Papua New Guinea
TRANSPORT SECTOR REVIEW NOTE
with an emphasis on the
Roads Sector

January 2004

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Consultant
### Abbreviations and Acronyms

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
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<tbody>
<tr>
<td>AADT</td>
<td>Annual Average Daily Traffic</td>
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<tr>
<td>ADB</td>
<td>Asian Development Bank</td>
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<td>AIDS</td>
<td>Acquired Immune Deficiency Syndrome</td>
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<td>AMP</td>
<td>Airport Maintenance Project</td>
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<tr>
<td>AMUP</td>
<td>Airport Maintenance and Upgrading Project</td>
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<td>AN</td>
<td>Air Niugini</td>
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<td>AusAID</td>
<td>Australian Agency for International Development</td>
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<td>BIMS</td>
<td>Bridge Inventory and Management System</td>
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<td>CAA</td>
<td>Civil Aviation Authority</td>
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<td>CAC</td>
<td>Consumer Affairs Council</td>
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<td>CACC</td>
<td>Central Agencies Coordinating Committee</td>
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<td>CAR</td>
<td>Civil Aviation Rules</td>
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<td>CASA</td>
<td>Civil Aviation Safety Authority (Australia)</td>
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<tr>
<td>CEO</td>
<td>Chief Executive Officer</td>
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<td>CEP</td>
<td>Community Engagement Program</td>
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<td>CIMC</td>
<td>Consultative Implementation and Monitoring Council</td>
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<td>CTC</td>
<td>Coastal Trade Committee</td>
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<tr>
<td>CWTF</td>
<td>Community Water Transport Fund</td>
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<td>CWTP</td>
<td>Community Water Transport Project</td>
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<td>DNPM</td>
<td>Department of National Planning and Monitoring</td>
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<td>DOF</td>
<td>Department of Finance</td>
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<td>DOT</td>
<td>Department of Transport</td>
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<td>DOW</td>
<td>Department of Works</td>
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<td>DOWT</td>
<td>Department of Works and Transport</td>
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<td>DT</td>
<td>Department of Treasury</td>
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<td>DTCA</td>
<td>Department of Transport and Civil Aviation</td>
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<td>EIRR</td>
<td>Economic Internal Rate of Return</td>
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<td>EPM</td>
<td>Employer’s Project Manager</td>
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<tr>
<td>FER</td>
<td>Functional and Expenditure Review</td>
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<td>FY</td>
<td>Financial Year</td>
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<td>GDP</td>
<td>Gross Domestic Product</td>
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<td>GMDSS</td>
<td>Global Maritime Distress and Safety System</td>
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<td>HDI</td>
<td>Human Development Index</td>
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<td>HDM</td>
<td>Highway Design and Maintenance Model</td>
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<td>HHA</td>
<td>Highlands Highway Authority</td>
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<td>HHMU</td>
<td>Highlands Highway Maintenance Unit</td>
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<td>HIV</td>
<td>Human Immunodeficiency Virus</td>
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<td>HRD</td>
<td>human resource development</td>
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<td>HRMG</td>
<td>Highlands Road Maintenance Group</td>
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<td>ICAO</td>
<td>International Civil Aviation Organization</td>
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<td>IDG</td>
<td>Infrastructure Development Grant</td>
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<td>IHO</td>
<td>International Hydrological Office</td>
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<td>IMF</td>
<td>International Monetary Fund</td>
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<td>IMO</td>
<td>International Maritime Organization</td>
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<td>IRI</td>
<td>International Roughness Index</td>
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<td>LTD</td>
<td>Land Transport Division</td>
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<td>MCSB</td>
<td>Maintenance Coordination Services Branch (DOW)</td>
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<td>MIS</td>
<td>Management Information System</td>
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<td>MOU</td>
<td>Memorandum of Understanding</td>
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<td>MSB</td>
<td>Maritime Safety Branch</td>
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<td>MSRFL</td>
<td>Maritime Safety Regulatory Functions Levy</td>
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<td>MTD</td>
<td>Maritime Transport Division</td>
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<tr>
<td>Abbreviation</td>
<td>Full Form</td>
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<tr>
<td>MTDS</td>
<td>Medium-Term Development Strategy</td>
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<td>MTFS</td>
<td>Medium-Term Financial Strategy</td>
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<td>MVIT</td>
<td>Motor Vehicle Insurance Trust</td>
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<td>NAASRA</td>
<td>National Association of Australian State Road Authorities</td>
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<td>NAC</td>
<td>Navigational Aids Contributions</td>
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<tr>
<td>navaids</td>
<td>navigation aids</td>
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<tr>
<td>NCD</td>
<td>National Capital District</td>
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<td>NCDC</td>
<td>National Capital Development Commission</td>
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<td>NEC</td>
<td>National Executive Council</td>
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<td>NLTB</td>
<td>National Land Transport Board</td>
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<td>NMSA</td>
<td>National Maritime Safety Authority</td>
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<td>NPRS</td>
<td>National Poverty Reduction Strategy</td>
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<td>NRA</td>
<td>National Roads Authority</td>
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<tr>
<td>NRBMP</td>
<td>National Road and Bridge Maintenance Project</td>
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<td>NRRSP</td>
<td>National Roads Regravelling and Sealing Project</td>
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<td>NRSC</td>
<td>National Road Safety Council</td>
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<td>NSO</td>
<td>National Statistical Office</td>
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<td>NTDP</td>
<td>National Transport Development Plan</td>
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<td>OCA</td>
<td>Office of Civil Aviation</td>
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<td>OOT</td>
<td>Office of Transport</td>
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<td>PEM</td>
<td>Provincial Employer’s Project Manager</td>
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<td>PERR</td>
<td>Public Expenditure Review and Rationalization</td>
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<td>PMG</td>
<td>Project Management Group</td>
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<td>PNG</td>
<td>Papua New Guinea</td>
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<td>POOW</td>
<td>Provincial Office of Works</td>
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<td>PRU</td>
<td>Provincial RAMS Unit</td>
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<td>PSC</td>
<td>Port State Control</td>
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<td>PSL</td>
<td>Protection of the Sea Levy</td>
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<td>PSRMU</td>
<td>Public Sector Reform Management Unit</td>
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<td>PSRP</td>
<td>Public Sector Reform Program</td>
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<td>PWU</td>
<td>Provincial Works Unit</td>
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<td>RA</td>
<td>Road Authority</td>
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<td>RADP</td>
<td>Road Authority Development Project</td>
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<td>RAMS</td>
<td>Road Asset Management System</td>
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<td>RAN</td>
<td>Royal Australian Navy</td>
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<td>RDC</td>
<td>Road Damage Charge</td>
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<td>RF</td>
<td>Road Fund</td>
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<td>RMUP</td>
<td>Road Maintenance and Upgrading Project</td>
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<td>RRP</td>
<td>Report and Recommendation to the President</td>
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<td>RSCRP</td>
<td>Road Sector Cost Recovery Improvement Project</td>
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<td>RSTMB</td>
<td>Road Safety and Traffic Management Branch</td>
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<td>RUC</td>
<td>Road Use Charge</td>
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<td>SAB</td>
<td>Shipping Administration Branch</td>
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<tr>
<td>SAR</td>
<td>Search and Rescue</td>
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<td>SOLAS</td>
<td>Safety of Lives at Sea</td>
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<td>TA</td>
<td>technical assistance</td>
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<td>TRL</td>
<td>Transport Research Laboratory</td>
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<td>UNDP</td>
<td>United Nations Development Program</td>
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<tr>
<td>UPNG</td>
<td>University of Papua New Guinea</td>
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<tr>
<td>VOCs</td>
<td>Vehicle Operating Costs</td>
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<td>VWD</td>
<td>Vehicle Weight and Dimensions</td>
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<td>WB</td>
<td>World Bank</td>
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SUMMARY OF FINDINGS AND RECOMMENDATIONS

1 The Problem

1. PNG’s transport networks are failing. Major roads, including the crucially important Highlands Highway, have deteriorated alarmingly, raising the costs and reducing the availability of transport services. Half of all feeder roads are frequently impassable. Communities in coastal and mountainous areas that rely on sea and air transport are becoming more isolated because of deteriorating physical infrastructure.

2. In all transport sub-sectors, the dilapidated state of infrastructure is largely the result of inadequate maintenance and poor management over a long period. For roads, annual maintenance budgets have fallen consistently; they are now little more than 10 percent of estimated needs. The situation is similar in other sub-sectors. This is in spite of a government policy of preserving existing assets rather than developing new ones.

3. An earlier maintenance culture has been lost. Investment is wasted, the benefits soon dissipated by poor quality control and lack of maintenance. Because maintenance has been neglected for so long, the need for rehabilitation – to bring assets back to a state in which they can be maintained – has mushroomed. Some 60 percent of maritime navaids need replacement. Wharves, jetties and airstrips have fallen into disrepair and disuse. Almost half of the 7,800 km of national roads and two thirds of the 5,350 km of provincial roads need rehabilitation or reconstruction before they can be properly maintained. This rehabilitation task may be beyond the Government’s capacity to fund and implement (para 21).

4. The lack of funds, and a related decline in management skills, budget discipline and financial controls, have critically diminished the capacity of institutions responsible for transport infrastructure and services. The MTD, responsible for maritime safety, is largely ineffective in meeting its responsibilities and will shortly be replaced by a NMSA. The OCA was the same until it was replaced by the CAA, which unfortunately inherited many of its shortcomings. DOW, responsible for national roads, was found by a 2001 functional and expenditure review to suffer from a raft of management, financial, technical and staffing deficiencies; it has failed in its most important task of preventing deterioration of the road network. DOW’s lack of funding has also contributed to a reduction in the capacity and quality of the contracting and consulting industries.

5. Almost all of these institutional weaknesses are attributable to inadequate funding, but they are also linked to a more general failure of governance: stated policies and strategies often fail to influence decisions; planning and priority-setting is neither objective nor transparent; budget controls and systems of financial management and reporting have become weakened and are often ineffective; technical standards have fallen; project supervision is weak; staff have not been adequately trained; career incentives are weak; supervision of works is lax; staff morale is low.
2 The Consequences

6. The consequences are obvious and severe: the condition of transport infrastructure now threatens economic recovery. It hinders access to markets and services, imposes high costs on producers and consumers, discourages investment and worsens the isolation and poverty of a significant proportion of the population. Neglected infrastructure and unreliable services contribute to a growing public distrust in the Government’s ability to address basic community needs, feeding cynicism and lawlessness which, in combination with rising unemployment, result in crime, the destruction of public assets and political instability.

3 Lessons Learned

7. Donor support for policy reforms and improved planning has raised awareness of their importance and resulted in sensible-sounding government statements about needed changes. But there is a disconnect between these and practice. Priorities continue to be influenced by political, “strategic” and other non-economic considerations. No effective mechanism is in place to monitor the achievement of objectives and to adjust transport-sector strategies, plans and budgets to changes in circumstances, priorities or the availability of funds.

8. Donor-sponsored efforts to help strengthen institutional capacity have mostly had limited, not lasting, success. The sustainability of institutional-strengthening and HRD efforts is often undermined by management limitations, lack of follow-up funding and the absence of performance incentives. More radical reforms – notably by establishing more autonomous statutory authorities – have been attempted and others are proposed (para 11), but the experience both outside and within the transport sector (e.g. the CAA) has not been encouraging.

9. Government-funded projects are often poorly planned and suffer from low standards of implementation and supervision. Donor-funded projects – usually infrastructure rehabilitation or periodic maintenance – have generally been implemented more satisfactorily, but these usually require considerable external technical assistance and donor-imposed management, financial control and reporting arrangements. The Government often fails to maintain them adequately once built.

10. A recognition of the importance of maintenance and the consequences of neglect has prompted calls for more drastic reform of organizations and funding. Past donor efforts to require adequate maintenance budgeting and programming as loan conditions have not been successful. For DOW, the introduction of improved needs-assessment, planning and scheduling procedures under the RAMS project has helped strengthen its technical justification for increased maintenance funding, but their long-term sustainability is still questionable and they seem to have little impact on the level of funds made available; there are also concerns about their ability, in their present form, to help define the rehabilitation needs that are critical in the short term.

4 Perceived Solutions

11. A general agreement has emerged within government and among interested private-sector groups that the sector as a whole, and the roads sub-sector in particular, needs drastic rather than incremental reform. The main directions of this reform – all supported by this Review – are as follows:
• placing responsibility for infrastructure maintenance in the hands of more streamlined, autonomous and business-like statutory authorities – the NRA in the case of roads, NMSA for maritime safety – supervised by independent boards representing the interests of government and users and held strictly accountable for the authorities’ performance;

• establishing more reliable and adequate sources of funds for maintenance through user charges set to reflect the costs attributable to different users; revenues would be channeled through independently-managed funds (the RF in the case of roads, and a fund administered by the NMSA in the case of navaids);

• mandating the use of rational, transparent priority-setting and decision-making procedures in allocating funds;

• implementing maintenance by outsourcing under competitive performance-based contract, with strict supervision and financial controls; and

• requiring transparent monitoring, decision-making and reporting to allow performance and cost-effectiveness to be reviewed and managers to be held accountable.

12. There is understandable resistance from the agencies (notably DOW) most directly affected by such changes. Even supporters of reform acknowledge concerns about (i) the difficulties in handling the transition from government department to statutory authority and its implications for existing staff; (ii) the failure of most statutory authorities in PNG to meet expectations, often due to undue political interference; (iii) a perceived shortage of senior managers experienced in running such authorities in a business-like and accountable way; (iv) the willingness of users – and politicians – to accept the additional user charges proposed; (v) the temptation to raid the funds for purposes other than maintenance; (vi) the loss of control over funding allocations by DOF1 (and the risk that other sectors might demand similar arrangements); (vii) the objectivity and sustainability of expenditure planning and allocation procedures; and (viii) the difficulty in reconciling the interests of commercial users, who tend to be represented on the governing boards, with those of isolated and poor communities.

13. Most of these concerns, however, can be addressed by careful design of the procedures used in establishing the respective authorities, appointing board members and managers, and establishing transparent operations, and the way in which user charges are introduced and justified. The lessons from past experience with statutory authorities are being reflected in the approach taken in establishing both the NMSA and NRA. Close consultations with private-sector users are helping to overcome resistance and support the case for transparency and strong controls designed to minimize the risk of failure.

14. But these initiatives are mainly concerned with securing adequate maintenance. They leave open the question of how infrastructure is to be brought to a maintainable state in the first place. In the maritime sector this will be done using

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1 It should be noted, however, that current RF proposals envisage new user charges, not earmarking of revenues from existing charges.
ADB loans under a comprehensive maritime sector restructuring project, but the task for roads is more daunting.

5 Road Maintenance

15. The advantages of an independent RF financed by user charges are widely recognized: it would provide a consistent, reliable source of funds for road maintenance, overcoming the past problems of unreliable and inadequate budget allocations; structured properly, the charges would make users face the externalities of their vehicle and travel decisions; and, managed properly, it would provide a link between what users pay and what they get back in the way of better-maintained roads. Rehabilitation too? No, because it would be inequitable to charge present users for past government neglect, and recovering just the long-run costs of routine, periodic and emergency maintenance would already require substantial – and potentially unpopular – increases in fuel taxes and vehicle registration fees. These are being re-estimated by the RADP TA but were estimated by the RSCRP in 2000 to be Kina 92 million p.a. for the national network and Kina 86 million p.a. for the provincial/district networks: say Kina 200 million p.a. in all, a great deal more than recent allocations of only around Kina 25 million p.a. The RADP TA is also examining how these user charges could be phased in over a period to minimize their perceived negative impacts on users.

16. Under the NRA legislation passed in May 2003, the NRA would manage the RF as well as plan and implement road maintenance. Most successful funds, however, have separated these functions, with the fund managers purchasing services from maintenance providers, which could be a road authority but could also be private contractors or local community groups. Some of the advantages of this purchaser-provider relationship could still be captured if the NRA board were to appoint an independent agent, such as a respected international accounting firm, to set up and manage the RF on its behalf, even if only for the first year or two. The legislation also establishes a RAMS-type planning function within the NRA. Again, the advantages of a separate function could be captured if the board were to outsource these planning services to an independent firm that would carry out condition surveys, recommend priorities on economic grounds and monitor network and maintenance performance in a transparent manner.

17. According to the RADP, the intention is to build up NRA’s financial and technical contribution to maintenance of the national network over five years and to wind down DOW’s accordingly. This winding down of DOW will not be easy; it is already meeting resistance. The intention, rightly, is to start the NRA with a clean slate, allowing its managers freedom to establish needed staffing – which need not be large, since most work will be outsourced – and other resources. On no account should the NRA inherit staff obligations and attitudes from DOW, the critical mistake made when the CAA was established. To ensure this, most of DOW’s road-related staff (which amounted to an estimated 17 percent of its total staff of 2,895 in 2001) will have to be retrenched over the five-year transition period and positions in the NRA advertised and filled on a competitive basis. This will require compensation, settlement of accrued entitlements and retraining, the costs of which are now being estimated by the RADP.
18. What about the 16,000+ km of roads that are the responsibility of provincial and lower-level administrations\(^2\), most of which are even more severely constrained in their ability to maintain their networks? Do they not warrant a share of the revenues collected from user charges? Clearly yes, on equity grounds. Unless lower-level administrations delegate responsibility for maintenance of their roads to the NRA – a longer-term option raised by the RSCRIP – arrangements will have to be made to assign them a portion of RF revenues for road maintenance under conditions yet to be specified.

19. Given these difficulties and the discouraging experience with statutory authorities in PNG to date, is it possible that the risks of failure in establishing the NRA and winding down DOW are greater than the potential benefits? Possibly; that remains to be determined by the RADP. The alternative of strengthening DOW’s capacity\(^3\) is no less risky, however. AusAID’s experience in implementing its projects through established DOW channels has been satisfactory, albeit with significant external TA, but these arrangements are not a routine feature of DOW’s maintenance regime; like the PMUs established for other donor-funded projects, they are special cases unrepresentative of normal maintenance operations. The NRA offers the possibility of tailoring staffing resources and operating procedures more closely in line with needs. Drawing on competitively-outsourced maintenance services, the NRA ought to be more, not less, efficient and sustainable.

20. The NRA should not proceed, however, until the concerns listed in para 12 are adequately addressed. In view of the critical role donors must play in helping to bring the network up to a state capable of being maintained by the NRA (see below), they are in a position to exercise leverage by withholding funds for rehabilitation if the NRA lacks adequate transparency and accountability.

6 Road Rehabilitation

21. Roads can only be maintained once they are in a maintainable condition. Using assumptions based on RAMS network and condition data\(^4\), it would appear that some 65 percent of the network already needs rehabilitation or reconstruction, including 46 percent of the length of the national network (around 3,600 km) and two thirds (also around 3,600 km) of the provincial network (Table 1). The cost of this amounts to roughly Kina 2.7 billion in 2003 prices\(^5\), of which half would be for the national network. Even with substantially increased loan funding now under discussion between Government and donors, this is well beyond the Government’s capacity to fund.

\(\text{This figure includes about 8,000 km of roads not yet incorporated in the RAMS database.}\)

\(\text{There is a further option: contracting-out management of the network to the private sector. But this drastic approach would likely meet considerable public and political resistance.}\)

\(\text{Including that 70% of surveyed national roads and 85% of provincial roads classified as poor/bad require rehabilitation, 25% and 35% respectively of those classified as fair, and 5% and 10% respectively of those classified as good.}\)

\(\text{These estimates will shortly be refined by the RAMS project.}\)
Table 1: Approximate Rehabilitation Needs

<table>
<thead>
<tr>
<th>Road Class</th>
<th>Total Kms</th>
<th>Est Rehab Needs</th>
<th>%</th>
<th>K mln</th>
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<tbody>
<tr>
<td>National</td>
<td>7,782.4</td>
<td>3,562.6</td>
<td>46%</td>
<td>1,341.3</td>
</tr>
<tr>
<td>Provincial</td>
<td>5,347.5</td>
<td>3,563.4</td>
<td>67%</td>
<td>779.9</td>
</tr>
<tr>
<td>District/local</td>
<td>11,185.9</td>
<td>8,566.8</td>
<td>77%</td>
<td>568.1</td>
</tr>
<tr>
<td>Total</td>
<td>24,315.8</td>
<td>15,692.8</td>
<td>65%</td>
<td>2,689.4</td>
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</table>

Note: District/local includes other/unidentified (+/- 8000 km)

22. If the rehabilitation task were spread over, say, eight years, the annual expenditure needs (which would include emergency/holding treatments to delay the worst deterioration while roads await rehabilitation) would still be insurmountable, rising to about Kina 670 million in the fifth year before falling eventually to just over the Kina 200 or so needed annually, mostly for maintenance (Figure 1).

Figure 1: Projected Expenditure Requirements

23. How can this level of expenditure be funded? This review is not able to estimate the Government’s capacity to service further loans, but already it has hesitated to take on additional commitments for the ADB’s Southern Region Roads Project and Community Water Transport Project. At best, it could afford maybe a third of the needed road rehabilitation, i.e. some Kina 800-900 million, in addition to the maintenance expenditures raised from users and channeled through the RF. This would only cover between 60 and 67 percent of the national network rehabilitation needs and leave the rest, plus all provincial and lower-level roads, in deteriorated condition with only minimal emergency/holding treatment to try to keep them open.

24. Which roads should be rehabilitated and which omitted? There seems little alternative but for the Government to declare a core network of critical routes that are essential to the economy and should receive priority for rehabilitation. Selection should be based on cost-benefit analysis and considerations of network connectivity. Preliminary proposals have been made by the RAMS project but these need further
review and discussion. Certainly the Highlands Highway should be part of this core network.

25. DOW, not NRA\(^6\), should be the executing agency for these rehabilitation works, acting on behalf of the Government as borrower. Management and financial control procedures should meet the requirements of the lending agencies.

