

GOVERNMENT OF PAPUA NEW GUINEA E4327 V2
ROAD MAINTENANCE AND REHABILITATION PROJECT II,
ADDITIONAL FINANCING

ENVIRONMENTAL AND SOCIAL MANAGEMENT
FRAMEWORK

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Executive Summary

This document; the Environment and Social Management Framework (ESMF) provides the basis for the environmental management of the Road Maintenance and Rehabilitation Project II Additional Financing (RMRP II AF) to ensure that project activities are implemented in such a manner that there are no deleterious environmental or social effects or if they cannot be avoided that they are managed and mitigated.

The ESMF is Volume 1 and it can be used as a stand-alone document. Volume 2 is the Land Acquisition and Resettlement Framework (LARF) and Volume 3 is the Environment Management Plan (EMP) for the Year 1 project (Milne Bay). Volume 2 will also include Public Consultation on the EMP and LARF. Together these three documents constitute the requirements as specified by the PNG Environment Act 2000 and the World Bank Safeguards Policies.

RMRP II AF will be implemented in ten provinces in Papua New Guinea; Central, Gulf, Western, Milne Bay, Madang, Manus, East and West New Britain, Oro, and Morobe Provinces, focusing on rehabilitation and improvement of selected road segments and the strengthening the institutional arrangements for road maintenance. In particular the RMRP II AF will restore satisfactorily physical restore satisfactory physical condition and safety to parts of the network of national roads in selected provinces based on priority needs and complements the Road Maintenance and Rehabilitation Project II (RMRP II). Besides this core component is the provision of Technical Assistance for roads maintenance and capacity building to the National Roads Authority (NRA) and small and medium local contractors. In addition, a new component focuses on providing economic opportunities for women within the sub projects. In the first year of the Project, the upgrade of (Alotau to East Cape Road) in Milne Bay will be done.

RMRP II AF will consist mainly of a discrete portion of the GoPNGs road maintenance and rehabilitation program. Physical works will primarily include the rehabilitation, upgrade to seal or maintenance of selected national and provincial roads and/or bridges. The GoPNG and the World Bank have agreed in principle, that as with the current RMRP II, to continue to fund projects in eight of the country's nineteen provinces: Central, Gulf, Oro, Morobe, East New Britain, West New Britain, Manus and Western Province. The RMRP II AF will include two addition provinces of Milne Bay and Madang.

RMRP II AF activities will be implemented along existing roads which are well away from sensitive environments and protected areas. The latter are generally located in remote locations with sparse population. In the first eighteen months (mid 2014 – end 2015), RMRP II activities will be in sections of the Hiritano Highway in the Central and Gulf provinces. For the remaining three and a half years, the locations of the RMRP II AF activities will be to Milne Bay and Madang provinces and then the remaining eight provinces. At this stage the other sub projects are not known, although they will be on national roads and highways. Thus, the environmental screening process in the ESMF will ensure the project does not impact on sensitive environment and protected areas.

RMRP II AF follows a priority approach and the specific locations of the other RMRP II AF sub projects besides those mentioned earlier are not known at the time of project preparation. Thus the Environmental Social Framework (ESMF) establishes the guidelines and procedures to be followed to ensure the project is implemented in an environmental and socially sustainable manner.

PART A : INTRODUCTION TO THE ESMF

I: Context

The Environmental and Social Management Framework (ESMF) presents a framework for environmental and social issues and concerns to be addressed under the Road Maintenance and Rehabilitation Project II Additional Finance (RMRP II AF) in Papua New Guinea. The RMRP II AF is an addendum to the Road Maintenance and Rehabilitation Project II (RMRP II) and this ESMF updates the version produced in February 2011. The RMRP II AF consists of an additional sub component on economic opportunities for women onto the previous components under RMRP II.

The Road Maintenance and Rehabilitation Project II AF will target ten provinces in Papua New Guinea over a period of four years beginning in 2014 till 2018 where it will enhance the activities undertaken under RMRP II.

II: Objective and Scope of the ESMF

The objective and scope of this document (ESMF) then is to provide documentation covering an overview of the components of the Roads Maintenance and Rehabilitation Project II Additional Financing followed by Policy, Legal and Institutional Framework Following on is the Sub Project Screening and Safeguard Process. The second last section covers Environmental and Social Management Plan and Monitoring and finally Consultation, ESMF Disclosure and Grievance Mechanism. These are contained in five Parts with the Annexes providing additional information to support the ESMF.

Part A: of the ESMF is the Introduction to the ESMF which consists of the purpose and structure of the document together with project description, institutional arrangement and an overview of project area/sites.

Part B: of the ESMF provides the Applicable Safeguard Policies for both the Government of Papua New Guinea and the World Bank and an overview of the Environmental Impact Assessment Process in Papua New Guinea.

Part C: of the ESMF contains Sub projects Screening Safeguard Procedures where the process of screening of sub projects with the preparation of safeguard instruments.

Part D: of the ESMF consists of Environmental and Social Management Plan and Monitoring with a focus on institutional capacity strengthening and

Part E: of the ESMF contains Consultation, ESMF disclosure and grievances redress mechanism.

III: PROJECT DESCRIPTION

Project Objectives. Under the Additional Financing (AF), the Project Development Objective (PDO) would be modified to include a third PDO to address the new component on enhanced economic opportunities for women. As such, the development objectives of the AF would be to: (i) improve road transport to project areas through providing satisfactory physical condition and safety in selected roads; (ii) strengthen institutional arrangements for road maintenance, including the participation of the private sector and local communities; and (iii) enhance road-related economic opportunities for women.

Project Components. With the exception of the additional sub-component on economic opportunities for women, the components under RMRP II would remain the same under the AF.

Component 1: Rehabilitate, Upgrade and Maintain Roads and Bridges (est. US\$142.85 million). Funding would be used to rehabilitate, upgrade and/or maintain existing roads and bridges in some of the ten provinces eligible for funding under the AF. The ten provinces eligible under AF are Central, East New Britain, Gulf, Madang, Manus, Milne Bay, Morobe, Oro, Western, and West New Britain.

The DoWI has identified a long list of priority roads for upgrade under the AF and the Task Team has assessed them for suitability, through field visits and desk reviews. A matrix of possible investments for inclusion in the AF and the Task Team's views on each is included in the project files. A detailed description of the activities to be carried out under the AF is included as Annex 2. The cost includes an estimated US\$142.05 million for works and about US\$0.80 million for specialized design and supervision activities. Efforts will be made to carry out consultations with communities and women's groups to obtain their views and concerns prior to rehabilitation and upgrading of roads and bridges.

Component 2: Technical Assistance (est. US\$4.00 million). Technical Assistance would be provided to relevant sector entities to continue the capacity strengthening measures launched under RMRP II to help DoWI and NRA to more effectively manage and maintain road sector assets. It is expected that funds would be utilized to: (i) pilot an integrated maintenance regime for the Hiritano and/or Magi Highways; (ii) pilot performance-based contracting through initial repairs to roads followed by a maintenance period; (iii) update design/construction standards and specifications for national roads and bridges, and for axle load limits; (iv) increase DoWI and NRA's capacity to manage road and bridge assets through capacity building initiatives, and train small- and medium-sized contractors in eligible provinces in preparing tenders and managing contracts.

Component 3: Enhancing Economic Opportunities for Women (est. US\$2.65 million). A component would be added to help enhance economic opportunities for women related to improvements in road assets. This would include: (i) non-technical routine roadside and bridge maintenance employment for community and women's groups; (ii) technical support to help implement the community-based maintenance activities; (iii) capacity building initiatives to elevate awareness of gender issues among stakeholders, as well as targeted training on routine road maintenance activities and life skills for communities and women; and (iv) socio-economic and gender surveys at the beginning, mid-term, and end of the AF to understand the impact of this component and to help reduce the gap in gender data.

Component 4: Project Implementation (est. US\$14.50 million). Resources would be utilized to support project implementation. In an effort to avoid another long delay in approving a second EPM, the current EPM for RMRP II will implement the AF up to the end of the RMRP II through a variation order, and DoWI will tender for a new EPM to take over until the AF closes in mid-2021.

As part of its responsibilities, the EPM will define, organize and carry out a program to develop and encourage young engineers enrolled in university by offering internships and other temporary activities to enable the students to work on project sites throughout the country. It is anticipated that these activities would occur during school breaks. Reasonable and necessary incremental operating costs

would also be financed under this component, such as maintenance and operation of vehicles and equipment, travel costs and per diems for DoWI and NRA staff, and communications and printing charges associated with the AF.

IV: Project Site Areas

The RMRP II AF will be implemented in ten provinces in Papua New Guinea. (Figure 1). The first twelve to 18 months will be focussed on completing the sub projects under RMRP II in the Central and Gulf provinces. Following on from that will be work along the East Cape road, Milne Bay province and Bogia – Awar bridge road – Madang Province. After that, prospective sub projects will be determined from the remaining eight provinces.



Figure 1: RMRP II AF Project Provinces

V: Status of implementation and Assessment of ESMF in the RMRP II and Rationale for revisions

During RMRP II, the ESMF produced was not used effectively and this remained within the Department of Works Environmental Management Unit. It would seem that the increasing load of road projects from other development partners besides the World Bank made it overwhelming for a single officer to attend to these projects. The Environmental Unit of the DoW was composed of just a single person. For

the additional financing, two additional staff have been added to the unit. This will increase the capacity of the Environmental Unit to supervise road projects.

The ESMF was also bulky and cumbersome for effective screening of the sub projects and hence it was not effectively used. However, sections of the ESMF in relation to addressing grievances were applied. The safeguards status of the RMRPII project was reviewed in preparation of the AF activities and appears moderately satisfactory.

Minor social issues regarding resettlement were reported and dealt with within government policies and guidelines and no land was acquired. The rehabilitation of the roads did not entail the construction of any new road and there has not been any particular environmental and social concerns discussed.

Minor environmental impacts were reported such as the removal of a few economic trees and activities related to site preparation such as the clearing of weeds.

These were dealt with within government policies and guidelines. The ESMF have been used as a general guide to advise contractors in undertaking activities that could have implications for safeguards due diligence. DoWI has maintained its Environmental Management Unit throughout the project, and has followed through with an agreement to increase its staff by hiring two new safeguards persons.

A revision of the Environmental and Social Management Framework (ESMF) for the AF will help more effectively address any concerns that may come up during implementation of the sub-project activities and additional financing activities. It was agreed with DoW that the ESMF will be revised to include changes in the following areas:

- the institutional arrangements for implementing and monitoring safeguards compliance,
- simpler procedures for screening and safeguards implementation
- the management plan and mitigation measures
- the grievance redress system.
- the description on the mechanisms for addressing the types of environmental and social impacts during construction, operation and post-construction phases of the sub-projects
- An update and revision of the screening matrices in the ESMF to develop a simpler environmental and social screening tool to assist in the risk evaluation of the planned and proposed future investments.

PART B POLICY, LEGAL and INSTITUTIONAL FRAMEWORK

I: Laws and Regulations for Environmental and Social Management

Papua New Guinea obtained independence from Australia in 1975 and a plethora of legislation were drawn up within the confines of its Constitution. Most were through the adoption of Australia or United Kingdom legislation. This is a legacy of its colony linkage. Since then laws and regulation have evolved by amending them to fit into the enabling environment. Legislation for environment and social management are formulated based on the 4th directive principle of the Constitution where it states that “Papua New Guinea’s natural resources should be conserved and used for the collective benefit of all and should be replenished for future generation”.

Given that setting, the legislation for environment and social management are shared within the Department of Environment and Conservation (DEC), the Youth, Religion and Community Development¹ and other resource sector departments such as the Department of Mineral Policy and Geohazard Management, Mineral Resources Authority, PNG National Forestry Authority and the Department of Works and Implementation.

The main environmental act administered by the Department of Environment and Conservation is the Environmental Act 2000 which caters for environmental impact assessment on projects covering both biophysical and social environments. In addition, it covers environmental policies, code of practices, permits, water use and enforcement. A number of regulations such as the Prescribed Activities Regulation 2000 provided procedural guidance in determined nature of activities and the corresponding documentation either a requirement for an Environmental Management Plan, Environmental Assessment leading to the granting of a permit or getting an exemption.

Besides the Environmental Act 2000 is the Conservation Area Act, National Park Act and the Fauna (Protection and Control) Act which are administered also by DEC. These cover the gazettal of conservation areas, controlling and regulating fauna that could be endangered from over harvesting and the creation of National Parks. The latter legislation has been devolved down to a number of provinces where they have created provincial parks under the auspices of the Organic Law on Provincial and Local Level Government and through the drafting of specific acts in their provincial assemblies.

The Department of Works (DOW) is the Papua New Guinea Governments implementing agency for infrastructure in the country. It is the biggest and one of the oldest government organizations in the country starting as the Office of Works and Supply during the pre-independence era. Being the biggest is

¹ This was previously the Department of Community Development and the name change was after the formation of Government in the 2012 National Elections

due to the fact that it is the only department in the government that can boast having an office in every province in the country all linked together through the wide area network.

Legislation for the management of natural resources is under the respective resource or sector specific departments of statutory authority. Hence for mineral resources, it is the Mineral Resources Authority, for forestry it is the PNG National Forestry Authority. For agriculture, it is under the Department of Agriculture and Livestock with its numerous boards dealing with specific crops such as coffee or cocoa. Land matters and issues are handled by the Department of Lands and Physical Planning and these are focussed on the 3% of land owned by the State and the 97% owned by the indigenous people of Papua New Guinea.

Customary land legislation is recognised together with the formation of Incorporated Land Groups (ILG) which allows for the organisation and development of customary land by landowners. Besides that is the Office of Urbanisation which is setup to administer the formation of urban development on the fringes of the existing cities around Papua New Guinea.

PNG signed and ratified 47 multilateral environmental agreements including the UN Convention on Biological Diversity, the UN Framework Convention on Climate Change, and the UN Convention to Combat Desertification².

Some of these specific for environment conservation polices besides those above are; International Plant Protection Convention, Rome 1951; International Convention for the Prevention of Pollution of the Sea by Oil, London 1954; Plant Protection Agreement for the South East Asia and Pacific Region, Rome 1956; International Convention on Civil Liability for Oil Pollution Damage, Brussels 1969; International Convention on the Prevention of Marine Pollution by Dumping of Wastes and other Matter, London, Mexico City and Moscow 1972; International Convention on International Trade in Endangered Species of Wild Fauna and Flora, Washington 1973 (CITES); International Convention on Conservation of Nature in the South Pacific, Apia 1976; International Convention on the Prohibition of Military or any other Hostile Use of Environmental Modification Techniques, New York 1976. 9. United Nations Convention on the Law of the Sea, Montego Bay 1982.

For Environmental Assessment of projects is the Environmental Act 200 and section 47- 59 outline the process for environmental assessment leading up to an approval. This then links to the issuing of an environmental permit and a requirement of the permit would be the submission of an Environmental Management Plan (EMP). The nature, scale and significance determine which level that activity is

² UNDP 2011, Assessment of Development Results – Papua New Guinea, United Nations Evaluation Office, Tortell, P, Whittington,S,Runic,O and Duguman,J, United Nations Development Program.

classified under with corresponding approval process. This is explained in the EIA process later in the document.

Legislation dealing with road safety and construction are dealt with under a number of organisations. The Department of Works and Implementation³ (DOW) is the principal organisation responsible for the implementing of road projects funded by the Government of Papua New Guinea (GoPNG) and donor agencies such as the World Bank, Asian Development Bank and others either through resource developers such as mining and petroleum companies.

DOW is coordinating the GoPNG's transport infrastructure priorities in the Medium Term Development Strategy (MTDS) and the National Transport Development (NTDS) plan to ensure that the existing road and bridge networks are maintained to a trafficable level. These road networks will contribute to a holistic quality of life that can be embraced and enjoyed by the people of PNG with access to opportunities available in a modern global village. New roads are being considered in line with economic growth.

