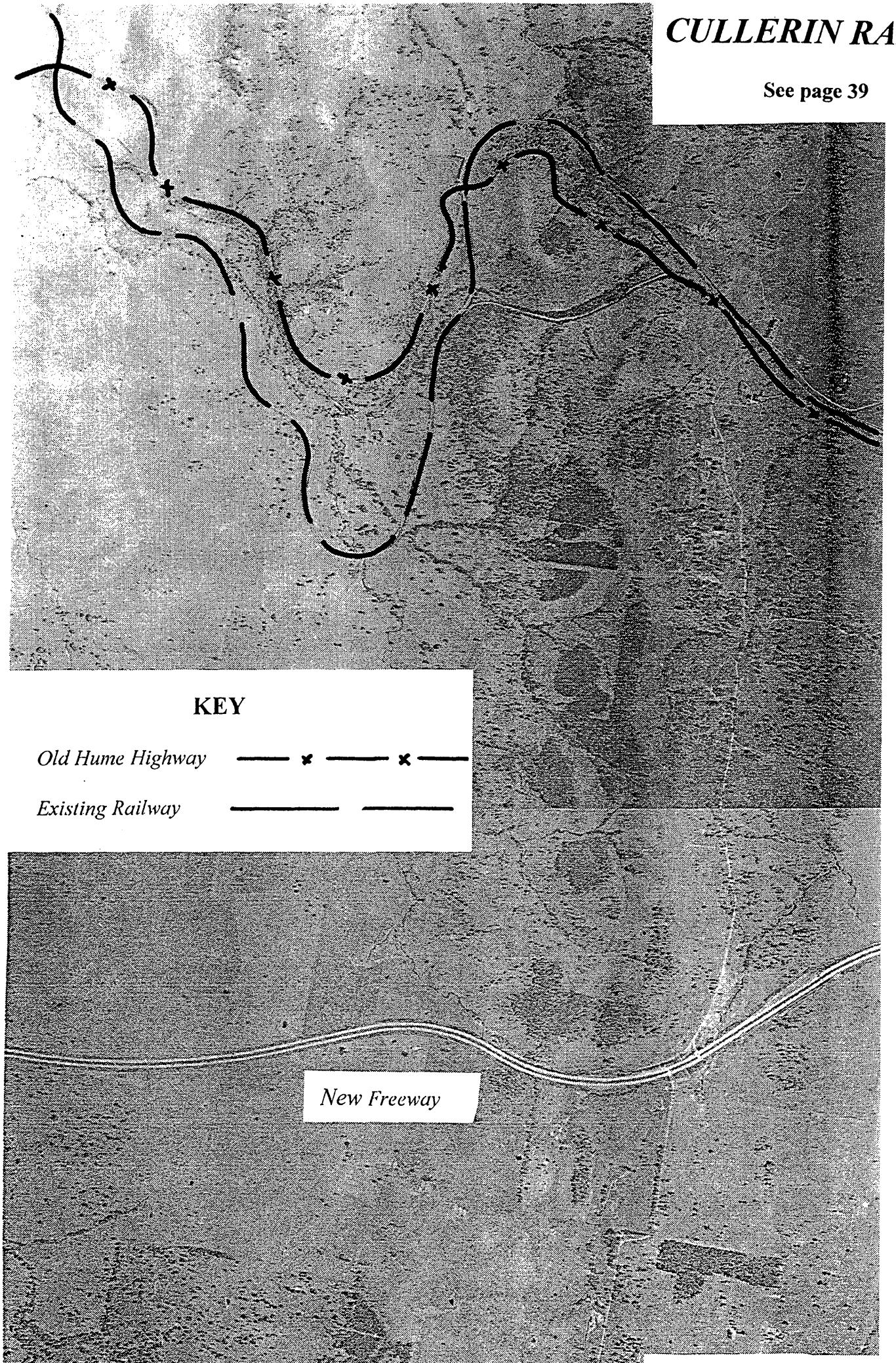

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