26. What of the remaining portions of the network needing rehabilitation? The Government cannot afford to bring them all up to a maintainable state. It should concentrate on preserving roads that are already maintainable and on rehabilitating the core network. For the rest, it should actively explore ways of (i) focusing limited resources on keeping the roads open by fixing the worst spots, keeping bridges serviceable and giving greater attention to maintaining adequate drainage, (ii) using voluntary community labor, supported with tools, materials and technical advice, to provide low-cost road and bridge repairs on a self-help basis and (iii) encouraging alternative forms of low-cost transport, including draught animals, bicycles and motorcycles, though a program of community engagement, education and micro-finance support.

7 Urgent Needs and Priorities for Donors

27. The Government faces some urgent and difficult decisions in the short term: on immediate priorities for road rehabilitation; on substantially increasing its level of debt to meet urgent road rehabilitation needs possibly amounting to some Kina 800-900 million over, say, 5 years (and on its ability to provide the necessary counterpart funds); on its readiness to disappoint community expectations for already-deteriorated roads that it cannot afford to rehabilitate and to promote innovative community-based solutions to local transport needs instead; on its willingness to transfer DOW’s road maintenance responsibilities to the NRA without also transferring its bureaucratic shortcomings (with implications for funding compensation and accrued entitlements for DOW’s road-related staff); on the steps and timetable for establishing the NRA, and whether it is prepared to give its management the necessary autonomy; and on its commitments to openness, accountability, good governance, responsiveness to the needs of users, efficient, streamlined operations and competitive outsourcing.

28. Donors can help by agreeing on a common, shared strategy for assistance, providing technical support to help the Government face the most critical choices and tasks listed above, and being ready to provide most of the Kina 800-900 million in loan finance for the major rehabilitation program required for the core network. But “business-as-usual” is not an option. Already bilateral and international donors are baulking at entering into new loan agreements while there are concerns about the Government’s ability to make counterpart funds available and to fulfill its commitments to infrastructure maintenance and good governance. Accordingly, a “calibrated response” mechanism is suggested, by which reforms achieved by the Government (Figure 2) are met with coordinated support from the donor community (Figure 3). This sort of arrangement would provide incentives for the Government to stick to its reform program while offering assurances to donors that their loan funds will not be wasted as before. The details will need to be worked out in discussions.

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\(^6\) NRA is intended to be a road maintenance agency. Giving it responsibility for rehabilitation would not be consistent with its intended role and form of organization and would divert it from its primary task. However, if DOW fails to carry out the rehabilitation task effectively, consideration should be given to transferring responsibility to the NRA. The NRA Act allows for this.
between donors and the Government, but it could involve four levels of donor support:

- a joint commitment to providing funds to rehabilitate the core network, including co-financing arrangements to cover any shortfalls that may occur from time to time in counterpart funding, support for low-cost, community-based initiatives for local roads. This highest level of response would be contingent on the Government implementing the complete package of reform measures shown in Figure 2;

- a lesser level of rehabilitation funding, amounting to little more than what is required to fix up the Highlands Highway, but with little prospect of substantial further assistance. This would depend mainly on satisfactory arrangements being in place to guarantee funding of subsequent maintenance;

- a program of technical assistance to help implement key decisions to restructure the institutional arrangements governing the sector, preferably including establishing the NRA and its associated RAMS/BIMS-based planning systems and funding through the RF; and

- at the bottom end of the scale, completion of ongoing/committed projects only, and effectively the suspension of assistance thereafter. This would apply if there is no effective progress towards the key goals of adequate and sustainable funding, good governance, institutional efficiency, objective planning and priority-setting and efficient works execution.
Figure 2: Key Measures of Achievement

<table>
<thead>
<tr>
<th>Primary Objectives</th>
<th>Areas of Concern</th>
<th>Critical Performance Goals</th>
<th>Key Measures of Achievement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adequate &amp; Sustainable Funding</td>
<td>Funding for Rehabilitation</td>
<td>Demonstrated Ability to Repay Loans</td>
<td>Satisfactory Assessment of Country Creditworthiness</td>
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<tr>
<td></td>
<td>Sustainable Funding for Maintenance</td>
<td>Provision of Counterpart Funds</td>
<td>Counterpart Funds Deposited in Imprest Accounts</td>
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<tr>
<td>Good Governance &amp; Institutional Efficiency</td>
<td>Institutional Restructuring</td>
<td>Establishment of the Road Fund</td>
<td>RF &amp; System of User Charges Established &amp; Operating Satisfactorily</td>
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<tr>
<td></td>
<td>Restructuring of DOW</td>
<td>Establishement of the NRA</td>
<td>NRA Board &amp; Managers Appointed Using Transparent Procedures</td>
</tr>
<tr>
<td>Objective Planning &amp; Priority-Setting</td>
<td>Investment Priorities</td>
<td>Definition of Core Network</td>
<td>Satisfactory Arrangements for Redundant DOW Staff</td>
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<td></td>
<td>Maintenance Priorities</td>
<td>Priorities Based on RAMS/BMS</td>
<td>DOW Restructuring Plan &amp; Technical/Financial Controls Implemented</td>
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<tr>
<td>Efficient Works Execution</td>
<td>Rehabilitation</td>
<td>Effective Procedures for Rehabilitation</td>
<td>Core Network for Rehabilitation Publicly Announced</td>
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<tr>
<td></td>
<td>Maintenance</td>
<td>Performance-Based Contracts</td>
<td>RAMS/BMS Operations &amp; Condition-Monitoring Surveys Outsourced</td>
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</table>

ix
### Figure 3: Calibrated Donor Response

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<th>Donor Response</th>
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<td>Joint support for a comprehensive rehabilitation program¹</td>
<td><img src="#" alt="Key: ● Necessary condition for donor response" /></td>
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<tr>
<td>Continuing support for rehabilitation, but confined to Highlands Highway</td>
<td><img src="#" alt="Key: ● Necessary condition for donor response" /></td>
</tr>
<tr>
<td>DOW/NRA technical assistance &amp; training, support for contractors</td>
<td><img src="#" alt="Key: ● Necessary condition for donor response" /></td>
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<tr>
<td>Completion of ongoing &amp; committed projects only</td>
<td><img src="#" alt="Key: ● Necessary condition for donor response" /></td>
</tr>
</tbody>
</table>

¹ Including co-financing of selected counterpart contributions
# Papua New Guinea

**TRANSPORT SECTOR REVIEW NOTE**

with an emphasis on the Roads Sector

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Papua New Guinea
TRANSPORT SECTOR REVIEW NOTE
with an emphasis on the
Roads Sector

1 Introduction

1. PNG’s transport infrastructure has been allowed to deteriorate over a long period. Its condition now threatens economic recovery. It hinders access to markets and services, imposes high transport costs on producers and consumers, discourages investment and worsens the isolation and poverty of a significant proportion of the population. Important arterial highways are badly damaged and require expensive reconstruction. About half of all feeder roads become impassable with heavy rain. Lack of reliable transport suppresses economic activity, lowers cash incomes and reduces the availability of goods and services. Shipping and air transport services to isolated communities are in decline, wharves and airstrips falling into disrepair. Neglected infrastructure and unreliable services contribute to a growing distrust in the Government’s ability to address the basic needs of rural communities, feeding cynicism and lawlessness which, in combination with rising unemployment, result in crime, the destruction of public assets and political instability.

2. This Note has been prepared at a time when public finances are severely stretched and the Government and its aid partners are reviewing national and sectoral policies, development strategies and programs. A new 2003-2007 Medium Term Development Strategy (MTDS) and 2003-2007 Medium Term Fiscal Strategy (MTFS) are being drafted. The World Bank (WB), Asian Development Bank (ADB) and Australian Agency for International Development (AusAID), in consultation with other donors, are jointly reviewing aid strategies and their coordination. The National Transport Development Plan 2001-2010 (NTDP) is being revised and institutional changes are being contemplated that will have important implications for the sector’s future organization and management.

3. It is an appropriate time to take stock, ask why successive governments have failed to prevent the decline in transport infrastructure, examine what initiatives show promise and renew a commitment to those that address the most critical policy, institutional, management, funding and service-delivery issues that stand in the way of restoring the relatively efficient transport system the country once enjoyed.

4. In this context, the Note makes an independent contribution to the debate over future directions of transport policy, sector management and donor assistance. It broadly covers the transport sector as a whole, but its main focus is on roads; the discussion of other modes is used mainly to illustrate lessons or principles applicable to the roads sub-sector. It is organized as follows. Section 2 summarizes the country’s recent economic performance and the role of transport. Section 3 reviews the status and performance of the transport sector and its ability to meet the needs of users; it concludes by summarizing the most critical problems and issues. This is followed, in Section 4, by an overview of the Government’s policies and plans before Section 5

---

7 It has been prepared as a desk study by John Lee, a consultant to the WB. The views expressed are his. But drafts have been circulated among the staff of WB, ADB and AusAID and their comments have been incorporated.
sets out recommendations for addressing the critical issues and suggests priorities for donor assistance. These are elaborated for the roads sub-sector in Section 6.

2 Economic Background and the Role of Transport

2.1 Economic Performance and Prospects

5. PNG’s economy has performed badly in recent years and its outlook is bleak. Real gross domestic product (GDP) fell for the third year running in 2002, the fifth year of recession in the last six years: it contracted by 1.2 percent in 2000, 3.4 percent in 2001 and an expected 0.5 percent in 2002. The Government hopes for some improvement by 2004 following measures in the 2002 Supplementary Budget and 2003 Budget, but the medium-term prospects are not encouraging: known reserves of gold, copper, oil and natural gas (mining contributed 21.6 percent of GDP in 2001) are nearly depleted and few new projects are in the planning pipeline to replace them.

6. Agriculture, forestry and fishing activity fell 5.4 percent in 2001 but is expected to pick up 3.6 percent in 2002 due in part to the Kina’s devaluation and better export prices. Mining and petroleum fell 0.4 percent in 2001 and an expected 11.2 percent in 2002, with gold, copper and oil production likely to fall 6.7 percent, 10.1 percent and 17.0 percent respectively. Manufacturing output fell 8.8 percent in 2001 after a fall of 8.1 percent in 2000. Declines also occurred in construction (down 5.5 percent in 2000 and a further 6.6 percent in 2001) and wholesale and retail trade (down 13.6 percent in 2000 and 5.9 percent in 2001).

2.2 Income Growth and Distribution

7. Per capita GDP has barely risen in the 30 years since independence (Figure 1) and has been falling since the mid-1990s. Before then, growth was mainly in mining and petroleum, benefitting few in the broader rural economy – more than 85 percent of the population live in rural areas; very few work in the mining sector. Rural incomes have remained depressed, the situation made worse by declining rural accessibility. The concentration of growth in non-rural sectors has bred corruption and a wasteful public-sector expansion at the expense of economic diversification and infrastructure maintenance.

2.3 Public Finance

8. The Government finds it difficult to fund efforts to overcome these problems. The budget deficit will likely amount to 3.8 percent of GDP in 2002, down from a predicted 8 percent only after a 2002 Supplementary Budget that drastically cut expenditures. Public debt is over 70 percent of GDP. Interest payments are equivalent to half the development budget. Several loan capital repayments are due soon, mostly in US dollars made more expensive by a Kina that has devalued by a quarter in the last two years. An inefficient public sector absorbs around 40 percent of total government expenditure; government employees, many unattached, account for more than half the formal workforce.

---

8 A Public Expenditure Review and Rationalization (PERR) is underway, funded by the WB. Preliminary findings reportedly raise very serious concerns about the Government’s financial position.
2.4 Effectiveness of Government Administration and Services

9. Slow economic growth, declining revenues, inadequate budgets, inefficiencies and corruption have undermined the effectiveness of public institutions. Law-and-order frequently breaks down, particularly in the populous Highlands\(^9\). A high proportion of the formal workforce, which itself accounts for only a small proportion of those of working age, are unemployed. Around 50,000 young people enter the job market each year, yet employment in non-mining and mining sectors fell by 6.1 and 6.6 percent respectively in 2001. Economic growth has not kept pace with the 2.5 percent annual growth in population. Violent crime is on the rise, scaring off tourists and investors and discouraging new job creation. Land – one of the few assets conferring power on the individual – is exploited as much as a source of compensation, frustrating development, as for any intrinsic productive value. Basic education and health services are unreliable, and materials scarce. School attendance is low and declining. Infant and maternal mortality rates (82 deaths per 1,000 live births and 320 deaths per 100,000 births respectively in 2001) are rising. Life expectancy, at 57 years, is the lowest in Melanesia. Malaria, tuberculosis and HIV/AIDS infection rates are starting to rise again. People are turning back to subsistence farming or migrating to urban areas in search of non-existent jobs. 37 percent live in poverty. On the UNDP’s Human Development Index (HDI), PNG ranks last among Pacific Island countries and 133rd among 173 developing countries.

2.5 Transport, Accessibility and Poverty

10. The country’s population of 5.2 million is one of the most isolated in the world. Four out of five live in rugged mountainous or coastal terrain, many without

---

\(^9\) Source: International Monetary Fund (IMF).

\(^10\) The Australian Government has recently announced an expanded program of country assistance involving more direct help with maintaining law and order.
even rudimentary access. Most of the 6,500 kms of coastline in the maritime provinces are accessible only by sea. Pockets of population elsewhere, particularly along the Sepik, Fly and Ramu river systems, can only be reached by transport as basic as dugout canoes. Roads, where they exist, are poorly maintained and provide unreliable, infrequent, high-cost road transport services. Even major highways, once well maintained and offering modern, efficient and competitive services, now experience closure in wet weather and frequent vehicle breakdowns. Air services are prohibitively expensive for the rural population.

11. Lack of access severely limits the opportunities available to rural communities, encouraging outward migration of the young and skilled and perpetuating a vicious circle of underdevelopment and despondency, with women and girls especially disadvantaged. Reliable access is a crucial requirement for poverty reduction, economic and social development and gender equality. To provide it, the Government must turn around the long-term decline in transport infrastructure and services. Yet it cannot simply spend its way out of this difficulty: it alone cannot sustain the necessary levels of funding to rehabilitate infrastructure and maintain it thereafter. And the spending cuts required to contain the budget deficit have only hastened the deterioration of infrastructure and services. More fundamental reforms are needed. These reforms must address the urgent need for infrastructure rehabilitation and maintenance, and its ongoing funding and efficient management on a sustainable basis.

3 Sector Status

3.1 Roads and Road Transport

3.1.1 Institutional Arrangements

12. Responsibility for roads is shared between the national government, 19 provincial governments and the National Capital District Commission (NCDC). At the national level, the Department of Works (DOW) has Offices of Works (POOWs) in the provinces and the National Capital District (NCD), each managed by a Provincial Works Manager (PWM). The PWMs are responsible for maintaining all national roads in their province. When funds are available – which is not often – this is usually done on a project basis (the work usually involves some rehabilitation) by local contractors, but most POOWs also have a small day labor force for limited routine activities.

13. Development and maintenance of provincial roads, when done at all, are carried out by Provincial Works Units (PWUs) under the control of provincial governments. These units are quite small and have limited technical capabilities. Local rural and urban roads are managed by local or municipal administrations with very few resources.

14. The present system’s weaknesses are well known. They include lack of funds, declining skills, low morale, deteriorated equipment, poor budget discipline and political pressure on expenditure allocations. A Workshop on Road Management and

---

11 Sandaun, West Sepik, Madang, Morobe, Oro, Manus, Milne Bay, Western, Central, Gulf, West New Britain, East New Britain, New Ireland and Bougainville.

12 Stranded vehicles are often attacked by bandits. One major oil company recently suspended fuel deliveries to the Highlands because it could no longer obtain insurance.
Finance held in Port Moresby in February 2000 reviewed these shortcomings and concluded that the present bureaucratic arrangements offered little prospect for improvement. It recommended commercialization of road management and a Road Fund (RF) to secure sustainable road maintenance financing. These proposals had been made by earlier studies, and were echoed in the 2000 Road Sector Cost Recovery Improvement Project (RSCRIP)\(^\text{13}\) as well as a Functional and Expenditure Review (FER) of the then Department of Works and Transport (DOWT) carried out in 2001\(^\text{14}\). Earlier, the Transport and Infrastructure Sector Committee of the Consultative Implementation and Monitoring Council (CIMC) had proposed establishing a private-sector Project Management Group (PMG) to control funds and implement road rehabilitation and maintenance under contract, concentrating initially on the Highlands Highway\(^\text{15}\). These are further discussed in Sections 5 and 6.

3.1.2 Extent and Condition of the Road Network

15. PNG’s public road network is thought to amount to some 25,000 kms. 16,258 kms have been identified and incorporated in a database established by the Road Asset Management System (RAMS) Project\(^\text{16}\) (Table 1); another ± 8,700 kms remain unaccounted for. Of the identified roads, national roads account for 7,819 kms (48 percent), provincial roads 5,488 kms (34 percent) and district, local and other roads 2,951 kms (18 percent). Western Highlands, Chimbu, East Sepik, Madang and West New Britain have the most extensive networks. Apart from the Highlands Highway linking Lae with Goroka, Kundiawa, Mount Hagen, Mendi and their hinterlands, most of the national network is discontinuous, serving the relatively well-developed areas around the main commercial centers (Figure 2). The poorest parts of the country are the most poorly served by the road network.

16. The national network is subdivided into four functional classes: national routes, main roads, district roads and institutional roads. Institutional roads serve government and private institutions but are maintained by DOW; there are proposals to reclassify many of these as district roads and to transfer responsibility for maintaining those that remain to the institutions themselves. Provincial roads are classified as trunk or urban, district roads as feeder and local roads as either access or town. Table 2 shows the respective shares of the identified network, as well as the condition of the 70 percent (11,315 kms) that has been surveyed by the RAMS project to date.

---

\(^{13}\) Department of Transport and Civil Aviation, *Road Sector Cost Recovery Improvement Project*, ADB TA 3191-PNG, WD Scott International Development Consultants Pty Ltd, August 2000.


\(^{15}\) Source: CIMC, *Proceedings of the National Development Forum – Reconstruction and Development through Partnership*, Institute of National Affairs, November 1999. The CIMC was established to help implement the recommendations of the 1998 National Economic Summit, to report to the National Development Forum and to advise the National Planning and Implementation Committee on matters affecting the economy, growth and development.

\(^{16}\) ADB TA 3004-PNG: *Road Asset Management Systems Project*, and ADB TA 3378-PNG: *RAMS in the Provinces*. 
<table>
<thead>
<tr>
<th>Province</th>
<th>National</th>
<th>Provincial</th>
<th>District</th>
<th>Local</th>
<th>Other</th>
<th>Total</th>
</tr>
</thead>
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<tr>
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Source: RAMS Project
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<th>Road Class</th>
<th>Surveyed Kms</th>
<th>Not Yet Kms</th>
<th>Total Kms</th>
<th>Surveyed Length</th>
<th>% of Kms Network</th>
<th>Surveyed Roads by Condition (2002)</th>
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<th>%</th>
<th>Fair Kms</th>
<th>%</th>
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<td>1,303.9</td>
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<td>46.8%</td>
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<td>267.6</td>
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<td>56.1%</td>
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<td>National Institutional</td>
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<td>67.0</td>
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<td>152.3</td>
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<td>84.6</td>
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<td>638.9</td>
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<td>74.6%</td>
<td></td>
<td>855.8</td>
</tr>
<tr>
<td>Provincial Trunk</td>
<td>1,682.5</td>
<td>817.2</td>
<td>2,499.7</td>
<td>195.0</td>
<td>11.6%</td>
<td>1,157.1</td>
<td>68.8%</td>
<td></td>
<td>330.4</td>
<td></td>
<td>19.6%</td>
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</tr>
<tr>
<td>Provincial Urban</td>
<td>1,002.6</td>
<td>1,985.3</td>
<td>2,987.9</td>
<td>124.0</td>
<td>12.4%</td>
<td>188.3</td>
<td>18.8%</td>
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<td>690.4</td>
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<td>68.9%</td>
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<tr>
<td>District Feeder</td>
<td>1,072.2</td>
<td>889.4</td>
<td>1,961.5</td>
<td>121.9</td>
<td>11.4%</td>
<td>851.8</td>
<td>79.5%</td>
<td></td>
<td>98.4</td>
<td></td>
<td>9.2%</td>
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<td>Local Access</td>
<td>310.8</td>
<td>478.4</td>
<td>789.2</td>
<td>43.4</td>
<td>14.0%</td>
<td>182.8</td>
<td>58.8%</td>
<td></td>
<td>84.5</td>
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<td>27.2%</td>
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<td>310.8</td>
</tr>
<tr>
<td>Local Town</td>
<td>102.4</td>
<td>31.6</td>
<td>134.0</td>
<td>5.5</td>
<td>5.4%</td>
<td>13.3</td>
<td>13.0%</td>
<td></td>
<td>83.6</td>
<td></td>
<td>61.6%</td>
<td></td>
<td>102.4</td>
</tr>
<tr>
<td>Other</td>
<td>62.9</td>
<td>3.3</td>
<td>66.2</td>
<td>38.7</td>
<td>61.5%</td>
<td>12.7</td>
<td>20.2%</td>
<td></td>
<td>11.5</td>
<td></td>
<td>18.3%</td>
<td></td>
<td>62.9</td>
</tr>
<tr>
<td>Totals</td>
<td>11,315.0</td>
<td>4,942.9</td>
<td>16,257.9</td>
<td>2,668.8</td>
<td>23.6%</td>
<td>3,466.9</td>
<td>30.6%</td>
<td></td>
<td>5,179.3</td>
<td></td>
<td>45.8%</td>
<td></td>
<td>11,315.0</td>
</tr>
</tbody>
</table>

Source: RAMS Project
17. More than 70 percent of the length of the national network are unpaved (Figure 2 and Figure 3); some are non-engineered earth roads that probably ought to be taken out of the national network. Of the length surveyed for RAMS, 30 percent of national roads are in good condition, compared with only 11-12 percent for all others (Figure 4 and Figure 517). 55 percent of the length of national roads are in bad condition18.

18. The distribution of road roughness for the surveyed network is shown in Figure 6. 61 percent of the length of paved roads have IRI values of 8 or less, while only 22 percent of unpaved roads do19. Only 28 percent of national roads have a roughness of 8 IRI or less (Figure 7), while an even lower proportion – 20 percent – of provincial roads do.