The DOW is responsible for ensuring implementation but the majority of actual design and construction are undertaken by the private sector. The Department concentrates on supervision and quality control⁴. Besides roads constructions and supervision, DOW is also responsible for administering of the building codes and standards. DOW implements all projects in accordance with Environment Act 2000 and the national environmental policies under the MTDS in addition to monitor compliance with prescribed environmental standards with effect from April 2011.

There is also the establishment of the National Roads Authority (NRA). The NRA's mission is to "Strive consistently towards maintaining the National Road Network in a condition which satisfies Users' needs, and to manage the country's road assets efficiently on behalf of the government and people of Papua New Guinea."

A total of 2,200 km of the National Roads Network have since been transferred to NRA on 01st October 2009 by the then Minister for Works and Transport from which 443 km of these national roads were being maintained in 2010. Progressive takeover of the entire, 2,200 km is envisaged by 2015, based on the approved annual work plan⁵. The NRA is in a capacity building period at the moment and is a recipient for RMRP II AF.

Road Safety is administered by the National Roads Safety Council⁶ (NRSC) who is a statutory authority tasked with providing road safety awareness through local media in a bid to reduce the

³ While there is name change, at present letter heads still reflect Department of Works and hence these can be used interchangeably.

⁴ Department of Works website <http://www.works.gov.pg> Accessed 9/10 13

⁵ National Roads Authority website: <http://www.nra.gov.pg> Accessed 10/10/13.

⁶ http://www.who.int/violence_injury_prevention/road_safety_status/2013/country_profiles/papua_new_guinea.pdf

fatalities on the roads. It also collects information on the fatalities and the contributing factors and devises strategies to enhance road safety in Papua New Guinea. It is not clear if there is coordination between the NRA, NRSC and DOW in delivering services to the travelling public at this stage although this could be the case.

The protection of historic and cultural resources in PNG rests under the auspices of the National Museum and Art Gallery who administer the National Cultural Property (Preservation) Act 1965 and the National Museum and Art Gallery Act 1992. The former Act states that the National Museum must be consulted should there be a discovery of an artefact during excavation as a result of a development project. They will then assess the find and its significance and what action is to be undertaken.

Within PNG, the issue of resettlement has not been accepted formally maybe because of the thought that 97% of the country is in the hands of the indigenous people. The issue of climate changes on small atolls such as the Carterets in the Autonomous Region of Bougainville has forced the provincial and national government to look into this issue. At this stage, there is no resettlement policy.

The asylum seekers from countries who wish to go to Australia but have been processed in PNG has triggered the need for a resettlement policy however this is not as yet formalised even though the United Nations High Commission for Refugees (UNHCR) together with the International Migration Organisation (IMO) have had input into dealing with refugees from the Papuan province of Indonesia and others. Organisations who will be tasked with this would be the Department of Foreign Affairs, Department of Community Development, UNHCR and IMO among NGOs and other organisations.

Labour laws and occupational health and safety requirements in PNG are administered and regulated by the Department of Labour and Employment. Its website provides information for employers and employees who are coming into PNG for work. In addition, the Department of Labour and Employment work with the Migration section of the Department of Foreign Affairs in relation to visa application and verification of passports for the employees and employers.

The Occupational Health and Safety Act of 1961 is being amended as an Occupational Health and Safety Bill 2012 is proceeding through before it can be passed as an Act of parliament. This will cater for the changes in the operating environment since the 1960s.

Gender and gender parity laws are non-existent at the moment in PNG and this may be a reflection of the traditional cultures that exist within the majority of ethnic groups in Papua New Guinea. While land around PNG is owned and passed through both a patrilineal or matrilineal lineage the gender concept is

only slowly being adhered to in community although there is still a long way to achieve a satisfactory outcome.

Gender inequality is widespread in PNG, in public as well as private space. Accesses to education and employment opportunities are much less for women than men. Women are vastly underrepresented at all levels of government, limiting their power to influence governance and public policy. Violence against women is common, and is exacerbated by socio-economic and cultural pressures as traditional society adapts to change. While the constitution provides equal rights to all citizens, legislation that promotes equal opportunities for men and women is only at the early stages⁷.

There is on-going work by UN Women, United Nations High Commission for Refugees, PNG Royal Constabulary, the Law and Justice Sector funded by AusAID and a myriad of Non-Governmental Organisations (NGO). At this stage, it is not known if appropriate policies on gender based violence and gender equity has been developed effectively. Each organisation or department may have developed their workplace policy to cater for gender however there is not a legislative effort on the GoPNG's part although the passing of the Child Discrimination Act recently will provide protection to the children.

As to disability, this is still to be fully developed; there is a PNG National Policy and Action Plan on Disability and its aim is to create a barrier free physical and social environment for all. PNG has not yet signed or ratified the UN Convention on the Rights of Persons with Disability (CRPD). There are however positive moves on a regional level to support the Pacific nations through the convention process with the adoption of a Pacific Regional Strategy on Disability by the Pacific Islands Forum Secretariat in October 2009. An estimated 10 - 15% of the population or 520,000 people are living with a disability in Papua New Guinea (PNG). People with disabilities are often excluded from community development activities⁸.

In relation to road infrastructure, they are recognized as approaches to poverty reduction in developing countries and PNG has demonstrated positive changes in income and travel time to schools and health clinics for village members living near road developments. However, there is no evidence of whether these benefits are equitably distributed and enjoyed by people with disabilities, or whether there are in fact negative outcomes as a result of the road.

The most commonly reported causes of disability are disease, accidents and aging. Supernatural causes, such as sorcery or evil spirits are also reported as a perceived cause of disability, more commonly in the rural regions. The third most commonly cited cause of disability in Goroka was domestic violence and

⁷ See footnote 2

⁸ http://ni.unimelb.edu.au/__data/assets/pdf_file/0006/575205/PNG_ADRA_53770_Literature_review.pdf

fights. These findings are consistent with other studies which have demonstrated high levels of domestic and sexual violence against women in Papua New Guinea, in some cases causing impairment and disability.

Among people with disabilities, those living in rural areas are significantly disadvantaged with up to 25% completing secondary schooling, compared with 50% in urban areas. Two thirds of people with disabilities living in rural areas are dependent upon subsistence farming, whereas a quarter of people with disabilities are committed to home duties in urban areas.

II: World Bank Safeguards Requirements

This ESMF has been designed so that all investments in the RMRP II AF comply with all the Environmental Laws of the Independent State of Papua New Guinea and the Environmental and Social Safeguard Policies of the World Bank. In this chapter, the Bank's safeguards policies and their applicability are discussed and in the subsequent chapter those of PNG are presented.

The Bank's ten safeguard policies are designed to help ensure that programs proposed for financing are environmentally and socially sustainable, and thus improve decision-making. The Bank's Operational Policies (OP) is meant to ensure that operations of the Bank do not lead to adverse impacts or cause any harm. The Safeguard Policies are lumped into Environment, Rural Development, Social Development and International Law. These operational policies include:

- OP/BP 4.01: Environmental Assessment
- OP/BP 4.04: Natural Habitats
- OP 4.09: Pest Management
- OP/BP 4.12: Involuntary Resettlement
- OD 4.20: Indigenous Peoples
- OPN 11.03: Cultural Property
- OP 4.36: Forests
- OP/BP 4.37: Safety of Dams
- OP/BP 7.50: Projects on international Waters
- OP/BP 7.50: Projects in Disputed Areas
- BP 17.50: Disclosure

The World Bank Safeguard Policies that will be triggered by the project are:

1. Environmental Assessment (OP 4.01)
2. Indigenous Peoples (OP 4.10)
3. Involuntary Resettlement (OP 4.12)

These policies apply to all activities funded under the RMRP II AF irrespective of whether or not they are being funded in whole or in part by the World Bank, Government of Papua New Guinea or any other donor. Therefore, it is inconsequential in terms of the applicability of this ESMF what the source of funding for any activity of RMRP II AF is. Once an activity is funded by RMRP II AF, all of the World Bank's safeguards policies apply, if the Bank is to fund the RMRP II AF.

In the first year, the location of the road upgrade and double sealing is known, however in the following two years, the sub projects are not fully known, although these are on the national roads in the remaining seven provinces. Therefore, other bank policies apart from those mentioned above may apply.

The World Bank's official web site www.worldbank.org lists a complete description of the Bank's safeguards and their triggers for applicability. The ones listed here will be used as part of the Environmental and Social Management process presented in chapter 6 of this ESMF.

Environmental Assessment (OP4.01)

This policy requires the screening of all activities under the project for proper environmental assessment (EA) requirements of projects/programs proposed for Bank financing. This will help ensure that they are environmentally sound and sustainable, and thus improve decision making. The EA is a process whose breadth, depth, and type of analysis depend on the nature, scale, and potential environmental impact of the program investments/sub projects under RMRP II AF. The EA process takes into account the natural environment (air, water, and land); human health and safety; social aspects (involuntary resettlement, indigenous peoples, and cultural property) and trans boundary and global environmental aspects.

The environmental and social impacts of the RMRP II AF will come from the sub projects and investments contained in the RMRP II AFs of the qualifying provinces and districts that will receive financing under the RMRP II AF. While the location of these sub projects/investments have been identified during the appraisal of the project, the RMRP II AF is envisaged to extend into other provinces, hence it is essential through the EA process that the GoPNG prepare an Environmental and Social Management Framework (ESMF) report.

This will establish a mechanism to determine and assess future potential environmental and social impacts during implementation of the sub project activities and investments contained in the approved RMRP II AFs under the proposed RMRP II AF, and then to set out mitigation, monitoring and institutional measures to be taken during operations of these activities, to eliminate adverse environmental and social impacts, offset them, or reduce them to acceptable levels.

OP 4.01 further requires that the ESMF report must be disclosed as a separate and stand-alone document by the Government of Papua New Guinea and the World Bank as a condition for the Bank's appraisal of the RMRP II AF. The disclosure should be both in Papua New Guinea where it can be accessed by the general public and local communities and at the Infoshop of the World Bank and the date for disclosure must precede the date for appraisal of the program and no later than 120 days prior to the board approval date of the World Bank's Board of Directors as required by the United States Federal Law⁹.

The policy further calls for the RMRP II AF as a whole to be environmentally screened to determine the extent and type of the EA process. The RMRP II AF has thus been screened and assigned an EA Category B. This category of projects/programs is defined as follows.

Category B projects are likely to have potential adverse environmental impacts on human populations or environmentally important areas - including wetlands, forests, grasslands, and other natural habitats - and are less adverse than those of category A projects. These impacts are site specific, few if any of them are irreversible, and in most cases mitigation measures can be designed more readily than for category A projects. The EA process for category B projects examines the potential negative and positive environmental impacts and recommends any measures needed to prevent, minimize, mitigate, or compensate for adverse impacts and improve environmental performance.

⁹ Pelosi Amendment (US Federal Law) prohibits US Executive Directors of multi-national development agencies from voting in favour of the agencies lending operations if the EA reports are not publicly disclosed 120 days prior to board date.

Therefore, this ESMF sets out to establish the EA process to be undertaken for implementation of program activities (i.e. the RMRP II AFs in the second and third provinces) when they are being identified and implemented. This process requires the implementers/operators/sponsors of the activities in the RMRP II AFs, to use processes contained in the ESMF, especially section 6.0, to identify potential adverse impacts of their activities in the RMRP II AFs and thereby determine the corresponding mitigation measures they would need to incorporate into their planned activities. Section 6.0 sets the relevant process and requirements for environmental and social management.

Indigenous people (OP/BP 4.10)

This policy focuses on two goals. A) To ensure that indigenous people benefit from development projects, and B) to avoid or mitigate potential adverse effects on indigenous people caused by Bank – assisted activities. Special action is required where Bank investments affect indigenous peoples, tribes, ethnic minorities, or other groups considered distinct or vulnerable.

The RMRP II AF triggers OP/BP 4.10 on Indigenous People. However, as all beneficiaries of the project, and all people affected by the project are indigenous, no Indigenous Peoples Policy (IPP) will be required. But, elements of an IPP will need to be integrated in the project design. In line with this is the community consultation where the need for broad community support for the RMRP II AF is imperative.

Previous social surveys carried out under the earlier Road Maintenance and Rehabilitation Project I highlighted the community's support for the project, and the RMRP II AF interventions will most likely be similar. The project will, however, ensure the specific characteristics and vulnerabilities of groups targeted by the sub projects will be considered and that specific consultations with these groups take place. This will ensure a better project design and effective interventions.

Involuntary Resettlement (OP/BP 4.12)

The project engineers or contractors of the RMRP II AFs will make every possible effort to avoid impacts on people, land, property and people's access to natural and other economic resources, as far as possible. Notwithstanding, land acquisition, compensation and resettlement of people may be possible, although the chances are slim. This social issue is of crucial concern to the Government of Papua New Guinea and the World Bank, as its impact on poverty, if left unmitigated, is negative, immediate and widespread.

Thus, OP 4.12 will be triggered in RMRP II AF and a Land Acquisition and Resettlement Framework (LARF) has been prepared by the government to be approved by the World Bank in compliance with OP 4.12. The LARF will guide the Project Engineer and the Project Management Unit together with the Contractors Liaison Officer and Provincial Lands Officer in determining appropriate steps to take in case of land and livelihood impacts in the RMRP II AF.

Table 1: Summary of World Bank Safeguard Policies triggered by RMRP II AF

Bank Safeguards Policy Triggered	Action Required by Triggered Policy	By Whom	Date action required by
OP4.01 Environmental Assessment	1) Preparation of ESMF (this document)	1) ESMF by GoPNG	1) ESMF to be approved by the DOW of the GoPNG and Bank and disclosed in PNG and Bank Infoshop before program appraisal date and 120 days before Bank Board date.
	2) Screening and Preparation of sub	2) Sub project ESIA's	2) Category B sub projects to be approved at the PMU in DOW HQ

	project safeguards instruments (see section 7.0 of this report	Screening forms, and EMPs by sub project sponsors	and then appropriate funding released for activities.
OP/BP 4.10 Indigenous People	1) Elements of IPP to be included into Project Design.	1) Elements of IPP by GoPNG	1) Consultations with affected people to determine if there is broad community support 2) Elements of IPP to be included in the Project Appraisal Document.
OP 4.12 Involuntary Resettlement	1) Preparation of LARF	1) LARF by GoPNG	1) LARF to be approved by DOW and by the Bank and disclosed in PNG and Bank Infoshop before project appraisal

It is envisioned that under RMRP II AF, OP 4.12 will be triggered because the RMRP II AF component of roads or infrastructure rehabilitation may affect gardens or fruit trees that would have grown along the Right of Way.

Where there is a conflict between the laws of Papua New Guinea and the Bank's OP 4.12, the latter must take precedence if the Bank is to fund the RMRP II AF component. Finally, OP 4.12 also requires the LARF to be disclosed both in Papua New Guinea and at the Info shop of the Bank before project appraisal. Table 2 provides a summary of the requirements and the World Bank's Safeguard Policies triggered by the RMRP II AF.

Gap Analysis and Comparison of legislation in PNG and WB safeguard requirements

Three World Bank Operational Procedures (OP) are triggered in RMRP II AF, and these are stated in Table 2 with Papua New Guinea equivalents.

Table 2: Safeguard Policies Triggered in RMRP II AF

Safeguard Policy Triggered	World Bank	PNG
Environmental Assessment	OP/BP 4.01	Environmental Act 2000
Indigenous People	OP/BP 4.10	None
Involuntary Settlement	OP/BP 4.12	None

The World Bank Operational Procedures are triggered because it lends to more than 100 countries and each country has its uniqueness and hence the Bank must be equipped to be able to provide assessment as per the conditions of its lending.

For Environmental Assessment, the Environmental Act 2000 provided an overarching legislation dealing with environmental assessment among other principles such as issuing of permits. These are stated in the next section.

As for indigenous people, Papua New Guinea's land tenure is unique and is similar to the countries in the South Pacific where the bulk of the land mass is in owned by the indigenous people. Hence, the bulk of the people do have ownership to some land, although this situation is changing. Increasing population places pressure on land and other resources and this are already vulnerable groups of people in the

community that may have lost their land as another tribes population encroaches on their land or through prior arrangement with their parents allies¹⁰.

The Government of PNG does recognise this and are addressing this issue; however, it is not one of priority in the midst of the proliferation of resource sector development.

III: Overview of the EIA process in PNG

The EIA process in Papua New Guinea is shown by Figure 2 and it sets out the process in relation to the Environmental Act 2000 and the Environmental Regulatory Framework (ERF) as outlined by the Department of Environment and Conservation in 1996.

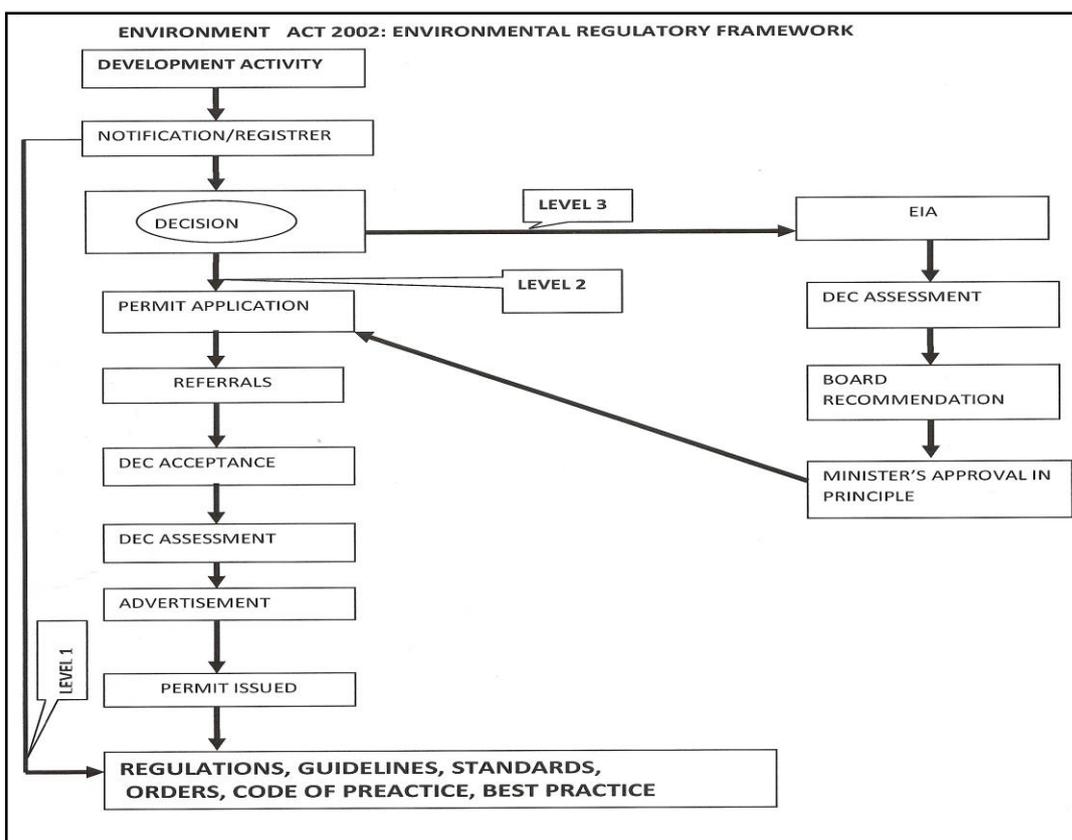


Figure 2: EIA Process in PNG

Provided with the ERF document are prescribed activities within the Levels to determine whether an activity will require either a full EIA or be subjected to regulations, guidelines, standards, orders, code of practice and best practice. Level 1 is deemed to have insignificant impact and would be subject to regulations. While Level 2 and 3 has significant impact and will be subjected to the EIA process.

The EIA procedure involves the following:

- * **Registering a development activity:** The proponent is required to register the activity or project with the DEC.
- * **Screening and Decision Making:** The project is classified to determine the level at which the environmental assessment should be carried out. If the project does not have any significant

¹⁰ A parent may have formed an alliance with another person during the tribal war days and because of this has allowed that person to reside on his land. His children will then inherit what their parents resided on and the other children will then demand to evict them.

impact on the environment then the activity will be approved and subject to the guidelines, regulations, standards or code of best practice. If the project falls into Level 2 or Level 3 then the EIA process will continue.

* **Conducting an EIA:** This involves the three main stages of the EIA process (scoping, preparing terms of reference and preparing a Notification of Preparatory Work). For the PPAP, this was provided in the Environmental Assessment document. By submitting a notification of the preparatory work, projects can be further screened and then decisions made. Level 2 activities will be assessed and then approval through an appropriate Permit. For Level 3, a full EIA will need to be conducted.

A number of documents are submitted to DEC for the Level 3 project with firstly an Environmental Inception Report. This is assessed and feedbacks made to the proponent to adjust or expand on the EIA process. This is then followed through with the full project EIA. Guidelines for the Environmental Inception Report and the Environmental Impact Statement (EIS) are provided by DEC.

* **Reviewing the EIA:** An Environment Council established by the DEC reviews the EIA and decides whether the EIA is acceptable or not.

* **Issuing the relevant permits:** If the EIS is approved, the DEC issues the necessary environmental permit that confirms the EIS has been satisfactorily completed and the project may proceed.

* **Decision-making:** A decision is made as to whether a proposal is approved or not; a record of decision explains how environmental issues were taken into consideration.

* **Monitoring project implementation:** The operator prepares and executes an appropriate monitoring program (i.e. an environmental management program).

Monitoring the project: The DEC undertakes periodic and independent compliance monitoring of the project. It will provide a report which will be given back to the developer for discussions and amendment to its operation, should there be an environmental concern.

* **Decommissioning the project upon its completion:** A decommissioning report is prepared at the end of the project life. This report outlines the restoration/rehabilitation activities to be carried out by the operator and is lodged with the DEC. At the moment in PNG, only mines have followed the process of decommissioning completed projects. In the other sectors, reporting has not been consistent.

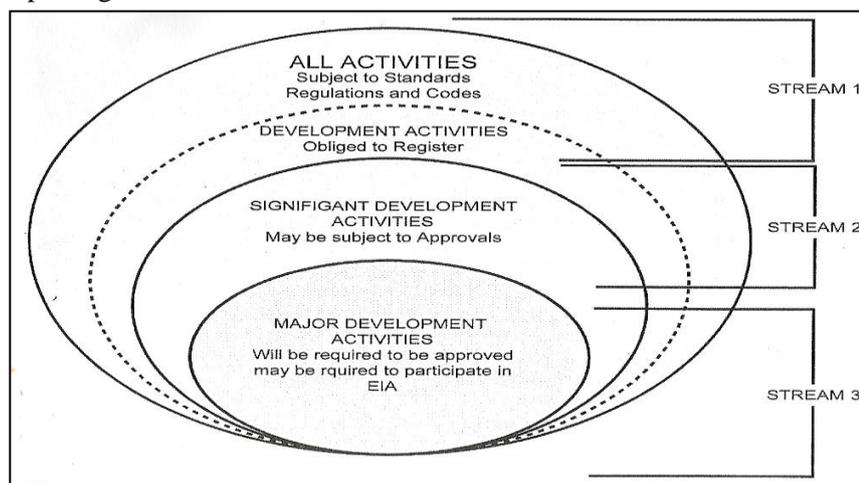


Figure 3: Regulatory Streams under the Environmental Act 2000 (DEC 1996)

As earlier stated, activities are screened into three streams (Figure 2) where Level 1 or Stream 1 activities could be subjected to standards, regulations and codes. The new Environment Act provides for a regulatory framework for environment management which also covers management of chemicals and hazardous substances. The Act specifies three levels of Activities which is a categorisation of the degree and magnitude of environmental impacts. Levels of impacts are categorized into three groups and illustrated in Figure 3.

Level 1 Activities

- ❖ are those that require a minimum level of environmental protection. Regulation of such activities will be based on standards, codes and regulations that set benchmarks for environmentally acceptable activities. For example, maximum discharge levels, ambient quality standards for receiving environment, codes of practice, guidelines for best/acceptable practice. In cases of non-compliance, environmental protection orders, clean-up orders and emergency directions may be issued.

Level 2 Activities

- ❖ are those that require a framework of environmental approvals allowing for water discharge permits, or licensing for importation, sale and use of environmental contaminants (hazardous chemicals) and for site-specific environmental conditions to be set for these activities which have more significant potential impacts. Level two activities will be regulated by means of conditions in environmental permits, environmental improvement plans and environmental management programs.

Level 3 activities

- ❖ cover those with the potential of major environmental impact and are projects of national significance or of large scale. Such activities will be subject to a process of public and detailed considerations of environmental implication through the Environmental Impact Assessment process.

Activities of the Road Maintenance and Rehabilitation Project II AF(RMRP II AF) all fall under Level 2 and is consistent with the World Bank Category 'B' project and are stated in the following sub categories 2 of the Environmental Act 2000 respectively.

2.3 Gravel extraction operating continuously for more than 6 months and involves the extraction of no greater than 10,000 tonnes per annum.

2.4 Quarrying involving the extraction of no greater than 100,000 tonnes per annum.

There is no specific category for the rehabilitation and upgrading of existing roads in the Prescribed Activities and consultation with DEC on these activities is imperative to ensure that they are well

informed of this project. The anticipated impacts and their mitigation measures from these activities will be covered in Part D.

IV: Extent and process of public participation

In Papua New Guinea, the process of public participation is catered for in the Constitution and also in the Environmental Act 2000 where the section of the Environmental Assessment allows for developers or proponents to engage with the community well before the project starts. This is one of the risks that any project would have when coming into Papua New Guinea because of overwhelming customary land.

The proponent's engagement with the community and relevant government department allows for their involvement as per their mandated jurisdictions. Hence, projects involving mining will require discussions with the Mineral Resources Authority, Department of Lands, Provincial and Local Level Governments, Landowners, and civil society which could involve the institutions. Likewise for all other sector development, the respective sector agency will be the lead guide with the other departments, individuals who are stakeholders of this process. Hence public participation in PNG is promoted.

World Bank requirements of OP 4.01 stipulate that the involvement of the public in any project is an important aspect of environmental management. Any road rehabilitation project in PNG is likely to have at least some impacts on local people, and their involvement at the earliest stages of project feasibility is essential, particularly where any asset loss, however minor, is likely. In addition, the particular conditions in PNG (specifically the variety of ethnic groups) make it important for villagers to be directly involved in the maintenance works, requiring a more creative and flexible approach to contracting than is normally the case.

In PNG, the DOW works very closely with the Department of Lands in order to ensure that land acquisition issues are addressed at the earliest possible stages. It is recommended that this structure continue to be applied in the present project. The Land Acquisition and Resettlement Framework in Part III of the Environmental Management and Social Framework state these arrangements.

It is important that the public be advised and consulted very early in the project planning cycle in order to ensure that their concerns are properly addressed. This should be done by the Project Engineers, in liaison with the PMU in DOW. This should consist of a public consultation with interested stakeholders, previously notified, to inform them of the project, get their inputs and address their concerns. Stakeholders should also be informed of the grievance procedures in place and the contact person is the Project Engineers, Provincial Lands Office and DOW. This person should maintain an involvement throughout the life of the project and be available for discussions with the local people.

PART C: SUB-PROJECT SCREENING AND SAFEGUARDS PROCESS

This section provides firstly the Sub project Screening and Safeguard requirements for the RMRP II AF. At this stage not all the sub projects locations are known and hence this screening provides a prompt and easy process in assessing them. Following this are the negative environment and social impacts that are most likely to arise from the RMRP II AF and the corresponding mitigation measures. Consistent with streamlining the screening and processing of environmental and social safeguards, the RMRP II AF shall adopt a simplified three step process, as follows:

- I. **First step – Eligibility screening** of all proposed road and bridge project against the negative list of activities (Annex 1), to determine eligibility of projects for support under RMRP II AF.

- II. **Second step – Safeguards Screening.** If the project is deemed eligible, the project is screened using the Environmental and Social Safeguards Checklist or ESSC (Annex 2) to determine potential safeguards risks, and categorization. The appropriate safeguards instruments are determined through the ESSC. The project is also assessed whether it is covered under the PNG EIA system. Projects not covered under the PNG EIA system will follow the requirements according to the ESSC, and

- III. **Third Step – Preparation of Safeguards Instrument.** Some projects will require an EIA. But all projects will need to prepare an Environmental and Social Management Plan (ESMP). If the subproject needs additional safeguard instruments such as RAP, this is drafted and approved before the start of any civil works. Annex 3 provides guidelines in how to prepare and ESMP. An ESMP has also been prepare for Year I sub projects and this will be valuable insight in preparing this document.

The environmental and social assessment and review procedures shall apply to proposed projects that pass eligibility screening under the first step above.

I: Negative Environmental and Social Impacts

The potential environmental impacts associated with the subprojects particularly occur during the construction phase. The major potential environmental impacts to be addressed for the upgrade to seal of selected road sub project are concerned primarily with temporary impacts of mobilization and construction, problems of pollution related to the disposal of sewage, waste fuel and oils, and solid wastes generated during the construction.

In addition, impacts associated with increased road traffic and noise in the area when traffic increase may cause accidents with the construction facilities. Furthermore, social impacts will potentially occur as a result of engagement with the local community. These impacts are stated below and the table in the EMP section compliments this listing.

A: Physical Environment

- i. **Construction Impacts:** During the conduct of preparing sub base and road base material and stockpile areas, heavy rains and soil erosion problems can be expected along the length of the sub projects. Control measures will be established to minimize the possibility of soil erosion.
- ii. The impact of residual emissions is not expected to be significant because these will be for a very short duration. Construction activities may cause noise impacts for a short duration. Possible noise impacts from all mechanical equipment (e.g., excavators, dozers, etc.) if not properly maintained and fitted with mufflers. Work will be limited only during the daytime to eliminate disturbance to surrounding communities during night time.
- iii. Construction run-off from unprotected cleared areas, spillage and leakage from storage sites and machines may cause water quality deterioration of nearby water courses or into natural vegetation.
- iv. Fumes from bituminous chemicals and bitumen may cause impact if not properly mitigated. In general, the fumes are likely to be well dissipated in the open terrain and are unlikely to accumulate to nuisance levels.
- v. **Pollution:** Problems of pollution related to the disposal of sewage, waste fuel, oils and solid wastes generated at the camp site and along the sub projects during construction and operations; Temporary site contamination, noise and soil erosion associated with construction and camp site wastes.
- vi. **Dust and Vibration impacts:** These would be associated with construction along roads during the laying of road and sub base material and at quarry or borrow pits sites.

B: Social Environment

- i. **Public safety/ Accidents:** Possible road accidents from traffic which frequent road surfaces during construction into construction workers or facilities.
- ii. **Health risks:** Potential health risks would be the spreading of HIV/AIDS within and in the sub project camp sites brought about by the interaction between employees and community
- iii. The risk of increase malaria if camp area is not properly drained and allows for the breeding of mosquitos which are malaria carriers
- iv. Unhappy villagers along the route of the sub project
- v. **Waste management:** This is both a physical and social impact and requires appropriate mitigation measures.

C: Planned Mitigation Measures: Impacts from Construction Activities

Potential contamination of the surrounding waters may occur as a result of the establishment of the temporary contractor's facilities and the minor clearing works along the road surface in the sub project.