3.1.3 Asset Management

19. The failure to maintain roads reflects several inter-related factors. At their heart is the most critical: inadequate and unreliable funding. As Section 3.1.4 shows, maintenance expenditures have been only a small fraction of the amounts budgeted, and the amounts budgeted have covered only a small proportion of estimated needs. So roads have deteriorated, as have the skills and morale of DOW staff, the quality of management and the operational procedures, controls and standards needed to run the organization efficiently and effectively. A decade or more ago, PNG had a road network of good quality and a public works organization that was respected

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17 Figure 2 and Figure 5 have been plotted from RAMS data for 2000, not the latest data from 2002 and 2003.

18 Surprisingly, the proportion of the length of provincial roads in bad condition is less, at 35 percent, and of district roads even less, at 9 percent. This is probably due to different methods of classification: the condition of national roads is based on roughness, in IRI units (see footnote 19), measured by NAASRA roughness meter, while that of provincial and lower-level roads is based on a visual assessment of pavement damage.

19 IRI = International Roughness Index. A new asphalt concrete pavement has a roughness of 3-4 IRI. A sealed pavement starts to break up when its roughness approaches 8-9 IRI. A road with a roughness of more than 12 IRI is in a very deteriorated condition, with average vehicles speeds of only around 10-20 km/hr possible.
internationally. Now, as the FER pointed out, it fails to manage the network effectively and suffers from widespread management weaknesses and low staff and equipment productivity.

**Figure 4: Proportion of Surveyed Road Lengths by Condition, 2002**

20. Because of limited budgets, few new roads have been built in recent years, other than in urban areas. By default, priority has been given to emergency repairs and rehabilitation, the latter mostly with donor assistance. Following pressure from users and donors, and with a growing recognition of the economic costs imposed by poorly-maintained roads and bridges and the significant benefits of preventive maintenance, efforts have been made to develop improved systems and procedures for asset management. At the same time, options for establishing a more reliable system for funding road and bridge maintenance have been reviewed.

21. Under the RAMS project, a computerized road asset management system has been established for the national road network\(^{20}\) and is being established for provincial, district and local roads. Based on road condition and traffic surveys and the use of HDM-4 to evaluate alternatives\(^{21}\), RAMS can determine the optimum maintenance strategy for each link, i.e. the combination of major reconstruction, routine maintenance and periodic maintenance cycles that would maximize the economic return from a given budget. Central and provincial government staff have been trained in the survey, data coding/entry, systems development, analysis, feasibility study and budgeting tasks associated with the system. The surveys were carried out by POOW and PWU staff.

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\(^{20}\) This replaced an earlier system, Maresman, that had been allowed to fall into disuse.

\(^{21}\) HDM (Highway Design and Maintenance Standards Model) analyses the future streams of agency and user costs under alternative road maintenance strategies. Developed with support from the major donor institutions, it has been used extensively throughout the world. HDM-4 is the latest version of the model.
Figure 5: National Roads – Distribution by Condition, 2000
Figure 6: Distribution of Road Roughness, All Surveyed Links, 2002

![Distribution of Road Roughness, All Surveyed Links, 2002](image)

Figure 7: Distribution of Roughness, Surveyed National Roads, 2002

![Distribution of Roughness, Surveyed National Roads, 2002](image)

22. The principles used for the national network are also applied to maintenance strategies and budgeting for the sub-national networks, but only for provincial roads designated as trunk roads; the remainder carry so little traffic (see Section 3.1.5) that the main concern is simply to keep them open. The provincial version of RAMS has been supplied to the PWUs and training workshops held. Provincial RAMS Units (PRUs) are being established and Memoranda of Understanding (MOU) signed between DOW and provincial administrations in an attempt to ensure committed resourcing of the PRUs and the continued use of RAMS for maintenance priority-setting and budgeting. Analysis of priorities over the whole network is done at DOW headquarters, with the results sent in read-only format to the PRUs.
23. After an initial delay, RAMS now appears to be accepted as the basis for road maintenance budgeting and prioritizing. There were criticisms by the FER in 2001, but DOW now appears to have more successfully integrated the RAMS evaluation of priorities into its budget preparation and works programming – this is not to say, however, that the resulting budgets and expenditure warrants adequately reflect needs. RAMS is also used to evaluate candidate maintenance works for donor-funded projects. DOW’s management appears to have confidence in its results. Equally importantly, RAMS is recognized by the financial and planning ministries as a rational basis for allocating funds. This should help strengthen DOW’s claim on budgetary resources. The main problem, however, remains that the amounts actually made available to DOW for rehabilitation and maintenance fall far short of the needs assessed by RAMS.

24. RAMS does not prioritize bridge maintenance needs. DOW has a Bridge Inventory and Management System (BIMS), but it is not functioning. Under its Road Maintenance and Rehabilitation Project (Loan 7119-PNG) the WB is supporting a new TA project to address this shortcoming. The TA is due to start in January 2004 and to be completed over 18 months.

3.1.4 Funding

25. Funding for road development, rehabilitation and maintenance comes from four main sources, of which the first two are the most significant:

- DOW’s road maintenance budget for national roads;
- foreign loans for road projects, for which DOW is usually the executing agency and is supposed to provide counterpart funding from its budget;
- the Infrastructure Development Grant (IDG) from the national government to the provinces (Kina 32 million budgeted in 2000), although (according to provincial budget submissions) roads generally receive only a small proportion of the total for these; and
- provincial governments’ own revenues.

26. There have been significant fluctuations in annual maintenance expenditures for national roads (Figure 8), but as a proportion of estimated needs expenditure has been in decline since the late 1980s; in 2001 it covered only 10 percent of what was estimated to be required. Even when budgeted expenditure was raised by 120 percent in 1999 over the level of 1998, it still accounted for only 30 percent of estimated requirements. The 2003 budget has been very significantly increased to Kina 291 million (Kina 85 million for the Highlands Highway and Kina 206 million for other roads and bridges, including donor-funded projects), but disbursements are already running well below the average monthly amount budgeted.

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22 RAMS is also able to demonstrate the additional economic costs imposed on users by budgeting insufficient funds for maintenance.

23 This points to a further failing of the budgeting system. Even when funds are allocated, they are usually not released by the Department of Treasury (DT) without considerable delay, making contracts management very difficult and adding to contractors’ costs.
27. Details of spending on provincial/district roads are not readily available; a survey of records held in the provinces would be necessary. In some cases provincial budget documents submitted to the Department of Finance (DOF) identify road projects funded from central government grants – notably the IDG – but the distinction is rarely made between maintenance and capital works. Road maintenance spending from the provinces’ own revenues is rarely itemized. And some (though probably not much) road maintenance spending comes out of provincial transfers to district and local-level government agencies, which are also not itemized.

28. The 2000 Road Sector Cost Recovery Improvement Project (RSCRIP) is one of several that have drawn attention to this chronic under-funding of road maintenance. It found that road user costs25 in 1999 were some Kina 200 million higher than they would be if adequate maintenance had been carried out. It estimated that the optimum level of road and bridge maintenance in the long run – the level that minimizes both agency and user costs once failed sections have been reconstructed or rehabilitated – was about Kina 175 million in 1999 prices: Kina 90 million for national roads and Kina 85 million for provincial/district roads. These figures are confirmed by more recent estimates (see Section 6.2.1). According to RSCRIP, raising annual expenditure to Kina 175 million (1999 prices) would have given users a 20 percent saving in vehicle operating costs (VOCs): 15 percent on national roads and 30 percent on provincial/ district roads.

29. In spite of some Kina 136 million p.a. already collected (in 1999) in taxes and charges from road users and channeled into consolidated revenue, the study recommended an additional, independent system of funding for road rehabilitation and maintenance, financed by new user charges. This was because DOF would not

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25 These include the costs of vehicle wear and tear, fuel and oil consumption, tire wear and vehicle maintenance.
contemplate diverting funds from programs in other sectors at a time of tight budgets. Under the RSCRIP proposals, the revenues from user charges would be channeled through a Road Fund (RF), managed by an independent Board held accountable under legislation and with a majority of private-sector members. Allocation of the Fund’s proceeds would be on the basis of RAMS analyses of priorities. They would not be permitted to be used for any purpose other than road rehabilitation and maintenance.

30. These RSCRIP proposals have been widely circulated and discussed, and there is general agreement that they should form the basis for any new RF. But with rising inflation, political instability and two intervening elections, it has proved difficult to implement them. Only now, with the most recent change of government and growing public concern about the state of the national network, does there appear to be the political will to carry them forward. Legislation was passed in May 2003 to enable the establishment of a National Roads Authority (NRA) whose responsibilities would include management of a RF. A Road Authority Development Project (RADP) is currently helping to update and refine the RF proposals for implementation. These initiatives are further discussed in Sections 4.2 and 6.1.

3.1.5 Road Transport and Traffic

31. The Department of Transport (DOT) is responsible for national transport policy formulation, planning, safety and the regulation of transport operations. The National Land Transport Board (NLTB) implements these policies in respect of driver licensing, vehicle safety and inspection, licensing of heavy vehicles on inter-provincial routes, for-hire transport and motor-vehicle dealerships. DOT’s Land Transport Division (LTD) acts as the Board’s secretariat. Provincial land transport boards regulate commercial passenger and goods transport within the provinces, though in practice there is little effective control.

32. While DOT has policies for regulating road transport and traffic – involving a relaxation of unnecessary controls to encourage competition, improved cost recovery to make users face the full costs attributable to them and better policing – it has failed to implement them effectively. It has been unable to control unauthorized vehicle modifications and vehicle overloading, which (apart from lack of road maintenance) is the most critical cause of road damage. Its administration of service licensing fails to strike a reasonable balance between supply and demand and, as Section 3.1.6 shows, to uphold safety standards. No system of cost recovery for infrastructure has yet been implemented. And the system of enforcement of traffic regulations fails to prevent a terrible accident toll.

33. Provincial governments are responsible for registering vehicles. They report their statistics to LTD, but do so in no systematic or consistent way, and no consolidation, analysis or reporting is done. The latest year for which vehicle statistics were published by the National Statistical Office (NSO) is 1988, when the fleet was a reported 49,171 vehicles. Efforts were made by DOT to assemble statistics for 1994 and 1995 from provincial sources, but gaps in the provincial returns make these unreliable. There is an urgent need for a renewed effort to put in place a reliable system for maintaining statistics on the numbers of vehicles registered in the country.

34. The state-owned Motor Vehicles Insurance Trust (MVIT) provides compulsory third-party insurance for motor vehicles. Figures supplied by them in 2000 indicated an insured fleet in 1999 of just over 60,900 vehicles, though there
were discrepancies between these and figures obtained directly from selected provinces\textsuperscript{26}. The proportion of uninsured vehicles on the roads is not known.

35. Routine traffic counts have been reintroduced under the RAMS project, having earlier ceased to be carried out. The RAMS database includes estimates of annual average daily traffic (AADT) for each link in the national network. Figure 9 shows the frequency distribution, based on the latest data, for the 6,479 kms on which traffic surveys have been carried out. Levels of traffic are very low indeed: 74 percent of the length of the national network carries less than 500 vehicles per day and 89 percent less than 1,000 vehs/day. Traffic on the provincial and lower-level networks is even lower.

![Figure 9: Distribution of Daily Traffic, National Roads](image)

36. According to RAMS figures, total vehicle-kms of travel on the national roads for which traffic survey data are available (i.e. on 6,479 kms of the $\pm 25,000$ kms of all roads throughout the country) amount to 291 million p.a. This compares with 1,118 million p.a. estimated by the RSCRIP for 1999 for the country’s network as a whole, which was at the time broadly consistent with estimates of annual transport fuel consumption and average vehicle utilization rates.

3.1.6 Road Safety

37. According to data from the early 1990s\textsuperscript{27}, some 300 people are killed in traffic accidents each year and over 3,000 injured, one of the highest accident rates in the region. Many accidents go unrecorded. The National Road Safety Council (NRSC) estimated that the direct economic cost of road accidents was as much as Kina 200 million in 2000. The main causes of traffic accidents are drunk driving, inadequate road safety awareness by drivers and pedestrians, an absence of uniform traffic

\textsuperscript{26} Source: RSCRIP. Op. Cit.

\textsuperscript{27} Source: ADB TA 1658-PNG, PNG Institutional Strengthening in Road Safety and Traffic Management, Final Report, December 1996.
engineering standards, hazardous road locations (accident blackspots) and inadequate enforcement of traffic rules28.

38. Over the years, DOT has achieved little in trying to reduce the accident toll. Several TA projects in the late 1980s and early 1990s tried to establish a road safety and traffic management capability but with no lasting success. Computer equipment was provided to record and analyze traffic accident statistics29, training was given in traffic accident reporting and analysis, projects were implemented at blackspot locations, research was carried out into the causes of accidents and training was given in developing low-cost remedial measures. All to little avail. There is still no reliable source of information on traffic accidents and their causes. Accident reporting forms have fallen into disuse. No qualified or experienced staff remain. Notwithstanding a 1996 policy, DOW has not effectively integrated a safety audit function within its design procedures. Safety programs set out in the 2001-2010 NTDP have gone largely unfunded. There appears to be little practical commitment by DOT and DOW to improving the situation.

39. On the other hand, there has been some success in establishing the NRSC, responsible since 1999 for promoting road safety. The Council is chaired by DOT but its membership includes representatives of concerned government and private agencies30. Funded from a 5 percent levy on MVIL third-party insurance premiums, its budgets do not suffer from the whims of the government budget appropriation process. It seems to have displaced the Road Safety and Traffic Management Branch (RSTMB) of LTD as the country’s main road safety and traffic management agency. Its main efforts are in funding small projects to educate the community in matters of road safety, raise standards of traffic enforcement and bring stakeholders together in tackling the issues.

3.1.7 Roads and Rural Access

40. The problems of rural isolation were mentioned in Section 2.5. Little is known about the impact of deteriorating accessibility on life in rural communities, but the overall trends are evident in lower standards of health and education, declining availability of goods and services, and high-cost and unreliable transport services. Whereas in the past people could carry a basket of vegetables or bag of coffee for market to the nearest road-head (which might often be 10 or more kms away) knowing that a transport service will be available there, they now risk finding none available and their produce going to spoil. The sick can no longer be assured of access to a clinic or hospital, and the medical services available there have deteriorated too, partly due to the increased costs of transport.

41. A series of studies – under a program known as Joint Studies into the Transport Process31 – were carried out during the 1970s and 1980s into the micro-economic impacts of improved road access. They traced the generally beneficial

28 Source: 2001-2010 NTDP.
29 Using the Microcomputer Accident Analysis Package (MAAP) developed by the UK Transport Research Laboratory (TRL) and commonly used in other developing countries.
30 Apart from DOT and DOW, these include the Traffic Division of the Police, the University of PNG, UniTech, MVIL, the Chamber of Commerce and Industry, NCDC and the Departments of National Planning and Rural Development, Education and Health.
31 Funded jointly by the then Department of Transport and Civil Aviation (DTCA) and the Geography Department of the University of Papua New Guinea (UPNG).
changes that occurred in the range and types of goods produced, the development of
marketing channels and access to external markets, the increased incomes, the greater
availability of consumer goods in trade stores, medicines and medical services,
increased school enrolments and the greater awareness of events outside the village
boundary. A WB-funded study carried out in 1980/81, the Provincial Rural Transport
Project\textsuperscript{32}, found a strong relationship in five pilot provinces between the levels of
goods traffic and personal travel (whether by road, river or coastal shipping) and
accessibility, measured in terms of generalized transport cost to the nearest provincial
capital\textsuperscript{33}. These relationships were used to predict the response of rural communities
to improved rural transport access and were incorporated in a Provincial Rural
Transport Planning Manual\textsuperscript{34}.

42. Now, the situation is in reverse. Accessibility standards are declining. Already
some 35 percent of the population live more than 10 kms from a national road (Figure
10) and 17 percent from any road at all (Figure 11), and the roads are getting worse.
Transport costs are between 40 and 60 percent higher in real terms than before, when
they were better maintained\textsuperscript{35}. Activity levels are consequently falling. Fewer market
opportunities are available. There is less cash in people’s pockets, and they can afford
fewer daily necessities. They are probably eating less. People are reverting to a
subsistence living or deserting the rural areas for the (dim) prospect of employment in
urban centers. It remains to be seen how this will affect community welfare, but
health and education indicators are generally falling and there appears to be a growing
disenchantment with the efforts of government, manifest in lawlessness.

3.2 Ports and Shipping

3.2.1 Infrastructure and Services

43. With its dispersed population, PNG’s air and coastal shipping services take on
special significance in providing access to rural communities. 46 airports and
numerous airstrips serve a network of scheduled, charter and missionary air services,
even to some very remote communities, but the costs of air transport prohibit all but
emergency trips. 17 commercial ports, mostly very small, and innumerable small
wharves, jetties and beach landings provide the basic infrastructure for maritime
services, but the majority of these are in poor condition and carry very little traffic.
The ports serving Port Moresby, Lae, Madang, Kimbe, and Rabaul carry international
and coastal traffic and have a reasonable level of infrastructure, but lesser ports,
ranging from those at Wewak, Kavieng, Oro Bay and Alotau to mere timber jetties
and beach landings, provide only a basic service for coastal traffic and are often
unusable in bad weather. Many landings involve loading and offloading over the
ship’s side from/to small village “banana” boats and canoes.

\textsuperscript{33} “Generalized” cost combines the fares paid with estimates of the time taken for transport.
\textsuperscript{34} The Manual has unfortunately fallen into disuse, but the relationships were used again in 2002, with updated
cost figures, to predict demand for community water transport services under the ADB-funded Community Water
Transport Project (CWTP).
\textsuperscript{35} This takes account of the effects of road conditions, lower vehicle productivity and the rising costs of imported
fuels and vehicle components.
Madang, serving many small coastal vessels, and Kimbe, serving agricultural exports, are the most frequently visited ports, but Port Moresby, Lae and Rabaul handle the most cargo; most imports pass through Lae and Port Moresby. Lae is the main import/export point for the populous Highlands region, the goods moved from/to the port by road. Annual throughput by the major ports has been growing at about the rate of population growth with import/export tonnages (increasingly containerized, but also including a growing logging trade) accounting for about a third of the total and most of the growth. Passenger cruise visits have started to grow again, albeit from a low base. Coastal passenger operations are significant between the larger centers
like Lae, Madang, Kimbe, Kavieng and Buka, but recent falls in traffic have led to some service reductions. Community-based services also extend to many smaller coastal villages, often in small, open, over-loaded craft operating over stretches of open sea without safety facilities or navigation aids (nav aids).

45. Coastal services are of several types provided by36: primary shipping lines, with scheduled or semi-scheduled services mostly focusing on the major ports; secondary shipping lines, also providing scheduled or semi-scheduled services to a mix of large and small ports; specialized, smaller and often regional shipping companies providing specific services to industry, including charters; operators of small commercial craft providing general goods and passenger services; community-based organizations providing semi-commercial services mostly for their own members; and subsidized provincial government services.

46. Services in the first of these categories are provided by two lines, both carrying only cargo. One operates strictly as a liner service, the other semi-scheduled and chartered services with departures depending on cargo availability. There is one main secondary carrier serving northern coast and island ports – from Alotau in the east to Vanimo in the west, and as far north into the islands as Buka – carrying both passengers and cargo. A second operates a mix of cargo, passenger and cargo/passerger vessels from a base in Rabaul.

47. For the most part, even between Port Moresby and Lae, the coastal routes are poorly-equipped with navaids. The Fly River and its estuary is an exception; there, navaids are maintained by private mining and oil companies. Elsewhere, local companies and community groups operate largely without charts or navaids and rely on the local knowledge and skills of their ships’ masters. Sudden storms, mangrove swamps, shifting mud and sand banks and floating obstructions make journeys hazardous. Simple, low-cost navaids would significantly reduce the risks involved.

3.2.2 Institutional Arrangements

48. The 1980 Merchant Shipping Act and the 1976 PNG Harbours Board Act provide the legal framework for maritime sector management. DOT is responsible for all maritime safety matters. It is organized into an Office of Transport (OOT), an Office of Civil Aviation (OCA), recently transformed into a Civil Aviation Authority (CAA), and a Policy and Planning Division, each headed by a Director. OOT’s maritime responsibilities, implemented through its Maritime Transport Division (MTD), include ship surveys, inspection, and port state control (PSC); navigation aids; marine search and rescue (SAR); monitoring and control of oil pollution; small-boat safety awareness and education; and hydrographic surveys.

49. MTD is planned to undergo transformation shortly into a National Maritime Safety Authority (NMSA) – see Section 4.3.1 – but currently has two branches: the Maritime Safety Branch (MSB) and Shipping Administration Branch (SAB). It is represented by offices in Port Moresby, Lae, Madang, Rabaul, Alotau, Daru and Angoram, the last of these serving river traffic.

50. MSB is responsible for maritime safety and safety-related infrastructure. Its functions include installation and maintenance of navaids; coordination of SAR services; prevention of oil spills and environmental disasters; registration and

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licensing of vessels over 10 m in length; PSC; small-boat safety; hydrographic surveys; and ensuring that PNG’s maritime safety obligations under international conventions are met. MSB has a depot in Madang, where it also bases its vessels Sepura (recently disposed of) and Kulasi, an inventory of navaids spares and maintenance equipment. For SAR operations, it has a small fleet of catamarans and for hydrographic surveys a 26 m purpose-built hydrographic survey vessel.

51. The SAB is responsible for issuing certificates to ship owners wishing to register their vessels in PNG; maintaining the PNG register of ships; advising the Coastal Trade Committee (CTC) on the issuing of coastal trade licenses and permits; certifying seafarers, including foreign seafarers, working in PNG waters; clearance of foreign naval vessels; collecting the PNG Maritime College Levy; ratifying international maritime conventions and treaties; liaising with international maritime agencies; preparing maritime legislation; and making recommendations on freight rates and bunker charges to the Consumer Affairs Council (CAC).