- i. Loose soil and debris during the works may be washed into creeks and into the sea along the length of the sub projects. The operation of heavy equipment will likewise contribute to the sedimentation from silt and mud along the sub project length.
- ii. The contractor's camp site and office must be provided with sanitary disposal facilities that will address the generation of domestic wastewater and proper solid waste management practices shall be institutionalized in all areas.
- iii. Silt traps where applicable shall be established around areas identified for clearing to prevent siltation into the surrounding area.
- iv. Proper management, handling and disposition of spoils and unsuitable materials will be practiced during the construction phase to prevent siltation and sedimentation that will drain into creeks and into the sea or into communities' residences along the length of the sub project.
- v. Operation of bitumen plants may cause an acute, albeit temporary, increase in levels of Total Suspended Particulates (TSP). The generation of SO₂, NO₂ and other gaseous materials is also an unavoidable impact of the development activities, which is a direct result of the operation of fossil fuel burning equipment, vehicles and machineries.
- vi. Oil and diesel fuel drums will need to be contained within properly banded areas.
- vii. The development works will be undertaken along the existing road surface and corridor which is already a cleared/disturbed area and minimal grubbing of vegetation cover and clearing of road surface will be maintained so as to eliminate loss of habitat of faunal communities.
- viii. Water trucks will periodically water road surfaces so as to reduce dust emissions during construction.

Social Environment

- i. Contractor to implements its Occupational Health and Safety plan so as to reduce incidents of accidents at the work place or along road works.
- ii. HIV/AIDS awareness to be undertaken by the contractor for its employees and also in communities along sub projects
- iii. Camp management of draining out water and areas where potential breeding areas for mosquito are avoided.
- iv. Contractor to provide employment opportunities to qualified and unskilled workers

from villages along sub project routes. This provides good public relationship between the community and contractor. After the all Works have been completed, the contractor shall ensure that unauthorized occupants in the work area, because of their participation in the works, return to their original place of residence.

- v. Appropriate waste management strategies for camp site and along construction areas to dispose of waste in designated areas.

In addition, livelihood (economic) opportunities for women and community groups will be created independent of the project. Women and groups engaged in these activities are expected to improve their standard of living because of additional income for their families.

Pollution will be generated during the construction phase and is expected to include day-to-day production of solid waste, domestic sewage, oil and chemical wastes. The handling of pollution will also be an important part of emergency response for spills and accidents. These considerations will be addressed in the Environmental Management Plan for the Project. The EMP incorporates the following features for the Construction Phase:

- a) Restrict the contractor to a single, pre-planned construction site;
- b) Require the contractor to install a septic tank or mobile toilets or pit toilets;
- c) Establish mechanisms for grey water to be managed according to site conditions;
- d) Require appropriate solid waste management system that do not impact on the local community or disposal at designated sites;
- e) Require that all waste oils and lubricants be collected, recycled or reused;
- f) Ensure that the contractor has a spill contingency plan including drainage/settling pond control, bunds-drainage around fuel and storage areas;
- g) Ensure demobilization is clearly addressed.

**PART D: ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN
AND MONITORING**

I Management Plan

This section sets out the type of activities proposed under the RMRP II AF, examines the potential environmental impacts and recommends the appropriate mitigation measures that need to be in place to minimise deleterious impacts and provides indicators for environmental monitoring.

Table 5 presents the descriptions of the activities under the subprojects in the RMRP II AF. The Environmental Management Plan details measures and steps that the supervising engineer will take in relation to the environmental and social impacts in the sub project. Table 5 is reproduced from the EMP and it also ties each of the mitigation measures to Environmental Management Guides (EMG).

i: Implementation of Recommended Mitigation Measures

For each of the mitigation measures presented, a method of implementation is proposed. Timing is extremely important with respect to effective implementation because some of the recommendations involve additional cost and can affect the subproject budget. The recommended methods of implementation include the following:

As a design guideline or recommendation

This means that the mitigation measure should be included in the initial design of the project. Often, on road maintenance projects where anticipated environmental impacts are minimal, effective mitigation is simply a matter of ensuring that the roads are designed properly to control negative effects. In general, if the design is properly done (as should be the case on this project), there will be minimal impacts. In a few cases, slight changes to design will eliminate the potential for impacts. Of particular concern in the design stage is the location of material sources. These should be clearly identified and located on maps in order to ensure that no problems ensue once construction starts.

As a suggested clause in the contract

This suggests that there should be a clause in the contract document referring to this particular mitigation measure. There are a number of ways of addressing this. A common method is to simply refer, in the contract, to the Environmental Management Guidelines in existence, detailing any specific aspects not already in the guidelines. The main problem with this is that it assumes that both the DOW and contractors are familiar with and understand how to implement these guidelines. This is not the case at this time in Papua New Guinea. Therefore the option of providing very specific clauses in the contract detailing measures and actions required on the part of the contractor is probably the best way to proceed.

To be included in the Bill of Quantities (and usually also in the contract)

This means that the recommended mitigation measure should be included as an item in the Bill of Quantities. This will ensure that the item has been budgeted for and will be implemented as required. There are two approaches to deal with the incorporation of environmental management costs into the bids prepared. One is to request that the contractors include these costs in their rates. Although this works well in some instances, in many cases the contractors, in the interests of remaining competitive, will not adequately reflect the real cost of environmental mitigation in their bids. The second approach, recommended above, presents the mitigation measure as a line item in the Bill of Quantities. There is an identified extra payment in the contract to ensure that the work is carried out by the contractor as specified. An example of clauses that could be included in the Bill of Quantities is as follows:
the definition of exactly how many cubic meters of spoil and excess material must be disposed of
a definition of how many hectares in total of replanting or revegetation must be undertaken and cost per hectare (or m²)

cost of recommended erosion control structures (if over and above those that would normally be constructed as part of normal engineering design)

In order to achieve this in practice, it is recommended that the draft contracts be reviewed by an environmental specialist to ensure that the appropriate clauses have been incorporated. This could be undertaken by the staff of the EMU in DOW. The potential impacts identified in the Environmental Impact Assessment are then addressed through the provision of the EMP and EMG.

Responsibilities Regarding Acquisition of ROW for Widening or Realignment

There will not be any land acquisition for widening or realignment requirements and all road activities will be within the ROW. If however, should there be a few occasions where some land may have to be acquired, or where assets or livelihoods are impacted then the Land Acquisition and Resettlement Framework (LARF) for the project will address these issues.

The contractors will be responsible for conducting on-going consultations with stakeholders to determine the extent of impacts and get stakeholder's inputs into the project. They will also disclose the LARF and EMP at the project location. In addition, they will be responsible if there is a justification that there is an impact on assets along the road corridor. If such is warranted, then an appropriate census of people and assets impacted will be documented in an Abbreviated Resettlement Plan (ARP) as detailed in the LARF.

The contractor will be responsible for liaising with DOW and the Provincial Lands Office to pay compensation for impacts as needed, and ensure all impacts are mitigated and compensated for before the start of works. In addition, the contractor will also be responsible for documenting all the consultations it conducts with stakeholders, and attaching these to relevant documents (such as ARP, or monitoring reports). Furthermore, the contractor will be responsible for translating the ARP in local language and making it available at a place accessible to all stakeholders. Finally, DOW will be responsible for monitoring compliance of the contractor regarding all these responsibilities.

Earthworks

Clearing of ROW

During rehabilitation activities, there will be clearing of the existing ROW. In some cases, this ROW will not have been cleared for many years and there will be a significant loss of vegetation along the roadside as a result of the clearing exercise. Where it is necessary to remove large trees and other desirable vegetation local landowners should be consulted and the cleared material made available to them for disposal. If any stakeholders experience loss of crops or fruits trees, they will be appropriately compensated based on the LARF.

Operation of Existing Quarry Sites (Terrestrial)

This refers to the on-going operation of quarry sites, which have been established prior to the commencement of present construction activities. The activities associated with this include blasting and the resultant noise and dust pollution. Handling of explosives is an activity to be carried out by licensed persons. Abandonment of the quarry after material extraction can have impacts of not properly managed.

Establishment and Operation of Stone Crushing Plants

This can be part of the asphalt plant or separate and involves the crushing of stones using large and very noisy equipment. The activity generates substantial amounts of dust and can be very disturbing to nearby settlements.

Earth Movements Relating to Cut and Fill Activities in Flat Areas

This activity consists of minor cutting and filling activities and could include the removal of roadside vegetation. The main environmental impacts would relate to possible increased sedimentation and erosion.

Earth Movements in the Vicinity of Settlements along the Roadside

This could disturb local market activities and affect pedestrian walkways. Even though the earthworks would be undertaken within the ROW, there is the possibility that illegal structures have been constructed, which could be affected. If so, users and owners of these structures would need to be compensated.

Pavement Work

Construction of Base or Sub-Base Course, Regravelling

This involves the use of heavy, noisy equipment and can cause noise and air pollution disturbances.

Material Transport

This includes the transport of all construction materials such as rock, gravel, bitumen, concrete or other material as well as the transport of equipment or machinery. Again, minor environmental impacts would include noise and dust pollution.

Drainage Work

This includes all drainage works such as culverts and drainage ditches. The main anticipated impacts are the possible effects of increased sedimentation in surrounding water bodies as a result of inappropriate deposition of excavated materials and associated disturbances.

Bitumen Works

Establishment and Operation of Asphalt Plants or Asphalt Preparation Areas

This refers to the activities associated with the preparation of the concrete or asphalt and could involve a large production plant with conveyors, oil fired aggregate heaters and dryers and batch mixers, or it could simply involve the heating of bitumen over wood fires and hand mixing. Some of the potential environmental problems include spills or improper handling of bitumen and contamination of nearby water sources may also result in air pollution, particularly dust and smell.

Bitumen Overlay

This includes the laying down of the various bitumen sealing or resealing surfaces such as single bituminous surface treatment (SBST), double bituminous surface treatment (DBST) or asphaltic concrete.

Erosion Protection - see Earth Works

Campsite Management

Equipment Mobilisation

Includes the delivery of materials, plant and equipment to the site and involves large transport vehicles which cause air and noise pollution. May also result in traffic and safety problems and damage to vegetation where separate haul roads are provided.

Mobilisation of the Labour Force

Refers to the arrival of an outside labour force for construction activities. These newcomers may be culturally or ethnically different from people in the area and in Papua New Guinea this can have significant impacts. Potential health impacts such as the spread of HIV/AIDs is possible and therefore appropriate AIDS/HIV awareness be conducted for the employees and also within nearby communities. In addition, cultural awareness of the surrounding communities to be provided to all contractors employees.

Other social issues within the mobilisation of the labour force include;

There is the potential problem of not engaging local unskilled labour where the constructive work is being undertaken and workers from another area are often despised by the local community.

Safety induction done for all workers both skilled and unskilled to be mindful of Occupational Health and Safety in the Work place and camp site. That all workers be appropriately clothed with safety work wear.

Besides local men workers, the RMRP II AF will provide economic opportunities for women and this will require the organisation of women groups to be recognised at the Local Level Government.

Establishment and Operation of Labour Camps

This refers to the camp established to house the non-resident workforce. The major problems with the labour camps are the pollution caused by waste and sewage disposal and the potential use of local resources in an unsustainable manner (for instance, fuelwood for cooking, hunting and fishing activities).

Establishment and Operation of Base Camps

The project base camps are where the equipment and machinery is stored when not in use, and where fuels, oils and other materials are stockpiled. The project office may be located here, and sometimes the stone crushing plant or batching plant is on the same location. Occasionally the labour camp and the base camp are one and the same, but they have been examined separately for the purpose of this EMP. The main potential problems here include contamination of water through spills of oils and fuels or improper storage.

Increased Traffic and Operating Speeds

This can result in increased traffic accidents, especially involving children. Increased traffic can also result in some pollution in surrounding water bodies as a result of runoff.

ii. Supervision of Environmental Mitigation

The main objective of environmental supervision is to ensure that the recommended mitigation measures are implemented as required by the contractor. In road rehabilitation projects, environmental supervision is often part of the standard construction supervision. Figure 4 presents an environmental management structure for RMRP II AF. This is based on the current arrangements under the RMRP II and similar supervision is anticipated to continue.

The Project Director (World Bank) is responsible for the overall administration of the project. He coordinates with the Employer Project Manager (EPM) at the DOW Headquarters. In the provinces, the Provincial Works Manager will oversee with responsibilities directed to the Project Engineer who will liaise with the contractor. The Project Engineer is responsible for the day to day supervision, quality control, contract management, management meetings and certifying payments for sub projects. Any environmental queries or concerns can be addressed to the Project Director who will liaise with the Environmental Manager to attend to them. The project engineer will communicate with the Environmental Manager who with the two officers, will undertake quarterly or six monthly inspections. For the social and land acquisition associated concerns, this will be undertaken by the contractor's Public Relations Officer who will liaise with the project engineer and the LARF will be followed.

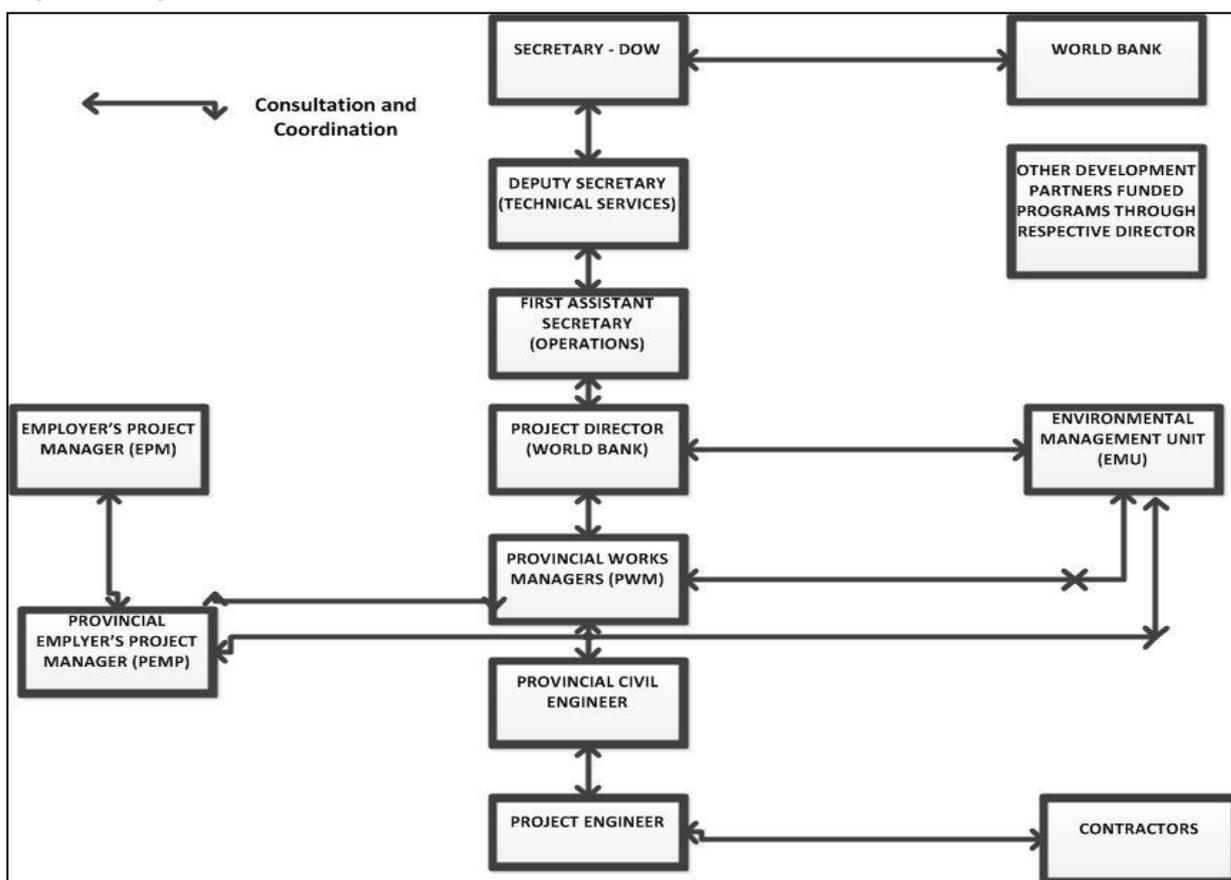
The EMGs in Table 5 and Annex 1 of the EMP provides detailed monitoring and supervision recommendations for the engineer in charge of supervision. By including clauses into a contract document and specific items in the Bill of Quantities forming part of the contract, monitoring and supervision of the application of mitigation measures is automatically included in the normal engineering supervision of the contract on a day-to-day basis.