3.2.3 *Maritime Safety and Environmental Protection*

52. Standards of maritime safety are poor. MSB fails to maintain adequately the system of navaids. Out of a total of 166, only 96 navaids were operating in 2000. Most of the rest are in need of repair or replacement. There is virtually no maintenance. When failures occur, months often pass before faults are reported. No notification is given to ship operators, who no longer trust the system and resent the imposition of light dues intended to fund navaids maintenance and repair.

53. The reasons for this deterioration in infrastructure are similar to those that affect the roads sector. They include inadequate and unreliable budgets, the inherent inefficiencies and lack of incentive associated with MTD’s departmental structure, poor management performance, lack of technical standards and management controls, land disputes, community alienation and vandalism.

54. The lack of navaids affects both major shipping operations and community services. The former can sometimes make do with their own equipment, but often have to make expensive detours to reduce risk. Community services commonly make dangerous journeys in hazardous waters without help from markers or lights. These add to the costs of sea transport, affecting incomes and impacting on producers and consumers at all levels.

55. PNG has no effective capacity for marine surveying or charting, nor capacity to issue its own hydrographic charts, instructions to mariners or marine publications. Utilization of its specialized hydrographic survey vessel is minimal. PNG’s sea area amounts to some 1.7 million sq km, only about a tenth of which has been properly surveyed. Most charts are old and fail to identify accurately shoals, reefs and other hazards. They are rated by the International Hydrographic Office (IHO) as not meeting minimum standards, with several unacceptable for safe navigation. The Royal Australian Navy (RAN) is helping with new surveys at a rate of about 300 sq km p.a. Lack of adequate charts means efficient route planning cannot be done. Risks

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37 The PNG Maritime College provides vocational, technical and management training to seafarers. It also conducts examinations to certify seafarers for PNG waters. It is funded by a levy on shipping and comes under the responsibilities of the Department of Education, though DOT is represented on its board.

38 Source: MTD.
are increased; insurance premiums, hence shipping charges, are consequently higher. Resource exploration and development is delayed and made more difficult and costly.

56. PNG is party to international conventions on SAR, including the 1974 SOLAS and 1979 IMO SAR Conventions, but its SAR operations fall short of the standards required by these conventions. When MSB receives a distress call, theoretically it can call on its own SAR resources, enlist the help of commercial aircraft or hire fixed-wing aircraft or helicopters, but communications problems and shortages of funds often delay the response, increasing the risk of loss of life.

57. In 1997 IMO introduced the Global Maritime Distress and Safety System (GMDSS) to modernize ship rescue operations worldwide. All ships in international waters are required to carry GMDSS equipment, and each member country should have land-based facilities to support the system. Preparations have been made to install GMDSS coastal radio stations at Port Moresby, Lae, Rabaul and Wewak, but funding has not yet been committed.

58. Currently there are no requirements that vessels under 10 m be registered and tested for seaworthiness, carry compulsory safety equipment, observe safety procedures or follow preferred routes. The extension of such controls to small vessels would undoubtedly help reduce the risk of accidents.

59. MSB also fails to fulfill its responsibilities for protecting the marine environment by controlling oil spillages. It has the equipment: oil spill booms, mechanical floating skimmers and other equipment to confine and remove oil were provided under the 1998 ADB Transport Infrastructure Development Project, together with training in the use of the equipment. Even so, it is ill-prepared for a serious spill. Arrangements have been made between PNG and Australia for assistance in the event of an incident.

3.2.4 Funding

60. MSB is funded from the national budget, even though it is authorized to collect revenues from Navigational Aids Contributions (NAC), known as “light dues”, levied on domestic and international vessels under the Merchant Shipping Act. These light dues were increased by 75 percent in 2000 but have not kept up with inflation. Because vessel operators receive very little service in return, there is resistance to the levy and collection rates are poor.

61. The NMSA, to take over the safety-related functions of MTD, is intended to be a self-funding Authority with control over its revenues and expenditures. Its main revenue sources will be: the NAC, which was to be increased again in 2003; a new Protection of the Sea Levy (PSL, previously the Oil Pollution Levy), to be introduced under a Protection of the Sea Levy Act intended for promulgation in 2003; and a new Maritime Safety Regulatory Functions Levy (MSRFL), planned to be introduced in 2004. Altogether these levies were expected to contribute revenues rising from a projected Kina 3.55 million in 2003 to Kina 14.09 million in 2011, when the Authority is expected to move into profit. On a cash-only basis, the Authority was expected to be in positive cash flow from 2004 onwards.

3.2.5 Shipping Industry and Registration

62. SAB is responsible for registering all vessels above 10 m in length, of which there are at least 500. The ship registry records details of the dimensions and tonnages of each vessel, as well as ownership, mortgages and transfers of interest. But
information on the portion of the fleet most at risk – vessels under 10 m – is lacking entirely. If approved, the ADB Community Water Transport Project (CWTP), currently under preparation, will incorporate several initiatives to strengthen small-boat safety practices and associated infrastructure.

63. SAB’s procedures for vessel inspections and seafarer certification and registration appear to work reasonably effectively. Vessel inspections are carried out by regional MTD staff or by classification societies; there is some scope for the development of domestic inspection services. The tasks of seafarer certification and registration are delegated to the PNG Maritime College. Although no specific funding is given to the College for this task and there is little effective auditing of its activities, it is believed to carry out its task conscientiously.

3.3 Airports and Civil Aviation

3.3.1 Services and Infrastructure

64. For its size and population, PNG has a relatively well-developed system of air services (though it has been more extensive in the past), necessitated by its topography, the isolation of pockets of population and the difficulties in establishing road access. The main carrier is state-owned Air Niugini (AN), which operates a fleet comprising a Boeing B767, four Fokker F28-4000s, one F28-1000 and two Dash-8 200s. AN operates international services between Port Moresby and Brisbane, Cairns and Sydney (code-shared with Qantas39), Honiara, Manila and Singapore. Its domestic services are to 20 out of a total of 46 airports/airstrips in the country: Alotau, Buka, Goroka, Kavieng, Kimbe/Talasea, Kundiawa, Lae, Lihir, Madang, Manus, Mendi, Mount Hagen, Popondetta, Port Moresby, Rabaul (Tokua), Tabubil, Tari, Vanimo, Wapenamanda and Wewak. Secondary airlines, including Regional Air, National Jet, Hevi Lift and Airlines PNG, operate scheduled and charter services; additional services to the more isolated communities are provided by missionary groups.

65. Government policy encourages competition in air services, but the market is very thin and AN holds an effective monopoly over most important routes. Even so, its financial performance has been very poor, the result of low load factors, poor selection of aircraft (AN recently terminated the services of a high-cost Airbus A310-324), lack of investment, heavy debt repayment obligations, poor management and the difficulty of meeting dollar-denominated costs with revenues largely in devalued Kina. An attempt to sell 49 percent of the airline in 1998 failed; it is still the Government’s policy to privatize, but this is unlikely until its financial performance improves. This would require significant staffing cuts (it has some 200-300 excess staff) and other cost savings, for which a program recently re-commenced. In November 2002 AN announced a currency and fuel surcharge of 17.75 percent on domestic airfares and 20 percent on international airfares. This was in response to a 48 percent increase in fuel prices between January and November 2002 (and an expected 5 percent further increase forecast for December) and a significant decline in the Kina/USD exchange rate in the same period, both impacting severely on cash flow.

66. In common with the equivalent facilities in the maritime sector, airport and air safety infrastructure has suffered from funding shortages. With lack of Government budget-funded investment and maintenance, there has been a deterioration in the

39 AN operates on a full Code Share basis with Qantas the newly leased B767 on services to Brisbane with extensions to Sydney, and the F28 fleet on the Cairns route.
condition of runways, taxiways, aprons and visual aids in most major airports and of runways at secondary airports, frequently causing the diversion and cancellation of services. An AusAID-funded Airport Maintenance Project (AMP) is currently providing assistance with the restoration and maintenance of airport facilities, as well as the preparation of new regulatory material to upgrade the air safety standards and practices of the new CAA. This project follows on from an earlier AusAID-funded Airport Maintenance and Upgrading Project (AMUP) completed in 2000.

67. In the longer term, sustainability of airport and air safety infrastructure maintenance is intended to be ensured by the CAA’s requirement to cover its costs through user charges. It has not achieved full cost recovery yet. Its annual deficit is running at about Kina 8 million.

3.3.2 Institutional Arrangements and Air Safety

68. In addition to the AMUP and AMP, AusAID has played a major role in helping to strengthen other aspects of air sector management, notably through reform of institutional arrangements under the Balus program. The main aim of Balus was to transform the OCA into the CAA, taking over responsibility and being held accountable for airport development, management, operations and maintenance; the development, operation and maintenance of navaids; provision of civil airport fire services; certification of air service operators, aircraft and air crew; air accident investigations and safety inspections; and provision of meteorological services. AusAID is continuing its support for the CAA under the AMP, providing new Civil Aviation Rules (CAR), guidelines on airport certification, operation and maintenance, and aerodrome charts and obstacle surveys.

69. Establishing the CAA under the CAA Act 2001 was a major step in the Government’s reform agenda, an attempt to move from a bureaucratic departmental structure to an accountable and financially self-sufficient authority responsible for infrastructure. But it has not been successful. The transition process suffered from several shortcomings that have compromised CAA’s ability to offer efficient, well-managed services to its airline customers. These offer useful lessons to other sub-sectors. They include:

- the appointment of an ineffective Board that lacked independence, integrity and financial management capability (the Minister eventually replaced the Board in November 2002);
- the appointment of a Chief Executive Officer (CEO) and senior management who lacked commercial management experience and were unable to adopt the new businesslike approach required by the CAA (the CEO was recently replaced);
- a misguided decision to allow staff to transfer from the OCA to the CAA, carrying with them their bureaucratic attitudes and accumulated entitlements as public servants and resulting in considerable excess staff numbers over needs; and
- an apparent reluctance on the part of Government fully to delegate decision-making to CAA’s management, with key decisions on major expenditures continuing to be dictated by the National Executive Council (NEC).

70. CAA’s management has not yet adjusted to the new business-like environment and customer-oriented approach expected of it. Effective financial management and
reporting systems are still not fully in place. There appears to be little effective control over costs and revenues. Ill-considered investments are still being put forward for Government budget support. Systems and procedures have still not been put in place to satisfy the safety-related requirements of international agreements and conventions. These concerns have prompted the Minister – supported by the airline industry – to replace key staff and to require an immediate action plan to address the management and financial shortcomings.

3.4 Problems and Issues

3.4.1 Problems and Issues in the Roads Sector

71. In September 2001, the Government’s Public Sector Reform Management Unit (PSRMU) submitted its draft Functional and Expenditure Review (FER) of the then Department of Works and Transport (DOWT) to the Central Agencies Coordinating Committee (CACC). The report found that, despite almost 2,900 staff and a FY2001 appropriation of Kina 305 million, DOWT failed to discharge many of its responsibilities, including maintaining the road network. It failed to apply and control most of its established systems and procedures. It suffered widespread management weaknesses. It had an unreasonably high level of unproductive administrative overhead. Staff productivity and morale were low. It paid little attention to staff development. Its equipment was underutilized and deteriorating. And – most importantly of all, and certainly a contributing factor in all the above deficiencies – it had suffered serious shortfalls in funding every year for at least the previous decade.

72. Some 100 recommendations were made by the FER. For road maintenance, they included: (to address the shortfall and unreliability in funding) adopting a system of road cost recovery through a RF as recommended by the 2000 RSCRIP; (to address criticisms that RAMS had not been effectively institutionalized nor its procedures fully adopted) appointing and motivating permanent, trained staff to the RAMS unit, carrying out annual road condition surveys and traffic counts, providing support for the use of RAMS and providing continuing training in maintenance management systems; (to address non-compliance with systems and procedures) requiring managers and supervisors to fulfill their duties and re-appointing regional works managers; and (to address the poor quality of maintenance works) increasing the use of contractors, ensuring effective supervision of their work and outsourcing maintenance supervision services.

73. The FER recommended that ultimately, once relieved of functions more appropriately transferred elsewhere, DOWT should be transformed into a NRA with its road maintenance responsibilities financed through a dedicated RF.

74. It has long been recognized that the road sector’s underlying problems require new ways of securing reliable and sustainable funding from user charges rather than relying on annual budget appropriations, and making management more business-like.

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40 In December 2002, Australia’s Civil Aviation Safety Authority (CASA) wrote to Air Niugini and the four other PNG operators holding Australian foreign aircraft Air Operator’s Certificates (AOCs) to advise that they should not presume the AOCs would be extended beyond the end of January 2003. This was as a result of concerns about CAA’s capacity to carry out its safety oversight responsibility in accordance with its obligations under the International Convention on Civil Aviation (ICAO).

41 DOWT’s responsibilities included public building maintenance, architectural and other services unrelated to its main task of managing the road network.
and accountable with stakeholders involved in deciding how the funds they contribute are spent. There is widespread support for reform along these lines in government and the private sector. Though not without their own shortcomings, the PMG proposals made by the CIMC are indicative of a feeling that the present bureaucratic system has failed and that it is time for radical change. Piecemeal efforts to address the problem in the past, mostly through a temporary injection of funds, have not had lasting benefits. The present way of managing the network is becoming recognized as an old-fashioned model in which roads are treated as a free public good with no sense of their economic value. There are few incentives to make management efficient or responsive to users. Public officials are not held accountable for the network’s condition – how can they be, if funding through the budget is so unreliable? In short, the present system does not work. It fails to prevent wasteful deterioration of public assets estimated to have a replacement value of at least Kina 5 billion and excessive costs (amounting to at least Kina 200 million p.a.) imposed on users.

75. The fundamental change needed would treat roads as essential economic assets, subject to normal business principles: maximizing investment returns, minimizing asset depreciation and maximizing efficiency. The essential features – all of which are necessary and most of which are reflected in the current NRA legislation – would be: (i) more reliable and adequate funding; (ii) more autonomous, accountable road network management, more representative of road users, freed from the constraints imposed on public employees and subject to market pressures to control costs, raise standards and meet the needs of users; (iii) better planning, so that road expenditures are allocated according to rational criteria, including that of poverty reduction; (iv) tighter budget controls and better supervision of expenditures; (v) increased opportunities, facilitated by the regulatory environment, for infrastructure and service providers to respond to market opportunities where they develop; and (vi) improved regulation and policing based largely on incentive, to raise driver and vehicle safety standards, reduce emissions and reduce truck overloading.

76. While the need for and broad nature of such reforms are generally acknowledged, there are still details to be fleshed out:

- Should the NRA be responsible for all classes of road, or just national roads, or just a regional portion of the network?
- Should the NRA be responsible for road maintenance alone (and, if so, what activities does that include?) or development (capital investment) as well? Would both these be subject to cost recovery from users? If not, where would the additional funds come from?
- How can a national RF and NRA be reconciled with the delegation of road-related responsibilities to provincial and lower-level governments under the 1995 Organic Law on Provincial Governments and Lower-Level Governments? How can NRA’s criteria, priorities and procedures be applied to provincial and lower-level roads?
- In setting the NRA’s expenditure priorities, how best should the public interest – e.g. in reducing poverty and providing access to isolated communities – be reconciled with the interests of stakeholders like truck and bus operators

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42 The NRA Act makes provision for both rehabilitation and maintenance, though the RF is only to be used for maintenance.
mainly using arterial roads? To what extent should poverty objectives over-ride those of economic efficiency? What principles should govern the choice between rehabilitating a major arterial highway and maintaining a feeder road?

- Where should RAMS functions best be located? Should they be made independent of, or at arms-length from, the NRA? What measures should be taken to ensure that RAMS functions, capabilities and procedures are sustainable in the long term?

- How best should the effectiveness of the NRA be monitored and evaluated? What opportunities should be given to interested parties and the public to review its effectiveness? How best should its managers be held accountable for its performance?

- What is the most efficient and effective way to implement works carried out by the RA? How should they be supervised? What forms of contract should be used? Is there a role for day labor? Is there sufficient capacity in the private sector to carry out the required road works under contract?

- What are its implications of the NRA for the existing organization and staff of DOW? What should be done to cushion the impacts on those of DOW’s employees who do not benefit from the change?

77. These questions are being addressed by the RADP and are discussed further in Sections 5 and 6. The answers, though, have much in common with those to similar questions in non-roads sectors, discussed briefly below.

3.4.2 Problems and Issues in the Maritime Sector

78. The maritime sector also evidences a failure of government to fund needed infrastructure expenditures on a sustainable basis – in this case, on navaids and secondary ports and wharves – and to deliver safety-related services and manage assets efficiently and effectively. Just as for roads, budgets have been grossly inadequate and unreliable, expenditures have been poorly planned and managed, services are not responsive to the needs of users and institutional performance is poor, with managers largely unaccountable for outcomes. There is an obvious parallel between proposals to establish a NRA and current moves to transform MTD into the NMSA.

79. Preparation for this transformation is already underway. An ADB-funded TA project\(^4\) drafted legislation to establish the NMSA and prepared a Corporate Plan, financial projections and detailed recommendations for the transition from the MTD. These include arrangements for staff retrenchment, compensation and retraining (the NMSA will require only 40 staff, all to be appointed following open competition, while the MTD currently has 108 staff positions). The legislation was passed in September 2003.

80. Two ADB-funded projects – the Rehabilitation of the Maritime Navigation Aids System Project (Navaids Project, for short) and Community Water Transport Project (CWTP) – are crucial to the establishment of the NMSA. The Navaids Project is to be the main vehicle for upgrading navaids over the five years to 2007. It will include help with sector reorganization and support for the NMSA; development of

\(^4\) ADB TA 3619-PNG: *Maritime Sector Restructuring Project.*
new navigation channels; restoration, reconstruction or replacement of existing navaids; support for the Authority’s Community Engagement Program (CEP) to ensure effective navaids security and routine maintenance\(^{44}\); establishment of a self-reliant hydrographic survey and mapping service; and training for maritime safety and hydrographic staff.

81. The complementary CWTP would address the decline in services to remote coastal communities, with its main components being a Community Water Transport Fund (CWTF) to fund temporary subsidies for services to target communities established through competitively-tendered route/service franchises; restoration of water transport and maritime safety infrastructure, including navaids; improved small-craft safety; community support services to help maximize demand for and utilization of water transport services; and further assistance with the establishment, management and operations of the NMSA. The last of these would include funds for equipment, facilities and hardware needed by the Authority; retrenchment payments for MTD staff; settlement payments for the backlog of accumulated compensation claims by owners of land occupied by navaids; and further technical and management assistance to the Authority, particularly in navaids installation and maintenance, community engagement and financial management of the CWTF.

82. These two projects would address the main institutional and infrastructure problems facing shipping in PNG. But there are problems with timing and implementation. The legislation establishing the NMSA has been passed by Parliament and the Navaids Project has been approved and budgeted, but the CWTP, which provides crucial funds on which the establishment of the Authority depends, has not yet been approved and might not be approved until 2004. A line item exists in the 2003 budget but there is as yet no allocation of counterpart funds. Technical discussions and loan negotiations are to take place shortly with a view to agreement to proceed in 2004.

83. This delay has implications for the NMSA’s implementation schedule: the temporary absence of a critical source of initial funding means either that establishment must be delayed until the CWTP is approved, the loan negotiated and counterpart funds allocated, or that alternative sources of funds must be found. Possibilities for the latter include funds available under the ADB Public Sector Reform Project (PSRP) and a reallocation of funds from other existing or planned projects.

3.4.3 Problems and Issues in the Aviation Sector

84. The aviation sector took an early step along the path to institutional reform with the establishment of the CAA in 2001. But the transition was poorly managed and now serves as an illustration of the pitfalls to be avoided. The lessons include the following:

- There must be full agreement about the aims of reform and the strategies for achieving it, set within a consistent policy framework for the sector as a

\(^{44}\) Community service agreements will be concluded under the CEP to ensure the security and maintenance of navaids. Workshops and training sessions will be held to train communities in these navaids security and maintenance tasks. Needed tools and equipment will be provided. The backlog of land claims related to navaids will be cleared and new lease agreements signed with landowners. Procedures will be established for monitoring the condition of navaids and community performance under their service agreements, including arrangements to prosecute offenders for damage.
whole. The advantages of the planned transformation should be carefully spelled out and discussed openly with stakeholders, employees and the public.

- To avoid a carry-over of bureaucratic culture, there should be a clean break between the departmental system of management and that of the more autonomous, commercially-focused statutory authority, as has been proposed for both the NMSA and NRA. Ideally, the department’s employees should resign with compensation and accumulated entitlements paid out to those who fail to win positions in the new authority. Positions in the new authority should be advertised and filled on a competitive basis. Staff should be consulted during the process and made aware of the opportunities and job requirements in the new organization. Those that choose not to apply should be helped to establish themselves in alternatives. Those that fill positions in the new authority should receive training in the new skills required.

- Senior positions should be filled by competent, experienced managers who can demonstrate the skills needed by the more commercial, service-oriented organization. There should be no presumption that departmental managers will transfer to the new organization. Management positions should be advertised widely. Ideally, appointments should be made only after suitability assessments have been carried out by independent advisors.

- Management should be given full independence of decision-making, free from government influence. Management tasks should be spelled out clearly in job descriptions. Managers should be required by legislation to prepare corporate plans containing performance targets against which their performance can be judged and they can be held accountable. Key decisions should be transparent, open to review by interested stakeholders and members of the public.

- Supervision should be by a Board that represents the interests of stakeholders. Management should be held accountable to the Board which should, in turn, be accountable to Parliament and the public. Arrangements should be established for regular consultations with stakeholders so that the needs of customers are fully taken into account.

- Financial management systems should be in place from the start of operations. Detailed projections of costs, revenues and profitability should be available to management and updated regularly. Rates for user charges should be set to cover related costs based on efficient operations. Investments and major items of expenditure should be evaluated for their impact on service standards and financial performance. Variations from projections should be brought to the attention of managers and the Board immediately.

- Policy documents, technical standards, operating procedures, guidelines and manuals should be reviewed and updated before the authority’s operations commence. It should not be presumed that those applicable to the old department can be carried forward into the new organization.

- The opportunity should be taken to review and update the regulatory environment governing operations in the sector, ensuring the response of competitive infrastructure and service providers to market opportunities while protecting public infrastructure and raising safety and environmental standards.
85. Now that shortcomings in its establishment have been recognized, the CAA’s failings are being addressed. The new management team has been tasked with carrying out a major overhaul to raise standards of service, efficiency and financial performance. But this has been made much more difficult by the legacy of inefficiency, over-staffing and bureaucracy carried over from the old OCA structure.

86. The other key issue in the air transport sector is the difficulty of establishing profitable airline operations. With air transport demand unlikely to grow significantly, it is necessary to maintain pressure on AN to curb its costs, rationalize its fleet and maximize its revenue opportunities. This pressure will have to come from Government while the airline remains in public hands, but the sooner it is sold and its drain on the budget ended the better. Concerns about resulting cuts in services on less profitable routes should be addressed by specific subsidies to those services rather than by underwriting general airline losses. In both air transport and shipping sectors, consideration should be given to providing support for competitively-tendered route franchises, as has been recommended by the maritime sector’s CWTP.

3.4.4 Problems and Issues Common to All Transport Sectors

87. It is evident that all three transport sub-sectors have problems and issues in common, indeed in common with non-transport sectors where economic services are provided by government departments or public utilities. These include:

- inadequate and unreliable funding through the national budget, particularly for infrastructure maintenance;
- outdated and bureaucratic institutional and management arrangements that fail to provide incentives for efficiency and effectiveness;
- expenditure planning procedures that lack objectivity, are capable of being influenced for non-economic purposes and fail to address the needs of users and the poor;
- ineffective works supervision, budget/expenditure controls and financial management; and
- inadequate procedures for monitoring the efficiency and effectiveness of management and implementation activities.

88. The inability of government to budget and provide sufficient funds and to manage and control those funds efficiently is crucial. And this problem will not ease. As the Public Expenditure Review and Rationalization (PERR) is finding, the country’s financial situation has deteriorated alarmingly and urgently requires a combination of (i) strict discipline over public expenditures, including a substantial pruning of civil service numbers, (ii) a rapid overhaul of budget institutions and systems to make budgeting more reliable and re-establish effective systems of control, (iii) improvements in expenditure planning, to ensure that expenditures achieve maximum returns and (iv) efforts to raise levels of cost recovery from the beneficiaries of public services. The transport sector is no different from others in facing these challenges.

89. In addition, the sector suffers from a number of external factors, notably (i) restrictions on the use of community land subject to customary title and (ii) a lack of clarity about the division of responsibilities for infrastructure development and
maintenance – and their sources of funds – between national government agencies and provincial and lower-level administrations.

90. While most of these shortcomings have been apparent for some time, the few attempts made to address them have been ineffectual. There have been some experiments in reform, notably with the establishment of the CAA, but these have not been fully successful, usually because principles have been compromised by vested interests; in such cases, poorly-implemented reforms have strengthened resistance to needed change. Even so, the direction of needed reform is clear: a clear and consistent policy framework; more reliable funding through systems of user charges; more autonomous, accountable management of infrastructure, freed from public-sector constraints and subject to market pressures to control costs, raise standards and meet the needs of users; increased community “ownership” and stakeholder interest in public facilities; better planning, with expenditures allocated according to rational criteria; and a regulatory environment that encourages lower costs and higher quality among competitive services, and provides the necessary incentives and controls to protect public infrastructure and raise safety and environmental standards.

91. There has been resistance to the process of commercialization and privatization of public-sector functions and services, even when efficiencies are evident. Understandably, public-sector employees take a negative position when the aim is to cut costs through redundancies without alternative sources of income having been found. Any attempt at institutional reform will need to provide for careful management of the change process itself, with stakeholders closely involved and staff fully compensated for any negative impacts.

4 Government Policies and Plans

4.1 Policy Principles and Priorities

92. The two main plans governing the transport sector are the Government’s MTDS and the NTDP. The MDTS provides broad guidelines for the country’s economic and social development; the NTDP translates these into policies and strategies for the transport sector itself.

93. The 1997-2002 MTDS gave priority to health, education, infrastructure maintenance, job creation and law and order. But continued economic decline, uncontrolled and unproductive spending and poor institutional performance undermined its achievements. It is now being updated as the 2003-2007 MTDS, being prepared in conjunction with the new National Poverty Reduction Strategy (NPRS). The new MTDS will give greater recognition to the short-term challenges facing the Government: downward pressure on the currency, inflation, rising interest rates, balance of payments difficulties, limited budget resources and an economy in recession. According to the 2003 Budget papers, it will focus on fiscal responsibility and expenditure control, good governance, improved economic management, improved public sector performance and lower barriers to investment and export growth. It is to be integrated with the Government’s public expenditure management system and the plans of sub-national government administrations.

94. Five key areas defined as “high impact” will receive priority funding: (i) creating and improving access to markets through rehabilitation and maintenance of transport infrastructure; (ii) creating income-earning opportunities in agriculture, forestry and fisheries, and promoting export opportunities; (iii) securing peace and
good order, through effective law and justice enforcement; (iv) improving the delivery of, and access to, basic education and health services, and empowering people to participate more in economic development; and (v) improving the selection, effectiveness and accountability of Government programs and services. Reflecting these priorities, the 2003 Budget gave special priority to the programs shown in Table 3. The transport sector features prominently, as does the emphasis on rehabilitation and maintenance rather than new projects.

Table 3: “High-Impact” Programs under the 2003 Development Budget

<table>
<thead>
<tr>
<th>Program &amp; Activity</th>
<th>2003 Budget Allocation (million Kina)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transport Infrastructure:</td>
<td></td>
</tr>
<tr>
<td>Highlands Highway maintenance &amp; rehabilitation</td>
<td>85.0</td>
</tr>
<tr>
<td>Other roads &amp; bridges maintenance &amp; rehabilitation</td>
<td>206.0</td>
</tr>
<tr>
<td>Airport maintenance &amp; rehabilitation</td>
<td>24.6</td>
</tr>
<tr>
<td>Maritime infrastructure development (mainly navails)</td>
<td>46.8</td>
</tr>
<tr>
<td>Income-Earning Opportunities &amp; Export Promotion:</td>
<td></td>
</tr>
<tr>
<td>Nucleus agro-enterprises</td>
<td>12.5</td>
</tr>
<tr>
<td>Agriculture extension, rehabilitation, research &amp; smallholder support</td>
<td>27.9</td>
</tr>
<tr>
<td>Skills development &amp; employment</td>
<td>18.7</td>
</tr>
<tr>
<td>Microfinance &amp; employment</td>
<td>12.4</td>
</tr>
<tr>
<td>Commercial fisheries development</td>
<td>15.1</td>
</tr>
<tr>
<td>Mining/petroleum/gas institutional strengthening &amp; support</td>
<td>17.6</td>
</tr>
<tr>
<td>Revitalization of the Rural Development Bank (RDB)</td>
<td>2.0</td>
</tr>
<tr>
<td>Industrial centers development</td>
<td>1.0</td>
</tr>
<tr>
<td>Total</td>
<td>469.6</td>
</tr>
</tbody>
</table>

Source: 2003 Budget Papers

95. The 2001-2010 NTDP was the first comprehensive plan for the transport sector. Its basic strategy involved a commitment to regular maintenance of transport infrastructure; upgrading, rehabilitating and constructing new assets in all three transport modes; and safety conditions and standards. Although the plan included a project-level breakdown of expenditures, it also recognized the over-riding importance of institutional, financial and legal reforms. It proposed to:

- adopt a more integrated approach to transport planning across all modes;
- diversify sources of funds, by introducing cost-recovery measures based on user charges to generate the funds required for infrastructure maintenance;
- establish accountable authorities in roads and water transport, like the (then) newly-established CAA, to improve the management of publicly-owned transport assets;
- encourage enterprise and competition through liberalization and deregulation;
- update the legislation required to administer the sector effectively; and
- establish performance indicators to guide implementation of the Plan and associated reforms, and mechanisms to monitor progress.
96. These are all admirable aims, as was that of allocating to maintenance 43 percent of the Plan’s estimated total expenditure of Kina 6.0 billion. But already in the first two years there has been a disconnect between the Plan and practice. Adjustments have not been made to account for changes in priorities (some deriving from the change in government), funding levels and progress on reform. The Plan was never effectively linked with the programming and budgeting of projects. The overall level of expenditure has been well below the amount envisaged. The proposed broadening of the revenue base was delayed. A start was made on some aspects of the institutional and legal reform agenda, but progress was slow.

97. These shortcomings are being addressed in a new 2003-2012 NTDP now under preparation. A close-to-final draft has made adjustments reflecting the renewed priority given in the 2003 Budget to infrastructure rehabilitation and maintenance, the reduction in funding likely to be available for new investment and a more realistic view of progress on establishing statutory authorities and cost-recovery mechanisms in the roads and maritime sectors. But to be effective and to avoid becoming irrelevant within a few years, greater effort should be made to link the new NTDP to the annual budgeting, project scheduling, works programming, project completion and monitoring process. Changes in budgets should become reflected in changed work schedules and a revision to the Plan, even if only a detailed rolling three-year sub-set of the Plan. This will require a strengthening of the national transport planning capabilities of DOT. In the case of roads, it will rely considerably on the systems and procedures of the RAMS unit (see Section 6.2.1).

4.2 Policies and Plans for the Road Sector

98. Road maintenance was to have had top priority under the 2001-2010 NTDP and will undoubtedly do so under the 2003-2012 version. Of all areas of transport expenditure, road rehabilitation and maintenance generate the highest economic rates of return; with PNG’s roads in such poor condition, these returns can be expected to be unusually high. Spending on maintenance – in the absence of which roads would require expensive reconstruction or may even become impassable – results in significant reductions in transport costs, the benefits of which flow throughout the economy. It reduces poverty directly, by improving access to services (promoting health care and school attendance, for example), and indirectly by fostering economic growth. Smallholders will have better access to markets at lower cost. This applies not only to local feeder roads but also to the main arterial roads as well, most notably the Highlands Highway; even highland villages located far from the Highway benefit from its improved condition, since a high proportion of their food, tools and other inputs, as well as their cash-crop production, travels at some stage on the Highway.

99. The Government’s priorities for the medium term include support for broad-based maintenance programs, institutional and financial reforms – establishment of the proposed NRA, implementation and application of RAMS, introduction of a

45 In fact, the proportion was to be higher, since revenues from user charges would progressively have added to the pool of funds available for maintenance.

46 It is commonly held that, in a country like PNG, every Kina spent on road maintenance is likely to result in a three Kina saving in user costs.

47 This includes the Government-funded National Road Maintenance Program, which will provide some Kina 11 million for maintenance of the Highlands Highway and other high priority roads identified using RAMS.
dedicated RF funded from user charges – and several donor projects focusing on rehabilitation and improved maintenance:

- the AusAID-funded National Roads Regravelling and Sealing Project (NRRSP) and National Road and Bridge Maintenance Project (NRBMP), as well as several regional projects and, in the planning pipeline\(^{48}\), a Key Roads for Growth Maintenance Project, concentrating on the Highlands Highway in Morobe and Eastern Highlands, and a Bridge Restoration Project\(^{49}\);
- the ADB Road Rehabilitation Project, funding rehabilitation work on the West Highlands sections of the Highlands Highway, together with high-priority provincial arterial and feeder roads;
- the WB Road Maintenance Project, preparing to rehabilitate national and provincial roads in the six provinces of Manus, West New Britain, East New Britain, Central, Oro, and Morobe; and
- a new WB Highlands Highway loan of US$30 million, originally intended to be fast-tracked in 2003.

100. In addition, according to the 2003 Development Budget, a total of Kina 12.8 million in tax credits carried forward from 2002 will be used by Porgera Joint Venture, Ok Tedi Mining Limited and Misima Mines Limited to upgrade 35 kms of the Highlands Highway in Simbu, Eastern Highlands and Morobe Provinces. A further Kina 15.4 million will be used for other maintenance works on the Highway.

101. In all, some Kina 85 million, including tax credits, has been included for the Highlands Highway in the 2003 Budget. Existing road development programs are being reviewed and re-scoped to ensure that the necessary funds are available.

102. The 2003 Budget also committed the Government to establishing the NRA and implementing the RF broadly along the lines recommended by the RSCRIP – though under current proposals (see Section 6.1) the NRA will manage the RF which, in the original RCSRP proposals, would have been managed by an independent RF Board. Details of the NRA’s establishment and the transition from the existing DOW to the NRA are being examined by an ADB-funded TA, the Road Authority Development Project, or RADP, which commenced in April 2003\(^{50}\).

103. The RADP has adopted the earlier RSCRIP recommendations that the Fund’s revenue source should be a system of charges that assigns a fair share of road maintenance costs among different classes of road user: those caused by heavy trucks would be paid by heavy truck operators, for example, and the rest would be fairly shared by all road users in relation to their use of the network. These charges are to comprise a Road Use Charge (RUC), levied on gasoline and diesel imports, to recover the costs associated with general road use, and a Road Damage Charge (RDC), levied annually at the time of vehicle registration and based on laden axle weight, to recover the costs attributable to different vehicles depending on their size and weight. The charges are to be introduced over a five-year period, after which the Fund should

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\(^{48}\) Including the Bougainville Coastal Trunk Road Maintenance Project and the Gazelle Road Reconstruction Project.

\(^{49}\) Since the commencement of program aid in the early 1990s, AusAID has spent AUD 450 million on aid to PNG’s transport sector, of which $325 million has been for road and bridge maintenance, covering more than 2,100 km of roads in 14 provinces.

\(^{50}\) This is a revision of an earlier TA that was delayed by the 2001 and 2003 national elections.
cover all routine, periodic and emergency maintenance costs for the national road network, estimated to amount to approximately Kina 100 million p.a. Later, consideration is to be given to recovering the costs of maintaining provincial and district roads, though the arrangements by which the NRA would execute maintenance of provincial and district roads are as yet unclear (Section 6.1.5).

104. To give road users a say in how their funds are used, the NRA’s Board will represent stakeholders in the road transport system, with private-sector members in the majority. It will be held accountable to Parliament for the operations of the Fund, the condition of the network and its impacts on user costs. To facilitate this accountability, the Board’s decisions are to be transparent and its reports will include indicators against which the Fund’s performance can be judged. Arrangements for this are being designed by the RADP.

105. Evaluation of road maintenance needs and priorities would be carried out using transparent, objective criteria based on RAMS and its counterpart for bridges, the Bridge Inventory and Management System (BIMS). The RSCRIP proposed that this function would be independent of the executing agency, but the NRA legislation places responsibility within the NRA itself.

106. Many of DOW’s shortcomings derive from its status as a government department that relies on the budget provided by the Government. These include political interference in decision-making; ill-defined objectives; poorly-defined responsibilities; lack of financial control; lack of accountability; cumbersome budgeting, contract management and disbursement procedures; lack of incentive and motivation; inadequate skills; poor or ineffective training; lack of a sense of customer service; and difficulties in attracting and retaining good staff. A more autonomous NRA would have greater flexibility in acquiring the necessary skills and more incentive to deliver the necessary services in a more efficient manner. It would be held accountable for how money from the RF is spent. Its managers would be accountable for their decisions, but would have autonomy in marshalling resources to meet the objectives of a business plan and the needs of road users. Its efficiency and performance in meeting these objectives would be measured and monitored.

4.3 Policies and Plans for Other Transport Sectors

4.3.1 Maritime Sector

107. Infrastructure maintenance also features prominently in the Government’s policies for the maritime sector. Under the 2001-2010 NTDP, the main aims were to: (i) fund the economically feasible costs of maintenance, rehabilitation and construction of maritime facilities and the improvement of navaids and boat services; (ii) establish a sustainable program to maintain the existing transport infrastructure such as ports, wharves, jetties, ramps, landing areas, pontoons and warehouses; and (iii) ensure that half the total expenditure in water transport is devoted to maintenance of facilities and assets.

108. Just as for roads, budget allocations have not kept pace with needs. There is a substantial backlog to be dealt with. The Plan envisaged a total expenditure in water transport of Kina 84.7 million (2000 prices) over the 2001-2010 period: Kina 52.8 million for rehabilitation and replacement of navaids, Kina 26.0 million for national wharves, Kina 3.1 million for provincial wharves/jetties, Kina 0.43 million for inland waterway infrastructure and Kina 2.4 million for infrastructure maintenance. These expenditures were to be accompanied by institutional reorganization, greater
efficiency, transparency and accountability, in which the establishment of the NMSA would play the major role; establishment of an adequate, reliable and sustainable source of funding for navaids and related services through an improved system of cost recovery, managed through a dedicated fund for which the NMSA would be held accountable; improved navaids maintenance and reduced vandalism achieved through new relations and agreements with local communities, stakeholders and beneficiaries; and establishing a national capability for hydrographic services in support of the improved navaids program.

109. Just as in the roads sector, institutional weakness is the most serious problem. There has been a marked deterioration in physical facilities, largely as a result of inadequate funding, lack of planning, lack of a corporate culture to promote maritime safety, consult with stakeholders and act promptly in response to users’ needs, little sense of customer focus, inappropriate institutional structures, inadequate staffing levels and skills, unproductive use of manpower, vessel and equipment resources, an inability to use information management and technology to good effect, and landowner frustration and vandalism.

110. The NMSA is intended to address most of these shortcomings. Its aim is to establish the capacity to install, manage, operate, and maintain needed navaids on a sustainable basis, with associated financial responsibility. It has been given authority under legislation to set and collect charges from users, make independent management decisions on the use of funds, and establish the necessary management and technical expertise to ensure efficient operations and investment, to control expenditure productively and to plan effectively. The aim is to establish a lean, fully-functioning organization equipped with the competent staff, systems and procedures and equipment needed to carry out its functions and meet its objectives efficiently and effectively and with a focus on customer satisfaction.

111. Apart from the establishment of the NMSA itself, the strategy for the maritime sector includes:

- in the area of maritime safety, (i) replacement and rehabilitation of all damaged or missing navaids and installation of new navaids along coastlines and inland waterways with the assistance of the Navaids Project and CWTP; (ii) establishment of community-based procedures for ensuring the security and maintenance of navaids; (iii) strengthened resources for carrying out hydrographical surveys, storing and retrieving digital hydrographical data and printing high-quality charts; (iv) formalized arrangements for vessel inspections by authorized agencies; (v) procedures for seafarers’ documentation and certification transferred to the Authority from the National Maritime College; and (vi) an agreed plan established for SAR response; and

- in the area of marine pollution control, a substantially-upgraded capacity to meet IMO standards for PSC vessel inspections and pollution clean-up.

4.3.2 Air Transport Sector

112. The main strategies being pursued in the aviation sector center on (i) continued reform of the CAA, (ii) airport rehabilitation and maintenance and (iii) improving the financial performance of AN.

113. The Government has recognized the need to shake up CAA’s management. A new Board and CEO have been appointed and instructed to shed unnecessary staff,
cut costs, improve efficiency, upgrade service standards and improve financial performance. Planned expenditures are being pared back. Financial management and reporting systems are being improved. Staff are receiving training in modern management methods. There is a renewed focus on meeting international safety standards and the needs of airline customers and on recovering the associated costs from user charges.

114. With AusAID assistance, airports and airstrips are being rehabilitated. Cost-recovery mechanisms are being introduced that will hopefully ensure sustainability of maintenance and operations. Revenue-capture procedures are being strengthened.

115. AN’s management is being set clear targets for its financial performance. The Government has made it clear that budget hand-outs can no longer be expected. The airline is being prepared for eventual privatization.

4.4 Lessons Learned from Donor-Funded Projects

116. The most critical issues of concern in relation to donor-funded projects have been about:

- the inability of government to budget and make available the necessary counterpart funds. In some instances, donors have had to finance the Government’s contribution or classify contributions-in-kind as counterpart funding.

- the level of funding for, and sustainability of, infrastructure maintenance. Roads, airstrips, air safety facilities, wharves and nav aids are falling into disrepair because of inadequate and unreliable budgets to maintain them. Assumptions made about the economic lives of donor-funded projects have generally been too optimistic because maintenance has not been carried out as planned.

- the declining quality of management and technical skills in organizations responsible for infrastructure maintenance and operations. To a great extent this reflects a lack of budgeted resources, but there is also a lack of accountability for performance among government departments that encourages over-staffing and discourages a responsible concern for cost control, service standards and efficiency.

- problems in the transition to more accountable statutory authorities, with inefficiencies carried forward and vested interests sometimes undermining attempts to secure efficiency and independent, autonomous and responsible management.

- a failure to secure stakeholder involvement in decision-making in ways that benefit the public at large.

117. In addition, it has proved difficult to reconcile policies of cost recovery, systematic planning and a heightened role for semi-autonomous statutory authorities with (i) the responsibilities given to provincial and lower-level governments under the 1995 Organic Law and (ii) the need for a consistent national approach to poverty reduction.

118. Lastly, it is worth noting that donor organizations have adopted different approaches to the administration of infrastructure development and maintenance projects. After its experience with the CAA, AusAID is doubtful about the likely
success of radical policy and institutional reform and favors channeling its projects through well-established procedures which take advantage of existing line management arrangements, albeit with considerable external assistance in the form of project managers and little or no requirement for counterpart funding. The ADB and WB, on the other hand, have chosen to promote more radical policy and management reforms. In both road and maritime sectors, they have supported important TA projects concerned with improved cost recovery, improved expenditure planning and budgeting systems and the transition to a more commercial approach to infrastructure management, claiming more lasting benefits, even if the Government’s response to date has been slow.

5 The Way Forward: Basic Principles for Reform

5.1 Overview

119. Clearly, in all three transport sub-sectors, there has been a long-standing failure to provide and adequately maintain transport infrastructure. Of the many reasons, the most critical have been the lack of reliable, sustainable funding and inflexible, bureaucratic institutional arrangements that are weak at identifying needs and acting on them promptly, efficiently and effectively. If infrastructure assets are to be managed better, there must be:

- a more reliable way of funding maintenance than the present reliance on annual budget appropriations and transfers to provincial and lower-level governments;
- a more business-like approach to “ownership” and management of infrastructure, with a greater focus on measurable outcomes and pressure put on managers to meet financial and other performance targets;
- greater involvement by stakeholders and other parties concerned about how taxes and revenues from user charges are spent, and more transparent decision-making by those who manage infrastructure; and
- acceptance and consistent application of rational criteria, based on economic principles, as the basis for allocating expenditures.