Table 3: EMP Summary showing Activities, Potential Impacts and Mitigation Measures and EMGs

Activities	Potential Impacts	Mitigation Measures	EMG
Land Acquisition, ROW Clearing, Resettlement & Social Issues	<ul style="list-style-type: none"> • Disturbances on part of affected community • Disturbance from construction activities • Safety problems and issues • Cultural and archaeological areas uncovered 	Community consultation and participation; early surveys ;use LARF	EMG1
1. Earthworks a. Cut & Fill Material in Flat Areas b. Cut & Fill in Steep, Hilly and Unstable Areas c. Earth movements close to settlements/villages d. Borrow Pits e. Dust and Noise Control f. Quarry Operation g. Stone Crushing Plants	<ul style="list-style-type: none"> • Scouring of valley slopes resulting in landslide; Damage to and removal of trees, vegetation and topsoil; Disruption to natural drainage systems; Surface water pollution and increased sedimentation • Disruption of natural land contours and vegetation leading to erosion; Disturbance in natural drainage patterns; ponding, water logging and water pollution. Removal of vegetation cover. • Vibrations, noise and dust generation, traffic and safety problems and damage to roadside vegetation. • Disturbance of natural land contours; Accelerated erosion and sedimentation; landslides and slope instability; noise vibration and dust; accidents 	a. Limit spoils, not into sensitive areas, stockpiles to be secured to be stable. See EMG1. b. Use conventional civil engineering structures to contain fill material eroding, clear drainage c. Refer to b; Spoil to be discarded after consultation with community; Bare areas to be vegetated d. Use of sand bags or sediment traps to prevent the siltation of rivers and small streams. e. Area to be drained, and vegetation to be encouraged after ceasing of activities; consultation with communities. f. Regular dust suppression on roads and on quarry area; Equipment with mufflers and activity , only during normal working hours g. Site to be stable with proper drainage of rainwater, order of activities to avoid traffic accidents	EMG1 EMG 2 EMG 2 EMG 5 EMG 6 EMG 7
2. Pavement Works a. Base and Sub Base Construction &Regravelling	<ul style="list-style-type: none"> • Vibrations, noise and dust generation, traffic and safety problems and damage to roadside vegetation. 	a. Similar measures as in 1e; Stockpiles to be covered and used immediately; avoid huge storage so as to minimise run off into creeks and rivers	EMG 6
3. Drainage Works	<ul style="list-style-type: none"> • Scouring of valley slopes resulting in landslide; Damage to and removal of trees, vegetation and 	Measures to be that of ensuring less spoil to be in the way of drains, properly constructed and allows for water to	EMG 2

	topsoil; Disruption to natural drainage systems; Surface water pollution and increased sedimentation	flow and flushed out sediments. Similar measures as in 1 b.	
4. Bitumen Works a. Asphalt Plants and Preparation Area b. Bitumen overlay	<ul style="list-style-type: none"> • Release of bitumen into the environment and runoff of bitumen into surface water causing water pollution; deforestation resulting from the use of fuel wood to heat bitumen; air pollution, smell • Improper use of bitumen drums e.g. as drinking water storage containers. Adverse health impacts of solvents and chemicals 	<p>a. Proper siting of plant away from settlement or village, use asphalt only on fine days; bitumen drums in bunded area; clean-up of areas after activity.</p> <p>b. Similar to a: Ensure proper preparation for gravel layout and application for bitumen</p> <p>c. Educate the users of old bitumen drums about the dangers of using these as drinking water storage drums.</p>	EMG 11 EMG 11
5. Erosion Protection	<ul style="list-style-type: none"> • Unplanned settlements and hamlets along road corridor; uncontrolled exploitation of natural resources in the new project areas; increased traffic speeds along the road with likely accidents 	<ul style="list-style-type: none"> • Ensure all roadwork are contained and spoil carted to designated area, not close to creeks or wetlands; issues discussed with authorities on illegal hamlets and settlements. 	EMG13
5. Campsite Management a. Equipment Mobilisation b. Labour Force Mobilisation c. Labour camps d. Base (Construction) camps e. Material transport f. Increased Traffic and Operating Speeds g. Explosives, Combustibles and Toxic Material	<p>a. Vibrations, noise and dust generation, traffic and safety problems and damage to roadside vegetation.</p> <p>b – d) External labour force with different attitudes; introduced STD and HIV; Deforestation, use of fuelwood; competition for scarce natural resources; pollution of surface and ground water from unsanitary waste disposal practices; illegal hunting and fishing by camp residences.</p> <p>e. Vibrations, noise and dust generation, traffic and safety problems and damage to roadside vegetation.</p> <p>f. Increased traffic speeds along the road with likely accidents</p> <p>g. Fire and explosive hazard; ground and surface water pollution from pollution runoff; infiltration from spills and/or leaks; improperly discarded oils and lubricants</p>	<p>a. Similar to 1e; Equipment (including aggregates, spoils, fill materials) to be well contained on transport so as not to be an hazard to people and the environment</p> <p>b. Maximise local labour, provide appropriate training and familiarization for outsiders; rules and regulations enforced.</p> <p>c. Similar to b: Camps away from villages; not impact on local drinking water; good waste management practices</p> <p>d. Good waste management practices; buildings properly constructed with well contained storage areas; removal of waste at the end of activity and clear up area.</p> <p>e. Similar to 1 a: Material could mean aggregates or chemicals or other equipments, that must be well contained so as not to impact on the environment.</p> <p>f. Measures outlined in 1e;2a;5a and 5e. Road improvement will mean reduced driving times and appropriate signs and speed humps to be in place during construction phase.</p> <p>g. Management of storing hazardous materials in marked areas to avoid possible impacts within the camp and to humans; Provision of proper sanitation facilities.</p>	EMG 6 EMG 16 EMG 16 EMG 17 EMG 13 EMG 6 EMG 20

Figure 4: Organizational Structure for RMRP II AF - DOW



II Monitoring Indicators

A very important aspect of environmental management is environmental monitoring. Monitoring has two aspects. The first and simplest is compliance monitoring, which basically ensures that mitigation measures are properly implemented, while the second is impact monitoring. In this EMP, there will be only compliance monitoring.

This is part of the supervisory activities discussed above and is generally the one that most monitoring programs focus on. Detailed monitoring recommendations are included in Annex 1 of the EMP, including suggested parameters and indicators. It is envisaged that the RMRP II AF will feature compliance monitoring and upon the completion of work activities, there will be minimal monitoring required in comparison with other projects such as mining, which require constant compliance monitoring.

III Institutional Capacity Strengthening Programme

i. Introduction

Building up capacity within an institution allows for the ability for the institution to be better equipped to implement its core goals and functions. Training is an essential component of any project or program

activity. It allows persons to gain knowledge so that he is aware of the tasks that his position requires of him to be able to fully execute them. This section provides the rationale for building up capacity within the Environmental Management Unit and its associated costs.

Within the Road Maintenance and Rehabilitation Project II Additional Financing (RMRP II AF AF), the capacity building including training targets the officers within the Environmental Management Unit (EMU), the project engineers and small to medium contractors, who will consist of work supervisors, foremen and their project engineers. Within the EMU, there is a need to build up its capacity so that they have appropriate database and resource systems that would enable them to perform their roles as stated in the Environmental and Social Management Framework (ESMF).

The RMRP II AF will cover ten provinces and besides the project engineers, these has been the initiative to invite environmental officers from the respective provincial administration to attend. This would allow for a clearer consultation and information sharing for both the Government of Papua New Guinea (GoPNG) and the World Bank.

The ESMF stated training needs for the EMU and the other stakeholders and this training plan provides the details to implement the training needs. Project engineers together with the environmental officers, while they would have studied within their fields to gain qualifications will still need additional environmental and social and gender awareness training.

This is because of changes in the legislative and procedures in the Department of Environmental and Conservation (DEC) over the last thirteen years. In addition, social and gender issues are part and parcel of development donors that would like to ensure that their projects represent fairly across all people in the community, whether they are resource owners, leaders or ordinary citizens. Hence it is imperative that information on this be made available to the personal involved with the RMRP II AF.

Similarly, small and medium contractors must be aware of the environmental requirements for a road project as being aware of the mitigation measures will ensure that they will be more focussed on the management of their projects. It is also worth noting the increasing events of the El Niño and La Niño events and Papua New Guinea is a land mass that is also impacted by these events and floods and water on roads badly affect road surfaces and drainages. Social and gender issues are inherent in Papua New Guinea and for the road projects, the community often has expectations and without an appreciation of these will mean little attention made to that.

In section ii, this training plan sets out the rationale and target recipients for the training, followed by the areas of training and the likely areas of coverage for the three day workshops in section iii. Finally,

section iv then outlines the indicative costs for the training including the need for the production of a training manual for the participants.

i. Current Status and Training Rationale

The Environmental Manager Unit (EMU) in DOW has a staff of three consisting of an Environmental Manager and two environmental officers. This number of staff in the EMU at present does provide some environmental management of projects within DOW. There is for the effective coordination of the environmental requirement of the RMRP II AF and also with the ADB and AusAID funded road projects in the country.

In addition, the Liquefied Natural Gas (LNG) project in the country has warranted for the upgrading and maintenance of the road network especially the segments of the Highlands Highway, where the EMU will need to also oversee this as this comes under its jurisdiction, even though the Department of Environment and Conservation (DEC) has the primary role of ensuring environmental impacts are maintained in PNG. There is however the need to develop the EMU further so that it can effectively provide input into these project and sub projects. Hence the requirement for providing field equipment to the EMU and training of its officers.

Besides the listing of equipment to be procured for the EMU, there is also a need for the building up of database and software which will make their jobs more effective, hence this will serve as an information hub for contractors and other stakeholders in the road projects. The list of database and estimated prices for software are stated in Annex 3.

Target Recipients of the Training

Training recipients for the RMRP II AF environmental training involves officers of the EMU, project engineers and others as stated in i and Table 1 provides a tally and the categories where the officers will come from.

Table 1: Recipients for RMRP II AF Training

Category	Tally	Total
EMU staff	3	3
Project Engineers and Work Supervisors	2 + 2 X 10 provinces	40
Provincial Civil Engineer	1 X 10 provinces	10
Provincial Environmental Officers	1 X 10 provinces	10
Contractors Public Relations Officer	1 x 10 provinces	10
Contractors Project Engineers	1 x 10 provinces	10
Grand Total		83

At this stage, the numbers of participants are based on the ten provinces that the RMRP II AF will be implemented in and should there be a need for an expanding to the other provinces will need the contribution from the Asian Development Bank and AusAID as they are involved in the other twelve provinces.

Previous road infrastructure programs such as the Bridge Replacement and Upgrading Project (BRUP), National Roads and Bridges Maintenance Project (NRBMP) have shown attendance at provinces to vary and some do have up to fifteen and above participants. Hence this is again a decision for the World Bank and Government of PNG through DOW to decide.

iii Areas of Training

Training would be in the awareness of the environmental impact assessment (EIA) process in Papua New Guinea and the World Bank Environmental Safeguards and Policies, environmental management plan (EMP) and how to prepare one and social and gender awareness.

EIA Process

Environmental legislation and procedures in PNG has changed in the amalgamation of three legislation into the Environmental Act 2000. This meant that particular aspects of the legislation are were streamlined into the single Act. Besides this, the permits process has steps that must be adhered to and therefore the training will highlight these changes and steps of completing applications to the Department of Environment and Conservation. While the focus is on the roads and infrastructures, the legislation material covers other issues that would be useful to the participants in their daily lives.

In 2013, the Department of Environment and Conservation is in the process of becoming the Conservation and Environment Protection Authority (CEPA). This will involve changes to the sections of the Environmental Act 2000 and its regulations. The process of approval may change and this information is essential for environmental managers and contractors within the RMRP II AF.

EMP

Environmental Management Plans are required by each contractor to prepare along road works and all road projects under World Bank or other donor funding requires EMPs to be produced as meeting the requirements of the contract agreement. It is therefore useful for the contractor to be aware of the requirements and by knowing this would also make him or her adhere to the contract obligations. The training will involve getting participants to develop an EMP for the project they are working on and this would greatly give them additional skills which could be applied in other road projects.

Social and Gender Awareness

Social and gender issues in Papua New Guinea are evolving from a strictly traditional society where women are often given less attention. This situation is slowly changing but still a lot of workers are not given this awareness to be able to make an educated and wise decision when it comes to road or other projects that occur in or adjacent to communities. Some provinces are leading in recognising the imbalance and provide gender equity; however others are still way off. Hence, it is imperative that social and gender awareness is given to the recipients as with this information, it would ensure that the vulnerable and less fortunate persons will be better addressed in the society.

Likely Contents of Workshop Material

From the three preceding sections the possible contents for the courses are stated in Table 2.0

Table 2: Contents for the Training Workshop

Areas	Topic
EIA – Introductory Phase I	EIA legislation Potential and levels of impact Devolution of functions and activities to the provinces

	Environmental Regulatory Framework EIA & SIA
EMP – Intermediate Phase II	EMP requirement Sections of EMP addressing roads and bridges Information sources EMP Guidelines from the Road and Bridges Guidelines
SIA/SIS – Intermediate to Advanced – Phase III	Sustainable Human Development or People Centres Development Inter-relatedness of factors and problems Inappropriate interventions and technologies Community participation Responsive to local needs Impacts on Gender and family roles Gender and Development Impacts – social change and development Preparing ARP LARF Procedure

At this stage, this tentative workshop program and contents will be further developed with the EMU to review the previous projects and the interventions to streamline the workshop materials. Tentative costing for the production of a workshop materials are in section iv.

iv. Training Costs

Table 3 sets out estimates for the three phases of workshops to target the recipients of the course. The three phases have the number of days set out for each of these phases and costing include having an introductory workshop here in Port Moresby for EIA and overall project outlook followed by having individual workshops in the provinces.

The reason why workshops are held in provinces is the practicality of delivering the factors and issues to the project engineers on site in their province. There is also the opportunity for other DOW staff to attend and gain new knowledge. Previous provincial workshops have seen the attendance of a number of other staff who was appreciative of the awareness that they have been given at these workshop.

It is also an opportunity where project engineers are able to related issues arising from the RMRP II AF and hence follow through with the workshop notes in resolving these issues. Another reason would be the costs of having project engineers fly into Port Moresby for all the sessions and that would be at enormous costs to DOW and the World Bank. Hence, for the introductory session would be useful for the entire project engineers to attend and have the EMU or the facilitator go onto the provinces.

The estimates in Table 3.0 replace the previous figures in the ESMF where costs have increased because of the increase in the number of provinces and the potential areas of the courses in the three phases that needs to be delivered to the recipients. There will be an introductory session followed by phase two and three following from the main areas as stated in section 3.0.

It is hoped that the same persons attending the introductory courses are able to attend to all three workshops to get a firm grounding of the issues and themes associated with environmental and social and gender aspects of the road projects with application to RMRP II AF. While this is the case, there could be a turnover of other participants who may not be available and hence a substitute attends. In that case, a comprehensive handout is needed so that the person is able to read and follow through with the earlier phases where he was present. Hence Table 4 contains the production of the handout or training manual for workshop participants.