120. The country’s transport infrastructure has now so badly deteriorated, however, that a major program of rehabilitation and reconstruction is needed before any such asset management regime can become effective. Neither users not the Government alone will be able to fund the level of expenditure required to bring the condition of infrastructure back to a maintainable state. Not only will substantial donor assistance be needed, but very difficult choices will have to be faced about rehabilitation and reconstruction priorities: Which items of infrastructure should be rehabilitated or reconstructed first? In which regions? And how can the objectives of efficiency (which would tend to direct expenditure towards the main arterial/trunk facilities) be reconciled with those of poverty reduction (for which the focus would be on the more remote parts of the transport system, serving those who are most cut off from the rest of the economy)?

5.2 Sustainability of Maintenance Funding

121. An adequate and reliable flow of funds is critical to the effective maintenance of infrastructure. The 2001-2010 NTDP gave priority to the introduction of systems of
cost recovery for roads, public wharves and jetties, maritime navaids, airports/airstrips and air safety and communications facilities. To provide the sustainable basis for funding that is needed, these systems of cost recovery should follow a common set of principles.

122. Users should face at least the additional infrastructure costs they cause to be incurred, i.e. the marginal costs caused by their use of infrastructure. They should be made to face the economic consequences of their actions. Heavy road vehicles should be charged for the cost of road damage they cause when laden. The costs of repairing impact damage to wharves and jetties should be borne by vessels in relation to their size, mass and use of the facilities. The portion of airport/airstrip maintenance costs that varies with traffic should be apportioned on the basis of laden aircraft weight and take-off/landing movements. Any additional portion of infrastructure maintenance costs that is unrelated to use – usually caused by natural conditions like rain or sea damage – should be spread equitably among all users.

123. User charges should be regarded as a fee-for-service. The revenues from them should be held and managed separately from other tax revenues and used solely for maintaining the infrastructure to which they relate. They should be protected by legislation from raids for other uses and should not be pooled with general tax revenue. If otherwise, they would almost certainly eventually be used for other purposes and users would resent paying a fee without getting service in return.

124. Cost-recovery charges should be set independently of political considerations by representatives of stakeholders. Users’ willingness to pay for well-maintained facilities should be the main criterion used in setting charge rates. Users should be made aware of the consequences, in terms of deteriorated infrastructure and increased user costs, of any decision they might make to lower the charges.

125. Wherever possible, a purchaser-provider relationship should be established between those who control the funds from user charges and those who carry out the infrastructure maintenance works. This relationship would put pressure to raise quality standards and control costs, especially if contracts are awarded following competitive tender and are subject to independent supervision and audit.

5.3 Sector Organization and Management

126. The Government’s institutional arrangements in the sector should recognize the shortcomings of departmental organizations: their lack of enforceable accountability; their inflexibility in responding to needs; the lack of management autonomy; their passive reliance on government budget allocations; the lack of incentive to improve efficiency and performance; the difficulties of redirecting resources and controlling costs. They should reflect the nature of the task and the potential efficiencies provided by a competitive private sector. Tasks that are the function of government alone and that could not be done by the private sector should remain with government, but public-sector responsibilities that can be delegated or assigned to independent agencies with greater flexibility to raise quality and control costs should be contracted out with appropriate controls. And tasks that can best be provided by a competitive private sector should be freed from government involvement except only to protect the public’s interest in efficiency, safety and the environment through regulatory controls.

127. The Government, through its Ministries, should retain the public-sector functions of policy formulation, strategic planning and monitoring. It should set out a
clear and consistent framework of policy principles within which users and service
providers can pursue their competitive interests. These should include principles
governing the respective roles of public and private sectors; the organization of
government functions; the criteria to be used for planning and scheduling public
expenditures; the role of regulations in encouraging competition and protecting
infrastructure, public safety and the environment; and the setting of taxes, prices, cost-
recovery levels and, where appropriate, subsidies for infrastructure and services. The
Government should also make provision to monitor the application of these principles
and to anticipate the longer-term demand for and influences over infrastructure and
services, ensuring that mechanisms are established to facilitate suitable market-based
responses.

128. Unless they can be privatized51, public infrastructure and economic services
that directly benefit users – such as the provision and maintenance of roads – should
be managed by self-funding public statutory authorities52. Such authorities have
greater autonomy in managing their resources to achieve the objectives and targets set
for them. They can be held more directly accountable for their performance in
meeting these goals and targets. The arrangements governing them should include
enabling legislation that makes clear their powers and responsibilities; clear goals and
targets against which performance can be judged and management held responsible;
autonomy to make management decisions without political or other external
interference; specific sources of funds from user charges and fixed procedures for
adjusting charge rates; clear limits on the purposes for which the funds can be used;
objective criteria to be used as the basis for allocating expenditures; transparent
decision-making and arrangements for the involvement of stakeholders in reviewing
management performance; and clear lines of reporting to the Government, Parliament
and the public.

129. As long as competitive markets exist for the services in question, those tasks
which would benefit from private-sector competition, in terms of increased quality
and reliability and lower costs, should be outsourced. These include tasks such as
management and training services, data management, payroll management, audit
services, surveys, feasibility studies, design services, construction and maintenance,
and independent supervision of activities, works and procurement.

130. All infrastructure and services that are of a commercial nature and that could
be provided by a competitive private sector should be left to the private sector, subject
only to controls to maintain competition, to ensure that standards of safety and
environmental protection are maintained and to protect public facilities from
inappropriate use, e.g. from damage by overloaded trucks. Examples of facilities or
services currently in public ownership that could benefit from outsourcing include the
management of ports and the maintenance of roads and airports/airstrips. In all cases,
it is necessary first to ensure that competitive conditions exist in the markets for the

51 Most public infrastructure and economic services could, in fact, be privatized, with appropriate regulatory
controls, but some are more sensitive to political considerations. Privatizing the management of the road network,
for example, while potentially attractive in terms of efficiency, has been ruled out of consideration in this Review
because of likely political and popular resistance. It remains an option, however, if all else fails.

52 Not all statutory authorities have been successful in PNG – indeed, almost all have not. But failure has mostly
been due to attempts to over-ride the basic principles of autonomy, transparency and accountability that are their
main advantages. With suitable controls, the advantages can be secured and the risks minimized.
services in question; it may even be worthwhile for the Government to assist in strengthening competition in these markets.

131. Commercialization, privatization and outsourcing of public-sector tasks, however, have critical consequences for the staff of the government agencies affected. The changes must be managed carefully to protect their interests and win their support. In the case of a transfer of responsibilities to a statutory authority, as is being proposed for roads, the experience of the CAA has shown that there should be a clean break between the original departmental form and the operation of the statutory authority. On no account should the new authority be saddled with the staffing, accrued entitlements and obligations, bureaucratic attitudes and inefficiencies of the department it replaces. There must be a clean break, as is being proposed for the NMSA, to replace the MTD.

132. At the end of 2002, the MTD had 108 staff positions, of which 19 were vacant, 57 filled by staff in an acting capacity and 19 filled by unattached staff. The NMSA, by contrast, needs only 40 staff, the economies coming from improved internal efficiency, disposal of redundant assets and related staff positions, and competitive outsourcing of several functions and services. All NMSA positions will be filled by open competition. No obligations to MTD staff will be carried forward into the Authority: accrued staff entitlements will be paid out in full under a retrenchment package funded from the CWTP. Assistance will be given to MTD staff under a transitional plan for staff development that includes retraining for positions in the Authority for those whose applications to join have been successful; assistance with establishing companies or cooperatives to supply outsourced services to the Authority; assistance with finding alternative occupations and strengthening needed skills; and counseling to help adjust to retirement.

133. New skills will be needed by the authority’s staff that were not required under the earlier structure: financial and commercial management, supervision of outsourced services and customer and public relations, for example. These skills should be emphasized in staff recruitment and training/retraining programs. As service-based organizations that have to convince their customers – stakeholders and those who contribute revenues – that they are getting value for money, the authorities must ensure that their staff are capable of carrying out their tasks efficiently, effectively and with a customer-oriented attitude. This requires a clear understanding by staff of the tasks they are to fulfill and the policies and operating procedures that apply to them; the skills needed for their assigned tasks, and the training, including refresher courses, needed to develop, maintain and update those skills; opportunities for staff to become involved in improving service standards, work practices and the working environment; systems and procedures for monitoring their effectiveness in carrying out their tasks and responding to feedback from the staff members themselves; the office and communications equipment and management information systems (MIS) needed to maximize the benefits of automation and give instant and reliable access to information; high standards of occupational safety, and procedures for regular safety audits; and a system of incentives to promote improved performance, linked to a clear path for salary and career enhancement based on merit. These have been included in the NMSA’s corporate plan and should also feature in the plans of other statutory authorities like the NRA to which key public-sector tasks are to be transferred.
5.4 Development versus Maintenance

134. With inadequate budgets and deteriorating assets, there has been a trend towards treating all infrastructure works, whether capital or recurrent, as projects and to budget for them as such. This is because deterioration has reached the point where reconstruction or rehabilitation is usually necessary. The concept of managed maintenance has fallen into disuse. But there is a difference between development and maintenance that has implications for resource allocation decisions and potential sources of funding. Development involves building new capital assets (roads, ports, airstrips) or significantly upgrading existing ones by increasing the capacity (e.g. road widening or runway extensions), raising the construction standard (e.g. sealing a gravel road) or reinstating the earlier condition of an asset that has seriously degraded. Maintenance, on the other hand, involves simply preserving the value of existing assets – for roads, this means the cycle of periodic and regular routine maintenance53. Decisions about allocating funds for development projects rightly involve political considerations as well as economic: they impact on the economic and social development of the region/s they serve, benefiting one group of communities over others beyond their area of influence. But decisions about allocating funds for maintenance should not be contentious in any way: maintenance should be carried out on the basis of technical and economic considerations to prevent the escalating costs – increased user or operating costs and the higher costs of later rehabilitation – that would arise in their absence, a task for which RAMS, in the case of roads, is ideally suited54.

135. Decisions about infrastructure development projects are rightly those of government, but the task of allocating funds for maintenance, being apolitical, need not involve government departments but can be assigned to more commercial enterprises, whether publicly- or privately-owned, that are better equipped to undertake it efficiently. The role of a statutory authority or private-sector agency in relation to development projects should be limited to implementation; in general it should not decide on priorities for capital works55.

5.5 Expenditure Priorities

136. Public expenditure should be allocated so as to meet the government’s objectives for economic and social development and to maximize the efficiency of public infrastructure and services. With the goals of poverty reduction and economic efficiency widely accepted and the transport sector playing a significant role in promoting economic growth and relieving the access constraints that help perpetuate

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53 Apart from emergency repairs due to unforeseen circumstances, there are two components to road maintenance: (i) periodic maintenance, carried out on a condition-responsive basis and including regravelling, resealing (overlays), major drainage, pavement and bridge repairs and road furniture replacement; and (ii) routine maintenance, done on a more frequent cycle, involving gravel regrading and reshaping, pothole repairs, edge patching, crack resealing, grass cutting, drainage clearing, line marking, road furniture repair, bridge repainting and other minor repairs. Reflecting damage partly due to the passage of vehicles, periodic maintenance expenditures vary more with levels of traffic than do routine maintenance, which depends a great deal on the type of construction and climatic and weather conditions.

54 RAMS does not incorporate procedures for assessing the development benefits of capital projects. It is not suitable as the sole tool for evaluating major development projects, therefore, and needs to be supplemented by additional economic and social impact analyses. For assessing optimal maintenance treatments, however, it is ideal.

55 The exception is in cases where the criteria for project selection are unambiguous and removed from all possibility of political interference.
poverty, it is especially important that transport infrastructure spending is allocated according to these criteria.

137. The issue becomes more complex, however, with the move towards cost recovery. If stakeholders were to have more “ownership” of infrastructure spending and its allocation, they would likely favor economic efficiency over equity, choosing to spend money more on the main, arterial facilities than on minor, feeder facilities serving the isolated poor. The risk can be minimized if rational expenditure planning tools and criteria – such as those incorporated in RAMS – are mandated, preferably by legislation, but there remains the problem of reconciling efficiency objectives (e.g. maximizing the economic internal rate of return, or EIRR, as calculated by RAMS) with the important objective of relieving poverty. Most economic evaluation tools like RAMS are not yet capable of incorporating an analysis of the impacts of expenditures on the poor, nor do the tools used to identify expenditure needs adequately focus on those of the poor.

138. There is a need both to extend the planning tools to incorporate these poverty-reduction objectives and to ensure that they are integrated with the procedures used to allocate resources by the organization responsible for infrastructure management. This is made somewhat more difficult by the statutory authority form of organization, with its semi-commercial focus.

5.6 Budget Management

It is also important to ensure that funds, when allocated, are used efficiently. The PERR has highlighted a failure of budget management and control as one of the most critical challenges facing government and a key to curbing the public-sector deficit. Systems and procedures for budget planning, monitoring, disbursement and expenditure control have all become weakened and more opaque in recent years. Budget allocations are sometimes made without reference to approved expenditure plans and with little analysis of the consequent impacts on goal achievement. Once allocated, funds are often released late, raising the costs of providing services to government. Procedures for the award of contracts lack transparency. The pressures of openly-competitive markets risk being undermined by the buying of influence. Work is often inefficiently carried out and sub-standard, the result of collusion among service-providers and between contractor and client, and of poor-quality supervision. Expenditure controls are weak. The effectiveness and efficiency of spending is not being measured.

The PERR is expected to result in tightened procedures for government budget allocation, appropriation, management and control. For development and maintenance expenditures funded from national or regional government budgets, this will result in better value for money. For expenditures financed from user charges and managed by statutory authorities, it is crucially important that managers are held openly accountable for the effectiveness and efficiency of the expenditures they control.

5.7 Funding Rehabilitation

139. The condition of PNG’s transport infrastructure has been allowed to deteriorate to such an extent that the majority of facilities – including roads – require reconstruction or rehabilitation first, before they can be maintained on a routine basis. It is one thing to expect users to pay for maintenance, but quite another to ask them to pay for the cost of making up for earlier neglect by government too. In the case of
roads, recovering reconstruction/rehabilitation costs from users would initially at least double the charges they would face if only the long-run costs of maintenance are recovered.

140. Clearly, the Government must take responsibility for funding this initial reconstruction and rehabilitation. And, given the critical state of public finances, it will need considerable donor assistance to do so. Limits on the Government’s ability to raise taxes and repay loans, however, make it necessary for it to prioritize expenditures very carefully, ensuring that economic returns are maximized. This will make it necessary to define an affordable network of infrastructure on which efforts should be concentrated and to devise alternative ways (see Section 6.2.3) of preserving the remaining parts of the network.

5.8 Incentives and the Regulatory Environment

141. Regulating the use of infrastructure is as important as managing its development and maintenance. The aim of regulating transport operations should be to promote efficiency, primarily by facilitating competition, while controlling those impacts that bear directly on the public interest, notably on infrastructure damage (e.g. by overloaded trucks), public safety and the environment. Wherever possible, regulation should be through economic incentives, encouraging users to adopt patterns of use that are economically efficient, safe and environmentally sustainable. Taxes and user charges are tools that can be used this way. The structure of road user charges can be set to encourage the use of multiple-axle trucks that, by spreading the load over more tires, do less damage to pavements per tonne of payload. Fines for vehicle emissions and overloading should be set to discourage those practices. But where self-regulation is not possible and regulation relies on fines and other sanctions, the enforcement effort needs to be such that users are unwilling to take the risk.

5.9 Land Issues, “Ownership” and Community Involvement

142. Customary rights over land are acknowledged as a critical constraint on development. In the maritime sector, for example, land owners have lodged numerous claims for compensation for the use of their land for navaids installations and resist attempts to gain access for maintenance.

143. In the long run, the solution to this problem lies in registering title to land and allowing a land-rights market to develop. In the short run, attempts should be made to engender a greater sense of “ownership” of public infrastructure among landholders. The maritime CEP (community engagement program) attempts to reduce vandalism and engender self-interested ownership – and responsibility for security and maintenance – on the part of local communities likely to benefit from improved navaids. This will be done through service agreements with community groups; small routine maintenance contracts, backed up with the supply of essential materials; public information programs and workshops to educate people on the benefits and importance of navaids and to explain their responsibilities and benefits under the maintenance contracts; improved law enforcement; and lease agreements with the owners of land occupied by the navaids. Past land compensation claims will be settled prior to the hand-over of assets to the NMSA. There is scope for similar community-based arrangements under infrastructure maintenance programs in other transport sub-sectors.
5.10 Priorities for Donor Assistance

144. The lesson of recent years has been that project assistance alone is not sufficient to ensure sustainability of benefits: upgraded infrastructure has almost invariably failed to be maintained properly. Even policy conditions attached to project loans, such as a commitment to full infrastructure cost recovery and budgeted maintenance, have not had sufficient influence over high-level decision-making to secure the types of reform that generate greater, lasting benefits. Moreover, many of these needed reforms have short-term consequences that are often seen as negative – increased taxes, retrenchment of public-sector workers – and are difficult to promote to the public in a positive light.

145. In these circumstances donor assistance can be helpful. Quite apart from providing funds to help implement high-priority capital projects and attaching conditions to their use, donors can help bring about more fundamental policy and institutional reforms by providing the technical analysis needed to supply convincing arguments for change. The most important areas for this assistance are in (i) establishing cost-recovery mechanisms and more reliable funding of infrastructure maintenance, (ii) moves towards greater efficiency and accountability in the management of infrastructure, including the establishment of statutory authorities, (iii) strengthening the role of stakeholders in decision-making about levels of service, cost recovery and monitoring, and (iv) strengthening the objectivity and independence of needs-assessment, planning and priority-setting procedures. In relation to the last of these, there is also scope for donors to help governments to resolve choices between the objectives of poverty reduction, equity and economic efficiency.

6 Reform of the Roads Sector

6.1 Sector Management

6.1.1 The Tasks of Road Sector Management

146. Road sector management involve the following tasks:

- policy formulation – establishing the basic principles governing the sector, including the respective roles of the public and private sectors in providing infrastructure and services; the organization of government functions; planning and investment criteria for public-sector projects and maintenance activities; engineering and construction standards for capital and maintenance works; regulations governing competition, the use of infrastructure and to protect the public interest in road safety and the environment; and pricing, taxation, cost recovery and subsidy targets;

- strategic planning – anticipating future changes in the sector’s environment and the demand for its facilities and services, planning investments in additional capacity and putting in place the conditions needed to allow market responses to emerging needs;

- funds management – managing the collection, allocation and disbursement of revenues collected from road users as well as funds provided from the government budget and donors;

- medium-term planning, programming and budgeting – assessing short- and medium-term needs for infrastructure upgrading, rehabilitation and
maintenance and scheduling works on the basis of priorities established using rational planning criteria;

- project/works preparation – for capital projects, carrying out feasibility studies and preparing engineering designs, cost estimates and contract documents; for maintenance works, assessing needs by survey and preparing schedules and contract documents for outsourced works;

- implementation – undertaking the works in accordance with approved designs, standards and contract conditions;

- implementation supervision – supervising the implementation of works to ensure that they are carried out in accordance with designs, standards and contract conditions;

- regulating the use of roads – implementing and enforcing regulations designed to protect public infrastructure, enhance road safety and protect the environment; and

- monitoring – surveying the condition of the network and its use to measure the effectiveness of road management and making the results available for external review; this task also includes technical and financial audits.

147. The aim should be to ensure that each task is carried out efficiently by the type of organization most suited to it, taking account of the basic responsibilities of government, the constraints on public-sector organization and performance, and the potential efficiencies of private-sector competition. Table 4 shows the institutional options considered best suited to each of these tasks.

**Table 4: Road Sector Management Tasks**

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<td>Govt Dept Statutory Authority Private Sector</td>
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<td>Sector policy formulation</td>
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<tr>
<td>Strategic planning</td>
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<td>Implementation</td>
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<td>Implementation supervision</td>
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<tr>
<td>Regulating the use of roads</td>
<td><img src="image" alt="Alternative for primary responsibility" /></td>
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<tr>
<td>Monitoring</td>
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</table>

148. Under present institutional arrangements, most of these tasks are handled by DOT and DOW. Only selected planning (e.g. RAMS), implementation (construction and maintenance) and supervision tasks are contracted out, RAMS only temporarily under a TA project. Monitoring is done by DOW, the same agency that is responsible for the condition of the roads. The function of planning, programming, works
preparation and implementation are also retained within the same department. The incentives to carry out maintenance efficiently and effectively under the present system of organization, and with present funding levels, are very weak indeed. What is needed is a more autonomous agency held fully and publicly accountable for its performance in fulfilling these functions, together with a reliable source of the necessary funds.

6.1.2 National Roads Authority and Road Fund

Following NEC Decision NG65/2002 of November 2002, enabling legislation for the NRA was approved by Parliament in May 2003. The legislation, once gazetted, establishes the NRA and RF, with the RF administered by the NRA. The objectives of the NRA are (i) to raise funds for the maintenance of public roads, (ii) to ensure the efficient preparation of effective annual road maintenance programs and (iii) to ensure that all routine, specific and emergency maintenance of roads and road rehabilitation and reconstruction are executed in a transparent, effective and efficient manner, maximizing the contribution of road assets to the country’s economic and social development. Its functions, listed in the legislation, are:

- to establish and operate a RF from road user charges, budgets and other sources;
- to establish the resources and organization to enable it to perform its functions;
- to maintain and manage updated data on asset conditions using the RAMS, BIMS (Bridge Inventory and Management System) and other approved systems;
- using the RAMS, BIMS and other approved systems, to formulate and determine prioritized annual road maintenance plans and programs to be supported by the road sector cost-recovery revenues;
- to establish annual road maintenance funding requirements in accordance with these future annual road maintenance plans;
- to determine and implement road user charges in accordance with the financial resource requirements of the annual road maintenance plans;
- to deliver the required routine, specific and emergency road maintenance in accordance with maintenance service levels established for each class or type of road by using independent contractors, and to monitor and supervise the contracts as they are executed;
- to deliver road improvement and road restoration, when required, by undertaking the design studies necessary for the programmed road improvement or rehabilitation projects (i) by preparing construction plans, specifications, cost estimates and the other contract documents and (ii) by monitoring and supervising the works as they are executed, using qualified consultants and/or contractors;
- to establish and sustain a contract management capacity to ensure the validity and effective management of contracts awarded for the execution of agreed road maintenance works and rehabilitation and reconstruction projects;

56 The legislation has been passed by Parliament and the responsible minister – the Minister for Works – has been declared, but the Bill has not yet been gazetted; this needs to be done before the legislation is effective.
• to ensure that all contracts are tendered through a transparent and competitive procedure to secure efficiency and sustainability in the delivery of road maintenance and rehabilitation works;

• to keep adequate records and maintain a management information system which will provide the Board and staff with accurate and timely information on commitments, expenditures and revenues for the purchase of consultancy and contracting services and other purchases and outlays;

• to report publicly and transparently on collections of user charges and revenues, and in detail on the use of the revenues on the road maintenance programs, in accordance with internationally accepted accounting principles;

• to establish an environmental management capacity;

• to provide a continuing program of professional staff development and skills training for non-professional staff; and

• to construct, erect or affix signs or marks on road transport infrastructure in accordance with the Motor Traffic Act.

150. According to the legislation, the NRA will be supervised by an 11-member Board held responsible and accountable to the Minister (the Minister for Works) for ensuring optimal road conditions and for efficiency, effectiveness, transparency and propriety in the collection of funds, the conduct of the NRA’s business and the effective operation of its activities. Members representing non-government stakeholders will be in the majority. The membership will comprise: the Head of the Department responsible for treasury matters, ex officio, or his nominee; the Head of the Department responsible for planning and monitoring matters, ex officio, or his nominee; the Head of the Department responsible for works matters, ex officio, or his nominee; the Head of the Department responsible for transport and civil aviation matters, ex officio, or his nominee; the Chairman of the Transport and Infrastructure Sector Committee of the CIMC; one person nominated by the PNG Chamber of Commerce and Industry; one person nominated by the Road Transport Association of PNG; one person nominated by the PNG Chamber of Mines and Petroleum; one person nominated by the PNG Institute of Accountants; one person nominated by the Institution of Engineers PNG; and one person nominated by the Rural Industries Council.

151. The Chairman will be elected by the Board from among its non-government members. The Board will meet at least quarterly. It will be required to submit an annual report to the Minister, to be tabled in Parliament, containing:

• an explanation of the NRA’s mission and objectives;

• a description of its activities for the year, structured according to the strategies and program pursued in relation to each objective, including output measures or indicators against which its performance can be judged;

• an explanation of the accounting policies adopted, with a clear demonstration of how the Board fulfils its commitment to transparent operations;

• the performance measures achieved by the NRA during the year compared with previous years and an explanation of the apparent trends;

• the audited accounts of the NRA, together with the auditor’s report; and
• comprehensive appendices of road network and road traffic statistics.

152. The following staff positions are specified in the draft legislation, with appointments to be made by the Board following public advertisement:

• the CEO, responsible for the day-to-day running of the NRA, implementing the Board’s decisions, administrating the staff and organization of the Authority and being held accountable to the Board for its performance;

• three Unit Managers, respectively the heads of (i) a Planning and Programming Unit responsible for formulating road maintenance, rehabilitation and reconstruction plans based on RAMS and BIMS, (ii) a Road Fund Unit to secure funds for, operate and manage the RF, and (iii) an Implementation Management Unit to manage the contracting of services for road maintenance and for road rehabilitation and reconstruction; and

• a Board Secretary.

153. The CEO is empowered to appoint other staff as necessary.

154. Under the Act, the operations of the NRA are to be funded from the RF. The funds channeled through the RF are to consist of:

• all monies appropriated by Act for the purposes of carrying out or giving effect to the NRA Act;

• all monies received by the NRA from road user charges (see below);

• all monies or assets as may accrue to or vest in the RF, whether in the course of the exercise by the Board of its functions or powers or otherwise;

• monies or assets as may accrue to or vest in the RF by way of grants, subsidies, bequests, donations, gifts and subscriptions, from the National Government or from a Provincial Government or from any other person;

• all monies received by the RF by way of voluntary contribution;

• all moneys received as a loan, grant or assistance from authorized institutions (as defined in the Banks and Financial Institutions Act 2000), international agencies or organizations, or foreign governments for the purposes of the NRA;

• all other monies received by the NRA in the exercise and performance of its functions and powers; and

• fines payable under the NRA Act.

155. The Act gives authority to the NRA to levy user charges to contribute to the costs of maintaining public roads. Revenues from these are to be channeled through the RF and can only be used to cover the costs of administration, contracting out routine, periodic and emergency maintenance services and enforcing vehicle weight and dimensions (VWD) limits; no other purpose is allowed. The structure of user charges and their rates, however, are not specified in the legislation. Provision is made for exemptions and rebates to be prescribed for specified road users.
6.1.3 **Key Features of the NRA Legislation**

156. The NRA Act 2003 is a satisfactory document. It meets most of the conditions discussed earlier in Section 5. Most notably:

- it prescribes clearly the objectives and functions assigned to the NRA;
- it makes the Board responsible and accountable for the performance of the NRA and the condition of the network, and it requires its performance to be monitored using objective measures with the results made public;
- it prescribes clearly the NRA’s sources of funds and imposes strict controls over the uses to which they may be put; it ensures that the proceeds of the RF are to be used for road maintenance alone (apart from meeting the costs of administration and protection against damage from overloaded trucks) and not for upgrading or other capital works;
- it specifies that the preparation of road maintenance plans and the allocation of expenditures from the RF should be based on the rational economic criteria that underlie the RAMS and BIMS;
- it makes clear that the NRA is to implement its maintenance works and upgrading projects through outsourcing to private-sector contractors;
- it requires transparency in decision-making and reporting and encourages a culture of responsibility and accountability towards road users; and
- it establishes, through the responsibilities and membership of its Board, oversight and supervision arrangements that allow stakeholder participation in decision-making and attempt to minimize opportunities for political interference.

157. Several questions remain unanswered by the legislation, however, and will need to be clarified by later amendments, further legislation or administrative regulation:

- It is not clear whether the NRA is to be responsible for the network of national roads only or for all public roads, including those (being not national roads) that are currently the responsibility of provincial or lower-level agencies. Nor is it clear whether the RF would fund maintenance of the whole network or only national roads and, if only national roads, how the maintenance of provincial and lower-level roads is to be funded and carried out.
- The sources and structure of the road user charges are not specified, nor are its initial rates, nor the procedures to be used to propose and approve changes in the rates.
- No process or timetable is specified for the establishment of the NRA, nor for transfer of the road network (or portions of it) to the NRA for maintenance.

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57 The Act refers to public roads, but according to the Organic Law those that are not national roads are the responsibility of provincial and local-level administrations and cannot be assigned to a national agency like the NRA.

58 Indeed, the legislation is silent on the question of maintenance of provincial and lower-level networks, for which responsibility cannot be assigned to the NRA without revoking the relevant provisions of the Organic Law.
- Nothing is said in the Act about the relationship between the NRA and the existing DOW organization. It is not clear whether DOW would continue to exist and, if so, what its residual responsibilities would be. If responsibility for the maintenance and, where instructed, upgrading of public roads is to be transferred to the NRA, there is no explanation of how the transition will be effected and what will happen to the organization and staff of DOW.

158. The Act differs in several respects from the proposals of the earlier RSCRIP, though the RSCRIP proposals for user charges are the basis for the current RF proposals. The RSCRIP argued for an arms-length relationship between the three functions of (i) managing the funds in a RF; (ii) monitoring and medium-term planning, programming and budgeting; and (iii) implementing the maintenance works. This was based on a review of the factors contributing to the success or otherwise of road funds elsewhere in the world. RSCRIP argued that separation of these functions allowed purchaser-provider relationships to exert pressure to raise standards and lower costs. Thus, under the RSCRIP proposals, the managers of the RF would commission monitoring (condition survey) and planning, programming and budgeting (RAMS/BIMS) tasks from the private sector and implementation tasks from the proposed NRA, private-sector contractors and (for those provinces choosing to subscribe to the RF and its procedures) provincial road agencies.

159. The NRA Act combines the functions of managing the funds and planning, programming and budgeting for maintenance, though it leaves implementation to be outsourced. This combination of functions could be made to work effectively if the Board is conscientious in fulfilling its overview role, but a more efficient and sustainable alternative would be – and this could still be considered by NRA’s management – to outsource the planning, programming and budgeting tasks to independent, competitive RAMS/BIMS service providers, as well as separately outsourcing road/bridge condition survey tasks. This would encourage private firms to develop, maintain and enhance their RAMS/BIMS support capabilities and data management and planning tools, and would reduce the risk that these skills might be lost with staff transfers if left in public-sector hands.

6.1.4 CIMC Proposal for a Project Management Group

160. The proposals of the NRA Act enjoy widespread but not wholly universal support. An alternative has been promoted by the CIMC. This followed a 1999 review of road maintenance management and financing carried out by its Transport and Infrastructure Sector Committee. Instead of proposing the NRA and RF, the committee recommended establishing a private-sector PMG to take control of allocated funds and implement road rehabilitation and maintenance programs under contract, initially concentrating on the Highlands Highway corridor. These PMG proposals were endorsed by the CIMC-sponsored National Development Forum in 1999, 2000 and 2001 and by the NEC. Little had been done to implement them, but further deterioration of the Highlands Highway and renewed government interest in resolving the sector’s institutional difficulties, prompted by the FER, encouraged their proponents to put them forward again as an alternative to the proposed NRA.

161. The PMG concept has its origins primarily in concerns about the serious deterioration in the condition of the Highlands Highway. Commercial transport

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59 It is possible that the momentum established by RAMS would not have been achieved had it not been supported by ADB funding and a team of consultants.
operators, some represented on the committee, were frustrated by the government’s failure to repair and maintain badly-damaged sections of the Highway and by the rising costs of operating vehicles between Lae and the Highlands region. The PMG proposal came from a sense that the government had failed to preserve road assets, that piecemeal efforts to improve the situation had proved ineffective and that the time had come for the private sector to fix the problem instead. It centered on repairing the Highlands Highway using private-sector management skills, but did not address the longer-term organization and funding of maintenance of the country’s public road network as a whole, the competing needs of arterial, secondary and tertiary access roads, the inherent lack of accountability and the risks in having narrow commercial interests, focused on the Highlands Highway, influencing maintenance priorities for the wider network.60

162. The CIMC proposals were not developed in any detail, and some of their features are contrary to best road management practice. The PMG, as proposed, represented vested interests in a single, admittedly major, highway corridor. No mechanism was proposed that would hold it accountable for the condition of the broader network. No criteria were put forward as the basis for decisions about the allocation of funds. The sources and amounts of funds were not clear, nor the permitted uses to which the funds would be put. It is not clear whether the PMG was to manage ongoing maintenance as well as initial reconstruction and rehabilitation. Nor is it clear whether the PMG would manage the country’s road network as a whole, or only national roads, or even only the Highlands Highway. Even so, the proposals are symptomatic of users’ frustrations with the present system of road management and indicate the degree to which radical solutions are viewed as viable alternatives.

6.1.5 National and Sub-National Roads

163. The present system fails to maintain the 7,819 kms of national roads, let alone the more extensive network of provincial and lower-level roads amounting to over 17,000 kms. Yet these provincial and lower-level roads are those that serve the poorest and most isolated population groups who rely on them for access to basic education and health services, markets and cash income opportunities. Improving and maintaining the condition of national roads will help reduce transport costs in the regions served by them but might not contribute much to solving the problems of poverty and isolation in the villages served by provincial and lower-level feeder roads – the poorest make little use of the national network. Moreover, users of provincial and lower-level roads would be expected to pay the proposed user charges, through fuel levies and increased vehicle registration fees, like everyone else; there is no practical way of granting them exemptions if the RF were only to fund the maintenance of national roads. According to the earlier RSCRIP analyses, of the optimum long-run level of annual expenditure on maintenance of Kina 175 million (1999 prices), Kina 90 million was needed for national roads and almost as much, Kina 85 million, for provincial, district and lower-level roads. Bringing expenditures up to this level would give users a 20 percent saving in vehicle operating costs: 15 percent on national roads and 30 percent on provincial/district roads.

60 Some of these shortcomings could have been overcome had the proposals focused on contracting-out the management of the network, or parts of it, following competitive tender. But this alternative has received little consideration and might present insurmountable political difficulties.
164. Under the 1995 Organic Law, roads other than national roads are the responsibility of provincial and local-level governments. The national government cannot dictate priorities, even though funding is generally provided in the form of block grants or Rural Development Funds (RDFs). Unless the Organic Law is repealed or amended, priorities and procedures for these sub-national roads can only be influenced by central government if the relevant provincial or lower-level administrations were to delegate their own responsibilities to the central government. Provision is made for this in the Organic Law.

165. There are currently no formal procedures to ensure that funds are allocated and used optimally for sub-national roads, although DOW does budget some funds for provincial road maintenance scheduled using RAMS. If road rehabilitation and maintenance planning is to be improved for these roads on a systematic basis, then either (i) an objective RAMS-/BIMS-based survey and analysis capability should also be formally established at the provincial level, as is currently being attempted under the RAMS Project, or (ii) responsibility for road rehabilitation and maintenance planning (but not road development planning, which should reflect the aspirations of local communities) should be delegated by provincial and lower-level administrations to a central authority like the NRA.

166. A weakness of the first of these options (the current approach) is the lack of any incentive for RAMS/BIMS to be used as the basis for allocating funds: there is no reason to suppose that provincial and lower-level administrations would not continue to respond to other pressures in deciding what roads to repair or maintain. The RAMS/BIMS systems would risk falling into disuse. The second option is preferable. It would give provincial and lower-level administrations less discretion over road maintenance priorities, but has the advantage of more consistent and rational control over maintenance planning and budgeting for all roads and bridges using RAMS and BIMS. The sub-national administrations would remain free to determine their own priorities for road development (the construction of new roads or capital road upgrading projects) and to allocate funds from other sources (RDF, revenues from provincial/district sources) as they see fit.

167. Having RAMS/BIMS analysis carried out by the NRA, however, will not alone guarantee that the funds are well spent. Measures must also be introduced to ensure efficient and effective implementation of the road maintenance program itself. At the provincial level, this would require PWU capabilities and procedures to be substantially strengthened. This could be achieved by requiring them to meet specified conditions before being permitted access to the proceeds of the RF. These conditions would include agreement to the use of RAMS/BIMS as the basis for setting maintenance priorities and the adoption of standard procedures for the tender, award and supervision of performance-based maintenance contracts. Several options are possible to help strengthen the ability of PWUs to meet these requirements, including technical assistance and training financed from the RF, pooling PWU technical resources within a region, pooling PWU and NRA technical resources within a region (along the lines of the HRMG established for ADB’s RMUP – see Section 6.1.6) and voluntary delegation of authority to manage the sub-national roads in any province to the NRA.

168. Selection of the most suitable option, depending on the circumstances in each province or region, should be examined by the RADP.
6.1.6 Arrangements Adopted for Donor-Funded Projects

169. Project management arrangements established for donor-assisted projects also have a bearing on future institutional and funding arrangements, particularly where they are seen as providing a model that could be extended subsequently to the country as a whole.

170. For the ADB’s Road Maintenance and Upgrading (Sector) Project (RMUP), a Highlands Region Maintenance Group (HRMG) has been established as the implementing agency. Headquartered in Mount Hagen, the HRMG includes representatives of DOW and the provincial administrations in the region covered by the project. The group has begun to establish a road maintenance operation in the field with a focus on user expectations and quality control. Implementation of the project provides practical training opportunities. During project preparation, the HRMG was envisaged as the potential technical nucleus of an autonomous Highlands Highway Authority (HHA), to take over responsibility for management of the Highlands Highway corridor. Eventually the HHA was seen as migrating into a national authority with representation in all regions, the whole process expected to take some 10 years. It is difficult, however, to see how this transition might take place. The initial emphasis on project-oriented capital works (reconstruction and rehabilitation) detracts from the HRMG’s ultimate role as a maintenance management organization. So too does its lack of independence and autonomy: its government representatives are drawn from DOW’s POOWs and the PWUs of the provincial administrations.

171. Project management arrangements for the WB’s Road Maintenance and Rehabilitation Project (RMRP) involve no special management group outside normal organizational structures. They focus instead on strengthening existing functions, with an Employer’s Project Manager (EPM) and Provincial Employer’s Project Managers (PEPMs) appointed to assist DOW’s central and provincial operations. The WB’s Highlands Highway Rehabilitation Project (HHRP), under preparation, makes more specific provision for longer-term institutional reform by including studies to secure sustainable management and funding of road rehabilitation and maintenance in general and on the Highlands Highway system in particular. A preparatory study reviewed alternative forms of organization – strengthening DOW’s existing structure, expanding the HRMG, the CIMC concept, establishing a HHA and establishing a Highlands Highway Management Unit (HHMU) – and concluded in favor of the last of these, with a largely private-sector Advisory Board reporting to the Secretary of Works.

172. Both ADB and WB projects require the Government to commit a proportion of project costs from its own resources – counterpart funds. Its inability to provide these has been a major cause of delay. The search for them has led to some innovative solutions, including the use of bilateral co-financing to fund them and counting maintenance expenditures as contributions-in-kind. DOW’s draft 2004 roads budget is said to be almost wholly allocated to counterpart funds for donor projects.

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61 The FAS Operations of DOW is project manager, AS Maintenance is project maintenance manager and the five PWMs, from Eastern Highlands, Enga, Simbu, Southern Highlands and Western Highlands, are provincial project implementation managers.

AusAID projects – notably the NRRSP and NRBMP – do not require counterpart funds and rely on external consultants to manage project implementation on behalf of DOW and AusAID. There is a long track record of successful implementation under this arrangement, and management overhead costs are said to be less than 10 percent of total project costs. Accordingly (and following its experience with the CAA) AusAID is less enthusiastic about dismantling DOW’s road maintenance organization and replacing it with a statutory authority. Others argue, however, that AusAID’s project implementation arrangements, even when applied to periodic maintenance projects, do not promote a sustainable maintenance capability within DOW itself.

6.1.7 Scenarios for Establishment of the Authority

None of the above arrangements have been adjusted to correspond with the establishment of the NRA. Although the Government suggested in its 2003 Budget that the NRA’s initial focus would be on the Highlands Highway region, the NRA Act places no regional limit or priorities on its activities – it is to be responsible for maintaining all public roads, whether defined to include provincial and lower-level roads or not.

There is little scope, other than through the introduction of local tolls, for introducing the proposed system of user charges in a limited geographic area. It would have to be national in scope. But the maintenance management operations of the NRA itself could be started in one region or corridor and then extended to cover additional regions later. The RADP proposes that it should take on 20 percent of the national network each year until it manages the lot after five years. Revenues accruing to the RF would rise at roughly the same rate. In the meantime, maintenance of the remaining sections would continue to be carried out by the POOWs and PWUs using the government budget.

One problem with this is the possibility that failed sections of the national network cannot be rehabilitated in time to allow the transfer of 20 percent of maintainable roads each year – see Section 6.2.1. If receipts from user charges started to run ahead of the cost of maintaining NRA’s network, a system would need to be established for allocating its proceeds between the NRA’s operations and those of the PWUs and POOWs.

The RADP envisages that the maintenance responsibilities of the NRA should start with national roads only, leaving provincial and lower-level roads until later. The RSCRIP also proposed implementing the RF in two stages (Section 6.2), with recovery of all routine, periodic and emergency maintenance costs for the national road network (Kina 92 million p.a. in 1999 prices) achieved after five years and recovery of the costs of routine and periodic maintenance for 16,500 km of provincial and district roads (Kina 178 million p.a. for both national and provincial/district roads together) achieved three years later. Provincial and lower-level administrations would draw on the Fund’s proceeds during the second stage, but only after agreeing to the use of the NRA’s systems and procedures for condition-monitoring surveys, planning and priority-setting, budgeting, works outsourcing and contract management and supervision.

The issue of a staged establishment of the NRA is particularly relevant in the context of the Highlands Highway. Its deterioration has prompted, notably in the proposals of the CIMC, the notion that a regional road authority (the PMG, in CIMC’s
case) should carry responsibility not just for maintenance but also for reconstruction and rehabilitation. A HHA or PMG that concentrated initially on major capital works in a specific corridor, however, is a different type of organization from one responsible for maintaining the network once reconstruction and rehabilitation have been carried out. Moreover, arrangements are already being discussed for forthcoming donor projects to provide funding, design, contracts management and supervision arrangements for capital works in the Highlands region; these projects include the ADB’s RMUP, the World Bank’s RMRP and HHRP, and AusAID’s Key Roads for Growth Maintenance Project now in the planning pipeline. Each incorporates controls over project preparation and implementation that should satisfy CIMC’s requirements. Rather than focusing on the immediate rehabilitation needs of the Highway, discussions about implementing the NRA should address the longer-term task of maintaining the network once reconstruction and rehabilitation have taken place and damaged road links have been brought up to a maintainable state – itself a major task discussed in Section 6.2.1.

179. A further critical consideration regarding the staging of NRA’s establishment is the transition process for existing DOW staff. Here, there are two options: (i) making a clean break, as proposed in the maritime sector for the NMSA, by requiring all DOW road maintenance staff to resign and, if interested, apply for positions in the NRA; and (ii) making the transition gradually, by giving the Authority responsibility for increasing portions of the network. The second of these is favored by the RADP. It would allow the NRA to build up staffing structures and working arrangements over a period of five years, starting with 20 percent of the network (yet to be defined). Arrangements for the transition are being worked out by the RADP in consultation with those affected.