In Table 3, the costs of hosting the workshop firstly in Port Moresby allows for 20 project engineers from the provinces to attend the introductory session. After that, all costs cover facilitators and EMU staff to travel out to the nine provinces¹¹

Other costs are for the purchase of software such as PNG Resource Information System Database, Forestry Inventory Mapping Software, Geo Books and other software that would make the EMU to have resource database and merge with the Roads Network database of the county and have this information available to assist project engineers and small and medium contractors in the provinces as per the objectives of RMRP II AF.

Table 3: Training Cost Estimates for RMRP II AF

Type	Duration	Schedule
EIA Introductory workshop	3 days	2014
SIA/SIS workshop	3 days	Annually 2014 – 2017
EMP workshop	3 days	2014

Facilitator fees, travel and associated expenses

Facilitator**	Rate (US\$)	Total (US\$) ¹²
EIA Introductory workshop & reporting	500 x 3 days + 500 x 1 day	1,500.00 500.00
EMP/SIA workshops	500 x 3 days x 2 x 10 provinces	27,000.00
Airfares (9 sessions to be out of Port Moresby)	Estimate of 10,000	10,000.00
Accommodation (for participants)	In Port Moresby 20 x 100 X 4 day	8,000.00
Out of Port Moresby (9 provinces) (for facilitators)	9 x 150 X 72 days***	97,200.00
Per Diems for participants	In Port Moresby 20 @ 70 X 4 days	5,600.00
Lunch and morning tea for three day workshop	Estimate of 2000	2000.00
Per diems for facilitators	Outside of Port Moresby 9 @ 70 X 72 days	40,320.00
Other training and material requirements for the EMU****		10,000.00
	TOTAL	US\$ 210,160.00 *****

** Two consultants will be required here, one for the environment and the other for social & gender aspects

*** Two days need to be allowed for travelling to and from provinces plus the six days for the training.

**** The EMU in conjunction with the environmental objectives will decide what areas they need further training to effectively carry out their duties.

***** This total is based on assuming consultants can facilitate at the maximum of US\$500.00 per day.

Table 4: Costs for the Production of Workshop Manual

Production of manual for the RMRP II AF	Estimated Costs US \$
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¹¹ Central and Gulf can be covered by road so there will not be a need to fly to Gulf and have a workshop there, hence only nine provinces to have workshops there.

¹² Fees for consultants vary and US\$500 per day is stated here. Per diems are revised to reflect increases

workshop	
Draft manual consist on notes covering all three phases – up to 60 ~ 70 pages	5,000.00
Final draft of manual	5,000.00
Printing of 100 copies of the manual	8,000.00
Total	18,000.00

The specifics of the delivery of the workshop manual is the 1st draft to be ready in two weeks after contract agreed to and submission of final draft by the next two weeks. Printing of manual will take a month allowing for possible job delays.

IV Institutional Assessment and Framework for ESM

i: Institutional Roles and Responsibilities

The main institutions with key responsibilities for environment and social management (ESM) in the RMRP II AF are the Project Management Units in the DOW.

National Level

Overall policy guidance and coordination of the RMRP II AF will continue to be provided through the Project Steering Committee (PSC). The PSC is responsible for overseeing the implementation of the RMRP II and monitoring its performance to ensure that the goals of the program are being achieved. The PSC meets at least six-monthly, and consists of representatives of the commodity boards and other stakeholders in the RMRP II AF.

Provincial Level

Coordination of the RMRP II AF in the province will be through the Provincial Works Manager and the Project Engineer. While the Provincial Works Manager oversees the project and reports to the PSC and PMU at the national level, it will be the Project Engineer that would be responsible for daily management of project implementation.

ii: Institutional Roles and Responsibilities at all levels for Environment and Social Management

Under the PMU is a Project Engineer (PE) who will be assisted by the Environmental Management Unit at the DOW Headquarters for all the components for the ESMF. They will be supported by the Provincial Lands Officer (PLO) and Local Level Government officers together with the Contractor Public Relations Officer (CPRO). They will be responsible for the environmental and social management. This will include:

- (i) complying with the relevant national laws regarding the environment and with all social guidelines set by the GoPNG, and all World Bank Safeguards policies;
- (ii) supervising the implementation of RMRP II subproject activities according to and consistent with the provisions of this ESMF;
- (iii) ensuring that these mitigation measures are complied with during construction and post construction (i.e. operations) stages of RMRP II activities, by monitoring these activities and by periodically reporting to the PMU; maintaining an adequate budget to implement the appropriate procedures and practices for their operations; ensuring that relevant mitigation measures are implemented and sustained in their operations; and

- (vi) complying with any directives that may be issued from time to time from the DEC or DOW.

**PART E: CONSULTATION, ESMF DISCLOSURE AND GRIEVANCE
MECHANISM**

I: Public Consultation

Public Consultation with provinces and communities along the RMRP II AF sub projects is essential for the success and clarity of the commitment from both GoPNG and the World Bank. It is also to ensure that there is public scrutiny of the process of ensuring that these sub projects are delivered on time in improving travel time and road conditions for the commuters. Documentation will need to be made publicly available so that all stakeholders are able to view them.

Copies of the summary of the EMP report in English and Pidgin will be made available to DOW Provincial Civil Engineers and the environmental manager for comments. Copies will be also made available of the LARF in English and Pidgin and the Abbreviated Resettlement Plan (ARP), if applicable, in English and Pidgin.

Sufficient copies will be made available so that a copy can be supplied to the relevant Provincial and Local Level Government (LLG) authorities. Consultations will take place with local stakeholders to inform them of the project and get their inputs and concerns during preparatory work leading to the award of the project and during the sub projects. Stakeholders will be able to access this document in English at the LLG offices and a one-page project brochure in English and the local language.

On-going consultations will also take place throughout the implementation of the project and as part of resettlement activities, if any. As noted in Part D and Annex 2, contractors will be responsible for preparing consultation records that can be attached to relevant project documents (ARP, monitoring reports, etc).

II: ESMF Disclosure

Copies of the ESMF (this document) must be made available to the Provincial Works Managers in the ten provinces together with copies to the Environmental Management Unit. In addition to that, copies of the Executive Summary of the ESMF will be made available to the Provincial and Local Government authorities

III Grievance Mechanism

The RMRP II AF will not require the acquiring of additional land besides those within the Right Of Way (ROW). However, there is always the possibility of issues that may arise from the implementation of these sub projects. If these issues arise, then a Grievance Mechanism has been set up and is outlined in the Land Acquisition and Resettlement Framework (LARF). As stated earlier, copies of these will be made available to the stakeholders.

Annex 1: List of Negative project attributes

This negative list has been compiled to exclude certain activities associated with road and bridge rehabilitation works that fulfill one or more of the following criteria: (i) environmentally risky; (ii) may create impacts that require more sophisticated planning and preparation of mitigation measures; (iii) have technical complexities and requirements that would go beyond the capacity normally available in-country; (iv) would trigger additional safeguards policies or change the project's safeguards category; and (v) are not aligned with public interests or do not benefit common goods or public services.

Applying the above criteria to the anticipated context of the road and bridge rehabilitation activities under the RMRP II Additional Financing, the following list of activities has been compiled:

- activities that would damage cultural property, including, but not limited to, any activities that affect archaeological and historical sites, and religious monuments, structures and cemeteries;
- materials for construction such as gravel and sand, sourced from illegal quarries and sites which do not comply with the guidelines of the Government of Papua New Guinea;
- activities which significantly convert or degrade critical natural habitats, including, but not limited to, any activity within legally declared protected areas (critical habitats may be legally protected or proposed for legal protection and those areas, which are known to have high conservation value);
- activities involving the use of fuel wood, including trees and bush;
- activities involving the use of hazardous substances compounds which are toxic, explosive, flammable etc.);
- repair of facilities storing hazardous substances (e.g. fuel depots), except simple clearing of debris or landslide materials on access roads and perimeters;
- any “salvage logging” operations (which might be undertaken as result of storm damage to forests);
- construction of new, or substantial expansion of existing flood protection works, especially when this involves the conversion of floodplains or riverine forests;
- bulk purchase of pesticides, herbicides or other hazardous substances; and

any activity in a sensitive or protected natural habitats as defined by OP 4.04, except the removal of debris and the repair of pre-existing infrastructure, e.g. access roads or park ranger buildings.

Annex 2: Environmental and Social Safeguard Checklist

Name of Road or Bridge Rehabilitation Package:

Name of Sub-project's sponsor:

Name of the District:

Name of the Province and LLG:

I. Subproject Screening:

- a. Has the subproject been screened against the list of ineligible activities (negative list)? If yes, proceed. If no, contact DoW Environmental Management Unit (EMU) and the Employer's Project Manager (EPM) to conduct screening.

II. Site Selection:

- a. When considering the location of a subproject, rate the sensitivity of the proposed site in the following table according to the given criteria. Higher ratings do not necessarily mean that a site is unsuitable. They do indicate a real risk of causing undesirable adverse environmental and social effects, and that more substantial environmental and/or social planning may be required to adequately avoid, mitigate or manage potential effects.

Issues	Site Sensitivity			Rating
	Low	Medium	High	
Natural Habitats	No natural habitats present of any kind	No critical natural habitats; other natural habitats occur	Critical natural habitats present. Within declared protected areas.	
Water quality and water resource availability and use	Water flows exceed any existing demand; low intensity of water use; potential water use conflicts expected to be low; no potential water quality issues.	Medium intensity of water use; multiple water users; water quality issues are important	Intensive water use; multiple water users; potential for conflicts is high; water quality issues are important	
Natural hazards vulnerability, floods, soil stability/erosion	Flat terrain; no potential stability/erosion problems; no known volcanic/seismic/ flood risks	Medium slopes; some erosion potential; medium risks from volcanic/seismic flood/typhoons	Mountainous terrain; steep slopes; unstable soils; high erosion potential; volcanic seismic or flood risks.	

Physical Cultural Property	No known or suspected physical cultural heritage sites	Suspected cultural heritage sites; known heritage sites in broader area of influence	Known heritage sites in subproject area	
Involuntary Resettlement	Low population density; dispersed population; legal tenure is well defined;	Medium population density; mixed ownership and land tenure;	High population density; major towns and villages; low income families and/or illegal ownership of land; communal properties.	

III. Areas for Potential Environmental and Social Impact

			Yes	No
A.		B. Environment - Will the Subproject:		
1	Water	Risk the contamination of drinking water?		
2		Cause poor water drainage and increase the risk of water related diseases such as malaria, dengue and schistosomiasis		
3		Cause a change in the pattern of collecting water for households?		
4	Natural habitats and resources	Harvest or exploit a significant amount of natural resources such as trees, wood for fuel or water?		
5		Be located within or nearby environmentally sensitive areas, protected areas (e.g. intact natural forests, mangroves, wetlands or threatened species?)		
6		Disrupt the food and fuel wood sources of the community?		
7	Soil	Create a risk of increased soil degradation or erosion?		
8		Create a risk of increasing soil salinity?		
9		Will land or soil deposits from the project area be used as construction materials?		
10		Will spoil from the road works impact onto food gardens and other resources used by the community?		
11	Waste	Produce, or increase the production of solid wastes (e.g. water, domestic or construction wastes)?		
12		Result in the production of solid or liquid waste, or		

		result in an increase in waste production, during construction or operation?		
13		Will the waste from the road works impact on the aesthetics of the community and will this potentially seep into the ground?		
14	Water quality	Affect the quantity or quality of surface waters (e.g. rivers, streams, wetlands), or groundwater (e.g. wells)?		
		<i>If the answer to any question from 1-14 is "Yes", please include an Environmental and Social Management Plan (ESMP) with the subproject application</i>		
C.		D. Land Acquisition and access to resources – Will the Subproject:		
15		Require that land (public, private or customary) be acquired (temporarily or permanently) for its development? Construction camp?		
16		Use land that is currently occupied or regularly used for productive purposes (e.g. gardening, farming, pasture, fishing, forests)		
17		Displace individuals, families, businesses? Have any individuals, families, businesses been displaced up to 2 years prior to road or bridge rehabilitation?		
18		Result in the temporary or permanent loss of crops, fruit trees or household infrastructure such as crop storage facilities, outside toilets and kitchens		
19		Result in the involuntary restriction of access by people to legally designated parks and protected areas?		
		<i>If the answer to any of the questions 15 -19 is "Yes", please inform the DoW EMU and EPM and prepare appropriate documents such as a Resettlement Action Plan (RAP) as required under the Land Acquisition and Resettlement Framework (LARF).</i>		
E.		F. Pesticides and Agricultural Chemicals - Will the subproject:		
20		Will the subproject increase agricultural productivity?		
		<i>If the answer to Question 20 is "Yes" please inform the DoW EMU and EPM. Integrated Pest Management techniques should be taught and promoted instead of using chemical pesticides,</i>		

Categorization of Subproject

In general these are the criteria for categorization of the project activities.

Category A The activity is likely to have significant adverse environmental and social impacts that are sensitive diverse, or unprecedented.

- the site sensitivity rating above are mostly high e.g. 4 out of 6,
- potential social and environmental impacts are mostly positive e.g. 12 out of 14
- scope of impacts is large in terms of area.
- impacts are difficult or to mitigate.

Category B The activity has potential adverse environmental impacts on human populations or environmentally important areas--including wetlands, forests, grasslands, and other natural habitats--are less adverse than those of Category A projects. These impacts are site-specific; few if any of them are irreversible; and in most cases mitigation measures can be designed more readily than for Category A projects.

- one or two site sensitivity ratings are medium or high
- three to four potential social environmental impacts are identified in Table III
- most bridge and road construction activities will fall under this category.

Category C The activity is likely to have minimal or no adverse environmental and social impacts. Beyond screening, no further Environmental Social and Impact Assessment (ESIA) action is required for a Category C project.

The proper categorization is left to the judgement of the DoW/ EPM considering the guidelines above. The final objective of the categorization is to ensure that all social and environmental impacts are avoided, minimized or properly mitigated.

Proposed Category	
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CERTIFICATION

We certify that we have thoroughly examined all the potential adverse effects of this subproject. To the best of our knowledge, the subproject plan as described in the application and associated planning reports (e.g. ESMP, Resettlement Plan, if any, will be adequate to avoid or minimize all adverse environmental and social impacts.

Name, department, job title, and contact details for the person who is responsible for filling out this form.

Name:

Department and title:

Name of Provincial Body:

Telephone number:

Fax number:

E-Mail address:

Date:

Signature:

EPM representative
(signature).....

Date:.....

Annex 3: Guidelines for Environmental and Social Management Plan

Environmental and Social Management Plans contents usually are:

- Project Description.
- Description of adverse impacts: The anticipated impacts are identified and summarized.
- Description of Mitigation Measures: Each measure is described with reference to the effects it is intended to deal with. As needed, detailed plans, designs, equipment description, and operating procedures are described.

Refer to Part C and D of this document for a detailed listing of the impacts and the mitigations measures. These are for both the environmental and social impacts. The EMP also provides this information.

- Description of monitoring program: Monitoring provides information on the occurrence of impacts. It helps identify how well mitigation measures are working, and where better mitigation may be needed. The monitoring program should identify what information will be collected, how, where and how often. It should also indicate at what level of effect there will be a need for further mitigation. How environmental impacts are monitored is discussed below.
- Responsibilities: The people, groups, or organizations that will carry out the mitigation and monitoring activities are defined, as well as to whom they report and are responsible. There may be a need to train people to carry out these responsibilities, and to provide them with equipment and supplies.
- Implementation Schedule: The timing, frequency and duration of mitigation measure and monitoring are specified in an implementation schedule, and linked to the overall sub project schedule.
- Cost Estimates and Source of Funds: These are specified for the initial sub project investment and for the mitigation and monitoring activities as a sub project is implemented. Funds to implement the EMP will be part of the RMRP II budget.