6.1.8 The Role of DOW

180. Possibly the most critical challenge is the future of DOW and the associated transitional arrangements for staff. According to the FER, DOWT had 2,895 funded positions in 2001; some 2,500 of these are probably now with DOW. Many have skills applicable only in the roads sector. A number are involved in non-core activities unrelated to roads: architectural services, public buildings management and maintenance, etc. According to the recommendations of the FER, many of these functions will be dispensed with. A NRA that out-sourced its road maintenance tasks to private contractors would need a substantially reduced number of permanent staff, many of whom would require skills in business, financial, personnel and contracts management that are currently not required by DOW. A substantial proportion of the present DOW staff would be made redundant. Some would retire, some find employment in outsourced NRA activities, some in other public- and private-sector occupations and some in DOW.

181. Managing this change process, and carrying the support of the present staff through it, will not be easy. Already, rumors of the impending change to a NRA have lowered the morale of existing DOW employees. So far, they have been told little about the risks and prospects presented by the coming changes, and resentment is growing. It is important for DOW management to prepare, with assistance from donors, a roadmap that shows clearly what the implications and opportunities are for each individual and explains how their interests will be protected. DOW employees should be fully briefed on the options available to them, their consequences and the
efforts that will be made to minimize or compensate for any negative impacts on them and to create opportunities for them in providing external services to the NRA.

6.1.9 Key Actions

182. The most critical institutional actions needed in the short term, most of which will benefit from the assistance of the ongoing RADP TA, are:

- to clarify the responsibilities of the NRA in respect of sub-national roads;
- to define the organizational structure, tasks and responsibilities of the NRA, and to assess its staffing requirements having regard to the opportunities to outsource appropriate functions to a competitive private sector;
- to clarify the staged establishment of the NRA and to identify the links for which it will be initially responsible;
- to prepare a program of change management, with the implications and opportunities of existing DOW staff members clearly identified and plans prepared to accommodate their needs; and
- to establish a budget to compensate DOW staff and to pay out their accrued entitlements in full prior to recruiting staff for the NRA.

6.2 Evaluating and Funding Road Expenditure Needs

6.2.1 Funding Requirements

183. The earlier RSCRIP proposals for maintenance funding were based on the estimated long-run costs of periodic and routine maintenance once initial reconstruction and rehabilitation needs have been met. These amounted to Kina 90 million p.a. (1999 prices) for national roads and Kina 85 p.a. for provincial and district roads, a total of Kina 175 million. More recent projections have been made by RAMS, but only for national roads; these are summarized in Figure 12. They broadly confirm the earlier RSCRIP estimates, showing that expenditure in the range of Kina 90-110 million p.a. (this time in current prices) will be necessary for national roads. To a degree, these RAMS estimates include the costs of rehabilitation, but these are likely to be under-estimated since RAMS evaluates them as periodic maintenance works.\(^3\)

\(^3\) Periodic maintenance treatments are triggered when optimum intervention conditions are reached, whether or not reconstruction or rehabilitation may be more suitable in the first instance.
184. Neither RAMS nor the earlier RSCRIP adequately addressed the costs of the initial reconstruction/rehabilitation works needed to bring the network back to a state in which it can be maintained by an appropriate periodic and routine maintenance regime. Using assumptions based on RAMS network and condition data\textsuperscript{64}, it would appear that some 65 percent of the network already requires rehabilitation or reconstruction, including 46 percent of the length of the national network (amounting to around 3,600 km) and two thirds (also around 3,600 km) of the provincial network (Table 5). The cost of this amounts to some Kina 2.7 billion in 2003 prices\textsuperscript{65}, of which half would be for the national network. Even with substantially increased loan funding now under discussion between Government and donors, this is probably well beyond the Government’s capacity to fund.

<table>
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<tr>
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<th>Total Kms</th>
<th>Est Rehab Needs</th>
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<tr>
<td></td>
<td>Kms</td>
<td>%</td>
</tr>
<tr>
<td>National</td>
<td>7,782.4</td>
<td>3,562.6</td>
</tr>
<tr>
<td>Provincial</td>
<td>5,347.5</td>
<td>3,563.4</td>
</tr>
<tr>
<td>District/local</td>
<td>11,185.9</td>
<td>8,566.8</td>
</tr>
<tr>
<td>Total</td>
<td>24,315.8</td>
<td>15,692.8</td>
</tr>
<tr>
<td>Note: District/local includes other/unidentified (+/- 8000 km)</td>
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185. If the rehabilitation task were spread over, say, eight years, the total annual expenditure needs (which should include emergency/holding treatments to delay the worst deterioration while roads await rehabilitation) would still be very large, rising to

\textsuperscript{64} These assumptions include the following: that 70% of surveyed national roads and 85% of provincial roads classified as poor/bad require rehabilitation, as do 25% and 35% respectively of those classified as fair, and 5% and 10% respectively of those classified as good.

\textsuperscript{65} These estimates will shortly be refined by the RAMS project.
about Kina 670 million in the fifth year before eventually falling to just over the Kina 200 or so needed annually mostly for maintenance (Figure 13).

**Figure 13: Projected Expenditure Requirements**

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186. As a further imposition on top of the long-run costs of maintenance, there is little chance that the rehabilitation costs can be funded solely from a system of user charges. How else, then, can they be funded? This review is not able to estimate the Government’s capacity to service further loans, but already it has hesitated to take on additional commitments for the ADB’s Southern Region Roads Project and CWTP. At best, it could afford perhaps a third of the needed road rehabilitation, i.e. some Kina 800-900 million in all, in addition to the maintenance expenditures raised from users and channeled through the RF. This would only cover between 60 and 67 percent of the national network rehabilitation needs and leave the rest of the national network, plus all provincial and lower-level roads, in deteriorated condition with only minimal emergency/holding treatment to try to keep them open.

**6.2.2 An Affordable Network**

187. If the Government could afford to rehabilitate only two thirds of the national roads needing rehabilitation, which links should be rehabilitated and which omitted? There is no escaping the necessity to declare a core network of critical routes that are essential to the economy and that should receive priority for rehabilitation. Selection should be based on cost-benefit analysis and considerations of network connectivity. Preliminary proposals have been made by the RAMS project but these need further review and discussion. Certainly the Highlands Highway should be part of this core network. The RAMS proposals are:

1. Sepik Highway (NR00012), length 263 km
2. Bundi Highway (NR00011), length 90.3 km
3. New Britain Highway (NR00010), length 205.4 km
4. Coastal Highway (NR00009), length 788.9 km
5. Ramu Highway (NR00008), length 172.6 km
6. Highlands Highway (NR00007), length 603.4 km
7. Enga Highway (NR0006), length 90.9 km  
8. Wabag-Mendi Highway (NR0005), length 144.5 km  
9. Wau Highway (NR0004), length 128.6 km  
10. Northern Highway (NR0003), length 83.2 km  
11. Magi Highway (NR0002), length 240.2 km  
12. Hiritano Highway (NR0001), length 295.8 km.

188. DOW, rather than the NRA, should be the executing agency for these rehabilitation works, acting on behalf of the Government as borrower. Management and financial control procedures should meet the requirements of the lending agencies. It may be necessary, however, to get the NRA to share the load if it is able to demonstrate more efficient and transparent operations. Its enabling legislation allows it to undertake rehabilitation works as required.

6.2.3 Improving the Accessibility of Isolated Communities

189. If rehabilitation and maintenance efforts were to be concentrated on a limited number of high-priority routes, what of the rest of the network? Should it be left to deteriorate further and become impassable?

190. Under RSCRIP and RADP proposals the system of user charges would eventually, perhaps by year 8, recover the costs of periodic and routine maintenance for the whole network of public roads. Most of the links outside the affordable network are not sealed. And, unlike sealed roads that have failed, most non-sealed roads do not necessarily require expensive reconstruction and rehabilitation before they can be made trafficable. Until the RF covers their full maintenance costs, a system of emergency maintenance could be put in place to keep them open, with an initial focus on improving and maintaining drainage and achieving a better cross-section by grading to facilitate water run-off.

191. There are other ways, too, in which governments and local communities can help reduce the costs and improve the reliability of road access. These include:

- securing the assistance of commercial enterprises who might benefit from better-maintained roads in their area of operations or who contribute to the costs of road pavement damage, e.g. plantation, mining and logging companies. Such assistance should reflect the share of road maintenance costs that are attributable to the enterprise in question. The responsible agency – usually the provincial government – should earmark the associated revenues for the maintenance of the roads in question (enterprises would only be willing to assist if they see the funds put to effective use);

- allocating a greater proportion of revenues from provincial and lower-level tax sources – e.g. land, property or business taxes – to road maintenance, in recognition of the role of accessibility in raising economic growth, land values and business incomes;

- encouraging low-cost, labor-intensive methods of road maintenance through performance-based maintenance contracts for specific roads and the provision of tools, materials and training to help ensure adequate work standards; and

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66 Labor-intensive construction techniques and self-help schemes were widely used up until as recently as the late 1970s, but have fallen out of favor in recent years, replaced by a “cargo-cult” view of the role of government in...
• using micro-finance and other sources of rural credit, in conjunction with limited government guarantees and a program of community engagement, to encourage the use of alternative forms of transport that have proven effective in similar countries, such as animal-drawn vehicles, bicycles, motorcycles and the small hybrid tractor/truck units commonly used in China and southeast Asia.

6.2.4 RAMS and Expenditure Priorities

192. Priorities for road/bridge expenditures from the Fund should be carried out using transparent, objective criteria by a unit that is, ideally, free of any vested interest in the outcome. RAMS and BIMS are tools suited to this role. The results from RAMS/BIMS represent the economically optimum strategy for road and bridge maintenance for any given budget: the strategy that minimizes total life-cycle costs, including both agency costs and user costs. Using RAMS/BIMS would help ensure that the net benefits of road maintenance expenditure are maximized.

193. There will be pressure to vary the priorities suggested by RAMS/BIMS, however, especially if those involved in carrying out the analysis also have a vested interest in its results. This is why the RSCRIP proposed that RAMS/BIMS functions (including analysis and surveys) should be carried out by an independent unit, ideally through outsourcing following competitive tender. This is not the case now, however, nor is it a feature of the current NRA legislation. It becomes all the more important, therefore, for the independence and objectivity of the RAMS/BIMS analysis to be protected. The Board will have to play an essential role in ensuring that this is done.

194. Under the new legislation, a Planning and Programming Unit would be established within the NRA67. The activities of this unit would be based on the use of RAMS and BIMS to determine expenditure needs and works priorities. This differs from the RSCRIP recommendations, which proposed that RAMS functions – road maintenance planning and scheduling – should be placed at arm’s length from the functions of road fund management and execution of road maintenance works. It was argued that the efficiency and longer-term sustainability of RAMS is best ensured if the task is periodically outsourced following competitive tender. And keeping RAMS independent of the task of maintenance execution would help ensure its objectivity.

195. Ideally, the required services should be outsourced under competitive contract to a private firm which would undertake on behalf of the NRA to: (i) commission and supervise periodic surveys of road conditions and traffic; (ii) maintain the road and bridge system databases, and provide relevant data to interested parties; (iii) analyze optimum maintenance strategies and treatments, using specified economic and technical criteria; (iv) allocate the costs of these maintenance strategies among classes of road user, for the purpose of reviewing and updating user charges; (v) prepare a rolling forward plan for maintaining the national (and eventually provincial/district) network, based on technical and costing inputs received from the respective road agencies and any adjustments in the light of budgets available from the RF; and (vi)

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67 RAMS is currently established in DOW’s Maintenance Coordination Services Branch (MCSB). This reflects a commonly-held view that RAMS is a replacement for Maresman, itself primarily a tool for planning and scheduling maintenance works activities (the daily allocation of labor, material and equipment) rather than a higher-level planning tool for comparing the economic costs and benefits of alternative strategies and budgets.
monitor progress on the execution of maintenance programs at the network level, and evaluate their impacts on the overall condition of the network and pattern of user costs.

196. In many other countries, RAMS-like systems have failed — more, in fact, than have succeeded — notwithstanding initial promises of continuing support. The reasons are many, but include the following:

- a tendency to over-ride or manipulate the priorities recommended by the system, or to manipulate survey/input data, to take into account non-economic considerations;
- a failure to provide the necessary funding to support continuing operations, especially for the regular (and expensive) surveys needed to update information on road, bridge and traffic conditions;
- a failure to provide sufficient funding for road maintenance itself — it becomes pointless to carry out surveys and evaluate priorities for routine and periodic maintenance if there are only enough funds for emergency repairs;
- loss of confidence in the accuracy or utility of the output generated, whether by operational field staff or donors;
- loss of staff trained in the use of the systems — already PNG’s RAMS project has lost key members reassigned to other tasks; in other cases, staff might be reluctant to become involved in RAMS because of its perceived complexity (though much effort has gone into making PNG’s RAMS as user-friendly as possible); and
- the lack of incentive to maintain and develop RAMS.

197. The last of these is especially critical. The objectivity and utility of RAMS would be maximized if it were operated independently of any vested interest in its recommendations, preferably by contracting out the management, operation and further development of RAMS on a periodic basis, giving local consultants an interest in maintaining and strengthening their RAMS capabilities and holding them accountable under the conditions of their contracts.

6.2.5 Key Actions

198. On the basis of the above discussion of road maintenance planning and funding, the most critical tasks would appear to be:

- to define the functions and operations of NRA’s Planning and Programming Unit and to consider outsourcing road/bridge condition surveys, RAMS/BIMS analysis, further system development and other planning support services;
- to evaluate priorities for road reconstruction and rehabilitation and to define an affordable program of reconstruction/rehabilitation works that can be funded with available capital resources from donor and domestic sources;
- to implement improved maintenance over the maintainable portions of the network, based on RAMS priorities for periodic and routine maintenance; and
- to try innovative ways of managing the maintenance of sub-national roads, including the use of community-based maintenance contracts, and incentives to encourage the use of alternative forms of transport.
6.3  Donor Assistance

6.3.1 The Role of Donor Assistance

199. As Section 5.10 argued, apart from providing funds to help implement high-priority rehabilitation/reconstruction projects, donor assistance can best help bring about fundamental policy and institutional reforms, supporting the technical analysis needed to supply convincing arguments for change, especially in the areas of cost-recovery and more reliable maintenance funding, greater efficiency and accountability in infrastructure management, strengthening budget discipline and the role of stakeholders in decision-making and improving planning tools and procedures, including resolving choices between poverty reduction, equity and economic efficiency objectives.

6.3.2 Critical Tasks

200. In the roads sector, the needed assistance is mainly in:

- establishing the NRA and the RF, for which the main tasks are to –
  - define functions and responsibilities and appropriate organizational structures, estimate staffing requirements and draft job descriptions, draft functional and operational procedures for key activities, develop a human resource development (HRD) and training plan, establish procedures for technical and financial management, outsourcing, internal operations and reporting and monitoring;
  - determine the role of residual DOW functions, estimate their staffing and functional needs and decide whether they should be privatized, remain under the Ministry of Works or be transferred elsewhere;
  - map out in detail, in close consultation with the staff affected, the process by which road-related functions will be transferred from DOW to the NRA, including arrangements for staff compensation, paying out accrued staff entitlements, retraining and assistance with re-employment, the valuation, transfer or sale of DOW assets, and associated timetables; and
  - update the RSCRIP proposals for cost recovery, user charges and the establishment and operation of the RF, canvassing the revised proposals among key stakeholders and the general public, and drafting the necessary regulations to implement the charges and their administrative arrangements; and
  - strengthening the tools and procedures used for expenditure planning, involving –
    - analyzing the advantages and disadvantages of outsourcing the RAMS/BIMS-related functions of road/bridge condition-monitoring surveys, programming and budgeting, and assessment of network performance;

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68 This will require a more detailed analysis of whether the NRA should be assigned responsibility for maintaining the whole public network (in which case formal agreements will be needed with provincial and lower-level governments) or just part of it, whether just national roads or one or more corridors or regions.
• extending the scope of the RAMS needs-assessment and evaluation criteria to encompass considerations of equity and poverty reduction, and incorporating these more effectively in the programming and scheduling of maintenance works on both national and sub-national roads;  
• integrating RAMS (and its network database and VOC-estimating procedures) more effectively with the process of network-level national transport planning, the conduct of feasibility studies for major investments on a more consistent basis and the evaluation of regulatory measures such as those governing permissible VWD limits;  
• improving the coverage, reliability and quality of reports on the condition of the network and the performance of the NRA, to include reports for both internal and external stakeholders; and  
• developing improved funding and budgeting arrangements, procedures, criteria and standards for keeping sub-national roads open and mobilizing local resources to assist in their maintenance.

201. As far as capital projects are concerned, the priority lies with rehabilitation – bringing the network up to the condition in which it can be maintained with a cycle of periodic and routine maintenance. Donor assistance to capital projects should focus on link-based projects in the core network that maximize the EIRR of investment and contribute most towards poverty reduction. With the Government’s ability to service loans limited, efforts should focus on an “affordable” network in the first instance.

202. The Government faces some urgent and difficult decisions in the short term: on immediate priorities for road rehabilitation; on increasing its level of debt to meet urgent road rehabilitation needs possibly amounting to some Kina 800-900 million over, say, 5 years (and on its ability to provide the necessary counterpart funds); on its readiness to develop innovative community-based solutions to maintaining sub-national roads and meeting local transport needs; on its willingness to transfer DOW’s road maintenance responsibilities to the NRA without also transferring its bureaucratic shortcomings; on the steps and timetable for establishing the NRA, and whether it is prepared to give its management the necessary autonomy with accountability; and on its commitments to openness, accountability, good governance, responsiveness to the needs of users, efficient, streamlined operations and competitive outsourcing.

203. Donors can help by agreeing on a common, shared strategy for assistance, providing technical support to help the Government face the most critical choices and tasks listed above, and being ready to provide Kina 800-900 million in loan finance for the major rehabilitation program required for the core network.

204. “Business-as-usual” – continuing to provide support for rehabilitation and maintenance projects without progress on institutional and funding reforms – cannot be an option. Already bilateral and international donors are baulking at entering into new loan agreements while there are concerns about the Government’s ability to provide counterpart funds and to fulfill its commitments to maintenance and good governance. Accordingly, a “calibrated response” mechanism is suggested, by which Government reforms in the sector, illustrated in Figure 14, are met with coordinated support from the donor community depending on their degree of successful implementation (Figure 15). This kind of calibrated response would provide encouragement and incentives for the Government to carry out its reform program.
while offering assurances to donors that their loan funds will not be wasted as has often been the case before. The details will need to be worked out in discussions between donors and the Government, but it could involve four levels of donor support:

- a joint commitment to providing funds to rehabilitate the core network, including co-financing arrangements to cover any shortfalls that may occur from time to time in counterpart funding, and supporting low-cost, community-based initiatives for local roads. This highest level of donor response would be contingent on the Government’s implementing the complete package of reform measures shown in Figure 15;

- a lesser level of rehabilitation funding, amounting to little more than what is needed to fix up the Highlands Highway, but with little prospect of substantial further project assistance. This would depend mainly on satisfactory arrangements being in place to guarantee funding of subsequent maintenance;

- a program of technical and advisory assistance to help implement key decisions to restructure the institutional arrangements governing the sector, including establishing the NRA and its associated RAMS/BIMS-based planning systems and funding through the RF; and

- at the bottom end of the scale, under a situation in which there is no effective progress towards the key goals – adequate and sustainable funding, good governance and institutional efficiency, objective planning and priority-setting, disciplined budgeting and efficient works execution – completion of ongoing/committed projects only, and effectively the suspension of assistance thereafter.
Figure 14: Key Measures of Achievement by Government

<table>
<thead>
<tr>
<th>Primary Objectives</th>
<th>Areas of Concern</th>
<th>Critical Performance Goals</th>
<th>Key Measures of Achievement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adequate &amp; Sustainable Funding</td>
<td>Funding for Rehabilitation</td>
<td>Demonstrated Ability to Repay Loans</td>
<td>Satisfactory Assessment of Country Creditworthiness</td>
</tr>
<tr>
<td></td>
<td>Sustainable Funding for Maintenance</td>
<td>Provision of Counterpart Funds</td>
<td>Counterpart Funds Deposited in Imprest Accounts</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Establishment of the Road Fund</td>
<td>RF &amp; System of User Charges Established &amp; Operating Satisfactorily</td>
</tr>
<tr>
<td>Good Governance &amp; Institutional Efficiency</td>
<td>Institutional Restructuring</td>
<td>Establishment of the NRA</td>
<td>NRA Board &amp; Managers Appointed Using Transparent Procedures</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Restructuring of DOW</td>
<td>Satisfactory Arrangements for Redundant DOW Staff</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Core Network for Rehabilitation Publicly Announced</td>
<td>DOW Restructuring Plan &amp; Technical/Financial Controls Implemented</td>
</tr>
<tr>
<td>Objective Planning &amp; Priority-Setting</td>
<td>Investment Priorities</td>
<td>Definition of Core Network</td>
<td>Trial Arrangements for Community-Based Maintenance of Feeder Roads</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Priorities Based on RAMS/BMS</td>
<td>RAMS/BMS Incorporated in NRA/DOW Planning/Scheduling Systems</td>
</tr>
<tr>
<td>Efficient Works Execution</td>
<td>Rehabilitation</td>
<td>Effective Procedures for Rehabilitation</td>
<td>Donor Procedures Adopted for All Rehabilitation Procurement</td>
</tr>
<tr>
<td></td>
<td>Maintenance</td>
<td>Performance-Based Contracts</td>
<td>Competitive Performance-Based Maintenance Contracts Established</td>
</tr>
</tbody>
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Figure 15: Calibrated Donor Response

<table>
<thead>
<tr>
<th>Donor Response</th>
<th>Key:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Joint support for a comprehensive rehabilitation program</td>
<td>• •</td>
</tr>
<tr>
<td>Continuing support for rehabilitation, but confined to Highlands Highway</td>
<td>• •</td>
</tr>
<tr>
<td>DOW/NRA technical assistance &amp; training; support for contractors</td>
<td>• • •</td>
</tr>
<tr>
<td>Completion of ongoing &amp; committed projects only</td>
<td>• • •</td>
</tr>
</tbody>
</table>

Including co-financing of selected counterpart contributions

Key: • Necessary condition for donor response