Monitoring methods:

Methods for monitoring the implementation of mitigation measures or environmental and social impacts should be as simple as possible, consistent with collecting useful information, so that the sub project implementer/farmer group can apply them. For instance, they could just be regular observations of the sub project activities or sites during construction and then when in use.

Are plant/equipment being maintained and damages repaired, does a water source look muddier/cloudier different than it should, if so, why and where is the potential source of contamination. Most observations of inappropriate behaviour or adverse impacts should lead to common sense solutions. In some case, e.g. high emission of greenhouse gases or loss/death of flora and fauna, there may be need to require investigation by a technically qualified person.

Annex 4: Guidelines for Preparing and Implementing Public Consultation

The purpose of public consultation is to engage stakeholders in the community in the sub project(s) so that they can share ownership and to give them the opportunity to inform the design process. It will also give the community the comfort of knowing early on in the process the mechanism through which affected individuals/households will be treated and how grievances will be addressed. In developing a strategy for public involvement there are a number of key issues that must be considered:

Broadly defined, stakeholders include any individual or group affected by, or that believes it is affected by, the project; and any individual or group that can play a significant role in shaping or affecting the project, either positively or negatively, including the host community. Early consultation helps to manage public expectations concerning the impact of a project and its expected benefits. Subsequent consultations provide opportunities for the sponsor and representatives of people affected by the project to negotiate compensation packages and eligibility requirements, resettlement assistance, and the timing of resettlement activities. Project consultation with people affected by resettlement is mandatory.

Particular attention should be paid to ensure that Vulnerable groups are represented including:-women, whether or not they are head of households (particularly as they may not typically be included in consultations or land title holder)

- disabled persons, whether mentally or physically
- the elderly, usually above 60 years of age
- Widows,
- Children and
- Ensure that community members were not coerced into attending the meeting, that they knew in advance, with sufficient time, of the meeting, that they were given sufficient time to participate in the meeting, and that the meeting participants are representative of the community.
- Community consultations are not a one-time event. Good consultations are an on-going dialogue between the project and the community.
- Define goals clearly.
- Provide clear details on the project in a culturally-appropriate fashion.
- Throughout the consultation processes, explore whether or not there is broad community support for the project. If there is no broad community support the subproject will not be implemented.
- Plan consultation timing and phasing.
- Provide adequate resources and ensure consultations are in an appropriate format for the given community (for instance, take into account literacy rates).

- Be aware of site specific sensitivities.
- Be aware of the historical context.
- Recognize the interest of developers/operators.
- Be prepared to hear different views.
- As much as possible, aim to integrate views into project design. Report back to the community on how views were incorporated, or why they were not incorporated.

In planning for the process of a public involvement program, the following principals must be followed:

Identify all stakeholder groups: Who will be affected directly and indirectly? Who else might have an interest or feel that they are affected?

- Identify the key issues around which public involvement will be required (scoping). These key issues would include:
 - environmental and social issues/ decisions at stake
 - key organizations and interested parties involved
 - any other issues highlighted by the public
- Understand the decision making process
 - identification of parties making the decisions
 - where in the project cycle decisions are made
- Determine the necessary level of involvement. Meaningful public involvement takes place at five levels:
 - conveying information to the public
 - listening to the opinions and preferences of the public
 - involving the public in making decisions
 - incorporating the public's views into project design whenever feasible
 - reporting back to the public on how views were incorporated, or why they were not

The nature and size of the project, combined with both the nature and number of stakeholders and the status of national legislation, will largely define when, where, and at what level public involvement is required for an EA and the environmental management plan.

- Identify key points to be included in the public involvement process

Timely disclosure of information is key and it may be useful to develop systems to ensure that stakeholders receive information on time and in an accessible format. Whilst it is important that consultation take place before major decision points, the aim should be to facilitate consultation throughout the preparation and implementation phases. This implies that consultation will often be necessary as part of the research effort of the EA and in the development of mitigation measures during the analysis phase of the study.

- Select most effective involvement techniques to be used
- Define a communication methodology
- Develop a budget

Annex 5: Institutional Capacity Plan

1.0 Introduction

Beginning in 2001, during the Road Maintenance and Rehabilitation Project (RMRP I), the need for environmental management was imperative. Since then with the Road Maintenance and Rehabilitation Project II, an environmental officer was recruited. In 2010, DOW institutionalise for two addition staff to be recruited and there are now is the formation of the current Environmental Management Unit (EMU). The EMU has now an Environment Manager with two environmental officers. The EMU needs environmental monitoring equipment as well as information, resource information database and computer hardware and software.

In 2011, a listing for the purchase of field and office equipment and training needs for the EMU was submitted. This equipment would ensure that there is an effective environmental management and monitoring of the RMRP II AF. At this stage, no equipment has been purchased besides the office equipment and desk top computers for communication. Hence here is the submission again for this equipment.

To guide the provincial engineers, the Environmental Management Plan (EMP) has been prepared in order to assess the potential impacts, both negative and positive, associated with RMRP II AF. The EMP is discussed in section 6.0. The requirements of the EMP would then be adhered to using the equipment purchased. Besides these, there are the training needs for the new staff and also for the small and medium contractors. The EIA Roads and Bridges Guidelines is being upgraded through an ADB TA and this will be adopted by the DOW EMU and further refined given the proliferation of road projects in PNG.

1.1 Current Status

The EMU is currently staffed by an Environmental Manager with two environmental officers providing environmental management backstop to WB, ADB, AusAID and other road projects in the country. The Liquefied Natural Gas (LNG) project in the country has warranted for the upgrading and maintenance of the road network especially the segments of the Highlands Highway, and the EMU will need to also oversee this as this comes under its jurisdiction, even though the Department of Environment and Conservation (DEC) has the primary role of ensuring environmental impacts are maintained in PNG.

1.1.1 Environmental Management Unit Responsibilities

The EMU now established is responsible for the following;

1. Establishment of a comprehensive database for sectorial, project – specific and regional environmental assessment (including roads, environmental conditions including sensitive areas, protected areas and other relevant information),
2. Undertake sectorial, project – specific and regional environmental assessment of all infrastructure projects falling under the jurisdiction of DOW to identify the need for environmental studies as per World Bank and all other donor requirements and PNG regulations,
3. Co-ordinate with DEC and other agencies with respect to obtaining the appropriate approvals for these projects,
4. Liaise with the project management offices of all donor-funded projects (ADB – HRRIP, TSSP, PNGSDL, LNG – Highlands Highway and IBRD Roads Maintenance and Rehabilitation Project II), in order to ensure that any environmental work being carried out by them is closely co-ordinated with the unit,
5. Organise training seminars and workshops (in close co-ordination with DEC) for environmental management of transport projects,
6. Co-ordinate with DEC on the further discussion and approval of environmental management guidelines for road and bridge projects,
7. Develop of procedures for effective environmental management within the infrastructure (transport) sector. This objective has been addressed in ADB funded TA 7566 with the provision of an updated EIA Guidelines for Roads and Bridges. In addition, this will involve close co-ordination with DOW at the provincial level as well as the Provincial Administration and could include the further development of contractual clauses related to environmental matters,
8. Liaison with project contractors and Provincial Lands Office on an on-going consultations process, preparation of Abbreviated Resettlement Plans (ARP) when necessary, submission of ARPs to the World Bank, approval of ARPs and ensuring compensation payments are promptly made prior to the commencement of works.

2.0 Equipment Specification

Equipment requirements for the Environmental Management Unit fall into two categories namely computer support and field equipment. The computer support will address responsibilities 1 and 2 and to certain extent 3 in section 1.1.1.

The computer setup will be at DOW Headquarters and consist of a hardware requirement of a desktop computer, a digital camera, a dual colour and black and white printer and a scanner. Operating System would be Windows 7 with Microsoft Office 2010 or later together with the (Papua New Guinea Resource Information System (PNGRIS) database, Geo Book and also others such as Mapping

Agriculture System (MASP), and other Provincial and Local Level Government databases. Office space and an air condition unit is necessary for computer maintenance and staff comfort.

Field equipment will consist of portable instrumentation to measure parameters that are of significance to the project. It is envisaged that four pieces of equipment is necessary and there is no need for a full lab to determine the other measurements. Such measurements can be determined at commercial laboratories such as the National Analytical Laboratory (NAL) in Lae or the National Agriculture Research Institute (NARI) Laboratory in Port Moresby or even at the DOW Training Centre Laboratory. In addition to these instruments, a portable laptop is necessary for report compilation whilst out in the field and other items such as waders, boots and tape measures. Full specifications are given in Table 3.

3.0 Office and Laboratory

Current offices housing the Environmental Manager are not adequate for additional staff in the Environmental Management Unit and a rearrangement of some of the offices may ensure the security of the computers and other software and hardware would be guaranteed. If that is not so then minor maintenance and installation of an air condition unit will need to be installed.

Details of laboratory facilities such as soil testing and weighing balances would be supplied by DOW and EPM (Employer's Project Manager), and the DOW Training Centre may have these facilities.

4.0 Monitoring

Monitoring in the RMRP II AF has been covered in section 6.3 and will consist of field inspection to determine baseline. Once baseline data are established then, compliance monitoring can take place. Mitigation measures put in place would be checked to ensure that these are working satisfactorily and hence reducing impacts to background levels.

Impact monitoring will need to be developed however given the scale of works in the RMRP II AF, it is not envisaged to be a big problem and would only be an exercise that is not necessary. Training needs for the monitoring activities would then need to be conducted for the engineers

Table3: Equipment Specification for the Environment Management Unit

Equipment	Specification	Purpose and Remarks
Desktop computer	Dell brand, OptiPlex™ 7010 DT Base1TB Hard Disk, 4 GB RAM 1600MHz 3rd Generation Core i3/i5/i7 CPUs with internal modem for internet access	To store PNGRIS and other database such as MASP, and Provincial and Local Level Government data. To use parameter in PNGRIS to screen sub projects so as to provide feedback to DOW and other stakeholders
Laptop computer	Dell or Toshiba 500GB Hard Disk 8GB RAM 2.5GHz Intel R Core TM i5- 3210M CPU with WIFI built in for internet access IBM Compatible software	For report compilation whilst out on the field for feedback to provincial DOW, DEC and other stakeholders. It would involve a complete set of PNGRIS and other database as the desktop computer.
Complete Office 2010 or later Suite	Dual colour and black and white printer	To ensure that the officer is fully aware of the potential and limitations of software as an application tool in report production
Laser Jet Printer	0.5KVA or equivalent	To print out reports and also other documentation for the project
UPS (Uninterrupted Power Supply)	240V and higher surge protector	To ensure that is uninterrupted power supply
Power Surge Protectors	7.5 Mega Pixel, 2 GB Picture Card	To guard UPS and computer against The frequent power surges that are experienced in this country
Digital camera	A4 with text options	To ensure that images of projects are captured quickly for the compilation of environmental reports
Scanner (Dual colour and black and white)	12,000 – 20000BTU output	To scan in documents that cannot be captured on camera
Split or RAC condition unit		To ensure that office machines are kept in good conditions and also for officer's comfort
Water Quality Meter & consumables (calibration kits)	Instrument that can measure pH, temperature, dissolved oxygen, electrolytic conductivity, turbidity and, salinity insitu	Portable and robust instrument with a digital readout that does not need daily calibrations. Must have powerful sensor with state of the art functions
Dust Meter	Instrument to measure and determine dust	Portable and robust instrument with a digital readout that does not need daily calibrations. This will be used for pre, during and post construction determinations.
Global Positioning Systems (2)	Instrument to determine exact location	Portable and robust instrument with a digital readout. Information can be down loaded from the instrument onto computers
Integrated Sound Level Meter	Instantaneous sound measurement to cover 100dB dynamic range	Required to determine noise levels and duration of activity to ensure that these are well within range of acceptance to the community at large
26" TV screen and a Video Cassette Recorder	To screen videos for training purposes	This equipment will prove useful for the training at both the headquarters and provinces
Multimedia projector	Compact unit to take out to provinces when conducting training workshops	This equipment will prove useful for the training that will be done by the environmental officer in the provinces

Miscellaneous field equipments	Field boots 3 pairs), Waders (3 pairs) and 100 metres tape measure (3)	These equipment will assist the environmental officer completes his task
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5.0 Training Requirements

The newly recruited environmental officers must be well versed with the environmental management requirements for the EMU and also to have a wider understanding and comprehension of resource database (PNGRIS¹³) and inventories that are available. This will greatly assist the assessment of the environmental management plans submitted by contractors to the DOW for assessment. The other trainings will be on carrying out a field visit with instruments and using checklists on roads and bridges where applicable.

The Training Plan here and in Part D (Institutional Capacity Strengthening Programme outlines the training needs and the approximate costs. Total estimated course for the training of personnel under the RMRP II AF stands at **US\$ 210,160.00** and the training manual is estimated at **US\$18,000.00**.

Besides them is the need for the provincial engineers and small to medium contractors under the RMRP II AF to have an appreciation of environmental management and the synergies that occur between the two areas and specialties.

It is also envisaged that social and gender awareness components be slotted into the training programme as the RMRP II AF is targeted towards the delivery of improved road services to the people. The first point of contact on the sub projects for engineers, work crews and contractors will be the people and inter personnel skills need to be developed further.

5.1 Completed Task

One of the tasks that the EMU required was the review of the EIA Roads and Bridges Guidelines that was issued in 1999. This has been completed through ADB TA 7566 and these guidelines are now available at DOW EMU.

6.0 Equipment Costs

Preliminary costing based on the approximate value of equipment is presented in Table 8. GST has not been calculated in and, it is hoped this would equate to real prices. These are given as those required by the EMU.

¹³ Papua New Guinea Resources Information System

Table 4: Equipment Costs for the Environment Management Unit

Item	Quantity	Cost (USD)	Total Costs (USD ¹⁴)
Desktop computer	3	2000	6000
Complete Office 2010 Suite	31	500	500
PNGRIS software and other databases	3		
	3	10,500	10,500
Laptop computer		2000	6000
Laser Printer	3	1000	1000
UPS (Uninterrupted Power Supply)	3		
	3	100	300
Power Surge Protectors	3	00	300
Digital camera		500	1,500
A4 Scanner (Dual colour and black and white)		200	600
Water Checker Meter & consumables (calibration kits etc)	3	6000	18,000
Integrated Sound Level Meter	1	800	800
Air-condition unit	2	2000	4000
Dust meter	1	800	800
Global Positioning System	3	800	2400
26" TV screen and video recorder	1 set	2500	2500
Multimedia projector	2	2000	4000
Miscellaneous field items, e.g. work boots		1000	1000
Renovation work if any		1000	1000
		TOTAL	48,150
		Incidentals (10%)	4815
		TOTAL	US\$ 114,165.00

The two new environmental officers in DOW together with the Environment Manager will be liaising with the EPM and Provincial Employment Project Manager to oversee the environmental requirements for the eight provinces. Additional equipment (if required) would then be purchased to address the specific environmental needs of the RMRP II AF.

7.0 Procurement

The procurement of the field and office support equipment must be carried out as soon as the loan agreement is signed so that the officers can be trained in the use of these equipment and databases.

8.0 Conclusion

The grand total as calculated for the equipment set up and the associated training and review are as follows:

- | | |
|------------------------------------|------------|
| ▪ Training Needs & Training Manual | 210,160.00 |
| ▪ Equipment Needs | 114,165.00 |

GRAND TOTAL

US\$324,325.00

¹⁴ Price estimated for August 2013 also includes shipping costs for equipment outside of PNG

Annex 6: Socio – Economic Environment of the ten RMRP II AF provinces

The RMRP II will cover Central, Gulf, East and West New Britain, Oro, Morobe, Madang, Milne Bay, Manus and Western provinces. Hence, brief descriptions of the socio – economic environment are given for each of the RMRP II provinces, taken from Hanson et al 2001.

Central Province occupies 29 900 km² along the south coast of the PNG mainland. The rugged Owen Stanley Range forms the border with Oro Province. In the northwest are the Guari, Tapini, Woitape and Longai areas at the headwaters of the Kunimaipa, Angabanga, Vanapa and Mambare rivers.

In the southeast are the Efogi, Dorobisoro, Mari and Keria areas at the headwaters of the Brown, Kemp-Welch, Ulamanu and Kutu rivers. Coastal hills, plains and swamps cover the lowlands of the province. Average annual rainfall varies from 1200 mm north of Bereina, to 3000 mm in the Owen Stanley Range, but most of the province receives less than 2000 mm per year with a long dry season.

Altitude varies from sea level to over 4000 m on Mt Victoria in the Owen Stanley Range. Port Moresby has a powerful influence on the economy and the movement of people in this province. Good roads allow people to commute for long distances to work in Port Moresby from coastal villages. The four districts in Central are Abau, Goilala, Kairuku-Hiri and Rigo. The city of Port Moresby and the nearby surrounds are part of the National Capital District (NCD) and are not described here.

The estimated rural population of Central in the year 2000 is 167 000, which is four per cent of the national rural population. The provincial rural population growth rate is two per cent per annum. The highest population density is on the plains west of Bereina with 225 persons/km². Elsewhere densities range from 120 – less than 7 persons/km².

Areas around Port Moresby, Bereina and Kwikila have significant in-migration of people, while the Tapini, Sogeri and Efogi areas have significant outmigration. People in the Bereina area have very high incomes derived from the sale of betel nut and fresh food, while people in parts of the Sogeri Plateau and Cape Rodney land settlement schemes earn high incomes from the sale of fresh food and rubber.

People in the mid Angabanga Valley, southwest of Tapini, earn moderate incomes from the sale of betel nut, coffee, fresh food and rubber, while those within a 40 km radius of Port Moresby markets earn moderate incomes from the sale of fresh food. People in most other areas of the province have very low to low incomes derived from minor sales of coffee and fresh food in the mountains, and betel nut, coconut, fish and fresh food in the coastal areas. There are many sources of non-agricultural income around Port Moresby including wage employment and small business activities such as the running of PMVs and trade stores.

Gulf occupies roughly 13 500 km² on the south coast of the mainland of PNG. It consists of the estuaries of six major rivers converge into one large delta of islands, swamps and channels. The west of the province is dominated by the limestone country of the Great Papuan Plateau and the valleys of the Turama and Kikori rivers. The Purari River divides the limestone plateau country in the west from the mountains of the Albert and Staniforth ranges in the east.

Towards the border with Central Province are the large plains and swamps of the Tauri and Lakekamu rivers. Inland, the valleys of the Mbwei, Ivori, Lohiki, Tauri and Werr rivers are densely settled, particularly in the Kaintiba area. Average annual rainfall varies from 1300 mm on the south coast near Kerema, to over 5000 mm in the upper Kikori Valley. Most of the areas west of Ihu receive over 4000 mm of rain per year. There are long dry seasons on the coast east of Kerema. Altitude varies from sea level to over 2700 m on the Morton Peaks north of Kaintiba. There are only two districts, Kerema and Kikori.

The estimated rural population of Gulf in the year 2000 is 64 000, which is two per cent of the national rural population. The provincial rural population growth rate is 0.6 per cent per annum. The highest population density of 36 persons/km². All other areas have low densities of less than 10 persons/km². Areas around Kaintiba, Ihu, Baimuru and much of the Purari, Kikori and Turama valleys have significant out-migration, particularly to Central Province.

Gulf is one of the poorer provinces in PNG. People on the coast between Iokea and the Central Province border have high incomes derived from the sale of betel nut and fresh food, mainly in the Port Moresby markets. People around Kikori, Baimuru, Ihu, Kerema and the Lakekamu Valley earn low to moderate incomes from the sale of fresh food, betel nut and fish. All other people in the province have very low incomes derived from minor sales of fish, fresh food or coffee in the Kaintiba area. Other than small business activities and wage employment around Kerema, there are few non-agricultural sources of income in the province. Forestry operations in various locations provide limited wage employment and royalties for villagers, as does the Kutubu to Kikori oil pipeline.

The **East New Britain** includes roughly 15,100km² of the island of New Britain. Altitude ranges from sea level to over 2000m at Mt Ulawun, Mt Bamus and Mt Berurumea. The Gazelle Peninsula is in the north of the province and encompasses the Baining Mountain, valleys of Kerevat and Warongoi, and numerous smaller rivers and nature coastal plains. In the north east of the Gazelle Peninsula are fertile hills and plains that surround the Rabaul volcanoes.

The islands of Wartom and Duke of York make up the larger of the islands to the northwest and east of Rabaul respectively. In the south, the Nakanai Mountains of extensive limestone plateau dominates here, with narrow coastal plains and the active volcanic peaks of Mt Ulawun and Mt. Bamus. With the province built upon successive layers of ash, agriculture is extensive and small holder cocoa farmers thrive. Agriculture is practiced up to 1200m on the Mamusi Plateau in the Baining Mountains. The average annual rainfall varies from 2000mm near Kokopo to over 5000mm on the south coast.

The northeast of the Gazelle Peninsula, including the Duke of York Islands, is one of the wealthiest areas in PNG. People earn high to very high incomes from the sale of cocoa, betel nut, fresh food, copra and fish. There are low incomes in the west Baining Mountains derived from the sale of fresh food. People in all other areas in the province earn very low incomes from minor sales of cocoa, copra and fresh food. There are many sources of non-agricultural income in the northeast of the Gazelle Peninsula. People run small businesses such as PMVs, trade stores and cocoa fermentaries; and gain wage employment from businesses and plantations. A limited number of people in the Baining Mountains, in the inland Pomio area and in other coastal areas receive wages and royalties from forestry operations.

West New Britain occupies 20 800 km² of New Britain Island in the northeast of PNG (Annex 1). The northeast coast, from Talasea to Sule, is dominated by plains and floodplains with fertile volcanic soils. This area has been densely settled since the early 1970s through formal settlement schemes based on oil palm production. Inland of the coastal plains are the volcanic peaks of Mt Ulawun, Mt Bamus and Mt Galloseulo. The Willaumez Peninsula has fertile valleys and many volcanic peaks, of which a number are still active. West of Talasea are extensive coastal plains and a number of prominent mountains.

The interior of the province is dominated by the Nakanai Mountains and the Whiteman Range with coastal plains and valleys along the south coast. The Bali Witu Island group is 160 km northwest of Kimbe in the Bismarck Sea, while Lolobau Island is eight km off the coast from Sule. Altitude varies from sea level to over 2000 m on Mt Ulawun and Mt Bamus. Average annual rainfall varies from 3500 mm at Cape Gloucester, to over 5000 mm on the south coast. Most occupied areas of the province receive over 4000 mm of rain per year. The two districts in West New Britain are Kandrian-Gloucester and Talasea.

The estimated rural population of West New Britain in the year 2000 is 99 000, which is 2.5 per cent of the national rural population. The provincial rural population growth rate is high at 3.3 per cent per annum. The highest population densities are on the Bali Witu Islands where there are 220 persons/km²

and the Arawe Islands which have 200 persons/km². The northeast coastal plains, from Kimbe to Biella, have 130 persons/km², while the Talasea area has a density of 50 persons/km². Elsewhere average density is 30 persons/km² to 5 persons/km².

People on the northeast coast have high to very high incomes derived from oil palm production and supplemented by income from the sale of fresh food, cocoa, betel nut and copra. People in the Bali Witu Islands earn high incomes from the sale of copra, cocoa, fish, fresh food and betel nut. All other people in the province have very low incomes derived from minor sales of fresh food, copra, cocoa, fish or tobacco. There are many sources of non-agricultural income on the northeast coast around Talasea, Kimbe and Hoskins such as small businesses i.e. PMVs and trade stores, and wage employment opportunities provided by businesses and plantations.

Manus comprises approximately 2000 km² of islands in the far north of PNG. It is the smallest province in the country, both in land area and population. Manus Island is the largest island in the province and is dominated by hills and the mountain peaks of Mt Dremse, Mt Tapalow and Mt Chayer.

The coastal areas include limestone plains, swamps and the floodplains of the Luis, Warei, Malai, Uganda, Kauwa, Drangoi and Tingau rivers. There is a causeway between Los Negros and Manus islands that connects the provincial airport at Momote to Lorengau. Rambutyo, Lou and Baluan islands, southeast of Manus Island, have mountainous interiors surrounded by narrow limestone plains.

Most of the remaining islands in the province are small raised coral limestone plains, located close to Manus Island. Four groups of islands, however, are distant from Manus Island and two of these are the Aua-Wuvulu Islands and Ninigo Group. Altitude in the province varies from sea level to over 700 m on Mt Dremse. Most people live near sea level. Average annual rainfall is 3500 mm on most islands. There is only one district in the province, also named Manus.

The estimated rural population of Manus in the year 2000 is 37 000, which is one per cent of the national rural population. The provincial rural population growth rate is high at three per cent per annum and the highest population densities are on the small islands off the north coast of Manus such as Harengan, Arowe, and Mbuke and Tilianu islands where there is an average of 500 persons/km². Other islands have densities from 250 down to the lowest at 7 persons/km².

Most people in the province have moderate to high incomes derived from the sale of copra, betel nut, fresh food, fish and cocoa. People closer to markets in Lorengau tend to have higher incomes. People in the Aua-Wuvulu, Ninigo, Hermit and Kaniet island groups earn low incomes from minor sales of copra. The major source of non-agricultural income in the province is remittances from relatives working in urban centres elsewhere in PNG. People from Manus Province have a long history of gaining advanced education, working elsewhere and sending money home.

Oro Province occupies 43 700 km² on the north coast of the mainland of PNG. The high and rugged Owen Stanley Range forms the southern border with Central Province. Extensive coastal floodplains of the Gira, Mambare and Kumusi rivers cover the northwest of the province from the border with Morobe Province to Oro Bay. The inland mountains of the Otava and Ajule Kajale ranges separate the coastal floodplains from the upper Mambare Valley around Kokoda. The centre of the province is dominated by the volcanic plains and fans that surround Mt Lamington. The volcanic plains and fans have moderate population densities and are used extensively for plantation and smallholder oil palm production. The southeast of the province covers coastal floodplains of the Yupuru, Musa, Wakioka and Rakua rivers and the Nelson Range, including extinct volcanoes and inland valleys. Altitude range from sea level to over 4000 m on Mt Victoria in the Owen Stanley Range. Average annual rainfall varies from 1900 mm near Safia, to 3800 mm near Kokoda. There is a long dry season in the southeast of the province. There are two districts in the province, Ijivitari and Sohe.

The estimated rural population of Oro in the year 2000 is 110 000, which is 2.7 per cent of the national rural population. The average population growth rate is 2.5 per cent per year. The highest population densities of 36 persons/km² are on the volcanic plains and fans, inland of Popondetta, and in the upper

Mambare Valley around Kokoda. Other parts of the provinces has population density of 25 – 10 persons/km². The floodplains and swamps to the northwest and southeast, and the Owen Stanley Range, are largely unoccupied. Areas around Popondetta have significant in-migration.

People inland of Popondetta and in the Kokoda Valley earn high incomes from the sale of oil palm, cocoa, fresh food and minor quantities of betel nut. On the coast around Oro Bay, people earn low to moderate incomes from oil palm. On the Managalas Plateau, low incomes are derived from minor sales of coffee, betel nut and fresh food, while people on the northern floodplains earn low incomes from oil palm, fish, fresh food and betel nut. There are many sources of non-agricultural income around Popondetta including small business activities such as PMVs and trade stores, and wage employment from businesses and plantations.

Western occupies 97 000 km² in the southwest of PNG and is the largest province in the country. The entire western border of the province forms part of the international border with Indonesia, while the Australian border lies within 10 km of the south coast on Boigu and Saibai islands. The north of the province covers the high and rugged mountains and plateaux of the Hindenburg Range and the deep valleys of the upper Strickland, Murray, Wok Feneng and Ok Tedi rivers. Approximately 40 km north of Kiunga and Nomad, the landscape flattens into the floodplains, plains and hills of the Fly, Ok Tedi and Strickland rivers.

The south of the province covers the Fly River delta and its islands. Average annual rainfall varies from 1500 mm on the south coast, to around 8000 mm in the Ok Tedi Valley. There is a long dry season south of Lake Murray. Rainfall increases and seasonality decreases from south to north. Altitude varies from sea level to over 3000 m on the Hindenburg Range, but most of the province is below 150 metres. The three districts in Western Province are Middle Fly, North Fly and South Fly.

The estimated rural population of Western in the year 2000 is 106 000, which is three per cent of the national rural population. The provincial rural population growth rate is 2.2 per cent per annum. The highest population densities are on the south coast plains between the Oriomo and Pahoturi rivers where there are 26 persons/km². Other areas have low population density such as 10 persons/km².

People around Lake Murray and along the Fly River earn moderate incomes from the sale of crocodile skins, fish and fresh food. Those north of Kiunga, around Morehead and along the south coast between the Oriomo and Pahoturi rivers have low incomes derived from the sale of betel nut, fresh food and rubber. Most other people in the province earn very low incomes from minor sales of fresh food, betel nut, animal skins, fish, crocodiles and rubber.

Madang occupies 28 000 km² in the central north of the PNG mainland. The province has a diverse range of environments, from the top of Mt Wilhelm, the highest peak in PNG, to the coast. Areas include the mountains of the Adelbert, Finisterre and Bismarck ranges, the extensive floodplains of the Ramu Valley, the coastal limestone plains from Bogia to Saidor, the dry seasonal hills inland of Bogia and the volcanic offshore islands. Manam, Karkar and Long islands are active volcanoes that present a serious hazard to people living on them.

Altitude ranges from sea level to over 4000 m on the slopes of Mt Wilhelm. The Bismarck Fall has a vertical drop of 4300 m, from the summit of Mt Wilhelm to the Ramu Valley, over a distance of only 45 kilometres. This relief is similar to the Himalaya Mountains.

Average annual rainfall varies from 2000 mm around Bogia, to more than 4000 mm in the Ramu Valley and Bismarck Fall, with a moderate to long dry season in the northwest and southeast of the province. The six districts in the province are Bogia, Madang, Middle Ramu, Rai Coast, Sumkar and Usino-Bundi.

The estimated rural population of Madang in the year 2000 is 251 000, which is six per cent of the national rural population. The provincial population growth rate is 1.6 per cent per year. Population densities are highest on Karkar, Boisa, Manam and Bagabag islands with an average of 110 persons/km². The Gogol Valley and coastal plains around Madang have 68 persons/km². Areas around Bundi, Simbai and Teptep have an average of 34 persons/km², while the rest of the province has low densities of 14 persons/km².

More than half of the province is unoccupied. The Aiome area and coastal plains from Cape Gourdon to Madang have significant in-migration. The Simbai area and the upper Ramu Valley around Bundi, Brahman and Walium have significant out-migration.

Madang is connected to Lae, Goroka and Mt Hagen by the Ramu and Highlands highways. The road from Madang to Lae is mostly sealed. A sealed road runs north along the coast from Madang town to Bogia and the Ramu River. A road of lesser quality extends inland from Bogia to Josephstaal. A good quality road runs from the Ramu Highway at Bogadjim to Saidor along the Rai Coast, but the numerous rivers are not bridged and are dangerous to cross during the wet season.

There is a bridge over the Ramu River at Brahman, linking Bundi to Madang. People travel from the islands to the mainland by sea and air. Boat travel is common between the islands and along the coast. People on the coastal plains around Madang require less than one hour's travel to reach Madang town, while people in the coastal hills and in the Gogol Valley require less than four hours' travel. People in all other areas require between 4 – 8 hours' travel to reach the nearest service centre, except those west of Simbai who are very remote and require more than one day's travel.